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DEPARTMENT OF
WATER RESOURCES

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ORIGINAL

IN THE DISTRICT COURT OF THE FIFTH JUDICIAL DISTRICT

OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF TWIN FALLS

In Re SRBA Case No. 39576	Subcase Nos. 63-00179C 63-32580 **STATEMENT REGARDING INJURY AND ENLARGEMENT, AND REQUEST FOR HEARING**

TO: THE IDAHO DEPARTMENT OF WATER RESOURCES

Pioneer Irrigation District, through undersigned counsel of record, hereby submits this Statement Regarding Injury and Enlargement, and Request for Hearing to the Idaho Department of Water Resources ("IDWR"), pursuant to Idaho Code Section 42-1425 and this Court's Trial Scheduling Order of July 17, 2011. This Statement is supported by the affidavit of

Scott King, P.E., filed contemporaneously herewith, as well as by the following attachments hereto:[1]

A. Stewart Decree Testimony related to the Mason Creek Ditch Company;

B. "Return Flow and Seepage Into Boise River During the Low Water Period of 1914," by W.G. Steward, Assistant Engineer in charge of Duty of Water Investigations, Boise Project;

C. "Report on Canal Deliveries from the Boise River and Different Features Affecting These Deliveries, for the Period of July 9, 1914, to September 16, 1914, Inclusive," by A.V. Tallman, Irrigation Engineer;

D. "Report on Return Flow and Seepage into Boise River During the Irrigation Season of 1915," by W.G. Steward and D.J. Paul;

E. "Report on Canal Deliveries from the Boise River and Different Features Affecting These Deliveries for the Period April 1st to October 15, 1916, Inclusive," by A.V. Tallman;

F. "Report on Canal Deliveries from the Boise River and Different Features Affecting These Deliveries for the Period April 1st to September 30, 1917, Inclusive," by A.V. Tallman; and

G. Minutes from Pioneer Irrigation District's Board of Director's meeting on July 6, 1915.

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[1] Hard copies of these reports have been provided only to the Director of IDWR and IDWR's Western Region office. A CD containing PDF versions of these documents have been provided to the SRBA Court and the remaining service parties. Hard copies can be provided upon request.

I.
REQUEST FOR HEARING

Pioneer respectfully requests a formal hearing before IDWR on this matter pursuant to Section 42-1425. Section 42-1425(2)(a) specifically states that if an objection is filed to an accomplished transfer, "the district court shall remand the water right to the director for further ***hearing***. . . ."

Pioneer is aware of the Presiding Judge's Memorandum Decision and Order on Challenge of April 4, 2011, in the Aberdeen-Springfield Canal Co. subcases (01-23B, *et al.*) (the "ASCC Opinion"). In that opinion, the Presiding Judge states that, "[i]t is clear the procedures set forth in Idaho Code § 42-1425 were not intended to require independent administrative proceedings, and do not trigger a separate right of review pursuant to the Administrative Procedures Act." (ASCC Opinion, p. 31.) Instead, according to the Presiding Judge, "the scope of the remand hearing contemplated under Idaho Code § 42-1425 is no broader than that associated with the preparation of a director's report or in the preparation of a supplemental director's report." (*Id.*, p. 32.) In other words, "[t]he parties have the opportunity to submit information and argument to IDWR regarding injury or enlargement," and "IDWR considers the information and argument and files an amended or supplemental report with the Court. . . ." (*Id.*)

Pioneer believes these statements by the Presiding Judge are dicta and therefore not precedential authority on the procedures that apply to a Section 42-1425 remand. *Petersen v. State*, 87 Idaho 361, 365, 393 P.2d 585, 587 (1964); *Long v. State Ins. Fund*, 60 Idaho 257, 260-61, 90 P.2d 973, 974 (1939); *Bashore v. Adolf*, 41 Idaho 84, 88, 238 P. 534, 534 (1925). According to the ASCC Opinion itself, the only issue related to Section 42-1425 that was being considered by the Presiding Judge was articulated as follows:

> Whether the Special Master erred by declining to remand water right 01-23B to IDWR under Idaho Code § 42-1425?

(ASCC Opinion, p. 6.)

This articulation of the issue is consistent with the issue that had been raised and argued by the parties to those subcases. (Objector's Motion to Alter or Amend of 5/28/10, pp. 4-7; Notice of Challenge of 9/14/10, p. 4.) Therefore, under this Court's Rules of Procedure, Docket Sheet notice was only provided regarding the specific issue of whether the refusal to remand was error. Other parties to the SRBA did not have notice that the Court would be addressing the procedures that govern a Section 42-1425 remand.

In addition, the Presiding Judge's analysis of remand procedures under Section 42-1425 is non-binding dicta because it was made without the benefit of legal briefs and arguments made by opposing parties in an adversarial setting. Deciding whether declining to remand in the first place was error is a separate and distinct issue from determining the procedures that apply when a remand is granted. And, Pioneer believes there are compelling arguments that can be made which support the conclusion that Section 42-1425 contemplates a formal hearing. For example, Idaho Code Section 42-1701A states that:

> All hearings required by law to be held before the director of the department of water resources shall be conducted in accordance with the provisions of chapter 52, title 67, Idaho Code, and rules of procedure promulgated by the director.
>
> The director, in his discretion, may direct that a hearing be conducted by a hearing officer appointed by the director. ***In such event, the hearing officer shall have the duty to make a complete record of the evidence presented and duly received at the hearing and to prepare a recommended or preliminary order in accordance with chapter 52, title 67, Idaho Code, and rules of procedure promulgated by the director.***

IDAHO CODE § 42-1701A(1), (2) (emphasis added).

Similarly, the statutes governing administrative hearings, which are incorporated by reference in Section 42-1701A, specifically provide parties with the right of "cross-examination" and to "present evidence." *Id.* at § 67-5242(3). Moreover, Black's Law Dictionary defines a "hearing" as "[a] proceeding of relative formality . . . in which witnesses are heard and evidence presented." BLACK'S LAW DICTIONARY 721 (6th ed. 1990).

Based upon the foregoing, Pioneer respectfully requests that IDWR conduct a formal hearing on injury and enlargement pursuant to Section 42-1425.

II.
FACTUAL AND PROCEDURAL BACKGROUND

Water right 63-00179C was originally decreed to the Mason Creek Ditch Company ("MCDC" or "Mason") in the Stewart Decree of 1906. The point of diversion on the Boise River specified in the Stewart Decree was in Section 16 of Township 4 North, Range 2 West. (Barker Aff. of 9/17/10, Ex. A (Stewart Decree).) This was the heading of the Mason Slough, also known as the Big Slough and Thomas Slough. (King Aff., ¶¶ 4, 8.)

On July 6, 1915, the Pioneer Board of Directors adopted a resolution instructing the President of the Board to make a request to the State Engineer to "continue diverting" "the Mason Creek ditch rights" into the Caldwell Highline Canal.[2] These Board minutes are attached hereto as Attachment G. However, neither of the parties nor IDWR have been able to locate any other administrative documentation associated with this transfer. (Lawrence Aff. of 10/1/10, Ex. C, 76:21-78:3 (30(b)(6) dep. of IDWR).) Without such administrative documentation, it is impossible to determine whether, in the language of Section 42-1425(2), Mason "complied with

[2] This resolution was recently discovered by Pioneer. Neither of the parties nor IDWR were previously aware of this resolution.

sections 42-108 and 42-222, Idaho Code," and, accordingly, whether injury and enlargement issues were analyzed at the time of that transfer.[3]

When IDWR issued its Director's Report recommendation for this right, it recommended the point of diversion as within the NENENE of Section 24 of Township 4 North, Range 2 West. (Lawrence Aff. of 9/14/10, Ex. C (IDWR recommendation for 63-00179C).) This point of diversion is the Caldwell Highline Canal (*see* Lawrence Aff. of 9/14/10, Exs. C (63-00179C recommendation), E (Mason admissions)), which is owned and operated by Pioneer. (*See* Fowler and Zirschky affs. of 9/14/10.) The heading of the Caldwell Highline Canal is approximately three to four miles upstream of the original point of diversion specified in the Stewart Decree. IDWR's recommendation also specifically states that it "includes accomplished change in point of diversion pursuant to Section 42-1425, Idaho Code." (Lawrence Aff. of 9/14/10, Ex. C (63-00179C recommendation).) Pioneer timely objected to the recommended

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[3] MCDC has previously argued that, under Section 42-1425, it "complied" with Sections 42-108 and 42-222 because the contemplated transfer did not require the approval of the State Engineer at that time. (MCDC Mem. in Opp. of 9/28/10, p. 6.) This is not accurate. At the time of the Mason transfer, the statutory predecessor to Section 42-222 required a water user to file an application with the state to change its place of use. *See, e.g.,* Rev. Code § 3264; S.L. 1907, p. 507, § 1; S.L. 1915, ch. 34, § 1. When the change in place of use also involved a change in the point of diversion, the applicant was required to "fully set out" such facts in its application, so that the State Engineer could evaluate whether the "transfer"—not just the change in place of use—injured other water users. *Id.* As this Statement establishes, the Mason transfer involved a change in place of use, because its place of use expanded. Also, at the time of the Mason transfer, the statutory predecessor to Section 42-108 specifically stated that, "[t]he person entitled to the use of water may change the place of ***diversion***, if others are not injured by such change . . . ." Gen. Laws 1899, p. 380, § 11 (emphasis added); Rev. Code § 3247. While there is no specific reference to an administrative application and approval process in this particular statute, in 1915, the Idaho Supreme Court confirmed that a change in point of diversion under Section 3247 (the statutory predecessor to Section 42-108) required "substantial compliance" with Section 3264 (the statutory predecessor to Section 42-222) through the filing of an application by the water user, and the approval of that application by the State Engineer. *Washington State Sugar Co. v. Goodrich*, 27 Idaho 26, 40, 147 P. 1073, 1078 (1915).

point of diversion. (Pioneer's Standard Form 1 Objection of 6/19/07, p. 2 (Subcase No. 63-00179C).)

Based upon this accomplished transfer, on September 14, 2010, Pioneer filed a motion to remand this matter for further hearing pursuant to Idaho Code Section 42-1425. That statute provides in pertinent part:

> If an objection is filed to a recommendation for accomplished change[4] of place of use, point of diversion, nature or purpose of use or period of use, the district court shall remand the water right to the director for further hearing to determine whether the change injured a water right existing on the date of the change or constituted an enlargement of the original right. After a hearing, the director shall submit a supplemental report to the district court setting forth his findings and conclusions. If the claimant or any person who filed an objection to the accomplished transfer is aggrieved by the director's determination, they may seek review before the district court. If the change is disallowed, the claimant shall be entitled to resume use of the original water right, provided such resumption of use will not cause injury or can be mitigated to prevent injury to existing water rights. The unapproved change shall not be deemed a forfeiture or abandonment of the original water right.

IDAHO CODE § 42-1425(2)(a).

On October 22, 2010, the Special Master conditionally granted Pioneer's motion to remand, and required Pioneer to submit a statement of the injury and enlargement issues it would have IDWR investigate. (Mem. Decision and Order of 10/22/10, pp. 10, 11.) Pioneer submitted that statement on October 29, 2010. During the telephonic hearing held November 2, 2010, the Special Master fully granted Pioneer's motion to remand.

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[4] An "accomplished change" occurs when there has been "[a]ny change of place of use, point of diversion, nature or purpose of use or period of use . . . prior to November 19, 1987," where that water right owner "has not complied with sections 42-108 and 42-222, Idaho Code. . . ." IDAHO CODE § 42-1425(2).

During a telephonic status conference of November 30, 2010, the trial and related proceedings were vacated to accommodate settlement negotiations. Pioneer settled its objections with the Franklin Ditch Company, but has not obtained a settlement with the Mason Creek Ditch Company. Therefore, after a scheduling conference, the Special Master issued a Trial Scheduling Order on July 17, 2011, establishing August 19, 2011 as the deadline for submission of injury and enlargement information to IDWR pursuant to Section 42-1425.

III.
GENERAL DISCUSSION OF THE "INJURY" AND "ENLARGEMENT" CONCEPTS IN THE CONTEXT OF WATER RIGHTS

Pioneer is not aware of one definitive statement of what constitutes an "injury" or an "enlargement" in the water rights context. Instead, those concepts have been developed over the years through statutory enactments, case law, IDWR administrative proceedings and rules, and IDWR-issued guidance documents. Therefore, Pioneer believes it will be helpful to briefly discuss these concepts as a general matter, as they have been developed and described by the legislature, the courts, and IDWR.

A. Discussion Of Injury

In the context of a new water right application, injury to an existing water right occurs if:

> i. The amount of water available under an existing water right will be reduced below the amount recorded by permit, license, decree or valid claim or the historical amount beneficially used by the water right holder under such recorded rights, whichever is less.
>
> ii. The holder of an existing water right will be forced to an unreasonable effort or expense to divert his existing water right . . . or;
>
> iii. The quality of the water available to the holder of an existing water right is made unusable for the purposes of the existing user's

> right, and the water cannot be restored to usable quality without unreasonable effort or expense.

WATER APPROPRIATION RULE 45.01(a).

According to the Idaho Supreme Court, "[p]riority in time is an essential part of western water law and to diminish one's priority works an undeniable injury to that water right holder." *Jenkins v. Idaho Dept. of Water Res.*, 103 Idaho 384, 388, 647 P.2d 1256, 1260 (1982).

According to IDWR, "[c]onsideration of this [injury] factor may require an analysis of the timing and location of return flows both before and after a proposed change to determine if the change will reduce the supply ***available*** to other rights." IDWR, ADMINISTRATOR'S MEMORANDUM: TRANSFER PROCESSING POLICIES & PROCEDURES, p. 24 (Transfer Processing No. 24, Dec. 21, 2009) ("TRANSFER MEMO") (emphasis added).

In addressing a depletion of flows by 0.03 cfs, IDWR has stated:

> While the [0.03 cfs] depletion in flow is small, it is still real and determinable.[FN2] Moreover, simply because the injury to a water source is small, doesn't mean the injury should not be mitigated for.
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> * * *
>
> [FN2] This is consistent with the Department's previous statements on this issue. See Final Order, In the Matter of Application for Transfer No. 5174 in the name of Dennis M. Baker and No. 5175 in the name of Huf-N-Puf Trust, at 1 ("Even if the maximum instantaneous depletion would not exceed 0.02 cfs and could not be measured using conventional methods, the hearing officer correctly concluded that such depletion would be 'real'").

In the Matter of Transfer for Application No. 73969 in the Name of Robert Rohe, Final Order and Order Denying Exceptions, p. 6, n. 2 (Idaho Dept. of Water Resources, May 12, 2010) (Spackman, Interim Dir.).

And, as will be noted in the next section, the concepts of injury and enlargement are related, in that an enlargement results in a *per se* injury to junior water rights.

B. Discussion Of Enlargement

According to the Idaho Supreme Court, "[a]n enlargement may include such events as an increase in the number of acres irrigated, an increase in the rate of diversion or duration of diversion." *Fremont-Madison Irr. Dist. v. Idaho Ground Water Appropriators, Inc.*, 129 Idaho 454, 458, 926 P.2d 1301, 1305 (1996). The concept of enlargement also includes "[a]n increase in the volume of water diverted." *Id.* In addition, an enlargement occurs when the "transfer would result in the use of water at a time when it was historically unavailable." *Barron v. Idaho Dept. of Water Resources*, 135 Idaho 414, 420, 18 P.3d 219, 225 (2001). This is consistent with IDWR's position that:

> An application for transfer, which proposes to change a point of diversion from a surface water source to a new location where the water available is greater or more reliable, such as moving from the tributary of a stream downstream to the mainstem of the stream, is presumed to enlarge the water right, unless the proposed change is subject to conditions limiting diversion of water at the proposed new point of diversion to times when water is available and in priority at the original point of diversion.

IDWR, TRANSFER MEMO, p. 31.

Pursuant to Idaho Code Section 42-222(1), in the administrative transfer context, IDWR "may consider consumptive use, as defined in section 42-202B, Idaho Code, as a factor in determining whether a proposed change would constitute an enlargement in use of the original water right." Generally speaking, "consumptive use" is "that portion of the annual volume of water diverted under a water right that . . . otherwise does not return to the waters of the state." IDAHO CODE § 42-202B(1). So, while consumptive use "is not an element of a water right," and while "[c]hanges in consumptive use" alone "do not require a transfer pursuant to

section 42-222," *id.*, consumptive use is relevant to whether a change in point of diversion or other water right element would result in an enlargement of that water right.

It is also notable that, according to the Idaho Supreme Court, the concept of enlargement is directly related to that of injury:

> This Court has made it clear that there are few instances in which an enlarged use will not cause injury to junior appropriators, consequently requiring subordination in the case of a new enlargement. *Fremont-Madison*, 129 Idaho at 461, 926 P.2d at 1308. *Fremont-Madison* held that, "[i]t is difficult, if not impossible, to perceive of a situation in which an enlargement would not injure an appropriator who had an established right if the enlargement receives priority." *Id.* (emphasis added).

A & B Irr. Dist. v. Aberdeen-American Falls Ground Water Dist., 141 Idaho 746, 752, 118 P.3d 78, 84 (2005).

The Idaho Supreme Court's A & B decision quoted above ultimately affirmed the SRBA Court's rulings in the related district court proceedings. *A & B*, 141 Idaho at 754, 118 P.3d at 86. In its rulings, the SRBA Court explained:

> At the time an enlargement occurs the affect on other appropriators may not be physically apparent or apparent because there may be sufficient enough water supply at the time to satisfy all rights on the system as well as the enlargement.[5] However, the relative priority dates on a system only become significant when there is not enough water to supply all water rights on the system. Hence, the essence and value of a water right in a prior appropriation system is the priority date. To the extent a claimant is entitled to retroactively receive a valid water right with a priority date senior

[5] This reasoning further supports the need for IDWR to analyze these issues upon remand, even though the Pioneer Board authorized the Mason transfer in 1915, as does the Legislature's finding in Section 42-1425 "that many of these changes [in place of use, point of diversion, nature/purpose of use, and period of use] occurred with the knowledge of other water users and that the water has been distributed to the right as changed." Obviously, it is IDWR and its predecessor agencies, not Pioneer, that have had the statutory duty to evaluate injury and enlargement.

> to other appropriators on the same source the juniors are per se injured irrespective of the extent of the water supply.

In re SRBA (A & B Irr. Dist.), Order on Challenge, p. 25, Case No. 39576, Subcase Nos. 36-02080, *et al.* (5th Dist., April 25, 2003) (Burdick, P.J.).

In other words, to the extent the transfer of a water right results in the enlargement of that right, the enlarged portion should be considered a separate water right with a priority date as of the enlargement. *See* IDAHO CODE § 42-1426(2).

IV.
DISCUSSION OF INJURY AND ENLARGEMENT ISSUES FOR IDWR TO EXAMINE

As previously noted, after remand, Section 42-1425 requires IDWR to determine whether an accomplished transfer injured an existing water right or constituted an enlargement of the original right. Therefore, the issues that Pioneer wishes IDWR to examine upon remand are as follows:

A. Did Transferring Water Right 63-00179 Into The Caldwell Highline Canal From A Point Three To Four Miles Downstream On The Boise River Allow Mason To Expand Its Irrigation Under That Right?

The record establishes that at the time of the Stewart Decree, Mason's water right 63-00179 was not conveyed into the Caldwell Highline Canal. (Pioneer's Resp. in Opp. to Mason's MSJ, 10/1/10, pp. 12-14.) Instead, that right was diverted from the Boise River approximately three to four miles downstream of the heading of the Caldwell Highline Canal, into the Mason Slough. (*Id.; see also* King Aff. of 9/28/10, Ex. B.) The transfer of Mason's right 63-00179 into the canal allowed Mason water users to access more acres of irrigation when compared to its irrigation practices prior to the transfer.

The Stewart Decree provided MCDC with a water right to irrigate "the lands lying under its canal system." (Barker Aff. of 9/17/10, Ex. A.) According to calculations

performed and a map prepared by Pioneer expert witness Scott King, P.E., at the time of the Stewart Decree, there were approximately 1,116 irrigated, irrigable acres under MCDC's canal system. (King Aff., ¶¶ 2-6, Ex. A.) Transferring 63-00179C from the Mason Slough into the Caldwell Highline Canal allowed MCDC to access additional acreages located above the Mason Slough that could not have been irrigated from the Mason Slough.

Now, IDWR's recommendation authorizes MCDC to irrigate 1,504.3 acres within a larger permissible place of use. This is an enlargement of that water right. Therefore, Pioneer requests that IDWR examine this issue upon remand, as required by Section 42-1425.

B. Did Transferring Water Right 63-00179 Into The Caldwell Highline Canal From A Point Three To Four Miles Downstream On The Boise River Injure Other Water Rights By Diluting Their Priority And Making Less Water Available Under Those Rights?

It is undisputed that the Caldwell Highline Canal has a finite capacity. During the summary judgment proceedings, Pioneer adduced evidence that a particular bridge culvert near the heading of the canal effectively limits its operational capacity to 40-43 cfs. (*See* Pioneer's Resp. Br. of 9/23/10, pp. 4-5; Pioneer's Resp. Br. of 10/1/10, pp. 8-12.) However, determining a particular capacity is not necessary here because, whatever it is, it is a finite number.

Given that the Caldwell Highline Canal has a finite capacity, the transfer of water right 63-00179 into the canal could have injured other junior water rights diverted into the canal and existing at the time of the transfer, including Franklin's water right 63-00167. With a priority date of October 9, 1880, that water right is junior to 63-00179 and therefore could have been injured by the transfer of 63-00179 into the Caldwell Highline Canal. Therefore, upon remand, Pioneer requests that IDWR examine whether the transfer of water right 63-00179 into

the Caldwell Highline Canal injured other water rights existing at that time, specifically including 63-00167.[6]

IDWR should also evaluate injury to other junior water users within "Section 1" of the Boise River. Prior to the transfer of 63-00179C from Mason Slough to the Caldwell Highline Canal, MCDC's diversion was from "Section 2" of the Boise River, while the Caldwell Highline Canal was within "Section 1" of the river. (*See* King Aff., ¶ 13.) Generally speaking, all of the Boise River water which entered Section 1 was diverted within Section 1, and return flows to the river from Section 1 diversions were sufficient to satisfy the downstream diversions in Sections 2, 3, and 4 of the river. (*See* King Aff., ¶ 15.) The Tallman and Steward reports

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[6] The Mason Creek Ditch Company has previously suggested that Pioneer lacks standing to raise issues related to the Franklin Ditch Company water rights. This is fundamentally not true. First, in the context of both administrative transfer proceedings and the SRBA, IDWR is obligated to investigate injury and enlargement, regardless of who many be affected. *See generally* IDAHO CODE § 42-222(1), 42-1425(2)(a); *Barron v. IDWR*, 135 Idaho 414, 420-21, 18 P.3d 219, 225-26 (2001); (*City of Pocatello*, Memorandum Decision and Order on Challenge of 11/9/09, p. 10 (Subcase Nos. 29-00271, *et al.*) ("[a]lthough the amnesty provisions of I.C. § 42-1425 waive the application of the formal transfer requirements, the purpose of the statute is not to put the claimant in a better position than had the transfer requirements been followed by overlooking whether the transfer results in injury or enlargement in the absence of an objection by a third party").) Second, Mason's argument ignores that Pioneer has a substantial interest in ensuring that water right 63-00179C is accurately decreed in the SRBA. As IDWR knows, the Mason right, along with two rights of the Franklin Ditch Company, have all been recommended or decreed for diversion into Pioneer's Caldwell Highline Canal. As the record in this matter demonstrates, these three rights are diverted into fifteen separate diversions from the Caldwell Highline Canal. (*See* King Aff. of 10/1/10, Ex. A.) And, as a complicating factor, three of those fifteen diversion points are lateral ditches which are also used to deliver water to Pioneer's own patrons. (*See id.*) Typically, patrons within an irrigation district are all treated equally, in that they are delivered a certain quantity of water per acre of irrigated land. (*See generally* Zirschky Aff. of 10/1/10, ¶ 4.) Therefore, when deliveries of water to the irrigation district are reduced because the water source is in regulation under the priority doctrine, the effect upon the irrigation district's patrons is generally the same. Here, however, Pioneer is essentially charged with acting as a watermaster, in that it must administer the priority of these three separate ditch company water rights among fifteen diversions from its canal, potentially subjecting Pioneer to legal claims and liabilities if the ditch companies disagree with Pioneer's operation of its canal. Therefore, Pioneer has a substantial interest in ensuring that these water rights are accurately decreed in the SRBA.

from this general time period describe transfers of water from Section 2 to Section 1 as "disastrous" and "injurious to the rights already existing in the section above." (*See* King Aff., ¶ 14.) In other words, such upstream transfers "would injure upstream water rights with priority dates junior to the transferred right, because it would place a new burden on the supply within Section 1, thereby depriving existing Section 1 users of their full water supply." (King Aff., ¶ 15.) In order to avoid this injury, IDWR would need to subordinate 63-00179C to all junior water rights within Section 1 of the Boise River.

IDWR should also evaluate whether the transfer injured water rights associated with the Canyon County Water Company and the Kennedy Ditch. The "Diagram Showing the Average Conditions on the Boise River" in the appendices to the 1914 Steward Report appears to depict diversions from the Boise River labeled "Kennedy" and "Canyon County" upstream of the Mason Slough diversion, but downstream of the Caldwell Highline Canal diversion. This at least raises the possibility that rights associated with those diversions were injured when MCDC transferred its water right to the Caldwell Highline Canal.

C. Did the Change in Mason's Point of Diversion Result in Water Right 63-00179 Being Available More Often?

In its prior briefing, Mason has relied upon the case of *Hillcrest Irr. Dist. v. Nampa & Meridian Irr. Dist.*, 57 Idaho 403, 66 P.2d 115 (1937), as providing a potential explanation for why Mason would have wanted to transfer its water right into the Caldwell Highline Canal. (Mason's Mem. in Opp., 9/28/10, p. 4.)

Hillcrest states:

> It appears that since 1914 all the natural flow of Boise river, during the low water periods, has been used in the irrigation of lands upstream from the head of the Caldwell Highline Canal; and that it has been the practice, in recent years, to dam the river below the intake of that canal and divert, through the Caldwell Highline

> Canal, all the water of the stream that flows down that far. The irrigated lands below the head of said canal have been watered from the return flow of the river, which has been adequate for their irrigation.

Hillcrest, 57 Idaho at 407, 66 P.2d at 116.

What this passage seems to suggest is that prior to the damming of the Boise River at the heading of the Caldwell Highline Canal, downstream water users (presumably including Mason) were not receiving any water "during low water periods," because "all the natural flow of [the] Boise [R]iver . . . [had] been used in the irrigation of lands upstream from the head of the Caldwell Highline Canal. . . ." *Id.* If that is the case, then the change in point of diversion may have resulted in Mason's diversion and use of water at a time of the year when it previously had been unavailable or available in much smaller quantities.

As previously discussed, it appears that Mason transferred its Boise River right from the Mason Slough to the Caldwell Highline Canal in 1915. The evidence available just prior to those years, in 1914, demonstrates that MCDC was diverting very little water from the Boise River into the Mason Slough. For example, on what appears to be the second day of river regulation that year, MCDC was diverting 11.28 cfs of water—less than one third of its total authorized right—despite the fact that 193.34 cfs was available for diversion. (King Aff., ¶¶ 9, 10.) And, from August 8th to September 10th of that year, MCDC diverted an average of 5.6 cfs of water from the Boise River into the Mason Slough, even though an average of 28.5 cfs was available. These records strongly suggest that MCDC simply did not have the physical capability to divert its entire Boise River right into the Mason Slough, particularly as flows in the river decreased later in the irrigation season. Indeed, this is a common attribute of watercourses referred to as "sloughs." (King Aff., ¶ 8.)

In fact, in light of the factual background provided in *Hillcrest* and the watermaster reports, one would assume that Mason would not have pursued a transfer of 63-00179 unless it realized some benefit in the form of water availability. Under the *Barron* case previously cited, this would be an enlargement. Therefore, Pioneer requests that IDWR examine this issue upon remand, as required by Section 42-1425.

D. Did the Transfer of Water Right 63-00179 Into the Caldwell Highline Canal Allow MCDC to Enlarge its Diversions of Boise River Water?

Prior to transferring 63-00179C into the Caldwell Highline Canal, MCDC diverted its Boise River right into the Mason Slough. (King Aff., ¶ 4.) However, the historical record establishes that well prior to the transfer of 63-00179C out of the Mason Slough, the Boise River was not the only source of water within the Mason Slough. Instead, approximately 0.6 miles downstream of where the Mason Slough historically diverted from the Boise River—well upstream of the vast majority of the irrigable acres within MCDC's place of use—Ten Mile Creek emptied into the Mason Slough. (King Aff., ¶ 12.) This is reflected in MCDC's Stewart Decree testimony (Att. A, p. 934) and in the 1914 Steward Report (Att. B, p. 9.) The fact that MCDC has claimed water right 63-33392—a diversion from Five Mile Creek for 17.0 cfs, with a claimed priority date of June 1, 1869—at the same point of diversion where "Ten Mile Creek" historically emptied into the Mason Slough supports this historical record, and demonstrates that MCDC water users historically used "Ten Mile Creek" water conveyed through the Mason Slough for irrigation. (King Aff., ¶ 12.)

Consistent with this hydrography, the historical record reflects that MCDC historically diverted relatively small quantities of water from the Boise River into the Mason Slough. For example, at the beginning of river regulation in 1914, MCDC was only diverting 11.28 cfs of water from the Boise River itself—less than one third of its total

authorized diversion rate at that time of 37.2 cfs. (King Aff., ¶¶ 9, 10.) This was occurring while other canals were diverting considerably higher percentages of their authorized diversion rates. (*See* King Aff., ¶ 11.)

This is significant because, through the SRBA, MCDC is attempting to obtain IDWR's approval for a transfer of the entire 36.2 cfs of water that was decreed in the Stewart Decree (and after the 1.0 cfs was deducted in Transfer #29.) Section 42-1425 requires IDWR to determine if an accomplished transfer resulted in an enlargement of the transferred right. Critical to any enlargement analysis is the concept of historic beneficial use. Typically, IDWR does not simply look at the "paper" water right; it examines the historic beneficial use of the water right to be transferred, and only allows the transfer of the portion of the right that has actually been beneficially used.

Here, while MCDC may have historically diverted and used 36.2 cfs of ***total*** water for irrigation purposes over the years, there is no factual evidence that MCDC ever diverted and used 36.2 cfs of ***Boise River*** water for irrigation. In fact, the available evidence indicates quite the opposite, *i.e.*, that MCDC historically diverted only a fraction of that 36.2 cfs from the Boise River, and obtained the rest of its irrigation water in the Mason Slough from Five Mile Creek. MCDC's claim to 63-33392 confirms this. Regardless of the "paper" water right that MCDC obtained through the Stewart Decree in 1906, by 1914, MCDC was not diverting near that amount of water from the Boise River.

Upon remand, IDWR must substantially reduce the authorized diversion rate of 63-00179C. Otherwise, the transfer of that right into the Caldwell Highline Canal will constitute a considerable enlargement of that right.

E. Did The Transfer Of Water Right 63-00179 Into The Caldwell Highline Canal Result In Reduction Of Conveyance Losses?

Prior to its transfer into the Caldwell Highline Canal, water right 63-00179 was diverted and conveyed through facilities located in areas close to the Boise River, regarded in the Stewart Decree proceedings as the river "bottom" lands. (*See* King Aff. of 9/28/10, Ex. B.) Because these "bottom" lands tend to be more porous than the upgradient lands, it is possible that the transfer of this right into the Caldwell Highline Canal resulted in lower conveyance losses, increasing the availability of water to Mason water users. If this increased availability of water resulted in the irrigation of additional acres, this would constitute an enlargement of those two rights. *See, e.g.*, IDAHO CODE § 42-1426(1)(a) (referring to water right enlargements "through water conservation and other means"). Therefore, Pioneer requests that IDWR examine this issue upon remand, as required by Section 42-1425.

