Seventeenth Biennial Report

OF THE

State Engineer

TO THE

Governor of Colorado

For the Years 1913-1914

PART ONE

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LETTER OF TRANSMITTAL.

Sir: I have the honor to transmit herewith the Seventeenth Biennial Report of the Office of the State Engineer, covering the period December 1st, 1912, to November 30th, 1914, inclusive.

Very respectfully,

JOHN E. FIELD,
State Engineer.

To His Excellency,
ELIAS M. AMMONS,
Governor of Colorado.

LIST OF OFFICIALS IN CHARGE OF WATER DISTRIBUTION.

STATE ENGINEERS OF COLORADO

Since Organization of Department, June 3, 1881.

Eugene K. Stimson	June 1881 to April 1883
Edwin S. Nettleton	April 1883 to April 1887
J. Sire Greene	April 1887 to April 1889
James P. Maxwell	April 1889 to April 1893
Charles B. Cramer	April 1893 to April 1895
Horace A. Sumner	April 1895 to April 1897
John E. Field	April 1897 to April 1899
Addison J. McCune	April 1899 to April 1903
Louis G. Carpenter	April 1903 to April 1905
Thomas W. Jaycox	April 1905 to April 1909
Charles W. Comstock	April 1909 to April 1913
John E. Field	April 1913 to April 1915

LIST OF OFFICERS AND EMPLOYEES

State Engineering Department.

John E. Field	State Engineer
Arthur F. Hewitt	Deputy State Engineer
Emmet C. McAnelly	Deputy State Engineer
Ralph I. Meeker	Deputy State Engineer
Thomas Grieve, Jr	Chief Hydrographer
Harry D. Amsley	Hydrographer
Delos L. Bundy	Hydrographer
Milne E. Bunger	Hydrographer
Charles L. Chatfield	Hydrographer
Clarence O. Crisman	Hydrographer
Charles C. Hezmalhalch	Hydrographer
George P. Woodhall	Hydrographer
Oscar L. Nelson	Draftsman
Ellie H. Rhodes	File Clerk
May A. Bradford	Stenographer and Clerk
Anna O. Finch	Stenographer
Louise D. Smith	Stenographer

IRRIGATION DIVISION ENGINEERS

Div. No. 1	Fillmore Cogswell	Denver
Div. No. 2	Edward R. Chew	Pueblo
Div. No. 3	Frederick W. Swanson	Alamosa
Div. No. 4	Heman C. Getty	Montrose
Div. No. 5	Theodore Rosenberg	Glenwood Springs

WATER COMMISSIONERS

Div. No.	Dist. No.	Name	Address
1	1	J. K. Samples	Brush
1	2	James P. Higgins	Brighton
1	3	John L. Armstrong	Fort Collins
1	4	Howard H. Kelly	Loveland
1	5	N. C. Sullivan	Longmont
1	6	James M. Platte	Boulder
1	7	Wm. M. Elliott	Golden
1	8	Louis Bertolett	Littleton
1	9	J. R. Cruse	Morrison
2	10	F. D. Eubank	Fountain
2	11	Max Dickman	Poncha Springs
2	12	D. S. Jones	Florence
2	13	H. W. Hendershot	Silver Cliff
2	14	H. R. Thompson	Pueblo (Box 148)
2	15	S. T. Curtis	Bulah
2	16	Parson S. Brown	Walsenburg
2	17	G. M. Weybright	Rocky Ford
2	18	Fred Willis	Agusta
2	19	A. C. Windham	Trinidad
3	20	F. C. Spencer	Monte Vista
3	21	Jos. C. Pursley	La Jara
3	22	Wm. Christiansen	Manassa
1-2	23	W. A. Craig	Jefferson
3	24	Gaspar Gallegos	San Luis
3	25	John L. Charles	Crestone
3	26	Alexander Russell	Saguache
3	27	Arthur N. Coolbroth	La Garita
4	28	J. Roy Hicks, Jr	Sargents
4	29	F. A. Byrne	Pagosa Springs
4	30	Wm. E. Tyner	Durango
4	31	No commissioner	
4	32	No commissioner	
4	33	O. J. Legitt	Kline
4	34	H. M. Barber	Mancos
3	35	I. N. Janney	Alamosa
5	36	No commissioner	
5	37	Wm. A. Schliff	Gypsum
5	38	August Naefe	Basalt
5	39	K. E. Shuster	Rifle
4	40	C. H. Luellen	Eckert
4	41	A. J. Baxter	Montrose
4	42	Geo. M. Saunders	Mesa
5	43	Jas. Mikkelson	Sulphur
5	44	Arthur Collom	Axial
5	45	S. B. Potter	Rifle
1	46	J. P. Vaughn	Coalmont
1	47	Clarence Boston	Walden

Div. No.	Dist. No.	Name	Address
1	48	R. E. Moan	Gleneyre
2	49	No commissioner	
5	50	No commissioner	
5	51	J. N. Ostrander	Granby
5	52	Clarence Rundell	Sheephorn
5	53	Jos. H. Macfarlane	Yampa
5	54	E. W. Leggett	Baggs, Wyo.
5	55	No commissioner	
5	56	No commissioner	
5	57	No commissioner	
5	58	F. D. Hutchinson	Yampa
4	59	No commissioner	
4	60	H. C. Browning	Norwood
4	61	Lorenzo Walter	Paradox
4	62	W. O. Brower	Cimarron
4	63	No commissioner	
4	64	John O. Shay	Sterling
1	65	Dwight L. Bower	Wray
2	66	No commissioner	
2	67	Harry A. Pettee	Holly
4	68	J. W. Martin	Ridgway
4	69	No commissioner	
5	70	Geo. F. Newton	De Beque

FOREWORD

STATE IRRIGATION SITUATION

The irrigation situation in the State of Colorado at the present time, to the casual observer, and to those who have gotten out of touch with conditions in the last two years, is little known. As compared with the activity of five or ten years ago, it is very quiet indeed, and on that account the casual observer concludes that irrigation development has ceased, and some, especially among the financial interests of the State, consider it as discredited. To those more closely in touch with the situation, it is almost incomprehensible that the gentlemen who are supposed to have their fingers on the pulses of every branch of business in the State should have any such idea. Briefly, the situation is

First. That speculation has been practically eliminated both in the development of projects and in the purchase of lands.

Second. In the elimination of the speculator and the investor who never really intended to move upon the land himself, a very considerable amount of land has been thrown upon the market, so that today one may obtain choice tracts for very reasonable figures—in my opinion, much less than their intrinsic value.

Third. Those irrigation enterprises which had not been financed and had not reached the construction stage, one might say have been discarded for the present, perhaps wisely so, because in almost every period when there was a large development in irrigation, construction has been several years ahead of the necessities, with the result that they were not profitable to the originators.

Fourth. On those projects which were under construction or which had been financed, the efforts of the builders have been directed to putting the enterprise on a paying basis, ensuring revenue and payment of interest and maintenance. Many of the projects have been changed and only certain portions finished, the idea being to finish in units and settle each unit before another was undertaken.

Fifth. On some projects having considerable merit, although not financed, reorganization has been attempted by making the development a mutual enterprise, eliminating the profit of the promoters and builders, and the cost, whatever it may be, to be distributed on the acreage basis equally, the owners of the land in control electing their own officers and directing their own work on new organization, paying the old organization the value of

the work actually accomplished, this of course including investigations and surveys. During the past two years the efforts on old irrigation projects have been directed to increasing the efficiency and where the actual experience has demonstrated that during dry years and dry periods the water supply has been insufficient in obtaining better water supplies.

The San Luis Valley is illustrative of this last condition. The Mosca Irrigation District, using water from the San Luis Ditch and irrigating land in the vicinity of Mosca, has completed a reservoir on Beaver Creek, a tributary of the South Fork of the Rio Grande. Under ordinary conditions this district has an ample supply of water, but to perfect the supply this reservoir was constructed. The Rio Grande Canal, controlled by the Travellers' Insurance Company, has also constructed a reservoir —Santa Maria Lake—and has put the same in operation during 1914. This canal has been in successful operation and the lands under it have grown successful crops for more than twenty years, but with the more intensive cultivation, the higher price of products, the desirability of greater insurance in dry years justified the construction of this reservoir for supplemental supply. The Farmers' Union Canal irrigating lands in the San Luis Valley irrigation district, in the vicinity of the town of Center, had a very good water supply, but constructed the Rio Grande Reservoir near the headwaters of the Rio Grande River, for the purpose of affording a supplemental supply to the land. This reservoir is of such a character that it also gives a supplemental supply to the canal.

One might say that we have passed beyond the promotion period or the period of initiating new enterprises, and that now we are in the period of completion and perfection. A great deal of work is going on all over the State along these lines, and while work is on a small scale in each case, in the aggregate it is very considerable, necessary and desirable.

The period is also marked by another condition which is that there are not enough settlers on the land as yet and the percentage of land irrigated under the new settlers is hardly sufficient to pay the interest charges and maintenance. During the past year those in control of the various enterprises have realized this condition and are making extra effort to get settlement of a permanent character. The speculative element is discouraged and the non-resident holder is not considered desirable. The State, through its Land Board is cooperating along these lines and the sale of state lands in the irrigation districts is generally only under condition that the purchaser enter the district and bear his portion of the interest and maintenance, and the Land Board has tried to place the land at such a figure that it would meet with ready sale and so would begin to contribute its legitimate proportion to the maintenance of the district. The districts, on the other hand, have generally agreed to not require the purchasers to pay back assessments. This was necessary because, in some cases, the back assessments had accumulated to such an extent as to overshadow the value of the land. It is believed that this arrangement will be mutually beneficial and satisfactory and will lead to the more rapid settlement and cultivation of the state lands. The State Land Board has also reviewed the conditions on all of the Carey Act projects, and has cancelled those segregations and contracts where the same appear to be unwise under present conditions. One Carey Act project only has been completed, and this one, the Two Buttes, promises to be a very considerable success, as far as the State and the settler are concerned. In this case the holders of the bonds have cancelled the interest charges of several years and have made the payments much easier than the original contract called for. The result is that some 7000 acres have been put in cultivation and during the past year there was actually in successful crops about 3500 acres.

The season of 1913 was successful. The crops were perhaps somewhat above the average. The season of 1914 was one of the best that the State has ever enjoyed, due largely to the perfection of the irrigation systems and, in part to the fact that the year 1914 was a year of abundant water supply. The year 1915 promises to be fully as successful as 1914. At this writing nearly all of the reservoirs of the State are filled and there is a very considerable amount of water in all of the streams. So that even should 1915 prove to be a very dry season and should there be little snow in the mountains, there will be an adequate water supply in nearly all sections of the State. The outlook at present, however, is that the supply will at least be normal for 1915. The thing most needed at present is more real farmers, and I believe that these will come because, as I have stated, the prices now asked for land and water are, in my opinion, lower than their actual intrinsic value. The prices have gone as low as they will go, and there is a good prospect of a considerable advance in value in the next few years, and as soon as the European War is over and the present depression is ended. It is my belief that it is necessary to offer the settler a bonus for undertaking the development of new land, and it appears to me to be certain that at present prices, with the certainty of advance in a short time, the man who invests at this time, who goes on the land himself and improves it, will find that he not only has developed a proposition which will ensure him a reasonable, but that the certain increase in the value of his holdings, sometimes called "unearned increment", is a sufficient bonus to induce him to pioneer. During the next two years, I look to see a greater acreage of new land successfully put under cultivation than ever before in our history.

COLORADO'S ATTITUDE ON INTERSTATE QUESTIONS AND HOME RULE

Colorado believes in Home Rule and local self government.

Professor Farnham of the College of Law of Yale University says in his great work on "Water Rights": "The establishment and enforcement of laws upon the waters within the limits of the State are absolutely necessary, it being established that the title to the waters and the lands covered by them is in the State. They form a part of its domains and its laws are binding thereon."

Colorado believes in the economy of use and in the greatest good to the greatest number and that these are elements in the consideration of interstate rights.

Colorado believes that each state has certain sovereign and inalienable rights. When natural resources are essential to a state's development, the state has a right to the use of such resources as are within its boundaries in much the same way that independent governments have in furthering their development.

Colorado, as one of the sisterhood of states, believes that an equitable division of the rights between the states, with a due regard to the necessities of each, should control in determining interstate relations.

She believes in the interest of economy in the use of water and that in the proper conservation of this natural resource the use of water high up on the streams is necessary.

Colorado believes and history shows that a diversion of water from one water shed to another is a necessity in the proper utilization of the water supply. In all countries where irrigation has been practiced, we find transmountain and transcontinental diversions as old as written history.

Colorado believes that, although ditches may have been built in other states earlier than in Colorado, where these ditches were abandoned or ceased to be used for any considerable period, the dates of priority of such ditches should be fixed at the time of their reconstruction and actual use and not of date of their inception.

Colorado believes in the utilization of the natural resources at this time and not in their being held for a similar utilization by future generations. She does not believe in retarding development merely because in the past some frauds may have been practiced upon the government or that some of the natural resources have been wasted, or that development should be hindered for the fear that these may at some future time pass into the hands of monopolistic owners.

Colorado has been accused of "assuming to be bigger than the whole United States," and of being "bigger than the government." No such assumption, thought or feeling exists in the State of Colorado. The people do believe, however, that the State has the same rights as every other state in the Union, and that the laws, as made by Congress, are superior to departmental rulings, and that every person, corporation or state believing itself to be injured by departmental rulings and decisions should have the opportunity to take the matter into court for final judicial determination.

Colorado believes that the public lands and natural resources belong to all of the people of the United States but not to the government as a sovereign owner, but that they should belong to the government as a trustee for the whole people, which trusteeship will continue until the individuals signify their desire, under proper regulation, to take over the public lands and natural resources and utilize them. We believe that the public lands and natural resources belong only to such people as are willing to put them to beneficial use and do not belong to such people as elect to remain in the East and are not willing to come West and claim their inheritance and aid in the building up of the West and the utilization of the opportunities offered them.

The West believes that the United States government should in no sense become a landlord, nor the people using the public lands and natural resources become a tenant. The people of the West believe in conservation—in a sane and practical conservation. I quote herewith the resolutions adopted at the Conference of Governors in Denver in the Spring of 1914.

WHAT THE WEST WANTS

Resolutions Adopted Unanimously By the Third Annual

CONFERENCE OF WESTERN GOVERNORS

Held in Denver, Colo., April 9, 10, 11, 1914.

We, the members of the Western Governors' Conference, in convention assembled at Denver, Colorado, April 7, 8, 9, 10 and 11, 1914, do hereby adopt the following resolutions:

CONSERVATION

We believe in conservation—in sane conservation. We believe that the all wise Creator placed the vast resources of this nation here for the use and benefit of all the people—generations past, present and future, and while we believe due consideration and protection should be given to the rights of those who come hereafter, we insist that the people of this day and age should be given every reasonable opportunity to develop our wonderful resources and put them to a beneficial use.

STATE CONTROL

That it is the duty of each and every state to adopt such laws as will make for true conservation of our resources, prevent monopoly and render the greatest good to the greatest number;

and that as rapidly as the states prepare themselves to carry out such a policy of conservation the federal government should withdraw its supervision and turn the work over to the states.

SETTLEMENT OF OUR LANDS

Believing that those who control the soil control the nation, and that the most blessed nations are those where the ownership of lands is in many hands, we insist that in the management and sale of our public lands both the federal government and the state should maintain such a policy as will make for the rapid settlement of all vacant agricultural lands.

DESERT LAND ACT

Resolved, That this convention recommend to Congress amendments of the following nature to the Desert Land Act.

(1) That the entryman's proof of citizenship in the state wherein he makes a desert land filing be changed from the time of filing to the time of proving up.

(2) That the requirements of reclamation be enlarged to embrace the alternative proof of cultivation by the actual growing of crops by dry-farm methods on double the acreage required if by irrigation.

HOMESTEAD ENTRY

We approve the plan now before Congress to permit homestead entries by persons over 18 years of age.

WATER POWER

Whereas, Congress has declared "the water of all lakes, rivers, and other sources of water supply, upon the public lands and not navigable shall remain and be held free for the appropriation and use of the public for irrigation, mining and manufacturing purposes" we insist the federal government has no lawful authority to exercise control over the water of a state through ownership of public lands.

We maintain the waters of a state belong to the people of the state, and that the state should be left free to develop water power possibilities and should receive fully the revenues and other benefits derived from such development.

PRECIOUS METALS

We reiterate our expression contained in Article 10 of the 1913 resolutions referring to the reopening of mineral land, and in addition would urge that the revenues derived from the sale of such lands should be used for the reclamation of the arid lands of the West.

GRAZING LANDS

We believe grazing lands should be so disposed of through an "enlarged homestead" act giving the settler sufficient ground to enable him on a live stock basis to support a family.

SUMMER HOMESTEAD LAW

We favor the passage of a summer homestead law, permitting land not valuable for timber, minerals or agriculture, but suitable for summer homes, to be acquired in not to exceed 40-acre tracts for summer homes. The entryman should not be required to be a resident of the state in which the land is situated, and suitable improvements of the value of $300 in three years' summer residence should be necessary to secure patent.

GOOD ROADS

We reiterate that five per centum of the public lands in the several states should be granted to the said states to aid in construction of permanent roads.

DELAYS—RED TAPE

We believe one of the greatest blessings the officials at Washington could bestow upon the West would be the elimination of all red tape and the taking of prompt action upon all matters pending before the departments and in which the Western states are interested, and we are pleased to note that efforts are already being made in that direction.

INTERIOR DEPARTMENT

We are pleased at the thoughtfulness of the Secretary of the Interior in sending so many of his representatives to the Irrigation Conference now in sesson in this city. We express our appreciation of his intention to adopt a more liberal policy toward the settlement and development of the West, and assure him of our hearty cooperation in this direction.

DONATION OF LANDS

We recommend that 10 per centum of all vacant and unappropriated public lands in each of the arid states be donated to such states and each of them as shall so request, said lands to be sold by said states as other state lands are disposed of, and the proceeds of such sales to form a reservoir fund to be used under the direction of the state for irrigation reclamation purposes.

RECLAMATION PROJECTS

We urgently recommend that the United States reclamation projects now under process of construction be completed at the earliest practicable moment and turned over to the settlers thereunder as soon as can be.

CAREY ACT PROJECTS

We urgently recommend that the United States Reclamation Service immediately investigate any and all Carey land, irrigation district or like projects commenced or under construction in the arid states, and render such projects all financial and other assistance possible, to the end that they may be immediately

completed and the settlers thereunder protected and assisted, and the persons holding bonds issued against said projects be compensated as far as practicable.

We urge the press of the Western states to investigate and actively support these principles.

RESOLUTIONS REAFFIRMED

We reaffirm the action taken by the Governors' Conference in Salt Lake City, Utah, in 1913, as follows:

"We, the Governors of public land states, in conference assembled believing that upon the adminstration of the laws governing the disposal of the public lands in a very large measure depends the future prosperity of our states, do hereby agree to the following statement of what we believe should be the policy of the national government in the administration of the public lands.

"1. That, the newer states having been admitted in express terms on an equal footing in all respects whatever with the original states, no realization of that condition can be attained until the state jurisdiction shall extend to all their territory, the taxing power to all their lands, and their political power and influence be thereby secured.

"2. That, as rapidly as the states become prepared to take over the work of conservation, the federal government withdraw its bureau from the field and turn the work over to the states.

"3. That permanent withdrawal of any lands within our states from entry and sale we believe to be contrary to the spirit and letter of the ordinance of 1787, the policy of which was followed for over a century, and we urge that such lands be returned to entry and opened to sale as speedily as possible.

"4. Dilatory action on the part of executive departments of the government in passing title to purchasers of public lands is unfair to the states, as it permits purchasers to occupy the lands indefinitely, without the states having power to tax them.

"5. We believe that the best development of these states depends upon the disposal of the public lands to citizens as rapidly as the laws can be complied with.

"6. Bona-fide homestead entry within the forest reserve boundaries should be permitted in the same manner as on unreserved lands, subject only to protest where lands selected are heavily timbered with trees of commercial value, or known to contain valuable mineral deposits.

"7. That the government grant to the public land states five per cent of the public land remaining in such, to be administered by the states as the school lands are now administered, for the purpose of building national public highways.

"8. That liberal land grants be made for the purpose of establishing and maintaining forestry schools in the public-land states.

"9. That rights of way for all lawful purposes be granted without unwarranted hindrance or delay.

"10. That all mineral lands now withheld from entry, or classified at prohibitive prices, be reopened to entry at nominal prices, under strict provisions against monopolization.

"11. That we express our appreciation of the splendid work done by the departments at Washington in cooperation with the several states in experimentation and instruction. This assistance has been most valuable in the education of our children and the development of our states, and we commend the same principle to the administration at Washington as being the most feasible plan for the present advancement of true conservation.

"12. We believe that the national government should provide for expert experimental work in the solution of the mining problems of the mineral states, in the same manner that the Agricultural Department assists the farmers in solving the agricultural problems.

"13. We believe that the speedy settlement of those public lands constitutes the true and best interests of the republic. The wealth and strength of the country are its land-owning population.

"14. The best and most economical development of this Western territory was accomplished under those methods in vogue when the states of the Middle West were occupied and settled. In our opinion, these methods have never been improved upon, and we advocate a return to those first principles of vested ownership with joint interest and with widely scattered individual responsibilty."

STATE VS. NATIONAL CONTROL

In 1913 this office made an investigation of the cost of reclamation projects as compared with private projects and also the cost of operation under government supervision and under private supervision, and those investigations showed that the statements made in the last report of the Census Bureau were substantially correct. The reason for making this investigation was that the Reclamation Service had caused to be published a statement to the effect that the Reclamation Projects were cheaper than those built under private enterprises. The portion of the article relating to Colorado was so obviously incorrect and even where correct was so unjust that it seemed necessary to refute the statements. To state that a thing is correct but unjust seems strange, but the selection of the private enterprises in giving the cost of construction embraced many of very small acreage and consequently high cost, and a large number were those which required expensive pumping plants, so that the averaging of the cost of these projects did not at all represent the

average of actual cost on any large number of enterprises. The reason for bringing the attention of the public again to the matter herein is that even since attention was called to the errors of omission and commission in the article, its obvious injustice, and in spite of an agreement that this article should not be published any more it had appeared in some journals without the consent or approval of the Reclamation Service, but it seems that when one of these "yellow journal" articles appears anywhere, they, like Banquo's ghost "will not down." There was considerable controversy on the matter and there appeared in the Engineering News a number of articles on both sides of the question. The State Engineer of Colorado felt that none of the articles has in any way refuted his statements, nor had anything that he had stated been shown to be materially in error, so that he neither answered the articles nor acknowledged any error on his part, which he would have been glad to do had the general conclusions arrived at been materially in error, so that his final conclusions still remain good, i. e.

(1) That government enterprises cost from 25 per cent. to 50 per cent. more than private enterprises after making due allowance for interest charges paid on the private enterprises and for the maintenance paid on both the private and government enterprises.

(2) That the maintenance on the government projects is about twice what it is on private projects, and that as a general proposition the ownership of land under private irrigation system is more advantageous to the farmer, even aside from consideration of cost.

From the showing made to date on behalf of the government works, there is nothing to justify a claim of either less expense in construction or more efficiency in management. In fact, the government projects have been so expensive that it has been necessary to go before Congress and ask for an amendment to the Reclamation law extending the time of payment from ten years, as originally contemplated, to twenty years; this necessity being on account of the increased cost as determined by final figures on construction over original estimates. It was recognized that the settlers on the government projects could not meet the charges in the ten year period and that it was necessary either for the government to charge on the basis of original estimates or to extend the time of payment to twenty years.

The criticism which I would offer on the government work is that the government does many things which more properly should be done by the water users, this criticism applying both to original construction and to maintenance and operation. I think there can be no question that the water users themselves can build the small laterals and distribute the water to the individual users much more economically than can the government. This conclusion is confirmed by the fact that any corporate enterprise where the corporation attempts to build all of the small laterals and where it attempts to maintain and operate canals, has always been found to be a losing proposition, and through experience large ditch companies have learned that it is to the advantage of all concerned to have the system turned over to the users at the earliest moment possible. The charges for water at the present time on private enterprises, including irrigation districts, is from $20 to $50, except on those projects where expensive pumping plants have been necessary and the lands irrigated have been largely fruit lands. While on the government projects the costs estimated in the last annual report vary from $36.00 to $110.00, the average being about $60.00 per acre; on private projects the average is not over $35.00. The government works are, generally speaking, more substantial than the private projects, but those private projects which have been built during the last few years are well built and meet the necessities, though it is probable that as time goes on and the people under the projects become more prosperous and can better afford better and more permanent works, they will be built. In the meantime the amount saved on interest by the construction of somewhat temporary works will be such that this interest saving alone will replace the temporary works. On the other hand, many of the government works are unnecessarily expensive and have been built before sufficient data could be gathered on which the designs were based.

Control of interstate streams has been suggested by some of the Government men as a solution of interstate controversies. At this time the relative rights on interstate streams has not been judiciously determined and there is nothing that would direct the decisions and actions of such Government water official except his own private opinion, prejudiced or academic theory of what was proper. A judicial determination of the rights or priorities is necessary before an executive can act with authority and after such determination it is better to leave the matter in the hands of the local officials who are executing the local laws, regulations, decisions and adjudications. It is unwise to create a dual executive control of the streams and to move the control of local matters to Washington and put them in the hands of men probably from humid regions and where knowledge and experience is limited to the perusal of "Authorities" on the subject.

Speaking of authorities, it is strange but nevertheless true that many writers on irrigation in the United States are men who have merely a theoretical knowledge of irrigation. This is especially true of writers on irrigation law and too often the case in writings on engineering and other related subjects. Unfortunately in the past the reliability of the Government publications has not justified the high place accorded them by the general public. The influence for good and evil of the Government publications is so great and the confidence with which they are accepted should cause the heads of departments to be very careful in accepting and in publishing what their subordinates write,

or in accepting reports too often influenced by "the wish being Father to the thought," by inexperience and even at times prejudice.

The general public should recognize also that the Government officials believe thoroughly in bureaucratic control, in centralization of government, and their own unprejudiced view point. It should also recognize that they are not infallible, that they desire autocratic power and to enlarge and extend their control. If any one believes that the people are incapable of local self government, that each man's business should be supervised by some official, that independent thought and actions are undesirable, that initiative is dangerous and the acquiring of experience unprofitable, then such a person will be in favor of Bureau control of all of our enterprises and in a widespread and beneficent paternalism. The proposition of Government control is based on lust of power on the one hand and is encouraged by a lack of confidence in the ability and integrity of one man in another, who is his neighbor. "A prophet is not without honor except in his own country", a piece of goods is not first class unless it is imported, nor an adviser held in much regard unless he too is "imported".

The aggression of the executive departments is merely a manifestation of what the framers of our laws and constitution foresaw and attempted to guard against by creating these coordinate branches of government, each of which would act as a check upon the other and prevent centralization of power in any one branch. The weakness of our present legislative branch and the lack of intimate contact of the judicial branch with the country as a whole has permitted the executive departments to destroy the balance of power and to become the dominant branch of the Government to such an extent that it now has the temerity to assume to interfere with the sovereign rights of the states and to assume to direct and control the States' internal affairs.

The controversies which have arisen with the Government are, in the opinion of the writer, unnecessary and should not have arisen. Eliminate the question of increasing federal power and control and substitute a desire for cooperation and a sensible solution of the mooted questions and there remains only to determine whether the use of water in Colorado will or does materially affect users lower on the interstate streams. On the Rio Grande, the Colorado and the North Platte rivers, I believe that with proper economic use there is an ample supply in each of these rivers for the irrigation of all lands susceptible of irrigation at this time, or which it will probably be profitable to irrigate during the present generation. Each of these streams can be controlled by reservoirs; The North Platte by the Pathfinder Reservoir with over a million acre feet capacity; The Rio Grande by the Engle Reservoir and the already constructed and proposed reservoirs on its headwaters, and the Colorado River by the proposed reservoirs at Kremling in Colorado, on the Grande,

by the Browns Park and others on the Green, and by one said to have a five million acre ft. capacity at the junction of the Grand and Green.

The only controversy to my mind is whether users in Colorado are to be allowed to develop their systems now or whether they are to be held up until some future time when this opinion is actually demonstrated to be sound.

The constructors of projects in Colorado are so sure that there is an ample water supply for all, that they are willing to go ahead at this time, construct their works and take the order of priority to which their construction and use will entitle them. The present attitude of the Government shows that it is not willing to take its order of priority as determined by construction and use or that it is determined to curtail private enterprise and to extend unnecessarily its field of operations.

IRRIGATION LEGISLATION.

In all of the previous State Engineers' Biennial Reports suggestions have been made relative to legislation to correct inconsistencies and to eliminate from the statutes laws passed years ago and which have, to all intents and purposes, been repealed by subsequent laws, but which still remain on the statute books and create confusion in the minds of attorneys and others, especially in the minds of those attorneys outside of the State and those who are not familiar with our practices and customs. The Legislatures have shown a disposition to refuse to pass irrigation legislation. This attitude is, in my opinion, the correct one, as only such laws should be passed as are absolutely necessary. No other character of laws should be passed, especially none which would disturb our present laws and customs, most of which have already been passed upon by the State Supreme Court and are therefore permanently settled. The laws of the State of Colorado, supplemented by our Supreme Court decisions, are, in the opinion of the present Engineer (after some years of experience in Wyoming, Nebraska and New Mexico), the most workable and practical in the United States.

The most severe criticism of our laws has been against the right of transfer. Most of these writers have had little experience in the State of Colorado, and from an academic treatment, such as is generally given, their reasons seem to be sound. When one considers the tremendous development in the State of Colorado, as compared with the development in other states, and looks for the cause of the superior development in this State during practically every decade and as revealed by the reports of the Census Bureau, not even the somewhat superior climate and soil of the State accounts for the difference.

The laws of Colorado have grown gradually out of our practices, and the Supreme Court, fortunately, has had, generally, a practical view of the necessities of irrigation, principal among which is the right to the transfer of water, and it is to our laws that I attribute the success of irrigation in this State.

In the State of Colorado there has been very little control exercised by the State on irrigation projects. This condition has its advantages and its disadvantages. The State has been severely criticised for permitting the promotion of so-called "wild-cat" enterprises. Some such enterprises have been promoted, the promoters knowing them to be unsound; some have been promoted where the promoters were in good faith but were inadequately and incompetently advised; some have been promoted which were feasible, but in which there was practically no profit for the promoter, the estimates of cost being much too low, and others have been entirely feasible, but the cost of construction and management and other things have militated against the project, so that all profits were eliminated.

Generally speaking, the building of irrigation works has been in advance of the necessities and this has been true throughout the West and since almost the beginning of the construction of canals. In the late 80's and early 90's many large canals were built which are to-day a great success, the lands under them are well settled, well cultivated and a credit to the State, but the first investors often lost their money or were compelled to go without their interest for many years. A few enterprises have been profitable from the beginning. Most of the projects on which money has been spent, notwithstanding the first investment was unprofitable, have been a benefit to the State. Had the State of Colorado in its third period of development exercised the supervision which is presumed to be exercised in some of the other states, most of the projects constructed between 1880 and 1900 would not have been built.

We find in the Second Biennial Report of the State of Colorado, 1883-4, p. 32, the following:

"In 1876 the greater portion of the residents in the lower part of the Cache la Poudre Valley declared that no more new canals should be built or more water taken from the river. It is a very noticeable fact that new appropriations for canals every year have been made since 1876 from the Cache la Poudre River and yet no greater alarm exists at present as to the scarcity than was felt eight years ago."

In the Third Biennial Report, p. 57, we find the following:

"Nearly the whole of the discharge of the present season was utilized and needed for the cultivation of crops, and as there are large areas of unoccupied lands under several of the existing canals the era of beneficial canal building on this stream is probably past."

In the Fourth Biennial Report, 1887-8, p. 146, we find that the irrigated area in the Valley of the Cache la Poudre was 108,895 acres. The area at present actually irrigated is about 250,000 acres, and the area under canal something over 300,000 acres. From these facts and from the general attitude of the irrigators in reference to the amount of water available, it is probable that if the State had exercised its authority in determining whether or not projects were feasible, many of the canals now in successful operation in the Cache la Poudre Valley would not have been built or would have been delayed in the building for a considerable period and we would not now have the large and profitable development which is noted in the Cache la Poudre Valley. However, lack of State supervision has led to considerable financial losses and has caused irrigation projects to be discredited both in the State and abroad. It appears that the State should take some active interest in the irrigation and development and assume some control over projects, but it also appears that it is unwise for the State to assume to determine the feasibility of projects and to prohibit investment. It is the opinion of the present Engineer that all parties constructing canals or other irrigation works should be required to file with the State Engineer a complete report covering the project. This report should state the area to be irrigated, the character of the soil, the data relative to rainfall and climate, markets, transportation facilities, allied industries, crop production and water supply. The statement as to water supply should be as complete as the data available will permit. It should give the flow of the stream from which the water is to be taken, the number and capacity of all ditches taking water therefrom, the area irrigated under each of such ditches, the duty of water, the amount of water which has actually been used and an estimate of the amount available for the new project.

The State Engineer should examine this report as to its accuracy and completeness and should be permitted to require of the projectors that the report be completed and be true as to statement of fact, but the State Engineer should not be permitted to give an opinion as to the feasibility, but merely as to the correctness of the statements of fact made in the report, and it should be left to the investors and the projectors to determine whether under this statement of fact they cared to invest. It does not seem wise to place it in the power of any state official to prevent development. No law could be framed which would protect the unwise and incompetent investor which would not practically prohibit investment. It must be assumed that the investor has enough business ability to look into his investments and if not qualified himself to pass upon these matters that he should employ some one who was competent to advise him.

In this State there is a law permitting the Land Board to invest the school funds in irrigation district bonds to the extent of ten per cent. of the total issue, on those projects which have been completed. A favorable opinion must be secured from the State Engineer and from the Attorney General before such in-

vestment can be made. If the State should invest in these bonds it would in effect be an approval of the project by the State, and the State having once entered upon such investments, all irrigation districts seeking to sell bonds would be asked whether the State had purchased any of their bonds, and if the State had refused to purchase such bonds it would be equal in effect to stating that the project was not first class.

Such bonds would yield 6 per cent. to the school fund and would be as good and sufficient an investment as could be made and at the same time would be of very great benefit to the district in the placing of the balance of their issue.

The present Engineer, as Engineer of the Land Board, has hesitated to assume the responsibility of passing upon irrigation districts, realizing that if the State once began the purchase of irrigation district bonds it would have to continue to purchase at least a small amount of the bonds of each first class district; otherwise it would be very embarrassing to the projectors to have to explain why the State had refused such purchase. But it now seems to him that it is the duty of the State to exercise some supervision and to endorse those projects which are first class and to let the public know that there is a difference in irrigation enterprises—that some are safe and legitimate investments and some are not. He realizes that the responsibility assumed is very considerable and that the Land Board would be subject to all kinds of pressure and influence, but that is no reason for any longer avoiding responsibility and for not attempting to protect the investing public. The result would be that unless the projectors were certain in their own minds that they had a good and feasible project and one which would pass the scrutiny of the Land Board the project would not be attempted, with the result that few of the projects presented to the Land Board would not meet with its approval. On all projects where either land or securities are offered for sale the advertising literature should receive the approval of some state official before the same is sent out.

CHAPTER I

THE STATE ENGINEER'S OFFICE AND ITS WORK

The Nineteenth General Assembly, at both the regular and special sessions, passed no laws imposing upon the State Engineer additional duties, but by the creation of the "Highway Commission" it removed from this office the duty of supervising the expenditure of The Internal Improvement and Income Funds and placed in that commission the control of the construction of roads and bridges.

The duties of this office, therefore, are now more particularly confined to matters pertaining to irrigation and the use and control of the waters of the state.

The duties of the State Engineer were set forth in the previous Biennial Report, and it is not necessary here to repeat them. Additional work, however, fell to the office by reason of the interstate suits, two of which had already been begun, and one of which has been begun during the biennial period. The Nineteenth General Assembly appropriated fifty thousand dollars for the conduct of these suits, and a portion of that money has been expended through this office. By far the larger part of the money, however, expended by this office on these suits, has been from the appropriations of the office itself.

About one-half of the time of the Engineer has been spent on this work, and the most of the time of one deputy and about one-fourth of the time of the hydrographers is directly chargeable to these interstate suits; some of the time of the stenographers and the clerks has also been spent on this work.

In the late summer of 1913, the State Engineer, was appointed as engineer of the State Land Board and a considerable portion of his time and some of that of his assistants, has been devoted to the work of the Land Board.

The actual work on which the time, money and energies of the State Engineer's office can be classified, is as follows:

1. Office and clerical work in connection with the filing of claims to water rights.
2. Control of streams and supervision of distribution therefrom.
3. Examination of reservoir plans and specifications, supervision of dam construction and inspection of existing reservoirs.
4. Hydrographic work including measurement of stream flow and study of the water resources of the state.

5. Examination and report upon existing Carey Act projects for the benefit of the State Land Board.
6. Engineering work for other departments of the State government.
7. Work on the interstate suits.

OFFICE AND CLERICAL WORK

During the period December 1st, 1908 to November 30th, 1910, inclusive, the number of maps filed and claims for water rights was 2,751.

During the period December 1st, 1910 to November 30, 1912, inclusive, there were filed 1,820 maps, covering appropriations of water for 1,658 ditches and 763 reservoirs.

During the period December 1st, 1912 to November 30th, 1914, inclusive, there were filed 1097 maps covering appropriations of water for 1001 ditches and 300 reservoirs.

The number of filings made in the first two years was due to the fact that irrigation development was very active and there was a large influx of population, and as the making of filings was very inexpensive, as practically no fees were charged.

In the second period the decrease was due partly to a general decrease in irrigation development, and in part to the fact that the fees of this office had been very considerably increased by the act of the Eighteenth General Assembly. This increase in the fees had the effect of decreasing decidedly the number of amended maps and statements and particularly in the decrease of the amount of water claimed.

In the last biennial period the continued depression and the apparent fact that the demand for irrigated land had been fairly well supplied in previous years, practically stopped new enterprises being started, the efforts of investors being confined almost entirely to the completion of other projects, to getting them settled and cultivated and in putting them as nearly as possible on a paying basis.

SUPERVISION OF WATER DISTRIBUTION.

Details in this work are given in subsequent chapters, and in the abstracts of reports from the Water Commissioners and Division Engineers.

No material change in the method of administration or in the efficiency has been made during the biennial period.

The law relative to the maintenance of headgates and installation of measuring flumes, the placing of gages and automatic registers in reservoirs, was in part submitted to the people under the "Referendum" at the general election in the fall of 1912, resulting in the elimination of the first paragraph of section 4 as follows:

"The owner or possessor of reservoirs shall not have the right to impound water in such reservoirs during the time that such water is required in senior ditches for immediate use for direct irrigation or for storage in reservoirs holding senior rights."

The elimination of this clause had no effect whatever upon the law and water for reservoirs is now distributed strictly in accordance with the dates of priorities. It is distributed to the ditches if they have a senior appropriation and to the reservoirs if they have a senior appropriation. No irrigation season is now recognized as such but the administrative officers have tried to enforce more stringently than heretofore the law against waste and excessive use.

Extra efforts were also made to have proper headgates and rating flumes installed, especially in those districts where these necessary appliances had not been adequately provided. While a great deal has been accomplished along this line, there still remains a number of districts in the state where it will be necessary to continue the campaign for a strict compliance with the law relative to headgates and rating flumes. Although during the biennial period the amount of water available has been very satisfactory, nevertheless the construction of new reservoirs and ditches and extension of irrigated areas, has made it necessary to perfect as rapidly as possible the method of the distribution of water. The increasing use of the natural water courses, to transfer reservoir water from the reservoir to the canals has necessitated more complete information and more accurate measurements.

This is especially true in the San Luis Valley where a number of new reservoirs have been put in operation and where it has been necessary to conduct a campaign of education and to inform the owners of old ditches of the rights of the later appropriators, and especially of those who have constructed reservoirs, and effort was made during the year 1914 to have proper gages and recording devices installed at the several reservoirs. It is hoped that with the beginning of the irrigation season of 1915 that all of the reservoirs in the valley will have their devices installed and in operation.

RESERVOIR SUPERVISION.

The principal work of this nature during the biennial period has been the supervision of enlarging and repairing reservoir dams. A number of reservoirs have been built and these have been supervised and the plans submitted have received careful attention.

At the beginning of the biennial period, the engineer required that the specifications give a statement of the quantity of material going into the construction and a statement of the expenses; to give a mechanical analysis of the earth to be used in earth dams; to submit the log of test pits and borings; to submit a report of the drainage area above the reservoir and an

estimate of the maximum discharge of the stream where the reservoir was located upon a stream. The removal of earth from the reservoir basin for the purpose of constructing dams, has been almost always prohibited. The placing of the valves in the center of the dam has been preferred and the construction of wood and steel outlet pipes has been discouraged.

In the placing of riprap on the dam a substantial toe at the foot of the riprap has been insisted upon and almost always a base of gravel underneath both loose rock and concrete facings has been required.

It has been necessary to return plans very often on account of both the inner and outer slopes being, in the opinion of the engineer, too steep. More adequate and a larger number of cut-off trenches underneath the dam have been insisted upon. The spillways have been required to be ample and of such a nature that they could not be obstructed.

The placing of stop planks or other impediments in the spillway has been prohibited and the structure made as nearly "fool proof" as possible.

During the biennial period a number of failures have occurred in reservoir dams. These failures have been due almost without exception to inadequate investigation of the foundations of the dam and of the materials composing it.

In some cases, while the plans made ample provision for safety, the execution of the work by the contractors was of such a nature that the resulting structure was dangerous, and the engineer was impressed with the necessity in the future of having his own representative on the ground during the entire term of construction to see that the plans and specifications were complied with and to make necessary changes in the plans and specifications during the progress of the work, as the nature of the materials encountered and other matters required.

Numerous examinations have been made of dams which have been constructed and in some instances they appeared to be dangerous. It has, unfortunately, been almost universally the case that there were no funds available for repairs and reconstruction. This condition has necessitated limiting the amount of water which could be stored in such reservoirs, and orders to withdraw a portion of the water have been issued in a number of instances.

In a number of instances reservoirs have been constructed and after completion plans and specifications have been filed with a request that they be approved. As this office had no means of ascertaining whether the specifications had been complied with and no means of making proper investigation, such requests have been refused.

During the biennial period the funds at the disposal of this office for traveling expenses have been so small it has been impossible to comply with Section 3207 Statutes of Colorado 1908 which provides that the State Engineer shall annually determine the amount of water which it is safe to store in the several reservoirs of the state. The different railroads of the state, prior to 1913 gave transportation to the irrigation officials. When the granting of these passes was discontinued and prohibited, the traveling expenses necessarily greatly increased. To remedy the lack of expense money for the deputies and also the hydrographers, the Auditing Board was requested to furnish this office with two automobiles. An examination of the expense accounts revealed the fact that the office was spending for automobile and team transportation about two hundred dollars per month, and that the service obtained was unsatisfactory as well as expensive.

The hiring of an automobile necessitates the hiring of a driver, also extra hotel and other expenses must be paid. It was the opinion of the Engineer that if the state could own its own automobiles it would eliminate the necessity of employing a driver and the engineers could run their own machines, go when and where their duties required without interference or suggestions from anyone; that if they saw fit to stop all night at any point or to return to headquarters late at night they could do so without interference.

As an experiment the Engineer purchased an automobile on his own account in 1914 and the result has been that the traveling expenses have been cut about 33%. The number of days the automobile was used very much increased and the mileage covered averaged about 100 per day or 2500 miles per month, at a cost of about one hundred twenty-five dollars per month. Based on either a per diem or mileage charge, the cost was only about one-half of what hiring the automobile would have been.

If automobiles could be provided for use, one in northeastern Colorado, one in the Arkansas Valley and one in the San Luis Valley and one in the northwest corner of the state, it is the opinion of the engineer that five hydrographers instead of seven will be sufficient and that the amount of work accomplished will be increased.

With such equipment the law relative to the examination of reservoirs each year can be easily complied with in connection with the hydrographic work. It is believed that the most practical machine for such use would be a light run-about of the Ford type and would involve the investment of about $2500 and at a cost of operation, repairs and renewals of about five cents per mile.

HYDROGRAPHIC DEPARTMENT.

A separate volume has been devoted to the work of the hydrographic department and an examination of that chapter will show the extent and work of that department.

CAREY ACT REPORTS.

In conjunction with the State Board of Land Commissioners this office has examined and reported upon all of the Carey Act segregations and projects in the state.

These examinations and reports have not led to definite results in all instances, but the fund of information at the command of the Land Board is such now that the Land Board is able to lay down a definite policy in reference to each project. Generally speaking, the projects are feasible and attractive, but it has been found that the charges per acre of water permitted on the different projects was generally in excess of what the settlers could afford to pay. The depression in the money market has almost entirely suspended the construction on the projects, and it now seems necessary to reduce the charge per acre and for the state in many instances to cancel the contracts made with the proposers and to take up the development of the projects as a state enterprise eliminating all of the speculative element and the profits which would legitimately go to the proposers should they complete the work.

The present tendency is in the reorganization to take the settlers into a mutual company where the ultimate actual cost only would be charged against the land.

WORK FOR OTHER DEPARTMENTS OF THE STATE GOVERNMENT.

Little engineering work has been done for the other departments of the state other than for the Land Board. This work has consisted of the examination of descriptions in old patents and the writing of proper descriptions for lands which have been sold.

It was found that in the past, generally speaking, the descriptions were inadequate, inaccurate and confusing, and at the request of the state engineer the Land Board now submits to his office all descriptions except those which are by strictly legal subdivisions. He thus examines all deeds where the land is described by metes and bounds for rights of way of all kinds and for those tracts which are located in townships which have been re-surveyed. This latter is a very complicated matter and has led to a great deal of confusion and unless the utmost care is exercised will in the future be the cause of much trouble and doubtless of litigation.

The Engineer during the biennial period has interested himself in state, interstate and national questions affecting irrigation and the disposition of the state and public lands, and it appears to him to be necessary that the state provide sufficient funds so that the state can be adequately represented at the Irrigation and Land Congresses.

These Congresses are often held at a distance where the traveling expenses are such that the Engineer cannot meet them personally. Matters of the greatest importance are often considered at these Congresses and a considerable amount of our difficulties has been due to the fact that in the past, the western states have not been adequately and competently represented. The departments of the government are always adequately represented and have numerous energetic and well informed delegates.

The Congresses are too often made up largely of people either with a fad or theory to expound and promote, or of those who have some ulterior motive and as affecting large interests. Resolutions are adopted by those presumably representative bodies and no protest is raised on questions adversely affecting the welfare of the state.

It is suggested, therefore, that a fund be provided so that the state may be adequately represented through its officials in the next two years. A number of Congresses will be held when it will be desirable to have the Governor, Attorney General, State Engineer or the Register of the State Board of Land Commissioners present to take part in the proceedings and aid in directing and shaping the policies of the National Government and in presenting to the country, as a whole, the needs, rights and policies of the state. A campaign of education is necessary to prevent academic and, often, unwise and impractical policies from being attempted. While such policies will be abandoned as time proves their impracticability, in the interim the West is hampered in its proper development. An active interest in such Congresses by the state officers will broaden their own understanding and tend to eliminate the prejudice against state control of the natural resources.

CHAPTER II

INTERSTATE SUITS AND OTHER CONTROVERSIES.

The importance of the suits in which Colorado may become involved with other states relative to the use of water can scarcely be overestimated, each suit not only affects the stream in controversy, but any decision will necessarily have a great and direct influence upon all the interstate streams which may, in the future, be subject to litigation. The principles enunciated will be the basis probably, of later decisions and should Colorado be so unfortunate as to lose any of the earlier contests, it will detrimentally affect her growth, prosperity and development for all time.

Some of these suits are in themselves of little consequence, and the water and lands directly affected are small and therein lies the danger to the State. It is probably true that the people of the State generally do not appreciate the widespread effect of such suits, and are prone to look lightly upon the possible outcome. Should it become an established principle of law that states into which the waters of Colorado pass, have the right to demand the waters originating in Colorado, that the principle of priority, regardless of state lines, or some other adverse doctrine, should prevail, it will be a serious handicap in the development of the state. The public, while interested in the outcome of the suits and wishing the success of Colorado, are poorly informed of the consequences.

In conversation with presumably well informed citizens of the State, it has been a matter of surprise to me to learn that they were so poorly informed concerning the principles involved, the position which Colorado takes, the arguments in her favor or the terrible injustice which would be visited upon the State should the final decisions be against her. In fact, a great many citizens from reading the publications and comments originating in the other states, and from listening to addresses of visitors on this subject and, I regret to say, from reading Government publications, are inclined to believe that Colorado's contention is not tenable and that it is selfish.

It is with the purpose of correcting this impression, and of putting before the people of the State, the attitude of Colorado in this regard, that there is published in this report, a brief statement concerning the interstate suits.

One should first realize that this is a soverign state with all of the rights and privileges granted to the original thirteen states. In the original thirteen states, and in all of the other

states admitted to the Union since, the natural resources within the boundaries of any state belong to that state, to be used for its development. This principle was never questioned until the so-called policy of conservation was promulgated by the bureaus of the National Government.

One should also keep in mind that the greatest natural resource in the semi-arid region is the water supply, that in the states west of the 102nd meridian, (this is a meridian a few miles east of the eastern boundary of Colorado) irrigation is not only a benefit but a vital necessity. Without it agriculture is practically impossible; without agriculture manufacturing is impossible as a practical proposition. Few of our precious metal mines, even, could be operated at a profit were it not for the fact that food products necessary to the inhabitants of the mining districts and to the livestock used in the mines, is close at hand. In fact, our first agriculture was attempted for the purpose of furnishing food and hay and grain to the mining camps. It is easy to conceive that these mines would never have been developed, even in the early day, if hay and grain, flour and vegetables could not have been grown just outside of the foot hills. It has been properly stated by one of the representatives of the Colorado Fuel and Iron Co. that their mines and their works at Pueblo would be an economic impossibility were it not for the fact that there lies adjacent to the mines and to the mills, a rich agricultural valley.

On the other hand, states lying to the east are not dependent upon irrigation, while in the extreme western portions irrigation is a benefit, agriculture is being and can be carried on by the so-called, dry farming method. East of the 100th meridian it is unprofitable, even at this time, to invest in irrigation works for the purpose of increasing the yield of the farms.

Both Kansas and Nebraska though there was not an acre of irrigated land within their borders, would still be great and prosperous states, and would continue to grow and prosper though not a drop of water should be furnished them by the Colorado streams.

In considering the just apportionment of this great natural resource between the states, one must consider whether it is vital in the case of one state and merely beneficial in the case of the other.

The states to the east, over the greater portion of their area, have rainfall sufficient for their needs, and it is not just to give those states, which have such rainfall, the right to the use of water and to take away from a state which has no rainfall, that which is essential to its very life. While we are in the habit of saying that "To him that hath it shall be given, and to him that hath not, shall be taken away, even that which he hath", it is the belief of the State of Colorado that the United States as a whole, will not sanction such an unequal distribution of the benefits which nature has provided to the different states.

The second matter which one should keep in mind is the "greatest good to the greatest number". If one could imagine the state lines being obliterated, and that the motive in determining the rights to the use of water would be to provide the greatest number of homes and to make possible the greatest production, it would necessitate the use of the water as high up on the streams as the nature of the country permitted.

In the case of Colorado before any ditches were built, it is a matter of common knowledge that as soon as the rivers left the foot hills and passed eastward into what was then known as the Great American Desert, the waters of the rivers were gradually dissipated, until they reached a point outside of the semi-arid region where the inflow from tributary streams exceeded the losses in transit. To pass the water over the sandy river beds for hundreds of miles where the winds and the heat absorbed the moisture, is not the conservation of a great natural resource. To pass water from the foothills in Colorado to the plains of western Nebraska or Kansas would involve a very great loss in transit. The early history of our state shows that the early hunters, trappers, emigrants, settlers, etc. passing up our streams, found it necessary during the summer months, to dig into the sands of the river bed to secure water for themselves and their livestock.

Had no irrigation ever been practiced in Colorado, the flow on the streams passing from Colorado into Kansas and Nebraska would have remained torrential in character, large floods in May and June and a dry river in August and September, making the practice of irrigation in those states, a very risky and unsatisfactory business.

By the use of water high up on the streams, a large part of the losses is eliminated. The productiveness of the soil on the western edge of the great plains, is equal or superior to that of western Kansas and Nebraska, so that the yield accomplished by a given quantity of water as measured at the foothills would be considerably greater if used near the foothills than it would be after the losses in transit had depleted the stream, and a less quantity of water was available. The effect of irrigation high up on the streams has been to almost eliminate the torrential floods, and has been to increase the low flow of the stream so that even in western Kansas and Nebraska the supply, while less in the aggregate for the entire year's flow, is more constant, reliable and satisfactory.

The third matter which one should keep in mind is that the State of Colorado occupies the apex of the western portion of the continent. From its mountain peaks, the rivers flow in every direction. Waters originating in Colorado reach either the Gulf of Mexico or the Gulf of California. To the north the Laramie and the North Platte River flow into the State of Wyoming, to the west the Bear or Yampa, the White, the Grand and the Dolores flow in to the state of Utah, to the south the San Juan and its tributaries and the Rio Grande flow into New Mexico, and to the east the Arkansas flows into Kansas, and the Republican and the South Platte into the State of Nebraska. The aggregate discharge of these streams into the adjoining states, at the present time, after all of the irrigated lands have been supplied with water, amounts to nearly 13,000,000 acre feet per annum, an amount sufficient probably by reason of re-use and return seepage, to irrigate 13,000,000 acres of land, or four times the present irrigated area of the state.

Unfortunately, the topography of Colorado is such that only a small proportion of this water which now flows into other states, can ever be used within the boundaries of Colorado.

There is little irrigable land in Colorado on the North Platte River, there is comparatively little on the western slope where the largest amount of water flows; with the exception of the San Luis Valley there is little irrigable land in the southern part of the state, although there is an abundant water supply. East of the Continental Divide alone does the amount of irrigable land exceed the water supply, and even here after a development of fifty years, there still passes on the average, into the state of Kansas through the Arkansas River over 300,000 acre feet per annum; and on the South Platte River over 300,000 acre feet per annum passes into the State of Nebraska.

The larger part of this water which now enters these two states, cannot profitably be used in the State of Colorado, for the reason that it is largely seepage return water and any ditch constructed to make use of this water would of necessity pass into the states of Kansas and Nebraska to obtain land upon which it might be utilized.

It does not seem unjust, in view of the fact that so small a proportion of the water will be used, that the State of Colorado be permitted to use all of the water in the streams that it can use.

One should also keep in mind the fact that under irrigation the returns now obtained justify the most careful conservation of the water supply, and that on account of the wonderful climate and the benefits derived by reason of that climate, justifies the creation of as many homes as possible in the state. In this regard it appears, therefore, to be for the greatest good of a greatest number of people, that the state become populous and highly developed, where health can be conserved, homes built and wealth created.

It is entirely too narrow a conception of these interstate cases to consider merely priority or right to use the water. The question must be considered as between sovereign states and not between individuals of the states and their individual rights.

The interstate suits relative to the use of water on the interstate streams has formed the most important part of the work of this office for the biennial period. The time of the Engineer, of

one of his deputies and of the hydrographers has been largely devoted to the preparation of suits already begun, and for those which were even remotely probable.

In the case of the possible suits which may arise in the future, this office has endeavored to gather data concerning the stream flow, use of water, areas irrigated, searching out witnesses and in the securing of other miscellaneous information.

In the suits that have already been brought, all available data has been gathered, and the particular case studied in detail. The practices in other states and in other countries have been studied, and it has been the attempt of this office to present as completely as the time at our disposal allowed, as full and detailed information as possible, and to present it in as concise a form as the nature of the subjects permitted.

The suits on trial during the biennial term were three in number:

First—The State of Wyoming, Complainant, vs. the State of Colorado, The Greeley-Poudre Irrigation District and the Laramie-Poudre Reservoir and Irrigation Company, Defendants.

This suit was brought in the Supreme Court of the United States.

Second—The United States Irrigation Company vs. The Graham Ditch Company et al., in the United States District Court.

This is a renewal of the original Colorado-Kansas case, the principle difference being that in the first case it was between the two states and in the present case it is between ditch companies and individuals.

The same questions are involved as in the first suit, though the users in Colorado claim that as to those ditches in operation before the original Colorado-Kansas case was brought, the Supreme Court of the United States decided the question in so far as they were concerned and their status is "res adjudicata".

Third—The Pioneer Irrigation Company vs. Field, et al. This case is brought in the United States District Court to prevent the water officials from distributing the waters of the North Fork of the Republican to canals in Colorado in accordance with the Colorado decrees, and to force the closing of canals in Colorado so that lands in Nebraska may be supplied.

The suits in prospect are:

First—The rights of Colorado to divert waters of the North Platte River which might possibly affect the use of water under the Government North Platte Project in Wyoming and Nebraska.

Second—The right of persons in Colorado to construct reservoirs and canals on the headgates of the Rio Grande in Colorado which might possibly affect the use of water under the Government Rio Grande Project in southern New Mexico and Texas.

Third—The right of Colorado to divert water from the streams tributary to the Colorado River possibly affecting proposed projects on the lower Colorado River in southeastern Arizona in the vicinity of Yuma and in California in the Imperial Valley and in northern Mexico.

This possible case may involve also; the right of Colorado users to divert water across the Continental Divide from the headwaters of the tributaries of the Grand River to the watersheds of the Arkansas and South Platte Rivers.

Wyoming vs. Colorado:

In the Colorado-Wyoming case, Wyoming presented its evidence first. This evidence was to the effect that there was a scarcity of water in the Laramie River, not only for the areas which it was proposed to irrigate, but at times, for areas already irrigated. That there were periods when ditches with decrees older than the Laramie-Poudre diversion, were not supplied.

Their evidence also showed that good crops could be grown on the Laramie Plains and on the Wheatland Project. That these farming enterprises in combination with stock raising, was a valuable industry and produced considerable returns.

Their evidence also tended to show that the diversion of water through the tunnel from the Laramie to the Cache la Poudre River, would so deplete the stream as to jeopardize projects already constructed.

Considerable evidence was submitted relative to the dates of construction of canals and time of use of the water.

Wyoming also contends that the owners of lands in Wyoming have a riparian right, and claim that without water the lands would be valueless.

The evidence submitted by Colorado showed that there were about 500,000 acre feet of water on the average per annum flowing in the Laramie River and its tributaries, and that about half of this amount originated in the State of Colorado.

The evidence also showed that the ultimate possible use of water in Colorado on account of the peculiar topographical features, could not exceed one-third of the waters originating in Colorado. That even with the extension of the proposed Laramie-Poudre project to include the diversion of all of the possible waters of the Laramie River, only about one-third of that which, in its natural condition, crosses the state line could be diverted. A diversion of this one-third of the supply included the diversions of existing canals, the Skyline Canal and Sand Creek diversion; and that of the total supply of the stream Colorado would only be able to use about one-fifth, while there would be available for Wyoming about four-fifths, and that such a proportionate division of the benefits would not be unjust to Wyoming.

Wyoming contends that the diversion of water from one watershed to another is illegal, and that the waters of any drainage area if needed, should be used only in that drainage area.

The evidence on behalf of Colorado showed that there were a great many diversions in the State of Wyoming from one water-

shed to another. Also, that in every country where irrigation was practiced such diversions were made. That in India, water was taken from the Ganges to the Indus and from the Indus to the Ganges. That in Italy water was diverted from one watershed to another; also in France water was diverted from one watershed where there was an ample amount of land to use all of the water, it has been transferred to another watershed for use therein. That the same practice obtained in the Hawaiian Islands and in all of the irrigation states of the United States. That water was taken from the watershed of the Missouri and put into the watershed leading to Hudson Bay. That the Government had diverted water from the Pacific Slope onto lands in Nevada into a basin which had no outlet. That the City of Los Angeles had transferred water from one watershed to another. That the Government had diverted water from the Gunnison River to the Uncompahgre. That it had changed water from one watershed to another on the Sunnyside Project. In short, that there was no law or prohibition in any irrigated country preventing the transfer of water from one watershed to another, that it was merely an economic condition, and where such diversions were made, it was merely a matter of priority of right and whether it was feasible financially to go to the expense of making such diversions.

The evidence in behalf of Colorado also showed that although the Laramie Plains were much older in point of settlement than the lands in the Cache la Poudre Valley, and though the Laramie Plains had earlier railroad facilities and earlier settlements, the development had progressed very slowly, if at all. While in the Valley of the Cache la Poudre there has been a large and constant increase in population, the area irrigated, the value of crops and the assessed valuation.

The evidence also showed that in the Valley of the Cache la Poudre, the crop returns per acre were several times that of the Laramie Plains and much larger than that of Wheatland.

The evidence also showed that in economy of use and in the benefits derived from the use of water, the Cache la Poudre Valley showed that the same quantities of water applied to the land produced much greater return, and that it was not for the greatest good to the general public that water should be used on inferior lands where little other than feed for cattle could be produced, in preference to its use on the highly productive lands of Colorado. That a proper conservation of this natural resource and the making of homes for the greatest number of people required that the water be diverted from the Laramie River to the Cache la Poudre.

The evidence of Colorado also showed that even after the diversion of the maximum possible amount from the Laramie River to the Cache la Poudre there was still an ample supply

for all of the lands in Wyoming which could profitably be put under irrigation. That under the present practice in Wyoming the use was wasteful and uneconomical.

Colorado contended that for Wyoming to ask that water be sent down from Colorado that she be required first to exercise diligence in the conservation and utilization of what water was available from the Wyoming areas. That with proper administration and with the proper reservoiring of the water no scarcity would be felt on the Wyoming lands.

The evidence of Colorado also showed that the date of priority of the diversion of the water was earlier than that of the large projects in Wyoming, and that even should the "priority of use" doctrine prevail, these new projects could not demand the water from Colorado.

The evidence also went to show that on the Laramie Plains the raising of stock to be fattened elsewhere was at the present time, at least, the only profitable branch of farm operation, and that the highest utilization of the lands of the Laramie Plains was for range purposes.

The taking of the evidence in this case was completed about April first 1914 and the case will probably be argued early in 1915 before the Supreme Court of the United States.

The present Colorado-Kansas case has been progressing for some three years. All of the evidence has not yet been taken although the taking of the testimony has been almost continuous during that period.

The Republican River case known as the Pioneer Irrigation Co. vs. Field, et al., is a suit brought by the Pioneer Irrigation Company against the water officials of the state and against the users of water on the Republican River in Colorado. This case came to trial in the United States District Court, the contention of the Pioneer Irrigation Company being that it has a priority of right over some of the canals in Colorado, that it had beneficially used the water as far as possible but were prevented from the use of water under their priority by reason of diversions in Colorado, and that for that reason all of the lands under the line of the canal had not always received water, and that this diversion by the Colorado canals had prevented the proper development of the lands in Nebraska.

The Pioneer Irrigation Company has two decrees, one from Colorado for 15 cubic feet per second, for the irrigation of lands in Colorado and one for 77 feet from the State of Nebraska, for the use of water on the lands in that state.

Nebraska also showed the capacity of the canal near its headgate to be about 70 cubic feet per second and at the state line about 35 cubic feet per second. It showed the irrigated areas in both Colorado and Nebraska, claiming some 2300 acres in the latter state. When Colorado attempted to present its side of the case they were limited to a showing of the capacity of the canal and were not permitted to show the irrigated area, the duty of

water or other matters which it conceived to have a bearing upon the case. The Judge decided that Nebraska should have an amount of water at the state line equal to the capacity of its canal, and arrived at this figure by taking the capacity shown by one of the witnesses for Colorado, and one of the witnesses for Nebraska, and averaging them, arriving at the figure of 29 cubic feet per second, a little over one-third of the amount of the Nebraska decree of 77 feet.

Colorado desired to show that by the use of water high up on the stream a greater benefit is derived and that the return waters would supply all of the needs of the Pioneer Canal. That there was comparatively a small acreage under the Pioneer Canal in Nebraska which had been irrigated until the last few years. That diligence in the application of water had not been sufficient, and that the Pioneer Canal in its lower portion was never completed and that a large portion had been abandoned. That those ditches which were built subsequent to the Pioneer Canal were built because the builders realized that little water had been used or would be needed for the Pioneer Canal, and that there was water in the river for these newer ditches under the conditions existing at the time of construction.

Colorado desired to show that the water of the Republican River if left in its natural condition, increases the inflow to a point near the Town of Wray, and that from this point eastward the losses were very great. But that the inflow reached the State of Nebraska and served the purpose of irrigation of the meadow lands along the stream.

Colorado contended that as a sovereign state, it owned and controlled all of the water within its borders. And it desired to show that the use of water was a necessity in Colorado, while in Nebraska it is merely beneficial.

The suit will probably be carried to the higher courts and those representing Colorado are confident that the final decision will be favorable to the State.

Other prospective suits. It is believed that no development in Colorado will ever detrimentally affect either the state of Wyoming or Nebraska, as far as the use of the water of the North Platte River is concerned and it is believed to be true that with the control of the North Platte River by reason of the already constructed Pathfinder Reservoir, that there is not enough irrigable land along the borders of the North Platte River, in both the State of Wyoming and the State of Nebraska, to utilize all of the water of that stream. The flow of the North Platte River is about two million acre feet per annum, an amount about twice as great as that of the South Platte. On the South Platte and its tributaries about one million acres are irrigated. The supply of the North Platte, therefore, should be sufficient for two million acres.

The irrigable lands below the Pathfinder Reservoir while large in quantity were much less than two million acres, and are about as follows:

Above the headgates of the Goshen Hole Canal and the Laramie Canal about 50,000 acres, this area being in segregated tracts between the town of Casper and the town of Guernsey;

Under the Goshen Hole and Laramie Canal projects, 200,000 acres;

Under the Interstate Canal, as originally designed, 160,000 acres;

Under all other canals in Nebraska to a point twenty miles below the town of Bridgeport, 100,000 acres.

So that it appears only some 500,000 acres will ever be irrigated from the North Platte River below the Pathfinder Reservoir, only one-fourth as much as the river is capable of serving. Indeed, it is believed to be true that the return seepage water from the canals heading above the town of Scotts Bluff, Nebraska, in both Wyoming and Nebraska will be such that it will never be necessary to pass water over the Interstate Canal diversion dam for canals heading below Scottsbluff.

The return seepage on the North Platte River is very great in Nebraska, and probably at least equal in the percentage of return to the South Platte River in Colorado, which seepage return has been variously estimated at from thirty to sixty per cent of the amount diverted. It is believed that the prohibition of the development of projects in the North Park in Colorado above the Pathfinder Dam in Wyoming is unreasonable, and not based at all upon the necessities of the lands below the Pathfinder. In this case it appears to be unnecessary to go into the matter of interstate rights but that a proper examination and analysis of the flow of the North Platte River and the irrigable land along it, will prove that there is and always will be a surplus of water in the North Platte River or at least until such time as the value of lands and crops will justify the extension of the Goshen Hole Canal to the lands lying between Pole Creek and the North Platte River, and east of the line of the Burlington Railroad between Sidney and Bridgeport, Nebraska. This canal would have a total length of some three hundred and fifty miles, and pass for a considerable portion of its length through a sandy hilly country where the losses from seepage would be very large. If such a canal is ever constructed it will have to be lined to prevent this seepage. The cost of the construction of such a canal so lined is prohibitive.

The contention upon the Rio Grande in relative to the storage and use of water on the headwaters of the Rio Grande in northern New Mexico and in Colorado, which right is now denied by the U. S. Government.

In this case it is contended that the use of water high up on the stream is the proper use; that the sending of water from

Colorado for storage in the Engle Dam, a distance of 250 miles, involves enormous losses from evaporation in transit.

That the return seepage waters from the areas irrigated in the San Luis Valley will augment the low flow of the stream and that when the drainage canals now proposed are constructed the returns to the river will be nearly as great as they have been found to be on the South Platte River.

In this case there is involved an international question, the United States having made a treaty with Mexico, guaranteeing the delivery of 60,000 acre feet of water to lands in Mexico near the town of El Paso.

With this treaty as a basis of the necessity of the construction of the Engle Dam the project was enlarged so that the proposed Engle Dam as at present designed and being built, will contain some two million seven hundred thousand acre feet of water with an annual average delivery of 700,000 acre feet. We thus see that the project has been extended to more than eleven times the necessities on account of the Mexican treaty. In effect a right and priority to the use of water is sought to be acquired by the land in southern New Mexico and Texas as of the same date as for the land in Old Mexico, which will receive the sixty thousand acre feet of water. This procedure attempts to place the priorities for such lands ahead of not only the present developments in Colorado, but also on those which were attempted but prohibited by the Secretary of the Interior.

Colorado feels in this case that it is uneconomical and is not a conservation of this natural resource to force the water to flow from the boundary of Colorado to the vicinity of El Paso, Texas, involving as it does enormous losses. It has been estimated that such losses will probably be as great as 75% of the amount crossing the Colorado boundary line.

The construction of reservoirs in Colorado is for supplemental use, that is, to supplement the water supply of existing ditches during the period of low flow. One acre foot of stored water will supplement a supply for probably two acres of land. One acre foot of water passing the boundary line of Colorado would probably mean one-quarter of an acre foot delivered at El Paso. In other words, eight acres of land in Colorado must be deprived of their supplemental supply to deliver one-quarter of an acre foot at El Paso. It has been stated by some interested in the El Paso Project that three acre feet per acre per annum are necessary. Therefore, this one-quarter acre foot of water would irrigate about one-twelfth of an acre of land near El Paso, and although the returns per acre near El Paso may be greater than those in Colorado there is no such discrepancy in the productiveness as there is in the amount of water consumed. Even should this quarter acre foot of water be considered as a supplemental supply at El Paso and sufficient for one-half an acre, four acres in Colorado would be deprived of its supplemental supply to furnish supplemental supply for one acre at El Paso.

Furthermore, if this water is conserved in Colorado and used, the return seepage waters will return a large portion of the stored water to the stream through the drainage canals.

Major Powell for years the Director of the Geological Survey made a particular study of this question. Quoting from Water Supply Paper No. 240, Page 15, Mr. Siebenthal says:

"Major Powell urged that the tributaries of the Rio Grande below the Colorado-New Mexico line would, if the waters were conserved, furnish a sufficient flow to maintain the irrigation of that section as then developed. He pointed out that when the river emerges from the Valley at the foot of Embudo Canon, it is a fine stream and must always be so whatever water is taken out in Colorado above."

Mr. Siebenthal further says:

"The table on Page 20 giving the comparative acreage irrigated from the Rio Grande and its tributaries in 1889-1890 shows an increase in that period of over 100%, yet the discharge of the Rio Grande at Embudo shows no corresponding systematic diminution during the irrigating months, notwithstanding that the water is almost wholly removed from the river in its course through the valley, as shown by the gage at the State Bridge.

* * * * * * * * * * *

The sands and gravels of the San Luis Valley act as a natural reservoir with lasting benefit to the Rio Grande Valley below."

The right of Colorado users to divert water from the streams tributary to the Colorado River and to carry the water across the Continental Divide has been questioned. Any equitable division of the benefits to be derived could not deprive Colorado of what water she needs on account of the limited area irrigable in the Colorado River drainage in Colorado, and the right to divert across the Continental Divide cannot be questioned because it is a universal practice, not only in the United States but throughout the world wherever irrigation is practiced.

CHAPTER III

FINANCIAL

The Nineteenth General Assembly made appropriations for the State Engineer's office as follows:

	1913	1914
State Engineer's Salary	$3000	$3000
2 Deputy Engineers' Salary	3600	3600
Travelling and Contingent Expenses of Engineer and Deputies for biennial period		4200
Draftsman, Salary	1500	1500
Chief Hydrographer, Salary	1800	1800
Six Hydrographers at $125 per month	9000	9000
Stenographic services	1095	1620
Clerk, Salary	1200	1200
File Clerk, Salary	1200	1200
Incidental Expenses	1500	1500
Travelling Expense Hydrographers	3000	3000
Irrigation Division Engineers:		
Division No. 1	2500	2500
Division No. 2	2500	2500
Division No. 3	1500	1500
Division No. 4	1500	1500
Division No. 5	1500	1500
Travelling Expenses of Five Division Engineers	2500	2500
For Office Equipment Division No. 4		150
Total for Biennial Period of 1913-1914	$82,665	

From these appropriations balances were left in the various funds as follows:

	1913-14
Travelling and Contingent Expense Engineer and Deputies	$ 962.62
Deputies Salary	300.
Stenographic Services	520.
Incidental Expense	260.38
Travelling Expense, Hydrographers	642.30
Travelling Expense Five Division Engineers	554.09
Hydrographic Salary Fund	141.67
Total	$3381.06

This leaves the amount expended in 1913-14, for the administration of the State Engineer's office and for the service of water distribution in the State, exclusive of Water Commissioners' salaries, $79,283.94.

As a credit against this amount, this office has received and transmitted in 1913-14 to the State Treasurer, $25,404.73.

This makes a running cost, including the Division Engineers (but excluding water commissioners, who are paid by the counties) of $53,879.21.

Following is a detailed statement in tabular form of receipts and expenditures to and from each of the various funds handled through this office:

STATE ENGINEER'S SALARY FUND.

	1913	1913	1914	1914
Appropriated		$3000.00		$3000.00
C. W. Comstock	$1000.00			
John E. Field	2000.00		$3000.00	
	3000.00	3000.00	3000.00	3000.00

DEPUTIES, STATE ENGINEER—SALARIES.

	1913	1913	1914	1914
Appropriated		$3600.00		$3600.00
A. F. Hewitt	$2085.00		$2052.00	
J. W. Johnson	360.00			
R. I. Meeker			1098.00	
E. C. McAnelly	1155.00		150.00	
Balance			300.00	
	3600.00	3600.00	3600.00	3600.00

TRAVELING AND CONTINGENT EXPENSE, ENGINEER AND DEPUTIES, FOR THE BIENNIAL PERIOD.

	1913	1914	1913-1914
Appropriated			4200.00
Expended in 1913		1104.82	
C. W. Comstock	36.70		
A. F. Hewitt	176.40	79 49	
J. W. Johnson	6.20		
John E. Field	518.47	637.00	
E. C. McAnelly	233.05		
M. E. Bunger (Auto Livery)	134.00		
R. I. Meeker		803 46	
Miscellaneous		612.81	
Balance	3095.18	962.42	
Total	4200.00	4200.00	4200.00

DRAFTSMAN, SALARY FUND.

	1913	1913	1914	1914
Appropriated		1500.00		1500.00
O. L. Nelson	1500.00		1500.00	
	1500.00	1500.00	1500.00	1500.00

CHIEF HYDROGRAPHER, SALARY FUND.

	1913	1913	1914	1914
Appropriated		1800.00		1800.00
Thos. Grieve, Jr.	1800.00		1800.00	
	1800.00	1800.00	1800.00	1800.00

HYDROGRAPHERS, SALARY FUND.

	1913	1913	1914	1914
Appropriated		9000.00		9000.00
M. E. Bunger	1500.00		1500.00	
D. L. Bundy	1500.00		1500.00	
C. L. Chatfield	1500.00		1500.00	
B. S. Clayton	1500.00		500.00	
C. O. Crisman	895.83		1250.00	
C. C. Hezmalhalch	1500.00		1500.00	
Geo. P. Woodhall			875.00	
C. E. Turner	587.50			
H. D. Amsley			250.00	
Balance	16.67		125.00	
	9000.00	9000.00	9000.00	9000.00

STENOGRAPHIC SERVICES FUND.

	1913	1913	1914	1914
Appropriated		1095.00		1620.00
Mary W. Dargin	433.35			
Anna O. Finch			500.00	
L. D. Smith	661.67		600.00	
Balance			520.00	
	1095.00	1095.00	1620.00	1620.00

CLERKS, SALARY FUND.

	1913	1913	1914	1914
Appropriated		1200.00		1200.00
E. H. Rhodes	433.33			
May A. Bradford			1066.67	
Mary W. Dargin	766 67		133.33	
	1200.00	1200.00	1200.00	1200.00

FILE CLERKS, SALARY FUND.

	1913	1913	1914	1914
Appropriated	.....	1200.00	.....	1200.00
J. H. Bradley	433.33	.....	.....	.....
E. H. Rhodes	766.67	.....	1200.00	.....
	1200.00	1200.00	1200.00	1200.00

INCIDENTAL EXPENSE FUND.

	1913	1913	1914	1914
Appropriated	.....	1500.00	.....	1500.00
Salaries, Gage Readers	1215.65	.....	1461.97	.....
Bristol Automatic Gage	62.00	.....	.....	.....
Balance	222.35	.....	38.03	.....
	1500.00	1500.00	1500.00	1500.00

TRAVELING EXPENSE OF SIX HYDROGRAPHERS.

	1913	1913	1914	1914
Appropriated	.....	3000.00	.....	3000.00
M. E. Bunger	335.34	.....	557.70	.....
D. L. Bundy	298.00	.....	357.22	.....
C. L. Chatfield	626.25	.....	413.55	.....
B. S. Clayton	499.01	.....	123.45	.....
C. O. Crisman	309.50	.....	432.45	.....
C. C. Hezmalhalch	53.26	.....	144.40	.....
C. E. Turner	303.15	.....	.....	.....
Thos. Grieve, Jr.	396.50	.....	398.85	.....
H. D. Amsley	.....	.....	109.07	.....
Balance	178.99	.....	463.31	.....
	3000.00	3000.00	3000.00	3000.00

DIVISION ENGINEER SALARY, DIVISION NO. 1.

	1913	1913	1914	1914
Appropriated	.....	2500.00	.....	2500.00
F. Cogswell	2500.00	.....	2500.00	.....
	2500.00	2500.00	2500.00	2500.00

DIVISION ENGINEER SALARY, DIVISION NO. 2.

	1913	1913	1914	1914
Appropriated	.....	2500.00	.....	2500.00
E. R. Chew	2500.00	.....	2500.00	.....
	2500.00	2500.00	2500.00	2500.00

DIVISION ENGINEER SALARY, DIVISION NO. 3.

	1913	1913	1914	1914
Appropriated	.....	1500.00	.....	1500.00
F. W. Swanson	1500.00	.....	1500.00	.....
	1500.00	1500.00	1500.00	1500.00

DVISION ENGINEER SALARY, DIVISION NO. 4.

	1913	1913	1914	1914
Appropriated	.....	1500.00	.....	1500.00
H. C. Getty	1500.00	.....	1500.00	.....
	1500.00	1500.00	1500.00	1500.00

DIVISION ENGINEER SALARY, DIVISION NO. 5.

	1913	1913	1914	1914
Appropriated	.....	1500.00	.....	1500.00
Theo. Rosenberg	1500.00	.....	1500.00	.....
	1500.00	1500.00	1500.00	1500.00

DIVISION ENGINEER EXPENSE FUND.

	1913	1913	1914	1914
Appropriated		2500.00		2500.00
F. Cogswell, Eng. Div. No. 1	499.99		499.99	
E. R. Chew, Eng. Div. No. 2	533.35		500.00	
F. W. Swanson, Eng. Div. No. 3	389.65		320.75	
H. C. Getty, Eng. Div. No. 4	499.40		463.60	
Theo. Rosenberg, Eng. Div. No. 5	356.55		382.63	
Balance	221.06		333.03	
	2500.00	2500.00	2500.00	2500.00

OFFICE EQUIPMENT, DIVISION NO. 4.

	1913	1914	1913-14
Appropriated			150.00
Expended in 1913		75.00	
J. D. Volkenburg, Typewriter	75.00		
H. C. Getty		75.00	
Balance	75.00		
	150.00	150.00	150.00

DISTRIBUTION OF FEES RECEIVED IN STATE ENGINEER'S OFFICE, DECEMBER 1, 1912, TO NOVEMBER 30, 1914, INCLUSIVE.

	Dec. 1st, 1912 Nov. 30, 1913	Dec. 1, 1913 Nov. 30, 1914	Total 1913-14
Filing claims to water rights	14847.00	6727.00	21574.00
Rating Ditches (Gaging)	192.45	87.85	280.30
Postage	26.15	9.25	35.40
Blue Prints	519.73	635.70	1155.43
Certificates and certifications	372.00	290.00	662.00
Sale of Irrigation Law	41.00	41.00	82.00
Office Labor	74.50	37.00	111.50
Examination of Reservoir Plans	287.00	987.00	1274.00
Filing of Transfer Decrees	50.00	24.00	74.00
Examination of Dams	29.20	30.00	59.20
Incidental sale of old cable		85.00	85.00
Field Books	11.90		11.90
	16450.93	8953.80	25404.73

CHAPTER IV

REPORTS OF DIVISION ENGINEERS

STATE OF COLORADO
IRRIGATION DIVISION NO. 1
DENVER

Denver, Colo., Nov. 30, 1913.

Mr. John E. Field,
State Engineer,
Denver, Colorado.

Dear Sir: As provided for in Section 12, Chapter 125, Page 287, Session Laws of 1903, I herewith submit a report of the work of this irrigation division during the fiscal year ending November 30, 1913.

There has been no serious trouble over the distribution of water, although there was a shortage of water in the South Platte water-shed during May, June, July, August and September.

Only one appeal, during 1913, has been taken from rulings of this office to the Courts. On May 2nd, the Pioneer Irrigation Company owners of the Haigler Land and Canal Company's Ditch in District No. 65, made a verbal request for a ruling relative to the distribution of water from the Republican River to their ditch under its decree issued by a District Court of Nebraska.

They were informed that this office would distribute water to the ditch in accordance with the Colorado decree, but could not recognize the Nebraska decree. This question is now pending in the United States District Court, District of Colorado.

The annual appeal of District No. 3, from orders of this office relative to the storage of water, was received on October 7th. The standard charge that there was a discrimination against District No. 3, in the distribution of water by this office, was not omitted.

The State Engineer ruled that the complaint was not justified.

On April 9th, 1913, in compliance with your instructions of April 8th, a circular letter was sent to all the Water Commissioners in this division, instructing them to place on the head-

gates of all their decreed ditches, the name of the ditch; the priority numbers of the appropriations decreed to each ditch and the numbers of the transferred appropriations.

The first demand for water, for direct irrigation, was received on May 22nd, for 130 second-feet to supply ditches in District No. 2, antedating July 9, 1879. On May 24th, this demand was increased to 301 second-feet to supply appropriations of earlier date than January 1, 1879. On the same date a demand was received for 600 second-feet to supply the Highline Canal in District No. 8, on its appropriation of date Jan. 18, 1879.

The use of water for direct irrigation, in districts Nos. 3, 4 and 5, ceased about Oct. 4th and storage was commenced in decreed reservoirs with appropriations of earlier date than Jan. 1, 1893.

On October 10th, 1913, a general order was sent to the Water Commissioners in Districts Nos. 2, 3, 4, 5, 6, 7, 8, 9 and 23, allowing storage of water in any decreed reservoir.

On Nov. 7, 1913, this order was extended to also include storage in undecreed reservoirs, with appropriations of an earlier date than January 1, 1906.

Since November 1st, only ditches in Districts Nos. 1, 2 and 64 have used water for direct irrigation. The following tables are compiled from the weekly reports of the Water Commissioners, as they give the information most often asked for, except in special cases when more detailed and specific data are required:

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING DATES OF PRIORITIES OF LATEST DITCHES DRAWING WATER FOR DIRECT IRRIGATION IN DISTRICTS 1 TO 9 AND 64, DURING 1913.

Date, Saturday	No. 1	Upper No. 2	Lower No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	Upper No. 64
Apr. 5	All Ditches	.....	.....	.....	.....	.....	No Report	.....	No Report	.....	.....
Apr. 12	All Ditches	.....	See Note	Below	.....	.....	No Report	.....	No Report	.....	.....
Apr. 19	All Ditches	.....	.....	.....	.....	.....	No Report	.....	No Report	.....	.....
Apr. 26	All Ditches	July 1892	.....	.....	.....	.....	No Report	All Ditches	No Report	.....	.....
May 3	All Ditches	July 1892	Dec. 1874	All Ditches	.....	.....	Dec. 1873	All Ditches	No Report	All Ditches	.....
May 10	All Ditches	July 1892	Nov. 1874	All Ditches	July 1881	.....	Feb. 1888	All Ditches	Jan. 1879	All Ditches	All Ditches
May 17	All Ditches	July 1892	Dec. 1874	All Ditches	Feb. 1878	All Ditches	June 1885	All Ditches	Jan. 1879	All Ditches	All Ditches
May 24	June 1887	May 1865	Dec. 1874	April 1881	Oct. 1881	All Ditches	Feb. 1888	Nov. 1877	Jan. 1879	May 1874	All Ditches
May 31	Sept. 1882	May 1865	Nov. 1877	April 1881	Dec. 1880	All Ditches	Feb. 1888	Mar. 1878	Mar. 1868	Mar. 1869	June 1882
June 7	June 1882	Nov. 1885	July 1879	Sept. 1878	July 1881	All Ditches	May 1870	Dec. 1874	Jan. 1879	May 1871	June 1882
June 14	June 1882	July 1876	July 1879	Nov. 1874	June 1866	May 1878	May 1870	Dec. 1874	Jan. 1879	May 1871	June 1882
June 21	June 1882	Nov. 1885	July 1879	Nov. 1874	June 1866	Sept. 1884	May 1870	June 1883	Mar. 1868	Dec. 1882	June 1882
June 28	June 1882	July 1876	Dec. 1874	April 1873	June 1866	Mar. 1872	May 1870	Mar. 1873	Mar. 1868	May 1871	June 1882
July 5	June 1882	May 1865	Nov. 1874	April 1871	June 1866	Mar. 1872	Feb. 1865	Feb. 1871	Nov. 1873	Oct. 1864	June 1882
July 12	June 1882	May 1865	Nov. 1874	Oct. 1870	Nov. 1865	Mar. 1872	June 1863	Nov. 1865	Mar. 1868	Oct. 1864	June 1882
July 19	June 1882	July 1876	Nov. 1877	Nov. 1872	Nov. 1865	May 1878	June 1865	Dec. 1874	Jan. 1879	May 1871	June 1882
July 26	Oct. 1882	Nov. 1885	July 1879	April 1870	Nov. 1865	Sept. 1884	April 1872	Nov. 1878	Jan. 1879	Dec. 1882	June 1884
Aug. 2	Sept. 1882	May 1865	Nov. 1874	Oct. 1870	Nov. 1865	Mar. 1872	? 1872	April 1872	Nov. 1873	May 1871	June 1882
Aug. 9	June 1882	May 1865	Nov. 1874	May 1869	Nov. 1865	Mar. 1872	June 1862	Feb. 1871	Mar. 1868	Oct. 1865	June 1882
Aug. 16	Oct. 1881	May 1865	Nov. 1874	May 1869	Nov. 1865	Mar. 1872	May 1863	Feb. 1865	Mar. 1868	Mar. 1863	Sept. 1873
Aug. 23	Oct. 1881	May 1865	Nov. 1874	April 1867	Nov. 1865	Mar. 1872	May 1862	Feb. 1865	Mar. 1868	Oct. 1865	Sept. 1873
Aug. 30	Oct. 1881	May 1865	Nov. 1874	April 1867	Nov. 1865	Mar. 1872	May 1862	Nov. 1863	Mar. 1868	Oct. 1865	Oct. 1880
Sept. 6	June 1882	May 1865	Nov. 1874	April 1867	Nov. 1865	Mar. 1872	May 1862	Mar. 1865	Mar. 1868	May 1871	Oct. 1880
Sept. 13	Sept. 1882	May 1865	July 1879	Oct. 1870	Nov. 1865	May 1878	April 1865	April 1872	Jan. 1879	May 1871	Sept. 1894
Sept. 20	April 1883	Nov. 1885	July 1870	All Ditches	Nov. 1885	Mar. 1872	Nov. 1873	April 1871	Jan. 1879	Mar. 1882	Sept. 1894
Sept. 27	June 1887	Nov. 1885	Nov. 1874	All Ditches	July 1881	Mar. 1872	Nov. 1873	Nov. 1881	Jan. 1879	Dec. 1882	Sept. 1894
Oct. 4	All Ditches	Nov. 1885	Nov. 1874	.....	.....	.....	All Ditches	Nov. 1881	Jan. 1879	Dec. 1882	All Ditches
Oct. 11	All Ditches	Nov. 1885	Nov. 1874	.....	.....	.....	All Ditches	All Ditches	Jan. 1879	All Ditches	All Ditches
Oct. 18	All Ditches	Nov. 1885	Nov. 1874	.. See	Note	Below	All Ditches	All Ditches	Jan. 1879	All Ditches	All Ditches
Oct. 25	All Ditches	Nov. 1885	July 1879	.....	.....	.....	All Ditches	All Ditches	Jan. 1879	All Ditches	All Ditches
Nov. 1	All Ditches	Nov. 1885	.....	.....	.....	.....	All Ditches	.....	.....	.....	All Ditches

NOTE.—Upper Dist. No. 2, extends from Denver to Evans No. 2, ditch below Ft. Lupton. Lower Dist No. 2 includes Evans No. 2 ditch and extends to the mouth of the Cache la Poudre river. Below the mouth of St. Vrain Creek, 1874 water is supplied by seepage. IN DISTRICT NO. 3 at Greeley, 1881 water was used supplied by seepage. IN DISTRICT NO. 64 below Sterling, later ditches were supplied by seepage. When date of appropriation is not given, there was no water used for direct irrigation. When "All ditches" is given it means that all ditches demanding water for direct irrigation were supplied, not that all ditches were drawing water.

THE WEEKLY REPORTS OF THE WATER COMMISSIONER OF DISTRICT NO. 3 SHOW THE FOLLOWING AMOUNTS OF WATER BROUGHT OVER FROM DISTRICTS NOS. 47-48 AND 51, INTO DISTRICT NO 3, DURING 1913.

	From District No. 47 in Acre-Feet	From District No. 48 in Acre-Feet	From District No. 51 in Acre-Feet	Total
April	0	0	0	0
May	140	2,930	1,470	4,540
June	1,684	6,616	5,736	14,036
July	622	4,168	2,454	7,244
August	216	1,558	434	2,208
September	232	762	0	994
October	88	0	0	88
November	0	608	0	608
Totals	2,982	16,642	10,094	29,718
Stored in Dist. No. 3	574 in Fossil Creek Res. and Cameron Res.	860 In Chambers Lake & Rocky Ridge Res.	0	1,434
Used for direct irrigation	2,408 By North Poudre Canal & Larimer County Ditch	15,782 By Larimer County Ditch	10,094 By Larimer County Ditch	28,284

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF RIVER WATER, IN ACRE-FEET, USED IN IRRIGATION DURING 1913.

Dist.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
1	3800	47900	24506	23452	16904	30842	58772	32924	239100
2	1920	28960	55018	43982	38990	33350	11240	3656	217116
3	400	53010	87598	35948	20188	10826	0	84	208054
4	0	18200	37862	22498	11372	10684	0	0	100616
5	0	13076	16524	7962	3388	3976	0	0	44926
6	No report	11260	30828	15780	5710	5440	830	30	69878
7	270	18700	35394	24022	14338	13500	5050	0	111274
8	No report	21546	18428	16896	9072	11276	8910	0	86128
9	0	3070	7728	6204	5386	4640	1116	0	28144
64	0	20118	17578	18630	15060	20590	11390	2500	105866
Total	6390	235840	331464	215374	140408	145124	97308	39194	1211102

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF RESERVOIR WATER, IN ACRE-FEET, USED IN IRRIGATION DURING 1913. SEE "NOTE" BELOW.

Dist.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
1	0	0	10304	7574	11154	648	0	0	29,690
2	0	0	0	7800	3828	660	0	0	12,288
3	0	2100	18240	13272	21700	8850	0	0	64,162
4	0	0	1664	1738	1950	964	0	0	6,316
5	0	0	5552	3730	4270	0	0	0	13.552
6	No report	0	4954	5190	930	0	0	0	11,074
7	0	0	0	390	0	0	0	0	390
8	No report	0	10954	9780	5224	810	0	0	26,786
9	0	0	0	0	0	0	0	0	0
64	0	0	280	3660	1284	144	0	0	5,368
Totals	0	2100	51948	53134	50340	12076	0	0	169,598

NOTE.—The above quantities do NOT include the water run from reservoirs directly to the land irrigated without first passing through the rivers or used in exchange for river water. *They only include the* reservoir water that was discharged into the rivers and re-diverted, or discharged into the rivers or into ditches in exchange for river water. The annual reports of the Water Commissioners show that by the three above methods of using reservoir water for irrigation, District No. 1 used 82,250 acre-feet; District No. 2 used 47,492 acre-feet; District No. 3 used 139,189 acre-feet, and District No. 4 used 38,061 acre-feet, during 1913.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF RIVER WATER AND RESERVOIR WATER, IN ACRE-FEET, USED IN IRRIGATION DURING 1913. SEE "NOTE" BELOW.

Dist.	April	May	June	July	August	Sept.	Oct.	Nov.	Total
1	3800	47900	34810	31026	28058	31490	58772	32924	268780
2	1920	28960	55018	51782	42818	34010	11240	3656	229404
3	400	55110	105838	49220	41888	19676	0	84	272216
4	0	18200	39526	24236	13322	11648	0	0	106932
5	0	13076	22076	11692	7658	3976	0	0	58478
6	No report	11260	35782	20970	6640	5440	830	30	80952
7	270	18700	35394	24412	14338	13500	5050	0	111664
8	No report	21546	29382	26676	14296	12086	8910	0	112896
9	0	3070	7728	6204	5386	4640	1116	0	28144
64	0	20118	17858	22290	16334	20734	11390	2500	111234
Total	6390	237940	383412	268508	190738	157200	97308	39194	1380700

NOTE.—The above quantities do NOT include the water run from reservoirs directly to the land irrigated without first passing through the rivers or used in exchange for river water. They only include the reservoir water that was discharged into the rivers and re-diverted, or discharged into the rivers or into ditches in exchange for river water.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF WATER, IN ACRE-FEET, DIVERTED FROM THE RIVERS FOR STORAGE IN RESERVOIRS DURING 1913.

Dist.	April	May	June	July	August	Sept.	Oct.	Nov.	Total
1	44756	12160	0	0	0	0	0	18392	75308
2	15380	1800	0	0	0	0	15080	13768	46028
3	16014	14150	462	0	0	2714	12314	9642	55296
4	10320	6294	0	0	0	834	6332	4026	27806
5	3202	5326	0	3668	0	480	4014	1372	18062
6	No report	6840	0	0	0	270	2240	1290	10640
7	2992	3140	0	0	0	0	2400	3370	11902
8	Reservoirs full May 1st, 1913								
9	2520	880	0	0	0	0	336	1530	5266
64	840	700	0	0	0	0	8700	16080	26320
Total	96024	51290	462	3668	0	4298	51416	69470	276628

NOTE.—The above table includes the 1434 acre-feet of water brought over from Districts 47 and 48 and stored in District No. 3, but does not include the water transferred from one reservoir to another via the river.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AVERAGE DAILY UNSUPPLIED SHORTAGE OF WATER FOR IRRIGATION, IN SECOND-FEET, DURING 1913. SEE "NOTE" BELOW.

Dist.	April	May	June	July	August	Sept.	Oct.	Nov.
1	0	Last 7 days	624	604	769	600	First 3 days	0
2	0	200	194	418	464	125	0	0
3	.....	276	689	607	320	74	.....	.....
4	.....	0	516	348	189	47	.....	.....
5	.....	0	95	183	106	22	.....	.....
6	No report	0	493	346	225	76	0	.....
7	0	0	142	270	274	84	0	.....
8	No report	114	133	154	318	168	30	.....
9	.....	0	18	47	32	18	First 3 days	.....
64	.....	Last 7 days	358	591	687	536	0	0
Totals	0	590	3462	3568	3384	1750	30	0

NOTE.—When quantities are not given there was no water used for direct irrigation. When the first and last days are noted, there was a small shortage during those days, but no shortage during the balance of the month.

A CONDENSED STATEMENT OF THE WEEKLY REPORTS OF THE WATER COMMISSIONERS FOR 1913 IS AS FOLLOWS:

If we take Districts 1 to 9, both inclusive, and District No. 64 covering the South Platte River and its tributaries from Platte Canon to the Colorado-Nebraska line, a distance of 250 miles, we have the following table:

	Amount of Water Diverted from the Rivers for Storage in Reservoirs in Acre-Feet	Amount of Reservoir Water Used in Irrigation in Acre-Feet See "Note"	Amount of River and Reservoir Water Used in Irrigation in Acre-Feet See "Note"	Average Daily Unsupplied Shortage of Water for Irrigation in Second-Feet
April	96,024	0	6,390	0
May	51,290	2,100	237,940	590
June	462	51,948	383,412	3,462
July	3,668	53,134	268,508	3,568
August	0	50,340	190,748	3,384
Sept.	4,298	12,076	157,200	1,750
Oct.	51,416	0	97,308	0
Nov.	69,470	0	39,194	0
Totals	276,628	169,598	1,380,700	.....

NOTE.—The "Amount of Reservoir Water Used In Irrigation" and "Amount of River and Reservoir Water Used in Irrigation" given above, do NOT include reservoir water run directly from the reservoirs to the land irrigated, without first passing through the rivers or used in exchange for river water. They only include the reservoir water that was discharged into the rivers and re-diverted, or discharged into the rivers or into ditches in exchange for river water.

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL RESERVOIR REPORTS FOR THE IRRIGATION SEASON OF 1913.

Dist.	Number of Reservoirs Reported	Area of High Water Line Acres	Capacity in Acre-Feet	Quantity of Water in Reservoirs May 1, 1913 Acre-Feet	Quantity of Water in Reservoirs Nov. 1, 1913 Acre-Feet	Quantity of Water held Over from Nov. 1, 1912 Acre-Feet
1	5	10,295	149,867	110,494	None	27,376
2	19	8,644	153,455	113,286	22,300	78,330
3	59	9,980	156,256	125,459	45,317	83,794
4	16	6,130	95,949	69,093	40,600	49,601
5	14	2,376	41,912	28,512	19,217	33,819
6	31	2,577	41,651	21,598	4,894	22,079
7	94	Not reported	19,822	17,714	9,110	16,818
8	3	600	10,000	10,000	3,500	3,507
9	36	1,729	28,433	24,526	13,987	20,706
23 (A)	2	5,760	164,628	114,514	96,857	111,512
46		No Reservoirs Reported				
47		No Reservoirs Reported				
48		No Reservoirs Reported				
64	3	6,982	142,341	60,277	7,434	15,411
65 (B)	4	70	574	Not Reported	46	11,128
Totals	286	55,143	1,004,888	695,473	263,262	474,081

(A) Compiled from the records in office of Division Engineer. No annual report received from the new water commissioner, as he did not qualify until late in July.

(B) Two of these reservoirs not in use, dams broken.

The foregoing tables show that during June, July, August and September, 1913, there was an average unsupplied shortage of water for direct irrigation in the South Platte drainage of 3,000 second-feet.

During June, July, August and September, 1912, there were diverted from the rivers for storage in reservoirs 213,614 acre feet of water. During the corresponding months of 1913, only 8,428 acre feet were diverted for storage.

The amount of water stored in the 218 reservoirs reported in this division, on November 1st, 1912, was 474,081 acre feet.

On November 1st, 1913, there were only 263,262 acre feet in the 286 reservoirs reported, or a shortage of 210,819 acre feet, when compared with the amount in storage on November 1st, 1912.

It should be borne in mind that the above tables refer only to the reservoirs that are reported by the Water Commissioners and do not include all of the reservoirs decreed or undecreed.

There are in the South Platte drainage, not including the South Park, Dist. No. 23, 252 decreed reservoirs with a storage capacity of 342,000 acre feet.

If to these we add the three large decreed reservoirs in Dist. No. 23, to-wit: Lake Cheesman, Lost Park and Antero, with a storage capacity of 210,578 acre feet, we have a total storage capacity in 255 decreed reservoirs of 552,578 acre feet.

There are today nine undecreed reservoirs diverting water directly from the South Platte river, between Denver and Sterling. Their total shortage capacity is about 350,000 acre feet.

If we include Standley Reservoir in Dist. No. 7 with a storage capacity of 45,000 acre feet, we have a total storage capacity in these ten undecreed reservoirs of 395,000 acre feet.

Combining the above decreed and undecreed reservoirs, we have 265 reservoirs with a storage capacity of 947,578 acre feet. In addition to the above, there are an unknown number of small undecreed reservoirs in the division, some of which are included in the reservoir reports of the Water Commissioners.

During November, there has been a reported storage of 69,470 acre feet. We, therefore, on December 1st, 1913, have in storage 332,732 acre feet of water.

It is conservative to estimate the shortage of water for storage in the South Platte drainage on December 1st, 1913, as 614,000 acre feet.

To supply this shortage, it will require a diversion from the streams of not less than 800,000 acre feet of water.

Even though the snowfall during the coming winter months should be above normal, we cannot predict with any degree of certainty that this shortage will be made good, as we cannot control the run-off from the accumulated snow next spring. Predictions as to the supply of water during the coming season, based alone upon the amount of snowfall during the winter, are very liable to turn out as simply another "Iridescent dream."

The amount of run-off in the spring months from the snow stored in the mountains, that will be available for storage in reservoirs depends more upon the amount of rain that falls during those months, than upon the snow accumulation. Without seasonable rains the snow melts slowly and is absorbed by the ground, or it is evaporated by the winds and the result is a large "cut-off" and "fly-off" and a small "run-off" only sufficient to supply the ditches with their decreed appropriations for direct irrigation.

These are cold facts and do not dove-tail at all, with the popular fallacy, that there is a great lack of reservoirs in this division for the storage of the surplus water. The contrary is the truth, there is a surplus of reservoirs and a lack of water to fill them once each year.

Mr. John K. Samples, Water Commissioner of District No. 1, makes the following special report:

ACREAGE OF CROPS RAISED WITHOUT IRRIGATION, 1913.

Alfalfa	1200 Acres.	Average yield 2 tons per acre
Wheat	25000 acres.	Average yield 5 bushels per acre
Oats	12000 acres.	Average yield 10 bushels per acre
Barley	8000 acres.	Average yield 10 bushels per acre
Corn	35000 acres.	Average yield 8 bushels per acre
Potatoes	3000 acres.	Average yield 40 bushels per acre
Spelts	9000 acres.	Average yield 11 bushels per acre
Other Crops	*20000 acres.*	
Total	113,200 acres.	

I hereto attach the regular statutory tabulation of the Water Commissioner's annual reports.

Respectfully submitted,

(Signed) F. COGSWELL,

Irrigation Division Engineer Irrigation Division No. 1.

IRRIGATION DIVISION NUMBER 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1913.

(1) District	(2) Amount of Appropriation in Second-Feet	(3) Capacity of Ditches in Second-Feet	(4) Length of Main Ditches in Miles	(5) Length of Laterals in Miles	(6) First Day Water Diverted from Natural Streams for Irrigation
1	2,076	2,697	367	257	April 20
2	4,044	2,854	254	73	April 22
3	3,569	3,469	352	1,288	April 17
4	2,445	2,670	220	120	April 1
5	2,513	1,451	238	226	March 3
6	2,557	1,978	305	169	March 26
7	1,708	Not Reported	232	Not Reported	March 19
8	1,825	1,685	232	235	March 1
9	393	429	52	35	March 12
23	No Report Received. New Water Commissioner in July.				
46	1,914	1,879	183	.....	April 25
47	The Water Commissioner only reports relative to 14 Ditches out of a total of 371 decreed appropriations. He reports an abundance of water for all the unreported ditches.				
48	573	.....	84	.....	April 15
64	3,604	3,614	269	783	April 1
65	164	205	28	.....	Not Reported
Totals	27,385	22,931	2,816	3,186	March 1

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1913.

District	(7) Last Day Water Diverted from Natural Streams for Irrigation	(8) Maximum No. of Days Water Diverted from Natural Streams for Irrigation	(9) Maximum No. of Days Water Carried from Reservoirs	(10) Amount of Water Carried from Reservoirs in Acre-Feet
1	Nov. 18	212	110	82,250
2	Nov. 30	223	95	47,493
3	Sept. 30	167	Not Reported	139,189
4	Nov. 4	318	110	38,061
5	Sept. 30	212	Not Reported	Not Reported
6	Oct. 24	213	76	16,485
7	Nov. 15	242	Not Reported	Est. 8,600
8	Nov. 1	245	125	29,348
9	Oct. 31	234	Not Reported	Est. 10,500
23				
46	Aug. 15	112	No Reservoirs Reported	
47				
48	Sept. 30	169	No Reservoirs Reported	
64	Nov. 1	215	87	51,706
65	Nov. 6	145	Not Reported	
Totals	Nov. 30	275	125	423,631

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1913.

District	(11) Average Daily Amount of Water Diverted by Ditches During Season from Natural Streams for Irrigation Second-Feet	(12) No. of Acre-Feet Diverted by Ditches During Season from Natural Streams for Irrigation	(13) Total No. of Acres That Can be Irrigated See "Note"	(14) Crops Irrigated, Etc. Alfalfa	(15) Crops Irrigated, Etc. Natural Grasses
1	1,083	232,846	152,800	25,892	14,022
2	771	237,612	94,565	22,622	3,767
3	1,180	275,992	374,800	54,695	6,915
4	478	119,726	112,055	28,975	1,150
5	388	86,640	111,084	31,302	4,928
6	556	71,734	98,857	33,710	10,535
7	363	114,199	121,700	32,150	7,205
8	340	94,261	113,053	13,580	1,638
9	135	33,325	13,090	5,770	297
23					
46	1 467	185,909	89,700		50,295
47					
48	328	44,854	10,803	20	4,981
64	698	128,499	101,882	29,311	19,880
65	53	11,100	2,870	1,080	555
Totals	7,840	1,636,697	1,397,859	279,107	126,168

NOTE.—The quantities given in columns (13) to (24) represent the total acreage that can be irrigated or was irrigated, whether the ditches only used the natural flow of streams, or used river and reservoir water combined. The total amount of water used in any district, except in Districts Nos. 3 and 7, will be found by adding together the "No. of Acre-Feet Diverted by Ditches During Season from Natural Streams," given in column (12) and the "Amount of Water Carried From Reservoirs in Acre-Feet" as given in column (10). In District No. 3, 28,284 acre-feet were diverted from Districts Nos. 47-48 and 51. Also an unknown amount of reservoir water was used. In District No. 7, 1,150 acre-feet were diverted from District No. 51 and used by the Golden City and Ralston Creek Ditch.

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1913.

District	CROPS IRRIGATED FROM CANALS IN ACRES, SEE "NOTE" BELOW					
	(16) Cereals	(17) Orchards	(18) Market Gardens	(19) Potatoes	(20) Sugar Beets	(21) Other Crops
1	27,020	234	30	2,230	15,285	5,371
2	39,775	228	4,174	1,868	14,944	1,536
3	87,969	2,343	1,581	21,190	46,115	4,382
4	55,150	1,380	180	2,375	15,025	2,825
5	46,061	1,198	872	100	18,800	875
6	35,432	2,188	1,060	270	8,940	2,120
7	45,920	3,875	9,640	.....	500	75
8	19,309	3,451	2,080	100	474	6,303
9	3,801	206	65	.....	423	47
23	.....	.....	.....	.....	.....	.....
46	283	.....	.....	.....	.....	.....
47	.....	.....	.....	.....	.....	.....
48	.....	.....	.....	5	.....	30
64	19,685	135	47	1,789	15,843	432
65	224	7	12	27	38	.....
Totals	380,629	15,245	19,741	29,954	136,387	23,996

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1913.

District	Crops Irrigated from Canals in Acres			Cost—Dollars		
	(22)	(23)	(24) Total Irrigated	(25) Superintendence	(26) Repairs	(27) Improvements
1	.....	.....	90,084	$ 14,070	$ 2,350	$ 16,250
2	.....	.....	88,914	19,150	5,320	7,580
3	.....	.....	225,190	21,984	57,320	93,915
4	.....	Peas 1,520	108,580	10,340	5,800	.....
5	.....	.....	104,136	7,435	6,260	4,035
6	.....	.....	94,255	3,890	18,680	15,320
7	.....	.....	99,365	Not Reported		
8	.....	Celery 60	46,995	12,066	10,363	91,610
9	Timothy 197	Corn 92	10,898	2,200	2,002	1,852
23	.....	.....	.....	.....	.....	.....
46	Pasture 39,122	.....	89,700	.....	.....	.....
47	.....	.....	.....	.....	.....	.....
48	Timothy 352	.....	5,388	.....	.....	.....
64	.....	.....	87,122	6,125	4,380	4,690
65	.....	.....	1,943	.....	1,820	.....
Totals	39,671	1,672	1,052,570	$ 97,260	$114,295	$235,252

Denver, Colo., Dec. 10, 1914.

Mr. John E. Field,
State Engineer,
Denver, Colo.

Dear Sir: I herewith submit a report of the work of Irrigation Division No. 1, during the fiscal year ending November 30th, 1914.

The most notable event of 1914, relative to the distribution of water, was the decision of the Supreme Court of this State handed down on December 7th, 1914, in Case No. 7582, Charles W. Comstock, state engineer, et al., vs. The Larimer & Weld Reservoir Company. In substance and effect the opinion declares that there can be no fixed irrigation or non-irrigation season in this state. The year cannot be divided into two seasons, one for direct irrigation and the other for storage of water in reservoirs. The waters of a river with its tributaries must be distributed as a whole, among those entitled to the decreed priorities for irrigation, and other beneficial uses, in accordance with the dates of such priorities and the needs of the parties for whose benefit such priorities were decreed. The courts cannot arbitrarily fix a definite season for direct irrigation, under a vested right, when no such limitation is "attached to it by the decree itself, or by any constitutional or statutory provision or decision of this Court".

The decree itself may fix a limitation as to the time of use of water or it may be fixed in a proper action where it can be shown, "by competent evidence, that the actual use had been in fact so limited".

"The question of the division of the year into direct irrigation and storage seasons is not a judicial one". Where that power lies is "left entirely open and unaffected by this decision".

Even, "a custom for the past twenty years" will not be allowed to overturn and nullify any constitutional or statutory provision of our irrigation laws, or the uniform and unbroken line of judicial decisions.

The Court said, "that is, users and consumers of water for irrigation in one district cannot make and apply regulations in the administration of their priorities according to their own interpretation of them, and to meet their needs as they think they should be met; but the waters of a division must be distributed to all consumers under the uniform rule provided by law."

The irrigation officials and users of water in the other districts, of the same division, are not bound by any custom or usage that may prevail in any particular district. The waters of a tributary are waters of the South Platte river, and a junior appropriator on the tributary can no more interfere adversely with the rights of a senior on the South Platte river proper, than he can do so at the headgate of the senior ditch.

Direct irrigators should not be allowed to divert water in excess of their needs, nor to use it in a non-economical and wasteful manner.

"Each separate offender, or those acting jointly would be held to answer for his or their own wrong in independent actions".

The unexpected has happened. The State of Colorado has gone "Wet" in one way and "Dry" in another. Although the spring months were the wettest ever known in this State, it is conceded by all that November 3, 1914 was the dryest day that Colorado has ever seen. It serves to teach us that the thing that "cannot happen" has a way of happening.

The "Big Snow" of the first week of December 1913 did not furnish much water for storage. It was nearly all absorbed by the dry ground and the direct run off was very slight. It was a phenomenon and cannot be looked for more than once in fifty years. The effects of the "Big Snow" on the run-off were not felt until April 1914. There was more water passing through Denver during April than during the preceding four months from Dec. 1st to April 1st.

There was a shortage of water for storage in district No. 1 during Dec. 1913 and the South Platte River was dry at one or more places until Jan. 3, 1914. There was no water passing from district No. 1 to No. 64 during that time.

The Cache la Poudre river was dry below the inlet of Fossil Creek reservoir until Feb. 1, 1914.

The Big Thompson River was dry below the inlet of Lake Loveland until April 1, 1914. Clear Creek was dry below the inlet of Standley Lake until April 1, 1914. During the winter months Lake Cheesman discharged about 7,000 acre feet of stored water into the general supply of the South Platte River, but was again full on April 3rd.

The rainfall in Denver during last April totaling 3.75 inches, or 1.58 inches above normal, was greater than in forty of the last forty-three Aprils. The abnormal precipitation of the spring months coming on top of the "Big Snow" delayed the field work in some of the districts and the packing of the soil by heavy rains necessitated replanting of some beet fields. It is reported that many workings of the mines in the mountains were drowned out on account of the veins and drifts being full of water from the melting snow and spring rains.

Many of the reservoir inlet ditches were filled with ice and snow during the winter and were not able to divert any water for storage until March.

The "Big Snow" of December 1913 should be charged to the supply of water for irrigation during 1914. We, therefore, so far as the resultant run-off is concerned, have from Dec. 1, 1913 to Sept. 1, 1914, a run-off from a precipitation equal to 17.83 inches at 17 stations in the South Platte drainage area above the mouth of Cache la Poudre river. (See following table of precipitation.)

Now in the language of the street, this is certainly "going some" for an arid state.

During 1914, the ditches diverting water directly from the South Platte river have been well supplied, and there has been a shortage of water since June 27th in the tributaries in districts Nos. 3, 4 and 6. There was a shortage in district No. 3 during August and in No. 7 since August 8th.

The first demand for water from district No. 1 was received July 2nd to supply a shortage of 280 second-feet of 1882 and 1888 water. The first demand for water from district No. 2 was received on July 2nd to supply a shortage of 617 second-feet for appropriations prior to January 1, 1886. 302 second-feet of this shortage was prior to January 1, 1879. This shortage in district No. 2 was of short duration and on July 18th, the water commissioner reported his district supplied.

The first shortage of water for direct irrigation and the first use of reservoir water, were reported on June 27th in districts Nos. 3, 4 and 6.

After the rivers went down during the last week in June, many ditches were unable to divert water on account of washed out dams and headgates. In district No. 7 on July 10th, there was a landslide on South Table Mt. one-half mile below the headgate of the Agricultural ditch. The ditch was unable to divert water for 35 days.

In July the Water Commissioner of district No. 6, reported that the second crop of alfalfa fell short on account of using too much water.

The South Platte river was reported dry at Merino from July 2nd to July 20th.

On July 25th I received demand from Mr. D. T. Bush, Supt. of the Julesburg Irrigation District for 700 sec-ft. to supply his decreed appropriations. He had been receiving only 50 second-feet of these priorities during July. After July 30th his demands were supplied, although on Aug. 31st he was receiving only 130 second-feet, but he was satisfied with that amount.

During July and August the river was dry at Sedgwick below the headgate of the Peterson Ditch, except from Aug. 5th to morning of Aug. 10th. On August 5th I measured the South Platte river at Julesburg and found only 78 second-feet. On August 6th I found 285 second-feet passing Sedgwick.

The Riverside Irrigation District and the Bijou Irrigation District were not supplied with any water on their decreed appropriations after July 1st until Aug. 3rd.

The Water Commissioner of district No. 2, on Aug. 3rd reported that an undecreed ditch near Denver, had diverted 176 second-feet of river water without his permission. On my return from Julesburg Aug. 8th I instructed No. 2 to shut out all river water from the undecreed ditch and to place locks on the headgates. On Aug. 17th he reported that he had complied with the order.

On Oct. 14th orders were sent to all districts in the South Platte drainage, to store water in any decreed reservoir. On Oct. 24th permission was given to all the districts to store in undecreed reservoirs, provided the demands of their decreed reservoirs were supplied.

On Dec. 1st orders were issued to stop all storage in undecreed reservoirs until further instructions from this office, on account of a shortage of 500 second-feet for storage in decreed reservoirs in district No. 1.

The South Platte river has been reported dry at one or more places in district No. 1 since Nov. 14th; the Cache la Poudre river since June 27th; the Big Thompson river since Oct. 25th; the St. Vrain river and Clear Creek since Oct. 31st.

Any statement at this time that there will be an abundant supply of water for irrigation during 1915 is premature. There is no assurance that there will be any heavy snow falls during the coming winter, or seasonable rain in the spring months. These are prime factors in our water supply.

Since the "Carpenter" bill went into effect in 1911, this office has sent repeated instructions to the water commissioners to notify the ditch and reservoir owners to comply with the requirements of Section 2 of the bill, relative to the installation of self registering devices when water is transferred from one stream to another, or from a reservoir to a ditch via the river. So far as this office is advised, very few of the self registers have been installed. I have also sent instructions relative to the location and construction of rating flumes in ditches and canals, a copy of which is as follows:

Circular letter to Water Commissioners in Division No. 1, relative to the location and construction of rating flumes.

(1) The rating flume should be an open flume, with apron and wings, located not less than 200 feet, nor more than 1,000 feet below the headgate.

(2) If part of the water in the ditch is to be discharged through a waste gate and the balance passed down the ditch, the flume should be located not less than 200 feet below the waste gate, but in either location it should be above all lateral gates where practicable.

(3) It should be located in a straight part of the ditch and the channel should have a uniform grade and cross section for 100 feet up stream from the flume, and should be straight for that distance, with its axis passing through the middle of the flume and parallel to it.

(4) The upstream end of the flume should be placed at the practical grade of the ditch. The bottom should be horizontal in both directions and the sides vertical.

(5) The length of the flume should not be less than twelve feet for ditches whose bottom width six feet or less, nor less than sixteen feet for ditches between six and twelve feet in width, and

twenty-four feet for widths between twelve and twenty-four feet. For larger ditches, the length should not be less than the width of the ditch.

(6) The width of the flume should be equal to the bottom width of the ditch plus the depth of water that the ditch is intended to carry. One-half of this depth being added to the bottom width of the ditch on each side of the flume. If the flume is too narrow, there will be a material contraction at the upstream end and if it is too wide, the velocity will be reduced and eddies formed.

(7) The sides of the flume should be high enough to contain all the water when the ditch is carrying its maximum capacity.

(8) The floor and sides should be smoothly laid and the material used should be heavy enough to prevent warping or twisting out of shape. For flumes 16 feet long, the sills and posts should be 6″ x 6″ lumber and 2″ planks used for the bottom and outside of the sides. The sides being lined with 1″ boards.

(9) The upstream end should have a submerged apron to prevent leakage, this to extend 2 feet below the bottom. There should also be wings extending into the bank beyond the surface of the water, at an angle not to exceed 30 degrees with the axis of the ditch. The foundation timbers should be solidly imbedded, and the earth around them and around the sides of the flume carefully and solidly rammed in order to prevent settlement or passage of water around either the bottom or sides.

(10) There should be a cross beam or bridge just below the center of the flume for convenience in making measurements.

DECREED AND UNDECREED APPROPRIATIONS OF THE RESERVOIRS DIVERTING WATER FROM SOUTH PLATTE RIVER AND LOST PARK CREEK AND ALSO STANDLEY LAKE FROM CLEAR CREEK. COMPILED NOVEMBER 30, 1914.

Name of Reservoir		Date of Appropriation	Gage Rod Feet	Amount of Appropriation Acre-Feet	Area at Highwater Line—Acres
Antero	Decreed	Oct. 8, 1907	36.00	85,564	4,886
Lidderdale or Lake George	Decreed	Aug. 31, 1890	15.00	735	84
Lost Park	Decreed	Oct. 3, 1907	250.00	45,914	180
Cheesman	Decreed	June 27, 1889	140.67	30,691	497
			Total	Enlgt. 48,373	
Cheesman Enlgt.	Decreed	Sept. 24, 1893	212.00	Total 79,064	Total 874
		Jan. 10, 1907			
Standley	Not Decreed	Mar. 4, 1902	95.00	45,000	1,800
Barr (Oasis)	Decreed	Nov. 20, 1885	19.10	11,081	803
		June 11, 1906	Total	Enlgt. 25,240	
Barr Enlgt.	Not Decreed	Dec. 11, 1902	45.00	Total 36,321	Total 1,883
Horse Cr.	Not Decreed	Jan. 14, 1908	60.00	29,356	1,200
		May 29, 1909			
Milton	Not Decreed	Jan. 9, 1907	35.00	43,262	2,342
Lr. Latham	Not Decreed	Sept. 20, 1898	13.00	4,325	702
(Enlgt.)			Total	Enlgt. 1,889	
Lr. Latham	Not Decreed	Sept. 20, 1900	15.00	6,214	Total 987
Empire	Decreed	May 18, 1905	30.00	37,709	2,842
Riverside	Decreed	April 1, 1902	17.41	16,070	1,900
			Total	Enlgt. 41,437	
Riverside Enlgt.	Decreed	Aug. 1, 1907	32.00	Total 57,507	Total 3,700
Jackson Lk.	Decreed	May 18, 1901	28.70	31,708	2,447
			Total	Enlgt. 3,227	
Jackson Lk. Enlgt.	Provisional	May 18, 1901	30.00	Total 34,935	Total 2,534
Bijou No. 2	Decreed	Jan. 15, 1909	20.00	9,183	800
Pt. of Rocks	Not Decreed	Nov. 9, 1905	59.00	81,329	3,082
Prewitt	Not Decreed	Jan. 15, 1906	25.00	23,916	2,117
Julesburg	Decreed	Feb. 12, 1904	28.00	28,178	1,578
Total				644,187	30,889

Horse Creek Reservoir broke night of Jan. 28, 1914.

DECREED RESERVOIRS IN SOUTH PLATTE RIVER DRAINAGE, NOVEMBER 30TH, 1914.

District	Number of Decreed Reservoirs	Number of Decreed Appropriations	Date of Earliest Appropriations	Date of Latest Appropriations	Total Amount of Decreed Appropriation Acre-Feet
1	112	124	Dec. 1, 1888	May 1, 1912	480,594
	"Provisional" decrees for 332,826 Acre-ft. and "Final" decrees for 147,768 acre-feet.				
2	24	30	Sept. 1, 1869	April 25, 1906	23,487
3	44	60	April 15, 1875	July 10, 1904	133,387
4	37	41	Feb. 1, 1881	May 2, 1906	104,494
5	58	69	June 1, 1871	Dec. 10, 1904	25,184
6	56	73	Sept. 1, 1869	Dec. 13, 1906	29,101
7	28	35	1866	Dec. 1906	12,284
8	23	21	Apr. 30, 1871	Aug. 30, 1893	5,906
9	20	23	May 1, 1873	Dec. 6, 1882	Est. 5,100
23	17	18	Dec. 31, 1877	July 13, 1910	288,542
	"Provisional" decrees for 71,648 Acre-ft. and "Final" decrees for 216,894 acre-feet.				
64	4	6	Nov. 15, 1888	Dec. 16, 1906	28,568
Totals	423	500	1866	May 1, 1912	1,136,647

NOTE.—There are two duplicates in above table. Kinnear Reservoir decreed in Districts No. 2 and No. 6 for 940 acre-ft. Culver Reservoir decreed in Districts No. 4 and No. 5 for 150 acre-ft.

The following tables of precipitation at 22 stations in the drainage area of the South Platte River are compiled from the reports of the U. S. Weather Bureau. The 1st table of 17 stations located above the mouth of the Cache la Poudre River. The 2nd table of 5 stations located below the mouth of the Cache la Poudre River.

Name of Station	Dec. 1913 Inches	Jan. 1914 Inches	Feb. 1914 Inches	Mar. 1914 Inches	April 1914 Inches	May 1914 Inches	June 1914 Inches	July 1914 Inches	Aug. 1914 Inches
Boulder	4.20	0	0.08	1.77	3.38	3.57	1.70	.....	1.97
Castle Rock	5.35	0.06	0.36	0.50	2.91	2.65	1.14	3.33	1.99
Cassels	2.57	0.40	0.33	0.66	2.55	1.47	1.59	5.54	2.49
Cheesman	4.82	0	0.08	1.03	2.82	2.45	1.79	6.78	1.55
Denver	5.21	0.03	0.39	2.02	3.75	3.55	1.67	1.49	2.43
Estes Park Fish Hatc'y	2.95	0.59	0.12	0.98	1.98	2.37	1.32	4.36	1.75
Fort Collins	4.08	0.35	0.30	0.87	3.23	2.73	2.01	1.68	1.27
Fort Lupton	3.85	0.08	0.05	0.72	1.89	2.49	0.73	1.44	2.91
Fry's Ranch	5.90	1.00	0.66	0.41	2.45	2.03	0.82	1.77	1.45
Georgetown	4.17	0.49	0.04	1.54	2.07	1.50	1.21	4.57	2.14
Greeley	4.79	0.01	0.11	0.61	1.34	2.92	1.98	.....	.....
Hartsel	0.91	0.17	0	0.37	0.91	0.95	2.36	8.74	2.25
Idaho Springs	4.92	0.18	0.13	1.36	1.81	0.96	0.87	4.20	2.63
La Porte	3.26	0.03	0.14	0.58	3.10	2.24	2.22	1.60	1.08
Longmont	4.23	0.07	0.10	1.18	2.78	3.46	2.05	2.64	0.58
Long's Peak	5.89	2.15	1.20	1.45	3.85	0.90	2.20	6.18	1.58
Platte Canon	.....	0	0.70	1.55	1.69	2.08	1.72	2.28	1.10
Mean of stations reported	4.23	0.33	0.28	1.04	2.50	2.25	1.61	3.77	1.82

Total mean precipitation Dec. 1, 1913, to Sept. 1, 1914, 17.83 inches.

NORTHEASTERN COLORADO, DISTRICTS NOS. 1 AND 64.

Name of Station	Dec. 1913 Inches	Jan. 1914 Inches	Feb. 1914 Inches	Mar. 1914 Inches	April 1914 Inches	May 1914 Inches	June 1914 Inches	July 1914 Inches	Aug. 1914 Inches
Kersey	4.46	0	0.10	0	2.22	2.30	5.00	2.30	0.60
Ft. Morgan	.....	0	0.62	0	3.74	1.39	2.43	3.69	1.33
Merino	.....	0	0.50	.....	4.32	0.20	0.60	0.15	1.70
Sterling	2.33	0.03	0.56	0	2.05	1.25	1.45	0.53	.....
Sedgwick	1.75	0	0.12	0	3.50	2.60	6.22	0.50	3.11
Mean of stations reported	3.84	0.03	0.38	0	3.16	1.55	3.14	1.43	1.68

Total mean precipitation Dec. 1, 1913, to Sept. 1, 1914, 14.21 inches.

NOTE.—Your attention is directed to the exceptional precipitation above the mouth of the Cache la Poudre river, when compared with the precipitation below the mouth. The mean precipitation for the same period, at the six stations of Hartsel, Cheesman, Cassels, Platte Canon, Denver and Ft. Lupton, all located on the South Platte river above the mouth of Cache la Poudre river, was 17.48 inches, as compared with 14.21 inches at the five stations located below the mouth. An excess of 23 per cent. more precipitation on the upper reaches of the South Platte river than in the lower valley.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING DATES OF LATEST PRIORITIES OF DECREED DITCHES DRAWING WATER FOR DIRECT IRRIGATION IN DISTRICTS 1 TO 9 AND 64, DURING 1914.