V.
CONCLUSION

Based upon the foregoing, Pioneer respectfully requests that IDWR examine these injury and enlargement issues in accordance with Idaho Code Section 42-1425.

DATED this 19th day of August, 2011.

MOFFATT, THOMAS, BARRETT, ROCK & FIELDS, CHARTERED

By _____
Dylan B. Lawrence – Of the Firm
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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this 9th day of August, 2011, I caused a true and correct copy of the foregoing **STATEMENT REGARDING INJURY AND ENLARGEMENT, AND REQUEST FOR HEARING** to be served by the method indicated below, and addressed to the following:

Mason Creek Ditch Company Represented by: Albert P. Barker Shelley M. Davis BARKER ROSHOLT & SIMPSON LLP 1010 W. Jefferson, Suite 102 P.O. Box 2139 Boise, ID 83701-2139	( ) U.S. Mail, Postage Prepaid (x) Hand Delivered ( ) Overnight Mail ( ) Facsimile
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Dylan B. Lawrence

In re SRBA Subcase Nos. 63-00179C and 63-32580

EXHIBIT A

to

Statement Regarding Injury and Enlargement,
and Request for Hearing

IN THE

SUPREME COURT

OF THE

STATE OF IDAHO

November Term, 1908

Farmers' Co-operative Ditch Company
(a corporation)
Plaintiff and Respondent.

vs.

Riverside Irrigation District, Ltd., et al
Defendants and Respondents.

Nampa & Meridian Irrigation District, Pioneer Irrigation District, Riverside Irrigation District, Ltd., and New York Canal Company, Ltd.,
Defendants and Appellants.

Transcript on Appeal

VOL. I

Appeal from the District Court of the Seventh Judicial District of the State of Idaho, in and for the County of Canyon.

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For Defendant American Ditch Association.

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For Defendant Boise City Irrigation Land Co., or the Ridenbaugh Canal.

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Ryan, Charles	1319-1321	4238-4242

For Defendant Leonard & Manville Ditch.

Leonard, F. L.	1328-1330	4266-4269
McClellan, John	1331-1332	4275-4277
Manville, J. S. D.	1330-1331	4270-4274

For Defendant John Mammon Ditch.

Bowman, M. B.	659-660	2155-2158
Burnett, Pryor	658-659	2150-2154
Mammon, John	651- 658	2129-2149

For Defendant Mammon-Allen & Mammon.

Allen, Clinton	673- 674	2197-2202
Boman, M. B.	667- 670	2180-2188
Hawkes, F. M.	670- 673	2189-2196
Mammon, John	661- 667	2159-2179
Mammon, John (rec.)	676-677	2207-2211

For Defendant The Mason Creek Ditch Company.

Ballard, J. W.	941-941	3056-3056
Cook, L. F.	925- 930	3008-3020
Cook, L. F. (rec.)	930- 932	3021-3028
Hess, George	938- 939	3047-3050
Hess, George, (rec.)	943- 943	3060-3060
Madden, C. F.	921- 923	2995-3001
Milliner, George	932- 936	3029-3042
Potts, Mary	942- 943	3059-3060
Thomas, John	923- 925	3002-3007
Vassar, S. H.	942- 942	3057-3058
Wells, Charles	939- 941	3051-3056
Wells, J. P.	938- 938	3046-3046
Whitney, H. M.	937- 937	3043-3045

For Defendant Peter Meeves.

Meeves, Peter	1360-1361	4362-4366
Walling, Enos A.	1359-1360	4358-4361

For Defendant Middleton Mill Ditch Company.

Annett, W. C. (reb.)	1391-1401	4461-4489
Chaney, S. F.	809- 811	2631-2635
Eagleson, E. G. (reb.)	1401-1405	4490-4504
Everett, Phelps	778- 781	2530-2540
Foote, S. S.	792- 804	2576-2612
Foote, S. S. (rec.)	808- 809	2628-2630
Hartley, C. P.	811- 814	2633-2644
Neth, Peter	814- 816	2645-2652
Palmer, M. B.	771- 778	2507-2529
Smith, J. J.	781- 792	2541-2575
Smith, J. J. (rec.)	804- 808	2613-2627
Stephenson, D. O. (ref.)	1377-1382	4414-4429
Vaughn, Z. B.	1382-1391	4430-4460

For Defendant Middleton Water Cmpany.

Annett, W. C. (reb.)	1391-1401	4461-4489
Ayers, J. F.	1323-1324	4251-4252
Ayers, John O.	1324-1325	4253-4255
Breshears, John	865- 871	2819-2835
Breshears, J. E.	829- 846	2694-2757
Breshears, J. E. (rec.)	1337-1339	4295-4298
Eagleson, E. G. ((reb.)	1401-1405	4490-4504
Estes, Arthur	1325-1326	4257-4258
Exhibit "C"	1332-1336	4278-4289
Ford, J. G.	1325-1325	4256-4256
Groome, J. F.	846- 855	2758-2785
Jones, J. W.	820- 829	2665-2693
Jones, Mary E.	1326-1327	4260-4261
McDonald, F. H.	863- 865	2812-2818
Rainard, A. H.	1336-1337	4290-4291
Spetherman, J. M.	1327-1328	4262-4665
Shelton, F. M.	855- 863	2786-2811
Stephenson, D. O. (reb.(	1377-1382	4414-4420
Thornton, E. M.	1326-1326	4259-4259
Vaughn, T. B.	1382-1391	4430-4460
Wilkins, Mrs. W.	1337-1337	4292-4294

For Defendant The New Dry Creek Ditch Co.

Farmer, T. S.	1114-1114	3596-3598
Martin, Frank	1115-1115	3600-3600
Smith, H. D.	1131-1132	3651-3653
Stephenson, D. O. (rec.)	1114-1115	3599-3599
Wood, Joe	1109-1110	3581-3585

For Defendant New York Canal Co.

Annett, W. C.	1293-1309	4156-4205
Annett, W. C. (reb.)	1391-1401	4461-4489
Prose, J. W.	1260-1263	4051-4061
Brown, N. J.	1250-1252	4020-4027
Cage, M. G. (reb.)	1408-1410	4513-4517
Coston, Mrs. I. N.	1253-1255	4031-4034
Eagleson, E. G.	1267-1273	4075-4091
Eagleson, E. G. (rec.)	1311-1313	4213-4213
Eagleson, E. G. (reb.)	1401-1405	4490-4504

Fenton, W. C. 1264-1267 4065-4074
Goodwin, M. H. 1252-1253 4028-4030
Irvin, Charles H. 1255-1260 4035-4050
Irvin, Chas. H. (rec.) 1263-1264 4062-4064
Rankin, W. A. 1276-1282 4104-4120
Ross, D. W. (reb.) 1410-1428 4518-4577
Smith, Edward 1309-1311 4206-4212
Stephenson, D. O. (reb.) .. 1364-1366 4374-4378
Thompson, W. H. 1273-1276 4092-4103
Vaughn, Zenas M. 1282-1293 4121-4155
Wiley, A. J. 1243-1250 3998-4019
Ross, D. W. (report) 1443-1447 4625-4636

For Defendant Perrault Ditch.

Agnew, J. D. Sr. 1152-1153 3713-3716
Greene, R. E. (reb. for) ... 1430-1435 4583-4596
Harmon, C. F. 1159-1161 3737-3742
Page, Frank 1163-1164 3747-3749
Perrault, Jos. 1153-1157 3717-3730
Perrault, Jos. (rec.) 1161-1163 3743-3746
Stephenson, James 1157-1159 3731-3736

For Defendant Pioneer Canal Co.

Everett .Phelps 1007-1008 3263-3264
Fowler, W. A. 1008-1008 3265-3265
Hart, Frank 1006-1007 3260-3262
McGrath, J. H. 997-1001 3230-3244
Prosser, Amos 1009-1010 3268-3272
Palmer, M. B. 1010-1012 3273-3278
Stewart, J. M. 1003-1005 3249-3254
Swalley, B. F. 1001-1003 3245-3248
Thornton, W. A. 1008-1009 3266-3267
Weeks, J. E. 1005-1006 3255-3259

For Defendant Pioneer Dixie Ditch.

Brooks, Walter 708- 710 2308-2312
Dils, N. S. 692- 694 2257-2263
Froman, I. S. 686- 692 2239-2256
Froman, I. S. (rec.) 720- 721 2345-2349
Garfield, J. B. 694- 695 2264-2266
Johnson, T. T. 701- 708 2285-2307
Keler, F. L. 695- 701 2207-2284
Powell, J. L. 684- 686 2231-2238
Stephenson, D. O. (reb.) .. 1377-1382 4414-4429
Vale, Wiliam 710- 712 2313-2316
Vaughn, Z. B. 1382-1391 4430-4466

For Defendant The Pioneer Irrigation District.

Blomfield, J. D. 1118-1120 3609-3614
Hedges, H. M. 1115-11-8 3601-3608
Hedden, Ed. 1132-1134 3654-3659
Irwin, C. H. 1120-1121 3615-3619
McGee, J. A. 1121-1125 3620-3630
Ross, D. W. 1410-1429 4518-4577
Stephenson, D. O. (reb.) .. 1377-1382 4414-4429
Strohecker, E. R. 1129-1131 3644-3650
Wiley, A. J. 1125-1129 3631-3643

For Defendant Ridenbaugh & Rossi Mill Ditch.

Hard, Wade P. 1186-1188 3820-3823
Ridenbaugh, W. H. 1186-1186 3815-3819
Rossi, A. 1182-1184 3806-3814

For Defendant Riverside Irrigation District Company, Ltd.

Faris, R. W. 1012-1013 3279-3280
Hill, Sylvester 585- 588 1925-1931
Imbler, Henry 645- 646 2110-2112
Kirkpatrick, E. M. 579- 585 1905-1924
Lowell, J. H. 576- 579 1894-1904
Peck, L. W. 588- 590 1932-1939
Ross, D. W. (reb.) 1410-1429 4518-4577
Vaughn, Z. B. 1382-1391 4430-4460
Wright, J. B. 570- 576 1877-1893

For Defendant C. B. Ross.

Johnson, T. T. 595- 595 1955-1956
Ross, C. B. 590- 592 1940-1945
Ross, J. M. 592- 594 1946-1950
Ross, William 594- 594 1951-1951
Ross, C. B. (rec.) 594- 595 1952-1954

For Defendant Seibenberg Co-operative Ditch Co. Ltd.

Beeson, W. N. 741- 742 2413-2414
Beeson, W. N. (rec.) 747-748 2431-2433
Dement, George 742- 744 2415-2419
Hewitt, A. J. 745- 747 2425-2430
Jenkins, C. F. 744- 745 2420-2424
Plowhead, Jacob 730- 733 2377-2387
Seivenberg, William 734- 736 2390-2397
Stafford, L. V. 737- 741 2398-2412
Thomas, John 733- 734 2388-2389

For Defendant Settlers Canal Co.

Green, R. E. (reb.) 1374-1376 4406-4413
Gibard, W. H. 1352-1356 4338-4351

Horton, Chris, (reb.) 1371-1374 4397-4405
Lemp, John 1172-1176 3778-3788
Purdum, R. W. (reb.) 1429-1430 4578-4580
Purdum, R. W. (reb.) 1443-1443 4622-4624
Olden, B. F. 1165-1172 3753-3777
Ross, D. W. (reb.) 1410-1429 4518-4577
Stephenson, D. O. (reb.) .. 1367-1371 4386-4396
Stephenson, D. O. (reb.) .. 1430-1430 4581-4582
Vance, S. E. 1346-1350 4320-4332

For Defendant Stockton Ditch.

Odum, W. B. 946- 946 3070-3071
Stockton, R. H. 943- 946 3061-3069

For Defendant Thurman Mill Slough.

Barber, Thomas 1061-1062 3431-3435
Bedall, Isaac 1045-1046 3382-3386
Clark, Jennie 1059-1060 3427-3427
Davidson, Frank 1052-1052 4303-4304
Dickens, Smith 1051-1051 3401-3402
Goodwin, Hannibal 1049-1049 3394-3395
Coble, Joe 1060-1061 3428-3430
Havird, C. C. 1070-1071 3462-3463
Hutchinson, S. M. 1065-1066 3449-3446
Joplin, Mrs. L. 1062-1064 3436-3441
Joplin, S. N. 1055-1055 3412-3413
Joplin, S. N. (rec.) 1067-1067 3449-3451
Joplin, Andrew 1066-1066 3447-3448
Koble, Joseph 1054-1055 3408-3411
McGuffey, Ed. 1049-1051 3396-3400
McCarty, Mrs. M. 1053-1053 3406-3407
McGuffey, Ed. (rec.) 1070-1070 3459-3460
McGuffey, Ed. (rec.) 1072-1072 3466-3466
Ott, Henry 1046-1049 3387-3393
Ott, Henry 1070-1070 3461-3461
Ray, Ed. 1052-1053 3405-3405
Warner, Ed. 1052-1052 3402-3403
Webster, A. V. 1055-1057 3414-3418
Wilson, Jesse 1057-1059 3419-3426
Wilson, Jesse, (rec.) 1064-1065 3442-3443
Wilson, Jesse (rec.) 1068-1070 3455-3458
Wilson, Jesse (rec.) 1070-1072 3464-3465
Yearian, Mrs. H. 1067-1068 3452-3454

For Defendant Union Ditch Company.

Carpenter, John 1023-1023 3313-3314
Frank, C. H. 1017-1018 3295-3297
Kinkaid, R. S. 1017-1017 3294-3294

Miller, Jule 1018-1019 3298-3301
Patterson, Fred 1014-1017 3284-3293
Patterson, Mrs. L. 1022-1023 3311-3312
Pierce, J. B. 1020-1021 3304-3305
Saxton, H. G. 1019-1020 3302-3303
Wood, Mrs. N. J. 1021-1022 3306-3310

For Defendant Webster Slough.

Barber, Thomas 1344-1344 4313-4315
Bingham, Jacob 1344-1346 4316-4319

For Defendants Wiliam H. Young, et al.

Rice, John C. 1357-1358 4354-4355
Young, William H. (dep.)

1 IN THE DISTRICT COURT OF THE THIRD JUDICIAL DISTRICT OF THE STATE OF IDAHO, IN AND FOR THE COUNTY OF CANYON.

Farmers' Co-operative Ditch Company (a corporation), *Plaintiff,*

vs.

Riverside Irrigating District, limited (a corporation), The Siebenberg Co-operative Ditch Company, limited (a
2 corporation), Frank Gilbert, T. W. Boone, Prior Burnett, Thomas Andrews, H. Ray Boudinot, I. N. Tucker, C. F. J. Peterson, William McNett, Fred J. Kiesel, Neil McCarron, Michael Gilbride, Lower Boise Ditch Company (a corporation), R. H. Stockton ,H. F. Vanderpool, D. D. Campbell, William Ross, Smith Stockton, John Atkins, Ben Ross,
3 John Ross, D. K. McConnel, John Lemp, John Mammon, Bird Bowman, D. Mumford, T. T. Johnston, H. Carlyle, Charles Allen, J. Bowman, Robert McGuire, Frederick Ode, Eureka Ditch Company (a corporation), J. Roland, Lillian Potter, administratrix of the estate of L. D. Potter, deceased; Susan E. Potter, Thad S. Potter, Elisha Potter,
4 Lillian Potter, Ida Potter, James Baker, C. W. Cooper, Pioneer Dixie Ditch Company (a corporation),

William C. Young, Lizzie Young, Estella C. Young, E. M. Kirkpatrick, S. H. Mitchell, L. F. Cook, Triphenia Jobe, administratrix of the estate of J. H. Jobe, deceased; Triphenia Jobe, Charlotte Coonrod and —— Coonrod her husband, Minta Lund and Frank Lund her husband, William Jobe and Alice Jobe, Edith Jobe and Corinna Jobe, minors, A. Holcomb, George Milner, George Hess, John Thomas, H. N. Whitney, Emma S. Lee, Edwin Curtist, Eureka Water Company (a corporation), William Simpson, William Lewis, Huston Frost, Elijah Frost, George Goodrich, R. M. Brannan, William Frost, Adam Schindler, Pioneer Irrigation District (a corporation), Franklin Ditch Company (a corporation), Canyon County Water Company (an association), Francis A. Phelps and Frances Phelps husband and wife, John D. Rutledge, James Hartley, Joseph Wilson, Daniel Masterson, Perry Stoffle, H. McGill, S. S. Foote, J. B. Smith, John Lemp, M. F. Fowler, Thomas Norris, James Harvey, Jacob Alchenberger, Peter Watkins, A. J. Breshears, C. G. Myers, John Langford, F. M. Ryals, Frank Hart, Mrs. A. Moudy, A. Blessinger, Dan Shuee, S. H.

Amended Complaint

Mitchell, T. Cheneworth, W. F. Foster, Mrs. Perkel, Milt McIntyre, Perry Shafer, Hiram Payne, John Steele, J. C. Baldwin, B. F. Swalling, S. McDowell, J. W. Dickson, Amos Prosser, Thomas Martin, T. A. Thornton, Mrs. E. J. McDowell, Joseph Weeks, James Stewart, P. H. Everett, W. A. Fowler, Charles Palmer, Middleton Mill Ditch Company (a corporation), Middleton Canal Company (a corporation), Middleton Water Company (a corporation), Levi Smith, Charlotte Calhoun and David Calhoun her husband, Mrs. E. J. Linder and A. V. Linder her husband, Lizzie Everett and P. H. Everett her husband, Jesse Wilson, Union Ditch Company (a corporation), Dry Creek Ditch Company (a corporation), Farmers' Union Ditch Company (a corporation), Boise Valley Irrigating Ditch Company (a corporation), John Utter, Stephen Utter, J. H. Gallagher, Charles Ryan, William Bubb, I. N. Coston, The Boise City Irrigation and Land Company (a corporation), Settlers Canal Company, limited (a corporation), New York Canal Company, Ltd. (a corporation), A. Rossi, W. H. Ridenbaugh, R. Z. Johnson, Kate Perrault and Joseph Per-

rault her husband, Boise City Canal
11 Company (a corporation), Boise Rapid Transit Company (a corporation), The Canyon County Irrigation Company, limited (a corporation), Denver and Idaho Land Company (a corporation), *Defendants.*

Plaintiff complains and for cause of action against defendants alleges:

I.

That it is a corporation organized and existing un-
12 der the laws of the State of Idaho and has its principal place of business at Parma, County of Canyon, State of Idaho.

II.

That the defendant, the Siebenberg Co-operative Ditch Company, limited, is a corporation organized and existing under the laws of the State of Idaho, and as such, is doing business in Canyon county, Idaho.

III.

That the defendant, the Lower Boise Ditch Com-
13 pany is a corporation organized and existing under the laws of the State of Idaho, and as such, is doing business in Canyon county, Idaho.

IV.

That the defendant, the Eureka Ditch Company, is a corporation organized and existing under the laws of the State of Idaho, and as such, is doing business in Canyon county, Idaho.

V.

That L. D. Potter died intestate in Canyon county,

and I will say that the original appropriation of Mr. Dodd was with the original incorporator, Adam Schindler.

We desire also to have the record show that the articles of incorporation of the Franklin Ditch Company were filed October 29, 1880.

2993 We further wish to have the record show that we introduce in evidence the deed or copy of the deed from the Franklin Ditch Company to the Idaho and Oregon Land and Improvement Company, under date of June 24, 1884. I have to introduce this record in order to get in this resolution. They deed all of it and then deeded back this 1,350 inches.

Then the deed from the Oregon Land and Improvement Company covering this 1,350 inches under date of December 4, 1884, we will have to supply copies from
2994 the record. I have an abstract here.

The Franklin Ditch Company rests.

Testimony in relation to the Mason Creek Ditch Company.

C. F. Madden, called as a witness by said defendant, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I have known the Mason slough since 1865; it has been used for irrigating purposes all the way down from Mr. Schindler's to the canyon. We always
2995 termed it the "outside slough." There is water run into that slough near my place for irrigating purposes. The water has been turned in there for irrigation since the fall of 1866. I dammed the slough off; it was a large slough coming out of the river. The next year—probably a year or two after that, the people

below came up and requested me to let them cut that dam and I consented, but they agreed to put in a box so it would be possible to irrigate the—to regulate the amount of water that would come down that slough.
2996 That must have been in 1868 or 1869—somewhere along there. These people put the box in. They were George Wooten, John Thomas and all the people who live below there and who used the water out of that slough. The slough was larger at that time than it is now. It was 75 or 80 feet then; it is 15 or 20 feet now, that is up at the headgate where it leaves the river.

They have been turning the water in there ever since for irrigating. They put in a new headgate last fall,
2997 the old headgate washed away; in fact there is a couple of hundred yards of soil washed out. The country was all settled up at that time below me to the canyon. George Houten, John Thomas and Davis were land owners. The Davis ranch was benefitted by that water, the Beardsley place, George Wooten, the Cook place, Potts—and I think Potter lived on it afterward; he sold to Potts and Job; I believe Arch Newland was living above the canyon then. It was used for irrigating purposes all the way down the slough. It has
2998 been used for that purpose ever since. I have a dam in the slough and sub it for the purpose of irrigating my timber land and meadow. Mr. Plowhead owned a portion of the land below me; he takes water from that slough. I used water out of this slough for the purpose of irrigating timber land. I testified that I irrigate two tracts from the Franklin ditch, one that my daughter owns—160—and one that I own, 160 and

I irrigated both, or all of these tracts; that is 320 acres.

2999 What this slough sub irrigates I don't have to irrigate from the Franklin ditch. I put this water on the same land that the Franklin ditch goes on.

CROSS EXAMINATION BY MR. WOOD

My timber is on the north 80 of my daughter's entry.

REDIRECT EXAMINATION BY MR. GRIFFITH

The description of the land my daughter owns is the south half of the southwest quarter of section 16, and the north half of the northwest quarter of section 21;
3000 and my quarter is directly south of that. My land is on sections sixteen and twenty-one. This slough runs over that 80 in section 16. This slough coming out of the river, and the other slough coming down, they join together. The creek empties into that slough that we have all irrigated out of, and they all come together about the center of the east 40 of that 80, and the slough runs on west. It leaves the land about the center of the west 40, and it runs off onto Thomas's on the north side and then there is a dam
3001 there to keep it from running back into the river, and the slough runs back and cuts the northwest quarter. This timber that is irrigated by damming the slough is on the north side of the slough, and extends back east.

John Thomas, recalled as a witness, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I stated that I lived where I now live since 1866; I irrigate some of my land from this Mason slough.
3002 About 45, maybe 50 acres is irrigated from this source. I think me and Mr. Wooten put a cut in there in 1868 or '69, a headgate I mean. I had 156 acres there all together; it lies right west, a part of it north of Madden's place, and I irrigated about 45 acres from this slough. I never was in the corporation but used water from it, and everybody below us watered from it. I bought part of the land from a party who was in the corporation. I irrigated the lower tract of land from the Mason slough; it joins Madden's place. I
3003 irrigate the north part of my land from the Mason slough; the place farther down the river. I have got three places up there. I irrigate the two upper ones from the Franklin slough. The third place joins Mr. Wheatley on the north, that is this one next to the railroad. The second one joins Charles Madden. I irrigate in section 17, joining the railroad right of way from the same slough as the Franklin ditch. I do not irrigate from the Franklin ditch, I irrigate 45 acres of the lower place from the Mason slough. There are
3004 107 and 156 acres in the two upper places joining Madden; I irrigate it all; I had it all in cultivation, except what washed away; I stated this morning that I had under cultivation on these two places 160 acres.

CROSS EXAMINATION BY MR. WOOD

I call the northwest quarter of section 17, joining the railroad track, the lower place; I irrigated that all out of the slough. The Franklin ditch has nothing to do with it.

BY THE COURT

3005 There is not a bit of difference between this Mason creek slough and the Mason slough that the Franklin ditch empties into.

BY MR. WOOD

This 75 acres was credited to the Franklin ditch.

BY THE STATE ENGINEER

That is a mistake; I took it all out of the Franklin slough. I irrigate nearly 80 acres from that slough. I think I meant the upper place when I stated that I irrigated nearly 45 or 50 acres. I don't irrigate the
3006 upper place out of the upper slough. I said I irrigate the upper land out of the Mason slough because I had an old ditch up there and I had no water.

BY MR. GRIFFITH

There was 160 acres and a fraction of 37 acres in the Plowhead place, but I think the fraction all washed away and I think a little of the other. I think there is about 120 acres left. The Snobbel place is the same place I bought from him, that is the Plowhead place. In my original place, the place that I took originally there
3007 was 156 acres in one and 107 acres in the other, that would make 267 acres, and from that 40 acres washed off one tract.

L. F. Cook, recalled as a witness, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I have lived about three miles and a half from Cald-

well since 1879; I own about 471 acres there. That land is irrigated from the Boise river through these sloughs; it is pretty hard to tell what I irrigate out
3008 of the main canal of the Pioneer Irrigation District.

There is 80 acres lying outside of all of the sloughs next to the bluff. I have an interest in 79 1-2 inches coming out of the slough and irrigate that 80 acres with that, and the rest of this land is irrigated from this water, from what we would call the Mason slough and the Franklin ditch together. We have had 79 1-2 inches put in our shares. In putting in the ditches in different places when that ditch was built there was 1,350 inches of water to be divided between us, and
3009 the water that comes down is all turned in at two different points, one near the headgate of the ditch and the other at the "Waste slough." One is 800 inches and the other 350 inches, then the Mason creek comes right into the same slough again. I don't know how much water I get from these two sources that comes from the Strahorn heading. The 1,350 inches is divided into 17 shares, and that would give me 125 inches. The whole ranch is all irrigated, that on the bench and all on the bottom, 471 acres.

3010 BY THE COURT

I said this morning that 250 acres was in cultivation in hay and grain; now there is pasture land and hay land.

BY MR. GRIFFITH

I have about 250 acres under cultivation that I irrigate for the purpose of pasture and hay, native grass that grows there wild hay. I knew the people ir-

rigating from this slough, the Mason slough, when first come there. It goes through the Madden ranch,
3011 Thomas, Hamilton Davis, Mr. Beardsley's, now owned by Mr. Whitney, through the Wooten place on down the canyon; through Potts' place and Mr. Wells.' The Potter ranch was all owned at that time by Mr. Potts. Mr. Job is below the Potts ranch. The people incorporated that into a company known as the Mason Creek Ditch Company; they became members of that company and regulated the proportion and distribution of the water from that same source thereafter.

Mr. Madden, Mr. Thomas, Hamilton Davis, Whit-
3012 ney, Milliner and myself, Mr. Hesse, Mr. Wells and Mr. Mason right at the canyon, own this land at the present time. Mr. Smith owns the 40 acres right east of Mr. Whitney. All that is a part of the Hamilton Davis place; it is known now as the Stoddard place.

At the time we made the transfer to the Idaho and Oregon Land and Improvement Company, one year when the water was a little short we saw that we didn't have as much water in the sloughs as we should have, we then went to work and organized an incorporation
3013 known as the Mason Creek Ditch Company, and then we took in other members and other lands beside what was irrigated from the Franklin ditch, persons who are not under the Franklin ditch at all, but have irrigated from this slough. This land has been irrigated from this slough ever since I have been there.

BY MR. WOOD

It is pretty hard for me to tell how much of my land I irrigate from the Mason slough. The water runs together for a half a mile. I take water out of two

places now; I don't know how to get at how much water I use in irrigating land from the Mason slough. I don't know—I would say something over 100 acres of land irrigated from the Mason slough. I would say about 125 acres, maybe 150 acres of my land is actually under cultivation and irrigated from the Franklin ditch. I own besides the west half of section 18, the southeast quarter of the northeast quarter and the northeast quarter of the northeast quarter of section 13, and then I own the southeast quarter of the northeast quarter of section 24.

These two 40's, the west half of section 18, the southeast quarter of the northeast quarter of section 24, then there is a 40 that lies in here (indicating) belonging to a man named Parrish in section 13, between what I own there and own in section 24.

A part of the 40 acres in the northeast quarter of the northeast quarter of section 24 is in alfalfa, about 20 acres. I took up that 10 as a pre-emption about 1885; it was sage brush land. The sage brush has not been cleared off all of it, about one-half of this 40 acres is still in sage brush.

BY MR. BORAH

We generally call what I own 480 acres the township line runs through there and there are a few lots; I think it is 471 acres and a fraction. I could hardly tell you how much I irrigate and how much I put water on. There is some timber land lying next to the river and the sloughs irrigate the timber, I should think there must be 40 acres of it. There must be over 300 acres that I irrigate out of the 471 acres, pasture

land and everything. I don't know how much is sub irrigated from these sloughs. The timber land next to the river sub irrigates. There is about 40 acres of that land. I irrigate this from the Mason ditch and the Franklin ditch.

I have 80 acres lying apart from my other land that I irrigate from the Franklin ditch. That water is not mingled with the Mason creek ditch at all. The Mason creek and Franklin ditch all mingles. There has never been any measuring device arranged by which we could tell how much water I use coming from the Mason creek ditch and how much from the Franklin. I have 80 acres that the Mason creek ditch doesn't irrigate at all. That is irrigated wholly from the Franklin.

BY MR. GRIFFITH

I dam the water up in the sloughs to irrigate the pasture land and the timber land. Most generally the hay land I am aiming to run water out over the land and the grain land I sub it. I flood all my land by entirely by damming the sloughs or running it over the surface one way or another. I wet all of my land in one of these two ways, and from one of these two sources. I have been irrigating this land in this manner ever since I have been on the place. I bought the place from a man by the name of Marion E. Mason. A portion of it I pre-empted myself. When I found after this survey that the house was not on the land I bought, as I thought it was, I pre-empted that tract, 160 acres.

BY MR. RICE

I don't know how much timber land there is. I expect there is 80 acres of this 471 acres still in sage brush, probably more. I seeded about 20 acres of this sage brush to alfalfa and clover, the biggest portion of it. I have taken off the sage brush—the sage brush is still standing on probably 100 acres; I don't know, there is 100 acres, about that. I have never seeded anything on this where the sage brush is standing.

3021 L. F. Cook, recalled, testifies as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I now own 471 acres that has been figured up with the assessor. There would be if it takes an inch to the acre, 147 inches of water used on it that comes from the Franklin ditch. The only way to get at it is to divide by the number of inches in the Franklin ditch, divide 2,500 inches and that gives 147 inches. I irrigate all of my place; it is in pasture, grain land and hay. It is all fenced. The balance of it is irrigated
3022 from the Mason creek head. I think that would leave 324 acres irrigated from that source. I am acquainted with the different persons and land owners who irrigate from thisMason creek ditch and slough. They are John Thomas, Emma Stoddard, Hamilton Davis, H. N. Whitney and Jacob Plowhead—it is owned by Mr. Thomas. Next after Whitney coming down the slough is L. O. Leonard, George Milliner, myself, L. F. Cook, Charles E. Gooey, J. W. Ballard, George Hesse, S. H. Vassar, Charles S. Wells, Edith Mason and C. Mason.
3023 J. P. Wells has 120 acres, and the other is 1,800 acres

or something over it, I don't just remember what it is, but I think something over that.

CROSS EXAMINATION BY MR. RICE

John Thomas irrigates some of his Plowhead place beside from Mason creek. This Mason Creek Ditch Company is not a capital stock company, it is a partnership company. I don't know as I can explain to you how a member becomes a member of the Mason Creek Ditch Company. I paid in about the amount
3024 that was done in the first place, to put in headgate and dams and such as that and become a member. I expect that Thomas irrigates something near 200 acres out of the Mason creek slough. I don't know exactly where the line runs through or how his land lies.

Of the Emma Stoddard place there is about 50 acres that lies above the grade of the Mason creek ditch. There is a little ditch that goes right around under the bluff back of the house that comes out of the Mason slough. This is the highest point it reaches. I don't
3025 remember the size of the headgate of that little ditch, but I should think it was something like three or four feet. It has been carrying water right along the last year. I guess every year so far as I know there has been water running through the headgate there. I don't know whether the balance of the Stoddard land is considered too wet or not—I don't know whether they are cultivating it or not. I don't know just how it is, I am not positive, I haven't been through there—I don't know whether it has been irrigated from this ditch
3026 or not. I don't know whether this 40 acres credited for the Hamilton Davis place to the Mason slough is exclusive of the amount put in as being irrigated from the

Franklin ditch on the Hamilton Davis place. I can hardly say how much land on the Hamilton Davis place is under cultivation now. Some of the place lies up towards the bluff, towards the Franklin ditch; I don't know whether it is cultivated or not; it is fenced, but I don't know whether they use water on it or not, but all down on the bottom is under cultivation.

3027 Part of the Leonard place is covered with timber. The state engineer's map is not correct as the river has cut in there until there is about only 15 acres of that place. I think this list here (indicating) would be excessive of the amount, to the amount of 15 acres, if it were all cultivated. It is all in timber except for what grass grows among the timber.

The Vassar place is south of the Hesse place, it is in pasture, there is some sage brush on it and grass. There are different grasses, some of it is salt grass. 3028 Mr. Vassar runs water over that. That was once under cultivation when Mason creek ditch was first built, it was first put under cultivation in grain and alfalfa by Mr. Evans, then they went out of the country and there was nobody on it for a while, and then they rented it and it has been used for pasture ever since.

Mr. George Milliner, recalled as a witness, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I live about four miles east of Caldwell; I have 3029 lived there three years; I know the land irrigated from the Mason creek ditch; I own land irrigated from that ditch; I own about 173 acres.

A man by the name of L. McIntyre and another by the name of George Houton originally owned that

land. I own all together in that same tract 323 acres; 173 acres of this is irrigated from the Mason creek ditch. I am acquainted with the persons who irrigate from this ditch at the present time; I think I am. I saw some names here that I am not ac- 3030 quainted with, probably they were people whom I have never seen, some of them ranchers. The Hamilton Davis ranch I know, but I don't know much about them people at all, and the Stoddard ranch I have never seen any of them. I know the renter who is on his place. I know where the Stoddard land lies, and have been across all of it. I know the place irrigated from this ditch.

This list (indicating) contains the name of the owners, and the number of acres owned, and the num- 3031 ber of acres irrigated from the Mason creek ditch, as far as I know, but I have not measured their land, it does to the best of my knowledge. To the best of my knowledge the acreage would be all right.

(Counsel for the Mason Creek Ditch Company offers the paper mentioned, marked as Exhibit A, in evidence.)

I believe there is somewhere between 1,800 and 2,000 acres irrigated from the Mason creek ditch; 1,850 acres I believe is what it has been figured at on 3032 that list. I have been put in as secretary of the Mason Creek Ditch Company, I suppose although I haven't acted, I have got neglectful of that business. Generally when we have our meeting we call on somebody who is qualified to handle the business. I believe I saw the articles of incorporation of that company. As near as I can tell there is no capital stock, it is just a partnership company.

CROSS EXAMINATION BY MR. RICE

I am familiar with the Mason creek slough, or the
3033 Mason creek ditch from its head on down. We have a headgate at the river which is seven feet wide and five feet high. Farther on down to Ten Mile is a slough, or a part of the river. Then we have gates again at Ten Mile. When we get down to the Whitney place, or somewhere near there, there is a dam put in the slough and a constructed ditch on down.

It has been carrying the proper amount of water heretofore, but I believe there is a cut a little higher above the slough that goes further south on higher
3034 ground, it runs west to the old ditch, I think.

It is completed and water run through it to the old Mason creek ditch that covered the lower ground years ago. I should judge it goes into the Mason creek ditch again in about two miles probably. That ditch runs over the land of J. P. Wells, it runs entirely around it I believe, but a part of the ditch might be off of his place still south of what is known as the Vaughn ranch. This map showing the ditch entirely north of the J. P. Wells ranch is wrong. The Whitney
3035 place is on the north side of the road; the Wells land is just north of the Whitney and runs a quarter south. The ditch runs close to the line, but in places where the bench comes out, it may go into the Wells land farther than in other places, but it is calculated to cover it all. Mr. Wells owns 120 acres, I think all of it is in cultivation. He has not owned it a great while, I think not over four years, that is the place that Denerline lived on.

I never lived there only one year to know what was

3036 going on on that place and that year there was quite a little of it cultivated. That ditch which is brought down from Whitney's is a small ditch. I don't know what it would carry, but the head at that time was about two feet. The south ditch which runs around from there further south is one by four feet, probably two by four; I mean two feet deep. It might be larger than four feet on the bottom, I have not seen the ditch. Below the gate the ditch was four feet on the bottom and probably five or six feet on the top.
3037 It will carry more water than the one which goes through Whitney's on the south side of the place. I don't know what both of these ditches together will carry. You see I don't understand measuring water at all.

I have timber on the north part of my land which I irrigate. I irrigate it by damming it up near the land that has crops on it. It subs. I use that water raising the timber and pasture. There is probably 60 acres of that. The Stoddard ranch I think is all
3038 irrigated. There was hay and grain raised on the part of it under the bluff last year I believe. I don't know how much water it takes to irrigate that. It is a very dry piece of land. I guess it is as dry a piece of land as there is on the river bottom. It is hard to produce a crop on it for the reason that the land there is chiefly gravel, a gravel bar. There is a ditch that runs around below a part of the Stoddard place; the Mason ditch runs there. To a certain amount I believe that would catch the waste water
3039 off the Stoddard place. The ground that I spoke of that is so awful dry is on the north side of the slough; it is between the slough and the river.

That slough is a quarter of a mile north of the county road—it is over that. I think this little bench is not over 200 yards from the road where the bench drops off. This ditch would naturally make it a little wet, this ditch which comes out of it, some little portions of it, not any to speak of I don't believe. I think this land needs irrigation to produce pasture—it
3040 may be too wet for grain. It needs more water for pasture than for grain. It subs, you understand, probably clean through this bench from the Mason creek slough.

BY MR. GRIFFITH

I have been calling this slough down there (indicating) the Mason creek slough, and these ditches that come out of here are taken out by putting dams there and making a cut through the bank and taking the water out. There are a number of them and con-
3041 sequently one don't have to be so very large for one or two places. It is taken out clear to the west side of my land, within 50 yards, and if any goes off it empties into the river on my land, and Mr. Cook's probably within 20 yards of my west line. If the water is not utilized that is where it goes. This timber land of mine is irrigated from irrigating the grain land or the land that is cultivated.

You would term them sloughs if there was water in them. After irrigating the grain land the water
3042 rests there and produces grass and timber which I run together, pasture land and timber land.

BY MR. RICE

This 471 acres of mine includes the land here (indicating) as conshay land.

Mr. H. M. Whitney, a witness for said defendant, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I live four miles east of Caldwell; I know the land that is irrigated from the Mason creek ditch; I own
3043 120 acres of land there. I irrigate practically all of it from this ditch. George W. Beardsley was the original owner of that land; it has been irrigated from this ditch ever since I knew it. There are ditches and sloughs running through my land and rights of way. I think the actual area of the irrigated land outside of the rights of way is about 125 acres. I get water from no other source.

CROSS EXAMINATION BY MR. RICE

This south ditch from Mason creek slough runs
3044 along the south side of my place just north of the road. It comes out of the main slough at Madden's place. The south ditch gets to Well's land at his east line. It goes to the bluff and then around the edge of his land—I think it covers the most of it. I own out to the road south of my place. I do not irrigate my orchard from the Caldwell water. The south ditch is about four feet on the bottom.

The ditch which comes from my place near the south side of Millinger's is about three feet on the
3045 bottom. I have had no experience in measuring water, and couldn't say what these two ditches carry.

Mr. J. P. Wells, a witness for said defendant, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I live about four miles east of Caldwell; I own land irrigated from this Mason creek ditch, about 120 acres. Mrs. Lee was the original owner of this land—I irrigate it from the Mason creek ditch.

CROSS EXAMINATION BY MR. RICE

3046 I have irrigated this land ever since I have been there, over two years. When I went there it was all fenced and in pasture and some of it cleared up and an orchard on it. The orchard lies just in the center east and west and then back out from the road. All of it was pasture when I was there. This orchard was there when I went there and the portion marked "Orchard" in the northeast corner on the state engineer's map was forest trees. I have no waste land; I have to furnish a right of way for the ditch.

3047 Mr. George Hesse, called as a witness for said defendant, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I live about three miles northeast of Caldwell. I own about 275 acres irrigated by the Mason creek ditch. I own 430 acres all together. Mitchell Potts was the original owner of this land.

CROSS EXAMINATION BY MR. RICE

I irrigate 147 acres from the Franklin ditch. I estimate it to be that, and both of them coming in

3048 together I irrigate that many acres by subbing. I go south of the Martin land, that is about a quarter south of the slough of the Mason creek ditch. I irrigate all of the land I have there by subbing or surface irrigating. I do not cultivate it all; I cultivate about 300 acres. I cultivate that part down next to the river. There is none of it, about 80 acres south of the Mason creek slough that is cultivated. That is salt grass pasture—I irrigate it. I get the water out of that slough. I get it from the south slough. I take that water
3049 across Mason creek to that ditch. There is Mason creek water empties into the south slough above where I take it. I have never measured it. That is about a half a mile above where I take out water. The ditch from Mr. Wells empties into it up there. That would empty into Mason creek on Mr. Cook's place. The road makes a turn to the north just where it crosses Mr. Cook's place. This ditch comes right in there pretty close to the southwest corner of Well's place. It empties into Mason creek within a few hundred yards.
3050 It is what Mr. Wells uses for irrigation on his land. There is probably 120 acres of salt grass pasture on my place. I sub it all the time as long as there is water to get. There is a couple of ditches through the highest part.

REDIRECT EXAMINATION BY MR. GRIFFITH

Mr. Gooey has 40 acres. He sub irrigates from the same slough that I take my water from.

Mr. Charles Wells, a witness for said defendant, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

3051 I live a mile and a half northwest of town—I own 173 acres of land under the Mason creek ditch which I irrigate from this ditch; I own 281 acres all together. I have been over the Mason land three times, that is all. I know the Edith Mason 40, it is irrigated from this slough, there is about 30 acres, over that, there is 40 acres, that is watered from that, and the rest is on the hill where the bench cuts off the southwest corner of the Cornelius Mason land. He has the northwest
3052 corner of that section; that is, the fraction that the river cuts off a portion. He irrigates that from this slough—he irrigates all with the exception of a little on the bluff, probably five acres. All together, in my judgment he irrigates all of 158 acres excepting about five acres. Something like that. I wouldn't say for sure, I never paid any attention to how much land there was.

CROSS EXAMINATION BY MR. RICE

There is a great deal of Mason's land washed away
3053 by the river; I hardly know how much is left; I don't know where his north line is. I think four or five or six acres runs up on top of Canyon hill, and there is about ten acres of Edith Mason's place on that bluff.

BY THE COURT

I couldn't state exactly how much of C. Mason's land is washed away and how much of it is left. There is one slough in it. He irrigates over 100 acres, but I couldn't give you any estimate of it. He irrigates probably 125 acres.

CROSS EXAMINATION BY MR. RICE

3054 My place runs down to the river adjoining Mr. Mason's on the east. The railroad fence is the southeast corner of his land. I couldn't say how far north from there to the river as it is now. I know about where that corner is, I couldn't tell the distance unless I measured it. I have a fence through there, I never measured the fence. Mason irrigates between the creek and my land. He raises crops and pasture both.

REDIRECT EXAMINATION BY MR. GRIFFITH

3055

I know this land of Ballard and Vassar. I couldn't say how much of the Ballard land he irrigates from this ditch, some of it washed away. Mr. Jobe was the original owner of this land.

CROSS EXAMINATION BY MR. RICE

I use some of the Franklin water. It is brought to my land in the slough. It is emptied in above, that 800 inches and that 350 inches described yesterday. The 800 inches and the 350 inches both come through the
3056 slough; that is my proportion, according to my understanding.

Mr. J. W. Ballard, a witness for said defendant, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I own about 20 acres of land under the Mason creek ditch; it is a lot that is on the river, a part of it washed away. It is irrigated from the Mason creek ditch.

Mr. S. H. Vassar, a witness for said defendant,
3057 testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I live about two miles and a half east of Caldwell. I own 40 acres of land under the Mason creek ditch. I irrigate that land from this ditch.

CROSS EXAMINATION BY MR. RICE

I have irrigated this land two years this coming May or June. I began in 1903. When I went there the land was in pasture and grass. There was sage brush in some spots. The ditch I irrigate from comes
3058 in by the school house. I am not well acquainted with the location of the head of it; part of it runs south and part of it runs east of the place. A lateral from the Caldwell ditch runs through my place. I don't irrigate out of that. I have 80 acres all together, it lies north and south. I bought one of these 40's from Lola Sutton—I bought both of them from her.

Mrs. Mary Potts, a witness for said defendant, testified as follows:

3059 DIRECT EXAMINATION BY MR. GRIFFITH

I live in Caldwell. I did live before coming to Caldwell two miles and a half up on what is now called the Hesse place. I lived there from December '03 until March 14, 1890. The country was soon settled up soon after I came. I irrigated my place and raised crops on it right shortly after I came. We irrigated from the slough at the time, it was all water from the river, the slough they afterwards constructed

the Mason creek ditch from. Since that time we ir-
3060 rigated from this ditch all the time.

Mr. George Hesse, a witness being recalled, testified as follows:

CROSS EXAMINATION BY MR. RICE

I am put in among the Franklin ditch people as only one share; get the Franklin water to my place from the slough where it is turned out. My part all comes down through the slough. It is all commingled with the Mason creek water up at Ten Mile.

TESTIMONY IN RELATION TO THE STOCK-
3061 TON DICTH

R. H. Stockton, called as a wtiness in his own behalf, testified as follows:

DIRECT EXAMINATION BY MR. GRIFFITH

I have been living at Parma for about 16 years. I own about 300 acres that is irrigated from the Boise river. I irrigate part of it from the Sebree ditch—150 acres irrigated that way.

I can use this water that I use on the south side of the place. I can run it on the north side of the place;
3062 I own ten inches in the Sebree ditch, and I use that, and there is a part of that north part that is too wet and a part of it isn't.

I irrigate the balance by a slough that comes down what we call the Shipley place, and through the Kiesel place and runs on down through my place, and I put dams in the slough and take the water out. That is not a private ditch, there are others who use out of it; my brother uses some out of that. And

In re SRBA Subcase Nos. 63-00179C and 63-32580

EXHIBIT B

to

Statement Regarding Injury and Enlargement,
and Request for Hearing

DEPARTMENT OF THE INTERIOR

UNITED STATES RECLAMATION SERVICE

BOISE PROJECT

IDAHO.

*

REPORT
on
RETURN FLOW AND SEEPAGE INTO BOISE RIVER DURING THE LOW WATER PERIOD OF 1914.

by

W. G. STEWARD, Assistant Engineer in charge of
Duty of Water Investigations,
Boise Project.

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Object of the work.

Early in the irrigation season of 1914 it was decided to obtain a record of all the principal creeks and sloughs that furnish return water to the Boise River, the primary object being to determine what canals, if any, were taking more water than necessary and then wasting large amounts of this available water back into the river, thus depriving other canals on the river above of the water necessary to properly irrigate their land.

With this in view, rating stations were established on Ten Mile creek, Mason creek, Mason slough, Dixie slouth, Indian creek, Hartley Gulch, Willow creek, Middleton slough,

and on various small sloughs and at various points along the river and on many of the important canals along the valley and records of the flow were kept during the irrigation season.

Division of Boise River into Sections.

(See Figs. 1 and 2)

In the study of the low water conditions in the Boise Valley, the river naturally divides itself into four sections. (See Fig 2)

(1) From the Government Diversion Dam to a point just below the Canyon County Water Company Canal, a distance of about 25 miles.

(2) From Canyon County Water Company Canal to the diversion dam in the canyon above Caldwell, a distance of about 9 miles.

(3) From the canyon dam to a point just below Lower Center Point canal, a distance of about 7 miles.

(4) From the Lower Center Point canal to the Snake River, a distance of about 13 miles.

These divisions come by the fact that all the water may be taken from the river at three points; viz., opposite Canyon County Canal, the Farmers' Cooperative (Sebree) canal, and the Lower Center Point canal and still there will be enough return flow to furnish all decreed rights below these points respectively. In the study of river flow and water rights this condition must be constantly kept in mind.

1919

The following table gives the average discharge in second-feet, for a period of 34 days from August 8th to September 10th, inclusive, of all waterways along the river as far down as Notus bridge, as per sections indicated on preceding page.

Section No. 1.

1921

Boise River at Highland	835.0+	Boise Valley Waste	1.6+
Main New York Canal	85.5-	Dry Creek Canal	33.0-
Penitentiary "	2.5-	Thurman Mill Waste	1.0+
Ridenbaugh "	303.7-	Eagle Island Canals	28.4-
Bubb "	6.2-	Eagle Slough	1.0+
Rossi Mill Canal (Power)	25.0-+	Ballantine Canal	7.8+-
Cruzen Canal	50.0-	Dry Creek waste	4.0+
Boise City Canal	20.3-	Phyllis Canal	64.5-
Jacobs Canal	2.2-	Eureka Canal No. 1	13.4-
Cottonwood Creek	22.0+	Middleton Water Co.	58.2-
Settlers Canal	68.1-	Middleton Mill Co.	30.0-
Davis Canal	13.4-	Pioneer	13.9-
Thurman Mill Canal	19.8-	Eureka No. 1 waste	6.7+
Sand Creek	3.0+	Caldwell High Line	50.4-
Boise Sewer	20.0+	Franklin Canal	1.5-
Farmers' Union Canal	39.7-	Kennedy Canal	2.6-
Boise Valley Canal	22.0-	Canyon County Canal	24.0-
Little Union	13.7-	Boise River (Below Canyon County)	12.0

Total Canal deliveries	965.0
Total tributary gain	59.3
Total seepage gain	75.1

1340

\+ Indicates discharge into the river.

\- Indicates discharge from the river.

1914

Section 2.

Boise River ..... (Below Canyon County)	12.0+
Phyllis Slough.....	5.0+
Ten Mile	11.5+
Big Slough	5.6-
Middleton Slough	30.7+
Willow Creek	3.0+
Hartley Gulch	4.0+
Mason Creek	25.8+
Riverside No.1	8.0-
Farmers' Cooperative	96.0-
Canyon Canal	10.1-
Seibenberg Canal	8.9-
Boise River at Canyon ...	10.7-
Total canal deliveries	120.6
Total tributary gain ...	80.0
Total seepage gain	47.3

Section 3.

Boise River ..... (Below Seibenerg Canal)	10.1+
Riverside Canal No.1 ...	3.0+
Caldwell Drain	3.5+
Indian Creek	71.6+
Riverside No.2	37.5-
Upper Dixie Slough ..	4.8+-
Pioneer Dixie	10.1-
Eureka No.2	21.5-
Upper Center Point ..	7.2-
Lower Center Point ..	5.4-
Five small sloughs ..	5.4+
Boise River at Notus	28.7-
Total canal deliveries	86.5
Total tributary gain ...	85.3
Total seepage gain	11.2

\+ Indicates discharge into the river.

\- Indicates discharge from the river.

Explanation of Figure 2.

Figure 2 represents Boise River with incoming and outgoing waterways from the Government Diversion Dam to Notus. The diagram is drawn to a scale so that the width of the stream represents the average daily flow for a period of 34 days, from August 8th to September 10th, inclusive.

The direction of the flow of water is indicated in three ways; first, in looking from the left to the right of the sheet, all streams leaving the river are shown as branching out and all streams entering are shown as branching in; second, the names are lettered in the direction of flow; and third, the arrows indicate the direction of flow. The lengths of sections as shown on the diagram are approximately proportional to the distances along the river, so that the location of the streams are shown in about their relative position on the map. In the table, column 2, the term "Delivered" includes all water taken from the section by canals, together with the water passing to the next section. In column 3, "In river and tributary" includes the water in the river at the upper end of the section, together with all the tributary flow in the section. Column 4, "Seepage Gain" is the water gained to the section from underground flow or from very small surface streams not measurable. It is obtained by subtracting amounts in column 3 from those in column 2. "Tributary Gains" is the sum of the measurable tributaries in the section.

Complex Conditions.

There are several complex conditions along the river that need explanation in order to fully understand the dif-

ficulties of canal deliveries.

(1) Rossi Mill ditch, originally constructed for power purposes, was used, during the irrigation season, for irrigation only. While it carries a good head, there is very little used for irrigation and as a rule it acts as much as a drain ditch as for carrying irrigation water, so that it discharges back to the river an amount equal or a little greater than the amount diverted, therefore, in Figure 2 it is so shown.

(2) The Cruzen (Perrault) Canal heading usually carries a larger quantity of water than is used by the Capital Water Company, the Boise City and the Jacobs Canals, all of which it feeds. Part of the water is used for power. This excess water, together with the flow of Cottonwood Creek, is returned to Boise River through Cottonwood Creek.

(3) The Boise City water works pumps water from the Boise river bed at a point opposite the Natatorium. This water is returned to the river through the Boise sewer. In the above table the return water of the sewer is noted but no account is taken of the water pumped, as the quantity is not known. This, however, is taken care of in the river seepage.

(4) The Farmers' Union Canal diverts water for the Boise Valley Canal. It has a wasteway just above the Boise Valley heading and another where it crosses Dry Creek. The Boise Valley canal wastes its water into the Dry Creek Canal about one-quarter mile above the Dry Creek Canal rating flume. As there is a wasteway above this flume, the Boise Valley waste is assumed to be a part of the river supply.

(5) The Ballantime Canal gets practically its entire supply from waste water. It has a river heading that is kept up and may be used in case a very large flow is desired. The waste water flowing in the Ballantine Canal that is not used may be discharged at either one of three places; into the river near Eagle; into Dry Creek at the flume crossing; or into Middleton Water Company Canal below Linder.

(6) The Dry Creek Canal has a wasteway at its Dry Creek crossing.

(7) The Middleton Mill Slough forms a wasteway for a network of canals, laterals and waste composed of the lower end of Ballantine, Dry Creek, Middleton Water Company, Middleton Mill Company, Pioneer, and Canyon County Water Company Canals. It would be possible to divert practically all of this waste at the low water period to the Hartly Canal which in turn wastes into Willow Creek and Hartly Gulch.

(8) Ten Mile Creek empties into Big Slough , sometimes called Thomas slough or Mason slough. From this slough the water may be discharged direct into the Boise river or by a system of dams and channels it may be taken through Big slough to a point south of Middleton, where the water can be discharged to the river or diverted to a canal irrigating land below.

(9) The Riverside canal has a heading in the river in the Canyon above Caldwell. Any water diverted here is emptied into Indian Creek. From Indian Creek, the Riverside Canal has another heading below Caldwell. By this system the Riverside Canal may take water from the river or from Indian Creek or from both. As the court has decreed that Indian Creek is tributary to Boise River, the Riverside Canal has a right to this water only when it is not needed to supply the rights below.

(10) Upper Dixie slough is seepage and waste water from the lands south and west of Caldwell. A ditch has been dug to conduct this water into the Pioneer Dixie canal at a point approximately two and one-half miles northwest of Caldwell. In this investigation it was assumed that this water was a part of the river supply but it has been accounted for separately from the discharge into Pioneer Dixie heading.

Conditions Prevailing Along Boise River for the Irrigation Season of 1914.

Distribution of Boise River flow.- The flow of the Boise River for a number of years has been determined by a station established by the United States Geological Survey at Highland, about 16 miles above Boise. Measurements are made at this station by both the United States Geological Survey and the United States Reclamation Service and several check measurements were made this season by State hydrographers.

The water passing Highland is used in the low water season to supply the various decreed rights along the river from the Government diversion dam to Snake River. (See Figure 1 - Map of Boise river canals.) There are about forty canals supplied from the river.

Return Flow.- To the water passing Highland there are added considerable quantities of water from sloughs, wasteways and return seepage. (See Figure 2 - a diagram of Boise river flow.) This diagram was made from the average of 34 days during the low water period, at which time the river was in a very stable condition. (See Figure 3 - Hydrograph showing daily water deliveries on Boise River.) This shows that the entire hydrograph for the period is very even.

It is to be understood that while individual canals may change materially in their diversions, the general river conditions will remain fairly constant and hold a more or less balanced condition. For instance, the return flow and seepage from August 15 to August 31 are very uniform. The amount of water which passed in the river below Canyon County did not vary more than a few second-feet for the whole month of August and the discharge of water in the river below the Canyon started with about 20-second-feet in the early part of August and fell to about 5 second-feet, with an average during the month of about 10.5 second-feet. The same relative constant condition held at Notus bridge. This shows that during the low water season, with a reasonable duty of water, the return flow and seepage will take care of all canal rights below the Canyon County Canal.

1914 a Medium Low Water Year.- In Figure 4 - Boise River Hydrographs, 1895 - 1914 - I have shown the discharge of Boise River in second-feet from July 9 to September 16, inclusive, as follows:

(1) For the highest year - 1899.

(2) For the Lowest year - 1905.

(3) For the mean of the four highest years.

(4) For the mean of the four lowest years.

(5) For the year 1914.

From these hydrographs it will be seen that the year of 1914 was considerably below the mean of the 20-year period for the low water season, but that there may be expected one year in about every five in which the water will be somewhat lower and that once in a long period of years the flow may be very much lower.

Return Water Increased by Drainage.- It will be noticed that the greater proportional part of the return flow to the river occurs below the Canyon County Canal heading and it is almost a certainty that the amount of waste or tributary water available for use to the river will increase very materially in the next few years as the systems of drainage now proposed are completed, as this drainage water will largely be made available during the irrigation season and not be held in the ground to find its way to the river by gradual seepage.

What is Considered as Seepage Water.- It should be understood that there is no clear demarkation between tributary flow and seepage. In this work any water in channels large enough to be measured with a meter was considered tributary flow, but it is evident that at times of heavy irrigation along the river there might be many small streams that would appear in the results as seepage. Any water that came into the river in such a way that it could not be measured directly was considered as seepage and the

amount was ascertained by subtracting the known measured diversions from a certain section of the river from the known measured discharges into that section. As there was a more or less continual fluctuation of river flow, due to the power plants above and to the uneven canal diversions, this seepage may have apparently large fluctuations when in reality the variation is in either the river flow or canal discharge. General averages, however, will determine the amount of return seepage quite accurately.

Ground Water Contours.- In connection with seepage return flow, it may be of interest to study the ground water contours on the south side of the river, as shown in Figure 5. This shows the plane and direction of ground water movement in June 1914. It will be noted that practically all of this ground water tends to move towards Boise river, entering it between Eagle and Notus, the line of greatest movement being towards the Caldwell canyon. Very little ground water from above the Ridenbaugh canal will reach the river where it will be available for irrigation, except through drains. This condition may change somewhat as the plane of ground water rises on the bench under the Main New York canal, but it is believed that the general conditions will remain the same. After the ground is fully saturated, this water movement will be practically a constant quantity, whereas the surface return flow will vary from day to day with the amount of water applied, the

temperature, the distance of the point of application from the river or the drain ditch, etc.

Return Seepage from the North Side of Boise River.- It is believed that a large part of the return seepage to Section came from the canals irrigating the north side of the Boise river between Pierce Park and the Canyon, because nearly all of this area is served by canals with old rights and they all have good headings and divert large quantities of water. Much of this water eventually finds it way back to the river by underground seepage.

"Laggage" in Water Deliveries.

In Figure 3, the hydrograph of Boise river is set one day ahead of the others; that is, in the computations there was allowed one day's time for the water passing Highland to reach the distributing system along the river. For instance, in the column for July 8th of river discharge, there would be July 9th for water deliveries and return flow. As a matter of fact, it might take two or three days for the effect of a slight raise or fall in the river to be felt as far down as the Canyon County Canal. This irregular "laggage" in the flow of the river and tributary flow partly accounts for the apparent discrepancies in the hydrograph. Another factor is that the Barber Lumber Company used varying quantities of water in the operation of their power plant, this causing irregular waves in the river flow. This wave motion gives rise to some of the most difficult problems in water deliveries, especially where a canal is

at the lower end of a river section. It also requires the higher canals to give constant attention to canal headings in order to keep a constant flow in the river and prevent waste to the section below.

Deliveries During Low Water Period - 1914.

In Figure 3 the lower hydrograph shows the daily discharge of the Boise river from July 8th to September 16th, inclusive, and the upper one shows the total amount of water delivered to the canals of Boise valley, as far down as Notus, together with a small amount, averaging about 39 second-feet per day, which passed Notus bridge. The space between these two hydrographs shows the daily gain to the river from tributary and seepage flow. The middle line shows the demarkation between the amount of tributary flow and the seepage, as ascertained by subtracting the daily river flow, plus the tributary flow, from the daily deliveries. The regularity of these results is surprising. Only on July 14th and July 31st does there seem to be any great discrepancy and this is probably due to some error in a gage reading that does not show up otherwise in the records, or to water held in Barber pond as temporary storage.

The large percentage of gain is very marked, especially in September when there was not so great need of careful use of water and more water was allowed to run

to waste. An average gain of 34 per cent of the discharge at Highland, for a period of 70 days, adds very materially to the water supply of the vally lands. The amount of return water was much larger in May and June.

Need of Careful Management.

It is very evedent from a study of the conditions on the river that the water must be very carefully handled in order to make the best and most equitable use of it. It is like the management of a great railroad system. Suppose the rise in the river about July 2nd had not been properly handled, it would have broken over all the dams on the river and probably 4,000 or 5,000 acre-feet of water would have gone down into Snake River. At this season of the year, that would have meant a loss of many thousand dollars in available water besides the damage to the dams. As it was, arrangements were made with the larger canals to take the main part of this excess water when the rise reached their respective headings and no canal heading was injured and practically no water was lost. In order to accomplish this, it was necessary for the head watermaster to know when this flood was expected, how much each canal was carrying, how much each canal could handle, and to see that the water was taken as directed.

In the case of a falling river, the larger water rights should be cut gradually so as not to cause a wave down the

river by cutting all at once.

Where a large canal wishes to turn water out for a day or two, notice should be given prior to the time so that arrangements can be made for the proper use of the water and not allow it to run down the river and be wasted.

The above cited examples show that the proper operation of the river requires very careful and constant attention.

River Work should be Started Early in the Season.

The work of selecting stations, setting gages, rating stations, computing discharge curves, and selecting watermasters should begin early in the season and be ready for the time when needed. When the river is falling at the rate of 100 to 200 second-feet per day, there is no time to do this detail work. That is the time when results from the above work should be available for immediate use.

The excellent handling of the river this season by the Deputy State Engineer, A. V. Tallman, was due largely to the fact that he had had several years of experience in hydrographic work and was able to put to intelligent use the basic data that had been secured by the United States Reclamation Service during the previous years and this was further strengthened by the cooperation of this office with the Deputy State Engineer during the irrigation season.

State Cooperation.

As the season advanced it was found that arrangements could be made with the Deputy State Engineer, A. V. Tallman, by which cooperation could be secured and that by an exchange of data a very much wider range of results could be obtained. Under this agreement the Water Commissioner was able to furnish to the various canals a much more satisfactory delivery than had ever been before obtained, because it was possible to know not only the amount of water in the river at Highland but the approximate return flow and seepage day by day during the low water period and the watermasters could be instructed as to where to set canal headings so as to deliver the proper amount. The use of this valuable data also made it possible for the deputy state engineer to anticipate cuts in canals so that priorities, which were entitled to the water, were never deprived of a full head and also made it possible for the deputy state engineer to notify the different canals as to the expected cuts in their respective canals and thus give the water users under these systems ample notice of an expected shortage. During the past season Mr. Tallman not only secured to each canal a more regular flow but prevented a large amount of water passing down the river and wasting below the lower headings.

Middleton Mill Slough.

Figure 6 is a hydrograph showing the amount of water diverted by the Middleton Water Company, the Middleton Mill Company, and the Canyon County Water Company and the amount of water wasted through Middleton Mill Slough. A comparison with the 1911 and 1912 reports shows that less water was used by each of the three canals in 1914 than in either 1911 or 1912. In the case of the Canyon County Canal, this is partly accounted for from the fact that they had difficulty in getting water from the river.