Date, Saturday	No. 1	Upper No. 2	Lower No. 2	Upper No. 3	Upper No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	Upper No. 64
April 4	All Ditches								All Ditches		All Ditches
April 11	All Ditches								All Ditches		All Ditches
April 18		See Note below									All Ditches
April 25	All Ditches								All Ditches		All Ditches
May 2		Ditches							All Ditches		
May 9	All Ditches	All Ditches		All Ditches				All Ditches	All Ditches		All Ditches
May 16	All Ditches	All Ditches	All Ditches	All Ditches		All Ditches		All Ditches	All Ditches		All Ditches
May 23	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches		All Ditches	All Ditches		All Ditches
May 30	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches
June 6	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches
June 13	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches
June 20	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches	All Ditches
June 27	All Ditches	All Ditches	All Ditches	Sept. 1877	Nov. 1877	All Ditches	Nov. 1873	All Ditches	All Ditches	All Ditches	All Ditches
July 4	April 1886	July 1876	July 1879	July 1873	Nov. 1877	All Ditches	Nov. 1873	All Ditches	Jan. 1879	May 1871	All Ditches
July 11	April 1888	July 1876	Dec. 1877	April 1873	Nov. 1877	All Ditches	Nov. 1873	All Ditches	Jan. 1879	All Ditches	June 1882
July 18	June 1882	All Ditches	All Ditches	Nov. 1872	Nov. 1877	All Ditches	Nov. 1873	Nov. 1881	All Ditches	All Ditches	June 1882
July 25	All Ditches	All Ditches	All Ditches	Sept. 1871	Nov. 1877	All Ditches	Nov. 1873	All Ditches	All Ditches	All Ditches	June 1884
Aug. 1	All Ditches	All Ditches	All Ditches	Nov. 1872	Feb. 1878	Sept. 1884	June 1873	All Ditches	All Ditches	All Ditches	Sept. 1894
Aug. 8	All Ditches	All Ditches	All Ditches	Sept. 1871	Oct. 1871	Sept. 1884	Nov. 1873	All Ditches	All Ditches	All Ditches	All Ditches
Aug. 15	All Ditches	All Ditches	All Ditches	April 1867	Feb. 1865	Mch. 1872	June 1865	April 1772	All Ditches	All Ditches	All Ditches
Aug. 22	All Ditches	All Ditches	All Ditches	April 1867	June 1867	Mch. 1872	Oct. 1862	April 1872	All Ditches	All Ditches	All Ditches
Aug. 29	All Ditches	All Ditches	All Ditches	Oct. 1867	Feb. 1865	Mch. 1872	Oct. 1862	Feb. 1871	All Ditches	All Ditches	All Ditches
Sept. 5	Oct. 1888	All Ditches	All Ditches	April 1867	April 1863	Mch. 1872	June 1862	Mch. 1865	All Ditches	All Ditches	All Ditches
Sept. 12	Oct. 1888	All Ditches	All Ditches	April 1867	April 1863	All Ditches	June 1862	Mch. 1865	All Ditches	All Ditches	All Ditches
Sept. 19	Oct. 1888	All Ditches	All Ditches	April 1867	Feb. 1865	All Ditches	May 1862	Mch. 1865	All Ditches	Mch. 1869	All Ditches
Sept. 26	All Ditches	All Ditches	All Ditches	All Ditches	Feb. 1865	All Ditches	May 1862	Oct. 1864	All Ditches	Mch. 1869	All Ditches
Oct. 3	All Ditches	All Ditches	All Ditches	All Ditches	Feb. 1865	All Ditches	May 1862	May 1864	All Ditches	Mch. 1869	All Ditches
Oct. 10	All Ditches	All Ditches	All Ditches		All Ditches		April 1865	Oct. 1864	All Ditches	Mch. 1869	All Ditches
Oct. 17	All Ditches	All Ditches	All Ditches		All Ditches	All Ditches	June 1865	Mch. 1865	All Ditches	All Ditches	All Ditches
Oct. 24	All Ditches							All Ditches	All Ditches	All Ditches	All Ditches
Oct. 31	All Ditches								All Ditches		All Ditches

NOTE.—When date of appropriation is not given there was no water used for direct irrigation. When "All Ditches" is given, it means that all decreed ditches demanding water for direct irrigation were supplied, not that all ditches were drawing water.

Upper District No. 2 extends from Denver to Evans No. 2 ditch below Fort Lupton.

Lower District No. 2 includes Evans No. 2 Ditch and extends to the mouth of the Cache la Poudre River. Below the mouth of the St. Vrain Creek, 1874 water is supplied by seepage.

In District No. 3, at Greeley, 1861 water was used, supplied by seepage.

In District No. 4, near Milliken, 1887 water was used, supplied by seepage when not required to supply the earlier appropriation in District No. 2.

In District No. 64, below Sterling, 1895 water was used, supplied by seepage.

THE WEEKLY REPORTS OF THE WATER COMMISSIONER OF DISTRICT NO. 3 SHOW THE FOLLOWING AMOUNTS OF WATER BROUGHT OVER FROM DISTRICTS NOS. 47, 48 AND 51, INTO DISTRICT NO. 3, DURING 1914.

	From District No. 47 in Acre-Feet	From District No. 48 in Acre-Feet	From District No. 51 in Acre-Feet	Total
April	0	0	0	0
May	0	0	0	0
June	690	930	2,000	3,620
July	1,540	5,912	4,574	12,026
August	394	3,098	1,042	4,534
Sept.	162	1,064	0	1,226
Oct.	0	0	0	0
Nov.	0	0	0	0
Totals	2,786	11,004	7,616	21,406
Stored in Dist. No. 3	56 In Halligan Reservoir	382 In Rocky Ridge Reservoir	0	438
Used for direct irrigation	2,730 By North Poudre Canal and Larimer County Ditch	9,962 By Larimer and Weld and Larimer County Ditches	7,616 By Larimer County Ditch	20,308

NOTE.—During June, 660 acre-feet of the water brought over from District No. 48 went to the general supply of the Cache la Poudre River.

In making this transfer of water 5 per cent. is deducted for loss in transit.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF RIVER WATER, IN ACRE-FEET, USED IN IRRIGATION DURING 1914.

District	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
1	5,300	48,236	70,886	48,988	67,630	40,084	37,560	19,980	338,664
2	1,000	29,926	66,720	70,478	59,980	46,530	19,560	280	294,474
3	0	61,180	117,460	62,556	27,994	12,626	890	490	283,196
4	0	22,082	46,396	34,620	18,720	8,088	2,410	0	132,316
5	0	15,090	34,652	25,238	9,106	4,316	1,002	0	89,404
6	0	1,200	46,986	39,046	13,438	5,260	2,508	140	108,668
7	0	8,940	33,810	35,840	20,518	9,720	6,366	280	115,474
8	2,358	13,328	29,168	38,320	27,670	22,912	16,720	448	150,924
9	0	408	5,574	9,466	7,068	4,660	2,442	0	29,618
64	19,860	23,884	23,972	25,250	40,290	17,700	12,900	0	163,856
Totals	28,518	224,274	475,624	389,802	292,414	171,896	102,448	21,618	1,706,594

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF RESERVOIR WATER, IN ACRE-FEET, USED IN IRRIGATION DURING 1914. SEE "NOTE" BELOW.

District	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
1	0	0	0	1,316	84	1,498	0	0	2,898
2	0	0	0	1,500	5,182	150	0	0	6,832
3	0	0	4,880	19,650	21,900	8,800	0	0	55,230
4	0	0	260	1,938	3,172	2,240	90	0	7,700
5	0	0	0	700	5,488	2,568	36	0	8,792
6	0	0	0	3,770	4,060	1,430	456	0	9,716
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
64	0	0	0	2,940	0	0	0	0	2,940
Totals	0	0	5,140	31,814	39,886	16,686	582	0	94,108

NOTE.—The above quantities do NOT include the waters run from reservoirs directly to the land irrigated without first passing through the rivers or used in exchange for river water. They only include the reservoir water that was discharged into the rivers and rediverted, or discharged into the rivers or into ditches in exchange for river water.

The annual reports of the water commissioners show that by the three above methods of using reservoir water for irrigation, District No. 1 used 110,723 acre-feet; District No. 2 used 149,508 acre-feet; District No. 3 used 99,325 acre-feet; and District No. 4 used 39,862 acre-feet during 1914.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF RIVER WATER AND RESERVOIR WATER, IN ACRE-FEET, USED IN IRRIGATION DURING 1914. SEE "NOTE" BELOW.

District	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
1	5,300	48,236	70,886	50,304	67,714	41,582	37,560	19,980	341,562
2	1,000	20,926	66,720	71,978	65,162	46,680	19,560	280	301,306
3	0	61,180	122,340	82,206	49,894	21,426	890	490	338,426
4	0	22,082	46,656	36,558	21,892	10,328	2,500	0	140,016
5	0	15,090	34,652	25,938	14,594	6,884	1,038	0	98,196
6	0	1,200	46,986	42,816	17,498	6,090	3,054	140	118,384
7	0	8,490	33,810	35,840	20,518	9,720	6,366	280	115,474
8	2,358	13,328	29,168	38,320	27,670	22,912	16,720	448	150,924
9	0	408	5,574	9,466	7,068	4,660	2,442	0	29,618
64	19,860	23,884	23,972	28,190	40,290	17,700	12,900	0	166,796
Totals	28,518	224,274	480,764	421,616	332,300	188,582	103,030	21,618	1,800,702

NOTE.—The above quantities do NOT include the water run from reservoirs directly to the land irrigated without first passing through the rivers or used in exchange for river water. They only include the reservoir water that was discharged into the rivers and rediverted, or discharged into the rivers or into ditches in exchange for river water.

The irrigation officials have no authority to supervise the use of water by the first mentioned method.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AMOUNTS OF WATER, IN ACRE-FEET, DIVERTED FROM THE RIVERS FOR STORAGE IN RESERVOIRS DURING 1914.

District	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Total
1	58,848	31,770	23,936	0	10,192	0	26,320	55,042	206,108
2	9,490	1,600	0	0	0	0	5,250	11,420	27,760
3	26,270	9,990	4,290	0	0	2,780	9,820	5,470	58,620
4	5,322	608	0	0	0	0	1,442	2,440	9,812
5	560	6,960	600	0	0	0	1,204	2,166	11,490
6	3,520	7,490	0	0	0	0	98	2,172	13,280
7	2,550	620	0	0	0	0	1,960	5,180	10,310
8	140	0	0	0	0	0	0	0	140
9	5,376	3,847	1,320	88	0	0	742	448	11,821
64	1,000	0	0	0	0	0	0	0	1,000
Totals	113,076	62,885	30,146	88	10,192	2,780	46,836	84,338	350,341

NOTE.—The above table includes the 438 acre-feet of water brought over from Districts No. 47 and No. 48 and stored in District No. 3. Reservoir water discharged into the river and stored in another reservoir is NOT included. River water stored in exchange for water from another reservoir is NOT included. These exchanges exist only in districts No. 3 and No. 4.

POINT OF ROCKS RESERVOIR AND PREWITT RES. are located in District No. 64, but the headgates of the inlet ditches are in District No. 1 and the Water Commissioner of No. 1 reports the amounts diverted for storage in them. In this table these amounts are charged to District No. 1. District No. 64 is only charged with the amounts diverted for storage in Julesburg Reservoir.

STANDLEY LAKE is located in District No. 2 but the headgate of the inlet ditch is in District No. 7 and the Water Commissioner of No. 7 reports the amounts diverted for storage in it. In this table these amounts are charged to District No. 7.

District No. 2: Standley Lake Res. commenced to store water Feb. 1911, and Milton and Horse Creek Reservoirs in May, 1912. Horse Creek Reservoir broke night of Jan. 28, 1914. Loss of 12,000 acre-feet.

District No. 3: Halligan Res. commenced to store water Aug. 1910.

District No. 5: Foot Hills Res. commenced to store water May, 1912.

District No. 6: Barker Meadow Res. commenced to store water in Spring of 1912.

District No. 8: Castlewood Res. Capacity 5,257 acre-feet.

District No. 64: Point of Rocks Res. commenced to store water Feb., 1911, and Prewitt Res. commenced to store Dec., 1912. Julesburg Res. Capacity 28,178 acre-feet.

THE WEEKLY REPORTS OF THE WATER COMMISSIONERS SHOW THE FOLLOWING AVERAGE DAILY UNSUPPLIED SHORTAGE OF WATER FOR IRRIGATION, IN SECOND-FEET, DURING 1914.

District	April	May	June	July	Aug.	Sept.	Oct.	Nov.
1	0	0	0	First 18 days 303	Last 2 days 123	First 19 days 226	0	0
2		0	0	First 11 days 135	0	0	0	
3		0	Last 10 days 340	461	350	First 19 days 284	0	0
4		0	Last 10 days 334	281	218	98	First 3 days 35	
5		0	0	Last 6 days 55	47	First 5 days 60	0	
6		0	Last 10 days 400	252	154	229	First 17 days 190	0
7		0	0	7 days 100	128	191	First 17 days 116	0
8	0	0	0	First 11 days 126	0	0	0	0
9		0	0	First 4 days 55	0	12	First 17 days 13	
Upper 64	0	0	0	525	0	0	0	
Totals	0	0	1,074?	2,293?	1,020?	1,100?	354?	0

? This shortage is only for a part of the month.

NOTE.—When quantities are not given there was no water used for direct irrigation. When the first and last days are noted, there was a shortage during those days, but no shortage during the balance of the month.

A CONDENSED STATEMENT OF THE WEEKLY REPORTS OF THE WATER COMMISSIONERS FOR 1914 IS AS FOLLOWS:

If we take Districts 1 to 9, both inclusive, and District No. 64, covering the South Platte River and its tributaries from Platte Canon to the Colorado-Nebraska line, a distance of 250 miles, we have the following table:

	Amount of Water Diverted from the Rivers for Storage in Reservoirs in Acre-Feet	Amount of Reservoir Water Used in Irrigation in Acre-Feet See "Note"	Amount of River and Reservoir Water Used in Irrigation in Acre-Feet See "Note"	Average Daily Unsupplied Shortage of Water for Irrigation in Second-Feet
April	113,076	0	28,518	0
May	62,885	0	224,274	0
June	30,146	5,140	480,764	(a) 1,074
July	88	31,814	421,616	2,293?
August	10,192	39,886	332,300	1,020?
Sept.	2,780	16,686	188,582	1,100?
Oct.	46,836	582	103,030	354?
Nov.	84,338	0	21,618	0
Totals	350,341	94,108	1,800,702	

(a) Last 10 days in June, in districts No. 3, No. 4, and No. 6.

? This shortage is only for a part of the month.

NOTE.—The "Amount of Reservoir Water Used in Irrigation" and "Amount of River and Reservoir Water Used in Irrigation" given above, do NOT include reservoir water run directly from the reservoirs to the land irrigated without first passing through the rivers or used in exchange for river water. They only include the reservoir water that was discharged into the rivers and rediverted, or discharged into the rivers or into ditches in exchange for river water.

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL RESERVOIR REPORTS FOR THE IRRIGATION SEASON OF 1914.

District	Number of Reservoirs Reported	Area of High Water Line Acres	Capacity in Acre-Feet	Quantity of Water in Reservoirs May 1, 1914 Acre-Feet	Quantity of Water in Reservoirs Nov. 1, 1914 Acre-Feet	Quantity of Water Held Over from Nov. 1, 1913 Acre-Feet
1	5	10,295	149,867	111,249	38,294	None
2 (A)	32	9,714	160,470	143,470	812	22,300
3	57	10,224	158,073	122,261	49,816	45,317
4	15	4,905	94,843	70,510	32,698	40,600
5	14	2,795	41,912	31,660	16,297	19,217
6	27	2,638	41,955	33,545	16,922	4,894
7	53	Not reported	17,911	17,744	1,741	9,110
8	3	600	10,000	10,000	3,500	3,500
9	36	1,729	28,658	27,026	21,800	13,987
23 (B)	2	5,760	164,628	107,385	105,618	96,857
46			No reservoirs	reported		
47			No reservoirs	reported		
48	5	93	597	459	60	.....
64 (A)	3	6,982	142,341	71,657	33,789	7,434
65	3	64	528	287	413	46
Totals	255	55,799	1,011,783	747,253	321,769	263,262

(A) District No. 2 includes storage in Standley Lake.
District No. 64 includes storage in Pt. of Rocks and Prewitt Reservoirs.
(B) These two reservoirs, Antero and Lake Cheesman, are compiled from the records of this office. No annual report received from the Water Commissioner of District No. 23.

During 1913 certified copies of the decrees entered in the general adjudication of water rights for ditches and reservoirs in district No. 23, were filed in this office. One decree was for use of water for irrigation and the other for non-irrigation.

During 1914 decrees were entered in general adjudications of water rights in districts No. 7 and No. 1, certified copies of which have been filed in this office.

In district No. 7 the decree is for ditches and reservoirs using water for non-irrigation, or beneficial use or application other than direct irrigation, such as domestic, power, municipal, manufacturing and other beneficial purposes.

In district No. 1 the decree is for ditches and reservoirs using water for irrigation and other beneficial purposes. This decree for district No. 1 and the findings of Referee William R. Kelly as approved by Judge Robert G. Strong, are without exception, the clearest and most explicit of any decree and findings on file in this office.

This decree has simplified the distribution of water in the South Platte drainage, not only as regards the rights of reservoirs for storage of water, but also as to the distribution of the water claimed to have been developed by so-called seepage ditches. The refusal of this office, during the past six years, to distribute this seepage water without an order from the Court, has been the basis of many injunctions issued for my better education in irrigation matters.

These findings of the referee in district No. 1, relative to claims for the *exclusive* right to water appropriated by seepage or drainage ditches; the question of "due diligence" or "reasonable time" in perfecting an appropriation; the much abused, in the past, doctrine of "appropriation by relation"; and the authorities quoted in support of his rulings, are recommended to all who are interested in the betterment of our system of appropriation of water.

They should be used as an established precedent to be followed in all future adjudications of water rights.

The statutes of this State require the clerks of The District Courts to file in this office, within ten days after they are rendered, certified copies of all decrees fixing the priorities of appropriation of water for all beneficial purposes. This law in many instances has never been complied with. I have been advised that decrees for certain ditches and reservoirs have been entered by the courts, copies of which have not been filed in this office. I have requested the owners of these appropriations and the clerks of the courts to furnish this office with copies of same, but have not been successful in obtaining them. One clerk wrote me that he would furnish this office with a copy of the decree requested, if I would send him one dollar and fifty cents. It is needless to say, that I still have my one dollar and fifty cents and the clerk still has his decree. I would recommend that the legislature be requested to pass a law, that no decree fixing priorities

of appropriation of water for irrigation or any other beneficial purpose, nor any order of the Court modifying said decree, shall go into effect until a certified copy of same has been filed in the office of the State Engineer and in the office of the Division Engineer as required in Chapter 155, Sec. 11, Session Laws of 1911.

The necessity for this enactment is obvious when we recall, that the present law requires the division engineer to distribute the waters of the division, in accordance with the dates of appropriation as shown by his "Register Priorities" compiled from the decrees on file in his office.

For many years past the irrigation officials in charge of the distribution of the waters of the state have, without exception, been of the opinion that there should be a change in the methods of selecting and paying the water commissioners.

The fact that a man is a good political worker, is no criterion by which to judge of his efficiency as a water commissioner. A hammer and a saw are both useful instruments in their place, but a hammer is worthless when used to saw wood, and a saw is worse than worthless when used to drive nails.

There should be no politics in the question. It is a matter of business. We should have one of the most progressive systems for the distribution of water in the country. The changes of the personnel of the water commissioners should be for the purpose of providing adequate, efficient and constantly improving service. At present it is crude and inefficient.

Our system of distributing water has not progressed as rapidly as it should, in response to the growing demands made upon it with the increasing number of new ditches and reservoirs. There should be a rearrangement of present methods which will eliminate all useless appeals. Above all things our system should be practical and allow the division engineer to work in harmony with the water commissioners. Nothing can be accomplished if all these men are pulling in different directions. I would therefore urge that the following changes be made, which seem absolutely necessary for effective work.

All ditches should be rated at least once each year and in some cases oftener. Some of the large ditches need frequent check measurements. This would necessitate the continuous services of a hydrographer during the irrigation season.

Ditches should be required by statute to be provided with self registering devices. Water Commissioners and their deputies should give all of their time during the irrigation season, to the distribution of water. They should visit daily each ditch on the main stream of their district. Some of them never inspect the ditches near the lower end of their districts.

If these officials knew their tenure in office depended upon their efficiency and not upon their "pull", there would be a marked change for the better in some of the districts in this division.

The finest system in the world is utterly worthless without the best personnel, and the utmost possible efficiency should be demanded of them.

Under the present method of appointing and paying them, the administration of the laws lacks strength, uniformity or impartiality in their enforcement. I would, therefore, recommend that the legislature be requested to place them under the State Civil Service after an examination as to their qualifications for the position, and that they should be paid by the State a definite salary. The division engineer should be given the authority to suspend any water commissioner, without pay, for failure to carry out his instructions.

This office is in need of a filing case, book case and a map hanger, for a proper transaction of the business and preservation of the records of the division. The estimated cost of which is placed at ($100.00) One Hundred Dollars, to be covered by a special appropriation.

I hereto attach the regular statutory tabulation of the Water Commissioners' Annual Reports.

Respectfully submitted,

(Signed) F. COGSWELL,
Irrigation Division Engineer,
Irrigation Division No. 1.

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1914.

(1) District	(2) Amount of Appropriation in Second-Feet	(3) Capacity of Ditches in Second-Feet	(4) Length of Main Ditches in Miles	(5) Length of Laterals in Miles	(6) First Day Water Diverted from Natural Streams for Irrigation
1	3,368	2,756	378	314	April 5
2	3,240	2,844	250	69	April 15
3	3,560	3,333	363	1,239	April 25
4	2,509	2,935	228	125	May 31
5	2,494	1,480	243	230	April 27
6	2,212	1,929	291	181	April 1
7	1,620	.....	208	.....	March 14
8	1,962	1,885	241	388	April 1
9	395	345	54	36	March 8
23		No annual report received			
46	1,912	1,934	180	.....	April 10
47	The Water Commissioner only reports relative to 14 ditches out of a total of 371 decreed appropriations. He reports an abundance of water for all the unreported ditches				
48	1,430	.....	102	.....	April 28
64	3,215	3,215	262	739	April 1
65	171	181	Not reported		May 1
Totals	28,088	22,837	2,800	3,321	March 8

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1914.

District	(7) Last Day Water Diverted from Natural Streams for Irrigation	(8) Maximum No. of Days Water Diverted from Natural Streams for Irrigation	(9) Maximum No. of Days Water Carried from Reservoirs	(10) Amount of Water Carried from Reservoirs in Acre-Feet See "Note"
1	Nov. 30	239	69	110,723
2	Nov. 1	200	202	149,508
3	Oct. 5	163	Not reported	99,325
4	Oct. 31	154	Not reported	39,862
5	Oct. 7	164	Not reported	24,127
6	Nov. 11	225	194	24,211
7	Nov. 15	247	Not reported	18,583
8	Nov. 10	224	125	6,500
9	Oct. 31	238	Not reported	11,223
23	.....	.....	.....	None
46	Sept. 25	169	No reservoirs reported	
47	.....	.....	No reservoirs reported	
48	Oct. 10	167	Not reported	390
64	Oct. 31	214	128	92,318
65	Nov. 15	199	59	94
Totals	Nov. 30	267	194	576,864

NOTE.—The quantities in column (10) represent the reported acre-feet in the reservoirs on May 1st, 1914, plus the acre-feet diverted from the rivers for storage from May 1st to Nov. 1st, minus the acre-feet reported in the reservoirs on Nov. 1st, 1914.

District No. 2 includes storage in Standley Lake.

District No. 64 includes storage in Pt. of Rocks and Prewitt Reservoirs.

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1914.

District	(11) Average Daily Amount of Water Diverted by Ditches During Season from Natural Streams for Irrigation Second-Feet	(12) No. of Acre-Feet Diverted by Ditches During Season from Natural Streams for Irrigation	(13) Total No. of Acres That Can Be Irrigated See "Note"	(14) Crops Irrigated, Etc. Alfalfa	(15) Natural Grasses
1	1,406	326,354	148,600	26,100	13,200
2	1,007	296,296	92,816	24,583	3,692
3	1,378	316,449	391,690	66,836	6,790
4	559	133,548	113,810	31,200	725
5	436	113,875	108,694	31,520	5,590
6	672	114,060	94,102	34,180	9,630
7	368	110,921	130,435	35,195	6,490
8	539	187,607	122,290	17,271	1,498
9	137	36,848	12,357	4,970	273
23					
46	1,577	224,384	89,915		50,954
47					
48	422	55,273	10,784	6	5,213
64	987	211,269	101,515	31,810	21,830
65	96	15,668	3,779	1,187	1,272
Totals	9,584	2,141,546	1,420,787	304,858	127,157

NOTE.—The quantities given in columns (13) to (25), represent the total acreage that can be irrigated or was irrigated, whether the ditches only used the natural flow of streams, or used river and reservoir water combined. The total amount of water used in any district, except in Districts Nos. 3 and 7, will be found by adding together the "No. of Acre-ft. Diverted by Ditches During Season from Natural Streams," given in column (12) and the "Amount of Water Carried from Reservoirs in Acre-Feet," as given in column (10). In District No. 3, 20,308 Acre-Feet were diverted from Districts Nos. 47, 48, and 51. Also an unknown amount of reservoir water was used. In District No. 7, 476 Acre-Feet were diverted from District No. 51 and used by the Golden City and Ralston Creek Ditch.

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1914.

CROPS IRRIGATED FROM CANALS IN ACRES, SEE "NOTE" BELOW

District	(16) Cereals	(17) Orchards	(18) Market Gardens	(19) Potatoes	(20) Sugar Beets	(21) Other Crops
1	26,545	214	40	2,528	14,773	10,953
2	32,542	226	4,342	2,268	12,320	2,761
3	92,057	2,396	1,643	29,040	42,755	4,050
4	53,640	1,700	135	2,745	15,995	2,675
5	38,570	1,204	917	200	10,160	1,290
6	33,865	2,056	864	405	8,440	1,818
7	43,705	3,995	10,585		700	70
8	16,666	3,378	1,590	200	574	5,510
9	4,273	204	44		235	29
23						
46	505		1			
47						
48				6		
64	17,090	136	68	1,430	15,938	745
65	484	41	32	26	37	200
Totals	359,942	15,550	20,261	38,848	121,927	30,101

IRRIGATION DIVISION NO. 1.

TABULATED STATEMENT OF WATER COMMISSIONERS' ANNUAL DITCH REPORTS FOR THE IRRIGATION SEASON OF 1914.

	CROPS IRRIGATED FROM CANALS IN ACRES				COST—DOLLARS		
District	(22)	(23) Cabbage	(24)	(25) Total Irrigated	(26) Superintendence	(27) Repairs	(28) Improvements
1				94,353	14,580	7,900	11,400
2		857	Celery 107	83,698	17,910	6,755	3,130
3				245,567	25,405	20,850	20,700
4			Peas 1,485	110,300	10,650	800	7,575
5			Peas 776	90,227	9,705	3,490	3,135
6				91,258	3,600	11,880	7,000
7				100,740	Not reported		
8			Celery 60	46,747	3,650	6,558	605
9	Timothy 202	15	Corn 39	10,284	2,436	1,400	787
23							
46	Pasture 38,455			89,915	Not reported		
47							
48				5,225		402	226
64				89,047	6,450	5,210	2,735
65				3,278		633	296
Totals	38,657	872	2,467	1,060,639	94,386	65,878	57,589

Pueblo, Colo., December 15, 1913.

Hon. John E. Field,
State Engineer,
Denver, Colo.

Dear Sir: I have the pleasure of handing you herewith my report for the year ending November 30, 1913, for Division No. 2, comprising the drainage basin of the Arkansas River and all its tributaries within the State of Colorado, divided into 13 Districts embracing more than one-fourth of the entire state.

The soil within the boundaries of this Division in richness and productiveness is second to none in the world; every variety of fruit or vegetable indigenous to this latitude will grow most bountifully here.

I will briefly mention here, although foreign to irrigation, yet vital to this Division, the great wealth of mineral,—gold, silver, lead and zinc, together with enormous coal fields, and oil-producing wells for more than 25 years; the mineral production greatest of any in the Union, the best of building stone and beautiful marble. The great feeding grounds for tens of thousands of cattle, sheep and hogs; large numbers are finished in the fattening pens throughout the valley for local and outside markets, as the local packing plant here consumes over fifty thousand hogs, cattle and sheep in proportion. The best of local markets for not only a limited amount of live stock, but for truck garden products.

Whilst the last season was a most prosperous and productive one, the precipitation was much below the normal, so distributed throughout the season as to produce good results. Beginning the season without a full reservoir in the entire Division, and many with but a very meagre amount with the above conditions, and no storage whatever during the entire season, one of the shortest on water ever known,—we had most bountiful and excellent yields of all crops and many record makers.

SNOWFALL, RAINFALL, AND RUNOFF

The rainfall and snowfall records for the past year show a result considerably under the normal. Taking the year from Dec. 1, 1912, to Dec. 1, 1913, the total rainfall at Pueblo totals 9.25 in., which is about 77% of the normal. The precipitation in June was less than half the normal, being 0.66 in. In July several very heavy rains, totaling 3.12 in. brought the precipitation for the month much above the normal of 1.97 in. August showed a precipitation of 0.87 in. while the normal is 1.57 in.

A comparison of the snowfall records at Leadville, Tennessee Fork, Lake Fork, and Twin Lakes, with those for the previous winter, which were normal, show the supply to have been about 2/3 of the normal.

The total runoff at Canon City for the past season, April to November inclusive, was 345,000 acre feet, which is 64% of the runoff for 1912. The records at Granite showed 84%, at Salida 79%, and Pueblo 57% of the runoff for 1912.

COMPARISON OF 1913 WITH 1912

The reports from Districts 11, 12, 14, 17 and 67, which lie along the main river and may be taken as approximately correct, show a total diversion of 838,400 acre feet. The report from the same districts for the previous year of 1912 show a total diversion of 1,212,400 acre feet. The diversions of 1913 are about 69% of those of 1912. The total acres irrigated by these same districts in 1912 was 373,574 acres and in 1913 was 364,164 acres or 97.5% of the previous year.

A comparison of the past year with the previous year shows a decrease of about 20,000 acres in alfalfa, a decrease of 20,000 acres in cereals and an increase of 7500 acres in sugar beets.

FINANCIAL

If the office of the Division Engineer is to serve the purpose for which it was created, it is absolutely essential that a more liberal appropriation be provided; the abolition of railroad passes, the demand for more frequent and accurate measurements of ditches and streams and necessity for more frequent use of telephones has raised the expense of the office to a point where the $500.00 now allowed is entirely inadequate. During the past season this amount was exceeded by $135.00, which represented a personal loss to the Division Engineer in charge. The amount appropriated should not be less than $1000.00; and we further recommend the State furnish each Division Engineer an automobile, in view of the increased expense of traveling due largely to the abolition of passes, &c. It is the intention of the office during the coming season to make a charge of $10.00 per day and expenses for all canal rating. During the past season 28 ratings were made. At the above rate this would amount to $260. per year, and it is suggested that this amount be credited to the Division office to be expended for necessary expense and betterment of service.

OFFICE FURNISHINGS

In the laws of the 18th General Assembly it was provided that the Secretary of State provide and furnish the Division Engineers offices with the necessary furniture, filing cases, etc. required to properly care for the numerous letters and records. The law, as enacted, failed to provide an appropriation for this purpose. It is hoped that the next legislature will not overlook this important matter. Such furnishings as are now in this office are provided by the Division Engineer. The records collected by the office, consisting of canal ratings, stream gagings, reservoir and canal reports, copies of decrees, capacity tables, letters, etc., are of considerable value and can only be properly preserved in suitable filing cases. The cost of the necessary cases would not exceed $100.00.

FRUIT

The apple and cherry crop was the best ever known in the valley,—size, color, flavor and yield never excelled in any land. The great value of pruning and spraying has begun to dawn on our people and thus the fruits of vigorous application of each has been most satisfactory and remunerative. Some districts have already marketed over one hundred thousand dollars worth of apples, and there are many such districts throughout the valley.

MELONS

The cantaloupe and melon crop was very heavy and most satisfactory returns obtained.

CROPS

Of the more than one half million irrigated acres of this Division there was 185,274 acres of alfalfa yielding 741,096 tons at $8.00 (minimum) $5,928,768—84896 acres in cereals, nearly 20,000 acres in orchards, 50867 acres sugar beets, bringing to the farmer alone more than four million dollars. The tonnage and per cent of sugar was above the average, some growers received as much as $8.00 per ton sliding scale based on percent sugar.

SEED AND TRUCK GARDENING

There is a large acreage devoted entirely to growing seeds of all kinds for truck gardeners et al sold at wholesale throughout the country. Some of the best paying crops are celery, cucumbers, onions, cabbage and tomatoes; during the summer months they are shipped in car lots to many states east and south.

CANNING FACTORIES

The several canning and pickling factories were supplied to capacity during the season.

ALFALFA MEAL MILLS

The alfalfa meal mill has proved a success, advanced the price of alfalfa,—a short haul for the farmer, and saves the price of baling.

INTENSE FARMING

The value of intense farming is shown by the great number of good homes made possible on 5, 10, 20 or 40 acres, with modern equipments, affording comfort, with many luxuries. This can be done with any one of a number of different crops. There is no other investment of like amount that will produce the above.

CONDENSED MILK PLANT

One of the most important enterprises ever located in this State is the Helvetia Condensed Milk Plant at Lamar, which will begin active operations about January 5th, 1914,—a "capacity of 5000 cows." One can readily imagine the great importance of this industry. It is a well known fact that prosperity follows the cow.

DUTY OF WATER

The duty of water, for irrigation, is the amount of land a given amount of water will irrigate successfully in the growing and maturing of any particular crop. The demand for water by the various ditch, canal and reservoir managements is becoming more insistent and constant each year. The reason of this is apparent.

The various ditch managements have spent much money and time each year since the ditches were built in bringing settlers (either land purchasers or renters) on to the lands to be irrigated from the respective ditches. Even with the most constant efforts to settle up the territory and subdue the lands to be irrigated, and even with unlimited means available for settling up the lands, the process has been slow. Gradually, however, the acreage of land actually in cultivation and under irrigation from the various canals and reservoirs has increased from year to year until now practically the maximum acreage is being irrigated under each irrigation system. As the acreage has increased, the need for water has become greater until now practically every irrigation enterprise in the Arkansas Valley needs and demands its full appropriation of water all the time; whereas in earlier times, a constant flow of the full appropriation of water was not always needed.

WATER COMMISSIONERS' SHEET

I would suggest that columns 3, 7, 8, 9, 10, 11, 25, 26 and 27, in the sheets used by the Water Commissioners for their annual reports, be eliminated, as they mean nothing to them and are not understood sufficiently to give them place. That columns 6 to 14, inclusive, in reservoir sheets, be left off. I would recommend that all quantities be expressed in acre feet, and that the date of priority be added. Also that the field books used by the Commissioners can be used 2 or 3 years each, as they are not nearly used up in one season, and much expense can be saved, as there is plenty unused space to accommodate from one to two years more.

WATER COMMISSIONERS

There are eleven water commissioners in this Division, five on the main river and six on tributaries. It is again urged as in previous reports that the commissioners be chosen by Civil Service and paid directly by the State. It is further recommended that the commissioners in Districts 12, 14, 17 and 67 be paid $1,500.00 per year and that the remaining commissioners in Districts 10, 11, 13, 15, 18 and 19, be paid $1,000.00 per year. If deputy commissioners be needed these should still be paid directly by the counties, as is now the case. This arrangement would cost the State $13,000.00 in salaries for Division No. 2. It is believed that this method would greatly increase the efficiency of water distribution and commissioners would then be chosen on a basis of merit and removed from local influences. Further, each water commissioner or water officer should wear a star, or some emblem of authority, at all times while employed in the duties of his office.

GAGES AND MEASURING DEVICES

There is a tendency of headgate keepers to hold their ditches from 0.05 to 0.10 above their correct gage height in order that they may not give their ditches the "worst of it." This, together with the fact that ditch owners naturally will not request a new rating when they know their ditches are carrying more than their due priority, results in a diversion of probably 10% more water than the records show. Under present conditions it is very probable that the last ditch out should be receiving its priority. To properly see that all ditches receive their exact rights it is recommended that ditches carrying over 25 second feet of water be required to install self registering gages that will record a week's flow; this installation would cost each ditch about $100.00. The water commissioner should then be instructed to make the round of their ditches each week, taking off the past week's chart and inserting a new one. The records should be filed in the office of the Division Engineer. Furthermore, the commissioners should be provided with a current meter and instructed in its use. They could then check the ratings of their ditches at regular and frequent intervals.

We have associated with us in the office Mr. B. S. Clayton, a most competent hydrographer, from the State Engineer's Office; with his able assistance this office was never better equipped to meet the demands and requirements of the water consumers than now; we are able to make measurements of streams and ratings without any delay whatever. The great benefit of this can be readily understood by the water consumers.

In conclusion I desire to thank the State Engineer for his courteous treatment and substantial advice on all matters pertaining to this office. I also wish to thank the several water commissioners in this Division, as they have been most active and faithful in the discharge of their duties, giving at all times accurate and reliable information.

Respectfully submitted,

(Signed) E. R. CHEW,
Irrigation Division Engineer.

IRRIGATION DIVISION NO. 2.

WATER COMMISSIONERS' RESERVOIR REPORT FOR THE IRRIGATION SEASON OF 1913.

District No.	Location	Source of Supply	Capacity in Cu. Ft.	Quantity Water in Reservoir May 1st, Cu. Ft.	Quantity Water in Reservoir Nov. 1st, Cu. Ft.
10	El Paso Co.	Fountain River	2,260,905,800	289,211,800	23,582,200
11	Lake and Chaffee	Ark. Riv. and Tribs.	1,201,809,559	909,144,500	527,009,000
12	Fremont	Ark. Riv. and Tribs.	750,452,000	363,470,000	349,605,000
13					11,979,000
14	Pueblo Co.		1,385,272,581	416,825,640	
15	Pueblo Co.	St. Charles	270,000,000	171,442,391	267,460,711
16					
17	Otero	Ark. River	24,933,825,560	1,108,908,000	43,560,000
18					
19	Las Animas Co.	Purgatoire	965,046,220	61,838,000	23,628,000
	Totals		31,767,311,720	3,321,840,331	1,248,623,911

ENGI
013-14.
95-1896
NER'S DITCH R
TION SEASON OF 19 WATER DIVISION NO. 2
S IRRIGATED FROM CANA

		Market Gardens	Potatoes	s, Source of Information, Etc.
6000.00				
3000.00				
260.45				
9260.45				
626.10	8	160		
224.51	7	217	497	) hogs; col. 22—peas; 23—cattle.
	1	349	33	
	7	23		
850.61	8	2893	2	rs and tomatoes; 23—cantaloupes and melons.
	4			
	0	220		
52.95	1	1725	23	—cantaloupes, 400 ac. cucumbers.
	2	428		cattle.
304.90				
	0	205		l. 23—beans.
357.85				
	3	6220	555	
1492.91				
0				
1492.91				

tion for

the above is a sum on Division Engineer.

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SUMMARY OF EXPENSES—STATE ENGINEER'S OFFICE

BIENNIAL PERIOD 1881-2 TO 1913-14.

	1881-1882	1883-1884	1885-1886	1887-1888	1889-1890	1891-1892	1893-1894	1895-1896	1897-1898	1899-1900	1901-1902	1903-1904	1905-1906	1907-1908	1909-1910	1911-1912	1913-1914
State Engineer—Salary	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	.....	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00	$ 6000.00
Deputies and Asstn.—Salaries	.....	1200.00	.....	.....	2778.00	2394.00	.....	3000.00	3406.85	3378.00	4060.00	.....	387.75 / 5238.00	6558.80	7083.00	8388.00	6900.00
Expenses Eng. Dep. and Asstn	.....	389.00	.....	.....	78.10	.....	.....	260.45	126.90	38.00	490.08	.....	1355.26	2232.97	555.00	544.69	2490.77
Total	$ 6000.00	7589.00	6000.00	6000.00	8856.10	8394.00	6000.00	9260.45	9533.75	9416.00	10550.08	.....	12981.01	14791.77	13638.00	14932.69	15390.77
Chief Hydrographer	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2000.00	.....	3325.00	3600.00
Asst. Hydrographers	.....	357.65	.....	.....	2542.40	1856.55	.....	626.10	88.00	374.45	1038.15	.....	119.80	3133.72	6793.65	15530.17	17858.33
Equipment	.....	216.73	.....	.....	155.40	.....	.....	.....	85.70	.....	.....	.....	181.97	70.15	5364.35	355.87	172.99
Salaries Gauge Observers	.....	.....	.....	.....	574.18	555.35	.....	224.51	61.00	.....	338.50	.....	196.45	297.30	2203.63	2902.15 / 638.19	2739.62
Expenses Hydrographers	.....	217.00	.....	.....	480.62	232.00	.....	.....	.....	365.60	509.83	.....	.....	992.68	4643.93	7235.26	134.00 / 5357.70
Total	.....	791.38	.....	.....	3752.60	2643.90	930.00	850.61	234.70	740.05	1886.48	.....	477.22	6493.85	19005.56*	29986.64	29862.64
New Indices	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4489.74	2208.12	.....
Stenographer	.....	.....	.....	.....	161.85	29.00	.....	52.95	127.10	294.20	668.50	.....	3195.43	2409.00	2400.00	4200.00	2195.00
Draughtsman	.....	.....	.....	.....	340.00	150.00	.....	.....	.....	.....	.....	.....	2400.00	2400.00	2400.00	2862.50	3000.00
Filing Clerk	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1799.96	2000.00	2308.32	2400.00
Clerk	.....	.....	.....	.....	125.00	290.00	.....	304.90	260.00	.....	27.00	.....	3991.82	1411.95	.....	1800.00	2400.00
Incidental	.....	8.60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	293.64	609.84	1689.17	300.71	439.82
Total	.....	8.60	.....	.....	626.85	469.00	.....	357.85	387.10	294.20	695.50	.....	9880.99	8630.75	12978.91	13679.65	10434.82
Grand Total	.....	8388.98	.....	.....	13235.55	11506.90	6930.00	11492.91	11099.55	10450.25	13132.06	.....	23339.22	29916.37	45622.47	58598.98	55688.23
Receipts of Office	.....	0	.....	.....	0	0	0	0	0	801.00	1057.55	.....	4132.56	8266.71	14403.27	24106.57	25404.73
Net Cost to State	$ 6000.00	$ 8388.98	$ 6000.00	$ 6000.00	$13235.55	$11506.90	$ 6930.00	$11492.91	$11099.55	$ 9649.25	$12074.51	.....	$19206.66	$21649.66	$31129.20	$34492.41	$30283.50

NOTE.—During the biennial periods 1909-10, 1911-12, most of the important gauging stations were equipped with automatic gauges and new meters purchased for the hydrographers. A new rating station for rating meters was installed at Cooper Lake. In the office an entire new index was installed as described in the report for those periods. This amounted to about $13,000.

98B

WATER COMMISSIONER'S DITCH REPORT

FOR THE IRRIGATION SEASON OF 1913

IRRIGATION DIVISION NO. 2 — WATER DIVISION NO. 2

District No.	Water Commissioner	Amount of Appropriation Cu. ft. per sec.	Capacity of Canal	Length of Main Ditch, Miles	Length of Laterals, Miles	No. of Days Water Delivered from Natural Stream	Average Daily Flow of Water During Season (cu. ft. per sec.) from Natural Stream	No. of Acre-Feet Used by Canal Season from Natural Stream	Total No. Acres That Can be Irrigated	CROPS IRRIGATED FROM CANAL IN ACRES: Alfalfa	Natural Grasses	Cereals	Orchards	Market Gardens	Potatoes	Sugar Beets	Other Crops	22	23	Total Irrigated	COST, DOLLARS: Superintendence	Repairs	Improvements	Remarks. Source of Information, Etc.
10	F. D. Eubank	606	474	169	81	.....	.....	.....	.....	5069	2691	1567	68	160	.....	160	349	.....	.....	10064	.....	.....	.....	.....
11	Max Dickman	1166	1072	401	149	.....	.....	105893	43292	548	12482	6559	267	217	497	51	775	2512	1017	27622	.....	2700	.....	1406 head of horses, 4630 hogs; col. 22—peas; 23—cattle.
12	D. S. Jones	783	.....	.....	.....	.....	339	137381	29969	6091	2261	3499	8961	349	33	80	265	1	.....	21438	3605	21836	3777	Col. 22—asparagus.
13	H. W. Hendershot	439	.....	186	.....	.....	.....	.....	19671	1980	13086	3582	27	23	.....	.....	12	.....	.....	19803	.....	.....	421	.....
14	H. R. Thompson	2062	2135	247	205	.....	459	170390	133820	42195	4231	21080	5548	2893	2	19885	5264	205	3628	104931	21545	13326	10736	Col. 22—celery, cucumbers and tomatoes; 23—cantaloupes and melons.
15	S. F. Curtis	215	213	89	65	4517	90	12867	7085	2553	1066	733	94	.....	.....	80	.....	.....	.....	4523	.....	1670	.....	.....
16	P. S. Brown	932	.....	389	184	.....	500	28270	90987	14905	2600	5306	650	220	.....	348	468	.....	.....	24525	5417	4194	10675	.....
17	G. M. Weybright	3110	3874	.....	1045	.....	879	307164	194805	79665	11515	32645	1831	1725	23	25237	980	370	3375	157156	20620	25440	71300	Col. 22—melons; col. 23—cantaloupes, 400 ac. cucumbers.
18	Fred Willis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19	A. A. Windham	550	.....	.....	.....	.....	.....	.....	40235	13813	66202	3383	82	428	.....	95	743	1335	5980	24421	.....	1212	1075	Col. 22—horses; col. 23—cattle.
49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
66	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
67	H. A. Pettee	974	2220	214	164	.....	347	117592	106470	23488	3130	8109	420	205	.....	5091	6045	523	207	53016	9899	17643	16346	Col. 22—cantaloupes, col. 23—beans.
		10837	.....	.....	.....	.....	.....	879562	666334	193343	119264	88463	17948	6220	555	51027	14901	4946	14207	447499	61086	88011	114330	

I hereby certify that the above is a summary of the facts to the best of my knowledge. E. R. CHEW, Irrigation Division Engineer.

Hon. John E. Field,
State Engineer,
Denver, Colo.

Dear Sir: I herewith submit my report for the fiscal year ending November 30th, 1914, for Division No. 2.

The greatest snow storm known in this Valley began the first day of December, 1913, accompanied with lightning and thunder and slight rain; from 20 to 30 inches covering the entire Division, in the Mountain Districts from four to six feet. This snow lasted the entire winter, going off slowly, leaving the ground in the very best condition for plowing and seeding.

Rains began in March, continued intermittently throughout the entire season; early planting was somewhat retarded by rain. The entire season was the wettest ever known in this Division, in fact, too much water. By the too free use of irrigation water together with the rains, much damage was done to growing crops, also in harvesting same.

There were numerous heavy rains and many disastrous floods in the tributaries.

All reservoirs were filled to full capacity and were not called upon during the season for water; practically no water from the reservoirs was used for irrigation during the season.

The flow of the streams, with the rain-fall, was abundant for all purposes. The average rain-fall at this point (Pueblo) was 18 inches; in several other locations in the Division it was 22 inches. Indeed, "Dry Farming" was a complete success, producing some of the finest crops ever grown in the State, particularly grains of all kinds, and in many instances, remarkable yields. Mr. Teller had 1000 acres in wheat, just west of the City, in one tract, first year on sod, that made 27½ bushels per acre; 40 bushels reported from several locations.

There was more rain, more water in every stream, than was ever known before; even the oldest inhabitant acknowledged the unprecedented snow and the rain-fall of the past season and duration of the same.

The acreage in sugar beets was 40000; the tonnage very high; sugar content about average; too much water for banner crop.

In alfalfa, 214682 acres; some very peculiar circumstances governed this crop; for instance, in many localities three good crops and a fair fourth; in others, only two, owing to rains; so that the crop throughout the Valley would not average over 3½ tons per acre or 751387 tons at stack price of $6.00 would be $4,508,312.

In cereals 84162 acres; many reports of 50 bushels of wheat (and often more) per acre; oats 100 bushels; corn 80 bushels, some instances more. The above maximum yield; the minimum, wheat reported 20 bushels, oats 45 bushels, corn 40 bushels.

In natural grasses or blue stem, 42000 acres; this class of hay averages about 1½ tons per acre, and always has a ready

sale at a minimum of $12.00, and maximum $24.00. Season and climatic conditions govern prices.

In orchards 18000 acres. The yield this season was not so heavy as last, yet it was a superior crop of fine quality.

We have 7000 acres in market gardens, not only supplying our home markets, but many states receive their supply during certain months from these gardens.

In other and diversified crops there are 41000 acres. This does not include 12000 acres of melons and seed crops of all kinds for market gardens, etc. These seeds not only supply a large part of our domestic trade, but are exported in car lots; seed crops are proving very remunerative; many farmers are turning their attention to these crops solely.

A careful estimate of the value of the smaller fruits, such as cherries, plums, prunes, bush fruits, berries and grapes, together with celery, vegetables and honey, is $2,000,000. All canning and pickling factories were put to their utmost capacity.

The stock industry has assumed gigantic proportions; more than 600,000 lambs and sheep were fatted, about 20000 head of cattle and ten thousand hogs, shipped to the packing houses of Pueblo, Denver, and the eastern cities. Raising of mules and draft horses is growing more important each year. This stock is of a most superior quality.

A great stimulant in the dairy industry is the building of a large condensary at Lamar, and a number of creameries and cheese factories in other sections. This means the progressive farmers who are building silos; only a year or two ago there were only one or two, now they are numbered by scores and are to be seen everywhere; they are easily filled as the farms produce abundance of fine ensilage, the dry farmer uses cane, milo, maze, kaffir and kindred crops, as these crops are rarely a failure.

Thus closing one of the most fruitful years in the history of the Valley. Were I to indulge in legal suggestions it would be but a repetition of former reports. That other laws are badly needed none will deny. Owing to the great increase in population, new irrigation projects, with the old, the duties of the water officers increase proportionately. The demands on this office have increased at an alarming rate. There is a crying need for a clerk and stenographer, and an increase in expense account; ten or fifteen years ago $500.00 per annum was all right; twice that, with a good stenographer, is demanded, that even will barely suffice the needs.

In closing I wish to mention, the valuable assistance given the administration of this office, by Mr. Bunger, Hydrographer and Deputy State Engineer; since April first he has made sixteen complete ratings on ditches, thirty-two check measurements, and fifty-eight measurements on the Arkansas River and its tributaries. This has been a difficult year to obtain accurate ratings on most of the ditches in this Division owing to extremely sanded conditions, caused by numerous floods, occurring oftener and

more disastrous than previous years. The ratings on the river station remained fairly constant, especially at Pueblo and "The Oxford Farmers Dam"; at no time did the measurements vary more than 10% from the curves used to determine the rating tables. These stat[illegible]

100A

IRRIGATION DIVISION NO. 2

RESERVOIR REPORT—1914

District No.	No. of Reservoirs Reported	Area of High Water Lines, Acres	Capacity in Cubic Feet	Quantity of Water in Reservoir May 1st, cu. ft.	Quantity of Water in Reservoir Nov. 1st, cu. ft.	First Day Water Used from Reservoir	Last Day Water Used from Reservoir	No. of Days Water Carried from Reservoir	Average Daily Amount of Water Carried from Res. in Cubic Feet During Season	No. of Acre-Feet of Res. Water Carried During Season	CROPS IRRIGATED FROM RESERVOIRS ONLY, IN ACRES											COST, DOLLARS			Remarks
											Alfalfa	Natural Grasses	Cereals	Orchards	Market Gardens	Potatoes	Sugar Beets	Other Crops			Total Irrigated	Superintendence	Repairs	Improvements	
10	9	941	74,996,160	61,333,360	3,949,800																				
11	7	4205	3,650,967,011	814,643,170	2,957,504,460																				
12	12		794,556,000	140,828,000	477,450,000																				
13	1		2,592,000	2,592,000	0	4-18-14	4-23-14	5	5			160									160			10	
14	9	3710	138,527,581	85,826,268	476,808,000			45	120	5558															
15	6	674	320,000,000	237,862,000	294,673,000																				
16	25	3590	4,087,817,418	3,800,709,500	741,268,550			145	120	8170	1938	35	1218	105	26		49	152			2195	1500			Strictly reservoir water.
17	15	8167	8,838,337,000	1,132,560,000	2,722,312,000																				
18																									
19	18	20150	965,046,220	478,806,924	291,068,962					20000	2000	100	4790	885	100	1000	150	625	700	240	8650	22000			
49																									
66																									
67	2	15435	99,905,200,000	1,132,560,000	3,271,965,840			66	378	23624	22108	69	5569	306		5	1134	4360	217	66	30904				
Total			118,777,539,390	7,885,721,222	11,238,990,612					57352	26046	204	11577	1296	120	1005	1333	5137	917	306	41749	23500		10	

NOTE.—Where no report of crops is given, the reservoir water is used as an auxiliary to canals having a direct right from the river.

100B

IRRIGATION DIVISION NO. 2

DITCH REPORT—1914

District No.	Amount of Appropriations Cu. ft. per sec.	Capacity of Canals	Length of Main Ditch Miles	Length of Laterals Miles	Average Daily Amount of Water During Season Cu. ft. per sec. from Natural Stream	No. of Acre-Feet Used by Canal for Season from Natural Stream	Total No. of Acres That Can be Irrigated	CROPS IRRIGATED FROM CANALS IN ACRES											COST, DOLLARS			REMARKS
								Alfalfa	Natural Grasses	Cereals	Orchards	Market Gardens	Potatoes	Sugar Beets	Other Crops			Total Irrigated	Superintendence	Repairs	Improvements	
10	437		119	60		59029	13918	4442	4060	1695	163	233		4	84	Peas		10903		7943	400	
11	1751		451	150	851	184150	42347	5312	12864	6645	272	250	487	45		2695		28445		2565	500	Horses, 1426; Cattle, 11463; Hogs, 3480
12	947				430	211240	34025	7306	2022	4623	9253	388	15	115	761			24780	3610	16792	1388	
13				244	162		19836	1927	13990	3732	17	19	1	0	35			19836	423			
14	2061	2112	238	205	611	261350	126105	51977	2146	10236	5052	2097		13455	18575	3045	255	106748	24358	10135	50258	
15	215	227	98	69	98	19741	7080	2629	1162	833	74			65	15			4778		2100		
16	859		389	189	735	64111	115442	15619	3817	6066	389	285		105	884	Water Melons	Cantaloupes	26730		10716	30667	
17	3033	3949	366	1065	1069	594530	198405	79980	2960	41670	1600	905	15	22902	13460	510	3350	169030	23720	50000	38100	
18																						
19	656	955	219	191			42320	14167	8007	3577	63	383	11	69	1307			27715	2620	6375	4386	Cattle, 8020; Horses, 2344; Sheep, 5000
49		No	decrees																			
66		No	decrees																			
67	977	2240	212	164	500	214668	106613	32953	4850	8817	398	454	253	2832	5337	Beans 72	Corn 414	56929	6091	17021	12271	
Total	9936	9483	2092	2337	4456	1,608,819	706091	216609	55878	87894	17271	5014	782	39592	40458			475892	60399	123647	137970	

sale at a minimum of $12.00, and maximum $24.00. Season and climatic conditions govern prices.

In orchards 18000 acres. The yield this season was not so heavy as last, yet it was a superior crop of fine quality.

IRR

Natural Stream	No. of Acre-Feet	Cereals	Orchards	REMARKS
	0	1695	1	
	4	6645	27	Cattle, 11463; Hogs, 3480
	2	4623	925	
	0	3732	1	
	6	10236	505	
	2	833	7	
	7	6066	38	
	0	41670	160	
	7	3577	6	Horses, 2344; Sheep, 5000
	0	8817	398	
	8	87894	17271	

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and fifty-eight measurements on the Arkansas River and its tributaries. This has been a difficult year to obtain accurate ratings on most of the ditches in this Division owing to extremely sanded conditions, caused by numerous floods, occurring oftener and

more disastrous than previous years. The ratings on the river station remained fairly constant, especially at Pueblo and "The Oxford Farmers Dam"; at no time did the measurements vary more than 10% from the curves used to determine the rating tables. These stations were most valuable in the administration of the water. There is need of a good station at La Junta, or preferably below the mouth of the Purgatoire at Las Animas. The only way a station could be secured would be to build a permanent control across the river.

This office, in conjunction with the "Ditch Association", has been able to keep a much better check on the tributaries this season than ever before, necessitating frequent measurements, in fact, after each flood a new rating is necessary.

Perhaps it is of interest to know that in this Division there is 13000 sec. ft. of water decreed, 706091 acres can be irrigated. 475,892 acres were irrigated, average daily amount of water used 4500 sec. ft., in round numbers, or approximately 1.70 acre ft. per acre.

Respectfully submitted,

(Signed) E. R. CHEW,
Irrigation Division Engineer.

Alamosa, Colorado, November 22, 1913.

Mr. John E. Field,
State Engineer,
Denver, Colo.

Dear Sir: I herewith submit to you my annual report, as Irrigation Division Engineer, for Division No. 3.

There has been less water in this Division this year than I have seen before. We have not had any high water at all this year, which is a very unusual thing to happen. If it had not been for the reservoirs the crops would have suffered a great deal, but we had the reservoirs to draw upon, and the crops were very good, all but the native hay, which is short, on account of having no flood water, which the hay land needs to make a good crop.

I have visited nearly all the districts in the Division, and have found most of them handled fairly well by the Commissioners.

In District No. 20 the Commissioner, F. C. Spencer, has done very well for a new man. This District is very large and is too much for one man to handle, and will be more difficult to handle when all the reservoirs are completed. There are five reservoirs completed now and there is work being done on three more. The S. L. V. Irrigation District Reservoir is a very complete proposition and is very well handled by the Directors.

In District No. 21 the Commissioner, Thomas McCunniff, has had some trouble on account of shortage of water in the Alamosa River and the La Jara River, and on account of a number of the ditches not having headgates and measuring flumes. This difficulty will be overcome next season. The crops in this District were very good with the exception of some on new land that was seeded very late in the season.

In District No. 22 there has not been any trouble, with the exception of one or two small disputes, which were settled satisfactorily to all concerned. Mr. W. W. Christensen, the Water Commissioner, is a new man, but has done well. The crops in this District were very good, considering the shortage of water, in the latter part of the season.

In District No. 24, the Water Commissioner, Mr. J. P. Sanchez, has not had so much trouble as in former years. The Mexican people and the Costilla Estates seem to have got together and are working for the best interests of all concerned. Most of the crops in this District were very good.

In District No. 25, the Water Commissioner, Mr. John L. Charles, has reported no difficulties. This District is a very prosperous one and the crops were good. Mr. Charles seems to have the faculty of getting along with the water users very well. There are never any complaints.

In District No. 26, Mr. Alex Russell, the Commissioner, seems to get along without any trouble, as he has not asked for any assistance from me. The District is settled by old timers in

the valley. They are mostly wealthy and have plenty of cattle, sheep and horses. If the newcomers in the valley would follow their example they would all do well.

In District No. 27, Mr. A. N. Coolbroth, the Commissioner,

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IRRIGATION DIVISION NO. 3

RESERVOIR REPORT, SEASON 1913

Reservoir	Name of Owner	Source of Supply	Area High Water Line, Acres	Capacity Cubic Feet	Kind of Dam	Length of Dam, Feet	Height of Dam Above Bottom of Outlet	Number and Diameter of Outlets	Width of Spillway, Feet	Height of Freeboard, Feet	Character of Protection	Name of Ditch Supplied from Reservoir	Quantity of Water in Reservoir May 1, Cu. Ft.	Quantity of Water in Reservoir Nov. 1, Cu. Ft.	General Condition	
Cove Lake	H. H. Jordan	San Antonio and Conejos Cks.	600	250,000,000	Rock	135	32		15		Earth	North and South Laterals	100,000,000	None	Good	Dis. No. 22
Medano Extension	Jesse M. Denton	Medano Spg. Creek	2¼	2,837,392	Earth	100	4	2.			Earth	Outlet	2,128,044	None	Good	Dis. No. 35
Sanches	S. L. P. & W. Co.	Ventura Crk., Ballejos Ck., Culebra Riv., San Francisco	3151¼	4,493,459,605	Earth	1407	120	8.0x10.6	250	10	Riprap	Culebra Eastdale Canal	770,881,320	134,905,320	Good	Dis. No. 24
Eastdale No. 1	S. L. P. & W. Co.	Culebra Riv. Eastdale Res. 2, Costilla Riv.	336	150,975,000	Earth	2630	32	2 Opgs. 3.6x5.3	100	7	None	Laterals No. 1 and 6	22,651,200	None	Good	Dis. No. 24
Eastdale No. 2	S. L. P. & W. Co.	Costilla Riv., Culebra Riv.	357	132,468,000	Earth	3340	32	2 Opgs. 3.6x5.3	100	7	Riprap	Eastdale Res. No. 1, No. 4 coming to	632,491,200	37,026,000	Good	Dis. No. 24
Mesita Res.	S. L. P. & W. Co.	Costilla Riv., Culebra Riv.	266.3	113,531,887	Earth	2900	46.7	3.0x4.6	50	5	Riprap	Laterals No. 7 and 8	5,270,760	2,178,000	Good	
Salazar	S. L. P. & W. Co.	Rito Seco Creek	10	5,341,151	Earth	1350	19.7	12.	100	5	Sagebrush	Irrigation Direct	5,300,000	4,000,000	Good	Dis. No. 24
Upper and Lower Lost Lakes	Collins, Hanselkins Co.	Lost Trail		112,184,723	Earth							Midland	81,075,065	29,378,057	Good	Dis. No. 20
Rood Canon	Lost Lake Fish Hatching Co.	E. Crooked Creek		121,993,026	Earth						Rock, Hand laid	Midland	82,630,448	31,109,858	Fair	
Santa Maria	Rio Grande Res. & Ditch Co.	North Clear Crk.	641.5	2,101,298,860	Earth	1265	96	9 Opgs. 6.0x7.6	40	8	Rock, Hand laid	Rio Grande and Monte Vista Canal	345,991,710	188,049,025		
Rio Grande	S. L. V. Irrigation District	Rio Grande Riv.	1196.2	3,231,855,970	Earth	458	100	2 Opgs. 7.0x11.3	30	15	Rock, Hand laid	Farmers Union	536,783,512	89,647,296	Good	
Mountain Home	Trinchera Irrigation Dist.	Trinchera, Ojito and Indian Creeks	640.	834,047,503	Rock and Earth	535	110	3.36	60	12	22 Ft. Riprap	Trinchera, High Line, Garland	3,000	5,000	Good	Dis. No. 35

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IRRIGATION DIVISION NO. 3

TABULATION OF WATER COMMISSIONERS' REPORTS FOR THE SEASON OF 1913.

District No.	Number of Priorities	Amount of Appropriation Second-feet	Length of Main Ditch, Miles	Average Number of Days Water from Natural Stream	Average Daily Amount of Water During Season Sec. Ft.	Total Number of Acres That Can be Irrigated	CROPS IRRIGATED FROM CANAL IN ACRES									COST, DOLLARS		
							Alfalfa	Natural Grasses	Cereals	Orchards	Market Gardens	Potatoes	Sugar Beets	Peas, Etc.	Total Irrigated	Superintendence	Repairs	Improvements
20	176	5731.	289.	96.	1843.	459,310	18,424	109,389	58,986	14	86	9085.	2,432	53,336	251,752	31,142.99	8,002.00	13,038.00
21	88	1588.75	712.	47.61	1220.	65,365	2,421	32,094	17,273		2	1329.	330	6,930	61,009	265.00	2,662.00	2,305.00
22	108	3832.93	360.2	68.65		91,200	3,385	35,162	40,938	8	176	1295	166	16,749	97,951	14,540.00	2,095.00	1,090.00
24	35	369.99	93.2	67.36	256.38	192,100	1,582	4,600	9,306	5	63	18	123	396	15,226	840.00	480.00	575.00
25	60	420.91	159.80	96.	124.5	51,888	592	16,742	1,363	4	20	38		177	18,936		650.00	200.00
26	193	553.79	107.25	80.4	314.67	35,097	2,392	24,060	1,462	5	45.5	15		518	28,499			170.00
27	86	134.29	21.75	103.39	82.48	11,895	281	4,344	770	2	.5	27.5	18	9	5,452		430.00	175.00
35	6	95.	20.	103.			45	330	1	0.5								
Totals	752	12725.74	1762.84			806,855	29,122	227,321	130,099	38.5	392.	11807.5	3,069	78,145	378,825	46,788.00	33,219.00	14,553.00

Alamosa, Colorado, November 22, 1913.

Mr. John E. Field,
State Engineer,

TABULATI

District No.	Number of Priorities	Amount of Appropriation Second-feet	Length of Main Ditch, Miles	Average Number of Days Water from Natural Stream	Average Daily Amount of Water During Season Sec. Ft.	Total Number of Acres That Can
20	176	5731.	289.	96.	1843.	459.0
21	88	1588.75	712.	47.61	1220.	65.0
22	108	3832.93	360.2	68.65	.....	91.0
24	35	369.99	93.2	67.36	256.38	192.0
25	60	420.91	159.80	96.	124.5	51.0
26	193	553.79	107.25	80.4	314.67	35.0
27	86	134.29	21.75	103.39	82.48	11.0
35	6	95.	20.	103.	.....	.....
Totals	752	12725.74	1762.84	.....	.....	806.0

gether and are working for the best interests of all concerned. Most of the crops in this District were very good.

In District No. 25, the Water Commissioner, Mr. John L. Charles, has reported no difficulties. This District is a very prosperous one and the crops were good. Mr. Charles seems to have the faculty of getting along with the water users very well. There are never any complaints.

In District No. 26, Mr. Alex Russell, the Commissioner, seems to get along without any trouble, as he has not asked for any assistance from me. The District is settled by old timers in

the valley. They are mostly wealthy and have plenty of cattle, sheep and horses. If the newcomers in the valley would follow their example they would all do well.

In District No. 27, Mr. A. N. Coolbroth, the Commissioner, has not reported any trouble. He seems to handle this District with good satisfaction to the water users. The crops in this District were very good, as usual.

In District No. 35, Mr. I. N. Janney, the Commissioner, has paid no attention to the work. What work has been done was by Jessie Denton, a deputy. There have been some disputes, which were settled without much trouble.

In my forty years residence in the valley, I have never seen so little water in the valley as there was this season, yet the crops have been very good. It convinces me that the farmers have been using too much water heretofore. With two or three more reservoirs, at the headwaters of the streams, the San Luis Valley would never suffer for want of water for their crops, and crop failure would never be known in the San Luis Valley.

Respectfully submitted,

FREDERICK W. SWANSON,
Irrigation Division Engineer, Division No. 3.
Alamosa, Colorado, November 30, 1914.

Alamosa, Colo., Nov. 30, 1914.

Mr. John E. Field,
State Engineer,
Denver, Colo.

Dear Sir: I hereby submit my Annual Report as Irrigation Engineer Division No. 3. The Annual Reports of the several Water Commissioners, and tabulations for the entire Division during the Irrigation season of 1914.

There has been no extreme high water during the season just closed on any of the streams but a very even flow during the whole season. There has only been a very few small ditches closed down and only for a few days at that, this was because the Water Commissioner, being a new man, did not understand how to handle the District.

The Valley has had one of the most prosperous seasons that I have seen for many years. The farmers have had all the water that they could use, and some to spare.

The crops throughout the valley were extra good.

There was feed enough raised to fatten thousands of cattle, sheep and hogs.

In District No. 20, there are now about six Reservoirs completed, which will furnish all the water that they will need, for all time to come.

The farmers in the District are very prosperous, they are building themselves some of the finest homes that can be seen in any part of the country.

In District No. 21, there are two Reservoirs, which have done good service during the season just closed. The people in this District have put in crops, a great amount of new land this year, and have had good crops. As this is about the oldest settled portion of the valley, the farms are in better condition than any other part of the Valley that I know about.

There was some trouble about water in this District, in the early part of the season, the reason for this was that the Water Commissioner was a new man.

District No. 22 had all the water that they could use, and the crops were extra good, so everybody was happy. The farmers in this District are building a great many silos, which will make them all rich in a few years.

District No. 24, which is in the Southeastern part of the Valley has one of the finest reservoirs in the State, if not one of the best. It is called the Sanchez Reservoir, and was built by the Costilla Estate and Developing Company, it covers some of the finest land in the State. They have had plenty of water for all purposes, and some to spare. They have stored a great deal of water, the Reservoir has a capacity of 104,000 acre feet.

District No. 25, is a small District, but is very prosperous, they raise a great deal of hay and stock feeding is the principal business of the District.

The farmers are doing a great deal of improvement, that they may be able to handle the water with more economy.

District No. 26, is looked after by Commissioner Alex Russell, ...ict,

[illegible]

If the water commissioners were instructed to gather crop reports early in the season, I think that their reports would show at least one-fourth more crops in the valley.

Respectfully submitted,
(Signed) FREDERICK W. SWANSON,
Irrigation Division Engineer, Division No. 3.

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IRRIGATION DIVISION NO. 3

RESERVOIR REPORT—1914

District No.	Name of Reservoir	Name of Owner	Location	Source of Supply	Kind of Dam	Area of High-Water Line, Acres	Capacity in Cubic Feet	Quantity of Water in Reservoir May 1st, Cu. Ft.	Quantity of Water in Reservoir Nov. 1st, Cu. Ft.	Name of Ditch Supplied from Reservoir	Length of Dam, Feet	Height of Dam Above Bottom of Outlet, Feet	Size of Outlet Feet	Width Mouth of Spillway, Feet	Height of Freeboard, Feet	Character of Protection	General Condition
20	Santa Maria	Rio Grande R. & D. Co.	Mineral and Hinsdale Co's.	Clear Cr.	Earth	611	1,828,435,350	566,854,216	975,539,966	Rio Grande	1265	90	6 x 7	40	8	Hand-Laid Rock	
	Rio Grande	San Luis Valley Irr. Dist.		Rio Grande	Earth	1187	2,320,923,661	45,837,361	37,869,751	Farmers Union	462	100	11 x 15	30	6	Hand-Laid Rock	
	Road Canon	Lost Lakes Fisheries Co.	Hinsdale Co.	Crooked Cr.	Earth	162	121,993,026	No report	No report	Midland		20	2 x 3	30		Rock	
	Upper and Lower Lost Lakes	Lost Lakes Fisheries Co.	Hinsdale Co.	Crooked Cr.	Earth		112,184,923	No report	No report	Midland		10	4 x 3	10		Rock	
	San Luis Valley	San Luis Res. Co.	Rio Grande Co.	Beaver Cr.	Earth	100	152,460,000	130,680,000	0	San Luis Canal	190	85	4.5 x 5	180	5	*Concrete	
22	Cove Lake	H. H. Jordan	Poncha Valley	San Antonio and Conejos	Rock	600	250,000,000	100,000,000	0	Toltec	120	40	3 x 4				
24	Sanchez	San Luis P. & W. Co.		Culebra and Tribs.	Earth	3151.21	4,493,454,605	274,068,000	711,319,000	Culebra, Eastdale	1410	125	8 x 12.5	250	10	Rock	
	Eastdale No. 1	San Luis P. & W. Co.		Culebra River	Earth	336	150,975,000	28,925,000	30,000,000	Laterals 5 and 6	1733	25	3.5 x 5.25	100	7	Rock	
	Eastdale No. 2	San Luis P. & W. Co.		Culebra and Costilla	Earth	357	132,468,000	65,340,000	37,000,000	Lateral 4	3500	25	3 x 4.5	100	7	Rock	
	Mesita	San Luis P. & W. Co.		Culebra	Earth	266.3	113,531,887	8,700,000	12,250,000	Laterals 7 and 8	2900	46.5	3 x 4.5	50	5	Rock	
	Salazar	Delfino Salazar		Rito Seco Cr.		19.99	5,341,151	5,000,000	1,000,000	Direct							
21	La Jara	Terrace Irrig. Dist.		La Jara Riv.	Earth	1241	612,301,126	348,480,000	261,360,000	Terrace Irr. Dist.	1230	40	5	100	10	Rock	
	Alamosa	Terrace Irrig. Dist.		Alamosa Riv.					348,480,000								
	Total					8031.50	10,294,068,729	1,573,904,447	2,414,818,717								

*Unsatisfactory.

104B

IRRIGATION DIVISION NO. 3

DITCH REPORT—1914

District No.	No. of Priorities	Amount of Appropriation, Cu. Ft. Per Sec.	Length of Main Ditch, Miles	Average Daily Amount of Water (Cu. Ft. per Sec.) from Natural Stream	No. of Acre-Feet Used by Canal from Reservoirs from Natural Stream	Total No. of Acres That Can be Irrigated	CROPS IRRIGATED FROM CANALS IN ACRES: Alfalfa	Natural Grasses	Cereals	Orchards	Market Gardens	Potatoes	Sugar Beets	Other Crops	Peas, Etc.	Pasture	Total Irrigated	COST, DOLLARS: Superintendence	Repairs	Improvements
20	268	4660	429	111	1680	447,580	23075	122173	100516	2	139	8237	15		11135	35000	300,287	34,960	4017	25,839
21	86	1702	333	63	1069	67,525	2670	23654	16383			1207			7530		51,444	2707	530	
22	103	4019	215	98		85,440	3902	30100	33761		167	290			17510		85,730	5575	2740	525
24	84	1682	81	151	114	18,590	826	4801	8463	5	67				1132		15,294			
25	50	396	159	93	188	52,714	690	17237	1471	4	0	9			189		19,600	500		
26	204	572	106	92	410	38,672	2635	27480	1191	5	4	30			291		31,636			375
27	87	149	25	99	102	8835	362	3782	842	2½	3½	29			2	1062	6025		610	355
35	49	290																		
Totals	931	13470	1348	707	3563	719356	34160	229,227	162627	18½	380½	9802	15		37789	36062	510,016	43,742	7897	27,094

Alamosa, Colo., Nov. 30, 1914.

Mr. John E. Field,
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all purposes, and some to spare. They have stored a great deal of water, the Reservoir has a capacity of 104,000 acre feet.

District No. 25, is a small District, but is very prosperous, they raise a great deal of hay and stock feeding is the principal business of the District.

District No.	No. of Priorities	Amount of Appropriation Cu. Ft. Per Sec.	Length of Main Ditch, Miles	Average Daily Amount of Water (Cu. Ft. per Sec.) from Natural Stream	No. of Acre-Feet Used by Canal	Acres That Can be Irrigated	Improvements
20	268	4660	429	111	7,580		25,839
21	86	1702	333	63	7,525		
22	103	4019	215	98	3,440		525
24	84	1682	81	151	3,590		
25	50	396	159	93	2,714		
26	204	572	106	92	3,672		375
27	87	149	25	99	8835		355
35	49	290	.....	.....	.....		.....
Totals	931	13470	1348	707	9356		27,094

The farmers are doing a great deal of improvement, that they may be able to handle the water with more economy.

District No. 26, is looked after by Commissioner Alex Russell, and he seems to get along with all the water users in the District, as he gives them all the water they want.

This is a very prosperous District, and the farmers are all making good.

District No. 27, is taken care of by A. N. Coolbroth, and he seems to give them good satisfaction, and there has not been a complaint made by the water users.

The crops were very good and there was plenty of water for all.

District No. 35 has no Water Commissioner, as Mr. I. N. Janney has left the District. It was looked after by Mr. Steve Calkins, as deputy, he is a new man. He has done fairly well for the first time, and by another season will make a good Commissioner.

There is one reservoir in this District, owned by the Trinchera Estate people, and in order to handle this District properly, next year they will have to put in their measuring flumes and gauge-rods, which they have not done yet.

I haven't been able to get any report from District No. 35.

In conclusion, I will say, as I have done in former reports, that the reports from the water commissioners are not complete, and they never will be, until there is a change in the manner of appointing of the water commissioners, and also in their pay.

I will say, that the water commissioners have done the best that they could, under the circumstances. The water users are very slow in complying with the law in regard to the headgates and measuring flumes.

The water users have all been served with notices, this year, that they must put in their headgates and flumes, or not get any water next year. A great many have already complied with the order, and I think many more will do so before next season.

It will be a great help to the water commissioners.

I think that the valley will be in better shape for the distribution of water, next season, than it has ever been.

In regard to crop reports from the water commissioners, I will say, that they are not very reliable, one reason for this is that the farmers do not seem to want to give the commissioners the necessary information and another reason is that the commissioners do not commence to get the data early enough, but wait until the season is over and then try to get the crop report, this is very hard to do so late in the season.

If the water commissioners were instructed to gather crop reports early in the season, I think that their reports would show at least one-fourth more crops in the valley.

Respectfully submitted,

(Signed) FREDERICK W. SWANSON,
Irrigation Division Engineer, Division No. 3.

Montrose, Colo., Nov. 30, 1913.

State Engineer,
Denver, Colorado.

Dear Sir: In submitting my annual report for the fiscal year ending with this date, I shall comply as fully as possible with the statutes governing the same which reads as follows:

"The reports filed with the State Engineer shall include all correspondence for the season on all business and official acts for the season last past, and shall include the reports of the water commissioners as hereinafter defined, and other data and information."

By an Act of the Eighteenth General Assembly, the office of this division was located in Montrose, and a portion of that act reads as follows:

"The Secretary of State shall provide a suitable office for each Division Engineer, and shall supply him with suitable furniture and office equipment for the proper transaction of the business and preservation of the records of the irrigation division." (L '11, p 469, Sec. 1)

After the above section went into effect, I made repeated efforts to have the Secretary of State comply with the law by furnishing an office for this division, so that the office might be moved from Delta to Montrose as the law required. How successful I was in getting the Secretary of State to carry out the provision of the law so far as this division is concerned is shown by the following letter which I received from him.

"State of Colorado
Office of Secretary of State,
Denver, Colo., Nov. 13, 1912.

Hon. H. C. Getty,
Division Engineer, District No. 4,
Delta, Colorado.

Dear Sir: I am informed by Mr. Monell, County Clerk of Montrose County, that you requested him to speak to me about furnishing you an office as division engineer, under the statutes creating the office of Division Engineer.

I beg to say that while the law provides that the Secretary of State shall furnish office for Division Engineers, the Legislature failed to make any appropriation to cover this expense and therefore, it can not be done.

I have had several requests from different Division Engineers and have answered them in the same manner that I reply to you.

Yours very truly,
(Signed) JAMES B. PEARCE,
Secretary of State."

On June first of this year the office equipment, which the state did not furnish, was moved from Delta to Montrose, and the office has been maintained, not as provided in the above statute, but from my expense fund.

This division comprises a large extent of territory and each year some important irrigation project is completed, and thereby the work of the engineer of this division is extended.

This season I travelled six thousand five hundred miles in the discharge of my official duties, and the amount allowed for expenses, $500.00 is inadequate to meet office expenses, railroad fare, livery hire, hotel bills, etc. I therefore, recommend that an appropriation be made by the next General Assembly for the proper maintenance of his office.

Through an appropriation of one hundred fifty dollars made by the Nineteenth General Assembly, this office was equipped with a desk, typewriter, etc.

The season of 1913 was the driest in this part of the state that we have known for many years, yet crops were good. A bountiful harvest and fair prices added not a little to the prosperity of this section.

So low did the Gunnison River get, that when the Gunnison tunnel was diverting six hundred second feet of water, at times in August and September there was not to exceed two hundred second feet passing the tunnel headgate.

There were more acre feet of water per acre used under the Gunnison Tunnel project than were used in any part of this division.

In Districts Nos. 40 and 42 the water commissioners handled the distribution of water in very commendable and satisfactory manners. I mention these two districts as they are difficult districts to handle during a dry season.

IRRIGATION DIVISION NO. 4.

REPORTS OF WATER COMMISSIONERS FOR THE IRRIGATION SEASON OF 1913.

The following districts have made no report for this season: 29, 31, 32, 33, 59, 63 and 69.

District No. 28, Commissioner J. Roy Hicks, Sargents, Colo. Mr. Hicks worked a few days only, and the crop report is all that is given:

Total number acres that can be irrigated		19710
Natural grasses (acres)		18213
Alfalfa	(acres)	20
Cereals	(acres)	156
Potatoes	(acres)	18
Total irrigated		18407

District No. 30, Commissioner W. E. Tyner, Durango, Colo.

Amount appropriated (second feet)	272.4
Capacity of ditches (second feet)	223.
Length of ditches (miles)	559.
Average No. days water was used	60
Average daily amount of water used (second feet)	67
No. acre-feet water used	7393
No. acres can be irrigated	11020
Alfalfa	2170 acres
Cereals	4195 acres
Potatoes	96 acres
Other crops	135 acres
Total irrigated	6596 acres
Duty of water in acre-feet per acre	1.16
Spent for repairs	$4800.
Spent for improvements	1100.

District No. 34, Commissioner H. M. Barber, Mancos, Colo.

Amount appropriated (second feet)	1432
Length of canals (miles)	144
Length of laterals (miles)	200
Average No. days water was used	81
Average daily amount used (second feet)	183
Total No. acres can be irrigated	82631
Alfalfa	2759
Natural grasses	1357
Cereals	2505
Orchards	99
Potatoes	149
Sugar beets	14
Other crops	60
Total acres irrigated	6943
No. acre-feet water used	29646
Duty of water (acre-feet)	4.2 per acre
Spent for maintenance	$2361.

District No. 40, Commissioner Charles H. Luellen, Eckert, Colo. This report is notorious for its neatness, completeness and excellency. It is by far the best report ever received by this office.

Amount appropriated (second feet)	509
Capacity of ditches (second feet)	1295
Length of ditches (miles)	409
First day water was used, April 7.	
Last day water was used, Sept. 29.	
Average No. days used (stream)	100
Average No. days used (reservoir)	60
Cu. Ft. water used from reservoir	1,317,854,896
Average daily amount used for season (second feet)	550
No. acre-feet used for season	139,341
No. acres that can be irrigated	72,403
Alfalfa	21791 acres
Natural grasses	1878 acres
Cereals	6711 acres
Orchards	11485 acres
Market gardens	196 acres
Potatoes	1285 acres
Sugar beets	393 acres
Other crops	820 acres
Total irrigated	44459 acres
Duty of water (acre-feet)	3 per acre
Spent for superintending	$2900
Spent for repairs	3319.50
Spent for improvements	2573.
Total spent	$8792.50

District No. 41, Commissioner A. J. Baxter, Montrose, Colo.

Amount appropriated this district	716 sec. ft.
Amount appropriated district 62	1360 sec. ft.
Capacity of canals	1590 sec. ft.
Length of canals (miles)	378
Length of laterals (miles)	256
First day water used, March 15th.	
Last day water used, Nov. 10th.	

Average No. days water was used	240.	
Average daily amount used (sec. ft.)	809.5	
No. acre-feet water used	332640.	
No. acres that can be irrigated	96840.	
Alfalfa	18967	acres
Natural grasses	400	acres
Cereals	14210	acres
Orchards	5570	acres
Market gardens	4235	acres
Potatoes	7620	acres
Sugar beets	4470	acres
Other crops	1470	acres
Total irrigated	56942	acres
Duty of water in acre-feet, per acre	5.8	
Cost of superintending	$ 550.	
Cost of repairs	200.	
Cost of improvements	12160	
Total spent	$12910.	

District No. 42, Commissioner Geo. M. Saunders, Mesa, Colo.

Amount appropriated	772.6	sec. ft
Average daily amount (stream)	184.33	sec. ft
Average daily amount (reservoir)	190.	sec. ft
Average No. days used (stream)	93.	sec. ft.
Average No. days used (reservoir)	36.	
Amount from reservoir	259,259,320	cu. ft.
No. acre-feet used	56,119	
Crop acreage: Alfalfa	46037	acres
Natural grasses	1506	acres
Cereals	2010	acres
Orchards	809	acres
Market gardens	48	acres
Potatoes	370	acres
Sugar beets	26	acres
Other crops	2128	acres
Total irrigated	50934	acres
Duty of water in acre-feet, per acre	1.1	

Expended for superintending	$1431.
Expended for repairs	3710.
Expended for improvements	575
Total	$5716.

District No. 60, Commissioner H. C. Browning, Norwood, Colo.

Amount appropriated	168.2	sec. ft
Average amount carried from stream	100	sec. ft.
Average amount carried from reservoir	20.5	sec. ft
Average daily amount used	97.	sec. ft.
Amount used from reservoir	95,000,000	cu. ft.
Acre-feet used for season	13,625	
No. acres can be irrigated	65,400	
Alfalfa	5820	acres
Cereals	4952	acres
Orchards	351	acres
Market gardens	283	acres
Potatoes	186	acres
Corn	245	acres
Barley	890	acres
Timothy	2732	acres
Pasture	2330	acres
Total irrigated	17789	acres
Duty of water in acre-feet, per acre	.8	
Expenditures: Superintending	$2600	
Repairs	2075	
Improvements	3800	
Total	$8475	

District No. 61, Commissioner Lorenzo Walters, Paradox, Colo.

Amount appropriated	16.54	sec. ft.
From Utah, from 10 to 50 second feet.		
Capacity of ditches	68	sec. ft.
Length of ditches	23	miles
First day used, April 25.		
Last day used, November 2.		
Average daily amount used	22.16	sec. ft.

No. acre feet used	5056	acre ft.
No. acres can irrigate	4090	acres
Alfalfa	885	acres
Natural grass	74	acres
Cereals	601	acres
Orchards	41	acres
Potatoes	12.5	acres
Other crops	40.5	acres
Total irrigated	1654	acres
Duty of water in acre-feet, per acre	3.	
Cost of operating	$ 648.	
Improvements	225	
Superintending	372	
Total	$1245.	

District No. 62, Commissioner W. O. Brower, Cimarron, Colo.

Amount appropriated	109.	sec. ft.
Capacity ditches	137.	sec. ft.
Length of ditches	51	miles
No acres can be irrigated	7425	acres
Appropriated, but used in District 41	1360	sec. ft.
Alfalfa and timothy	848	acres
Natural grasses	770	acres
Cereals	167	acres
Potatoes	23	acres
Pasture	88	acres
Timothy	104	acres
Total irrigated	2000	acres
Cost of superintending	$1300	

District No. 68, Commissioner John W. Martin, Ridgway, Colo.

Amount appropriated	586.6	sec. ft.
No. acres can be irrigated	2885.	acres
Alfalfa	3133	acres
Natural grass	2269.	acres

Cereals	3867.	acres
Orchards	108	acres
Market gardens	62	acres
Potatoes	356	acres
Mixed hay	5704	acres
Timothy	976	acres
Sugar beets	70	acres
Total irrigated	16540	acres
Cost of repairs	$5211.	
Cost of improvements	5834	

In closing this report I cannot refrain from suggesting that the method of paying the water commissioners should be changed. Under the present method, some of the counties are over burdened, the incompetent commissioners are over-paid, the efficient commissioners are under-paid. Under the present system the expense is too great and the results obtained too small.

The Field books and Report Blanks should be revised.

Why not have a more efficient, less cumbersome and more satisfactory method?

Very respectfully,

(Signed) H. C. GETTY,

Irrigation Division Engineer, Division No. 4.

Montrose, Colo., Nov. 30, 1914.

State Engineer,
Denver, Colorado.

Dear Sir: I herewith submit my annual report for irrigation Division No. 4 for the fiscal year ending Nov. 30, 1914. (Here follows copies of letters and correspondence between the Division Engineer and the office of State Engineer, which it is not thought necessary to print.)

The year 1914 was remarkable in many ways. The snow-fall in the mountains was very heavy, and the season was especially noted for the heavy rains during the summer months. The precipitation from Nov. 1st, 1913 to Nov. 1st, 1914 was about fifteen inches and for May, June, July and August about seven inches.

The snow melting was comparatively slow and hence the streams held up late in the season. There was such an abundant supply of water that only about one-half of the water commissioners in the division were called out. Crops were exceptionally good but the prices very low. This was especially true of the fruit crop in Mesa, Delta, and Montrose Counties. Peaches barely paid the expense of picking, packing and shipping. The

price received for apples was far below the average, though the quality was never better. Many of the apple growers shipped their entire crop in bulk and as a result realized better porfits than did those who packed their apples.

SOME NEEDS OF THE DIVISION

If seventy-five per cent of the farmers could grow as good crops and farm as well as the other twenty-five per cent are now doing, there would be no talk or failures, or doubt as to meeting water assessments, charges for advertising needed to bring every acre of this fertile valley under cultivation.

More teaching of agriculture and domestic science courses in schools is needed in order to interest the young people in farming and the promotion of good crops and good stock.

More sugar factories would add greatly to its prosperity as there are large returns from the raising of beets. A large indirect return from the feeding of beet pulp to stock and a large return of money to the community thru this pay roll.

Starch factories, vinegar plants, evaporating plants, etc., are badly needed to work up portions of the crops during years of large yields and to work up those grades of produce not suitable or profitable for shipment out of the valleys and which are now going to waste. These industries would tend to keep up prices especially during years of large crops.

Packing plants for handling the pork and poultry raised in the valleys would greatly increase the possibilities of profitable hog and chicken raising.

Another thing badly needed, especially in the Uncompahgre Valley is some uniform system of drainage. Last season about six acre feet of water were used for every acre of crops grown. The same is true of this season. The duty of water in the valley should be greater, as the farms are using entirely too much water. Even if extreme caution is practiced in the use of water, yet there will be necessary some extensive drainage system.

About four years ago, The Elliott-Meaker Drainage Company began operation in the valley. They are experts in their line and have done incalculable service in the way of tile drainage. Mr. Herman Elliott, President of the Company, was formerly Drainage expert of the U. S. Department of Agriculture.

UNCOMPAHGRE VALLEY PROJECT, COLORADO

The Uncompahgre Valley Project consists of ten principal divisions, as follows—The Gunnison Tunnel; which brings the waters of the Gunnison river thru Vernal Mesa into the Uncompahgre Valley to supplement the flow of the Uncompahgre river, which has proven insufficient for the irrigable land in the valley. The South canal, which carries the water from the Gunnison Tunnel to the Uncompahgre river, and is also capable of irrigating about 13,000 acres of land between the South canal and the

Loutzenhizer canal. And the following canal systems which divert or will divert water from the Uncompahgre river to irrigate approximately the acreage shown—

Loutzenhizer canal system	11,200	acres
Selig canal system	22,400	"
East canal system	22,000	"
Garnet Mesa	4,000	"
West canal system	7,200	"
Montrose & Delta system	33,000	"
Ironstone or California system	26,000	"

making a total of approximately 140,000 acres of land to be irrigated of which 30,000 acres was under cultivation and 80,000 under ditches before the U. S. R. S. began work.

In addition to the above, there is contemplated a reservoir at Taylor Park for the purpose of maintaining the flow of water in the Gunnison river, sufficient to supply the needs of the project.

STATUS OF WORK

The Gunnison Tunnel is completed, except for the concrete lining of about 15,000 feet of side walls and arch where tunnel is thru solid rock. The completion of this lining will not be necessary until the full capacity is needed. Experiments were made this summer to determine the true capacity of the Gunnison Tunnel. Collapsible shutters will be required on the diversion weir and a few changes in the tunnel diversion gates before they will be completed.

The South canal system is complete, except for permanent outlet works to replace the present wooden structure where the water empties into the Uncompahgre river. The wooden flume of full capacity, in place of the present temporary flume across the arroya near tunnel No. 5, and a few short laterals, tap boxes, weirs, etc., which will have to be built.

The Loutzenhizer canal system is practically complete except for a few short laterals and a number of tap boxes, etc., necessary to supply water to new lands.

Maurice A. Wogan of Denver, Colorado, has a contract for seven and one-half miles of the Selig canal, and a portion of the lateral systems. The important structures are being built by the Government. This canal system will be finished in time for the 1915 irrigation season, except for the Peach Valley lateral.

About one-half of the lateral system and the principal structures on the East canal system were completed during the year. Reynolds-Ely Construction Company have a contract for excavating twenty-eight and a half miles of lateral systems and the Pacific Pipe and Tank Company for 8,600 feet of 32″ wood stave pipe, which will supply water to Garnet Mesa. This work will practically complete the system.

The Garnet system was transferred to the Government on September first. The headworks and other structures are being replaced and the canal put in shape for the next season.

The West canal system is complete, except, for the connection with the South canal, which will be built during the coming winter.

The Montrose & Delta canal is complete, except for the construction of a few laterals and completion of the headgates, and the replacement of several flumes built before the Government took the system over and enlarged it. The canal system is unable to supply all of the land under it with water, on account of the fact that about ninety second feet of water is being delivered to lands below the Ironstone canal. When the Ironstone canal system is complete, this water can be used on high lands under the Montrose & Delta system.

No work has been done on the California or Ironstone system, except for surveys and investigations.

No work has been done on the Taylor Park reservoir, except for surveys, borings, and studies of the duty of water.

EXPENDITURES

The expenditures on the Project to October 1, 1914 was $5,693,103.00.

ALLOTMENTS

The Secretary of the Interior approved allotments for the year 1914 for $750,861.00.

CROPS

The season was a very good one for the growing of crops. The principal crops grown on the project are alfalfa, potatoes, wheat, oats, sugar beets, apples and onions. The total acreage cropped this year, is approximately 38,000 acres out of 140,000 acres in the project and the crop values are estimated at $1,000,000.00.

DUTY OF WATER

The water is delivered on a continuous flow basis, and often in very small heads, with the result that the duty of water is very low. In 1908, 3.17 acre feet were delivered per acre of crops; in 1909, 4.5; in 1910, 6.25; in 1911, 5.44; in 1912, 4.81; in 1913, 5.43; and this year, approximately 5 acre feet. This duty may be greatly increased in the future by delivering the water on an acre-foot basis and in larger heads.

STATEMENT OF THE IRRIGATION SYSTEM AND WORKS OF THE PARADOX VALLEY IRRIGATION, LAND AND DEVELOPMENT COMPANY, WEST PARADOX VALLEY, MONTROSE COUNTY, COLO.

West Paradox Valley, is located in the western extremity of Montrose County, Colorado, bordered on the West by the Colorado-Utah State line. It is surrounded by precipitous cliffs merging into the La Salle mountains which have an elevation of 13,000 and more feet. It is sheltered in a most peculiar and marked manner, being completely shut in by these red sandstone barriers with the exception of an opening about four miles wide on the south-east. The Rio Dolores river creates East and West Paradox Valley by cutting across it at a point about nine miles from the northwestern extremity. This river comes into the Valley thru a canyon about fifteen hundred feed in depth and goes out thru a similar canyon. Paradox Valley is a great fissure which has gradually filled up with the disintergrations of the ages from its lofty surroundings. The soil is a deep red sandy loam varying in depth from five to seventy-five feet.

West Paradox Valley has an area of about twenty-eight square miles and practically the entire area is susceptible of cultivation and irrigation. It slopes to the southeast about 150 feet to the mile which makes it impossible to utilize the Rio Dolores for irrigation purposes.

The La Salle Mountains, located to the northwest and in close proximity to the valley affords a simple solution of its irrigation problem. The drainage area of a part of the north, the east, and a part of the south water sheds of these mountains has been utilized by means of ditches and the water diverted to the Paradox Water Shed from whence it finds its way through natural courses to West Paradox Valley.

The diversion system has a carrying capacity of 236 cubic feet per second of time and is practically completed with the exception of the Taylor Creek Feeder which is a small ditch to be used in diverting the water from Taylor Creek.

This company also owns a storage system which when completed will conserve 10,000 acre feet of water for late summer and fall use. This system consists of two reservoirs; the Geyser reservoir and the Buckeye reservoir.

The Geyser dam was built during the summer of 1908 to a height of 40 feet with a storage capacity of 1500 acre feet. It failed in the spring of 1909 under the pressure of an unusually heavy runoff. This dam has not been rebuilt. It was constructed by the ground sluice method, the material consisting of a mixture of sand and clay intermingled with a large percentage of stone and gravel. The material was held in place by means of a log cribbing on the down stream slope and was left to find its own

slope on the upstream side. It was constructed in a rock gorge twenty feet wide on the bottom and one hundred and thirty feet wide on the top, and its failure was probably due to an insufficiency of material and a lack of proper precaution in establishing a impervious union between the material deposited and the rock faces of the gorge.

The Buckeye dam is being constructed by the hydraulic method. The completed dam will contain 244,336 cubic yards of material. A hand placed rock fill has been carried up on the down stream slope to the present height of the dam, viz; forty feet. A puddle core six feet in width has been carried up thru the center of the dam, and three small puddle trenches on each side of the puddle core are also being carried up. The outlet tube, constructed of concrete, seven feet in diameter and four hundred and forty one feet in length was completed in 1910 and has developed no signs of weakness. The reservoir was filled in the spring of 1914 and was held full most of the season. During this period no leakage whatever has developed. The material used is one-half rock, which is broken up in the borrow pits by means of dynamite and rock hammers. This is placed on both the up and down stream faces by means of the delivery boxes to a deapth of about fifty feet, making a very substantial retainer for the puddle which consists of sand and clay mixed together as deposited.

There has been expended on the project as follows:

Diversion works	$ 14,181.81
Geyser dam, approximated	10,000.00
Buckeye dam	104,444.74
Delivery system	12,139.55
Total expenditure	$140,766.10

The completed project contemplates the irrigation of 13,000 acres of land. Under the facilities now available we can irrigate 7000 acres. At present time less than one-half that acreage is being irrigated.

Owing to the incomplete state of our delivery system during the season of 1914 we were unable to keep accurate record of the water delivered through the various ditches; we, however, kept an accurate record of the water delivered through one ditch which supplied 620 acres of irrigated land. Part of this land is new, being farmed for the first time and part is old cultivated land, partly in alfalfa. This record shows the duty of water on the above named 620 acres during the irrigating season of 1914 to be 1.637 acre feet to the acre. It is possible that 1914 was not an average season and that the duty in average years will run higher.

IRRIGATION DIVISION NO. 4

SUMMARY OF WATER COMMISSIONERS' REPORTS

District No.	No. of Ditches	Amount of Appropriations Cu. Ft. Per Sec.	Capacity of Canals	Length of Main Ditches Miles	Length of Laterals Miles	First Day Water Used From Natural Stream	Last Day Water Used From Natural Stream	Maximum No. of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season from Natural Stream Cu. Ft. Sec.	No. of Acre-Feet Used by Canal for Season from Natural Stream	Total No. of Acres That Can be Irrigated	CROPS IRRIGATED FROM CANALS IN ACRES: Alfalfa	Natural Grasses	Cereals	Orchards	Market Gardens	Potatoes	Sugar Beets	Other Crops	Pasture	Timothy	Total Irrigated	COST, DOLLARS: Superintendence	Repairs	Improvements	REMARKS
28																										
30		272.31	223	70		July 3	Sept. 5	65	3.7	670927	11020	2175		4209			96		325			6805		$ 4440	$ 1100	
31																										
32																										
33		81.85	77.6	31		May 20	Sept. 30	190	3.2	13883	1455	10	30	30		2	2					100		37		Very incomplete
34																										
40																										
41		71.6	1590	378	256	Mch. 15	Nov. 10	240	(?) 8.09½	332640	98840	18965	400	14210	5570	4235	7620	4470	1470			57790	$ 550	200	12160	
42		601.7	543.5	192.5	24.6	Apr. 1	Oct. 12	191	2.4	55425	13798	12936	1506	2915	814	50	369		165			20152	1431	3709	1295	Incomplete
50																										
60																										
61																										
62											7425	848	770	167			23			88	104	7020	1500			
63																										
68																										
69																										
1914																										
33	18		469	145	154	June 29	Sept. 23	44	124	616	13530	5100	600	6290	160	530	1030		240			13950	$ 480	$ 525	$ 500	
34		244.5	338.5	180	105.5	May 1	Sept. 10	106	225	34654	14295	3352	1711	2593	78.5	12.75	132		9.75		4.4	7888.75		4800		
40	148	630	1390	407	317	Mch. 1	Oct. 1	118	1537	120818	246119	22169	1627	6961	15065	327	1408	425	936		2.5	49518	10900	1211	4140	
41		700	1717	331	185	Mch. 1	Nov. 15	237	736.5	332518	85700	10660	350	12280	5425	10690	7710	3590	1550		6	51655	1300		3820	
42	70	356.24	465	102.25	171.4	Mch. 1	Oct. 5	56	147.14	23217.71	15711	8378.5	1062	2020	612	26	583	5	2.79			12965.5	150	2052	1000	
59		No report																								
60	90	161.71						90				6859	4365	4582	435	556	330		90			17217	4488	6547	3000	
61	30	29.88	117	40.5		Apr. 23	Sept. 30	106	34.3	8341	10470	1814	194	982	54	8	28		93			3173		1015.50	725.80	
62	54	402.25	404.45	72.5		May 1	Nov. 15	64			6902		4909	134						1455		6498				
63		No report																								
68	101	502.59		216.75		May 1	Oct. 30	140			28915	2897	1638	3213	123	57	229	Mixed hay 62.27		769		15203	2015.50	4508.50	386.50	
69		No report																								

No Commissioners for Districts Nos. 29, 30, 31, 32, 59, 63, 69.

CONCLUSION

In closing this report I desire to again emphasize the necessity of a change in our laws relating to the manner of appointing and paying water commissioners.

The reports of the water commissioners are not what they should be as they are not reported for the entire districts, but for that portion only where the commissioners had work to do.

The report of the commissioner of District 33 is for only eighteen ditches. The report of the commissioner of District 40 is the most complete one received, yet it does not include the Gunnison Valley where the commissioner is seldom if ever needed. The report of the commissioner of District 42 does not include the Grand Valley. If the commissioners were paid by the year and were assignable by Division Engineers to different districts, then when their services were not needed in one district they could be sent to another where they were needed. District No. 40 is in four counties, viz; Mesa, Delta, Gunnison and Montrose, and while Mesa and Gunnison, at present, have no necessity for the services of a commissioner in the territory which is in this district, yet they are compelled, under the law and court decisions, to pay an equal amount with Delta and Montrose counties. In District 62, which is in Montrose, Gunnison and Hinsdale counties, Hinsdale County is unwilling and unable to pay their third of the expense of the water commissioner, hence, he gets only two-thirds of his salary. This district should have been abolished and that part of it lying in Gunnison county should be attached to District 28, the portion in Hinsdale county should be in a district of its own, and the portion tributary to the Big and Little Cimarron rivers should be put in District 41.

Very respectfully submitted,

(Signed) H. C. GETTY,
Irrigation Division Engineer
Division No. 4.

Glenwood Springs, Colorado, Nov. 26, 1913.

Hon. John E. Field,
State Engineer,
Denver, Colorado.

Dear Sir: I herewith submit my annual report for the year of 1913.

The season was unusually late, dry and cold in the spring, with occasional rain and snow storms, and a subnormal supply of snow at the head of the main sources of irrigation, causing shortage of water, in a majority of Districts within this Division.

However, considering this defect, the irrigators seemed to have either economized from prudence, or they were satisfied with the short supply for other reasons. The crops did not suffer as much as was perhaps anticipated and prices for produce compensated in most instances for limited quantities.

A complaint by some associated ditch owners on Roan Creek, District No. 70, was adjusted by the Water Commissioners, preventing the threatened litigation.

A case in District No. 37 where the Commissioner mis-interpreted my instructions in an instance in which an irrigator failed to provide, first: the ditch itself, which was particularly described in the decree by courses and bearings and by reference to artificial monuments like a road and a house; second: measuring devices at points where the alleged ditch, which is really nothing but a sharp depression in the natural ground, empties into and comes out of, a gulch; was also amicably adjusted by me.

In the same District the owner of a power plant situate at the mouth of Gypsum Creek, which he first endeavored to supply from the Eagle River—a rank failure—and later on from Gypsum Creek, complained to me that the irrigators on that Creek used water to excess and to his detriment; the investigations made by the Water Commissioner did not satisfy him, and I then measured every single ditch along that creek, and found indeed an excess of 3.5 c. s. f. which had been applied on lands not described in decrees for from three to twenty-eight years prior to the construction of the power plant.

Altho the plant itself was not decreed the owner insisted that he was entitled to the necessary quantity of water to run it anyhow, and, not satisfied with my conclusion he laid the matter before the Governor and before your office.

I have not heard from either of the instances he appealed to, and I would not mention the case at all, if it had not resulted in the appointment of a new Water Commissioner of that District; as the attorney for the owner of the plant expressed himself to me; the refusal of the Commissioner to shut down the irrigation priorities in order to give the power plant the desired supply, resulting in Cimmerean darkness in the Town of Eagle, started an agitation for the removal of the unaccommodating Water Commissioner. This being accomplished, an entire new power plant was built above the intake of the last important ditch upstream, a transmission line was constructed, light shone over Eagle and peace was restored. Whether the interests and effectiveness of the irrigation service was increased in this instance remains to be seen.

The attempt by an irrigator in the same District to use his full decreed supply on the smaller part of his land, during the cutting and gathering of crops on the larger balance, was quickly stopped over his strenuous objections, to-wit: that he had an absolute right to his full decreed priority at all times, whether or not used in the decreed proportion of 1 c. s. f. to 50 acres, and that it took him from four to five days to run one foot over fifty acres.

I mention this fact because the irrigator in this case backed his contention by the fact that he had been a Deputy Water Commissioner for four years and knew all about the law affecting his case.

I have observed on numerous occasions that the figure in the decree standing for the adjudicated quantity is to the irrigator like unto the law of the Medes, without any further reference to statutes, general provisions of the irrigation laws, proportion of quantity to area even as laid down in the decree.

Such an interpretation was also placed in the case of a supply out of an associated ditch on Canon Creek in District No. 39, where one of the part owners insisted that 1.4 c. s. f. being his "absolute priority" was to be applied on forty acres: "He had been so advised by his attorney—" and he added that he was acquainted with a high State officer——.

The long drawn out case of the Rifle Creek Irrigators Association vs. The Mesa Verde Land and Canal Co. ended in an injunction against the latter. This case was under advisement and was heard before your predecessor in office, who overruled by instruction to the Water Commissioner of District No. 39 with respect to exchange of supply effected by pumping water from the Grand River into Rifle Creek above the headgate of the Pioneer Ditch—the oldest priority on that Creek and locally the last ditch down stream.

Rifle Creek is a compensating stream and this fact enabled us to supply out of a visible flow of 33 c. s. f. at the junction of its forks, a quantity of 49 c. s. f. to the ditches between the headgates of the above Company's and the Pioneer Ditch respectively, a distance of about nine miles. On July 30th, 1913 I measured the Creek at its mouth and found over 7 c. s. f. flowing into the Grand River, and within forty minutes thereafter I measured Rifle Creek 2½ miles above the mouth and found a flow of 3.4 c. s. f.

Considering these facts it appeared that the exchange of supply above referred to, impoverished the flow of the Creek for the distance above mentioned, and the direct supply to the Company's Ditch from the Creek in exchange for the water pumped below

for the Pioneer Ditch was made the basis for a petition by the Irrigators Association for an injunction against the Mesa Verde Land an Canal Company.

After a trial lasting eighteen days this injunction was granted and made permanent by the District Court under the ruling of the State Supreme Court of 1902 in the case of The New Cache La Poudre Irr. Co. vs. Water Sup. and Stor. Co. (29 Colo. 469, 68 P. 781).

This judgment upholds my first instruction of 1911 to the Water Commissioner.

I desire to again urgently recommend a change in the present mode of appointing Water Commissioners.

At present the choice of this official, depends not so much on his qualifications, which should be: knowledge of one or two simple methods of measuring water; good judgment, firmness of character, impartiality, and a good physical constitution; but on his personal influence to secure the largest number of indorsements for his petition to the County Commissioners, whose recommendations to the Governor is tantamount to appointment; a procedure which is in many cases entirely unsatisfactory and produces appointees who lack the necessary qualifications for their office, and tends to create among the irrigators a contempt for the irrigation laws and lowers the standard of the Irrigation Service.

The Commissioner should qualify under the provisions of the Civil Service Law, should be paid a living wage out of the State Treasury direct, and should be placed under the control of the Division Engineer.

It is also desirable that the succession of instances should be observed so that instruction from your office to the Water Commissioners should pass thru the office of the Division Engineers.

Very Respectfully,

(Signed) THEODORE ROSENBERG,
Division Engineer.

Freeboard—Feet | Character of Slope Protection

1913

FROM CANAL IN ACRES

No. of District	Potatoes	Sugar Beets	Other Crops
37	1323	.....	334
38	4651	30	110
39	1527	1362	214
43	716	31	482
45	740	230	751
52	59	.....	17
58	154	.....	.....
70	50	161	99
1914			
37	1350	.....	.....
38	4694	43	78
39	1810	1445	187
44	53	.....	.....
45	802	224	241
52	21	.....	23
58	137	.....	191
70	40	47	54

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122A

IRRIGATION DIVISION NO. 5

DITCH REPORT

1913

No. of District	Amount of Appropriation Cu. Ft. Per Sec.	Capacity of Canal	Length of Main Ditch, Miles	Length of Laterals, Miles	First Day Water Used from Natural Stream	Last Day Water Used from Natural Stream	No. of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season from Natural Stream (Cu. Ft. Per Sec.)	No. of Acre-Feet Used by Canal for Season from Natural Stream	Total No. of Acres That Can be Irrigated	CROPS IRRIGATED FROM CANAL IN ACRES: Alfalfa	Natural Grasses	Cereals	Orchards	Market Gardens	Potatoes	Sugar Beets	Other Crops		Duty Acre-Feet Per Acre	Total Irrigated	REMARKS
37	389.16	512.90	149.61	10.83	4-28	9- 5	65	319.65	45006	22370	10200	3092	1705			1323		334		2.7	16654	
38	838.70	569.12	324.0	61.61	5-20	11- 4	143	489.12	60190	29000	11164	4800	7310	50	63	4651	30	110		2.13	28178	
39	990.46	594.8	249.71	74.20	5- 8	9-28	132	201.2	66703.83	58000	7113	16869	5975	3271	678	1527	1362	214		1.84	36109	
43	624.00	369.0	284.0		5- 5	9-20	97	412	79928	59000	11700	10160	3991	20		716	31	482		2.91	27100	
45	602.41	394.2	339.18	101.64	4-20	10-30	59	369	37412	40190	13016	1673	6010	1702	88	740	230	751		1.54	24210	
52	104.00	91.0	69.4	29.1	4-15	8-20	78	58.8	91728	4480	596	1512	908			59		17	Meadow 230	2.97	3092	
58	904.60	720.5	6.0				6	516	62952	78000	956	1524	5297	10		154				2.54	24759	Timothy, 16412 acres; small fruit, 176 acres
70	192.20	250.0	102.9	4.	4- 1	11-11	106.4	127	11994	9800	2667	142	1202	271	2	50	161	99		2.61	4504	
1914																						
37	438.23	649.4	174.6	12.28	4-15	9-30	108	496	107136	23280	8221	7109	4583	11	19	1350				4.6	23293	
38	851.24	570.4	324	61.61	3- 1	10- 9	106	514.28	109190	30110	11686	4885	7965	34	61	4694	43	78		3.7	20446	
39	1008.	607.2	253.7	74.2	5- 4	9-28	133	391	104006	57700	7206	16591	3218	3265	690	1810	1445	187		2.86	36412	
44	486.93	519.26	192	24	4-20	9-14	86	220.6	37843	24370	6035	5560	2245	3		53				2.72	13896	
45	628.26	409.12	344.9	103.17	4- 1	10- 1	98	421	62496	39941	14889	1793	2027	1019	117	802	224	241	Pasture 347	2.56	24459	
52	107.4	93.25	70.9	29.1	4- 4	8-30	56	84	9397	4412	574	1260	581			21		23		2.97	2459	
58	926.3	743.5			5-22	8-28	73	80.81	117966	63031	1224	9940	9061	7	48	137		191	Timothy 14982	3	39611	Pasture, 402 acres
70	204.16	259.25	257.1	76	4-15	10- 8	91	155.07	26539	8985	3052	145	1514	305	7	40	47	54		5.13	5164	

122B

IRRIGATION DIVISION NO. 5

RESERVOIR REPORT—1913

Name of Reservoir	Name of Owner	Location	Source of Supply	Area of High Water Line—Acres	Capacity in Cubic Feet	Kind of Dam	Length of Dam	Height of Dam Above Bottom of Outlet—Feet	Dimensions of Outlet	Width of Spillway—Feet	Height of Freeboard—Feet	Character of Slope Protection	Name of Ditch Supplied from Reservoir	Quantity of Water in Reservoir May 1st—Cu. Ft.	Quantity of Water in Reservoir Nov. 1st—Cu. Ft.	General Condition	Remarks
DISTRICT 38																	
Spring Park	Holmes	Spring Park	Cattle Cr.			Earth						Rock Faced		26136000	6534000	Good	
Miller	Miller et al	Coulter Cr.	Coulter Cr.			Earth								Dry	Dry	Out of Repair	
Hopkins	Hopkins Bros.	Landis Cr.	Melting Snows		1098000	Earth						Earth	Hopkins	1098000	Dry	Good	
Waters	T. Waters	Coulter Cr.	Melting Snows		1088000	Earth						Earth		1088000	Dry	Fair	
McKensie	J. McKensie	Wild Cat Cr.	Wild Cat Cr.		1189680	Earth						Earth		1189680	Dry	Not Completed	
Van Cleve Fisher	Van Cleve	Mesa Cr.	Mesa Cr.		1524600	Earth						Earth		1524600	Dry	Not Completed	
Lake Ann	H. W. Yoemans et al	Sopris Cr.	Sopris Cr.									Earth	Mt. Sopris			Not Completed	
Pat McNulty	Pat McNulty	Cattle Cr.	Cottonwood Cr.		1393930	Earth						Earth		1393930	Dry	Not Completed	
Bourg	B. Bourg	Dry Woody Cr.	Dry Woody Cr.		27000	Earth						Earth		27000	15000	Good	
Kelly Pond	E. B. Kelly	Basalt Mt. Cr.	Springs and Snows		7391875	Earth						Earth	Kelly Pond D.	7391875	2465.625	Good	
Thomas	J. Thomas	Thomas Cr.	Thomas Cr.												Dry		
Total														39840985	9014625		
DISTRICT 39																	
Antlers	Farmers Irr. Co.	Sec. 13 T 5 S R 92 W	East Rifle Cr.	158.6	174244356	Earth	690	60	24"	100	16	Rock Hand Laid	Grass Valley Canal	130680000		Very Good	
Harris	G. E. Harris	16 mi. No. of Rifle	West Rifle Cr.			Earth						Earth	Harris Ditches	3266000	Empty	Fair	
Park	West Elk L. & L. S. Co.	13 mi. No. of Rifle	West Elk Cr.	8	7623000	Earth			18"	20		Rock (Partial)	Saint	6534000	Empty	Very Good	
Rifle Valley	Rifle Irr. & P. Co.	1½ mi. N. of Rifle	Rifle Cr		2962080	Earth						Earth		2178000	Empty	Very Good	
Thompson	W. Clark		West Rifle Cr.									Earth	Clark	348480	Empty	Very Good	
Saint	W. Elk Land & Live S. Co.	West Elk Cr.	West Rifle Cr.	1½	653400	Earth						Earth	Saint	435600	Empty	Very Good	
Cozza	Cozza & Sons	2½ mi. No. of Silt	Cozza Spg. D.	1½	435600	Earth						Earth		217800	Empty	Very Good	
Total					185918436									143659880	0		
DISTRICT 58																	
Gardner Park	Stillwater D. & R. Co.	White River Forest	Melting snow and springs	96	47916000	Earth	150	30	16" dia.		6	Rock	Stillwater	40000000	0	Good	
Wheeler	W. E. Wheeler	Sec. 12 T 2 N R 85 W	Lake Cr. D.	4	1600000	Earth	150	12	6" dia.			Earth	Wheeler No. 3	1600000	1600000	Good	Not completed
Chambers	Chambers	T 3 N R 85 W	Snow and Springs		4221000	Earth		10	6" dia.			Earth		21105500	0	Good	Not completed
B. L. Allin	B. L. Allin	Near Trull	Trull Cr.		6503805	Earth			3" x 8"			Earth					No particulars
Hart Lake	Arnold Powell et al	W. of Yampa	Watson Cr.		12000000	Earth						Partial Riprap	Watson Cr. Ditches	12000000	6000000	Good	No particulars
DISTRICT 70																	
McDowell No. 1	Biggs & Weis	Roan Cr.	Roan Cr.	4	1393920								Res. Ditch	1393920	1393920		
McDowell & Blair	Biggs & Weis	Roan Cr.	Floodwater	10													
Glen Beulah No. 1	John W. Carr	Clear Cr.	Clear Cr.	4	871200												
Brush Cr.	Company	Brush Cr.	Brush Cr.	11													
Carr Cr.	Company	Carr Cr.	Carr Cr.	20													
Myers	Myers	Roan Cr.	Roan Cr.	2	261360								Roan Cr. D.	261360	261360		
Conwell	Conwell	Con Cr.	Con Cr.	7	1088000												
Stewart	E. T. Stewart	Dry Fork Cr.	Dry Fork Cr.	4													
Kimball	J. A. Wilcox & Son	Kimball Cr.	Kimball Cr.	4													
Trough Springs	McKay Estate	Dry Fork Cr.	Flood water	5	871000								G. G. De & G. & De Ditch	87120			
Boldt	Harve Boldt	Dry Fork Cr.	Spring water	1	129000								Boldt Spg. Gulch	129000			

Glenwood Springs, Colorado, December 2d, 1914.

Hon. John E. Field,
State Engineer,
Denver, Colorado.

Dear Sir: I herewith submit my annual report for the year 1914:

The irrigation season was late on account of copious spring rains and the application of water for irrigation was sparse for the same reason during June, and in some Districts, and along some capacious creeks, during part of July also.

The abundance of water caused some irrigators really more grief than a limited supply would have done, and I have personal knowledge of actual shortage of crops caused by over-irrigation.

In District No. 38 on one ranch with a record of many years for banner production, the potato crop on over 100 acres total, fell short over 50 per cent; while on an adjoining place the crop yielded over and above normal—the comparative figures being 7.85 and 14.4 tons per acre; the latter result being attained by the smallest possible quantity of water used, while the reverse was the case in the former instance.

In District No. 37 on Gypsum Creek this distinction was more prominently observable. On two adjoining pieces of oats there was water applied seventy-two hours and forty-two days of water respectively. The yield in the first case was 128 bushels, in the second 26 bushels. While the average results thruout the Division were satisfactory and mostly up to normal and above, I believe that more economical handling of water would have raised the total yield.

Rotation and better methods in judging plant food, studying soil conditions under advice of the State Agricultural College experts, etc., have in some instances produced marked increase, while others, where the water was "hogged", continually brought forth subnormal and even negligible results.

With this abundance of water supply it was strange to see one irrigator ask for an apportionment over and above decreed priority, on the grounds of private agreement defining some inchoate rights resulting from labor and antedating the decree, without record proof however (District No. 39). A suit, just started, aims at reversal of decree, dating back to 1884, for similar reasons. In this case the agreement is of record, but does not appear to have been introduced in the adjudication proceedings, as the decree itself is silent with respect to it (District No. 38).

A case of unlawfully raising a headgate (District No. 45) was tried in the District Court before a jury and the defendant was found not guilty. The custom of local Justices to treat similar offenses rather leniently, especially in one where the defendant raised his headgate twice on the same day and was fined

$1.00 and costs and the fine remitted (!) caused the Deputy Water Commissioner to file direct information with the District Attorney with the result first mentioned.

The Commissioner in District No. 58 served notice on a coal company to stop dumping mine waste into and polluting the water in Oak Creek, used for domestic and stock watering purposes, and the nuisance was abated.

The Deputy District Attorney at Steamboat Springs was ready to proceed against the offending party and his readiness was really the main cause of the abatement.

A perpetual injunction by the District Court was granted (District No. 45) in the case Grove vs. Gant, where the latter attempted a change of diversion from a point upstream from the two headgates of the Grove Ditches to a point between the two headgates. The petitioner showed that the attempted diversion would damage him, since the contemplated ditch would absorb and divert the seepage from his upper ditch and from the creek itself—which runs erratic between gravel banks—and which seepage had been previously decreed to him.

The owners of the Beaver Creek Grass Mesa Ditch (District No. 45), and the Irrigators Association on Beaver Creek arrived at a stipulated agreement in a suit before the District Court. This ditch takes part of the natural drainage of Beaver Creek and its owners are now permitted to do so under their decree for part of the season between stated dates, and by keeping open the specified overflow-device between other dates.

The associated owners of the Home Supply Ditch (District No. 38) had their annual day in Court with practically the same result as before. The irrigators on the upper part of the ditch neglect to repair their leaking drainage crossings, and those on the lower end of the ditch are periodically short of water. The Court ordered the proper remedy and recommended metal flumes to be placed, etc., before the commencement of the next irrigation season.

The recommendations with respect to a change in the mode of appointment of Water Commissioners, contained in my report for 1913, are hereby repeated. A bill to the desired effect was introduced in the State Senate (Session of 1911) but later on withdrawn, mainly on account of energetic objections published by a former State Senator on the grounds that the City and County of Denver would have to bear one-third of the increased taxes resulting from the appropriation carried by the contemplated bill; whereas, as he claimed, Denver, was not affected by any water rights. The recent trials, hearings and investigations, affecting the Denver water supply have since disclosed the fact that in the Denver supply there are affected several dozen of water right decrees, and it would seem that your office, with this information in its possession, should recommend the passage of a bill which would make the office of Water Commissioner one of qualifications, better compensated, and which would, withal, offer

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ERG,
Engineer.

IRRIGATION DIVISION NO. 5

RESERVOIR REPORT—1914

Name of Reservoir	Name of Owner	Location	Source of Supply	Area of High-Water Line—Acres	Capacity in Cubic Feet	Kind of Dam	Length of Dam	Height of Dam Above Bottom of Outlet—Feet	Dimensions of Outlet	Width of Spillway—Feet	Name of Ditch Supplied from Reservoir	Quantity of Water in Reservoir May 1st—Cu. Ft.	Quantity of Water in Reservoir Nov. 1st—Cu. Ft.	General Condition	Remarks
DISTRICT 44															
J. N. Wyman	J. N. Wyman	Little Beaver	Little Beaver	14	4,791,600	Dirt	150	20	8" x 10"		Private	4,791,600	2,395,800	Good	
Thornburgh	O. J. & D. J. Aldrich	Hulett Cr.	Martins Cr.	40	30,492,000	Dirt and Rock	175	20	8" x 12"		Private	30,492,000	15,246,000	Good	
Dry Lakes		Deception Cr.	Deception Cr.	30		Dirt	250	12	8" x 12"					Bad Break Last Spg.	
Dunstan	Tom Dunstan	Near Flat Spgs.	Surface Water	20		Dirt and Rock	175	15	6" x 10"		Private			Dam out Last Spg.	
Total					35,283,600							35,283,600	17,641,800		
DISTRICT 45															
Battlement Nos. 1-2-3-4-5-6-7	Battlement Storage & Res. Co.	Upper Battlement Creek	Battlement Cr.	106 38	44,138,536						Battlement, Mosconeetcong, Dewitt, Dabney, R. F. Huntley, Shutt, O'Toole, Good, Cedar Grove	44,138,536	Empty		
Total					44,138,536							44,138,536	0		
DISTRICT 58															
Gardner Park	Stillwater D. & Res. Co.	White R. Forest Res.	Snow and springs		47,916,000						Stillwater	47,916,000			
Wheeler	W. E. Wheeler	Sec 12 T 2 N R 85 W	Lake Cr.		1,600,000						Wheeler No. 3	1,600,000			
Chambers	Chambers	T 3 N R 85 W.	Snow and springs		4,221,000						Chambers	4,221,000			
Allen	B. L. Allen	Near Trull	Trull Cr.		6,503,805						Allin	6,503,805			
Hart Lake	Arnold Powell et al	8 miles from Yampa	Watson Cr.		12,000,000						Watson Creek	12,000,000			
Total					72,240,805							72,240,805			
DISTRICT 70															
McDowell	Briggs & Wys.	Roan Cr.	Roan Cr.	4	348,480						Outlet	348,480	348,480		No water received from Res. during Period
Glen Beulah	J. W. Carr	Clear Cr.	Clear Cr.	4	348,480						Newton	348,480	348,480		
Blair & McDowell	Briggs & Wys.	Roan Cr.	Floodwater	12							Outlet				
Myers	Allans & Myers	Roan Cr.	Roan Cr.	1	174,240						Roan Cr. Ditch	174,240	174,240		
Conwell	C. H. Conwell	Con Cr.	Con Cr.	3	218,800						Conwell	218,800	218,800		
Total					1,090,000							1,090,000	1,090,000		

to the right kind of candidates the proper inducement, and make the office of Water Commissioner more effective than it is now. The irrigation industry forming by far the most important asset of our State deserves the best treatment at the hands of the Legislature, and it should be urged by all legitimate means to create laws for the better development and progress of and protection to this industry.

Very respectfully,

(Signed) THEODORE ROSENBERG,
Division Engineer.

CHAPTER V

ABSTRACTS OF REPORTS OF WATER COMMISSIONERS

The following tables show the quantity of water used by various ditches and reservoirs during the seasons of 1913 and 1914. They are abstracted from the annual reports of the water commissioners and cover all reports of ditches to which twenty-five cubic feet per second or more of water has been decreed, and all reservoirs concerning which the necessary information is obtainable.

The first series of tables shows for each ditch the first and last day on which water was used, the number of days water was carried, the average daily quantity in cubic feet per second, the number of acre feet of water used, the number of acres irrigated, and the duty of water for each of the seasons 1913 and 1914. In some instances the figures given by the water commissioners' reports were obviously in error, and such have been omitted. In other cases a part of the information desired could not be obtained. However, the tables contain a sufficient volume of information, especially on the much disputed question of the duty of water to repay careful study. The tremendous variation in the duty is due partly to real difference in economy in the use and distribution of water, and in some few cases to inaccuracy of the figures furnished by the water commissioners. By far the greater part of this information, however, is believed to be substantially correct.

The second series of tables shows for each reservoir reported its capacity, the ditches supplied from it, and the volume of water in the reservoir on May 1st and November 1st of the years 1913 and 1914. This information is much less complete than in the case of the ditches, because, particularly in the case of the smaller reservoirs, accurate capacity surveys have not been made, and the reservoir owners content themselves with more or less accurate guesses. In these tables, as in those of the first series, figures which were obviously erroneous have been omitted. There is a possibility of error in some of those given, but it is not believed that these errors are large.

These tables follow the previous report, so that comparisons may be made with previous years.