In this connection I have compiled the following tables which show that while the discharge to these canals was materially reduced, still the waste was excessive for so small an area and that the amount of water actually needed from the Boise river for this land is small. All of the results in the valley go to show that the amount of water needed for irrigation, when properly delivered from the river so as to be made available for economic use, is much smaller than is usually considered necessary.

During the low water period with a 60 per cent of the Stewart decree duty, all canals that had full rights for all lands under them had the greatest abundance of water. It is of course impossible to stretch a proper duty of water so it will cover a much larger area than the one for which rights were decreed.

Table giving the discharge in acre-feet of Middleton Water Company, Middleton Mill Company, and Canyon County Water Company Canals and the Middleton Mill Slough for 1911, 1912 and 1914 for the period from July 9th to Sept. 16th inclusive.

Middleton Water Co., Middleton Mill Co., & Canyon County Water Co.

	July 9-31	Aug.	Sept.1-16	Total	
1911	8791	9087	3891	21769)	
1912	8587	7817	4064	20268)	21,018 mean 11+12
1914	6158	6952	3728	16838	16,838
Total	23,336	23856	11,683	58,875	4,180 difference

Middleton Water Co., & Middleton Mill Co.

	July 9-31	Aug.	Sept. 1-16	Total	
1911	7123	6767	2958	16848)	
1912	6303	5956	2956	15215)	16032 mean 11+12
1914	4894	5534	2870	13298	13298 difference
Total	18,320	18257	8,784	45,361	2,734

Canyon County Water Co.

	July 9-31	Aug.	Sept.1-16	Total	
1911	1668	2320	933	4921)	
1912	2084	1861	1108	5053)	4987 mean 11+12
1914	1264	1418	858	3540	3540
Total	5,016	5,599	2,899	13, 514	1,447

Middleton Mill Slough

	July 9-31	Aug.	Sept.1-16	Total	
1911	3923	2659	1445	8027)	
1912	3013	2705	2418	8136)	8082 mean 11+12
1914	2038	1410	2122	5570	5570
Total	8974	6774	5985	21,733	2512

Character of Return Water below Canyon County Canal.

Herewith is a copy of a report of the Idaho State chemist on samples of water taken by the Deputy State Engineer, Mr. A. V. Tallman, on August 17 and 18, at various points along Boise river below Canyon County canal. This analysis shows conclusively that there could be no injurious effect from the proper use of the water.

The two most deleterious salts known are black alkali (Na_2CO_3) and white alkali in two forms, sodium sulphate, (Na_2SO_4) and sodium chloride, (NaCl - salt). Of these the black alkali is the most injurious to irrigated crops and white alkali the least injurious and it requires from 2,500 to 3,000 parts per million of white alkali (Na_2SO_4) to be detrimental.

In the analysis not a trace of the black alkali (Na_2CO_3) was found and the worst condition, Indian Creek below Caldwell sewer, gave only 498 parts in a million of white alkali.

As is well known, water entirely free from alkali used on lands containing alkali, as does practically all lands in the Boise valley, if improperly applied, would bring the alkali to the surface and make it appear that the water is highly charged with salts, while land may be irrigated with

water carrying a very much larger quantity of alkali than any shown in the analysis and if properly used the land will become better instead of worse. (See E.W.Hilgard on Soils - Chapter XXII, Alkali Soils and Chapter XXIII, Utilization and Reclamation of Alkali Lands). Hilgard shows that alkali moves to a greater or less depth in the soil with the movement of water applied and that with proper irrigation and cropage, even lands heavily charged with alkali may become very productive. In other words, the proper duty and method of application of water is the most important factor in the problem of alkalied lands.

IDAHO STATE BOARD OF HEALTH

Boise, Idaho, September 14, 1914.

Mr. A. V. Tallman,
Office of State Engineer,
Boise, Idaho.

Dear Sir:

At your request and with the approval of the State Board of Health, I have examined seven samples of water used for irrigation to determine their content of mineral matter, especially in regard to alkali.

Wiley in his Principals and Practices of Agricultural Analysis quoting from Hilgard, the expert of the California Agricultural Experiment Station, defines alkali in the following words: "These salts (speaking of alkali soils) are chiefly sodium & Potassium sulfates, chlorides and carbonates." And again: "The three most important ingredients of the alkali of the lands referred to (alkali lands) are sodium chloride, sulfate, and carbonate. When the latter salt, namely, sodium carbonate, is present in predominant quantity, it gives rise to what is popularly known as black alkali. This black color is due to the dark colored solution which sodium carbonate makes with the organic matters of humus of the soil. The black alkali is far more injurious to growing vegetation than the white alkali composed chiefly of sodium sulfate and chloride."

In examining the samples, all determinations were made by the "Standard Methods of Water Analysis" of the American Public Health Association. Total and fixed solids were determined in 50 cubic centimeter (c.c) samples after the water had settled for two days and thus represents only solids in solution and not silt.

The difference between Total & Fixt solids or "Loss on Ignition" represents principally organic matter which has been burned away.

A.V.T. #2

Total alkalinity represents all salts which will neutralize acid and may consist of carbonates or bicarbonates or either one of the two plus caustic alkali, but never all three at once. Total alkalinity, carbonates and bicarbonates are expressed in terms of Ca CO_3.

With these words of explanation the results are expressed in Parts per Million in the form of a table.

Very truly yours,

(Sgd) H. Louis Jackson,

State Chemist.

Table Enclosed.

HLF/FM

CHEMICAL ANALYSIS OF WATER SAMPLES TAKEN AT VARIOUS POINTS ALONG BOISE RIVER BELOW CANYON COUNTY CANAL. ANALYSIS MADE BY REQUEST OF A. V. TALLMAN, DEPUTY STATE ENGINEER.

WATER ANALYSIS EXPRESSED IN PARTS PER MILLION.

NO. OF SAMPLE AND DESCRIPTION.	Total solids	Fixed solids	Loss on Ignition	Silica SiO_2	Iron & Alumina Fe_2O_3 & Al_2O_3	Calcium Ca	Magnesium Mg.	Nitrogen as Nitrites	Nitrogen as Nitrates	Chlorine Cl.	Sulphates SO_4	Carbonates as Ca CO_3	Bicarbonates CO_3 as Ca	Total Alkalinity as Ca CO_3	Oxygen consumed O_2 & K. to Ca CO_3	Grains Ca & Mg Ca CO_3 per Gal. Total Alkalinity	Hard. Alkali as Ca CO_3	Chlorine equivalent as Na Cl.	Sulphate calculated as Ca SO_4	Total Solids calculated from Analysis
1. 8/17/14 J. V. Tallman Lower Canyon Point Below Canyon County Canal J. V. Tallman	492.	438.	54.	(1)	(1)	(1)	(1)	.005	Nil.	62.7	(1)	.15.	149.	152.	(1)	(1)	(1)	106.	(1)	(1)
2. 8/17/14 J. V. Tallman Below mouth of Drain No 60 and Upper Canyon Point Canals.	588.	500.	80.	30.4	(2) 1.8	52.5	14.4	.009	.055	80.8	154.	10.5	178.5	180.	190.	Nil.	Nil.	155.	228.	381.
Culvert Drain Slough at gaging station 8/2/14 J. V. Tallman	702.	608	94	44.2	(2) 5.6	54.8	16.5	.016	Nil.	14.	175.	Nil.	184.	192.	205	Nil.	Nil.	180.	250.	440
3. Keller Canal Below Parma Bridge 8/17/14 J. V. Tallman	706.	598.	108	42.0	(3) 1.6	62.3	17.7	.022	.200	101.	190	25.4	173.6	198.	221	Nil.	Nil.	167	281.	448
5. Indian Creek at Boise Payette River Pipe Canal entrance 8/1/14 J. V. Tallman	754	642	112.	41.6	(3) 1.6	66.1	19.3	.009	.250	113	210	10.5	178.5	189.	235.	Nil.	Nil.	187	311.	498
6. Boise River at Canyon ferry Caldwell 8/17/14 J. V. Tallman	290.	210	80.	(1)	(1)	(1)	(1)	.004	Nil.	22.4	(1)	60.9	117	118.	(1)	(1)	(1)	49.	(1)	(1)
7 Boise River Below Canyon Co. Canal 8/18/14 W. C. Kelly	130.	94	35.	(1)	(1)	(1)	(1)	Nil.	Nil.	3.0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)

REMARKS:--(1) Not determined when first solids were below 500

(2) Mostly Fe_2O_3 Iron oxide

(3) Mostly Al_2O_3 Alumina

H. Louis Jackson
State Chemist.

Tables Omitted.

Discharge Curves - Rating tables and discharge tables have been made for nearly all the canals, sloughs, wasteways, etc., but are on file in the Boise office for use whenever desired. Their insertion into this report would add very much to the size and very little to its value. There are also many tables compiled to obtain the results here given that are not considered of sufficient value to be included.

CONCLUSIONS.

From a study of the foregoing data the following conclusions have been drawn:

(1) That the seepage return flow to the river will not materially increase from now on.

(2) That the tributary return flow will increase considerably during the irrigation season for some years to come.

(3) That the largest proportional increase in total return flow will probably be in sections 2 & 3.

(4) That the amount of water used per acre may be materially reduced if the canal flow is made dependable and the deliveries in the systems are properly handled.

(5) That the more uniform the flow of the river can be maintained the better are the results to the canals using water.

(6) That all rights below Canyon County Canal can be supplied by return flow to the river from seepage and tributaries.

(7) That the water so returned is not detrimental to crops.

(8) That any right transferred from below Canyon County Water Company Canal to a point above is equivalent to giving a new water right at the later point with a prior date and takes that much water from later rights in the upper section.

(9) That the parties transferring any water from a point below the Canyon County Water Company Canal to a point above still have their right as the water can not be taken from them because of return flow to the river.

(10) That to secure proper results in the delivery of water, the river should be put under a competent man who should devote all of his time to the river problems.

(10a) That no man can become thoroughly acquainted with the river conditions except from a careful study of and actual experience in river operation for one or more years.

(11) That it would be more economical for the water users in the valley to employ sufficient competent help than to allow even a small amount of water to go to waste during the low water period when the water is most valuable.

(12) That no proper distribution of water can be obtained without a considerable force of reliable, well-informed men.

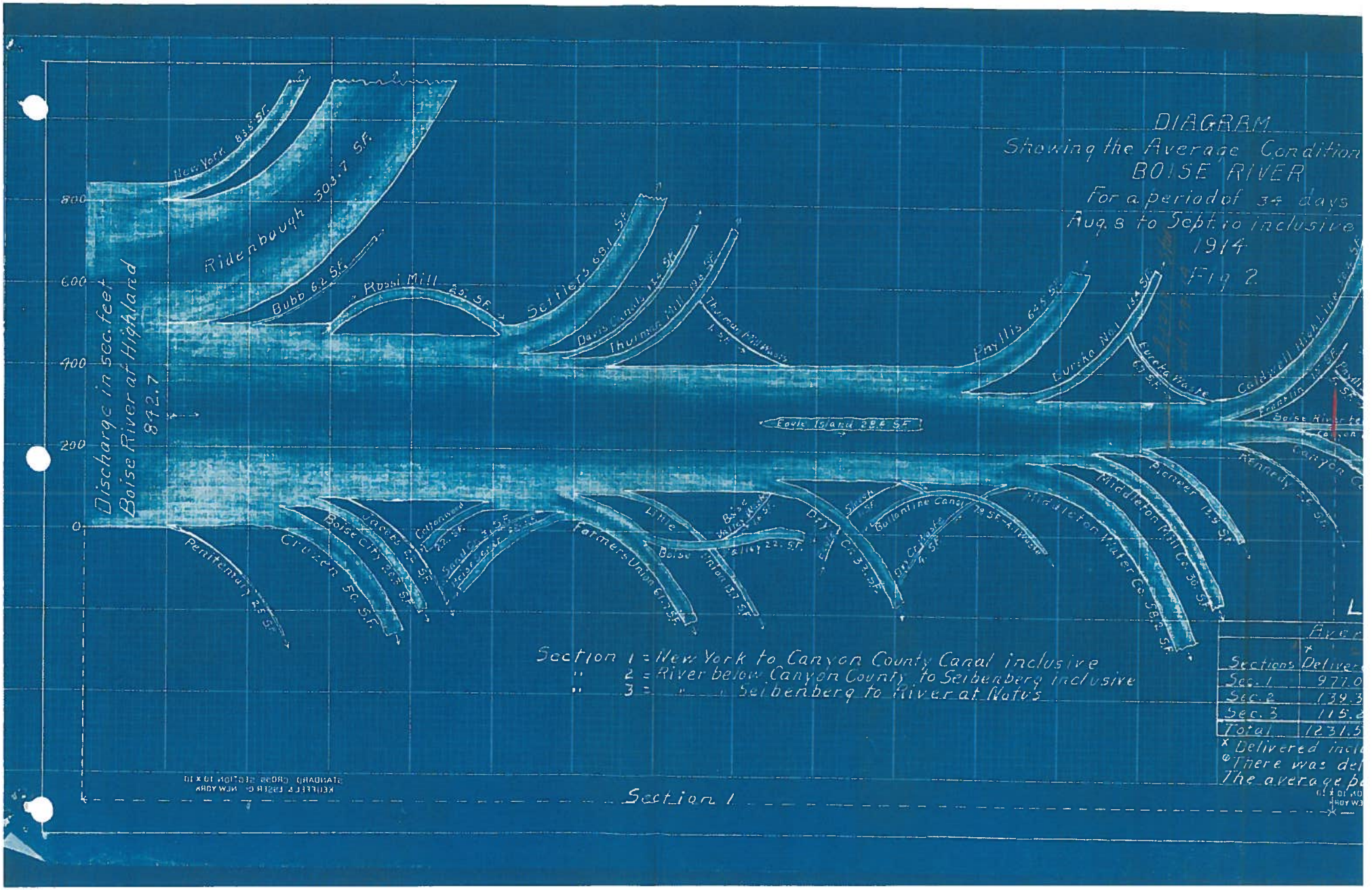
(13) That the Boise sewer water is properly a part of the river supply, as it is pumped directly from the river bed. If sold to any canal it creates a prior right from water taken from the river.

(14) That the excess water carried through the Middleton Mill Slough deprives newer priorities above this supply during the low water flow.

Supplemental Reports.

Supplemental to this report are detailed reports on the two lower sections of the river by D. J. Paul, who made special investigations on these sections during the summer under my direction. Much of the work was done ny myself or under my personal supervision. Mr. Paul was very careful and painstaking in all his work and I consider his reports thoroughly reliable.

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Sections	Aver. Delivered*
Sec. 1	977.0
Sec. 2	139.3
Sec. 3	115.2
Total	1231.5

* Delivered incl
© There was de
The average p

DIAGRAM

Showing the Average Conditions on

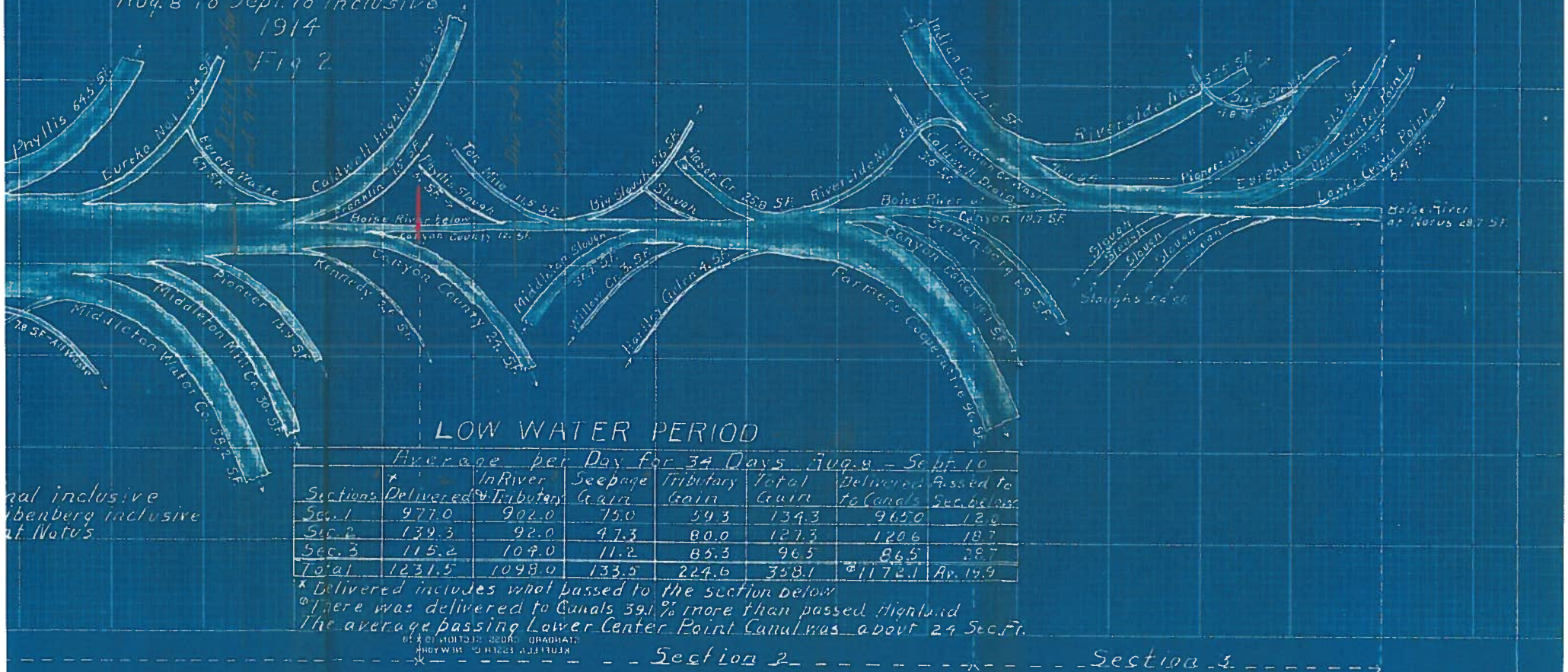
BOISE RIVER

For a period of 34 days

Aug. 8 to Sept. 10 inclusive

1914

Fig 2



LOW WATER PERIOD

Average per Day for 34 Days Aug. 8 – Sept. 10

Sections	*Delivered	In River & Tributary	Seepage Gain	Tributary Gain	Total Gain	Delivered to Canals	Passed to Sec. below
Sec. 1	977.0	902.0	75.0	59.3	134.3	965.0	12.
Sec. 2	139.3	92.0	47.3	80.0	127.3	120.6	18.7
Sec. 3	115.2	109.0	11.2	85.3	96.5	86.5	28.7
Total	1231.5	1098.0	133.5	224.6	358.1	⊙1172.1	Av. 19.9

* Delivered includes what passed to the section below

⊙ There was delivered to Canals 39.1 % more than passed Highland

The average passing Lower Center Point Canal was about 24 Sec. Ft.

nal inclusive
benberg inclusive
at Notus

Hydrograph showing daily water deliveries on Boise River between the Diversion Dam and Notus from July 9 to Sept. 16 inclusive 1914

	Average Daily in Sec.ft. Boise River	Canal Deliv.	Tributary Flow	Seepage Flow	Gain River	Gain per cent
July 9 to 31 – 16 days	1668	2191	302	221	523	31
Aug. – 947		1240	194	99	293	31
Sept. 1-16 – 792		1217	263	162	425	54
For 70 days – 1149		1547	295	142	387	34

Canal deliveries include the small amount of water passing Notus.

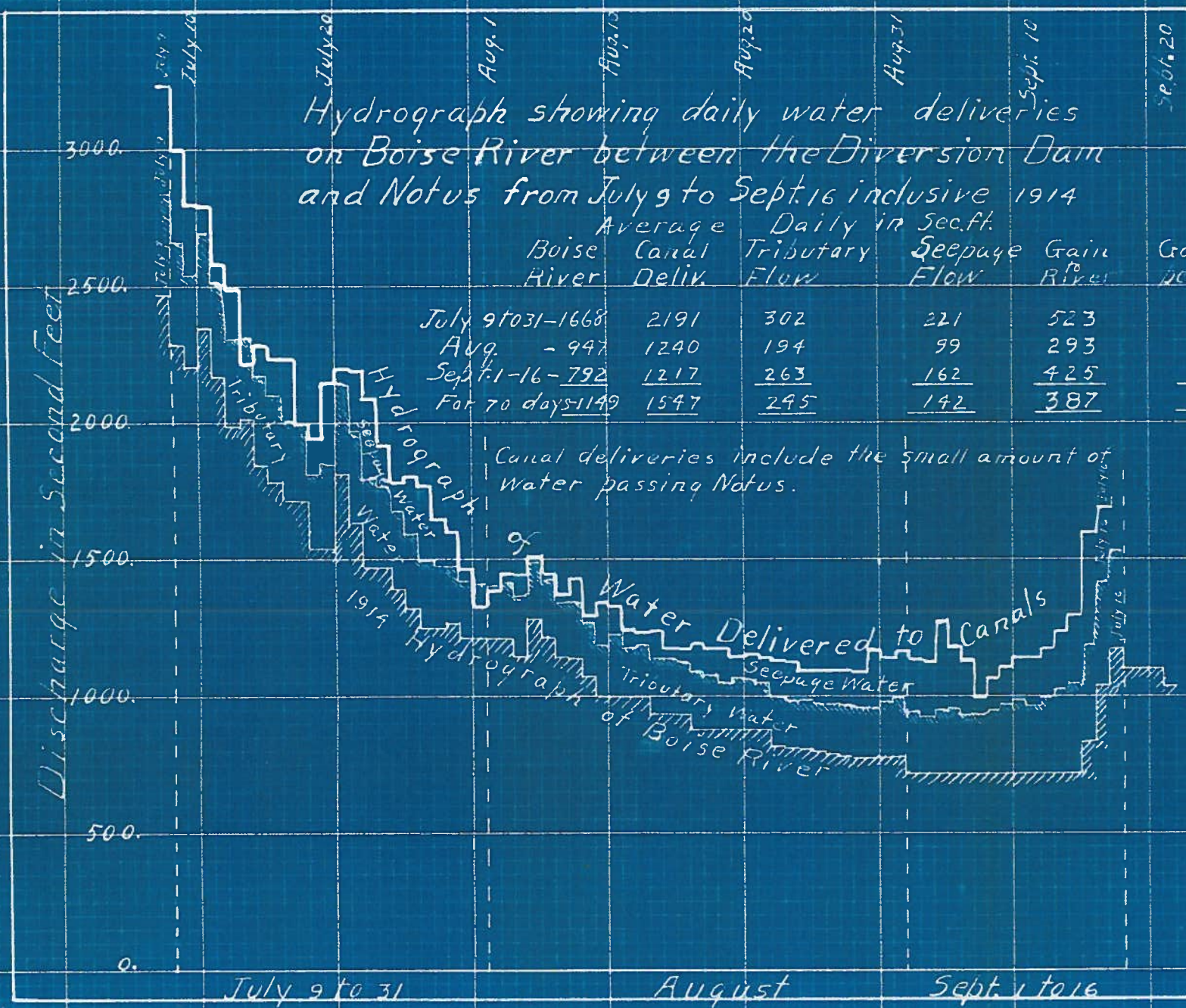
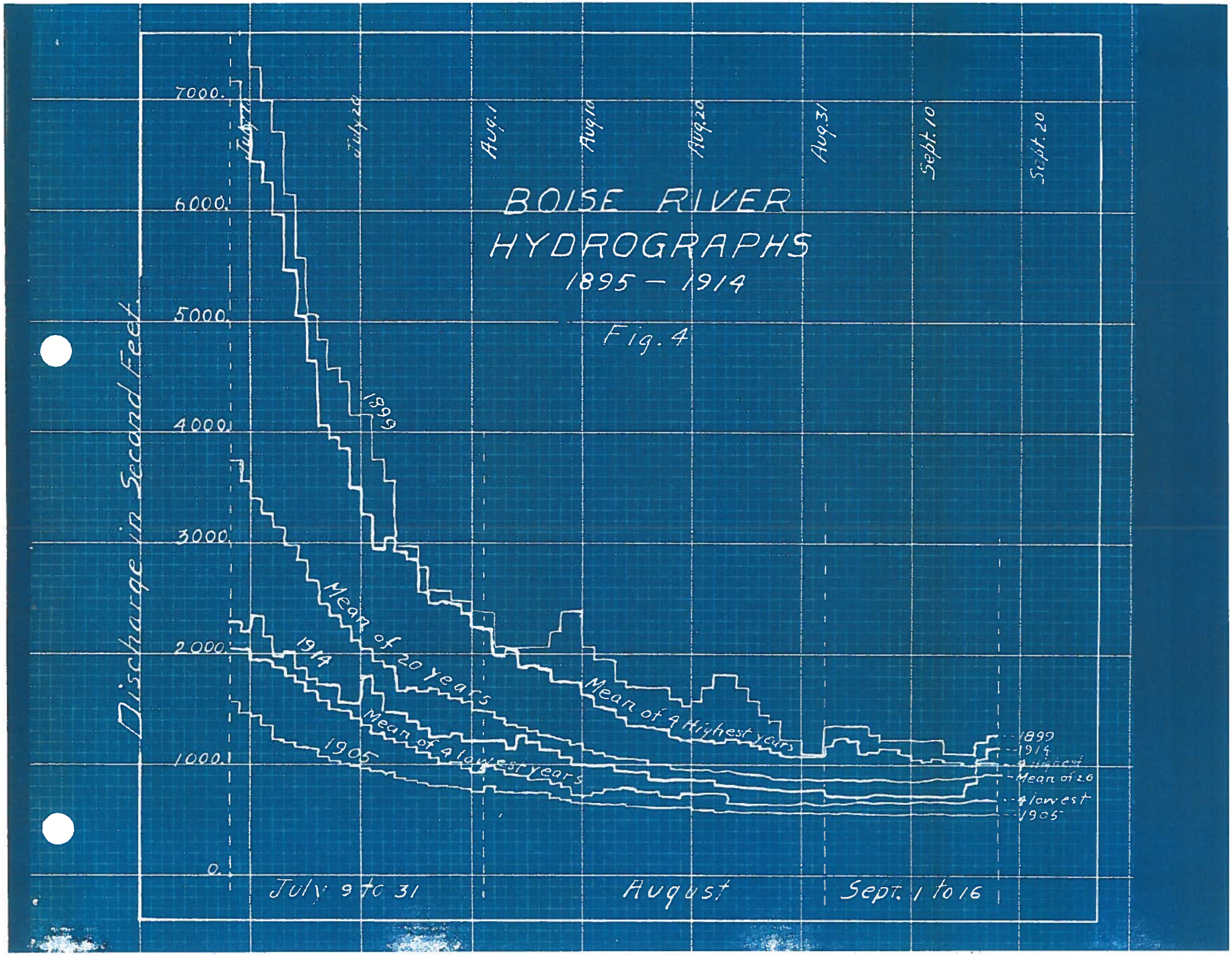
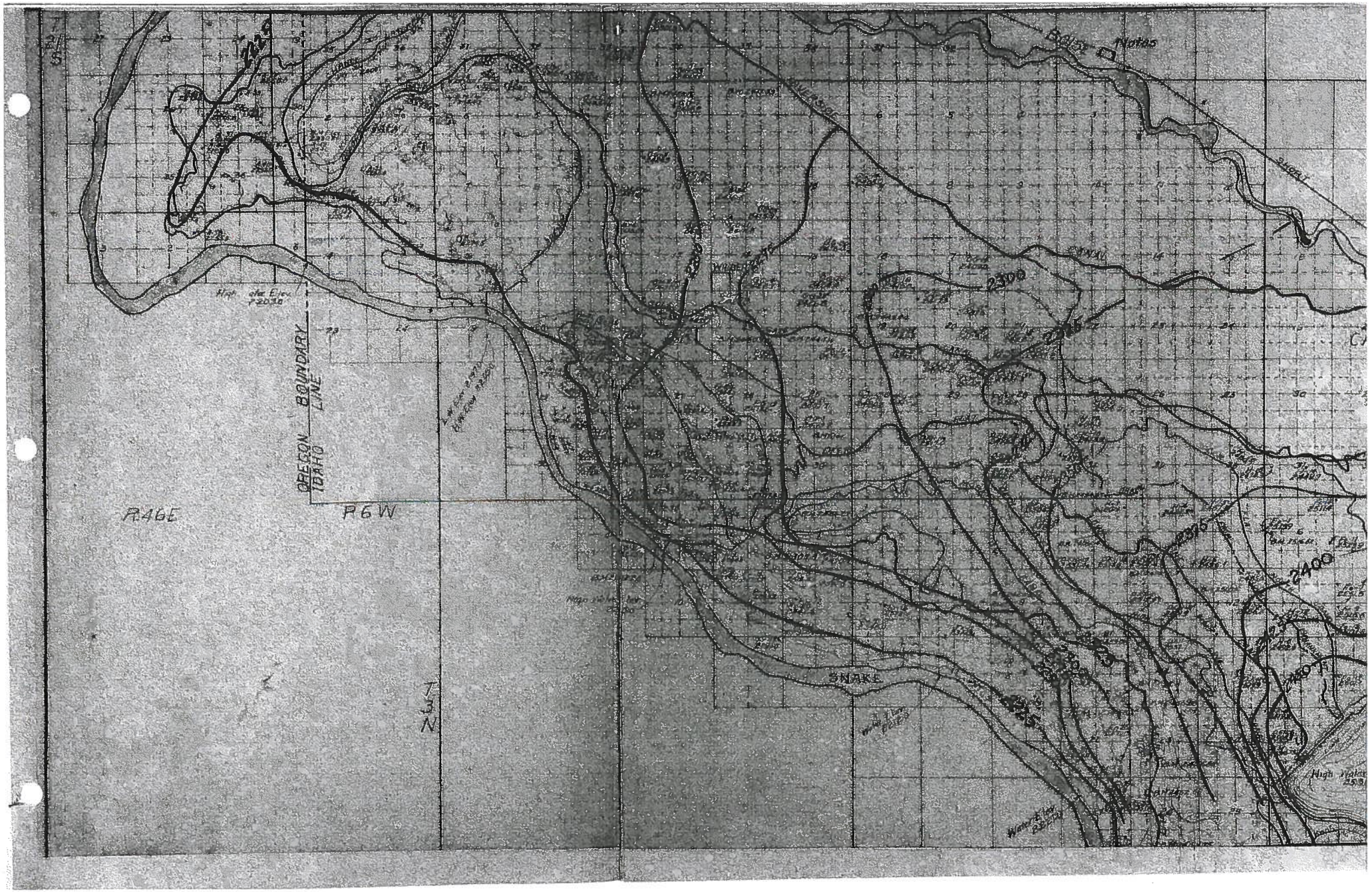


Fig. 3


BOISE RIVER
HYDROGRAPHS
1895 – 1914
Fig. 4
Discharge in Second Feet.
7000.
6000.
5000.
4000.
3000.
2000.
1000.
0.
July 1
July 20
Aug. 1
Aug 10
Aug 20
Aug. 31
Sept. 10
Sept. 20
1899
1914
1905
Mean of 20 years
Mean of 4 highest years
Mean of 4 lowest years
1899
1914
4 highest
Mean of 20
4 lowest
1905
July 9 to 31
August
Sept. 1 to 16


OREGON
IDAHO
BOUNDARY
LINE
R46E
R6W
T3N
SNAKE
2300
2400
Boise
Notus

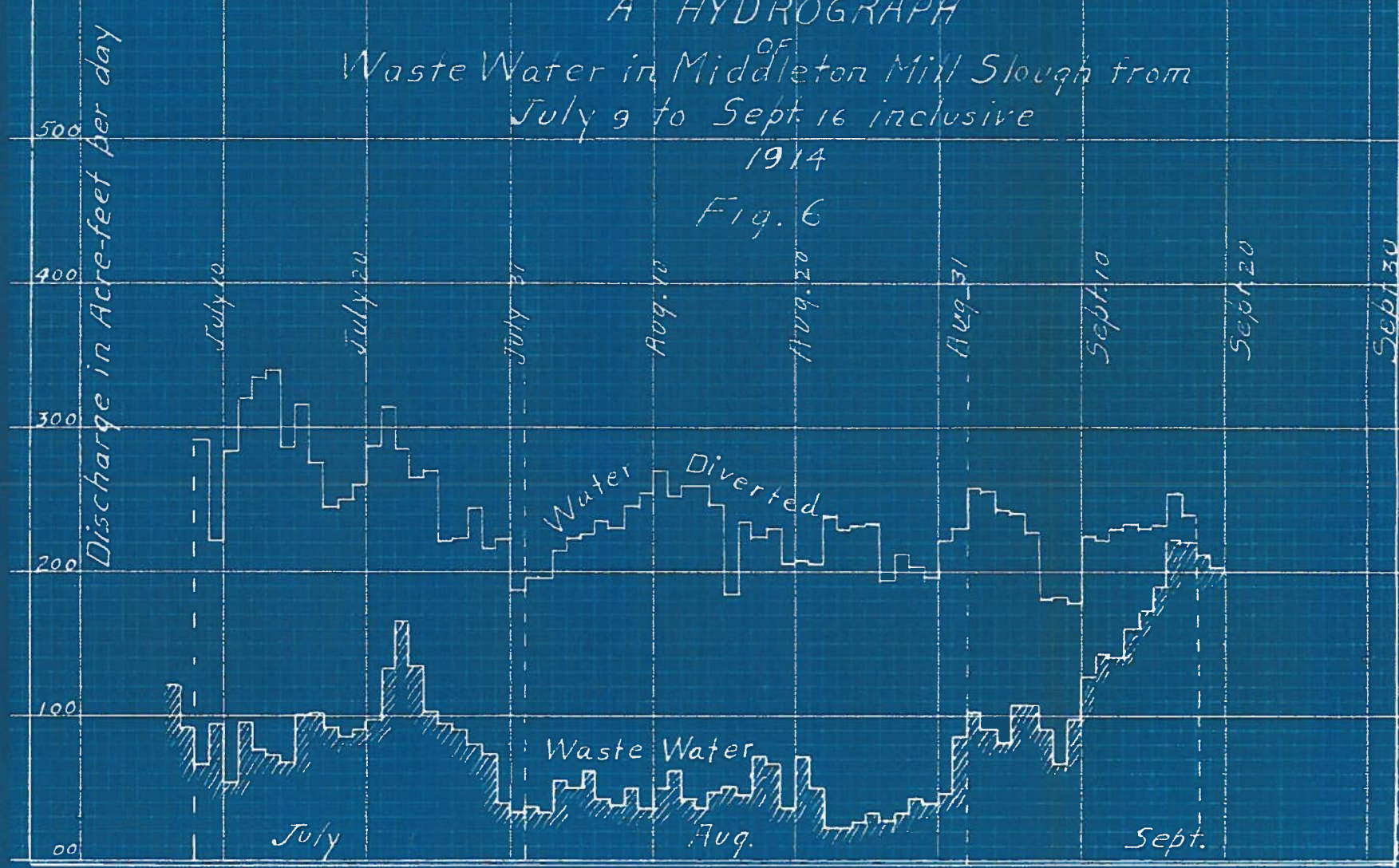

R3W
R2W
R1W
CALDWELL
NAMPA
Middleton
Star
CANAL
Water Elev. 2406.0
Water Elev. 2580.0
High Water Elevation 2530.0
2345
2350
2400
2405
2410
2415
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2600


R 1 W.
R 1 E.
R 2 E.
T 4 N.
T 3 N.
Eagle
Star
Middleton
Boise
Meridian
Nampa
Caldwell
South Boise
Department of the Interior
United States Reclamation Service
Boise Project, Idaho.
GENERAL DRAINAGE Map
Underground Water Contours
for June 1914.
Scale 1" = 6000 ft.
Explanation
Underground Water Contour
Farm Well
Well Platform Elevation
Contour Interval 25'

Fig. 5

SUMMARY HYDROGRAPH
OF
Middleton Water Co., Middleton Mill Co. & Canyon County Water Co.
AND
A HYDROGRAPH
OF
Waste Water in Middleton Mill Slough from
July 9 to Sept. 16 inclusive
1914

Fig. 6



STANDARD CROSS SECTION 10 x 10
KEUFFEL & ESSER CO. NEW YORK

In re SRBA Subcase Nos. 63-00179C and 63-32580

EXHIBIT C

to

Statement Regarding Injury and Enlargement,
and Request for Hearing

R E P O R T

on

CANAL DELIVERIES FROM THE BOISE RIVER

and

DIFFERENT FEATURES AFFECTING THESE DELIVERIES FOR THE PERIOD JULY 9, 1914, to SEPTEMBER 16, 1914, Inclusive.

(Work carried on through a cooperative agreement between the United States Reclamation Service and the State of Idaho.)

By

A. V. TALLMAN
Irrigation Engineer.

R E P O R T
on
CANAL DELIVERIES FROM THE BOISE RIVER AND DIFFERENT FEATURES AFFECTING THESE DELIVERIES, FOR THE PERIOD OF JULY 9, 1914, to SEPTEMBER 16, 1914, Inclusive.

--0--

(Work carried on through a cooperative agreement between the United States Reclamation Service and the State of Idaho.)

A. V. TALIMAN,
Irrigation Engineer.

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Previous Management.

Prior to the year 1914, the State of Idaho, through the Water Commissioner's office and the State Engineer's office, had never systematically regulated the deliveries of the waters from the Boise River during the irrigation season so that all water users had a just and equitable d distribution of the waters of this stream.

During the years previous to the diversion of water by the United States Reclamation Service, there was very little attention given to the river during the flood water season, as there as usually a surplus, but during the low water period of July, August, amd September, there was a noticeable jealousy existing between the water users on the upper part and the lower part of the river. If the water commissioner happened to be a man interested in the upper part of the river,

the canals on the lower section always maintained that all the water in the river was being diverted by the upper canals, while if the water commissioner was a man representing the lower part of the river, the canals on the upper part maintained that they were deprived of water early in the season so that there would be a sufficient supply at the lower end.

These factional feelings grew out of the facts that the water masters, employed from year to year, had no accurate method of determining the quantities of water diverted by each canal and that the river was cut up into three sections, each handled separately by a water master and no uniformity of action was possible.

After the United States Reclamation Service entered thw field as an individual water user, they were quick to see the necessity of accurate, reliable measurements of all canals diverting water from the river and during the past five years they have made exhaustive investigations along this line and have made it possible for the water masters to come a little closer to a just and equitable distribution of the water of the Boise river by the use of this information.

1914 Distribution.

Owing to the fact that during the irrigation season of 1913 serious trouble was encountered by the water commissioner and water masters in the management of the river, the State Engineer was forced to place a competent hydrometrist in charge

of the river early in the season of 1914.

On May 1, 1914, the writer was placed in charge of the river and instructed to gather whatever data was necessary to successfully carry out the proper distribution of the water. As the writer had several years experience in the measurement and distribution of water for irrigation purposes, he was thoroughly alive to the necessity of securing such data as would be needed during the low water period for the proper regulation of the various canals headings.

During the months of May and June the headings of all the large canals were visited as often as possible and current meter measurements made. These measurements were computed and trial discharge curves were established preparatory to the low water period.

As stated above, the United States Reclamation Service, through W. G. Steward, their engineer, had been carrying on hydrometric work on the Boise river during the five years previous and an abundance of very accurate, reliable data had been secured. This data, which was placed at my disposal through the Management of the United States Reclamation Service, together with the data secured by myself prior to the low water period, made it possible to satisfy all of the water users of the Boise river.

Early in this work a cooperative agreement was formed with the management of the U. S. Reclamation Service and myself,

which made it possible for me to derive a great benefit from the years of study Mr. Steward had given to the river and its many peculiar problems. By this agreement, all data gathered was made available for either party and gave me a much wider range of accurate data with which to operate the river.

After having gone through an irrigation season on the Boise river, during which time I was able to gather a large amount of data and check up the data secured by Mr. Steward during previous years, I can safely say that anyone desiring to obtain accurate, reliable, and unbiased information on the Boise river may use Mr. Steward's figures.

Through this cooperative work, data was secured on the discharge of all the important canals, tributaries and waste ways along the river from the Government diversion dam to Parma, Idaho.

Boise River Discharge.

A study of Chart 1 will give a comparison of the daily discharge of the river for the 70-day period extending from July 9 to September 16, inclusive, covering a period of twenty years. This chart shows that the season of 1914 can be classed as a low water year, although there are four years that are lower. There are thirteen years that have a much higher total run-off, during any one of which the water users should have had an ample supply of water practically throughout the season, had there been in effect a careful management of the river.

During the period of May 1 to July 7, inclusive, there

was sufficient flow in the river so that there was no need to call out the water masters to assist in keeping the canals down to the quantities to which they were entitled. All of the large canals having men in charge of their headings were instructed as to the gage height in the rating flumes necessary to give them a full flow and but very few instances were noted where instructions were not carried out by the canal companies.

Temporary Decree Issued.

On June 18, 1914, Judge Bryan of Caldwell issued a decree for the river based on the Stewart Decree, which gave all decreed rights 100 per cent of the Stewart Decree up to and including July 15; 75 per cent of full decree from July 16th to July 25th, inclusive, and 60 per cent of full decree for the balance of the season. This decree authorized 2755 second-feet of rights under the 100 per cent basis, 2066 second-feet for the 75 per cent period, and 1653 second-feet for the 60 per cent period.

Low Water Period.

On July 8th the flow of the river had decreased to such an extent that it was imperative that daily readings be secured and regulations made on all canals on the river. Therefore, the water masters were called out and started to work.

There were three water masters employed; one on a section extending from the Government diversion dam to the Dry Creek Canal; one on a section extending from the Dry Creek Canal to

the Canyon County Water Company Canal; and one on the lower section of the river from the Riverside Canal heading in the heading of the Lower Center Point Canal. It was the duty of each of these water masters to report daily, by telephone or in person to the Water Commissioner's Office, the gage height of every rating flume in his section of the river. They were instructed daily by myself as to the gage heights necessary to give each canal in their section the full decree and later in the season, as cuts in certain canals became necessary, the water masters were instructed when to make cuts and what the gage heights should be after the cut was made.

By having reports daily on gage heights of every canal on the river, I was enabled to know each day the exact condition existing along the entire river.

Classifications of River Sections.

During the low water period, July 9 to September 16, inclusive, the river naturally divided itself into four separate distinct sections because of the fact that at three points along the river all water may be diverted from the river channel without, in any way, detracting from the necessary canal requirements of the respective section or sections below any one of said points.

Section 1. This section includes all of that part of the river that lies between the Government diversion dam and a point immediately below the Canyon County Water Company Canal.

Section 2.- This section includes all of that part of the river that lies immediately below the Canyon County Water Company Canal and a point in the river immediately below the Seibenberg dam and the Farmers Cooperative dam.

Section 3.- This section includes all of that part of the river that lies between the points in the river immediately below the Seibenberg dam and the Farmers Cooperative dam and a point in the river immediately below the Lower Center Point dam.

Section 4.- This section includes that part of the river that lies between the points in the river immediately below the Lower Center Point Canal and the mouth of the Boise River. This section is very seldom referred to in this report, as the water rights existing in this section have an abundance of water throughout the season, regardless of how ~~or~~ large or small the quantities of water passing the Lower Center Point Canal heading. This is borne out by the fact that during the past few years the water master on the lower river has never regulated any canal heading below the Lower Center Point Canal.

Hereafter in this report any particular part of the river will be classed as Section 1, 2 or 3, etc.

Daily Canal Records.

Chart 2 gives the daily discharge of all canals on Sections 1,2 and 3 of the river for the 70-day low water period. By close examination of each canal by days, any cuts made on canals, subject to cut, can be found and the day noted on which cut was made. This chart includes the small quantities of water

passing Notus as a delivery. The miscellaneous column includes all small ditches which are visited infrequently and their daily discharge is given as a full right.

Chart 3 shows graphically the daily discharge of the river at Highland Station and the canal deliveries, the intermediate space being the net gain to the river.

Daily Tributary Flow.

In order to determine the relationship of the tributary flow to the net gain, data was obtained on all of the principal streams feeding water to the river below Highland rating station.

Chart 4 gives the daily discharge of fourteen (14) tributary streams and the total for each day in second-feet.

Daily Tributary and Seepage Gains to Boise River.

Chart 5 gives a comparison of river discharge at Highland station, canal deliveries, decreed rights, and net gain to the river. This chart shows that "lagging" in the river is taken into consideration; that is, the discharge of the river for July 8 is comparable to the deliveries to canals for July 9. This is done so that proper time may elapse for the water passing Highland to reach the canals that may be a 24-hour run from Highland. The river discharge is based on data for 1914 as shown in Chart 1. Canal deliveries are the daily totals taken from Chart 2.

The data in column headed "Decreed Rights" is taken from Judge Bryan's temporary decree of June 18 and shows daily the total rights in effect on each day of the 79-day period. The

daily net gain is made up from actual daily readings and measurements made on all tributary flow, which were of enough importance to warrant a rating station, as shown in Chart 4. A total derived by adding the daily tributary gain to the river discharge of the preceeding day is subtracted from the canal deliveries to give the daily seepage gain. In this column, "Total Seepage Gain", the _ sign indicates a loss was found for that particular day.

Although the indicated daily net gain in the river may vary somewhat, the averages by months are thoroughly reliable and give a very clear idea of the importance of the tributary and seepage gain to the river.

Canal Regulation.

One of the principal difficulties encountered in handling the Boise River during the season of 1914 was the method of making cuts in canals so that, as the river was dropping from 50 to 200 second-feet per day, each canal with a priority would have the water to which they were entitled. During the early part of the season the United States Reclamation Service filing is the first right subject to cut and as their canal is the first canal diverting water from the river, it is the most easily regulated of any canal on the river. As water is needed in the lower canals to fill rights in effect, the United States Reclamation Service canal is cut as the river at Highland Station drops, thus preventing any shortage in the river supply.

As the Phyllis, Farmers Union, and Settlers Canals become subject to cut, the situation becomes more complicated and great care must be taken not to cut too much water, as it is a greater mistake to waste water than it is to give a canal a surplus.

During the extreme low water period great care was taken in making cuts so that only small quantities, not to exceed 50 second-feet, were turned out of any canal at any one time. This was done because of the many small brush dams which are found at the headings of nearly all the canals. If a large quantity , 100 second-feet or more, was suddenly turned into the river, many of these frail dams would be damaged, entailing a loss of water as well as a loss of money to the canals depending upon this type of structure to divert their water from the river.

Barber Dam.

The most serious and disturbing factor that hampers the water master in making quick deliveries or changes in canals during the low water period is the operation of the Barber Lumber Company's dam or Power Plant. During the month of July the river fell rapidly amd when the time came to make cuts in the New York Canal, the river was so low that the Barber Power Plant had difficulty in securing sufficient water to develop all power needed. On several occasions cuts were made in the New York Canal and no chmnge in the river would be noticed at the heading of the Ridenbaugh Canal for a period of 48 hours.

As the Ridenbaugh heading is only about two miles below that of the New York Canal, it did not seem possible for the water to travel that distance so slowly. At other times the river would hold constant for several days and fluctuations of several feet in height of river at the Ridenbaugh heading would occur. As the Ridenbaugh heading is immediately below the Barber Dan, these fluctuations were finally traced to the operation of the power plant of the Barber Lumber Company (Boise-Payette Lumber Company). On or about July 22nd a man was placed at this power plant, who was first instructed to keep the pond above the dam at a certain level by regulating the quantities of water passing through the power plant. As the pond was continually changing elevation, instructions were then given to the man in charge to keep the generators in the plant so regulated that a continuous even supply of power was produced. This meant that an even head of water was passing through the plant at all times and the supply below the dam was a constant factor. After pursuing this last method for several days, it was found that the pond above the dam fluctuated frequently but at the end of a 24 or 48-hour interval the gage in the pond gave practically the same readings as when the period started. After going through these troubles with the power plant, it is the writers opinion that the contract under which the plant is operated is the cause for the fluctuations in the river. This contract calls for a certain "load" to be developed

by the plant from 12 o'clock noon to 12 o'clock midnight and a lesser"load" from 12 midnight to 12 noon. This necessitates the drawing off of some of the surplus water in the pond during the "High load" 12-hour shift and during the 12-hour,"low load" shift the pond is filled again for the next 12-hour, "high load" shift. If for 48 hours there should be a heavy call for power followed by a "light load", the following 24 or 48 hours, the "heavy load" would give a surplus in the river below while the "light load" might nearly dry up the river until the level of the pond had reached the top of the dam.

Canyon County Water Company Heading.

Daily records of canal deliveries early in this 70-day period gave a strong indication that it would be possible to dry up the river at the Canyon County Water Company Canal heading and still have sufficient water below for all lower rights.

As near as possible this course of procedure was followed out but due to the fact that the heading of this canal was several feet above the level of the river, a dam had to be maintained in the river in order to divert the river water into the Canal. This dam was approximately 12 feet in height and was made up principally of brush, sand bags, manure, and some earth. This conglomerate mixture was so porous that most of the water that should have been diverted by the canal went on down the river into Section 2. This canal company was warned several times to fix their dam if they cared to have a water

supply, but after making several attempts to tighten the structure, they decided it was cheaper to take chances on getting the water than it was to reconstruct the dam.

As the canal company had made a reasonable effort to improve their dam, I though it best to waste a small quantity of water past their canal so that they could get part of the amount to which they were entitled. This canal cannot be sure of getting a full supply of water until the heading has been changed to a point farther up the river. Plans were made to make this change but due to legal difficulties the company has not been able to secure proper right of way. Therefore, the present heading has to be maintained.

Summer Floods.

Another important feature in handling the river so that none of the canals will suffer during low water period is the proper regulation or handling of small floods occurring from summer rains.

As explained in one of the preceding paragraphs, there are many small brush dams in the river at the headings of the various canals, which are of a very flimsy nature and easily washed out. These dams are usually placed in the river each year as the low water period approaches and are usually built by the water users themsleves during spare time. If a flood should be allowed to rush down the river during the busy summer months, it would take all of these dams with it and would deprive the water users of their water for a period of from three days

to a week or more, depending upon the size of the structure.

In order to prevent these floods from coming down the river, arrangements were made early in the season with the management of the United States Reclamation Service to take these flood waters into the New York Canal and then cut the canal gradually as it was needed to fill the rights below. Had not these arrangements been made ahead of time, the flood following the rains on July 3 and 4 would have destroyed all of the small dams then existing on the river.

Notification of Emptying Canal.

A possible saving of water and prevention of waste could also be secured during the low water period by notifying the water master of any contemplated emptying of a canal for cleaning purposes.

During the low water period several canal companies were compelled to clean their ditches and without warning being given to the water master they would shut down their headgates in the river and waste their water through the river for 24 or 48 hours. Had ample notice been given the water master, this surplus water could have been used by some other canal which had lost a decreed right and a great benefit would have been derived by the canal getting the surplus. In the future operation of the river this matter should be given careful consideration so as to prevent any undue loss to the water users.

Results Obtained.

The method of handling the distribution of the water during this 70-day period demonstrated conclusively that the river

may be cut into four separate and distinct sections.

Section 1.

Section 1, as outlined on the preceding page, derives its water supply mainly from the natural flow of the river. Charts 5 and 6 show that there is some tributary and seepage gain, but this gain depends largely upon the amounts of water diverted by certain ditches which waste the water directly back into the river. Cottonwood Creek is fed by surplus water diverted by the Cruzen ditch, while the Boise River water comes from Sewer water pumped by the City of Boise from its filter bed in the channel of the river back of the Natatorium. This sewer water should be classed as part of the river flow and not as a tributary.

By drying up the river at the lower end of Section 1, the water users getting water in this section were given a much longer period of full water rights than could have been maintained under any other system of river management.

Chart 6 gives an itemized statement of the use made of the natural flow of the river and shows that for the period of July 9 to 31, inclusive, the average daily gain to the river was 130 second-feet; for the month of August the average daily gain was 70 second-feet; and for the period of September 1 to 16, inclusive, the daily gain averaged 201 second-feet. The total daily deliveries include the small quantities passing the Canyon County Water Company Canal heading.

Emphasis should be given the fact that this section diverted all of the natural flow of the Boise River.

Section 2.

In Section 2 the following canals divert water from the River: Riverside, Farmers Cooperative, Canyon (Campbell) and the Seibenberg.

During the 70-day period these canals derived their water supply from the following sources: (See Chart 4) - Boise River below Canyon County Water Company Canal, Middleton Mill Slough, Mason Creek, Ten Mile Creek, Hartley Gulch, Willow Creek, and varying quantities of seepage water.

Chart 7 gives a daily record of water available and deliveries to canals in this section and shows that during the period of July 9 to 31, inclusive, there as an average daily net gain of 218 second-feet; that during the month of August there was an average daily net gain of 108 second-feet; and that the average daily net gain for the period of September 1 to 16, inclusive, was 158 second-feet.

A total of 24,422 acre-feet was delivered to the four canals in this section, 2,662 acre-feet of which came from the river below the Canyon County Water Company Canal heading or water that the Canyon County Canal should have diverted.

The above figures show that 90 per cent of the available water in this section came from tributary and seepage gain, while 10 per cent was derived from the river section above.

During the early part of this 70-day period, there was considerable water passing the Seibenberg canal, but as soon as a shortagle occurred the Farmers Cooperative Canal tightened their rock dam across the river and by the latter part of July the waste past the Seibenberg Canal had been reduced to the ~~minim~~ minimum.

Section 3.

In this section of the River the following canals divert water:- Riverside No.2, Pioneer, Dixie (Kellar), Eureka No.2, Upper Center Point and Lower Center Point.

During the 70-day period, these canals derived their water supply from the following sources: See Chart 4) - Indian Creek, Upper Dixie Slouth, and varying quantities of seepage flow. Riverside No.2 is included in the diversions in this section due to this canal diverting water from Indian Creek. All water passing the Lower Center Point Canal is included as a diversion as the four lower canals in this section do not maintain proper dams for the diversion of the river water, thereby losing a large part of the water to which they are entitled.

Upper Dixie Slough is figured as a tributary to the river as it supplements the river supply of the Pioneer Dixie Canal.

Chart 8 gives a daily record of the water available and deliveries to canals. This chart shows that during the period of July 9 to 31, inclusive, there was a daily average net gain in this section of 139 second-feet; that during the month of

August the average daily net gain was 105 second-feet; and from September 1 to 16, inclusive, a daily average net gain of 122 second-feet.

A total of the deliveries to canals for the 70-day period gives a discharge of 20,868 acre-feet, while the amount available from the river, that passed the Seibenberg canal, gives a discharge of 4,048 acre-feet, or 19 per cent of the total deliveries from the river section above, while 81 per cent was tributary and seepage gain in Section 3. Most of the 19 percent, or 55 per cent of the 19 per cent, passed the Seibenberg canal in July at which time there was a surplus in Section 2, which could not be taken care of by the canals in that section.

Sections 1, 2, & 3.

Referring again to Chart 5, it is noted that during the period of July 9 to 16, inclusive, there was an average daily tributary and seepage gain for all three sections of the river of 465 second-feet or 27 per cent over the amount available at Highland Station. (See table, Chart 3).

During the month of August the average daily net gain to the river was 276 second-feet or 29 per cent over the amount available at Highland station.

During the period of September 1 to 16, inclusive, the average daily net gain was 469 second-feet or 52 per cent over the amount available at Highland station.

The daily average net gain for the 70-day period was 403 second-feet or 36 per cent over the quantities available at Highland.

Complete River Measurement.

In order to convey a clear impression of the importance of the tributary and seepage gain to the river as a whole, the following table has been prepared from data secured by cooperative work on the part of the U. S. Reclamation Service and the writer. These data were secured on July 9 by a force of six hydrometrists, the work being carried on simultaneously on six different sections of the river. By this method all canals and tributaries were visited on the same day and measurements made of the discharge of all streams. The total net gain to the river on this day, as noted in the summary table, was 827.75 second-feet. It is the writer's opinion that during the preceding month, June, there was at least a daily net gain of 1,000 second-feet to the river in Sections 1,2, and 3.

TABLE SHOWING COMPLETE RIVER MEASUREMENTS
and
NET GAIN
July 9,1914.

Canals and Tributaries.	Boise River	Canal Discharge.	Tributary flow.	Seepage flow	Net Gain
	2470				
Penitentiary Canal		7.00			
U.S.R.S.Canal M.C.#2		1319 .80			
Ridenbaugh Canal		385.00			
Bubb Canal		13.80			
Cruzen Canal		69.60			
Boise City Canal		7.12			
Cottonwood Creek			18.90		
Boise River at Boise		759.80			
Rossi Mill			4.40		
Totals	2470	2562.12	23.30	111.02	~~134.32~~
Gain Highland to Notus ~~Boise~~					134.32
	Boise to Eagle				
Boise River at Boise	801.90				
Settlers Canal		137.00			
Little Davis Canal		1.50			
Big Davis Canal		10.05			
Thurman Mill		47.80			
Boise Sewer			22.06		
Sand Creek			1.20		
Farmers Union Canal		141.60			
Boise Valley Canal		30.40			
Little Union Canal		3.32			
Boise Valley Waste			11.70		
Dry Creek Canal		41.00			
Warm Springs		3.20			
Thurman Mill Waste			11.98		
Graham & Gilbert		5.20			
Joplin Canal		1.96			
Catlin & Mace		2.78			
Conway & Hamming		8.43			
Boise River at Eagle		408 .27			
Slough South of Eagle			2.78		
Totals.....	801.90	842.51	49.72	- 9.11	
Gain - Boise to Eagle					40.61

Table continued.

Eagle to Star.

Canals and Tributaries.	Boise River Discharge.	Canal	Tributary flow.	Seepage flow.	Net Gain.
Boise River at Eagle	411.05				
Hart & Davis Canal		5.77			
Phyllis Canal		220.00			
Eureka No.1 Canal		15.50			
Dry Creek Waste			14.26		
Ballantine Canal		11.90			
Ballantine "			11.90		
Middleton Water Co.		53.20			
Middleton Mill Co.		29.86			
Pioneer		10.00			
Boise River at Star		248.20			
Totals	411.05	574.43	26.16	137.22	
Gain - Eagle to Star					163.38
Boise River at Star	248.20				
Eureka No. Waste			6.00		
Caldwell High Line Canal		85.38			
Franklin Ditch		1.34			
Kennedy Ditch		0.40			
Canyon Co.Water Co.		51.83			Sec. 1
Ten Mile Waste			74.95		Sec. 2
Thomas Slough			3.14		
Big Slough		11.28			
Boise River at Middleton		214.60			
Totals	248.20	364.83	84.09	32.54	
Gain - Star to Middleton					116.63
Boise River at Middleton	214.60				
Middleton Slough			38.32		
Willow Creek			4.81		
Mason Creek			78.29		
East Hartley Gulch			1.90		
West " "			0.00		
Indian Creek			94.59		
Riverside No. 2		108.03			
Sebree Canal		309.43			
Canyon Canal		20.96			
Seibenberg Canal		6.44			
Boise River at Canyon		73.50			
Totals	214.60	518.36	217.91	85.85	
Gain - Middleton to Canyon					303.76

Table Continued.

Canals and Tributaries.	Boise River	Canal Discharge.	Tributary flow.	Seepage flow	Net Gain.
Boise River below Canyon	73.50				
Caldwell Drain			5.11		
Riverside Waste			4.00		
Kellar & Dixie Slough		16.93			
Upper Dixie Slough			11.22		
Eureka No. 2		34.66			
Upper Center Point Canal		11.69			
Lower Center Point Canal		7.78			
Boise River at Notus		71.54			
Totals.....	73.50	142.60	20.33	48.72	
Gain - Canyon to Notus					69.05

SUMMARY TABLE.

Section of river.	Tributary flow.	Seepage flow	Net Gain.
Highland Station to Boise	23.30	111.02	134.32
Boise to Eagle	49.72	- 9.11	40.61
Eagle to Star	26.16	137.22	163.38
Star to Middleton	84.09	32.54	116.63
Middleton to Canyon	217.91	85.85	303.76
Canyon to Notus	20.33	48.72	69.05
Total gain to River	421.51	406.24	827.75

Chart 13 has been compiled for a period of 34 days, from August 8 to September 10, inclusive, and shows graphically the average conditions existing along the Boise river during the low water period.

Riverside Exchange (Chart 9).

Prior to July 9, the Riverside Canal entered into an agreement with the United States Reclamation Service whereby the Reclamation Service was enabled to divert the decreed rights of the Riverside Canal into the New York Canal and substitute therefor stored water from the Deer Flat Reservoir.

The physical features of these two canals systems made it possible for both to benefit by an exchange. The U.S. Reclamation Service derived a benefit through having a decreed right in effect in their canal after all their flood right had been cut out, while the Riverside Canal had their Deer Flat Reservoir Water turned into their canal some ten miles below the river heading, thus saving the expense of operating this ten miles of canal and also saved the usual seepage losses to which their canal is subject.

Up to July 22 there was sufficient water in the river to fill all decreed rights in Section 1, while sections 2 and 3 had a surplus supply. On July 22, 23, 24, and 25th the Phyllis Canal lost their right No.135, which deprived them of 42 second-feet per day for these four days or a total of 256 acre-feet. Had the Riverside Canal derived their supply direct from their heading in the river in Section 2, the Phyllis Canal would not

have lost this 256 acre-feet of water.

On July 26 all canals on the river were cut to 60 per cent of a full decreed right and this gave a sufficient surplus so that the Riverside exchange did not affect any rights on that date. This condition prevailed until July 31st, at which time the Phyllis right No. 135 and New York right No. 131 were cut. As the Riverside Right No. 133 of 70 second-feet had been previously cut out of the New York Canal, the New York right No. 131 was injured 74 second-feet per day for a period of 6 days or a total of 888 acre-feet.

On August 6 the Farmers Union Canal was cut out of their right No. 126, which deprived them of a total of 544 acre-feet for the 70-day period.

As the Riverside Canal had a right of 20 second-feet, which carried a priority that guaranteed a full supply throughout the season, that was in effect in the U. S. R. S. canal through the 70-day period, all canals that were cut during this period would have had this additional 12 second-feet for short periods if the exchange had not been in effect.

The first column under the name of each canal in Chart 9 gives a daily record of the losses sustained by the different canals due to the Riverside exchange. By examining closely this Chart it will be noted that on August 9 the Farmers Union Canal was injured to the extent of 12 second-feet by the exchange.

This shows that all of the Riverside right had been cut out of the U. S. R. S. canal prior to that date with the exception of a right of 12 second-feet.

The summary table on Chart 9 gives the total losses in acre-feet of wach canal injured during this 70-day period.

The question immediately arises as to whether or not there was sufficient tributary and seepage gain in Sections 2 and 3 to have taken care of the Riverside rights had the Riverside Canal diverted their water right through their own canal heading in the river in Section 2.

This is best answered by the data found in Chart 12. This chart shows that during the month of July there was an average daily deficit of 74 second-feet in the available supply, but during the months of August and September there was a surplus in the available supply over the canal requirements. Chart 12 will be explained in detail later in this report.

On August 25 the Riverside Canal notified the Water Commissioner's office in writing that they wished to exchange all of their rights back down the river with the exception of right No. 91, which was left in the U. S. R. S. canal. By this re-exchange their canal gained a right of 48 second-feet from that time on through the season. Later in the season as the river increased its natural flow the rights were again manipulated so that they again existed in the U. S. R. S. canal.

If this exchange is to be continued the best means of preventing an injury to the canals in Section 1 would be to

give the Riverside rights the same status as the Government rights and when the time arrives so that it is necessary to cut decreed rights, the exchange water should all be cut before the Phyllis right No. 135 is subject to cut.

Middleton Mill Slough and Boise River Waste.

Another column in Chart 9 gives the daily waste in second-feet from the Middleton Mill Slough and the Boise River immediately below the Canyon County Canal heading and the injury it worked on different canals in Section 1.