DISTRICT NO. 1, DIVISION NO. 1—1913

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used		Last Day Water Used		Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Hoover	45.	May	20	Oct.	25	95	13	2550	.....	.....
Bijou	181.23	May	1	Nov.	15	199	141	56234	12010	4.78
Corona Ranch	56.	May	24	Nov.	1	90	14	2568	800	.....
Shultz	28.	.....		.....		.....	.....	.....	800	.....
Putnam	40.	May	5	Nov.	1	178	12	4438	2500	1.78
Weldon Valley	165.	Apr.	20	Nov.	9	190	94	36020	6500	5.54
Ft. Morgan	323.	May	18	Nov.	15	107	139	29688	12000	2.47
Upper Platte and Beaver	234.17	May	1	Nov.	15	193	69	26970	11500	2.24
Deuel and Snyder	45.	May	1	Nov.	13	135	17	4664	2000	2.33
Brown and Piatt	45.	May	28	July	10	43	8	688	500	1.38
Lower Platte and Beaver	322.	May	17	Nov.	15	178	63	22746	14490	1.57
Cooper	90.	May	20	Oct.	25	147	6	1948	1600	1.22
Johnson and Edwards	63	May	12	Nov.	15	118	20	5120	2560	2.00
Tetsel	37.	May	28	Nov.	9	165	12	4194	1407	2.98
Beaver	44.	May	1	Nov.	1	180	5	1800	500	3.60
Beaver Farmer's C. & D. Co.	308.	July	19	Oct.	5	10	159	3180	4300	.74

DISTRICT NO. 2, DIVISION NO. 1

Brantner	111.18	May	5	Oct.	31	180	41	14760	4560	3.24
Platteville	147.38	May	1	Oct.	31	184	35	12880	2112	6.10
Farmer's and Gardener's	24	Jan.	1	*Nov.	1	365	6	4380	350	12.50
Lupton Bottom	140.57	May	1	Oct.	31	184	28	9800	1633	6.00
Brighton	44.8	May	10	Oct.	31	175	23	4048	2615	1.54
Fulton	448.8	Apr.	22	Nov.	7	199	75	29850	10795	2.78
Farmer's Independent	520.	May	1	Oct.	14	167	67	22378	7875	2.84
Meadow Island No. 1	26.23	May	23	Sept.	21	122	17	2074	1920	1.08
Meadow Island No. 2	66.16	May	30	Sept.	13	97	12	1164	862	1.35
Hews and Cook	98.57	May	12	Oct.	31	170	56	19040	7110	2.68
Hodgson	12.82	May	1	Sept.	30	153	4	1224	245	5.00
Lower Latham	287.73	May	1	Oct.	26	179	52	18616	8140	2.29
Section No. 3	57.71	May	29	Sept.	15	135	76	4320	1443	2.99
Highland	64.40	June	12	Aug.	27	74	7	2072	385	5.38
Union	184.03	May	1	Oct.	31	184	50	18400	4830	3.82
Evans No. 2	404.05	May	8	Oct.	10	110	101	11110	8397	1.32
Beeman	127.	May	26	Sept.	18	113	13	2938	1405	2.09
Buckers	121.87	May	9	Oct.	26	68	32	4352	6280	.69
Burlington	350.	May	1	*Nov.	1	213	42	17892	14940	1.20
Lupton Short Line	72.	Apr.	26	July	30	32	38	2432	410	5.94

*Still using.

DISTRICT NO. 3, DIVISION NO. 1

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used		Last Day Water Used		Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Dry Creek	50.92	Apr.	29	Sept.	27	152	19	3990	2300	1.74
Pleasant Valley	138.	Apr.	30	Sept.	27	147	45	13230	7000	1.89
Boyd and Freeman	99	May	26	Sept.	16	104	10	2080	700	2.80
Whitney	61.	May	22	Sept.	15	108	34.5	5452	2500	2.18
B. H. Eaton	41.	May	26	Sept.	15	113	10	2260	1100	2.05
Larimer and Weld	720.	May	7	Sept.	30	148	156	46176	53000	.87
J. G. Coy	31.	Apr.	28	Sept.	16	105	6	1260	290	4.35
Box Elder	52.7	Apr.	29	Sept.	9	104	20	4160	2000	2.40
Taylor and Gill	18.5	Apr.	28	Sept.	13	139	12	3336	600	5.70
Josh Ames	36.	May	15	Sept.	19	103	7	1442	710	2.03
Buckeye and Bristol	30.	.....		.....		.....	.....	.....	2100	.....
Cache la Poudre Irr. D. Co.	82.5	May	27	Sept.	14	86	20	3440	1600	2.15
Ft. Collins	130	Apr.	28	Sept.	30	147	16	4707	3600	1.30
New Mercer	163.	May	13	Sept.	16	106	24	5088	6700	.76
Canal No. 3	173.	May	1	Sept.	30	153	43	13158	4000	3.29
Cache la Poudre Irr. Co.	585.	May	6	Sept.	17	89	254	45212	42000	1.08
Burnham and Emerson	26.	.....		.....		.....	.....	.....	330	.....
Lake	158.	May	14	July	28	54	83	8964	8000	1.12

DISTRICT NO. 3, DIVISION NO. 1—Concluded.

Larimer Co. No. 2	175.	May	12	Sept.	20	132	42	11088	7200	1.54
Larimer Co.	463.	May	18	Sept.	30	133	198	.....	46000	.....
Ogilvy	57.6	May	15	Sept.	18	126	.....	.....	4000	.....
DISTRICT NO. 4, DIVISION NO. 1										
Handy	192.	May	10	Nov.	4	179	35	12520	13650	.92
Home Supply	279.	Apr.	9	Oct.	22	189	47	17766	22310	.80
South Side	50.	May	19	Sept.	23	126	10	2520	3375	.74
Louden	318.	May	23	Oct.	13	137	34	9316	15025	.62
Geo. Rist	195.	Apr.	1	Nov.	4	148	19	6424	5100	1.26
Barnes	44.	Apr.	17	Nov.	4	137	53	14522	1835	7.92
Rist and Goss	86.5	June	1	Aug.	10	71	4	568	445	1.28
Loveland and Greeley	402.23	Apr.	1	Nov.	4	158	69	21804	18825	1.16
Big Thompson No. 2	126	June	7	Sept.	15	80	21	3360	1965	1.71
Farmer's	64.	May	31	Sept.	20	113	12	2712	4110	.66
Hillsboro	153.6	May	12	Sept.	20	130	61	15860	11035	1.44
Hill and Brush	61.8	May	29	Sept.	20	83	11	1826	1500	1.22
Big Thompson and Platte R.	121.18	June	8	Oct.	4	119	24	5712	1860	3.07
Supply Lateral	74.57	May	29	July	12	44	10	880	935	.94
Boulder and Larimer Co.	66.72	May	29	June	4	3	23	138	1950	.07
Blower No. 1	44.93	May	29	July	12	45	4	360	320	1.12
Miner and Lougan	40.8	May	31	June	30	30	7	420	580	.72

DISTRICT NO. 5, DIVISION NO. 1

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used		Last Day Water Used		Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
South Ledge	31.	May	11	Aug.	1	59	7.5	886	1110	.80
Supply	92.2	Mar.	9	Sept.	19	92	35.5	6532	14900	.44
Highland	229.	Mar.	3	Sept.	24	123	130	31980	27493	1.16
Rough and Ready	83.3	Apr.	25	Sept.	30	141	33	9306	20200	.46
Swede	24.6	May	28	Sept.	15	80	18	2880	2915	.99
St. Vrain and Palmerton	164.31	Mar.	21	Sept.	15	123	14	3444	1270	2.72
Longmont Supply	53.4	May	26	Sept.	17	115	14	3220	3270	.98
Oligarchy	239.31	May	23	Sept.	17	110	22	4840	3930	1.23
James	27.11	May	15	Sept.	12	121	7	1694	3250	.52
Pella	42.64	Apr.	28	Sept.	18	143	10	2860	890	3.21
Niwot	35.96	Apr.	28	Sept.	8	127	4	1016	725	1.40
South Flat	71.43	June	1	Sept.	24	146	7	2044	825	2.48
Chapman and McCaslin	98.13	June	1	Sept.	15	100	2.	400	495	.80
Denio and Taylor	41.8	May	12	Sept.	24	114	4.5	1026	810	1.27
Zweek and Turner	82.61	May	30	Sept.	17	110	7.	1540	685	2.25
Lefthand	726	June	1	Sept.	30	100	18.6	3720	14800	.25
Last Chance	96.94	June	1	Aug.	31	90	27.	2430	1153	2.10
Hayseed	41.54	June	1	July	31	61	3.	366	270	1.35

DISTRICT NO. 5, DIVISION NO. 1—Concluded.

Montgomery	31.96	June	1	July	31	50	1.5	150	80	1.88
Goss Private	29.51	June	1	July	31	61	1.	122	295	.42
Goss No. 2	25.01	June	1	July	31	61	1	122	395	.30
DISTRICT NO. 6, DIVISION NO. 1										
Lower Boulder	122.	Mar.	29	Sept.	16	106	36.6	9534	9860	.96
Smith and Goss	44.3	May	23	Sept.	10	100	2.5	502	220	2.28
Anderson	25	May	24	Sept.	29	121	7	850	850	1.00
Godding, Daily and Plum	30.44	June	2	Sept.	11	101	6.5	1326	530	2.50
No. Boulder Farmers	190	May	25	Sept.	16	93	25.2	4702	3530	1.34
Rural	221.04	June	2	Sept.	30	145	18.9	4350	3005	1.44
Green	34.68	May	26	Aug.	18	51	2.3	260	530	.49
Farmers	73.29	May	6	Sept.	15	108	28.	6072	8575	.71
Smith and Emmons	47.16	June	2	Sept.	11	81	5.2	848	678	1.25
Carr and Tyler	33.7	July	5	Sept.	11	66	2.1	286	160	1.78
Butte Mill	110.4	May	26	Sept.	9	46	5.3	488	1005	.48
Delehant	37.12	June	3	Sept.	8	50	3.1	316	484	.66
Highland So. Side	99.7	June	2	Sept.	11	49	30.7	3016	1325	2.27
Leggett	31.35	May	26	Sept.	15	44	30.2	2666	4565	.58
Boulder and Weld Co.	59.4	June	2	Sept.	8	28	20.1	1124	2595	.43
Boulder and White Rock	656.3	May	27	Sept.	20	23	41.3	7445	7515	.99
Boulder and Left Hand	246.6	May	24	Sept.	17	68	3.7	510	1000	.51
Silver Lake	45.	May	6	July	11	34	7.2	1135	1210	.94
Howard	36.	May	10	Oct.	4	153	6.3	1510	1205	1.26

DISTRICT NO. 6, DIVISION NO. 1—Concluded.

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
East Boulder	228.58	May 26	Sept. 24	114	5.6	1266	925	1.37
Cottonwood No. 2	33.7	May 15	Sept. 30	100	6.6	1336	725	1.81
Dry Creek (Davidson)	29.95	May 27	Sept. 19	109	6.5	1428	840	1.70
Dry Cr. No. 2	69.	May 1	Oct. 24	165	6.1	2058	1260	1.59
Enterprise	34.08	June 1	Sept. 3	64	9.4	1200	1340	.90
Leyner and Cottonwood No. 1	216.3	June 6	Oct. 9	104	14.6	3044	3545	.86
Marshallville	46.68	May 20	Oct. 10	43	13.4	1286	1680	.77
Davidson	221.35	May 14	Oct. 9	34	46	3120	4000	.78
Goodhue and Rock Cr.	96.23	May 2	Sept. 24	45	41.9	3778	3440	1.09
So. Boulder and Coal Cr.	65.93	May 16	Sept. 12	29	28.5	1654	1965	.84
Community	83.3	May 3	May 19	17	57.7	8780	10960	.80
DISTRICT NO. 7. DIVISION NO. 1								
Golden Canal	720.66	Apr. 17	Oct. 20	187	112.15	41950	42200	1.00
Swadley	25.	.....	.....	.....	.....	.....	450	.....
Fisher	35.	May 15	Oct. 7	134	11.2	3000	2350	1.28
Clear Cr. and Platte R.	70.06	May 10	Oct. 7	151	19.9	5990	2625	2.28
Rocky Mountain	190.00	Apr. 28	Sept. 24	131	51.8	15854	7850	2.02
Lee, Stewart and Eskins	33.19	May 7	Sept. 29	142	10.25	2872	2310	1.24
Golden City and Ralston Cr.	110.9	May 1	Nov. 15	186	55.15	20526	13200	1.55

DISTRICT No. 7, DIVISION No. 1—Concluded.

Colorado Agricultural	61.8	May 10	Oct. 7	146	20.26	5910	2350	2.52
Golden	26.	Apr. 22	Oct. 3	123	22.3	5288	4650	1.14
Agricultural	150.	Mar. 19	Oct. 10	128	49.22	12710	11300	1.12
DISTRICT NO. 8, DIVISION NO. 1								
Platte Water Co.	85.95	Apr. 25	Oct. 28	179	32	11456	1500	7.65
Nevada	62.3	May 6	Nov. 4	183	55	20130	1640	12.20
Platte Canon	56.	May 13	Oct. 31	171	16.5	5643	924	6.10
Last Chance	32.	May 17	Oct. 20	155	28.	8680	1100	7.88
Northern Colo. Irr. Co.	1184.	Apr. 24	Oct. 28	116	193	44742	28000	1.60
First Attempt	32.	.....	.....	.....	.....	.....	18	.....
Arapahoe	50.	None	None	.....	.....	.....	10000	.....
DISTRICT NO. 9, DIVISION NO. 1								
Simonton	35.76	May 24	Oct. 14	112	8.6	1926	426	4.53
Warrior	52.52	May 25	Oct. 3	132	25.9	6637	1457	4.55
Pioneer Union	55.67	May 25	Oct. 18	138	12.5	3450	707	4.88
Arnett	56.65	Mar. 12	Oct. 28	184	26.5	10017	2821	3.56
Lewis and Strouse	30.68	May 12	Sept. 6	75	1.7	255	30	.85
DISTRICT NO. 11, DIVISION NO. 2								
Missouri Park	40.	May 10	Oct. 1	120	35.	8400	1436	5.84
Riverside	26.	May 20	Sept. 1	90	7.5	1350	167	8.09
Bowen	50.9	.....	.....	.....	.....	.....	446	.....
Sunnyside Park	29.17	May 10	Oct. 1	120	4.17	1000	313	3.20
Starr	52.15	June 1	Oct. 1	120	30	7200	.....	.....
Stevens and Leiter	36.	Jan. 1, '12	Jan. 1, '13	365	36	26380	.....	.....

DISTRICT NO. 12, DIVISION NO. 2

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Park Center	28.92	Apr. 16	Oct. 15	175	15.6	5460	1272	4.28
Beaver Water & Irr. Co.	58.	Nov. 1, '12	Oct. 31	362	16.33	11823	4850	2.44
Union	48.	Nov. 6, '12	Oct. 31	361	24	17328	845	.....
So. Canon	40.	Nov. 6, '12	Oct. 31	239	26	12428	1400	.....
Canon City and Oil Creek	33.6	Nov. 1, '12	Oct. 31	257	27	14028	1145	.....
Canon City Hyd. & Irr. Co.	96.	Nov. 1, '12	Oct. 31	281	54	30348	2750	.....
DeWeese Dye	28.5	Nov. 15, '12	Oct. 31	168	11.3	3797	1150	3.30
Fremont Water Supply Co.	57.	Mar. 2	Oct. 31	184	2.85	1040	160	6.50
Arkansas Valley Conduit	70.	Nov. 1, '12	Oct. 31	365	69.	36570	.....	.....
DISTRICT NO. 14, DIVISION NO. 2								
Arkansas Valley	70.	.....	.....	.....	.....	.....	.....	.....
Oxford Farmers	116.	Mar. 4	Sept. 27	184	40.67	14964	5815	2.57
Bessemer	370.	Jan. 16	Nov. 1	319	73.97	47296	19385	2.44
Collier	26.	.....	.....	.....	.....	.....	.....	.....
Excelsior	60.	June 2	Aug. 23	24	41.15	1975	3130	.63
Pueblo Water Works	46.	.....	.....	.....	.....	.....	.....	.....
Rocky Ford Highline	469.1	Nov. 1, '12	Oct. 31	345	81.15	56000	28000	2.00
Colorado Canal	756.28	Jan. 1	Oct. 13	126	154.	38803	45000	.86

DISTRICT NO. 16, DIVISION NO. 2.

Montez	37.64	Apr. 20	Oct. 3	30	8.6	516	175	2.95
Huerfano Valley	42.	Mar. 12	.....	35	30	2100	2630	.80
DISTRICT NO. 17, DIVISION NO. 2								
Rocky Ford	209.	Nov. 1, '12	Oct. 31	345	70	47650	9165	5.20
Jones Consolidated	129.5	Nov. 6, '12	Oct. 31	305	42.5	17140	6200	2.76
Las Animas Town	32.5	Nov. 1, '12	Oct. 31	230	25.6	11742	2460	4.78
Ft. Lyon	933.	Nov. 1, '12	Oct. 31	356	214.6	152768	71200	2.14
Catlin	345.	Nov. 1, '12	Oct. 31	263	136.	71494	19881	3.59
Lake and (Holbrook)	600.	Nov. 1912	Aug. 24	9	155	2790	19800	.....
Otero	457.92	Nov. 1912	Aug. 24	8	160	2560	16360	.....
Timpas Creek	51.84	June 13	Aug. 13	6	45	540	3225	.....
Omer	120.4	June 13	Aug. 24	8	30	480	8100	.....
DISTRICT NO. 19, DIVISION NO. 2								
Baca (No. side)	54.44	May 3	.....	.....	.....	.....	4308	.....
DISTRICT NO. 21, DIVISION NO. 3								
Capulin	31.37	Apr. 20	Aug. 1	90	30	.....	750	.....
Head Overflow	49.	Apr. 10	July 1	70	4	.....	2000	.....
Alamosa Spring Creek	62.	May 1	Aug. 1	60	29	.....	2000	.....
Aroya	53.	May 1	Aug. 1	70	50	.....	1300	.....
Union	40.	May 1	July 1	80	35	.....	3500	.....
No. Alamosa	49.	May 1	July 1	60	40	.....	1280	.....
Cottonwood	35.8	May 10	July 20	60	30	.....	1000	.....

DISTRICT NO. 21, DIVISION NO. 3—Concluded.

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used		Last Day Water Used		Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Overflow No. 4	40.	May	1	Aug.	1	50	5	.....	500	.....
Lower La Jara	44.8	May	1	July	30	40	44	.....	1700	.....
Norland	48.	Apr.	25	July	20	50	45	.....	705	.....
Flinthan	25.	May	1	Aug.	1	45	20	.....	600	.....
Miller	66.	May	1	July	25	40	40	.....	1210	.....
Overflow No. 1	112.	Apr.	20	July	1	60	112	.....	5030	.....
Plano Vista	30.	May	1	Aug.	1	60	20	.....	1720	.....
Davies-Chapman	51.	May	1	July	1	65	25	.....	1200	.....
Scandinavian	43.	May	1	Juiy	1	60	10	.....	1000	.....
Alamosa Creek	50.	May	1	Aug.	1	60	40	.....	4220	.....
Coddington	30.	June	1	Aug.	1	70	30	.....	960	.....
Rivera	28.	Apr.	1	July	1	45	15	.....	360	.....
La Joya	27.	Apr.	1	June	25	45	20	.....	585	.....
DISTRICT NO. 22, DIVISION NO. 3										
Santiago	55.59	Apr.	16	July	1	75	.....	.....	1000	.....
San Juan and San Rafael	47.76	Apr.	16	June	25	70	.....	.....	160	.....
Sanchez	27.26	Apr.	16	July	11	88	.....	.....	900	.....
Sanford	107.5	Apr.	16	June	5	50	.....	.....	4000	.....

DISTRICT NO. 22, DIVISION NO. 3—Continued.

Trujillo	29.8	Apr.	16	July	4	79	.....	.....	400	.....
Taos Valley No. 1	500.	Apr.	16	June	12	57	.....	.....	.....	.....
Taos Valley No. 2	500.	Apr.	16	June	12	57	.....	.....	.....	.....
Espinosa J. N.	26.	Apr.	16	July	4	79	.....	.....	60	.....
Angustura	42.72	Apr.	16	June	22	67	.....	.....	320	.....
Alamo	36.	Apr.	16	June	20	61	.....	.....	2080	.....
Antonito	250.	Apr.	16	June	20	61	.....	.....	1440	.....
Canon	42.89	Apr.	16	July	18	93	.....	.....	1700	.....
Cottonwood	28.5	Apr.	16	June	13	58	.....	.....	1120	.....
El Cado	25.18	Apr.	16	Aug.	25	131	.....	.....	900	.....
Ephraim	47.	Apr.	16	July	3	78	.....	.....	4000	.....
Fuerticitos	31.47	Apr.	16	July	5	80	.....	.....	400	.....
Guadalupe	69.82	Apr.	16	Oct.	4	173	.....	.....	2560	.....
Heads Mill	117.44	Apr.	16	July	26	101	.....	.....	80	.....
Llano	31.18	Apr.	16	Aug.	15	121	.....	.....	900	.....
Del Rio	31.44	Apr.	16	July	5	50	.....	.....	640	.....
Los Sauces	27.58	Apr.	16	July	8	83	.....	.....	600	.....
Lobato	88.43	Apr.	16	July	10	85	.....	.....	80	.....
Los Ojos No. 1	44.2	Apr.	16	June	27	72	.....	.....	1400	.....
Mesitas	38.99	Apr.	16	July	15	90	.....	.....	2200	.....
Manassa	73.6	Apr.	16	July	1	75	.....	.....	2000	.....
Mogote	342.4	Apr.	16	June	10	55	.....	.....	.....	.....

DISTRICT NO. 22, DIVISION NO. 3—*Concluded.*

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Northeastern	122.8	Apr. 16	June 22	67	.....	.....	.....	.....
Richfield	56.24	Apr. 16	June 12	57	.....	.....	3000	.....
Romero	46.97	Apr. 16	July 5	80	.....	.....	6370	.....
Servietta	31.70	Apr. 16	July 26	101	.....	.....	2410	.....
Seledonia Valdez	31.77	Apr. 16	July 26	101	.....	.....	600	.....
San Jose	40.28	Apr. 16	July 24	99	.....	.....	1600	.....
DISTRICT NO. 25, DIVISION NO. 3								
Baca Grant	150.	Apr. 9	Aug. 24	137	33	9042	4435	2.04
Wale & Shellanbarger	75.	Apr. 16	Aug. 27	120	11.5	2760	1942	1.42
DISTRICT NO. 26, DIVISION NO. 3								
Travis	25.	Apr. 24	July 3	35	21.4	.....	1250	.....
Company	92.73	Apr. 5	June 30	86	27.83	.....	4050	.....
DISTRICT NO. 30, DIVISION NO. 3								
Florida Farmers	45.	July 3	Sept. 5	65	24.	3120	2935	.....
Florida Mesa	200.	July 13	Sept. 5	60	19.	2280	3050	.74
DISTRICT NO. 33, DIVISION NO. 4								
Park	41.5	May 20	Sept. 30	190.	12.	2820	.....	.....

DISTRICT NO. 38, DIVISION NO. 5

East Mesa	31.8	.....	.....	.....	20.	.....	495	.....
Glenwood	30.	.....	.....	.....	15.	.....	604	.....
Salvation	58.	.....	.....	.....	25.	.....	899	.....
Mountain Meadow	25.6	.....	.....	.....	2.5	.....	150	.....
DISTRICT NO. 39, DIVISION NO. 5								
Irrigation Co. (Farmers)	100.	May 2	Aug. 28	107	7.3	1,562	3184	.49
Willcox Canal	300.	.....	.....	.....	.....	.....	534	.....
DISTRICT NO. 40, DIVISION NO. 4								
Alfalfa	30.	June 3	Sept. 25	.....	.....	.....	1612	.....
Butte	45.	June 3	Sept. 24	114	19.82	.....	2357	.....
Fogg	35	June 3	July 4	32	4.02	.....	.....	.....
DISTRICT NO. 42, DIVISION NO. 4								
City of Grand Junction	300.	June 17	Oct. 12	117	5.39	631	.....	.....
DISTRICT NO. 44, DIVISION NO. 5								
Lilly Park No. 1	36.67	May 1	Aug. 1	100	25	.....	902	.....
Cross Mountain	42.	May 1	Aug. 1	80	25	.....	805	.....
DISTRICT NO. 46, DIVISION NO. 1								
Eureka	70.	May 20	July 10	50	35	3500	2395	1.46
Mallon	37.5	May 10	July 14	64	35	4480	1200	3.74
Wolfer	146.	May 15	July 20	65	130	16900	11900	1.42
Mitchell	31.75	Apr. 25	July 10	75	18	2710	700	3.87
Mutual	100.	May 10	July 10	60	65	7800	4300	1.81

DISTRICT NO. 46, DIVISION No. 1—Concluded.

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used		Last Day Water Used		Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Victor	35	May	1	July	15	75	16	2400	890	2.70
Roaring	38.25	May	5	July	10	65	24	3120	1000	3.12
Pleasant Valley	36.	May	10	July	10	60	40	4800	2500	1.92
Davis	35	May	1	July	10	70	30	4200	1500	2.80
Staples No. 2	104.4	May	12	July	10	58	36	4176	3220	1.29
Little Grizzley	25.	Apr.	25	June	25	60	20	2400	550	4.36
Damfino	25.	May	25	July	10	45	12	1180	1400	.84
Arapahoe	39	May	12	July	10	58	19	2206	1220	1.80
Big Grizzley	30	May	5	July	10	65	18	2340	1280	1.83
Little Nellie	87.5	May	1	July	5	65	70	9100	4000	2.28
Chapman	27.	May	10	July	10	60	25	3000	8000	3.75
Mallon No. 2	80.	May	10	July	14	64	65	8320	3200	2.60
Darby	69.5	May	5	July	1	55	58	6380	3200	1.99
Hanson	93.24	May	1	July	10	70	80	11200	7000	1.60
Independent	33.75	May	10	July	15	65	30.	3900	1660	2.36
Briggs-Bohn	36.	May	10	July	20	70	25.	3500	1200	2.92

DISTRICT NO. 48, DIVISION NO. 1										
Laramie River	400.	May	19	.....		.....	.....	.....	.....	.....
Lone Tree	25.	May	5	June	28	53	2.45	259.7	30	8.68
Sand Creek System	288.	May	15	June	2	18	.....	.....	.....	.....
DISTRICT NO. 54, DIVISION NO. 5										
Fourmile	25	June	5	July	5	30	4.	240	120	2.00
Willow Cr.	77.05	May	2	Aug.	20	50	5.23	1150.6	710	1.62
DISTRICT NO. 60, DIVISION NO. 4.										
Gurley	62.5	May	16	Aug.	15	91	28.	5096	4311	1.18
Colony	60.	Apr.	15	Nov.	1	200	40.	16000	2810	5.70
DISTRICT NO. 62, DIVISION NO. 4.										
Cimarron	60	.....		.....		.....	.....	.....	5000	.....
DISTRICT NO. 64, DIVISION NO. 1										
South Platte	87.5	May	7	Oct.	19	140	24.4	6832	4000	1.71
Schneider	58.	May	6	Oct.	18	131	27.3	6606	2420	2.73
Sterling Irrigation	113.	June	1	Sept.	12	112	66.3	14850	5122	2.90
Pawnee	140.4	May	6	Oct.	12	158	70.5	22278	15500	1.44
Davis Bros.	127.	May	6	Oct.	29	64	18.	2304	2460	.94
Low Line	39.9	May	30	Oct.	19	123	23.5	5782	2980	1.94
Illiff and Platte Valley	150.	May	7	Oct.	15	143	28.	8048	8800	.91
Sterling No. 2	50.	June	24	Oct.	5	41	11.5	942	2203	.42
Springdale	62.5	May	7	Oct.	21	85	29.	4930	4480	1.10
South Reservation	25.	May	15	Oct.	15	50	13.	1300	1300	1.00

DISTRICT NO. 64, DIVISION NO. 1—Concluded

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Bravo	40.	May 6	Nov. 1	78	21.	3276	1790	1.83
Powell and Dillon	45.	May 16	Aug. 9	36	23.	1656	1800	.92
Knowles Spring No. 1	60.	Apr. 1	Sept. 20	20	3.	120	240	.50
Powell	40.	Apr. 22	Oct. 10	103	19.4	3996	2060	1.94
Harmony No. 1	252	Apr. 8	Sept. 8	30	33.8	2028	1415	1.43
Chambers	30	Apr. 6	Oct. 15	25	11.2	560	425	1.32
Harmony No. 2	212	Aug. 30	Sept. 4	9	27.6	496	.735	.68
Peterson	534	Apr. 1	Oct. 31	203	33.4	13560	8500	1.59
Red Lion Supply	52.	Apr. 1	Sept. 30	59	13.5	1593	1100	1.44
Settlers	288	Apr. 1	Oct. 30	71	22.2	3154	5100	.62
Tamarack	134	.....	.....	.....	.....	.....	.....	.....
Harmony No. 3	219	Apr. 1	Sept. 8	15	18.	540	590	.92
Cox Irrig. Co.	42.5	May 15	Oct. 15	152	20.	6080	600	10.12
Jumbo Highline	450.	Apr. 1	Oct. 31	52	83.	8632	7400	1.16
DISTRICT NO. 65, DIVISION NO. 1								
Wray Millrace	50.	.....	.....	.....	.....	.....	.....	.....

DISTRICT NO. 67, DIVISION NO. 2

Fort Bent	86.81	Nov. 16,'12	Nov. 15,'13	230	30.	13800	3830	3.62
Amity	283.5	Nov. 16,'12	Nov. 15,'13	154	177.	54516	29327	1.86
Lamar	285.75	Nov. 16,'12	Nov. 15,'13	267	50.	26700	7465	3.58
Manvel	54.	June 4	Nov. 15	74	13.	1940	260	7.46
X Y	69.	Apr. 14	Nov. 15	165	17.	5600	1650	3.40
Graham	61.	Nov. 16,'12	July 31	56	18.	2044	1877	1.09
Buffalo	67.5	Nov. 16,'12	Oct. 9	190	14.	5320	950	5.60

DIVISION NO. 1, DISTRICT NO. 1—1913

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Jackson Lake	So. Platte	1,543,991,407	Fort Morgan Canal, Upper Platte and Beaver, Lower Platte and Beaver and other small ditches	1,350,000,000	0
Empire	So. Platte	1,642,629,890	Bijou Irrig. Dist.	1,060,000,000	0
Moore Res. No. 4	Deer Trail or Muddy	46,000,000	Moore	10,000,000	0
Riverside	So. Platte	2,860,000,000	Riverside Res. & Land Co., Fort Morgan Canal, Upper Platte and Beaver, Lower Platte and Beaver and other small ditches	2,196,912,896	0
Fort Morgan Land and Res. Co. No. 2	So. Platte	435,600,000	Bijou Irrig. Dist.	.....	0
Point of Rocks	So. Platte	3,920,400,000	North Sterling Irrig. Dist.	.....	.....
Prewitt	So. Platte	.....	.....	.....	.....
DIVISION NO. 1, DISTRICT NO. 2					
Oasis	So. Platte	1,436,880,000	Hudson Lateral, Burlington Lateral	1,436,880,000	3,000
Horse Creek	So. Platte	740,520,000	Henrylyn Canals and Laterals	740,520,000	0
Prospect	So. Platte	243,936,000	Laterals	243,936,000	0
Sand Creek	So. Platte	78,408,000	Laterals	78,408,000	0
Higgins	So. Platte	4,900,500	Laterals	4,900,500	0
Lutz	So. Platte	2,380,200	Laterals	2,380,200	0

DIVISION NO. 1, DISTRICT NO. 2—Concluded.

Magers	So. Platte	2,321,021	Laterals	2,321,021	0
Little Western	So. Platte	5,500,000	Laterals	5,500,000	0
H. A. Smith	So. Platte	4,530,240	Laterals	4,530,240	0
Skeel No. 1	So. Platte	6,975,000	Laterals	6,975,000	0
Rutherford	So. Platte	1,787,500	Laterals	1,787,500	0
George Smith	So. Platte	3,180,255	Laterals	3,180,255	0
Fulton Waste	So. Platte	22,895,225	Laterals	22,895,225	0
Lower Latham	So. Platte	270,700,000	Latham	270,700,000	0
Z. J. Fort	So. Platte	7,168,200	Laterals	7,168,200	0
Milton	So. Platte	1,873,080,000	Gilmore	926,540,000	435,600,000
Carlin	So. Platte	9,500,000	Laterals	0	0
Duggan	So. Platte	9,626,760	Laterals	0	0
Standley Lake	Clear, Leyden, Woman, Ralston and Coal Creeks	1,960,200,000	Bull, Niver and O'Brian	1,176,120,000	392,040,000
DIVISION NO. 1, DISTRICT NO. 3					
Warren Lake	Cache la Poudre	96,000,000	Warren L. Outlet	96,000,000	4,000,000
Windsor Lake	Cache la Poudre	78,408,000	Windsor L. Outlet	41,000,000	35,000,000
North Gray	Box Elder	12,000,000	Lake Canal	12,000,000	9,000,000
South Gray	Box Elder	22,293,000	Lake Canal	22,000,000	16,000,000
Res. No. 2 and 3, W. S. & S. Co.	Cache la Poudre	30,000,000	Larimer Co. (By Exch.)	0	0
Res. No. 4, W. S. & S. Co.	Cache la Poudre	43,370,000	Larimer Co. (By Exch.)	43,000,000	25,000,000
Spring Canon	Spring Canon Cr.	2,683,000	Outlet	2,000,000	0

DIVISION NO. 1, DISTRICT NO. 3—Continued

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
Res. No. 1, N. Poudre Irr. Co.	North Poudre	29,346,000	Outlet	29,000,000	12,000,000
Claymore Lake	Cache la Poudre	39,000,000	P. V. and Lake Canal	35,000,000	25,000,000
Res. No. 1, Box Elder D. & R. Co.	Box Elder	24,830,000	Outlet	20,000,000	10,000,000
Richards	Cache la Poudre	46,000,000	Larimer Co. (By Exch.)	40,000,000	0
Res. No. 3, Box Elder D. & R. Co.	Box Elder	8,500,000	Outlet	5,000,000	2,000,000
Res. No. 3, N. Poudre Irr. Co.	North Poudre	125,000,000	Outlet	125,000,000	0
Caverly	North Poudre	7,500,000	Outlet	7,000,000	0
Curtis Lake	Cache la Poudre	34,000,000	Larimer Co. (By Exch.)	34,000,000	0
Dixon Canon	Dixon Canon Cr.	19,500,000	Outlet	10,000,000	2,000,000
Res. No. 4, Box Elder D. & R. Co.	Box Elder	11,000,000	Outlet	5,000,000	3,000,000
Res. No. 3, Box Elder D. & R. Co.	Box Elder	34,500,000	Outlet	25,000,000	10,000,000
Stuchell	North Poudre	3,050,000	Outlet	3,000,000	0
Jameson Lake	Box Elder	3,500,000	Outlet	2,000,000	0
Mitchell Lake No. 1	Lone Pine	25,280,000	Larimer and Weld	25,200,000	5,000,000
Mitchell Lake No. 2	Lone Pine	4,370,000	Larimer and Weld	4,000,000	0
Mitchell Lake No. 3	Lone Pine	4,335,000	Larimer and Weld	4,000,000	0
Res. No. 4, N. Poudre Irr. Co.	North Poudre	46,766,000	Outlet	47,000,000	20,000,000
Res. No. 2, N. Poudre Irr. Co.	North Poudre	169,000,000	Outlet	169,000,000	0
Larimer and Weld	Cache la Poudre	390,000,000	Larimer and Weld	380,000,000	190,000,000

DIVISION NO. 1, DISTRICT NO. 3—Continued

Windsor	Cache la Poudre	810,000,000	Cache la Poudre	770,000,000	403,000,000
Res. No. 1, W. S. & S. Co.	Cache la Poudre	206,000,000	Larimer Co. (By Exch.)	200,000,000	105,000,000
Long Pond	Cache la Poudre	176,000,000	Larimer Co. (By Exch.)	176,000,000	0
Lindenmeier's	Cache la Poudre	40,000,000	Larimer Co.	25,000,000	10,000,000
Cache la Poudre	Cache la Poudre	415,000,000	Cache la Poudre	410,000,000	180,000,000
Wood	Seepage and Flood	140,000,000	Outlet	70,000,000	0
Res. No. 5, N. Poudre Irr. Co.	Cache la Poudre	250,000,000	N. Poudre (By Exch.)	190,000,000	150,000,000
Neece	Floodwater	4,257,000	Neece Ditch	3,000,000	0
Res. No. 1, Lake Canal & R. Co.	Cooper & Ames Slough	35,000,000	Lake Canal	31,000,000	0
Dowdy & Twin	Lone Pine	16,856,000	Laramie-Poudre	20,000,000	8,000,000
Res. No. 6, N. Poudre Irr. Co.	Cache la Poudre	445,000,000	N. Poudre (By Exch.)	380,000,000	290,000,000
Deer Lake	Lone Pine	3,842,000	Laramie-Poudre	1,000,000	0
Fossil Creek	Cache la Poudre	503,000,000	N. Poudre (By Exch.)	503,000,000	137,000,000
Erie Lake	Lone Pine	3,000,000	Laramie-Poudre	0	0
Douglas	Cache la Poudre	460,000,000	Larimer and Weld	287,000,000	17,000,000
Coal Creek	Box Elder	178,400,000	Cactus Hill	150,000,000	120,000,000
Res. No. 3, Agri. College	Soldier Canon	31,000,000	Outlet	20,000,000	5,000,000
Big Beaver	Beaver Creek	69,201,000	Water for sale	24,000,000	0
Res. No. 8, Windsor Res. Co.	Cache la Poudre	400,000,000	Larimer and Weld	300,000,000	110,000,000
Cameron Pass	Joe Wright Cr.	35,458,000	Poudre Valley	0	0
Black Hollow	Cache la Poudre	250,000,000	Larimer County	250,000,000	0
Tenny	Cache la Poudre	15,000,000	Mt. Supply	10,000,000	0
Res. No. 2, Mt. Supply Co.	Cache la Poudre	6,500,000	Mt. Supply	6,000,000	0

DIVISION NO. 1, DISTRICT NO. 3—Concluded

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Bubble	Cache la Poudre	9,750,000	Mt. Supply	7,000,000	0
Halligan	N. Poudre	280,000,000	N. Poudre	265,000,000	31,000,000
Res. No. 15, N. Poudre Irr. Co.	N. Poudre	240,000,000	N. Poudre	80,000,000	40,000,000
Sheep Creek	Sheep Creek	20,000,000	Water for sale	7,000,000	0
Lake Agnes	Zimmerman Cr.	5,000,000	Water for sale	5,000,000	0
Timberline	Beaver Cr.	33,000,000	Water for sale	0	0
Elder	Cache la Poudre	100,000,000	Larimer and Weld	0	0
Portner	Fossil and Cache la Poudre	26,000,000	N. Poudre (By Exch.)	10,000,000	0
Chambers Lake	Cache la Poudre	290,000,000	Larimer County	80,000,000	0
DIVISION NO. 1, DISTRICT NO. 4					
Boyd Lake	Big Thompson	1,918,000,000	Exchange	1,000,000,000	896,320,000
Donath	Big Thompson	50,000,000	Loveland and Greeley	25,000,000	25,000,000
Mariano	Big Thompson	180,000,000	Home Supply	180,000,000	120,000,000
Home Supply	Big Thompson	400,000,000	Home Supply	375,000,000	300,000,000
Lake Loveland	Big Thompson	625,000,000	Loveland and Greeley	571,096,806	136,813,516
Seven Lakes	Big Thompson	367,300,000	Loveland and Greeley	250,000,000	125,000,000
Buckhorn	Buckhorn Cr.	56,000,000	Louden	48,000,000	48,000,000
Long Lake	Roaring Fork	33,088,000	Farmers	33,088,000	0

DIVISION NO. 1, DISTRICT NO. 4—Concluded.

Boulder and Larimer	Little Thompson	319,895,000	Boulder and Larimer County	319,895,000	65,637,000
Welch Lakes Nos. 3 and 4	Big Thompson	20,564,676	Handy	20,564,676	15,000,000
Welch Lakes Nos. 1, 2 and 5	Big Thompson	168,598,658	Handy	140,000,000	35,000,000
Ryan Gulch	Ryan Gulch Seepage	31,796,870	Rist	31,796,870	1,796,870
South Side	Ryan Gulch	15,285,639	South Side	15,285,639	285,639
DIVISION NO. 1, DISTRICT NO. 5					
Pleasant Valley	St. Vrain	110,300,055	Rough & Ready	100,000,000	70,000,000
Knoths Lake	St. Vrain	2,000,000	Hansen	1,000,000	0
Highland No. 1	St. Vrain	125,071,248	Highland	35,000,000	50,000,000
Highland No. 2	St. Vrain	105,280,000	Highland	50,000,000	69,600,000
Highland No. 3	St. Vrain	71,023,000	Highland	40,000,000	60,000,000
Highland Lake	St. Vrain	24,452,500	Private Ditches	5,000,000	0
McIntosh Lake	St. Vrain	107,153,830	Oligarchy	35,000,000	0
Union	St. Vrain	850,000,000	Union (in Dist. No. 2)	850,000,000	500,000,000
Oligarchy	St. Vrain	76,816,437	Oligarchy	50,000,000	50,000,000
Gold	So. St. Vrain	19,000,000	Left Hand	5,000,000	5,000,000
Crystal Lake	St. Vrain and Left Hand	1,033,000	Private Ditches	1,000,000	500,000
Clover Lake	Dry Cr., Lykins Gulch and St. Vrain	25,962,250	Clover Basin	20,000,000	5,000,000
Beaver Park	Beaver Cr.	122,976,000	Highland and Supply	20,000,000	5,000
Foot Hills	St. Vrain	184,629,820	Oligarchy and 7 others	30,000,000	27,000,000

DIVISION NO. 1, DISTRICT NO. 6

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Marshall Lake	So. Boulder	381,000,000	Community	55,800,000	0
West Lake	So. Boulder and Coal	30,450,000	Community	20,450,000	450,000
Section 19	So. Boulder and Coal	3,520,000	Community	2,520,000	520,000
Section 17	So. Boulder and Coal	1,475,812	Community	1,000,000	475,000
Section 15	So. Boulder and Coal	769,900	Community	700,000	7,900
Section 35	So. Boulder and Coal	2,500,100	Community	2,000,000	500,000
Section 11	So. Boulder and Coal	3,598,056	Community	598,000	200,000
McKay Lake	So. Boulder and Coal	41,678,208	Community	20,500,600	500,000
Section 9	Coal Cr.	927,000	Community	500,000	7,000
Erie	So. Boulder	5,206,750	Erie	5,400,000	500,000
Louisville	So. Boulder	12,664,864	Louisville	6,500,400	5,000,000
Harper	So. Boulder	2,713,450	Harper	500,000	500
Prince	So. Boulder	3,520,250	Prince	1,635,500	500,000
Silver Lake	N. Boulder	35,164,124	Silver Lake	15,500,000	500,000
Island Lake	N. Boulder	16,196,629	City of Boulder	8,500,000	8,000,000
Goose Lake	N. Boulder	20,024,899	City of Boulder	6,500,400	500,000
Panama No. 3	Boulder	196,000,000	White Rock	190,000,000	50,000
Panama No. 1	Boulder	304,920,000	Panama	205,500,000	5,500,000
Base Line	So. Boulder	130,680,000	Lower Boulder	125,500,000	5,200,000

DIVISION NO. 1, DISTRICT NO. 6—Concluded

Barker Meadow	Middle Boulder	479,160,000	Power Line	174,240,000	152,000,000
Smart	Coal Cr.	10,305,000	Community	3,500,000	100,000
Kinnear	Coal Cr.	40,982,478	Community	35,000,000	500,000
Last Chance	Coal Cr.	1,983,200	Zang	1,500,000	100,000
Churches Upper Lake	Coal Cr.	1,960,000	Community	1,910,000	50,000
Eggleston No. 4	Coal Cr.	1,015,000	Eggleston	1,500,000	50,000
Eggleston No. 6	Coal Cr.	8,000,000	Eggleston	7,000,000	650,000
Lafayette No. 1	So. Boulder	614,685	City of Lafayette	0	650,000
Lafayette No. 2	So. Boulder	892,000	City of Lafayette	800,000	805,600
Teller No. 5	So. Boulder	4,625,529	Lake Lateral	2,600,000	1,500,000
Jim Burke	So. Boulder	1,500,850	J. Burke Lateral	1,000,000	900,000
DIVISION NO. 1, DISTRICT NO. 7					
Neresheimer	Clear Cr.	13,068,000	Farmers Highline	11,000,000	7,000,000
Brown	Clear Cr.	8,273,400	Farmers Highline	7,000,000	4,000,000
Bromley	Clear Cr.	8,712,000	Farmers Highline	8,000,000	5,000,000
Smith	Clear Cr.	7,840,800	Farmers Highline	7,000,000	5,000,000
Richardson	Clear Cr.	13,068,000	Farmers Highline	11,000,000	7,000,000
Porters	Clear Cr.	13,503,600	Farmers Highline	11,000,000	8,000,000
Bancrofts 1-2-3-4	Clear Cr.	11,351,000	Agricultural	11,000,000	9,000,000
Lee 1 and 2	Clear Cr.	5,103,800	Agricultural	5,000,000	3,000,000
Hallack 1-2-3	Clear Cr.	5,854,400	Agricultural	5,000,000	3,000,000
Ward 1-2-3-4	Clear Cr.	54,384,000	Agricultural	50,000,000	30,000,000

DIVISION NO. 1, DISTRICT NO. 7—Continued

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Lake 1-2-3	Clear Cr.	20,200,000	Agricultural	19,000,000	15,000,000
Wilbur	Clear Cr.	26,136,000	Golden Cy. and Ralston Cr.	25,000,000	3,000,000
Groves & Dollison	Clear Cr.	21,780,000	Golden Cy and Ralston Cr.	21,000,000	3,000,000
Gay	Clear Cr.	3,484,800	Golden Cy. and Ralston Cr.	3,000,000	.....
Legault	Clear Cr.	17,424,000	Golden Cy. and Ralston Cr.	17,000,000	2,000,000
Christman	Clear Cr.	5,445,000	Golden City and Ralston Cr.	5,000,000	.....
Church	Clear Cr.	13,068,000	Golden Cy. and Ralston Cr.	13,000,000	5,000,000
Copeland 1-2	Clear Cr.	4,356,000	Golden Cy. and Ralston Cr.	3,000,000	2,000,000
Leyden	Clear, Ralston and Leyden	78,408,000	Farmers Highline	60,000,000	40,000,000
Standley Lake	Clear and Ralston Cr's.	3,464,800,000	.....	.....	.....
Long Lake	Ralston	34,848,000	Long Lake Land & Res. Co.	34,848,000	34,848,000
Westminster	Clear Cr.	26,136,000	.....	26,000,000	10,000,000
Loch Lomond 1-2-3-4-5	Clear Cr. and Fall River	21,780,000	Agricultural	21,780,000	.....
Tucker	Ralston	78,408,000	Tucker Lake Ditch	70,000,000	45,000,000
Broad & Hyatt 1-2	Clear Cr.	86,120,000	Farmers Highline	85,000,000	.....
Hockbury 1-2-3	Clear Cr.	6,969,000	Farmers Highline	6,500,000	4,000,000
Shoup 1-2	Clear Cr.	8,500,000	Farmers Highline	6,500,000	3,000,000
Lathrops 1-2-3	Clear Cr.	18,295,200	Farmers Highline	15,000,000	10,000,000
Calkins	Clear Cr.	16,988,400	Farmers Highline	15,000,000	5,000,000

DIVISION NO. 1, DISTRICT NO. 7—Concluded

Church	Clear Cr.	4,356,600	Farmers Highline	4,000,000	3,000,000
Green Lawn	Clear Cr.	4,791,600	Farmers Highline	4,000,000	2,000,000
Williams	Clear Cr.	3,920,400	Farmers Highline	3,000,000	2,000,000
Harrington	Clear Cr.	9,147,600	Farmers Highline	8,500,000	5,000,000
Storm & Rankins	Clear Cr.	9,583,200	Farmers Highline	9,000,000	7,000,000
Burnett	Clear Cr.	3,920,400	Farmers Highline	3,500,000	3,000,000
Freys	Clear Cr.	6,969,600	Farmers Highline	6,500,000	4,000,000
Vogle	Clear Cr.	3,484,800	Farmers Hibgline	3,000,000	2,000,000
Heintze	Clear Cr.	4,791,600	Farmers Highline	4,000,000	3,000,000
Hussey	Clear Cr.	3,920,400	Farmers Highline	3,500,000	2,000,000
Crokes 1-2-3-4-5	Clear Cr.	39,204,000	Farmers Highline	35,000,000	20,000,000
Finnerty	Clear Cr.	2,613,600	Farmers Highline	2,500,000	1,000,000
Webster	Clear Cr.	6,969,600	Farmers Highline	6,500,000	5,000,000
Browns	Clear Cr.	13,939,200	Farmers Highline	12,000,000	8,000,000
Hallick	Clear Cr.	5,227,200	Farmers Highline	5,000,000	3,000,000
Smith	Clear Cr.	3,920,400	Farmers Highline	3,000,000	2,000,000
Brown	Clear Cr.	5,227,200	Farmers Highline	5,000,000	3,000,000
Brewer	Clear Cr.	3,920,400	Farmers Highline	3,500,000	2,000,000
East Lakes 1-2-3-4	Clear Cr.	52,722,000	Farmers Highline	46,000,000	30,000,000
King & Wooley	Clear Cr.	23,958,000	Farmers Highline	21,000,000	15,000,000
Johnson	Clear Cr.	3,049,000	Farmers Highline	3,000,000	2,000,000
Paitz	Clear Cr.	5,227,200	Farmers Highline	5,000,000	3,000,000
Wadley	Clear Cr.	13,939,200	Farmers Highline	12,000,000	7,000,000

DIVISION NO. 1, DISTRICT NO. 8

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Castlewood	Cherry Cr.	261,360,000	Arapahoe	261,360,000	108,900,000
Clark	Cherry Cr.	108,900,000	Arapahoe	108,900,000	21,780,000
DIVISION NO. 1, DISTRICT NO. 9					
Soda Lake No. 1	Bear Cr.	10,500,000	Arnett	10,500,000	5,500,000
Soda Lake No. 2	Bear Cr.	76,860,000	Arnett	76,860,000	0
Harriman	Bear Cr.	38,000,000	Johnson	38,000,000	36,000,000
Stickfort	Bear Cr.	1,000,000	Rucker	800,000	500,000
Henry	Bear Cr.	6,600,000	Henry	6,000,000	4,200,000
Henry Lake	Bear Cr.	8,700,000	Henry Lake	8,000,000	5,750,000
Fort Logan	Bear Cr.	348,480	Logan	348,480	180,000
Rucker	Bear Cr.	1,100,000	Rucker	226,600	1,000,000
Johnson	Bear Cr.	11,200,000	Dutch Cr.	11,200,000	5,600,000
Grant No. 1	Bear Cr.	4,900,000	Grant	4,000,000	3,400,000
Grant No. 2	Bear Cr.	3,200,000	Grant	1,600,000	2,000,000
Grant No. 3	Bear Cr.	3,000,000	Grant	1,500,000	200,000
N. B. Coy No. 1	Bear Cr.	1,100,000	Coy	900,000	900,000
N. B. Coy No. 2	Bear Cr.	300,000	Coy	200,000	0
Bowles No. 1	Bear Cr.	76,000,000	Bowles	75,000,000	68,425,560

DIVISION NO. 1, DISTRICT NO. 9—Concluded

Bowles No. 2	Bear Cr.	15,681,600	None	15,681,600	15,681,600
Bowles No. 3	Bear Cr.	2,613,600	Bowles	2,613,600	2,613,600
Bowles No. 4	Bear Cr.	2,395,800	Bowles	2,395,800	2,395,800
Marston	Bear Cr. and Platte R.	853,200,000	Filters	703,000,000	437,544,000
Bergen No. 1	Turkey Cr.	16,345,300	Bergen	16,345,300	0
Bergen No. 2	Turkey Cr.	24,984,500	Bergen	24,984,500	0
Brooks	Turkey Cr.	435,600	Brooks	435,600	0
Dean	Turkey Cr.	17,424,000	Dean	17,424,000	0
J. B. Grant No. 1	Turkey Cr.	4,356,000	Grant	4,356,000	0
J. B. Grant No. 2	Turkey Cr.	522,720	Grant	522,720	0
Sharer	Turkey Cr.	4,356,000	Sharer	3,356,000	0
Grant No. 7	Turkey Cr.	784,080	No. 7	600,000	0
Shepard	Turkey Cr.	2,439,360	Shepard	0	0
Gulch	Turkey Cr.	4,201,252	Gulch	3,547,820	0
Kendrick	Bear Cr.	5,227,220	Kendrick	3,277,000	0
Ward & Kendrick	Bear Cr.	17,424,000	Ward & Kendrick	15,682,000	7,500,000
Smith	Bear Cr.	15,424,000	Green	11,939,200	5,000,000
Porter	Bear Cr.	522,720	Porter	522,720	400,000
Deutcher & Reynolds	Bear Cr.	3,267,000	Deutcher	3,267,000	1,200,000
Rollins No. 1	Bear Cr.	3,484,800	Rollins	2,613,600	2,613,600
Rollins No. 2	Bear Cr.	653,400	Rollins	653,400	653,400

DIVISION NO. 2, DISTRICT NO. 11

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Evans Gulch	Evans Stream	1,439,000	Leadville Water Co.	1,000,000	1,000,000
Big Evans Gulch No. 2	Evans Stream	2,000,000	Stevens & Leiter	1,000,000	700,000
Mountain Lake	Springs	5,333,333	Leadville Water Co.	3,000,000	1,500,000
Boss Lake	Springs	26,832,960	So. Arkansas	26,832,960	0
Sugar Loaf	Lake Fork	756,666,666	Arkansas R.	577,257,120	523,809,000
Clear Creek	Clear Creek	409,537,600	Otero Irrigation	300,654,420	0
Twin Lakes	Lake Cr.		Colorado		
DIVISION NO. 2, DISTRICT NO. 12					
Schaeffer	Beaver Cr.	137,151,000	Beaver Water & Irr. Co.	128,600,000	40,000,000
Skagway	Beaver Cr.	144,000,000	Power	64,496,000	97,600,000
Victor No. 2	East Br. W. Beaver	9,105,000	Victor Water System	2,400,000	9,000,000
Bison Basin	East Br. W. Beaver	45,000,000	Victor Water System	0	15,000,000
Colo. Springs No. 4	Middle Beaver	115,272,000	Colo. Spgs. Water System	53,300,000	53,000,000
Colo. Springs No. 2	Middle Beaver	13,000,000	Colo. Spgs. Water System	13,000,000	13,000,000
Colo. Springs No. 5	Middle Beaver	86,000,000	Colo. Spgs. Water System	63,000,000	75,000,000
Colo. Springs No. 7	East Br. W. Beaver	6 600,000	Colo. Spgs. Water System	0	6,600,000
Colo. Springs No. 8	East Br. W. Beaver	23,324,000	Colo. Spgs. Water System	3,600,000	3,000,000
Gillette	South Fk. Oil Cr.	500,000	Town of Gillette	200,000	300,000

DIVISION NO. 2, DISTRICT NO. 12—Concluded

Cripple Creek W. Co. No. 1	W. Br. W. Beaver	16,600,000	Cripple Creek W. Co.	3,000,000	16,600,000
Cripple Creek W. Co. No. 2	W. Br. W. Beaver	6,600,000	Cripple Creek W. Co.	0	6,600,000
Mt. Pisgah	Four Mile Cr.	138,000,000	Park Center and others	31,874,000	13,905,000
Cedar Park	Eight Mile Cr.	1,000,000		0	
Roosevelt	Stout Cr.	5,000,000	West Side	0	
Curtis	Stout Cr.	3,000,000	West Side	0	
Taylor	Stout Cr.	300,000	West Side	0	
DIVISION NO. 2, DISTRICT NO. 14					
Lake Henry	Arkansas R.	117,742,680	Sugar City Lat.		
Lake Meredith	Arkansas R.	678,359,880		392,040,000	
Green View	Fountain R.	2,613,600			
Pueblo W. Co. No. 1	Arkansas R.	679,000	City of Pueblo		
Pueblo W. Co. No. 2	Arkansas R.	767,180	City of Pueblo		
Pueblo W. Co. No. 3	Arkansas R.	955,441	City of Pueblo		
Pueblo W. Works No. 1	Arkansas R.	1,740,000			
Pueblo W. Works No. 2	Arkansas R.	1,760,000			
Turkey Creek	Turkey Creek	580,654,800	Teller	24,785,640	11,979,000
DIVISION NO. 2, DISTRICT NO. 15					
Minnequa	Drainage and seepage	60,000,000	Steel Works	49,213,636	57,181,149
Savard	Arkansas R.	69,000,000	Steel Works	44,316,844	76,650,802
Corwin	Arkansas R.	141,000,000	Steel Works	77,911,911	133,628,760

DIVISION NO. 2, DISTRICT NO. 16

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
Cucharas No. 5	Cucharas R.	1,807,740,000	Orlando No. 5	86,684,400	0
Bradford Lake	Huerfano	1,843,459,200	Orlando No. 5	215,970,480	0
Maria	Cucharas	10,394,200		0	0
C. T. Richie	Cucharas	1,200,000		0	0
Robinson	Muddy Cr.	2,500,000		0	0
Hayes	Cucharas	1,448,400		0	0
Montez	Huerfano	251,400		0	0
Huerfano Valley	Huerfano	87,855,600		0	0
La Joya	Cucharas	7,741,400		0	0
Stevens	Bear R.	91,150,000		0	0
Pope Bros.	Huerfano	4,024,238		0	0
McMillan	Huerfano	1,045,000		0	0
Sharps Orchard	Cucharas	3,696,000		0	0
Ellis	Huerfano	450,000		0	0
McDonald	Cucharas	91,150		0	0
Archuleta	Huerfano	569,400		0	0
Holita	Cucharas	23,524,020		0	0
Lake Oehm	Cucharas	171,543,950		88,794,450	0
Walsenburg	Cucharas	17,933,400		0	0
Apache	Apache	50,946,205		0	0

DIVISION NO. 2, DISTRICT NO. 17

Lake No. 1	Arkansas R.	326,700,000	Holbrook	326,700,000	43,560,000
Dye	Arkansas R.	196,020,000	Holbrook	196,020,000	0
Horse Creek	Ark. R. and Horse Cr.	1,171,163,000	Fort Lyon	174,240,000	0
Adobe Creek	Ark. R. and Adobe Cr.	2,682,207,000	Fort Lyon	174,240,000	0
Timpas No. 2	Timpas Cr.	128,585,000	Lateral No. 2		0
Timpas No. 3	Timpas Cr.	79,725,000	Lateral No. 3	21,180,000	0
Red Top	Mustang Cr.	26,136,000	Red Top		
Hardesty	Mustang Cr.	6,846,000	Hardesty No. 1		
Bruin (Mustang)	Mustang Cr.	144,000,000	Lat. No. 1		
Swink No. 1	Apishapa Cr.	100,318,000	Lat. No. 1		
Swink No. 2	Apishapa Cr.	12,167,800	Lat. No. 2		
Box Spring	Horse Cr.	162,000,000	Box Springs	42,280,000	
Thurston	Arkansas R.	348,480,000	Fort Lyon	174,240,000	
Nee Skah	Arkansas R.	1,120,276,000	Amity, Pawnee, Comanche		
Nee Noshe	Arkansas R.	3,195,578,720	Amity, Pawnee, Comanche		
Nee Sopah	Arkansas R.	1,109,908,800	Amity, Pawnee, Comanche		
Nee Gronda	Arkansas R.	2,566,328,000	Amity, Pawnee, Comanche		
Prairie	Dry Cr.				
DIVISION NO. 2, DISTRICT NO. 19					
Model	Las Animas and Tribs.	886,883,220	Model L. & I. Co.'s	52,200,000	
Johns Lake	Las Animas	1,935,000			
North Lake	Las Animas	44,000,000	Trinidad Pipe L.	40,000,000	44,000,000

DIVISION NO. 2, DISTRICT NO. 19—Concluded.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Monument Lake	Las Animas	7,000,000	Woodruff	7,000,000	7,000,000
Madrid No. 1	Las Animas	1,334,000	Trinidad Pipe L.	1,334,000	1,334,000
Madrid No. 2	Las Animas	1,334,000	Trinidad Pipe L.	1,334,000	1,334,000
Madrid No. 3	Las Animas	8,000,000	Trinidad Pipe L.	6,000,000	3,000,000
Jansen	Las Animas	800,000	Trinidad Pipe L.	800,000	800,000
Maple Street	Las Animas	170,000	Trinidad Pipe L.	150,000	160,000
Russell	Whiskey Cr.	13,590,000	Russell and Storg	10,000,000	10,000,000
DIVISION NO. 3, DISTRICT NO. 22					
Cove Lake	San Antonio and Conejos	250,000,000	North and South Laterals	100,000,000	0
DIVISION NO. 4, DISTRICT NO. 34					
Bauer Lake No. 2	Chicken Cr.	80,000,000	Bauer Lake	5,000,000	50,000,000
Bauer Lake No. 1	Chicken and Crystal Crs.	30,000,000		1,000,000	12,000,000
Summit	Los Canon	174,240,000		20,000,000	0
Puett	Los Canon				
Joe Moore	Los Canon		Los Canon		0
Webber	Middle Mancos	13,000,000	Webber	7,000,000	0

DIVISION NO. 5, DISTRICT NO. 38

Spring Park	Cattle Cr.			26,136,000	6,584,000
Miller	Coulter Cr.			0	0
Hopkins	Drainage	1,098,000	Hopkins	1,098,000	0
Watters	Drainage	1,088,000		1,088,000	0
McKensie	Wild Cat Cr.	1,189,680	Lateral	1,189,680	0
Van Cleave-Fisher	Mesa Cr.	1,524,600	Laterals	1,524,600	0
Mt. Sopris	Sopris Cr.		Mt. Sopris	0	0
Pat McNulty	Cottonwood Cr.	1,393,930	Laterals	1,393,930	0
Bourg	Dry Woody	27,000	Laterals	27,000	15,000
Kelly Pond	Drainage	7,391,875	Kelly Pond	7,391,875	2,465,625
Thomas	Thomas Cr.				0
DIVISION NO. 5, DISTRICT NO. 39					
Antlers	E. Br. Rifle Cr.	174,244,335	Antlers	130,680,000	0
Harris	W. Br. Rifle Cr.		Geo. E. Harris	3,267,000	0
Park	W. Elk Cr.	7,753,680	Saint	6,534,000	0
Rifle Valley	Rifle Cr.	29,620,800		2,178,000	0
Thompson	W. Rifle Cr.	653,400	Clark	348,480	0
Saint	W. Elk Cr.	653,400	Saint	0	0
Cozza		435,600	Cozza	217,800	0

DIVISION NO. 4, DISTRICT NO. 42

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Quantity of Water in Reservoir, Cubic Feet Nov. 1st
Fish Lake	Snow		Parker Basin	0	0
Cottonwood No. 1	Snow			0	0
Cottonwood No. 2	Snow			Two-thirds full	0
Cottonwood No. 4	Snow	62,850,606	All ditches on Cottonwood Cr.	Full	0
Cottonwood No. 5	Snow			0	0
Meadow Lake No. 2	Snow			One-half full	0
Meadow Lake No. 3	Snow			One-third full	0
Big Creek	Snow			0	0
Bonham	Snow	103,593,412	All ditches on Big Creek	0	0
Atkinson	Snow			0	0
Bull Creek Nos. 1-2-4-5	Snow	9,211,652	All ditches on Bull Creek	0	0
Coon Creek Nos. 1-2-4	Snow	13,658,674	Ellsbury	0	0
Mesa Creek No. 1	Snow			One-half full	0
Mesa Creek No. 4	Snow			0	0
Mesa Creek No. 3	Snow	39,002,756	All ditches on Mesa Creek	0	0
Summit No. 1	Snow			0	0
Summit No. 2	Snow			0	0
Grand Mesa Nos. 1-6-9-8	Snow	47,677,291	All ditches on Kannah Cr.	0	0
Dry Creek	Snow	8,890,279	Juniata, Highline and Berry	0	0

DIVISION NO. 5, DISTRICT NO. 44

Martin's	Martin's Creek	30,492,000	Martin's	30,492,000	0
Wyman	Little Beaver	4,791,600	Yellow Jacket 1 and 2	4,791,600	0
DIVISION NO. 1, DISTRICT NO. 48					
Porter Lake	Porter and Nunn Crs.	10,140,425		0	0
Lost Lake	Drainage		Chambers Lake	4,000,000	0
Laramie Lake	Drainage		Chambers Lake	4,000,000	
DIVISION NO. 5, DISTRICT NO. 58					
Gardner Park	Drainage	47,916,000	Stillwater	40,000,000	0
Wheeler	Lake Cr.	1,600,000	Wheeler No. 3	1,600,000	1,600,000
Chambers	Drainage	4,000,000		2,110,000	0
B. L. Allin	Trull Cr.	6,503,805			
Heart Lake	Watson Cr.	12,000,000	Ditches from Watson Cr.	12,000,000	6,000,000
DIVISION NO. 4, DISTRICT NO. 60					
Gurley	Beaver Cr.	28,000,000	Gurley	0	0
Lone Cone	Naturita and Brewster	77,000,000	Lone Cone	68,000,000	500,000

DIVISION NO. 1, DISTRICT NO. 64

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
Jumbo	So. Platte River	1,227,445,000	Jumbo Highline, Settlers, Peterson	986,961,000	269,390,000
Prewitt	So. Platte River	1,429,831,368	Schneider, Pawnee, Davis Bros., Iliff and Platte Valley, Springdale, Bravo, Powell & Dillon, Ramsey, Powell, Harmony Nos. 1-2-3, Farmers	375,000,000	31,300,000
Point of Rocks	So. Platte River	3,543,111,030	Point of Rocks	1,263,675,600	23,156,060
DIVISION NO. 1, DISTRICT NO. 65					
Holy Joe	Holy Joe Cr.	1,000,000	Holy Joe	.....	500,000
Rush Creek	Rush Cr.	2,000,000	Rush Cr.	.....	1,500.000

DIVISION NO. 1, DISTRICT NO. 1—1914

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used		Last Day Water Used		Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Hoover	45.	May	8	Oct.	31	167	11	3684	860	4.20
Riverside	270	May	11	Oct.	12	64	185	23700	14610	1.62
Bijou	204	May	4	Oct.	1	142	229	65164	13720	4.76
Corona Ranch	56	May	1	Aug.	1	90	11	1990	781	2.54
Shultz	28	.....		.....		.....	.....	.....	800	.....
Putnam	40	May	4	Nov.	1	162	12	4110	2505	1.64
Weldon Valley	165	May	11	Oct.	31	169	89	30400	6500	4.68
Ft. Morgan	323	May	11	Oct.	31	170	171	58310	12000	4.86
Upper Platte and Beaver	251	Mch.	27	Nov.	1	163	106	34610	11500	3.01
Deuel and Snyder	45	May	4	Oct.	31	167	18	6270	2000	3.14
Brown and Piatt	39	May	4	Aug.	17	83	15	2540	500	5.08
Lower Platte and Beaver	322	May	4	Oct.	31	179	133	47870	15000	3.19
Tremont	150	Apr.	5	Oct.	31	144	30	8650	2000	4.32
Huston	175	Apr.	10	Oct.	25	110	28	6360	1900	3.35
Cooper	90	May	1	Oct.	31	83	12	2132	1600	1.33
Union	46	Aug.	1	Aug.	17	15	23	690	1080	.64
Johnson and Edwards	59	May	20	Oct.	31	153	24	6700	2460	2.72
Tetsel	37	May	11	Oct.	31	165	13	4380	1467	2.98
Beaver	44	May	12	Oct.	31	169	5	1746	500	3.49

DIVISION NO. 1, DISTRICT NO. 2

Brantner	111.18	May	11	Oct.	22	165	40	13200	4560	2.88
Platteville	147.38	May	1	Oct.	22	175	43	15050	2112	7.14
Lupton Bottom	140.57	May	1	Oct.	21	174	26	9048	1633	5.53
Brighton	44.8	May	1	Oct.	22	175	27	9450	2615	3.62
Duggan	27.	May	1	Oct.	22	175	20	7000	411	17.00
Fulton	448.8	May	1	Oct.	22	171	122	41724	10595	3.94
Farmer's Independent	458.4	May	18	Sept.	30	135	105	28350	6835	4.15
Meadow Island No. 1	26.23	May	20	Sept.	30	153	10	3060	625	4.90
Meadow Island No. 2	66.	May	21	Oct.	10	94	12	2256	697	3.23
Hewes and Cook	98.57	May	23	Sept.	7	96	53	10176	7100	1.43
Lower Latham	287.73	May	16	Oct.	12	150	105	31500	8315	3.78
Section No. 3	57.7	May	20	Oct.	12	138	14	3864	1413	2.74
Patterson	.....	.....		.....		.....	.....	.....	.....	.....
Highland	64.4	July	1	Aug.	20	51	6	612	410	1.49
Union	184.03	May	12	Oct.	12	154	91	28028	5204	5.43
Evans No. 2	404.05	May	14	Oct.	12	147	96	28224	6206	4.50
Beeman	127.	May	21	Oct.	12	132	21	5544	1155	4.78
Bucker's	121.87	May	10	Oct.	12	127	34	8636	5205	1.66
Burlington	350.	May	1	Oct.	22	164	116	38048	15540	2.45
Lupton Short Line	72.	June	9	Sept.	8	73	38	5548	410	13.54
Elwood	37.6	June	1	Aug.	1	61	5	610	305	2.00

DIVISION NO. 1, DISTRICT NO. 3

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used		Last Day Water Used		Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Dry Creek	50.92	May	11	Sept.	30	143	20	5720	2380	2.40
Pleasant Valley	138	May	14	Sept.	18	128	46	11776	7000	1.68
Boyd and Freeman	99	July	3	Sept.	11	71	8.5	1207	700	1.72
Whitney	61	June	8	Sept.	30	109	25	5450	2500	2.18
B. H. Eaton	41	June	8	Sept.	22	107	10	2140	1100	1.94
Larimer and Weld	720	May	16	Sept.	24	132	210	55440	58000	.96
John G. Coy	31	May	15	Sept.	22	100	8	1600	290	5.50
Box Elder	52.7	May	18	Sept.	24	130	10	2600	2000	1.30
Josh Ames	36	May	20	Sept.	3	107	7	1498	710	2.11
Little Cache la Poudre	82.5	May	18	Sept.	12	93	15	2790	1650	1.69
Fort Collins	130	May	7	Oct.	3	148	14	4144	3600	1.15
New Mercer	163	May	6	Sept.	3	112	30	6720	6700	1.00
Canal No. 3	173	May	11	Oct.	4	147	70	20580	4000	5.13
Cache la Poudre	585	May	14	Aug.	30	94	296	55648	47000	1.18
Lake	158	May	13	Aug.	2	61	87	10614	8000	1.32
Larimer Co. No. 2	175	May	7	Sept.	25	142	42	11928	7200	1.66
Larimer Co.	463	May	18	Sept.	22	128	260	66560	50000	1.33
Ogilvy	57.6	May	12	Oct.	5	140	28.6	8008	4000	2.00

DIVISION NO. 1, DISTRICT NO. 4

Supply Lateral	74.57	May	31	Aug.	29	81	12	1944	1135	1.71
Boulder and Larimer Co.	66.72	May	31	June	24	25	21	1050	1995	.52
Blowes No. 1	44.93	June	29	Aug.	29	48	4	384	320	1.20
Miner and Lougan	40.8	June	21	Aug.	29	67	7	938	600	1.55
Handy	192.43	May	17	Oct.	16	151	53	16006	13360	1.20
Home Supply	278.84	May	17	Oct.	16	153	50	15300	22125	.69
South Side	50.3	May	25	Oct.	16	137	8	2192	3250	.68
Louden	317.78	May	10	Oct.	31	175	43	15226	14900	1.02
Geo. Rist	195	May	17	Aug.	5	81	37	6074	5175	1.30
Barnes	43.86	May	20	Sept.	30	91	16	3002	1890	1.59
Rist and Goss	86.48	May	25	Sept.	7	106	5	1060	435	2.44
Loveland and Greeley	408	May	17	Oct.	19	112	120	26880	19200	1.40
Big Thompson D. & Mfg. Co.	146.25	May	29	Sept.	30	119	12	2976	1905	1.56
Farmers'	63.9	May	28	Sept.	28	121	14	3388	4090	.83
Hillsboro	153	May	20	Oct.	5	139	59	16402	11060	1.48
Hill & Brush	61.8	June	15	Sept.	26	100	11	2200	1435	1.53
Big Thompson and Platte River	121.18	May	1	Sept.	22	145	15	4350	1985	2.20
Bee Line	40	May	1	Sept.	22	145	23	6670	450	14.80

DIVISION NO. 1, DISTRICT NO. 5

South Ledge	30.4	May	13	Aug.	26	94	8.1	1522	1170	1.30
Supply	92.2	May	24	Oct.	2	113	43.8	9894	10825	.92
Highland	325	Mch.	13	Oct.	7	171	150.5	51470	28706	1.97
Rough and Ready	83.34	Mch.	13	Sept.	26	162	25.5	8262	4570	1.81

DIVISION NO. 1, DISTRICT NO. 5—Concluded.

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
St. Vrain and Palmerton	164.31	Apr. 27	Oct. 7	163	10.62	3560	1500	2.37
Montgomery	31.96	June 12	Aug. 26	40	2	160	115	1.39
Longmont Supply	53.4	May 31	Sept. 23	114	12.3	2812	3415	.82
Oligarchy	237.51	Mch. 14	Sept. 26	145	38	5510	4355	1.27
Chapman and McCaslin	98.18	Mch. 24	Sept. 12	85	2.2	374	500	.75
James	27.11	June 2	Oct. 1	122	3.6	876	3250	.27
Denio and Taylor	41.18	June 3	Oct. 1	117	6	1404	895	1.57
Zweck and Turner	82.61	June 5	Oct. 1	110	6.2	1364	655	2.08
Pella	42.64	May 24	Sept. 25	123	7	1722	1050	1.64
Ni Wot	35.96	June 4	Sept. 20	106	2.8	592	805	.74
South Flat	71.43	June 8	Sept. 30	114	8	1824	905	2.02
Last Chance	96.84	June 4	Aug. 25	62	31	3844	2062	1.86
Hayseed	41.54	June 22	Aug. 31	50	1.6	160	220	.73
J. W. Goss No. 2	29.51	June 20	Aug. 15	47	1.3	126	295	.43
Goss Private	25.01	June 20	Aug. 24	50	1.6	160	405	.40
Left Hand	726	June 20	Sept. 24	92	25	4600	15750	.29

DIVISION NO. 1, DISTRICT NO. 6

Howard	36	June 11	Nov. 11	148	5.3	2068	1210	1.71
Schearer	26.08	June 18	Oct. 5	67	1.3	186	200	.93
East Boulder	102.3	Mch. 30	Oct. 22	111	4.1	916	907	1.01
Cottonwood No. 2	33.7	June 11	Sept. 19	110	8.4	1858	740	2.51
Dry Creek Davidson	29.95	June 12	Oct. 14	98	5.8	1144	810	1.42
Dry Creek No. 2	69.	June 11	Nov. 12	155	5.7	1784	1270	1.4
Enterprise	34.08	June 11	Oct. 15	130	4.8	1254	1230	1.02
Leyner and Cottonwood No. 1	82.	June 8	Oct. 31	111	16.1	3358	3505	.96
Marshallville	45.92	June 11	Oct. 19	70	13.1	1836	1665	1.1
So. Boulder Canon	26.37	June 5	Oct. 29	66	22.2	2886	3195	.905
Davidson	116.3	Mch. 23	Sept. 22	54	48	5204	7435	.7
Goodhue or Rock Creek	96.24	May 17	Oct. 27	59	51.9	6130	7440	.69
So. Boulder and Coal Creek	53.55	June 8	Oct. 31	51	20.1	2052	3055	.67
Community	85.3	Jan. 11	June 24	132	42.4	11176	11410	.98
Lower Boulder	122	June 7	Oct. 12	123	46.5	11462	10000	1.14
Smith and Goss	44.36	June 10	Nov. 1	145	2.9	854	220	3.87
Anderson	25	June 8	Nov. 11	125	10.5	2652	850	3.12
Godding, Daly and Plum	30.44	June 7	Oct. 9	124	10.5	2606	551	4.72
N. Boulder Farmers'	58	June 10	Oct. 1	109	15.6	3382	3355	1.01
P. M. Rural	220	June 7	Oct. 14	109	27.8	5904	3160	1.87
Green	34.58	June 10	Sept. 1	67	5	670	530	1.26
Farmers'	73.29	June 6	Oct. 1	100	33.3	6670	3575	1.86
Smith and Emmons	47.16	June 7	Oct. 9	117	9.4	2206	728	3.04

DIVISION NO. 1, DISTRICT NO. 6—Concluded

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Carr and Tyler	33.75	June 7	Sept. 27	90	5.3	966	165	5.78
Butte Mill	110.86	June 13	Sept. 9	55	8.2	904	1005	.899
Tom Delehant	37.12	June 7	Sept. 28	107	5.1	1042	500	2.08
Godding	99.7	June 7	Aug. 11	64	39.5	5068	1345	3.77
Leggett or Charity	31.35	June 7	Oct. 11	73	28.8	4202	4570	.92
Boulder and Weld Co.	59.4	June 7	Aug. 7	61	17.6	2152	2685	.8
Boulder and White Rock	190.58	June 4	Aug. 9	63	70	8826	7525	1.17
DIVISION NO. 1, DISTRICT NO. 7								
Golden	720.66	Mch. 14	Nov. 14	216	100	43280	.....	.....
Clear Creek and Platte R.	70.06	May 19	Oct. 22	154	20	6170	.....	.....
Rocky Mt.	190	May 5	Oct. 14	134	60.83	16310	.....	.....
Lee, Stewart and Eskins	33.19	May 8	Oct. 18	148	9.65	2834	.....	.....
Golden City and Ralston Cr.	110.	May 23	Nov. 15	135	68.9	18598	.....	.....
Golden City	26.	May 21	Nov. 15	119	20	47.82	5900	.81
Agricultural	150	May 21	Nov. 15	87	59.7	10380	13200	.78
Colo. Agricultural	62	May 21	Oct. 22	152	20.18	6130	2450	2.5
DIVISION NO. 1, DISTRICT NO. 8								
Platte Water Co.	89.95	Mch. 31	Oct. 30	210	43	15824	1500	10.55
Nevada	62.3	May 10	Nov. 10	180	50	18000	1740	10.35

DIVISION NO. 1, DISTRICT NO. 8—Concluded.

Platte Canon	56	May 15	Oct. 15	150	20	6000	924	6.5
Last Chance	32	May 15	Nov. 1	165	25	8250	1100	7.5
No. Colo. Irrig. Co.	1184	Apr. 24	Oct. 31	188	278	104528	28000	3.73
First Attempt	32	June 15	Oct. 15	120	6	1400	42	33.4
Arapahoe	50	May 1	Oct. 15	165	50	16500	10000	1.65
Fairview	52	.....	.....	.....	.....	250	150	1.67
DIVISION NO. 1, DISTRICT NO. 9								
Simonton	35.76	July 1	Aug. 5	24	11.2	538	426	1.26
Warrior	52.52	June 9	Oct. 23	137	21.8	5973	1456	4.1
Pioneer Union	55.67	June 1	Oct. 23	139	14.8	4014	711	5.65
Lewis and Strouse	30.68	June 1	Oct. 8	54	1.6	172	30	5.73
Ward	63.	Apr. 9	Oct. 30	124	10.5	2604	1479	1.76
Arnett	56.65	Mch. 8	Oct. 30	231	31.	14322	2821	5.08
DIVISION NO. 2, DISTRICT NO. 10								
Fountain	29.09	July 1	Oct. 1	41	29.09	2389	282	8.42
Chilcott	27.	July 24	Oct. 15	161	27.	8694	1213	7.16
Widefield	26.75	July 1	.....	90	26.73	4814	852	5.64
DIVISION NO. 2, DISTRICT NO. 11								
Mo. Park	40	May 1	Nov. 1	90	30	5400	1370	3.94
Bowen	50.9	June 1	Sept. 15	90	35	6200	.....	.....
Sunnyside Park	29.17	May 1	Nov. 1	150	10	3000	373	8.04
Starr	52.15	June 1	Sept. 1	90	30	5400	.....	.....
Stevens and Leiter	36.	Jan. 1	Jan. 1, 15	365	36	26280	.....	.....

DIVISION NO. 2, DISTRICT NO. 11—Concluded.

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Salida Power and Utility Co.	136.6							
B. V. Smelting and R. Co.	115							
Cache Creek	40							
Clear Creek	50							
Arlington	50							
Colo. Gulch Placer	30							
DIVISION NO. 2, DISTRICT NO. 12								
Park Center	28.92	Nov. 5, 13	Oct. 29	168	18	6048	1471	4.1
Beaver W. & I. Co.	58.	Nov. 1, 13	Oct. 31	326	16.88	11008	4850	2.28
Union	48	Nov. 1, 13	Oct. 31	349	25.71	18746	920	20.4
So. Canon	40	Nov. 1, 13	Oct. 31	240	26.	12674	1400	9.04
Canon City and Hydraulic	77	Nov. 1, 13	Oct. 31	352	46.	32944	2750	11.55
Canon City and Oil Creek	33.6	Nov. 1, 13	Oct. 31	298	20.9	12460	1210	10.3
DeWeese-Dye	28.25	Nov. 2, 13	Oct. 31	198	12.28	4684	1150	4.06
Tremont W. S. Co.	57.	Nov. 1, 13	Oct. 31	189	2.17	822	160	5.13
Arkansas Valley Conduit	70.	Nov. 1, 13	Oct. 31	233	63.6	51642		

DIVISION NO. 2, DISTRICT NO. 14

Oxford Farmers'	116	Feb. 16	Oct. 31	230.5	54.6	25174	6000	4.19
Bessemer	370	Jan. 1	Oct. 31	288.	141.	81166	19790	4.1
Collier	26						1560	
Excelsior	60	Apr. 29	Oct. 31	104	32.9	6840	2770	2.47
Pueblo Water Wks.	46							
High Line	468.5	Nov. 1, 13	Oct. 31	329	138	91000	28000	3.24
Colorado	756.28	Jan. 8	Oct. 28	122.	184	44884	45200	.995
DIVISION NO. 2, DISTRICT NO. 16								
Montez	37.64	Apr. 10	Aug. 15	50	8	800		
Huerfano Valley	42	Jan. 17	Sept. 25	176	29.9	8262	3017	2.74
DIVISION NO. 2, DISTRICT NO. 17.								
Rocky Ford	209	Nov. 16, 13	Nov. 15	329	71	46756	9665	4.83
Las Animas Consolidated	129.5	Nov. 16, 13	Nov. 15	224	42.6	18104	6220	2.90
Las Animas Town	32.5	Nov. 16, 13	Nov. 15	330	21	13866	2460	5.64
Ft. Lyon	933	Nov. 16, 13	Nov. 15	360	440.2	316978	84400	3.75
Catlin	345	Nov. 16, 13	Nov. 15	325	120	79638	19880	4.0
Lake or Holbrook	600	Dec. 2, 13	Oct. 30	219	136	59686	20000	2.98
Otero	457.92	May 2	Oct. 19	117	137.7	32322	17700	1.83
Timpas Creek	51.84	May	Oct.					
Omer	120.4	May 1	Sept.	120	60	14400	2000	7.20
Carmen	60	Apr. 15	Nov. 15	183	30	10980	2800	3.92
DIVISION NO. 2, DISTRICT NO. 19								
Baca Consolidated	95.49	May 12	Sept. 26	134			4556	
Pulaski	163.56	Apr. 18	Nov. 1	192			6822	

DIVISION NO. 3, DISTRICT NO. 21

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Capulin	31.37	Apr. 20	Aug. 1	90	30	5400	700	7.72
Head Overflow	49.8	Apr. 10	July 1	70	40	5600	59	95.0
Alamosa Spring Cr.	62.	May 1	Aug. 1	60	15	1800	1930	.93
Arroya	53.	May 1	Aug. 1	70	40	5600	1260	4.44
Union	40	May 1	July 20	70	40	5600	1266	4.42
N. Alamosa	49	May 1	July 1	70	40	5600	1000	5.60
Cottonwood	35.10	May 1	July 20	60	30	3600	1000	3.60
Overflow No. 4	40	May 1	Aug. 1	50	15	1500	500	3.0
Lower La Jara	44.8	May 1	July 30	40	30	2400	.....	.....
Norland Bros.	48	Apr. 25	July 20	50	45	4500	705	6.38
Flintham	25	May 1	Aug. 1	45	20	1800	400	4.5
Miller	60	May 1	July 25	40	40	3200	1510	2.12
Overflow No. 1	112	Apr. 20	July 1	80	60	9600	5030	1.91
Plano Vista	30	May 1	Aug. 1	60	20	2400	1570	1.53
Davis and Chapman	51	May 1	July 10	65	25	3250	1200	2.71
Scandinavian	43	May 1	July 1	65	10	1300	1200	1.08
Alamosa Creek	166	May 1	Aug. 1	60	14	1680	4210	4

DIVISION NO. 3, DISTRICT NO. 21—Concluded.

Coddington	30	May 1	Aug. 1	70	15	2100	960	2.19
Rivera	28	May 1	July 1	45	15	1350	360	3.75
La Joya	27	Apr. 1	June 25	45	20	1800	585	3.08
DIVISION NO. 3, DISTRICT NO. 22								
Angustura	42.72	Apr. 1	June 20	81	.....	.....	320	.....
Alamo	36.	Apr. 1	June 20	81	.....	.....	2000	.....
Antonito	250	Apr. 1	June 20	81	.....	.....	2000	.....
Canon	42.89	Apr. 1	Aug. 12	134	.....	.....	1700	.....
Cottonwood	28.5	Apr. 1	June 12	73	.....	.....	720	.....
El Coda	25.18	Apr. 1	Aug. 29	150	.....	.....	260	.....
Ephraim	47.	Apr. 1	July 4	95	.....	.....	4000	.....
Fuerticitous	31.47	Apr. 1	Aug. 18	140	.....	.....	400	.....
Guadalupe Main	69.82	Apr. 1	Aug. 29	150	.....	.....	2560	.....
Heads Mill & Irr. Co.	117 14	Apr. 1	Aug. 29	150	.....	.....	160	.....
Jose B. Romero	25	Apr. 1	July 14	105	.....	.....	1000	.....
J. M. Espinosa	26	Apr. 1	July 21	112	.....	.....	240	.....
La del Rio	31.44	Apr. 1	Aug. 29	150	.....	.....	640	.....
La Sauces	88.43	Apr. 1	Aug. 29	150	.....	.....	1600	.....
Lobatos	27.58	Apr. 1	Aug. 1	91	.....	.....	160	.....
Los Ojos No. 1	44.16	Apr. 1	June 26	87	.....	.....	160	.....
Mesitos	38.99	Apr. 1	Aug. 19	144	.....	.....	2000	.....
Manassa	73.6	Apr. 1	July 4	95	.....	.....	12000	.....
Magote	342.4	Apr. 1	June 6	67	.....	.....	5000	.....

DIVISION NO. 3, DISTRICT NO. 22—Concluded

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Mogales Valley	26	Apr. 1	June 1	61	.....	.....	560	.....
Overflow	34.71	Apr. 1	Aug. 22	144	.....	.....	160	.....
Seledonai Valdez	31.77	Apr. 1	Aug. 29	150	.....	.....	640	.....
San Jose	40.28	Apr. 1	Aug. 29	150	.....	.....	1600	.....
Santiago	55.59	Apr. 1	Aug. 22	144	.....	.....	500	.....
San Juan and San Rafael	47.76	Apr. 1	July 11	102	.....	.....	450	.....
Sanchez	27.26	Apr. 1	July 4	93	.....	.....	720	.....
Sanford	107.5	Apr. 1	July 4	95	.....	.....	4000	.....
Trujillo	29.8	Apr. 1	Aug. 29	150	.....	.....	300	.....
Taos Valley No. 1	500.	Apr. 1	June 20	81	.....	.....	3000	.....
Taos Valley No. 2	500	Apr. 1	June 20	81	.....	.....	.....	.....
Richfield	56.24	Apr. 1	July 4	95	.....	.....	3000	.....
DIVISION NO. 3, DISTRICT NO. 24								
Cordillera	435	Water diverte	d through Culeb	ra and Eastdale	Canal			
San Luis Mill	27	Continual for	power					
Eastdale-Culebra	25	.....	.....	.....	.....	.....	.....	.....
Culebra-Eastdale	723	.....	.....	.....	.....	.....	.....	.....
Sanchez	606	.....	.....	.....	.....	.....	.....	.....

DIVISION NO. 3, DISTRICT NO. 25

Baca Grant	125	May 1	Sept. 30	150	70	21000	4435	4.84
Wale and Shellabarger	75	May 6	Oct. 5	150	10	3000	1930	1.56
DIVISION NO. 3, DISTRICT NO. 26								
Travis	25	May 6	July 6	61	2352	.....	1250	.....
DIVISION NO. 5, DISTRICT NO. 38								
East Mesa	31.8	May	.....	80	14	.....	682	.....
Salvation	58.	May	Sept. 9	100	40	.....	965	.....
Mt. Meadow	25.6	Mch.	July 12	.....	.....	.....	150	.....
DIVISION NO. 5, DISTRICT NO. 39								
Rifle Creek Canon	28	May 8	Sept. 28	142	.....	.....	1019	.....
Grand Tunnel	26.5	May 8	Sept. 28	135	.....	.....	1086	.....
Grass Valley	100	May 8	Sept. 28	140	.....	.....	1457	.....
Cactus Valley	50	May 8	Sept. 10	125	.....	.....	663	.....
Ware and Hinds	26.2	May 8	Sept. 25	140	.....	.....	1284	.....
DIVISION NO. 4, DISTRICT NO. 40								
Minnesota	32.51	May 15	Oct. 1	130	20	5200	2200	2.36
Stewart	50.75	May 22	Oct. 10	135	50	13500	2700	5.0
Fire Mountain	50.	May 20	Oct. 5	130	80	20800	3150	6.61
Leroux	54.35	May 1	Sept. 16	139	19.6	5449	1159	4.7
DIVISION NO. 4, DISTRICT NO. 41								
Loutsenhizer	48	Mch. 15	Nov. 15	245	75	36750	4300	8.55
Montrose and Delta	200	Apr. 1	Oct. 15	198	250	100000	14500	6.9
Ironstone	37.5	Mch. 15	Nov. 15	245	50	24500	5800	4.23

DIVISION NO. 4, DISTRICT NO. 41—Concluded.

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Garnett	45	Mch. 10	Nov. 15	200	30	15000	1800	8.32
Home Run	25	Apr. 1	Nov. 15	229	20	9660	1550	5.92
DIVISION NO. 4, DISTRICT NO. 42								
Brown and Campion	30.6	May 3	Oct. 4	154	3.93	1210	716	1.69
DIVISION NO. 1, DISTRICT NO. 46								
Eureka	70.	May 8	July 18	70	40	5600	2395	2.33
Mallon	37.5	Apr. 15	July 10	85	40	6800	1200	5.66
Wolfer	146	May 1	July 10	70	130	18200	11900	1.53
Staples No. 1	35	May 15	July 25	70	35	4900	1800	2.72
Mitchell	31.75	May 10	July 18	68	25	3400	700	4.85
Mutual	100	May 10	July 10	60	75	9000	4300	2.09
Victor	35	May 10	July 15	95	25	4500	890	5.05
Little Grizzley	25	May 18	July 20	62	25	3100	850	3.65
Damfino	25	May 15	July 15	60	12	1440	1400	1.03
Arapahoe	39	May 10	July 12	62	22	2728	1220	2.24
Big Grizzley	30	Apr. 25	July 16	81	30	4860	1280	3.78
Little Neilie	87	May 1	July 12	72	70	10080	4000	2.52
Chapman	27	May 1	July 15	75	20	3000	800	3.75
Roaring	38.25	May 20	July 20	60	30	3600	1000	3.6

DIVISION NO. 1, DISTRICT NO. 46—Concluded.

Pleasant Valley	36	May 5	July 15	70	45	6300	2500	2.52
Davis	35	May 10	July 10	60	35	4200	1500	2.80
Staples No. 2	104.4	May 11	July 15	64	40	5120	3200	1.60
Mallon No. 2	80	Apr. 15	July 10	85	70	11900	3200	3.72
Darby	69.5	May 12	July 20	68	50	6800	3200	2.12
Hanson	93.24	May 10	July 10	60	45	5400	7000	.77
Independent	33.75	May 5	July 15	70	28	3920	1660	2.36
Briggs and Bohn	36	May 12	July 20	68	24	3264	1200	2.72
DIVISION NO. 1, DISTRICT NO. 47								
Midland	202	May 21	July 12	52	62.33	6448	1380	4.67
Old S. C.	32.9	May 21	Nov. 30	193	24.3	9372	600	15.6
Lost Treasure	55.	May 10	July 20	71	35	4970	1000	4.97
Cleveland	38.5	May 15	Nov. 6	175	25.3	8866	1000	8.86
DIVISION NO. 1, DISTRICT NO. 48								
Yelton	30.14	May 16	July 20	66	12.9	1702	131	13.0
Timothy	34.36	June 15	Oct. 10	127	7.46	.....	80	.....
DIVISION NO. 4, DISTRICT NO. 60								
Gurley	62.5	May 10	.....	.....	.....	.....	6272	.....
Lone Cone	32.	May 15	Aug. 20	98	.....	.....	4950	.....
Colony	60	Mch. 28	Nov. 14	231	.....	.....	4365	.....

DIVISION NO. 2, DISTRICT NO. 67

NAME OF DITCH	Amount of Appropriation in Cu. Ft. Per Sec.	First Day Water Used	Last Day Water Used	Number of Days Water Carried from Natural Stream	Average Daily Amount of Water During Season	Number of Acre-Feet Used During Season	Number of Acres Irrigated	Duty in Acre-Feet Per Acre
Colorado-Kansas	98.51	Nov. 16, 13	Nov. 15	232	48	22272	4517	4.94
Amity	283.5	Nov. 16, 13	Nov. 14	257	267	137228	32794	4.18
Lamar	385.29	Nov. 16, 13	Nov. 15	263	77	40402	9459	4.28
Manvel	54	Nov. 16, 13	Sept. 28	92	12	2208	250	8.86
X Y	69	Nov. 16, 13	Nov. 15	154	25	6700	2362	2.84
Graham	61	Apr. 20	Aug. 14	30	23	1380	1650	.84
Buffalo	67.5	June 15	Sept. 30	97	20	3880	1952	1.99

DIVISION NO. 1, DISTRICT NO. 1—1914

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Jackson Lake	So. Platte	1,543,991,407	Fort Morgan, Upper Platte and Beaver, Trowell	1,413,000,000	1,200,000,000
Empire	So. Platte	1,642,629,890	Bijou Irrig. Dist.	1,100,000,000	120,019,807
Moore No. 4	Muddy Cr.	46,000,000		35,000,000	0
Riverside	So. Platte	2,860,000,000	Tremont and others	2,048,000,000	348,069,108
Fort Morgan Land & Res. Co. No. 2	So. Platte	435,600,000		250,000,000	0
Point of Rocks	So. Platte	3,920,400,000			
Prewitt	So. Platte				
DIVISION NO. 1, DISTRICT NO. 2.					
Oasis and Barr	So. Platte, 1st, 2nd, 3rd Crs.	1,436,880,000	Neres, Burlington and others	1,436,880,000	34,920,000
Horse Creek	So. Platte	740,520,000		740,520,000	0
Prospect	So. Platte	243,946,000	Henrylyn	243,946,000	0
Sand Creek	So. Platte	78,408,000	Henrylyn	78,408,000	0
Higgins	So. Platte	4,900,500	Lateral	4,900,500	0
Lutz	So. Platte	2,380,200	Laterals	2,380,200	0
Magers	So. Platte	2,321,021	Laterals	2,321,021	0
Little Western	So. Platte	5,500,000	Laterals	5,500,000	0
H. A. Smith	So. Platte	4,530,240	Laterals	4,530,240	0

DIVISION NO. 1, DISTRICT NO. 2—Concluded.

Skeel No. 1	So. Platte	6,975,000	Laterals	6,975,000	0
Rutherford	So. Platte	1,787,500	Laterals	1,787,500	0
Geo. Smith	So. Platte	3,180,255	Laterals	3,180,255	0
Fulton Waste	So. Platte	22,895,225	Laterals	22,895,225	0
Lower Latham	So. Platte	270,700,000	Laterals	270,700,000	0
Z. J. Fort	So. Platte	7,168,200	Laterals	7,168,200	0
Milton	So. Platte	1,873,080,000	Gilmore	1.873,080,000	0
Carlin	So. Platte	2,962,080	Lateral	2,962,080	0
Dougan	So. Platte	9,583,200		9,583,200	0
Standley	Clear, Woman, Ralston, Leyden, Coal Crs.	2,178,000,000	Bull, Niver and O'Brian	435,600,000	0
Foster Nos. 1-2	So. Platte	5,227,200	Bowles	5,227,000	0
Kinear Nos 1-2	So. Platte	2,613,000	Bowles	2,613,000	0
Meek No. 1	So. Platte	2,613,600	Bowles	2,613,600	0
Meek No. 2	So. Platte	4,007,520	Bowles	4,007,520	0
Bowles No. 1	So. Platte	30,492,000	Bowles	30,492,000	0
Bowles No. 2	So. Platte	20,691,000	Bowles	20,691,000	0
Geneva	So. Platte	654,400	Bowles	654,400	0
Henry	So. Platte	1,089,000	Bowles	1,089,000	0
Mildred	So. Platte	19,295,200	Bowles	19,295,200	0
Curtis	So. Platte	784,080		784,080	0
East Line	So. Platte	3,267,000		3,267,000	0
Clark	So. Platte	2,744,000		2,744,000	0
Ferguson	So. Platte	871,200		871,200	0

DIVISION NO. 1, DISTRICT NO. 3

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
Warren Lake	Cache la Poudre	96,000,000	Outlet	64,000,000	10,000,000
Windsor Lake	Cache la Poudre	78,408,000	Outlet	60,000,000	50,000,000
North Gray	Box Elder	12,000,000	Lake	12,000,000	9,000,000
South Gray	Box Elder	22,293,000	Lake	22,000,000	16,000,000
Reservoir No. 4	Cache la Poudre	43,370,000	Larimer County	26,000,000	0
Spring Canon	Spring Canon Cr.	2,683,000	Outlet	2,683,000	0
Reservoir No. 1	North Poudre	29,346,000	Outlet	29,000,000	19,000,000
Claymore	Cache la Poudre	39,000,000	Pleasant V. and Lake	39,000,000	26,000,000
Reservoir No. 1	Box Elder	24,830,000	Outlet	21,000,000	5,000,000
Richards	Cache la Poudre	46,000,000	Larimer Co.	46,000,000	13,000,000
Reservoir No. 2	Box Elder	8,500,000	Outlet	5,000,000	0
Reservoir No. 3	N. Poudre	125,000,000	Outlet	125,000,000	21,000,000
Caverly	N. Poudre	7,500,000	Outlet	7,000,000	0
Curtis	Cache la Poudre	34,000,000	Larimer Co.	34,000,000	0
Dixon Canon	Dixon Canon Cr.	19,500,000	Outlet	12,000,000	0
Reservoir No. 4	Box Elder	11,000,000	Outlet	6,000,000	0
Reservoir No. 3	Box Elder	34,500,000	Outlet	28,000,000	0
Stuchell	N. Poudre	3,056,000	Outlet	3,000,000	0
Jameson Lake	Box Elder	3,500,000	Outlet	0	0

DIVISION NO. 1, DISTRICT NO. 3—Continued.

Mitchell No. 1	Lone Pine	25,280,000	Water for sale	25,000,000	7,000,000
Mitchell No. 2	Lone Pine	4,370,000	Water for sale	4,000,000	0
Mitchell No. 3	Lone Pine	4,335,000	Water for sale	4,000,000	0
Reservoir No. 4	N. Poudre	46,766,000	Outlet	46,000,000	0
Reservoir No. 2	N. Poudre	169,000,000	Outlet	169,000,000	40,000,000
Larimer and Weld	Cache la Poudre	390,000,000	Larimer and Weld	360,000,000	200,000,000
Windsor	Cache la Poudre	810,000,000	Cache la Poudre	712,000,000	300,000,000
Reservoir No. 1	Cache la Poudre	206,000,000	Larimer Co.	167,000,000	32,000,000
Long Pond	Cache la Poudre	176,000,000	Larimer Co.	144,000,000	13,000,000
Lindenmeier	Cache la Poudre	40,000,000	Larimer Co.	35,000,000	25,000,000
Cache la Poudre	Cache la Poudre	415,000,000	Cache la Poudre	400,000,000	190,000,000
Wood	Seepage and Flood	140,000,000	Outlet	75,000,000	30,000,000
Reservoir No. 5	Cache la Poudre	250,000,000	N. Poudre by Exch.	250,000,000	0
Neece	Flood	4,257,000	Neece	3,000,000	0
Reservoir No. 1	Cooper and Ames Slough	35,000,000	Lake	31,000,000	0
Dandy and Twin	Lone Pine	26,856,000	Water for sale	22,000,000	13,000,000
Reservoir No. 6	Cache la Poudre	445,000,000	N. Poudre by Exch.	420,000,000	445,000,000
Deer Lake	Lone Pine	3,842,000	Water for sale	3,000,000	0
Fossil Creek	Cache la Poudre	503,000,000	N. Poudre by Exch.	496,000,000	160,000,000
Erie Lake	Lone Pine	3,000,000	Water for sale	2,000,000	0
Douglas	Cache la Poudre	460,000,000	Larimer and Weld	280,000,000	58,000,000
Coal Creek	Box Elder	178,400,000	Cactus Hill	153,000,000	82,000,000
Reservoir No. 3	Soldier Canon	31,000,000	Outlet	20,000,000	10,000,000

DIVISION NO. 1, DISTRICT NO. 3—Concluded.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Big Beaver	Beaver Cr.	69,201,000	Water for sale	0	0
Reservoir No. 8	Cache la Poudre	400,000,000	Larimer and Weld	380,000,000	260,000,000
Cameron Pass	Joe Wright and Michigan	35,458,000	N. Poudre	0	0
Black Hollow	Cache la Poudre	250,000,000	Larimer Co.	58,000,000	11,000,000
Tenney	Cache la Poudre	15,000,000	Outlet	12,000,000	0
Reservoir No. 2	Cache la Poudre	6,000,000	Outlet	6,000,000	0
Bubble	Cache la Poudre	9,000,000	Outlet	8,000,000	5,000,000
Halligan	N. Poudre	280,000,000	N. Poudre	280,000,000	32,000,000
Reservoir No. 15	N. Poudre	240,000,000	N. Poudre	0	0
Sheep Creek	Sheep Cr.	20,000,000	Water for sale	7,000,000	7,000,000
Lake Agnes	Zimmerman Cr.	5,000,000	Water for sale	5,000,000	5,000,000
Elder	Cache la Poudre	100,000,000	Larimer and Weld	40,000,000	0
Portner	Fossil Cr.	26,000,000	N. Poudre	12,000,000	12,000,000
Chambers Lake	Cache la Poudre	290,000,000	W. S. and Storage Co.	155,000,000	64,000,000
Worster	Sand and Sheep Cr's.	132,421,000	Larimer and Weld	0	.....
DIVISION NO. 1, DISTRICT NO. 4.					
Boyd Lake	Big Thompson	1,918,000,000	Exchange	1,000,000,000	992,000,000
Seven Lakes	Big Thompson	367,300,000	Loveland and Greeley	275,000,000	110,000,000

DIVISION NO. 1, DISTRICT NO. 4—Concluded.

Marianna	Big Thompson	180,000,000	Home Supply	180,000,000	45,000,000
Home Supply	Big Thompson	400,000,000	Home Supply	400,000,000	25,000,000
Lake Loveland	Big Thompson	625,000,000	Loveland and Greeley	625,000,000	147,397,178
Buckhorn	Buckhorn Cr.	51,816,431	Louden	35,000,000	10,000,000
Long Lake	Roaring Fork	33,088,000	Farmers	.....	.....
Boulder and Larimer Co.	Little Thompson	319,895,000	Boulder and Larimer Co.	319,895,000	77,812,000
Welch Nos. 3-4	Big Thompson	20,564,676	Handy	20,564,676	.....
Welch Nos. 1-2-5	Big Thompson	168,598,658	Handy	168,598,658	.....
Ryan Gulch	Big Thompson	31,796,870	Exch.	31,796,870	16,796,870
South Side	Big Thompson	15,225,639	So. Side	15,285,639	285,639
DIVISION NO. 1, DISTRICT NO. 5.					
Pleasant Valley	St. Vrain	110,300,055	Rough and Ready	70,054,400	20,000,000
Knoths Lake	St. Vrain	2,000,000	Hanson's	1,633,500	0
Highland No. 1	St. Vrain	125,071,248	Highland	33,889,104	0
Highland No. 2	St. Vrain	105,280,000	Highland	85,957,000	0
Highland No. 3	St. Vrain	71,023,000	Highland	71,855,680	0
Highland Lake	St. Vrain	24,452,500	Private	4,638,930	20,000
McIntosh	St. Vrain	107,153,830	Oligarchy	.....	.....
Union	St. Vrain	850,000,000	Union (in Dist. 2)	850,000,000	600,000,000
Oligarchy	St. Vrain	76,816,437	Oligarchy	.....	.....
Gold Lake	Left Hand Cr.	19,000,000	Left Hand	19,000,000	8,000,000
Crystal Lake	St. Vrain	1,033,000	Private	1,033,000	20,000

DIVISION NO. 1, DISTRICT NO. 5—Concluded.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
Clover Basin	St. Vrain	25,962,000	Clover Basin	25,962,000	20,000,000
Beaver Park	Beaver Cr.	122,976,000	Highland and Supply	100,000,000	0
Foothills	St. Vrain	184,629,820	Oligarchy and 7 others	74,491,200	0
DIVISION NO. 1, DISTRICT NO. 6.					
Marshall	So. Boulder	435,600,000	Community	435,600,000	174,240,000
West Lake	So. Boulder and Coal Cr's.	30,452,000	Community	30,452,000	400,000
Section 19	So. Boulder and Coal Cr's.	3,520,000		3,520,000	200,000
Section 17	So. Boulder and Coal Cr's.	1,520,000		1,475,812	50,000
Section 15	So. Boulder and Coal Cr's.	767,900		767,900	1,000
Section 35	So. Boulder and Coal Cr's.	2,500,100		2,500,100	25,000
Section 11	So. Boulder and Coal Cr's.	3,598,000		3,598,000	500,000
McKay Lake	So. Boulder and Coal Cr's.	41,678,208		40,678,208	650,000
Section 9	Coal Creek	927,000		927,000	2,500
Erie	So. Boulder	10,407,500	Town of Erie	6,000,000	4,000,000
Louisville	So. Boulder	12,664,764	Town of Louisville	3,500,000	3,000,000
Harper	So. Boulder	2,713,450	Harper's	715,450	0
Prince	So. Boulder	3,520,250	Prince's	2,000,000	500,000
Silver Lake	North Boulder	35,164,124	Town of Boulder	6,073,127	0

DIVISION NO. 1, DISTRICT NO. 6—Concluded.

Island Lake	North Boulder	16,196,629	Town of Boulder	16,196,626	25,000
Goose Lake	North Boulder	11,377,158		10,467,326	505,000
Panama No. 3	Boulder	196,000,000	Branch of White Rock	190,000,000	1,000,000
Panama No. 1	Boulder	304,920,000	Panama	300,020,000	219,612,000
Base Line	So. Boulder	130,680,000	Lower Boulder	130,680,000	79,453,440
Barker Meadow	Middle Boulder	479,160,000	Boulder Cr.	174,240,000	215,550,000
Smart	Coal Cr.	10,305,000	Community	10,305,000	350,000
Kinnear	Coal Cr.	40,982,478		40,982,478	898,000
Last Chance	Coal Cr.	1,983,200	Zang	1,983,200	500,000
Church Upper Lake	Coal Cr.	1,910,000	Church	1,900,000	5,000
Eggleston No. 4	Coal Cr.	1,015,000	Eggleston	1,015,000	4,500
Eggleston No. 6	Coal Cr.	8,000,000		8,000,000	20,000
Albion Lake	North Boulder	40,000,000	Town of Boulder	37,602,791	35,620,000
DIVISION NO. 1, DISTRICT NO. 7.					
Loch Lomond 1-2-3-4-5	Clear Cr.	24,567,840	Agricultural	25,567,840	
Tucker	Ralston Cr.	78,408,000		78,408,000	25,000,000
Long Lake	Ralston Cr.	34,848,000		34,848,000	34,848,000
Copeland Nos. 1-2	Clear Cr.	4,356,000		4,356,000	
Standley	Clear Cr.	1,742,400,000	In District 2	1,350,560,000	519,660,000
Broad 1-2 and Leyden	Clear Cr.	73,180,000		73,180,000	
Ward and Lake	Clear Cr.	63,631,400		63,631,400	
Lee and Hallack 1-2-3-4	Clear Cr.	11,158,200		11,158,200	

DIVISION NO. 1, DISTRICT NO. 7—Continued.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
East Lakes 1-2-3-4	Clear Cr.	52,272,000		52,272,000	
Hackberry and Shoup 1-2-3-4-5	Clear Cr.	15,463,700		15,463,700	
Lathrop 1-2-3	Clear Cr.	18,295,200		18,000,000	3,000,000
Calkins	Clear Cr.	16,988,400		16,000,000	2,000,000
Church 1-2-3, Williams and Henry	Clear Cr.	16,068,000		13,000,000	1,000,000
Burnett and Harrington 1-2	Clear Cr.	13,058,000		13,000,000	
Fry Vogel 1-2-3 and Hintz	Clear Cr.	15,246,000		15,000,000	
Huzzy and Rankin	Clear Cr.	13,503,600		13,000,000	1,000,000
King and Wooley 1-2-3	Clear Cr.	23,958,000		23,000,000	2,000,000
Johnson and Poitz	Clear Cr.	8,276,400		8,276,000	1,000,000
Neresheimer	Clear Cr.	13,068,000		13,000,000	1,000,000
Wadley and Brown	Clear Cr.	22,215,600		22,000,000	2,000,000
Webster and Brown	Clear Cr.	20,908,800		20,500,000	1,000,000
Hallack and Smith	Clear Cr.	8,276,400		8,276,000	
Crokes 1-2-3-4	Clear Cr.	39,204,000		39,000,000	
Finnerty, Brower and Brown	Clear Cr.	11,761,200		11,500,000	1,000,000
Richardson and Smith	Clear Cr.	20,928,800		20,928,800	1,000,000
Westminster	Clear Cr.	70,779,000		70,779,000	
Groves and Dollison	Clear Cr.	18,800,000		18,800,000	

DIVISION NO. 1, DISTRICT NO. 7—Concluded.

Legault 1-2 and Gay	Clear Cr.	23,000,000		23,000,000	
Wilbur and School	Clear Cr.	28,000,000		28,000,000	
Church	Clear Cr.	20,000,000		20,000,000	
DIVISION NO. 1, DISTRICT NO. 8.					
Castlewood	Cherry Cr.	250,000,000	Arapahoe	250,000,000	108,900,000
Clark	Happy Canon	108,900,000	Arapahoe	108,900,000	21,780,000
22 and 16	Cherry and Wild Cat Crs.	65,340,000	Arapahoe	65,340,000	21,780,000
DIVISION NO. 1, DISTRICT NO. 9.					
Soda Lake No. 1	Bear Cr.	10,500,000	Arnett	3,200,000	7,668,600
Soda Lake No. 2	Bear Cr.	76,860,000	Arnett	52,506,400	15,922,160
Harriman	Bear Cr.	38,000,000	Johnsons	34,689,440	35,389,440
Stickford	Bear Cr.	1,000,000	Rucker	475,000	724,400
Henry	Bear Cr.	6,600,000	Henry	6,600,000	5,467,440
Henry Lake	Bear Cr.	8,700,000	Henry Lake	6,619,220	1,500,000
Fort Logan	Bear Cr.	348,480	Logan	217,800	217,800
Rucker	Bear Cr.	1,100,000	Rucker	686,600	824,000
Johnson	Bear Cr.	11,200,000	Dutch Creek	11,200,000	8,425,500
Grant No. 1	Bear Cr.	4,900,000	Grant	4,900,000	4,228,800
Grant No. 2	Bear Cr.	3,200,000	Grant	3,200,000	3,000,000
Grant No. 3	Bear Cr.	3,000,000	Arnett	3,000,000	2,431,840
N. B. Coy No. 1	Bear Cr.	1,100,000	Coy	1,000,000	100,000

DIVISION NO. 1, DISTRICT NO. 9—Continued.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
N. B. Coy No. 2	Bear Cr.	300,000	Coy	300,000	200,000
Bowles No. 1	Bear Cr.	76,000,000	Bowles	75,242,056	64,630,775
Bowles No. 2	Seepage and Waste	15,681,600		15,681,600	11,761,200
Bowles No. 3	Bear Cr.	2,613,600	Bowles	2,613,600	1,742,400
Bowles No. 4	Bear Cr.	2,395,800	Bowles	2,395,800	1,950,700
Marston	Bear Cr.	853,200,000	Filter	834,846,440	753,948,540
Bergen No. 1	Turkey Cr.	16,345,300	Bergen	16,345,300	1,651,400
Bergen No. 2	Turkey Cr.	34,781,500	Bergen	34,781,500	750,000
Brooks	Turkey Cr.	435,600	Brooks	435,600	100,600
Dean	Turkey Cr.	17,424,000	Dean	17,424,000	200,000
Grant No. 1	Turkey Cr.	4,356,000	Grant	4,356,000	3,500,000
Grant No. 2	Turkey Cr.	522,720	Grant	522,720	450,000
Shearer	Turkey Cr.	4,356,000	Shearer	4,356,000	400,000
No. 7	Turkey Cr.	784,080	No. 7	784,080	100,000
Shepherd	Turkey Cr.	2,439,360	Shepherd	2,439,360	0
Gulch	Turkey Cr.	4,201,252	Gulch	4,201,000	0
Kendrick	Bear Cr.	5,227,220	Kendrick	871,220	150,000
Ward and Kendrick	Bear Cr.	17,424,000	Ward and Kendrick	17,424,000	12,197,200
Smith	Bear Cr.	15,424,000	Greene	8,185,920	6,176,400

DIVISION NO. 1, DISTRICT NO. 9—Concluded.

Porter	Bear Cr.	522,720	Porter	300,000	375,000
Deutcher and Reynolds	Bear Cr.	3,267,000	Deutcher	3,000,000	1,250,000
Rollins No. 1	Bear Cr.	3,484,800	Rollins	1,742,400	1,150,000
Rollins No. 2	Bear Cr.	653,400	Rollins	653,400	0
DIVISION NO. 2, DISTRICT NO. 10.					
Charter Oak	Rock and Little Fountain	26,136,000		16,423,000	14,216,000
Clover Irr. Co.	Fountain	17,424,000		17,424,000	8,712,000
Stratton Estate No. 1	Cheyenne	6,534,000		6,534,000	3,267,000
Stratton Estate No. 2	Cheyenne	3,484,800		3,484,800	1,742,400
Stratton Estate No. 3	Fountain	13,547,160		13,547,100	6,773,580
Torbit	Rock Creek	3,049,200		3,049,200	811,200
(*)	Rock Creek	3,949,800		471,200	653,400
Calhan	Fountain Creek				3,949,800
DIVISION NO. 2, DISTRICT NO. 11.					
Evans Gulch	Evans Gulch	1,439,000	Stevens and Leiter	1,000,000	1,000,000
Big Evans Gulch No. 2	Evans Gulch	2,000,000	Stevens and Leiter	2,000,000	2,000,000
Mountain Lake	Springs and Seepage	5,000,000	Starr	5,000,000	5,000,000
Boss Lake	Springs and Seepage	26,832,000	So. Arkansas River	26,000,000	0
Sugar Loaf	Lake Fork Arkansas	828,306,931	Arkansas River	577,257,000	523,809,000
Clear Creek	Clear Creek	409,537,600	Otero	203,386,170	287,160,820
Twin Lakes	Lake Creek	2,377,851,480	Bob Creek		2,138,534,640

DIVISION NO. 2, DISTRICT NO. 12.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Schaeffer	Beaver Cr.	137,151,000		132,828,000	0
Skagway	Beaver Cr.	144,000,000			130,000,000
Victor No. 2	E. Br. W. Beaver Cr.	9,105,000		8,000,000	8,933,000
Bison	E. Br. W. Beaver Cr.	45,000,000			44,666,000
Colorado Springs No. 7	Beaver Cr.	6,600,000			4,333,000
Colorado Springs No. 8	Beaver Cr.	26,000,000			25,060,000
Colorado Springs No. 2	Beaver Cr.	24,000,000			24,000,000
Colorado Springs No. 4	Beaver Cr.	115,000,000			86,933,000
Colorado Springs No. 5	Beaver Cr.	86,060,000			84,000,000
Lake Moraine	Beaver Cr.	40,000,000			33,200,000
Gillette	S. Fork Oil Cr.	500,000			500,000
Cripple Creek Nos 1-2	W. Fk. Beaver Cr.	23,200,000			23,200,000
Mt. Pisgah	Fourmile Cr.	138,000,000	Park Center		12,625,000
DIVISION NO. 2, DISTRICT NO. 13.					
Thomas Balman Lake Creek	Lake Cr.	2,592,000	Price	2,592,000	0
DIVISION NO. 2, DISTRICT NO. 14.					
Lake Henry	Arkansas R.	117,742,680	Sugar City	117,742,680	
Lake Meredith	Arkansas R.	678,359,880	Exch.	479,160,000	259,008,000

DIVISION NO. 2, DISTRICT NO. 14—Concluded.

Greenview	Fountain	2,613,600			
Pueblo W. Co. No. 1	Arkansas R.	679,000			
Pueblo W. Co. No. 2	Arkansas R.	767,180			
Pueblo W. Co. No. 3	Arkansas R.	955,441			
Pueblo W. Works No. 1	Arkansas R.	1,740,000			
Pueblo W. Works No. 2	Arkansas R.	1,760,000			
Teller	Turkey Cr.	580,654,800	Teller	261,360,000	217,800,000
DIVISION NO. 2, DISTRICT NO. 15.					
Chase					
Minnequa	Seepage	60,000,000	C. F. & I.	44,931,000	49,105,000
Bonnie Meade	Greenhorn Cr.				
Savard No. 2	Arkansas R.	119,000,000	C. F. & I.	58,686,000	105,987,000
Corwin or No. 2	Arkansas R.	141,000,000	C. F. & I.	134,234,000	139,221,000
Hayden	Greenhorn Cr.				
DIVISION NO. 2, DISTRICT NO. 16.					
Cucharas No. 5	Cucharas R.	1,807,740,000	Orlando No. 5	124,799,400	217,800,000
Bradford Lake	Huerfano R.	1,843,459,200	Orlando No. 5	None available	401,623,200
Maria	Cucharas R.	10,354,200			
C. T. Richie	Cucharas R.	1,200,000			
Robinson	Muddy	2,500,000			
Hayes	Cucharas R.	1,448,400			
Montez	Huerfano R.	251,000	Montez	257,000	100,000

DIVISION NO. 2, DISTRICT NO. 16—Concluded.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
Huerfano Valley	Huerfano R.	87,855,600		87,855,000	57,000,000
La Joya	Cucharas R.	7,741,400			
Stevens	Bear Cr.	91,150			
Pope Bros.	Huerfano R.	4,029,038			
McMillan	Huerfano R.	1,045,000			
Sharps Orchard	Cucharas R.	3,696,000			
Ellis	Huerfano R.	450,000			
McDonald	Cucharas R.	91,150			
Archuleta	Huerfano R.	569,400			
Holita	Cucharas R.	23,524,020		22,522,900	3,000,000
Dixon	Huerfano R.				
Homestead	Huerfano R.			Full	
Lake Oehm	Cucharas R.	171,543,950	Mo. Valley and Gomez	126,367,400	57,823,150
Willis Lake	Cucharas R.				
Walsenburg	Cucharas R.	17,933,950		15,000,000	0
Apache	Apache Cr.			217,800	3,922,206
Valdez	Santa Clara R.	50,946,205			
Goose Lake	Huerfano R.				

DIVISION NO. 2, DISTRICT NO. 17.

Lake No. 1	Arkansas R.	326,700,000	Lake (Holbrook)	326,700,000	174,240,000
Dye	Arkansas R.	196,020,000	Lake (Holbrook)	196,020,000	152,460,000
Horse Creek	Arkansas and Horse Cr.	1,171,163,000	Fort Lyon	392,040,000	435,600,000
Adobe Cr.	Arkansas and Adobe Cr.	4,094,640,000	Fort Lyon	217,800,000	1,711,720,000
Timpas No. 2	Timpas Cr.	128,585,000	Lateral No. 1		43,560,000
Timpas No. 3	Timpas Cr.	79,725,000	Lateral No. 2		34,848,000
Red Top	Mustang Cr.	26,136,000	Red Top		13,068,000
Hardesty	Mustang Cr.	6,846,000			
Brown (Mustang)	Mustang Cr.	144,000,000			
Swink No. 1	Apishapa	1,798,156,800	Lateral No. 1		78,408,000
Swink No. 2	Apishapa	94,525,200	Lateral No. 2		4,356,000
Swink No. 5	Apishapa	304,920,000	Lateral No. 5		30,492,000
Thurston	Arkansas R.	304,920,000	Fort Lyon		30,492,000
Box Springs	Horse Cr.	162,000,000	Box Springs		13,068,000
DIVISION NO. 2, DISTRICT NO. 19.					
Model	Las Animas	886,883,220	Outlet	412,234,604	229,600,962
North Lake	Las Animas	44,000,000	Trinidad Pipe L.	38,000,000	36,000,000
Monument	Las Animas	7,000,000	Trinidad Pipe L.	7,000,000	7,000,000
Madrid No. 1	Las Animas	1,334,000	Trinidad Pipe L.	1,334,000	1,334,000
Madrid No. 2	Las Animas	1,334,000	Trinidad Pipe L.	1,334,000	1,334,000
Madrid No. 3	Las Animas	8,000,000	Trinidad Pipe L.	6,000,000	5,000,000
Jansen	Las Animas	800,000	Trinidad Pipe L.	800,000	700,000

DIVISION NO. 2, DISTRICT NO. 19—Concluded.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir. Cubic Feet	
				May 1st	Nov. 1st
Maple Street	Las Animas	170,000	Trinidad Pipe L.	100,000	100,000
Russell	Middle Fk. Whiskey Cr.	13,590,000	Russell and Storz	12,000,000	10,000,000
DIVISION NO. 3, DISTRICT NO. 22.					
Cove Lake	San Antonio and Conejos	250,000,000	North and South Laterals	100,000,000	0
DIVISION NO. 3, DISTRICT NO. 24					
Sanchez	Culebra River	4,493,454,605	Culebra-Eastdale	274,088,000	711,319,000
Eastdale No. 1	Culebra and Costilla R.	150,975,000	Laterals 5 and 6	28,925,000	30,000,000
Eastdale No. 2	Culebra and Costilla R.	132,468,000	Lateral 4	65,340,000	37,000,000
Mesita	Culebra River	113,531,887	Laterals 7 and 8	8,700,000	15,350,000
Salazar	Rito Seco	5,341,151	Outlet	5,000,000	1,000,000
DIVISION NO. 4 DISTRICT NO. 34.					
Bauer Lake No. 2	Crystal and Chicken Cr.	60,000,000		50,000,000	20,000,000
Rentz	Lost Canon	174,240,000	Jones Lateral	142,460,000	20,000,000
Webber	Middle Mancos	15,000,000	Webber	12,000,000	1,000,000

DIVISION NO. 4, DISTRICT NO. 40

Calumet	Surface Creek	777,600		777,600	0
Chipmunk	Surface Creek	2,462,400		2,462,400	0
Cole	Surface Creek	3,369,600		3,369,600	0
Greenback	Surface Creek	1,598,400		1,598,400	0
Little Giant	Surface Creek	1,728,000		1,728,000	0
Hale	Beaver Cr.	2,073,600		2,073,600	0
Last Chance	Beaver Cr.	432,000		432,000	0
Leon Lake	Drainage	79,142,400		79,142,400	39,571,200
Trickle	Beaver	1,728,000		1,728,000	0
Y. & S.	Drainage	6,393,600		6,393,000	0
Zig Zag	Beaver Cr.	518,400		518,400	0
Trickle Park	Surface Cr.	136,907,200		136,907,200	0
Trout Lake	Surface Cr.	4,406,400		4,406,400	0
Upper Twin	Surface Cr.	5,184,000		5,184,000	0
Lower Twin	Surface Cr.	3,628,800		3,628,800	0
Cedar Mesa	Surface Cr.	16,416,000		16,416,000	0
Cabin Lake	Surface Cr.	2,073,600		2,073,600	0
Blanch	Surface Cr	1,728,000		1,728,000	0
Bonita	Surface Cr.	13,392,000		13,392,000	0
Weir & Johnson	Surface Cr.	25,920,000		25,920,000	0
Weir Park	Surface Cr.	1,728,000		1,728,000	0
Dryfus	Surface Cr.	2,764,800		2,764,800	0
Kehemeir	Surface Cr.	5,722,400		5,722,400	0

DIVISION NO. 4, DISTRICT NO. 40—Continued.

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
Deserted Park	Surface Cr.	2,073,600		2,073,600	0
Sackett	Surface Cr.	4,320,000		4,320,000	0
Military	Surface Cr.	4,320,000		4,320,000	0
Vella	Surface Cr.	5,356,800		5,356,800	0
Round Lake	Surface Cr.	1,468,800		1,468,800	0
Greenwood	Surface Cr.	1,728,000		1,728,000	0
Little Pointer	Surface Cr.	1,728,000		1,728,000	0
Patterson No. 2	Leroux Cr.	2,073,600	Patterson	2,073,600	0
Hobson	Leroux Cr.	479,160	Leroux No. 4	479,160	0
Crater	Leroux Cr.	6,393,600	Stull	6,393,600	0
Holy Terror	Leroux Cr.	5,443,200	Leroux No. 4	5,443,200	0
Patterson No. 3	Leroux Cr.	648,000	Leroux No. 4	648,000	0
Skimmilk	Leroux Cr.	518,400	Leroux No. 4	518,400	0
Dog Fish	Leroux Cr.	6,998,400	Leroux No. 4	6,998,400	0
Bailey Extension	Leroux Cr.	16,588,800	Leroux No. 4	16,588,800	0
Brockman No. 2	Leroux Cr.	518,400	Allen Mesa	518,400	0
Brockman No. 1	Leroux Cr.	1,209,600	Leroux No. 4	1,209,600	0
Fisher	Leroux Cr.	259,200	Allen Mesa	259,200	0
Green Mountain	Leroux Cr.	259,200	Highline	259,200	0

DIVISION NO. 4, DISTRICT NO. 40—Continued.