The data contained in this column is based on the daily discharge of Middleton Mill Slough in Chart 4, from which has been subtracted a permissible waste of 5 second-feet; and also on the daily discharge of the river below the Canyon County Canal, found in Chart 7, from which has been subtracted a permissible waste of 5 second-feet. The reason or excuse for such a large waste through the Middleton Mill Slough cannot be definitely traced to an oversupply of any one or group of canals, but my opinion is that the Middleton Mill Ditch and Middleton Water Company Canal both contribute to a large extent in furnishing this excess waste water, not through any desire to waste water but through careless distribution of the water in their canals. It is the writer's intention, if given an opportunity during the next irrigation season, to make a special study of these canals and if possible devise some method

whereby the service to the water users can be bettered and still decrease, to a minimum, the large quantities of waste water that are daily discharged through the Middleton Mill Slough during the entire irrigation season.

As explained in a previous discussion, the water wasted past the Canyon County Canal heading rightfully belonged to this canal but due to a faulty diversion dam, they were not enabled to get a full supply from the river, but nevertheless this water should be classed as waste water for it was not needed in Sections 2 or 3.

Referring again to Chart 9 it will be noted that the U. S. R. S., New York, Farmers Union, Settlers, and Ridenbaugh Canals suffered losses in their supply through this waste water going into Section 2. A total of over 6,000 acre-feet was thus lost to the above mentioned canals during the 79-day low water period.

Canals Benefitted by Excess Water.

In Section 2 of the river there are only two large canals diverting water. These are the Riverside and the Farmers Co-operative Canals. During the period of July 9 to August 25, the Farmers Cooperative Canal was entitled to all of the surplus water in Section 2, as the Riverside decreed rights had had their point of diversion changed to the U. S. R. S. canal in Section 1 and did not exist in Section 2. On August 25, as explained in a preceding paragraph, the Riverside rights

came into effect in Section 2 and were entitled to a daily discharge of 48 second-feet. A part of this 48 second-feet was supplied from Section 2 and part from Indian Creek in Section 3.

After the Riverside right of 48 second-feet had been supplied, all surplus water, as needed, was then used to fill the Farmers Cooperative right No. 129. After this right was filled, the Riverside Canal was then entitled to a further discharge of 54 second-feet.

The source of the excess water in Section 2, together with the canals benefitted by it, are shown in a daily discharge sheet on Chart 10. This chart also partially duplicates Chart 9, as it shows the extent of the loss the canals in Section 1 suffered through this waste water.

Transfers.

During the administration of A. E. Robinson, as State Engineer of Idaho, a transfer of 21.56 second-feet was made from decreed rights having their point of diversion in Section 3 of the river, changing the point of diversion to the New York Canal in Section 1. This Transfer is known locally as the Hillcrest transfer.

In the early part of the irrigation season of 1914, State Engineer F. P. King granted a transfer of 39.20 second-feet, 19.2 second-feet of which was transferred From Sections 2 and

3 of the river to Section 1. This transfer is hereinafter referred to as the "Wise Transfer" as the project upon which this water is to be used is known as the Boise Fruit Tracts or the Wise Project. During the period of July 11 to September 16, the Wise transfer was diverting water from the Boise River in Section 1, through the Farmers Union Canal.

On the 17th of July the Hillcrest transfer went into effect and continued throughout the season, the water being diverted through the New York Canal.

The total transfer of water from Sections 2 and 3 that had a direct bearing on the decreed rights in Section 1 was 40.76 second-feet for the period that the canals were diverting 100 per cent of their rights. From July 16 to 25, inclusive, these transferred rights from Sections 2 and 3 had a value of 30.57 second-feet, and from July 26 on through the season, these rights diverted 24.45 second-feet.

As these transferred rights had priorities over practically all of the decreed rights diverting water in Section 1, their rights had to be filled from the natural flow of the river regardless of any deficit that might occur to the canals in Section 1, which had been diverting water for several years past.

The losses sustained by the various canals in Section 1 are shown in the second column under each canal heading on Chart 9. These losses are shown in daily discharges in second-feet for the entire 70-day period, while the summary table on

the same chart gives the totals in acre-feet that each canal lost for the entire 70-day period. This summary table shows that the U. S. R. S. rights lost a total of 796 acre-feet, New York Rights lost a total of 492 acre-feet, Farmers Union rights a total of 816 acre-feet, Settlers rights a total of 936 acre-feet, and the Ridenbaugh rights lost a total of 54 acre-feet, or a grand total loss to all canals in Section 1 of 3,094 acre-feet. As this water has a value ranging from $1 to $2 per acre-foot, the actual financial loss to these canals was $3,094, figuring on the $1 basis, or $6,188, figuring on the $2 basis. The financial loss to these canals is difficult to estimate as all the canals suffering this loss could not have taken any financial consideration for this water had they been able to have retained it.

Prior to July 9, had these transfers been in effect, the U. S. R. S. would have lost an additional 8,142 acre-feet during the period of April 1 to July 9.

Although the loss sustained by the canals in Section 1 is not a startling one, the effect of allowing these transfers to continue is far-reaching and the precedent established will lead the owners of decreed rights in Sections 2 and 3 and 4 to believe that they have a right to sell their waters even though it works an injury to owners of other decreed rights on the Boise River.

In order to quiet any doubts that might arise as to the feasibility of drying up the river at the lower end of

Section 1 and still have a sufficient supply for all decreed rights below, Chart No.12, was compiled from data actually obtained during the 70-day period. This proves conclusively that during the months of August and September there was a surplus over the canal requirements in Sections 2 and 3 and that the rights previously transferred could have been taken care of had they existed in these sections.

Future Transfers.

On the assumption that the Hillcrest and Wise transfers would be allowed to remain in effect, Chart 11 was compiled in order to estimate the effect of future transfers. If these two transfers hold good, it is very probable that other owners of decreed rights in Sections 2, 3 and 4 will ask to have their rights transferred to other sections of the river. As the tributary and seepage flows in these sections are increasing rapidly each year, the owners of these rights could sell their water and still have a supply, from waste water, that could not be taken away from them for this water would waste into the Snake River if not diverted by these canals.

This chart is based on a possible transfer of 263 second-feet from Sections 3 and 4 to Section 1 and shows the losses that would have been sustained by canals in Section 1, had this transfer been in effect during the 70-day period, July 9 to September 16, inclusive, 1914. This transfer of 263 second-feet includes the following rights which exist in Sections 3 and 4:-

Riverside Canal - 40.76 sec.-ft., Pioneer-Dixie, 61.64 sec-ft., Eureka No.2, 51.20 sec-ft.,Upper Center Point, 12.72 sec-ft., Lower Center Point, 26.18 sec-ft., Mammonm 18.16 sec-ft., Haas, 8.54 sec-ft., Andrews, 36.20 sec-ft., and the Stockton right of 7.92 sec-ft.

As all of the above rights have priorities over practically all of the rights diverting water in Section 1, a transfer of 263 second-feet to Section 1 would necessitate the filling of all these rights before other rights in Section 1 would be entitled to a water supply. Chart 11 gives the daily loss in second-feet for each canal affected and clearly shows the disastrous effect such a transfer would have exerted on the canals in Section 1.

The summary table on this chart shows that a total loss of 24,370 acre-feet would have been sustained during this 70-day period by the following canals:

U. S. R. S. Canal	6,718	Acre-feet.	
Phyllis Canal	1,780	"	"
New York Canal	3,344	"	"
Farmers Union Canal	2,520	"	"
Settlers Canal	2,626	"	"
Middleton Mill Ditch	740	"	""
Bubb Canal	420	"	"
Ridenbaugh Canal	6,164	"	"
New Dry Creek Canal	28	"	"
Thomas Davis	16	"	"
Ballantine Canal	14	"	"

Estimating the value of this water at $2 per acre-foot, the above canals would have suffered a financial loss of $48,740 during the short period of 70 days in the low water season of 1914.

Prior to July 9 and following September 16, the U.S.R.S. would have suffered a loss of 263 second-feet for 115 days, or an additional loss of 60,490 acre-feet. As this water is actually rented by the U.S. Reclamation Service to their water users during the flood water period at 40 cents per acre-foot, their annual loss would be $24,196.

To emphasize the status of these transfers from Sections 2, 3, and 4, to Section 1, the following statement hold_ true: A sale of decreed rights diverting water in Sections 2, 3, and 4, and changing their point of diversion to Section 1 is equivalent to selling the rights of Section 1 to a third party, giving them priorities over rights in Section 1, and Sections 2, 3, and 4, still having the same available water supply as before the sale was made.

Transfers from Sections 3 & 4
to
Section 2.

A transfer of a decreed right from Sections 3 and 4 to Section 2 would have the same effect on the rights diverting water in Section 2 as described in Section 1. At the ppesent time there is not a sufficient excess of tributary and seepage gain in Section 2 to take care of any more rights than already divert water in this section. A study of Chart 12 emphasizes the fact that during the month of July 1914, there was an average daily deficit of 74 second-feet and that only during the months of August and September a surplus was found.

A transfer of decreed rights from Sections 3 and 4, having old priorities, to Section 2 would practically destroy the fi__ right of the Farmers Cooperative Canal.

Available Water Supply for Sections 2 and 3.

In order to substantiate the facts brought out in the above discussion on the available water supply in Sections 2 and 3 and its relationship to canal requirements in these Sections, Chart 12 has been compiled.

The first column in this chart "Available Return Flow," is computed from the daily flow of the following tributaries:- Ten Mile Waste, Willow Creek, Mason Creek, Hartley Gulch, Indian Creek, Upper Dixie Slough, 5 second-feet daily from Boise River below Canyon County Canal, and 5 second-feet from Middletom Mill Slough, together with the daily seepage gain in Sections 2 and 3, as shown in Charts 7 and 8.

The second column in this chart gives the daily canal requirements, based on 1914 deliveries. The data in this column are computed from actual daily deliveries of the following canals: Campbell or Canyon, Seibenberg, Pioneer Dixie, and Upper Dixie Slough, Eureka No.2, Upper Center Point and Lower Center Point, together with the decreed rights of the Riverside and Sebree canals, according to the priorities of these rights, had they been subject to cuts the same as any other canal on the river.

For example, the Riverside Canal was entitled to a full right of 206 second-feet from July 9 to July 15, inclusive, 154 second-feet from July 16 to 25, inclusive, 124 second-feet from July 26 to 28, inclusive, 82 second-feet from July 29 to 31, inclusive, 70 second-feet from August 1 to 8, inclusive, and 22 second-feet daily for the balance of the season.

A study of the priorities of decreed rights in the Stewart Decree will show the order in which rights are subject to cut.

Chart No. 12 proves conclusively that during the low water period of August and September there is a sufficient supply of water in Sections 2 and 3 to take care of all canal requirements in those sections.

Filings on Tributary Streams.

The effect of a filing on any of the tributary waters of the Boise river and diverting the same before or after it reached the river would as disastrous to the decreed rights already existing as a transfer of water from Sections 2, 3 or 4 to Section 1.

During the next few years it will require the most careful management of the Boise River to give to the water users depending upon these waters a full supply during the low water period. If filings on tributary streams, waste water, and seepage water are permitted, the supply necessary to fill all the present rights would be greatly diminished and loss to some one or group of canals would result. If a filing and diversion of 50 second-feet of Mason Creek waters should take

effect, the canals in Section 2 would lose a large part of their available supply during low water period and would work an extreme hardship on the water users already depending upon this source for a part of their available supply.

Relation of Indian Creek to River Conditions.

During the early part of the irrigation season of 1914 the writer realized the importance of settling once and for all the status of the waters of Indian Creek.

In previous years the Riverside Canal, which uses Indian creek as a channel for a short distance, had been accustomed to divert the waters of Indian Creek into their canal during the low water period when their rights in the Boise river terminated.

During the latter part of July, at a time when cuts of rights were necessary, the question arose in the writer's mind as to whether or not it was just to cut the canals on the upper end of Section 1, in order to get water through to Section 3, when a cut in the Riverside Canal of Indian Creek water would prevent the necessity of a cut of canals in Section 1. As the canals in Section 1 had a priority over a part of the Riverside rights and the Riverside rights already existed in Section 1, due to the exchange with the United States Reclamation Service, it hardly seemed fair to make the canals in Section suffer cuts in order for the Riverside Canal to get a surplus.

Working on this theory, the Riverside Canal was deprived of Indian Creek water about the 28th of July. Injunction proceedings were immediately started by the Riverside Canal, asking the Court to restrain the water commissioner and the State Engineer from interfering with the canal's diversion of water from Indian Creek.

Judge Bryan held in his decision that Indian Creek was a tributary to the Boise River and that the waters from this stream should be treated the same as any other waters of the Boise River. Judge Bryan also held that any surplus water that was not needed to fill prior decreed rights should be given to the Riverside Canal.

Had the Court held that Indian Creek was not a tributary to the Boise River, the rights in Section 1 would have had to havehave been cut sufficiently to have made up the quantities diverted by the Riverside Canal, or practically the entire flow of Indian Creek during the low water period.

As Judge Bryan held that the Riverside Canal was entitled to all of the surplus waters of Indian Creek, an attempt was made to so regulate the canal deliveries in Section 3 that there would be a minimum flow of water wasting past the Lower Center Point Canal.

The water master on this section of the river was repeatedly given implicit orders to so regulate his deliveries, but due to fear that the Pioneer Dixie, Eureka No.2, Upper Center Point

and Lower Center Point Canals would be deprived of a sufficient supply of water, some water was wasted which should have gone to the Riverside Canal. The four canals above - mentioned were somewhat to blame for this waste, as they would not maintain proper dams in the river in order to divert the water they needed. These four canals were continually complaining of a shortage of water, but as there was always water passing through their dams and going down the river, their complaints had no foundation in fact.

Section 4 of the Boise River.

As explained in the first part of this report, Section 4 includes that part of the Boise River lying between the Lower Center Point Canal and the mouth of the Boise River.

There are four decreed rights in this section of the river - Haas, Mammon, Stockton, and Andrews, all of which depend upon the tributary and seepage gain in this section for their water supply.

Mr. D. J. Paul, a hydrometrist of the United States Reclamation Service, carried on a complete investigation of this section of the river and his data shows that throughout the low water period there was a sufficient tributary and seepage gain in this section of the river to supply all of the requirements of these canals, had the river been entirely dried up at the Lower Center Point Canal or the end of Section 3.

Chemical Analysis of Waters in Sections 1, 2, 3.

While carrying on the work of the distribution of the waters of the Boise River, the question was asked frequently as to the quality of water delivered to water users in Sections 2 and 3.

On the 17th day of August, the writer secured samples of water from the following sources:- Heading of Lower Center Point Canal, Heading of Upper Center Point Canal, Eureka No.2 Canal, Upper Dixie drain, Heading of Pioneer Dixie Canal, Indian Creek just above inlet of Riverside Canal, and the heading of the Farmers Cooperative Canal. On the following day a sample was secured from the Boise river at Star by Mr. A. C. Polly, watermaster on that section.

As these samples were obtained at a time when the worst possible condition of water shortage was in effect, it is the opinion of the writer that the parts per million of alkali found in these samples would not be materially increased under even more adverse conditions.

Through the courtesy of the State Board of Health, Mr. Jackson, State Chemist, made an analysis of these samples of water and the following chart and letter of transmission give the results in parts per million.

This analysis shows that there was not even a trace of black alkali.

The sample containing the highest proportion of white

alkali was found to be Indian Creek waters, which contained 498 parts per million.

The sample containing waters from Upper Dixie Slough, which the writer thought would carry the highest per centage of alkali, only contained 448 parts per million of white alkali. Many authorities agree that 3,000 parts per million of white alkali in irrigation water is a permissible quantity and not highly injurious to the lands upon which the water is applied. (For reference see Hillgarde).

This chemical analysis eliminates any doubt as to the feasibility of using this tributary and seepage gain in Sections 2 and 3 for irrigation purposes.

Letter of State Chemist, transmitting table of analysis of samples of water.

IDAHO STATE BOARD OF HEALTH.

Boise, Idaho, Sept. 14, 1914.

Mr. A. V. Tallman,
Office of State Engineer,
Boise, Idaho.

Dear Sir:

At your request and with the approval of the State Board of Health, I have examined seven samples of water used for irrigation to determine their content of mineral matter, especially in regard to alkali.

Wiley in his Principals and Practices of Agricultural Analysis quoting from Hillgard, the expert of the California Agricultural Experiment Station, defines alkali in the following words: "These salts (speaking of alkali soils) are chiefly sodium & Potassium sulfates, chlorides and carbonates." And again: "The three most important ingredients of the alkali of the lands referred to (alkali lands) are sodium chloride, sulfate, and carbonate, When the latter salt, namely, sodium carbonate, is present in predominant quantity, it gives rise to what is popularly known as black alkali. This black color is due to the dark colored solution which sodium carbonate makes with the organic matters or humus of the soil. The black alkali is far more injurious to growing vegetation than the white alkali composed chiefly of sodium sulfate and chloride."

In examining the samples, all determinations were made by the "Standard Methods of Water Analysis" of the American Public Health Association. Total and fixed solids were determined in 50 cubic centimeter (c.c.) samples after the water had settled for two days and thus represents only solids in solution and not silt.

The difference between Total & Fixt solids or "Loss on Ignition" represents principally organic matter which has been burned away.

A. V. T. #2

Total alkalinity represents all salts which will neutralize acid and may consist of carbonates or bicarbonates or either one of the two plus caustic alkali, but never all three at once. Total alkalinity, carbonates and bicarbonates are expressed in terms of Ca CO_3.

With these words of explanation the results are expressed in parts per million in the form of a table.

Very truly yours,

(Signed) H. Louis Jackson,

State Chemist.

SEE FIG. 1 IN FRONT OF REPORT.

Effect of Drainage.

During the past few years several drainage canals have been dug in the Boise valley and the discharge from these drains has had a material effect on the gains in the Boise river during the low water period.

Before these drains were constructed the excess water in the lands lying within the drainage area of the Boise river travelled very slowly toward the river and were not of much benefit to the river during the low water period. With several drain ditches now completed and more under construction, the return flow to the river during the low water period will be greatly augmented in Sections 2 and 3 and from year to year this flow will increase as more land is brought under cultivation on the United States Reclamation Service Project.

The following map, Chart 14, prepared by the U. S. Reclamation Service, showing contours of the water table underlying the Boise River drainage area, gives the direction of the flow of this underground water and explains why Sections 2 and 3 derive more benefit from this underground flow than the upper section of the river.

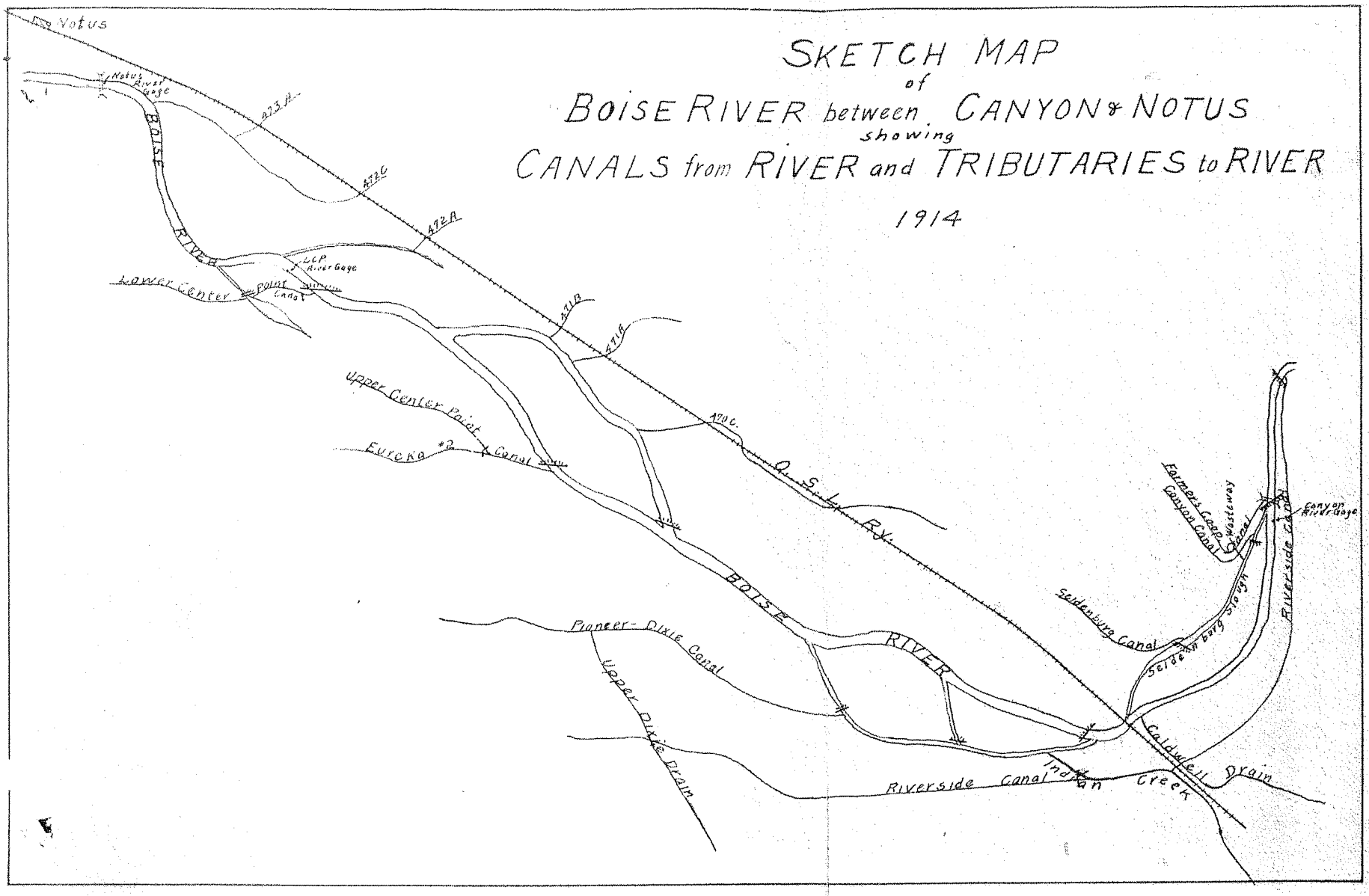
Necessity for River Regulation for Entire Irrigation Season.

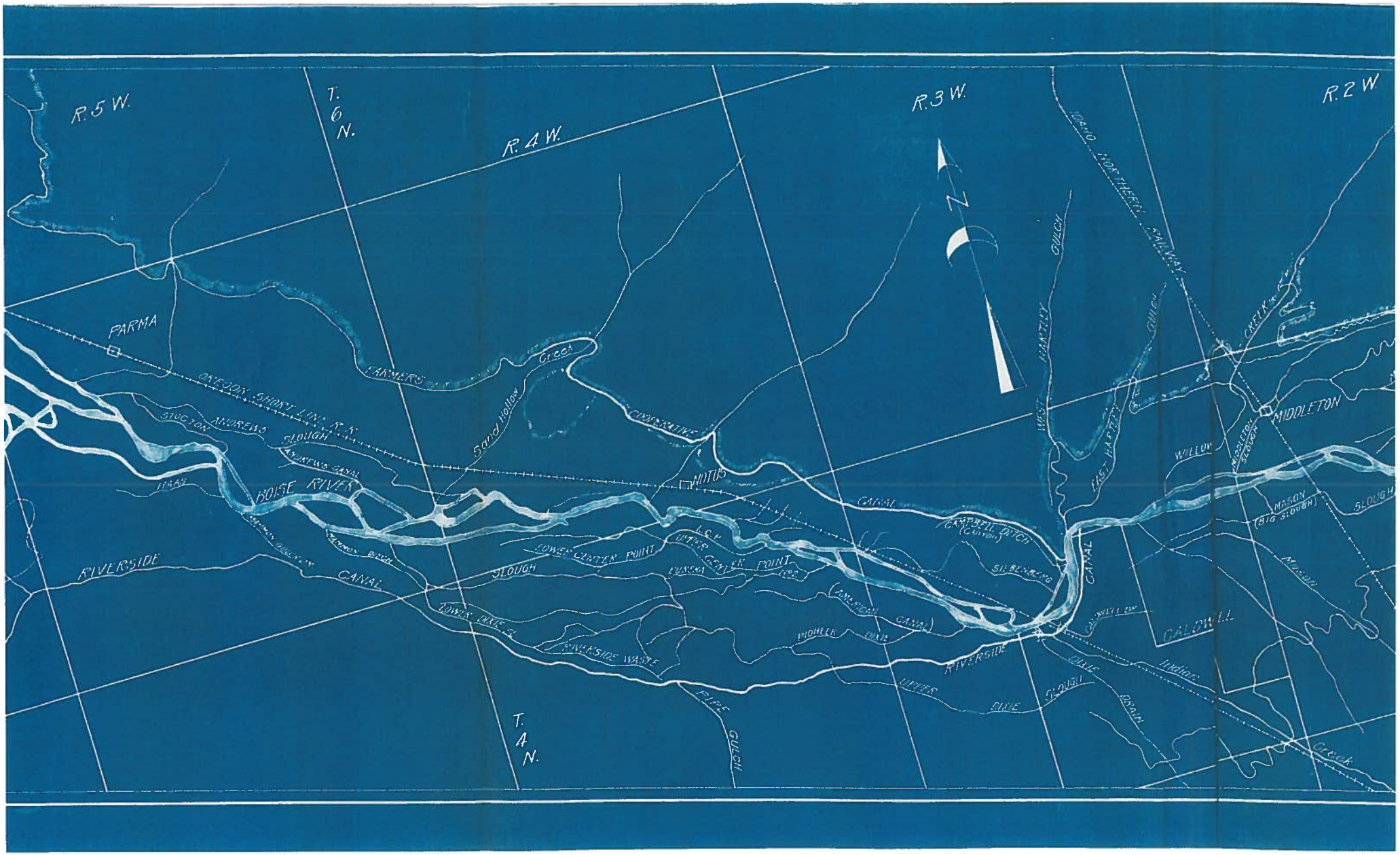
Beginning with the irrigation season of 1915, the Arrowrock Reservoir of the United States Reclamation Service will probably store water. This means that during a low water

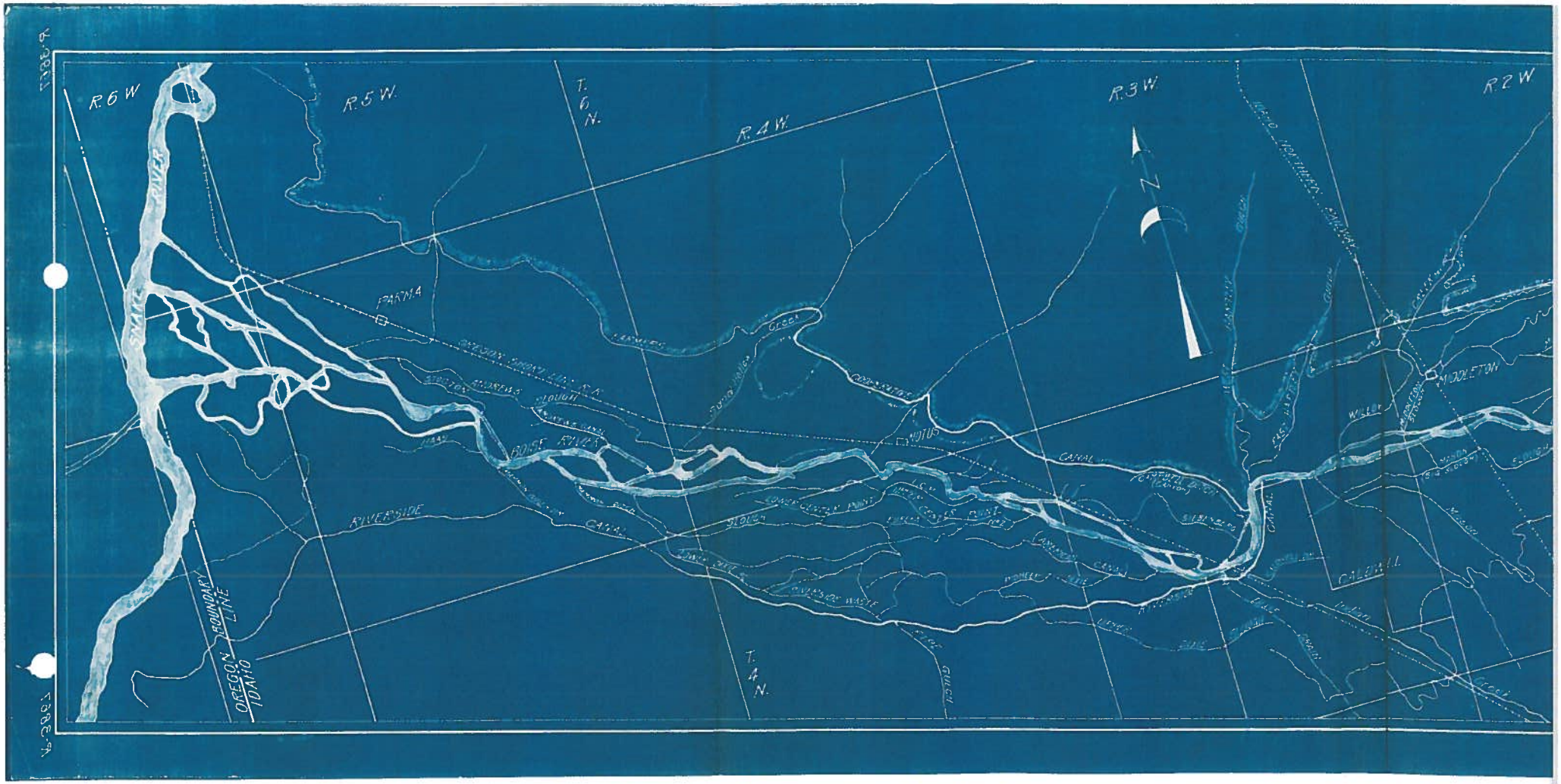
year like 1914, the flow of the river will be so controlled that there will be no surplus water in the river for decreed rights after April 1, and the water masters will be called upon to make the best possible use of the river water for the entire irrigation period.

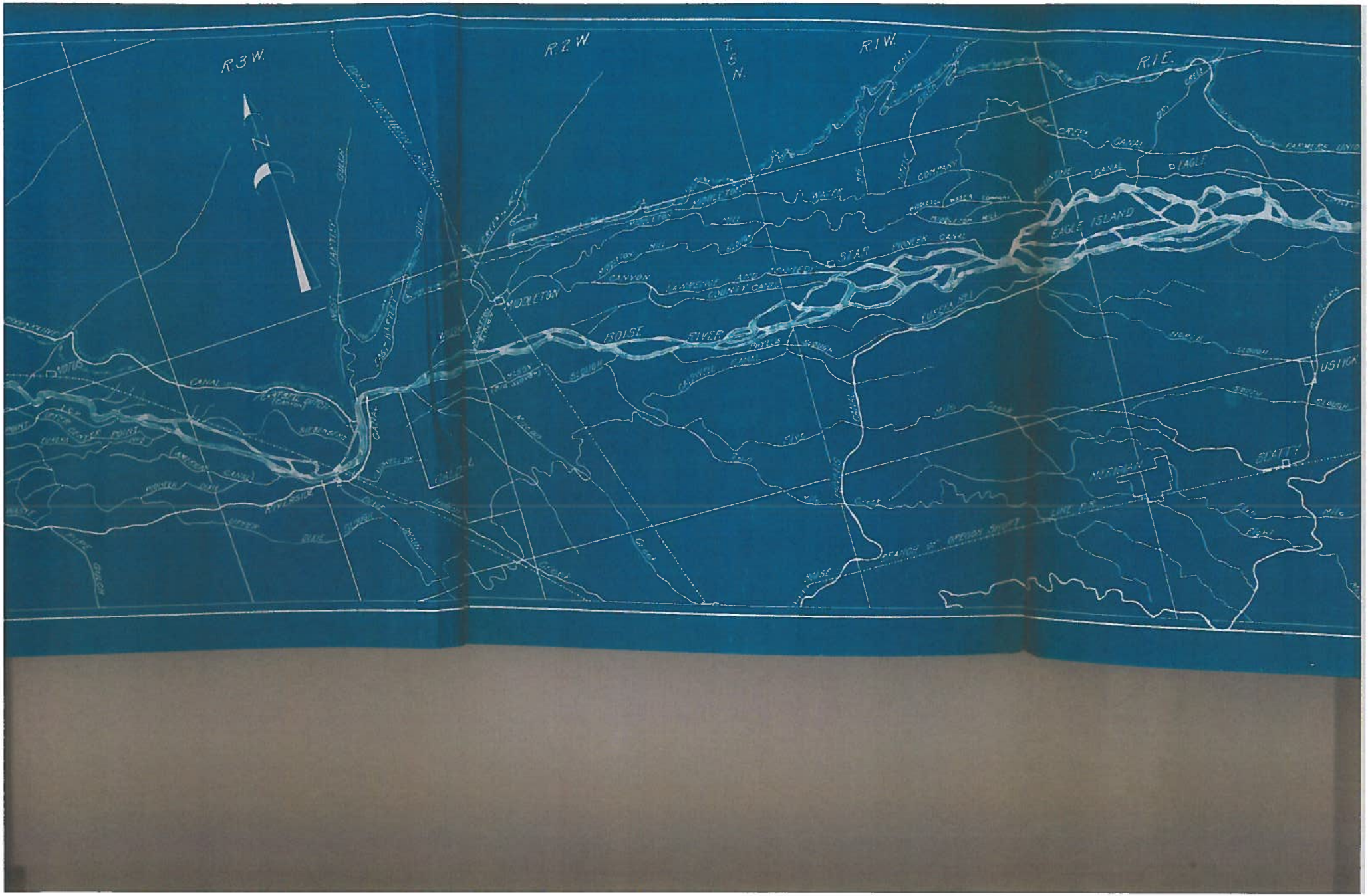
CONCLUSIONS.