Blide	Leroux Cr.	1,036,800	Leroux No. 4	1,036,800	0
Barrow	Leroux Cr.	432,000	Allen Mesa	432,000	0
Miller	Leroux Cr.	1,555,200	Ellington	1,555,200	0
Dowdy	Leroux Cr.	3,628,800	Leroux No. 4	3,628,800	0
Lost Hunter	Leroux Cr.	345,600	Leroux No. 4	345,600	0
Ellington	Leroux Cr.	864,000	Allen Mesa	864,000	0
Skookum	Surface Cr.	691,200		691,200	0
McClellan	Surface Cr.	4,406,400		4,406,400	0
Trio	Surface Cr.	1,814,400		1,814,400	0
Stell No. 2	Surface Cr.	257,200		257,200	0
Little Jonah	Beaver Cr.	345,600		345,600	0
Sissey	Beaver Cr.	345,600		345,600	0
Boyd, Alexander, Matt Arch, Deep Slough, Island, Rim Rock, Sheep Slough, Big Eggleston, Little Eggleston, Twin, Forest, Kennicott, Kiser, Donnelly, Barren, Ward	Ward and Kiser Cr's.	345,600,000		345,600,000	99,104,000
Carbonate	Youngs Cr.	648,000		648,000	0
Finney Lake	Kiser Cr.	3,110,400		3,110,400	0
Kiser	Kiser Cr.	1,296,000		1,296,000	0
Lily Pad	Kiser Cr.	1,252,800		1,252,800	0
Little Gem	Kiser Cr.	3,888,000		3,888,000	0
Young's Cr. No. 1-2-3	Youngs Cr.	12,830,400		12,830,000	0
Musk Rat	Kiser Cr.	691,200	Surface Cr.	691,200	0

DIVISION NO. 4, DISTRICT NO. 40—*Concluded.*

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet May 1st	Nov. 1st
McCoon	Kiser Cr.	1,468,800	Surface Creek	1,468,800	0
Noles Slough	Kiser Cr.	2,073,600	Surface Cr.	2,073,600	0
Pine	Kiser Cr.	345,600	Surface Cr.	345,600	0
Pedro	Kiser Cr.	2,721,600	Surface Cr.	2,721,600	0
Prebel	Youngs Cr.	4,600,800	Surface Cr.	4,600,800	0
Rock Lake	Kiser Cr.	1,339,200	Surface Cr.	1,339,200	0
Wayman	Kiser Cr.	1,036,800	Surface Cr.	1,036,800	0
Womack No. 1, Womack No. 2	Kiser Cr.	3,888,864	Settle	3,888,864	0
Basin No. 1	George Cr.	4,432,000	Doctors	4,432,000	0
Basin No. 2	George Cr.	2,160,000		2,160,000	0
Granby Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	George Cr.	45,360,000	Granby	45,360,000	0
Fruitgrowers	Alfalfa Run	259,250,000	Butte-Fogg	259,200,000	86,400,000
Monument	Minnesota Cr.	72,250,000	Minnesota	72,250,000	0
Overland	Cow. Cr.	250,470,000	Overland	250,470,000	0
Fruitland	Crystal Cr.	140,948,000	Fruitland	140,948,000	0
Big Battlement	George Cr.	8,121,600	Cedar Park West	8,121,600	0
Little Battlement	George Cr.	6,220,800	Cedar Park West	6,220,800	0
Gray	Leroux Cr.	5,749,920	Gray	5,749,920	0
Lucky Find	Leroux Cr.	1,728,000	Leroux No. 4	1,728,000	0

DIVISION NO. 4, DISTRICT NO. 42

Bonham, Atkinson, Lake Nos. 1-2-4	Snow and Springs	132,835,348	Kiggins and Goyn, Koakley and Kiggins, Johnson and Stewart, Akins, Last Chance	0	0
Anderson and Libby	Snow and Springs	12,534,826	Grove Creek No. 1	0	0
Lake No. 1, Water Dog No. 4, Fish Lake No. 3, Summit Nos. 1-2	Snow and Springs	42,042,370	Koakley and Kiggins, Mesa Cr., West Side Independent, Arkansas, Bower, Sunset, King, Miller, Beizer and Davis	0	0
Grand Mesa Nos. 1-6-8-9	Snow and Springs	83,670,899	Juniata, Highline, Brown and Campion, Smith Irr., Bowen, Barry, Sullivan, Williams and Washburn and Downing	0	0
Chambers	Snow and Springs	11,936,311	Juniata, Kannah Cr. H. L.	0	0
Elk Glen	Snow and Springs	7,800,912	Juniata, Northwestern	0	0
Lake Nos. 1-2-4-5, Meadow Lake Nos. 1-2, Blackman Lake, Jensen Lake	Snow and Springs	53,013,996	Snipes, Hall, Mill, Kirkendall, Wolfe, Shotwell, Davenport, Miller, Duffy, Mormon, Mesa Enl., Parker Basin, Park View	0	0
Coon Creek Nos. 1-2-3	Snow and Springs	16,884,292	Ellsbury, Barnes, Wagner, Whitney, Atwell, Craig, Allen	0	0
Bull Creek Nos. 1, 2, 3, 4, 5	Snow and Springs	18,961,668	Bull Creek, Riser, Pioneer Plateau	0	0
DIVISION NO. 5, DISTRICT NO. 45					
Battlement Reservoirs 1, 2, 3, 4, 5, 6, 7	Battlement Cr.	57,775,806	Battlement, DeWitt, Doby, R. F., Huntley, Shutt, O'Toole, Good, Cedar Grove, Musconetong	57,775,806	0

DIVISION NO. 1 DISTRICT NO. 48

Name of Reservoir	Source of Supply	Capacity in Cubic Feet	Ditch Supplied from Reservoir	Quantity of Water in Reservoir, Cubic Feet	
				May 1st	Nov. 1st
Laramie Lake	Laramie River	5,000,000	Chambers Lake	5,000,000	0
Lost Lake	Laramie River	12,000,000	Chambers Lake	10,000,000	0
Porter Lake	Porter Creek	10,140,425	Brown	0	0
Johnson	Grace Creek	6,500,000		5,000,000	3,000,000
Weir	Jimmie Creek	2,947,628		0	0
DIVISION NO. 5 DISTRICT NO. 58.					
Gardner Park	Snow and Springs	47,916,000	Stillwater	47,916,000	
Wheeler	Lake Creek	1,600,000	Wheeler No. 3		
Chambers	Snow	4,221,000	Chambers	4,221,000	
Allin	Trull Creek	6,503,805		6,503,805	
Hart Lake	Watson Cr.	12,000,000	Watson Creek	12,000,000	
DIVISION NO. 4, DISTRICT NO. 60.					
Gurley	Beaver Creek	28,000,000	Gurley	0	0
Lone Cone	Naturita and Brewster	84,000,000	Lone Cone	45,000,000	50,000,000
DIVISION NO. 4, DISTRICT NO. 61.					
Buckeye	Deep, Taylor, Geyser Creeks		Ray, Midland, Highline	87,120,000	52,272,000

DIVISION NO. 1, DISTRICT NO. 64.

Jumbo	So. Platte	1,227,445,000	Highline, Peterson, Settlers	987,000,000	862,000,000
Prewitt	So. Platte	1,429,831,368	Pawnee, Schneider, etc.	914,716,000	435,600,000
Point of Rocks	So. Platte	3,543,110,030	Outlet	1,219,680,000	174,200,000
DIVISION NO. 1, DISTRICT NO. 65.					
Rosenkrans	Willow Cr.	20,000,000	Rosenkrans	10,000,000	15,000,000
Olive Creek	Olive Cr.	2,000,000	Olive Cr.	1,500,000	2,000,000
Holy Joe	Holy Joe Cr.	1,000,000	Holy Joe	1,000,000	1,000,000
DIVISION NO. 2, DISTRICT NO. 67.					
Two Buttes	Two Buttes Cr.	1,960,200,000	Main Canal	1,132,560,000	1,350,360,000
Great Plains	Arkansas		Amity		1,921,605,840
DIVISION NO. 5, DISTRICT NO. 70.					
McDowell	Roan Creek	348,480	Outlet	348,480	348,480
Glen Beulah No. 1	Clear Creek	348,480	Newton	0	0
Blair and McDowell	Floodwater				
Meyers	Roan Creek	174,240	Roan Creek	174,240	174,240
Conwell	Con Creek	218,800	Conwell	43,560	43,560

CHAPTER VI

CAREY ACT PROJECTS

There is in the State of Colorado one completed and successful Carey Act project which deserves special mention for the fact that it is the first one to be completed and there is quoted herein a recent report from the Manager of the project which sets forth concisely, but in some detail, the main facts concerning the project, namely the Two Buttes Project.

The reservoir has a capacity of over 40,000 acre feet, and the area which will be irrigated is nominally 23,000, but actually about 20,000 acres of first class irrigable land.

The main canal has a capacity of 225 cubic feet per second:

Lateral No. 1	60 cubic feet
Branch A	70 cubic feet
Lateral No. 2	125 cubic feet
Branch B	120 cubic feet
Branch C	50 cubic feet

The works are very well constructed and permanent in character. The dam is of earth, well riprapped and well constructed. Rating flumes have been established along the line of the main canal and a good system of control in the use of the water has been established. The most cordial relations exist between the water users and the construction company; indeed, the construction company on account of a very short supply of water since completion of the project, have remitted the interest payments until the present year.

The charge for water is $35 per acre. The construction company, through its agencies, has established a bank, stores and built a small town on the project, and it now proposes to purchase high grade live stock and to advance money for the development of the project.

The records of this office show that in 1912 something over 15,000 acre feet were stored. In 1913 only a little over 3,000 acre feet, but during 1914, as shown by the report of the Manager, the supply was some 50,000 acre feet, of which 40,000 acre feet are available, and that there remains a sufficient amount of water for next year's crops. The principal difficulty encountered by the projectors was that immediately after the completion of the dam, there was a series of some four years when the precipitation averaged nearly six inches below normal; indeed, 1914 is the first year of normal, or above normal, precipitation since the work on the project was completed.

In another chapter is given a discussion of run-off from watersheds in the plains region, and those interested in the details of this project or others similarly located, are referred to that chapter.

One Carey Act project has been cancelled in the last two years, and others have been allowed to lapse. Those remaining are thought to have merit, especially ones covering comparatively small areas. Little actual construction work has been done on these Carey Act projects, and it will probably be some time before any great amount of work is done. Probably not until after better business and credit conditions obtain and until after the European War is over. In the meantime, this office proposes to make further investigations on its own initiative and to take an active interest in the development of the projects, even though the state may let contracts to other parties for construction and development, and may not itself furnish the money necessary for construction.

Chicago, December 29, 1914.

Hon. John E. Field,
State Engineer, Capitol Building,
Denver, Colorado.

Dear Sir: In response to your inquiry relative to the Two Buttes Project, known officially as Colorado Segregation List No. 7, being the seventh segregation under the Carey Act secured by the State of Colorado, we desire to report as follows:

The petition for the segregation was filed with the State Board of Land Commissioners, December 8, 1908. This petition was favorably acted upon by the Board, and on April 9, 1909, a contract between the State and the Department of the Interior was executed and the lands segregated. A formal contract between the State Board of Land Commissioners and the Two Buttes Irrigation and Reservoir Company was executed June 12, 1909. Construction work by the latter company was commenced shortly thereafter, and by December 1, 1910, the entire irrigation system was completed, with the exception of the facing of the dam, which was postponed for a year but was finished in January, 1913. In February, 1913, final examinations were made of the system by the State Engineer, the State Board of Land Commissioners and representatives of the water users, and approved in all its details, such approval being formally noted on the records of the State Board of Land Commissioners.

In June, 1914, the Register of the State Land Board notified all entrymen on the Carey Act lands that actual residence upon the land embraced in their respective entries must begin not later than July 1, 1915, and that such residence must be continuous thereafter until final proof is tendered. The State Board of Land Commissioners has made application to the United States Depart-

ment of the Interior for a patent for certain of the lands amounting to about 8,000 acres, such lands having been cultivated, irrigated and reclaimed in accordance with the terms of the Carey Act; and we understand that a patent will be issued by the department to the State in due course, and then the State will be able to issue deeds to the various entrymen who have tendered final proof. Final proof has been tendered by entrymen on about 3,000 acres to this date, and these proofs are being handed in from time to time.

The year 1914 has been a very prosperous one for the entrymen on this segregation. Crops of all kinds were excellent and no serious damage was caused by any of the natural agencies. All crops matured and were harvested without injury by frost. The principal crops were alfalfa, wheat, corn, oats, spelt, barley, maize, cane, caffir, feterita; the relative importance and quantity being in the order mentioned. Besides these, there were many minor crops produced as well for practical purposes as a demonstration of the agricultural range. Water was run in the canals a total of 39 days.

Rainfall in the region was slightly above normal, but the best and most advantageous feature about it was its timeliness; in fact, except in the case of alfalfa, just as good crops were produced without irrigation as with it. The following is a record of rainfall for the year 1914 at two stations—one at the town of Two Buttes, and the other at the dam. We give this with some remarks in order to show its bearing upon the run-off of the Two Buttes water shed. We have another station thirty miles above the dam, but the record is not reliable for one reason or another, and the results are not given.

Month	TWO BUTTES STATION		RESERVOIR STATION	
Jan.	Precipitation, all in form of snow	.05	Only a trace of precipitation for this month from snow	0.00
Feb.	Precipitation, form of snow	.30	Precipitation, form of snow	0.22
Mar.	Precipitation, form of snow	.12	Precipitation, snow	.07
Apr.	Precipitation, all in form of rain. A storm 29th and 30th .75 in rain. Slow rain. General	2.00	Precipitation, heaviest storm 29th and 30th. 1.25 in. in 2 days. On 30th 1.05 in. fell during day of 24 hours	2.13
May	Precipitation for month heaviest storm May 1st. 2.99 in. fell in 24 hrs. On 19th rain of 2.00 in. which fell in 2 hrs. On 28th rain of 0.91 in. 6 hrs. duration	6.08	Precipitation. Heaviest storm on 1st. 2.79 in. Duration 14 hrs. On 28th rain of 1.53 in. 10 hrs. duration	4.80
June	Precipitation, rainfall between 12th and 16th with exception of one rain, 20th, .09 in.	2.50	Rainfall Heaviest rain 2.57 in. Duration 24 hrs. Only one other rain of .06 during month	2.63
July	Rainfall Beginning with 14th there were a series of storms until and including 19th, precipitation 1.92 in. for the 6 days. Heaviest storm being on 18th, 0.66 in. Duration 6 hrs.	3.17	Rainfall A series of storms 17th to 19th 2.41 in. fell in 3 days. Heaviest storm 18th, 1.35 in. From 20th to 23rd, 0.58 in. water fell	3.36

Month	TWO BUTTES STATION		RESERVOIR STATION	
Aug.	Rainfall. Heaviest storm was .62 in. 4th about 2 hrs. duration. There were four storms of comparatively light precipitation.	1.06	Rainfall. Heaviest rain 1st and 3rd .24 in. and .23 in. S. W. winds all month.	0.73
Sept.	Precipitation. Two storms of .11 in. Several hours duration.	0.47	Rainfall. Heaviest .16 on 23rd.	0.43
Oct.	Rainfall. From 22nd to 24th were a series of storms. 2.30 in. fell in 3 days. Heaviest storm 1.16 in. on 23rd.	2.54	Precipitation. Form of rain and snow. A 3 days storm 22nd to 24th 2.38 in. water fell. Heaviest 1.28 in. in 20 hours.	2.50
Nov.	No precipitation during month of Nov.		Only a trace of precipitation for month of November.	
Dec.	"Snow"—trace.		"Snow"—trace.	
Total.		18.29	Total.	16.87

The catchment of water during the season of 1914 is shown in tabulation given below; also the amount of water used:

Date		Gage Height	Acre-Feet Used	Acre-Feet Increment
Jan. 18		15.7		
Jan. 19	An increment 0.2 ft. from melting snow. or,	15.9		40
Feb. 20		15.7		
Feb. 23	An increment of 00.9 ft. melting snow along creek, equivalent to	16.6		182
Apr. 30		15.6		
May. 3	An increment 35.6 from heavy protracted storm being general all over the country, rainfall varying with locality to very high degree. The volume or acre-feet in this flood amounts to. This storm lasted from Apr. 28 to May 1st— total rainfall in four days 4.04 at Reservoir Station, and at Two Buttes Sta. 3.74. The water ceased to rise in the Reservoir at 9:00 a. m. May 2, but there was an inflow which continued for several days; this inflow was 700 sec. ft. at 6:00 p. m. May 2nd and about 50 cubic second feet at 6:00 p. m. May 7th.	51.2		21640
June 10	Gates opened for first run of water of the season	50.5		
June 15	End of run 6 days	48.8		
June 15	1.7 ft. of water used or,		1895	
June 15	Gage Height	48.8		
June 17	A rise of 1.8 ft. giving an increment of 2,000 acre ft. This flood apparently from a heavy rain preceded by several light rains. Two Buttes Sta. records: rain for 5 days, 12th to 16th, in which the total rainfall was 2.41 in. one storm of the three of 2.00 in. (15th). The Reservoir Sta. shows only one rain, 15th, 2.57 in.	50.6		2000
July 5	Beginning run of water	49.8		

Date		Gage Height	Acre-Feet Used	Acre-Feet Increment
July 8	Morning 1.0 ft. of water used	48.8		
July 8	Evening Gage showed rise 2.1 ft. during night. Above "outflow" an increment of 2350 acre feet	50.9		2350
July 14	End of run. Gate closed	49.9		
	Water used and no. days run		2225	
	The Reservoir Sta. shows a rain 0.12 in. July 7th duration 1 hr. Two Buttes Sta. shows two days rain aggregating .06 in.			
July 17	Gage Height	49.8		
July 20	A 3 days run of the creek give a rise of 6.2 ft. by gage or 7820 acre ft. This flood came from a series of storms apparently beginning with the 17th until 23rd. The total rainfall at reservoir indicates 2.68 for the 6 days. Heaviest storm on the 18th. Duration 12 hrs. with 1.35 in. rainfall. The following day shows 0.84 in.— 12 hrs.	56.0		7820
	As noted above, the rise in the reservoir was continued during three days time but there was a continuous and varying inflow of from 50 second feet to 400 second feet in the creek 17 days after the reservoir ceased to rise.			
July 24	Gage height	56.0		
July 26	Evening showed a rise of 1.9 ft.	57.9		2680
	Two Buttes Sta. shows a rain of 0.23 and .32 for 22 and 23rd. The Reservoir Sta. gives only one rain of .10 in. on 28th, 1 hr. duration. The increment was probably part of the water from storms the preceding week.			
Aug. 1	Gage Height	57.7		
Aug. 5	Beginning with Aug. 1st creek flowed until the 5th, resulting in 2.0 ft. rise	59.7		3190
	Reservoir rainfall two storms of .24 and .23 precipitation 1st and 5th respectively. Two Buttes Sta. 0.62, 4th Aug.			
Aug. 18	Gage Height	58.6		
Aug. 29	Gage Height a. m.	56.7		

Aug. 30	Rise of 0.40 ft. during day	57.1		360
Aug. 30	Gates closed end of irrigation 13 days run 1.5 ft. of water used or	57.1	3056	
	This run was attended with exceptionally hot weather, weeds absorbed large portion of water. About 1400 acres irrigated.			
Sept. 30	Gates opened for run of water	55.9		
Oct. 9	Gates closed, end of run	54.5		
	1.4 ft. of water used equivalent to 800 acres land irrigated. Run of 10 days. Last run of season		1870	
Oct. 25	A small inflow of from 125 to 250 cubic second feet was noted in the creek, but the reservoir level was not raised appreciably.			
Dec. 18	Gage height	54.0		
Total			9046	40262

The quantity of water impounded during the year, as noted above, is 40,262 acre feet, but this does not include the amount lost through primary absorption in the reservoir itself. Just what this amount is we have no means of knowing, but from observation taken of the inflow after the Gage ceased to mark a rise in the water level in the reservoir, we would place this amount conservatively at 10,000 acre feet, and in all probability it far exceeded it. The present water level in the reservoir is 54 feet, and our available supply about 30,000 acre feet. During the year 1914 our measurements show that we used 9,046 acre feet for irrigation, running the water for 39 days. However, owing to the absorption and saturation going on in the reservoir all the time as well as evaporation, we believe that not over one-half of this amount was actually run in the canals—the records to the contrary, notwithstanding, and this estimate of 4500 acre feet coincides with the measurement of No. 1 rating crew.

The number of farms under irrigation is slightly over 21% of the total. Our statistics do not cover exact acreage, but we estimate that about 3,000 acres were furnished with water during the season. Of this land, 996 acres are now producing alfalfa. There are about 750 acres in fall wheat at the present time. The acreage under irrigation next year should be not less than 8,000 acres, and possibly it will go to 10,000 acres. For this purpose we have plenty of water available and doubtless our supply will be sufficient, assuming an ordinary rate of development for the next three years even though we should have an extremely dry year.

Our canal system has given us no trouble whatever during the year and there have been no breaks or leaks or undue loss of water. We have had a little trouble with our sluice gates, and necessary repairs will have to be made upon these gates. Altogether, however, the system may be said to be in perfect working order and we believe it can be as economically operated as any new irrigation system in the country. Loss due to seepage in the canals is constantly diminishing, and we have been able to deliver approximately 80% of the amount turned out of the headgate to the farmer.

Very truly yours,

TWO BUTTES IRRIGATION & RESERVOIR COMPANY.

By (Signed) F. L. HARRIS,
General Manager.

CHAPTER VII

SEEPAGE INVESTIGATIONS

Seepage measurements have been resumed since in the opinion of the present Engineer these are valuable to all of the users of water and may be used in estimating the amount of the available water supply and what it is believed to accomplish. They are also valuable in contests relative to the transfer of water.

Seepage measurements have been suspended for four years, the former Engineer believing that their value was not commensurate with the cost. In the Sixteenth Biennial Report, p. 135, he criticises seepage measurements and gives his reasons for this belief that they are not only seriously in error but are misleading. He states five reasons, with none of which the present Engineer agrees.

An absolutely permanent condition of the stream is not necessary, because if the measurements are made properly changes in stream flow are taken into account.

If the measurements are properly made the surface inflow is taken into account, each surface stream entering the river is measured as well as each diversion from the river. To be sure, a considerable portion of the surface inflow as it appears at the river is really seepage which enters the gulches and draws, and if it is desirable to have the total return seepage, each of these gulches, draws or streams can be investigated independently and the return seepage in each determined.

While the ground water is not entirely due to the application of water to irrigate lands, yet we know that before irrigation was practiced the ground water inflow was not sufficient to keep up the losses from evaporation in the river after it entered the plains areas, and we know also that the quantity from sources other than irrigation are small and practically negligible, so that if there is any error in the seepage measurements they show too small return, for these return waters make up the deficiency or loss and in addition show a considerable increase in the flow of the stream where formerly there was an actual loss.

The accuracy of the measurements is of course relative rather than absolute, but the seepage measurements are made with the greatest care and the errors are largely compensating, so that considering the return seepage on a stream as a whole the results are sufficiently accurate and reliable for all practical purposes.

It is not necessarily assumed that the conditions found to prevail at the time the measurements are made prevail through-

out the year. Such an assumption would be erroneous in some cases and in others would be proper. Seepage measurements have been made at different times of the year and there is no data at hand that either proves or disproves that the seepage as determined is not approximately the same throughout the year. Where the valley is broad, with numerous parallel ditches reaching as much as ten miles from the river, as is the case in the Poudre River, the return seepage is quite constant. The water percolates through the soil at the rate of perhaps a mile a year and a great reservoir exists beneath the surface which discharges its water into the water courses at a fairly uniform rate. Where there are few ditches and these lie close to the river and the subsoil is open and porous there is of course a wide variation in the amount of return seepage in different times of the year, and those using the seepage measurements should be sufficiently familiar with the local conditions to properly use the data furnished. Merely because certain records are misused by some persons not qualified to use them intelligently is no reason for not presenting them for the uses where they can be properly used. Whatever the accuracy may be or whatever the misuse may be the methods which have been employed are the best yet devised. It is impractical to determine the seepage through the maintenance of permanent gaging stations. The permanent station at Platte Canon and at Denver give nothing whereby the seepage can be determined. To make such records available for that purpose it would be necessary to have automatic registers at these stations and most accurate rating curves and permanent channels. An automatic register would have to be kept on every ditch and on every inflow stream and these stations would be so numerous that the cost would be prohibitive and we would merely be getting by an indirect method what can be more easily gotten by the present direct method. In presenting seepage measurements, full and direct detailed notes should accompany them and those using seepage measurements should consult field notes from the original field books which, it must be assumed, contain all of the necessary information as to local conditions at the time the measurements were made.

During 1915 and 1916 it is proposed to conduct the seepage measurements by the use of a larger number of men, dividing the river into sections and assigning a short division to each hydrographer, so that he may keep an accurate record of the inflow and outflow during the time of the investigations.

SEEPAGE MEASUREMENTS

Seepage measurements were made in 1913 on the South Platte River by Thomas Grieve, Jr., C. C. Hezmalhalch, M. E. Bunger and C. O. Crisman; on Bear Creek and Clear Creek by Thomas Grieve, Jr.; on South Boulder Creek, Dry Creek, Boulder Creek, St. Vrain Creek, Big Thompson Creek and Cache la Poudre River by D. L. Bundy; on the Arkansas River by B. S. Clayton; on the Rio Grande by B. S. Clayton and C. O. Crisman; on Rifle Creek by C. L. Chatfield.

In 1914, measurements were made on Bear Creek, Clear Creek and Cache la Poudre River by Thomas Grieve, Jr., and D. L. Bundy; on St. Vrain Creek and Big Thompson Creek by Thomas Grieve, Jr., and C. C. Hezmalhalch; on the Arkansas River by M. E. Bunger and D. L. Bundy; on the Rio Grande by R. I. Meeker and H. D. Amsley.

The measurements made on Boulder Creek in 1913, are omitted as unreliable on account of frequent fluctuations in the stream caused by the power plant above Boulder.

Measurements were also made on the Purgatoire River, but conditions were very unfavorable for good results and they are therefore omitted.

Measurements on the Rio Grande for 1914 will be found in another chapter of this report.

CACHE LA POUDRE RIVER

In 1913, conditions for seepage measurements were considered good, except for the intermittent running of water by the Larimer and Weld Canal. This Canal is forced to let water by, to run the flour mill at Fort Collins, and takes the water up again when the mill is shut down in the evening. There is also a variation in the amount of water wasted by the sugar factories along the stream, but it is probably too small to make any appreciable difference in the final results.

In 1914, the stream was very low at the mouth of the Canon and for the upper part of the River conditions were even better than in 1913. To obviate any effect the intermittent running of water by the Larimer & Weld Canal might have, measurements were concluded on the first day at a point below the intake of the No. 2 Reservoir. A fall in the River is shown at this point the next morning, which is no doubt due to water having been turned into the Larimer & Weld Canal the previous evening.

The large gain in the section from the Ogilvy Ditch to the mouth, is due to a rainstorm the day before the measurements were made.

BIG THOMPSON CREEK

The conditions on this stream both 1913 and 1914 were very good, except for the section from below the Big Thompson and Platte River Ditch to the mouth. This section for 1914 shows too great a return and is due to a rainstorm which occurred the day before the measurements were taken. This storm caused the measurements to be abandoned for about a week.

ST. VRAIN CREEK

The return flow in the sections from below the mouth of Boulder Creek to the mouth of St. Vrain Creek, is liable to error on account of the fluctuation in the flow of Boulder Creek caused by the power plant near Boulder.

The drop in the Creek shown by the measurements at Longmont, is due to water being turned into the Supply Ditch early in the evening of the day before.

CLEAR CREEK

Measurements on Clear Creek in 1913 may have been affected slightly by a light snow storm. The ground was so dry at this time that it is believed that there was very little run-off from this storm.

In 1914 the gain from the gaging station to a point below the head of the Rocky Mt. Ditch appears too large, and can only be explained by a fluctuation in the Creek.

The section gain from the head of the Slough to a point above the mouth of Ralston Creek also appears too large. This may be due to the fact that a number of small ditches taking water from the Slough or branch of the Creek, may have wasted water back directly into the Slough, as apparently no irrigation was being done at this time.

BEAR CREEK

The results on Bear Creek for both 1913 and 1914 are considered good. The slightly larger gain shown in 1914 is due to reservoirs being filled to capacity and the plentiful supply of water available during the year.

SOUTH PLATTE RIVER

Results on the South Platte River are considered good. There was considerably more water from Platte Canon to the head of the Bijou Ditch than was consistent for good results, but below the Bijou Ditch the conditions were exceptionally good.

Measurements in 1914 were abandoned on account of high water.

ARKANSAS RIVER

Measurements were made on this stream in 1913 from La Junta to Holly. The conditions were excellent and results are considered good.

In 1914, the results above La Junta cannot be considered good on account of high water which prevented the measurements on the River being taken by wading and the choice of sections being necessarily limited to bridges. The results below La Junta should be good.

SEEPAGE MEASUREMENTS ON SOUTH PLATTE RIVER

November, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in River	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Below Highline Waste	0	127				
Below Last Chance Ditch	3	129	0.5	6.9	8.4	8.4
Howarth Bridge	6	129	0	0	0	8.4
Howarth Bridge		202				
Littleton	12	240	25	0	12.7	21.1
Littleton		143				
Petersburg	15	187	23.4	0	20.6	41.7
Denver	22	233	19.9	1.8	27.9	69.6
Denver		220				
Below Burlington Ditch	26	16	70.5	314	39.5	109.1
Below Fulton Ditch	33	82	36.0	3.7	33.7	142.8
Below Fulton Ditch		89	1			
Brighton	41	127	14.0	16.1	40.1	182.9
Brighton		118				
One mile below Lupton	50	164	14.0	3.6	35.6	218.5
One mile below Lupton		138				
Platteville	58	148		5.3	15.3	233.8
Platteville		159				
Above mouth St. Vrain Creek	62	170	0	0	11.0	244.8
Evans Bridge	70½	253	145	142	86.0	324.8
Evans Bridge		237				
Above mouth of Cache la Poudre	77½	396	113	0	46.0	370.8
Kersey Bridge	80½	536	83	0	57.0	427.8
Kersey Bridge		562				
Hardin	90½	342	0	241	21.0	448.8
Below Putnam Ditch	102½	36	0	370	64.0	512.8
Orchard	111	136	0	5.5	105.5	618.3
Orchard		131				
Weldona	120	42.9	0	148	59.9	678.2
Fort Morgan	129	72.3	8.0	32.1	53.5	731.7
Snyder	140	84.3	7.2	84.9	89.7	821.4
Snyder		82.6				
Balzac	147	89.9	0	39.0	46.3	867.7
Merino	158	173	0.3	4.4	87.2	954.9
Sterling	171¾	167	9.0	56.1	41.1	996.0

SEEPAGE MEASUREMENTS ON SOUTH PLATTE RIVER—Concluded

Place Where Measurements Were Taken	Total Distance in Miles	Amount in River	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Iliff	183½	197	12.5	14.2	31.7	1027.7
Crook	200½	23.0	0	221	47.0	1074.7
Sedgwick	215½	8.3	0	35.7	21.0	1095.7
Julesburg	230½	42.2	1.0	0	32.9	1128.6

SEEPAGE MEASUREMENTS ON BEAR CREEK
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Morrison	0	54.1	.....	.....	.....	.....
Below headgate Pioneer-Union Ditch	4	41.7	0	13.4	1.0	1.0
Below headgate Pioneer-Union Ditch	.....	42.4	.....	.....	.....	.....
Jefferson-Arapahoe Co. Line	9	65.0	5.8	.....	16.8	17.8
Mouth	12	63.2	.....	0.3	1.5	16.3

SEEPAGE MEASUREMENTS ON BEAR CREEK
October, 1914

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Morrison	0	38.5	.....	.....	.....	.....
Below Pioneer-Union Ditch	4	0.4	0.5	40.7	2.1	2.1
Jefferson-Arapahoe Co. Line	9	17.8	.....	.....	17.4	19.5
Jefferson-Arapahoe Co. Line	.....	18.2	.....	.....	.....	.....
Mouth	12½	19.0	0.2	1.4	2.0	21.5

SEEPAGE MEASUREMENTS ON CLEAR CREEK
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Two miles above Golden	0	125	.....	.....	.....	.....
Below headgate Rocky Mt. Ditch	3	2.3	14.6	141.9	4.6	4.6
Below headgate Rocky Mt. Ditch	.....	2.9	.....	.....	.....	.....
Head of Slough	5	0	0	3.1	0.2	4.8
Above mouth of Ralston Creek	11	6.6	0	0	6.6	11.4
Below Clear Creek and Platte River Ditch	14½	0	9.4	24.2	14.8	26.2
Near mouth	17	2.6	0	0	2.6	28.8

SEEPAGE MEASUREMENTS ON CLEAR CREEK
October, 1914

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Gaging station 2 mi. above Golden	0	95.7	.....	.....	.....	.....
Below Rocky Mt. Ditch	3	53.5	9.3	74.3	22.8	22.8
Above head of slough	5	55.6	.....	2.9	5.0	27.8
Above head of slough	.....	49.0	.....	.....	.....	.....
Above mouth of Ralston Cr.	11	53.0	2.8	24.9	26.1	53.9
Below Clear Cr. and Platte River Ditch	14½	11.8	5.4	50.0	3.4	57.3
Below Clear Cr. and Platte River Ditch	.....	12.9	.....	.....	.....	.....
Mouth	17	19.1	1.2	.....	5.0	62.3

SEEPAGE MEASUREMENTS ON SOUTH BOULDER CREEK
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outflow		
Eldorado Springs	0	21.3	.....	.....	.....	.....
Below head of Dry Creek	5.5	5.7	.....	10.5	—5.1	—5.1
Mouth	8	5.9	.....	.....	7.4	2.3

SEEPAGE MEASUREMENTS ON DRY CREEK
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outflow		
Head	0	0.1	.....	.....	.....	.....
Mouth	5.5	0.7	.....	.....	0.6	0.6

SEEPAGE MEASUREMENTS ON ST. VRAIN CREEK
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outflow		
Gaging Station ½ mi. below Lyons	0	81.6	.....	.....	.....	.....
Below Oligarchy Ditch	3	5.4	3.7	84.0	4.1	4.1
Below Niwot Ditch	6	5.1	0.3	2.9	2.3	6.4
Longmont	9	4.9	0	5.1	4.9	11.3
Longmont	.....	4.9	.....	.....	.....	.....
Dixon's Mill	12	38.1	26.0	0.2	7.4	18.7
Below Boulder Creek	15	48.7	5.9	0	4.7	23.4
Fleming Bridge	20½	75.7	17.5	0.2	9.7	33.1
Mouth	27	86.6	0	0	10.9	44.0

SEEPAGE MEASUREMENTS ON ST. VRAIN CREEK
October, 1914

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Gaging Station near Lyons	0	82.8	.....	.....	.....	.....
Below Oligarchy Ditch	3	34.7	0	53.3	5.2	5.2
Below Pella Ditch	6	45.9	4.6	1.0	7.6	12.8
Longmont	9	48.9	.....	3.6	6.6	19.4
Longmont	.....	23.1	.....	.....	.....	.....
Dixon's Mill	12	59.9	29.6	.....	7.2	26.6
Below Boulder Creek	15	144	72.3	.....	11.8	38.4
Fleming bridge	20½	154	0.5	.....	9.5	47.9
Mouth	27	164	.....	.....	3.9	51.8

SEEPAGE MEASUREMENTS ON BIG THOMPSON CREEK
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outflow		
Below Home Supply Dam	0	3.5	.....	.....	.....	.....
Below Barnes Ditch Headgate	5	0	16.1	26.0	6.4	6.4
Below Loveland and Greeley Canal	8	0	0	3.2	3.2	9.6
Below Lytle Bridge	16	20.8	18.1	8.4	11.1	20.7
Below Hill and Brush Ditch	21	20.6	0	0	—0.2	20.5
Below Hill and Brush Ditch	.....	21.9	.....	.....	.....	.....
Below Big Thompson and Platte Riv. Ditch	26	31.1	0	0.2	9.4	29.9
Below Evans Town Ditch	34	72.3	29.2	5.4	17.4	47.3

SEEPAGE MEASUREMENTS ON BIG THOMPSON CREEK
October, 1914

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Home Supply Dam	0	78.1	.....	.....	.....	.....
Below Barnes Ditch	5	5.8	1.7	84.8	10.8	10.8
Below Greeley and Loveland Canal	8	0	.....	8.0	2.2	13.0
Lytle Bridge	16	23.1	20.5	6.4	9.0	22.0
Below Hill and Brush Ditch	21	23.6	.....	.....	2.2	24.2
Below Hill and Brush Ditch	.....	23.5	.....	.....	.....	.....
Below Big Thompson and Platte Valley Ditch	26	27.9	.....	10.4	14.8	39.0
Mouth	34	58.4	20.8	35.9	45.6	84.6

SEEPAGE MEASUREMENTS ON CACHE LA POUDRE RIVER
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in River	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Gaging Station Mouth of Canon	0	205	.....	.....	.....	.....
Below Larimer County Canal	4	187	0	20.4	12.4	12.4
Below Larimer and Weld Canal	10	83.1	0	129.7	25.8	38.2
Below Larimer and Weld Canal	.....	45.1	.....	.....	.....	.....
Below No. 2 Res. Inlet	14.5	33.8	12.2	43.8	20.3	58.5
Below Fossil Cr. Res. Inlet	17.5	3.3	11.2	51.3	9.6	68.1
Below No. 2 Canal	22	12.5	4.8	0	4.4	72.5
Below Eaton Ditch	25	0.9	.....	16	4.4	76.9
Below Jones Ditch	32.5	24.6	8.8	14.7	29.6	106.5
Below Jones Ditch	.....	24.4	.....	.....	.....	.....
Below Old Greeley Water Wks.	37.5	53.7	0	1.6	30.9	137.4
Below Ogilvy Ditch	40.0	94.5	7.5	0.5	33.8	171.2
Near Mouth	41.5	106	8.1	0	3.4	174.6

SEEPAGE MEASUREMENTS ON THE CACHE LA POUDRE RIVER
October, 1914

Place Where Measurements Were Taken	Total Distance in Miles	Amount in River	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Gaging Station	0	82.5	.....	.....	.....	.....
Below Larimer Co. Canal	4	61.1	.....	24.6	3.2	3.2
Below New Mercer Ditch	7	51.6	.....	17.1	7.6	10.8
Below Larimer and Weld Canal	10	61.6	.....	.....	10.0	20.8
Below Reservoir No. 2 Supply Ditch	14.5	15.6	3.5	69.5	20.0	40.8
Below Reservoir No. 2 Supply Ditch	.....	8.1	.....	.....	.....	.....
Below Fossil Cr. Res. Inlet	17.5	0.3	.....	20.6	12.8	53.6
Below No. 2 Canal	22	0	.....	5.6	5.3	58.9
Below Eaton Ditch	25	2.8	.....	.....	—0.7	58.2
Below Jones Ditch	32.5	24.2	6.5	.....	14.9	73.1
Old Greeley Water Wks.	37.5	49.4	.....	.....	25.2	98.3
Old Greeley Water Wks.	.....	57.6	.....	.....	.....	.....
Below Ogilvy Ditch	40.0	80.3	8.2	.....	14.5	112.8
Mouth	41.5	125	4.3	.....	40.4	153.2

SEEPAGE MEASUREMENTS ON THE ARKANSAS RIVER, LA JUNTA TO HOLLY
March, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in River	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outflow		
La Junta	0	23	.....	.....	.....	.....
Las Animas	19	57	7	15	42	42
Lamar	37	98	35	47	53	95
Holly	61	167	0	0	69	164

SEEPAGE MEASUREMENTS ON THE ARKANSAS RIVER
October and November, 1914

Place Where Measurements Were Taken	Total Distance in Miles	Amount in River	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outtake		
Buena Vista	0	271	.....	.....	.....	.....
Bray Bridge	6	289	0	0	18.0	18.0
Salida	26	407	62.5	14.7	70.2	88.2
Howard	38	482	73.7	10.7	12.0	100.2
Texas Creek	57	618	18.3	0.5	118.2	218.2
Canon City	81	512	49.4	112.2	—43.2	175.0
Three miles below Florence	94	633	98.5	56.4	78.9	253.9
Carlisle	100	607	40.2	74.3	8.1	262.0
Pueblo	124	598	2.0	39.6	28.6	290.0
Pueblo	.....	464	.....	.....	.....	.....
Vineland	134	572	116.7	15.2	6.5	296.5
Boone	148	701	2.0	0	127.0	423.5
Nepesta	158	474	10.0	227.7	—9.3	414.2
Manzanola	178	474	55.2	51.8	—3.4	410.8
Below Ft. Lyon Canal Dam	200	0	.....	.....	.....	.....
La Junta	203	54.1	42.5	0	11.6	422.4
Hadley	212½	89.3	0	0	35.2	457.6
Las Animas	222½	110	9.0	36.8	48.5	506.1
Caddoa	238½	260	45.6	0	104.4	610.5
Caddoa	.....	210	.....	.....	.....	.....
Prowers	250	142	1.5	68.6	—0.9	609.6
Lamar	259	5.0	0	164.4	27.4	637.0
Morse	265	31.5	7.0	7.0	26.5	663.5
Grote	271½	34.5	0	21.8	24.8	688.3
Granada	278½	52.0	3.5	0	14.0	702.3
Holly	290	63.6	.....	10.0	21.6	723.9

SEEPAGE MEASUREMENTS ON THE RIO GRANDE
October, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in River	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outflow		
Del Norte	0	650				
Seven Mile Bridge	7	526		93	—31	—31
Monte Vista	15	517		27	18	—13
Below Centennial Ditch	22	521		8	12	—1
Alamosa	33	478		46	3	2
Hanson's Ranch	43	461	1		—18	—16
La Sauces	58	562	74	1	28	12
La Sauces		490				
State Bridge	72	490			0	12
Dunn's Bridge, New Mexico	102	641	24		127	139
Embudo, New Mexico	137	742	98		3	142

SEEPAGE MEASUREMENTS ON RIFLE CREEK
September, 1913

Place Where Measurements Were Taken	Total Distance in Miles	Amount in Creek	Section		Section Gain or Loss	Total Gain or Loss
			Inflow	Outflow		
Power House	0	39.5				
Below Parrish and Mann Ditch	3	13.4		26.5	0.4	0.4
Below Rifle Creek Canon Ditch	6.5	8.2	5.1	11.3	1.0	1.4
Below Wisdom Ditch	10.5	1.6		9.3	2.7	4.1
Below Pioneer Ditch	14	7.3	1.6	0.3	4.4	8.5

RIO GRANDE SEEPAGE INVESTIGATIONS.
Section 1, October 27, 1914.

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
(a) Rio Grande 500′ above water tank at So. Fork, Colo.	517		
Willow Creek at mouth		4.5	
Bear Creek at mouth		1.5	
Highwater Ditch			0.0
Anaconda Ditch			2.1
Hillsdale Ditch			0.0
Shaw Creek at mouth		1.4	
Minor Ditch			0.8
Hosselkus Ditch			0.0
Meadow Glen Ditch			0.4
Pfeifer Ditch			0.0
Myer or Embargo Creek at mouth		6.8	
(b) Independent Ditch No. 2			0.8
(c) Wolf Creek (Intercepted by Minor Ditch)		0.0	
Ehrowitz Ditch			2.0
Knoblauch Ditch			0.0
Bauer Ditch			0.0
Corson Ditch			0.0
(d) Rio Grande at Del Norte Gaging Station seven miles above Del Norte	550		
Totals		+14.4	—6.1

Total Inflow ..... 14.4 sec. ft.
Total Outflow ..... 6.1 "
Difference ..... +8.3 "
Flow at beginning of section plus inflow minus outflow 517 8.3 = 525.3 sec. ft.
Apparent gain ..... 550— 525.3 = +24.7 "
Length of section 9 miles.

Remarks:

NOTE—(a) Measured above a riffle; cross section of cobbles and small boulders 2 to 12 inches in diameter, surface smooth and current even.
(b) Independent ditch was picking up 0.25 ± sec. ft. seepage water from Ewing drainage ditch.
(c) Wolf Creek discharge at South road crossing estimated 0.1 sec. ft.
(d) Measured a. m. Oct. 28. No change of stage during night, as determined by gage readings measured from State bridge on account of depth of water: section chiefly of sand and gravel, some boulders up to 2 ft. in diam.
(e) Small ditches from Meyer and Wolf Creeks diverting small heads of water for stock purposes.
(f) A total surface seepage return of 1 sec. ft. observed in this section intercepted by ditches.

Section 2, October 28, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande at Del Norte Gaging Station	550		
(a) Slough ¼ mile below Del Norte Gaging Station		0.3	
Hallett Ditch			0.0
(b) Slough on Bauer Ranch		0.4	
(c) Slough ¼ mile above mouth Schrader Creek on Voss Ranch		3.3	
(d) Schrader Creek		0.5	
Park and Green Ditch			0.0
(e) Los Pinos Creek		7.5	
(f) Del Norte Town Ditch			0.1
Rio Grande Canal			42.4
(g) Rio Grande 300 ft. above Del Norte Bridge	498		
Totals		+12.0	—42.5

Total Inflow ..... 12.0 sec. ft.
Total Outflow ..... 42.5 "
Difference ..... —30.5 "
Flow at beginning of section plus inflow minus outflow 550— 30.5 = 519.5 sec. ft.
Apparent loss ..... 519.5— 498 = —21.5 "
Length of section 8 miles.

Remarks:

NOTE—(a) Surface Seepage Inflow: originates chiefly in Section 1.
(b) Surface Seepage Inflow.
(c) Surface Seepage Inflow. May contain a little waste water from ditches above and waste water from Independent and Meadow Glenn ditches.
(d) Surface Seepage Inflow.
(e) A slough carrying seepage water, estimated discharge 0.5 sec.-ft. intercepted by Los Pinos Creek. Pinos Creek discharge estimated as 50% seepage water.
(f) Del Norte Town Ditch flow 50% seepage water.
(g) Discharge of 498 sec.-ft. was measured at 10 a.m. Oct. 29. River showed rise of 0.02′ over stake set 6 p. m. Oct. 28. Measured by wading 300 ft. above Del Norte Bridge above riffle. Section of cobbles and small boulders.
(h) Entire inflow of this section except part of Pinos Creek is seepage from irrigated land and springs.
(i) Drainage ditch from Pinos Creek lands at West edge of Del Norte discharging 2.6 sec.-ft. seepage water at road crossing; enters river in Section 3.

Section 3, October 29, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande 300 ft. above Del Norte Bridge	498		
(a) Mill Ditch fed from slough		2.8	
Rio Grande Ditch No. 4 takes water via Mill Ditch			0.0
Gus Weiss Ditch takes water via Rio Grande No. 4			0.0
Midland Ditch			0.0
(b) Rio Grande Ditch No. 1			2.3
Rio Grande Ditch No. 2			0.3
Kane and Kallan Ditch			0.2
(c) Slough near Bridge No. 281A D. & R. G. Alamosa—Creede Branch		0.5	
Brey Ditch			0.0
Schachert Ditch			0.0
New Raber Ditch			0.0
Of's Ditch			1.0
Raber Ditch			0.0
Voss Ditch			1.6
Hall Ditch			0.0
McIntosh Arroyo Ditch			0.1
Farmers Union Canal			117.7
Cochran Pioneer Ditch			0.0
Sylvia Ditch			3.4
Atencio No. 2			1.1
(d) Rio Grande 300′ below 7 mile bridge	379		
Total		+3.3	—127.7

Total Inflow ..... 3.3 sec. ft.
Total Outflow ..... 127.7 "
Difference ..... —124.4 "
Flow at beginning of section plus inflow minus outflow 498— 124.4 = 373.6 sec. ft.
Apparent gain ..... 379— 373.6 = +5.4 "
Length of section 7 miles.

Remarks:

NOTE—(a) Seepage water from drainage ditch from Pinos Creek and waste water from Del Norte.
(b) 0.25 S. Ft. seepage water enters Rio Grande No. 1 near headgate.
(c) Not measurable on account of moss: estimated.
(d) Measured on Oct. 30 set stake night of Oct. 29. No change in water surface. Measured by wading 300 ft. below concrete bridge above riffle; section of cobbles and boulders from 2 to 10 inches diameter.
(e) Farmers Union, Atencio No. 2 Sylvia & McIntosh Arroyo Ditches measured morning of Oct. 30.

Section 4, October 30, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande 300 ft. below 7 mile bridge	379		
Deitrich and Lacass Ditch			0.0
Prairie Ditch			20.4
McDonald Ditch via Prairie			0.8
Monte Vista Canal			1.2
Rio Grande and Piedra Valley or Rock Creek Ditch			9.9
Pace Ditch			0.0
Consolidated Canal			40.3
Butler Ditch			0.0
Star Ditch			0.0
Anderson Ditch			0.0
Atencio Ditch			0.0
Hubbard No. 2 Overflow Ditch			0.0
(a) Slough waste water from Monte Vista Rock Creek and Consolidated Canals		35.7	
Fish Ditch			0.0
Horner and Ydren 2 ditches			0.0
Nichol Ditch			0.0
Manson from left bank slough			0.0
Seepage Slough left of river at Gunbarrel Road			0.0
(b) Rio Grande 600 ft. below bridge on Gunbarrel Road	340		
Total		+35.7	—72.6

Total Inflow ..... 35.7 sec. ft.
Total Outflow ..... 72.6 "
Difference ..... —36.9 "
Flow at beginning of section plus inflow minus outflow 379— 36.9 = 342.1 sec. ft.
Apparent loss ..... 342.1— 340 = —2.1 "
Length of section 8 miles.

Remarks: San Jose or Lucero Ditch drawing 0.25 sec. ft. waste water from Monte Vista Canal. Navajo Ditch drawing .05 sec. ft. from Monte Vista slough. Rio Grande and San Luis Ditch drawing 0.6 sec. ft. from Consolidated Canal. Above quantities estimated. Rio Grande and Lariat Ditch drawing 0.2 sec. ft. from Consolidated Canal.

NOTE—(a) Measured Oct. 31. This is direct flow diverted and returned unused to the river with some picked up seepage water. What per cent is seepage water we are unable to say.
(b) Measured by wading above riffle; section of gravel and cobbles 2 to 4 inches in diameter, surface of water smooth.

Section 5, October 31, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
(a) Rio Grande 600 ft. below bridge on Gunbarrel Road. (No change in river from previous meas.)	340		
James Patterson Ditch			0.0
Ben Ogle			0.0
Billings Ditch			0.2
Seepage slough at railroad bridge ¼ mile above Empire Canal Headgate some sewage from Monte Vista		4.7	
Empire Canal			8.2
Seepage slough 200 feet above Centennial H. G.		1.7	
Centennial Ditch			0.0
(b) San Luis Valley Canal			0.5 E
Blanca via San Luis V. C.			0.0
Kenilworth Canal			0.0
(c) Rio Grande 300 ft. below County Line bridge	349		
Totals		+ 6.4	—8.9

Total Inflow ..... 6.4 sec. ft.
Total Outflow ..... 8.9 "
Difference ..... —2.5 "
Flow at beginning of section plus inflow minus outflow 340— 2.5 = 337.5 sec. ft.
Apparent gain ..... 349— 337.5 = +11.5 "
Length of section 7 miles.

Remarks: E—Estimated.

NOTE—(a) Measured evening of 30th. Reference stake set. Less than 0.01 ft. difference in elevation of water surface.
(b) 2.8 sec. ft. discharging from drainage ditch and slough along west side of county road into San Luis Canal.
(c) Measured by wading; excellent section, coarse gravel up to 3" diameter.

Section 6, November 1, 1914

Name of Stream or Ditch	River Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande 300 ft. below County line bridge	317		
Excelsior Ditch			8.1
a) Seepage slough on South side of river, East of County line		2.5	
Costilla Canal or San Luis Valley Irrigation Ditch			0.4
Independent or Maddox Ditch			0.0
Hickory Jackson Ditch			0.0
(b) Rio Grande 650 ft. below Concrete bridge at Alamosa	320		
Totals		+ 2.5	— 8.5

Total Inflow ..... +2.5 sec. ft.
Total Outflow ..... —8.5 "
Difference ..... —6.0 "
Flow at beginning of section plus inflow minus outflow ..... 317— 6 = 311. sec. ft.
Apparent gain ..... 320— 311 = +9. "
Length of section 11 miles.

Remarks:
NOTE—(a) Estimated on account of moss and vegetation.
(b) Mean of measurements of Nov. 1, p. m. and Nov. 2, a. m., due to falling stage. Only 6 hours elapsed between measurements of Section 6 on Nov. 1. Section of shifting sand, velocities non-uniform.

Section 7, November 2, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande 650′ below Concrete Bridge at Alamosa	306		
South Sewer at Alamosa		0.6	
West Side Ditch			0.0
East Side Ditch or Rio Grande Ditch			0.2
Meadow Overflow or Swartz Ditch			0.0
Rio Grande ¼ mile below Meadow Overflow Ditch Headgate	319		
Totals		+ 0.6	— 0.2

Total Inflow ..... 0.6 sec. ft.
Total Outflow ..... 0.2 "
Difference ..... +0.4 "
Flow at beginning of section plus inflow minus outflow ..... 306+ .4 = 306.4 sec. ft.
Apparent gain ..... 319— 306.4 = +12.6 "
Length of section 5 miles.

Remarks: Slightly falling stage in river. The main sewer from Alamosa discharges into the River in this Section, but the discharge was not measurable since the sewer outlet was submerged. The discharge of the sewer is estimated at 8 ± Sec. ft. on account of the large number of artesian wells which discharge into it.
NOTE—(a) Section of solid clay with bed of shifting blanket of sand along right half of section.

Section 8, November 3, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande ¼ mile below Meadow Overflow Ditch	310		
(a) Alamosa River		20.6	
Slough Old Channel		(e) 1.4	
(b) La Jara Creek		30.2	
(c) Trinchera Creek		0.2 E	
(d) Rio Grande 100 ft. above Trinchera Ford at Stuarts Ranch	358		
Totals		+52.4	— 0.0

Total Inflow ..... 52.4 sec. ft.
Total Outflow ..... 0.0 "
Difference ..... 52.4 "
Flow based on measurement at beginning of section plus inflow minus outflow ..... 310+ 52.4 = 362.4 sec. ft.
Apparent loss ..... 358— 362.4 = —4.4 "
Length of section 10 miles.

Remarks: E—estimated, not measurable.
NOTE—(a) This water includes the flow from Rock Creek, which is part seepage and 10 sec. ft. of drainage water from the Outlet of the Carmel Drainage District.
(b) Includes some seepage water: amount unknown.
(c) South Reservoir about 10 miles above storing entire flow of Trinchera Creek.
(d) Measured above riffle; section of coarse gravel not over 3 inches diameter.
(e) Seepage water.

Section 9, November 4, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande 100′ above Trinchera Ford at Stuart's Ranch	349		
Rio Conejos north channel		120.8	
Rio Conejos south channel		8.4	
Seepage Slough 1200 ft. north of La Sauces, Colo.		0.2	
Seepage Slough 600 ft. north of La Sauces, Colo.		0.1	
Waste Water from La Sauces ditch		1.2	
Rio Culebra		0.0	
(a) Rio Grande, Colo. N. Mexico Line (State Bridge)	489		
Totals		+130.7	— 0.0

Total Inflow ..... 130.7 sec. ft.
Total Outflow ..... 0.0 "
Difference ..... +130.7 "
Flow at beginning of section plus inflow minus outflow ..... 349+ 130.7 = 479.7 sec. ft.
Apparent gain ..... 489— 479.7 = 9.3 "
Length of section 21 miles.

Remarks:
(a) Measured at bridge by wading a. m. Nov. 5. River falling stage on Nov. 4.

Section 10, November 5, 6, 7, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande Colo. N. Mex. Line (State Bridge)	489		
(a) Poncha Creek near mouth waste from Cove Lake Res.		6.4	
Costilla Creek at mouth		0.0	
(b) Latir Creek		0.0	
(c) Rio Colorado		60.6	
(d) San Cristobal Creek		0.7	
(e) Rio Grande at Dunns Bridge	629		
Totals		+67.7	— 0.0

Total Inflow ..... 67.7 sec. ft.
Total Outflow ..... 0.0 "

Difference ..... +67.7 "
Flow at beginning of section plus inflow minus outflow 489+ 67.7 = 556.7 sec. ft.
Apparent gain ..... 629— 556.7= +72.3 "
Length of section 32 miles.

Remarks:
(a) Poncha Creek measured on Nov. 11, 1914. Same discharge on Nov. 5, 1914. Waste water from irrigation and Cove Lake Res.
(b) Latir Creek is intercepted by Cerro Ditch: water being used for domestic and stock purposes.
(c) Rio Colorado measured on Nov. 6, 1914.
(d) San Cristobal Creek measured on Nov. 10, assumed discharge was same on Nov. 6.
(e) Meas. at Dunn's bridge Nov. 7—8 a. m., 40 hours after initial measurement. Distance between State Bridge and Dunn's Bridge 32 miles.

NOTE—Attention is called to increase in flow of the Rio Colorado from Vigil's Mill (near Questa) through the lava box canyon to its mouth, a distance of approximately 8 miles.

Nov. 6, at Vigil's Mill ..... 32.6 sec. ft.
Nov. 6, at Canyon mouth ..... 60.6 "

Increase ..... 28.0 "

Section 11, November 7, 8, 1914

Name of Stream or Ditch	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
Rio Grande at Dunns Bridge	629		
Arroyo Hondo (Rio Hondo) at mouth		14.6	
Rio Taos at mouth		30.6	
Arroyo del Aguago		0.0	
Rio Grande at Cienequilla (a)	622		
Totals		+45.2	— 0.0

Total Inflow 45.2
Total Outflow 0.0

Difference ..... +45.2
Flow at beginning of section plus inflow minus outflow 629+ 45.2 = 674.2 sec. ft.
Apparent loss ..... 622— 674.2 = —52.2 "
Length of section 14 miles.

Remarks:
(a) 24 hours elapsed between meas. at Dunns Bridge and measurement at end of section. River cross section of sand gravel and cobbles under 4 inches diameter. Excellent measurements.

Section 12, November 8, 1914

Name of Stream or Creek	Section Discharge Sec. Ft.	Inflow Sec. Ft.	Outflow Sec. Ft.
		+	—
(a) Rio Grande at Cienequilla	622		
Rito Cienequilla		0.2 E	
East Rinconnado Ditch			0.0
West Rinconnado Ditch			0.0
Embudo Creek at mouth		47.2	
(b) Rio Grande at Embudo Cable	698		
Totals		+47.4	— 0.0

Total Inflow ..... 47.4 sec. ft.
Total Outflow ..... 0.0 "

Difference ..... +47.4 "
Flow at beginning of section plus inflow minus outflow 622+ 47.2 = 669.2 sec. ft.
Apparent gain ..... 698— 669.2 = +28.8 "
Length of section 9 miles.

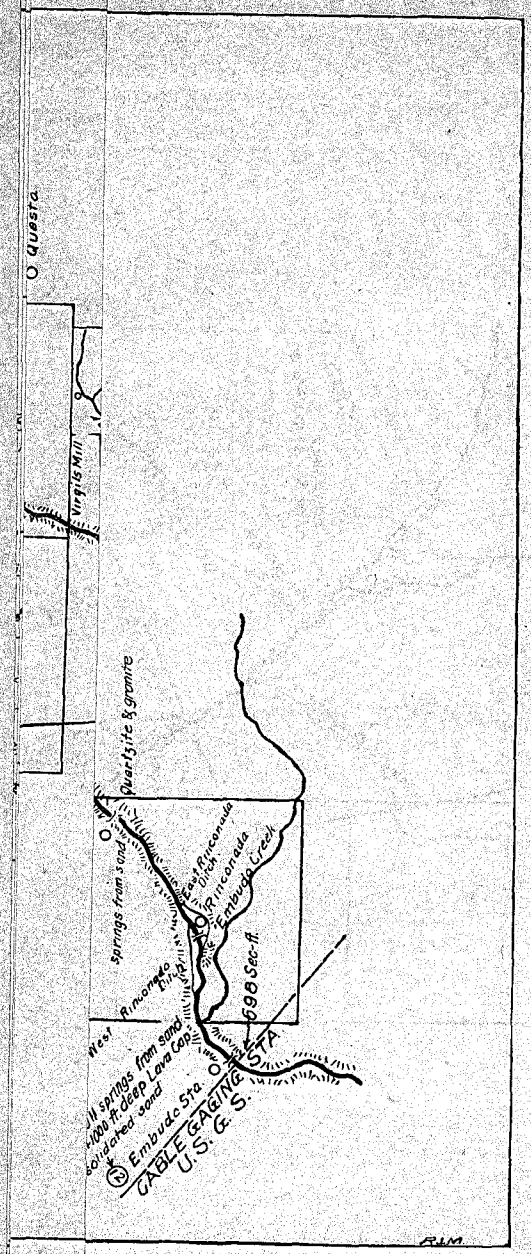
Remarks: E—estimated not measurable. Frequent springs observed from Sienequilla to Embudo on East and West side of river from sand outcrops forming sides of canyon except at Glenwoody on East side of river where unconsolidated sand is replaced by granites and quartzite.

(a) Excellent cross section and accurate measurement secured.
(b) At U. S. G. S. station. Measured from cable. Less accuracy secured at this station than at the Sienequilla ford measurement on account of depth of water and rough current along right bank.

RECAPITULATION

Section		Apparent Gain in Sec. Ft.	Apparent Loss in Sec. Ft.	(a) Measured Seepage Return Surface Sec. Ft.
1	South Fork to Del Norte Gaging Station 7 miles above Del Norte	24.7		
2	Del Norte Gaging Station to Del Norte Bridge		—21.5	(b) 9
3	Del Norte Bridge to 7 miles Plaza Bridge	5.4		3.5
4	7 mile Plaza Bridge (concrete) Monte Vista Gunbarrel Bridge		—2.1	
5	Monte Vista (Gunbarrel Bridge) to County Line Bridge	11.5		6
6	County Line Bridge to Alamosa (concrete bridge)	9.0		2.5
7	Alamosa Concrete Bridge to clay outcrop on Schwartz Ranch ¼ mile below headgate Meadow Overflow Ditch	5.0		
8	Clay Outcrop Schwartz Ranch to Trinchera Ford near Stuarts Ranch		—4.4	(c) 11.4
9	Trinchera Ford to State Bridge Colo.-New Mexico line station	9.3		0.3
10	State Bridge Colorado to Dunns Bridge above mouth Rio Hondo	72.3		
11	Dunns Bridge to Ford at Cienequilla		—52.2	
12	Cienequilla Ford to Embudo Cable U. S. G. S. Station	28.8		
	Totals	+166.0	—80.2	32.7

(a) Includes overflow to river and seepage water intercepted by ditches.
(b) Allowance made for seepage in Los Pinos Creek.
(c) 10 Second-feet drainage water Carmel District.



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RIO GRANDE
FROM SOUTHFORK, COLO.
TO EMBUDO, NEW MEXICO.
showing
SEEPAGE MEASUREMENT SECTIONS
October 27, to Nov 9, 1914.
Engineering Department State of Colorado
R.I. Meeker Hydrographer
Dec 1 1914
N
SO. FORK
DEL NORTE
MONTE VISTA
ALAMOSA
Rio Grande
Oct 27, 1914
Oct 28
Nov. 3
Nov. 4
Nov 5, 6, 7
Nov. 7, 8
COLORADO
NEW MEXICO
Rio Grande Del Norte
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(b) Allowance n
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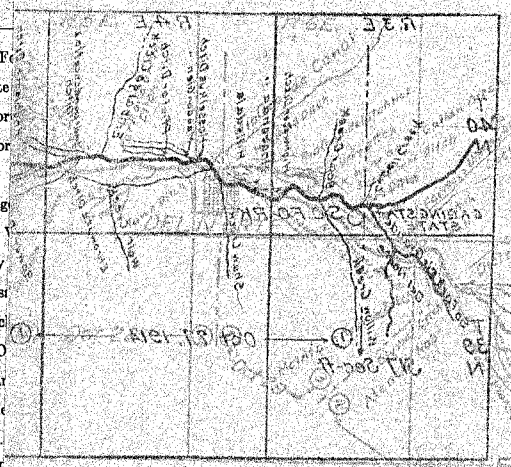

GENERAL CONCLUSIONS

From data and discussions hereto attached*, it is evident that the accurate determination of seepage losses or gains on a River of the magnitude of the Rio Grande, even at its low flow (500 second-feet) in October, when run-off and diversion conditions are fairly constant, is a problem of difficulty, with experienced Hydrographers and extreme care in metering.

A gradually falling stage and errors of measurement (due to roughness of cross sections) are a constant source of annoyance and introduce uncertainties which prevent the acceptance of numerical data at face value and require a discussion of each section. Even then only general inferences can be drawn. The deductions made from this investigation are only general and their application to other periods of the year or other years is dangerous.

Heretofore seepage investigations have reached the official publications in a tabular form with little or no discussion of conditions prevalent during the investigation or qualifications of data secured. If these data are published it is advised that a discussion accompany them and that they be qualified. Such notations are imperative, if proper weight be given the investigation.

Based on the preceding data and discussion it can be announced with some emphasis that there is no pronounced increase to the Rio Grande during the months of October and November from the irrigated lands of the San Luis Valley in Colorado. There is a slight increase which is partly evidenced by measured seepage inflow at various points on the different sections. Such inflow is qualified as "Surface Seepage Inflow".

During the irrigation season there is undoubtedly a greater inflow of seepage return waters to the Rio Grande from meadow lands directly adjacent and perhaps from some land beyond. Just how much is mere conjecture. It should be noted that the Valley floor is very flat and ditches and canals were observed intercepting small volumes of return seepage waters from irrigation.

Mention is made of the irrigated low, bottom meadow lands which extend almost without exception along the Rio Grande from Del Norte to La Sauces are devoted exclusively to native hay. The subsoil is very porous, being part of the old river bed. Water is applied copiously and returns occur quickly. This portion is directly comparable with meadow lands on the Laramie and Little Laramie Rivers in Wyoming where similar conditions exist, and where there is a large re-use of the water. The major

* Discussion is on file in the State Engineer's office.

part of the irrigated area of the San Luis Valley is not comparable with the irrigated lands of the Poudre, Arkansas and South Platte Valleys from the view point of seepage returns.

Attention is directed to the fact that the greatest slope of the Valley lands from Monte Vista to Alamosa is toward the East, and roughly parallel to the course of the River. Lesser slopes occur to the south and north. Since the subsoil is sand and gravel and is quite porous, the trend of the underground waters on the north side of the River (except where disturbed by local conditions) is toward the north and east and away from the River. There are no natural drainage channels of magnitude in this area, until La Garita Creek is reached far to the North. On the south side of the river the general gradient is toward the south and east and roughly parallel or away from the Rio Grande. Rock Creek is the natural waterway here and undoubtedly picks up some seepage water. These facts then in a measure explain the lack or the meagre return waters from irrigated lands in the San Luis Valley to the Rio Grande. Natural drainage or general slope of the lands irrigated coupled with the very porous subsoil draw the return waters of irrigation directly away from the Rio Grande and it accumulates in the low, flat ground and is lost by evaporation, hence the need of drainage ditches in the vicinity of Mosca, Hooper and Dune on the north side and the seeped and alkalied areas to the south and west of Alamosa beyond Rock Creek, which require drainage.

There is undoubtedly an intimate relation between the Rio Grande and the water table of the San Luis Valley on account of the porous sub-soil. At times of the year during the irrigation season the water table from sub irrigation is higher than the water surface of the river, at other times lower, so that the movement of water reverses from one to the other.

In this connection, it should be pointed out that F. W. Swanson, Division Engineer, who came to the San Luis Valley in 1871, and has resided there almost continuously since that time, is authority for the statement that prior to irrigation of any magnitude, there was no alkali on the soil surface of the Valley and Rock Creek which is now a perennial stream, was generally dry from a point seven or eight miles west of Alamosa to its mouth during the fall and winter months.

This shows the importance of extending seepage investigations to Rock Creek, La Garita Creek and the tributaries at favorable times of the year.

As noted in the recapitulation, the largest apparent gain to the Rio Grande above Embudo in 1914, occurs, not in the irrigated area but in the lava canyon between the Colorado-New Mexico line and Dunns Bridge. This increase is in part directly chargeable to observed, frequent small springs in the canyon.

On pages 17 and 18 of Water Supply Paper No. 240, C. E. Siebenthal, Geologist, suggests and indicates that the increment from springs, in the Rio Grande canyon between Lobatos and

Embudo Stations may come from the artesian basin of the San Luis Valley. Siebenthal is inclined, however, to attribute the difference in flow of the River between the State Bridge and Embudo entirely to underground waters, making direct statement of practically no inflow from surface streams in New Mexico.

Such is not the case however and the surface flow to the Rio Grande between the Colorado-New Mexico station and the Embudo is large.

Hydrographic data is now extant which was not available at the time of Seibenthals Investigation, which, as I understand it, did not include field work in New Mexico.

Insufficient seepage measurements and related investigations have been secured on this section of the Rio Grande (Colorado-New Mexico line to Embudo) to make any definite statements as to location of inflow or volume added to the river from underground sources.

During August and September 1915 when the Rio Grande is low on account of diversions in Colorado, it would be advisable to do some additional work on that Section of the River extending from the State Bridge in Colorado to Cinequilla, using automatic water stage registers at various points in conjunction with the Register at the State line and securing records for a period of two weeks to a month. Only in this way can decisive figures be secured on the underground inflow. Work should also be done in the examination of the canyon and location of springs and their size and extent determined.

In conclusion then conditions encountered on the Rio Grande in Colorado and Northern New Mexico require special methods, greater efforts, and longer periods of time to secure dependable seepage data upon which to base reliable deductions.

CHAPTER VIII

DRAINAGE INVESTIGATIONS SAN LUIS VALLEY.

Detailed drainage investigations were commenced in May, 1914, when an irrigation engineer from the Denver office was sent to the San Luis Valley. The investigations are well under way but not far enough advanced to publish a comprehensive report. It will require all the 1915 field season to complete the investigations under way. The data herewith attached are advance in nature and subject to modification as the work progresses.

No effort will be made at this time to indicate the causes leading up to the need of drainage, other than to say that the slope of the porous valley floor is insufficient for rapid drainage. This fact, coupled with the excessive use of water by canals and waste from canals and artesian wells, has waterlogged the lands and brought alkali to the surface. Relief can come in two ways, by a more careful use of water and by artificial drainage, but both are imperative if the irrigated area is to grow.

WATER TABLE INVESTIGATIONS

During August and July, 1914, sixty-three observations were made of the water table in the San Luis Valley, extending on the north from Alamosa to beyond Moffat, on the south from Alamosa to Romeo and Manassa, on the east to the old river channel between Baldy and Alamosa and on the west to Monte Vista. The maximum depth to water was 7 feet, the minimum depth 1.25 feet, and the general depth to water was from 2 to 5 feet. The lesser depths being encountered on irrigated land, and the greater depths in the nonirrigated areas. Most of the observations were secured by making borings, which served at the same time to show the nature of the soil and subsoil. Water was invariably struck on penetrating the loose sand or gravel substratum which lies from 1½ to 7 feet below the general surface.

MAPPING OF IRRIGATED, SEEPED AND ALKALIED AREAS

During the summer work was commenced on the preparation of a map showing in a comprehensive way the irrigated lands, the seeped and alkalied areas and the raw lands of the Valley. 120,000 acres have been mapped. It will require the entire field season of 1915 to complete this phase of the work.

DRAINAGE DISTRICTS

The attached table shows the community attempts by land owners of the Valley to secure drainage and covers over 160,000 acres at a total cost of approximately $1,000,000.00.

DRAINAGE DISTRICTS. SAN LUIS VALLEY, COLORADO.

Name	Acreage	Cost	Status	Remarks
Parma Tract	7,500	a$25,000	Constructed	Additional work being done from time to time
Carmel Drainage District	5,040	55,000	Constructed	Constructed 1913 and 1914. Chiefly tile and wooden underdrains.
Saguache Drain Ditches	10,000	60,000	Constructed	Open ditches. Water developed used for irrigation.
Sylvester Tract	10,500	a 47,250	Constructed	Ditto.
San Luis Valley Drainage Dist.	70,000	350,000	Bonds issued	Unsold.
Moffat Irrigation District	50,000	400,000	Bonds issued	Unsold. (c.)
La Jara Drainage District	7,500	b 45,000	Bonds issued	Unsold.
	160,540	$982,250		

(a) Approximate.
(b) Estimated.
(c) Drainage water developed to be used in district includes some water by pumping and old ditch rights.
NOTE—A drainage district in process of formation between Monte Vista and Center at the present time.

The most notable example of reclamation by drainage recently completed is the Carmel Drainage District located 12 miles southwest of Alamosa. The drainage, accomplished at a cost of $10.50 per acre, is very satisfactory and will undoubtedly result in the reclamation of more extensive areas by the same methods, namely: underground drains. The amount of water developed by drainage systems is a matter of some importance from the viewpoint of efficiency of the system and the amount of water made available for irrigation on lower lands. The attached measurements represent conditions prevailing in 1914.

MEASUREMENTS OF OUTLET, CARMEL DRAINAGE DISTRICT, JUST BELOW JUNCTION OF SUB-MAINS "A" AND "B", AT THE WEST ¼ CORNER OF SECTION 5, T. 36 N, R. 9 E

Date	Hydrographer	Volume Sec. Ft.	Remarks
1914			
May 28	(a) Stannard and Adams (b)	5.9	.....
June 27	R. I. Meeker	9.5	System 50% completed.
July 23	R. I. Meeker	7.8	.....
Aug. 26	R. I. Meeker	9.4	.....
Sept. 23	R. I. Meeker	11.7	Fall irrigation to wash land of alkali commenced in dist. about Sept. 10.
Oct. 23	Meeker & Amsley	11.0	System completed on Oct. 31.
Nov. 24	H. D. Amsley	7.1	No ice in ditch.
Dec. 1	O. V. Adams (b)	7.3	.....
Dec. 17	O. V. Adams	5.8	.....
1915			
Jan. 2	O. V. Adams	5.5	.....

(a) Engineer U. S. Reclamation Service.
(b) Engineer Carmel Drainage District.

MISCELLANEOUS MEASUREMENTS OF DEVELOPED DRAINAGE WATER.

Parma outlet ditch 1 mile south of Parma.
Sept. 23, 1914, 1.55 Sec. ft. by R. I. Meeker.
Saguache Drain Ditches, total of all laterals at Gibson
Sept. 24, 1914, (a) 5.30 Sec. ft. by R. I. Meeker.
(a) Laterals obstructed by water moss and vegetation.
Sylvester Drain Ditch at W 1/4 corner Section 30 T 41 N R 10 E.
Sept. 24, 1914, (b) 1.95 Sec. ft. by R. I. Meeker.

(b) 1.3 Sec. ft. of seepage water discharging from Noffsinger ditch into Sylvester ditch at head of Sylvester ditch. Sylvester ditch badly choked with Russian thistles at point of measurement.
Noffsinger Drain Ditch, at end.
Sept. 24, 1914, 1.20 Sec. ft. by R. I. Meeker.
" " " 1.15 " " lateral drawing water from Noffsinger ditch 1/2 mile above end.

Total 2.35

Note: Banks of Noffsinger Ditch along last 1/2 mile in bad shape; water overflowing and spreading in chico and greasewood.

Insufficient data have been secured at this time to draw any reliable deductions as to the volume of drainage water produced per 1000 acres of drained land, other than to indicate it ranges from 0.75 sec. ft. to 2.0 sec. ft. per 1000 acres of drained land and varies at different times during the year.

ARTESIAN WELLS

Data are being secured on the artesian wells with reference to number, size, location, waste of water, depletion of the artesian basin through unrestrained flow and related matters, but will not be published at this time.

Montrose, Colorado, Nov. 11, 1914.

Mr. H. C. Getty,
Irrigation Div. Engineer,
District No. 4,
Montrose, Colorado.

Dear Sir:

Replying to your letter of recent date requesting information regarding seepage conditions under the Uncompahgre Valley Project and the progress made in reclaiming lands so affected, I will say, that, while the subject is a very important one not only under this Project but in all irrigated sections as well, and worthy of much longer discussion than it is possible to submit at this time, I herewith submit some general statements on conditions as we have found them throughout the Uncompahgre Valley.

Using the data obtained from reports of the different Reclamation Engineers together with personal observations and data gathered during our operations in drainage work in this Valley, it has been estimated that 35% of the land under the Project is in need of artificial drainage. Approximately one-half of this area is too wet or excessively alkalied to produce any kind of crops

whatever, while through the balance of the land in need of drainage, the water-table is too close to the surface to permit a full maturity of the crops planted.

It is believed by a great many that the excessive rise of the ground water-table is due to the leakage from the large canals. While this is true in a few instances, it has been found that the largest per cent of the water that is causing the seep and alkaline condition is the water absorbed by the soil on the irrigated lands above.

Up to the present time there have been no Drainage Districts formed or organized in the Uncompahgre Valley which may be attributed mainly to three facts. 1st. That the majority of seep-affected bodies of land are small individual tracts which are widely scattered, and owing to the ample slope of the surface, outlets for the drains are obtained within short distances of the area to be drained with very little difficulty. 2nd. In some localities where the affected area is large enough to necessitate the organizing of a District, the majority of land owners, whose lands would be included, are non-residents of the Valley and consequently it is difficult to get the matter before them in a necessary manner for forming such a district. It could be done, however, with no little amount of time and expense, but no one individual cares to assume the responsibility. 3rd. The land-owners who are local residents of the Valley having affected areas large enough to comprise a fair sized District have not as yet realized the importance of such work and are skeptical of the feasibility of Drainage Districts.

As a result of these chief conditions, all of the drainage work so far has been individual work. It is only a question of a short time until District work will be undertaken and if one District could be organized and completed, the others would soon fall into line.

During the four years that our company has been engaged in the Reclamation of Alkalied Land by Scientific Drainage, we have installed over sixty miles of tile and successfully reclaimed approximately 7000 acres of land in the Valley at an average cost of $35.00 per acre. The land, so reclaimed, is now bearing full crops and in most cases the crops have paid off the cost of reclamation.

There are two general soil and sub-soil conditions existing in the Valley. On the East side of the Uncompahgre River is found the sandy adobe soil underlaid with a shale sub-soil, while on the West side of the River the soil is composed of a sandy-loam with a sand or gravel sub-soil. In connection with each of these general conditions there is found a great variety of sub-soil formations, and it will no doubt be interesting to learn that of all the projects installed, we have found no two sub-soil formations exactly alike or requiring the same system of drainage. Each project is a separate study in itself.

The sizes of tile we have been using are 6″, 8″, 10″ and 12″. The 6″ tile, however, are used only on short laterals having a steep grade. The time has arrived when larger tiles than twelve inch is needed and steps have been taken to promote the manufacture of sizes up to 27″ by the local tile factories.

On the smaller projects the tile lines are constructed by hand labor, while the trenches on the larger projects are excavated with a trenching machine. Very seldom is a tile line constructed without the use of timber, as the soil of most of the work is so thoroughly saturated that it is impossible to keep the banks standing while the tile is being laid.

While the people of the Valley are beginning to realize more than ever the necessity of draining, and there is more drainage work, in proportion to the population of the Valley, being done than in any other one locality in the irrigated section of the West, it is still difficult to impress upon the mind of the water-user the absolute necessity for careful irrigation as a future preventative against seepage and in conclusion let it be said that if every farmer would use as his motto, "More cultivation and less irrigation", he would not only increase his present crop production but he would insure himself as well as his neighbor, in a great measure, against the spots, which every farmer dreads to see appear on his land, commonly known as seep.

Respectfully submitted,

(Signed) H. R. Elliott,
President,
THE ELLIOTT-MEAKER DRAINAGE CO.

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Seventeenth Biennial Report

OF THE

State Engineer

TO THE

Governor of Colorado

For the Years 1913-1914

PART TWO

DENVER, COLORADO
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1915

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HYDROGRAPHIC DATA

The following pages contain descriptions of gaging stations, records of discharge measurements and tables of daily discharges on the various streams for the biennial period. A number of these stations have been maintained in co-operation with the United States Geological Survey, the United States Forest Service and private parties. Credit for this co-operation has been given where *due*.

The method of computing the run-off is that used by the United States Geological Survey, in order that the records will not differ from the Government records on account of difference in the methods of computing.

The drainage areas have been computed from U. S. Geological Survey topographic sheets, U. S. Forest Atlas or Hayden's Atlas.

The altitudes given are those given for the nearest town and may be in error a few hundred feet, but should be accurate enough to make a comparison of the run-off at various altitudes.

Seepage measurements have been made on the more important streams of the State where possible. The results of these measurements will be found in Volume I with a short discussion of the conditions affecting the results.

ARKANSAS RIVER DRAINAGE

ARKANSAS RIVER AT GRANITE.

Location.—At Granite, in sec. 31, T. 11 S., R. 79 W., below the mouth of Lake Creek and above Lost Canyon and Clear Creeks.

Records Available.—May 1, 1897, to September 10, 1899; April 6, 1910, to November 30, 1914.

Drainage Area.—425 square miles.

Gage.—Automatic recording gage established in 1910; datum of recording gage bears no determined relation to that of the vertical staff gage which was used from 1897 to 1899, and which was located at the highway bridge near the railroad station.

Channel.—Practically permanent.

Discharge Measurements.—Made from car and cable.

Winter Flow.—Ice causes backwater during the winter months and the records are discontinued.

Artificial Control.—The discharge is affected by the operation of the Twin Lakes reservoir.

Diversions.—There are court decrees for diversions of 76 second-feet from the Arkansas between this station and the junction of Tennessee and East Forks, and diversions of 22 second-feet from the intervening tributaries.

Co-operation.—During 1913 and 1914 this station has been maintained in co-operation with the U. S. Geological Survey.

DISCHARGE MEASUREMENTS ON THE ARKANSAS RIVER AT GRANITE.

Date	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
1913				1914			
Feb. 27*	B. S. Clayton		73	May 3	R. H. Fletcher	1.51	124
May 20	Raymond Richards	3.07	988	Aug. 14	M. D. Anderson	2.10	287
July 15	R. H. Fletcher	2.80	761	Oct. 7	R. H. Fletcher	1.79	201
Sept. 19	R. H. Fletcher	1.96	256				

*Ice conditions.

ARKANSAS RIVER AT SALIDA.

Location.—At Salida, Colorado, some distance above the mouth of the South Fork of Arkansas River, the nearest tributary of importance.

Records Available.—April 11, 1895, to October 31, 1903; November 3, 1909, to November 30, 1914.

Drainage Area.—1,160 square miles.

Gage.—Automatic recording gage; no determined relation between automatic gage and the gage used from 1895 to 1903.

Channel.—Slightly shifting.

Winter Flow.—Springs keep the river open during the winter months.

Diversions.—There are court decrees for diversions of 148 second-feet from the Arkansas between this station and Granite, and diversions of 380 second-feet from intervening tributaries.

Co-operation.—During 1913 and 1914 this station has been maintained in co-operation with the U. S. Geological Survey.

DISCHARGE MEASUREMENTS ON THE ARKANSAS RIVER AT SALIDA.

Date	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
1913				1914			
Jan. 29	B. S. Clayton	0.45	220	May 6	R. H. Fletcher	0.80	345
Feb. 26	B. S. Clayton	0.46	222	Aug. 16	M. D. Anderson	1.65	731
Apr. 4	B. S. Clayton	0.95	365	Oct. 8	R. H. Fletcher	1.09	473
May 16	Robert Follansbee	2.75	1280	Oct. 22	M. E. Bunger	1.10	407
July 16	R. H. Fletcher	2.35	1040				
Aug. 26	R. H. Fletcher	1.20	459				

ARKANSAS RIVER AT CANON CITY.

Location.—Just below the suspension bridge at Hot Springs Hotel, at the mouth of the canyon, and 1½ miles above Canon City. Nearest important tributary is Grape Creek, which enters above.

Records Available.—May 1, 1888, to November 30, 1914.

Drainage Area.—3,060 square miles.

Gage.—Automatic recording gage established by the State engineer in September, 1909. The river shifted away from this gage early in 1912, and a chain gage reading to the same datum was placed on the opposite side of the river and used during the year. This gage was washed out in 1914. The original Geological Survey gage was established April 17, 1889. On October 4, 1895, a new staff gage was established on the left bank about 100 feet below the original gage and referred to the same datum. At low stages it read 0.4 foot lower than the original gage, but at high stages the readings were the same. On August 26, 1902, a gage was established on the right bank near the first gage and referred to the same datum. The datum of the recording gage now used is 2.00 feet higher than that of the last gage.

Channel.—The channel shifts to such an extent during high water that at times it is necessary to move the gage in order to read the gage heights.

Discharge Measurements.—Made from car and cable.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 131 second-feet from the Arkansas between the stations at Canon City and Salida, and diversions of 2,286 second-feet from intervening tributaries.

DISCHARGE MEASUREMENTS ON THE ARKANSAS RIVER AT CANON CITY.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan.	11	B. S. Clayton	4.10	297
Feb.	28	B. S. Clayton	4.00	330
Apr.	2	B. S. Clayton	4.49	508
May	7	B. S. Clayton	4.70	551
May	8	B. S. Clayton	5.32	942
June	5	B. S. Clayton	5.70	1240
June	22	B. S. Clayton	6.60	1970
Aug.	4	B. S. Clayton	4.08	372
Oct.	6	B. S. Clayton	4.26	421
Nov.	25	B. S. Clayton	4.00	320

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec .Ft.
Jan.	9	B. S. Clayton	3.92	328
Apr.	22	M. E. Bunger	4.04	376
June	26	M. E. Bunger	7.00	2846
Sept.	7	M. E. Bunger	4.90	510
Oct.	29	M. E. Bunger	4.90	512

Discharge of Arkansas River at Granite for 1913.

Drainage Area, 425 Square Miles. Altitude, 8,930 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.
1			110	139	365	1600	605	276	220	203	186	82
2			110	170	476	1490	640	276	220	220	203	96
3			110	170	476	1090	539	238	220	220	220	96
4			110	170	365	1000	750	186	220	203	220	
5			110	170	365	915	915	170	238	203	154	
6			139	139	365	958	872	203	220	186	110	
7			139	124	605	1000	830	297	220	186	110	
8			124	82	830	750	830	342	238	186	110	
9			110	55	872	750	830	297	238	186	124	
10			124	55	830	750	915	276	203	203	110	
11			139	68	830	915	915	342	186	203	110	
12			139	96	1340	712	830	447	203	170	139	
13			110	170	1280	915	750	476	186	154	139	
14			110	238	1000	830	712	476	203	154	139	
15			110	257	830	750	750	447	203	154	124	
16			120	238	958	750	572	418	203	124	110	
17			130	257	1000	830	418	392	203	124	110	
18			139	238	1000	1000	640	392	186	124	124	
19			139	238	1040	1180	675	365	186	110	96	
20			139	297	1000	1140	539	392	170	110	110	
21			139	297	539	1000	476	392	186	124	124	
22			139	297	476	750	392	297	170	124	110	
23			139	220	539	790	392	203	186	110	82	
24			139	186	830	830	605	203	186	124	96	
25			139	203	1040	712	539	203	186	124	96	
26			139	203	1090	750	508	203	186	124	82	
27			139	203	1240	830	447	203	186	110	82	
28			139	238	1000	915	392	220	186	96	96	
29			139	257	1180	872	365	220	170	82	82	
30			139	276	1380	750	318	220	170	110	82	
31			139		1490		297	203		139		
Mean			129	192	859	917	621	299	199	151	123	
Run-off acre-feet			7930	11400	52800	54600	38200	18400	11800	9280	7320	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Granite for 1914.

Drainage Area, 425 Square Miles. Altitude, 8,930 Feet Above Sea Level.

Day	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					120	1700	1090	1090	307	174	174	
2					133	1700	958	1000	270	189	146	
3					133	1600	1000	830	253	189	146	
4					146	1490	1140	705	253	204	133	
5					160	1490	1340	554	253	204	133	
6					160	1340	1180	518	236	204	133	
7					146	1180	1040	518	220	160	133	
8					204	1090	915	518	189	174	133	
9					349	1000	958	486	160	174	133	
10					453	1140	1090	425	146	189	133	
11					453	1180	1140	328	160	189	133	
12					425	1340	1000	288	174	174	133	
13				108	397	1540	915	270	189	160	133	
14				133	518	1490	958	307	204	146	120	
15				160	665	1600	958	328	204	160	120	
16				174	745	1340	958	288	189	160	95	
17				146	745	1140	915	270	174	160	95	
18				133	788	1180	1000	328	174	146	82	
19				120	830	1240	958	486	174	160	108	
20				174	915	1240	1000	518	160	160	146	
21				204	1240	1140	915	590	220	160	120	
22				204	1280	1090	1040	518	220	189	95	
23				204	1340	1280	915	590	189	174	95	
24				189	1180	1380	830	705	189	189	95	
25				204	1280	1490	665	665	204	204	95	
26				220	1280	1490	705	590	220	189	95	
27				189	1380	1280	872	554	204	174	95	
28				133	1340	1240	1180	518	174	174	95	
29				133	1180	1180	915	486	174	174	95	
30				133	1240	1140	872	328	174	189	95	
31					1180		1000	328		189		
Mean				164	723	1320	981	514	202	177	118	
Run-off acre-feet				5860	44500	78600	60300	31600	12000	10900	7020	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Salida for 1913.

Drainage Area, 1,160 Square Miles. Altitude, 7,038 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	242	210	210	350	495	1700	1360	730	400	455	335	279
2	220	200	220	350	583	1630	1170	455	400	475	366	279
3	254	200	220	320	780	1420	1110	475	417	475	400	279
4	254	200	210	279	755	1360	1110	475	400	495	350	266
5	231	210	210	266	655	1300	1230	436	400	475	306	279
6	220	200	210	292	680	1490	1170	400	382	417	306	279
7	231	200	210	306	730	1490	1170	417	366	417	292	266
8	242	210	210	292	1050	1420	1170	436	538	436	306	266
9	242	220	210	254	995	1490	1170	417	583	436	306	266
10	242	200	210	231	995	1560	1170	436	538	400	306	254
11	254	200	210	231	940	1700	1170	436	495	400	306	242
12	242	191	220		995	1420	1170	560	516	400	320	254
13	231	191	220		1490	1490	1050	630	516	417	335	254
14	242	191	200		1420	1420	995	630	516	436	335	254
15	231	200	200		1170	1360	995	606	516	400	335	254
16	231	200	182		1230	1300	995	560	516	366	306	254
17	242	200	191		1170	1300	830	516	495	382	292	266
18	242	200	210		1230	1420	940	495	516	366	306	254
19	231	210	220		1420	1490	1110	560	516	320	306	266
20	220	220	220		1170	1490	1050	560	475	320	306	254
21	220	220	200		1050	1490	1110	630	495	350	306	242
22	231	220	200		830	1490	1110	583	495	350	320	224
23	231	220	200	335	940	1420	1050	436	475	350	306	238
24	231	210	191	306	1050	1560	1110	475	455	366	306	220
25	231	210	182	292	1300	1420	995	495	455	350	306	220
26	231	231	182	306	1560	1420	995	455	475	320	306	231
27	210	220	182	320	1630	1420	885	417	455	320	320	266
28	220	220	191	350	1420	1420	805	436	436	335	320	231
29	220		220	350	1420	1560	805	495	436	335	279	222
30	220		242	366	1560	1420	805	475	417	320	279	220
31	220		279		1560		730	436		335		227
Mean	233	207	208	305	1110	1460	1050	502	470	388	316	252
Run-off acre-feet	14300	11500	12800	11500	68200	86900	64600	30900	28000	23900	18800	15500

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Salida for 1914.

Drainage Area, 1,160 Square Miles. Altitude, 7,038 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	242	266	254	242	328	2720	2080	1840	807	476	455	
2	254	254	266	242	315	3350	2000	1690	730	476	455	
3	254	242	266	266	300	3020	2000	1690	680	497	435	
4	242	254	254	292	315	2920	2340	1690	655	497	435	
5	238	254	254	279	315	2520	2340	1480	655	518	435	
6	238	254	242	306	345	2160	2160	1400	518	518	435	
7	238	231	231	292	345	1620	2080	1340	518	518	415	
8	235	242	242	279	345	1540	1840	1280	456	497	395	
9	242	254	242	266	475	1400	1690	1150	415	497	395	
10	254	254	242	266	680	1540	1690	1030	395	497	395	
11	242	254	242	266	755	2000	1690	970	435	476	376	
12	242	254	231	279	730	2340	1690	888	476	497	376	
13	242	242	242	254	705	2720	1690	834	476	476	395	
14	266	242	254	266	805	2920	1840	730	476	415	395	
15	266	220	254	292	885	3570	1760	680	456	395	356	
16	279	231	279	320	940	3350	1690	655	376	435	337	
17	292	231	292	320	885	2720	1840	632	376	415	337	
18	279	242	292	320	995	2820	2000	730	376	395	337	
19	254	242	266	278	940	2920	2080	807	415	395	318	
20	242	242	254	290	1110	2920	2160	888	415	395	376	
21	242	254	254	325	1630	2820	2000	970	415	395	376	
22	254	254	242	340	1930	2520	2520	888	435	455	318	
23	266	231	242	355	1850	2340	2080	834	395	476	300	
24	266	231	254	355	1930	2820	1840	1030	395	497	300	
25	254	220	231	370	1770	2720	1690	1030	415	497	300	
26	254	231	242	370	1630	2520	1760	1030	415	497	318	
27	266	231	254	355	1770	2160	1840	1030	395	476	318	
28	266	254	254	340	1930	2080	2720	1030	395	476	318	
29	231		266	325	1700	2080	2160	1030	415	455	318	
30	242		254	345	1770	1920	2000	915	435	455	281	
31	254		248		2090		1920	834		476		
Mean	253	243	253	303	1050	2500	1970	1070	474	466	367	
Run-off acre-feet	15600	13500	15600	18000	64600	149000	121000	65800	28200	28700	21800	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Canon City for 1913.

Drainage Area, 3,060 Square Miles. Altitude, 5,363 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	310	380	310	500	410	1840	1150	442	365	410	335	335
2	310	380	310	545	545	1840	1000	365	365	500	335	335
3	310	380	310	545	722	1620	970	335	365	442	365	365
4	310	380	365	460	590	1260	870	350	365	425	425	380
5	310	380	365	365	568	1220	1080	335	335	425	410	395
6	310	380	365	365	590	1340	1110	335	335	425	410	365
7	290	380	365	425	590	1420	1150	335	335	410	365	335
8	290	380	350	425	810	1420	1080	335	365	395	335	365
9	290	380	350	380	970	1500	1190	335	460	395	335	365
10	310	380	350	335	902	1620	1460	335	442	395	335	335
11	310	365	335	335	935	1970	1110	365	442	380	335	310
12	310	365	365	365	1000	1970	1190	365	500	380	335	310
13	335	335	365	425	1340	1880	970	568	442	395	350	310
14	335	335	365	460	1460	1620	870	545	425	395	335	365
15	335	365	310	545	1150	1540	780	545	425	395	335	395
16	335	365	310	522	1150	1580	840	480	442	365	335	395
17	365	365	310	522	1150	1580	810	460	425	365	335	395
18	365	365	310	545	1190	1670	750	460	425	365	335	395
19	365	365	310	522	1260	2060	1040	460	410	335	395	335
20	365	365	310	522	1260	1970	1000	522	380	335	365	395
21	365	365	350	500	1190	1840	1260	722	365	335	335	310
22	365	335	350	500	935	1880	1260	668	365	335	365	310
23	365	335	350	442	840	1750	1110	480	365	335	335	335
24	365	335	350	410	970	1710	1150	395	425	335	335	335
25	380	335	335	380	1340	1670	1080	410	425	335	335	335
26	380	335	335	365	1460	1500	902	395	410	335	365	310
27	380	335	335	365	1710	1420	840	365	380	335	365	425
28	365	335	335	380	1670	1340	750	395	365	335	365	425
29	365		335	395	1500	1420	615	480	395	335	365	365
30	365		410	410	1800	1340	568	410	460	335	335	335
31	380		410		1710		522	380		335		335
Mean	340	361	343	442	1090	1630	983	431	400	375	354	355
Run-off acre-feet	20900	20000	21100	26300	67000	97000	60400	26500	23800	23100	21100	21800

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Canon City for 1914.

Drainage Area, 3,060 Square Miles. Altitude, 5,363 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	380	330	342	330	428	2760	2330	2460	755	430	470	
2	380	330	355	330	428	3320	2330	4800	728	430	470	
3	380	330	368	330	462	3210	2280	2140	620	430	450	
4	355	330	368	342	542	3010	2510	2050	595	415	430	
5	355	330	342	355	395	2810	2700	1820	595	430	450	
6	355	355	355	355	355	2520	2600	1600	572	430	430	
7	355	330	355	380	355	2150	2560	1430	510	430	470	
8	355	310	355	355	355	1710	2200	1310	470	430	470	
9	355	380	355	355	368	1510	2100	1350	490	430	400	
10	355	355	355	342	542	1430	1970	1230	490	430	400	
11	330	380	355	355	710	1920	1920	1190	470	430	400	
12	330	380	355	355	765	2240	2200	1150	450	430	400	
13	330	380	355	368	710	2520	2060	1010	450	430	400	
14	330	380	355	355	710	2810	2200	1010	470	450	400	
15	330	355	355	355	950	3930	2200	940	470	370	400	
16	355	380	380	355	1050	4410	2200	908	470	385	400	
17	355	355	368	380	1050	3640	2420	845	450	400	430	
18	355	355	410	355	982	3480	2650	815	430	415	430	
19	355	355	380	330	1050	3480	3050	875	430	400	450	
20	380	355	355	330	1120	3370	2940	1010	400	400	400	
21	380	330	355	342	1550	3370	2700	1010	400	400	415	
22	380	330	355	355	1970	3100	3210	1040	430	450	400	
23	355	330	342	355	2020	2800	2840	940	430	490	385	
24	355	355	355	355	2150	3060	2510	1040	415	550	385	
25	355	330	355	330	2100	3000	2330	1120	415	550	370	
26	355	330	355	330	1920	2740	2280	1120	370	572	370	
27	355	355	342	342	1920	2460	2460	1010	370	595	370	
28	355	330	330	330	2020	2280	3100	975	370	550	370	
29	380		330	330	1880	2200	3260	940	370	530	370	
30	310		330	355	1840	2200	2840	908	415	490	400	
31	330		330		2200		2740	755		470		
Mean	354	348	355	348	1130	2780	2510	1320	477	453	413	
Run-off acre-feet	21800	19300	21800	20700	69500	165000	154000	81200	28400	27900	24600	

Unless otherwise noted, all discharges are in cubic feet per second

ARKANSAS RIVER AT PUEBLO.

Location.—At Main Street Bridge in Pueblo, 2 miles above the mouth of Fountain Creek, the nearest tributary.

Records Available.—September 19, 1894, to November 30, 1914. From May 1, 1885, to September 30, 1886, a station was maintained at Pueblo by the State engineer; from June 1, 1887, to September 30, 1887, a station was maintained at a point 9 miles above Pueblo; from May 1, 1889, to August 31, 1889, the Geological Survey maintained the station 9 miles above Pueblo.

Drainage Area.—4,600 square miles.

Gage.—An automatic gage located 150 feet below Main Street Bridge has been used since March 22, 1911. It is referred to the same datum as the chain gage on the Main Street Bridge, which was installed July 7, 1905, but the slope of the river between the two points causes differences in readings. A vertical staff placed at the Santa Fe Avenue Bridge on September 19, 1894, was used until July 10, 1898, when a second gage was placed at Main Street Bridge, and used until March 3, 1900. From that date until July 14, 1902, a vertical staff near the Union Avenue Bridge was used. From that date until July 7, 1905, when the present gage was placed in position, a staff gage referred to a different datum was used.

Channel.—The channel shifts to such an extent during high water that it has been necessary to move the gage in order to read the gage heights.

Discharge Measurements.—Made from Main Street Bridge.

Winter Flow.—Ice causes some slight backwater during the winter months.

Diversions.—There are court decrees for diversions of 637 second-feet from Arkansas River, between the station at Canon City and Pueblo, and diversions of 372 second-feet from intervening tributaries.

Co-operation.—This station is maintained in co-operation with the Arkansas Valley Ditch Association.

DISCHARGE MEASUREMENTS ON THE ARKANSAS RIVER AT PUEBLO.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 31	B. S. Clayton	2.12	283	Jan. 7	B. S. Clayton	2.40	389
Feb. 23	B. S. Clayton	2.10	312	Apr. 14	M. E. Bunger	2.42	476
Mch. 17	B. S. Clayton	1.77	146	May 14	M. E. Bunger	3.05	853
May 8	C. L. Patterson	2.49	618	May 27	M. E. Bunger	4.10	1856
May 9	C. L. Patterson	3.13	1105	June 1	C. L. Patterson	5.30	3183
June 2	B. S. Clayton	4.00	1880	June 25	M. E. Bunger	4.94	3102
June 20	B. S. Clayton	4.00	1692	Aug. 18	H. E. Turner	2.92	666
July 7	B. S. Clayton	3.21	942	Sept. 11	M. E. Bunger	2.62	499
July 31	B. S. Clayton	2.55	554	Oct. 14	M. E. Bunger	2.65	523

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Aug. 6	C. L. Patterson	2.15	278
Aug. 12	A. A. Weiland	1.99	228
Aug. 13	C. L. Patterson	2.40	383
Aug. 23	B. S. Clayton	2.46	445
Oct. 7	B. S. Clayton	2.40	421
Nov. 12	Clayton & Thomson	2.10	245
Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Oct. 31	M. E. Bunger	2.87	599
Nov. 4	M. E. Bunger	2.63	464

ARKANSAS RIVER NEAR NEPESTA

Location.—At the dam of the Oxford Farmers' Canal Co., in sec. 31, T. 21 S., R. 60 W. 1½ miles above Nepesta; about 6 miles below the mouth of Huerfano River, the nearest important tributary.

Records Available.—September 8, 1897, to October 31, 1903; July 14, 1909, to November 30, 1912; January 1, to November 30, 1914.

Drainage Area.—9,130 square miles.

Gage.—An automatic recording gage with its zero coinciding with the lowest point of the diversion dam has been in use since 1910. There is no known relation between the present gage and that used in 1903.

Channel.—The diversion dam is the control point, and as the results show shifting conditions it is evident that the dam is not permanent.

Discharge Measurements.—Made from the bridge at Nepesta except during low water, when measurements are made by wading. Between the gage and the measuring section is a wasteway from the canal. The flow at this point is subtracted from the flow at the bridge in order to show the amount of water flowing over the dam.

Winter Flow.—Ice causes backwater during a portion of the winter months.

Diversions.—There are court decrees for diversions of 1,552 second-feet from the Arkansas between Pueblo and Nepesta, and approximately 1,600 second-feet from intervening tributaries. The discharge records given in this report do not include the flow of the canal.

Accuracy.—The channel was so shifting in character during 1913 that no daily discharges have been computed. The results for 1914 are considered fair.

Co-operation.—Maintained in co-operation with the Arkansas Valley Ditch Association.

DISCHARGE MEASUREMENTS OF ARKANSAS RIVER NEAR NEPESTA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Mch. 3	B. S. Clayton	0.25	257
Apr. 5	B. S. Clayton	0.39	267
June 6	B. S. Clayton	1.22	1040
June 21	B. S. Clayton	1.88	1790
June 30	B. S. Clayton	1.47	1200
July 9	B. S. Clayton	1.00	487
July 16	C. L. Patterson	0.75	303
July 30	B. S. Clayton	1.20	541
Aug. 6	B. S. Clayton	0.70	209
Aug. 18	B. S. Clayton	0.45	128
Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 2	C. L. Patterson	1.20	486
May 5	C. L. Patterson	1.70	1030
May 23	M. E. Bunger	2.40	3038
June 2	M. E. Bunger	3.70	7200
June 6	C. L. Patterson	2.80	4670
June 9	M. E. Bunger	1.50	1890
July 17	M. E. Bunger	1.38	1523
Aug. 19	H. E. Turner	1.53	1283
Aug. 21	M. E. Bunger	0.95	615
Sept. 17	M. E. Bunger	0.65	328

ARKANSAS RIVER AT LA JUNTA.

Location.—Half a mile below the east bridge at La Junta; no important tributary within several miles.

Records Available.—April 11, 1912, to November 30, 1914. From December 5, 1893, to December 31, 1895, a station was maintained near the city pumping plant. During 1899 and 1901 a station was maintained at the head of the Fort Lyon Canal by the Great Plains Water Co. From April 7, 1903, to October 31, 1903, a station was maintained 1 mile east of La Junta and a number of discharge measurements were made during 1904. From August 27, 1908, to November 30, 1908, a station was maintained half a mile northwest of La Junta, just below the mouth of Crooked Arroyo.

Drainage Area.—12,200 square miles.

Gage.—Automatic recording gage.

Channel.—Shifting.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter Flow.—No data.

Diversions.—There are court decrees for diversions of 2,735 second-feet from the Arkansas between Nepesta and La Junta, and 511 second-feet from intervening tributaries.

Co-operation.—Station maintained in co-operation with the Arkansas Valley Ditch Association.

DISCHARGE MEASUREMENTS ON THE ARKANSAS RIVER AT LA JUNTA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 6	B. S. Clayton	2.15	50
Mar. 4	B. S. Clayton	0.88	25
Apr. 5	B. S. Clayton	1.63	109
Apr. 21	C. L. Patterson	2.00	269
May 1	C. L. Patterson	0.80	25.7
June 4	B. S. Clayton	1.95	301
June 24	B. S. Clayton	2.12	355
July 1	B. S. Clayton	2.28	488
July 10	B. S. Clayton	1.70	162
July 30	C. L. Patterson	2.18	362
Aug. 7	C. L. Patterson	1.10	46.3
Nov. 8	B. S. Clayton	1.60	153

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 26	C. L. Patterson	0.90	34.6
May 5	C. L. Patterson	0.82	53.6
June 9	C. L. Patterson	2.40	528
Aug. 27	H. E. Turner	2.55	289
Sept. 1	H. E. Turner	2.53	248
Sept. 9	H. E. Turner	2.45	151
Sept. 16	M. E. Bunger	2.45	130
Sept. 21	H. E. Turner	2.46	146

Discharge of Arkansas River at Pueblo for 1913. Drainage Area, 4,600 Square Miles. Altitude, 4,665 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	260	290	320	455	260	1840	1120	375	300	350	280	300
2	260	260	320	490	290	1880	950	350	260	428	225	325
3	260	260	290	455	455	1510	950	280	280	428	350	400
4	260	385	290	385	760	1320	795	260	300	428	428	428
5	205	385	290	385	600	1270	720	280	280	375	428	455
6	205	420	260	385	525	1170	950	260	260	400	400	455
7	205	385	290	320	525	1290	950	225	280	350	400	455
8	205	385	205	385	525	1370	950	195	260	325	400	455
9	205	420	205	385	1080	1360	950	195	300	400	400	455
10	250	455	205	320	960	1620	1350	195	400	350	325	400
11	300	385	260	290	1000	1670	1120	195	455	325	300	350
12	300	385	320	260	1000	1820	992	225	515	400	300	350
13	275	352	290	290	1130	1360	910	350	455	375	242	400
14	300	320	320	420	1560	1400	832	400	400	375	280	350
15	400	320	232	490	1340	1390	758	428	455	400	300	350
16	400	232	155	562	1080	1340	720	428	455	375	300	375
17	350	290	110	562	1170	1320	795	375	428	375	300	428
18	280	260	110	525	1170	1530	992	400	400	350	300	455
19	300	320	180	562	1260	1700	1120	400	350	375	260	485
20	300	260	205	525	1300	1740	832	515	350	350	300	485
21	280	260	205	525	1210	1690	795	548	350	350	280	428
22	280	260	205	455	1080	1740	1080	795	350	350	300	350
23	300	260	205	420	840	1690	1990	400	350	350	300	350
24	300	290	200	385	880	1540	1640	400	428	350	280	400
25	300	385	110	290	1080	1490	1040	375	400	375	280	350
26	200	385	180	260	1300	1300	795	325	375	350	300	350
27	250	320	205	260	1480	1160	910	300	375	350	300	325
28	275	320	205	260	1700	1160	870	300	375	300	300	325
29	270		180	260	1480	832	650	350	400	260	280	300
30	280		205	260	1660	1300	548	350	375	300	300	300
31	280		260		1880		455	300		260		300
Mean	277	330	228	391	1050	1460	953	348	365	359	315	385
Run-off acre-feet	17000	18300	14000	23300	64600	86900	58600	21400	21700	22100	18700	23700

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Pueblo for 1914.

Drainage Area, 4,600 Square Miles. Altitude, 4,665 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	395	345	375	360	1590	3440	1640	5300	720	395	528	
2	395	345	390	345	1300	3960	1930	3740	790	395	450	
3	395	345	390	360	980	4200	2120	6720	720	418	450	
4	395	345	390	408	895	3900	2480	4610	625	418	450	
5	395	345	390	408	718	3500	2870	3740	595	440	450	
6	395	360	390	465	625	3020	2480	2810	595	465	428	
7	395	330	375	465	565	2720	3220	2480	655	465	405	
8	378	330	390	490	565	2108	2120	2240	568	490	385	
9	360	360	390	465	595	1950	1930	2030	595	418	365	
10	360	360	390	425	685	1690	1640	2100	595	440	385	
11	330	360	390	425	895	1860	1640	1770	490	540	475	
12	300	360	375	465	1160	2790	2060	1480	440	515	450	
13	300	360	375	490	980	2870	2400	1480	440	490	450	
14	300	355	375	515	858	3220	4700	1260	540	540	450	
15	320	355	375	490	895	4000	2330	990	515	540	450	
16	320	360	390	465	1250	6060	2120	870	490	470	450	
17	320	350	390	465	1250	4860	3480	830	490	470	450	
18	340	350	408	515	1390	4260	3220	720	490	470	450	
19	340	340	425	515	1250	3920	3830	625	440	520	500	
20	360	340	408	490	1250	3660	3830	720	440	520	450	
21	330	335	390	445	1440	3660	3390	720	440	550	450	
22	315	395	375	465	2060	3390	3390	790	395	550	450	
23	330	395	360	490	2270	3040	4610	950	440	690	450	
24	345	335	375	465	2320	2710	3220	910	440	760	428	
25	330	350	390	465	2490	3040	2790	1030	395	660	428	
26	330	330	390	408	2110	2870	2870	1030	395	750	385	
27	345	355	375	465	1950	2400	3040	1080	395	790	365	
28	345	355	375	465	2380	2260	5130	1030	378	660	405	
29	360		375	465	2380	1860	4700	950	360	620	385	
30	330		375	895	1950	1750	4180	910	395	620	365	
31	315		390		2220		6470	870		555		
Mean	347	352	386	468	1400	3170	3000	1830	509	536	418	
Run-off acre-feet	21200	19500	23700	27800	86100	189000	184000	113000	30300	33000	24900	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River near Nepesta for 1914.

Drainage Area, 9,130 Square Miles. Altitude, 4,396 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	300	570	255	210	5300	7200	1980	5570	860	411	680	
2	500	402	210	202	2930	6960	2020	4860	860	411	630	
3	500	390	210	186	1180	7110	1960	6830	840	366	600	
4	500	434	275	174	940	6600	2190	5900	730	374	580	
5	500	390	255	174	1030	5600	2380	4640	660	475	531	
6	450	360	250	260	780	4410	3320	3050	620	494	484	
7	450	402	255	554	780	3430	2070	2330	730	465	456	
8	450	469	265	330	725	2380	1920	2400	650	420	465	
9	400	530	222	295	725	1890	1730	1720	750	393	475	
10	375	420	222	324	900	1820	1550	2800	750	366	465	
11	375	408	250	420	1180	1760	1480	2010	670	384	550	
12	350	342	250	441	1180	2050	1570	1450	630	456	630	
13	400	300	255	378	758	3090	1730	1100	580	484	580	
14	425	250	265	390	758	2750	2050	920	550	512	570	
15	450	170	255	372	1030	6160	3320	750	550	531	590	
16	300	198	238	420	940	7300	1980	600	540	411	600	
17	350	202	250	420	900	7110	2050	920	366	402	650	
18	325	170	265	490	4580	4230	2640	960	366	366	670	
19	325	30	306	420	2100	3550	3200	1100	358	475	550	
20	385	300	360	420	1570	3550	3710	800	310	503	512	
21	390	202	378	408	1900	3460	3550	800	286	465	475	
22	330	214	408	360	7890	3660	3060	630	306	475	512	
23	300	360	330	390	3170	2970	4480	670	342	660	531	
24	342	265	250	408	2800	2270	2840	730	393	1080	475	
25	348	115	230	792	3120	2510	4080	750	375	860	375	
26	378	34	290	408	2990	2510	2700	730	326	650	375	
27	455	138	270	420	1950	2020	2370	750	366	700	326	
28	348	265	255	441	3700	1690	3640	800	374	772	366	
29	360		238	434	3170	1640	3870	900	390	838	366	
30	506		210	840	2870	1960	3970	780	374	730	374	
31	490		210		2520		4390	770		730		
Mean	399	298	264	393	2040	3790	2700	1900	530	537	518	
Run-off acre-feet	24500	16600	16200	23400	125000	226000	166000	117000	31500	33000	30800	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at La Junta for 1913.
Drainage Area, 12,200 Square Miles. Altitude, 4,052 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	34	117	57	79	21	430	430	115	40	190	150	126
2	30	61	45	52	38	525	400	92	34	187	132	135
3	35	60	63	65	50	430	372	54	35	198	110	138
4	33	59	60	167	42	341	372	27	32	242	103	126
5	28	50	35	154	46	478	274	19	18	229	187	80
6	22	50	30	111	63	704	174	14	26	176	242	42
7	30	50	35	111	42	362	184	46	34	153	229	88
8	31	50	35	79	41	77	66	46	34	166	210	63
9	32	50	30	133	47	191	52	40	34	147	144	47
10	33	50	22	120	59	442	133	34	34	166	213	34
11	38	50	18	202	44	454	202	34	34	135	238	73
12	51	84	11	120	38	167	224	35	49	115	220	209
13	68	59	10	130	50	102	184	38	84	68	120	150
14	51	45	12	125	128	79	130	35	106	70	101	33
15	50	37	110	130	279	68	56	57	74	138	96	27
16	70	32	184	130	367	52	37	40	80	166	120	38
17	91	31	221	217	288	384	35	64	86	138	157	44
18	77	27	88	306	145	395	389	82	86	166	96	82
19	55	25	33	341	246	407	173	49	92	138	135	90
20	28	25	28	320	246	490	46	49	76	120	141	82
21	46	26	30	320	297	217	63	35	84	123	126	106
22	46	16	38	311	279	194	194	89	70	123	98	100
23	75	58	30	302	224	356	293	224	57	118	106	40
24	24	58	18	240	139	330	564	49	60	118	106	50
25	44	58	21	209	70	672	400	42	80	120	120	50
26	139	79	95	198	93	537	132	53	135	129	120	30
27	37	82	33	40	384	384	255	31	147	166	101	25
28	51	63	46	40	600	407	364	34	153	150	51	20
29	58		41	30	504	466	341	38	176	170	44	15
30	120		37	24	454	442	312	36	176	138	106	15
31	202		63		504		176	45		144		15
Mean	55.8	51.9	50.9	153	188	353	227	53.1	74.2	149	134	70.1
Run-off acre-feet	3420	2870	3130	9100	11500	21000	13900	3260	4410	9120	8000	4300

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at La Junta for 1914.
Drainage Area, 12,200 Square Miles. Altitude, 4,052 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	*15	50	50	60	3400	840	870	2990	284	87	118	
2	25	37	120	70	3180	5100	630	2500	129	220	79	
3	25	31	198	84	165	4800	670	3040	297	87	66	
4	25	50	209	26	66	4800	670	3420	263	52	104	
5	25	75	203	23	46	4650	925	2475	128	134	342	
6	25	84	238	60	46	3450	925	1880	139	195	292	
7	25	227	191	148	32	2255	550	1175	192	195	86	
8	*25	195	88	186	52	1230	72	600	185	116	116	
9	37	169	23	166	59	585	115	353	178	132	82	
10	31	75	16	206	24	125	340	397	151	132	140	
11	25	58	20	228	94	65	510	291	166	132	98	
12	25	50	36	250	150	250	510	148	162	116	86	
13	25	58	36	228	214	660	550	163	91	170	86	
14	25	116	26	186	138	1810	770	160	88	220	76	
15	37	158	23	206	126	5010	239	80	75	316	76	
16	84	158	84	206	214	14160	405	57	96	264	110	
17	37	105	114	228	75	8480	310	158	98	300	140	
18	37	66	186	250	104	6620	870	182	75	227	110	
19	84	66	166	277	2550	4400	3950	172	44	188	66	
20	84	66	166	250	75	2400	2074	123	38	123	76	
21	143	58	250	206	59	2300	1875	94	133	251	66	
22	43	58	186	98	2180	1610	970	96	31	406	66	
23	37	125	206	148	3180	720	2740	75	20	406	76	
24	37	50	186	186	975	340	1900	62	20	313	174	
25	84	94	130	166	470	182	1810	125	20	90	76	
26	43	84	114	166	670	239	1110	150	27	104	66	
27	37	37	70	186	420	167	890	225	34	188	98	
28	37	58	31	130	2180	152	890	260	34	134	110	
29	37		60	342	1310	218	1900	293	34	48	86	
30	25		98	360	1850	870	1730	346	43	169	86	
31	158		130		930		1300	362		118		
Mean	45.2	87.8	118	178	808	2650	1070	719	109	182	108	
Run-off acre-feet	2780	4880	7260	10600	49700	158000	65800	44200	6490	11200	6430	

Unless otherwise noted, all discharges are in cubic feet per second. *Discharge estimated.

ARKANSAS RIVER AT LAMAR.

Location.—Located at Highway Bridge one mile north of Lamar.

Records Available.—May 11, 1913, to November 30, 1914.

Gage.—Bristol automatic gage and standard chain gage.

Channel.—Shifting.

Diversions.—With the exception of a few small ditches, below all diversions on the river.

Accuracy.—Results are considered fair.

Co-operation.—Maintained in co-operation with the Arkansas Valley Ditch Association.

DISCHARGE MEASUREMENTS ON THE ARKANSAS RIVER AT LAMAR.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 4	S. W. Cressy	4.50	6894	June 20	S. W. Cressy	4.40	4005
May 4	S. W. Cressy	3.95	5006	June 21	S. W. Cressy	4.06	3179
May 6	S. W. Cressy	2.79	2130	June 22	S. W. Cressy	3.95	3076
May 7	S. W. Cressy	2.40	1614	June 23	S. W. Cressy	3.92	2949
May 8	S. W. Cressy	1.65	734	June 24	S. W. Cressy	3.06	1521
May 9	S. W. Cressy	1.17	458	June 25	S. W. Cressy	2.40	878
May 10	S. W. Cressy	0.98	315	June 30	S. W. Cressy	0.90	36
May 11	S. W. Cressy	0.83	295	Aug. 29	H. E. Turner	0.22	5
May 13	S. W. Cressy	1.03	270	Sept. 21	H. E. Turner	0.15	4.8
June 9	C. L. Patterson	3.10	956	Nov. 11	S. W. Cressy		39
June 17	S. W. Cressy	6.12	8940	Nov. 18	S. W. Cressy		108
June 18	S. W. Cressy	5.35	6237	Nov. 22	S. W. Cressy		104
June 19	S. W. Cressy	5.06	5211	Nov. 23	S. W. Cressy		103

ARKANSAS RIVER AT HOLLY.

Location.—At highway bridge half a mile southeast of Holly, on line between secs. 14 and 15, T. 23 S., R. 42 W., 1 mile below the mouth of Wild Horse Creek, an intermittent stream.

Records Available.—October 15, 1907, to November 30, 1914.

Drainage Area.—Approximately 25,000 square miles.

Gage.—A number of gages have been used at the station, but all readings have been referred to the same datum except those from October 25 to December 31, 1911, when a different datum was used.

Channel.—Very shifting.

Discharge Measurements.—Made from bridge during high water and by wading at low stages.

Winter Flow.—Ice causes backwater during a portion of the winter months.

Diversions.—There are court decrees for diversions of 1,072 second-feet from Arkansas River between the stations at La Junta and Holly, and diversions of 1,253 second-feet from intervening tributaries. There are many diversions from Arkansas River below Holly, in Kansas.

Co-operation.—Station maintained in co-operation with the Arkansas Valley Ditch Association.

DISCHARGE MEASUREMENTS ON THE ARKANSAS RIVER AT HOLLY.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Mar. 13	B. S. Clayton	2.53	167	Jan. 27	C. L. Patterson	2.50	256
Apr. 26	C. L. Patterson	2.04	29.3	May 5	S. W. Cressy	3.80	3542
June 14	C. L. Patterson	3.20	1137	May 6	M. E. Bunger	3.35	2247
June 15	C. L. Patterson	2.77	434	May 8	S. W. Cressy	2.90	1397
July 20	C. L. Patterson	2.88	409	May 9	S. W. Cressy	2.60	1032
July 21	C. L. Patterson	2.73	310	May 10	S. W. Cressy	2.40	684
				May 12	S. W. Cressy	2.19	378
				June 10	C. L. Patterson	3.07	1100
				June 17	S. W. Cressy	5.65	8700
				June 18	M. E. Bunger	5.25	8584
				June 19	S. W. Cressy	4.98	5250
				June 20	S. W. Cressy	4.70	3955
				June 23	S. W. Cressy	4.27	2872
				June 24	S. W. Cressy	3.69	1626
				June 30	S. W. Cressy	2.20	156
				Aug. 28	H. E. Turner	1.62	19.6
				Sept. 19	H. E. Turner	1.52	6.2
				Nov. 11	M. E. Bunger	1.95	63.6
				Nov. 18	S. W. Cressy	2.27	99
				Nov. 23	S. W. Cressy	2.47	146
				Nov. 25	S. W. Cressy	2.31	103
				Nov. 27	S. W. Cressy	2.25	98
				Nov. 28	H. E. Turner	2.07	64

EAST FORK OF ARKANSAS RIVER NEAR LEADVILLE.

Location.—At highway bridge in sec. 16, T. 9 S., R. 80 W., about 300 yards above mouth of Tennessee Fork, 3 miles northwest of Leadville.

Records Available.—April to August 31, 1890; June 18 to September 29, 1903; June 5, 1911, to November 30, 1914.

Drainage Area.—52 square miles.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There is a court decree for a diversion of 2 second-feet from the East Fork above the station, but none below.

Accuracy.—Owing to the high altitude of the drainage basin, it is probable that the stage is subject to considerable diurnal fluctuation at certain seasons, due to the alternate melting and freezing. Mean daily gage heights based on one reading per day are therefore liable to considerable error. Estimates have only been made for the days on which the gage was read, and can only be considered fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON EAST FORK OF ARKANSAS RIVER NEAR LEADVILLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 20	Raymond Richards	0.53	62	May 4	R. H. Fletcher	0.12	12
June 22	R. H. Fletcher	0.70	97	June 9	Robert Follansbee	1.03	203
Sept. 8	R. H. Fletcher	0.45	46	Aug. 13	M. D. Anderson	0.41	34
Oct. 14	Robert Follansbee	0.21	15	Oct. 6	R. H. Fletcher	0.22	14

Discharge of Arkansas River at Lamar for 1913.
Drainage Area, —— Square Miles. Altitude, 3,610 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						1	119	1	2	3	2	2
2						9	5	2	2	2	3	4
3						34	18	2	2	3	2	3
4						9	5	2	2	3	2	21
5						4	3	2	2	2	2	12
6						4	2	1	2	1	2	2
7						394	2	2	2	2	2	2
8						232	2	3	2	2	2	8
9						5	2	3	1	2	3	10
10						3	2	2	2	2	2	4
11					1	4	2	3	1	2	3	3
12					1	25	2	2	2	2	2	5
13					1	1070	2	1	3	2	2	30
14					2	810	2	2	2	2	2	140
15					2	78	1	3	2	2	2	187
16					2	7	1	4	3	2	2	187
17					2	3	1	2	2	2	2	144
18					2	2	1	2	2	2	2	144
19					1	2	29	2	1	2	2	126
20					1	3	50	2	1	2	2	126
21					1	9	14	2	2	3	2	133
22					1	11	6	2	2	2	2	126
23					1	1	3	2	2	2	2	148
24					1	1	9	2	1	3	2	140
25					1	0	58	2	2	2	2	169
26					1	0	148	2	2	1	1	122
27					1	2	9	2	2	1	2	140
28					1	2	2	2	2	1	2	157
29					0	1	3	2	2	1	2	140
30					0	3	1	3	2	1	2	140
31					0		1	2		2		161
Mean					1.1	121	19.5	2.2	1.9	2.0	2.1	88.3
Run-off acre-feet					45	7200	1000	131	113	121	123	5420

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Lamar for 1914.

Drainage Area, —— Square Miles. Altitude, 3,610 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	205	60	*10	0	14000	1700	79	2210	2	3	4	
2	140	120	10	0	17800	4680	119	3580	2	2	4	
3	140	74	*10	0	10500	5920	90	3780	2	3	5	
4	160	120	0	0	5780	6150	4	4780	2	2	6	
5	205	57	0	0	3500	5220	1770	4110	2	2	3	
6	93	47	0	0	2190	3760	350	3100	2	3	16	
7	93	67	0	0	1560	2450	170	2370	2	4	8	
8	93	176	0	0	735	1950	103	1240	2	4	4	
9	70	148	0	0	458	1270	30	1000	2	2	4	
10	70	74	0	0	315	630	12	1000	2	2	4	
11	70	176	0	0	295	595	14	570	2	2	4	
12	80	97	0	0	200	630	12	535	144	2	16	
13	93	94	0	0	270	460	4	338	54	3	54	
14	98	97	0	0	165	1340	4	174	8	4	82	
15	93	97	0	0	115	1760	4	500	6	6	54	
16	111	189	0	0	76	9960	36	242	5	13	34	
17	180	*20	0	0	15	8240	18	62	4	16	40	
18	160	15	0	0	15	6510	410	29	3	6	104	
19	148	15	0	0	70	4900	5420	20	4	4	130	
20	180	15	0	0	380	3540	5420	10	4	4	190	
21	123	15	0	0	500	3210	4900	20	3	4	130	
22	140	15	0	0	4450	2870	3190	8	3	6	104	
23	205	10	0	0	7320	2750	4900	5	2	6	104	
24	180	20	0	0	2850	1430	6760	4	2	117	72	
25	123	30	0	0	1420	695	5420	4	5	174	46	
26	106	35	0	0	915	350	4110	3	4	46	20	
27	475	25	0	0	843	146	3800	3	4	62	24	
28	40	*20	0	0	2530	90	2550	4	4	34	16	
29	74		0	0	4210	50	3100	4	4	10	16	
30	97		0	*30	2830	36	3380	0	3	6	10	
31	40		0		2780		2640	2		4		
Mean	132	68.1	1.0	1.0	2870	2780	1870	958	9.6	17.8	43.6	
Run-off acre-feet	8120	3780	61	60	176000	165000	115000	58900	5710	1090	2590	

Unless otherwise noted, all discharges are in cubic feet per second.

*Estimated.

Discharge of Arkansas River at Holly for 1913.

Drainage Area, 25,000 Square Miles. Altitude, 3,387 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	340	340	204	72	4	8	65	24	13	24	13	40
2	450	340	302	72	4	8	95	18	13	24	13	40
3	450	340	204	40	4	8	80	24	13	24	13	40
4	450	302	340	263	8	6	85	24	13	24	13	40
5	522	263	395	60	7	6	95	24	13	13	13	263
6	595	302	395	50	8	6	80	24	13	13	13	118
7	595	302	302	40	8	6	65	24	13	13	13	125
8	595	340	234	85	7	340	65	32	13	13	13	125
9	595	450	180	13	8	118	65	32	13	13	24	125
10	595	595	157	18	8	24	65	13	13	13	24	125
11	595	595	157	13	4	24	65	13	13	13	24	180
12	595	522	157	24	4	24	65	13	13	13	24	125
13	595	450	157	6	4	263	65	13	13	13	24	125
14	595	340	204	6	4	2140	65	13	13	13	24	200
15	595	395	234	5	4	475	65	13	13	13	24	325
16	595	395	157	4	4	230	65	13	13	13	24	300
17	595	450	522	4	4	120	65	13	13	13	24	350
18	595	450	395	4	6	85	65	10	13	13	24	250
19	595	450	157	4	5	95	7000	13	13	13	24	250
20	522	450	302	3	6	95	302	18	13	13	24	225
21	450	450	340	3	6	80	263	24	13	13	24	150
22	450	395	263	13	6	65	157	24	13	13	24	150
23	450	395	263	24	6	65	85	18	18	13	24	175
24	450	340	157	40	6	65	60	13	13	13	24	150
25	340	450	118	60	6	65	60	13	13	13	24	150
26	340	450	157	24	6	65	138	13	13	13	24	250
27	340	1360	157	5	8	65	157	13	13	13	24	175
28	395	522	118	5	6	65	102	13	24	13	24	175
29	450		118	4	6	65	60	13	24	13	24	200
30	395		118	3	6	65	60	13	24	13	40	200
31	340		118		6		138	13		13		200
Mean	499	444	228	32.1	5.8	158	318	17.5	14	14.4	22.4	172
Run-off acre-feet	30700	24700	14000	1910	357	9400	19600	1080	833	885	1330	10600

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Arkansas River at Holly for 1914.
Drainage Area, 25,000 Square Miles. Altitude, 3,387 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	285	144	114	38	7030	1910	160	1680	20	6	64	
2	220	129	135	38	18000	3240	165	1500	22	8	64	
3	220	113	144	38	11200	5340	156	1400	27	5	55	
4	240	106	129	38	8600	6650	152	1900	34	6	51	
5	280	92	125	38	3540	5580	134	5400	27	4	57	
6	170	92	158	38	2600	5110	1500	3330	24	4	79	
7	170	92	106	38	1600	4000	500	2280	29	5	58	
8	170	144	56	38	1210	3320	300	1520	20	3	43	
9	224	205	56	38	900	1310	175	1440	18	4	23	
10	224	198	78	38	750	1000	75	1360	22	5	18	
11	237	182	84	38	570	890	75	1150	24	2	18	
12	243	144	56	38	430	730	50	790	22	2	20	
13	243	144	56	38	282	490	50	865	82	2	22	
14	256	163	60	38	233	600	30	524	74	4	71	
15	249	205	38	38	225	4920	30	400	66	2	172	
16	256	224	38	38	176	10600	25	1200	77	2	124	
17	237	243	45	38	136	9100	25	145	66	2	136	
18	224	224	38	38	84	6240	25	122	30	4	188	
19	224	192	38	38	300	5240	5000	154	9	6	212	
20	224	224	38	38	1000	4450	5500	120	8	4	180	
21	243	178	38	38	440	3960	5000	116	6	4	160	
22	249	110	38	38	1530	3270	3100	90	8	18	112	
23	263	106	38	38	6650	3000	5000	85	6	77	104	
24	271	133	38	38	3210	1940	6800	79	6	200	90	
25	256	187	38	38	2610	910	5500	58	6	588	79	
26	243	182	38	38	1810	566	4000	44	6	370	74	
27	237	144	38	38	1200	384	3000	44	8	260	74	
28	192	125	38	38	1790	258	2150	28	12	180	69	
29	192		38	38	3180	238	2370	18	6	192	61	
30	168		38	125	2820	192	1490	14	7	128	61	
31	144		38		2800		1570	16		87		
Mean	228	158	64.8	40.9	2700	3180	1580	891	25.7	64.0	81.6	
Run-off acre-feet	14000	8780	3980	2430	166000	189000	97200	54800	1530	3940	5030	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of East Fork of Arkansas River near Leadville, Colo., for 1913.
Drainage Area, 52 Square Miles. Altitude, 10,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						125	68	25	25	19	6	
2						125	68	25	25	19		
3						125	68	25	25	19		
4						125	61	25	25	19		
5						120	61	23	25	13	10	
6						112	61	23	32	13	13	
7						112	61	19	28	13		
8						100	57	19	54	13	4	
9						100	78	19	48	13		
10					19	89	89	19	48	13		
11						120	74	23	40	13		
12						105	54	23	32	13		
13						100	57	23	32	13	10	
14						100	68	19	25	13	6	
15						105	54	13	25	13		
16					40	105	68	13	25	13		
17						105	54	13	25	13		
18						120	57	13	25	13		
19						105	54	13	25	10		
20					63	120	57	25	25	10		
21						105	57	25	25	10		
22						100	57	25	19	10		
23					89	96	74	25	19	10		
24						96	68	25	19	10		
25					156	82	48	25	19	10		
26						89	43	25	19	10		
27						96	57	25	19	10		
28						89	54	25	19	10		
29						96	40	25	19	10		
30						74	32	25	19	10		
31							32	25		6		
Mean						105	59.1	21.8	27.0	12.4		
Run-off acre-feet						6250	3630	1340	1610	762		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of East Fork Arkansas River near Leadville for 1914. Drainage Area, 52 Square Miles. Altitude, 10,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					11	326	150	87	28	20	14	
2					10	310	150	83	21	20	14	
3					16	280	150	66	21	20	14	
4					22	265	150	48	21	17	9	
5					19	236	163	66	21	27	9	
6					16	236	145	57	21	27	9	
7					17	280	140	51	16	27	9	
8					28	221	132	48	16	27	9	
9					66	236	125	48	16	27	9	
10					80	236	120	48	16	27	9	
11					80	265	120	48	16	27	9	
12					74	265	120	45	17	27	9	
13					68	265	120	38	17	27	9	
14					91	227	120	38	17	27	9	
15					74	295	115	38	17	27	9	
16					82	259	108	32	17	27	9	
17					89	238	108	32	18	27	9	
18					128	244	101	32	18	27	9	
19					145	244	96	25	18	27	9	
20				16	140	244	96	25	18	27	9	
21				18	166	238	91	25	18	27	9	
22				19	188	238	91	25	18	27	9	
23				19	190	210	91	32	18	27	9	
24				19	207	210	91	34	18	27	9	
25				19	166	196	91	34	18	27	9	
26				16	188	180	91	34	19	27	9	
27				12	207	180	103	31	19	20	9	
28				12	193	163	140	27	19	20	8	
29				12	166	156	115	27	19	20	8	
30				11	236	156	91	27	19	20	8	
31					280		91	27		14		
Mean				15.6	111	237	120	41.2	18.5	24.7	9.40	
Run-off acre-feet				340	6820	14100	7380	2530	1100	1520	559	

Unless otherwise noted, all discharges are in cubic feet per second.

TENNESSEE FORK NEAR LEADVILLE.

Location.—At highway bridge in sec. 16, T. 9 S., R. 80 W., a few hundred yards above the mouth of the stream and about 3 miles northwest of Leadville.

Records Available.—February 8, 1911, to November 30, 1914.

Drainage Area.—45 square miles.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 24 second-feet above the station. There is also a decree for diversion of 18.5 second-feet from the headwaters of Eagle River to Tennessee Fork above the station.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records were furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON THE TENNESSEE FORK NEAR LEADVILLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 19	Raymond Richards	0.66	121	May 4	R. H. Fletcher	0.34	50
June 22	R. H. Fletcher	0.47	70	June 9	Robert Follansbee	0.62	121
Sept. 8	R. H. Fletcher	0.14	21	Aug. 13	M. D. Anderson	0.11	21
Oct. 14	Robert Follansbee	0.04	14	Oct. 6	R. H. Fletcher	0.40	11

HALF MOON CREEK NEAR LEADVILLE.

Location.—In sec. 6, T. 10 S., R. 80 W., 1 mile above mouth of stream and 6 miles southwest of Leadville; no tributaries below the station.

Records Available.—April 10, 1911, to September 30, 1914.

Drainage Area.—30 square miles.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge Measurements.—Made by wading.

Winter Flow.—Ice causes backwater during the winter months and records are discontinued.

Diversions.—There are court decrees for diversions of 12 second-feet above the station.

Accuracy.—Owing to the high altitude of the drainage basin, the stage is likely to show considerable diurnal fluctuations at certain seasons of the year, due to alternate melting and freezing, and the mean daily gage height based on one reading for day may be considerably in error. For this reason the estimates cannot be considered better than fair.

Co-operation.—This station is maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON HALF MOON CREEK NEAR LEADVILLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 16	Raymond Richards	.38	23.7	May 4	R. H. Fletcher	0.14	7.0
June 22	R. H. Fletcher	0.78	66.5	June 9	Robert Follansbee	0.50	35.
Sept. 8	R. H. Fletcher	.50	18.5	Aug. 13	M. D. Anderson	0.55	31.
Oct. 14	Robert Follansbee	.31	7.3				

COTTONWOOD CREEK BELOW HOT SPRINGS, NEAR BUENA VISTA.

Location.—In the Leadville National Forest, at bridge in sec. 22, T. 14 S., R. 79 W., half a mile below Hot Springs Hotel and 6 miles west of Buena Vista; 2 miles below mouth of South Fork, the nearest tributary.

Records Available.—April 9, 1911, to November 30, 1914. From September 25, 1910, to September 11, 1913, a station was maintained in section 21, 1 mile above the present station.

Drainage Area.—72 square miles (measured on forest atlas).

Gage.—Vertical staff.

Channel.—Probably permanent, although the rough section makes the results erratic.

Discharge Measurements.—Made from bridge or by wading.

Winter Flow.—The river is open during the winter months on account of hot springs above.

Diversions.—There are court decrees for diversions of 133 second-feet from Cottonwood Creek, of which 28 second-feet are above the station.

Accuracy.—Owing to the very rough condition of the stream bed, the estimates cannot be considered other than fair or possibly good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON COTTONWOOD CREEK NEAR BUENA VISTA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 22	Raymond Richards	1.02	71	Jan. 7	R. H Fletcher	0.63	20
June 21	R. H. Fletcher	1.75	187	Aug. 15	M. D. Anderson	1.20	96
Sept. 9	R. H. Fletcher	0.95	63	Oct. 7	R. H. Fletcher	0.90	54
Oct. 13	Robert Follansbee	0.87	50				

Discharge of Tennessee Fork near Leadville, Colo., for 1913. Drainage Area, 45 Square Miles. Altitude, 10,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					103	100	30	18	12	12		
2						103	27	18	12	12		
3						109	27	18	12	12		
4						109	27	18	12	12		
5						90	25	17	12	12	15	
6						90	25	17	13	12	18	
7						90	25	17	15	12		
8						82	27	15	18	12	18	
9						77	27	15	18	12		
10					103	98	27	15	18	12		
11						140	27	17	18	12		
12						140	22	15	15	12		
13						60	20	17	15	12	12	
14						66	18	15	15	12	15	
15						66	20	15	15	12		
16					77	66	34	15	15	12		
17						66	27	15	15	12		
18						98	40	15	12	12		
19					121	73	53	15	12	12		
20						73	34	12	12	12		
21						73	34	12	12	12		
22						60	34	12	12	12		
23					90	73	53	12	12	12		
24						73	90	15	12	12		
25					440	60	40	12	12	12		
26						60	30	12	12	12		
27						48	27	12	12	12		
28						53	27	12	12	12		
29						53	27	12	12	12		
30						37	27	12	12	12		
31							22	12		12		
Mean						79.5	31.4	14.6	13.5	12		
Run-off acre-feet						4730	1930	898	803	738		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Tennessee Fork near Leadville for 1914.
Drainage Area, 45 Square Miles. Altitude, 10,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				29	34	414	84		24	12	10	
2				36	29	397	79		18	12	10	
3				43	58	329	84		18	12	10	
4				43	86	312	84		18	12	10	
5				43	67	244	84		18	11	10	
6				43	67	244	79		18	11	10	
7				40	84	176	69		12	11	10	
8				36	160	176	64		12	11	10	
9				20	217	129	60		12	11	10	
10				29	237	160	60		12	11	10	
11			6	18	237	210	54		12	11	10	
12				40	176	193	45		12	11	10	
13				62	170	183	54		12	11	10	
14			6	96	193	203	54		12	11	10	
15				129	190	380	54		12	11	10	
16				108	203	247	54		12	11	10	
17				86	176	196	54		12	11	10	
18				74	203	213	54		12	11	10	
19			6	69	278	213	62		12	11	10	
20				64	295	186	79		12	11	10	
21			8	72	329	196	67		12	11	10	
22				81	363	179	67		12	11	10	
23				90	380	173	67		12	11	10	
24				99	431	147	67		12	11	10	
25			8	108	278	141	62		12	11	10	
26				100	346	111	72		12	11	10	
27				92	295	89	97		12	11	10	
28			8	74	346	89	200		12	11	10	
29				42	261	89	106		12	11	10	
30			10	38	312	89	92		12	11	10	
31					363		67			11		
Mean		8.0	8.0	63.5	221	204	73.4		13.4	11.1	10.0	
Run-off acre-feet		440	492	3780	13600	12100	4510		791	680	595	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Half Moon Creek near Leadville for 1913.
Drainage Area, 30 Square Miles. Altitude, 9,580 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						45	82	18	18	7	6	
2						90	82	18	18	7	6	
3					10	90	82	18	18	7	6	
4						78	82	18	14	7	6	
5						56	82	18	14	7	4	
6						56	82	18	14	7	4	
7						67	59	18	18	7	4	
8						56	70	18	24	7	4	
9						78	70	18	14	7	4	
10						78	48	24	10	7	4	
11						90	48	18	10	7	4	
12						90	48	14	10	7	4	
13						78	40	10	18	7	4	
14						78	31	10	18	7	4	
15						67	40	10	18	7	4	
16					65	102	31	10	18	7	4	
17						102	40	10	18	7	4	
18						130	48	10	18	7	4	
19						138	48	18	18	7	4	
20					70	138	48	31	18	7	4	
21						138	31	31	12	7	4	
22						109	31	31	12	7	4	
23						82	40	24	10	7	3	
24						70	48	24	10	7	3	
25						70	48	24	9	7	3	
26						95	48	24	9	6	3	
27					67	82	48	31	9	6	3	
28						82	48	24	8	6	3	
29						70	31	24	8	6	3	
30					90	70	31	18	8	6	3	
31					90		18	18		6		
Mean						85.8	51.1	19.4	14.0	6.81	4.00	
Run-off acre-feet						5110	3140	1190	833	419	238	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Half Moon Creek near Leadville, Colo., for 1914.

Drainage Area, 30 Square Miles. Altitude, 9,580 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						138	132	87	15			
2						138	132	71	15			
3						123	140	69	15			
4					7	123	140	69	15			
5					12	85	140	69	15			
6					12	85	138	49	15			
7					12	44	138	49	15			
8					12	35	138	49	15			
9					12	52	102	49	15			
10					29	110	102	47	15			
11					29	123	110	47	15			
12					29	138	102	47	15			
13					44	168	100	31	13			
14					44	202	107	17	13			
15					44	168	92	17	13			
16					52	146	92	17	13			
17					52	138	100	15	13			
18					62	168	107	15	13			
19					73	168	107	17	13			
20					73	178	97	17	10			
21					73	168	97	21	10			
22					97	165	85	17	10			
23					97	149	73	17	10			
24					110	165	110	17	10			
25					110	143	110	15	10			
26					110	135	115	13	10			
27					110	126	95	13	10			
28					85	135	95	21	10			
29					85	132	87	21	10			
30					97	140	87	21	10			
31					138		87	21				
Mean					61.1	133	108	33.7	12.7			
Run-off acre-feet					339	7910	6640	2070	756			

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Cottonwood Creek Below Hot Springs, near Buena Vista, for 1913.

Drainage Area, 72 Square Miles. Altitude, 8,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	21	21	22	18	37	200		70	55	62	30	19
2	21	21	23	18	50	200		68	55	68	30	24
3	21	21	18	14	37	181		66	48	68	30	30
4	21	21	18	14	37	181		64	48	68	36	30
5	21	21	18	14	37	181		62	48	68	36	30
6	21	21	18	14	43	181		55	48	62	36	36
7	21	21	18	14	63	144		55	48	62	30	36
8	21	21	18	14	69	144		55	48	62	30	30
9	21	21	18	14	56	162			58	62	30	36
10	21	21	18	14	63	200			55	68	30	30
11	21	21	18	14	76	181			55	68	36	30
12	21	21	18	14	90	162			68	62	30	30
13	21	21	18	14	90	144			68	65	36	30
14	21	21	18	14	76	144			68	62	36	30
15	21	21	18	18	50	181			68	62	36	30
16	21	21	18	20	50	200			62	55	24	30
17	21	21	18	20	63	200	68		62	48	24	30
18	21	21	18	26	76	200	68	55	55	42	30	30
19	21	17	18	26	90	200	68	55	55	42	30	24
20	21	17	18	26	76	220	68	48	55	42	30	19
21	21	17	18	26	63	200	68	48	55	36	30	19
22	21	17	18	26	67	200	111	55	55	36	30	24
23	21	17	18	26	82	181	111	68	55	42	19	24
24	21	17	18	16	111	181	96	68	55	42	24	30
25	21	17	18	16	111	181	82	68	55	42	30	30
26	21	21	18	16	162	181	82	62	55	48	30	24
27	21	21	14	20	200	181	80	62	55	48	30	24
28	21	21	14	20	144	172	78	55	55	30	24	24
29	21		14	26	181	172	76	55	55	36	24	24
30	21		18	31	200	172	74	55	55	36	19	19
31	21		18		220		72			30		19
Mean	21	20	17.9	18.8	89.4	181	80.1	59.3	55.9	52.4	29.7	27.3
Run-off acre-feet	1290	1110	1100	1120	5500	10800	2380	2590	3330	3220	1770	1680

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Cottonwood Creek Below Hot Springs, near Buena Vista, for 1914.

Drainage Area, 72 Square Miles. Altitude, 8,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20	24	22	19	32	360	240	181	85	52	42	
2	21	22	19	17	32	320	230	172	75	48	42	
3	22	22	19	22	32	280	220	172	75	45	37	
4	23	19	19	22	36	260	240	162	75	55	37	
5	23	22	22	27	36	240	230	172	68	52	37	
6	23	19	19	27	38	210	230	153	65	52	36	
7	21	19	19	24	39	190	200	153	62	55	34	
8	21	19	19	23	45	190	190	153	62	52	34	
9	19	22	19	14	60	162	190	153	58	52	34	
10	17	18	22	23	85	220	181	144	58	52	32	
11	17	19	19	23	85	260	181	136	58	48	32	
12	17	22	19	17	75	280	181	119	58	47	30	
13	17	22	19	19	79	300	181	119	52	47	34	
14	17	22	22	23	89	320	220	108	52	45	30	
15	23	24	22	28	89	340	200	104	58	45	22	
16	23	24	19	29	79	320	200	104	65	45	24	
17	23	22	22	27	89	300	200	104	58	42	27	
18	23	23	22	27	104	300	240	99	52	42	24	
19	23	23	22	16	119	280	230	93	52	42	24	
20	21	24	16	23	148	280	240	85	55	42	23	
21	22	24	16	23	200	280	230	85	82	42	24	
22	17	24	16	27	220	260	230	93	82	48	23	
23	21	19	17	32	220	260	220	93	71	48	24	
24	23	19	17	27	230	240	200	85	71	65	24	
25	21	22	16	32	210	240	200	93	65	52	24	
26	21	22	17	29	200	240	200	89	65	48	23	
27	23	19	22	32	240	230	200	89	58	48	24	
28	23	22	23	32	230	230	240	96	55	45	24	
29	19		22	32	200	230	230	96	55	48	24	
30	17		17	34	260	230	190	89	52	45	24	
31	19		18		300		190	93		45		
Mean	23.9	20.8	19.4	25.0	126	262	211	119	63.3	48.2	29.1	
Run-off acre-feet	1470	1160	1190	1490	7750	15600	13000	7320	3770	2960	1730	

Unless otherwise noted, all discharges are in cubic feet per second.

NORTH COTTONWOOD CREEK NEAR BUENA VISTA.

Location.—At highway bridge in sec. 10, T. 14 S., R. 79 W., 6 miles northwest of Buena Vista, just below a small stream entering from the west, and 1½ miles below mouth of Silver Creek.

Records Available.—October 5, 1911, to July 25, 1914.

Drainage Area.—50 square miles (measured on Forest atlas).

Gage.—Vertical staff.

Channel.—Permanent.

Discharge Measurements.—Made from the bridge during high water and by wadng at ordinary stages.

Winter Flow.—Ice causes some backwater effect during the winter months.

Diversions.—There are court decrees for diversions of 32 second-feet from North Cottonwood Creek.

Accuracy.—Owing to the high altitude of the drainage basin, it is probable that the river stage is subject to considerable diurnal fluctuations at certain seasons, due to the alternate melting and freezing. Therefore the mean daily gage height as determined from one reading per day may be considerably in error. This uncertainty in mean gage height and the many interpolated discharges make the estimates only fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON NORTH COTTONWOOD CREEK NEAR BUENA VISTA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 22	Raymond Richards	4.24	20	Jan. 7	R. H. Fletcher	4.00	6.02
June 21	R. H. Fletcher	4.90	49				
Sept. 9	R. H. Fletcher	4.25	22				
Oct. 13	Robert Follansbee	4.04	11				

CHALK CREEK AT UPPER STATION NEAR ST. ELMO.

Location.—In sec. 27, T. 15 S., R. 80 W., in the Leadville National Forest, one-quarter mile below the power plant of the Tin Cup Gold Dredging Company, and one and one-quarter miles below St. Elmo. The nearest tributary is Coal Creek, which enters a quarter mile below.

Records Available.—January 1, 1914, to November 30, 1914.

Drainage Area.—48 square miles (measured from Forest atlas).

Gage.—Friez recording gage owned by the Tin Cup Gold Dredging Company.

Channel.—Apparently permanent.

Discharge Measurements.—Made from foot bridge and by wading.

Winter Flow.—Ice causes backwater and discharge measurements are made to determine the approximate winter flow.

Diversions.—There are no court decrees for diversions from Chalk Creek, the water of which is not returned to the stream above the station.

Regulated Flow.—Low-water flow regulated to a certain extent by a small reservoir at St. Elmo formed by the diversion dam for the Tin Cup Gold Dredging power house.

Accuracy.—Conditions are favorable for accurate results and the estimates are considered excellent.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the Tin Cup Gold Dredging Company. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON CHALK CREEK AT UPPER STATION NEAR ST. ELMO.

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan.	6*	R. H. Fletcher	1.07	7.7
Feb.	18	R. H. Fletcher	1.00	7.6
May	5	R. H. Fletcher	1.33	21
June	10	Robert Follansbee	1.98	117
Aug.	15	M. D. Anderson	1.60	50

*Slight ice effect.

CHALK CREEK NEAR ST. ELMO.

(Lower Station.)

Location.—In the Leadville National Forest at highway bridge in sec. 28, T. 15 S., R. 79 W., just below the cascades of Chalk Creek and 6 miles east of St. Elmo. Nearest tributary is a small intermittent stream entering from the north just below.

Records Available.—March 10, 1911, to November 11, 1914. From September 6 to December 28, 1910, a station was maintained in sec. 24, T. 15 S., R. 79 W.

Drainage Area.—75 square miles.

Gage.—Vertical staff.

Channel.—Somewhat shifting.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes only slight backwater.

Diversions.—There are no court decrees for diversions from Chalk Creek above the station, but below there are decrees for 132 second-feet.

Accuracy.—Owing to the high altitude of the drainage basin, it is probable that there is considerable diurnal fluctuation of stage at certain seasons, due to the alternate melting and freezing, and that the mean daily gage height as based on one reading per day may be considerably in error. The uncertain gage height and the many interpolated discharges can make the estimates only fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON CHALK CREEK NEAR ST. ELMO.

(Lower Station.)

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	21	Raymond Richards	1.46	86
July	16	R. H. Fletcher	1.43	89
Oct.	13	Robert Follansbee	1.16	40
Nov.	11	R. H. Fletcher	1.02	21

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan.	6*	R. H. Fletcher	0.90	18
May	5	R. H. Fletcher	1.10	28
June	8	Robert Follansbee	1.68	185
Aug.	15	M. D. Anderson	1.42	83
Oct.	7	R. H. Fletcher	1.16	43

*Slight ice effect.

Discharge of North Fork Cottonwood Creek, near Buena Vista, for 1913.

Drainage Area, 50 Square Miles. Altitude, 8,200 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					11			24	14	19	16	15
2					11			22	14	19	16	15
3					10			22	14	18	16	16
4					11			20	14	18	17	14
5					12			18	14	18	17	13
6					14			18	15	19	17	12
7					20	45		16	16	20	16	12
8					19		26	14	26	19	15	12
9					18	75	25		20	18	14	12
10					17		25		20	16	14	12
11					16		24		20	14	13	12
12					15		24		24	13	13	12
13					14		23		26	12	14	12
14					14		23		28	16	14	11
15					14		22		28	16	14	11
16					14		22	14	28	17	14	11
17					14	79	22	14	28	17	14	11
18					14		22	14	26	12	14	10
19					14		22	15	26	13	14	10
20					16		22	15	25	14	13	10
21					18	51	23	15	25	15	13	10
22					20		40	16	24	16	13	10
23				10			45	16	23	18	14	10
24				10			42	16	22	18	14	10
25				11			40	16	20	17	14	10
26				12			38	15	18	17	14	9
27				12			35	15	16	18	14	9
28				12			32	15	17	18	14	9
29				12			30	15	18	19	14	9
30				12			28	15	20	18	14	9
31							26	15		17		9
Mean					14.8		28.4	16.5	21.0	16.7	14.4	11.2
Run-off acre-feet					646		1350	786	1250	1030	857	689

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork Cottonwood Creek, near Buena Vista, for 1914.

Drainage Area, 50 Square Miles. Altitude, 8,200 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					d 14							
2			10									
3												
4				b 9		193						
5					e 12							
6			10	7								
7	6				e 12							
8					15							
9			10									
10												
11				6		152						
12												
13				6	38		106					
14												
15												
16			11			223	116					
17												
18				6	92		116					
19						193						
20												
21			14	6			64					
22												
23				c 5		193						
24												
25							57					
26												
27			a 10									
28				6								
29												
30			10									
31												
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

a Water turned into ditches about 2 sec. ft. b Approximately 4 ft. diverted.

c Approximately 5 ft. diverted. d Ditches dry. e Approximately 3 sec. ft. diverted.

Discharge of Chalk Creek at St. Elmo (Upper Station), for 1914. Drainage Area, 48 Square Miles. Altitude, 10,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	9		8	9	18	357	121	86	35	16	17	
2	9		8	9	18	334	121	90	33	17	17	
3	9		8	10	18	304	121	86	33	22	16	
4	9		8	10	23	263	121	80	29	32	14	
5	8		8	9	23	204	121	74	26	20	14	
6	8		8	9	23	182	109	67	24	20	14	
7	8	9	8	9	33	136	103	62	21	20	14	
8	8		8	9	53	118	86	65	22	20	11	
9	9		8	8	68	140	84	80	24	20	12	
10	9		8	8	82	220	86	79	23	21	11	
11	9		8	11	79	259	82	65	23	20	11	
12	9		8	11	77	277	80	59	23	17	11	
13	9		8	11	88	284	95	54	24	18	11	
14	9	7	8	11	92	253	107	50	25	16	8	
15	9	7	8	17	79	296	105	50	27	17	7	
16	9	7	8	17	72	235	117	52	24	16	7	
17	9	7	8	14	85	246	109	53	20	17	8	
18		7	8	11	100	240	132	54	20	16	9	
19		7	8	11	113	235	143	46	18	16	8	
20		7	9	15	160	224	132	46	16	13	8	
21			9	16	215	220	143	54	32	16	8	
22			11	17	236	215	154	52	27	19	9	
23			9	16	190	210	121	45	20	16	8	
24			8	17	179	200	113	42	20	19	8	
25			9	23	167	190	117	41	15	19	9	
26			8	23	203	143	111	40	17	19	9	
27			7	20	224	166	111	30	16	20	8	
28			10	21	178	154	132	26	15	18	8	
29			10	20	194	132	107	29	16	19	8	
30			10	20	264	121	99	44	16	18	8	
31			9		320		99	41		19		
Mean	8	8	8.4	13.7	119	219	112	56.2	22.8	18.6	10.4	
Run-off acre-feet	492	444	516	815	7320	13000	6890	3460	1360	1140	619	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Chalk Creek near St. Elmo (Lower Station), for 1913.

Drainage Area, 75 Square Miles. Altitude, 10,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	10	9	10	10	28	300	270	66	94	54	17	16
2	10	10	9	10	32	300	240	66	93	54	20	16
3	10	10	8	9	32	270	240	66	92	54	24	16
4	10	10	10	9	30	270	215	62	91	54	96	16
5	10	11	10	8	44	240	215	64	90	54	24	16
6	10	9	9	9	72	240	190	62	89	54	17	17
7	10	10	10	9	89	215	146	64	88	39	17	17
8	10	10	9	9	99	190	146	54	83	54	17	17
9	10	10	10	9	67	240	146	47	75	32	18	17
10	9	9	10	9	82	300	190		75	32	19	17
11	9	10	11	9	120	300	168		75	29	19	17
12	9	9	10	9	138	332	146		75	34	28	17
13	9	9	11	9	159	270	128		75	39	19	17
14	9	9	11	16	120	300	104		69	39	19	17
15	9	9	11	14	82	332	98		63	36	17	17
16	9	10	11	12	56	365	110		63	27	18	17
17	9	10	11	26	95	365	146		63	27	19	17
18	9	10	10	19	138	380	110	54	63	19	19	24
19	9	10	10	19	159	380	98	56	63	26	23	24
20	8	10	10	14	120	365	104	56	63	32	17	22
21	9	10	9	19	102	365	146	56	59	27	19	20
22	9	10	10	24	138	332	190	62	54	28	19	18
23	9	10	10	19	230	300	215	67	50	25	18	17
24	9	10	9	19	258	332	215	72	46	24	18	17
25	10	10	9	21	230	332	168	78	42	18	18	17
26	10	10	9	14	317	300	168	80	38	22	16	21
27	10	10	10	19	285	332	98	88	40	25	16	21
28	10	10	10	28	205	332	92	96	45	25	16	19
29	10		10	37	258	300	86	96	45	18	16	17
30	10		10	40	285	300	83	95	50	150	16	17
31	10		10		258		75	95		25		17
Mean	9.48	9.79	9.90	15.9	140	306	153	69.7	67.2	37.9	21.3	17.9
Run-off acre-feet	583	544	609	946	8610	18200	9410	3180	4000	2330	1270	1100

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Chalk Creek near St. Elmo (Lower Station), for 1914.

Drainage Area, 75 Square Miles. Altitude, 10,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	17	17	16	17	28	445	250	195	69	41	41	
2	17	17	16	16	26	480	195	195	63	41	37	
3	17	17	16	17	27	410	250	195	58	41	41	
4	17	17	16	19	27	375	250	170	58	45	29	
5	17	17	16	20	27	342	220	170	58	41	29	
6	17	17	16	20	29	250	195	145	50	48	33	
7	17	17	16	24	29	230	195	145	52	45	41	
8	17	17	16	20	42	195	195	145	52	45	26	
9	17	17	17	20	67	250	195	145	46	48	29	
10	17	17	16	19	84	375	195	145	43	41	29	
11	17	17	16	19	101	375	170	145	43	41	29	
12	20	16	16	19	84	375	195	126	43	37		
13	17	20	16	19	84	375	195	107	45	41		
14	17	17	16	18	107	425	250	101	45	26		
15	17	17	16	20	107	480	195	92	45	35		
16	17	17	16	26	95	375	222	92	53	35		
17	17	16	16	26	101	375	195	92	45	35		
18	17	16	16	20	107	375	250	92	45	35		
19	17	16	17	22	126	375	280	78	46	35		
20	17	16	17	22	195	375	250	78	46	35		
21	17	16	17	22	310	375	250	78	65	35		
22	17	16	17	23	375	375	280	92	54	41		
23	17	16	16	26	342	375	250	92	54	41		
24	17	16	17	28	300	280	222	92	46	41		
25	17	16	16	27	250	280	195	74	48	35		
26	17	16	16	27	310	145	195	67	48	35		
27	17	16	16	27	280	145	195	67	44	35		
28	17	16	17	28	250	175	250	67	40	35		
29	17		17	26	310	200	250	78	40	35		
30	17		17	30	375	225	195	78	40	35		
31	17		17		410		195	74		35		
Mean	17.1	16.6	16.3	22.2	161	328	220	113	49.5	38.5	33.1	
Run-off acre-feet	1050	920	1000	1320	9900	19500	13500	6950	2940	2370	722	

Unless otherwise noted, all discharges are in cubic feet per second.

SOUTH FORK OF ARKANSAS RIVER AT PONCHA.

Location.—At highway bridge about half a mile from Poncha, in sec. 10, T. 49 N., R. 8 E. Nearest tributary, Poncha Creek, enters one-fourth mile below.

Records Available.—January 14, 1911, to November 30, 1914.

Drainage Area.—140 square miles.

Gage.—Vertical staff.

Channel.—Permanent prior to the high water of 1912, when it shifted.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Springs keep this stream open during the winter months.

Diversions.—There are court decrees for diversions of 113 second-feet from the South Fork above the station, and 66 second-feet below. There are also decrees for diversions of 76 second-feet from the North Fork which enters above.

Accuracy.—The high altitude of the drainage basin causes diurnal fluctuations of stage during certain seasons, due to alternate melting and freezing. The mean daily gage height is based on three readings per day, the maximum stage, which occurs during the night, and readings at 6 a. m. and 6 p. m. The mean stage as determined in this manner may be somewhat in error, and therefore the estimates can not be considered better than good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON THE SOUTH FORK OF ARKANSAS RIVER AT PONCHA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 16	Robert Follansbee	-0.03	16.5	Feb. 9	R. H. Fletcher	0.30	29.
June 20	R. H. Fletcher	1.00	134	May 6	R. H. Fletcher	-0.09	11
Aug. 26	R. H. Fletcher	0.10	20.4	May 31	Robert Follansbee	2.30	385
Oct. 25	Robert Follansbee	-0.20	7.0	Aug. 17	M. D. Anderson	1.10*	32

*Gage lowered 1.00 ft.

PONCHA CREEK AT PONCHA.

Location.—At highway bridge in sec. 10, T. 49 N., R. 8 E., near Poncha, about one-fourth mile above the mouth of creek.

Records Available.—January 14, 1911, to November 30, 1914.

Drainage Area.—89 square miles (measured on Forest Atlas).

Gage.—Vertical staff.

Channel.—Shifting.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Springs prevent the creek from freezing to any considerable extent.

Diversions.—There are court decrees for diversions of 7 second-feet above the station, but none below.

Accuracy.—Owing to the high altitude of this drainage basin, the stage is subject to considerable diurnal fluctuations at certain seasons of the year due to alternate melting and freezing, and the mean daily gage height based on morning and evening readings and the maximum stage for 24 hours may be somewhat in error. The uncertain mean gage height and the shifting conditions make the estimates of daily discharge only fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON PONCHA CREEK AT PONCHA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 16	Robert Follansbee	0.99	43	Feb. 9	R. H. Fletcher	0.30	5.82
June 20	R. H. Fletcher	1.10	59	May 6	R. H. Fletcher	*1.66	25
Aug. 26	R. H. Fletcher	0.35	6.88	May 31	Robert Follansbee	2.49	140
Oct. 25	Robert Follansbee	0.25	5.04	Aug. 17	M. D. Anderson	1.34	12
				Oct. 8	R. H. Fletcher	1.20	5.44

*Gage established May 6.

Discharge of South Fork Arkansas River at Poncha for 1913. Drainage Area, 140 Square Miles. Altitude, 7,471 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					15	152	40	4	15	13		
2					15	173	21	7	16	15		
3					8	142	16	6	16	18		
4					6	119	11	11	8	16		
5					5	79	15	14	4	17		
6					13	75	20	16	4	10		
7					16	57	21	17	2	8		
8					22	65	20	10	5	9		
9					24	218	23	8	4	10		
10					24	255	18	8	4	10		
11					59		18	13	4	10		
12					132		20	37	4	13		
13					132		18	19	4	12		
14					100	152	9	15	6	12		
15					30	195	12	17	8	12		
16					20	195	13	18	7	11		
17					21	173	14	20	6	9		
18					33	162	15	21	8	8		
19					46	184	16	32	5	9		
20					28	152	27	46	8	9		
21					18	184	50	28	8	9		
22					18	230	28	25	8	8		
23					53	195	113	25	11	8		
24					113	195	43	21	10	9		
25					162	162	26	25	10	10		
26					195	100	28	22	10			
27					206	65	21	21	8			
28					173	53	20	22	8			
29					184	48	8	21	8			
30					173	32	3	16	8			
31					184		4	16				
Mean					71.9	141	22.9	18.7	7.57	11.0		
Run-off acre-feet					4420	7550	1470	1150	450	546		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Fork Arkansas River at Poncha for 1914. Drainage Area, 140 Square Miles. Altitude, 7,471 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		36	20	14	14	515	88	183	13	8	44	
2		34	26	11	26	485	76	173	13	8	41	
3		34	20	10	16	397	86	227	13	8	37	
4		29	26	9	18	397	110	213	13	10	33	
5		30	26	11	12	324	123	183	13	9	35	
6		30	34	12	9	302	79	133	13	9	35	
7		32	48	8	12	209	91	91	10	10	35	
8		30	48	9	23	139	86	67	10	8	32	
9		34	43	9	74	88	63	67	10	10	30	
10		32	26	8	104	199	54	95	8	9	30	
11		32	26	8	120	240	49	95	8	9	32	
12		30	23	8	77	324	37	70	7	10	32	
13		26	20	10	54	334	56	58	6	10	32	
14		34	26	9	60	271	45	56	6	13	37	
15		30	26	11	74	355	39	46	6	18	46	
16		30	20	15	60	355	37	48	5	14	37	
17		26	23	10	60	338	55	37	5	14	37	
18		30	23	8	64	317	231	28	5	14	37	
19		32	23	8	104	307	235	28	5	13	37	
20		32	26	6	179	275	235	33	5	16	37	
21		29	26	7	250	300	205	28	6	33	41	
22		32	20	8	334	279	267	33	5	35	50	
23		26	20	10	302	258	169	33	5	52	41	
24		20	23	7	302	187	110	26	5	37	50	
25		20	18	7	282	141	125	26	5	39	50	
26		20	14	5	302	121	110	33	5	43	46	
27		26	14	5	282	102	118	16	5	39	46	
28		20	18	5	271	102	296	16	5	39	41	
29			23	4	282	112	265	19	5	44	37	
30			20	10	355	79	244	19	7	43	33	
31			14		455		203	16		43		
Mean		29.1	24.6	8.7	148	262	129	70.8	7.6	21.2	38.4	
Run-off acre-feet		1620	1510	518	9100	15600	7930	4350	452	1300	2280	

Unless otherwise noted, all discharges are in cubic feet per second.

NOTE.—Water running around gage May 31-June 4.

Discharge of Poncha Creek at Poncha for 1913. Drainage Area, 89 Square Miles. Altitude, 7,471 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					31	58	26	11	13	19		
2					30	68	25	12	12	16		
3					24	54	24	11	13	16		
4					22	58	23	11	13	16		
5					24	39	18	9	10	16		
6					30	50	19	8	10	8		
7					36	43	18	10	10	20		
8					39	50	18	7	12	6		
9					34	73	20	6	10	7		
10					58	68	20	6	10	4		
11					58		18	11	10	8		
12					54		15	12	10	14		
13					68		13	16	10	16		
14					78	78	13	13	10	11		
15					45	63	14	13	11	9		
16					45	63	14	13	12	9		
17					73	54	14	13	12	7		
18					73	54	20	13	11	7		
19					73	58	27	13	9	6		
20					54	63	41	14	4	5		
21					50	54	35	13	6	6		
22					54	50	41	12	4	3		
23					68	39	39	11	7	4		
24					73	45	35	9	9	3		
25					78	36	24	11	9	4		
26					78	32	20	10	8			
27					100	37	20	11	9			
28					73	28	16	9	8			
29					78	28	16	12	8			
30					68	25	16	13	8			
31					78		13	15				
Mean					56.4	50.7	21.8	11.2	9.6	9.6		
Run-off acre-feet					3470	2720	1340	689	571	476		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Poncha Creek at Poncha for 1914.
Drainage Area, 89 Square Miles. Altitude, 7,471 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		12	3	7	30	193	26	24	8	6	13	
2		3	2	10	41	182	25	23	8	6	13	
3		2	4	14	24	152	25	27	8	6	16	
4		2	3	14	22	132	27	26	8	8	16	
5		2	3	13	29	132	26	22	8	6	16	
6		2	6	16	40	123	24	22	8	6	12	
7		3	12	11	40	80	27	19	8	6	8	
8		4	14	12	50	80	25	16	7	6	8	
9		4	12	8	72	87	23	16	6	7	8	
10		4	5	10	80	104	20	14	6	6	10	
11		4	4	9	80	132	14	13	6	6	10	
12		4	2	9	80	104	16	12	6	6	10	
13		4	2	10	96	104	16	11	6	6	5	
14		4	1	11	114	65	14	10	6	6	4	
15		4	0.5	16	104	132	13	12	6	6	19	
16		4	1	23	72	104	9	11	6	6	19	
17		4	0.5	14	65	114	18	11	6	5	4	
18		5	2	12	114	72	25	12	6	10	4	
19		5	2	13	142	65	37	11	6	7	4	
20		4	2	19	123	65	33	10	6	9	5	
21		4	3	22	152	65	24	25	7	23	4	
22		5	3	24	152	56	20	23	6	18	4	
23		4	2	28	172	45	27	23	6	18	4	
24		2	4	22	172	40	22	18	6	18	4	
25		3	6	26	193	35	20	18	6	16	6	
26		4	3	28	193	35	19	23	6	18	5	
27		2	2	20	182	29	22	23	6	16	8	
28		3	2	22	152	29	49	10	6	16	6	
29			4	24	152	27	44	9	7	14	5	
30			6	37	182	16	31	9	6	14	4	
31			8		182		28	9		14		
Mean		3.8	4	16.8	107	86.6	24.5	16.5	6.6	10.2	8.5	
Run-off acre-feet		211	246	1000	6580	5150	1510	1010	393	627	506	

Unless otherwise noted, all discharges are in cubic feet per second.

GRAND RIVER DRAINAGE

NORTH FORK OF GRAND RIVER NEAR GRAND LAKE.

Location.—Three miles southwest of Grand Lake, Colo., in sec. 13, T. 3 N., R. 76 W. Nearest tributary, Grand Lake outlet, enters some distance below; no tributaries for several miles above the station.

Records Available.—July 29, 1904, to September 30, 1909; September 20, 1910, to November 15, 1914.

Drainage Area.—107 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from highway bridge at the gage.

Winter Flow.—Ice forms along the edges, but springs keep the river open.

Diversions and Storage.—There are court decrees for diversions of 716 second-feet from the headwaters above the station. Of this amount 525 second-feet are for diversion across the divide into the headwaters of the Cache la Poudre. There is also a reservoir decree for 19,000 acre-feet from the flood water.

Accuracy.—Results considered good.

Co-operation.—Station maintained in co-operation with the United States Geological Survey.

DISCHARGE MEASUREMENTS ON NORTH FORK OF GRAND RIVER NEAR GRAND LAKE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
July 31	R. H. Fletcher	3.98	82	May 15	R. H. Fletcher	4.80	367

GRAND RIVER AT SULPHUR SPRINGS.

Location.—At the bridge connecting the Denver, Northwestern & Pacific Railway station with the town of Sulphur Springs, in sec. 2, T. 1 N., R. 78 W. Nearest tributary, Beaver Creek, enters the river 2 miles below the station.

Records Available.—July 22, 1904, to September 30, 1909, a station was maintained at this point by the United States Geological Survey; September 23, 1910, to November 16, 1914.

Drainage Area.—946 square miles (measured from Hayden's atlas).

Gage.—Chain gage; datum the same as that of the gage used originally.

Channel.—Somewhat shifting.

Discharge Measurements.—Made from bridge during high and ordinary stages and by wading during low water.

Winter Flow.—The river is frozen over during the winter months and discharge measurements are made to determine the winter flow.

Diversions.—Between this station and that near Granby there are court decrees for diversions of 100 second-feet from Grand River and 662 second-feet from intervening tributaries. There is also a reservoir decree for 31,300 acre-feet from the flood waters of Grand River.

Accuracy.—Owing to the shifting of the channel, the estimates of discharge can not be considered better than fair or possibly good. Estimates have been made only for days on which the gage was read.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON GRAND RIVER AT SULPHUR SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec.-Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 11	R. H. Fletcher	4.32	1870	Jan. 29	R. H. Fletcher	3.20	115
July 3	R. H. Fletcher	3.38	907	Mar. 7	R. H. Fletcher	3.22	132
Oct. 9	Robert Follansbee	2.46	388	May 16	R. H. Fletcher	4.88	2550
				June 3	R. H. Fletcher	7.97	7970
				Aug. 4	M. D. Anderson	3.20	805
				Aug. 6	M. D. Anderson	2.99	664
				Oct. 18	R. H. Fletcher	2.20	274

GRAND RIVER NEAR KREMMLING.

Location.—At the entrance to Gore Canyon, 3 miles southwest of Kremmling, in sec. 23, T. 1 N., R. 81 W. Nearest tributary, Blue River, enters a mile below Kremmling.

Records Available.—July 24, 1904, to November 30, 1914.

Drainage Area.—2,380 square miles.

Gage.—Automatic recording gage, except during the winter months when a staff gage is read.

Channel.—Somewhat shifting; the bed scours at high stages and silts during low.

Winter Flow.—Although the river is frozen entirely across at the station, there is little, if any, backwater, as shown by discharge measurements made during the winter. Rapids below the station remain open and thus prevent backwater except for short periods when ice jams on the rapids.

Kremmling Reservoir Site.—The station is located at the site of the proposed Kremmling reservoir of the United States Reclamation Service. With a 200-foot dam at the mouth of Gore Canyon the capacity of the reservoir would be 2,200,000 acre-feet.

Diversions.—Between this station and that at Sulphur Springs there are court decrees for diversions of 34 second-feet

from Grand River and 2,315 second-feet from intervening tributaries exclusive of diversions for placer mining in the Blue River drainage.

Accuracy.—Although the channel is somewhat shifting, sufficient discharge measurements have been made to form a basis for fairly reliable estimates of flow.

Co-operation.—Station maintained in co-operation with the United States Geological Survey.

DISCHARGE MEASUREMENTS ON GRAND RIVER NEAR KREMMLING.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 25*	C. L. Chatfield		260
May 10	R. H. Fletcher	8.60	3830
July 1	R. H. Fletcher	6.70	2660
July 31	R. H. Fletcher	3.90	1320

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 27*	R. H. Fletcher	0.90	419
Mar. 6	R. H. Fletcher	.85	408
May 17	R. H. Fletcher	11.42	6520
Oct. 17	R. H. Fletcher	2.49	809
Nov. 11	R. H. Fletcher	2.06	664
Nov. 12	R. H. Fletcher	0.96	338
Nov. 14	R. H. Fletcher	1.55	436

*Ice conditions.

Discharge of North Fork of Grand River at Grand Lake for 1913. Drainage Area, 125 Square Miles. Altitude, 8,153 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				30	208	740	208	75	62	75	41	
2				28	197	620	184	72	68	82	35	
3				30	190	560	174	72	68	68	49	
4				42	154	560	159	68	62	82	31	
5				38	165	505	154	90	62	87	60	
6				35	208	478	137	75	68	82	60	
7				42	242	450	132	75	72	75	53	
8				42	260	395	159	65	75	78	62	
9				38	260	395	137	60	82	68	60	
10				38	260	395	154	75	94	62	56	
11				38	260	395	137	62	82	60	56	
12				38	345	395	127	72	90	51	49	
13				42	422	345	101	68	90	82	53	
14				42	345	300	127	65	82	78	51	
15				60	242	370	137	60	94	75	38	
16				159	225	422	146	56	105	72	68	
17				159	218	370	154	53	94	68	72	
18				159	242	370	159	51	82	65	46	
19				137	300	395	137	51	72	65	42	
20				109	280	370	127	49	65	65	49	
21				120	242	345	146	62	65	60	46	
22				132	260	300	174	60	62	62	44	
23				132	280	280	208	53	68	68	44	
24				75	300	260	280	60	65	65	44	
25				78	422	345	218	56	65	68	51	
26				68	532	300	159	51	72	62	56	
27				82	620	280	127	53	68	60	53	
28				114	560	260	101	51	65	53	46	
29				174	590	242	90	51	65	65	42	
30			28	184	680	225	87	49	72	56	42	
31			28		680		82	56		49		
Mean				82.2	329	389	149	61.8	74.5	68.0	50.0	
Run-off acre-feet				4890	20200	23100	9160	3800	4430	4180	2980	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork of Grand River at Grand Lake for 1914. Drainage Area, 125 Square Miles. Altitude, 8,153 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				33	145	1700	405	145	140	85	52	
2				33	132	1470	332	145	100	58	47	
3				33	132	1470	355	132	85	58	46	
4				33	145	1320	355	132	82	58	46	
5				33	200	1170	405	120	74	71	44	
6				33	235	1020	355	110	71	58	40	
7				35	355	885	310	100	71	58	37	
8				35	405	885	310	100	85	58	35	
9				37	455	750	310	100	78	71	35	
10				37	565	685	270	100	71	64	40	
11				37	455	750	235	92	71	64	46	
12				40	332	1020	235	82	71	71	47	
13				40	332	1100	270	78	85	64	58	
14				58	332	1170	235	74	71	61	68	
15			27	82	310	1240	218	71	71	64	74	
16			27	100	405	1020	200	71	74	64		
17			30	88	455	815	685	78	71	71		
18			30	85	455	815	655	85	68	64		
19			27	100	455	955	170	92	64	64		
20			27	104	538	1020	145	85	61	61		
21			27	116	625	955	170	100	71	64		
22			27	125	750	815	200	92	68	71		
23			27	145	815	750	158	85	64	85		
24			27	145	815	625	145	78	61	78		
25			27	145	885	565	145	71	58	71		
26			30	140	955	510	132	78	58	68		
27			30	132	1100	455	132	88	56	64		
28			30	132	1470	455	132	85	58	61		
29			30	140	1170	455	120	82	64	58		
30			30	170	1020	405	235	78	71	56		
31			30		1020		194	85		52		
Mean			28.4	82.2	563	908	265	94.0	73.0	65.0	47.7	
Run-off acre-feet			958	4890	34600	54000	16300	5780	4340	4000	*1420	

Unless otherwise noted, all discharges are in cubic feet per second. *15 days.

Discharge of Grand River at Sulphur Springs for 1913. Drainage Area, 946 Square Miles. Altitude, 7,665 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						3760	1110	472	246	325	246	
2						3100	1020	447	250	350	246	
3						2960	935	447	280	357	230	
4						2820	820	429	292	378	215	
5					1340	2650	805	412	305	337	215	
6					1540	2480	890	395	317	347	215	
7					1440	2420	875	378	280	357	215	
8					1540	2050	860	368	286	357	215	
9					1440	2050	845	357	292	378	215	
10					1490	2050	830	357	298	378	215	
11					1820	2050	700	368	304	357	230	
12					1930	2000	650	400	310	357	246	
13					2050	1900	600	380	317	360	246	
14					1930	1650	550	345	317	355	246	
15					1380	1650	700	310	400	350	246	
16					1190	1760	900	298	400	325	201	
17					1190	1820	1100	298	375	300	215	
18					1190	2000	1100	286	349	280	215	
19					1220	1950	1000	275	324	280	215	
20					1250	1800	980	263	298	289	210	
21					1280	1700	1020	280	298	298	206	
22					1100	1600	1020	270	295	280	201	
23					1520	1490	1080	246	290	275	200	
24					1930	1490	1250	246	290	255	205	
25					2110	1490	1190	246	295	246	220	
26					2680	1490	935	246	295	246	240	
27					3310	1280	860	246	300	246	280	
28					3240	1280	725	246	300	246	280	
29					3460	1190	725	246	298	246	280	
30					3680	1190	550	246	300	246	280	
31					3900		550	246		246		
Mean					1930	1970	877	324	307	311	230	
Run-off acre-feet					103000	117000	53900	19900	18300	19100	13700	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River at Sulphur Springs for 1914.
Drainage Area, 946 Square Miles. Altitude, 7,665 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					790	7580	2290	1020	391	263	246	
2					860	8000	2170	935	366	263	230	
3					860	7790	2050	860	337	260	215	
4					935	6740	2050	790	317	253	212	
5					1020	5530	2550	695	302	246	212	
6					1020	4970	2170	606	298	246	201	
7				497	1020	4970	2050	550	284	234	193	
8				424	1100	4290	1930	550	280	230	167	
9				357	2170	3830	1700	550	266	246	187	
10				337	2960	4290	1600	550	263	253	174	
11				310	3240	4620	1490	539	253	253	151	
12				317	2680	4790	1380	497	249	263	158	
13				400	2420	5530	1380	447	280	277	158	
14				636	2170	5730	1280	447	298	280	167	
15				790	2290	5530	1190	400	302	266	162	
16				825	2680	5150	1190	400	317	273	167	
17				725	2820	4620	1190	391	317	263		
18				524	3100	4790	1100	400	317	263		
19				550	3380	4790	1100	400	295	263		
20				578	3580	4790	1020	400	295	249		
21				758	4130	4790	1190	447	298	260		
22				665	4620	4620	1190	447	298	287		
23				1100	4970	4290	1140	447	295	317		
24				898	5530	3980	1020	378	277	317		
25				860	5150	3680	860	349	266	302		
26				1240	4790	3240	790	349	260	302		
27				1280	5150	2960	790	349	246	298		
28				860	6330	2550	898	357	230	284		
29				725	6130	2420	1140	366	227	277		
30				860	6130	2550	1240	366	227	260		
31					5730		1100	391		249		
Mean				688	3220	4780	1430	506	288	268	188	
Run-off acre-feet				32700	198000	284000	87900	31100	17100	16500	5950	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River near Kremmling for 1913.
Drainage Area, 2,380 Square Miles. Altitude, 7,320 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						7730	2720	1250	812	812	752	
2						7370	2480	1180	843	955	708	
3						6740	2370	1120	843	1000	678	
4						6120	2200	1100	859	971	678	
5						5600	2160	1080	891	1040	664	
6						5300	2060	1050	907	1050	622	
7						4920	2000	1050	1020	1020	693	
8						4380	1960	1020	1130	939	737	
9						4220	1960	987	1170	907	580	
10					3900	4380	1960	955	1150	907	636	
11					4470	4920	2000	955	1050	875	693	
12					4740	5500	1660	987	987	812	636	
13					5300	4560	1540	1100	1000	843	678	
14					4560	4560	1440	1050	939	875	737	
15					3760	3830	1520	987	955	875	737	
16					3340	4140	1700	939	1120	859	678	
17					3340	4220	1900	891	1080	828	708	
18					3410	4380	2200	859	1020	782	693	
19					3690	4920	2260	843	939	737	722	
20					3760	4830	2000	828	859	708	664	
21					3550	4300	1900	828	812	737	636	
22					3200	3980	2000	859	782	752	594	
23					3140	3830	2000	859	797	752	487	
24					3830	3690	2260	828	812	752	461	
25					4470	3550	2600	812	812	676	494	
26					5300	3480	2320	828	797	650	526	
27					6340	3340	2000	812	782	622	664	
28					6780	3200	1750	812	782	650	622	
29					6780	3200	1500	843	782	678	737	
30					7250	3020	1380	891	797	693	678	
31					7610		1290	828		737		
Mean					4460	4610	1970	949	918	822	653	375
Run-off acre-feet					203000	274000	121000	58400	54600	50500	38900	23100

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River near Kremmling for 1914.
Drainage Area, 2,380 Square Miles. Altitude, 7,320 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	375	301	461	843	2100	15100	5290	3080	1190	739	707	
2	375	389	474	971	2100	16300	5070	2720	1120	739	707	
3	375	474	474	1240	2160	16400	4860	2600	1080	739	707	
4	375	474	479	1340	2200	16000	4650	2370	1010	771	676	
5	375	474	479	1600	2540	14300	5200	2100	975	771	645	
6	375	474	479	1240	2660	12900	4920	2000	950	739	602	
7	373	448	487	1440	2600	11500	4300	1860	925	739	587	
8	410	448	474	1170	2960	9950	4060	1720	900	771	559	
9	436	448	487	1070	4060	9680	3830	1720	875	837	531	
10	410	448	487	1040	5500	7860	3620	1680	850	871	531	
11	436	448	495	907	6670	9290	3480	1590	825	837	559	
12	392	448	495	843	6340	10400	3340	1470	800	837	464	
13	349	448	531	1040	5400	11400	3270	1430	771	804	545	
14	325	448	521	1270	5200	12800	3270	1350	871	837	464	
15	349	448	505	1720	5700	12300	3200	1350	905	771	518	
16	349	448	492	2160	6120	12000	2960	1230	871	771	477	
17	373	448	479	2100	6560	10900	3020	1230	905	804	518	
18	349	448	536	1480	7010	10500	3200	1230	837	804	518	
19	398	448	594	1170	7610	10500	2960	1230	771	771	425	
20	373	448	534	1340	8250	10500	2840	1230	771	771	388	
21	349	448	474	1860	9290	10800	2660	1230	871	804	375	
22	313	448	468	1820	10400	10200	3140	1310	940	804	464	
23	319	448	461	2420	11500	9420	3140	1390	871	940	438	
24	325	448	487	2000	12500	8510	2720	1270	837	940	425	
25	386	448	513	1860	12800	7610	2420	1190	804	871	425	
26	398	474	568	1860	12000	6670	2370	1160	771	837	425	
27	398	474	622	2060	11900	5900	2370	1190	707	837	425	
28	373	474	748	1960	12600	5700	2540	1230	707	804	412	
29	349		875	1860	13700	5500	2540	1270	707	771	412	
30	337		859	1960	13200	5500	2540	1310	707	771	412	
31	487		843		13400		3140	1230		771		
Mean	374	447	545	1520	7320	10500	3450	1580	871	802	511	
Run-off acre-feet	23000	24800	33500	90400	450000	625000	212000	97200	51800	49300	30400	

Unless otherwise noted, all discharges are in cubic feet per second.

GRAND RIVER AT GLENWOOD SPRINGS.

Location.—At Glenwood Springs, at the point where the discharge from the hot springs enters the river. No Name Creek enters Grand River about 2 miles above the station and Roaring Fork enters one-half mile below.

Records Available.—May 12, 1899, to November 30, 1914.

Drainage Area.—4,520 square miles.

Gage.—Chain gage originally installed at the railroad bridge just above the Roaring Fork, but in 1900 a staff gage was installed at the present location. Since 1902 a number of automatic gages referred to the staff gage datum have been used, the present one being a Friez gage.

Channel.—Slightly shifting.

Discharge Measurements.—Made from a car and cable stretched beneath the State Street Bridge, which crosses the river one-third mile below the gage.

Winter Flow.—Ice never forms at the station, as the hot water from the springs keeps the water above the freezing point.

Artificial control.—The Shoshone power plant of the Central Colorado Power Co., 6 miles above Glenwood Springs, has sufficient pondage to withhold the flow of the river for a portion of the day during low-water periods.

Diversions.—Between this station and the one near Kremmling there are court decrees for a diversion of 13 second-feet from Grand River and 1,508 second-feet from the intervening tributaries.

Accuracy.—Conditions are favorable for accurate results and the estimates are considered reliable.

Co-operation.—Station maintained by the United States Geological Survey, in co-operation with the United States Forest Service and Central Colorado Power Co. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS OF GRAND RIVER AT GLENWOOD SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 20	Follansbee-Fletcher	3.61	994	Jan. 11	R. H. Fletcher	3.10	597
Jan. 21	Robert Follansbee	2.34	246	Oct. 15	Robert Follansbee	4.15	1520
May 2	R. H. Fletcher	6.68	6050				
Sept. 5	R. H. Fletcher	4.00	1270				

GRAND RIVER NEAR PALISADES.

Location.—At the State bridge 2 miles above Palisades, about sec. 3, T. 11 S., R. 98 W. Nearest important tributary, Plateau Creek, enters about 6 miles above the station.

Records Available.—April 9, 1902, to November 30, 1914.

Drainage Area.—8, 550 square miles.

Gage.—Chain gage; location and datum unchanged.

Channel.—Practically permanent.

Discharge Measurements.—Made from bridge to which the gage is attached. Prior to 1906 measurements were made from the suspension bridge at Palisades, where conditions were less favorable for accurate determination of discharge.

Winter Flow.—The river usually freezes over a portion of the year, but except for slush and ice and an occasional thin ice cover the effect on the gage heights is slight.

Diversions.—There are court decrees for diversions of 420 second-feet from Grand River and 2,500 second-feet from intervening tributaries between Palisades and the Glenwood Springs station. The proposed high line canal of the United States Reclamation Service will divert 700 second-feet 7 miles above the Palisades station. Below the station the Grand Valley Irrigation Co. has a diversion of 400 second-feet.

Accuracy.—Conditions are favorable for accurate results, and the estimates should be reliable.

Co-operation.—Station maintained by the United States Reclamation Service in co-operation with the United States Geological Survey, by whom records were furnished.

DISCHARGE MEASUREMENTS ON GRAND RIVER NEAR PALISADES.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
July	8	Page and Page	14.3	4440
Sept.	17	Page and Anderson	13.2	2340
May	12	Page and Thomas	12.6	1640

GRAND RIVER NEAR FRUITA.

Location.—At highway bridge, 1½ miles south of Fruita, in sec. 20, T. 1 N., R. 2 W., Ute principal meridian. Nearest important tributary, Little Salt Wash, enters a mile below the station; Gunnison River enters at Grand Junction, about 12 miles above.

Records Available.—Flood records during 1908, 1909, and 1910; May 4, 1911 (station established), to November 30, 1914.

Drainage Area.—16,800 square miles.

Gage.—Chain gage; datum was raised 0.05 foot May 3, 1911.

Channel.—Practically permanent.

Discharge Measurements.—Made from the highway bridge.

Winter Flow.—The river is frozen over during a portion of the year and readings are taken to water surface through a hole in the ice.

Diversions.—Between the Palisades station and Fruita nearly 500 second-feet are diverted during the irrigation season.

Maximum Stage.—Since the establishment of the station the maximum stage has been 15.0 feet, which occurred June 9, 1909. The highest stage known was about 18.5 feet on July 4, 1884.

Accuracy.—Results considered good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Weather Bureau. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON GRAND RIVER NEAR FRUITA.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	5	R. H. Fletcher	7.35	13800
Sept.	2	R. H. Fletcher	2.40	2320

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	28*	Robert Follansbee	12.80	47600
Aug.	23†	M. D. Anderson	4.81	7230
Oct.	16	Robert Follansbee	4.28	4870
Dec.	14	R. H. Fletcher	2.77	2530

*Sub-surface method.

†Results too large as insufficient weight was used.

Discharge of Grand River at Glenwood Springs for 1913. Drainage Area, 4,520 Square Miles. Altitude, 5,747 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		741	587	2120	5120	12100	4240	2060	1370	1400	1110	857
2		735	426	3320	5480	11600	3880	1940	1270	1500	1150	803
3		782	463	3820	5300	10600	3630	1800	1050	1790	1090	798
4		667	480	2770	4760	9620	3410	1750	1030	1740	1050	800
5		647	491	2110	4550	8920	3260	1630	1070	1710	1130	785
6		681	474	1930	4950	8370	3130	1560	1310	1820	1130	775
7		606	502	2540	5700	7740	2970	1570	1360	1780	1110	757
8		621	573	2630	6310	6730	2900	1610	1560	1650	1100	785
9		556	701	2040	6190	6420	2830	1610	1680	1540	1200	715
10		613	907	1420	6210	6550	2870	1610	1700	1520	1050	667
11		641	696	1220	6930	7430	2940	1610	1730	1490	1000	618
12		609	782	1260	8140	8220	2900	1610	1580	1440	1060	623
13		649	828	1420	8870	7140	2660	1640	1440	1420	1080	616
14		665	698	1780	8840	6310	2450	1620	1360	1480	1290	612
15		703	691	2670	7470	6080	2400	1460	1290	1510	1250	529
16		650	710	3820	5140	6440	2540	1350	1380	1480	1180	597
17		696	710	4120	5610	6650	2860	1260	1510	1430	1200	652
18		782	710	4320	5730	6680	3410	1230	1440	1390	1010	688
19		679	740	4300	6280	7240	3620	1120	1320	1390	1000	684
20	890	705	740	4540	6550	7400	3730	1170	1290	1390	1090	600
21	714	665	790	4420	6120	6760	3410	1190	1270	1240	1070	650
22	841	612	755	4430	5600	6320	3510	1260	1380	1190	1080	640
23	773	601	733	3980	5550	6000	3460	1260	1450	1190	900	630
24	784	743	810	3300	6470	5700	4270	1230	1430	1100	850	600
25	694	622	734	2820	7820	5590	4660	1210	1430	1210	803	542
26	627	725	748	2660	8820	5290	4010	1150	1390	1220	984	723
27	805	676	711	2570	9940	5120	3450	1200	1400	1180	1030	770
28	706	698	695	2940	10300	5020	3070	1130	1400	1160	1010	704
29	749		830	3680	10400	4840	2670	940	1430	1100	998	660
30	701		778	4500	11100	4690	2410	1180	1360	1090	883	629
31	757		1370		11500		2220	1280		1050		639
Mean	753	674	705	2980	7020	7120	3220	1430	1390	1410	1060	682
Run-off acre-feet	17900	37400	43300	177000	432000	424000	198000	87900	82700	86700	63100	41900

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River at Glenwood Springs for 1914. Drainage Area, 4,520 Square Miles. Altitude, 5,747 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	652	672	770	1340	3490	26700	8870	4570	2240	1410	1290	778
2	670	752	816	1450	3680	28700	8530	4570	2160	1480	1450	707
3	848	770	816	1930	3580	29700	7880	4280	2080	1480	1350	628
4	705	770	783	2300	3770	28200	7880	4080	2010	1480	1350	623
5	716	790	776	2620	4060	25700	8200	3720	1860	1540	1110	661
6	717	773	740	2960	4360	22700	8530	3460	1720	1540	1220	673
7	702	756	759	2780	4360	20200	7570	3200	1670	1480	1190	752
8	674	740	760	2460	4680	17700	6980	2950	1530	1580	1160	693
9	703	746	849	2160	6170	14700	6430	2950	1540	1860	1160	712
10	757	746	860	1930	8530	13700	6170	2950	1540	1860	1110	585
11	684	752	833	1780	10300	15200	5920	2790	1570	1740	1060	564
12	613	758	764	1640	10300	18200	5680	2630	1540	1670	1010	598
13	618	752	725	1580	9220	20200	5560	2550	1520	1580	956	564
14	793	773	807	1860	8870	22200	5450	2390	1460	1580	947	545
15	744	770	823	2300	9220	22200	5450	2310	1650	1320	957	500
16	737	719	945	3130	9950	21700	5220	2160	1720	1580	1000	470
17	891	792	1190	3490	10700	20200	5000	2010	1650	1940	830	535
18	856	721	1250	3040	11500	19200	5220	2010	1720	1700	879	622
19	802	716	1140	2380	12800	19200	5340	2010	1590	1700	796	666
20	734	710	1140	2230	14700	19200	4890	2010	1660	1520	849	545
21	710	740	959	2620	17200	19700	4570	2080	1870	1620	782	580
22	734	796	936	3220	17700	18700	4890	2080	1900	1650	753	570
23	764	802	982	3400	19700	16700	5340	2390	2050	1790	760	580
24	783	770	994	3770	21700	15200	4780	2390	1840	1860	773	622
25	776	764	950	3310	22200	13700	4280	2160	1800	1940	769	606
26	783	752	978	3220	21200	12300	3990	2010	1490	1750	761	580
27	802	752	1240	3400	20700	11100	4080	2010	1460	1670	764	611
28	770	752	1740	3400	21700	9950	4470	2010	1340	1670	774	616
29	704		2000	3130	23200	9580	4470	2470	1340	1670	727	694
30	644		1640	3130	23200	9220	4370	2310	1340	1540	838	655
31	633		1390		24200		4570	2390		1510		611
Mean	733	754	1010	2600	12500	18700	5830	2710	1700	1640	979	618
Run-off acre-feet	45100	41900	62100	155000	769000	1110000	358000	167000	101000	101000	58300	38000

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River near Palisades for 1913.
Drainage Area, 8,550 Square Miles. Altitude, 4,730 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				3880	8950	20300	7880	2620	1370	2120	1640	1640
2				4920	9740	20300	7300	2390	1280	1880	1880	1420
3				5840	10600	18800	6470	2460	1480	2120	1940	1320
4				4810	8480	17800	6080	2250	1640	2320	1760	1370
5				3780	8340	17000	5840	2060	1480	2390	1760	1320
6			2700	2700	8180	15400	5360	1940	1480	2540	1760	1150
7			2540	4280	10700	13800	4920	1880	2250	2780	1880	1190
8			2390	4700	11500	13100	4920	1820	2320	2390	1700	1150
9			2120	4600	12000	13200	4700	1880	2460	2390	1640	1150
10			2320	3030	12400	13600	4700	1940	3300	2320	1530	1150
11			2390	3030	13800	14700	4500	2060	2780	2250	1530	1280
12			2460	3120	15600	14100	4390	1880	2460	2250	1580	1320
13			2390	3300	17000	13600	3980	2060	2320	2320	1640	1530
14			2120	3300	18000	10900	3480	2320	2320	2390	1760	1760
15			2120	3780	14700	10700	3390	2000	2320	2250	2540	1700
16			2000	5140	11900	12200	3390	1880	2250	2250	2120	1580
17			1940	6610	10700	11700	3580	1820	2460	2250	1640	1370
18			1880	7590	10600	12700	4700	1700	2390	2180	1880	1420
19			1580	7590	11400	13600	5600	1580	2250	2060	1760	1480
20			1530	7880	11200	13900	5960	1480	2120	2000	1640	
21			1480	8030	11200	13600	5360	1530	2060	2000	1820	
22			1370	8030	11400	11400	3390	1580	3780	2000	1760	
23			1480	7440	11500	10400	4810	1820	3300	1880	1700	
24			1420	6340	12700	10600	4810	1760	2540	1880	1530	
25			1640	5140	14100	10400	6880	1700	2390	1880	1370	
26			1700	4920	16400	10100	6340	1420	2390	1880	1370	
27			1760	4600	19000	9100	5140	1420	2250	1880	1370	
28			1580	5360	19900	9580	4700	2000	2250	1760	1480	
29			1700	6080	19500	9420	3980	1420	2000	1640	1760	
30			2060	7730	19700	8640	3390	1280	1940	1700	1580	
31			2180		20800		2780	1420		1640		
Mean			1960	5250	13300	13200	4930	1850	2250	2120	1710	1380
Run-off acre-feet			101000	312000	818000	786000	303000	114000	134000	130000	102000	52000

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River at Palisades for 1914.
Drainage Area, 8,550 Square Miles. Altitude, 4,730 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		1820	2120	2390	5720	37600	17400	8180	3580	2320	2460	1760
2		1880	2000	2250	7020	41800	16200	8640	3300	2250	2320	1320
3		1760	1940	2860	8030	42800	15000	7590	3210	3210	2620	1280
4		1880	1760	3390	6880	40400	14500	8030	3120	7880	2540	1280
5		1820	1580	4600	7880	37000	15600	6210	2860	4500	2320	1280
6		1760	1580	4600	8030	34000	15600	5480	2780	3580	2060	1420
7		1760	1640	4810	8640	32200	14700	4920	2540	3300	2180	1370
8		1760	1580	4080	9260	26800	12700	4700	2390	3300	2120	1420
9		1760	1640	3580	11500	23800	12400	4500	2540	5600	1940	1370
10		1760	1640	3390	15200	22100	12200	4600	2180	3780	2060	1370
11		1760	1760	3210	18600	22100	11700	4180	2250	3580	1940	1280
12		1760	1640	3120	19700	27900	11000	3980	2250	3390	1820	1230
13		1760	1580	2780	18400	32800	10400	3780	2320	3300	1700	1230
14		1760	1640	2940	17600	34000	10600	3480	2250	2860	1880	1280
15		1760	1760	3390	17600	33700	10400	3210	2390	3030	1640	1280
16		1760	1820	4500	17400	34300	9580	3030	2180	2860	1580	1280
17		1760	1760	5140	17600	33100	9100	3120	2540	2860	1760	
18		1760	1820	5030	19200	31300	8790	2860	2250	2860	1640	
19		1820	1920	4390	20800	31300	10100	2780	2250	2860	1700	
20		1820	2000	4080	23000	31300	10200	2860	2250	2860	1480	
21		2860	2320	4180	26000	33400	8790	3210	2460	2860	1820	
22		2940	1700	5140	29300	31300	8480	3030	2700	3030	1530	
23		1880	1320	5840	32800	27900	9100	3580	2390	3030	1480	
24		1880	1880	6080	37000	26300	8790	3480	2700	3030	1320	
25		1820	1880	5960	38800	25300	7300	3120	2320	3030	1480	
26		1530	2000	5600	33700	21900	7020	3210	2540	3030	1370	
27		1640	2000	5720	32800	19700	6880	3580	2390	3030	1420	
28		2250	2120	6080	33400	17800	7590	3210	2120	3030	1580	
29			2390	5600	33400	17800	8330	3390	2390	2860	1760	
30			2700	5480	34300	18000	7740	3390	2320	2700	1530	
31			2540		36100		8030	3580		2700		
Mean		1870	1870	4340	20800	29700	10800	4290	2530	3310	1840	
Run-off acre-feet		104000	115000	258000	1280000	1770000	664000	264000	151000	204000	109000	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River near Fruita for 1913.
Drainage Area, 16,800 Square Miles. Altitude, 4,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				7200	16600	26000	10500	4110	2370	4020	3220	2750
2				8410	17600	26000	9340	3610	2370	4020	3220	2750
3				9200	16400	24800	8800	3380	2320	4200	3380	2750
4				8930	15000	23300	8280	3080	2520	4470	3380	2820
5				6970	14000	21900	7670	3080	2520	4470	3300	2880
6				7320	15000	20200	7430	2940	2470	4560	3150	3010
7				7200	17600	18900	7080	2750	2880	4660	3150	2750
8				8160	19400	17400	6520	2520	3180	4560	3010	2820
9				7430	19200	15900	6300	2630	3480	4380	3080	2690
10				6410	18900	16600	6080	2690	3780	4290	3080	2580
11				5050	20200	17600	6190	2370	4080	4290	2940	2420
12			4200	5050	22700	20000	6300	2420	4380	4290	2880	2370
13			3940	5760	24500	19700	6190	2580	4200	4110	3450	2230
14			3300	7670	24200	16400	5450	2880	3860	4110	3860	
15			2880	9340	21300	15000	4850	2940	3860	4200	3770	
16			2880	11900	17600	15700	4760	2750	3770	4110	3450	
17			2820	14200	15500	16600	5250	2580	3770	4110	3220	
18			3150	15200	15200	16900	5870	2370	3860	3860	3380	
19			2940	15500	16600	17400	6630	2280	3770	3690	3150	
20			3220	16400	17900	18100	7790	2140	3530	3530	3220	
21			3300	16600	16400	17600	8280	2100	3300	3450	3300	
22			2940	16200	14000	16400	7430	2320	3300	3450	3380	
23			2880	14200	13500	15200	7670	2630	4950	3450	3220	
24			3010	12900	15500	14600	8160	2520	4950	3450	3010	
25			2630	11200	18400	14000	8670	2630	4760	3450	2690	
26			2750	9480	21300	12900	8410	2690	4470	3450	2690	
27			2690	8670	24500	12400	7670	2320	4470	3300	3080	
28			2630	10700	27300	12200	6410	2370	4470	3150	3220	
29			2630	13100	25700	11900	5660	2370	4110	3150	3080	
30			3690	16200	26300	12200	4760	2100	4290	3150	2940	
31			5350		26900		4470	2420		3150		
Mean			3190	10400	19200	17800	6930	2660	3670	3890	3200	2680
Run-off acre-feet			126000	619000	1180000	1060000	426000	164000	218000	239000	190000	60100

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Grand River near Fruita for 1914.
Drainage Area, 16,800 Square Miles. Altitude, 4,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			3300	3610	11000	53600	22700	12000	6020	3510	4010	
2			3940	3610	11700	58100	21600	12000	5570	3510	4010	
3			3150	4110	12800	58100	20500	11000	5150	3660	4010	
4			3010	5050	13100	56600	20000	9770	4750	16400	4010	
5			2880	6080	15900	52200	21600	9480	4750	8090	4010	
6			2880	7430	16400	47700	21600	8640	4370	6510	3660	
7			2880	8670	17400	44800	20500	7550	4010	5360	3830	
8			3010	8160	18400	40300	18400	7020	3660	5570	3510	
9			3300	7430	23300	35200	17400	7550	3660	8090	3660	
10			3300	6740	30300	33100	16400	8920	3490	8090	3510	
11			3450	6740	35900	33800	15500	7820	3660	6020	3360	
12			3150	6300	35900	38800	14600	8360	3490	5570	3510	
13			3010	5870	31700	44000	13800	6020	3490	5570	3220	
14			3010	6300	32400	47000	14600	5570	3490	5150	3360	
15			3010	7430	33100	47700	14600	5150	3330	5150	3220	
16			3150	9480	32400	48500	13800	4750	3660	4750	3220	
17			3610	11700	31700	46200	13100	4370	3660	4860	3360	
18			3940	10400	32400	43300	12400	4190	3660	4750	2970	
19			4110	8670	34500	43300	15500	4010	3490	4560	3090	
20			3770	8160	37400	43300	17900	3830	3330	4560	2760	
21			3610	9200	40300	43300	15900	3660	4010	4560	2760	
22			3300	11000	44000	41800	13800	4010	4010	4560	2860	
23		4470	3150	11700	47700	39200	14600	5360	4010	5150	2760	
24		3300	3300	12400	52200	35900	13800	5790	4190	5150	2860	
25		3150	3300	11700	53600	33100	12000	5360	4010	5150	2760	
26		2750	3610	11700	49200	31700	10700	5360	3830	5150	2760	
27		2630	3300	12400	47700	28900	10400	6760	3660	4750	2860	
28		2520	3610	11700	49200	25100	11000	6510	3490	4750	2760	
29			3940	10400	48500	24500	12400	6020	3330	4750	2970	
30			4110	10400	47700	23900	12400	6020	3330	4190	2970	
31			4290		50700		12000	5790		4190		
Mean		3140	3400	8480	33500	41400	15700	6730	3950	5540	3290	
Run-off acre-feet		37300	209000	505000	2060000	2460000	965000	414000	235000	321000	196000	

Unless otherwise noted, all discharges are in cubic feet per second.

FRASER RIVER NEAR ARROW.

Location.—One-fourth mile from Idlewild ranger station, in the Arapahoe National Forest, in sec. 3, T. 2 S., R. 75 W., sixth principal meridian, 2 miles from Arrow.

Records Available.—September 23, 1910, to November 5, 1914.

Gage.—Vertical staff whose location and datum have remained unchanged.

Channel.—Shifting after high water.

Discharge Measurements.—Made from log bridge to which the gage is attached.

Winter Flow.—The control remains open during the greater part of the winter and there is little if any backwater at the gage except for short periods.

Diversions.—There is a court decree for the diversion of 53 second-feet across the divide from the headwaters above the station. There are court decrees for diversions of 72 second-feet from Fraser River below.

Accuracy.—Owing to the high altitude of the drainage basin it is probable that at certain seasons there are diurnal fluctuations caused by the alternate melting and freezing. Therefore the mean daily gage height as determined by one or two readings may be considerably in error, and the estimates of discharge can not be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON FRASER RIVER NEAR ARROW.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 13	R. H. Fletcher	1.65	85	May 14	R. H. Fletcher	1.22	40
July 3	R. H. Fletcher	1.42	66	June 2	R. H. Fletcher	2.70	458
Aug. 1	R. H. Fletcher	1.20	37	June 5	R. H. Fletcher	2.40	383
Oct. 1	Robert Follansbee	1.17	32	June 6	R. H. Fletcher	2.20	314
Oct. 2	Robert Follansbee	1.11	28	Aug. 3	M. D. Anderson	1.23	74
				Aug. 4	M. D. Anderson	1.21	69

WILLIAMS FORK NEAR SCHOLL.

Location.—About 5 miles southeast of Scholl, Colo., in sec. 3, T. 2 S., R. 78 W., at the Horseshoe ranger station in the Arapahoe National Forest. Nearest important tributary, the South Fork, enters from the east three-quarter mile above the station.

Records Available.—September 22, 1910, to November 30, 1914.

Drainage Area.—141 square miles.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge Measurements.—Made by wading a short distance below the gage.

Winter Flow.—Ice causes some backwater during the winter months.

Diversions.—There are court decrees for the diversion of 858 second-feet from Williams Fork above the station. Of this amount 700 second-feet are to be diverted to the eastern slope. This latter diversion has not yet been made.

Accuracy.—Results are considered good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS OF WILLIAMS FORK RIVER NEAR SCHOLL.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 12	R. H. Fletcher	2.40	393	Mar. 8	R. H. Fletcher	1.02	41
July 2	R. H. Fletcher	2.20	310	May 19	R. H. Fletcher	2.65	586
Oct. 8	R. H. Fletcher	1.36	74	June 4	R. H. Fletcher	3.65	1150
				Aug. 5	M. D. Anderson	2.05	199
				Aug. 27	Robert Follansbee	1.81	110
				Oct. 19	R. H. Fletcher	1.56	70

WILLIAMS FORK NEAR PARSHALL.*

Location.—On highway bridge at Field's ranch, 4 miles above the mouth of the river, about sec. 36, T. 1 N., R. 79 W. Nearest tributary is a small stream that enters from the west 2 miles below the station.

Records Available.—July 25, 1904, to November 30, 1914.

Drainage Area.—185 square miles (measured from Forest atlas).

Gage.—Vertical staff; location and datum unchanged.

Channel.—Shifting after high water.

Discharge Measurements.—Made from bridge to which the gage is attached.

Winter Flow.—The main channel is kept open by springs, but ice forms along the edges and slush ice frequently forms. The morning readings are usually affected by backwater from ice, but the afternoon readings are practically unaffected.

Diversions.—There are court decrees for the diversion of 502 second-feet from Williams Fork between this station and the one near Scholl, and 25 second-feet from tributaries. There is also a storage decree for 80,700 acre-feet from Williams Fork.

Accuracy.—Conditions are favorable for accurate results, and the estimates should be reliable.

Co-operation.—Station maintained in co-operation with the United States Geological Survey.

*Formerly designated Williams Fork near Sulphur Springs.

DISCHARGE MEASUREMENTS ON WILLIAMS FORK NEAR PARSHALL.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 26*	C. L. Chatfield		45
May 12	R. H. Fletcher	4.07	413
July 2	R. H. Fletcher	3.80	273
Oct. 8	Robert Follansbee	3.19	90

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 28	R. H. Fletcher	2.92	49
Mar. 8	R. H. Fletcher	2.85	44
May 18	R. H. Fletcher	4.20	488
June 4	R. H. Fletcher	4.97	1360
Aug. 5	M. D. Anderson	3.34	156
Aug. 27	Robert Follansbee	3.15	117
Oct. 19	R. H. Fletcher	3.00	86

*Ice conditions.

Discharge of Fraser River near Arrow for 1913.

Drainage Area, 16 Square Miles. Altitude, 9,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					18	230	79	50	30	40	16	
2					36	298	79	48	28	33	16	
3					36	210	79	44	26	33	26	
4					36	238	64	50	33	44	24	
5					31	148	64	44	38	37	26	
6					36	148	64	40	33	30	28	
7					46	136	61	38	44	28	20	
8					46	136	61	38	57	28	26	
9					58	115	67	33	48	28	26	
10					52	115	67	33	40	33	24	
11					58	159	76	33	44	38	24	
12					71	126	57	33	44	40	16	
13					75	115	57	38	33	33	19	
14					71	115	57	33	38	26	22	
15					52	115	57	30	44	24	16	
16					52	115	57	30	50	24	14	
17					64	106	76	29	49	24	13	
18					64	106	72	28	48	24	13	
19					71	115	64	28	44	24	13	
20					71	115	57	28	38	24	13	
21					58	115	72	28	33	16	13	
22					52	106	64	26	33	19	13	
23					64	106	68	26	36	16	13	
24				18	78	115	72	33	33	19	13	
25				22	107	96	72	26	33	44	13	
26				10	136	88	72	24	28	24	13	
27				16	131	96	67	24	28	28	13	
28				22	121	96	57	26	28	33	13	
29				22	154	79	57	24	28	53	13	
30				22	230	79	57	24	30	57	13	
31					228		53	26		36		
Mean				18.8	81.0	131	65.4	32.7	37.3	31.0	17.5	
Run-off acre-feet				261	4980	7800	4020	2010	2220	1910	1040	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Fraser River near Arrow for 1914.
Drainage Area, 16 Square Miles. Altitude 9,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				10	10	445	184	82	46	26	20	
2		9	7	10	9	473	169	78	42	26	20	
3				10	10	507	136	75	40	26	23	
4				9	10	507	130	74	40	25	23	
5	8	10	6	9	13	422	123	69	35	24	23	
6				9	13	338	116	74	34	23		
7				9	13	322	110	72	34	23		
8	8			10	20	306	105	70	30	23		
9		9	4	10	28	275	105	70	30	23		
10				8	39	275	101	70	28	23		
11				7	50	291	98	66	28	23		
12	8	5	4	7	44	306	98	62	28	23		
13				7	38	338	99	59	28	23		
14				8	44	354	101	59	28	23		
15	4			10	50	371	98	56	28	23		
16		6	4	10	48	354	82	50	28	20		
17				10	54	354	82	45	28	20		
18				10	61	338	81	40	28	20		
19	8	5	5	10	67	338	84	42	28	20		
20				9	82	338	87	42	28	20		
21				12	106	322	86	42	28	22		
22	7			13	164	306	98	40	28	23		
23		8	8	13	247	306	92	40	28	23		
24				14	257	275	87	40	26	22		
25				13	267	275	84	40	26	22		
26	8	9	9	12	330	239	81	41	26	23		
27				10	362	219	78	40	26	23		
28				10	375	213	72	41	26	23		
29	8			10	412	205	69	46	26	23		
30			10	13	385	199	76	44	26	20		
31					415		82	41		20		
Mean	7.4	7.6	6.3	10.1	130	327	99.8	55.2	30.2	22.6	21.8	
Run-off acre-feet	455	422	387	601	7990	19500	6140	3390	1800	1390	120	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Williams Fork River near Scholl for 1913.
Drainage Area, 141 Square Miles. Altitude, 9,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					190	770	322	111	84	102	68	48
2					175	710	280	111	84	102	61	54
3					160	680	280	111	84	92	61	48
4					160	620	260	111	135	92	68	48
5					160	620	242	111	111	76	61	48
6					208	590	242	111	111	92	61	50
7					208	505	225	92	111	92	61	50
8					242	478	225	92	111	84	61	55
9					242	450	225	92	102	76	61	55
10					260	505	225	102	92	92	54	55
11					300	680	208	111	92	111	61	60
12					370	532	190	123	92	76	68	60
13					345	478	160	102	76	92	61	61
14					300	478	175	92	84	92	61	54
15					260	505	190	92	135	84	61	54
16					260	505	190	84	123	76	42	48
17					280	505	225	76	102	68	68	48
18					322	560	225	76	84	68	61	48
19					322	620	208	76	76	76	61	48
20					300	560	190	84	76	68	61	37
21					260	505	208	84	76	68	54	42
22					280	505	175	76	76	76	42	42
23					370	478	225	84	76	76	42	48
24					422	478	225	84	76	76	68	48
25					478	422	175	76	84	76	84	48
26					532	395	160	84	92	54	54	48
27				111	560	395	160	84	92	61	42	48
28				160	560	395	135	84	76	76	48	48
29				160	680	370	135	92	76	48	42	48
30				208	770	322	135	76	76	48	68	42
31					800		123	92		68		48
Mean				160	348	521	205	89.5	92.2	78.6	58.9	49.6
Run-off acre-feet				1270	21400	31000	12600	5500	5490	4830	3500	3050

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Williams Fork River near Scholl for 1914.
Drainage Area, 141 Square Miles. Altitude, 9,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	42	36	39	44	131	1560	800	248	103	75	55	
2	42	34	45	45	138	1600	710	248	96	72	53	
3	42	33	40	52	146	1390	680	248	85	74	43	
4	42	34	48	51	154	1260	680	232	82	67	39	
5	42	34	46	57	162	1160	710	214	75	61	38	
6	37	36	42	60	157	1120	620	199	75	61	37	
7	37	36	42	60	188	962	620	188	75	64	39	
8	37	36	41	57	270	865	545	188	66	68	40	
9	37	34	36	55	370	865	545	188	66	75	46	
10	42	37	39	55	445	962	545	188	64	68	44	
11	48	34	42	55	450	1060	490	155	64	68	42	
12	48	34	42	48	450	1160	480	137	64	64	44	
13	48	36	42	60	385	1290	480	137	75	72	40	
14	42	34	42	72	385	1420	430	125	78	61	39	
15	37	34	40	85	410	1460	420	125	75	61	44	
16	37	38	48	87	450	1290	420	112	80	59	44	
17	37	34	44	80	460	1320	445	107	72	72	44	
18	34	31	44	73	490	1260	445	107	72	59	46	
19	37	31	40	62	538	1290	420	107	64	72	44	
20	42	33	42	90	620	1360	370	107	64	74	45	
21	37	31	37	94	705	1320	360	107	100	72	45	
22	36	34	48	102	795	1290	370	112	87	77	46	
23	34	31	50	109	855	1220	352	108	75	85	47	
24	34	31	45	111	985	1190	300	99	64	72	45	
25	33	39	44	104	920	1190	275	96	62	74	46	
26	34	33	42	109	952	1040	275	90	62	74	43	
27	36	34	42	105	1020	930	305	99	62	67	42	
28	29	33	44	104	1180	898	290	104	62	64	40	
29	30		42	124	1120	865	280	110	60	64	30	
30	32		39	131	1250	832	262	116	61	64	37	
31	34		46		1500		280	99		61		
Mean	38.0	34.1	42.7	78.0	583	1180	458	145	73.0	68.4	42.9	
Run-off acre-feet	2340	1890	2630	4640	35800	70200	28200	8920	4340	4210	2550	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Williams Fork near Parshall for 1913.
Drainage Area, 198 Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					271	795	364	102	83	127	80	59
2					250	850	332	106	76	122	73	56
3					218	690	313	102	100	110	76	53
4					195	740	303	106	94	122	73	56
5					225	600	284	98	87	115	68	56
6					246	600	241	94	115	112	68	56
7					275	560	218	90	142	102	73	63
8					298	525	203	87	100	92	60	65
9					284	490	195	90	106	96	70	61
10					313	525	188	100	112	100	68	61
11				90	374	640	178	87	90	80	73	
12				78	430	560	169	122	83	98	76	
13				87	374	490	162	94	82	94	82	
14				92	369	525	175	88	75	108	82	
15				148	303	490	178	87	134	110	75	
16				162	343	490	165	87	120	94	49	
17				188	313	490	218	73	94	87	75	
18				210	343	525	206	76	90	83	69	
19				218	353	600	203	75	82	76	70	
20				210	333	525	218	75	75	90	69	
21				218	298	525	206	83	76	88	70	
22				185	267	490	169	80	73	92	63	
23				151	364	490	175	76	94	80	36	
24				110	374	460	258	75	115	80	49	
25				129	430	430	206	76	88	90	76	
26				132	525	430	210	76	82	66	72	
27				127	600	402	195	75	75	63	56	
28				182	600	402	172	98	92	76	58	
29				182	690	430	145	80	92	58	57	
30				246	795	369	129	75	94	73	51	
31					740		108	79		88		
Mean				157	380	538	209	87.5	94	92.6	67.2	58.6
Run-off acre-feet				6230	23400	32000	12900	5380	5590	5690	4000	1160

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Williams Fork near Parshall for 1914. Drainage Area, 198 Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	66	51	43	59	145	1550	735	232	117	81	94	
2	70	61	43	60	148	1610	645	228	107	79	94	
3	60	63	43	68	124	1500	645	200	101	77	81	
4	60	60	40	76	151	1210	645	187	94	74	80	
5	58	61	44	75	180	1160	645	169	94	71	91	
6	57	57	54	70	175	1100	605	158	89	69	80	
7	57	63	49	68	180	940	530	152	87	77	77	
8	49	58	44	63	233	835	565	152	87	85	75	
9	54	54	51	63	322	785	495	150	91	91	66	
10	49	60	54	65	402	835	465	145	86	86	64	
11	60	63	42	63	374	992	435	143	80	82	65	
12	54	54	40	68	374	1100	435	134	81	86	64	
13	49	46	39	70	369	1160	435	125	76	94	68	
14	54	45	40	96	369	1440	435	123	75	86	69	
15	49	44	52	115	374	1440	424	117	87	94	85	
16	51	43	40	140	460	1100	402	115	91	96	75	
17	49	44	66	117	460	1160	351	113	89	92	75	
18	49	42	50	90	460	1100	371	109	86	91	65	
19	49	43	50	80	490	1210	341	107	80	89	72	
20	46	47	51	102	525	1260	308	105	76	94	75	
21	49	49	43	129	640	1210	313	101	87	94	65	
22	58	46	39	120	795	1210	294	113	91	98	65	
23	57	47	43	151	850	1040	277	107	87	107	82	
24	51	47	50	129	1020	1040	251	101	87	98	73	
25	58	43	50	115	1020	888	260	94	82	101	73	
26	50	41	50	129	960	835	224	98	80	98	73	
27	49	44	53	129	1070	785	221	113	81	98	73	
28	49	48	50	129	1240	835	221	103	86	98	75	
29	42		50	122	1070	835	236	138	82	98	67	
30	49		53	132	1240	735	228	121	82	98	70	
31	50		52		1240		268	115		94		
Mean	53.3	50.9	47.4	96.4	563	1100	410	134	87.3	89.6	74.4	
Run-off acre-feet	3280	2830	2910	5740	34600	65500	25200	8240	5190	5510	4430	

Unless otherwise noted, all discharges are in cubic feet per second.

BLUE RIVER AT DILLON.

Location.—At the cemetery bridge on the outskirts of Dillon, in sec. 18, T. 5 S., R. 77 W., on the edge of the Leadville National Forest, a short distance above the mouth of Snake River. Ten-mile Creek also enters below the station.

Records Available.—October 15, 1910, to November 30, 1914.

Drainage Area.—110 square miles.

Gage.—Vertical staff; location and datum unchanged.

Channel.—Practically permanent.

Discharge Measurements.—Made by wading near by.

Winter Flow.—Ice causes backwater during the winter and discharge measurements are made to determine the flow.

Diversions.—There are court decrees for diversions of 2.3 second-feet from Blue River above the station and 68 second-feet below. There is an unadjudicated diversion from the headwaters of the Blue across Boreas Pass to Tarryall Creek. There are also decrees for diversions of 5 second-feet from tributaries entering above. In addition, there are decrees for placer mining, where practically all of the water used is returned to the river.

Accuracy.—Owing to the high altitude of this station alternate melting and freezing is likely to cause considerable diurnal fluctuations at certain seasons of the year, and the mean daily gage height based on one gage reading may be considerably in error. For this reason it is probable that the estimates cannot be considered better than fair for certain months.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON BLUE RIVER AT DILLON.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 27	R. H. Fletcher	1.80	70	June 10	Robert Follansbee	3.39	655
June 23	R. H. Fletcher	2.80	385	Aug. 19	Robert Follansbee	2.28	138
Oct. 15	Robt. F. Follansbee	1.78	64	Sept. 12	S. C. Hulse	2.00	92
				Sept. 30	Follansbee & Hulse	1.86	68

TEN-MILE CREEK AT DILLON.

Location.—At the highway bridge in Dillon, Colo., in sec. 18, T. 5 S., R. 77 W., 300 yards above the mouth of the creek. Nearest tributary, Canon Creek, enters from the west about 4 miles above the station.

Records Available.—October 15, 1910, to November 18, 1914.

Drainage Area.—113 square miles (measured from Forest Atlas).

Gage.—Vertical staff; location and datum unchanged.

Channel.—Practically permanent.

Discharge Measurements.—Made by wading near the bridge.

Winter Flow.—Ice causes backwater during the winter months, and discharge measurements are made to determine the flow during that period.

Diversions.—There are court decrees for diversions of 3.7 second-feet from Ten-mile Creek above the station and 14.5 second-feet from tributaries entering above.

Accuracy.—Owing to the high altitude of this station alternate melting and freezing are likely to cause considerable diurnal fluctuations at certain seasons of the year, and the mean daily gage height based on one gage reading may be considerably in error. For this reason it is probable that the estimates can not be considered better than fair for certain months.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS TEN-MILE CREEK AT DILLON.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 26	R. H. Fletcher	1.95	63	June 10	Robt. Follansbee	3.36	795
June 23	R. H. Fletcher	2.80	362	Aug. 19	Robt. Follansbee	2.06	82
Oct. 15	Robt. Follansbee	1.85	53	Sept. 12	S. C. Hulse	1.90	56

SNAKE RIVER AT DILLON.

Location.—At a highway bridge 200 yards above the mouth of the river in sec. 18, T. 5 S., R. 77 W. Nearest tributary is a small stream that enters from the north 1 mile above the station.

Records Available.—October 15, 1910, to November 18, 1914.

Drainage Area.—92 square miles (measured from Forest Atlas).

Gage—Vertical staff; location and datum unchanged.

Channel.—Practically permanent.

Discharge Measurements.—Made by wading above the bridge.

Winter Flow.—Ice gorging causes backwater of varying amount. During 1912 the control remained open most of the winter.

Diversions.—There are court decrees for diversions of 4.5 second-feet from Snake River above the station and 11 second-feet from tributaries entering above.

Accuracy.—Owing to the high altitude of this station, alternate melting and freezing are likely to cause considerable diurnal fluctuations at certain seasons of the year, and the mean daily gage height based on one gage reading may be considerably in error. For this reason it is probable that the estimates cannot be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SNAKE RIVER AT DILLON.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 27	R. H. Fletcher	0.85	21	Jan. 8	R. H. Fletcher	0.96	21
June 23	R. H. Fletcher	1.70	224	Feb. 10	R. H. Fletcher	0.98	26
Oct. 15	Robert Follansbee	.85	22	June 10	Robert Follansbee	2.25	459
				Aug. 18	Robert Follansbee	1.23	77
				Sept. 12	S. C. Hulse	0.88	30
				Sept. 30	Follansbee and Hulse	0.70	16

Discharge of Blue River at Dillon for 1913.
Drainage Area, 110 Square Miles. Altitude, 8,815 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					208	467	305	110	70	86	56	
2					225	462	285	106	70	86	57	
3					191	458	265	106	78	86	58	
4					215	435	255	106	78	86	56	
5					240	435	245	106	86	84	53	
6					265	424	235	106	132	83	56	
7					255	412	225	96	179	80	58	
8					245	424	222	86	225	78	58	
9					226	435	218	86	208	78	57	
10					208	446	208	101	191	78	57	
11						458	208	116	191	78	56	
12						480	208	131	176	74	53	
13						502	208	118	161	70	53	
14						480	208	102	151	69	50	
15						491	200	86	141	68	53	
16						502	191	86	131	68	52	
17						525	200	86	106	68	50	
18						548	208	86	102	64	49	
19						390	225	86	99	64	48	
20					265	401	235	86	96	64	48	
21				131	245	412	245	82	96	64	48	
22				131	225	401	245	78	96	60		
23				86	305	390	235	78	96	58		
24				70	345	390	225	76	96	58		
25				74	402	390	191	73	93	58		
26				78	458	379	176	70	90	58		
27				70	458	368	161	78	90	58		
28				86	458	345	146	70	88	58		
29				146	469	335	131	70	87	58		
30				225	480	325	120	70	86	58		
31					473		113	70		57		
Mean				110	312	430	211	90.5	120	69.6	53.6	
Run-off acre-feet				2180	13600	25600	13000	5560	7140	4280	2230	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Blue River at Dillon for 1914.
Drainage Area, 110 Square Miles. Altitude, 8,815 Feet Above Sea Level

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					96	1140	392	362	142	60	54	
2					99	1200	404	355	142	58	54	
3					103	1180	415	348	118	58	54	
4					106	1130	399	324	115	58	54	
5					142	1080	382	281	106	54	50	
6					191	945	365	281	106	54	49	
7					202	805	348	260	104	54	48	
8					214	665	348	220	88	49	48	
9					225	570	348	205	88	46	48	
10					275	665	328	190	74	46	48	
11					325	940	308	184	74	46	48	
12					354	968	314	178	92	46	48	
13					383	995	320	168	97	60	48	
14					412	980	326	158	94	71	48	
15				40	446	965	332	148	74	67	48	
16				42	480	880	338	141	73	63	48	
17				45	560	742	343	135	88	58	48	
18				48	640	795	348	128	83	58	48	
19				51	628	850	325	122	83	58	47	
20				54	615	805	302	95	88	58	47	
21				58	765	760	319	138	83	55	47	
22				62	802	715	335	188	71	54	47	
23				66	840	696	348	166	71	54	46	
24				70	857	667	348	131	71	54	46	
25				78	874	638	348	134	67	54	46	
26				82	890	574	336	136	67	54	46	
27				86	940	510	324	138	67	54	46	
28				86	1000	480	336	140	67	54	46	
29				86	1060	450	348	140	61	54	46	
30				91	1090	420	359	140	60	54	46	
31					1110		370	140		54		
Mean				65.3	539	807	347	189	87.2	55.4	48.2	
Run-off acre-feet				2070	33100	48000	21300	11600	5190	3410	2870	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Ten Mile Creek at Dillon for 1913.
Drainage Area, 113 Square Miles. Altitude, 8,815 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					194	715	265	74	54	48	34	
2					230	672	239	69	54	48	36	
3					177	610	212	67	54	48	37	
4					235	660	194	65	54	48	36	
5					294	610	177	63	61	48	34	
6					353	560	168	61	70	48	34	
7					301	510	160	57	115	46	34	
8					249	535	152	54	129	44	37	
9					240	560	144	54	89	44	36	
10					230	535	144	66	69	44	35	
11					238	510	129	78	54	44	35	
12					246	420	125	89	54	46	34	
13					254	465	120	79	54	48	32	
14					262	465	115	66	54	48	32	
15					270	488	122	54	54	48	34	
16					278	510	129	54	54	48	34	
17					286	510	144	53	54	48	34	
18					294	660	160	52	53	48	34	
19					302	398	144	52	53	46	34	
20					301	420	152	48	52	44	34	
21				212	280	442	160	45	53	44	34	
22				212	249	420	151	42	54	42		
23				89	420	398	148	42	54	42		
24				69	735	375	144	42	54	41		
25				65	948	353	129	42	54	40		
26				61	1160	342	115	42	54	38		
27				75	1010	331	102	48	48	37		
28				89	910	289	89	54	48	37		
29				177	885	289	89	54	48	37		
30				212	860	289	84	54	48	37		
31					777		79	54		36		
Mean				126	435	478	145	57.2	60.0	44.0	34.5	
Run-off acre-feet				2500	26700	28400	8920	3520	3570	2700	1440	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Ten Mile Creek at Dillon for 1914.
Drainage Area, 113 Square Miles. Altitude, 8,815 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					70	1380	400	184	70	49	45	
2					86	1410	432	177	67	53	49	
3					101	1440	465	170	64	53	49	
4					116	1360	434	150	62	53	48	
5					152	1270	403	133	62	49	49	
6					187	1200	372	116	58	45	49	
7					200	1130	340	110	68	49	49	
8					215	1050	312	103	55	53	49	
9					230	995	260	96	55	53	49	
10					262	782	212	90	53	49	49	
11					295	1220	212	90	55	45	49	
12					317	1300	212	90	55	43	49	
13					339	1380	212	86	58	49	49	
14					361	1340	212	83	58	55	49	
15				24	406	1300	212	80	55	49	49	
16				26	450	1220	212	80	55	45	50	
17				29	635	1060	212	80	55	45	53	
18				32	820	1040	212	80	55	43	53	
19				35	832	1020	212	80	53	43		
20				38	845	991	212	74	55	43		
21				42	1100	963	212	74	53	43		
22				46	1090	935	212	86	53	43		
23				50	1080	910	212	95	49	43		
24				55	1070	884	201	74	49	43		
25				62	1060	858	190	70	49	43		
26				66	1050	783	190	70	49	45		
27				70	1160	708	190	74	49	49		
28				70	1210	631	190	74	49	49		
29				70	1270	554	190	74	49	49		
30				70	1300	477	190	74	49	47		
31					1340		190	74		46		
Mean				49.1	634	1050	255	96.5	55.5	47.3	49.2	
Run-off acre-feet				1560	39000	62500	15700	5930	3300	2910	1760	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Snake River at Dillon for 1913.
Drainage Area, 92 Square Miles. Altitude, 8,815 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					82	300	180	76	35	25	16	
2					70	300	174	70	35	25	16	
3					35	300	169	68	35	25	16	
4					74	280	152	65	35	23	18	
5					113	280	136	62	30	23	21	
6					152	251	128	60	37	23	16	
7					136	222	121	65	44	22	11	
8					121	222	114	70	50	21	14	
9					114	222	108	70	35	21	13	
10					108	261	94	78	35	21	12	
11						300	108	86	35	21	11	
12						342	103	94	35	21	11	
13						364	98	70	35	21	10	
14						342	94	50	33	21	10	
15						342	115	42	31	21	11	
16						342	136	35	30	21	11	
17						342	161	35	30	21	11	
18						364	186	35	30	20	11	
19						241	204	35	30	20	11	
20					152	250	204	35	30	20	35	
21				136	136	260	204	32	30	19	35	
22				136	121	241	222	30	30	19		
23				30	186	222	204	35	30	19		
24				21	280	213	186	35	30	19		
25				21	322	204	169	35	28	19		
26				21	364	195	152	35	25	19		
27				25	342	186	130	42	25	19		
28				30	300	152	108	35	25	19		
29				42	300	169	94	35	25	19		
30				70	300	186	88	35	25	17		
31					300		82	35		17		
Mean						263	143	51.1	32.1	20.1		
Run-off acre-feet						15600	8790	3140	1910	1240		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Snake River at Dillon for 1914.
Drainage Area, 92 Square Miles. Altitude, 8,815 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		25	19	37	60	718	321	254	61	17	14	
2	25	25	17	39	60	718	342	248	61	17	14	
3		25	18	42	60	718	364	241	48	17	14	
4		25	19	42	60	704	343	241	34	17	14	
5		25	21	42	71	690	322	204	34	17	14	
6	22	26	23	42	82	671	301	204	34	17	14	
7		26	25	42	86	653	280	186	34	17	14	
8	21	26	25	42	90	635	270	169	34	17	14	
9		26	25	42	94	505	260	160	32	17	14	
10		26	25	42	101	625	280	152	29	17	14	
11		27	25	45	108	745	260	130	29	17	14	
12		27	25	50	117	860	258	108	29	18	14	
13		28	25	82	126	975	256	100	26	18	14	
14		24	26	50	136	945	253	91	32	18	14	
15		24	27	42	161	915	250	82	23	18	14	
16		24	29	42	186	975	247	80	23	18	14	
17		24	30	42	223	690	244	79	23	17	14	
18		23	30	42	260	745	241	78	21	17	14	
19		22	30	42	260	800	222	73	21	17		
20		22	30	42	260	745	204	73	23	16		
21		21	30	42	321	690	210	68	18	14		
22		20	32	44	353	635	216	118	18	14		
23		19	35	47	385	609	222	102	18	14		
24		18	35	50	400	582	232	82	17	14		
25		17	35	50	415	555	241	62	17	14		
26		18	35	55	430	492	260	62	17	14		
27		20	35	60	480	430	280	56	17	14		
28		21	35	60	558	398	280	56	16	14		
29			35	60	635	365	280	62	16	14		
30			35	60	653	332	280	56	16	14		
31			36		671		260	56		14		
Mean	*22.0	23.4	28.1	47.3	255	671	267	120	27.4	16.1	14.0	
Run-off acre-feet	1350	1300	1730	2810	15700	39900	16400	7380	1630	990	830	

Unless otherwise noted, all discharges are in cubic feet per second. *Estimated.

EAGLE RIVER AT RED CLIFF.

Location.—In sec. 30, T. 6 S., R. 80 W., in the town of Red Cliff, in the Holy Cross National Forest, 100 yards above mouth of Turkey Creek, and 1 mile above the mouth of Homestake Creek.

Records Available.—January 1, 1911, to November 30, 1914.

Drainage Area.—74 square miles.

Gage.—Chain gage; location and datum unchanged.

Channel.—Shifting after high water.

Discharge Measurements.—Made from highway bridge at station during high water and by wading at ordinary stages.

Winter Flow.—Little, if any, ice forms at this station.

Diversions.—There are court decrees for diversions of 22 second-feet from Eagle River and tributaries above the station; 18.5 second-feet of this amount for diversion to the Arkansas Basin.

Accuracy.—Owing to the high altitude of the drainage basin, alternate melting and freezing possibly cause diurnal fluctuations of stage at certain seasons; therefore, the mean daily stage as determined from two readings per day may be somewhat in error. For that reason the estimates cannot be considered better than good.

Co-operation.—Station maintained by the United States Geological Survey, in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON EAGLE RIVER AT RED CLIFF, COLO.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 28	R. H. Fletcher	1.70	90	Jan. 9	R. H. Fletcher	0.66	10
June 30	R. H. Fletcher	1.63	85	Feb. 11	R. H. Fletcher	.68	12
Sept. 7	R. H. Fletcher	.95	28	June 11	Robert Follansbee	2.65	384
				Aug. 17	Robert Follansbee	.89	28
				Oct. 14	Robert Follansbee	.69	17

EAGLE RIVER AT EAGLE.

Location.—At the highway bridge at Eagle, in Eagle County, three-fourths of a mile above the mouth of Brush Creek.

Records Available.—March 12, 1905, to February 10, 1907, at site a short distance below the mouth of Brush Creek; January 17, 1911, to November 17, 1914, at present site.

Drainage Area.—630 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from highway bridge at ordinary and high stages and by wading during low water.

Winter Flow.—Ice causes backwater during the winter. Discharge measurements are made to determine the winter flow.

Diversions.—Between Eagle and the Station at Red Cliff there are court decrees for diversions of 50 second-feet from Eagle River and for diversions of 286 second-feet from intervening tributaries. Between Eagle and the mouth there are decrees for 28 second-feet from Eagle River.

Accuracy.—Except for the meager gage heights, which make the estimates for the later part of the year somewhat uncertain, the records are considered good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON EAGLE RIVER AT EAGLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 30	R. H. Fletcher	1.70	967	June 12	Robert Follansbee	4.48	4090
June 28	R. H. Fletcher	2.00	1120	Aug. 8	M. D. Anderson	1.19	504
Sept. 6	R. H. Fletcher	.62	258				

TURKEY CREEK AT RED CLIFF, COLORADO.

Location.—At highway bridge in Red Cliff, 800 feet above the mouth of the creek.

Records Available.—June 30, 1913, to November 30, 1914.

Drainage Area.—27 square miles.

Gage.—Vertical staff.

Control.—Data too meager to determine.

Discharge Measurements—Made from single span bridge, and by wading.

Winter Flow.—Ice causes backwater during the winter months, and discharge measurements are made to determine the flow.

Accuracy.—Owing to the high altitude of the station (8,600 feet), it is probable that at certain seasons there are diurnal fluctuations of stage, due to alternate melting and freezing. For that reason the mean daily gage height, based on one reading, may be considerably in error, and therefore the estimates are considered fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS OF TURKEY CREEK AT RED CLIFF, COLO.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
June 30	R. H. Fletcher	1.73	59
Sept. 7	R. H. Fletcher	1.18	13

Discharge of Eagle River at Red Cliff for 1913.
Drainage Area, 74 Square Miles. Altitude, 8,598 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					180	310	68	31	18	31	15	12
2					142	292	68	31	18	38	17	7
3					98	370	64	31	21	31	18	4
4					180	292	60	31	21	31	18	8
5					150	275	56	24	21	28	13	9
6					180	225	56	30	25	24	15	12
7					195	168	56	24	30	d 4	15	18
8				38	180	168	52	24	34	d 3	15	15
9				28	210	168	52	24	28	d 3	15	12
10				18	225	180	58	28	28	d 4	15	12
11				18	210	180	54	24	23	d 5	15	12
12				31	275	186	48	31	21	18	15	12
13				45	330	168	48	30	21	21	15	10
14				70	275	180	48	28	26	21	15	9
15				98	168	180	48	24	31	21	13	7
16				106	155	180	52	24	24	18	13	7
17				98	180	168	52	22	24	18	12	7
18				103	180	180	58	21	21	17	12	7
19				118	180	180	56	21	21	18	12	7
20				106	258	210	56	24	21	18	12	7
21				125	204	186	56	31	22	21	12	7
22				106	210	130	52	31	24	21	12	7
23				90	195	155	56	21	25	21	12	7
24				68	216	125	78	21	24	21	12	7
25				66	390	130	60	21	21	21	12	7
26				60	350	84	56	21	23	20	12	7
27				73	390	84	52	21	21	18	12	7
28				88	370	78	46	21	21	18	12	7
29				103	350	78	45	21	21	10	12	7
30				180	358	78	38	18	21	18	12	7
31					310		34	18		18		7
Mean				79.8	235	180	54.3	24.9	23.3	18.7	13.7	8.74
Run-off acre-feet				3640	14400	10700	3340	1530	1390	1150	815	537

Unless otherwise noted, all discharges are in cubic feet per second.

d Filling Pando ice ponds.

Discharge of Eagle River at Red Cliff for 1914.
Drainage Area, 74 Square Miles. Altitude, 8,598 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6	12	10	17	76	750	117	53	31	22	23	11
2		12	11	17	74	750	117	51	28	24	23	11
3		12	13	25	73	750	113	49	26	21	22	12
4		12	8	31	72	700	106	43	24	21	18	14
5	7	11	11	36	76	605	119	38	24	20	15	13
6		11	10	42	80	470	66	38	24	22	15	12
7		11	12	38	84	390	63	38	23	22	15	10
8		11	18	30	120	390	64	38	22	22	14	10
9	10	11	23	31	180	430	64	36	22	22	14	14
10		11	10	31	210	390	66	34	22	23	13	7
11		11	8	28	310	590	66	33	20	22	15	9
12	10	11	5	32	225	410	68	29	22	22	16	9
13		11	18	35	210	432	68	29	22	23	18	9
14		10	5	37	225	346	62	28	22	19	17	7
15		9	8	52	240	455	64	29	24	a 6	17	5
16		9	10	68	210	367	60	28	27	5	16	7
17	10	8	24	62	240	268	63	27	22	4	18	6
18		7	12	51	430	250	64	30	22	5	13	6
19		7	12	52	470	268	62	28	22	5	19	5
20	10	10	7	55	515	187	62	26	22	4	13	5
21		11	4	65	538	160	59	28	33	a 5	6	7
22		10	7	68	700	155	61	35	28	13	5	4
23		10	10	76	700	146	56	32	22	24	9	4
24	10	12	12	68	750	132	52	30	22	27	9	5
25		10	5	66	582	141	43	29	21	b 34	9	4
26		8	18	79	538	128	44	30	21	b 34	10	5
27		8	23	92	560	141	46	29	20	25	15	5
28	7	10	15	70	605	132	66	33	21	23	12	4
29			15	74	560	123	60	38	24	19	12	4
30			15	b 155	605	120	62	34	23	23	12	4
31	12		17		700		66	29		22		4
Mean	9.1	10.2	12.1	52.8	353	353	69.3	33.9	23.5	18.8	14.4	7.5
Run-off acre-feet	*560	566	744	3140	21700	21000	4260	2080	1400	1160	857	461

Unless otherwise noted, all discharges are in cubic feet per second.

a Filling Pando ice ponds. b Letting water out of ponds. *31 days.

Discharge of Eagle River at Eagle for 1913.
Drainage Area, 630 Square Miles. Altitude, 6,588 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					1180	3410	1090	490	295	385	295	
2					1180	3020	1000	435	251	340	295	
3					1180	2650	975	435	251	295	295	
4					840	2410	950	390	208	340	295	
5					920	2410	920	340	208	385	295	
6					1270	2300	960	337	208	385	251	
7					1460	2070	1000	333	251	385	251	
8				273	1360	1960	1000	329	295	385	251	
9				208	1460	2070	1000	325	340	385	251	
10				208	1550	2180	1000	321	340	340	251	
11				208	1650	2530	920	318	340	295	251	
12				230	1860	2070	895	330	340	340	208	
13				251	1960	1750	870	340	340	340	240	
14				318	2070	1650	840	350	340	295	273	
15				463	1650	2070	685	360	385	295	208	
16				463	1360	2180	700	365	295	340	208	
17				800	1360	2070	720	365	340	295	208	
18				880	1460	2180	740	380	340	295	208	
19				685	1860	2300	770	390	340	340	208	
20				760	1650	2070	850	435	340	340	208	
21				840	1550	1960	937	385	295	385	187	
22				760	1360	1650	1240	340	295	340	166	
23				550	1860	1860	1550	295	340	340	166	
24				490	2180	1650	1550	295	295	295	166	
25				385	2650	1650	1550	251	295	340	166	
26				273	3020	1550	1180	251	295	295	166	
27				550	3410	1550	1180	251	340	295	166	
28				520	3150	1460	950	295	385	295	166	
29				723	3280	1270	720	295	385	295	166	
30				1000	3550	1180	490	295	385	295	146	
31					3410		490	295		295		
Mean				515	1890	2040	959	342	312	336	220	
Run-off acre-feet				23500	116000	121000	59000	21000	18600	20300	13100	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Eagle River at Eagle for 1914.
Drainage Area, 630 Square Miles. Altitude, 6,588 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				251	650	6310	1860	1180	435	304	295	
2				295	615	6310	1750	1090	435	295	286	
3				322	615	6610	1550	1000	410	295	286	
4				318	615	6010	1960	760	410	331	286	
5				298	685	4670	2070	722	410	340	251	
6				277	685	4110	1860	685	410	331	230	
7				362	685	3760	1550	650	410	318	230	
8				340	760	3410	1550	615	410	331	219	
9				308	962	2530	1550	582	385	385	208	
10				308	1360	2770	1460	615	376	349	208	
11				277	1960	4250	1360	550	340	304	208	
12				264	1360	4670	1460	550	340	295	200	
13				251	1550	4810	1460	490	349	295	200	
14				295	1650	4960	1270	462	376	295	187	
15				435	1860	5110	1360	435	340	295	166	
16				615	1750	4250	1270	435	340	295	146	
17				582	1860	3970	1270	410	340	295	166	
18				435	1960	4250	1650	410	340	295		
19				462	2530	4530	1460	410	340	295		
20				490	2890	4250	1270	410	340	273		
21				462	3690	3970	1360	410	385	284		
22				410	4670	3150	1750	425	435	296		
23				462	5260	3020	1270	550	395	307		
24				615	5480	2650	1050	462	349	318		
25				550	5710	2410	1000	425	340	251		
26				582	5410	2410	1000	410	340	295		
27				615	5410	2300	1090	410	340	295		
28				615	5560	2070	1270	425	340	273		
29				650	5410	1960	1180	685	318	251		
30				615	5710	1860	1090	615	318	295		
31					6010		1550	520		295		
Mean				425	2750	3910	1440	574	370	302	222	
Run-off acre-feet				25300	169000	233000	88500	35300	22000	18600	7480	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Turkey Creek at Red Cliff for 1913.
Drainage Area, 27 Square Miles. Altitude, 8,598 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							55	19	13	14	9	
2							55	19	12	12	8	
3							55	17	12	12	8	7
4							49	17	12	12	5	
5							45	17	12	12	5	
6							44	17	12	12	6	7
7							43	16	13	7	9	
8							35	17	14	10	14	
9							35	15	12	10	13	7
10							35	15	12	10	12	
11							31	15	12	10	9	
12							31	16	12	10	8	7
13							29	16	11	10	8	
14							29	15	11	10	8	
15							29	14	12	9	8	
16							31	12	12	8	8	
17							31	13	12	10	8	7
18							29	14	10	10	8	
19							27	14	10	10	9	
20							25	14	11	9	8	7
21							25	14	10	8	8	
22							25	14	11	10	8	7
23							24	13	11	12	8	
24							25	13	12	12	8	
25							22	14	11	10	7	
26							22	14	11	10	7	
27							22	14	11	9	7	7
28							22	14	12	9	8	
29							20	14	12	9	8	7
30							19	14	12	9	7	
31							19	13		10		
Mean							31.9	14.9	11.7	10.2	8.2	7.0
Run-off acre-feet							1960	916	696	627	488	430

Unless otherwise noted, all discharges are in cubic feet per second.

HOMESTAKE CREEK NEAR RED CLIFF.

Location.—In sec. 30, T. 6 S., R. 80 W., one-fourth mile above the mouth of the creek and three-fourths of a mile from Red Cliff; below all tributaries.

Records Available.—January 8, 1911, to November 30, 1914.

Drainage Area.—64 square miles.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge Measurements.—Made by wading near by.

Winter Flow.—Ice causes backwater, and discharge measurements are made to determine the winter flow.

Diversions.—There are court decrees for diversions of 1.2 second-feet from Homestake Creek.

Accuracy.—Owing to the high altitude of the drainage basin, alternate melting and freezing may cause diurnal fluctuations in stage during certain seasons. Therefore the mean daily gage height as determined from one reading may be considerably in error. In view of the foregoing, and of the many interpolated discharges, the estimates can not be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON HOMESTEAD CREEK NEAR RED CLIFF.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 28	R. H. Fletcher	1.55	103	Jan. 9	R. H. Fletcher	0.58	8.05
June 29	R. H. Fletcher	1.95	176	Feb. 11	R. H. Fletcher	0.50	8.61
Sept. 7	R. H. Fletcher	1.15	55	Aug. 17	Robert Follansbee	0.82*	40.0
				Oct. 14	Robert Follansbee	0.52†	14.0

*New gage put in. Old gage read 1.00.

†New gage put in. Old gage read 0.58.

ROARING FORK AT ASPEN.

Location.—In sec. 7, T. 10 S., R. 84 W., at Aspen, Colo., above Castle, Maroon, and Hunter creeks.

Records Available.—January 1, 1911, to November 30, 1914.

Drainage Area.—109 square miles.

Gage.—Vertical staff.

Channel.—Very rough and slightly shifting.

Discharge Measurements.—Made by wading, except during high water, when bridge is used.

Winter Flow.—Ice causes backwater during the winter; discharge measurements are made to determine the winter flow.

Diversions.—The Salvation ditch, which has a decree for 42 second-feet, diverts water above the station usually from the middle of May to the middle of September.

Accuracy.—Owing to the high altitude of the drainage basin, alternate melting and freezing probably cause diurnal fluctuations in stage at certain seasons. Therefore the mean daily stage, as determined from one reading, may be somewhat in error. For this reason the estimates can not be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON ROARING FORK AT ASPEN.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 6	R. H. Fletcher	1.40	228	Jan. 13	R. H. Fletcher	0.22	26
June 27	R. H. Fletcher	2.25	489	Feb. 12	R. H. Fletcher	0.10	30
Oct. 19	Robert Follansbee	.42	52				

ROARING FORK BELOW ASPEN.

Location.—In sec. 1, T. 10 S., R. 85 W., two miles below Aspen at the first highway bridge. Nearest tributary above is Castle Creek, and below, Maroon Creek.

Records Available.—October 24, 1913, to November 30, 1914.

Drainage Area.—223 square miles.

Gage.—Vertical staff. Mean stage based on one reading and the high water mark for the 24-hour period.

Control.—Apparently permanent.

Discharge Measurements.—Made from two-span bridge.

Winter Flow.—Ice causes little or no backwater during the winter months, as shown by discharge measurements.

Diversions.—Between the station at Aspen and this one there are a number of small diversions, some of which return the water to the river above the lower station. The Roaring Fork Light and Power Company diverts water from Maroon Creek into Castle Creek, and thence into Roaring Fork above the station.