1. That tributary flow and seepage gain are important items to be considered in the management of the Boise river.
2. All tributary and seepage waters should be considered as a part of the available water supply of the Boise River.
3. That the River naturally divides itself into four sections.
4. That during low water periods the tributary and seepage flow will supply the demands of the present existing rights in Sections 2, 3, and 4.
5. That any water permitted to waste from Section 1 to Section 2 works an injury on canal rights in Section 1.
6. That the exchange or transfer of any rights from a lower section to any section above is injurious to the section to which it is exchanged or transferred and is equivalent to selling the rights of the section above to a third party, giving them priorities over the other rights in said section and the lower section still having the same available supply as before the sale was made.


SKETCH MAP
of
BOISE RIVER between CANYON & NOTUS
showing
CANALS from RIVER and TRIBUTARIES to RIVER
1914
Notus
Notus River Gage
BOISE RIVER
422 R.
422 L.
422 R.
L.C.P. River Gage
Lower Center Point Canal
421 R.
421 L.
Upper Center Point Canal
Eureka #2 Canal
100 C.
O. S. L. R.R.
BOISE RIVER
Pioneer-Dixie Canal
Upper Dixie Drain
Riverside Canal
Indian Creek
Caldwell Drain
Seidenberg Canal
Seidenberg Slough
Farmers Co-op Canyon Canal
Wasteway
Canyon River Gage
Riverside Canal


R. 5 W.
T. 6 N.
R. 4 W.
R. 3 W.
R. 2 W.
T. 4 N.
PARMA
OREGON SHORT LINE R.R.
FARMERS
Sand Hollow
Creek
COOPERATIVE
STOCKTON
ANDREWS SLOUGH
ANDREWS CANAL
IRAY
BOISE RIVER
NOTUS
CANAL
LOWER CENTER POINT
UPPER CENTER POINT
LCP
UCP
CAMPBELL DITCH
(Canyon)
SIEBERTS
CANAL
RIVERSIDE
CANYON COUNTY
CANAL
SLOUGH
TOWN DITCH
RIVERSIDE WASTE
PIPE GULCH
(CARLSON CANAL)
PIONEER
DITCH
RIVERSIDE
DITCH
UPPER
DIXIE
SLOUGH
DRAIN
WEST HANLEY GULCH
EAST HAPPY GULCH
IDAHO NORTHERN RAILWAY
CREEK
MIDDLETON
WILLOW
MIDDLETON SLOUGH
MASON
(BIG SLOUGH)
SLOUGH
CALDWELL
Creek


R.6W.
R.5W.
T. 6 N.
R.4W.
R.3W.
R.2W.
SNAKE RIVER
OREGON BOUNDARY LINE
OREGON / IDAHO
PARMA
BOISE RIVER
RIVERSIDE
CANAL
NOTUS
MIDDLETON
CALDWELL
T. 4 N.


R.3W.
R.2W.
R.1W.
R.1E.
T. 5 N.
N
MIDDLETON
STAR
EAGLE ISLAND
EAGLE
BOISE RIVER
CANYON
LAWRENCE AND ACHEY COUNTY CANAL
STAR POWER CANAL
MIDDLETON WATER COMPANY
FARMERS UNION CANAL
NEW YORK CANAL
BOISE-NAMPA CANAL
USTICK
SMITH'S
MERIDIAN
LINE RD.
BOISE

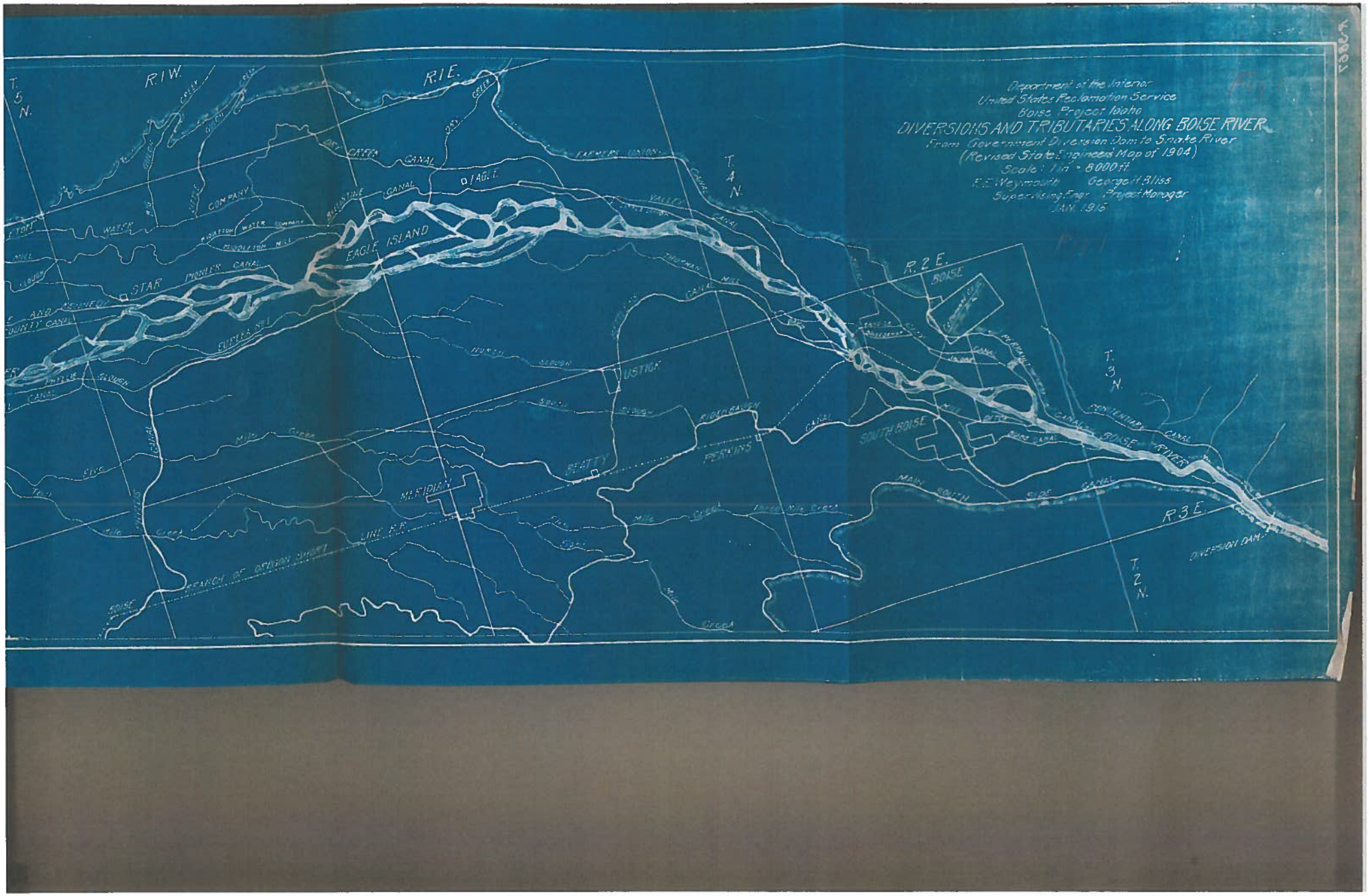

Department of the Interior
United States Reclamation Service
Boise Project Idaho
DIVERSIONS AND TRIBUTARIES ALONG BOISE RIVER
From Government Diversion Dam to Snake River
(Revised State Engineer's Map of 1904)
Scale: 1 in. = 8000 ft
F. E. Weymouth George H. Bliss
Supervising Engr. Project Manager
JAN. 1916
R.1W.
R.1E.
R.2E.
R.3E.
T. 5 N.
T. 4 N.
T. 3 N.
T. 2 N.
EAGLE ISLAND
STAR
BOISE
USTICK
PERKINS
SOUTH BOISE
MERIDIAN
BEATTY
DIVERSION DAM
BOISE RIVER
FARMERS UNION CANAL
PIONEER CANAL
BOISE RIVER CANAL
CONSOLIDATED CANAL
MAIN SOUTH SIDE CANAL
THREE MILE CREEK
LINE F.P.
RESERVOIR OF DEVELOPMENT COMPANY

CHART I

DAILY DISCHARGE OF BOISE RIVER
JULY 9 to SEPTEMBER 16 inc.
FOR THE YEARS 1895 to 1919 inc.

Day	1895	⊙ 1896	1897	* 1898	⊙ 1899	1900	* 1901	* 1902	1903	1904	* 1905	1906	⊙ 1907	⊙ 1908	⊙ 1909	1910	1911	1912	1913	1914	Mean of 20 Years	Mean of Highest Years	Mean of Lowest Years	Day
JULY 9																								
10																								
11																								
12																								
13																								
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
AUGUST 1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								
16																								
17																								
18																								
19																								
20																								
21																								
22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
SEPTEMBER 1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14																								
15																								
16																								
Total	9630	16058	9640	11420	17836	16807	7612	6110	8639	5300	6300	17852	15625	17800	10950	11400	12150	10770	8000		10124	15443.1	6707	Total

⊙ High Water Years.
* Low Water Years.

Compiled from U.S. Geological Survey Records.

DISCHARGE IN SECOND FEET OF BOISE VALLEY CANALS

During the low water period of 70 days

JULY 5 to SEPT. 16 inc. 1914.

No.	Name of Canal	JULY 31	AUGUST 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	U.S.R.S. Main Canal																							
2	Ream Ranch																							
3	Richardson																							
4	Bobb																							
5	Boise City																							
6	Settlers																							
7	Thurman Mill																							
8	Farmers Union																							
9	Dry Creek																							
10	Phyllis																							
11	Eureka No. 1																							
12	Burton Ditch																							
13	Meridian Water Co.																							
14	Middleton Mill Ditch																							
15	Lincoln (Star)																							
16	Caldwell Highline																							
17	Canyon County Water Co.																							
18	New York No. 2																							
19	Farmers (Caldwell)																							
20	Canyon (Caldwell)																							
21	Seybert																							
22	Pioneer Ditch (Notus)																							
23	Dixie Slough																							
24	Eureka No. 2																							
25	Upper Center Point																							
26	Lower Center Point																							
27	Boise River at Notus																							
28	Miscellaneous *																							
	Total Secft.	3238	2996	2894	2786	2539	2494	2222	2284	2232	2194	1992	1942	2173	2204	2200	2093	1922	1754	1601	1767	1642	1580	1742

Caldwell Ditch	50 Sec. ft.	Conway & Manning	5.1 Sec. ft.	Warm Spr	
Jacobs "	2.2 " "	Thomas Aikens	5.2 " "	Joplin	
Davis "	13.4 " "	Catlin & Mace	16.72 " "	Total Decr	
New Union "	13.7 " "	Hunt & Davis	11.62 " "	Rights July	
Kennedy "	2.6 " "	Graham & Elbert	5.46 " "	Rights July	

* Miscellaneous includes

The above table covers the Boise River from Government Diversion Dam

CHART 2

DISCHARGE IN SECOND FEET OF BOISE VALLEY CANALS

During the low Water period of 70 days

JULY 9 to SEPT. 16 inc. 1914.

AUGUST

SEPTEMBER

Farmers Ditch 50 Sec. ft.
Cecil " 2.2 " "
Davis " 13.4 " "
Union " 13.7 " "
Woods " 2.6 " "

Conway & Manning 3.7 Sec. ft.
Thomas Aikens 5.2 " "
Cutlin & Wade 10.72 " "
Mark E. Davis 11.00 " "
Graham & Silvey 2.46 " "

Kaiser Springs Ditch 8.34 Sec. ft.
Joplin " 2.66 " "
Total Decreed Right 129.38 " "
Rights July 16 to 25 inc. 114.00 " "
Rights July 26 to Sept. 16 98.00 " "

Irrigable lands under the Boise River from Government Diversion Dam to Notus Bridge.

CHART 3

HYDROGRAM SHOWING DAILY WATER LEVEL HEIGHTS ON RIVER BETWEEN THE LOCK & DAM AND MOUTH FOR THE PERIOD JULY 9 TO SEPT. 16 inc. 1914



Period	Days	Canal Delivery	Discharge Red River	Seepage Flow	Ave. Daily Seepage Flow	Ratio Seepage to Canal Delivery
July 9 to 31	23	3149	2014	1064	46.5	27
August	31	1230	1148	82	2.76	24
Sept. 1 to 16	16	1220	1163	106	7.07	52
Aug. 9 to Sept. 16	39	1549	1159	390	10.0	36

CHART 4

TRIBUTARY RETURN FLOW TO BOISE RIVER

During the low water period of 70 days
July 9 to Sept 16 inc. 1914.

DAILY DISCHARGE IN SECOND FEET

No.	Name of Tributary	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	JULY																															
1	Cottonwood									23	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
2	Boise Sewer									20	21	20	20	20	20	20	20	20	20	20	20	21	20	20	20	20	20	20	20	20	20	20
3	Sand Creek									3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	Boise Valley No 2									18	17	18	9	6	1	1	1	0	1	1	1	1	2	2	2	1	1	1	1	1	1	0
5	Ballantine									14	15	13	6	10	12	12	12	8	9	12	6	8	9	8	10	10	12	11	12	10	10	
6	Eureka Nat Waste									6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
7	Phyllis Waste									5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
8	Ten Mile Waste									44	37	34	34	51	41	42	43	43	33	32	34	31	48	40	35	39	43	20	16	17	13	
9	Middleton Slough									34	45	26	48	38	36	34	50	51	44	43	44	39	46	42	47	51	47	45	47	36	26	16
10	Willow Creek									5	5	5	5	6	7	7	7	6	6	6	6	12	12	7	6	6	6	6	6	6	6	6
11	Mason Creek									78	73	70	61	67	66	55	57	56	43	38	38	38	37	50	47	49	47	40	40	32	33	36
12	Hartley Gulch									7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
13	Indian Creek									93	93	93	91	90	89	86	82	82	82	82	76	77	77	76	76	76	70	64	61	60	61	61
14	Upper Dixie Slough									11	12	12	12	12	12	12	11	12	11	11	11	12	12	12	11	11	11	8	8	8	8	8
	Total									373	369	345	350	344	324	307	330	316	285	277	277	310	313	344	328	333	317	287	294	271	263	267
	AUGUST																															
1	Cottonwood																															
2	Boise Sewer																															
3	Sand Creek																															
4	Boise Valley No 2																															
5	Ballantine																															
6	Eureka Nat Waste																															
7	Phyllis Waste																															
8	Ten Mile Waste																															
9	Middleton Slough																															
10	Willow Creek																															
11	Mason Creek																															
12	Hartley Gulch																															
13	Indian Creek																															
14	Upper Dixie Slough																															
	Total																															
	SEPTEMBER																															
1	Cottonwood																															
2	Boise Sewer																															
3	Sand Creek																															
4	Boise Valley No 2																															
5	Ballantine																															
6	Eureka Nat Waste																															
7	Phyllis Waste																															
8	Ten Mile Waste																															
9	Middleton Slough																															
10	Willow Creek																															
11	Mason Creek																															
12	Hartley Gulch																															
13	Indian Creek																															
14	Upper Dixie Slough																															
	Total																															

The above table covers the Boise River from Diversion Dam to Notus Bridge.

All discharges are given in Second Feet.

CHART SHOWING WATER RIGHTS, WATER AVAILABLE AND DELIVERIES THEREOF, BY DAYS FOR THE PERIOD JULY 9 to SEPT. 16 inc. 1914.

JULY

DAY	Discharge Boise River at Highland	Total Deliveries to Canals	Total Decreed Rights	Total Tributary Gain	Total Seepage Gain	Net Gain Highland to Notus
	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.
1						
2						
3						
4						
5						
6						
7						
8	2470					
9	2290	3218	2755	374	374	368
10	2200	2996	2755	369	327	716
11	2370	2904	2755	335	269	684
12	2160	2796	2755	350	96	776
13	1980	2563	2468	348	75	733
14	2010	2498	2468	328	182	810
15	1980	2222	2267	307	- 85	812
16	1780	2284	2066	320	124	774
17	1770	2232	2066	316	136	752
18	1710	2194	2066	285	199	797
19	1540	1992	2066	277	51	792
20	1540	1942	2066	217	125	708
21	1810	2128	2066	310	278	899
22	1630	2204	2066	343	51	774
23	1770	2200	2066	346	224	870
24	1470	2088	2066	328	291	819
25	1393	1922	1860	303	149	752
26	1320	1784	1653	277	117	774
27	1250	1801	1653	261	220	781
28	1250	1767	1653	238	279	817
29	1220	1642	1653	231	161	822
30	1270	1580	1522	213	177	860
31	1210	1462	1488	207	- 15	792
Total	40850	50342	48299	6992	3760	16702
Avge.	1701	2189	2030	302	163	465

AUGUST

Day	Discharge Boise River at Highland	Total Deliveries to Canals	Total Decreed Rights	Total Tributary Gain	Total Seepage Gain	Net Gain Highland to Notus
	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.
1	1210	1353	1446	149	- 75	123
2	1210	1388	1446	197	- 19	178
3	1140	1476	1446	215	23	239
4	1280	1443	1446	217	86	303
5	1210	1365	1446	217	5	225
6	1140	1439	1446	206	12	279
7	1140	1366	1446	196	30	226
8	1070	1426	1355	201	85	286
9	1000	1292	1355	194	28	222
10	1000	1346	1355	194	152	396
11	1000	1335	1355	221	114	335
12	1000	1245	1240	187	58	245
13	940	1239	1240	189	50	239
14	950	1242	1240	149	143	302
15	930	1172	1240	201	31	232
16	870	1169	1160	172	37	229
17	930	1189	1160	267	112	315
18	870	1162	1160	201	111	312
19	870	1173	1133	179	129	308
20	830	1196	1133	194	82	276
21	870	1152	1133	183	97	282
22	810	1141	1133	170	101	271
23	810	1130	1133	170	150	320
24	800	1126	1133	173	143	316
25	800	1095	1133	176	119	295
26	790	1102	1133	179	123	302
27	790	1106	1133	186	130	316
28	750	1096	1113	171	115	306
29	780	1085	1113	185	120	305
30	780	1104	1113	188	136	324
31	760	1135	1113	215	140	355
Total	29360	38339	38631	6020	2529	8549
Avge.	947	1236	1296	194	82	276

S

DAY	Discharge Boise River at Highland	Total Deliveries to Canals	To D
	Sec. Ft.	Sec. Ft.	
1	720	1161	
2	720	1133	
3	720	1121	
4	720	1272	
5	720	1181	
6	720	1137	
7	720	943	
8	720	1063	
9	720	1112	
10	720	1178	
11	720	1174	
12	720	1171	
13	720	1344	
14	840	1296	
15	1030	1603	
16	1170	1331	
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
Total	12460	19310	
Avge.	775	1220	

Discharge of River for July 8 Comparable to Deliveries for July 9, etc.

KEUFFEL & ESSER CO. NEW YORK
STANDARD CROSS SECTION 10 X 10

Sec. 1-273. p 8447

CHART SHOWING WATER RIGHTS, WATER AVAILABLE AND DELIVERIES THEREOF, BY DAYS FOR THE PERIOD JULY 9 to SEPT. 16 inc. 1914.

CHART 5

Total Tributary Gain Sec. Ft.	Total Seepage Gain Sec. Ft.	Net Gain Highland to Notes. Sec. Ft.
373	345	168
369	327	716
335	269	604
350	96	446
348	75	423
328	182	510
307	- 95	212
320	124	444
316	136	452
285	199	484
277	5	282
217	125	342
310	278	588
343	51	394
346	224	570
328	291	619
303	149	452
277	117	394
261	220	481
238	279	517
231	161	392
213	147	360
207	- 15	192
6942	3760	10702
302	163	465

AUGUST

Day	Discharge Boise River at Highland	Total Deliveries to Canals	Total Decreed Rights	Total Tributary Gain	Total Seepage Gain	Net Gain Highland to Notes
	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.
1	1210	1333	1446	198	- 75	123
2	1210	1388	1446	197	- 19	178
3	1140	1419	1446	215	23	238
4	1280	1443	1446	217	86	303
5	1210	1565	1446	217	8	225
6	1140	1428	1446	206	12	218
7	1140	1366	1446	176	30	206
8	1070	1426	1355	201	85	286
9	1000	1292	1355	194	28	222
10	1000	1376	1355	194	152	346
11	1000	1335	1355	221	114	335
12	1000	1245	1240	187	58	245
13	990	1239	1240	189	50	239
14	990	1242	1240	199	103	302
15	990	1172	1240	201	31	232
16	970	1189	1166	192	37	229
17	970	1189	1160	207	112	319
18	970	1182	1160	201	111	312
19	870	1173	1133	174	129	303
20	870	1176	1133	144	86	276
21	870	1152	1133	185	97	282
22	810	1141	1133	170	101	271
23	810	1130	1133	176	150	326
24	800	1126	1133	173	143	316
25	800	1095	1133	176	119	295
26	790	1102	1133	179	123	302
27	790	1106	1133	186	130	316
28	750	1096	1113	141	115	306
29	780	1085	1113	125	120	305
30	780	1104	1113	188	136	324
31	780	1135	1113	215	140	355
Total	29360	38339	38631	6020	2529	8549
Avge.	947	1236	1246	194	82	276

SEPTEMBER

Day	Discharge Boise River at Highland	Total Deliveries to Canals	Total Decreed Rights	Total Tributary Gain	Total Seepage Gain	Net Gain Highland to Notes
	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.	Sec. Ft.
1	720	1161	1693	215	163	381
2	720	1133	1693	226	193	413
3	720	1121	1693	215	186	401
4	720	1272	1693	229	323	552
5	720	1181	1693	232	229	461
6	720	1137	1693	226	191	417
7	720	943	1693	217	56	273
8	720	1063	1693	232	111	343
9	720	1112	1693	260	132	392
10	720	1178	1693	266	162	428
11	720	1144	1693	257	167	424
12	720	1131	1093	271	180	451
13	720	1257	1133	309	215	524
14	940	1296	1133	323	253	576
15	1030	1603	1160	359	404	763
16	1179	1551	1600	371	330	701
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
Total	12400	19510	18582	4205	3295	7500
Avge.	775	1220	1161	263	206	469

Discharge of River for July 8 Comparable to Deliveries for July 9, etc.

Sec. 1

CHART 6

CHART SHOWING WATER AVAILABLE AND DELIVERIES BY DAYS JULY 9 TO SEPT. 16 inc. 1917 FOR THE SECTION BETWEEN NEW YORK CANAL AND CANAJOHARIE CANAL.

Month	Tributary Gain	Seepage Gain	Total
July 9-31	65	78	132
August	52	21	70
Sept 1 to 16	61	140	201

JULY

Day	Discharge Base River at Highland Sec. Ft.	Tributary Gain Sec. Ft.	Seepage Gain Sec. Ft.	Deliveries to Canals Sec. Ft.
1				
2				
3				
4				
5				
6				
7				
8	2470			
9	2280	92	187	2739
10	2200	75	260	2615
11	2340	73	241	2574
12	2160	70	87	2297
13	1980	77	- 2	2235
14	2010	70	72	2122
15	1840	62	-138	1914
16	1780	63	- 13	1890
17	1710	59	6	1945
18	1710	56	63	1829
19	1540	57	381	2154
20	1470	58	36	1634
21	1810	59	172	1771
22	1630	61	-172	1734
23	1470	60	63	1753
24	1410	62	118	1650
25	1390	68	20	1638
26	1320	65	10	1765
27	1230	63	62	1745
28	1230	62	130	1742
29	1220	61	94	1735
30	1220	60	77	1357
31	1210	59	- 93	1336
Total	39640	1484	1707	42829
Ave.	1283	65	77	1862

AUGUST

Day	Discharge Base River at Highland Sec. Ft.	Tributary Gain Sec. Ft.	Seepage Gain Sec. Ft.	Deliveries to Canals
1	1210	59	-139	1130
2	1210	57	- 80	1187
3	1170	53	- 39	1231
4	1280	56	32	1228
5	1210	57	- 36	1301
6	1140	57	- 75	1172
7	1140	57	- 39	1158
8	1070	58	9	1202
9	1030	58	- 36	1092
10	1060	58	56	1114
11	1000	58	47	1163
12	1000	53	- 9	1051
13	940	63	- 12	1051
14	940	62	92	1449
15	950	65	- 99	956
16	870	62	- 7	995
17	870	63	42	975
18	870	61	76	971
19	870	53	52	975
20	870	53	19	942
21	870	54	21	985
22	910	54	28	952
23	810	56	74	940
24	820	58	64	932
25	860	58	36	914
26	790	60	71	901
27	790	61	57	908
28	780	63	27	886
29	780	61	30	879
30	780	62	54	896
31	780	63	57	900
Total	29790	1817	340	31947
Ave.	961	59	11	1031

SEPTEMBER

Day	Discharge Base River at Highland Sec. Ft.	Tributary Gain Sec. Ft.	Seepage Gain Sec. Ft.	Deliveries to Canals Sec. Ft.
1	720	58	67	905
2	720	60	104	867
3	720	59	97	876
4	720	59	238	1017
5	720	60	164	944
6	720	62	111	893
7	720	62	- 24	759
8	720	63	49	832
9	720	62	95	877
10	720	62	116	844
11	720	55	115	870
12	720	55	132	907
13	720	64	170	954
14	840	64	193	977
15	1230	67	361	1268
16	1170	63	256	1349
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
Total	12010	973	2249	15232
Ave.	751	61	140	952

CHART 7

CHART SHOWING WATER AVAILABLE AND DELIVERIES BY DAYS, JULY 9 TO SEPT. 30, 1919, FOR THE SECTION BETWEEN CANYON COUNTY CANAL AND SEIBENBERG CANAL.

	JULY				AUGUST				SEPTEMBER				
Day	Discharge Boise River at Canyon Co. Canal Sec. Ft.	Tributary Basin Sec. Ft.	Seepage Gain Sec. Ft.	Deliveries to Canals Sec. Ft.	Day	Discharge Boise River at Canyon Co. Canal Sec. Ft.	Tributary Basin Sec. Ft.	Seepage Gain Sec. Ft.	Deliveries to Canals Sec. Ft.	Day	Discharge Boise River at Canyon Co. Canal Sec. Ft.	Tributary Basin Sec. Ft.	Seepage Gain Sec. Ft.	Deliveries to Canals Sec. Ft.
1					1	20	89	17	126	1	30	98	44	172
2					2	20	89	17	126	2	30	96	29	165
3					3	20	83	19	122	3	30	94	55	179
4					4	20	79	20	119	4	28	108	44	170
5					5	20	86	17	123	5	25	116	24	165
6					6	20	77	37	134	6	28	100	43	171
7					7	20	89	31	140	7	30	91	36	157
8					8	20	77	37	134	8	25	105	26	156
9	20	185	159	364	9	20	67	24	111	9	27	139	- 1	166
10	20	191	146	357	10	20	73	27	120	10	27	126	- 3	147
11	20	160	42	222	11	20	82	42	144	11	32	136	9	177
12	20	144	22	221	12	20	67	31	118	12	32	148	2	182
13	20	171	60	251	13	20	61	37	118	13	34	173	- 5	202
14	20	139	101	280	14	18	72	35	125	14	37	183	13	232
15	20	126	65	231	15	9	72	40	128	15	42	211	- 2	253
16	20	169	116	300	16	32	65	11	119	16	60	222	6	288
17	20	163	34	217	17	30	82	48	160	17				
18	20	136	51	207	18	14	78	49	141	18				
19	20	127	40	187	19	7	59	51	117	19				
20	20	136	33	185	20	6	74	36	116	20				
21	20	164	35	219	21	5	69	48	122	21				
22	20	195	69	284	22	5	54	43	102	22				
23	20	178	101	325	23	5	52	26	91	23				
24	20	183	126	329	24	5	54	41	100	24				
25	20	154	76	270	25	5	54	54	113	25				
26	20	131	57	208	26	5	50	45	105	26				
27	20	128	87	235	27	5	61	45	111	27				
28	20	107	71	198	28	5	64	35	104	28				
29	20	102	45	167	29	4	61	41	112	29				
30	20	83	19	122	30	3	63	48	114	30				
31	20	79	17	115	31	10	87	39	136	31				
Total	460	3436	1578	5474	Total	435	2132	1210	3777	Total	436	2179	375	2960
Ave.	20	149	69	238	Ave.	14	69	39	122	Ave.	27	134	24	185

Month	Tributary Gain	Seepage Gain	Total
July 9-31	1479	699	2178
August	69	39	108
Sept. 1-16	1374	234	1608
Total	3922	1972	5894

Sec. 3

CHART

CHART SHOWING WATER AVAILABLE AND DELIVERIES BY DAYS, JULY 9 to SEPT. 16 inc. 1914 FOR THE SECTION BETWEEN SEEBERGER CANAL AND LOWER CENTER CANAL.

DAY	JULY Discharge Boise River at Seyberbers Canal Sec. Ft.	JULY Tributary Gain Sec. Ft.	JULY Seepage Gain Sec. Ft.	JULY Deliveries to Canals Sec. Ft.	DAY	AUGUST Discharge Boise River at Seyberbers Canal Sec. Ft.	AUGUST Tributary Gain Sec. Ft.	AUGUST Seepage Gain Sec. Ft.	AUGUST Deliveries to Canals Sec. Ft.	DAY	SEPTEMBER Discharge Boise River at Seyberbers Canal Sec. Ft.	SEPTEMBER Tributary Gain Sec. Ft.	SEPTEMBER Seepage Gain Sec. Ft.	SEPTEMBER Deliveries to Canals Sec. Ft.
1					1	13	72	51	136	1	13	76	32	121
2					2	16	78	49	153	2	14	74	35	122
3					3	17	71	38	134	3	16	70	34	120
4					4	18	67	34	121	4	14	71	35	120
5					5	18	67	36	123	5	11	76	44	131
6					6	16	77	30	123	6	16	70	37	123
7					7	15	72	38	125	7	13	70	25	110
8					8	16	77	42	133	8	13	72	42	126
9	73	115	44	231	9	13	72	40	125	9	14	73	39	126
10	76	122	1	199	10	10	67	35	122	10	10	72	42	124
11	68	111	- 11	159	11	9	56	24	113	11	12	74	43	134
12	69	110	- 13	147	12	8	64	31	107	12	21	76	46	133
13	72	109	11	161	13	8	64	25	102	13	24	88	50	202
14	57	104	1	134	14	8	60	26	104	14	20	109	45	224
15	54	104	- 2	170	15	7	58	32	111	15	18	112	45	237
16	53	103	21	157	16	7	58	27	102	16	21	126	68	201
17	53	104	46	233	17	12	63	32	94	17				
18	53	103	75	211	18	13	63	22	100	18				
19	52	103	1	208	19	8	56	26	100	19				
20	22	71	56	185	20	8	62	24	105	20				
21	52	96	11	199	21	8	56	28	102	21				
22	50	93	77	239	22	7	64	30	101	22				
23	69	96	54	218	23	6	64	36	106	23				
24	60	89	41	204	24	6	63	36	107	24				
25	68	85	37	212	25	6	58	30	103	25				
26	68	83	30	201	26	6	86	31	139	26				
27	69	72	11	211	27	6	67	28	118	27				
28	61	70	24	209	28	6	81	33	126	28				
29	54	69	22	195	29	6	73	35	119	29				
30	42	71	51	164	30	6	78	32	115	30				
31	30	72	60	162	31	10	80	24	114	31				
Total	1131	2183	1022	4336	Total	324	2271	978	3573	Total	569	1299	657	2525
Mean	49	95	44	188	Mean	10	73	32	115	Mean	35	81	41	157

LOSSES SUSTAINED BY CANALS DUE TO RIVERSIDE EXCHANGE, HILLCREST AND WISE TRANSFERS, AND EXCESS WASTE THROUGH MIDDLETON MILL SLOUGH AND BOISE RIVER BELOW CANYON COUNTY CANAL.