Accuracy.—Owing to the high altitude of the station (7,900 feet) there are diurnal fluctuations at certain seasons, due to alternate melting and freezing. Therefore the mean daily stage as determined from one reading and the highwater mark may be somewhat in error. For this reason, and the meager gage heights, the estimates can not be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON ROARING FORK BELOW ASPEN.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan 13	R. H. Fletcher	0.21	102
Feb. 12	R. H. Fletcher	0.18	107
June 15	Robert Follansbee	2.85	2260
Aug. 10	M. D. Anderson	0.70	327

Discharge of Homestake Creek near Red Cliff for 1913. Drainage Area, 64 Square Miles. Altitude, 8,598 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					230	450	155	34	26	30	23	
2					230	395	155	38	23	56	23	
3					230	395	148	35	23	51	24	
4					230	430	148	35	23	51	25	
5					230	420	131	26	24	46	22	
6					260	395	127	26	26	40	20	
7					325	385	123	26	30	26	18	
8					290	375	123	26	51	27	17	
9				20	260	360	115	28	45	28	17	
10				26	290	360	125	30	40	30	17	
11				45	395	360	115	38	40	31	17	
12				61	395	360	86	79	34	33	17	
13				80	430	245	86	55	30	34	16	
14				115	375	205	86	46	34	30	15	
15				115	205	265	86	34	40	30	14	
16				115	166	325		30	36	30	8	
17				115	217	378	260	30	34	28	10	
18				125	220	360		30	26	28	12	
19				185	230	308	185	30	26	26	13	
20				175	260	315		34	26	26	13	
21				166	180	325		26	26	26	14	
22				125	166	290		26	26	24	14	
23				73	290	300		23	30	23	14	
24				86	395	290	217	22	28	25	14	
25				61	470	230	157	20	27	25	14	
26				51	430	260	108	20	26	25	14	
27				80	670	290	90	26	26	25	14	
28				108	490	205	73	26	26	25	14	
29				148	510	190	62	26	26	25	14	
30				195	610	176	52	26	26	25	14	
31					510		42	26		25		
Mean				103	329	321	122	31.5	30.1	30.8	16.0	
Run-off acre-feet				4490	20200	19100	6050	1940	1790	1890	952	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Homestake Creek near Red Cliff for 1914. Drainage Area, 64 Square Miles. Altitude, 8,598 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				19	86	850	430	218	46	22	18	
2				20	80	895	378	194	40	22	16	
3				20	98	940	325	171	37	22	14	
4			11	26	115	760	320	148	34	22	11	
5				32	128	635	314	124	32	22	10	
6				38	140	510	308	100	30	22	9	
7			12	46	153	510	308	93	28	22	8	
8				51	166	510	308	86	26	22	7	
9	8			46	378	550	282	80	23	23	7	
10			10	40	386	590	256	73	22	24	7	
11		9		34	395	630	230	73	22	25	7	
12				50	395	650	226	73	22	26	7	
13				67	395	670	222	62	23	26	7	
14			12	66	406	738	218	51	23	13	7	
15				65	412	805	212	42	24	14	7	
16				63	395	670	205	43	26	16	7	
17				61	412	685	218	44	24	17	7	
18				59	430	700	230	44	22	18	7	
19				67	590	715	230	44	20	20	7	
20				73	670	674	230	44	19	22	7	
21				82	630	632	230	44	34	24	6	
22				91	760	590	198	46	49	26	6	
23				100	703	550	166	48	46	25	6	
24				100	646	512	131	51	42	24	6	
25				100	590	473	140	54	39	24	7	
26				100	652	434	202	57	36	25	7	
27				100	715	395	264	60	32	26	7	
28				100	612	420	325	63	28	28	7	
29				96	510	445	285	66	25	26	7	
30				91	590	470	245	59	22	23	7	
31			19		720		232	52		20		
Mean	8.0	9.0	11.0	63.4	431	620	254	77.6	29.9	22.3	8.1	
Run-off acre-feet	492	500	676	3770	26500	36900	15600	4770	1780	1370	482	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Roaring Fork at Aspen for 1913.
Drainage Area, 109 Square Miles. Altitude, 7,931 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					142	770	365	109	55	109	67	55
2					142	885	423	102	55	109	67	
3					180	840	394	98	55	109	67	
4					226	780	365	94	55	104	67	
5					280	735	336	94	61	99	61	
6					226	690	336	85	61	94	61	
7					252	600	308	76	102	102	55	
8					280	600	308	67	142	61	45	
9				45	308	615	308	67	160	80	50	
10					336	630	294	94	156	80	55	
11				109	423	660	280	125	142	74	45	
12				125	510	600	226	100	138	84	48	
13					481	481	214	80	134	94	50	
14					481	510	202	74	130	94	55	
15					510	555	202	77	125	94	45	
16					472	600	202	80	117	67	48	
17					433	600	202	65	109	74	50	
18					394	600	202	55	109	61	49	
19					375	600	191	45	111	57	48	
20					355	600	186	50	113	59	47	
21					336	690	180	51	115	61	46	
22					365	670	214	52	117	64	45	
23				109	481	650	208	53	117	67	45	
24				109	510	630	202	54	113	67	46	
25				94	660	630	202	55	109	61	47	
26				94	690	630	170	55	105	63	48	
27				109	705	630	165	55	102	65	49	
28				125	720	570	160	55	109	67	50	
29				142	850	482	142	55	109	67	55	
30				160	885	394	126	55	109	70	55	
31					660		109	55		74		
Mean				111	441	631	239	72.0	108	78.4	52.2	
Run-off acre-feet				2420	27100	37500	14700	4430	6430	4820	3110	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Roaring Fork at Aspen for 1914.
Drainage Area, 109 Square Miles. Altitude, 7,931 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				25	98	1700	560	308	86	87	64	
2				31	106	1580	532	272	78	96	64	
3				37	112	1460	500	237	69	106	63	
4				38	117	965	468	202	60	106	62	
5				40	122	828	440	194	58	106	61	
6				42	104	690	408	187	56	106	54	
7				44	87	608	378	180	54	106	54	
8				45	160	526	362	172	52	106	53	
9				44	214	445	362	165	51	106	53	
10				44	274	635	362	158	59	106	52	
11				43	334	825	367	150	67	102	52	
12		30		44	394	1340	373	142	72	99	54	
13	26			45	423	1700	365	134	78	96	54	
14				70	452	1540	380	125	83	92	55	
15				75	481	1380	394	117	88	89	56	
16				80	540	1220	365	109	93	86	56	
17				72	555	1100	350	101	98	83	39	
18				65	570	1500	336	93	103	80	48	
19				60	715	1620	332	101	108	77	56	
20				55	860	1510	329	109	113	74	65	
21				78	1070	1410	326	117	118	80	65	
22				102	1180	1300	322	110	123	87	52	
23				122	1220	1340	312	103	107	94	39	
24				127	1080	1260	303	97	91	88	38	
25				132	930	690	294	91	75	83	36	
26				106	1100	660	318	92	74	78	34	
27				80	1180	630	342	92	72	72	32	
28				100	860	600	365	93	70	67	31	
29				96	720	570	350	92	68	66	30	
30				98	1020	540	336	90	78	66	30	
31					1360		322	98		65		
Mean	30	30	30	68.0	595	1070	373	139	80.1	88.9	50.1	
Run-off acre-feet	1840	1670	1840	4050	36600	63700	22900	8550	4770	5470	2980	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Roaring Fork below Aspen for 1913. Drainage Area, 223 Square Miles. Altitude, 7,900 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1											179	207
2											184	204
3											188	200
4											188	196
5											171	192
6											154	188
7											137	188
8											121	188
9											126	188
10											132	188
11											137	188
12											146	154
13											154	170
14											154	170
15											154	170
16											162	170
17											170	165
18											167	160
19											164	154
20											161	148
21											158	142
22											154	137
23											157	142
24										170	159	146
25										170	162	150
26										170	165	154
27										170	167	137
28										170	170	137
29										170	188	137
30										170	198	137
31										174		126
Mean										170	161	166
Run-off acre-feet										2700	9580	10200

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Roaring Fork below Aspen for 1914. Drainage Area, 223 Square Miles. Altitude, 7,900 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	116	106	108	106	233	4030	1400	530	174	184	154	
2	105	105	111	106	255	2620	1330	482	178	185	152	
3	110	104	115	107	262	2480	1250	435	183	186	151	
4	116	104	112	108	270	1810	1170	435	188	188	150	
5	121	103	110	116	275	1610	1100	390	185	196	148	
6	121	102	108	124	280	1400	1020	345	182	204	146	
7	121	103	111	132	285	1240	945	300	179	212	145	
8	121	104	114	140	368	1070	905	308	176	220	144	
9	121	105	118	150	452	905	905	316	174	220	143	
10	121	103	116	160	510	1160	905	325	176	220	142	
11	116	101	114	170	569	1690	918	300	178	215	140	
12	112	99	112	154	628	2080	932	276	177	210	140	
13	108	105	110	137	660	2480	945	252	176	205	137	
14	118	105	108	148	768	4000	925	228	175	200	136	
15	128	105	110	159	842	3660	905	218	174	195	135	
16	137	105	111	170	920	3310	832	208	188	190	134	
17	137	102	110	183	985	2960	758	198	203	185	148	
18	126	99	108	196	1050	2620	685	188	218	180	136	
19	116	102	106	202	1370	3230	702	194	232	175	124	
20	105	105	105	209	1690	3390	720	201	246	171	112	
21	106	108	106	216	2340	3160	738	208	260	170	120	
22	107	111	106	218	2700	2930	755	202	275	169	120	
23	108	114	107	220	2700	2700	672	196	252	168	120	
24	108	118	108	252	2550	2450	588	190	230	166	121	
25	108	121	108	285	2410	2200	621	185	208	165	123	
26	109	116	108	233	2000	1880	654	182	202	164	124	
27	109	110	108	181	2700	1630	687	180	195	162	125	
28	110	105	108	275	2320	1540	720	178	188	161	125	
29	110		107	237	1940	1440	672	177	181	160	125	
30	111		106	235	2410	1350	625	176	182	158	125	
31	108		105		3220		578	175		156		
Mean	115	106	109	178	1290	2300	857	264	198	185	135	
Run-off acre-feet	7070	5890	6700	10600	79300	137000	52700	16200	11800	11400	8030	

Unless otherwise noted, all discharges are in cubic feet per second.

ROARING FORK AT GLENWOOD SPRINGS.

Location.—On bridge 500 feet above the mouth of the river in Glenwood Springs. Nearest important tributary enters about 3 miles above the station.

Records Available.—April 6, 1906, to September 30, 1909; September 21, 1910, to November 30, 1914.

Drainage Area.—1,450 square miles.

Gage.—Chain gage; location and datum unchanged.

Channel.—Practically permanent, but rough. Extremely high water in Grand River may cause backwater at the gage. Measurements made at stages as high as 5.7 feet on Roaring Fork, and 9.2 feet on Grand River have shown no backwater effect.

Discharge Measurements.—Made from highway bridge.

Winter Flow.—Surface ice rarely forms entirely across the river, but slush and anchor ice frequently occur. Discharge measurements sometimes show backwater from ice.

Diversions.—There are court decrees for diversions of 196 second-feet from Roaring Fork above the station, and 795 second-feet from the various tributaries.

Accuracy.—Conditions are favorable for accurate results; estimates should be reliable.

Co-operation.—Since 1910 the station has been maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON ROARING FORK AT GLENWOOD SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 22*	R. H. Fletcher	1.52	422	Jan. 13	R. H. Fletcher	1.20	408
May 3	R. H. Fletcher	2.75	1960	Feb. 15	R. H. Fletcher	1.27	497
June 26	R. H. Fletcher	3.50	3130	Aug. 9	M. D. Anderson	2.65	1660
Sept. 4	R. H. Fletcher	1.60	667	Oct. 15	Robert Follansbee	1.98	829
Oct. 16	Robert Follansbee	1.74	756				

*Ice condition.

CASTLE CREEK NEAR ASPEN.

Location.—In sec. 35, T. 10 S., R. 85 W., in the Sopris National Forest, on the highway bridge 4 miles above Aspen. No tributary between the station and the mouth of the creek except small gulches that carry spring run-off. Nearest tributary above, Conundrum Creek, enters about 6 miles upstream.

Records Available.—February 16, 1911, to November 30, 1914.

Drainage Area.—72 square miles.

Gage.—Vertical staff. On February 29, 1912, the gage was moved to the opposite side of the creek and to the lower side of the bridge. The datum was lowered 1.00 foot, but the difference in gage readings varies. All 1912 gage heights are referred to the latter datum.

Channel.—Apparently permanent.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes some backwater at this station, and discharge measurements are made to determine the flow.

Diversions.—No water is diverted above the station. The Roaring Fork Light & Power Co. and the Newman mine divert water from Castle Creek below the station.

Accuracy.—The mean daily stage as determined from one reading may be somewhat in error, as a result of the high altitude of the station, and, therefore, the gage heights can not be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON CASTLE CREEK NEAR ASPEN.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 7	R. H. Fletcher	1.35	99	Jan. 14	R. H. Fletcher	0.90	32
June 27	R. H. Fletcher	2.20	283	Feb. 13	R. H. Fletcher	0.80	22
Oct. 19	Robert Follansbee	1.07	49	Aug. 11	M. D. Anderson	1.48	129

MAROON CREEK NEAR ASPEN.

Location.—In sec. 22, T. 10 S., R. 85 W., in the Sopris National Forest, just above the headgate of the Roaring Fork Light & Power Co., 5 miles above Aspen, Colo. Nearest tributary, Willow Creek, enters just below the station.

Records Available.—January 1 to November 30, 1914.

Drainage Area.—42 square miles.

Gage.—Vertical staff.

Channel.—Shifting after high water.

Discharge Measurements.—Made by wading, except during high water, when they are made from a footbridge.

Winter Flow.—Discharge measurements indicate that ice does not cause backwater at this station.

Diversions.—So far as known, no water is diverted above the station; the Roaring Fork Light & Power Co. diverts water just below.

Accuracy.—Estimates made are reliable, but snowslides upstream sometimes choke the channel and hold the water back.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON MAROON CREEK NEAR ASPEN.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 7	R. H. Fletcher	0.95	46	Jan. 14	R. H. Fletcher	0.63	24
June 27	R. H. Fletcher	1.80	238	Feb. 13	R. H. Fletcher	0.66	24
Oct. 19	Robert Fellanshce	0.92	37	Aug. 11	M. D. Anderson	1.45	147

Discharge of Roaring Fork River at Glenwood Springs for 1913. Drainage Area, 1,450 Square Miles. Altitude, 5,747 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.
1	485		410	820	2710	5720		990	680	715	620	535
2			410	750	2710	5840		900	680	750	635	560
3			410	680	1960	5840		900	650	750	650	460
4			410	620	2000	6070		900	620	770	620	485
5			435	680	2040	6300		820	680	800	620	535
6			460	730	3080	5150		750	727	820	590	535
7			410	785	3270	4920		785	774	785	620	522
8			460	680	3080	4810		785	820	820	650	510
9			448	560	2890	4700		823	1180	750	605	510
10			435	535	3420	4700		861	990	785	560	485
11			435	590	3950	4700	2530	900	945	715	620	435
12			435	620	4480	4700	2360	990	945	790	620	410
13			460	720	5150	3650	2200	990	820	820	620	410
14			390	820	4260	3270	1650	820	860	750	620	448
15			350	900	3080	3280	1620	820	900	715	620	485
16			370	1230	3650	3500	1750	750	820	715	620	485
17			390	1440	3580	4700	1750	750	820	750	620	485
18			435	1560	3520	4700	1750	750	750	715	650	460
19			435	1500	3460	4920	2200	680	750	668	620	485
20		410	410	1620	2890	5150	1980	680	750	620	650	460
21		410	390	1560	2530	4980	1750	650	800	620	650	370
22	422	370	390	1680	2200	4820	1750	680	860	650	590	350
23		370	380	1560	3230	4650	1890	680	900	680	600	485
24		370	370	1320	4260	4480	2530	680	820	620	610	435
25		460	410	1280	5050	3460	1820	680	750	620	620	450
26		410	370	1230	5840	3650	1440	680	785	620	620	465
27		460	370	1360	6780	4260	1340	620	750	620	605	485
28		435	435	1500	5840	4250	1230	620	750	620	590	485
29			460	1680	6540	4100	1230	680	750	560	560	485
30			560	2530	7270	3900	1080	680	715	590	560	435
31			680		5610		990	680		590		485
Mean		411	426	1120	3880	4640	1750	773	801	702	614	472
Run-off, acre-feet		7350	26200	66600	239000	276000	72800	47500	47700	43200	36500	29000

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Roaring Fork River at Glenwood Springs for 1914. Drainage Area, 1,450 Square Miles. Altitude, 5,747 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						13100	8800	2620	990	620	602	
2						12300	8540	2400	936	638	596	
3						12800	8020	2170	909	844	590	
4						9340	8370	2020	868	927	590	
5					3250	9880	8720	1750	868	806	560	
6					3140	9880	9070	1710	850	868	535	
7					3040	8540	7640	1580	832	884	490	
8					3710	8020	7450	1460	813	838	492	
9					5150	7140	7150	1680	806	792	495	
10					6070	8280	6900	1590	806	804	495	
11					6900	10400	7770	1500	806	816	530	
12					5960	12000	7340	1360	792	828	535	
13					5840	13700	6900	1280	834	757	505	
14					6420	14200	6660	1080	876	785	505	
15					6540	12800	6420	990	820	746	475	
16					6070	12700	6070	976	764	708	445	
17					6420	12600	5500	963	764	668	480	
18					6780	12400	6180	932	729	662	462	
19					7770	12300	6300	900	680	656	445	
20					8540	12200	6420	868	736	656	440	
21					9340	12100	5960	868	792	656	480	
22					10400	12000	6660	954	820	680	520	
23					10700	11500	5380	940	820	722	505	
24					11200	11000	4920	927	820	722	530	
25					10200	11000	4810	852	785	686	480	
26					9880	9880	4270	945	662	650	455	
27					10200	8940	3720	1060	650	620	490	
28					10400	9140	3170	954	638	608	490	
29					9610	9340	2620	1030	638	578	480	
30					10700	9480	2620	1080	638	620	490	
31					12300		2800	1130		608		
Mean					7650	11000	6230	1310	791	724	506	
Run-off acre-feet					410000	655000	383000	80600	47100	44500	30000	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Castle Creek near Aspen for 1913. Drainage Area, 72 Square Miles. Altitude, 7,931 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					32	301	258	148	88	62	43	41
2					32	297	258	148	88	60	43	43
3					71	294	235	142	88	58	43	41
4					71	291	254	135	91	56	43	40
5					80	288	273	127	94	59	43	39
6					89	285	293	124	98	62	43	38
7					98	281	235	120	100	64	43	38
8					117	265	231	117	110	62	43	38
9					136	250	227	122	148	59	43	38
10					154	235	223	127		56	43	43
11					172	258	218	120		54	43	43
12					191	236	213	113		50	43	43
13					178	214	206	107		47	43	43
14					162	191	199	105		45	43	43
15					148	191	191	104		43	43	43
16					144	191	191	103		43	43	43
17					140	191	191	102		42	43	43
18					136	191	191	101		41	42	43
19					130	191	189	100		40	41	43
20					127	210	186	98	107	38	40	43
21					117	258	183	96	112	36	39	42
22					107	281	180	94	117	34	38	41
23					150	305	176	92	108	32	39	40
24				43	192	294	172	90	98	28	41	39
25				43	235	282	169	88	89	32	43	38
26				43	305	270	164	88	80	36	38	38
27				43	293	258	158	88	71	40	35	38
28				43	281	258	153	88	68	43	32	38
29				43	305	258	148	88	66	43	35	38
30				32	305	258	148	88	64	43	38	38
31					305		148	88		43		38
Mean				41.4	161	252	202	108	94.2	46.8	41.1	40.5
Run-off acre-feet				575	9900	15000	12400	6640	3740	2880	2450	2490

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Castle Creek near Aspen for 1914.
Drainage Area, 72 Square Miles. Altitude, 7,931 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	37	32	31	32	54	442	342	200	85	58	50	
2	36	34	31	32	56	430	324	184	82	59	50	
3	35	36	31	32	57	418	305	171	79	60	50	
4	34	37	31	32	58	380	305	158	76	61	48	
5	33	38	32	33	59	351	305	152	74	62	48	
6	32	40	32	33	60	322	305	145	71	63	47	
7	32	38	32	33	67	293	299	138	68	64	47	
8	32	36	32	33	74	264	293	134	66	65	46	
9	32	34	32	34	80	235	342	130	63	65	46	
10	32	32	32	34	88	282	330	126	61	61	45	
11	32	30	32	34	95	330	314	123	75	57	45	
12	32	26	32	34	102	418	298	115	74	53	44	
13	32	23	32	34	100	430	281	107	72	53	43	
14	32	33	32	35	99	442	266	106	70	53	46	
15	32	33	32	36	104	430	250	104	68	52	49	
16	32	32	32	36	110	418	235	102	69	52	52	
17	33	32	32	34	144	405	240	100	70	52	55	
18	33	32	32	32	178	430	246	98	71	52	52	
19	34	32	32	34	213	436	252	96	72	48	49	
20	33	32	32	36	244	442	258	94	73	45	46	
21	32	32	33	38	274	446	264	92	74	41	43	
22	32	33	34	40	305	450	270	90	75	45	42	
23	32	33	35	42	318	455	226	88	70	48	40	
24	32	33	36	44	306	418	226	86	65	52	39	
25	32	32	36	46	294	380	225	85	61	51	37	
26	32	31	35	47	281	342	225	86	58	49	36	
27	32	30	34	48	293	355	224	87	56	47	36	
28	31	30	34	48	305	368	224	88	54	46	35	
29	31		32	50	340	360	221	88	52	49	35	
30	30		31	52	378	351	218	88	57	49	35	
31	30		32		408		215	88		49		
Mean	32.5	32.7	32.5	37.6	179	384	269	114	68.7	53.6	44.5	
Run-off acre-feet	2000	1820	2000	2240	11000	22800	16500	7010	4090	3300	2650	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Maroon Creek near Aspen for 1913.
Drainage Area, 42 Square Miles. Altitude, 8,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					39		149	124	66	34	28	25
2					39		158	116	65	33	28	25
3					40		167	108	64	32	28	25
4					41		176	101	64	31	28	25
5					42		185	97	65	31	28	25
6					43		194	93	80	31	28	25
7					45	233	204	89	100	31	28	25
8					53		194	85	135	31	28	25
9					61		185	81	145	31	28	25
10					69		176	86	149	31	28	25
11					77	204	176	91	140	31	30	25
12				25	85		176	89	135	31	31	26
13					93		176	87	120	31	31	27
14					101		176	85	100	31	31	28
15					95		170	83	70	31	31	30
16					88		166	81	50	31	31	31
17					81		162	81	45	31	31	30
18					119		165	81	39	31	31	29
19					157		168	81	39	31	30	28
20					195	233	172	79	39	31	30	28
21					233	263	176	78	39	31	29	29
22					204	248	176	76	39	31	29	30
23					176	233	176	75	39	31	28	31
24				39	149	215	176	73	42	31	28	31
25				39	165	200	166	72	45	31	26	31
26				39	181	190	156	72	35	30	25	31
27				39	192	186	146	71	35	28	25	31
28				39	204	182	136	70	35	28	25	31
29				39	204	179	133	69	35	28	25	31
30				39	204	176	130	68	35	28	25	31
31					204		127	67		28		31
Mean				37.2	119	211	168	84.2	69.6	30.7	28.4	28.1
Run-off acre-feet				590	7320	5440	10300	5180	4140	1890	1690	1730

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Maroon Creek near Aspen for 1914.

Drainage Area, 42 Square Miles. Altitude, 8,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31	25	20	17	40	330	295	184	74	46	38	
2	30	24	20	18	41	330	312	196	71	50	38	
3	30	24	20	18	40	312	312	184	67	53	38	
4	29	24	20	19	39	292	312	176	66	61	38	
5	28	25	20	19	38	282	312	173	64	50	38	
6	28	25	19	19	41	254	295	162	64	50	38	
7	28	25	18	19	44	233	295	168	60	50	38	
8	28	24	19	19	47	263	295	149	57	50	37	
9	28	22	20	18	56	210	312	149	58	50	37	
10	28	20	20	18	64	216	295	149	57	48	37	
11	28	19	20	18	72	251	312	144	57	46	37	
12	28	19	19	19	81	282	330	142	58	44	37	
13	28	20	19	20	80	312	312	124	60	44	37	
14	28	20	19	20	79	330	295	124	56	42	37	
15	27	22	20	21	78	365	279	124	53	41	37	
16	26	25	20	22	79	382	279	110	50	41	37	
17	26	24	20	21	97	348	292	110	50	41	36	
18	26	23	20	20	106	382	330	103	50	39	36	
19	25	22	19	22	112	365	295	101	49	39	36	
20	25	20	19	23	154	365	266	95	61	39	36	
21	25	20	19	24	184	365	292	91	58	41	36	
22	25	20	18	26	210	382	263	93	53	41	36	
23	25	20	18	28	218	365	257	91	50	41	36	
24	24	20	18	30	227	382	242	89	50	41	36	
25	22	20	18	32	233	348	233	81	49	39	36	
26	21	20	18	32	248	382	224	87	49	39	35	
27	20	20	17	33	242	365	210	83	44	39	35	
28	22	20	16	34	233	330	204	81	43	39	35	
29	24		16	36	260	295	198	81	43	39	35	
30	27		17	38	279	330	198	78	44	38	35	
31	26		17		312		201	78		38		
Mean	26.3	21.8	18.8	23.4	130	322	276	123	55.5	43.8	36.6	
Run-off acre-feet	1620	1210	1160	1390	7990	19200	17000	7560	3300	2600	2180	

Unless otherwise noted, all discharges are in cubic feet per second.

SNOW MASS CREEK AT SNOW MASS.

Location.—On a private bridge at Stewart's Ranch, in sec. 27, T. 8 S., R. 86 W., half a mile from Snow Mass., Colo. No tributaries between the station and the mouth of the creek.

Records Available.—February 21, 1911, to November 17, 1913.

Drainage Area.—89 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from the bridge during high water and by wading at other times.

Winter Flow.—Ice causes backwater during the winter months, and discharge measurements are made to determine the flow.

Diversions.—There are court decrees for diversion of 29 second-feet from the main stream above the station and 7 second-feet below. There are also decrees for diversions of 73 second-feet from tributaries entering above.

Accuracy.—Owing to the meager gage heights, estimates have been made only for the days when the gage was read. These estimates are considered fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SNOW MASS CREEK AT SNOW MASS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 7	R. H. Fletcher	.60	84.3
June 27	R. H. Fletcher	1.20	264

FRYING PAN CREEK AT NORRIE, COLO.

Location.—At the highway bridge in Norrie, in sec. 28, T. 8 S., R. 83 W., in the Sopris National Forest, 1 mile above the entrance of the North Fork.

Records Available.—February 18, 1911, to November 30, 1913.

Drainage Area.—112 square miles.

Gage.—Vertical staff.

Channel.—Slightly shifting after high water.

Discharge Measurements.—Made from the bridge.

Winter Flow.—Ice probably causes backwater during the winter months.

Diversions.—No water is diverted from this creek either above or below the station.

Accuracy.—Owing to the high altitude of the drainage basin, alternate melting and freezing causes diurnal fluctuations of stage at certain season; therefore the mean daily stage as determined from one reading may be considerably in error and the estimates can not be considered better than fair or, possibly, good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON FRYING PAN CREEK AT NORRIE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 8	R. H. Fletcher.....	3.80	223
Oct. 17	Robert Follansbee....	2.46	35.

FRYING PAN CREEK AT THOMASVILLE.

Location.—At a private bridge in sec. 12, T. 8 S., R 84 W., in the Sopris National Forest, three-fourths of a mile below Thomasville. Nearest tributary, Jakeman Creek, enters 100 yards above.

Records Available.—January 2, 1911, to November 30, 1914.

Drainage Area.—190 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months, and discharge measurements are made to determine the flow.

Diversions.—As there are no court decrees for diversion of water above the station, it is probable that the records represent the natural run-off from the drainage basin.

Accuracy.—Conditions favorable for fairly accurate determination of discharge; results should be reliable.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON FRYING PAN CREEK AT THOMASVILLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 8	R. H. Fletcher.....	2.20	581	Jan. 15*	R. H. Fletcher.....	0.66	38
Oct. 17	Robert Follansbee....	.65	65	Feb. 14	R. H. Fletcher.....	0.37	45
				Aug. 12	M. D. Anderson	1.48	219

*Ice conditions.

Discharge of Snow Mass Creek at Snow Mass for 1913. Drainage Area, 89 Square Miles. Altitude, 6,880 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							204		90*			
2					90	221						
3											60	
4								109				
5												
6					100					67		
7					90		157					
8									74			
9						221						
10											60	
11								131				
12					157					67		
13												
14							131					
15												
16												
17						240					60	
18								109	74			
19					157							
20												
21							131			60		
22									74			
23												
24												
25						187		90				
26					187							
27						260				60		
28							131					
29									74			
30												
31												
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Frying Pan Creek at Norrie for 1913. Drainage Area, 112 Square Miles. Altitude, 8,431 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					148	600	167	42	51	42	42	
2					167	435	158	42	51	42	42	
3					181	395	148	42	51	42	42	
4					196	360	131	42	51	42	42	
5					211	325	115	42	51	42	42	
6					219	292	108	42	51	42	42	
7					228	278	100	42	61	42	42	
8					236	263	100	42	61	42	42	
9					240	260	100	50	61	42	42	
10					263	260	100	61	61	42	42	
11					320	255	93	56	61	44	42	
12					360	250	86	51	57	46	42	
13					360	230	86	46	54	48	42	
14					360	211	86	42	51	51	42	
15					292	210	86	42	51	42	42	
16				188	188	270	100	42	51	40	42	
17				144	180	325	100	42	51	39	34	
18				100	250	312	100	45	46	39	34	
19				188	395	300	93	48	42	38	34	
20				188	350	270	86	51	42	38	34	
21				163	325	263	80	51	42	37	34	
22				139	325	250	73	51	42	36	34	
23				115	340	236	73	51	42	35	34	
24				94	395	228	80	51	42	34	34	
25				73	395	220	73	51	42	34	34	
26				86	395	211	67	51	42	36	34	
27				100	550	189	61	51	42	38	34	
28				110	710	167	56	51	42	40	34	
29				115	435	167	51	51	42	42	34	
30				131	600	167	46	51	42	42	34	
31					760		42	51		42		
Mean				129	335	273	91.8	47.5	49.2	40.7	38.3	
Run-off acre-feet				3840	20600	16200	5640	2920	2930	2500	2280	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Frying Pan Creek at Thomasville for 1913. Drainage Area, 190 Square Miles. Altitude, 7,968 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					377	860	320	124	86	94	70	
2					410	895	280	117	86	98	68	
3					443	825	280	117	86	101	66	
4					476	825	280	117	86	101	66	60
5					509	895	280	117	86	86	66	48
6					542	825	210	109	86	91	66	51
7					575	895	210	101	86	96	66	56
8					605	895	210	101	86	101	42	
9					520	895	210	101	86	106	66	51
10					575	895	210	101	86	111	79	
11					325	895	210	101	86	117	42	
12					965	895	210	101	86	111	42	
13					965	695	180	101	86	106	43	
14					965	665	180	101	86	101	44	
15					825	635	210	96	86	86	44	
16					575	760	320	91	86	72	51	
17					520	695	365	86	86	66	52	56
18					640	695	320	94	86	69	54	56
19					760	760	320	101	86	72	56	48
20					640	635	295	98	86	72	56	
21					520	635	270	94	94	72	56	
22					520	520	245	90	101	72	48	
23					635	520	280	86	94	72	52	
24					825	520	520	86	86	72	56	
25				155	860	465	280	86	86	72	60	
26				210	895	465	280	86	86	66	60	
27				245	1960	465	280	86	86	72	60	44
28				278	1410	465	180	86	86	72	57	
29				311	965	465	165	86	86	72	54	
30				344	895	320	150	86	90	72	51	44
31					825		135	86		71		
Mean				257	743	696	254	97.8	87.2	85.2	56.4	
Run-off acre-feet				3060	45700	41400	15600	6010	5190	5240	3360	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Frying Pan Creek at Thomasville for 1914. Drainage Area, 190 Square Miles. Altitude, 7,968 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				49	155	2200	850	440	179	101	83	
2			42	55	136	1900	825	415	172	101	83	
3				60	117	1550	825	390	170	101	74	
4				75	141	1420	825	365	168	101	66	
5			42	90	165	1240	751	415	147	101	61	
6			42	104	189	1180	678	465	126	101	56	
7				94	210	1120	605	372	118	105	52	
8				86	365	1110	650	280	109	109	51	
9				79	520	1340	695	266	117	113	51	
10			42	79	760	1440	646	252	121	117	50	
11				79	760	1540	597	238	126	117	50	
12				80	760	1640	548	224	130	113	50	
13				85	760	1560	538	209	135	109	50	
14		45		125	760	1480	529	194	130	105	50	
15	38		45	245	760	1460	520	180	126	101	50	
16			56	180	782	1430	529	180	126	101	50	
17				140	804	1410	538	180	118	101	50	
18				136	825	1380	548	174	109	101	50	
19			62	132	930	1340	555	168	105	101	50	
20				128	1040	1290	575	174	101	98	50	
21				121	1140	1250	600	180	180	96	50	
22				121	1240	1200	760	195	162	109	50	
23				135	1340	1160	686	210	144	107	50	
24				150	1260	1110	612	200	126	105	50	
25			51	170	1040	1110	538	189	120	103	50	
26				195	1190	1110	464	175	114	101	50	
27				188	1340	1110	390	194	109	96	51	
28				180	1340	1000	400	201	105	91	50	
29				155	1300	895	410	228	101	86	49	
30			45	155	1260	895	420	207	101	83	49	
31					1950		465	186		83		
Mean	40.0	45.0	48.0	122	817	1330	599	250	130	102	54.2	
Run-off acre-feet	2460	2500	2950	7260	50200	79100	36800	15400	7740	6270	3220	

Unless otherwise noted, all discharges are in cubic feet per second.

NORTH FORK OF FRYING PAN CREEK NEAR NORRIE.

Location.—On a highway bridge in sec. 21, T. 8 S., R. 83 W., in the Sopris National Forest, about 1 mile from Norrie. No tributaries between the station and the mouth of the creek.

Records Available.—February 18, 1911, to November 30, 1914.

Drainage Area.—42 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes little if any backwater during the winter months.

Diversions.—No water is diverted above the station, so the records represent the natural run-off.

Accuracy.—owing to the scattering gage heights and the probable error in mean daily stage as determined from one reading, the estimates cannot be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS NORTH FORK FRYING PAN CREEK NEAR NORRIE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 8	R. H. Fletcher	1.55	175	Aug 12	M. D. Anderson	0.65	29
Oct. 17	Robert Follansbee	.32	11.				

CRYSTAL RIVER AT MARBLE.

Location.—Near the electric railway bridge of the Colorado-Yule Marble Co., in sec. 26, T. 11 S., R. 88 W., half a mile west of Marble. Nearest tributary, Carbonate Creek, enters at Marble.

Records Available.—November 1, 1910, to November 30, 1914.

Drainage Area.—77 square miles.

Gage.—A vertical hook gage graduated to hundredths of a foot.

Channel.—Shifts slightly at long intervals.

Discharge Measurements.—Made by wading.

Winter Flow.—Gage heights at this station little, if any, affected by ice.

Diversions.—There are no court decrees for diversions above the station, but for 114 second-feet below Marble.

Accuracy.—Conditions are favorable for fairly accurate results and the estimates are considered reliable.

Co-operation.—The field data are furnished through the courtesy of the Colorado-Yule Marble Co. to the United States Geological Survey, from whom records were obtained.

DISCHARGE MEASUREMENTS ON CRYSTAL RIVER AT MARBLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 14	H. V. Knouse	3.68	467	Feb. 16	R. H. Fletcher	1.72	24
May 29	H. V. Knouse	4.73	1050				

EAST ELK CREEK NEAR NEW CASTLE.

Location.—At the highway bridge on line between secs. 24 and 25, T. 5 S., R. 91 W., 2½ miles northwest of New Castle, Colo. No tributaries between the station and the mouth.

Records Available.—January 19, 1911, to December 8, 1913.

Drainage Area.—60 square miles.

Gage.—Vertical staff.

Channel.—Permanent prior to high water of 1912, when it shifted.

Discharge Measurements.—Made from the bridge during high water and by wading during ordinary stages.

Winter Flow.—Little backwater from ice at this station during the winter, except for short periods.

Diversions.—There are court decrees for diversion of 43 second-feet from East Elk Creek, chiefly above the station.

Accuracy.—Owing to the very meager gage heights, estimates have not been made other than for the days having gage heights. These estimates should be reliable prior to high water, but are somewhat uncertain for the later part of the year, owing to a shift in the channel.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON EAST ELK CREEK NEAR NEW CASTLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 3	R. H. Fletcher	1.28	28
June 25	R. H. Fletcher	1.48	53
Sept. 3	R. H. Fletcher	.62	3.7
Oct. 20	Robert Follansbee	.90	9.5

Discharge of North Fork Frying Pan Creek near Norrie for 1913. Drainage Area, 42 Square Miles. Altitude, 8,431 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					120	296	96	18	10	16	13	
2					120	288	90	16	10	18	10	
3					120	280	84	14	10	26	10	
4					120	265	80	12	10	26	10	
5					120	250	76	10	10	26	10	
6					185	235	72	10	12	26	10	
7					185	220	69	11	14	26	10	
8					163	236	66	11	16	26	10	
9					165	252	63	11	18	26	10	
10					170	260	60	12	18	26	10	
11					200	268	56	12	17	26	10	
12					240	260	45	12	16	24	10	
13					255	220	45	13	15	22	10	
14					208	210	50	13	14	20	10	
15				84	163	200	60	13	12	18	10	
16				56	165	185	150	13	10	16	10	
17				60	185	176	185	13	10	13	10	
18				70	210	170	150	13	10	14	10	
19				95	300	163	120	13	10	16	10	
20				120	225	163	101	13	10	16	10	
21				120	190	163	84	13	11	16	10	
22				120	185	163	69	10	12	17	10	
23				120	185	163	75	10	12	17	10	
24				115	240	156	80	10	13	18	10	
25				110	305	149	56	10	13	18	10	
26				105	255	141	46	10	13	18	10	
27				101	500	140	35	10	13	18	10	
28				105	550	135	30	10	14	18	10	
29				110	425	130	26	10	14	18	10	
30				115	335	105	23	10	15	17	10	
31					305		20	10		16		
Mean				100	229	201	73.	11.8	12.8	19.9	10.1	
Run-off acre-feet				3170	14100	12000	4490	726	762	1220	6.01	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork Frying Pan Creek near Norrie for 1914. Drainage Area, 42 Square Miles. Altitude, 8,431 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				12	66	595	163	92	27	13	13	
2				12	76	490	152	82	26	13	13	
3				12	62	454	159	72	22	13	13	
4				20	56	417	166	62	18	13	12	
5				28	68	380	174	59	17	13	12	
6				35	80	341	174	56	15	13	12	
7				32	92	314	174	53	14	13	11	
8				30	111	278	166	50	13	13	11	
9				24	130	243	159	46	13	13	10	
10				18	220	296	152	43	13	12	10	
11				22	268	350	144	40	13	12	10	
12				26	259	388	137	35	13	12	10	
13				30	250	425	130	30	13	12	9	
14				35	240	432	124	26	13	12	9	
15				62	231	440	117	22	13	14	9	
16				69	231	350	110	28	13	16	9	
17				45	231	360	110	34	13	17	8	
18				50	255	370	110	40	13	18	8	
19				54	294	380	110	45	13	18	8	
20				58	333	350	110	45	15	18	8	
21				62	371	335	110	45	35	18	8	
22				64	410	320	104	45	30	18	8	
23				66	380	320	98	38	25	17	8	
24				69	365	320	92	32	20	16	8	
25				69	350	306	76	26	15	16	8	
26				69	365	292	76	30	13	15	7	
27				69	392	230	76	35	13	14	7	
28				66	410	168	76	33	13	13	7	
29				62	395	171	76	32	13	13	7	
30				56	425	174	84	30	13	13	7	
31					510		92	28		13		
Mean				44.2	256	343	123	43.0	16.7	14.3	9.3	
Run-off acre-feet				2630	15700	20400	7560	2640	994	879	553	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Crystal River at Marble for 1913. Drainage Area, 77 Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	34	30	32	44	213	1040	575	146	84	48	44	41
2	35	30	30	44	167	1040	575	189	84	53	41	30
3	35	25	29	44	167	1100	500	167	84	58	42	35
4	35	29	29	48	167	975	475	156	84	64	43	37
5	29	29	30	41	226	915	452	146	84	58	37	36
6	28	29	30	41	345	855	430	146	77	58	42	34
7	29	29	29	40	345	855	452	127	84	58	43	33
8	35	29	30	37	385	740	452	127	77	58	30	40
9	34	30	29	37	365	768	430	127	146	53	36	32
10	35	29	30	35	430	712	525	118	118	53	39	32
11	35	29	31	35	525	630	408	127	84	58	41	29
12	33	28	31	40	685	500	325	167	84	58	37	33
13	32	29	30	53	630	430	305	136	77	64	44	29
14	32	28	26	77	525	475	325	127	70	58	44	27
15	32	29	29	92	365	575	305	118	77	64	42	38
16	28	28	28	109	325	795	270	100	64	53	30	35
17	30	30	32	127	345	885	270	109	64	58	48	33
18	38	29	27	127	385	975	288	100	64	53	44	37
19	33	30	27	127	475	975	305	109	58	53	43	37
20	31	30	27	136	365	975	270	100	48	48	44	27
21	32	29	26	156	288	915	270	109	53	53	44	24
22	33	29	25	167	325	740	226	100	70	53	42	26
23	33	28	26	127	500	825	255	100	64	48	24	27
24	30	29	28	100	658	685	305	92	58	48	29	31
25	32	32	22	84	795	575	226	92	53	48	40	35
26	31	20	24	84	975	630	189	84	58	48	42	36
27	28	29	24	92	975	768	167	84	53	48	42	36
28	30	29	27	118	885	795	146	92	53	48	42	32
29	30		28	146	1160	685	146	84	58	39	39	32
30	30		28	189	1160	575	146	84	53	44	39	36
31	30		42		1040		146	84		44		32
Mean	32.0	28.7	28.6	86.6	522	780	328	118	72.8	53.2	39.9	33.0
Run-off acre-feet	1970	1590	1760	5150	32100	46400	20200	7260	4330	3270	2370	2030

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Crystal River at Marble for 1914.
Drainage Area, 77 Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31	35	41	53	127	1720	1340	525	127	77	70	
2	30	36	42	64	118	1530	1340	452	127	84	70	
3	29	27	41	70	127	1340	1280	452	118	226	64	
4	28	25	41	84	136	1160	1460	408	118	213	64	
5	30	32	41	92	146	975	1720	365	109	146	58	
6	28	25	41	92	146	825	1400	325	109	127	58	
7	28	25	41	84	167	685	1340	270	109	109	70	
8	28	24	35	84	226	575	1280	345	109	118	84	
9	28	25	48	77	325	550	1340	255	109	127	84	
10	27	24	44	77	430	712	1220	240	109	118	84	
11	25	24	42	70	452	975	1160	213	100	109	77	
12	28	24	44	77	385	1460	1160	213	109	100	84	
13	28	22	44	84	430	1660	1160	213	92	100	84	
14	27	26	48	92	500	1720	1100	189	92	84	84	
15	27	25	48	118	525	1720	975	189	92	84	70	
16	28	25	58	136	475	1460	885	178	92	92	64	
17	30	23	58	118	550	1600	855	167	92	92	64	
18	30	24	64	109	685	1720	855	178	84	92	64	
19	30	23	58	100	740	1860	885	167	92	92	64	
20	28	24	58	118	855	1920	855	167	92	92	64	
21	28	24	58	136	975	1720	795	167	167	100	64	
22	29	20	64	146	1040	1790	795	189	127	100	64	
23	29	29	58	146	1160	1720	630	178	109	100	64	
24	30	23	53	127	1040	1660	630	156	92	92	58	
25	28	22	53	127	975	1600	550	136	92	92	58	
26	27	23	53	136	975	1340	525	189	84	84	58	
27	28	36	58	127	1100	1340	575	167	84	84	64	
28	14	36	53	127	975	1400	575	167	84	84	64	
29	29		53	118	1160	1460	575	156	77	77	64	
30	33		53	127	1340	1400	525	146	77	70	58	
31	32		53		1600		712	136		70		
Mean	28.2	26.1	49.9	104	641	1390	984	235	102	104	68.0	
Run-off acre-feet	1730	1450	3070	6190	39400	82700	60500	14400	6070	6400	4050	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of East Elk Creek near New Castle for 1913.
Drainage Area, 60 Square Miles. Altitude, 5,552 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						335	31	3				
2							31	3		7	7	
3					31						7	7
4				7		250			4			
5	7										7	
6						175					7	
7			6									
8	7						10		4		7	7
9							10					
10					132		10				7	
11												
12								3			7	
13			7		160				4	10		
14						95	7	3				
15			13				7	3			7	
16				17	55	210	7		3	10		
17							7				7	
18						73				10		
19			10	27		73		3	3			
20					55	55		3			7	
21												
22			7	31		42		3				
23				17	119			3		7		
24		7									7	
25		6									7	
26					230	55			7	7	7	
27				31				3				
28				31								
29			8							7		
30					290					7		
31			10		290					7		
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

TAYLOR RIVER AT ALMONT.

Location.—At highway bridge in Almont, in sec. 22, T. 51 N., R. 1 E., New Mexico principal meridian, 100 yards above the junction of Taylor and East Rivers.

Records Available.—July 27, 1910, to November 30, 1913.

Drainage Area.—413 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from highway bridge.

Winter Flow.—Ice causes backwater.

Diversions.—There are no court decrees for diversions from Taylor River, but from Willow Creek, which enters above, there are decrees for 12 second-feet diversion.

Accuracy.—Conditions are favorable for accurate results; the estimates are considered good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Reclamation Service, by whom the field data are furnished. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON TAYLOR RIVER AT ALMONT.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
July 12	E. H. Swett	2.35	407
Sept. 10	E. H. Swett	2.00	235

GUNNISON RIVER NEAR GUNNISON.

Location.—At highway bridge, 2 miles below Gunnison. Nearest tributary, Tomichi Creek, enters about 1 mile below.

Records Available.—November 27, 1910, to November 30, 1914.

Drainage Area.—1,010 square miles.

Gage.—Chain gage; datum unchanged.

Channel.—Somewhat shifting.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 250 second-feet from Gunnison River, between this station and the forks at Almont, and diversions of 270 second-feet from intervening tributaries.

Co-operation.—Station is maintained in co-operation with the United States Geological Survey.

DISCHARGE MEASUREMENTS ON GUNNISON RIVER AT GUNNISON.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 11	Robt. Follansbee	2.26	2580	Jan. 19	R. H. Fletcher	1.3	223
July 19	R. H. Fletcher	0.88	873	Feb. 20	R. H. Fletcher	1.6	220
Aug. 27	R. H. Fletcher	0.43	446	May 7	R. H. Fletcher	1.29	1400
				May 30	Robert Follansbee	3.53	5010
				Aug. 18	M. D. Anderson	.73	665

EAST RIVER AT ALMONT.

Location.—At highway bridge at Almont, 200 feet above the junction of East and Taylor Rivers.

Records Available.—July 27, 1910, to November 30, 1913. A station was maintained at this point from April 15 to October 8, 1905, but the gage was referred to a different datum.

Drainage Area.—295 square miles.

Gage.—Vertical staff.

Channel.—Slightly shifting.

Discharge Measurements.—Made from bridge.

Winter Flow.—Ice causes backwater in varying amounts, but no measurements have been made to determine this.

Diversions.—There are court decrees for diversion of 78 second-feet from East River, above the station, and 52 second-feet from tributaries.

Accuracy.—Conditions are favorable, and therefore the results should be reliable.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Reclamation Service, by whom the field data are furnished. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON EAST RIVER AT ALMONT.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
July 12	E. H. Swett	1.75	380
Sept. 10	E. H. Swett	1.25	150

Discharge of Taylor River at Almont for 1913.
Drainage Area, 413 Square Miles. Altitude, 8,031 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				160	360	1080	590	74	132	235	235	
2				178	360	1140	534	74	132	235	235	
3				280	360	1080	520	74	160	235	235	
4				195	360	1020	520	61	160	235	235	
5				160	360	992	506	61	160	235	235	
6				215	590	970	506	50	178	235	235	
7				195	670	970	464	50	178	235	235	
8			146	146	715	970	464	56	195	235	235	
9			146	178	520	1020	464	50	195	235	235	
10			160	160	715	1380	485	50	195	235	235	
11			160	160	810	1500	450	50	235	235	235	
12			160	195	810	1380	438	50	235	235	235	
13			160	195	915	1250	402	61	235	235	215	
14			160	215	860	970	378	74	235	235	215	
15			110	235	670	915	342	74	235	235	235	
16			110	280	715	882	290	91	235	235	235	
17			110	235	810	948	258	91	235	235	235	
18			110	305	715	970	215	91	235	235	235	
19			110	330	670	948	154	100	195	235	235	
20			110	280	590	970	110	110	195	235	235	
21			110	280	606	970	91	110	235	235	235	
22			110	280	688	970	82	100	235	235	235	
23			110	235	688	948	74	91	235	235	235	
24			132	258	810	915	91	91	235	235	235	
25			146	258	1020	760	110	91	235	235	235	
26			146	235	1310	760	100	100	235	235	235	
27			146	280	1500	715	100	110	235	235	235	
28			132	330	1640	715	91	110	235	235	235	
29			132	420	1640	715	91	121	235	235	235	
30			160	420	1500	606	91	132	235	235	235	
31			160		1440		74	132		235		
Mean			135	243	820	981	293	83.2	210	235	234	
Run-off acre-feet			6430	14500	50400	58400	18000	5120	12500	14400	13900	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Gunnison River near Gunnison for 1913.
Drainage Area, 1,010 Square Miles. Altitude, 7,673 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					1940	2780	1460	522	405	480	340	
2					1600	2780	1400	522	340	340	340	
3					1600	2620	1210	442	405	405	405	
4					1340	2380	1030	480	405	405	340	
5					1400	2380	1090	480	405	405	340	
6					1870	2310	1030	442	405	372	285	
7					2460	2020	975	405	340	340	340	
8					2460	1940	975	340	405	405	340	
9					1870	1870	865	405	442	405	340	
10					2310	2860	920	405	480	405	340	
11					2380	2940	865	522	480	372	285	
12					2540	2860	865	612	340	405	340	
13					2700	2620	865	480	405	405	285	
14					2160	2020	760	480	405	405	340	
15					1600	2240	865	480	405	405	340	
16					1460	2310	865	480	480	405	240	
17					1600	2380	865	442	340	340	285	
18					1600	2540	865	372	405	372	340	
19					1730	2620	760	405	405	405	340	
20					1530	2310	975	405	442	405	340	
21					1400	2160	1090	480	340	372	240	
22					1660	1940	1460	480	285	405	340	
23					1730	2020	1210	340	372	442	340	
24					2380	1800	865	405	405	405	285	
25					2620	1940	865	405	405	372	312	
26					2940	2020	812	405	405	405	285	
27					3180	1870	760	405	340	340	340	
28					2780	1800	660	340	442	372	285	
29					2540	1600	522	405	405	340	340	
30					2860	1600	565	405	405	372	285	
31					3020		565	405		405		
Mean					2110	2250	932	439	398	391	320	
Run-off acre-feet					130000	134000	57300	27000	23700	24000	19000	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Gunnison River at Gunnison for 1914.
Drainage Area, 1,010 Square Miles. Altitude, 7,673 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				340	750	5680	2930	1680	560	560	560	
2				340	865	5500	2930	1680	560	560	560	
3				372	1260	5150	2760	1400	560	650	560	
4				405	1400	4800	2850	1400	560	750	560	
5				405	1680	4800	2760	1400	560	650	560	
6				405	1680	4620	2600	1400	560	560	560	
7				405	1820	4620	2600	1260	560	560	560	
8				442	1980	4620	2440	1260	480	560	560	
9				480	2280	4800	2440	1260	480	560	560	
10				480	2760	4980	2280	1120	480	560	560	
11				480	3100	4620	2130	1120	480	560	560	
12				480	3420	4280	2130	1260	480	560	560	
13				480	3420	4980	2130	1120	480	560	560	
14				480	3420	5150	1980	1120	480	560	560	
15				522	3600	4980	1980	1120	480	560	560	
16				522	3760	4980	1980	1400	480	650	560	
17				480	3940	4710	1820	1260	480	650	560	
18				522	4100	4780	1820	1120	560	560	560	
19				522	4620	4800	1820	990	480	560	480	
20				480	4800	4620	1820	865	480	560	480	
21				522	4980	4620	1680	865	560	560	408	
22				522	5150	4450	1680	750	480	650	408	
23				565	5150	4450	1820	750	480	650	408	
24				565	5320	3940	1680	750	480	560	408	
25				565	4800	3760	1680	650	480	560	343	
26				565	4980	3420	1680	650	550	560	343	
27				612	5150	3180	1680	650	560	560	343	
28				660	5410	3100	1820	650	480	560	343	
29				760	5150	3010	1680	650	480	650	343	
30				760	5500	2930	1680	560	480	560	343	
31					5500		1680	560		560		
Mean				505	3600	4480	2100	1060	509	586	491	
Run-off acre-feet				30000	221000	267000	129000	65200	30300	36000	29200	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of East River at Almont for 1913.
Drainage Area, 295 Square Miles. Altitude, 8,031 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				62	710	1520	550	32	45	140	90	
2				55	614	1280	534	32	45	140	90	
3				90	646	1220	534	32	55	140	90	
4				120	630	1200	534	26	55	140	90	
5				140	755	1220	486	26	55	140	90	
6				170	950	1180	510	22	55	140	90	
7				155	1100	1150	486	22	55	140	90	
8			58	140	1000	1280	486	22	70	140	90	
9			55	115	950	1360	486	22	90	140	90	
10			55	115	1080	1430	456	22	115	140	90	
11			55	128	1220	1460	456	22	140	140	90	
12			55	155	1320	1300	456	22	140	140	90	
13			55	470	1360	1220	414	19	140	140	90	
14			55	550	1360	1200	340	20	128	140	90	
15			45	510	900	1220	268	22	140	140	90	
16			45	630	1000	1180	225	22	140	140	90	
17			45	550	950	1120	155	22	140	140	90	
18			45	590	1250	1180	102	22	140	140	90	
19			45	630	1220	1120	70	22	115	140	90	
20			45	670	1250	1080	70	22	115	140	90	
21			45	646	1150	1000	70	26	115	140	90	
22			45	590	1100	1000	62	26	115	140	90	
23			45	614	1220	920	55	22	115	140	90	
24			58	550	1300	850	70	22	115	140	90	
25			62	614	1430	820	62	22	115	140	90	
26			62	614	1430	710	62	26	102	140	90	
27			62	590	1360	630	62	26	115	140	90	
28			58	590	1300	630	55	26	115	140	90	
29			55	614	1390	550	50	29	115	115	90	
30			55	710	1450	550	45	32	120	90	90	
31			62		1320		36	45		90		
Mean			52.1	406	1120	1090	266	25.0	104	136	90.	
Run-off acre-feet			2480	24200	68900	64900	16400	1540	6190	8360	5360	

Unless otherwise noted, all discharges are in cubic feet per second.

CEMENT CREEK NEAR CRESTED BUTTE.

Location.—At Ahren's ranch, in sec. 22, T. 14 S., R. 85 W., about 7 miles southeast of Crested Butte. No tributaries between the station and the mouth.

Records Available.—November 23, 1910, to November, 30, 1913.

Drainage Area.—32 square miles.

Gage.—Vertical staff.

Channel.—Somewhat shifting after high water.

Discharge Measurements.—Made by wading, except during extreme flood stage, when they are made from a foot-bridge.

Winter Flow.—Ice causes little if any backwater at this station, owing to hot springs above.

Diversions.—There are court decrees for diversions of 8.5 second-feet from Cement Creek above the station.

Accuracy.—Estimates for periods prior to the high water are considered reliable; after that period, when a shift occurred, they were obtained by the indirect method, and are only fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON CEMENT CREEK NEAR CRESTED BUTTE.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	10	Robert Follansbee....	1.00	77
July	18	R. H. Fletcher.....	.75	34

QUARTZ CREEK NEAR PITKIN.

Location.—On highway bridge in sec. 8, T. 50 N., R. 4 E., New Mexico principal meridian, 1 mile southwest of Pitkin. Nearest tributary enters about 2 miles below the station.

Records Available.—December 12, 1910, to December 18, 1913.

Drainage Area.—53 square miles.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge Measurements.—Made by wading.

Winter Flow.—Ice causes little if any backwater at this station.

Diversions.—No water is diverted above the station. Below the station there are court decrees for 30 second-feet.

Accuracy.—Owing to the high altitude of the drainage basin, alternate melting and freezing may cause diurnal fluctuations in stage at certain seasons; therefore the mean daily stage as determined from one reading may be considerably in error. For this reason the estimates can not be considered better than fair, or, possibly, good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON QUARTZ CREEK NEAR PITKIN.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	8	Robert Follansbee....	1.08	66
July	17	R. H. Fletcher.....	.97	52

SAPINERO CREEK[1] AT SAPINERO.

Location.—At highway bridge in sec. 28, T. 49 N., R. 4 W., New Mexico principal meridian, half a mile northeast of Sapinero. No tributaries below the station.

Records Available.—March 17, 1911, to September 30, 1914.

Drainage Area.—84 square miles.

Gage.—Vertical staff.

Channel.—Shifting after high water.

Discharge Measurements.—Made from bridge during high water by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—Water sufficient to irrigate approximately 300 acres is diverted above the station.

Accuracy.—Owing to the shifting channel and the infrequency of gage heights and measurements the estimates can not be considered better than approximate or fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SAPINERO CREEK AT SAPINERO.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	15	Robert Follansbee....	4.12	199
July	22	R. H. Fletcher.....	3.24	25
Aug.	29	R. H. Fletcher.....	3.03	9.4
Oct.	24	Robert Follansbee....	3.08	15

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	30	Robert Follansbee....	4.88	524

[1] Known locally as Soap Creek.

Discharge of Cement Creek near Crested Butte for 1913.
Drainage Area, 32 Square Miles. Altitude, 8,867 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					29	67	76	39	23	22	11	
2	10				31	23	76	40	27	25	11	
3	10				33	76	76	32	26	24	12	
4					33	165	76	23	25	23	14	
5	8				33	140	76	27	25	20	14	
6	8				36	129	67	23	22	16	14	
7					45	118	58	27	20	18	12	
8					39	140	86	27	18	20	11	
9	8	6			53	118	42	27	18	20	11	
10		6			76	118	42	27	18	20	11	
11	10				108	118	42	27	22	16	10	
12	8				140	118	50	32	25	16	9	
13		6			96	118	48	36	24	16	10	
14	6	6			96	118	46	34	23	16	11	
15		6			96	140	44	26	20	15	9	
16	6				107	140	42	24	16	14	9	
17					96	140	39	22	20	15	10	
18	8				107	140	36	19	16	16	11	
19					118	140	47	16	16	15	10	
20					96	118	58	23	16	14	9	
21					96	140	42	23	16	15	9	
22					118	129	59	23	16	16	9	
23					96	118	76	23	16	15	9	
24					140	118	65	23	16	14	9	
25					118	140	54	23	16	14	8	
26					118	129	43	23	16	12	7	
27				22	129	118	31	23	16	11	9	
28				22	140	118	34	27	16	12	7	
29				22	190	104	35	32	16	14	7	
30				21	140	90	36	36	16	12	7	
31					140		38	30		11		
Mean	8	6			93.9	120	52.9	27.0	19.3	16.0	10.0	
Run-off acre-feet	492	333			5740	7140	3250	1660	1150	984	595	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Quartz Creek near Pitkin for 1913.
Drainage Area, 54 Square Miles. Altitude, 9,190 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1							90		49			
2								67				
3								65				
4							67				42	
5									50	41	37	
6						110						
7											38	
8					65			55		42		36
9						136			50			
10						149						36
11								55	49			
12					110							
13										46	38	
14						183						
15					67						35	
16				44		166						35
17							52			48		
18					110		55					
19				40								
20									46		37	
21					67	136			46			
22								55			36	
23				30						49		
24							99					
25						110	90			42	42	
26						99						
27					149		77			45		
28								55	48	47		
29					267						34	
30						90					38	
31										44		
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Sapinero Creek at Sapinero for 1913.
Drainage Area, 84 Square Miles. Altitude, 7,245 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												16
3											20	
4												16
5							45			16		
6										8	16	
7							45	16	16			
8									16			
9										16		
10						164						
11						164						
12							30	20				
13											24	
14												
15					201							
16						126					16	
17						144						
18								8	16			
19						126		8	16		16	
20						108			8			
21						126						
22						108	30		16			
23						108	30	12				
24									16			
25						90			24		16	
26												
27						90	20		16		16	
28												
29									24			
30										16		
31												
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Sapinero Creek at Sapinero for 1914.
Drainage Area, 84 Square Miles. Altitude, 7,245 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2					182			56				
3						590		48				
4					228							
5				163			143	48				
6												
7				120		264	120	48	30			
8				99								
9				99	348				24			
10					348	264			24			
11					394		80					
12						440	63					
13							63					
14												
15				196	790							
16				196		440	63					
17							63		20			
18					565	394			16			
19								35				
20												
21				246	640		56					
22				228		348		35				
23				228					16			
24												
25				196								
26					540	264			16			
27												
28				182	490							
29												
30					540	168	56		16			
31								30				
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

UNCOMPAHGRE RIVER AT OURAY.

Location.—Near highway bridge in sec. 31, T. 44 N., R. 7 W., New Mexico principal meridian, half a mile south of Ouray, Colo. Nearest tributary, Canon Creek, enters 150 feet below; nearest tributary above is Bear Creek.

Records Available.—January 25, 1911, to November 30, 1914, January 7 to March 17, 1908, records were kept at the power plant of the Ouray Electric Light & Power Co., 1 mile south of Ouray, and were furnished through the courtesy of Wheeler & Whinnerah.

Drainage Area.—44 square miles.

Gage.—Vertical staff.

Channel.—Permanent, except at time of high water, when channel scours and fills.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Little if any backwater from ice at this station, as channel remains open during the year.

Diversions.—Water is diverted 2 miles above the station by the Ouray Light & Power Co. This amounts approximately to 8 second-feet and is returned to the river below the station.

Accuracy.—Owing to the high altitude of the drainage basin, alternate melting and freezing may cause diurnal fluctuations in stage at certain seasons. Therefore the mean daily stage as determined from one reading may be considerably in error. For this reason the estimates can not be considered better than fair, or, possibly, good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON UNCOMPAHGRE RIVER AT OURAY.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 12	Robert Follansbee	2.25	253	Jan. 18	R. H. Fletcher	0.04	3.7
July 20	R. H. Fletcher	1.00	36	May 26	Robert Follansbee	2.35	250
Aug. 31	R. H. Fletcher	.78	20	May 31	T. J. Watkins	3.20	587
Sept. 1	R. H. Fletcher	.68	22	July 2	T. J. Watkins	2.30	272
Oct. 22	Robert Follansbee	.56	17	Aug. 20	M. D. Anderson	1.22	47
				Oct. 18	Follansbee & Watkins	1.00	25

UNCOMPAHGRE RIVER BELOW OURAY.

Location.—At the lowest bridge in Ouray, one-third mile below the railroad station. It is below all tributaries in Ouray.

Records Available.—May 12, 1913, to October 31, 1914.

Drainage Area.—76 square miles.

Gage.—Vertical staff.

Control.—Shifting.

Discharge Measurements.—Made from bridge and by wading.

Winter Flow.—Ice causes little or no backwater as the warm springs above prevent freezing.

Diversions.—There are no diversions which are not returned to the river above the station.

Accuracy.—Owing to the high altitude of the station (7,700 feet), there are diurnal fluctuations of stage at certain seasons, due to alternate melting and freezing, and the mean daily gage height, based on morning and evening readings and the maximum stage for the 24-hour period, may be somewhat in error. For this reason, and because of the shifting character of the channel, the estimates can not be considered better than fair, or, possibly, good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS UNCOMPAHGRE RIVER BELOW OURAY.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 12	Robert Follansbee	3.50	518	Jan. 17	R. H. Fletcher	1.78	29
July 20	R. H. Fletcher	2.75	166	May 26	Robert Follansbee	4.18	722
Aug. 31	R. H. Fletcher	2.43	109	May 31	T. J. Watkins	4.62	1250
Sept. 1	R. H Fletcher	2.35	86	June 3	U. S. R. S. Engineer	4.02	856
Oct. 22	Robert Follansbee	2.10	58	July 2	T. J. Watkins	3.50	481
				Aug. 20	M. D. Anderson	2.58	91
				Oct. 18	Follansbee-Watkins	2.45	61

UNCOMPAHGRE RIVER AT MONTROSE.

Location.—At highway bridge, one-fourth mile west of Montrose. Nearest important tributary, Happy Canyon Creek, enters about 2 miles below.

Records Available.—April 22, 1903, to December 16, 1913.

Drainage Area.—565 square miles.

Gage.—Vertical staff; location and datum unchanged.

Channel.—Extremely shifting.

Discharge Measurements.—Made from the bridge.

Winter Flow.—Although ice forms along the edges of the river during the winter months, the river does not freeze over. Observations of gage heights are, however, discontinued during November, December, January, February, and March.

Diversions.—Uncompahgre River is so overappropriated that the United States Reclamation Service is constructing a tunnel and canal to divert 1,300 second-feet from Gunnison River into the Uncompahgre above Uncompahgre.

Accuracy.—Although the channel is extremely shifting, sufficient discharge measurements were made to afford data for estimates by the indirect method, and these estimates may be considered reliable.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Reclamation Service, by which the field data are furnished. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON THE UNCOMPAHGRE RIVER NEAR MONTROSE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 29	E. H. Swett	2.60	60
May 5	E. H. Swett	3.18	145
May 27	E. H. Swett	4.28	586
June 4	E. H. Swett	3.29	168
June 21	E. H. Swett	3.70	310
July 10	E. H. Swett	3.22	165
July 30	E. H. Swett	2.45	28
Aug. 16	E. H. Swett	2.77	68
Oct. 23	E. H. Swett	2.10	7.6

Discharge of Uncompahgre River at Ouray for 1913.

Drainage Area, 44 Square Miles. Altitude, 7,710 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3	2.5	3	16	50	350	120	30	24	20	12	9
2	3	2	3	16	50	365	120	26	23	20	10	8
3	3	2	3	13	50	350	120	26	22	24	12	9
4	3.5	2	3	10	66	285	108	26	22	24	12	8
5	3.5	2	3	13	76	272	108	24	51	24	10	4.5
6	2	2	3	13	86	216	108	24	54	22	10	4.5
7	2	2	3	13	110	206	97	24	54	22	9	4.5
8	2	2	3	13	110	206	86	22	54	22	9	4.5
9	2	2	3	10	124	178	86	20	115	22	9	3
10	3	2	3	10	124	161	81	20	74	32	8	3
11	3	2	3	8	124	145	72	26	51	24	9	3
12	3	2.5	3	8	275	169	72	26	42	24	9	3
13	3	2.5	3	16	262	145	72	22	42	18	9	3
14	2	2.5	3	25	189	130	72	18	30	18	6	4.5
15	2	2.5	3	37	131	137	68	18	22	18	4.5	4
16	1.5	2.5	4.5	53	155	211	91	18	20	18	4.5	6
17	1.5	2.5	4.5	62	199	243	81	18	20	18	6	4.5
18	2	2.5	3.5	53	230	270	72	18	20	32	8	4.5
19	2	2.5	3.5	62	250	211	72	18	18	32	8	4.5
20	2	2.5	3.5	62	199	202	56	18	18	30	9	3
21	2	2.5	3.5	70	154	192	64	18	18	18	8	3
22	2	2.5	3	70	162	174	72	18	20	16	6	4.5
23	2	2.5	3	68	250	174	72	23	20	16	3	6
24	2	2.5	3.5	66	305	163	68	37	20	15	6	6
25	2	2.5	3	63	335	163	60	25	18	15	6	9
26	2.5	2.5	2	61	370	157	53	17	20	15	6	9
27	2.5	2.5	2	59	492	157	49	17	20	15	8	9
28	3	2.5	2	57	350	157	42	22	20	15	6	9
29	3		2	55	370	142	42	22	20	14	4.5	10
30	2.5		3	52	335	127	32	38	20	12	6	12
31	2.5		9		319		32	31		12		12
Mean	2.42	2.34	3.24	37.8	203	202	75.7	22.9	32.4	20.2	7.78	6.05
Run-off acre-feet	149	130	199	2250	12500	12000	4650	1410	1930	1240	463	372

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Uncompahgre River at Ouray for 1914. Drainage Area, 44 Square Miles. Altitude, 7,710 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	12	6	2	12	61	925	345	100	44	31	31	
2	12	4	4	12	44	825	300	100	44	31	31	
3	9	4	4	19	48	505	300	98	44	84	27	
4	6	4	2	31	52	405	267	85	35	84	27	
5	6	4	2	37	70	370	255	85	27	73	27	
6	6	4	1	44	75	247	240	85	27	73	27	
7	8	4	1	34	75	198	240	74	27	63	27	
8	8	4	2	34	110	188	240	64	27	53	21	
9	6	4	2	29	170	198	245	59	27	40	18	
10	4	4	6	30	228	275	232	59	35	40	17	
11	4	3	4	30	270	435	207	59	35	40	16	
12	6	3	2	30	202	560	207	59	35	40	14	
13	6	2	2	30	240	625	185	54	35	40	14	
14	6	2	6	61	255	520	175	54	35	40	12	
15	6	2	9	52	270	500	150	54	35	40	9	
16	6	2	12	66	215	545	150	54	35	40	9	
17	6	2	19	44	215	574	150	45	35	40	12	
18	4	2	19	56	270	602	212	45	35	35	8	
19	4	2	12	34	270	630	182	45	35	27	7	
20	4	1	15	52	335	610	192	45	35	35	7	
21	2	1	12	70	430	640	163	44	40	35	8	
22	2	1	9	61	510	555	145	58	35	35	8	
23	2	2	9	75	552	530	145	58	35	35	9	
24	2	4	9	48	470	530	125	63	33	53	9	
25	2	4	6	56	300	555	103	63	33	44	10	
26	4	4	6	80	370	455	103	63	31	44	10	
27	4	1	9	70	642	435	103	63	31	40	11	
28	3	2	12	48	390	360	103	58	31	35	11	
29	4		12	44	490	315	103	53	31	35	9	
30	6		9	61	732	300	103	44	31	33	8	
31	6		12		875		133	44		33		
Mean	5.35	2.93	7.45	45.0	298	480	187	62.4	33.9	44.2	15.1	
Run-off acre-feet	329	163	458	2680	18300	28600	1500	3840	2020	2720	898	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Uncompahgre River below Ouray for 1913. Drainage Area, 76 Square Miles. Altitude, 7,710 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						845	435	92	128	67	42	34
2						810	435	84	98	67	42	17
3						778	408	84	88	69	42	33
4						745	355	79	92	69	42	35
5						745	355	79	210	69	34	30
6						680	355	79	195	67	34	33
7						615	308	81	180	67	33	33
8						555	245	79	195	67	33	33
9						525	245	79	285	67	34	30
10						408	245	79	195	75	33	30
11						380	224	84	155	69	34	30
12					732	495	224	84	137	69	38	30
13					648	380	217	84	122	64	38	30
14					447	308	217	84	104	61	34	31
15					224	408	189	81	75	59	33	33
16					316	585	308	75	71	59	30	35
17					495	648	285	75	71	54	34	33
18					1010	810	245	71	71	54	38	27
19					648	712	285	71	71	54	38	27
20					435	648	275	75	67	50	34	24
21					330	555	275	79	61	42	27	24
22					355	435	265	79	71	42	20	26
23					495	435	285	79	67	48	24	27
24					745	525	210	155	67	48	30	27
25					810	525	195	95	61	50	30	29
26					880	555	168	81	67	48	26	29
27					1020	555	168	81	67	46	30	29
28					810	555	150	81	67	48	27	29
29					845	495	132	81	67	46	28	29
30					810	465	122	150	67	42	30	31
31					810		104	155		43		31
Mean					643	573	256	87.6	109	57.4	33.1	29.6
Run-off acre-feet					25500	34100	15700	5390	6490	3530	1970	1820

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Uncompahgre River below Ouray for 1914. Drainage Area, 76 Square Miles. Altitude, 7,710 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	31	30	30	34	81	1650	495	215	92	64		
2	31	30	34	47	79	1130	525	215	92	64		
3	30	27	27	57	69	985	525	215	92	118		
4	28	27	20	64	81	845	525	195	92	118		
5	27	27	27	67	88	648	555	180	92	100		
6	27	26	24	48	100	435	615	180	77	92		
7	30	25	20	69	104	408	615	165	77	92		
8	33	26	20	64	149	380	585	285	67	84		
9	33	26	27	63	215	408	555	180	85	70		
10	30	26	34	62	270	555	555	180	85	70		
11	27	25	34	63	360	778	555	145	85	70		
12	27	25	24	64	288	1020	495	145	75	70		
13	29	26	34	65	400	1290	435	125	75	70		
14	30	28	42	75	380	1210	435	125	75	70		
15	30	29	42	92	400	1250	380	115	75	64		
16	30	28	50	116	380	1100	380	105	75	64		
17	29	27	59	69	360	1100	330	95	75	62		
18	28	24	69	64	380	1100	555	95	75	62		
19	28	21	59	67	495	1100	355	95	75	59		
20	30	20	59	92	565	1130	380	91	75	68		
21	31	20	50	100	745	1130	355	91	76	68		
22	30	20	34	104	778	1020	315	120	73	68		
23	29	20	42	95	845	985	315	120	73	66		
24	29	20	42	81	745	845	260	120	72	81		
25	29	20	42	95	620	1020	225	127	72	81		
26	27	27	40	112	745	845	225	127	70	81		
27	27	20	42	95	865	810	210	127	70	81		
28	28	27	42	88	780	680	225	120	70	78		
29	29		34	81	1000	680	225	110	70	78		
30	27		34	88	1350	615	225	94	70	76		
31	27		34		1610		260	94		73		
Mean	29.1	24.9	37.8	76.0	494	905	409	142	77.6	76.2		
Run-off acre-feet	1790	1380	2320	4520	30400	53900	25100	8730	4620	4680		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Uncompahgre River at Montrose for 1913. Drainage Area, 565 Square Miles. Altitude, 5,820 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					31	328	26	74	31	148	29	79
2					45	372	153	68	40	109	45	70
3					27	267	207	91	24	123	37	71
4					187	283	187	64	51	143	51	65
5					51	250	160	45	45	136	64	84
6					24	207	349	31	27	115	79	84
7					27	275	179	40	35	121	105	68
8					57	179	153	37	51	79	136	68
9					51	226	121	31	71	45	201	55
10					115	201	121	79	84	35	216	64
11					130	148	121	51	87	12	195	87
12					40	168	35	105	115	7	232	58
13					105	130	34	45	125	15	250	56
14					84	115	41	57	125	17	226	50
15					148	223	55	37	148	12	286	40
16					136	160	160	33	115	7	71	47
17					160	134	139	24	71	9	115	
18					201	372	405	20	45	9	115	
19					105	298	386	1	37	9	105	
20				306	57	250	226	0	35	17	96	
21				267	148	236	115	2	195	13	91	
22				195	201	358	216	4	187	20	84	
23				35	349	179	226	8	168	17	87	
24				24	298	253	173	40	125	8	85	
25				27	187	232	226	35	113	15	87	
26				10	250	267	250	35	115	15	84	
27				7	495	213	201	43	109	19	87	
28				40	136	250	160	51	105	21	105	
29				31	179	535	27	51	130	14	91	
30				160	201	121	24	45	160	13	71	
31					267		12	55		17		
Mean				100	145	241	154	42.0	92.3	43.2	118	65.4
Run-off acre-feet				2180	8920	14300	9470	2580	5490	2660	7020	2080

Unless otherwise noted, all discharges are in cubic feet per second.

UNCOMPAHGRE RIVER NEAR DELTA.

Location.—At highway bridge on township line between Tps. 95 and 96, 2 miles south of Delta; no tributaries between the station and the mouth and no important tributaries for several miles upstream.

Records Available.—April 29, 1903, to December 18, 1913.

Drainage Area.—1,130 square miles.

Gage.—Vertical staff. The gage was originally located at a highway bridge one-fourth mile above the Denver & Rio Grande Railroad bridge. On November 17, 1903, it was moved to the railroad bridge, where it was read until April 21, 1904. An inclined gage was installed near the bridge on April 21, 1904, which was used until November, 1906, when a staff gage was installed at the present site. April 16, 1910, a new gage was installed at a datum slightly different from the preceding. The relation between the gages at the various sites was not determined.

Channel.—Extremely shifting.

Discharge Measurements.—Made from the bridge.

Winter Flow.—The flow is probably not materially affected by ice, although ice forms along the edges and slush ice frequently occurs. Observations are discontinued during the winter months.

Diversions.—The normal flow is diverted during the irrigation season by ditches above the station, so that the records represent largely return seepage water.

Accuracy.—Estimates only fair, or, for certain periods, possibly good, measurements being insufficient to permit use of indirect method for shifting channels to fullest extent.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Reclamation Service, which furnishes the field data. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON THE UNCOMPAHGRE RIVER AT DELTA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 24	E. H. Swett	1.96	418
May 29	E. H. Swett	1.60	273
June 30	E. H. Swett	1.10	108
July 24	E. H. Swett	1.48	200
Aug. 20	E. H. Swett	.65	33
Oct. 21	E. H. Swett	1.10	108

CANON CREEK AT OURAY.

Location.—At Ouray, Colo., in sec. 31, T. 44 N., R. 7 W., New Mexico principal meridian, in the Uncompahgre Forest, 200 feet above the mouth of the creek. Nearest tributary, a small stream, enters from the east some distance above.

Records Available.—January 25, 1911, to November 30, 1914.

Drainage Area.—26 square miles.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge Measurements.—Made from near-by foot-bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes practically no backwater at this station.

Diversions.—No water is diverted above the station, so the records represent the natural run-off.

Accuracy.—Owing to the high altitude of the drainage basin, alternate melting and freezing causes diurnal fluctuations of stage at certain seasons. Therefore the mean daily stage as determined from one reading may be considerably in error. For this reason the estimates of discharge, in general, can not be considered better than fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON CANON CREEK AT OURAY.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 12	Robert Follansbee	1.20	118	Jan. 18	R. H. Fletcher	2.44	5.90
July 20	R. H. Fletcher	1.00	115	May 26	Robert Follansbee	3.75	154.
Aug. 31	R. H. Fletcher	*3.15	47	May 31	T. J. Watkins	4.12	375.
Sept. 1	R. H. Fletcher	†3.02	37	July 2	T. J. Watkins	3.32	216.
Oct. 22	Robert Follansbee	‡2.65	18	Aug. 20	M. D. Anderson	2.30	35.
				Oct. 18	Follansbee & Watkins	2.10	18.

*New gage. Old gage read 0.55.

†New gage. Old gage read 0.47.

‡New gage. Old gage read 0.20.

Discharge of Uncompahgre River near Delta for 1913. Drainage Area, 1,130 Square Miles. Altitude, 4,970 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					205	190	68	52	37	305	137	176
2					176	205	37	44	60	305	137	190
3					205	150	52	44	60	285	150	162
4					137	105	44	60	95	305	162	190
5					95	105	60	52	105	305	162	190
6					115	68	126	44	150	325	137	190
7					105	68	68	44	95	285	126	176
8					105	115	44	18	162	285	137	205
9					95	126	44	30	325	285	137	176
10					115	115	60	44	268	220	137	162
11					150	162	60	44	150	190	137	162
12					162	137	52	44	115	137	162	162
13					150	126	44	52	176	115	150	176
14					115	105	44	52	190	137	150	176
15				220	68	150	52	44	220	137	137	176
16				420	68	150	77	44	205	137	137	176
17				620	60	95	86	44	150	137	137	190
18				395	105	176	115	44	137	137	162	220
19				590	105	205	126	44	137	115	162	
20				502	95	190	448	37	126	115	162	
21				560	77	162	235	52	95	115	162	
22				370	60	190	176	60	162	115	162	
23				305	105	205	250	44	620	105	162	
24				115	268	162	220	60	325	115	162	
25				77	126	137	137	44	285	126	162	
26				77	105	126	105	52	305	115	162	
27				86	190	162	95	44	325	115	162	
28				150	150	126	115	68	325	137	190	
29				176	150	205	86	60	370	137	220	
30				220	162	126	60	44	325	137	205	
31					105		60	30		162		
Mean				305	127	145	105	46.4	203	182	156	181
Run-off acre-feet				9680	7810	8630	6460	2850	12100	11200	9280	6460

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Canon Creek at Ouray for 1913. Drainage Area, 26 Square Miles. Altitude, 7,710 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	5	6	6	17	32	289	175	38	56	22	13	12
2	5	6	6	17	32	298	175	35	45	22	13	6
3	5	6	6	13	32	298	175	35	40	22	13	8
4	5	6	6	10	59	289	150	35	43	22	13	10
5	5	6	6	10	59	289	134	32	60	22	13	8
6	4	6	6	12	59	262	134	32	63	22	13	10
7	4	6	6	12	83	244	110	32	63	22	14	10
8	4	6	6	12	83	244	110	32	63	22	14	10
9	4	6	7	13	83	226	97	32	115	22	14	10
10	5	6	7	13	83	209	86	32	58	27	10	10
11	5	7	8	12	83	158	86	32	58	19	10	10
12	5	7	8	12	192	158	86	32	51	19	12	10
13	5	7	7	13	184	118	102	32	43	19	12	8
14	5	7	7	24	143	118	102	32	43	19	10	10
15	4	7	6	24	104	244	86	32	30	19	10	10
16	4	7	6	26	115	244	110	26	30	19	10	10
17	4	7	6	40	167	262	110	25	27	19	10	10
18	5	7	7	32	184	289	110	21	27	19	10	10
19	5	7	7	32	200	280	110	21	22	19	12	10
20	5	7	7	32	151	244	110	26	22	19	12	6
21	5	7	7	40	112	218	114	26	22	19	10	6
22	5	7	6	40	112	200	118	26	24	16	10	6
23	5	7	6	40	175	200	134	26	22	16	14	6
24	5	7	6	39	218	206	102	52	22	15	12	6
25	5	7	6	38	235	209	86	46	22	18	10	6
26	5	7	5	37	253	209	72	35	22	19	8	6
27	6	7	5	36	346	218	62	35	22	15	12	6
28	6	7	7	35	280	218	52	32	22	19	10	6
29	6		7	34	308	200	52	32	22	14	8	6
30	6		8	33	289	192	40	65	22	14	10	6
31	6		12		289		38	102		13		6
Mean	4.9	6.6	6.6	24.9	153	228	104	35.2	39.4	19.1	11.4	8.2
Run-off acre-feet	301	366	406	1480	9410	13600	6400	2160	2340	1170	678	504

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Canon Creek at Ouray for 1914. Drainage Area, 26 Square Miles. Altitude, 7,710 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6	6	8	14	22	490	255	73	58	12	11	
2	6	6	10	13	22	478	226	73	58	12	11	
3	6	6	6	14	21	435	222	73	45	45	10	
4	6	6	6	15	22	317	222	58	45	45	10	
5	6	6	6	16	24	278	233	58	35	45	10	
6	6	6	6	22	24	148	233	58	26	30	10	
7	6	6	3	18	25	122	233	45	26	26	10	
8	6	6	6	16	41	113	233	73	26	26	6	
9	6	6	10	14	56	106	233	45	26	18	6	
10	6	6	10	15	86	169	211	45	26	18	6	
11	6	6	10	16	96	248	211	45	26	18	5	
12	6	6	8	18	70	331	194	45	18	18	5	
13	6	6	10	19	96	459	190	35	18	18	5	
14	6	6	14	24	78	418	190	35	18	18	5	
15	6	6	14	29	101	459	169	35	18	17	4	
16	6	6	14	34	78	435	169	35	18	17	4	
17	6	6	19	25	78	426	148	35	18	17	6	
18	6	6	19	23	86	416	255	35	18	17	5	
19	8	6	19	19	86	406	211	35	18	17	5	
20	8	6	19	25	125	363	211	35	18	18	5	
21	9	6	14	30	166	377	169	35	22	18	5	
22	6	6	14	27	198	365	148	82	18	18	6	
23	6	6	14	24	241	370	128	82	18	18	6	
24	6	6	14	24	208	370	109	90	18	35	6	
25	6	6	14	25	170	375	90	90	15	30	5	
26	6	6	13	30	208	331	82	90	15	26	5	
27	6	3	14	26	252	317	82	90	12	26	5	
28	6	6	14	23	200	278	73	82	12	26	5	
29	6		14	23	230	271	73	73	12	17	5	
30	6		14	24	412	248	73	58	12	17	4	
31	6		14		475		82	58		15		
Mean	6.22	5.89	11.9	21.5	129	331	173	58.1	23.8	22.5	6.37	
Run-off acre-feet	382	327	732	1280	7930	19700	10600	3570	1420	1380	379	

Unless otherwise noted, all discharges are in cubic feet per second.

LARAMIE RIVER DRAINAGE

LARAMIE RIVER NEAR WEST PORTAL LARAMIE-POUDRE TUNNEL.

Location.—At highway bridge, about one-half mile below the west portal of the Laramie-Poudre tunnel. The river divides into the east and west branches about one mile above.

Records Available.—May 10, 1913, to September 27, 1913, and several miscellaneous measurements.

Gage.—Reference point on bridge.

Discharge Measurements.—From highway bridge and by wading.

Diversions.—There is a decree for 400 second-feet from the West Branch Laramie River by the Skyline Canal which takes the water across the divide to the Cache la Poudre river.

Accuracy.—Results considered good, but 30 per cent below the normal flow of the stream.

DISCHARGE MEASUREMENTS LARAMIE RIVER NEAR WEST PORTAL LARAMIE-POUDRE TUNNEL.

Date 1913	Hydrographer	Ref. Point to Water Surface	Discharge Sec. Ft.
May 10	Thos. Grieve, Jr.	4.72	48
June 13	Thos. Grieve, Jr.	5.0	24
July 11	Thos. Grieve, Jr.	5.20	14
Sept. 27	M. E. Bunger		9.6

LARAMIE RIVER AT GLENDEVEY.

Location.—At highway bridge one-eighth mile west of Glendevey in sec. 36, T. 10 N., R. 76 W., in the Medicine Bow National Forest; McIntyre Creek enters a short distance below and Nunn Creek above.

Records Available.—June 24, 1904, to October 31, 1905; August 18, 1910, to August 9, 1914.

Drainage Area.—102 square miles.

Gage.—Automatic gage installed by the State engineer November 17, 1910, replaced vertical staff previously used. The datum of the gages has remained constant.

Channel.—Permanent.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 65 second-feet from Laramie River above the station and for 749 second-feet from tributaries entering above. Of this latter amount 688 second-feet are for diversion into the Cache la Poudre basin.

Accuracy.—Conditions are favorable for excellent results, and the estimates should be reliable.

Co-operation.—Since its re-establishment the station has been maintained in co-operation with the United States Forest Service.

DISCHARGE MEASUREMENTS ON LARAMIE RIVER AT GLENDEVEY.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 26	Thos. Grieve, Jr.	2.10	48
May 9	Thos. Grieve, Jr.	2.68	202
May 26	Thos. Grieve, Jr.	3.02	297
June 7	Thos. Grieve, Jr.	2.80	219
June 20	Thos. Grieve, Jr.	2.65	175
July 23	R. I. Meeker	2.36	84
July 29	Thos. Grieve, Jr.	2.20	53
Aug. 2	Thos. Grieve, Jr.	2.10	44
Aug. 11	M. E. Bunger	2.05	29
Aug. 17	R. I. Meeker	2.00	30
Sept. 10	M. E. Bunger	2.00	33
Sept. 27	M. E. Bunger	2.10	38
Oct. 12	R. I. Meeker	2.10	41

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 17	Bundy and Woodhall	2.93	264
May 24	D. L. Bundy	4.00	686
May 28	D. L. Bundy	4.45	999
June 2	D. L. Bundy	4.95	1316
July 30	M. N. Grant, Jr.	2.28	73

LARAMIE RIVER NEAR JELM, WYO.

Location.—At highway bridge in sec. 15, T. 12 N., R. 77 W., 4 miles south of Jelm postoffice, one-fourth mile below the Colorado-Wyoming line.

Records Available.—May 7 to October 31, 1914. From June 22, 1904, to October 31, 1905, a station was maintained at Decker's ranch, half a mile south of the State line. The records at the two stations are practically comparable as there are no tributaries nor diversions of any amount between.

Drainage Area.

Gage.—In 1911 an automatic recording gage was installed. This is referred to the same datum as the vertical staff used at first.

Channel.—Practically permanent.

Discharge Measurements.—Made from bridge.

Winter Flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—Between this station and that at Glendevey, Colo., there are court decrees for diversions of 236 second-feet from Laramie River and 204 second-feet from intervening tributaries. These diversions are all in Colorado.

Accuracy.—Conditions are favorable for accurate results, and the estimates should be excellent.

DISCHARGE MEASUREMENTS ON LARAMIE RIVER AT BOSWELL'S RANCH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 24	R. I. Meeker	1.30	114
Apr. 24	Thos. Grieve, Jr.	1.45	140
Apr. 25	Thos. Grieve, Jr.	1.34	128
Apr. 27	Thos. Grieve, Jr.	1.40	136
Apr. 29	Thos. Grieve, Jr.	1.70	252
May 8	Thos. Grieve, Jr.	2.20	467
May 14	R. I. Meeker	2.35	514
May 22	C. E. Turner	2.06	371
May 24	Thos. Grieve, Jr.	2.45	599
May 28	Thos. Grieve, Jr.	2.72	777
May 30	R. I. Meeker	2.82	850
June 15	Thos. Grieve, Jr.	2.05	380
June 21	C. E. Turner	1.97	334
July 22	R. I. Meeker	1.36	113
Aug. 9	M. E. Bunger	1.15	63
Aug. 17	R. I. Meeker	1.02	44
Sept. 2	Robert Follansbee	0.99	41
Sept. 2	M. E. Bunger	1.00	39
Sept. 30	M. E. Bunger	1.22	76
Oct. 3	M. E. Bunger	1.22	78
Oct. 12	R. I. Meeker	1.20	78
Nov. 25	R. I. Meeker	1.06	66

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 16	Bundy and Woodhall	2.30	516
May 23	Bundy and Woodhall	3.45	1486
May 28	D. L. Bundy	3.60	2482
June 2	D. L. Bundy	3.80	2872
June 9	D. L. Bundy	3.10	1169
July 31	M. N. Grant, Jr.	1.55	165

Discharge of Laramie River at One-Half Mile below Laramie-Poudre Tunnel for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						50						
2												
3												
4												
5												
6												
7												
8						34						
9												
10					50							
11							14					
12												
13						24						
14												
15												
16												
17							21					
18					40							
19												
20						31						
21												
22												
23												
24							21					
25												
26												
27					31				9.6			
28						18						
29							10					
30												
31												
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Laramie River at Glendevey for 1913.
Drainage Area, 102 Square Miles.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					142	342	85	40	25	36		
2					112	290	72	40	22	36		
3					98	290	72	36	25	36		
4					85	272	72	40	22	54		
5					98	255	72	40	25	54		
6					127	272	63	36	28	40		
7					189	238	54	36	31	36		
8					142	206	63	36	31	36		
9					173	222	63	36	31	31		
10					222	238	72	31	31	31		
11					238	255	72	31	28	31		
12					255	206	63	31	28	31		
13					238	189	54	31	28	31		
14					173	174	47	31	25	36		
15					173	174	47	31	25	31		
16					158	174	47	31	25	31		
17					173	174	54	31	25	31		
18					189	174	72	28	25	25		
19					189	206	72	28	25	25		
20					158	189	54	28	22			
21				72	142	174	47	25	25			
22				85	127	174	47	28	25			
23				54	158	142	72	28	31			
24				47	189	127	127	31	31			
25				47	222	174	85	28	31			
26				40	255	158	72	28	31			
27				63	325	127	63	28	36			
28				112	325	127	54	28	31			
29				142	325	127	47	31	31			
30				142	342	98	47	31	36			
31					360		40	31				
Mean				80.4	197	199	63.6	31.9	27.8	34.8		
Run-off acre-feet				1600	12100	11800	3910	1960	1650	1310		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Laramie River at Glendevey for 1914.
Drainage Area, 102 Square Miles.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			15	12	91	1380	272					
2			15	10	91	1300						
3			12	12	91	1060		80				
4			15	18	102	1060						
5			12	22	114	1140						
6			15	22	91	860	180	80				
7			15	22	102	712						
8			15	15	126	584						
9			15	15	180	456	180	80				
10			15	15	208	496						
11				15	223	609						
12					194	584						
13					180	684						
14					180	634	126					
15					208	659						
16					223	609						
17					225	634						
18					289	496						
19					342	540	152					
20					395	634						
21					518	659						
22					609	659						
23					634	456	80					
24					740	378						
25			15		770	360						
26			10	102	770	324						
27			12	91	800	306						
28			15	80	925	342						
29			12	80	860	306	80					
30			12	91	892	272	80					
31			12		990							
Mean			13.6		393	640	144					
Run-off acre-feet			*836	1230	24200	38100	*8850					

Unless otherwise noted, all discharges are in cubic feet per second. *Figured for full month.

Discharge of Laramie River at Boswell's Ranch near Jelm, Wyo., for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					356	836	194	102	42	67	57	
2					334	734	168	90	35	67	57	
3					269	668	161	77	28	67	57	
4					250	668	161	77	28	102	57	
5					269	606	146	77	42	130	57	
6					334	606	130	67	50	102	57	
7					434	606	116	67	57	77	57	
8					434	516	116	67	50	77	67	
9					406	516	116	57	57	77	57	
10					516	546	130	67	57	77	57	
11					546	576	146	57	42	67	57	
12					576	488	116	57	42	77	50	
13					606	434	102	57	42	77	57	
14					516	381	102	57	42	77	57	
15					434	356	116	57	50	67	50	
16					434	356	102	57	42	67	42	
17					434	356	116	42	42	77	57	
18					488	356	161	42	42	67	50	
19					516	406	178	42	42	57	57	
20					461	356	130	42	42	67	50	
21				212	406	356	130	42	42	57	50	
22				194	406	334	102	42	67	50	50	
23				130	488	290	161	42	77	57	57	
24				116	576	250	230	42	67	67	67	
25				130	636	311	178	42	77	57	57	
26				130	701	311	130	42	77	57	57	
27				130	801	269	130	35	77	77	57	
28				161	801	250	116	42	67	57	67	
29				230	801	269	102	42	67	57	57	
30				334	871	212	90	42	67	67	50	
31					906		102	42		67		
Mean				177	516	441	135	55	52	71	56	
Run-off acre-feet				3500	31700	26200	8300	3380	3090	4370	3330	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Laramie River at Boswell's Ranch near Jelm, Wyo., for 1914.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					155	2410	472	155	80	60		
2					185	2980	445	170	60	60		
3					185	2690	365	170	60	60		
4					220	2410	340	155	40	60		
5					238	2280	445	130	70	60		
6					255	2150	295	105	40	60		
7					220	1660	295	105	50	60		
8					255	1340	295	105	40	60		
9					295	1150	275	105	30	60		
10					390	1150	220	105	30	60		
11					472	1340	202	105	30	80		
12				80	472	1340	220	105	30	50		
13				92	418	1440	202	105	28	70		
14				105	530	1660	185	105	25	60		
15				105	500	1440	185	105	25	80		
16				105	500	1150	155	105	25	80		
17				118	630	1070	170	105	25	80		
18				105	780	1070	238	105	25	80		
19				130	905	1070	220	130	25	80		
20				142	1340	1230	185	105	25	80		
21				155	1500	950	185	105	30	80		
22				202	1560	1010	202	105	25	80		
23				155	1620	860	185	80	25	80		
24				155	2100	780	170	80	25	80		
25				155	1890	700	155	80	25	80		
26				155	1540	665	155	105	25	80		
27				155	1780	560	155	105	40	80		
28				170	2280	530	130	80	40	80		
29				155	2150	472	130	80	60	80		
30				155	2150	500	202	60	60	80		
31					2150		185	80		80		
Mean				136	957	1340	234	108	37.3	71.6		
Run-off acre-feet				5140	58800	79700	14400	6640	2220	4400		

Ualess otherwise noted, all discharges are in cubic feet per second.

RAWAH CREEK NEAR MOUTH.

Location.—About one-half mile above mouth.

Records Available.—May 10, 1913, to September 27, 1913, and miscellaneous measurements.

Gage.—Vertical staff.

Discharge Measurements.—By wading.

Diversions.—There are no decrees for diversions on this stream. There is a proposed diversion by the Greeley-Poudre Irrigation District through the Laramie-Poudre tunnel.

Accuracy.—Results considered good, but 30 per cent below normal flow of stream.

MEASUREMENTS ON RAWAH CREEK NEAR MOUTH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 10	Thos. Grieve, Jr.	0.40	17.3
May 27	Thos. Grieve, Jr.	0.90	56.
June 8	Thos. Grieve, Jr.	0.80	46.
Aug. 11	M. E. Bunger	0.40	10.
Sept. 20	M. E. Bunger	0.25	8.9
Sept. 27	M. E. Bunger	0.35	9.1

NUNN CREEK NEAR MOUTH.

Location.—About one-quarter of a mile above mouth near Glendevey postoffice.

Records Available.—April 8, 1913, to July 30, 1913, and miscellaneous measurements.

Gage.—Vertical staff.

Channel.—Permanent but rough.

Discharge Measurements.—By wading.

Diversions.—There are several decrees for diversions on this stream, one of which diverts water from Deadman Creek, which enters just above the station, across the divide to the North Fork Cache la Poudre River. The Greeley-Poudre Irrigation District also proposes to divert water from this stream to carry through the Laramie-Poudre tunnel.

Accuracy.—Owing to the rough channel results can only be considered fair. The flow for this year in this drainage basin is also about 30 per cent below normal.

DISCHARGE MEASUREMENTS ON NUNN CREEK NEAR MOUTH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 26	Thos. Grieve, Jr.	0.00	11
May 9	Thos. Grieve, Jr.	0.98	83
June 7	Thos. Grieve, Jr.	0.63	49
June 19	Thos. Grieve, Jr.	0.30	27
June 28	Thos. Grieve, Jr.	-0.05	11
July 11	Thos. Grieve, Jr.	-0.20	2.6
Aug. 11	M. E. Bunger	-0.20	6.2
Sept. 10	M. E. Bunger	-0.20	6.3
Oct. 13	M. E. Bunger	-0.05	10

STUB CREEK AT MOUTH NEAR GLENDEVEY.

Location.—Above State road from Glendevey to Walden one-half mile from Glendevey postoffice.

Records Available.—May 9, 1913, to September 10, 1913, and several measurements in 1912.

Gage.—Vertical staff.

Channel.—Shifts slightly.

Discharge Measurements.—By wading.

Diversions.—No water is diverted above this station. There is a decree for 7.94 second-feet below the station.

Accuracy.—Results good but 30 per cent below normal flow of stream.

DISCHARGE MEASUREMENTS ON STUB CREEK AT MOUTH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 9	Thos. Grieve, Jr.	1.20	15
May 27	Thos. Grieve, Jr.	1.38	20
June 28	Thos. Grieve, Jr.	0.95	4.1
July 11	Thos. Grieve, Jr.	0.75	2.6

Discharge of Rawah Creek near Mouth for 1913.

Day	Jan.	Feb.	Mar.	Apr	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						61	46	9.0				
2												
3												
4												
5												
6												
7												
8						46						
9												
10					17							
11							34	10				
12												
13						42						
14												
15												
16												
17							30					
18					17							
19												
20						51			8.9			
21												
22												
23												
24							42					
25												
26												
27					56				9.1			
28						46						
29							26					
30												
31												
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Nunn Creek near Mouth for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						73						
2								6				
3												
4												
5						60						
6						55	14					
7						51						
8						47						
9					84	44						
10							4		6.3			
11							2	6.2				
12						36						
13						33				10		
14						33	11					
15												
16							2					
17												
18					55							
19						27	2					
20						21	6					
21												
22												
23												
24												
25					78		11					
26					90	14						
27					73	9						
28					73	9						
29							6					
30							6					
31					78							
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Stub Creek at Mouth near Glendevey for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						18		0.3				
2												
3												
4							7.4					
5						16						
6						16	7.4					
7						14						
8						14						
9					14			0.3				
10							8.7		0.5			
11							3.4	0.3				
12						13						
13						13						
14						10						
15												
16							1.4					
17							0.7					
18					14							
19						10						
20						10	0.5					
21												
22												
23					16							
24							6.0					
25							0.7					
26						8.7						
27					20	7.4						
28							0.5					
29												
30												
31					18							
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

M'INTYRE CREEK NEAR GLENDEVEY.

Location.—At Talmadge's Ranch, about four miles from Glendevey postoffice and one-quarter mile below state road to Walden.

Records Available.—June 1 to September 30, 1913, and miscellaneous measurements.

Drainage Area.—19 square miles.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge Measurements.—Made from foot bridge.

Diversions.—One small ditch diverts water and there are contemplated diversions by the Greeley-Poudre Irrigation District and the Laramie Water Co. above the station.

Accuracy.—Results are good, but the year 1913 was extremely low in this drainage basin, being about 70 per cent of normal.

DISCHARGE MEASUREMENTS ON M'INTYRE CREEK NEAR GLENDEVEY.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
June 7	Thos. Grieve, Jr.	1.40	105
June 13	Thos. Grieve, Jr.	1.21	74
June 27	Thos. Grieve, Jr.	1.00	54
July 16	Thos. Grieve, Jr.	0.65	25
Aug. 1	Thos. Grieve, Jr.	0.50	17
Aug. 11	M. E. Bunger	0.40	11
Sept. 3	M. E. Bunger	0.30	9.6
Sept. 10	M. E. Bunger	0.35	8.8
Sept. 27	M. E. Bunger	0.40	12

M'INTYRE CREEK NEAR GLENEYRE.

Location.—At highway bridge near Gleneyre and one-half mile above mouth.

Records Available.—June 24, 1904, to September 30, 1904; April 1, 1905, to August 31, 1905; May 1, 1913, to July 29, 1913, and miscellaneous measurements.

Gage.—Vertical staff.

Discharge Measurements.—From foot bridge and by wading.

Diversions.—There are decrees for 28.28 second-feet from this stream and tributaries above the station.

Accuracy.—Results considered good, but owing to the extremely low run-off during 1913 can only be considered about 70 per cent of normal flow.

DISCHARGE MEASUREMENTS ON M'INTYRE CREEK NEAR GLENEYRE.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	9	Thos. Grieve, Jr.	0.40	88.
May	19	Thos. Grieve, Jr.	0.73	126.
May	26	Thos. Grieve, Jr.	1.15	182.
June	9	Thos. Grieve, Jr.	0.74	123.
June	27	Thos. Grieve, Jr.	0.20	56.
July	10	Thos. Grieve, Jr.	0.05	36.
July	29	Thos. Grieve, Jr.	-0.30	17.

LA GARDE CREEK NEAR MOUTH.

Location.—At Tatham's Ranch about one-quarter mile above mouth.

Records Available.—May 9, 1913, to October 14, 1913, and miscellaneous measurements.

Drainage Area.—Not measured.

Gage.—Vertical staff.

Channel.—Permanent.

Discharge Measurements.—By wading.

Diversions.—Two ditches divert water for irrigation of hay land above station.

Accuracy.—Results are good but are about 30 per cent below normal flow.

DISCHARGE MEASUREMENTS ON LA GARDE CREEK NEAR MOUTH.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	9	Thos. Grieve, Jr.	1.35	73
May	25	Thos. Grieve, Jr.	1.62	111
June	14	Thos. Grieve, Jr.	1.10	46
June	21	Thos. Grieve, Jr.	0.81	23
June	27	Thos. Grieve, Jr.	0.70	15
July	10	Thos. Grieve, Jr.	0.40	3.3
Aug.	11	M. E. Bunger	0.40	3.7
Sept.	3	M. E. Bunger	0.36	2.9
Oct.	14	M. E. Bunger	0.55	8.5

Discharge of McIntyre near Glendevey, Five Miles Above Mouth for 1913.

Drainage Area, 19 Square Miles.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						156	43	17	9			
2						156	43	17	9			
3						156	39	17	15			
4						156	35	17	13			
5						134	32	17	9			
6						134	28	17	11			
7						123	35	17	9			
8						123	32	17	9			
9						123	28	15	9			
10						123	28	13	9			
11						123	35	13	9			
12						95	28	13	9			
13						80	25	13	9			
14						80	22	13	9			
15						95	22	13	11			
16						87	22	13	15			
17						95	35	9	11			
18						95	32	9	9			
19						87	28	9	9			
20						80	22	9	9			
21						74	22	9	9			
22						74	22	9	11			
23						63	25	9	11			
24						63	48	9	9			
25						80	25	9	9			
26						63	22	9	9			
27						58	20	9	9			
28						58	17	13	9			
29						63	17	13	9			
30						48	17	13	9			
31							17	13				
Mean						98	28	12.7	9.9			
Run-off acre-feet						5831	1722	781	589			

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of McIntyre Creek at Gleneyre near Mouth for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					81	190	56					
2												
3												
4												
5												
6												
7												
8												
9					81	128						
10							39					
11												
12						107						
13												
14						88						
15												
16												
17							21					
18												
19					128	94						
20						81						
21												
22												
23												
24												
25					220		27					
26					183							
27						56						
28							24					
29							16					
30												
31					190							
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of La Garde Creek at Mouth for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2						117		3.5				
3												
4												
5									2.5			
6												
7						80		5.0				
8												
9					74							
10						62	3.5					
11								3.5				
12						74	2.5		2.5			
13												
14						46				8.5		
15						67	2.5					
16							3.5	3.5				
17												
18							3.5					
19					94	29						
20							10.5					
21						22						
22												
23												
24												
25					109	42	10.5	3.5				
26												
27						15						
28							8.5					
29												
30						15	6.5					
31					142	8.5	5.0					
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

GRACE CREEK NEAR MOUTH.

Location.—Just above Grace Creek Ranch about one-quarter mile above the mouth.

Records Available.—May 11, 1913, to October 2, 1913, and several miscellaneous measurements.

Gage.—Vertical staff.

Discharge Measurements.—By wading.

Diversions.—There is a decree for 19.44 second-feet above this station.

Accuracy.—Results goods. Flow of stream during 1913 about 70 per cent of normal.

DISCHARGE MEASUREMENTS ON GRACE CREEK NEAR MOUTH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 11	Thos. Grieve, Jr.....	1.55	28
May 25	Thos. Grieve, Jr.....	1.75	43
May 31	Thos. Grieve, Jr.....	2.02	70
June 21	Thos. Grieve, Jr.....	1.32	18
June 29	Thos. Grieve, Jr.....	1.20	11
July 12	Thos. Grieve, Jr.....	0.95	3.1
Sept. 12	M. E. Bunger.....	0.90	2.6

STUCK CREEK NEAR MOUTH.

Location.—Near Colorado-Wyoming line and about one-quarter mile above mouth.

Records Available.—May 8, 1913, to September 9, 1913, and miscellaneous measurements.

Drainage Area.—Not measured.

Gage.—Vertical staff.

Channel.—Apparently permanent.

Discharge Measurements.—By wading.

Diversions.—One ditch diverting water above the station not used in 1913.

Accuracy.—Results are good but are about 70 per cent of normal.

DISCHARGE MEASUREMENTS ON STUCK CREEK NEAR MOUTH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 8	Thos. Grieve, Jr.....	0.80	24
May 25	Thos. Grieve, Jr.....	0.90	39
June 5	Thos. Grieve, Jr.....	0.85	27
June 22	Thos. Grieve, Jr.....	0.63	10
July 10	Thos. Grieve, Jr.....	0.45	3.1

JOHNSON CREEK NEAR MOUTH.

Location.—Near road from Laramie to Walden.

Records Available.—April 28, 1913, to July 30, 1913, and miscellaneous measurements.

Gage.—Vertical staff.

Channel.—Permanent.

Discharge Measurements.—By wading.

Diversions.—Two small ditches divert water above this station.

Accuracy.—Results are good but 30 per cent below the normal flow during this year.

DISCHARGE MEASUREMENTS ON JOHNSON CREEK NEAR MOUTH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 28	Thos. Grieve, Jr.....	0.68	22
May 16	Thos. Grieve, Jr.....	0.82	31
June 16	Thos. Grieve, Jr.....	0.42	9.7
July 19	Thos. Grieve, Jr.....	0.21	3.3
Oct. 4	M. E. Bunger.....		4

Discharge of Grace Creek at Mouth for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2								4.5		4.6		
3												
4							7.5					
5						48		4.5				
6												
7								4.5				
8							4.5					
9												
10						40	4.5					
11					28							
12						32	3.5		3.5			
13												
14						25						
15												
16							7.5	4.5				
17					25							
18							9.0					
19						22						
20						20						
21						14						
22												
23												
24												
25					44		7.5	3.5				
26												
27						12						
28							7.5					
29					58	10						
30					74		6.0					
31					68		4.5					
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in acre-feet per second.

Discharge of Stuck Creek at Mouth for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2								0.5				
3												
4												
5						30						
6												
7								0.5				
8					22		3.2					
9									0.3			
10						22	3.2					
11												
12						22	2.0					
13					52							
14						14						
15								0.5				
16						14	2.0					
17					30							
18												
19						14	4.5					
20						11						
21							2.0					
22						11						
23					78							
24								0.5				
25					37		2.0					
26												
27						8						
28					37							
29												
30						6	1.0					
31							1.0					
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Johnson Creek near Mouth for 1913.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1												
2												
3												
4												
5												
6						20						
7												
8					18							
9							1.6					
10						15						
11												
12							1.0					
13												
14												
15												
16					30	9						
17												
18												
19							3.1					
20					33							
21												
22						6						
23												
24					33							
25												
26						6	2.4					
27												
28				23								
29				20								
30					37	6	1.3					
31												
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

RIO GRANDE DRAINAGE

RIO GRANDE AT THIRTYMILE BRIDGE, NEAR CREEDE, COLO.

Location.—In the Rio Grande National Forest, about 30 miles southwest of Creede, in sec. 13, T. 40 N., R. 4 W.; a short distance above mouth of Squaw Creek.

Records Available.—June 18, 1909, to November 30, 1914.

Drainage Area.—163 square miles (measured from topographic sheets).

Gage.—Chain gage, 200 feet upstream from Thirtymile Bridge; washed out October 5, 1911. The flood of this date changed the mouth of Squaw Creek, making it enter above the gaging station. For that reason, when the records were resumed April 8, 1912, a vertical staff gage was established a quarter of a mile above the old location and above the new mouth of Squaw Creek. The relation between the gages was not determined.

Channel.—Apparently permanent.

Discharge Measurements.—Made from car and cable except during low stages, when they are made by wading.

Winter Flow.—Ice causes backwater during the winter months and records are discontinued.

Diversions.—So far as known, no water is diverted above the station.

Artificial Control.—A short distance above the station the San Luis Valley irrigation district has constructed the large Rio Grande reservoir which materially modifies the flow of the river; also Lost Lake Reservoir.

Accuracy.—Owing to the high altitude at this point it is possible that at certain seasons of the year the alternate melting and freezing may cause considerable diurnal fluctuations. For this reason the mean daily gage height taken from morning and evening readings may not represent accurately the true mean for the day. With this exception, conditions are favorable for accurate results, and altogether the records are considered good.

Co-operation.—Prior to 1914 this station was maintained by co-operative action between the United States Geological Survey and J. C. Ulrich, engineer for the San Luis Valley Irrigation District. During 1914 gage heights were furnished by the San Luis Valley Irrigation District and discharge measurements made by the State Engineer's office.

DISCHARGE MEASUREMENTS RIO GRANDE AT THIRTYMILE BRIDGE BELOW RIO GRANDE RESERVOIR.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Mch. 29	C. H. Sievers	2.75	3.7
Apr. 15	C. H. Sievers	2.86	7.2
Apr. 19	C. H. Sievers	2.96	10.4
Apr. 20	C. H. Sievers	3.20	28.
Apr. 20	C. H. Sievers	3.25	42

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 26	Field & Evans	5.65	980
June 7	D. W. Evans	6.60	2037
July 7	D. W. Evans	5.73	925
July 10	D. W. Evans	5.63	830
July 11	Crisman & Meeker	5.63	825

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
April 21	C. H. Sievers	3.80	96
May 30	C. H. Sievers	6.00	1200
June 2	C. H. Sievers	4.29	262
June 2	C. H. Sievers	4.65	420
June 2	C. H. Sievers	4.49	349
June 2	C. H. Sievers	4.80	489
June 2	C. H. Sievers	4.90	539
June 3	C. H. Sievers	5.07	654
June 3	C. H. Sievers	5.32	828
June 3	C. H. Sievers	5.21	751
June 18	C. H. Sievers	4.41	309
June 18	C. H. Sievers	4.91	541
June 18	C. H. Sievers	4.82	511
June 18	C. H. Sievers	4.71	443
July 14	C. H. Sievers	4.85	534
July 17	C. H. Sievers	4.92	586
July 18	C. H. Sievers	5.13	712
July 19	C. H. Sievers	5.20	759
Aug. 3	Follansbee & Sievers	4.71	432
Aug. 4	C. H. Sievers	4.85	517
Aug. 4	C. H. Sievers	4.71	434

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Aug. 8	Crisman & Evans	5.12	551
Aug. 8	Crisman & Evans	4.68	325
Aug. 10	Crisman & Evans	4.40	213
Aug. 10	Crisman & Evans	3.80	82
Aug. 11	Crisman & Evans	3.12	43

Discharge of Rio Grande at Thirtymile Bridge for 1913.

Drainage Area, 163 Square Miles. Altitude, 9,380 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			3	4	210	94	500	314	107	95	395	
2			3	5	219	253	555	420	107	95	395	
3			3	5	219	760	610	445	103	95	390	
4			3	6	210	850	610	500	99	95	327	
5			3	6	210	850	610	500	120	95	74	
6			3	6	210	760	640	345	158	95	82	
7			3	6	210	538	555	292	175	144	81	
8			3	6	213	473	528	280	175	229	69	
9			3	6	216	473	555	284	175	284	64	
10			3	6	219	350	610	284	175	309	62	
11			4	6	260	292	610	284	175	309	44	
12			4	6	555	292	610	280	178	304*	14	
13			4	6	970	292	610	276	178	304		
14			4	7	970	292	528	292	178	304		
15			4	7	850	292	528	304	178	296		
16			4	8	640	292	555	318	160	296		
17			4	8	500	300	605	300	131	296		
18			4	9	483	395	700	296	118	288		
19			4	14	483	730	700	292	118	280		
20			4	39	483	730	610	276	118	280		
21			4	84	483	670	640	246	103	276		
22			4	158	483	670	610	257	92	268		
23			4	195	555	610	473	249	92	268		
24			4	195	395	500	445	239	92	264		
25			4	195	94	201	473	235	92	260		
26			4	195	910	44	445	201	92	256		
27			4	195	1210	18	370	133	92	253		
28			4	195	1210	190	336	94	92	246		
29			4	201	1210	445	318	90	92	239		
30			4	210	850	500	272	90	92	232		
31			4		128		272	99		296		
Mean			3.7	66.3	512	439	532	275	129	237	166	
Run-off acre-feet			228	3950	31500	26100	32700	16900	7680	14600	3960	

Unless otherwise noted, all discharges are in cubic feet per second. *Rio Grande Reservoir gates closed.

Note.—Discharge estimated. March 1—March 10.

Discharge of Rio Grande at Thirtymile Bridge for 1914.

Drainage Area, 163 Square Miles. Altitude, 9,380 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					122	980	625	740	125	87	95	
2					130	1240	625	740	125	87	95	
3					130	1540	600	710	125	95	95	
4					130	1770	710	680	125	95	95	
5					140	1770	830	650	125	95	95	
6					150	1770	865	575	125	95	95	
7					162	1770	900	525	125	95	95	
8					162	1580	865	430	125	95	95	
9					122	1400	865	150	117	95	95	
10					85	735	830	95	117	95	87	
11					48	615	830	102	117	95	87	
12					36	510	800	290	102	95	87	
13					39	535	740	290	87	95	65	
14					65	535	770	290	87	95	55	
15					150	535	800	270	87	95	55	
16					285	615	770	270	87	95	55	
17					385	945	770	270	87	95	55	
18					410	1580	770	270	87	95	55	
19					410	2100	800	290	87	95	55	
20					410	1980	800	310	87	95	55	
21					410	1860	800	310	87	95	55	
22					560	1520	800	310	87	95	55	
23					825	1320	800	310	87	95	55	
24					1050	1180	770	255	87	95	55	
25					1015	1040	770	255	87	95	55	
26					980	830	770	255	87	95	55	
27					980	740	770	225	87	95	52	
28					945	710	770	225	87	95	47	
29				*45	885	710	770	210	87	95	47	
30				85	885	710	740	195	87	95	47	
31					885		740	195		95		
Mean				65	420	1170	776	345	101	94	70	
Run-off acre-feet				258	25800	69600	47700	21200	5990	5810	4140	

Unless otherwise noted, all discharges are in cubic feet per second. *Rio Grande Reservoir gates opened.

RIO GRANDE NEAR CREEDE.

Location.—In the Rio Grande National Forest, at a highway bridge in about sec. 8, T. 41 N., R. 1 E., a quarter of a mile from Wason siding and 3 miles southeast of Creede. Nearest tributary, Willow or Goblin Creek, enters a short distance upstream.

Records Available.—April 24, 1907, to November 30, 1914.

Drainage Area.—689 square miles (topographic sheets and Forest Atlas).

Gage.—An automatic recording gage. It is referred to the same datum as the chain gage used previously.

Channel.—Practically permanent.

Discharge Measurements.—Made from bridge.

Winter Flow.—River frozen over during winter months; ice causes backwater at gage.

Reservoirs.—Daily, monthly and annual discharges modified by storage in the Rio Grande and Santa Maria Reservoirs, 30 miles above.

Diversions.—There are no court decrees for diversions from the Rio Grande above this station, but for diversions of 39 second-feet from tributaries. There are no reservoirs on the river between this station and the one at Thirtymile Bridge, but a large one is being built on Clear Creek, which enters between.

Accuracy.—Good.

Co-operation.—During 1913 and 1914 this station was maintained by the State engineer in co-operation with the United States Forest Service.

DISCHARGE MEASUREMENTS RIO GRANDE AT WASON NEAR CREEDE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 24	Chas. E. Turner.....		90*	Mch. 25	B. S. Clayton.....	0.14	120*
Feb. 7	Chas. E. Turner.....		81*	Apr. 6	C. O. Crisman.....	0.67	260
Mch. 21	Chas. E. Turner.....	0.02	111	May 23	C. O. Crisman.....	3.95	3232
May 24	C. O. Crisman.....	2.40	1456	June 7	R. I. Meeker.....	3.92	3306
June 19	C. O. Crisman.....	2.55	1600	June 18	C. C. Hezmalhalch ...	3.82	3026
July 22	C. O. Crisman.....	2.00	1170	July 9	C. O. Crisman.....	2.56	1637
Aug. 25	C. O. Crisman.....	1.25	568	Aug. 26	C. O. Crisman.....	1.30	616
Sept. 22	C. O. Crisman.....	0.60	230	Sept. 12	C. O. Crisman.....	0.92	273
Oct. 30	C. O. Crisman.....	0.90	365	Nov. 16	H. D. Amsley.....	0.39	181
				Dec. 16	H. D. Amsley.....		86*

*Ice interference.

Discharge of Rio Grande at Wason Near Creede for 1913. Drainage Area, 700 Square Miles. Altitude, 8,591 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				660	520	1160	910	660	342			
2				555	410	1110	990	660	342			
3				388	365	1470	1070	800	320			
4				222	342	1660	1030	730	320			
5				175	365	1660	950	660	388			
6				240	435	1380	910	625	410			
7		81		222	625	1240	990	590	410			
8				130	800	1160	950	590	490			
9				100	870	1290	950	590	520			
10				115	835	1560	1110	590	460			
11				122	990	1380	950	590	410			
12				162	1160	1240	910	590	410			
13				222	1340	1200	910	590	410			
14				388	1770	1200	870	590	388			
15				365	1340	1200	910	590	365			
16				365	1470	1200	950	590	342			
17				435	1380	1290	950	590	320			
18				460	1380	1470	1110	590	300			
19				460	1380	1660	1160	590	280			
20				388	1240	1520	1110	590	240			
21			111	365	1200	1380	1110	555	240			
22				342	1240	1240	1110	590	240			
23				365	1520	1200	1110	555	240			
24	90			342	1950	1110	1030	520	240			
25				300	1340	910	950	520	240			
26				320	1890	660	950	520	240			
27				320	2370	590	870	435	240			
28				365	2250	660	835	342	260			
29				435	2250	870	765	365	280			
30				520	2310	870	765	365	300			
31					1420		695	365				
Mean				328	1250	1220	964	565	333			
Run-off acre-feet				19500	76900	72500	59300	34700	19800			

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Rio Grande at Wason for 1914.

Drainage Area, 700 Square Miles. Altitude, 8,591 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				240	510	4380	1510	1460	510	945	370	
2				240	510	4660	1460	1420	395	945	370	
3				240	510	4560	1460	1380	395	1040	345	
4				240	510	4380	1660	1280	395	1440	320	
5				240	570	4030	1760	1240	420	990	320	
6				280	660	3790	1660	1200	395	1020	320	
7				280	800	3390	1660	1110	370	1020	320	
8				240	1070	3020	1600	1110	370	995	300	
9				205	1380	2560	1600	1030	370	900	280	
10				240	1460	3550	1560	765	370	885	280	
11				220	1420	3790	1510	630	370	820	280	
12				205	1280	3480	1460	730	370	775	300	
13				240	1330	3180	1460	765	370	570	300	
14				320	1240	2870	1460	765	345	540	280	
15				370	1200	2560	1420	730	320	480	240	
16				370	1240	2500	1460	695	320	480	190	
17				320	1330	2380	1560	695	300	450	175	
18				260	1380	3160	1860	660	570	420	160	
19				280	1380	3710	1920	630	850	420	160	
20				320	1660	3550	1860	660	945	420	160	
21				370	1980	3240	1700	730	1140	420	160	
22				345	2440	3020	1600	765	1040	480	160	
23				370	3160	2620	1510	730	900	480	160	
24				320	3320	2440	1460	695	1040	450	160	
25				345	2880	2260	1460	570	1040	420	160	
26				450	2820	1980	1420	540	1040	420	160	
27				395	2880	1700	1460	570	945	395	160	
28				370	2620	1600	1510	600	945	395	160	
29				345	2820	1760	1460	695	945	395	175	
30				395	3160	1510	1420	695	945	395	160	
31					3550		1460	630		395		
Mean				302	1710	3050	1560	844	624	652	236	
Run-off acre-feet				18000	105000	181000	96000	51900	37200	40000	14100	

Unless otherwise noted, all discharges are in cubic feet per second.

RIO GRANDE NEAR DEL NORTE.

Location.—At highway bridge in about sec. 30, T. 40 N. R. 5 E., 6 miles west of Del Norte, a short distance below the mouth of Wolf Creek. From October 11, 1889, to November 30, 1906, a station was maintained about 4 miles below the present station and just above Los Pinos Creek. The flow at the two points is comparable, if a few small ditches are disregarded.

Records Available.—May 16, 1908, to November 30, 1914.

Drainage Area.—1,400 square miles.

Gage.—Automatic recording gage. The gage is referred to the same datum as was the chain gage installed May 16, 1908.

Channel.—Slightly shifting at sides from silt deposition at low water.

Discharge Measurements.—Made from bridge.

Winter Flow.—River is frozen over during the winter months.

Reservoirs.—Daily, monthly and annual discharges modified by storage in Beaver Park, Santa Maria and Rio Grande Reservoirs.

Diversions.—There are court decrees for diversions of 101 second-feet from the Rio Grande between the Creede station and Del Norte, and for diversions of 162 second-feet from intervening tributaries.

DISCHARGE MEASUREMENTS RIO GRANDE NEAR DEL NORTE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 25	Chas. E. Turner		165*	Mch. 24	B. S. Clayton	0.85	336
Feb. 8	Chas. E. Turner		156*	Apr. 7	C. O. Crisman	1.26	663
May 24	C. O. Crisman	3.12	2963	May 22	C. O. Crisman	4.02	4866
June 21	C. O. Crisman	2.68	2284	June 5	R. I. Meeker	4.20	5383
July 24	C. O. Crisman	1.80	1156	June 19	C. C. Hezmalhalch	4.18	4907
Aug. 27	C. O. Crisman	1.26	648	July 2	C. O. Crisman	2.41	2012
Sept. 23	C. O. Crisman	1.10	523	July 22	C. O. Crisman	2.65	2350
Oct. 31	C. O. Crisman	1.11	517	Aug. 27	C. O. Crisman	1.59	976
				Sept. 21	C. O. Crisman	1.74	1223
				Oct. 28	Meeker & Amsley	1.18	550
				Nov. 27	H. D. Amsley	0.59	206
				Dec. 17	H. D. Amsley		182*

*Ice conditions.

Discharge of Rio Grande near Del Norte for 1913.
Drainage Area, 1,400 Square Miles. Altitude, 7,868 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					1460	2340	1280	720	470	470	525	310
2					1340	2340	1170	720	470	470	525	310
3					1120	2420	1220	875	498	498	555	190
4					920	2860	1220	835	470	650	618	290
5					1060	2770	1170	835	470	585	618	310
6					1400	2590	1170	795	525	525	618	310
7					1660	2340	1170	795	555	498	435	310
8		*156			1660	2420	1060	650	555	498	435	310
9					1460	2020	1060	618	650	498	410	310
10					1600	2180	1170	650	555	498	350	310
11					2100	2680	1120	650	585	498	350	310
12				410	2500	2500	1060	650	585	555	390	310
13				555	3140	2260	1020	795	555	585	350	290
14				795	2950	2020	965	720	525	650	350	290
15				1170	2420	2020	920	685	525	650	310	290
16				1060	2420	2100	965	720	525	618	310	290
17				1400	2500	2100	965	685	498	618	310	310
18				1120	2500	2100	965	685	470	618	310	310
19				965	2590	2420	1280	685	435	618	350	330
20				920	2180	2420	1118	685	435	618	350	330
21				1020	2100	2260	1280	720	410	618	350	330
22				1020	2020	2020	1220	720	410	585	330	330
23				875	2590	1950	1220	720	470	585	310	310
24				685	2950	1950	1060	685	498	585	290	310
25	*165			685	2950	1660	1020	685	470	585	290	310
26				720	2770	1280	1020	650	435	555	290	310
27				965	3800	1120	920	618	435	555	290	290
28				1220	3710	1060	875	555	435	555	290	290
29				1400	3710	1600	835	498	410	525	310	290
30				1530	3710	1460	835	498	410	525	310	290
31					3420		758	498		525		290
Mean				974	2350	2110	1070	687	491	562	384	302
Run-off acre-feet				36700	144000	126000	65800	42200	29200	34600	22800	18600

Unless otherwise noted, all discharges are in cubic feet per second. *Measurements.

Discharge of Rio Grande near Del Norte for 1914.
Drainage Area, 1,400 Square Miles. Altitude, 7,868 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				300	780	5290	2090	1760	730	1100	460	
2				330	830	5820	2020	1830	630	1100	460	
3				390	830	5820	1960	1830	540	1210	460	
4				500	830	5820	1960	1830	540	2520	425	
5				585	880	5090	2090	1760	540	1830	425	
6				680	1100	4990	2160	1580	540	1450	390	
7				630	1330	4300	2160	1390	500	1330	390	
8				585	1830	4010	2160	1390	460	1270	360	
9				425	2440	3480	2090	1390	460	1160	360	
10				460	2820	2980	2020	1040	460	1100	330	
11				460	2740	3400	1960	990	460	990	330	
12				425	2520	3560	1900	780	500	935	330	
13				460	2600	3920	1900	880	680	830	330	
14				540	2600	3740	1900	880	830	780	275	
15				830	2300	3310	1900	880	780	680	250	
16				935	2300	3920	1960	880	780	630	230	
17			275	780	2300	3650	1900	830	680	585	192	
18			275	585	2520	3830	2600	830	680	540	175	
19			275	630	2520	4790	2440	830	990	540	160	
20			275	780	2820	4790	2740	780	1100	500	160	
21			275	935	3220	4300	2440	830	1330	500	160	
22			275	830	3650	4010	2300	990	1210	630	160	
23			275	780	4690	3560	2160	935	1040	630	160	
24			275	730	4690	3310	2020	880	1210	630	160	
25			300	830	4490	2980	2020	830	1210	585	160	
26			300	935	4490	2820	1960	830	1210	585	175	
27			300	830	4690	2380	1960	935	1100	585	192	
28			300	780	4100	2230	2090	780	1100	540	210	
29			300	730	4100	2090	2090	730	1100	540	230	
30			300	730	4590	1960	1960	780	1100	500	210	
31			300		4990		1960	730		500		
Mean			286	314	2790	3870	2090	1080	816	881	277	
Run-off acre-feet			8530	18700	172000	230000	129000	66700	48600	54200	16500	

Unless otherwise noted, all discharges are in cubic feet per second.

RIO GRANDE AT ALAMOSA.

Location.—At Concrete road bridge in Alamosa, one-third of a mile above D. & R. G. Railroad bridge, where station was originally established in 1894, discontinued in 1895, and re-established in 1912. The flow at the two points is comparable, except for one small ditch diversion. Records initiated by State of Colorado April 19, 1914.

Records Available.—Discharge measurements and gage heights September 24, 1894, to December 31, 1895. Miscellaneous measurements, 1903 and 1910. Daily discharges May 15, 1912, to November 30, 1914.

Drainage Area.—Not measured.

Gage.—Chain.

Channel.—Shifting sand.

Discharge Measurements.—From Concrete road bridge at high water and by wading at low water.

Winter Flow.—Ice cover forms during winter months.

Diversions.—Below all but one of the large diversions from the Rio Grande.

Co-operation.—The records for 1913 were secured by the United States Reclamation Service and are published as furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS RIO GRANDE AT ALAMOSA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 6	Stannard & Robinson	4.88	63.8
May 8	Stannard & Robinson	4.54	25.8
May 9	Stannard & Robinson	5.07	126.
May 14	Stannard & Robinson	6.06	414.
May 17	Stannard & Robinson	5.22	160.
May 20	Stannard & Robinson	5.04	117.
May 22	Stannard & Robinson	4.64	36.
May 26	Stannard & Robinson	5.88	303.
May 29	Stannard & Robinson	6.50	576.
May 31	Stannard & Robinson	6.59	640.
June 2	Stannard & Robinson	5.33	169.
June 6	Stannard & Robinson	5.55	244.
June 12	Stannard & Robinson	7.12	981.
June 13	Stannard & Robinson	7.43	1177.
June 18	Stannard & Robinson	6.69	695.
June 20	Stannard & Robinson	6.96	835.
June 23	Stannard & Robinson	6.30	465.
June 26	Stannard & Robinson	5.71	204.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 9	C. O. Crisman	3.71	497
Apr. 20	C. O. Crisman	2.79	180
Apr. 24	C. O. Crisman	2.50	109
May 1	C. O. Crisman	2.13	54
May 20	Crisman & Stannard	3.55	401
May 25	Crisman & Stannard	6.15	2179
June 22	R. I. Meeker	6.85	2926
July 6	C. O. Crisman	3.70	348
July 13	C. O. Crisman	2.98	114
July 20	C. O. Crisman	5.30	1449
Sept. 1	C. O. Crisman	3.85	560
Sept. 16	C. O. Crisman	3.59	467
Oct. 5	Meeker & Amsley	5.33	1465
Oct. 5	H. D. Amsley	5.43	1595
Oct. 15	H. D. Amsley	3.56	437
Nov. 1	Meeker & Amsley	3.34	333
Nov. 2	Meeker & Amsley	3.27	306
Nov. 30	Amsley & Meeker	3.09	270

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
July 5	Stannard & Robinson	4.44	15.7
July 10	Stannard & Robinson	4.36	11.2
July 26	Stannard & Robinson	4.25	7.8
Aug. 7	Stannard & Robinson	4.25	8.3
Aug. 11	Stannard & Robinson	4.11	2.5
Sept. 5	Stannard & Robinson	4.48	22.2
Oct. 4	Stannard & Robinson	5.62	225.
Oct. 6	Stannard & Robinson	6.10	367.
Oct. 13	Stannard & Robinson	6.30	461.
Oct. 28	Stannard & Robinson	6.03	361.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Dec. 15	H. D. Amsley		108*
Dec. 22	H. D. Amsley		159*

*Ice interference.

Discharge of Rio Grande at Alamosa for 1913.
Altitude, 7,536 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					330	440	84	12	6	84	390	
2					279	177	58	11	5	132	394	
3					156	104	22	10	14	219	417	
4					124	84	22	10	31	242	492	
5					84	88	21	9	26	355	529	
6					72	184	21	6	25	390	510	
7					44	138	20	10	22	390	394	
8					37	82	17	6	22	370	334	
9					106	70	17	4	20	374	307	
10					68	62	16	3	49	448	297	
11					42	99	12	3	43	457	285	
12					44	1010	16	4	43	470	273	
13					114	1200	37	4	42	470	268	
14					330	1020	27	4	43	457	265	
15					291	836	20	4	37	457	268	
16					161	752	20	4	36	457	273	
17					138	733	23	4	30	448	262	
18					130	650	24	5	25	444	270	
19					110	667	26	5	22	431	270	
20					101	815	27	6	21	431	310	
21					49	802	27	6	20	417	316	
22					41	638	24	6	20	413	313	
23					36	474	27	6	26	413	310	
24					103	386	33	6	22	406	279	
25					203	316	13	6	23	406	273	
26					240	256	9	19	23	390	270	
27					95	196	8	10	23	386	297	
28					398	143	6	6	35	386	273	
29				363	539	114	5	6	43	367	262	
30				344	579	84	5	6	59	382	276	
31					632		12	5		415		
Mean					183	421	23	6	28	384	323	
Run-off acre-feet				1400	11300	25000	1390	405	1700	23600	19200	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Rio Grande at Alamosa for 1914.
Altitude, 7,536 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					60	2100	295	1040	560	635	320	
2					60	2400	255	1010	535	685	300	
3					60	2980	220	1040	510	635	285	
4					60	3150	175	950	440	685	285	
5					60	3150	160	920	380	1500	285	
6					55	2930	315	770	360	1310	255	
7					55	2550	255	770	360	1100	240	
8					50	2350	220	660	320	980	225	
9					195	1920	190	610	300	920	225	
10					740	1420	160	560	270	710	225	
11					1100	1100	130	440	255	710	225	
12					1040	1040	130	360	255	635	255	
13					860	1010	105	285	270	585	270	
14					860	1100	105	240	380	460	270	
15					740	1280	105	210	440	440	285	
16					610	1820	95	170	440	340	285	
17					510	2000	130	150	440	270	285	
18					510	2050	190	130	420	225	285	
19				210	535	2350	680	140	485	225	270	
20				170	460	2760	1340	120	635	210	255	
21				160	585	3040	1580	120	740	150	225	
22				160	770	2880	1460	120	800	120	225	
23				140	1070	2400	1420	170	800	150	255	
24				110	1780	2930	1310	300	740	195	255	
25				90	2150	1650	1240	380	740	270	255	
26				75	2150	1260	1340	360	740	285	255	
27				65	2050	990	1280	360	685	320	255	
28				70	2100	650	1200	460	685	320	270	
29				65	1660	530	1310	460	685	320	255	
30				65	1660	380	1310	460	635	340	255	
31					1780		1140	535		340		
Mean				115	850	1940	640	461	512	518	258	
Run-off acre-feet				2740	52300	115000	39300	28400	30500	31900	15300	

Unless otherwise noted, all discharges are in cubic feet per second.

RIO GRANDE NEAR LOBATOS.[1]

Location.—At highway bridge in sec. 22, T. 33 N., R. 11 E., 10 miles east of Lobatos and a few miles above the Colorado-New Mexico line; 17 miles below mouth of Conejos River.

Records Available.—June 28, 1899, to November 30, 1914.

Drainage Area.—7,700 square miles.

Gage.—Automatic recording gage. This gage is referred to the datum of the original gage.

Channel.—A gash cut in lava rock; shifting blanket of sand.

Discharge Measurements.—Made from bridge.

Winter Flow.—Ice causes backwater varying in amount during the three winter months.

Diversions.—There are court decrees for diversions from the Rio Grande of 5,134 second-feet between the Del Norte station and this one. There are also decrees for diversions from the following tributaries: Minor tributaries above Alamosa, 464 second-feet; Alamosa and tributaries, 2,116 second-feet; Conejos and tributaries, 3,464 second-feet; Culebra and tributaries, 177 second-feet.

DISCHARGE MEASUREMENTS RIO GRANDE NEAR LOBATOS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 26	Chas. E. Turner		230*
Feb. 10	Chas. E. Turner		224*
Mar. 20	Chas. E. Turner		391*
May 16	C. O. Crisman	2.42	904
May 31	C. O. Crisman	2.71	1100
June 28	C. O. Crisman	1.72	285
July 28	C. O. Crisman	1.00	69
Aug. 1	Robert Follansbee	0.78	40
Aug. 29	C. O. Crisman	0.80	44
Sept. 29	C. O. Crisman	1.18	114
Oct. 20	F. O'Brien	1.88	481

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Mch. 27	B. S. Clayton	2.05	508
Apr. 4	C. O. Crisman	2.08	562
May 8	C. O. Crisman	2.17	634
June 6	R. I. Meeker	5.05	4252
June 27	C. O. Crisman	2.86	1285
July 3	C. O. Crisman	1.68	310
July 21	C. O. Crisman	3.13	1682
Aug. 31	C. O. Crisman and R. I. Meeker	2.58	1031
Sept. 22	R. I. Meeker and C. O. Crisman	2.75	1224
Nov. 4	R. I. Meeker and H. D. Amsley	2.02	528
Nov. 5	R. I. Meeker and H. D. Amsley	1.97	489
Nov. 11	R. I. Meeker and H. D. Amsley	1.89	391
Dec. 20	H. D. Amsley		316*

*Ice conditions.

[1]Originally known as Rio Grande at Cenicero, Colo.

SOUTH FORK OF RIO GRANDE AT SOUTH FORK.

Location.—At highway bridge half a mile west of South Fork station, in sec. 34, T. 40 N., R. 3 E. No tributaries between the station and the mouth and none for several miles above.

Records Available.—August 9, 1910, to November 30, 1914. Also a number of discharge measurements made in 1909 by the United States Geological Survey.

Drainage Area.—216 square miles.

Gage.—Chain gage established May 12, 1912, at the site of the original staff gage, but referred to a different datum. The original gage was washed out by flood October 5, 1911, and was replaced by an inclined staff gage at the railroad bridge at different datum, October 16, 1911. This gage was read until May 12, 1912.

Channel.—Apparently permanent at the present location.

Discharge Measurements.—Made from bridge.

Winter Flow.—Ice causes backwater during the winter months.

Reservoirs.—Daily and monthly discharges modified by storage in Beaver Park Reservoir.

Diversions.—There are court decrees for diversions of 11 second-feet from South Fork above the station; none below.

DISCHARGE MEASUREMENTS SOUTH FORK RIO GRANDE AT SOUTH FORK.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 25	Chas. E. Turner		31*
Feb. 8	Chas. E. Turner		33*
Mar. 22	Chas. E. Turner		45*
May 24	C. O. Crisman	2.34	777
June 20	C. O. Crisman	1.85	487
July 23	C. O. Crisman	0.87	121
Aug. 26	C. O. Crisman	0.52	53
Sept. 24	C. O. Crisman	0.62	66
Nov. 1	C. O. Crisman	0.48	51

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 7	C. O. Crisman	1.10	190
May 22	C. O. Crisman	2.50	922
June 19	C. C. Hezmalhalch	2.41	876
July 22	C. O. Crisman	1.13	235
Aug. 27	C. O. Crisman	0.83	147
Sept. 13	C. O. Crisman	1.42	330
Oct. 6	H. D. Amsley	1.26	295
Nov. 27	H. D. Amsley	0.73	80*
Dec. 17	H. D. Amsley		34*

*Ice conditions.

Discharge of Rio Grande at Lobatos for 1913.
Altitude, 7,400 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				1300	1465	1360	205	45	38	110	430	
2				1200	1410	1050	185	45	30	135	430	
3				1100	1150	800	165	38	30	150	460	
4				1100	752	660	165	30	38	228	530	
5				850	615	572	110	30	45	250	530	
6				572	800	615	85	25	65	295	530	
7				530	800	572	65	25	65	320	615	
8				615	900	495	55	30	55	345	495	
9				900	752	530	45	25	55	400	400	
10		224		705	795	572	45	25	55	430	372	
11				615	705	800	45	20	55	460	372	
12				495	850	1050	30	25	65	460	345	
13				430	950	1750	30	30	75	460	345	
14				400	1150	1810	38	38	75	430	345	
15				660	1100	1520	30	45	75	430	345	
16				900	1000	1460	30	38	75	460	345	
17				1050	615	1250	30	30	65	460	345	
18				1200	530	1150	30	30	75	460	345	
19				1410	615	1100	30	30	65	430	345	
20			391	1300	615	1000	45	30	65	430	400	
21				1360	530	1100	38	30	65	430	400	
22				1410	460	1100	55	38	65	400	400	
23				1300	372	1000	65	55	75	430	400	
24				1100	345	752	150	55	85	460	400	
25				1100	460	705	185	65	85	460	400	
26	230			900	615	495	135	55	98	400	345	
27				752	900	430	110	55	98	430	400	
28				850	850	345	75	45	122	430	345	
29				1200	1100	272	85	45	110	430	345	
30				1460	1150	228	65	45	110	430	345	
31					1200		65	45		460		
Mean				959	821	885	80	38	69	384	403	
Run-off acre-feet				57100	50500	52700	4920	2340	4110	23600	24000	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Rio Grande at Lobatos for 1914.
Altitude, 7,400 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			310	585	545	2830	375	1510	925	760	545	
2			375	545	625	3610	320	1320	850	805	505	
3			347	545	625	4090	295	1290	778	805	470	
4			405	545	545	4330	270	1230	688	805	470	
5			405	545	545	4580	270	1200	670	1200	470	
6			435	569	585	4440	247	1120	625	1910	491	
7			405	670	545	3980	375	995	585	1630	470	
8			405	805	652	3390	405	975	585	1430	423	
9			405	805	868	2790	320	850	505	1280	405	
10			470	850	1590	2200	285	805	505	1150	375	
11			470	760	2360	1610	247	805	435	1020	375	
12			470	670	2500	1280	270	715	435	895	375	
13			470	670	2400	1430	247	625	470	733	435	
14			470	652	2200	1490	225	505	585	670	435	
15			470	585	2100	1670	197	405	805	670	435	
16			470	569	1790	1980	185	347	995	545	435	
17			505	609	1550	2560	197	310	1040	470	435	
18			585	715	1380	2970	205	270	945	405	435	
19			625	585	1320	3110	225	247	945	375	435	
20			670	585	1260	3320	609	270	895	347	435	
21			625	585	1260	3390	1550	261	1150	331	405	
22			715	670	1430	3580	1810	295	1200	320	375	
23			625	760	1830	3460	1790	295	1130	310	390	
24			625	760	2420	2900	1730	305	1060	331	405	
25			625	670	3210	2230	1650	435	1040	435	435	
26			585	670	2870	1750	1590	545	1020	505	435	
27			585	715	2740	1320	1670	569	975	505	435	
28			585	625	2660	995	1590	733	945	505	375	
29			609	545	2360	670	1670	850	895	521	375	
30			625	545	2360	470	1790	945	805	545	375	
31			609		2420		1790	995		545		
Mean			514	647	1660	2610	787	710	817	734	429	
Run-off acre-feet			31600	38500	102000	155000	48400	43700	48600	45100	25500	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Fork Rio Grande at South Fork for 1913. Drainage Area, 216 Square Miles. Altitude, 8,176 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	35	35	40	80	305	840	265	58	50	120	65	80
2	35	35	40	100	285	920	230	50	65	100	65	72
3	35	35	40	150	350	840	200	50	72	170	80	80
4	35	35	45	170	445	765	200	65	80	170	80	120
5	35	35	45	190	305	840	170	50	120	145	58	120
6	30	35	45	210	395	695	170	50	120	120	65	120
7	30	35	40	250	445	730	145	65	80	100	65	120
8	30	*33	40	250	472	695	110	50	80	90	65	110
9	30	35	40	270	395	625	120	65	65	100	65	100
10	30	35	40	300	445	695	120	50	80	80	58	100
11	30	40	40	300	840	765	110	80	80	80	50	80
12	30	40	40	300	765	625	100	100	90	80	65	80
13	30	40	40	305	695	500	110	80	80	80	80	
14	30	40	35	372	625	445	72	72	65	100	80	
15	30	45	35	472	445	472	100	50	65	90	65	
16	30	45	35	530	500	472	65	40	65	100	38	
17	30	45	35	350	730	500	80	40	50	90	50	
18	30	45	40	285	625	445	120	40	50	80	65	
19	30	40	40	248	695	500	100	45	50	80	65	
20	30	40	40	350	560	500	158	40	45	80	58	
21	30	35	45	372	625	500	100	65	40	80	65	
22	30	35	*45	305	500	445	120	100	50	80	65	
23	30	35	45	265	695	395	120	65	170	72	80	
24	30	40	45	285	802	328	100	65	132	80	65	
25	*31	40	40	215	765	285	65	72	100	65	65	
26	35	45	40	230	695	305	65	80	80	80	80	
27	35	40	40	248	840	305	65	50	80	50	120	
28	35	40	45	328	920	305	58	50	65	58	120	
29	35		50	420	765	625	58	45	80	50	100	
30	35		60	530	840	265	50	50	90	65	65	
31	35		70		840		65	50		72		
Mean	31.8	38.5	42.6	289	600	554	116	59	78	90	70	98
Run-off acre-feet	1960	2140	2620	17200	36900	33000	7130	3630	4640	5530	4160	2330

Unless otherwise noted, all discharges are in cubic feet per second. *Discharge estimated Jan. 1-Apr. 12.

*Measurements.

Discharge of South Fork Rio Grande at South Fork for 1914. Drainage Area, 216 Square Miles. Altitude, 8,176 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				105	222	1200	415	135	122	148	110	
2				105	222	1120	350	162	110	162	90	
3				118	206	1160	370	192	90	920	90	
4				145	175	1120	415	162	90	770	81	
5				222	206	415	370	110	110	390	90	
6				222	240	920	291	135	122	291	110	
7				190	295	860	291	148	110	255	110	
8				145	375	680	273	148	110	255	110	
9				190	490	620	291	162	135	222	122	
10				160	540	800	515	162	110	192	110	
11				160	515	920	370	122	90	192	110	
12				145	540	990	370	110	177	207	110	
13				145	540	990	310	122	291	177	110	
14				175	490	1060	310	90	177	162	110	
15				190	655	1060	330	110	110	135	72	
16				258	655	1060	415	110	100	135	63	
17				206	444	1060	255	122	207	110	55	
18				175	490	1020	291	100	192	110	63	
19				160	565	955	330	110	162	100	55	
20				222	655	1090	350	110	192	100	47	
21				240	655	860	255	135	238	110	55	
22				240	655	650	207	162	192	135	55	
23				240	820	680	192	148	177	135	55	
24				190	1060	620	192	135	177	135	55	
25			118	206	890	565	162	100	135	110	72	
26			118	240	1200	565	192	90	135	110	81	
27			118	206	1060	515	148	100	162	110	90	
28			131	175	860	465	162	110	162	90	81	
29			118	175	920	415	135	110	135	100	72	
30			145	190	1060	415	122	135	162	90	90	
31			118		1200		110	135		100		
Mean			124	185	610	828	283	129	149	202	84	
Run-off acre-feet			1720	11000	37500	49300	17400	7900	8890	12400	5000	

Unless otherwise noted, all discharges are in cubic feet per second.

SAGUACHE CREEK NEAR SAGUACHE.

Location.—At Ward's Ranch below the dam site of the Stark-Hagadorn Irrigation Co., 9 miles above Saguache. Ford Creek, the nearest important tributary, enters some distance below.

Records Available.—August 7, 1910, to September 30, 1912; June 1 to November 20, 1914.

Drainage Area.—595 square miles.

Gage.—An automatic recording gage.

Channel.—Shifting.

Discharge Measurements.—Made from footbridge during high water, and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversions of 46 second-feet from Saguache Creek above the station, and 365 second-feet below.

Co-operation.—Records through interest of Water Commissioner.

DISCHARGE MEASUREMENTS SAGUACHE CREEK AT WARD'S RANCH.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
June 2	R. I. Meeker	3.50	521
June 25	R. I. Meeker	1.52	156
Aug. 6	R. I. Meeker	1.35	133
Sept. 7	C. O. Crisman	0.98	68
Oct. 18	R. I. Meeker and H. D. Amsley	0.83	46
Oct. 18	H. D. Amsley and R. I. Meeker	0.83	47
Nov. 17	H. D. Amsley	0.72	31*
Dec. 18	H. D. Amsley		18.6*

*Ice conditions.

CONEJOS RIVER NEAR MOGOTE.

Location.—At highway bridge near Mogote. From September 1, 1899, to March 31, 1900, and from April 17, 1903, to October 31, 1905, a station was maintained about 4 miles above Mogote. From March 21, 1907, to October 5, 1911, a station was maintained at Jacob's Ranch, 8 miles above Mogote.

Records Available.—January 1, 1912, to November 30, 1914.

Drainage Area.—282 square miles.

Gage.—Chain.

Channel.—Apparently permanent at present location.

Discharge Measurement.—Made from bridge.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are court decrees for diversion of 3,476 second-feet from Conejos River, all but 66 second-feet being diverted below the present station.

Reservoirs.—No reservoirs have been constructed on the Conejos above this station.

DISCHARGE MEASUREMENTS CONEJOS RIVER NEAR MOGOTE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 26	Chas. E. Turner		46*
Feb. 10	Chas. E. Turner		45*
Mch. 20	Chas. E. Turner		51*
May 16	C. O. Crisman	3.48	935
May 31	C. O. Crisman	4.30	1603
June 28	C. O. Crisman	3.09	580
July 28	C. O. Crisman	2.00	113
Aug. 29	C. O. Crisman	1.78	68
Sept. 29	C. O. Crisman	1.90	92
Oct. 20	C. O. Crisman	1.92	97

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Mch. 27	B. S. Clayton	2.08	125
Apr. 4	C. O. Crisman	2.40	195
May 8	C. O. Crisman	3.02	524
June 6	R. I. Meeker and C. O. Crisman	4.25	1631
June 27	C. O. Crisman	3.30	771
July 3	C. O. Crisman	3.10	612
July 21	C. O. Crisman	2.80	415
Aug. 31	C. O. Crisman and R. I. Meeker	2.70	384
Oct. 3	R. I. Meeker	2.50	297
Nov. 24	H. D. Amsley	1.55	49*
Dec. 21	H. D. Amsley		32*

*Ice conditions.

Discharge of Saguache Creek at Saguache for 1914. Drainage Area, 595 Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						500	85	198	85	57	37	
2						534		164	78	57	44	
3						524		155	71	57	44	
4						503	147	164	71	57	37	
5						453	147	147	71	57	50	
6						403		122	78	57	37	
7						363		135	57	50	37	
8						316		147	57	50	37	
9						297		107	57	50	31	
10						287		107	57	57	31	
11						278	107	92	57	50	37	
12						260		92	71	50	44	
13						260		85	50	50	37	
14						260		85	64	50	44	
15						260		85	57	50	37	
16						260		85	57	50	31	
17						260		85	57	50	31	
18						260	278	85	57	50	25	
19						260	297	92	57	50	25	
20						260		100	50	44	25	
21						251		107	57	44		
22						206		147	57	57		
23						198		115	50	50		
24						181		85	50	64		
25						155		85	50	57		
26						155		85	57	50		
27						122	155	85	57	44		
28						100		92	57	44		
29						92		92	57	44		
30						85		92	57	44		
31							198	92		44		
Mean						278	177	110	60	51	36	
Run-off acre-feet						16500	*10900	6760	3590	3140	1430	

Unless otherwise noted, all discharges are in cubic feet per second. *31 days.

Discharge of Conejos River near Mogote for 1913. Drainage Area, 282 Square Miles. Altitude, 8,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	45	45	48	90	458	1390	430	50	60	80	70	
2	45	45	48	90	310	1390	430	50	42	80	25	
3	50	40	50	90	230	1290	430	42	42	90	30	
4	50	40	50	100	250	1240	405	35	50	210	30	
5	45	40	55	100	330	1240	330	35	70	270	25	
6	45	40	55	100	430	1110	290	70	70	192	22	
7	40	45	55	110	485	1020	250	50	70	160	30	
8	40	45	55	120	485	1060	160	70	80	145	35	
9	40	45	60	120	458	1110	230	60	80	175	60	
10	40	45	60	130	545	895	230	42	70	160	70	
11	40	45	60	115	605	895	230	70	60	145	70	
12	40	45	60	115	705	778	210	145	90	130	70	
13	40	45	55	210	705	855	145	130	80	115	70	
14	40	45	55	290	575	575	130	115	60	130	70	
15	40	45	50	330	430	778	130	102	60	115	70	
16	40	45	50	310	638	740	145	70	50	130	70	
17	40	45	50	230	1110	740	130	60	50	130	90	
18	40	45	55	145	1110	670	115	60	42	130	70	
19	40	45	50	130	1200	545	115	70	42	80	70	
20	40	45	51	192	1160	545	175	90	42	115	70	
21	45	40	50	210	1110	638	210	60	42	90	50	
22	45	40	50	145	1200	485	230	70	60	80	60	
23	45	40	55	70	1200	515	192	70	90	80	35	
24	45	40	55	25	1440	545	210	80	80	90	25	
25	45	45	50	30	1640	575	145	70	80	90	35	
26	46	45	50	42	1840	638	115	60	90	90	70	
27	45	45	60	80	1840	705	70	42	70	90	70	
28	45	45	65	160	1640	638	60	60	70	80	42	
29	45		70	192	1200	485	60	42	80	80	50	
30	45		75	430	1440	458	70	60	80	90	50	
31	45		80		1390		50	50		70		
Mean	43	44	56	150	910	818	197	67	65	120	53	
Run-off acre-feet	2640	2440	3440	8930	56000	48700	12100	4120	3870	7380	3150	

Unless otherwise noted, all discharges are in cubic feet per second. Note—Discharge estimated from measurements Jan. 1-Apr. 9.

Discharge of Conejos River near Mogote for 1914.
Drainage Area, 282 Square Miles. Altitude, 8,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				140	370	2220	530	220	300	170	125	
2				155	320	2220	395	260	280	170	125	
3				200	280	2020	560	280	220	280	125	
4				240	280	2340	720	345	185	620	125	
5				320	300	1780	685	395	170	420	125	
6				320	300	1500	620	370	155	345	112	
7				320	370	1500	500	345	140	300	112	
8			75	280	420	840	445	300	125	260	112	
9			75	220	650	720	395	320	125	260	100	
10			82	200	840	1040	370	300	140	220	75	
11			112	200	840	1720	420	300	112	220	75	
12			125	170	960	1900	445	240	155	185	75	
13			100	170	1000	2020	500	185	420	220	75	
14			155	220	880	1840	590	185	445	185	75	
15			112	320	840	1600	500	155	530	170	62	
16			185	395	760	1840	445	170	800	155	52	
17			140	300	720	1550	445	185	590	155	52	
18			170	260	840	1500	470	220	500	140	45	
19			140	280	840	1390	620	220	445	125	45	
20			140	395	960	1500	500	260	395	125	45	
21			125	445	1140	1190	445	300	345	185	45	
22			100	470	1440	1000	420	345	300	185	45	
23			112	370	1780	880	370	370	300	155	45	
24			125	320	1550	840	395	260	260	155	45	
25			112	370	1240	685	320	260	220	155	45	
26			140	445	1140	685	345	445	220	220	45	
27			140	370	1190	685	420	590	185	185	45	
28			140	345	1390	620	345	500	170	185	52	
29			140	370	1720	560	395	445	170	155	52	
30			140	320	1900	445	280	395	170	155	52	
31			125		2280		260	345		155		
Mean			125	298	953	1350	456	307	286	213	74	
Run-off acre-feet			5970	17700	58600	80300	28100	18900	17000	13100	4380	

Unless otherwise noted, all discharges are in cubic feet per second.

SAN JUAN RIVER DRAINAGE

SAN JUAN RIVER AT PAGOSA SPRINGS.

Location.—At Pagosa Springs, in sec. 13, T. 35 N., R 2 W., New Mexico principal meridian. Nearest tributary is a stream that enters from the north a mile below.

Records Available.—January 24, 1911, to November 14, 1914.

Drainage Area.—287 square miles.

Gage.—Vertical staff. The gage was originally located at a highway bridge above Pagosa Springs. On March 7, 1911, the gage was moved half a mile downstream. It was washed out by a flood October 5, 1911, and a new gage installed November 23 at the present site. The relation between datums of the different gages is not known.

Channel.—Apparently permanent.

Discharge Measurements.—Made from near-by bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater at this station for short periods.

Diversions.—Small irrigation ditches divert water above the station. Between sec. 17, T. 37 N., R. 1 E., and sec. 28, T. 36 N., R. 2 W., there are seven ditches averaging 2 feet wide on top, 1½ feet on bottom and 1½ feet deep. There are court decrees for diversions of 20 second-feet above the station and 175 second-feet from tributaries entering above.

Accuracy.—Conditions are favorable for fairly accurate results; the estimates are considered reliable.

Co-operation.—Station is maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SAN JUAN RIVER AT PAGOSA SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 15	F. O'Brien	3.93	929	May 29	R. S. Watrous	5.70	1790
July 15	F. O'Brien	1.80	174	Aug. 18	R. S. Watrous	1.67	155
Nov. 6	F. O'Brien	1.40	103				

SAN JUAN RIVER, AT ARBOLES.

Location.—At Arboles, Colo., a quarter of a mile above the mouth of Piedra River, near the center of T. 32 N., R. 5 W.

Records Available.—1895 to 1899; August 21, 1910, to November 30, 1914.

Drainage Area.—1,394 square miles.

Gage.—Chain gage.

Channel.—Probably permanent.

Discharge Measurements.—Made from car and cable and by wading.

Winter Flow.—Severe ice effect.

Diversions.—There are court decrees for the diversion of 23 second-feet between Arboles and the station at Pagosa Springs, and 61 second-feet from intervening tributaries.

Flood Discharge.—Two severe floods have occurred on the San Juan since the station has been maintained. The maximum stage of the flood, September 6, 1909, although very high, was less than that of October 1, 1911, when the river rose 17 feet, with a maximum discharge of about 40,000 second-feet.

Co-operation.—Station maintained in co-operation with the State Engineer of New Mexico and the United States Geological Survey in 1913. During 1914 station maintained by the State Engineer of New Mexico and the United States Geological Survey, by whom records were furnished.

DISCHARGE MEASUREMENTS ON SAN JUAN RIVER AT ARBOLES.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 23*	C. J. Emerson	1.43	98.4	Jan. 26*	Emerson & Watrous	1.10	150
Feb. 17*	Frank O'Brien	1.57	112	Feb. 27	R. S. Watrous	0.81	298
Apr. 1	Frank O'Brien	2.22	1150	Apr. 14	R. S. Watrous	2.34	1310
May 13	Frank O'Brien	3.54	2400	Apr. 24	R. S. Watrous	2.52	1460
Apr. 25	Frank O'Brien	1.73	799	May 30	R. S. Watrous	4.33	3420
July 16	Frank O'Brien	0.82	284	May 31	R. S. Watrous	4.90	4440
Aug. 2	Frank O'Brien	0.42	169	June 11	R. S. Watrous	3.75	2740
Aug. 23	Frank O'Brien	0.49	189	Aug. 16	R. S. Watrous	0.90	277
Oct. 1	Frank O'Brien	0.67	244	Sept. 27	R. S. Watrous	1.10	376
Nov. 6	Frank O'Brien	0.35	160	Nov. 1	R. S. Watrous	1.29	475
Nov. 14	Frank O'Brien	0.60	185				
Dec. 18*	C. J. Emerson	0.59	194				

*Ice conditions.

NAVAJO RIVER AT EDITH.

Location.—Six miles northeast of Lumberton, N. Mex., at highway bridge on road from Lumberton to Edith, one-fourth mile east of Edith, short distance north of the New Mexico-Colorado State line, near southwestern corner of T. 33 N., R. 1 E., about 5 miles southwest and downstream from the confluence of Navajo and Little Navajo rivers. A small tributary from the north enters Navajo River about one-fourth mile below the station.

Records Available.—September 21, 1912, to November 30, 1914.

Drainage Area.—Not measured.

Gage.—Vertical staff.

Channel.—Permanent at low stages but shifting during high.

Discharge Measurements.—At low stages made by wading; at high stages made from bridge.

Winter Flow.—Greatly affected by ice.

Diversions.—Considerable water is diverted above this station for irrigation.

Accuracy.—Estimates of daily discharge considered good.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the State Engineer of New Mexico. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON NAVAJO RIVER AT EDITH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 24*	C. J. Emerson	2.92	34.5	Jan. 28*	R. S. Watrous	2.98	36.0
Feb. 18*	F. O'Brien	2.61	25.9	Feb. 28*	R. S. Watrous	2.40	35.0
Mar. 14*	F. O'Brien	1.48	27.9	Apr. 13	R. S. Watrous	2.73	403
Apr. 3*	F. O'Brien	3.62	134.	Apr. 26	R. S. Watrous	2.95	449
Apr. 24	F. O'Brien	2.66	255.	May 28	R. S. Watrous	3.19	595
May 16	F. O'Brien	2.78	287.	July 22	R. S. Watrous	2.20	175
June 11	F. O'Brien	2.75	288.	Sept. 27	R. S. Watrous	1.79	90.5
July 14	F. O'Brien	1.90	73	Oct. 31	R. S. Watrous	1.96	108
Aug. 3	F. O'Brien	1.70	47.6				
Aug. 29	F. O'Brien	1.64	37.8				
Sept. 30	F. O'Brien	1.70	44.9				
Nov. 4	F. O'Brien	1.70	44.2				
Nov. 15	F. O'Brien	1.71	48.6				
Dec. 19*	C. J. Emerson	2.25	41.2				

*Ice conditions.

Discharge of San Juan River at Pagosa Springs for 1913. Drainage Area, 287 Square Miles. Altitude, 7,095 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					965	1510	495	120	96	166	96	
2					875	1540	455	107	96	185	108	
3					655	1540	420	107	87	420	120	
4					655	1480	385	107	107	455	107	
5					655	1420	325	96	120	376	107	
6					785	1260	325	96	120	298	107	
7					920	1110	325	96	250	248	107	
8					965	1080	298	96	225	226	107	
9					875	1040	325	96	248	205	107	
10					1010	1110	325	96	166	185	107	
11					1160	1260	298	96	134	185	107	
12					1310	1040	272	120	149	185	107	
13					1360	920	238	298	134	185	107	
14					1110	875	205	166	120	185	134	
15					920	942	205	134	107	185	127	
16					920	1010	205	107	107	166	120	
17					1060	875	205	114	107	166	114	
18					1160	875	185	120	96	149	114	
19					1260	1010	166	120	87	142	120	
20					1060	920	196	107	87	134	149	
21					1060	830	226	107	92	134	134	
22					1010	785	226	205	96	134	120	
23					1310	740	226	134	205	134	120	
24				420	1540	740	185	127	166	134	120	
25				385	1510	655	166	120	166	134	134	
26				420	1480	655	149	120	134	127	107	
27				600	1720	615	149	107	134	120	107	
28				785	1660	695	149	96	142	120	107	
29				920	1660	635	134	96	149	107	84	
30				920	1600	575	134	96	149	96	84	
31					1480		120	96		96		
Mean				636	1150	991	249	119	136	187	113	
Run-off acre-feet				8830	70700	59000	15300	7320	8090	11500	6720	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of San Juan River at Pagosa Springs for 1914. Drainage Area, 287 Square Miles. Altitude, 7,095 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					655	2910	655	340	298	149	195	
2					615	3180	615	315	272	149	185	
3					615	2550	575	285	248	920	185	
4					615	2310	595	285	205	2550	176	
5					695	2070	615	260	205	1210	166	
6				695	740	1790	635	248	225	875	158	
7				655	785	1500	595	237	248	740	158	
8				595	1060	1210	575	226	272	615	146	
9				495	1420	1010	535	231	226	575	134	
10				495	1510	1210	515	237	272	495	127	
11				535	1600	1660	515	216	272	440	127	
12				515	1480	2000	495	195	325	385	127	
13				495	1660	2000	475	176	370	355	127	
14				575	1420	2000	420	158	420	312	120	
15				695	1660	2000	402	149	420	298		
16				830	1420	1930	385	147	385	272		
17				695	1390	1660	402	145	355	260		
18				575	1360	1790	515	142	325	255		
19				680	1310	1720	565	142	325	248		
20				785	1480	1660	615	142	325	205		
21				920	1660	1510	555	149	325	205		
22				965	2000	1360	515	495	298	385		
23				965	2310	1210	420	330	298	355		
24				740	2160	1160	355	166	285	312		
25				740	2000	1010	370	149	248	290		
26				710	1860	920	350	535	226	272		
27				685	1930	875	325	495	195	272		
28				655	1720	810	355	420	166	260		
29				615	1860	740	420	355	149	237		
30				615	2000	695	370	327	134	216		
31					2400		355	298		205		
Mean				677	1460	1620	487	258	277	462	152	
Run-off acre-feet				33500	89800	96400	29900	15900	16500	28400	4220	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of San Juan River at Arboles for 1913. Drainage Area, 1,394 Square Miles. Altitude, 6,001 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			120	1510	1590	2960	984	159	116	204	146	169
2			120	1540	1660	2260	651	169	130	219	152	185
3			130	1470	1300	2060	532	167	120	904	169	169
4			130	888	2060	2280	542	139	105	1300	245	213
5			130	952	1610	1970	471	137	152	582	196	204
6			130	2620	1590	2020	498	137	570	515	177	185
7			140	2600	1840	2020	450	137	213	450	164	130
8			140	1750	920	1960	410	128	116	388	164	120
9			140	1110	1250	1700	401	124	225	344	164	120
10			180	1320	1740	1700	488	137	205	332	155	120
11			240	1410	1740	1810	435	146	225	305	162	140
12			280	1680	2100	1720	297	374	268	279	135	120
13			220	1910	2300	1630	258	374	146	245	141	120
14			160	1990	1740	1630	265	141	205	279	229	130
15			140	1900	1480	1560	248	141	164	268	190	130
16			160	2140	1560	1680	316	141	159	219	180	160
17			200	1610	1630	1660	460	185	130	235	172	180
18			180	1610	1810	1180	488	164	120	225	190	194
19			180	1480	1960	1130	401	204	110	190	190	160
20			220	1660	1300	1080	471	185	116	177	365	140
21			258	2140	1770	1630	542	185	116	204	316	140
22			169	1540	1600	980	365	164	110	190	332	140
23			282	1480	1660	930	365	196	388	204	245	140
24			162	984	1840	880	365	185	324	177	235	130
25			155	856	2110	830	374	185	305	190	225	130
26			180	805	2310	780	316	204	324	190	213	130
27			146	1000	3260	730	225	177	268	164	245	130
28			137	1610	2560	2160	202	124	219	141	245	130
29			235	3100	2760	1480	213	124	219	141	235	130
30			826	2840	2810	1000	225	124	219	152	146	130
31			1080		2980		177	141		159		130
Mean	*100	*115	225	1650	1900	1560	401	171	203	309	204	147
Run-off acre-feet	6150	6390	13800	98200	117000	92800	24700	10500	12100	19000	12100	9040

Unless otherwise noted, all discharges are in cubic feet per second. *Estimated from discharge measurements. Discharge estimated Mch. 1-21-Dec. 7-31.

Discharge of San Juan River at Arboles for 1914. Drainage Area, 1,394 Square Miles. Altitude, 6,001 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			291	1060	1200	6030	1150	488	756	422	456	
2			314	1000	1200	4980	1150	461	432	376	432	
3			432	960	1220	4510	1330	516	398	868	384	
4			362	1200	1230	3870	1360	576	398	5220	384	
5			277	1410	1340	3190	1790	576	398	3440	362	
6			267	1340	1430	2860	1560	483	398	1320	342	
7			178	1380	1380	2560	1260	522	402	1020	342	
8			178	1200	1900	2380	1110	510	306	852	342	
9			342	1270	2620	2380	1010	540	346	707	321	
10			570	1300	2500	2800	1060	467	402	642	321	
11			540	1480	2860	2860	1000	461	306	576	321	
12			384	1480	2800	3440	976	427	333	516	302	
13			456	1270	2860	3360	882	358	742	461	302	
14			570	1430	2780	3260	960	317	1180	422	274	
15			1080	1660	3100	3090	868	299	1650	376	274	
16			1380	1680	3030	3300	800	270	1490	358	250	
17			1340	1680	2200	3610	763	306	1270	358	219	
18			1500	1560	2540	2930	875	284	1200	358	219	
19			1480	1590	2420	2860	1240	270	822	346	219	
20			1040	1660	2720	3000	1290	270	800	337	205	
21			1160	1590	3100	2730	1190	270	960	358	219	
22			602	1720	3410	2430	928	1760	1010	1330	234	
23			735	1780	4260	2190	756	1320	576	1330	241	
24			830	1480	4590	1990	687	778	516	714	219	
25			845	1480	3650	1790	830	534	483	583	211	
26			845	1520	3300	1640	770	976	446	534	211	
27			882	1380	3470	1280	822	516	516	478	200	
28			882	1320	3030	1100	749	976	528	451	180	
29			905	1160	3230	1160	648	680	384	451	180	
30			960	1230	3610	1230	728	875	333	436	160	
31			880		4210		494	882		467		
Mean	*140	*190	726	1410	2680	2830	1000	580	659	853	278	
Run-off acre-feet	8610	10600	44600	83900	165000	168000	61500	35700	39200	52400	16500	

Unless otherwise noted, all discharges are in cubic feet per second. *Est.

Discharge of Navajo River at Edith for 1913. Altitude, 7,100 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				160	331	348	152	46	32	45	40	45
2				140	313	368	135	46	32	44	40	45
3				135	265	328	129	43	32	184	44	45
4				130	253	331	135	41	34	184	48	45
5				150	262	316	114	43	66	145	45	45
6				200	283	298	102	43	43	87	43	45
7				253	331	286	87	41	36	82	43	45
8				224	322	286	84	38	36	72	43	45
9				170	328	286	77	36	48	67	43	45
10				238	335	271	102	35	40	64	43	45
11				328	341	292	91	34	38	58	43	40
12				316	344	268	80	41	48	57	43	40
13				344	358	216	73	122	41	58	45	40
14				407	344	235	67	53	38	55	45	40
15				427	331	268	66	46	36	55	45	40
16				424	322	238	66	43	34	55	45	40
17				394	313	216	61	43	32	55	45	40
18				361	322	238	60	53	32	52	45	40
19				328	328	268	60	52	32	49	45	40
20				328	304	241	67	48	32	45	45	40
21				328	292	216	77	50	32	45	52	40
22				301	286	200	87	61	44	45	50	40
23				280	325	200	108	55	48	45	48	40
24				233	348	206	116	48	48	45	45	40
25				198	331	189	97	43	55	43	53	40
26				222	368	184	87	38	52	43	52	40
27				235	401	170	77	38	48	42	48	40
28				271	391	162	67	36	45	40	48	40
29				298	368	235	55	35	52	40	45	40
30				313	364	173	52	36	53	40	45	40
31					364		50	37		40		40
Mean	*35.0	*30.0	*60.0	271	328	251	86.5	45.9	41.3	63.9	45.5	41.6
Run-off acre-feet	2150	1670	3690	16100	20200	14900	5320	2820	2460	3930	2710	2560

Unless otherwise noted, all discharges are in cubic feet per second. *Estimated from discharge measurements and information furnished by gage reader.

Discharge of Navajo River at Edith for 1914.
Altitude, 7,100 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			40	198	293	1120				82	95	
2			40	195	304	1040				82	91	
3			40	244	286	855				258	91	
4			40	282	286	792				535	91	
5			40	324	324	741				332	85	
6			60	389	332	685				230	82	
7			80	332	344	645				162	83	
8			100	356	398	505				145	83	
9			120	340	430	380				162	74	
10			140	360	577	425				138	61	
11			160	380	511	605				142	56	
12			180	400	542	645				135	59	
13			200	420	613	605				123	59	
14			230	416	577	570				93	59	
15			234	412	577	570				87	59	
16			254	384	481	570				85	58	
17			276	380	542	517				79	58	
18			244	356	542	505				75	58	
19			248	372	481	556				69	58	
20			218	398	481					69	51	
21			192	407	542					95	44	
22			170	416	613					180	44	
23			160	376	613					180	44	
24			155	364	891					142	50	
25			165	348	653					115	44	
26			192	348	613					113	49	
27			195	328	653					107	49	
28			212	328	637					107	43	
29			215	308	717					97	43	
30			190	290	774					93	43	
31			192		927					93		
Mean	*37.0	*35.0	161	348	534	649				142	62.1	
Run-off acre-feet	2280	1940	9900	20700	32800	24500				8730	3700	

Unless otherwise noted, all discharges are in cubic feet per second. *Est.

PIEDRA RIVER AT ARBOLES.

Location.—At the railroad bridge at Arboles, Colo., in sec. 16, T. 32 N., R. 5 W., 1 mile above the junction with the San Juan River. No tributaries between station and mouth.

Records Available.—June 19, 1895, to September 30, 1899; August 21, 1910, to November 30, 1914.

Drainage Area.—650 square miles.

Gage.—Chain gage.

Channel.—Practically permanent except during high water.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Diversions.—There are court decrees for diversions of 18 second-feet from Piedra River in Colorado and 52 second-feet from Colorado tributaries.

Co-operation.—Station maintained in co-operation with the State Engineer of New Mexico and the United States Geological Survey in 1913. During 1914 station maintained by the State Engineer of New Mexico and the United States Geological Survey, by whom records were furnished.

DISCHARGE MEASUREMENTS OF PIEDRA RIVER AT ARBOLES, COLO.

Date 1913		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan.	24*	C. J. Emerson	2.81	37.8	Jan.	26*	Emerson & Watrous	2.82	70.6
Feb.	18*	Frank O'Brien	2.80	76.	Feb.	27	R. S. Watrous	1.91	118.
Mar.	12	Frank O'Brien	1.88	102.	Apr.	15	R. S. Watrous	4.77	1210
Apr.	1	Frank O'Brien	3.43	492.	Apr.	24	R. S. Watrous	4.47	980.
Apr.	26	Frank O'Brien	3.80	676.	May	31	R. S. Watrous	6.43	2420
May	13	Frank O'Brien	5.16	1380.	June	12	R. S. Watrous	5.85	1980
July	16	Frank O'Brien	2.08	124.	Aug.	16	R. S. Watrous	2.27	157
Aug.	2	Frank O'Brien	1.69	71.	Sept.	28	R. S. Watrous	2.20	154
Nov.	14	Frank O'Brien	2.20	135.	Nov.	2	R. S. Watrous	3.12	306
Dec.	18	C. J. Emerson	1.90	100.					

*Ice conditions.

LOS PINOS RIVER NEAR IGNACIO.

Location.—At the highway bridge near Ignacio Indian Agency, about sec. 8, T. 33 N., R. 7 W. New Mexico principal meridian, 1 mile north of Ignacio. Nearest tributary is a small stream that enters from the west 2 miles below.

Records Available.—April 22, 1899, to October 31, 1903; September 1, 1910, to November 30, 1914.

Drainage Area.—450 square miles.

Gage.—Chain gage.

Channel.—Shifting.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter Flow.—No data.

Diversions.—A number of ditches divert water above the station for irrigation.

Co-operation.—Station maintained in 1913 in co-operation with the State Engineer of New Mexico. Maintained in 1914 by State Engineer of New Mexico in co-operation with the United States Geological Survey. Records for 1914 furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON LOS PINOS RIVER NEAR IGNACIO, COLO.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 27*	Chas. E. Turner	2.00	58	Jan. 24*	Emerson and Watrous	1.40	80.2
Feb. 11*	Chas. E. Turner	2.00	77	Feb. 26	R. S. Watrous	1.47	133.
Mar. 10	F. O'Brien	1.22	94	Apr. 15	R. S. Watrous	3.01	835.
Apr. 9	F. O'Brien	2.12	428	Apr. 23	R. S. Watrous	3.18	838.
May 6	F. O'Brien	3.31	1080	June 1	R. S. Watrous	5.27	3860
June 9	F. O'Brien	3.04	753	Aug. 15	R. S. Watrous	2.11	129.
July 19	F. O'Brien	0.52	20.2	Sept. 28	R. S. Watrous	1.10	8.3
Sept. 2	F. O'Brien	0.68	24.8	Nov. 2	R. S. Watrous	2.52	295.
Oct. 15	F. O'Brien	1.95	212				
Dec. 17	C. J. Emerson	1.50	133.				

*Ice conditions.

ANIMAS RIVER AT DURANGO.

Location.—Located opposite the San Juan Water & Power Co.'s sub-station about one-fourth mile above Lightner Creek.

Records Available.—From June 20, 1901, to December 31, 1905; January 1, 1910, to December 31, 1910; January 1, 1912, to November 30, 1914, at a point above Lightner Creek; January 1, 1911, to December 31, 1911, below Lightner Creek.

Drainage Area.—694 square miles.

Gage.—Automatic recording gage.

Channel.—Liable to shift during high water.

Discharge Measurements.—Made from car and cable.

Winter Flow.—Little if any backwater from ice during the winter months.

Diversions.—Water is diverted above the station for irrigation.

Co-operation.—During 1913 station was maintained in co-operation with the United States Geological Survey and the State Engineer of New Mexico. In 1914 the station was maintained by the State Engineer of New Mexico and the United States Geological Survey, by whom the records were furnished.

DISCHARGE MEASUREMENTS OF ANIMAS RIVER AT DURANGO, COLO.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 28	Chas. E. Turner	1.10	180	Jan. 25*	Emerson & Watrous	1.21	223
Feb. 24	Frank O'Brien	1.10	184	Feb. 25	R. S. Watrous	1.06	197
Mar. 20	Frank O'Brien	1.10	207	Apr. 17	R. S. Watrous	2.78	1280
Apr. 19	Frank O'Brien	2.34	927	Apr. 22	R. S. Watrous	2.88	1380
May 10	Frank O'Brien	3.34	2020	June 3	R. S. Watrous	6.20	7060
June 6	Frank O'Brien	3.44	2090	June 11	R. S. Watrous	4.50	3510
July 5	Frank O'Brien	2.52	1060	Aug. 3	R. S. Watrous	2.43	1000
Aug. 16	Frank O'Brien	1.47	340	Nov. 4	R. S. Watrous	1.58	412
Oct. 14	Frank O'Brien	1.78	533	Dec. 20	R. S. Watrous	1.24	264
Dec. 16	C. J. Emerson	1.17	235				

*Ice conditions.

Discharge of Piedra River at Arboles for 1913.
Drainage Area, 650 Square Miles. Altitude, 6,001 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			80	504	1050	1410	307	76	104	141	90	129
2			80	681	1100	1390	257	78	92	130	102	129
3			80	740	812	1390	160	71	94	223	117	100
4			80	552	886	1050	124	68	94	520	120	141
5			80	694	938	1080	120	73	106	370	114	112
6			80	1350	992	860	202	75	155	287	114	120
7			80	1460	1080	938	184	70	143	249	110	90
8			80	1130	1040	1050	162	62	138	216	108	88
9			80	943	1090	774	159	70	356	230	108	111
10			80	602	1130	831	204	67	184	206	102	99
11			90	788	1300	1360	168	71	188	100	96	83
12			102	1630	1390	1200	106	80	252	184	102	100
13			85	1790	1510	1220	105	90	133	216	102	97
14			84	1510	1160	1180	91	100	143	193	135	97
15			78	1390	1130	1070	129	108	133	184	120	97
16			79	1420	1040	944	124	111	127	172	124	102
17			92	1390	1090	922	123	257	123	168	111	98
18			82	1390	1220	850	112	78	116	150	109	100
19			86	1350	1280	886	116	90	110	199	129	100
20			82	764	1100	922	112	114	114	141	133	100
21			84	1220	1090	694	105	102	92	119	130	100
22			78	1080	1120	668	174	104	98	119	141	90
23			99	593	1130	544	174	92	146	122	151	90
24			86	836	1190	606	162	124	164	119	130	90
25			90	593	1230	435	110	114	123	112	126	90
26			88	663	1300	472	99	114	130	112	136	80
27			84	672	1420	399	91	88	110	100	127	80
28			82	726	1390	374	98	88	116	94	127	80
29			91	1270	1370	392	90	92	116	92	122	80
30			410	860	1420	367	86	80	116	94	117	70
31			580		1550		77	116		94		70
Mean	*40.0	*70.0	111	1020	1180	876	139	94.3	137	176	119	97.2
Run-off acre-feet	2460	3890	6820	60700	72600	52100	8550	5800	8150	10800	7080	5980

Unless otherwise noted, all discharges are in cubic feet per second.

*Estimated from measurements and climatological reports. Discharge estimated Mch. 1-23, Dec. 18-31.

Discharge of Piedra River at Arboles for 1914.
Drainage Area, 650 Square Miles. Altitude, 6,001 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			137	697	785	3660	679	497	242	271	337	
2			149	715	810	3060	715	446	194	205	319	
3			194	850	822	2480	670	458	183	692	302	
4			194	938	835	1960	662	398	179	3360	302	
5			198	885	860	1650	1100	398	159	3360	286	
6			181	1210	938	1340	885	312	169	1580	271	
7			198	1210	1050	1340	706	262	156	810	262	
8			192	1100	1500	1060	565	286	150	706	256	
9			237	895	1720	976	513	312	156	620	256	
10			306	926	1860	1160	474	312	175	565	251	
11			341	910	1900	1500	486	312	163	517	242	
12			348	954	1600	1780	505	271	192	478	229	
13			344	926	1530	1860	505	234	391	466	237	
14			423	982	1460	1760	497	183	493	446	237	
15			416	1140	1670	1780	505	201	670	427	222	
16			513	1160	1500	1920	427	179	509	391	205	
17			790	1310	1410	1680	486	163	565	391	205	
18			943	1220	1390	1760	1250	149	217	384	205	
19			987	1240	1240	1680	1800	137	201	409	205	
20			1030	1160	1260	1620	1650	145	289	384	205	
21			1020	1280	1420	1480	1220	224	540	355	177	
22			524	1280	1560	1220	1090	229	405	599	183	
23			615	1240	2560	1200	976	326	215	692	183	
24			670	1090	2880	1080	607	187	219	532	190	
25		109	733	992	2360	885	692	201	196	439	190	
26		111	780	1050	2020	906	662	187	177	391	173	
27		103	756	965	2030	800	586	234	173	420	159	
28		123	770	860	1680	715	706	251	169	391	187	
29			751	785	1780	670	724	205	158	384	163	
30			728	820	1980	641	670	280	140	398	149	
31			666		2390		607	280		373		
Mean	*70.0	* 85	520	1030	1570	1520	762	266	262	691	222	
Run-off acre-feet	4300	4720	32000	61300	96500	90400	46900	16400	15600	42500	13400	

Unless otherwise noted, all discharges are in cubic feet per second. *Est.

Discharge of Los Pinos River near Ignacio for 1913.

Drainage Area, 450 Square Miles. Altitude, 6,481 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				458	1030	1230	420	1.0	30	71	124	119
2				477	972	1210	366	.9	28	90	120	114
3				411	876	1130	304	.7	35	246	152	119
4				341	856	1060	256	.7	35	458	146	126
5				452	888	1010	225	.7	37	349	122	129
6				631	1060	880	233	.5	148	338	117	135
7				624	1110	848	180	.2	178	279	109	135
8				509	1140	808	150	.2	253	253	106	136
9				452	1090	768	103	.2	635	238	100	142
10			95	452	1200	720	116	.2	512	238	96	131
11			100	484	1360	976	117	.1	390	220	96	131
12			93	576	1420	884	79	.2	327	204	98	127
13			64	672	1470	784	59	1.6	259	211	112	119
14			59	740	1340	812	43	146	211	223	158	117
15			53	812	1240	860	31	20	173	211	138	126
16			54	868	1200	892	34	8.8	140	196	133	150
17			64	944	1290	836	87	11	120	184	122	136
18			82	956	1350	968	19	14	103	146	120	131
19			79	900	1380	964	22	17	104	127	127	119
20			87	860	1220	856	27	9.6	65	120	140	103
21			90	884	1220	780	40	8.0	51	111	142	92
22			92	840	1200	704	101	104	64	104	144	90
23			83	780	1400	692	228	63	119	108	117	90
24			75	756	1440	668	87	37	109	106	131	90
25			64	684	1380	614	51	42	89	129	164	90
26			54	676	1440	583	21	18	98	152	144	85
27			48	748	1500	556	9.6	13	77	136	127	85
28			69	872	1340	549	8.4	13	76	131	122	85
29			135	908	1310	628	5.1	12	70	124	116	85
30			220	996	1310	509	3.0	16	70	122	109	85
31			349		1170		2.0	22		120		85
Mean			95.9	692	1230	826	111	18.8	154	185	125	113
Run-off acre-feet			4180	41200	75600	49200	6820	1160	9160	11400	7440	6950

Unless otherwise noted, all discharges are in cubic feet per second.

Dec. 19-31 estimated from measurements.

Discharge of Los Pinos River at Ignacio for 1914.

Drainage Area, 450 Square Miles. Altitude, 6,481 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	82	104	137	431	447	3800	1350	313	80	9.7	317	
2	81	105	158	484	426	4120	1290	317	57	17	299	
3	78	95	160	581	398	3280	1130	320	50	118	289	
4	80	110	146	607	394	2790	1490	324	44	1930	282	
5	72	113	148	822	403	2280	2210	269	36	1020	269	
6	72	102	142	902	417	2010	1550	211	31	750	269	
7	72	84	150	902	507	1490	1440	162	28	587	263	
8	70	94	162	875	718	1170	1170	121	25	513	249	
9	87	105	180	758	1250	930	1120	112	21	495	237	
10	60	114	243	635	1590	1200	866	100	18	426	228	
11	65	131	260	806	1630	1860	822	185	17	372	226	
12	95	128	237	758	1540	2580	782	198	16	355	220	
13	74	131	249	678	1690	2990	1060	156	14	435	201	
14	85	133	295	806	1490	3110	1110	144	21	320	206	
15	80	131	421	884	1630	2760	960	126	20	295	185	
16	70	122	542	1030	1440	3150	790	111	17	286	171	
17	88	119	702	911	1380	2700	806	95	14	320	178	
18	95	122	814	798	1410	3080	1350	80	12	339	164	
19	95	126	790	702	1100	3080	2310	38	9.7	339	160	
20	80	121	649	830	1000	2810	2500	23	10	317	164	
21	60	114	536	839	1380	2550	2150	28	16	317	160	
22	70	152	436	866	1730	2340	1470	63	21	426	158	
23	95	128	473	857	2560	2220	1020	58	16	490	156	
24	85	118	495	686	2700	2030	790	42	14	447	152	
25	100	111	473	663	2430	1860	656	41	12	398	150	
26	85	121	484	702	2200	1630	628	42	12	385	158	
27	78	111	501	663	2420	1500	490	81	12	364	158	
28	85	122	501	614	2210	1520	484	67	9.1	368	158	
29	90		507	542	2500	1430	468	78	10	351	158	
30	92		530	468	2810	1320	403	118	9.4	335	162	
31	93		478		3340		364	119		320		
Mean	81.1	117	387	737	1520	2320	1130	134	22.4	430	205	
Run-off acre-feet	4990	6500	23800	43900	93500	138000	69500	8240	1330	26400	12200	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Animas River at Durango for 1913.
Drainage Area, 694 Square Miles. Altitude, 6,550 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		180	106	630	1310	2920	1210	398	493	420	315	265
2		180	94	538	1220	3050	1190	392	512	450	315	265
3		180	119	468	1000	2760	1150	398	468	652	325	265
4		180	152	426	960	2490	1020	392	426	825	335	265
5		180	188	462	1100	2490	1100	392	426	802	315	265
6		180	188	552	1420	2000	936	387	512	720	315	247
7		180	192	630	1690	1920	888	370	652	652	310	247
8		180	212	526	1710	1920	840	365	780	615	290	247
9		162	212	432	1480	1580	780	370	1260	573	290	247
10		162	216	387	1920	1710	825	365	1180	545	290	247
11		162	216	381	2550	2050	880	365	952	519	290	247
12		162	216	474	2670	1900	780	398	825	512	290	247
13		162	200	698	2760	1630	735	376	735	512	310	247
14		162	162	1020	2070	1670	630	365	675	480	315	247
15		162	162	1280	1780	2100	615	345	630	480	315	247
16		162	166	1190	1950	2400	682	340	573	480	315	229
17		162	166	1280	2070	2460	802	340	512	480	295	224
18		162	204	1080	2320	2670	810	320	426	474	270	242
19		145	216	960	2370	2460	735	315	426	432	265	229
20		145	229	1020	1920	2550	825	315	426	420	275	212
21		145	208	1040	1670	2180	856	355	392	414	365	208
22		145	216	1000	1900	1960	880	426	376	392	265	204
23		130	204	920	2580	1780	976	409	480	392	265	200
24		145	166	765	2810	1710	920	426	409	370	265	195
25		104	166	615	2760	1650	802	519	365	365	265	190
26		130	145	630	3460	1560	675	468	365	345	265	185
27		104	170	765	3700	1560	601	420	365	325	265	180
28	180	116	208	936	3360	1560	532	398	370	315	265	175
29			220	1170	3120	1630	480	398	409	315	265	170
30			285	1340	3250	1380	444	450	420	315	265	162
31			398		2890		420	480		315		160
Mean	*150	162	194	787	2190	2060	807	389	561	481	290	225
Run-off acre-feet	9220	9000	11900	46800	135000	123000	49600	23900	33400	29600	17300	13800

Unless otherwise noted, all discharges are in cubic feet per second. *Estimated from measurements.

Discharge of Animas River at Durango for 1914.
Drainage Area, 694 Square Miles. Altitude, 6,550 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	189	189	222	505	976	6910	2590	1230	523	348	475	
2	189	189	233	535	945	8330	2560	1040	505	370	475	
3	205	189	240	587	870	6740	2390	976	464	684	448	
4	205	189	248	684	922	5750	2780	960	420	2360	410	
5	189	173	272	885	1080	4550	3700	870	420	1190	395	
6	189	158	289	1040	1210	3880	2880	825	380	885	395	
7	199	158	302	1000	1370	3010	2880	740	370	775	380	
8	205	158	316	900	1810	2320	2390	796	361	740	370	
9	205	158	334	810	2670	2040	2100	922	348	670	370	
10	205	173	370	775	3520	2530	2020	775	370	614	370	
11	205	179	395	754	3480	3700	2040	740	361	587	361	
12	205	173	380	740	3200	4750	2160	684	370	568	348	
13	205	173	420	825	3380	5750	2420	614	370	568	348	
14	205	158	464	922	3200	6210	2980	587	380	535	348	
15	205	158	487	1120	3170	5380	2420	568	348	505	334	
16	248	144	587	1340	2820	6110	2040	523	361	505	325	
17	280	167	726	1280	2730	5230	1810	505	361	523	325	
18	260	222	870	1080	2700	5710	2140	475	325	535	316	
19	250	248	900	1100	2590	5750	2880	431	325	523	280	
20	240	240	825	1300	2730	5600	2930	448	348	487	280	
21	222	222	726	1410	3260	4960	2390	464	380	505	280	
22	205	212	635	1370	4070	4490	1940	475	395	656	280	
23	205	205	600	1280	5380	4110	1610	523	395	635	280	
24	189	189	600	1190	5820	3790	1410	505	370	614	280	
25	189	189	548	1120	5020	3260	1370	475	361	568	280	
26	189	189	523	1280	4300	3200	1320	464	348	568	280	
27	202	199	523	1190	4850	3090	1280	505	348	568	280	
28	219	212	535	1040	4410	2880	1300	523	334	535	280	
29	205		505	1020	4260	2930	1320	523	325	535	280	
30	189		523	1020	5100	2850	1280	587	325	523	280	
31	189		505		6340		1260	548		523		
Mean	209	186	487	1000	3170	4530	2150	655	376	652	338	
Run-off acre-feet	12900	10300	29900	59500	195000	270000	132000	40300	22400	40100	20100	

Unless otherwise noted, all discharges are in cubic feet per second.

HERMOSA CREEK NEAR HERMOSA.

Location.—In sec. 34, T. 37 N., R. 9 W. New Mexico principal meridian, in the San Juan National Forest, 1½ miles above Hermosa postoffice, 200 yards below the mouth of Buck Creek. 1½ miles above the mouth of Hermosa Creek. No tributaries between the station and mouth.

Records Available.—November 28, 1911, to September 25, 1914.

Drainage Area.—172 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from a bridge 1 mile below station during high water and by wading at ordinary stages.

Winter Flow.—So far as known, ice causes little if any backwater at this station.

Diversions.—The station is above all diversions.

Accuracy.—Owing to infrequency of gage readings, estimates of monthly discharge have not been made. Daily discharge for days when gage height was read may be considered good for stages below about 1,200 second-feet.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON HERMOSA CREEK NEAR HERMOSA

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 12	F. O'Brien	3.50	524	June 2	R. S. Watrous	4.40	1240
June 4	F. O'Brien	2.95	23.8	Aug. 14	R. S. Watrous	2.14	58
Sept. 7	F. O'Brien	1.95	52.				
Nov. 7	F. O'Brien	1.75	34.				

Discharge of Hermosa Creek near Hermosa for 1913.
Drainage Area, 172 Square Miles. Altitude, 6,633 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1									46			36
2									49	76	35	
3						265		42				
4						249		41			37	
5						233		40	42	97		
6						204		37	79	78		
7					322	191			86	57	33	
8					367	199			106			
9					367	201	68		114			
10					418	204	69					33
11				106	475	322	65					
12				106	505		67					
13				218	475				57			
14									50			
15												
16				249								
17				249				33				33
18				367	418							
19				249	391			31		33		
20					391		82	34				
21					391			37	47			
22				249	322			42				
23				233	367	144		46			37	
24				218				48				
25				191						29	33	
26				218						26	35	
27				283					48			
28				301					46	33		
29				343	367				45	35	33	
30				475	367		46	42	46	34	35	
31					367		46	43				29
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Hermosa Creek near Hermosa for 1914. Drainage Area, 172 Square Miles. Altitude, 6,633 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					391							
2			34		367	1160						
3				191	301			158				
4				204	367			158				
5	26				391		198					
6	27				535							
7					505							
8							229					
9				233			229	94				
10				249		565						
11				233	1250				38			
12				218		700	145					
13			114	233		808	145					
14			154	233		665		61				
15				343				61				
16						598						
17						598	42					
18		33		391					38			
19	29		218			598			38			
20				565		630						
21			204			535			38			
22									38			
23				445		343		54				
24			178	391								
25			154	418					38			
26		34				343						
27								48				
28		33		391								
29			144	391			145					
30			154	391								
31												
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

SOUTH PLATTE DRAINAGE

SOUTH FORK OF SOUTH PLATTE RIVER AT LAKE GEORGE.

Location.—At highway bridge in sec. 19, T. 12 S., R. 71 W., one-fourth mile below Lake George, in the Pike National Forest, about 2 miles above the mouth of Caylor Gulch; no tributary between the outlet of the lake and the station.

Records Available.—October 22, 1910, to November 28, 1914.

Drainage Area—980 Square Miles.

Gage.—Automatic recording gage installed in 1911, reading to the same datum as the original staff gage.

Channel.—Conditions in the channel will remain unchanged as long as the control for the station—a 2-foot timber-crib dam 50 feet below the gage—remains permanent.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Artificial Control.—The discharge at the station is controlled naturally to some extent by the regulating effect of Lake George, which has an area of one-half square mile.

Diversions.—There are court decrees for diversions of 1,076 second-feet from the South Fork above this station and for diversions of 1,816 second-feet from tributaries entering above.

Accuracy.—Results are considered fair.

Co-operation.—Station maintained in co-operation with United States Forest Service and the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SOUTH FORK SOUTH PLATTE RIVER AT LAKE GEORGE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 16	M. E. Bunger	1.65	37.6	Jan. 20	R. H. Fletcher	1.24	4.9
June 3	R. H. Fletcher	2.06	122	May 12	Thos. Grieve, Jr.	2.00	133
June 4	R. H. Fletcher	1.92	85	June 7	Robert Follansbee	2.84	495
June 4	R. H. Fletcher	1.92	86	Aug. 26	R. H. Fletcher	2.68	453
Nov. 5	R. H. Fletcher	1.68	48	Oct. 9	R. H. Fletcher	2.06	177

SOUTH PLATTE RIVER AT SOUTH PLATTE.

Location.—In sec. 25, T. 7 S., R. 70 W., in the Pike National Forest, three-fourths of a mile east of South Platte; about 300 feet below junction of the North and South forks; no tributary between the forks and the station, and none for several miles below.

Records Available.—March 28, 1902, to November 30, 1914. Records at Platte Canon and at Deansbury, a few miles below, extend back to 1887 with the exception of the years 1893 and

1894. The earlier records, 1887-1892, were taken by the State Engineer, and the records from 1895 to 1898 were taken under the direction of the Denver Power & Irrigation Co.

Drainage Area.—2,610 square miles.

Gage.—An automatic recording gage installed March 14, 1910. From March 28, 1902, to May 7, 1905, the gage was at the highway bridge. On the latter date it was moved to its present site, 150 feet below. It is probable that the new gage read to a somewhat different datum. The recording gage is referred to the datum of the gage established in 1905.

Channel.—Shifting.

Discharge Measurements.—Made from car and cable during high water, and by wading at low stages.

Winter Flow.—Ice causes backwater during a portion of the winter months and measurements are made to determine the flow.

Artificial Control.—The flow is controlled to a certain extent by the Cheesman Reservoir, which is on the South Fork about 20 miles above the forks.

Diversions.—No water is diverted between this station and that on the South Fork at South Platte, nor between this station and that on the North Fork at Cassells.

Accuracy.—Although the channel is shifting, sufficient discharge measurements have been obtained to enable fair estimates of discharge to be made.

Co-operation.—Station maintained in co-operation with the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SOUTH PLATTE RIVER AT SOUTH PLATTE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 1	R. H. Fletcher	2.00	180	Jan. 12*	M. E. Bunger	2.69	126
May 15	Raymond Richards	2.84	540	Jan. 21*	M. E. Bunger	3.35	217
June 16	R. H. Fletcher	3.57	825	Feb. 5	M. E. Bunger	2.10	160
Aug. 8	R. H. Fletcher	2.68	454	Feb. 24	M. E. Bunger	1.70	120
Sept. 29	Robert Follansbee	2.46	351	May 4	Thos. Grieve, Jr.	5.48	1570
Dec. 5*	R. H. Fletcher	2.92	383	May 8	Robert Follansbee	5.60	1640
Dec. 29*	R. H. Fletcher	2.20	139	May 28	R. H. Fletcher	6.90	2900
				July 7	D. L. Bundy	4.35	1410
				July 31	M. D. Anderson	6.55	3040
				Aug. 21	Robert Follansbee	3.98	1120
				Oct. 2	R. H. Fletcher	2.83	513
				Oct. 24	R. H. Fletcher	2.84	489

*Ice conditions.

SOUTH PLATTE RIVER AT DENVER.

Location.—At the Sixteenth Street viaduct in Denver; 500 feet below mouth of Cherry Creek.

Records Available.—May 7, 1895, to November 30, 1914.

Drainage Area.—3,840 square miles.

Gage.—Automatic recording gage installed August 12, 1909. The original gage was located at the Twenty-third Street viaduct. In July, 1895, a new gage was installed at the Fifteenth Street bridge. In August, 1898, an inclined staff gage was placed on the opposite side of the river, but referred to the same datum. This gage was destroyed by high water in June, 1900, and for the remainder of the year the gage installed in July, 1895, was used. This gage was stolen, and a new one was placed between the Fifteenth Street and Sixteenth Street bridges May 15, 1901, reading to the same datum. This gage also was stolen and was replaced on June 10, 1903, by a vertical staff near the same place and having the same datum. Farmers and Gardeners Ditch dam below station washed out in July, 1912, and gage replaced at different datum in 1913.

Channel.—Shifting.

Discharge Measurements.—Made from the Fifteenth Street bridge during high water and by wading at low-water stages.

Winter Flow.—The flow at this point is seldom affected by ice.

Diversions.—Between this station and the one at South Platte there are court decrees for diversion from South Platte River of 2,226 second-feet and from intervening tributaries of 1,466 second-feet.

DISCHARGE MEASUREMENTS ON SOUTH PLATTE RIVER AT DENVER.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 21	Bunger & Hezmalhalch		130
Feb. 10	Bunger & Hezmalhalch		138
Apr. 22	Bunger and Bundy	4.60	1185
Apr. 29	Bunger and Bundy	4.20	814
May 5	Bunger & Crisman	3.90	669
May 23	M. E. Bunger	2.82	187
May 24	M. E. Bunger	2.75	170
July 2	Bunger & Hezmalhalch	2.90	319
July 25	Bunger & Hezmalhalch	4.60	1303
Oct. 2	D. L. Bundy	3.20	285
Nov. 11	Thos. Grieve, Jr.	2.78	233
Nov. 12	M. E. Bunger	2.70	220

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 13	M. E. Bunger	2.80	337
Mch. 30	Bundy & Grieve	4.12	848
Apr. 6	Bundy & Grieve	5.00	1661
May 5	Thos. Grieve, Jr.	5.28	2858
May 22	Thos. Grieve, Jr.	6.32	3665
May 25	C. C. Hezmalhalch	6.29	3774
June 17	D. L. Bundy & Woodhall	5.10	2846
July 1	Grieve & Hezmalhalch	2.40	582
July 16	Thos. Grieve, Jr.	4.08	1553
Aug. 22	D. L. Bundy	2.93	940
Sept. 17	D. L. Bundy	1.80	348
Nov. 27	C. C. Hezmalhalch	1.90	283

Discharge of South Platte River at Lake George for 1913. Drainage Area, 980 Square Miles. Altitude, 7,963 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						65	115	315	249	140	57	26
2						103	103	292	249	126	49	26
3						97	65	270	249	126	41	26
4						72	65	270	249	126	52	26
5						74	74	270	227	111	52	26
6						74	83	270	227	93	26	26
7						65	83	227	227	83	26	26
8						83	74	171	292	74	26	26
9						140	74	154	365	65	30	26
10						171	93	154	415	65	33	26
11						208	103	154	365	65	37	26
12						292	115	227	365	65	41	26
13						315	103	279	315	52	52	26
14						115	83	340	315	58	52	26
15						74	58	249	340	58	43	26
16						74	52	208	340	58	33	26
17						83	83	227	340	50	26	26
18						74	292	227	270	41	31	26
19						208	208	227	292	41	36	26
20						292	292	249	315	45	41	26
21						249	315	292	227	45	38	26
22						236	365	315	154	45	35	26
23						219	470	365	154	41	32	26
24						219	645	315	126	37	29	26
25						196	525	340	103	33	26	26
26						188	443	315	103	29	26	26
27						181	415	292	103	26	26	26
28						154	415	292	103	26	26	26
29						103	415	315	126	26	26	26
30						126	365	340	154	33	26	26
31							315	270		65		26
Mean						152	223	266	245	63	36	26
Run-off acre-feet						9040	13700	16400	14600	3900	2140	1600

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Fork of South Platte River at Lake George for 1914.

Drainage Area, 980 Square Miles. Altitude, 7,963 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			25	190	132	860	261	935	282			
2			25	204	146	930		935	272		158	
3			25	217	160	930		954	261		152	
4			25	120	146	825		972	217			
5			30	172	146	880		972	207	190	152	
6			30	224	175	930	515	972	207			
7			30	222	154	500	548	972	207			
8			34	219	132	415	428	935	207			
9			38	217	120	428	445	774	198		146	
10			41	192	107	442	463	612	190			
11			55	166	117	471	480	548	190			
12			69	136	127	500	498	532	195			
13			75	107	132	560	515	515	201			
14			80	190	132	860		455	207	190	143	
15			86	224	122	930		350	198			
16			86	132	184	1080		335	190	174	50	
17			86	126	224	1470	800	320	190	158	48	
18			96	120	244	645		303	190		50	
19			86	160	301	515		303	190			
20			69	132	382	495		303	190			
21			82	310	371	475		303	190		65	
22			95	287	360	455		311	190	158		
23			107	264	335	428		318	190			
24			96	184	500	400		326	190			
25			86	132	470	350		303	190			
26			91	160	530	323		444	190	174		
27			96	120	500	296		312	190		49	
28			120	103	470	269	750	297	190		62	
29			132	86	530	242	935	282	190			
30			107	78	560	254	972	282	190			
31			160		720		972	282				
Mean			73	173	282	605	613	531	203	174	97.7	
Run-off acre-feet			4490	10300	17300	36000	17000	32600	12100	*10700	*58100	

Unless otherwise noted, all discharges are in cubic feet per second. *Acre-ft. for full month.

Note: High water of June 17 caused by breaking of Lake George dam. Crest about 6 ft. on gage.

Discharge of South Platte River at South Platte for 1913.

Drainage Area, 2,610 Square Miles. Altitude, 6,097 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug	Sept.	Oct.	Nov.	Dec.
1				190	633	633	719	547	421	442	241	135
2				200	654	741	762	547	442	505	223	164
3				164	590	676	848	526	442	569	280	145
4				117	526	676	805	505	442	547	319	108
5				140	484	633	762	505	463	463	260	339
6				152	569	719	762	547	442	400	241	395
7				152	633	891	719	510	400	400	241	354
8				140	569	934	676	484	442	380	206	314
9				106	547	977	676	442	442	359	206	276
10				95	569	934	676	526	463	339	190	250
11				117	612	1020	676	547	590	319	206	160
12				129	633	1020	719	547	655	319	206	160
13				164	676	1068	505	526	590	870	223	220
14				280	590	1020	463	505	569	299	241	145
15				633	505	891	463	505	590	223	206	117
16				719	505	827	463	526	590	223	177	117
17				741	526	1100	569	762	547	241	190	124
18				655	547	1280	633	547	484	206	190	128
19				612	569	1450	805	762	421	206	223	117
20				633	526	1380	848	719	319	206	241	95
21				762	484	762	934	280	299	223	280	95
22				676	463	921	891	719	299	223	206	95
23				633	526	1080	977	848	280	223	152	140
24				505	569	1060	1110	590	280	260	129	140
25				505	526	999	1150	569	280	280	177	140
26				484	612	999	1150	547	280	241	169	152
27				484	633	999	1110	526	280	223	177	152
28				526	569	956	934	484	299	223	190	117
29				569	633	891	633	421	359	177	223	140
30				612	633	762	590	400	359	206	145	140
31					633		569	400		241		140
Mean	*108	* 83	* 90	397	572	943	761	544	426	324	212	171
Run-off acre-feet	6640	4610	5530	23600	35200	56100	46800	33400	25300	19900	12600	10500

Unless otherwise noted, all discharges are in cubic feet per second. *Estimated.

Discharge of South Platte River at South Platte for 1914. Drainage Area, 2,610 Square Miles. Altitude, 6,097 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	195	117	126	385	1360	2950	1230	2910	912	505	463	
2	159	160	128	405	1450	3140	1300	2960	848	526	568	
3	181	156	128	488	1620	3070	1450	3000	826	526	977	
4	152	153	102	840	1540	2910	1410	2920	784	526	442	
5	162	160	108	1180	1580	2780	1390	2760	762	505	360	
6	173	146	113	1120	1580	2660	1390	2610	740	484	360	
7	178	142	122	977	1620	2520	1380	2470	740	484	360	
8	168	143	117	784	1620	2420	1330	2300	698	484	339	
9	183	159	128	891	1730	2280	1300	2240	676	526	339	
10	168	166	128	870	1770	2230	1220	2110	654	526	319	
11	148	154	104	826	1840	2170	1220	1950	633	505	334	
12	128	164	104	826	1890	2100	1260	1850	612	505	319	
13	140	159	133	848	1960	2130	1340	1650	612	612	360	
14	165	163	157	805	1960	2100	1540	1570	676	568	380	
15	165	154	177	891	2080	2160	1690	1500	676	547	319	
16	180	166	206	870	2120	2300	1760	1360	676	590	339	
17	195	183	242	719	2260	2500	1760	1300	654	568	319	
18	210	128	280	900	2260	2310	1990	1210	654	526	140	
19	210	128	290	1000	2380	2020	2120	1110	633	463	152	
20	202	135	299	1100	2470	1960	2240	1110	590	400	280	
21	202	136	280	1240	2630	1860	2120	1110	547	400	190	
22	202	136	280	1170	2750	1710	2280	1110	547	484	190	
23	202	128	242	1130	2920	1690	2440	1110	526	568	177	
24	202	117	299	1060	2970	1590	2540	1080	526	547	177	
25	202	106	260	1040	3050	1530	2400	998	547	526	177	
26	202	106	319	1250	2920	1490	2300	1040	526	526	190	
27	202	113	319	1100	2900	1360	2290	1170	505	505	190	
28	202	122	339	1280	2860	1300	2480	1040	484	505	190	
29	152		339	1200	2840	1230	2640	998	484	505	190	
30	160		319	1320	2960	1190	2780	977	505	526	190	
31	165		350		2960		2900	977		463		
Mean	179	143	211	950	2220	2120	1850	1690	642	514	311	
Run-off acre-feet	11000	7940	13000	56500	136000	126000	114000	104000	38200	31600	18500	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Platte River at Denver for 1913. Drainage Area, 3,840 Square Miles. Altitude, 5,240 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					995	462	337	137	296			
2					995	621	226	116	226	269	360	
3					958	438	278	242	316			
4					845	371	296	242	358			
5					650	350	316	242	278	341	280	
6					621	331	278	170	260		300	310
7					621	775	226	170	260			310
8					538	810	182	182	316	253		
9					538	710	210	158	316		350	275
10					538	775	210	260	337	285		
11					538	710	158	404	337		230	
12					438	810	158	358	482	381	215	215
13					438	1080	158	296	381	330	190	
14					486	810	158	242	242			215
15					438	486	158	210	226	160		
16					350	538	278	196	242	145	190	
17					294	538	278	170	210			
18					276	1040	635	540	182			
19					331	1200	1120	316	158	170		
20					312	1160	455	182	158		170	
21					276	1680	510	196	137			170
22					242	780	455	510	98	190		
23					148	705	635	337			170	
24					170	780	570	337	285	150		
25					196	705	1400	316	225		170	
26					158	510	940	358	113	210		
27					182	404	455	337	95		155	
28					276	404	455	316	95			215
29					392	381	316	296	95	345		
30					438	358	242	381	80	280	145	
31					486		510	278		255		
Mean					457	691	407	274	235	251	225	244
Run-off acre-feet					28100	41100	25000	16800	*14000	*15400	*13400	*15000

Unless otherwise noted, all discharges are in cubic feet per second. *Figures for full month.

Discharge of South Platte River at Denver for 1914.

Drainage Area, 3,840 Square Miles. Altitude, 5,240 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	315	375	365	835	2700	2890	585	5120	800	315	470	
2	315	375	345	742	2720	3210	625	4760	750	315	530	
3	315	375	315	985	2920	3640	670	6270	705	295	900	
4	315	315	345	1150	2860	3800	705	6270	710	290	900	
5	315	335	300	1500	2880	3480	722	5490	590	300	400	
6	325	315	315	1660	2680	3360	640	4420	550	300	240	
7	345	315	325	1120	2550	2800	655	3820	530	300	240	
8	325	292	325	1100	2580	2250	598	3390	510	295	298	
9	325	278	325	1210	2700	1840	550	2850	500	295	260	
10	315	285	325	1190	2800	1470	525	2925	500	295	260	
11	300	285	325	1080	3000	1510	510	2850	475	270	260	
12	315	292	315	1180	3380	1650	495	2220	440	315	260	
13	325	285	335	1300	3060	1260	705	1900	420	340	272	
14	345	300	345	1320	2500	1030	705	1640	405	315	285	
15	335	355	530	1730	2380	1320	930	1470	380	330	272	
16	335	460	530	2000	2260	2640	1470	1390	360	350	260	
17	335	430	770	2840	2280	2850	1280	1040	350	350	250	
18	345	375	660	3300	2310	3820	780	1040	370	330	272	
19	345	355	610	2290	2320	2280	1960	995	322	330	240	
20	335	375	570	2300	2200	2280	2090	945	300	315	260	
21	355	460	530	2270	3160	1570	2280	995	330	315	260	
22	388	530	512	2520	4030	1380	2420	930	300	315	240	
23	388	512	530	3120	3930	1380	2560	1040	295	330	240	
24	388	400	530	3240	3830	1020	2850	910	295	675	260	
25	388	375	570	2760	3540	875	2780	880	315	515	285	
26	375	335	570	2480	3320	802	2420	960	308	500	285	
27	355	315	770	2980	2880	655	2160	1010	300	515	285	
28	355	335	948	2690	3020	610	1960	1350	300	515	310	
29	355		835	2270	2900	560	2500	970	295	515	310	
30	355		835	2290	2800	550	3150	780	300	515	285	
31	375		910		2840		4100	820		500		
Mean	342	358	510	1920	2880	1960	1500	2305	434	370	330	
Run-off acre-feet	21000	19900	31400	114000	177000	117000	92200	142000	25800	22800	19600	

Unless otherwise noted, all discharges are in cubic feet per second.

SOUTH PLATTE RIVER NEAR KERSEY.

Location.—At highway bridge in sec. 9, T. 5 N., R. 64 W., 1¾ miles north of Kersey, 2 miles below the entrance of Lone Tree Creek, an intermittent stream, and 3 miles below the mouth of Cache la Poudre River.

Records Available.—April 27, 1901, to October 31, 1903; March 1, 1905, to November 30, 1912; January 1 to November 30, 1914.

Drainage Area.—9,500 square miles.

Gage.—A chain gage, placed in the fall of 1906 in each of the two channels in which the river flows. These gages were referred to a datum slightly different from that of the original gage, but have remained permanent since. The original gage, a vertical staff, was used until June 14, 1906, when the observer moved it 20 feet south. This gage was placed 0.30 foot too high, and all readings were corrected by that amount until the chain gages were placed in position.

Channel.—Shifting.

Discharge Measurements.—Made from the bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes slight backwater for a few days during the winter.

Diversions.—Between this station and Denver there are court decrees for diversions of 3,764 second-feet from the South Platte, and 17,000 second-feet from intervening tributaries, besides numerous flood-water decrees.

Accuracy.—Although the channel is shifting, sufficient discharge measurements have been obtained to enable estimates of flow to be made which may be regarded as reliable for 1914. Sufficient measurements were not made in 1913 to estimate daily discharges.

DISCHARGE MEASUREMENTS OF SOUTH PLATTE RIVER AT KERSEY.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
	CHANNEL NO. 1				CHANNEL NO. 1		
Mar. 20	M. E. Bunger	3.20	378	Jan. 15	M. E. Bunger	3.95	652
May 3	M. E. Bunger	3.85	476	Feb. 2	M. E. Bunger	3.92	582
June 17	M. E. Bunger	2.35	58	Feb. 17	M. E. Bunger	4.00	513
Nov. 15	Grieve & Hezmalhalch	3.10	275	Feb. 27	M. E. Bunger	4.10	579
Nov. 19	Bunger & Crisman	3.00	258	Mar. 23	Grieve & Bundy	3.75	506
	CHANNEL NO. 2			Apr. 3	Grieve & Bundy	4.40	753
Mar. 20	M. E. Bunger	3.30	422	May 6	D. L. Bundy	7.45	7064*
May 3	M. E. Bunger	4.0	862	May 29	Grieve & Hezmalhalch	7.70	9133*
June 20	M. E. Bunger	2.05	57	June 20	Thos. Grieve, Jr.	7.15	5937*
Nov. 15	Grieve & Hezmalhalch	3.20	288	July 10	Thos. Grieve, Jr.	3.58	274
Nov. 19	Bunger & Crisman	3.15	278	Aug. 6	D. L. Bundy	6.00	4521*

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Aug.	27	Thos. Grieve, Jr.	3.70	759
Oct.	16	C. C. Hezmalhalch	3.85	421
		CHANNEL NO. 2		
Jan.	15	M. E. Bunger	4.02	631
Feb.	2	M. E. Bunger	3.95	621
Feb.	17	M. E. Bunger	4.02	646
Feb.	27	M. E. Bunger	4.10	732
Mar.	23	Bundy & Grieve	3.90	653
Apr.	3	Bundy & Grieve	4.30	1088
May	6	D. L. Bundy	7.45	7064*
May	29	Grieve & Hezmalhalch	7.70	9133*
June	20	Thos. Grieve, Jr.	7.30	5937*
July	10			Dry
Aug.	6	D. L. Bundy	6.00	4521*
Aug.	27	Thos. Grieve, Jr.	No water under	
		Gage No. 2		
Oct.	16	C. C. Hezmalhalch	3.90	383

*One channel. Total flow.

SOUTH PLATTE RIVER AT JULESBURG.

Location.—At highway bridge 1 mile south of Julesburg, about sec. 33, T. 12 N., R. 44 W. No important tributaries between the station and the Colorado-Nebraska State line, 1 mile distant. All the tributaries for 100 miles or more above the station are intermittent.

Records Available.—April 2, 1902, to November 16, 1906; May 12, 1908, to November 30, 1912; April 8 to November 30, 1914.

Drainage Area.—20,600 square miles.

Gage.—When the station was re-established in 1908 a gage was placed in each of the two main channels; both gages read practically the same as the original gage on the lower bridge 2,000 feet below the present site. The datum of the gages has remained unchanged.

Channel.—Shifting.

Discharge Measurements.—Made from the pile bridge during high water, and by wading at low-water stages.

Winter Flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—Between Kersey and Julesburg there are court decrees for diversions of 5,316 second-feet from the South Platte, and diversions of 1,240 second-feet from intervening tributaries, including Lodgepole Creek in Wyoming and Nebraska and Crow Creek in Wyoming, besides numerous flood decrees. Between the State line and the mouth diversions of 206 second-feet from the South Platte have been granted in Nebraska.

Accuracy.—Although the channel is shifting, sufficient measurements have been made to give fairly reliable discharge estimates.

Co-operation.—During 1914 this station was maintained in co-operation with the State Engineer of Nebraska.

DISCHARGE MEASUREMENTS ON THE SOUTH PLATTE RIVER AT JULESBURG.

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May	5	D. L. Bundy	3.62	5072
May	16	C. J. McNamara	3.75	6796
June	27	C. J. McNamara	2.75	1760
June	30	A. F. Hewitt	2.35	1042
Aug.	5	F. Cogswell	0.85	78
Sept.	11	Robt. Follansbee	1.40	345
Sept.	28	C. J. McNamara	1.20	296

TARRYALL CREEK NEAR JEFFERSON.

Location.—At Robbins ranch, in sec. 6, T. 9 S., R. 74 W., about 10 miles southeast of Jefferson. Rock Creek enters half a mile below.

Records Available.—June 27 to November 30, 1914. From October 18, 1910, to June 28, 1911, a station was maintained within a quarter of a mile of this point, but the relation between the two gages is not known.

Drainage Area.—Not measured.

Gage.—Vertical staff.

Channel.—Data too meager to determine.

Discharge Measurements.—Made by wading.

Winter Flow.—Ice causes backwater during the winter months and the records are discontinued.

Diversions.—There are court decrees for diversions of 314 second-feet from Tarryall Creek above the station and for 926 second-feet from tributaries entering above.

Accuracy.—Results fair.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the Tarryall Canal & Reservoir Co. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON TARRYALL CREEK NEAR JEFFERSON.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 15	Robert Follansbee	0.92	120	May 5	Robert Follansbee	0.71	110
Apr. 24	R. H. Fletcher	.42	49	May 6	Robert Follansbee	0.48	73
Apr. 25	R. H. Fletcher	.22	29	June 4	Robert Follansbee	2.09	339
July 23	Robert Follansbee	.82	116	June 5	Robert Follansbee	1.87	292
				Aug. 20	Robert Follansbee	0.71	72

Discharge of South Platte River at Kersey for 1914. Drainage Area, 9,500 Square Miles. Altitude, 4,612 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1830	1360	1560	1560	5600	10500	325	2630	715	540	1110	
2	1420	1180	2000	1650	8180	12200	290	3130	690	540	1160	
3	1260	1130	1920	1830	9280	14200	310	3500	690	570	1210	
4	1220	1100	1560	1750	8900	15400	290	3920	640	585	1210	
5	1180	1100	1560	1680	7850	14600	355	4770	620	620	1430	
6	1180	2000	1560	2100	6970	12200	570	4370	585	640	1160	
7	1220	2500	1480	2500	6970	9280	540	3830	570	665	1020	
8	1220	2830	1480	2950	6740	6740	460	2980	555	640	940	
9	1180	2600	1650	2950	6500	5150	370	2360	540	640	940	
10	1220	2830	1650	2520	6500	3550	290	2090	540	640	905	
11	1120	2600	1560	2420	6970	2410	250	2000	530	640	870	
12	1130	3060	1360	2320	8180	1880	230	1700	520	690	870	
13	1120	2600	1560	2130	8900	2520	235	1430	540	690	800	
14	1160	2000	1180	1780	8900	1880	235	1160	540	740	800	
15	1260	1560	1260	1850	6740	4060	250	1020	540	800	770	
16	1260	1180	1480	2380	6100	5300	340	940	540	800	740	
17	1360	1260	1360	3020	5920	6500	435	870	540	800	740	
18	1360	1560	1360	3620	6100	5600	510	800	540	800	740	
19	1480	1480	1310	4000	5750	5750	510	800	540	770	715	
20	1480	1650	1260	3850	5750	5440	770	740	555	740	715	
21	1420	2000	1180	3730	5750	4460	910	800	540	740	715	
22	1310	2600	1130	3840	6970	4460	1020	770	530	740	690	
23	1740	2600	1120	3950	11400	3430	1010	770	520	940	690	
24	1480	1650	1130	4060	10500	2220	1620	800	520	1310	690	
25	1420	1420	1160	4320	11000	1640	1900	800	520	1770	690	
26	1420	1420	1100	4190	10500	950	2050	740	530	1430	665	
27	1650	1420	1180	4320	9280	740	2100	740	530	1210	665	
28	1920	1420	1360	4590	8900	570	1620	770	540	1110	640	
29	1480		1480	4730	10500	485	1350	870	540	1060	640	
30	1220		1830	4730	11400	370	1520	800	540	940	640	
31	1220		1830		9280		2020	740		1110		
Mean	1350	1860	1440	3040	8010	5480	796	1730	561	836	852	
Run-off acre-feet	83000	103000	88500	181000	492000	326000	48900	106000	33400	51400	50700	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Platte River at Julesburg for 1914.
Drainage Area, 20,600 Square Miles. Altitude, 3,469 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					5160	5160	1280	15	740	225	530	
2					6060	4780	1150	20	740	225	530	
3					6060	4410	930	25	830	200	560	
4					5160	5160	560	40	830	200	625	
5					6060	5160	380	120	830	225	660	
6					7160	7160	275	325	830	250	700	
7					8510	10200	225	325	740	250	740	
8				300	7160	13400	200	250	740	275	830	
9				300	7840	12200	160	225	625	275	1030	
10				350	6060	11200	120	180	500	300	930	
11				500	5610	8510	80	160	410	300	830	
12				660	5160	3060	50	140	350	300	700	
13				830	5160	2210	30	120	300	300	560	
14				1030	5160	2210	30	120	275	300	470	
15				1090	5160	2210	50	100	275	350	470	
16				1150	6060	1960	30	80	275	350	530	
17				1350	6610	2210	30	120	275	350	590	
18				1420	6610	2210	30	120	275	350	700	
19				1580	7160	2680	30	140	300	350	830	
20				1960	7160	3520	30	180	300	300	930	
21				2210	5160	4780	25	200	300	275	1030	
22				2680	4410	3780	20	200	325	300	930	
23				3260	3780	3260	20	200	350	350	930	
24				3780	3780	2510	20	200	350	410	980	
25				3060	4410	2210	20	250	325	440	980	
26				3260	5160	1960	20	250	300	470	880	
27				3520	6060	1760	20	500	250	470	930	
28				4410	6060	1500	20	590	250	500	1030	
29				4410	6060	1420	20	660	250	500	1030	
30				4410	7160	1280	20	660	225	500	1030	
31					6060		15	740		530		
Mean				2070	5910	4460	190	234	446	336	783	
Run-off acre-feet				94100	363000	265000	11700	14400	26500	20700	46600	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Tarryall Creek near Jefferson for 1913.
Drainage Area, 223 Square Miles. Altitude, 9,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					90	84	39	53	36	84	24	20
2					86	73	34	43	36	99	24	20
3				146	50	95	31	40	36	54	24	19
4				114	43	61	24	36	36	45	24	17
5				99	40	64	13	36	36	42	27	
6				90	40	64	13	37	36	38	27	
7				60	42	84	7	37	54	36	36	
8				42	42	372	4	36	114	32	47	
9				54	36	353	8	36	130	28	54	
10				54	36	475	34	40	99	27	45	
11				42	37	433	30	84	84	27	42	
12				44	57	353	14	75	93	27	38	
13				84	54	155	9	54	54	27	36	
14				189	42	122	8	37	54	27	31	
15				225	27	80	8	36	46	27	27	
16				138	27	75	7	36	40	27	27	
17				114	26	76	216	36	36	27	27	
18				155	27	94	172	36	36	27	27	
19				106	27	155	198	36	36	27	27	
20				90	27	155	225	63	36	27	27	
21				130	27	155	198	64	36	61	27	
22				106	27	155	252	58	36	58	26	
23				73	19	155	138	64	36	36	24	
24				47	17	163	279	85	36	34	24	
25				35	17	130	106	60	36	31	21	
26				37	19	99	88	42	36	27	21	
27				36	79	71	45	36	36	27	20	
28				67	91	61	42	36	36	27	20	
29				84	55	46	42	36	36	27	20	
30				73	55	34	40	36	36	26	20	
31					64		36	36		26		
Mean				90.5	42.8	150	76.2	46.4	49.6	36.6	28.8	
Run-off acre-feet				5030	2630	8930	4690	2850	2950	2250	1710	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Tarryall Creek at Jefferson for 1914.

Drainage Area, 223 Square Miles. Altitude, 9,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				277	52	450	172	525	59	34	24	
2				250	98	525	207	312	52	33	24	
3				313	86	412	172	292	44	33	24	
4				331	114	315	172	273	42	34	22	
5				214	138	297	216	211	41	34	30	
6				223	78	261	106	180	44	34	34	
7				90	68	207	98	163	42	30	34	
8				48	96	172	94	152	39	30	34	
9				36	95	155	73	143	37	33	25	
10				84	95	130	50	127	37	33	23	
11				54	98	146	48	113	39	33	30	
12				54	109	172	90	108	39	31	34	
13				82	87	189	261	99	44	34	34	
14				122	117	189	412	93	48	34	34	
15				127	143	433	146	89	44	33	21	
16				114	171	525	155	87	44	34	18	
17				71	144	243	216	79	39	31	13	
18				48	124	198	392	84	40	30	15	
19				71	140	180	207	79	44	29	14	
20				48	188	189	172	72	34	30	14	
21				80	223	164	146	86	37	29	18	
22				90	241	146	353	90	36	40	21	
23				90	313	135	334	90	31	38	13	
24				82	277	119	261	79	29	38	16	
25				48	277	106	225	83	34	38	18	
26				48	232	97	216	97	34	34	18	
27				42	241	78	198	81	30	33	20	
28				44	328	74	279	65	28	34	23	
29				90	307	54	297	88	33	34	23	
30				95	248	54	225	66	34	30	27	
31					302		525	73		28		
Mean				112	168	214	210	135	39.3	33	23.3	
Run-off acre-feet				6660	10300	12700	12900	8300	2340	2030	1390	

Unless otherwise noted, all discharges are in cubic feet per second.

NORTH FORK OF SOUTH PLATTE RIVER AT GRANT.

Location.—At Grant postoffice, in sec. 9, T. 7 S., R. 74 W., in the Pike National Forest, 250 feet above the mouth of Geneva Creek.

Records Available.—July 18, 1910, to November 30, 1914.

Drainage Area.—51 square miles.

Gage.—Vertical staff.

Channel.—Shifting.

Discharge Measurements.—Made from footbridge and by wading.

Winter Flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—There are no court decrees for diversions from the North Fork above the station, but there is a decree for a diversion of 8 second-feet from a tributary.

Accuracy.—Though the channel is somewhat shifting, sufficient measurements were obtained to make the estimates reliable. The diurnal fluctuations at this station are so great that the mean of two daily readings does not represent the mean discharge, especially in the spring, when the snow is melting during the day and freezing during the night.

Co-operation.—Station maintained in co-operation with the United States Geological Survey.

DISCHARGE MEASUREMENTS ON NORTH FORK OF SOUTH PLATTE RIVER AT GRANT.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 15	Robert Follansbee	1.94	50	Jan. 9*	Follansbee & Bunger	1.80	7.2
May 22	R. H. Fletcher	2.11	69	Feb. 4*	M. E. Bunger	1.80	6.2
June 17	R. H. Fletcher	2.24	85	May 7	Robert Follansbee	1.86	42
Aug. 8	R. H. Fletcher	1.64	22.9	July 6	D. L. Bundy	2.20	75
Sept. 28	Robert Follansbee	1.60	20.0	Aug. 20	Robert Follansbee	2.02	48
Dec. 4	R. H. Fletcher	1.94	9.0				
Dec. 30	R. H. Fletcher	1.82	5.8				

*Ice conditions.

NORTH FORK OF SOUTH PLATTE RIVER AT CASSELLS.

Location.—At Cassells, in sec. 11, T. 7 S., R. 74 W., in the Pike National Forest. The nearest tributary is a small stream entering from the south, a short distance below.

Records Available.—July 4, 1908, to November 30, 1913. Discontinued 1913.

Drainage Area.—128 square miles.

Gage.—Chain gage which replaced a vertical staff reading to the same datum.

Channel.—Shifting.

Discharge Measurements.—Made from bridge.

Winter Flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—There are no court decrees for diversions between this station and that at Grant.

Accuracy.—Although the channel is shifting, sufficient measurements have been obtained to make the estimates of discharge reliable. The diurnal fluctuations due to melting during the day and freezing at night are so great at this station during the spring and, to a less extent, in the fall, that the mean of two daily gage readings does not properly represent the mean stage.

Co-operation.—Station maintained in co-operation with the United States Forest Service and the United States Geological Survey.

DISCHARGE MEASUREMENTS ON NORTH FORK SOUTH PLATTE RIVER AT CASSELLS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 16	Robert Follansbee	1.40	68.6
May 24	R. H. Fletcher	2.01	242
June 17	R. H. Fletcher	2.10	285
Aug. 8	R. H. Fletcher	1.28	88.3
Sept. 28	Robert Follansbee	1.19	74
Dec. 4*	R. H. Fletcher	0.92	27.3
Dec. 31*	R. H. Fletcher	1.20	29.2

*Ice conditions.

NORTH FORK OF SOUTH PLATTE AT SOUTH PLATTE.

Location.—One-third mile above South Platte. No tributary between station and mouth at South Platte.

Records Available.—January 4, 1909, to September 30, 1910; April 1, 1913, to November 30, 1914.

Drainage Area.—450 square miles.

Gage.—Inclined staff whose datum has remained unchanged.

Channel.—Somewhat shifting.

Discharge Measurements.—Made from car and cable during high and medium stages, and by wading at low stages.

Winter Flow.—Ice causes backwater and discharge measurements are made to determine the flow.

Diversions.—There are court decrees for diversions of 20 second-feet from North Fork between Grant and South Platte, and 62 second-feet from intervening tributaries, exclusive of Geneva Creek. There are also a number of small ice and fish ponds which divert small amounts of water at various times.

Accuracy.—As the mean daily gage heights are based on one observation, they may be somewhat in error, and therefore the estimates can not be considered better than good.

Co-operation.—Station maintained in co-operation with the United States Geological Survey.

DISCHARGE MEASUREMENTS ON NORTH FORK OF SOUTH PLATTE RIVER AT SOUTH PLATTE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 13*	R. H. Fletcher		36.
Feb. 25*	R. H. Fletcher		37
Apr. 1	R. H. Fletcher	1.8	76
May 15	Raymond Richards	2.73	275
June 16	R. H. Fletcher	3.00	380
Aug. 8	R. H. Fletcher	2.10	137
Sept. 29	R. Follansbee	2.25	126
Nov. 1	R. Follansbee	1.98	90.3
Dec. 29*	R. H. Fletcher		67.2

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 12	M. E. Bunger	3.20	54
Jan. 21	M. E. Bunger	3.16	70
Feb. 5	M. E. Bunger	1.89	65
Feb. 24	M. E. Bunger	2.55	52
May 4	Thos. Grieve, Jr.	3.78	574
May 8	Robert Follansbee	3.95	727
May 28	R. H. Fletcher	4.95	1420
July 7	D. L. Bundy	3.30	448
July 31	M. D. Anderson	4.45	1160
Aug. 21	Robert Follansbee	3.04	380
Oct. 2	R. H. Fletcher	2.11	126
Oct. 24	R. H. Fletcher	2.16	132

*Ice conditions.

Discharge of North Fork South Platte River at Grant for 1913. Drainage Area, 49 Square Miles. Altitude, 8,566 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					50	82	65	34	18	28	20	11
2					45	79	60	32	21	44	20	11
3					45	75	55	28	21	44	16	10
4					42	72	50	24	21	21	21	9
5					40	72	45	22	21	23	26	10
6					35	75	40	22	21	24	21	11
7					50	78	50	22	24	20	16	10
8					60	78	37	22	26	20	24	9
9					50	80	42	22	26	21	20	8
10					40	82	42	25	24	20	21	7
11					52	85	42	28	24	22	22	6
12					64	85	43	28	24	20	18	6
13					75	78	44	25	20	27	18	6
14					65	78	45	22	19	21	16	5
15				51	55	78	46	22	22	21	21	5
16				40	45	82	47	23	22	23	28	5
17				30	51	85	47	23	22	17	33	6
18				20	54	90	47	24	21	21	16	6
19				22	57	95	47	24	21	21	16	6
20				24	54	90	46	22	20	20	18	6
21				26	51	85	44	22	20	20	17	6
22				26	63	85	42	22	20	24	16	6
23				26	69	72	42	22	18	20	16	6
24				26	65	68	42	21	18	23	16	6
25				26	60	65	42	21	18	22	14	6
26				20	80	65	42	21	18	32	13	6
27				23	75	65	40	21	18	27	13	6
28				26	70	65	37	21	20	18	12	6
29				36	85	65	37	18	22	30	12	6
30				45	85	65	37	18	25	24	11	6
31					85		36	18		21		6
Mean				29.2	58.6	77.3	44.5	23.2	21.2	23.8	18.4	7.06
Run-off acre-feet				927	3600	4600	2740	1430	1260	1460	1090	434

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork South Platte River at Grant for 1914. Drainage Area, 49 Square Miles. Altitude, 8,566 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	6	5	8	24	57	318	110	104	35	29	17	
2	6	5	9	30	53	395	106	108	34	24	15	
3	6	5	10	23	92	275	99	118	35	19	13	
4	7	6	11	24	64	257	102	129	30	24	14	
5	7	5	12	47	62	223	92	105	30	19	16	
6	7	5	13	30	46	214	92	111	38	21	14	
7	7	5	14	26	47	193	92	99	26	21	14	
8	7	6	15	20	86	198	88	99	25	21	17	
9	7	6	16	16	111	158	70	93	25	26	15	
10	7	6	17	21	146	167	83	76	25	19	16	
11	7	6	19	26	141	174	81	69	25	19	19	
12	7	5	18	26	92	194	81	72	26	19	19	
13	7	5	18	30	126	178	88	63	26	19	15	
14	7	5	18	29	144	174	96	59	29	19	15	
15	6	6	18	34	161	202	89	55	33	19	18	
16	6	7	18	30	166	162	85	59	29	19	16	
17	5	7	19	35	177	158	89	57	25	19	19	
18	5	7	19	26	188	167	132	57	25	19	18	
19	5	7	19	51	199	167	89	62	25	21	17	
20	5	7	19	46	255	167	69	64	30	21	16	
21	5	7	20	59	291	162	86	63	29	18	15	
22	5	7	20	56	355	170	106	63	29	19	14	
23	5	7	20	44	327	170	104	64	29	19	13	
24	5	7	20	35	300	167	105	67	29	18	13	
25	5	7	23	53	282	158	99	72	29	22	10	
26	5	7	26	62	264	132	100	67	29	19	10	
27	5	7	23	68	264	114	104	47	29	18	10	
28	5	7	25	50	255	112	134	51	29	17	13	
29	5		20	62	246	110	130	47	24	16	13	
30	5		19	52	264	102	144	35	24	15	13	
31	5		20		282		188	36		16		
Mean	5.87	6.14	17.6	37.8	179	185	101	73.3	29.1	19.8	14.9	
Run-off acre-feet	361	341	1080	2250	11000	11000	6210	4510	1730	1220	887	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork South Platte River at Cassells for 1913. Drainage Area, 128 Square Miles. Altitude, 8,530 Feet Above Sea Level.

Day	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					115	243	139	139	73	100	47	
2					88	211	139	130	83	84	50	
3					88	211	130	106	76	84	54	
4					115	198	130	103	100	78	52	
5					105	184	120	96	85	74	52	
6					135	211	120	96	83	70	53	
7					148	184	118	88	88	66	56	
8					135	262	130	78	120	64	58	
9					115	227	130	82	106	65	52	
10					148	243	117	88	83	70	45	
11					160	262	100	96	97	70	52	
12					160	243	91	100	97	71	52	
13					160	198	91	91	87	64	50	
14					125	211	112	91	85	59	50	
15					105	227	117	88	100	63	39	
16				80	115	227	184	85	91	62	47	
17				67	125	262	150	82	85	53	50	
18				75	160	227	184	75	75	52	43	
19				66	135	243	211	75	71	52	43	
20				66	135	211	211	75	68	58	41	
21				74	135	227	184	75	73	62	41	
22				59	135	211	160	74	80	56	29	
23				67	211	198	160	71	75	59	37	
24				60	243	184	150	85	74	59	31	
25				54	227	184	139	74	76	62	50	
26				61	243	184	150	71	78	60	41	
27				66	243	160	150	74	79	53	43	
28				88	227	184	139	75	72	50	40	
29				105	243	184	139	73	68	52	30	
30				125	243	160	139	73	74	47	45	
31					243		139	71		43		
Mean				74.2	160	212	141	86.5	86.3	63.3	45.8	
Run-off acre-feet				2210	9840	12600	8670	5320	5140	3890	2730	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork South Platte River at South Platte for 1913. Drainage Area, 450 Square Miles. Altitude, 6,097 Feet Above Sea Level.

Day	Jan.	Feb.	Mar	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				76	343	424	274	171	150	180	90	46
2				93	343	343	274	171	150	230	90	54
3				61	274	343	244	150	171	188	107	54
4				35	217	343	244	150	171	188	90	54
5				61	307	307	217	171	193	146	90	93
6				76	343	307	217	150	193	146	107	130
7				76	382	343	193	150	171	146	107	130
8				61	343	424	217	130	217	126	107	93
9				61	274	517	217	111	244	126	107	76
10				47	382	517	193	150	193	126	90	68
11				76	424	620	193	217	171	126	90	54
12				76	424	469	171	193	274	126	90	54
13	36			93	675	424	150	193	193	126	90	54
14				111	382	382	150	193	150	116	90	68
15				171	274	424	193	171	191	107	90	68
16				171	244	382	193	150	212	107	90	68
17				193	274	382	424	150	186	107	90	68
18				193	382	424	274	171	184	107	90	54
19				150	382	424	382	171	160	107	90	68
20				193	343	424	307	171	158	90	90	54
21				217	307	424	382	171	136	126	90	54
22				193	343	382	307	150	134	126	59	54
23				171	343	382	382	150	132	107	36	54
24				111	382	382	343	150	150	107	36	68
25			37	171	424	343	244	193	148	107	90	84
26				150	469	343	217	171	146	107	74	84
27				171	517	307	217	171	144	107	90	76
28				244	469	307	193	150	130	126	90	68
29				343	469	343	193	150	125	59	90	68
30				343	517	307	171	150	125	107	36	68
31					469		171	171		90		76
Mean				140	378	391	243	163	170	125	85.9	69.8
Run-off acre-feet				8330	23200	23300	14900	10000	10100	7690	5110	4290

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork South Platte River at South Platte for 1914.

Drainage Area, 450 Square Miles. Altitude, 6,097 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	78	67	50	175	530	1700	510	820	273	131	120	
2	78	67	55	199	552	1780	530	820	258	120	120	
3	67	67	60	264	575	1460	510	1120	243	120	120	
4	46	67	60	308	595	1380	510	1000	229	120	120	
5	56	67	65	358	670	1220	552	940	202	120	120	
6	67	56	70	410	690	1080	490	880	202	131	120	
7	67	56	70	410	715	1010	450	820	202	120	100	
8	56	67	76	340	820	880	430	710	189	120	100	
9	67	72	61	308	880	792	410	660	189	120	100	
10	56	91	68	340	1080	850	392	660	177	120	92	
11	56	78	42	340	1150	880	375	565	177	120	120	
12	56	56	36	358	978	945	358	520	165	120	110	
13	56	67	48	392	880	945	410	480	165	131	100	
14	67	67	61	392	820	945	430	440	202	131	100	
15	78	67	76	410	792	1010	430	440	177	142	92	
16	104	67	111	430	880	978	450	422	165	131	83	
17	84	78	111	490	880	880	450	405	165	120	68	
18	78	84	111	430	945	820	470	422	165	110	54	
19	72	67	102	375	1010	792	410	405	154	110	54	
20	67	91	93	490	1150	765	392	388	154	100	54	
21	67	91	48	552	1220	740	358	388	154	100	54	
22	84	62	61	530	1620	715	490	370	142	110	54	
23	91	56	93	450	1860	665	575	370	142	177	54	
24	78	52	102	510	1620	620	450	352	142	120	42	
25	72	51	111	510	1380	575	470	388	142	131	42	
26	84	46	111	510	1300	530	450	388	131	142	42	
27	72	44	131	510	1380	510	430	370	131	131	42	
28	67	46	131	510	1460	490	610	319	131	120	54	
29	62		131	490	1460	470	660	319	142	110	100	
30	56		131	510	1460	490	660	288	142	120	100	
31	67		153		1620		1000	303		110		
Mean	69.6	66.0	84.8	410	1060	897	488	541	176	123	84.4	
Run-off acre-feet	4280	3660	5210	24400	65200	53400	30000	33300	10500	7560	5020	

Unless otherwise noted, all discharges are in cubic feet per second.

GENEVA CREEK AT GRANT.

Location.—In the Pike National Forest, at highway bridge in sec. 9, T. 7 S., R. 74 W., at Grant postoffice; 300 feet above mouth of creek.

Records Available.—November 3, 1911, to November 30, 1914.

Drainage Area.—74 square miles.

Gage.—Vertical staff.

Channel.—Somewhat shifting during high water.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions above this station.

Accuracy.—Results are considered good.

Co-operation.—Station maintained in co-operation with the United States Forest Service and the United States Geological Survey.

DISCHARGE MEASUREMENTS ON GENEVA CREEK AT GRANT.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 16	Robert Follansbee	1.15	28	Jan. 10*	Follansbee & Bunger	2.02	15
May 22	R. H. Fletcher	1.71	123	Feb. 4*	M. E. Bunger	1.40	15
June 17	R. H. Fletcher	1.80	143	May 7	Robert Follansbee	1.26	41
Aug. 8	R. H. Fletcher	1.40	62	July 6	D. L. Bundy	2.00	203
Sept. 27	Robert Follansbee	1.39	56	Aug. 20	Robert Follansbee	1.75	103
Sept. 28	Robert Follansbee	1.30	48	Oct. 3	Robert Follansbee	1.34	37
Dec. 4*	R. H. Fletcher	1.22	18				
Dec. 30*	R. H. Fletcher	.90	16				

*Ice conditions.

SCOTT GOMER CREEK * NEAR GRANT.

Location.—Near Sullivan's ranch, in sec. 19, T. 6 S., R. 74 W., in the Pike National Forest, about 5 miles above Grant, one-fourth mile above mouth of creek. No tributary enters between mouth and station.

Records Available.—Fragmentary records August 16, 1909, to November 21, 1913.

Drainage Area.—21 square miles.

* Also called East Geneva Creek.

Gage.—Vertical staff, moved to its present location, 2¾ miles below original site, September 4, 1909. Datum unchanged in new location, but has no determined relation to datum of original gage.

Channel.—Slightly shifting.

Discharge Measurements.—Made by wading.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions above this station, and therefore the records probably represent the natural run-off.

Accuracy.—Conditions are favorable for fairly accurate results and the estimates of flow should be reliable.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SCOTT GOMER CREEK AT GRANT.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
June 17	R. H. Fletcher	1.28	26
Aug. 8	R. H. Fletcher	1.03	17
Sept. 27	Robert Follansbee	1.29	28

BEAR CREEK AT MOUTH.

Location.—At Sheridan Junction station on the South Park branch of the Colorado & Southern R. R.

Records Available.—April 1 to November 30, 1914, and miscellaneous measurements.

Gage.—Vertical staff.

Channel.—Shifting.

Diversions.—Below all diversions on the stream.

Accuracy.—Owing to the extreme high water in 1914 and the shifting character of the channel, records can not be considered better than fair.

DISCHARGE MEASUREMENTS ON BEAR CREEK AT MOUTH.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Mch. 31	Grieve & Bundy	2.22	83
Apr. 6	Grieve & Bundy	3.55	260
Apr. 19	Thos. Grieve, Jr.	4.40	362
May 7	C. C. Hezmalhalch	4.50	592
June 10	C. C. Hezmalhalch	2.30	148
July 6	C. C. Hezmalhalch	0.42	38.8
Aug. 20	Thos. Grieve, Jr.	0.60	67.3
Oct. 8	D. L. Bundy	0.15	19.0

Discharge of Geneva Creek at Grant for 1913.
Drainage Area, 74 Square Miles. Altitude, 8,566 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				18	105	188	125	92	54	75	28	22
2				18	109	165	113	92	61	84	27	22
3				16	66	165	113	84	78	66	30	19
4				14	63	145	111	84	66	60	30	18
5				14	96	151	109	84	73	61	30	20
6				15	113	173	98	78	76	56	25	20
7				15	125	188	98	73	73	40	28	19
8				16	145	214	109	64	88	39	30	18
9				16	135	210	138	63	80	42	27	17
10				16	145	229	105	78	86	43	30	17
11				16	140	214	92	98	86	44	26	16
12				22	188	151	88	96	84	40	25	16
13				28	240	179	78	76	71	50	25	14
14				34	138	138	73	70	63	46	22	12
15				40	122	182	102	70	82	44	30	12
16				46	105	182	140	70	92	38	39	14
17				39	165	182	140	70	64	32	28	14
18				29	165	210	153	70	64	35	23	16
19				30	138	173	167	61	58	39	25	16
20				37	120	173	159	66	49	40	25	16
21				38	120	182	159	66	48	37	25	16
22				46	140	188	159	56	49	43	27	16
23				26	210	165	170	56	49	36	37	16
24				22	173	165	159	58	58	38	37	16
25				22	173	153	145	50	54	42	33	16
26				30	240	159	138	49	49	37	31	15
27				46	203	145	132	58	54	43	33	15
28				66	188	159	102	56	60	33	27	15
29				78	240	145	94	56	60	30	26	15
30				102	188	120	92	58	58	36	35	15
31					214		90	58		30		15
Mean				31.8	152	173	121	69.7	66.2	44.5	28.8	16.4
Run-off acre-feet				1890	9350	10300	7440	4290	3940	2740	1710	1010

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Geneva Creek at Grant for 1914.
Drainage Area, 74 Square Miles. Altitude, 8,566 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	15	16	14	17	26	1140	302	425	88	34	30	
2	15	15	13	15	31	1060	325	670	74	36	27	
3	15	15	13	22	113	855	260	715	76	37	29	
4	15	15	18	20	66	960	280	510	78	37	24	
5	14	15	17	30	66	785	260	410	78	31	22	
6	14	14	17	19	60	648	302	355	81	38	22	
7	15	14	17	25	82	615	280	285	60	35	21	
8	15	14	20	25	58	582	260	300	61	36	20	
9	15	15	17	22	203	460	260	295	78	36	21	
10	15	17	17	32	222	582	280	275	53	35	19	
11	15	17	17	25	240	648	325	260	57	35	19	
12	15	19	17	25	222	715	302	180	58	33	21	
13	16	17	13	28	222	680	350	158	58	37	21	
14	17	15	17	66	203	648	375	155	57	45	21	
15	18	17	17	49	222	715	402	165	76	32	18	
16	19	18	15	50	240	582	402	122	83	36	27	
17	19	18	13	45	280	582	325	122	60	33	12	
18	19	18	17	30	350	582	402	117	55	33	19	
19	17	19	22	40	430	582	325	120	45	32	19	
20	17	18	12	50	520	582	260	120	55	32	19	
21	17	18	14	45	582	582	280	120	46	30	19	
22	17	16	17	105	995	582	325	158	48	33	26	
23	17	17	19	109	925	582	302	104	52	34	26	
24	17	18	14	102	820	582	302	97	52	37	28	
25	17	19	22	92	820	648	302	126	52	36	24	
26	17	16	15	66	680	430	302	128	53	36	23	
27	17	15	17	33	785	302	350	92	52	38	22	
28	17	16	20	33	715	302	260	101	35	29	24	
29	18		19	39	715	280	680	115	44	29	23	
30	17		18	36	855	302	490	104	34	29	27	
31	15		15		960		785	88		29		
Mean	16.3	16.5	16.5	43.2	410	620	344	226	60	34.3	22.4	
Run-off acre-feet	1000	916	1010	2570	25200	36900	21200	13900	3570	2110	1330	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Scott Gomer Creek near Grant for 1913.
Drainage Area, 21 Square Miles.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1									16		12	
2												
3										23		
4						30						
5								16				
6												
7						25						
8						42		18		18	16	
9												
10					30		23					
11				3		39						
12									36		7.2	
13					46							
14								21				
15												
16				3.5								
17						28				18		
18									25			
19							42					
20								18				
21				4.2				16			8	
22					54				25			
23						19						
24							39					
25												
26												
27									25			
28				6.5			39					
29								16				
30						30						
31					95							
Mean												
Run-off acre-feet												

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Bear Creek at Mouth for 1914.
Altitude, 5,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				88	725	442	33	630	30	20	52	
2				102	695	442	42	642	30	20	46	
3				140	650	406	40	699	16	20	40	
4				153	650	383	39	676	12	25	46	
5				249	620	328	47	530	12	25	52	
6				242	592	296	40	486	12	20	52	
7				230	593	266	30	432	12	20	52	
8				308	606	224	12	400	6	20	66	
9				185	632	173	12	390	6	20	66	
10				211	632	155	6	350	6	20	59	
11				218	646	126	6	300	6	20	59	
12				204	646	107	6	243	6	20	66	
13				218	567	98	15	206	10	20	66	
14				282	466	116	30	187	16	20	66	
15				371	478	224	40	161	25	20	66	
16				410	528	350	40	128	20	20	59	
17				429	504	201	40	88	20	12	59	
18				429	567	167	96	80	20	12	59	
19				422	554	137	80	73	20	12	59	
20				445	567	116	73	66	20	12	59	
21				482	541	91	66	73	25	12	59	
22				487	580	72	104	88	25	12	52	
23				520	593	56	300	80	20	112	52	
24				520	593	49	187	66	20	104	52	
25				530	567	44	170	52	20	88	40	
26				545	541	42	144	52	20	88	40	
27				575	504	40	136	52	20	96	40	
28				645	491	38	178	59	20	80	40	
29				660	478	35	400	46	20	66	52	
30				695	454	34	370	40	25	66	52	
31					442		464	35		66		
Mean				366	571	175	105	23.9	17.3	37.7	54.3	
Run-off acre-feet				21800	35100	10400	6460	14700	1030	2320	3230	

Unless otherwise noted, all discharges are in cubic feet per second.

CLEAR CREEK NEAR GOLDEN.

Location.—About 2 miles above Golden, in sec. 6, T. 4 S., R. 70 W., and a short distance below the headgate of the Golden ditch. The only tributary of importance between the station and the mouth is Ralston Creek, which enters about 12 miles below.

Records Available.—December 4, 1908, to December 31, 1909; June 8 to September 24, 1911; January 1 to November 30, 1914.

Drainage Area.—Approximately 380 square miles.

Gage.—Automatic recording gage, whose datum has remained unchanged.

Channel.—Slightly shifting.

Discharge Measurements.—Made from car and cable located near the gage.

Winter Flow.—Ice causes backwater during the winter months, but discharge measurements are made to determine the approximate winter flow.

Diversions.—Between Forks creek and the station near Golden there is a court decree for a diversion of 26 second-feet by the Golden ditch.

Accuracy.—Conditions are favorable for accurate results, and the records should be reliable.

Co-operation.—Station maintained by the United States Geological Survey in co-operation with the Denver Reservoir Irrigation Co. Records were furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON CLEAR CREEK NEAR GOLDEN.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 15*	R. H. Fletcher		52.6
Feb. 29*	R. H. Fletcher		47.4
Mar. 8	R. H. Fletcher	1.10	50.4
July 11	R. H. Fletcher	2.42	391
Aug. 13	R. H. Fletcher	2.10	289
Oct. 21	Thos. Grieve, Jr.	1.63	125
Nov. 4	R. H. Fletcher	1.60	149
Dec. 27*	R. H. Fletcher		75.8

Date 1914	Hydrographer	Gage Ht. Feet	Discharg Sec. Ft.
Jan. 17	M. E. Bunger	1.40	105
Feb. 10*	M. E. Bunger	2.20	58
Feb. 21	M. E. Bunger	1.28	75
Mch. 26	R. H. Fletcher	1.30	95
Apr. 21	Thos. Grieve, Jr.	2.15	288
May 11	R. H. Fletcher	3.60	1040
Aug. 19	R. H. Fletcher	2.19	348
Sept. 30	R. H. Fletcher	1.38	124
Oct. 9	D. L. Bundy	1.35	96
Nov. 24	R. H. Fletcher	0.94	53

*Ice conditions.

CLEAR CREEK NEAR MOUTH.

Location.—At pile highway bridge seven miles from Denver and one-half mile above mouth.

Records Available.—April 1, 1914, to November 30, 1914.

Gage.—Standard chain gage.

Discharge Measurements.—From bridge at high water, wading at low stages.

Diversions.—Below all diversions on the stream.

Accuracy.—Channel is extremely shifting and results are poor. After July 14, gages on two channels were used. The results are the combination of the two channels.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Mch. 31	Thos. Grieve, Jr.	1.20	42.8
May 6	C. C. Hezhalmalch	2.80	632
June 24	C. C. Hezmalhalch	2.62	611
	CHANNEL NO. 1		
July 14	Thos. Grieve, Jr.	1.95	107
Aug. 12	D. L. Bundy	1.20	40.7
Sept. 3	Thos. Grieve, Jr.	.50	0.5
Oct. 16	D. L. Bundy	0.50	0.5
	CHANNEL NO. 2		
July 14	Thos. Grieve, Jr.	1.40	104
Aug. 12	D. L. Bundy	0.95	58.4
Sept. 3	Thos. Grieve, Jr.	0.55	20.9
Oct. 16	D. L. Bundy	0.60	17.9

BOULDER CREEK AT ORODELL.

Location.—At Orodell station in sec. 27, T. 1 N., R. 71 W.; just above mouth of Fourmile Creek.

Records Available.—March 18, 1907, to November 26, 1914. From May 14, 1895, to December 20, 1909, a station was maintained about 1 mile below the present site, chiefly by the State engineer. The records at the two points are not directly comparable, as some water is diverted for irrigation between.

Drainage Area.—108 square miles.

Gage.—Automatic recording gage installed by the Colorado Power Co.

Channel.—Shifts in extreme high water.

Discharge Measurements.—Made from car and cable.

Winter Flow.—Ice causes backwater during the winter months and during that period discharge measurements are made to determine the flow.

Diversions.—There are no diversions from Boulder Creek above the station, but there are court decrees for diversions of 165 second-feet from tributaries entering above. Below the station there are decrees for diversions of 2,871 second-feet from Boulder Creek.

Co-operation.—Station maintained in co-operation with the Colorado Power Co.

DISCHARGE MEASUREMENTS ON BOULDER CREEK AT ORODELL.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 30	M. E. Bunger	2.05	40
Feb. 27	M. E. Bunger	1.80	17
Mar. 19	M. E. Bunger	1.88	22
May 13	M. E. Bunger	2.28	61
July 8	M. E. Bunger	2.82	153
Oct. 22	D. L. Bundy	2.60	115

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 23	D. L. Bundy & Thos. Grieve	2.70	124
May 12	D. L. Bundy	2.95	196
June 16	Thos. Grieve, Jr.	3.60	670
July 10	D. L. Bundy	3.00	366
Aug. 25	Thos. Grieve, Jr.	2.20	129

Discharge of Clear Creek near Golden for 1913.
Drainage Area, 380 Square Miles. Altitude, 5,620 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			50	74	241	882	520	368	215	294	157	
2			50	80	234	810	520	330	215	294	144	
3			50	60	213	742	472	294	215	277	144	
4			50	40	204	698	450	294	220	260	157	
5			50	55	228	656	450	312	220	254	162	
6			50	60	267	692	450	330	220	244	167	
7			50	60	316	639	450	312	220	198	173	
8			52	56	316	595	450	294		194	157	
9			52	52	316	590	429	238		190	144	
10			52	50	316	622	429	260		187	120	
11			52	55	380	742	408	330		184	149	
12			52	60	450	662	388	330		180	152	
13			52	65	505	622	330	312		177	149	
14			52	70	446	595	349	294		173	154	
15	53		52	80	372	644	408	277		170	149	
16			52	85	330	686	472	260		170	132	
17			52	120	360	680	570	257		157	132	
18			52	125	380	845	595	260		157	149	
19			52	116	416	845	595	244	234	157	144	
20			52	139	421	810	520	234	254	157	144	
21			52	184	384	775	595	238	260	157	152	
22			52	173	360	710	595	234	250	163	102	
23			52	144	408	710	595	216	241	166	89	
24		47	52	125	505	650	680	247	228	170	100	
25			52	139	585	606	570	219	213	170	127	
26			47	125	845	570	520	210	222	132	116	
27			56	137	960	595	495	213	222	157	98	70
28			65	162	698	742	450	213	210	144	98	
29			62	190	742	742	450	213	213	98	144	
30			60	225	920	600	408	213	213	144	72	
31			68		845		388	213		157		
Mean			53	104	450	692	484	266	226	185	136	
Run-off acre-feet			3260	6190	27700	41200	29800	16400	8520	11400	8090	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Clear Creek near Golden for 1914.
Drainage Area, 380 Square Miles. Altitude, 5,620 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				86	403	2900	990	760	247	116	116	
2				103	431	2780	955	852	278	107	111	
3				106	439	2600	955	820	192	107	113	
4				109	473	2420	990	732	218	107	107	
5				112	486	2160	1020	679	192	116	97	
6				115	500	1850	955	603	192	116	88	
7				118	509	1650	885	555	157	116	87	
8				121	576	1510	852	532	192	116	82	
9				124	665	1300	820	509	192	126	82	
10		58		126	950	1420	820	465	218	116	82	
11				136	985	1600	820	423	168	116	78	
12				162	880	1650	790	423	168	107	80	
13				172	720	1900	760	383	168	116	80	
14				177	690	2000	760	364	146	116	69	
15				174	720	2050	705	328	192	116	53	
16				198	810	1600	679	328	192	116	53	
17	105			291	915	1700	760	328	168	107	54	
18				277	1060	1850	820	311	168	107	53	
19				264	985	1850	705	311	146	107	53	
20				280	1100	1750	653	328	146	113	53	
21		75		312	1300	1700	653	346	157	120	53	
22				333	1680	1510	790	364	157	126	53	
23				330	1950	1420	790	328	157	133	53	
24				328	1950	1420	653	311	146	140	53	
25				325	1900	1300	593	278	136	146	53	
26			92	322	1840	1140	569	278	126	146	53	
27			90	326	1900	1020	603	294	126	146	53	
28			85	330	1950	1140	603	278	116	136	53	
29			85	350	1950	1060	603	278	116	136	53	
30			76	375	1780	1060	643	294	116	136	53	
31			83		2300		885	278		136		
Mean			85.2	219	1120	1710	777	431	170	121	70.7	
Run-off acre-feet			1010	13000	68900	102000	47800	26500	10100	7440	4210	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Clear Creek at Mouth for 1914. Altitude, 5,110 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				330	822	1210	78	379	56	18	30	
2				390	894	1260	115	362	40	18	30	
3				240	858	1170	90	394	18	26	20	
4				270	822	1000	78	343	14	18	20	
5				285	822	1040	102	334	10	18	30	
6				484	822	930	142	289	8	27	25	
7				601	822	788	210	208	8	18	20	
8				652	894	720	255	180	8	18	20	
9				618	930	686	155	162	8	18	20	
10				584	1000	652	102	152	4	18	19	
11				601	1070	720	285	124	4	18	19	
12				517	966	720	360	120	4	18	19	
13				390	894	805	452	74	4	18	19	
14				652	788	788	550	36	4	22	19	
15				584	652	966	206	36	4	18	29	
16				584	788	858	192	36	10	18	39	
17				720	930	858	237	36	14	18	69	
18				788	1000	858	310	36	18	18	78	
19				720	966	894	266	46	26	18	133	
20				652	930	894	190	36	14	18	162	
21				686	858	930	147	30	14	18	171	
22				686	1000	858	199	36	10	18	89	
23				754	1000	788	339	36	10	218	30	
24				686	1000	720	195	36	8	203	30	
25				686	1000	618	254	36	8	132	30	
26				652	1000	517	199	36	8	123	25	
27				788	1040	452	184	36	8	65	20	
28				720	1000	300	180	36	10	35	20	
29				720	1000	155	189	26	14	30	20	
30				720	1040	102	250	30	14	30	20	
31					1110		394	30		30		
Mean				592	926	775	223	121	12.7	37.4	42.5	
Run-off acre-feet				35200	56900	46100	13700	7440	756	2300	2530	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Boulder Creek at Orodell near Boulder for 1913. Drainage Area, 108 Square Miles. Altitude, 5,723 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	20	27		27	51	328	157	117	40	51	40	45
2	45	28	17	27	51	308	147	112	57	51	38	45
3	12	29	27	37	51	308	147	107	51	51	36	51
4		30	32	47	45	308	147	102	84	51	45	45
5		31	32	57	57	308	147	97	92	51	51	36
6		33	27	57	64	287	157	92	92	84	51	40
7		34	32	64	70	231	170	87	84	57	51	40
8		36	24	70	77	231	157	82	117	64	39	40
9		38	19	64	77	214	137	77	108	57	27	40
10		40	14	64	70	231	137	77	108	51	40	51
11		40	36	70	70	268	147	84	106	36	45	64
12		36	32	77	70	268	108	64	103	45	40	70
13		40	32	64	70	268	108	64	100	57	40	70
14		40	45	84	64	248	108	70	70	40	40	67
15		40	32	84	57	214	137	64	64	40	40	64
16		20	30	70	51	231	117	64	57	40	39	70
17		32	27	57	57	199	127	51	51	40	39	64
18	36	32	36	57	64	214	137	64	51	40	39	57
19		40	14	45	64	231	137	51	45	40	38	57
20	17	40	17	51	64	231	147	51	40	64	38	45
21	32	32	15	64	64	231	170	77	64	64	36	64
22	32	29	14	57	70	248	184	40	51	57	36	70
23	32	26	12	51	70	268	170	51	51	53	36	70
24	36	20	17	51	77	248	157	51	45	49	36	70
25	20	45	8	51	77	231	157	51	40	44	36	64
26	24	36		51	92	199	147	70	64	40	35	64
27	27	32	51	51	137	199	137	57	51	57	33	45
28	36	40	40	51	157	199	157	64	51	51	32	42
29	36		27	51	214	170	127	45	51	48	32	40
30	36		32	51	170	170	127	36	51	45	24	38
31	36		32		214		127	36		42		36
Mean	29.8	33.8	26.7	56.7	83.4	243	143	69.5	68	50.3	38.4	53.7
Run-off acre-feet	*1830	1880	*1640	3370	5130	14500	8790	4270	4050	3090	2280	3300

Unless otherwise noted, all discharges are in cubic feet per second. *Figures for entire month.

Discharge of Boulder Creek at Orodell for 1914.

Drainage Area, 108 Square Miles. Altitude, 5,723 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	47	42		32	156		345	270	79			
2	47	58		37	156		305	270				
3	47	77		32	156		286	238			39	
4	47	58		52	169		305	195			39	
5	52		52	77	182		345	182		58	39	
6	52		42	91	169		324	170		46	39	
7	52		28	84	169		305	159	73	50	39	
8	52		18	77	182		286	148		50		
9	58		28	70	196		286	138		50		
10	42	37	37	84	196		286	170		63		
11	20	42	28	70	196		286	138				
12	47	42	37	64	182		286	138		42	46	
13	47	42	42	58	156		286	128	79	46		
14	20	42	32	58	134		286	128		39		
15	20		24	77	125		253	120		39		
16	47		32	91		670	223	120	68	39		
17	47		37	98			238	112	58	39		
18	37		28	77			253	112				
19	58		28	84			270	105	73	36		
20	58		24	91			253	98	68	36	58	
21	58		24	116		640	253	98	73	36		
22	58	15	24	125		584	270	98	79	39		
23	58	37	20	145		558	253	98			63	
24	58	37	20	145	394		253	105			63	
25	52	37	20	134	530		223	98			63	
26	70	42	20	134	530		209	85		50	63	
27	58	37	20	156	595	366	238	92		46		
28	52	32	20	156	702	345	195	85		54		
29	58		20	134	630	345	209	92				
30	52		28	156	562	345	270	79				
31	58		28				270	73				
Mean	49.3	42.3	28.2	93.5	294	482	269	134	72.2	45.2	50.1	
Run-off acre-feet	3030	*2350	*1730	5560	12800	7640	16500	8240	*4300	*2780	*2980	

Unless otherwise noted, all discharges are in cubic feet per second. *Acre feet figured for full month.

Note: Gage removed June 1 on account of flood and not replaced until June 16.

SOUTH BOULDER CREEK NEAR ROLLINSVILLE.

Location.—At highway bridge in sec. 35, T. 1 S., R. 73 W., 1 mile west of Rollinsville, in the Pike National Forest. The nearest important tributary, Jennie Creek, enters 3 miles above.

Records Available.—September 10, 1910, to November 30, 1914.

Drainage Area.—39 square miles.

Gage.—Vertical staff.

Channel.—Fairly permanent.

Discharge Measurements.—Made from bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater during the winter months.

Diversions.—There are no court decrees for diversions above the station, and therefore it is probable that the records represent the natural run-off.

Accuracy.—Conditions are favorable for fairly accurate results and the estimates of discharge should be reliable.

Co-operation.—Station is maintained by the United States Geological Survey in co-operation with the United States Forest Service. Records furnished by the United States Geological Survey.

DISCHARGE MEASUREMENTS ON SOUTH BOULDER CREEK NEAR ROLLINSVILLE.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 15	R. H. Fletcher	1.90	145	Jan. 26*	R. H. Fletcher	0.98	9.0
July 4	R. H. Fletcher	1.60	65	Mar. 4	R. H. Fletcher	0.93	10.
				May 12	R. H. Fletcher	2.20	176.
				May 13	R. H. Fletcher	2.05	152.
				Aug. 28	Robert Follansbee	1.22	30.

*Ice conditions.

SOUTH BOULDER CREEK AT ELDORADO SPRINGS.

Location.—At the mouth of the canyon at Eldorado Springs, in sec. 30, T. 1 S., R. 70 W., 3 miles southwest of Marshall. No important tributaries within several miles.

Records Available.—May 15, 1895, to September 30, 1901; July 1, 1904, to November 30, 1914.

Drainage Area.—125 square miles.

Gage.—Vertical staff; datum unchanged.

Channel.—Fairly permanent.

Discharge Measurements.—Made by wading.

Winter Flow.—Ice causes backwater during the winter months, and measurements are made to determine the flow.

Diversions.—There are court decrees for diversions of 137 second-feet above the station and 1,658 second-feet below. There are also a number of flood-water decrees.

DISCHARGE MEASUREMENTS ON SOUTH BOULDER CREEK AT ELDORADO SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 14	M. E. Bunger	1.75	75	June 16	Thos. Grieve, Jr.	2.70	238
July 8	M. E. Bunger	1.75	77.4	July 9	D. L. Bundy	2.25	176
Oct. 24	D. L. Bundy	1.40	21.3				

ST. VRAIN CREEK AT LYONS.

Location.—Three-fourths of a mile below Lyons, in sec. 17, T. 3 N., R. 70 W., one fourth mile below the junction of North and South St. Vrain creeks and just below Stone Canyon.

Records Available.—August 1, 1887, to October 31, 1890; June 13, 1895, to October 31, 1903; July 1, 1904, to November 30, 1914.

Drainage Area.—209 square miles.

Gage.—Inclined staff gage installed August 9, 1909, at practically the same datum as the inclined staff gage used from 1895 to 1903. It is not known whether the gage used prior to 1895 was located at the present site.

Channel.—Permanent.

Discharge Measurements.—Made from car and cable.

Winter Flow.—Ice causes backwater during a portion of the winter months.

Diversions.—There are court decrees for the diversion of 166 second-feet from the St. Vrain and tributaries above the station. Below there are court decrees for 1,632 second-feet from St. Vrain Creek and flood-water diversions of 190,000 acre-feet.

Co-operation.—During 1913 and 1914 the station was maintained in co-operation with the Great Western Sugar Co.

DISCHARGE MEASUREMENTS ON ST. VRAIN CREEK AT LYONS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 30	M. E. Bunger	1.65	12	Apr. 2	Bundy & Grieve	2.35	128
Feb. 27	M. E. Bunger	1.85	21	May 9	D. L. Bundy	3.45	511
Mar. 20	M. E. Bunger	2.00	22	June 5	Thos. Grieve, Jr.	4.02	923
May 13	M. E. Bunger	3.35	385	July 26	Thos. Grieve, Jr.	2.72	220
July 7	M. E. Bunger	2.90	198	Aug. 25	Thos. Grieve, Jr.	2.28	112
Oct. 18	D. L. Bundy	2.10	82	Oct. 28	C. C. Hezmalhalch	2.15	82.8

Discharge of South Boulder Creek near Rollinsville, Colorado. for 1913.

Drainage Area, 39 Square Miles. Altitude, 8,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					113	283	115	38	24	35	30	
2					113	271	115	37	29	37	28	
3					113	260	85	36	35	39	27	
4					122	248	92	35	40	41	30	
5					131	248	100	35	45	43	32	
6					140	239	85	35	58	45	35	
7					131	231	85	33	71	57	35	
8					122	222	80	27	85	54	35	
9					149	214	75	27	57	51	35	
10					144	205	70	27	51	48	35	
11					140	248	57	30	45	45	35	
12					175	226	57	32	40	48	35	
13					179	205	63	35	35	51	33	
14					160	202	68	27	31	44	31	
15					141	199	74	24	31	38	35	
16					145	196	79	27	29	31	31	
17					158	193	85	27	28	27	28	
18					172	190	85	27	27	20	24	
19					185	183	85	24	29	25	24	
20					145	177	65	22	30	30	24	
21					155	170	45	20	32	35	24	
22					165	160	58	20	33	35	24	
23					175	150	71	20	35	35	24	
24					185	140	85	20	35	35	24	
25					185	134	64	20	35	35	24	
26					271	128	59	20	35	35	24	
27					295	122	54	20	35	35	23	
28				110	295	122	50	20	35	35	21	
29					295	130	45	20	35	34	20	
30					295	122	40	17	35	32	20	
31					295		40	19		31		
Mean					177	194	72	26.5	38.8	38.3	28.3	
Run-off acre-feet					10900	11500	4430	1630	2310	2360	1680	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Boulder Creek near Rollinsville for 1914. Drainage Area, 39 Square Miles. Altitude, 8,500 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				25	62	b505	226	101	33		23	
2				27	60	b542	237	97	31		20	
3				34	74	498	228	93	29		20	
4			10	40	88	455	220	85	27		18	
5				37	98	405	212	78	24		15	
6				34	81	392	203	71	22		12	
7				31	64	392	195	64	20		12	
8				37	93	355	175	57	17		13	
9				32	171	318	165	24	15		13	
10				27	172	306	237	45	14		14	
11				31	174	282	205	51	13		14	
12				27	175	330	172	55	12		13	
13				29	146	380	140	57	16		16	
14				55	165	380	138	51	20		20	
15				60	180	380	137	48	20		18	
16				64	195	374	136	44	17		16	
17				55	227	368	146	40	10		14	
18				60	259	355	132	45	12		14	
19				64	355	405	114	42	14		13	
20				62	259	380	93	39	16		13	
21				64	455	355	93	36	19		13	
22				60	430	330	78	33	19		12	
23				67	424	306	94	31	19		12	
24				57	418	330	110	30	19		12	
25				93	411	306	104	29	19		12	
26	10			78	405	282	110	32	19	20	12	
27				64	430	248	116	35	16	26	13	
28				64	455	248	122	29	13	31	13	
29				64	405	248	128	30	14	33	12	
30				64	442	237	134	31	14	26	12	
31					450		140	32		26		
Mean	10.0	10.0	12.0	50.2	252	356	153	49.5	18.4	27.0	14.5	
Run-off acre-feet	615	555	738	2990	15500	21200	9410	3040	1090	321	863	

Unless otherwise noted, all discharges are in cubic feet per second.

b Dam burst above station.

Discharge of South Boulder Creek at Eldorado Springs for 1913. Drainage Area, 125 Square Miles. Altitude, 5,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				43	127	254	105	33	25	55	39	17
2				43	127	237	95	33	19	55	3[illegible]	17
3				25	116	237	85	33	29	43	33	17
4				25	155	237	85	38	22	55	26	17
5				25	124	207	85	43	22	49	27	17
6				33	128	207	85	43	19	43	23	15.5
7				33	135	179	77	33	19	33	27	15
8				25	165	179	77	29	43	38	19	15
9				22	187	193	69	25	69	43	30	15
10				19	155	207	69	33	55	33	23	21
11				33	185	237	69	33	43	29	21.5	
12				33	194	222	55	33	33	43	24	
13				43	229	193	55	29	25	43	19	
14				55	207	152	55	29	33	43	22.5	
15				69	164	166	69	25	38	38	19	
16				69	143	166	69	25	38	33	17	
17				77	144	166	85	25	43	33	23	
18				69	139	179	85	25	33	33	23	
19				69	153	179	69	25	33	33	19	
20				85	180	179	69	22	33	38	19	
21				85	105	179	85	22	29	38	18	
22				95	105	166	69	22	25	43	19	
23				85	127	166	85	19	29	22	19	
24				77	152	166	85	19	33	25	19	
25				69	166	140	69	22	33	29	25	
26				69	193	127	69	19	33	21	25	
27				77	237	127	69	19	33	21.5	22	
28				85	237	127	55	19	29	28	33	
29				105	270	127	55	19	33	29	16.5	
30				105	270	105	43	19	33	29	17	
31					254		43	19		33		
Mean				58.2	170	180	72.2	26.1	32.8	36.5	23.3	16.6
Run-off acre-feet				3460	10500	10700	4440	1600	1950	2240	1390	329

Unless otherwise noted, all discharges are in cubic feet per second. Note: Flow of Community Canal included.

Discharge of South Boulder Creek at Eldorado Springs for 1914. Drainage Area, 125 Square Miles. Altitude, 5,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			15.4	64.5	318	867	217	152	43	22	19	
2			15.4	67.5	315	855	205	179	43	25	9	
3			15.4	79.9	294	925	192	152	38	25	9	
4			15.4	102	312	765	194	127	33	25	9	
5			15.4	133	354	665	215	127	33	25	9	
6			15.4	151	354	570	200	105	33	25	22	
7			15.4	135	354	495	175	105	25	25	22	
8			15.4	108	450	390	177	105	33	25	22	
9			15.4	92.2	557	320	165	95	33	29	22	
10			15.4	97.2	615	330	167	105	33	29	19	
11			15.4	95.2	615	357	185	95	33	29	19	
12			15.4	102	557	356	160	85	25	29	19	
13			15.4	124	450	393	163	77	29	33	19	
14			21.3	160	400	466	267	69	33	33	19	
15			21.3	219	400	422	153	69	33	33	19	
16			33.3	263	557	329	132	62	33	33	13	
17			37.2	289	550	315	132	69	29	33	22	
18			41.1	213	605	309	152	69	29	33	25	
19			35.2	172	655	334	152	55	25	29	25	
20			33.3	197	715	319	140	55	25	29	25	
21			38.2	211	775	308	127	55	29	29	29	
22			39.2	238	920	300	179	69	33	33	25	
23			26.8	253	915	267	152	55	29	55	21	
24			31.4	222	950	252	127	55	29	33	21	
25			33.9	237	905	272	127	49	29	38	21	
26			38.8	252	750	220	127	55	25	43	21	
27			48.7	252	715	222	105	69	25	38	21	
28			49.6	252	790	210	105	55	25	33	21	
29			49.6	260	725	212	105	55	25	33	21	
30			52.6	276	664	215	105	55	25	33	23	
31			55.1		701		207	43		33		
Mean			28.6	177	588	409	162	83.0	30.5	32.4	19.7	
Run-off acre-feet			1760	10500	36200	24300	9960	5100	1820	1990	1170	

Unless otherwise noted, all discharges are in cubic feet per second. Daily estimates include flow of Community canal.

Discharge of St. Vrain Creek at Lyons for 1913. Drainage Area, 209 Square Miles. Altitude, 5,349 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					138	382	197	98	66	118	51	
2					138	382	184	98	66	118	45	
3					138	404	172	118	82	108	45	
4					138	404	184	118	82	128	35	
5					128	382	184	118	98	138	35	
6					138	382	210	118	98	118	45	
7					160	342	210	118	98	118	45	
8					160	382	210	98	220	118	45	
9				38	382	254	172	98	180	99	45	
10				38	306	288	238	98	138	83	35	
11				38	324	426	197	98	138	69	35	
12				52	324	342	160	98	138	99	35	
13				74	306	270	138	90	118	118	35	
14				98	382	254	128	90	99	108	35	
15				98	288	306	238	82	99	108	35	
16				98	224	342	197	82	118	99	35	
17				108	210	306	197	82	91	99	30	
18				128	224	342	224	82	83	99	25	
19				149	210	342	254	82	83	99	35	
20				184	184	324	184	82	83	83	25	
21				197	160	306	224	82	83	69	25	
22				184	138	270	270	74	76	69	21.5	
23				160	210	270	270	74	76	57	21.5	
24				149	224	254	306	74	83	45	21.5	
25				138	270	254	210	82	83	45	35	
26				138	270	238	160	66	83	35	35	
27				128	362	238	128	66	83	35	25	
28				128	362	238	118	66	76	35	21.5	
29				128	362	238	118	66	69	35	18	
30				138	362	210	118	52	69	35	18	
31					382		98	66		45		
Mean				118	254	312	190	88	99	85	33	
Run-off acre-feet				5150	15100	18600	11700	5410	5890	5230	1960	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of St. Vrain Creek at Lyons for 1914.

Drainage Area, 209 Square Miles. Altitude, 5,349 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			25	118	600	1190	461	486	91	45	57	
2			25	118	540	1340	436	346	118	45	45	
3			25	138	540	1190	436	327	99	45	35	
4			25	172	513	1090	436	308	99	45	40	
5			25	160	486	910	486	274	91	35	51	
6			30	149	461	750	461	242	83	40	45	
7			25	149	436	670	390	242	91	45	40	
8			30	160	486	570	346	212	83	45	45	
9			35	172	513	486	368	212	69	45	40	
10			25	160	540	540	368	212	76	45	35	
11			30	172	486	670	368	212	83	45	35	
12			35	160	461	790	346	185	83	45	35	
13			45	185	413	910	346	185	83	45	35	
14			57	185	368	1040	346	212	99	45	35	
15			69	212	308	1000	346	185	83	51	35	
16			69	291	346	830	346	185	99	51	18	
17			69	291	346	830	346	185	99	45	22	
18			83	274	368	830	346	198	83	40	18	
19			69	258	436	830	258	160	83	35	18	
20			69	242	486	910	242	138	76	35	18	
21			76	258	513	910	274	138	91	35	18	
22			76	242	600	790	390	128	83	69	18	
23			69	227	600	670	308	118	76	99	18	
24			69	242	600	600	242	118	76	83	18	
25			83	258	600	540	242	118	69	99	18	
26			83	291	600	436	212	118	57	99	18	
27			91	346	635	413	212	118	45	91	18	
28			99	436	870	436	242	118	40	91	18	
29			99	513	830	436	227	108	45	69	18	
30			99	570	830	436	670	99	45	57	18	
31			99		830		540	83		57		
Mean			58.3	238	537	768	356	192	79.9	55.5	29.4	
Run-off acre-feet			3580	14200	33000	45700	21900	11800	4750	3410	1750	

Unless otherwise noted, all discharges are in cubic feet per second.

BIG THOMPSON CREEK NEAR MOUTH.

Location.—At highway bridge four miles from Evans and about half mile above mouth.

Records Available.—April 1, 1914, to November 30, 1914.

Discharge Measurements.—From highway bridge during high stages and wading at low stages.

Diversions.—Station is below all diversions on the stream.

Accuracy.—During the extreme high water of this year, channel shifted and some water also went around the station. The results cannot be considered better than fair.

DISCHARGE MEASUREMENTS ON BIG THOMPSON NEAR MOUTH

Date 1914		Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr.	3	Bundy & Grieve	1.52	50
May	8	Thos. Grieve, Jr.	6.48	1147
July	10	C. C. Hezmalhalch	1.50	11.3
Aug.	27	Thos. Grieve, Jr.	1.45	12.6
Oct.	22	D. L. Bundy	2.00	58.0

CACHE LA POUDRE RIVER AT MOUTH OF CANON, NEAR FORT COLLINS.

Location.—In sec. 15, T. 8 N., R. 70 W., 3 miles below the intake of the Fort Collins waterworks, 12 miles above Fort Collins; half a mile above mouth of Lewstone Creek.

Records Available.—March 15, 1884, to October 15, 1901; February 3, 1910, to November 30, 1914.

Drainage Area.—1,060 square miles.

Gage.—An automatic recording gage installed November 30, 1909; datum unchanged. No information available concerning the gage used from 1884 to 1901.

Channel.—Permanent.

Discharge Measurements.—Made from car and cable.

Winter Flow.—Ice causes backwater during the winter months and measurements are made to determine the flow.

Diversions.—There is a court decree for a diversion of 57 second-feet from Cache la Poudre River between this station and the one 3 miles above, and decrees for diversions of 119 second-feet from intervening tributaries. Below the station there are decrees for diversions of 3,105 second-feet from the river. In addition, there are numerous decrees for flood-water diversions.

Co-operation.—During 1913 and 1914 the station was maintained in co-operation with the North Poudre and the Larimer and Weld Irrigation Companies.

DISCHARGE MEASUREMENTS OF CACHE LA POUDRE RIVER AT MOUTH OF CANON.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Jan. 29*	M. E. Bunger	1.6	38	May 8	D. L. Bundy	2.90	1240
Feb. 26*	M. E. Bunger	1.45	54	June 18	Thos. Grieve, Jr.	4.02	2600
Mar. 18	M. E. Bunger	1.05	57	July 22	Thos. Grieve, Jr.	2.64	933
May 12	M. E. Bunger	2.72	940	Aug. 26	Thos. Grieve, Jr.	1.68	291
June 12	M. E. Bunger	3.20	1351	Oct. 20	D. L. Bundy	1.08	82.6
July 11	M. E. Bunger	2.24	608				
Oct. 13	D. L. Bundy	1.48	205				

*Ice conditions.

CACHE LA POUDRE AT MOUTH.

Location.—About three miles below Greeley and one-half mile above mouth.

Records Available.—March 24, 1903, to October 31, 1903; July 20, 1904, to November 30, 1904; February 1, 1914, to November 30, 1914.

Discharge Measurements.—By wading at low stages and from highway bridge about one mile above at high stages.

Diversions.—Below all diversions on the stream.

Accuracy.—On account of extreme high water during 1914, and shifting channel, results cannot be considered better than fair.

DISCHARGE MEASUREMENTS ON CACHE LA POUDRE RIVER AT MOUTH.

Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 3	M. E. Bunger	1.50	66.5
Feb. 9	M. E. Bunger	2.39	115
Feb. 16	M. E. Bunger	3.16*	136
Feb. 28	M. E. Bunger	3.20	154
Mar. 23	D. L. Bundy	3.10	144
May 7	D. L. Bundy	6.78	1196
May 28	C. C. Hezmalhalch	7.38	1756
June 20	Thos. Grieve, Jr.	6.53	1102
July 10	C. C. Hezmalhalch	3.08	34.5
Aug. 6	D. L. Bundy	3.90	46.6
Aug. 27	Thos. Grieve, Jr.	3.12	39.1
Oct. 22	D. L. Bundy	3.55	125

*New gage put in.

Discharge of Big Thompson River at Mouth near Evans for 1914. Altitude, 4,652 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				50	1230	852	35	7	7	19	45	
2				50	1620	1030	19	7	7	19	45	
3				50	1620	1110	12	7	12	19	45	
4				50	1300	1090	10	7	16	27	40	
5				50	1260	971	45	7	19	40	40	
6				50	1220	881	96	7	19	35	40	
7				34	1180	808	66	6	19	27	35	
8				165	1160	681	66	6	16	27	40	
9				236	1130	489	27	6	16	27	35	
10				165	1130	227	19	7	16	27	40	
11				284	1170	227	4	7	16	27	45	
12				274	1180	152	7	7	16	27	35	
13				274	1170	160	12	7	16	45	35	
14				294	1050	325	7	7	19	45	35	
15				327	1000	723	7	7	19	40	35	
16				514	986	926	7	7	19	35	35	
17				680	956	911	6	7	19	35	35	
18				774	911	751	4	7	19	35	35	
19				720	823	597	4	7	23	35	35	
20				734	852	611	4	7	23	45	31	
21				734	911	653	4	7	27	45	27	
22				734	866	723	7	7	23	55	27	
23				748	941	569	72	10	27	66	35	
24				774	1000	227	27	10	27	84	35	
25				774	1060	135	12	7	31	66	35	
26				788	837	66	6	7	40	66	35	
27				842	653	55	7	10	45	55	50	
28				912	653	31	7	10	35	55	45	
29				926	923	23	7	7	27	55	45	
30				1010	780	19	7	7	27	55	40	
31					709		27	7		45		
Mean				467	1040	534	20.6	7.3	21.5	41.4	37.8	
Run-off acre-feet				27800	64000	31800	1270	449	1280	2550	2250	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Cache la Poudre River at Mouth of Canon for 1913. Drainage Area, 1,060 Square Miles. Altitude, 5,070 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					180	2060	660	300	235	130	145	
2					180	1720	590	300	235	162	145	
3					162	1600	590	325	255	215	145	
4					145	1600	590	145	198	255	145	
5					198	1540	590	375	198	255	145	
6					255	1360	590	400	215	235	180	
7					350	1190	520	375	180	198	115	
8					400	1190	490	375	430	162	80	
9					430	1240	490	350	375	198	90	
10					490	1240	555	350	325	162	145	
11					695	1720	625	325	300	162	198	
12				80	900	1480	520	375	278	215	115	
13				90	1040	1240	460	400	215	215	70	
14				130	945	1090	460	430	215	215	70	
15				145	730	1090	520	400	180	215	70	
16				145	660	1190	555	325	130	215	70	
17				130	660	1090	555	198	162	180	70	
18				130	730	1140	590	198	215	162	70	
19				130	945	1190	730	180	215	145	70	
20				115	900	1140	555	130	198	198	80	
21				162	810	1090	490	162	198	215	62	
22				130	695	1090	430	162	198	162	50	
23				145	855	990	555	130	115	180	40	
24				90	1240	945	695	162	90	180	50	
25				90	1420	1040	590	130	90	180	80	
26				90	1860	945	520	180	90	162	90	
27				90	2130	1040	460	162	102	198		
28				130	2060	1090	400	162	162	162		
29				162	2060	900	375	255	162	145		
30				162	2130	730	325	215	145	115		
31					2270		300	235		115		
Mean				123	920	1230	528	265	204	184	100	
Run-off acre-feet				4630	56600	73200	32500	16300	12100	11300	5160	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Cache la Poudre River at Mouth of Canon for 1914. Drainage Area, 1,060 Square Miles. Altitude, 5,070 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				35	1040	4560	990	625	430	80	70	
2				45	1190	4780	1040	590	430	70	70	
3				50	1300	4670	1040	555	400	80	70	
4				55	1240	4250	990	490	350	90	70	
5				70	1240	3960	1090	460	325	102	70	
6				80	1190	3340	1040	400	325	115	70	
7				80	1140	2780	1040	375	300	115	62	
8				70	1190	2410	945	375	278	115	62	
9				90	1300	1920	900	325	235	115	55	
10				115	1360	1990	900	300	198	90	55	
11				90	1420	2200	900	278	180	80	62	
12				90	1660	2200	810	255	162	80	62	
13				115	1860	2480	730	255	145	102	70	
14				130	1720	2780	810	255	145	102	70	
15				235	1790	2560	810	235	145	90	55	
16				325	1540	2480	770	215	162	90	55	
17				278	1420	2480	810	198	180	90	55	
18				235	1600	2410	855	198	145	90	62	
19				215	1720	2560	695	198	145	80	70	
20				235	2130	2480	770	198	145	80	70	
21				255	2560	2560	810	278	130	70	80	
22				255	2860	2200	900	350	115	80	70	
23				325	2940	1920	770	350	115	102	70	
24			35	300	3260	1660	695	300	102	115	70	
25			30	325	3340	1480	590	278	102	90	70	
26			35	350	3260	1300	555	300	102	102	80	
27			40	400	3430	1140	520	325	102	90	70	
28			32	375	4150	1300	590	350	90	80	70	
29			30	490	3780	1090	520	325	90	90	70	
30			35	730	3780	1090	730	325	90	80	62	
31			40		4150		730	430		80		
Mean			34.6	215	2150	2500	818	335	195	91.4	66.6	
Run-off acre-feet			549	12800	132000	149000	50300	20600	11600	5620	3960	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Cache la Poudre River at Mouth near Greeley for 1914.

Altitude, 4,664 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1		66	160	138		2530	35	44	35	65	120	
2		66	170	152			35	44	33	67	126	
3		66	156	152			35	48	33	72	120	
4		75	165	148			36	62	33	78	120	
5		84	170	152			37	71	33	102	120	
6		93	170	152			37	71	33	138	120	
7		102	181	175	1270		37	62	35	144	126	
8		112	187	181	1200		36	41	35	158	120	
9		115	213	220	1090	1640	35	39	34	144	120	
10		112	213	194	1060	650	35	39	35	151	126	
11		112	206	213	1200	401	35	37	33	144	132	
12		108	175	213	1340	454	33	37	35	144	126	
13		102	181	200	1640	504	33	36	41	132	126	
14		102	175	175	1600	559	33	35	36	151	120	
15		102	175	175	1310	820	33	35	41	138	110	
16		119	170	213	1090	1550	33	35	50	132	110	
17		138	165	305	990	1340	35	35	60	126	102	
18		141	160	315	870	1380	35	37	65	120	98	
19		144	141	335	706	1380	35	40	60	126	94	
20		152	138	335	517	1120	35	37	55	120	94	
21		160	134	315	634	1090	37	40	45	120	98	
22		170	138	315	1090	960	39	35	40	132	102	
23		156	144	335	1600		37	35	42	172	102	
24		134	141	357	1640		39	35	44	188	102	
25		141	144	379	1910		42	35	46	165	106	
26		152	141	346	2060		44	35	48	158	106	
27		148	141	357	1510		41	35	52	158	102	
28		148	144	379	1770		39	35	57	144	102	
29			141	401	2340	39	38	36	58	138	102	
30			141	413	2670	35	37	35	60	132	102	
31			138		2440		39	35		126		
Mean		119	162	258	1420	968	36.4	41.2	43.6	132	112	
Run-off acre-feet		6610	9960	15400	70400	32600	2240	2530	2590	8120	6660	

Unless otherwise noted, all discharges are in cubic feet per second. Note.—Above gage June 2-8.

YAMPA AND WHITE RIVER DRAINAGES

YAMPA RIVER AT YAMPA.

Location.—On the bridge connecting the town of Yampa with the Denver and Salt Lake Railroad station.

Records Available.—May 17, 1910, to November 30, 1914.

Drainage Area.—52 square miles.

Gage.—Chain gage.

Channel.—Shifting during high water.

Discharge Measurements.—Made from the highway bridge.

Winter Flow.—Ice causes backwater and the records are discontinued during the winter months.

Diversions.—There are court decrees for diversions of 258 second-feet from the headwater streams above Yampa.

Note.—Station moved downstream 150 feet to road bridge on April 5, 1914.

DISCHARGE MEASUREMENTS ON YAMPA RIVER AT YAMPA.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 24	C. L. Chatfield.....		18*	Apr. 4	C. L. Chatfield.....	1.85	20
Apr. 22	C. L. Chatfield.....	0.77	36	May 1	C. L. Chatfield.....	1.98	32
May 19	C. L. Chatfield.....	0.30	5.6	May 30	C. L. Chatfield.....	2.75	159
July 6	C. L. Chatfield.....	0.00	0.50	July 29	C. L. Chatfield.....	1.98	40
July 14	C. L. Chatfield.....	-0.05	0.40	Sept. 7	C. L. Chatfield.....	1.85	23
Sept. 3	C. L. Chatfield.....	0.48	11.9				
Sept. 25	C. L. Chatfield.....	0.52	15				

*Ice conditions.

YAMPA RIVER AT STEAMBOAT SPRINGS.

Location.—At the lower steel bridge at Steamboat Springs; a short distance below the mouth of Soda Creek.

Records Available.—May 3, 1904, to October 31, 1906; March 1, 1910, to November 30, 1914.

Drainage Area.—572 square miles.

Gage.—Automatic recording gage.

Channel.—Practically permanent.

Discharge Measurements.—Made from the steel bridge.

Winter Flow.—The hot springs keep the river practically open during the winter months.

Diversions.—There are court decrees for diversions of 115 second-feet from Yampa River between Yampa and Steamboat Springs, and diversions of 231 second-feet from intervening tributaries.

DISCHARGE MEASUREMENTS ON YAMPA RIVER AT STEAMBOAT SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 22	C. L. Chatfield.....	*1.40	111	Apr. 18	C. L. Chatfield.....	2.62	699
Apr. 24	C. L. Chatfield.....	2.65	727	May 7	C. L. Chatfield.....	3.00	969
Apr. 29	C. L. Chatfield.....	3.02	1093	June 3	C. L. Chatfield.....	5.55	4739
May 1	C. L. Chatfield.....	3.12	1278	July 16	C. L. Chatfield.....	1.65	239
May 9	C. L. Chatfield.....	3.62	1678	Aug. 12	C. L. Chatfield.....	1.35	151
June 4	C. L. Chatfield.....	3.42	1399				
June 20	C. L. Chatfield.....	2.30	522				
July 17	C. L. Chatfield.....	1.55	178				
Aug. 14	C. L. Chatfield.....	1.27	114				
Nov. 18	C. L. Chatfield.....	1.43	147				

*Ice conditions.

YAMPA RIVER AT CRAIG.

Location.—One mile south of Craig on steel bridge on road to Hamilton, Colo., a short distance below the mouth of Fortification Creek, the nearest tributary.

Records Available.—May 25, 1901, to September 4, 1902; April 30, 1904, to October 31, 1906; April 1, 1910, to November 15, 1914.

Drainage Area.—1,730 square miles.

Gage.—Chain gage.

Channel.—Slightly shifting.

Discharge Measurements.—Made from highway bridge.

Diversions.—There are court decrees for diversions of 238 second-feet from Yampa River between this station and Steamboat Springs, and 411 second-feet from intervening tributaries exclusive of a conditional decree for 587 second-feet from the North Fork of Elkhead Creek.

DISCHARGE MEASUREMENTS ON YAMPA RIVER AT CRAIG.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 10	C. L. Chatfield.....		166*	Apr. 7	C. L. Chatfield.....	5.34	3633
May 16	C. L. Chatfield.....	5.19	3405	May 12	C. L. Chatfield.....	6.72	6688
May 26	C. L. Chatfield.....	6.18	5451	June 12	C. L. Chatfield.....	6.60	6145
May 31	C. L. Chatfield.....	6.40	5778	July 1	C. L. Chatfield.....	4.25	2237
July 25	C. L. Chatfield.....	3.66	1219	Sept. 9	C. L. Chatfield.....	2.65	264
Aug. 25	C. L. Chatfield.....	2.24	106				
Sept. 9	C. L. Chatfield.....	2.50	225				
Oct. 14	C. L. Chatfield.....	2.65	339				

*Ice conditions.

Discharge of Yampa River at Yampa for 1913.
Drainage Area, 52 Square Miles. Altitude, 7,884 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
1					54	54	0.5	1.0	20	20	30	36
2					54	41	0.5	0.5	25	20	30	36
3					54	36	0.5	0.5	25	20	30	36
4					54	30	0.5	0.5	25	20	30	36
5					62	30	0.5	0.5	25	20	30	36
6					70	30	0.5	0.5	25	20	30	36
7					70	30	0.5	0.5	25	20	30	36
8				11	70	30	0.5	0.5	25	30	30	36
9				13	54	20	0.5	0.5	25	30	30	36
10				20	70	13	0.5	0.5	25	30	30	36
11				30	89	16	0.5	0.5	25	30	30	
12				30	100	8.5	1.0	2.2	25	30	30	
13				48	70	7	1.0	4.2	25	30	30	
14				62	54	7	0.5	11	25	25	36	
15				54	48	7	0.5	16	25	25	36	
16				48	41	5.5	0.5	16	25	25	36	
17				48	41	5.5	1.0	25	25	25	30	
18				41	41	5.5	1.5	25	25	25	30	
19				41	41	4.2	3	20	20	25	30	
20				41	36	2.2	5.5	20	20	25	30	
21				41	30	2.2	11	20	20	25	30	
22				41	30	1.5	13	20	20	25	30	
23				36	25	0.5	20	20	20	25	30	
24				30	30	0.5	36	20	20	25	30	
25				30	30	0.5	36	25	20	25	30	
26				41	30	0.5	36	25	20	30	30	
27				41	36	0.5	36	20	20	30	30	
28				48	41	0.5	25	20	20	30	30	
29				54	54	0.5	20	20	20	30	30	
30				54	54	0.5	13	20	20	30	30	
31					54		7	20		30		
Mean				40	51	13	8.8	12	23	26	31	36
Run-off acre-feet				1800	3140	774	541	738	1370	1600	1840	714

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Yampa River at Yampa for 1914.
Drainage Area, 52 Square Miles. Altitude, 7,884 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					27	212	77	50	38	27	27	
2					32	212	77	50	38	27	27	
3					32	224	77	50	38	27	17	
4					32	201	77	50	27	27	13	
5				38	38	201	93	38	27	27	9	
6				38	38	201	77	32	27	27	9	
7				38	56	201	77	27	27	27	9	
8				38	77	201	70	27	27	22	17	
9				38	85	179	50	27	27	22	17	
10				32	93	201	50	27	27	22	17	
11				27	93	224	38	27	27	17	17	
12				17	77	224	38	27	27	17	17	
13				22	93	224	32	27	27	17	17	
14				22	110	201	27	27	27	17	19	
15				27	102	190	27	27	27	17	19	
16				27	85	128	27	27	27	17	17	
17				27	128	128	27	17	38	17	17	
18				27	138	148	27	17	38	17	17	
19				32	148	168	17	17	38	17	17	
20				32	168	248	27	17	38	17	22	
21				32	190	248	27	27	27	17	27	
22				32	190	236	77	27	27	17	27	
23				38	212	201	63	27	17	17	27	
24				38	212	212	50	27	17	17	27	
25				38	168	148	38	27	17	27	27	
26				38	128	138	50	27	17	27	27	
27				38	128	110	50	32	17	27	27	
28				27	128	148	50	44	17	27	22	
29				27	168	85	50	38	17	27	27	
30				27	190	77	50	38	17	27	27	
31					212		50	38		27		
Mean				31	115	184	51	31	27	22	20	
Run-off acre-feet				1620	7100	10900	3110	1900	1600	1350	1160	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Yampa River at Steamboat Springs for 1913. Drainage Area, 572 Square Miles. Altitude, 6,680 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					1360	1760	190	108	70	85	70	78
2					1460	1710	160	100	85	78	70	78
3					1260	1660	135	92	85	78	70	70
4					1360	1560	125	92	85	78	70	70
5					1460	1560	115	92	85	100	70	70
6					1560	1360	115	108	85	108	70	70
7					1660	1220	100	85	85	85	70	70
8					1760	1260	85	85	85	92	70	70
9					1870	1220	85	78	92	92	70	70
10				350	1980	1080	100	78	92	92	70	70
11				350	2140	1120	100	78	92	92	70	70
12				430	2260	900	92	100	85	100	78	70
13				990	2200	820	85	108	78	100	92	70
14				1120	1870	780	92	100	78	100	92	70
15				1460	1460	740	115	92	85	92	92	70
16				1560	1560	660	115	85	78	92	85	70
17				1410	1660	660	160	85	78	78	78	70
18				1510	1760	660	135	85	78	78	70	70
19				1560	1820	590	160	85	78	78	70	70
20				1460	1510	525	135	85	70	78	70	70
21				1360	1260	460	225	85	62	78	70	
22				1310	1310	350	190	78	70	85	78	
23				990	2260	430	305	70	78	85	78	
24				820	2200	558	590	78	85	92	78	
25				900	2430	700	305	70	92	100	78	
26				740	2430	780	225	70	92	92	78	
27				820	2430	625	160	70	85	85	78	
28				900	2310	430	160	70	85	85	78	
29				1220	2430	328	135	55	85	78	78	
30				1360	2090	225	115	55	78	70	78	
31					1760		115	62		70		
Mean				1080	1830	891	159	83	82	87	76	71
Run-off acre-feet				44800	113000	53000	9800	5100	4900	5350	4520	2810

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Yampa River at Steamboat Springs for 1914. Drainage Area, 572 Square Miles. Altitude, 6,680 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				340	690	4860	588	250	340	140	190	
2				422	1070	4860	555	250	205	140	178	
3				588	1070	5120	445	220	205	140	178	
4			152	690	1170	3960	445	205	205	140	178	
5			152	850	1170	4060	422	205	190	178	178	
6			140	1360	1020	3580	400	190	140	190	178	
7			140	892	980	2460	380	178	100	190	165	
8			140	808	1170	2460	320	190	120	235	165	
9			130	728	1420	1840	320	190	120	285	152	
10			130	588	1730	3220	285	190	120	250	152	
11			165	588	1840	2200	285	190	120	250	140	
12			178	690	1520	2140	250	178	120	235	140	
13			165	808	1520	3220	250	165	140	205	140	
14			165	1020	1520	3060	268	165	152	205	140	
15			165	1460	1780	2330	268	152	165	205	140	
16			165	1520	2200	2080	250	152	165	220	130	
17			165	980	2330	2460	235	140	165	220	130	
18			190	655	2460	1780	250	140	152	220	130	
19			205	525	2740	1840	268	140	140	220	140	
20			205	655	2900	1960	235	140	165	220	152	
21			220	690	3140	2080	220	152	220	250	140	
22			235	728	3400	1840	285	152	190	285	140	
23			205	1170	3770	1620	360	178	140	320	130	
24			205	765	3770	1020	250	152	140	250	120	
25			190	690	3960	1020	235	152	140	250	120	
26			205	690	3680	892	235	205	140	220	130	
27			235	655	3400	765	250	285	130	220	130	
28			268	655	4170	620	250	205	120	220	120	
29			340	620	4170	555	250	205	130	205	120	
30			302	655	4620	495	250	205	140	205	120	
31			302		4740		250	220		220		
Mean			195	783	2420	2350	308	185	157	217	146	
Run-off acre-feet			10800	46600	149000	140000	19000	11400	9360	13400	8660	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Yampa River at Craig for 1913.
Drainage Area, 1,730 Square Miles. Altitude, 6,185 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
1				3000	6640	5580	885	390	145	260	325	
2				2700	6380	4360	835	390	145	260	325	
3				2420	4150	4250	745	358	172	260	325	
4				2560	3240	3860	658	325	200	260	390	
5				2630	3160	3240	615	325	200	325	390	
6				2560	3490	3160	615	325	145	325	390	
7				2630	3670	3240	575	260	200	325	390	
8				2350	4700	2850	498	260	230	325	325	
9				1240	5190	2700	460	260	292	390	325	
10				1030	4940	2700	460	260	200	325	325	
11				1080	5320	2920	460	260	200	325	325	
12				1340	5450	2850	460	260	200	325	325	
13				1680	5710	2420	425	260	200	325	325	
14				2210	5190	2210	390	260	200	325	325	
15				2780	3960	2210	358	260	200	325	390	
16				3160	3400	2210	325	260	200	390	390	
17				3320	3080	2140	325	230	200	390	325	
18				3400	3160	2070	460	200	200	390	390	
19				3960	3960	2140	535	172	200	325	325	
20				3320	3960	2000	535	145	200	325	390	
21				3240	3400	1740	535	95	200	325	390	
22				3160	3000	1620	535	95	230	325	390	
23				2920	2780	1460	535	95	200	325	390	
24				2920	3320	1290	885	95	200	325	390	
25				2780	4700	1400	1080	95	260	325	390	
26				2560	5190	1680	835	95	260	325	390	
27				2280	5710	1400	658	95	260	325	390	
28				2780	5710	1290	615	95	260	325	390	
29				3580	5450	1130	535	72	260	325	390	
30				4150	5580	1030	390	50	260	325	390	
31					5580		390	95		325		
Mean				2660	4490	2440	568	208	211	325	364	
Run-off acre-feet				158000	276000	145000	34900	12800	12600	20000	21700	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Yampa River at Craig for 1914.
Drainage Area, 1,730 Square Miles. Altitude, 6,185 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				1870	3080	9420	2000	790	390	390	535	
2				2000	3400	10000	1940	790	460	390	535	
3				2560	4050	10300	1870	790	615	460	460	
4				3080	4050	10000	1740	700	615	535	460	
5				3160	4580	9420	2280	700	460	615	496	
6				3960	4250	9560	2000	615	460	615	535	
7				4150	3960	8720	1740	535	460	615	615	
8				3000	4150	7460	1400	535	390	745	615	
9				2350	5450	5970	1340	535	390	700	535	
10				2070	6920	5320	1290	535	325	700	535	
11				1870	7460	5840	1130	535	325	790	460	
12				2000	7180	6100	1080	460	390	745	425	
13				2210	5710	6780	980	460	390	658	390	
14				2490	5580	7180	980	460	460	615	460	
15				3240	5970	7180	885	460	460	535	460	
16				3960	6240	6240	932	390	460	615		
17				3960	7180	5970	790	390	535	700		
18				2560	7740	6100	790	390	535	700		
19				2210	7600	5450	790	390	460	615		
20				2560	7600	5840	790	390	460	615		
21				3000	7880	6510	745	390	460	615		
22				3320	8580	5450	790	390	390	700		
23				4050	9000	4820	1080	460	460	790		
24				3860	9700	4050	838	460	460	790		
25				3000	9560	3670	790	460	460	700		
26				3160	9140	3320	790	460	460	700		
27				3490	8440	2850	700	460	460	658		
28				3160	8580	2560	790	535	425	615		
29			1240	2780	9280	2280	790	535	390	535		
30			1400	2920	9000	2000	790	460	390	615		
31			1510		9280		838	460		535		
Mean			1390	2930	6790	6210	1150	514	246	632	501	
Run-off acre-feet			8270	174000	418000	370000	70700	31600	26600	38900	14900	

Unless otherwise noted, all discharges are in cubic feet per second.

ELK RIVER AT HINMAN PARK.

Location.—At Hinman Park just above the mouth of South Fork and 8 miles above Clark.

Records Available.—May 25, 1912, to November 30, 1914.

Drainage Area.—61 square miles.

Gage.—Bristol automatic gage.

Channel.—Rough but permanent.

Discharge Measurements.—Made from cable and car.

Winter Flow.—No data, as records were discontinued.

Co-operation.—Station is maintained by the State engineer in co-operation with the Elk River Irrigation & Construction Co.

DISCHARGE MEASUREMENTS ON ELK RIVER AT HINMAN PARK.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 6	C. L. Chatfield	1.30	361	June 4	C. L. Chatfield	2.80	1202
June 9	C. L. Chatfield	1.60	470	June 17	C. L. Chatfield	2.00	597
July 30	C. L. Chatfield	0.35	105	Aug. 17	C. L. Chatfield	0.30	72
Aug. 21	C. L. Chatfield	0.10	51				

ELK RIVER NEAR CLARK.

Location.—At Kinney's ranch, 2 miles above Clark postoffice, Colo.

Records Available.—May 1, 1910, to November 30, 1914.

Drainage Area.—206 square miles.

Gage.—Chain gage.

Channel.—Rough but permanent.

Diversions.—There are court decrees for diversions of 4 second-feet from Elk River above this station and 25 second-feet from the tributaries entering above.

Co-operation.—The State engineer maintains the station in co-operation with the Elk River Irrigation & Construction Co.

DISCHARGE MEASUREMENTS ON ELK RIVER AT KINNEY'S RANCH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 18	C. L. Chatfield		53*	Apr. 20	C. L. Chatfield	3.70	515
May 7	C. L. Chatfield	4.85	1117	June 5	C. L. Chatfield	6.10	2069
June 9	C. L. Chatfield	4.50	928	July 10	C. L. Chatfield	3.22	370
July 29	C. L. Chatfield	2.50	119	Aug. 16	C. L. Chatfield	2.35	98
Aug. 20	C. L. Chatfield	2.18	71				
Nov. 1	C. L. Chatfield	2.25	81				

*Ice conditions.

ELK RIVER NEAR TRULL.

Location.—Two miles southwest of Trull postoffice on the road between Steamboat Springs and Hayden; below all tributaries; none above the station for several miles.

Records Available.—May 2, 1904, to August 16, 1906; May 1, 1910, to November 30, 1914.

Drainage Area.—415 square miles.

Gage.—Chain gage.

Channel.—Fairly permanent.

Discharge Measurements.—Made from highway bridge.

Diversions.—Between this station and that near Clark there are court decrees for diversions of 111 second-feet from Elk River and 62 second-feet from intervening tributaries. There are no decrees for diversions below the station.

DISCHARGE MEASUREMENTS ON ELK RIVER NEAR TRULL.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 17	C. L. Chatfield		63*	June 15	C. L. Chatfield	8.63	2492
May 8	C. L. Chatfield	8.02	1820				
May 13	C. L. Chatfield	8.28	2098				
June 18	C. L. Chatfield	7.43	1334				
July 19	C. L. Chatfield	5.80	312				

*Ice conditions.

Discharge of Elk River at Hinman Park for 1913.

Drainage Area, 61 Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					330	1020	245	82	60	65	75	
2					392	1060	230	75	55	65	90	
3					538	920	218	70	55	75	90	
4					538	990	218	60	55	82	75	
5					565	1100	205	65	55	90	75	
6					690	1140	180	65	55	90	65	
7					788	1060	140	60	82	70	65	
8					788	885	150	65	75	70	60	
9					722	690	150	65	75	75	60	
10					658	538	150	75	75	90	60	
11					415	370	160	98	82	90	55	
12					438	370	180	98	75	82	55	
13					722	370	140	90	75	65	60	
14					538	370	140	105	60	65	65	
15					260	438	140	105	55	65	50	
16					245	460	130	90	75	60		
17					312	438	120	75	60	60		
18					690	460	130	55	55	60		
19					820	438	150	55	70	60		
20					820	415	105	55	60	60		
21					920	350	112	55	70	60		
22					1100	350	105	60	65	60		
23					1260	370	105	60	65	60		
24				150	1340	415	105	60	60	60		
25				205	955	415	112	55	55	60		
26				260	852	392	112	55	65	60		
27				245	820	415	105	60	65	55		
28				230	755	295	98	55	65	60		
29				295	755	295	90	65	65	55		
30				350	690	245	90	55	60	60		
31					658		75	55		60		
Mean				248	689	569	142	69	65	67	67	
Run-off acre-feet				3440	42400	33900	8730	4240	3870	4120	1980	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Elk River at Hinman Park for 1914.

Drainage Area, 61 Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						1120	505	140	92	60	92	
2						1200	390	140	92	85	92	
3						1240	390	100	78	85	65	
4						1200	390	100	70	110	70	
5						1200	370	130	65	120	60	
6						980	370	150	85	120	55	
7						910	410	120	100	120	60	
8						840	410	110	140	130	60	
9						770	390	92	85	130	50	
10						710	390	92	92	130	48	
11						980	390	85	85	92	55	
12						910	370	78	78	120	60	
13						980	350	78	70	150	60	
14						1050	350	78	85	140	92	
15						980	310	85	92	120	60	
16						910	310	85	100	110	48	
17						770	310	85	92	150	50	
18						875	275	70	85	172	50	
19						910	240	78	70	150	65	
20						1015	210	65	55	140	50	
21						770	150	65	55	160	48	
22						710	185	70	65	160	50	
23						620	198	78	50	130	50	
24						650	150	78	50	140	48	
25						680	160	85	78	130	45	
26						590	130	92	50	120	48	
27						480	150	92	55	120	48	
28						430	120	110	55	110	50	
29						390	120	100	60	110	50	
30						430	120	100	55	110	50	
31							140	92		100		
Mean						843	282	94	76	123	58	
Run-off acre-feet						50200	17400	5800	4530	7580	3430	

Unless otherwise noted, all discharges are in cubic feet per second. Results rough.

Discharge of Elk River at Kinney's Ranch near Clark for 1913. Drainage Area, 206 Square Miles. Altitude, 7,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				85	600	1180	510	78	110	92	92	
2				92	1180	1300	420	100	100	70	92	
3				120	860	1180	362	150	70	92	97	
4				140	950	1150	400	130	78	140	62	
5				70	890	1080	362	110	100	172	70	
6				110	1150	980	362	172	110	160	78	
7				130	1180	1080	275	140	100	140	78	
8				140	1300	1180	260	92	110	120	100	
9				120	1340	1150	230	110	78	100	140	
10				130	1040	980	230	150	120	140	92	
11				120	1120	805	215	120	70	172		
12				130	1260	600	185	120	110	150		
13				185	920	670	172	110	140	150		
14				230	860	670	172	100	92	120		
15				292	950	645	172	120	85	130		
16				488	805	420	160	110	100	110		
17				420	950	488	215	100	92	110		
18				465	980	400	185	120	78	140		
19				600	1150	310	185	85	120	172		
20				750	1150	420	185	70	78	78		
21				832	1260	465	185	92	85	78		
22				750	1220	420	200	110	92	85		
23				670	1180	488	245	140	100	100		
24				465	1260	510	310	130	92	100		
25				345	1220	510	230	110	130	92		
26				420	1220	400	200	110	110	70		
27				420	1040	510	172	100	110	78		
28				345	1300	362	140	130	85	130		
29				832	1650	420	130	110	110	120		
30				832	1950	420	110	110	60	130		
31					1180		100	130		92		
Mean				358	1130	706	235	115	97	117	90	
Run-off acre-feet				21300	69500	42000	14400	7060	5780	7200	1780	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Elk River at Kinney's Ranch near Clark for 1914. Drainage Area, 206 Square Miles. Altitude, 7,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				160	555	2660	670	172	100	100	100	
2				140	532	3140	600	172	92	120	100	
3				150	555	3410	622	185	92	120	92	
4				160	670	3230	645	172	85	120	70	
5				140	670	1900	832	172	92	120	85	
6				160	600	1420	578	172	100	130	78	
7				260	750	1220	578	160	100	140	78	
8				160	950	1300	532	160	85	140	50	
9				140	1340	1120	465	150	92	130	65	
10				150	1300	1220	465	150	100	130	65	
11				160	1380	1300	420	140	85	130	65	
12				140	1300	1560	420	140	85	110	65	
13				160	1020	1600	362	140	85	120	78	
14				260	1150	1700	362	130	85	110	55	
15				260	1180	1340	345	120	78	120	70	
16				380	1340	1340	328	120	78	120	60	
17				362	1300	1340	345	120	78	130	92	
18				362	1260	1340	345	110	70	130	65	
19				292	1380	1420	345	100	70	120	85	
20				465	1510	1600	310	120	70	120	92	
21				600	1800	1260	292	110	140	120	100	
22				578	2060	1380	310	110	172	172	110	
23				532	2890	1340	275	100	185	150	120	
24				555	2580	1180	275	100	160	140	120	
25				510	1600	1120	260	85	140	140	120	
26				555	1510	1080	260	92	140	120	120	
27				510	2310	1010	275	92	140	120	120	
28				442	1600	1010	245	85	140	120	120	
29				600	1700	890	245	78	120	120	85	
30				555	1950	890	215	78	120	110	110	
31					2310		215	70		110		
Mean				330	1390	1540	401	126	106	135	88	
Run-off acre-feet				19600	85500	91600	24700	7750	6300	7700	5230	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Elk River near Trull for 1913.
Drainage Area, 415 Square Miles. Altitude, 6,650 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					1340	2600	585	100	100	80	110	
2					1430	2200	555	100	100	80	110	
3					1300	2100	475	100	100	80	120	
4					1380	2000	528	120	100	80	120	
5					1510	2000	500	110	100	90	120	
6					1510	2000	475	132	100	100	120	
7					1380	1910	378	120	100	120	120	
8					1380	1600	355	132	100	120	120	
9					1380	1600	310	110	100	120	120	
10					1380	1640	310	120	100	120	120	
11					1430	1860	290	110	100	120	120	
12				475	1640	1340	252	120	100	120	120	
13				768	1820	1260	235	120	100	120	120	
14				585	1640	1190	235	120	100	120	120	
15				585	1470	1430	220	120	100	120	120	
16				768	1380	1190	205	110	100	120	120	
17				1040	1380	1430	290	120	100	120	120	
18				1260	1380	1510	252	110	100	120	120	
19				1260	1560	1430	252	100	100	120	120	
20				1340	1560	1190	252	110	80	120	120	
21				1340	1600	1110	252	120	80	120	120	
22				1430	1510	1000	270	100	80	120	120	
23				1470	1470	962	332	100	80	120	120	
24				1220	1300	1000	475	110	100	120	120	
25				832	2200	1150	310	120	100	120	120	
26				1260	2200	1040	270	90	100	120	120	
27				1260	2600	962	235	100	90	120	120	
28				1260	2350	898	205	100	80	120	120	
29				1640	2500	898	175	100	80	120	120	
30				1640	2800	670	145	100	100	120	120	
31					2650		120	100		120		
Mean				1130	1690	1440	314	110	96	113	119	
Run-off acre-feet				42600	104000	85700	19300	6760	5710	6950	7080	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Elk River near Trull for 1914.
Drainage Area, 415 Square Miles. Altitude, 6,650 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						3120	1220	290	160	110	190	
2						3400	1190	332	145	110	175	
3						3450	1040	290	132	120	160	
4						3400	962	270	132	220	160	
5						3340	962	252	110	220	132	
6						3020	898	252	120	220	132	
7						2800	930	175	110	235	120	
8						2800	930	205	100	252	110	
9						2300	930	190	100	252	120	
10						1960	768	190	110	252	100	
11						2450	702	175	100	252	110	
12						2750	648	175	110	235	110	
13						3280	648	190	110	252	132	
14						3070	585	175	132	220	132	
15						2910	648	175	160	220	132	
16						2910	615	132	160	252	132	
17					2860	2960	528	145	145	252	110	
18					2910	2500	500	160	120	252	110	
19					2910	2350	475	132	90	252	132	
20					3120	2700	528	132	90	270	110	
21					3120	2450	585	160	100	270	100	
22					3230	2400	585	190	110	290	110	
23					3230	2350	475	175	110	290	100	
24					3340	2200	332	132	120	252	100	
25					3120	1910	378	160	100	252	90	
26					2800	1770	290	190	90	252	90	
27					3180	1430	290	160	90	235	100	
28					3340	1380	310	190	90	220	100	
29					3230	1300	332	190	100	205	120	
30					3180	1220	332	190	90	220	110	
31					3180		332	175		190		
Mean					3120	2530	644	192	116	226	121	
Run-off acre-feet					93400	151000	39600	11800	6820	14100	7200	

Unless otherwise noted, all discharges are in cubic feet per second.

WILLOW CREEK AT RYAN'S RANCH, NEAR BAGGS, WYO.

Location.—In Colorado, about sec. 26, T. 11 N., R. 90 W., 2 miles northeast of Ryan's ranch house and 22 miles southeast of Baggs, Wyo. No important tributary between the station and the mouth of Willow Creek.

Records Available.—May 4, 1912, to November 8, 1914.

Drainage Area.—Approximately 5 square miles.

Gage.—Bristol automatic gage.

Channel.—Small cobblestones, placed especially for the station.

Discharge Measurements.—No data.

Co-operation.—Station maintained by the State engineer in co-operation with the Elk River Irrigation & Construction Co.

DISCHARGE MEASUREMENTS ON WILLOW CREEK AT RYAN'S RANCH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 28	Chatfield & Finley	0.62	44	Apr. 16	C. L. Chatfield	0.10	10
June 24	W. P. Finley	0.30	8.9	June 10	C. L. Chatfield	1.00	38
July 26	C. L. Chatfield	-0.18	4.24				
Sept. 27	W. P. Finley	-0.50	3.02				

MAD CREEK NEAR STEAMBOAT SPRINGS.

Location.—At highway bridge on road to Hahns Peak, 6 miles from Steamboat Springs.

Records Available.—July 1, 1912, to June 30, 1914.

Drainage Area.—40 square miles.

Gage.—Vertical staff.

Channel.—Rough but permanent.

Discharge Measurements.—Made from bridge.

Winter Flow.—No data, as records were discontinued.

Co-operation.—The State engineer maintains the station in co-operation with Mr. F. A. Metcalf, of Steamboat Springs.

DISCHARGE MEASUREMENTS ON MAD CREEK NEAR STEAMBOAT SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 5	C. L. Chatfield	2.00	181	Apr. 21	C. L. Chatfield	1.65	85
May 7	C. L. Chatfield	2.22	243	June 17	C. L. Chatfield	2.60	481
June 6	C. L. Chatfield	2.40	410	Aug. 16	C. L. Chatfield	0.80	10
June 9	C. L. Chatfield	2.35	365				
June 18	C. L. Chatfield	2.28	310				
Aug. 1	C. L. Chatfield	1.00	16				
Aug. 22	C. L. Chatfield	0.71	5.1				

SODA CREEK AT STEAMBOAT SPRINGS.

Location.—At the Main Street Bridge at Steamboat Springs, below all tributaries, the nearest being a small creek that enters from the east about 2 miles above.

Records Available.—June 8, 1910, to August 31, 1911; April 24, 1913, to October 6, 1914.

Drainage Area.—47 square miles.

Gage.—Chain gage.

Channel.—Practically permanent.

Discharge Measurements.—Made from highway bridge.

DISCHARGE MEASUREMENTS ON SODA CREEK AT STEAMBOAT SPRINGS.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 27	C. L. Chatfield	2.20	72	Apr. 18	C. L. Chatfield	2.32*	58
Apr. 28	C. L. Chatfield	2.50	104	May 11	C. L. Chatfield	2.98	207
May 3	C. L. Chatfield	2.45	113	June 3	C. L. Chatfield	3.68	439
May 7	C. L. Chatfield	2.80	215	July 15	C. L. Chatfield	1.20	19
June 4	C. L. Chatfield	2.78	185	Aug. 13	C. L. Chatfield	0.80	1.35
July 16	C. L. Chatfield	1.24	4.88				
July 17	C. L. Chatfield	1.27	4.75				
Aug. 2	C. L. Chatfield	1.05	1.12				
Aug. 16	C. L. Chatfield	0.98	0.52				
Sept. 1	C. L. Chatfield	0.95	0.38				
Sept. 2	C. L. Chatfield	1.00	0.49				

*New gage installed Apr. 6, 1914.

Discharge of Willow Creek at Ryan's Ranch for 1913. Drainage Area, 5 (approximated) Square Miles. Altitude, 8,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					26	36	9	4.4	3.2	2.9	3.8	
2					19	31	7.5	4.4	3.4	2.9	3.8	
3					16	26	8	4	3.5	3	3.8	
4					16	22	8	4.4	3.4	3.2	3.8	
5					14	22	9	4	3.5	3.4	3.5	
6					19	22	8	4	3.1	3.4	3.2	
7					22	19	9	3.8	3.1	3.4	3.4	
8					22	19	9	3.8	3.2	3.4	3.8	
9					31	16	8	3.8	3.4	3.5		
10					42	13	9	3.8	3.2	3.5		
11					42	16	10.5	3.4	3.1	3.5		
12					42	13	9	3.4	3.0	3.8		
13					36	15	15	3.4	3.1	3.2		
14					26	13	15	3.5	3.1	3.1		
15					26	7	13	3.5	3.4	3.1		
16				14	26	7	10.5	3.2	3.1	3.1		
17				16	31	9	10.5	3.4	2.9	3		
18				14	42	9	10.5	3.5	2.9	3.1		
19				19	31	11	11	3.5	3	3.1		
20				19	26	11	10	3.5	3	3.1		
21				19	22	7.5	10	3.4	2.8	3.2		
22				19	22	6	8	3.4	2.9	3.2		
23				11	31	5.2	7	3.4	2.8	3.1		
24				14	48	7.5	6	3.4	2.8	3.5		
25				10	42	9	5.4	3.4	2.8	3.5		
26				11	42	9	4.4	3.1	2.9	3.5		
27				16	48	11	4.4	3.2	3	3.5		
28				22	54	13	4.4	3.2	2.9	3.5		
29				26	48	9	4.4	3.2	2.9	3.5		
30				26	48	9	4.4	3.4	2.8	3.5		
31					42		4.4	3.5		3.8		
Mean				17	32.3	14.1	8.5	3.6	3.1	3.3	3.6	
Run-off acre-feet				508	1990	839	523	221	184	203	58	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Willow Creek at Ryan's Ranch for 1914. Drainage Area, 5 (Approximated) Square Miles. Altitude, 8,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					10	85	21	4	4.5	4.5	3.5	
2					9	112	21	4	4.2	5	3.5	
3					9	134	21	4	4.2	5.5	3.5	
4					13	123	21	4	4.5	7	3.5	
5					23	134	20	4	4.5	5	3.5	
6					15	134	15	4	4.2	5	3.8	
7					18	77	15	4	4.2	5	3.8	
8					25	54	15	4	4.5	5.5	3.5	
9					27	50	18	3.5	4.2	6.2		
10					29	42	21	3.5	4.2	7		
11					27	45	18	3.5	4.2	5.5		
12					21	64	10	3.5	4.5	5		
13				7	20	64	10	3.5	4.5	4.5		
14				7	21	54	10	3.5	4.5	5		
15				8	25	38	10	3.5	5.0	4.2		
16				9	29	42	10	3.2	5.0	4.2		
17				7	29	42	10	3.0	4.5	4.5		
18				6.2	31	45	10	3.2	4.5	4.5		
19				6.2	31	50	7	3.5	4.5	4.5		
20				9	31	45	7	3.5	4.5	4.2		
21				10	36	36	7	3.8	4.5	4		
22				10	45	33	7	3.5	4.2	4.2		
23				11	59	31	7	3.2	4.2	4		
24				9	64	31	7	3.2	4.5	4		
25				9	38	31	7	3.5	5.0	3.8		
26				7	38	29	7	3.5	5.0	3.8		
27				7	38	29	6	3.5	4.5	3.8		
28				7	42	25	7	3.5	4.5	3.5		
29				7	45	25	7	3.5	4.5	3.5		
30				8	54	25	7	3.8	4.5	3.8		
31					54		7	4.0		3.8		
Mean				8	31	58	11.8	3.6	4.5	4.6	3.6	
Run-off acre-feet				287	1900	3430	726	222	267	286	56	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Mad Creek near Steamboat Springs for 1913. Drainage Area, 40 Square Miles. Altitude, 6,740 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				2	182		126	8	5.5	10		
2				2	182		114	7	5.5	8		
3				2	222		103	7	5.5	8		
4				2	222		103	8	5.5	10		
5				2	222		83	10	5	12		
6				2	182		66	12	5	14.5		
7				2	304		66	12	6			
8				2	335	405	74	10	6	23		
9				2	335	405	66	8	8	20		
10				2	405	405	66	10	6	17		
11				2	405	538	66	10	6	14.5		
12				2	490	490	66	12	6	10		
13				2.5	585	247	52	8	6	20		
14				2.8	405	247	74	8	6	23		
15				3	405	405	59	8	6	20		
16				3	272	370	40	6	6	20		
17				3.2	182	490	40	6	6	20		
18				3.2	272	405	40	6	6	17		
19				3.2	272	405	40	6	5.5	20		
20				4	182	247	31	6	5.5	14.5		
21				4	182	222	46	6	6	14.5		
22				4	222	202	40	5.5	6	20		
23				5	335	222	59	5.5	7	14.5		
24				6	335	202	52	5.5	8	14.5		
25				3.5	335	448	40	5.5	12	12		
26				8	335	272	31	5.5	12	12		
27				52	405	222	27	6	12	12		
28				182	490	182	23	6	12	14.5		
29				182	585	167	20	5.5	12	12		
30				182	690	139	12	5.5	12	12		
31					815		8	5.5		14.5		
Mean				22.6	348	319	56	7.4	7.2	15.1		
Run-off acre-feet				1340	21400	14600	3440	455	428	898		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Mad Creek near Steamboat Springs for 1914. Drainage Area, 40 Square Miles. Altitude, 6,740 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					139	1450						
2					126	1220						
3					126	1320						
4					139	1450						
5				36	139	1120						
6				52	152	1220						
7				59	139	1120						
8				46	167	1450						
9				114	182	1580						
10				31	202	1220						
11				46	202	965						
12				93	247	1120						
13				59	247	890						
14				126	272	752						
15				152	304	752						
16				182	304	752						
17				152	1040	890						
18				126	304	538						
19				114	335	538						
20				152	1580	405						
21				139	1880	405						
22				114	1880	335						
23				167	1880	335						
24				139	1720	272						
25				114	2050	272						
26				126	1720	304						
27				114	965	304						
28				114	1120	272						
29				126	1220	222						
30				126	1450	222						
31					1720							
Mean				108	773	790						
Run-off acre-feet				5590	47500	47000						

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Soda Creek at Steamboat Springs for 1913. Drainage Area, 47 Square Miles. Altitude, 6,680 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					124	161	30	1.2	0.5			
2					113	192	22	1.2	0.5			
3					97	225	19	1.2	0.5			
4					97	176	13.5	1.2	0.5			
5					113	113	11	1.2	0.5			
6					113	97	11	1.2	0.5			
7					161	161	9.2	0.5	0.5			
8					161	84	7.5	0.5	0.5			
9					208	97	4.5	0.5	0.4			
10					225	113	7.5	0.5	0.4			
11					225	97	7.5	0.5	0.4			
12					225	84	4.5	1.2	0.4			
13					225	84	3.2	0.5	0.4			
14					161	84	4.5	0.5	0.5			
15					113	84	4.5	0.5	1.2			
16					161	72	6	0.5	0.5			
17					124	84	7.5	0.4				
18					105	72	6	0.4				
19					192	51	9.2	0.4				
20					225	72	4.5	0.4				
21					208	51	4.5	0.4				
22					176	51	4.5	0.4				
23					208	35	6	0.4				
24				72	124	42	9.2	0.3				
25				66	161	51	13.5	0.3				
26				66	192	51	7.5	0.4				
27				84	225	35	7.5	0.4				
28				97	225	35	3.2	0.4				
29				124	192	28	2	0.4				
30				113	161	25	2	0.4				
31					161		8.2	0.4				
Mean				89	168	87	8.2	0.6	0.5			
Run-off acre-feet				1230	10300	5170	504	37	16			

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Soda Creek at Steamboat Springs for 1914. Drainage Area, 47 Square Miles. Altitude, 6,680 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					57	410	72	2	11	2		
2					57	490	57	2	2.5	2		
3					64	358	41	2	2	2		
4					64	322	41	2	1.5	2		
5					57	305	45	1	1.5	4		
6				51	57	322	37	1	1.5	5		
7				45	57	270	28	1.5	1			
8				26	90	182	24	2	1			
9				28	148	148	22	1.5	1			
10				22	157	196	14	1.5	1			
11				26	157	225	15	1.5	0.8			
12				26	122	305	14	1	0.8			
13				24	134	322	11	1	1			
14				31	134	340	9	1	1.5			
15				51	157	340	9	1	2			
16				51	210	305	8	1	2.5			
17				57	210	270	7	1	1.5			
18				64	240	240	6	1	1			
19				64	270	270	4	1	1			
20				64	240	358	4	1	2			
21				64	358	375	4	1	3			
22				57	375	375	5	1.5	2.5			
23				57	358	210	6	1.5	2			
24				57	322	157	4	1	2			
25				64	322	225	3.5	1	2			
26				57	270	157	3	1.5	2			
27				57	340	111	3	2	2			
28				57	270	90	3	1.5	2			
29				57	322	90	3	1.5	2			
30				57	322	81	2.5	1.5	1.5			
31					340		2.5	2				
Mean				48	203	262	16	1.3	2	2.8		
Run-off acre-feet				2410	12500	15600	1010	85	117	34		

Unless otherwise noted, all discharges are in cubic feet per second.

ELK HEAD CREEK NEAR CRAIG, COLO.

Location.—One mile above the mouth at bridge on road between Steamboat Springs and Craig, the latter being 6 miles west. No tributary between the station and the mouth and none for several miles above.

Records Available.—April 27 to September 7, 1906; April 17, 1910 to November 30, 1914.

Drainage Area.—249 square miles.

Gage.—Chain gage.

Channel.—Practically permanent.

Diversions.—There are court decrees for diversions of 45 second-feet from Elk Head Creek above the station and 48 second-feet from tributaries entering above. In addition, there are conditional decrees for reservoir diversions of 177,000 acre-feet from Elk Head Creek and a diversion of 587 second-feet from the North Fork.

DISCHARGE MEASUREMENTS ON ELK HEAD CREEK NEAR CRAIG.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 10	C. L. Chatfield.....		11*	Apr. 8	C. L. Chatfield.....	5.82	197
May 15	C. L. Chatfield.....	6.14	288	May 13	C. L. Chatfield.....	8.66	859
June 2	C. L. Chatfield.....	4.80	93	June 30	C. L. Chatfield.....	4.52	42
July 19	C. L. Chatfield.....	3.50	0.8				

*Ice conditions.

FORTIFICATION CREEK AT CRAIG.

Location.—One-eighth mile east of Craig on the road to Hayden. No tributaries between the station and the mouth, and none for some distance above.

Records Available.—June 12, 1905 to July 30, 1906; March 5, 1910 to November 21, 1914.

Drainage Area.—256 square miles.

Gage.—Chain gage.

Channel.—Very shifting.

Discharge Measurements.—Made from bridge.

Diversions.—There are court decrees for diversions of 91 second-feet from Fortification Creek above the station and 20 second-feet from tributaries entering above. There is also a conditional decree for a diversion of 235,000 acre-feet from Fortification Creek.

DISCHARGE MEASUREMENTS ON FORTIFICATION CREEK AT CRAIG.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 18	C. L. Chatfield.....	3.80	52	Apr. 9	C. L. Chatfield.....	5.05	152
May 30	C. L. Chatfield.....	3.40	28	Apr. 17	C. L. Chatfield.....	5.62	222
				May 14	C. L. Chatfield.....	6.74	344
				June 12	C. L. Chatfield.....	5.20	143
				June 30	C. L. Chatfield.....	3.30	1.0
				Sept. 10	C. L. Chatfield.....		0.2*

*Est. almost dry.

WILLIAMS RIVER AT HAMILTON.

Location.—Near Hamilton, at highway bridge, on the road from Meeker to Craig. Morapos Creek, the nearest tributary, enters some distance below the station.

Records Available.—April 29, 1904 to October 31, 1906; April 15, 1910 to November 30, 1914.

Drainage Area.—341 square miles.

Gage.—Chain gage.

Channel.—Shifting.

Discharge Measurements.—Made from highway bridge.

Diversions.—There are court decrees for diversions of 40 second-feet from Williams River above the station, and 7 second-feet below. There are also decrees for diversions of 87 second-feet from tributaries entering above.

DISCHARGE MEASUREMENTS ON WILLIAMS RIVER AT HAMILTON.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 8	C. L. Chatfield.....		42*	May 14	C. L. Chatfield.....	5.85	965
May 25	C. L. Chatfield.....	4.95	658	June 29	C. L. Chatfield.....	4.44	382
May 26	C. L. Chatfield.....	5.54	864	Aug. 8	C. L. Chatfield.....	3.08	82
July 24	C. L. Chatfield.....	3.90	317				
Oct. 22	C. L. Chatfield.....	2.95	72				

*Ice conditions.

Discharge at Elk Head Creek near Craig, for 1913.
Drainage Area, 249 Square Miles. Altitude, 6200 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					788	101	1	4	0.5	4	7	10
2					655	83	1	4	0.5	4	7	10
3					530	72	1	4	0.5	4	10	10
4					530	62	1	4	0.5	4	10	10
5					500	58	1	1	0.5	4	10	10
6					570	49	1	1	0.5	8.5	10	10
7					644	45	1	1	0.5	18	10	10
8					611	38	1	1	0.5	12	10	10
9					520	38	1	1	0.5	8.5	10	10
10					490	38	1	1	0.5	7	10	10
11				120	490	34	1	1	0.5	7	10	10
12				179	460	34	1	1	0.5	7	10	10
13				263	440	31	1	1	0.5	7	10	10
14				355	364	31	1	1	0.5	7	10	
15				480	290	31	1	1	0.5	7	18	
16				540	263	31	1	1	0.5	7	15	
17				590	254	31	1	1	0.5	7	15	
18				622	236	20	1	1	0.5	7	15	
19				677	236	15	1	0.5	0.5	7	15	
20				699	228	7	1	0.5	0.5	7	15	
21				765	236	7	2.5	0.5	0.5	7	12	
22				644	220	7	10	0.5	0.5	7	10	
23				550	195	7	20	0.5	0.5	10	10	
24				412	236	7	15	0.5	10	10	10	
25				355	236	7	8.5	0.5	5.5	10	10	
26				272	195	4	8.5	0.5	4	7	10	
27				440	195	4	7	0.5	4	7	10	
28				550	179	4	7	0.5	4	7	10	
29				732	163	4	7	0.5	4	7	10	
30				904	127	2.5	4	0.5	4	7	10	
31					107		4	0.5		7		
Mean				507	361	30.2	3.7	1.2	1.6	7.4	11	10
Run-off acre-feet				20100	22200	1800	228	74	95	455	655	258

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Elk Head Creek near Craig for 1914.
Drainage Area, 249 Square Miles. Altitude, 6200 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				150	490	450	24	10	4	4	10	
2				180	500	420	15	8	4	4	10	
3				267	610	400	15	6	3	4	10	
4				430	663	360	10	6	3	4	10	
5				225	915	370	10	6	3	15	10	
6				410	685	331	10	6	3	10	8	
7				410	696	350	10	6	3	6	6	
8				258	890	380	8	6	3	18	6	
9				250	1150	380	10	6	3	24	6	
10				233	1270	303	6	4	3	27	6	
11				250	1270	250	6	4	3	20	4	
12				276	904	233	6	4	3	20	4	
13				267	708	218	6	4	3	15	4	
14				303	819	188	6	4	4	15	4	
15				480	852	172	6	4	6	15	4	
16			165	600	840	172	6	4	12	15	4	
17			180	520	958	150	6	4	6	15	4	
18			165	312	1030	121	6	4	6	15	4	
19			128	250	930	114	6	4	6	15	4	
20			76	294	944	100	6	4	6	12	4	
21			46	590	973	158	6	4	4	12	6	
22			50	631	930	114	15	3	4	15	6	
23			55	865	917	107	10	3	4	24	6	
24			55	520	1000	88	10	3	4	27	6	
25			65	400	696	76	10	3	4	24	6	
26			107	480	570	65	10	3	4	15	6	
27			202	600	530	50	10	4	4	12	6	
28			180	400	550	46	10	4	4	12	6	
29			225	410	520	41	15	4	4	12	6	
30			150	390	460	38	10	4	4	10	6	
31			142		460		10	4		10		
Mean			124	388	798	208	9.4	4.5	4.2	14.4	6.1	
Run-off acre-feet			3950	23100	49000	12400	583	276	252	885	361	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge at Fortification Creek at Craig for 1913.
Drainage Area, 256 Square Miles. Altitude, 6,185 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					210	18	0	0	2	1	1	12
2					175	12	0	0	0	1	1	12
3					140	9	0	0	0	0.5	4	12
4					140	6	0	0	0	0.5	6	12
5					120	5	0	0	0	25	6	7
6					130	3	0	0	0	17	3	7
7					170	2	0	0	0	10	4	
8					150	2	0	0	3	6	5	
9					140	2	0	0	35	4	5	
10					130	3	0	0	5	7	5	
11					130	2	0	0	2	7	3	
12				50	122	1	0	0	1	6	3	
13				92	110	2	0	0	1	6	7	
14				140	100	2	0	0	1	4	9	
15				190	75	1	0	0	1	3	7	
16				180	55	0	0	0	2	4	7	
17				180	50	0	0	0	2	4	5	
18				185	55	0	0	0	2	4	5	
19				190	55	0	0	0	2	2	4	
20				200	50	0	40	0	0.5	1	4	
21				220	50	0	10	0	0.5	1	7	
22				180	35	0	10	0	0.5	5	10	
23				130	35	0	10	0	32	4	10	
24				95	35	0	9	0	8	3	9	
25				85	40	0	8	0	7	4	9	
26				85	45	0	0	0	3	4	10	
27				92	50	0	0	0	3	4	12	
28				122	30	0	0	0	1	6	14	
29				200	30	0	0	0	2	6	10	
30				210	30	0	0	0	2	4	12	
31					25		0	17		2		
Mean				149	87	2.3	2.8	0.55	4	5	6.6	10.3
Run-off acre-feet				5600	5350	137	172	34	238	307	393	123

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge at Fortification Creek at Craig for 1914.
Drainage Area, 256 Square Miles. Altitude, 6,185 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				545	175	270	3	5	0	1	1	
2				622	200	300	3	2	0	3	1	
3				654	396	270	3	1	0	2	1	
4				638	309	255	7	2	0	7	1	
5				594	303	305	7	1	0	10	1	
6				522	291	232	7	1	0	7	1	
7				403	210	226	3	1	0	3	1	
8				243	285	232	3	5	0	90	2	
9				160	417	200	1	1	0	66	3	
10				175	501	152	1	0.5	0	28	5	
11				118	487	148	1	0	0	16	10	
12				115	333	138	1	0	0	16	5	
13				135	267	125	1	0	0	13	3	
14				150	309	134	2	0	1	3	5	
15			445	267	375	112	2	0	5	1	3	
16			614	297	345	90	1	0	2	3	3	
17			646	255	351	70	1	0	1	5	3	
18			654	155	389	59	1	0	0.5	5	2	
19			417	115	333	56	1	0	0	5	5	
20			237	150	356	52	1	0	5	5	5	
21			220	237	400	66	1	0	3	7	5	
22			120	261	425	52	1	0	3	7		
23			165	309	485	38	1	1	3	25		
24			237	261	485	25	1	1	2	16		
25			375	170	375	16	1	0	1	19		
26			452	190	295	13	1	0	1	7		
27			750	261	265	5	1	0	1	3		
28			726	205	305	7	1	0	3	2		
29			606	160	320	7	1	0	0.5	1		
30			598	165	275	5	66	0	0	1		
31			598		265		45	0		1		
Mean			462	284	340	122	5.5	0.7	1.1	12.2	3.1	
Run-off acre-feet			15600	16900	20900	7260	337	43	64	750	131	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Williams River at Hamilton for 1913.

Drainage Area, 341 Square Miles. Altitude, 6,400 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				985	755	678	135	95	50	95	50	
2				875	795	538	125	95	72	95	50	
3				918	678	505	118	88	58	95	45	
4				358	538	475	102	88	235	110	45	
5				345	590	490	95	95	185	95	40	
6				332	795	460	88	95	118	95	40	
7				282	918	445	72	95	110	95	45	
8				258	815	385	72	80	125	95	40	
9				185	815	385	65	80	95	95	40	
10				195	895	400	72	80	88	95	40	
11				245	1120	400	65	80	80	95	30	
12				258	1120	385	65	80	88	95	30	
13				295	1150	320	65	80	88	110	30	
14				308	835	308	65	80	88	125	40	
15				370	755	295	65	65	95	95	35	
16				415	695	295	72	65	80	95	35	
17				475	625	270	65	65	88	80	35	
18				572	678	270	135	65	80	80	30	
19				590	755	270	225	65	80	80	30	
20				608	755	245	195	65	80	65	30	
21				608	475	235	215	65	80	65	40	
22				505	415	225	205	65	102	65	50	
23				475	475	225	270	65	110	58	45	
24				370	642	225	320	50	95	45	40	
25				358	715	225	185	50	95	45	35	
26				358	755	205	145	50	95	50	35	
27				445	755	185	118	50	95	50	35	
28				608	678	165	102	50	95	50	35	
29				678	755	155	95	50	95	50	35	
30				895	775	155	95	50	95	65	30	
31					735		95	50		65		
Mean				472	750	327	123	71	98	80	38	
Run-off acre-feet				28100	46100	19500	7560	4370	5830	4920	2260	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Williams River at Hamilton for 1914.

Drainage Area, 341 Square Miles. Altitude, 6,400 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				98	328	1310	315	130	75	30	75	
2				112	370	1220	315	105	90	45	68	
3				140	385	1200	290	98	68	52	68	
4				160	475	1120	290	90	45	60	68	
5				160	542	1100	328	90	45	60	75	
6				190	508	1060	205	90	45	60	68	
7				180	560	822	240	90	45	82	68	
8				150	735	682	200	82	45	112	60	
9				130	1040	630	200	75	45	150	60	
10				130	1240	665	180	75	30	120	52	
11				98	1260	805	200	60	30	105	38	
12				130	895	822	180	45	45	98	30	
13				150	875	905	180	30	75	90	20	
14				170	945	925	150	30	75	90	25	
15				230	945	840	140	38	75	82	30	
16				328	895	822	140	45	75	82	45	
17				265	1000	805	120	45	68	82	45	
18				180	1140	770	120	45	60	75	52	
19				150	1140	735	120	45	60	75	60	
20				200	1120	718	120	45	45	75	60	
21				328	1330	665	120	68	45	82	60	
22			112	355	1400	630	150	82	45	82	60	
23			140	415	1720	578	130	60	45	82	60	
24			105	355	1800	525	120	45	45	75	68	
25			112	328	1490	508	105	45	45	82	68	
26			130	385	1200	475	112	45	38	68	68	
27			140	340	1200	430	120	60	38	82	75	
28			150	315	1420	370	170	75	30	82	68	
29			98	302	1440	370	170	60	30	82	68	
30			90	315	1380	340	150	52	30	82	68	
31			75		1260		140	52		75		
Mean			115	226	1030	762	180	64	51	81	58	
Run-off acre-feet			2280	13500	63300	45300	11100	3960	3040	4960	3430	

Otherwise noted, all discharges are in cubic feet per second.

MIDDLE FORK OF LITTLE SNAKE RIVER AT GARDNER'S RANCH.

Location.—At Gardner's ranch, in sec. 21, T. 11 N., R. 86 W., on the county road bridge 10 miles above Battle Creek.

Records Available.—May 8 to November 8, 1914.

Drainage Area.—152 square miles.

Gage.—Bristol automatic gage.

Channel.—Practically permanent.

Discharge Measurements.—From bridge.

Co-operation.—The State engineer maintains the station in co-operation with the Elk River Irrigation & Construction Co.

DISCHARGE MEASUREMENTS ON MIDDLE FORK OF LITTLE SNAKE RIVER AT GARDNER'S RANCH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 12	C. L. Chatfield		15.5*	Apr. 14	C. L. Chatfield	1.54	112
June 10	C. L. Chatfield	1.85	203	July 19	C. L. Chatfield	0.83	40
July 28	C. L. Chatfield	0.59	23	Oct. 2	C. L. Chatfield	0.60	21
Aug. 26	C. L. Chatfield	0.30	10 2				
Oct. 17	Chatfield & Finley	0.57	14				

*Ice conditions.

SOUTH FORK OF LITTLE SNAKE RIVER AT GARDNER'S RANCH.

Location.—At Gardner's ranch, in sec. 28, T. 12 N., R. 86 W., 10 miles above Battle Creek. No important tributary between the station and the mouth.

Records Available.—May 8 to November 8, 1914.

Drainage Area.—46 square miles.

Gage.—Bristol automatic gage.

Channel.—Practically permanent.

Discharge Measurements.—From bridge.

Diversions.—There are decrees for adjudicated diversions of 8 second-feet from the South Fork.

Co-operation.—The State engineer maintains the station in co-operation with the Elk River Irrigation & Construction Co.

DISCHARGE MEASUREMENTS ON SOUTH FORK OF LITTLE SNAKE RIVER AT GARDNER'S RANCH.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 13	C. L. Chatfield		5.4*	Apr. 14	C. L. Chatfield	1.52	55
June 10	C. L. Chatfield	1.20	25	July 19	C. L. Chatfield	1.03	13.3
July 28	C. L. Chatfield	0.78	3.12	Oct. 3	C. L. Chatfield	1.12	16
Aug. 26	C. L. Chatfield	0.70	2.24				
Oct. 17	Chatfield and Finley	0.97	9.8				

*Ice conditions.

LITTLE SNAKE RIVER NEAR DIXON, WYO.

Location.—One mile west of Dixon, Wyo., in sec. 6, T. 12 N., R. 90 W. Nearest tributaries are Cottonwood Creek, which enters a short distance east of Dixon, and Willow Creek, which enters a mile or less downstream.

Records Available.—May 27, 1910 to November 30, 1914.

Drainage Area.—1,294 square miles.

Gage.—Chain gage.

Channel.—Slightly shifting during high water.

DISCHARGE MEASUREMENTS ON LITTLE SNAKE RIVER NEAR DIXON, WYO.

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 11	C. L. Chatfield		99*	Apr. 15	C. L. Chatfield	4.04	1731
Feb. 13	C. L. Chatfield		92*	June 10	C. L. Chatfield	4.80	2380
May 29	C. L. Chatfield	4.70	2332	July 20	C. L. Chatfield	0.90	75
June 11	C. L. Chatfield	2.97	993				
July 26	C. L. Chatfield	0.80	93				
Aug. 26	C. L. Chatfield	0.40	10.5				
Oct. 16	Chatfield and Finley	1.07	147				

*Ice conditions.

Discharge of Middle Fork of Little Snake River at Gardner's Ranch for 1913.

Drainage Area, 152 Square Miles. Altitude, 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					563	328	120	20	16	26	26	
2					431	313	120	18	20	26	23	
3					401	261	110	18	18	29	23	
4					416	261	100	20	13	45	20	
5					497	235	92	18	16	49	23	
6					629	235	100	23	16	35	20	
7					648	209	100	23	20	26	23	
8					612	235	110	18	16	32	18	
9					684	222	100	18	18	32	23	
10					755	174		18	18	29	20	
11					758	186		16	13	29	20	
12					740	163		16	13	26	23	
13					666	174	110	16	12	38	23	
14					563	163	110	13	13	45	23	
15				174	464	152	140	13	20	41	20	
16				186	431	140	130	13	16	26		
17				222	431	140	163	13	13	20		
18				300	480	140	163	12	13	23		
19				371	464	140		13	13	23		
20				371	416	152		13	13	20		
21				386	356	152		13	13	20		
22				342	300	152		13	20	23		
23				248	287	140	45	13	20	23		
24				209	287	152	49	13	23	26		
25				209	274	186	32	12	20	29		
26				235	287	163	32	12	23	18		
27				300	261	140	26	10	23	26		
28				431	300	130	23	9	23	23		
29				546	261	130	23	9	23	29		
30				629	274	120	20	10	23	29		
31					287		20	18		23		
Mean				322	459	182	85	15	18	29	22	
Run-off acre-feet				10200	28200	10800	4040	922	1070	1780	651	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Middle Fork of Little Snake River at Gardner's Ranch for 1914.

Drainage Area, 152 Square Miles. Altitude, 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					328	962	92	29	18	18	26	
2					342	982	83	29	18	23	26	
3					328	859	83	26	16	26	26	
4					416	859	100	26	16	38	26	
5					431	740	110	23	13	29	29	
6					401	629	70	20	13	32	29	
7					448	596	59	20	13	35	26	
8					703	530	54	23	13	49	26	
9					982	464	54	23	12	59		
10					1117	431	49	18	10	54		
11					900	401	49	18	13	49		
12					703	401	41	18	13	35		
13					703	386	38	18	18	35		
14				130	798	356	41	18	18	32		
15				140	859	313	49	18	23	35		
16				152	982	300	38	16	35	41		
17				120	1117	274	35	13	32	41		
18				100	1117	248	35	18	23	41		
19				110	1186	235	32	18	20	35		
20				163	1211	287	35	16	18	35		
21				261	1162	248	35	18	36	35		
22				401	1285	209	49	23	23	49		
23				416	1460	209	38	32	18	59		
24				342	1310	163	35	18	18	45		
25				313	1117	140	32	18	18	45		
26				313	1027	92	35	18	18	35		
27				287	941	120	35	23	18	32		
28				274	1072	100	29	20	18	32		
29				300	982	92	35	18	18	29		
30				313	941	83	35	18	18	32		
31					941		35	18		32		
Mean				243	881	391	50	20	19	38	27	
Run-off acre-feet				8200	54200	23200	3050	1250	1110	2320	424	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Fork of Little Snake River at Gardner's Ranch for 1913.

Drainage Area, 46 Square Miles. Altitude 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					164	113	8	3	4	6	8	
2					143	103	6	2	4	6	8	
3					123	94	4	2	4	6	10	
4					123	84	6	2	3	10	8	
5					123	84	6	3	4	20	8	
6					143	84	3	4	4	13	10	
7					143	74	3	3	3	10	10	
8					143	65	3	3	4	10	10	
9					154	48	2	2	6	10	8	
10					164	40	3	2	3	13	8	
11					123	32	4	2	3	13	8	
12					143	26	3	2	3	10	8	
13					164	32	2	2	3	10	10	
14					143	26	2	2	3	10	13	
15				154	133	20	3	2	4	10	10	
16				143	123	16	3	2	3	8		
17				154	133	13	3	2	3	10		
18				154	133	16	4	2	3	8		
19				164	133	13	6	3	3	8		
20				103	133	16	3	3	3	8		
21				196	133	16	4	3	3	10		
22				154	123	16	4	3	4	13		
23				123	123	10	4	4	3	10		
24				123	133	10	13	3	6	10		
25				113	133	8	6	3	4	13		
26				84	133	16	4	2	6	10		
27				143	133	13	3	1.5	6	10		
28				143	123	10	2	1.5	6	10		
29				164	123	10	2	2	6	10		
30				164	123	8	2	3	6	13		
31					123		2	4		10		
Mean				142	135	37	4	2.5	4.2	10.2	9.1	
Run-off acre-feet				4520	8300	2200	246	154	250	627	272	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Fork of Little Snake River at Gardner's Ranch for 1914.

Drainage Area, 46 Square Miles. Altitude 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					105	164	20	13	10.5	16	20	
2					125	164	20	13	10.5	20	16	
3					115	143	20	10.5	8	20	16	
4					125	143	20	8	10.5	26	16	
5					125	143	16	8	10.5	20	20	
6					123	133	13	8	10.5	20	20	
7					133	123	16	8	8	20	20	
8					174	103	16	10.5	8	32	26	
9					185	103	20	10.5	8	48		
10					206	94	16	8	10.5	40		
11					174	94	13	8	13	40		
12					164	94	13	8	13	26		
13					154	84	10.5	8	13	20		
14				59	164	65	13	8	13	20		
15				65	174	65	13	8	13	20		
16				95	174	65	10.5	8	13	20		
17				80	185	65	13	8	13	20		
18				60	206	56	13	8	13	20		
19				50	206	48	10.5	10.5	13	20		
20				60	206	65	13	8	16	16		
21				95	206	56	13	10.5	13	16		
22				95	218	40	13	13	13	26		
23				65	240	48	13	13	13	32		
24				48	229	40	13	10.5	13	32		
25				55	196	32	13	10.5	16	20		
26				105	174	32	13	8	16	20		
27				88	164	32	13	10.5	16	20		
28				88	196	20	10.5	10.5	13	20		
29				88	185	20	13	13	13	20		
30				88	185	20	13	10.5	13	20		
31					164		13	10.5		20		
Mean				76	174	78	14	9.7	12	24	19	
Run-off acre-feet				2550	10700	4670	873	596	728	1450	306	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Little Snake River at Dixon, Wyo., for 1913.
Drainage Area, 1,294 Square Miles. Altitude, 6,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				1620	2270	1580	111	11	11	42	100	
2				1550	1970	1510	100	20	34	42	111	
3				1370	1440	1340	82	20	27	34	100	
4				1240	1550	1180	74	16	27	49	111	
5				508	1480	1080	65	16	34	100	111	
6				720	1850	991	57	16	34	135	100	
7				612	2230	929	49	11	34	100	100	
8				441	2180	807	42	16	34	100	91	
9				420	2100	749	42	10	34	100	82	
10				382	2270	720	34	11	49	100	82	
11				363	2550	836	16	20	49	91	82	
12				720	2500	693	20	16	34	82	100	
13				1080	2600	612	20	11	34	91	111	
14				1580	2230	533	20	11	34	122	100	
15				1970	1810	508	11	16	34	122	122	
16				1930	1550	462	20	11	42	100	100	
17				2140	1440	401	34	10	49	82	100	
18				1890	1510	382	49	10	34	100	100	
19				2050	1810	382	49	11	34	82	100	
20				2140	1660	325	49	8	27	100	100	
21				2270	1550	289	34	10	20	111	122	
22				1970	1370	238	57	11	27	100	100	
23				1440	1410	223	49	11	34	100	91	
24				960	1550	178	135	11	49	82	100	
25				867	1770	255	122	8	49	82	122	
26				898	2100	363	65	11	49	100	135	
27				1310	2140	238	49	10	49	82	122	
28				1730	1970	178	42	8	49	82	100	
29				2010	2010	178	34	10	49	65	100	
30				2320	1850	163	20	11	34	65	100	
31					1730		20	10		100		
Mean				1350	1890	611	51	12.3	36.6	88	103	
Run-off acre-feet				80300	116000	36400	3140	756	2180	5410	6130	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Little Snake River at Dixon, Wyo., Colorado-Wyoming Line, for 1914.
Drainage Area, 1,294 Square Miles. Altitude, 6,300 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				390	2060	4380	580	122	27	65	122	
2				635	2380	4560	530	100	20	65	122	
3				920	2430	4830	435	122	34	74	111	
4				1110	2840	4740	390	91	34	82	111	
5				1290	3080	5660	530	82	27	82	111	
6				2190	2840	4200	458	65	20	100	100	
7				1980	2430	3660	330	34	20	100	111	
8				1320	3290	3500	238	49	20	238	111	
9				980	4290	2840	270	42	20	290	122	
10				745	5090	2330	208	49	20	330	100	
11				718	4980	2190	178	34	27	178	100	
12				580	3750	2330	178	49	20	178	100	
13				608	3220	2600	163	49	34	163	100	
14				1010	3360	2380	178	49	20	163	100	
15				1700	3500	2020	148	34	20	91	100	
16				2480	4110	2020	148	34	34	111	100	
17				1980	4290	1780	122	34	57	100	111	
18				1220	4560	1780	111	20	74	100	111	
19				980	4740	1700	82	27	82	122	111	
20				1320	4980	1662	65	20	65	100	111	
21				2240	5090	1860	65	20	65	100	111	
22			163	2720	5090	1780	91	20	65	163	111	
23			193	3430	5780	1400	57	20	65	254	100	
24			208	2240	6740	1250	65	20	65	193	100	
25			178	1980	6020	980	65	20	65	178	100	
26			310	2150	4830	890	91	20	65	178	100	
27			505	2190	4560	800	111	20	49	163	100	
28			370	2190	4650	690	178	20	49	148	100	
29			370	1740	4980	635	122	20	49	135	100	
30			350	2020	4380	580	148	20	49	122	100	
31			390		4560		148	20		135		
Mean			304	1570	4160	2400	209	43	42	145	106	
Run-off acre-feet			6020	93400	256000	143000	12900	2640	2500	8930	6320	

Unless otherwise noted, all discharges are in cubic feet per second.

SLATER FORK OF LITTLE SNAKE RIVER, AT BAXTER'S RANCH, NEAR SLATER

Location.—At Baxter's ranch, in sec. 22, T. 11 N., R. 89 W., 10 miles south of Slater.

Records Available.—May 6, 1912 to October 18, 1914.

Drainage Area.—80 square miles.

Gage.—Bristol automatic gage.

Channel.—Rough but permanent.

Discharge Measurements.—From bridge.

Diversions.—There are court decrees for diversions of 14 second-feet from Slater Creek, all below the station.

Co-operation.—The State engineer maintains the station in co-operation with the Elk River Irrigation & Construction Co.

DISCHARGE MEASUREMENTS ON SLATER CREEK AT BAXTER'S RANCH

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Apr. 10	W. P. Finley	2.00	135	Apr. 13	C. L. Chatfield	1.88	70
June 11	C. L. Chatfield	2.30	128				
June 24	W. P. Finley	1.23	25				
July 27	C. L. Chatfield	1.20	15				
Sept. 27	W. P. Finley	1.30	22				

FOURMILE CREEK AT RANGER STATION, NEAR BAGGS, WYO.

Location.—In Colorado, at forest ranger station near Ryan's ranch, in sec. 9, T. 10 N., R. 90 W., 20 miles southeast of Baggs, Wyo.

Records Available.—May 1, 1912 to November 7, 1914.

Drainage Area.—Approximately 4 square miles.

Gage.—Bristol automatic gage.

Channel.—Probably permanent.

Discharge Measurements.—Made from footbridge.

Co-operation.—The State engineer maintains the station in co-operation with the Elk River Irrigation & Construction Co.

DISCHARGE MEASUREMENTS ON FOURMILE CREEK AT RANGER STATION

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 28	Chatfield & Finley	0.90	13.4	Apr. 16	C. L. Chatfield	1.00	20
June 23	W. P. Finley	0.60	2.97	June 10	C. L. Chatfield	0.95	24
July 26	C. L. Chatfield	0.50	1.69				
Sept. 26	W. P. Finley	0.40	2.37				

NORTH FORK OF WHITE RIVER AT BUFORD

Location.—At Genier's ranch, 1½ miles above Buford, about sec. 3, T. 1 S., R. 91 W. No important tributary between the station and the mouth of South Fork. The gage and foot-bridge at Genier's ranch went out on May 27th, and was re-established on June 26th on the private road bridge at Buford P. O., 1½ miles below.

Records Available.—May 24, 1910 to November 30, 1914. From July 18, 1903 to October 31, 1906, a gaging station was maintained by the United States Geological Survey just below Ute Creek, 5 miles above the present station. The records at the two points are very nearly comparable, as no important tributaries enter between the two points.

Drainage Area.—240 square miles.

Gage.—Vertical staff.

Channel.—Practically permanent.

Discharge Measurements.—Made from private road bridge.

Diversions.—There is a court decree for a diversion of 1.6 second-feet from the North Fork above the station, but none below. There are also decrees for diversions of 33 second-feet from tributaries entering above the station.

DISCHARGE MEASUREMENTS ON NORTH FORK OF WHITE RIVER AT BUFORD

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 6	C. L. Chatfield		211*†	May 18	C. L. Chatfield	2.72	1068†
May 22	C. L. Chatfield	1.48	429†	June 26	C. L. Chatfield	1.92	906†
May 23	C. L. Chatfield	1.65	506†	Aug. 5	C. L. Chatfield	0.70	297†
July 23	C. L. Chatfield	1.12	a310				
Oct. 20	C. L. Chatfield	0.55	186†				

*Ice conditions. †At Buford P. O.

(a) At Genier's Ranch.

Discharge of Slater Fork of Little Snake River at Baxter's Ranch for 1913.

Drainage Area, 80 Square Miles. Altitude, 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					305	99	17	*25	28	28		
2					305	65	20	*22	40	32		
3					276	73	20	22	25	28		
4					290	65	17	22	25	25		
5					336	57	*15	25	25	*20		
6					290	57	13	25	22	*20		
7				108	220	82	13	28	20	*20		
8				99	208	150	15	28	25	*22		
9				82	208	161	15	28	22	*22		
10				73	248	172	20	22	17	*22		
11				73	276	172	22	22	20	*25		
12				73	234	172	22	25	22	*25		
13				65	220	172	*22	25	17	*25		
14				65	195	172	*22	28	20	28		
15				50	195	35	*22	28	22	25		
16				22	248	17	*22	28	22	28		
17				17	262	20	*20	25	25	32		
18				20	290	28	*20	25	20	40		
19				25	276	*28	*20	25	15	22		
20				108	276	*25	*20	25	17	28		
21				248	276	*22	20	28	20	28		
22				305	276	22	17	35	17	22		
23				336	276	22	15	40	20	25		
24				320	276	20	13	32	20	28		
25				248	234	13	13	32	22	25		
26				220	220	20	17	35	25	25		
27				234	195	22	17	32	28	28		
28				262	182	*17	22	28	40	28		
29				290	172	11	28	35	32	28		
30				320	161	10	25	35	25	28		
31					150		28	25		32		
Mean				153	244	66.7	19.1	27.7	23.3	26.2		
Run-off acre-feet				7260	15000	3970	1170	1700	1390	1610		

Unless otherwise noted, all discharges are in cubic feet per second. Note.—*Estimated.

Discharge of Slater Fork of Little Snake River at Baxter's Ranch for 1914.

Drainage Area, 80 Square Miles. Altitude, 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					234	571	118	28	17	17		
2					262	613	108	32	15	22		
3					290	571	118	25	13	32		
4					368	700	108	22	13	44		
5					384	613	118	20	13	28		
6					384	550	99	20	13	25		
7					470	550	82	20	13	28		
8					571	470	73	22	12	44		
9					634	434	65	22	12	50		
10					634	417	65	20	12	44		
11					634	434	57	17	13	35		
12					634	470	44	15	15	35		
13				82	634	470	40	15	15	44		
14				99	592	384	44	15	15	35		
15				161	592	352	44	15	20	65		
16				195	592	336	40	15	25	44		
17				150	592	320	40	13	22	40		
18				128	489	305	40	20	20	32		
19				99	613	305	32	20	15			
20				139	634	368	28	15	15			
21				234	634	290	28	15	20			
22				276	700	276	32	22	17			
23				305	745	248	32	20	15			
24				262	656	208	35	17	17			
25				234	571	195	28	15	17			
26				234	529	172	22	15	17			
27				220	529	161	20	20	15			
28				195	656	150	32	17	15			
29				208	634	139	28	17	15			
30				220	550	128	35	15	15			
31					571		28	13				
Mean				191	549	373	54	19	16	37		
Run-off acre-feet				6820	33800	22200	3320	1140	934	1320		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Four Mile Creek at Ranger's Station, near Baggs, Wyo., for 1913.

Drainage Area 4 (Approximated) Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					53	8.5	5.5	2.5	3	1.5	2	
2					40	8.5	3	3	3.5	1.5	2.5	
3					34	8.5	3.5	2.5	5.5	2.5	2.5	
4					34	11	2.5	2	4.5	2	2.5	
5					40	11	2.5	3	4.5	2.5	3	
6					46	11	3	3.5	4.5	1.5	2.5	
7					53	8.5	3	3	4.5	2	2	
8					53	7	2.5	3	4.5	2.5	2.5	
9					53	8.5	2.5	3	7	2.5		
10					60	8.5	3	3	5.5	2.5		
11					60	8.5	3	2.5	5.5	3		
12					53	8.5	3	3	5.5	3.5		
13					40	8.5	3	3	4.5	2.5		
14					34	7	3.5	3	5.5	2.5		
15					29	5.5	3.5	2.5	7	2.5		
16					29	3.5	3.5	2.5	7	2		
17				24	20	3.5	3.5	1.5	5.5	2.5		
18				34	17.2	3.5	4.5	1.5	7	2.5		
19				40	17.2	3.5	4.5	1.5	7	2		
20				34	13.5	3.5	3.5	1.2	5.5	1.5		
21				40	13.5	4.5	3.5	1.2	3	1.5		
22				34	11	3.5	3	1.2	3.5	1.5		
23				24	13.5	3.5	3.5	1.2	2.5	1.5		
24				24	17.2	3.5	4.5	1.2	1	2		
25				20	20	7	3.5	1.5	1	2		
26				29	17.2	7	3	1.5	2	1.2		
27				29	17.2	7	2.5	1.5	2	1.5		
28				53	13.5	5.5	2.5	2	1.5	2		
29				53	13.5	11	2.5	2	1.5	2		
30				53	11	24	2	3	2	2		
31					8.5		2	3		2		
Mean				35	30.2	74.3	3.2	2.3	4.2	2.1	2.4	
Run-off acre-feet				974	1860	442	197	141	250	129	30	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of Four Mile Creek at Ranger's Station, near Baggs, Wyo., for 1914.

Drainage Area 4 (Approximated) Square Miles. Altitude, 7,800 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					20	34	3	1.2	1.5	1.5	1.5	
2					17	40	3	1.5	1.5	1.2	1.5	
3					13.5	29	3	1.5	1.5	1.2	1.5	
4					13.5	40	3.5	1.5	1.5	1.5	1.2	
5					20	40	3	1.2	1.2	1.2	1.2	
6					29	34	2.5	1.2	1.2	1.2	1.5	
7				4.5	40	40	2.5	1.2	1.2	1.2	1.5	
8				4.5	53	34	2.5	1	1.2	1.5		
9				3.5	68	24	2.5	1	1.2	1.5		
10				3.5	85	17	3	1	1.2	1.5		
11				4.5	53	13.5	2.5	1	1.5	1.2		
12				4.5	40	17	1	1	1.2	1.5		
13				3.5	53	17	1	1	1.5	1.5		
14				5.5	60	13.5	1	1	1.2	1.5		
15				13.5	76	8.5	1	1	1.5	2		
16				20	76	8.5	0.5	1	2	2.5		
17				11	76	8.5	0.5	0.8	1.5	2.5		
18				8.5	76	7	0.8	1	1.5	2		
19				8.5	76	8.5	0.8	0.8	3	2		
20				17	68	8.5	0.8	1	1.2	1.5		
21				29	76	7	0.8	1	1	1.5		
22				34	76	5.5	0.8	1	1.2	2.5		
23				29	85	5.5	0.8	1	1.2	2.5		
24				20	68	4.5	0.8	1	1.5	2		
25				20	46	5.5	0.8	0.8	1.5	2		
26				20	40	5.5	1	0.8	1	1.5		
27				20	34	5.5	1	1	0.8	1.5		
28				20	40	4.5	1	1	0.8	1.5		
29				20	40	3.5	1	1	1	1.5		
30				29	40	3.5	1	1.2	1.2	2		
31					34		1.5	1.5		2		
Mean				15.4	51	16.4	1.6	1.1	1.4	1.7	1.4	
Run-off acre-feet				702	3160	978	97	66	80	103	20	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork of White River at Buford for 1913. Drainage Area, 240 Square Miles. Altitude, 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					655	780	275	210	185	185	178	178
2					605	748	250	210	185	185	178	178
3					450	685	250	210	192	185	178	178
4					470	655	250	210	185	192	178	178
5					538	605	230	210	192	192	178	178
6					715	605	230	210	192	192	178	185
7					715	560	220	210	192	185	185	185
8					655	515	230	210	192	178	178	178
9					605	515	230	192	192	185	178	178
10					780	515	230	192	192	178	192	178
11				210	850	515	230	192	192	192	192	
12				210	850	492	210	192	185	201	192	
13				240	780	470	210	192	185	201	201	
14				250	685	430	210	192	192	192	192	
15				345	560	395	220	192	185	192	192	
16				378	492	430	220	192	185	192	192	
17				395	492	395	240	192	185	185	192	
18				412	582	395	275	192	192	178	192	
19				430	515	395	262	192	178	185	178	
20				430	515	395	300	192	178	192	178	
21				470	430	360	275	192	178	192	192	
22				395	395	330	275	192	178	185	178	
23				315	470	330	330	185	192	185	178	
24				300	560	330	330	185	192	178	178	
25				300	655	360	275	185	192	178	185	
26				300	630	330	275	185	192	178	185	
27				470	655	300	240	185	192	192	185	
28				560	655	300	230	185	185	178	178	
29				748	748	300	230	185	185	178	178	
30				685	850	275	210	185	185	178	178	
31					780		210	185		178		
Mean				392	624	457	247	195	188	186	190	179
Run-off acre-feet				15600	38400	27200	15200	12000	11200	11400	11300	3560

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of North Fork of White River at Buford for 1914. Drainage Area, 240 Square Miles. Altitude, 7,000 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				178	360		760	342	280	222	235	
2				178	300		730	325	280	222	235	
3				178	378		640	325	280	222	235	
4				192	402		640	310	265	222	235	
5				201	492		760	310	250	250	235	
6				210	560		640	295	250	235	235	
7				192	655		585	295	235	235	235	
8			178	201	875		530	295	235	235	235	
9			178	192	1100		530	295	235	235	235	
10			178	192	1200		480	295	235	235	222	
11			172	192	1060		458	295	235	235	222	
12			166	192	935		458	280	235	235	222	
13			172	210	1030		458	280	235	235	222	
14			178	210	1100		435	265	250	235	222	
15			172	275	968		395	265	250	235	222	
16			172	300	968		395	265	265	235	222	
17			178	275	1160		395	265	250	235	222	
18			178	240	1130		395	265	250	235	222	
19			178	220	1030		395	265	235	235	222	
20			178	275	1200		378	265	235	235	222	
21			178	330	1240		360	265	235	235	222	
22			185	395	1350		360	265	235	265	222	
23			172	395	1900		360	265	235	265	222	
24			166	360	1720		342	265	235	235	210	
25			166	345	1390		342	265	235	235	198	
26			172	360	1350	895	342	325	222	235	198	
27			172	330	1310	895	342	280	222	235	198	
28			178	330		830	360	280	222	235	198	
29			172	330		830	360	280	222	235	198	
30			172	360		760	360	280	222	235	198	
31			172				360	280		235		
Mean			174	261	1010	702	463	285	242	236	221	
Run-off acre-feet			8300	15500	54000	8350	28500	17500	14400	14500	13100	

Unless otherwise noted, all discharges are in cubic feet per second.

WHITE RIVER AT MEEKER

Location.—At Reese's ranch, 3½ miles east of Meeker, in sec. 24, T. 1 N., R. 93 W. Nearest tributary above is Curtis Creek; nearest below is Sulphur Creek. Station moved from Van Cleave's to Reese's ranch October 20, 1913.

Records Available.—May 7, 1910 to October 31, 1914. From April 12, 1904 to October 31, 1906, a station was maintained 2.5 miles below this point by the United States Geological Survey.

Drainage Area.—634 square miles.

Gage.—Automatic recording gage.

Channel.—Practically permanent.

Discharge Measurements.—Made from private road bridge.

Diversions.—There are court decrees for diversions of 186 second-feet from White River above the station and 59 second-feet from tributaries entering above. Below there are decrees for diversions of 198 second-feet from White River.

Note.—Station moved to get above the head of the Meeker Power Canal. Diversion started during winter of 1912-1913. 1913 records prior to October 20 corrected for the diversion. Average diversion about 90 second-feet.

DISCHARGE MEASUREMENTS ON WHITE RIVER AT MEEKER

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
Feb. 7	C. L. Chatfield.....		*362	May 16	C. L. Chatfield.....	2.12	1811
May 21	C. L. Chatfield.....	2.10	b1027	June 25	C. L. Chatfield.....	2.58	2191
May 24	C. L. Chatfield.....	2.32	†1306	Aug. 4	C. L. Chatfield.....	0.95	544
July 23	C. L. Chatfield.....	1.20	† 554				
Sept. 11	C. L. Chatfield.....	0.87	†370				
Oct. 21	C. L. Chatfield.....	0.78	†305				

*Ice cond. meast. 6 miles above Station.

†At Reese Ranch.

(b)At Van Cleave Ranch old Station.

SOUTH FORK OF WHITE RIVER NEAR BUFORD,

Location.—At Shepherd's ranch, 7 miles above Buford, about sec. 7, T. 2 S., R. 90 W. Nearest tributary a small creek that enters from the east just below the station.

Records Available.—July 25, 1903 to October 31, 1906, station maintained by the United States Geological Survey; June 1, 1910 to November 30, 1914.

Drainage Area.—148 square miles.

Gage.—Vertical staff.

Channel.—Fairly permanent.

Discharge Measurements.—Made from highway bridge during high water and by wading at ordinary stages.

Winter Flow.—Ice causes backwater and records are discontinued during the winter months.

Diversions.—There are no court decrees for diversions from the South Fork above the station, but below there is a decree for 5.4 second-feet. There is a decree for a diversion of 9.2 second-feet from tributaries entering above the station.

DISCHARGE MEASUREMENTS ON SOUTH FORK OF THE WHITE RIVER NEAR BUFORD

Date 1913	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.	Date 1914	Hydrographer	Gage Ht. Feet	Discharge Sec. Ft.
May 22	C. L. Chatfield.....	1.95	487	May 17	C. L. Chatfield.....	1.85	446
May 23	C. L. Chatfield.....	2.60	644	June 26	C. L. Chatfield.....	5.05	1336
May 24	C. L. Chatfield.....	3.00	804				
July 22	C. L. Chatfield.....	0.75	199				
Oct. 21	C. L. Chatfield.....	0.45	*166				

*From bridge at White-Bear Ranch 6 miles below Station.

Discharge of White River at Meeker for 1913.
Drainage Area, 634 Square Miles. Altitude, 6,182 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1					860	1830	700	395	395	370	272	
2					860	1830	670	395	420	370	272	
3					762	1700	640	370	370	395	250	
4					670	1580	640	370	395	395	250	
5					730	1540	640	395	370	395	250	
6					892	1430	610	370	395	395	272	
7					1060	1320	580	370	395	370	272	
8					995	1240	580	370	345	395	272	
9					995	1200	580	370	345	395	272	
10					1100	1200	610	370	395	370	250	
11					1240	1240	580	370	395	395	250	
12					1200	1170	580	345	395	395	250	
13				445	1240	1170	550	345	420	395	272	
14				495	1140	1100	522	345	445	370	295	
15				580	960	1060	550	345	420	370		
16				580	828	1030	550	345	420	370		
17				670	795	1060	550	322	395	370		
18				640	828	925	610	322	370	370		
19				700	1100	960	640	322	370	370		
20				730	1140	960	670	300	370	320		
21				795	1100	925	670	300	345	250		
22				730	1060	892	610	322	395	250		
23				610	1170	860	640	345	445	295		
24				522	1280	860	610	322	395	295		
25				495	1320	892	550	322	395	295		
26				470	1470	892	522	322	420	272		
27				522	1580	892	470	322	395	272		
28				700	1580	828	445	345	370	272		
29				828	1700	795	445	345	345	272		
30				960	2080	762	420	395	370	272		
31					1960		420	395		272		
Mean				637	1150	1140	576	351	390	342	264	
Run-off acre-feet				22700	70700	67800	35400	21600	23200	21000	7340	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of White River at Meeker for 1914.
Drainage Area, 634 Square Miles. Altitude, 6,182 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1						2740	1400	400	400	320		
2						2830	1400	400	360	400		
3						2830	1400	360	320	440		
4						2570	1220	360	320	480		
5						2570	1460	400	320	285		
6						2320	1160	400	320	320		
7						2090	1050	400	285	400		
8						1940	940	400	320	480		
9						1800	940	400	320	605		
10						1800	840	440	285	480		
11						1940	740	440	285	440		
12						2090	695	440	320	400		
13						2400	650	400	285	400		
14						2480	650	360	320	360		
15						2400	560	360	360	400		
16					1800	2320	560	285	400	360		
17					1800	2320	560	320	320	400		
18					1800	2400	480	400	320	360		
19					1730	2480	480	360	285	360		
20					1800	2740	480	360	250	360		
21					2090	2830	480	360	320	360		
22					2240	2570	480	360	285	400		
23					2830	2240	480	285	285	480		
24					3100	2240	440	320	285	400		
25					2740	2160	440	440	250	360		
26					2840	2090	440	480	250	320		
27					2400	1940	400	520	180	320		
28					2830	1660	440	360	120	320		
29					2920	1660	440	400	180	320		
30					2740	1530	440	360	250	320		
31					2660		440	400		320		
Mean					2370	2270	729	386	293	386		
Run-off acre-feet					75300	135000	44800	23700	17500	23700		

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Fork of White River near Buford for 1913. Drainage Area, 148 Square Miles. Altitude 7,200 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1				216	260	1640	342	205	142	152	142	
2				216	260	1590	342	205	142	152	142	
3				216	260	1320	318	205	152	152	142	
4				216	272	1160	318	205	152	152	131	
5				216	283	959	306	194	152	152	131	
6				227	354	894	283	194	152	152	131	
7				238	483	831	260	184	142	152	120	
8				238	443	769	260	184	142	131	120	
9				260	443	769	260	184	142	131	110	
10				260	564	678	260	173	131	152	110	
11				260	620	620	260	173	131	152	120	
12				283	693	620	249	173	131	131	131	
13				283	784	592	249	173	131	131	142	
14				283	723	620	238	152	131	152	142	
15				294	693	606	238	152	131	142	131	
16				294	649	564	260	152	131	142	131	
17				238	524	537	260	152	131	131	131	
18				249	564	524	260	142	131	131	131	
19				249	564	510	260	131	131	131	131	
20				260	524	510	260	131	131	142	131	
21				249	510	496	260	131	131	142	131	
22				249	524	496	260	131	131	152	131	
23				260	620	470	260	131	131	152	131	
24				249	816	443	249	131	142	152	131	
25				227	831	443	249	131	142	152	131	
26				238	1150	417	238	131	152	142	131	
27				216	1270	417	238	131	142	142	142	
28				216	1200	392	238	131	131	142	142	
29				216	1420	366	216	131	131	142	142	
30				249	1640	366	216	131	131	142	142	
31					1640		205	131		142		
Mean				246	696	688	262	158	137	144	132	
Run-off acre-feet				14600	42800	40900	16100	9720	8150	8850	7860	

Unless otherwise noted, all discharges are in cubic feet per second.

Discharge of South Fork of White River near Buford for 1914. Drainage Area, 148 Square Miles. Altitude 7,200 Feet Above Sea Level.

Day	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1			150	118	200	1555	915	260	180	160	140	
2			132	118	200	1610	885	260	180	190	140	
3			132	118	190	1680	840	240	170	200	140	
4			132	132	210	1520	810	230	160	220	140	
5			132	132	210	1450	795	220	160	220	140	
6			150	132	200	1470	705	220	160	240	140	
7			150	132	200	1280	630	200	160	240	140	
8			160	118	210	990	592	200	160	230	140	
9			132	118	280	840	505	200	160	230	125	
10			132	118	320	795	492	220	160	220	125	
11			118	118	370	900	468	210	160	220	125	
12			118	132	380	1290	442	200	160	210	125	
13			170	132	370	1700	418	190	160	200	125	
14			200	150	380	1780	405	180	160	200	125	
15			160	150	370	1730	380	180	170	180	125	
16			150	170	418	1660	360	180	180	180	125	
17			170	170	418	1590	360	180	180	180	125	
18			140	180	418	1660	350	180	160	180	125	
19			118	170	505	1730	340	180	160	160	140	
20			118	180	618	1840	330	180	170	160	140	
21			150	180	730	1870	320	180	180	180	140	
22			132	180	885	1710	300	180	160	180	140	
23			132	210	1020	1780	300	180	160	200	140	
24			118	200	1180	1700	290	180	160	180	140	
25			118	190	1060	1520	270	180	160	180	140	
26			118	200	1100	1420	260	190	160	180	140	
27			118	200	1160	1260	260	200	160	160	140	
28			118	200	1200	1180	290	190	140	160	140	
29			118	200	1180	1160	300	200	140	140	140	
30			118	190	1220	885	280	200	150	140	140	
31			118		1420		280	180		140		
Mean			136	148	601	1450	457	199	163	189	135	
Run-off acre-feet			8380	9400	36900	86300	28100	12200	9680	11600	8030	

Unless otherwise noted, all discharges are in cubic feet per second.

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