JULY 9 to Sept. 16, 1914

JULY

Day	U.S.R.S.			PHYLLIS			NEW YORK		
	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise.	Loss due to Middleton Mill Slough & Boise River.	Loss due to Exchange Water on PHYLLIS	Loss due to Transfer to Hillcrest & Wise	Loss due to Middleton Mill Slough & Boise R.	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise	Loss due to Middleton Mill Slough & Boise R.
1									
2									
3									
4									
5									
6									
7									
8									
9			34						
10			53						
11		14	31						
12		14	53						
13		19	43						
14		19	41						
15		19	34						
16		19	55						
17		31	56						
18		31	51						
19		31	48						
20		31	51						
21		31	54						
22		31	71	42					
23		31	87	42					
24		31	72	42					
25		31	56	42					
*26			52						
27			50						
28			45						
29			41						
30			35						
31							24	24	21
Total		393	1113	128			74	24	21

AUGUST

Day	NEW YORK			FARMERS UNION			SETTLERS			RIDENBAUGH		
	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise	Loss due to Middleton Mill Slough & Boise R.	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise	Loss due to Middleton Mill Slough & Boise R.	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise	Loss due to Transfer to Wise & Boise River	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise	Loss due to Middleton Mill Slough & Boise R.
1	74	24	23									
2	74	24	21									
3	74	24	33									
4	74	24	30									
5	74	24	34									
6		19	26	60	6							
7		19	24	60	6							
8		19	30	60	6							
9				12	24	23						
10				12	24	30						
11				12	24	27			12			
12					18		12	6	26			
13					18		12	9	23			
14					14		12	3	27			
15					12		12	12	20			
16				7	24		3		37			
17				12	24	11			40			
18				1	24		11		33			
19					2		12	22	16			
20					18		12	6	26			
21					7		12	17	15			
22							12	24				
23							12	24				
24							12	24				
25							12	24	6			
26							12	24	7			
27							12	24	6			
28							3	24		9		11
29							2	24		10		10
30							3	24		7		13
31					10		12	14	18			20
Total	370	174	223	236	263	88	194	301	305	26		54

SEPTEMBER

Day	NEW YORK			FARMERS UNION			SETTLERS		
	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise	Loss due to Middleton Mill Slough & Boise River	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Hillcrest & Wise	Loss due to Middleton Mill Slough & Boise River	Loss due to Exchange Water on U.S.R.S.	Loss due to Transfer to Wise & Boise River	Loss due to Transfer to Hillcrest & Wise
1				4	24		5		
2					22		12	2	
3					3		12	21	
4					9		12	15	
5							12	24	
6								20	
7								11	
8								11	
9				5			8	24	
10				11			1	24	
11					15		12	9	
12				1	24		11		
13				8	24	1	4		
14				8	24	10	7		
15	12	24	15			54			
16	12	24	38			54			
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
Total	24	48	53	36	145	119	96	161	

□ All Canals cut to 75% of Full Decree.

* " " " 60% " " " .

All discharges in above table given in Second Feet.

[…]AINED BY CANALS DUE TO RIVERSIDE EXCHANGE, HILLCREST AND WISE TRANSFERS, […]STE THROUGH MIDDLETON MILL SLOUGH AND BOISE RIVER BELOW CANYON COUNTY CANAL.

JULY 9 to Sept. 16, 1914

AUGUST

Day	New York: […] Riverside with U.S.R.S.	New York: Loss due to Transfers Hillcrest & Wise	New York: Loss due to Middleton Mill Slough & Boise R.	Farmers Union: Loss due to Exchange Riverside with U.S.R.S.	Farmers Union: Loss due to Transfers Hillcrest & Wise	Farmers Union: Loss due to Middleton Slough & Boise River	Settlers: Loss due to Exchange Riverside with U.S.R.S.	Settlers: Loss due to Transfers Hillcrest & Wise	Settlers: Loss due to Middleton Slough & Boise River	Ridenbaugh: Loss due to Exchange Riverside with U.S.R.S.	Ridenbaugh: Loss due to Transfers Hillcrest & Wise	Ridenbaugh: Loss due to Middleton Slough & Boise River
1	74	24	23									
2	74	24	21									
3	74	24	33									
4	74	24	30									
5	74	24	30									
6		18	26	60	6							
7		18	24	60	6							
8		18	30	60	6							
9				12	24	23						
10				12	24	30						
11				12	24	24			12			
12					18		12	6	26			
13					15		12	9	23			
14					19		12	5	27			
15					12		12	12	20			
16				7	24		5		39			
17				12	24	11			40			
18				1	24		11		33			
19					2		12	22	10			
20					18		12	6	26			
21					7		12	17	15			
22							12	27				
23							12	24				
24							12	24				
25							12	24	6			
26							12	24	4			
27							12	24	6			
28							3	24		9		11
29							2	24		10		10
30							5	24		7		13
31					10		12	14	18			20
Total	370	174	223	236	263	88	194	307	305	26		54

SEPTEMBER

Day	New York: Loss due to Exchange Riverside with U.S.R.S.	New York: Loss due to Transfers Hillcrest & Wise	New York: Loss due to Middleton Slough & Boise River	Farmers Union: Loss due to Exchange Riverside with U.S.R.S.	Farmers Union: Loss due to Transfers Hillcrest & Wise	Farmers Union: Loss due to Middleton Slough & Boise River	Settlers: Loss due to Exchange Riverside with U.S.R.S.	Settlers: Loss due to Transfers Hillcrest & Wise	Settlers: Loss due to Middleton Slough & Boise River	Ridenbaugh: Loss due to Exchange Riverside with U.S.R.S.	Ridenbaugh: Loss due to Transfers Hillcrest & Wise	Ridenbaugh: Loss due to Middleton Slough & Boise River
1				4	24		6		36			20
2					22		12	2	30			20
3					3		12	21	11			34
4					9		12	15	17			40
5							12	24				64
6								20		12	4	48
7								11		12	13	39
8								11		12	13	39
9				4			8	24	12			64
10				11			1	24	19			64
11					15		12	9	23			54
12				1	24		11		33			64
13				8	24	1	4		40			64
14				8	24	10	4		40			64
15	12	24	15			54			8			64
16	12	24	38			54						64
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
Total	24	48	53	36	145	119	96	161	269	36	27	816

[…]ll discharges in above table given in Second Feet.

CHART 3

SUMMARY TABLE

Canal	Item	July 9-31	Aug. 1-31	Sept. 1-16	Total Sec. Ft.	Ac. Ft.	A. F.
Ridenbaugh	Loss due to Middleton Slough & Boise River		54	816	870	1740	1918
	Loss due to Transfers Hillcrest & Wise			27	27	54	
	Loss due to Exchange Riverside with U.S.R.S.		26	36	62	124	
Settlers	Loss due to Middleton Slough & Boise River		305	269	574	1148	2664
	Loss due to Transfers Hillcrest & Wise		307	161	468	936	
	Loss due to Exchange Riverside with U.S.R.S.		194	96	290	580	
Farmers Union	Loss due to Middleton Slough & Boise River		88	119	207	414	1774
	Loss due to Transfers Hillcrest & Wise		263	145	408	816	
	Loss due to Exchange Riverside with U.S.R.S.		236	36	272	544	
New York	Loss due to Middleton Slough & Boise River	31	223	53	307	614	2042
	Loss due to Transfers Hillcrest & Wise	24	174	48	246	492	
	Loss due to Exchange Riverside with U.S.R.S.	74	370	24	468	936	
Pioneer	Loss due to Middleton Slough & Boise River						256
	Loss due to Transfers Hillcrest & Wise						
	Loss due to Exchange Riverside with U.S.R.S.	128			128	256	
U.S.R.S.	Loss due to Middleton Slough & Boise River	1113			1113	2226	3022
	Loss due to Transfers Hillcrest & Wise	398			398	796	
	Loss due to Exchange Riverside with U.S.R.S.						

GRAND TOTAL LOSS TO ALL CANALS 11676 Acre Feet.

GAINS & LOSSES DUE TO EXCESS WATER PASSING THROUGH MIDDLETON MILL SLOUGH AND BOISE RIVER AT CANYON COUNTY CANAL.

July 9 to Sept. 16, inc. 1919.

JULY

Day	Source of Excess Water: Middleton Slough Excess	Source of Excess Water: River at Canyon C. Com.	Source of Excess Water: Total Sec. Ft. Excess	Canals benefitted by Excess Water: Farmers Coop. Canal	Canals benefitted by Excess Water: Riverside Canal	Canals benefitted by Excess Water: River below Seltenberg	Canals deprived of Excess Water: Phyllis Canal	Canals deprived of Excess Water: New York Canal	Canals deprived of Excess Water: Farmers Union	Canals deprived of Excess Water: Settlers Canal	Canals deprived of Excess Water: U.S.R.S. Canal
1											
2											
3											
4											
5											
6											
7											
8											
9	24	15	39			34					34
10	38	15	53	4	6	43					53
11	16	15	31			31					31
12	38	15	53		9	44					53
13	28	15	43		8	35					43
14	26	15	41		11	30					41
15	24	15	39	6	10	23					39
16	40	15	55	17	10	28					55
17	41	15	56	18	10	28					56
18	36	15	51	13	10	28					51
19	33	15	48	1	10	37					48
20	36	15	51	2	10	39					51
21	39	15	54	16	10	28					54
22	56	15	71	17	9	45	42				24
23	72	15	87	16	8	63	42				63
24	57	15	72	3	6	63	42				30
25	41	15	56			56	42				14
26	37	15	52			52					52
27	35	15	50			50					50
28	30	15	45			45					45
29	26	15	41			41					41
30	10	15	25			25					20
31	6	15	21			21		21			
Total	799	375	1174	113	127	894	168	21			973
Ave	34	15	49								

AUGUST

Day	Source of Excess Water: Middleton Slough Excess	Source of Excess Water: River at Can. Com.	Source of Excess Water: Total Sec. Ft. Excess	Canals Benefitted by Excess Water: Farmers Coop. Canal	Canals Benefitted by Excess Water: Riverside Canal	Canals Benefitted by Excess Water: River below Seltenberg	Canals Deprived of Excess Water: Phyllis Canal	Canals Deprived of Excess Water: New York Canal	Canals Deprived of Excess Water: Farmers Union	Canals Deprived of Excess Water: Settlers Canal	Canals Deprived of Excess Water: Riverside Canal
1	8	15	23	9		14		23			
2	6	15	21	8	2	11		21			
3	18	15	33	14	2	17		34			
4	15	15	30	12	2	13		30			
5	21	15	36	14	3	19		36			
6	11	15	26	12	3	11			26		
7	9	15	24	11	3	10			27		
8	15	15	30	15	5	10			30		
9	8	15	23	12	3	8			23		
10	15	15	30	13	7	10			30		
11	21	15	36	27	6	3			24	12	
12	11	15	26	16	5	3				26	
13	8	15	23	16	4	3				23	
14	14	13	27	21	3	3				27	
15	16	9	25	15	3	7				20	
16	12	27	39	34	3	2				39	
17	26	25	51	41	3	7			11	40	
18	24	9	33	22	3	8				33	
19	6	4	10	3	4	3				10	
20	26	0	26	21	2	3				26	
21	15	0	15	8	4	3				16	
22	0	0	0								
23	0	0	0								
24	0	0	0								
25	6	0	6			6				6	
26	4	0	4			4				4	
27	6	0	6			6				6	
28	11	0	11	10		1					11
29	10	0	10	9		1					10
30	13	0	13	12		1					13
31	33	5	38	33		5				18	20
Total	390	280	670	423	69	179		143	168	363	54
Ave	13	9	22								

SEPTEMBER

Day	Source of Excess Water: Middleton Slough Excess	Source of Excess Water: River at Canyon Co. Canal	Source of Excess Water: Total Sec. Ft. Excess	Canals Benefitted by Excess Water: Farmers Coop. Canal	Canals Benefitted by Excess Water: Riverside Canal	Canals Benefitted by Excess Water: River below Seltenberg C.	Canals De... Phyllis Canal	Canals De... New York
1	41	15	56	48		8		
2	33	16	50	42		8		
3	36	13	49	34		11		
4	44	13	57	48		9		
5	32	20	52	40		12		
6	33	14	45	34		11		
7	30	15	39	24		10		
8	39	6	39	32		7		
9	52	22	76	60	7	9		
10	61	22	83	36	23	24		
11	60	27	87	38	12	37		
12	78	27	97	26	15	56		
13	76	29	105	19	19	67		
14	85	29	114	31	18	65		
15	102	39	141	33	36	72		
16	101	55	156	38	36	82		
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
Total	901	356	1257	603	166	488		
Ave	56	22	78					

GAINS & LOSSES DUE TO EXCESS WATER PASSING THROUGH MIDDLETON MILL SLOUGH AND BOISE RIVER AT CANYON COUNTY CANAL.

July 9 to Sept. 16, inc. 1914.

CHART 10

AUGUST

Day	Source of Excess Water: Middleton Slough Excess	Boise River Canyon Co. Canal	Boise River Sec. Ft. Excess	Canals Benefitted by Excess Water: Farmers Coop Canal	Riverside Canal	River below Seibenberg	Canals Deprived of Excess Water: Phyllis Canal	New York Canal	Farmers Union	Settlers Canal	Ridenbaugh Canal
1	8	10	23	9		14		23			
2	6	10	21	8	2	11		21			
3	18	15	33	17	2	12		33			
4	15	15	30	15	2	13		30			
5	21	15	36	14	3	17		36			
6	11	15	26	12	3	11			26		
7	9	15	24	11	3	10			24		
8	15	15	30	13	5	10			30		
9	8	15	23	12	3	8			23		
10	15	15	30	13	7	10			30		
11	21	15	36	27	3	4			24	12	
12	11	15	26	18	5	3				26	
13	8	15	23	16	4	3				23	
14	14	13	27	21	3	3				27	
15	16	4	20	15	3	2				20	
16	12	27	39	34	3	2				39	
17	26	25	51	41	3	7			11	40	
18	24	9	33	22	3	8				33	
19	8	2	10	3	4	3				10	
20	26	0	26	21	2	3				26	
21	15	0	15	8	4	3				15	
22	0	0	0								
23	0	0	0								
24	0	0	0								
25	6	0	6			6				6	
26	4	0	4			4				4	
27	6	0	6			6				6	
28	11	0	11	10		1					11
29	10	0	10	9		1					10
30	13	0	13	12		1					13
31	33	5	38	33		5				18	26
Total	390	280	670	423	69	178		143	168	365	57
Ave.	13	9	22								

SEPTEMBER

Day	Source of Excess Water: Middleton Slough Excess	Boise River Canyon Co. Canal	Boise River Sec. Ft. Excess	Canals Benefitted by Excess Water: Farmers	Riverside Canal	River below Seibenberg C.	Canals Deprived of Excess Water: Phyllis Canal	New York Canal	Farmers Union	Settlers Canal	Ridenbaugh Canal
1	41	13	54	46		8				16	20
2	35	15	50	42		8				20	20
3	30	15	45	34		11				11	34
4	47	13	57	48		9				17	40
5	44	20	64	52		12					64
6	35	13	48	37		11					48
7	24	15	39	29		10					34
8	32	0	32	25		7					39
9	53	23	76	60	7	9				12	64
10	61	22	83	36	23	24				13	64
11	68	27	97	38	12	37				23	64
12	70	27	97	26	15	56				33	64
13	76	29	105	19	19	67			1	40	64
14	85	29	114	31	18	65			10	40	64
15	102	39	141	33	36	72			15	8	64
16	101	50	136	38	36	82			38	54	64
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
Total	901	356	1257	603	166	488			53	114	269	816
Ave.	56	22	78								

Loss

Canals Deprived of Excess Water

Gain

Canals Benefitted by Excess Water

Source of Excess Water

	Time	Total Ac. Ft.	Total Sec. Ft.	Sept. Ave.	Aug. Ave.	July Ave.
Ridenbaugh Canal		54	816			
Settlers Canal		305	269	570	870	1126
Farmers Union		168	114	217	569	
New York Stock	21	143	53	217	431	
Phyllis Canal	149			168	333	
U.S.R.S. Mig. Ffs.	945			945	1874	
River below Seibenberg C.	842	178		1056	1895	
Riverside Canal	127	69	166	362	718	
Farmers Coop. Canal	113	423	603	1139	2254	
Total Excess	1134	670	1257	3061	6012	
River at Canyon C. Canal	735	280	356	681	1376	
Middleton Slough.	794	390	901	2085	4126	

Grand Total Loss 6012 Ac. Ft.

TABLE OF LOSSES IN SECOND FEET SHOWING THE EFFECT OF A TRANSFER OF 26.3 SECOND FEET FROM SECTIONS 3 AND 4 TO SECTION 1, BOISE RIVER, BASED ON ACTUAL CONDITIONS EXISTING IN SECTION 1, FOR THE PERIOD July 4 to Sept. 16, inc. 1912.

CHART II.

	JULY							AUGUST									SEPTEMBER										
Day	U.S.R.S. Rights	Phyllis Canal	New York Stock	Farmers Union	Settlers Canal	Middleton Mill Ditch	Day	U.S.R.S. Rights	Phyllis Canal	New York Stock	Farmers Union	Settlers Canal	Middleton Mill Ditch	Bobb Canal	Richardson Canal	Day	U.S.R.S. Rights	Phyllis Canal	New York Stock	Farmers Union	Settlers Canal	Middleton Mill Ditch	Bobb Canal	Richardson Canal	New Dry Creek Canal	Thomas Dairy Canal	Gallentine Canal
1							1		16	22	66	44	10			1					27	16	7	119			
2							2			79	66	13				2					9	16	7	132			
3							3		12					7	139	3						8	7	143			
4							4			120	38					4				29	66	44	10	7	2			
5							5	28	34	76						5					22	84	10	7	76			
6							6			84	66	8				6						15	10	7	126			
7							7			58	66	42				7						9			120	14	8	7
8							8			94	64					8									138			
9	263						9		54		30	44	10			9							9	7	142			
10	263						10		32	6	66	44	10			10						26	10	7	121			
11	263						11		41		63	44	10			11						12	10	7	129			
12	263						12		95		9	44	10			12						24	10	7	112			
13	113	56	94				13	*	95		9	44	10			13					32	44	10	7	65			
14		56	207				14		102		2	44	10			14					55	84	10	7	72			
15			67	140	73	13	15				34	24	10	7	62	15		22	129									
16	197						16			7	66	44	10	7	34	16	76	34	78									
17	197						17				53	44	10	7	44	17												
18	197						18				49	44	10	7	48	18												
19	197						19				53	44	10	7	44	19												
20	44	42	112				20				20	44	10	7	77	20												
21	180	17					21				23	44	10	7	74	21												
22	168	29					22				30	44	10	7	67	22												
23	162	35					23				18	44	10	7	74	23												
24	58	42	96				24				10	44	10	7	87	24												
25		9	164	24			25					36	10	7	165	25												
26	138						26					23	10	7	118	26												
27	138						27					30	10	7	111	27												
28	138						28					2	10	7	134	28												
29	132	26					29					1	10	1	140	24												
30	84	34	40				30					18	10	7	123	30												
31			128	30			31					22	10	7	118	31												
Total	3253	446	909	164	73	13	Total	28	481	558	921	943	240	136	1601	Total	76	63	206	175	297	117	64	1481	14	8	7

* 2 Phyllis Rights injured.

SUMMARY TABLE OF LOSSES

Ballentine Canal			7			
Thomas Dairy Canal			8	7	16	1/4
New Dry Creek Canal			1/4	1/4	28	1/4
Richardson Canal		1601	1481	3082	6164	
Bobb Canal		126	84	210	420	
Middleton Mill Ditch	13	240	117	370	740	
Settlers Canal	73	943	387	1313	2626	
Farmers Union	164	921	175	1260	2520	
New York Stock	909	558	206	1672	3344	
Phyllis Canal	446	481	63	890	1780	
U.S.R.S. Rights	3253	28	76	3359	6718	
Time	July 4 to 31		Sept. 1 to 16	Total Sec. Ft.	Total Ac. Ft.	

Grand Total Loss to all Canals, 27,970 inches.

STANDARD CROSS SECTION 10 x 10
KEUFFEL & ESSER CO. NEW YORK

TABLE OF LOSSES IN SECOND FEET SHOWING THE EFFECT OF A TRANSFER OF 263 SECOND FEET FROM SECTIONS 3 AND 4 TO SECTION 1, BOISE RIVER, BASED ON FUTURE CONDITIONS EXISTING IN SECTION 1, FOR THE PERIOD July 4 to Sept 16 inc. 1912.

CHART II.

	JULY							AUGUST										SEPTEMBER											
July	U.S.R.S. Rights	Phyllis Canal	New York Stock	Farmers Union	Settlers Canal	Middleton Mill Ditch		Day	U.S.R.S. Rights	Phyllis Canal	New York Stock	Farmers Union	Settlers Canal	Middleton Mill Ditch	Bobb Canal	Wilsonville Canal		Day	U.S.R.S. Rights	Phyllis Canal	New York Stock	Farmers Union	Settlers Canal	Middleton Mill Ditch	Bobb Canal	Wilsonville Canal	New Dry Creek Canal	Thomas Davis Canal	Ballantine Canal
1								1		16	22	66	44	10				1					27	10	7	115			
2								2			79	66	13					2					9	10	7	132			
3								3		12					7	139		3						8	7	143			
4								4			120	38						4				29	66	74	10	7	2			
5								5	28	34	76							5					22	44	10	7	23			
6								6			84	66	8					6						15	10	7	126			
7								7			32	66	42					7						4			126	14	8	7
8								8			94	64						8									138			
9	263							9		54		50	44	10				9							9	7	142			
10	263							10		32	6	66	44	10				10						20	10	7	121			
11	263							11		41		63	44	10				11						12	10	7	129			
12	263							12		95		9	44	10				12						24	10	7	112			
13	113	56	94					13	*	95		9	44	10				13					32	44	10	7	65			
14		56	267					14		102		2	44	10				14					55	44	10	7	72			
15			67	116	73	13		15				34	44	10	2	63		15			29	128								
16	197							16			7	66	44	10	7	24		16	76	34	98								
17	197							17				53	44	10	7	44		17											
18	197							18				39	44	10	7	49		18											
19	197							19				33	44	10	7	54		19											
20	43	72	112					20				20	44	10	7	27		20											
21	180	17						21				23	44	10	7	74		21											
22	168	29						22				30	44	10	7	67		22											
23	162	35						23				18	44	10	7	79		23											
24	59	42	96					24				10	44	10	7	87		24											
25		9	168	24				25					36	10	7	165		25											
26	158							26					23	10	7	118		26											
27	158							27					30	10	7	111		27											
28	158							28					2	10	7	131		28											
29	132	26						29					1	10	7	140		29											
30	84	34	40					30					18	10	7	123		30											
31			128	30				31					22	10	7	119		31											
Total	3253	346	909	164	73	13		Total	28	289	538	921	943	280	126	1601		Total	76	63	206	175	247	117	84	1481	14	8	7

* 2 Phyllis Rights injured.

SUMMARY OF LOSSES

Ballantine Canal			1			
Thomas Davis Canal			8	7		
New Dry Creek Canal			17	8	16	19
Wilsonville Canal		1601	1481	14	28	
Bobb Canal		126	84	210	3082	6764
Middleton Mill Ditch	13	280	117	370	720	1640
Settlers Canal	73	943	247	313	2626	
Farmers Union	164	921	175	1260	2320	
New York Stock	988	538	206	1672	3354	
Phyllis Canal	346	289	63	898	1780	
U.S.R.S. Rights	3253	28	76	3359	6718	
Time	July 4 to 31		Aug. 1 to 31	Sept. 1 to 16	Total Inc. Ft.	

Grand Total Loss to all Canals, 24,343 Miner's Inches.

STANDARD CROSS SECTION 10 X 10
KEUFFEL & ESSER CO. NEW YORK

Explanation P-33.

CHART 12.

TABLE SHOWING RETURN FLOW AVAILABLE FOR CANAL REQUIREMENTS, BASED ON DELIVERIES FOR 1914, IN SECTIONS 2 AND 3 OF BOISE RIVER, FOR THE PERIOD JULY 2 TO SEPT. 16 inc. 1914.

JULY				AUGUST				SEPTEMBER			
Day	Available Return Flow	Canal Requirements based on 1914 Deliveries	Excess + Deficit −	Day	Available Return Flow	Canal Requirements based on 1914 Deliveries	Excess + Deficit −	Day	Available Return Flow	Canal Requirements based on 1914 Deliveries	Excess + Deficit −
1				1	190	198	− 8	1	210	128	+ 82
2				2	190	200	− 10	2	206	129	+ 77
3				3	194	195	− 1	3	210	126	+ 84
4				4	195	197	− 2	4	200	127	+ 73
5				5	173	187	− 14	5	188	127	+ 61
6				6	220	196	+ 24	6	204	129	+ 75
7				7	194	197	− 3	7	197	127	+ 70
8				8	204	202	+ 2	8	187	131	+ 56
9	410	412	− 2	9	197	152	+ 35	9	179	129	+ 50
10	338	415	− 77	10	212	153	+ 59	10	190	130	+ 60
11	272	472	−200	11	203	151	+ 52	11	198	138	+ 61
12	246	474	−228	12	178	138	+ 40	12	199	145	+ 54
13	315	482	−167	13	175	136	+ 39	13	209	146	+ 63
14	337	476	−139	14	179	136	+ 43	14	229	151	+ 78
15	274	477	−203	15	185	126	+ 59	15	228	154	+ 74
16	349	378	− 29	16	137	139	+ 23	16	276	157	+ 119
17	341	396	− 55	17	183	134	+ 49	17			
18	314	392	− 78	18	182	128	+ 54	18			
19	295	387	− 92	19	185	127	+ 58	19			
20	267	382	−115	20	173	129	+ 44	20			
21	313	374	− 61	21	187	129	+ 58	21			
22	384	367	+ 17	22	183	128	+ 55	22			
23	370	380	− 10	23	184	129	+ 55	23			
24	377	383	− 6	24	186	133	+ 53	24			
25	318	377	− 59	25	170	128	+ 42	25			
26	277	308	− 31	26	192	131	+ 61	26			
27	316	317	− 1	27	187	133	+ 54	27			
28	290	312	− 22	28	200	130	+ 70	28			
29	206	260	− 54	29	191	127	+ 64	29			
30	208	261	− 53	30	190	127	+ 63	30			
31	214	261	− 47	31	197	129	+ 68	31			
Total	11151	8863	1112	Total	5841	4660	1181	Total	3301	2174	1127
Mean	371	385	− 74	Mean	188	150	+ 38	Mean	206	136	+ 70

F O R C H A R T N O. 3

SEE FIG. 2 IN FRONT OF

REPORT.

0000

In re SRBA Subcase Nos. 63-00179C and 63-32580

EXHIBIT D

to

Statement Regarding Injury and Enlargement,
and Request for Hearing

WATER DISTRICT 12A

2

For Watermaster Paul

Report on Return Flow and
Seepage into Boise River
During the Irrigation Season
of 1915

By

W. G. Steward and D. J. Paul

DIVISION OF BOISE RIVER INTO SECTIONS

(See Figs. 1 and 2)

In the study of the low water conditions in the Boise Valley, the river naturally divides itself into four sections. (See Fig. 2)

(1) From the Government Diversion Dam to a point just below the Caldwell High Line Canal, a distance of about 25 miles

(2) From Caldwell High Line Canal to the Diversion dam in the canyon above Caldwell, a distance of about 9 miles

(3) From the canyon dam to a point just below Lower Center Point Canal, a distance of about 7 miles

(4) From the Lower Center Point canal to the Snake River, a distance of about 13 miles

These divisions come by the fact that all the water may be taken from the river at three points; viz., opposite Caldwell High Line Canal, the Farmers' Cooperative (Sebree) Canal, and the Lower Center Point canal and still there will be enough return flow to furnish all decreed rights below these points respectively, during most of the irrigation season. In the study of river flow and water rights this condition must be constantly kept in mind.

During the irrigation season of 1915, the Canyon County Water Company changed its heading from a point nearly opposite Can-Ada, up the river to a point just below Star Bridge. This change makes the Caldwell High Line Canal the last heading on the upper sections of the river and it was just below this heading that a station was maintained to

Section 2		Section 3	
Boise River		Boise River	
Below Franklin Canal	7.+	Below Seibenberg Canal	16.+
Phyllis Slough	6.+	Riverside Canal No. 1	39.+
Ten Mile	20.+	Caldwell drain	2.+
Ry. Slough	3.-	Indian Creek	66.+
Middleton Slough	46.+	Riverside No. 2	88.-
Willow Creek	9.+	Dixie drain	15.+
Hartley Gulch	6.+	Pioneer Dixie	13.-
Mason Creek	11.+	Eureka No. 2	25.-
Mason Creek Drain	29.+	Upper Center Point	8.-
Riverside No. 1	39.-	Lower Center Point	6.-
Farmers Cooperative	111.-	2 small slughs	2.+
Canyon Canal	8.-	Boise River at Notus	22.-
Seibenberg Canal	7.-		
Boise River at Canyon	16.-		
Total canal deliveries	129	Total Canal deliveries	140
Total tributary gain	127	Total tributary gain	85
Total seepage gain	50	Total seepage gain	22

\+ Indicates discharge into the Section
\- Indicates discharge from the Section

Explanation of Figure 2

Figure 2 represents Boise River with incoming and outgoing waterways from the Government Diversion Dam to Notus. The diagram is drawn to a scale so that the width of the stream represents the average daily flow for a period of 80 days, from July 23 to October 10th, inclusive.

(5) The Ballantine Canal gets practically its entire supply from waste water. It has a river heading that is kept up and may be used in case a very large flow is desired. The waste water flowing in the Ballantine Canal that is not used may be discharged at either one of three places: into the river near Eagle; into Dry Creek at the flume crossing; or into Middleton Water Company Canal below Linder.

(6) The Dry Creek Canal has a wasteway at its Dry Creek crossing.

(7) The Middleton Mill Slough forms a wasteway for a network of canals, laterals and waste composed of the lower end of Ballantine, Dry Creek, Middleton Water Company, Middleton Mill Company, Pioneer, and Canyon County Water Company canals. It would be possible to divert practically all of this waste at the low water period to the Hartley Canal which in turn wastes into Willow Creek and Hartley Gulch.

(8) Ten Mile creek empties into Big Slough, sometimes called Thomas slough or Mason slough. From this slough the water may be discharged direct into Boise river or by a system of dams and channels it may be taken through Big slough to a point south of Middleton, where the water can be discharged to the river or diverted to a canal irrigating land below.

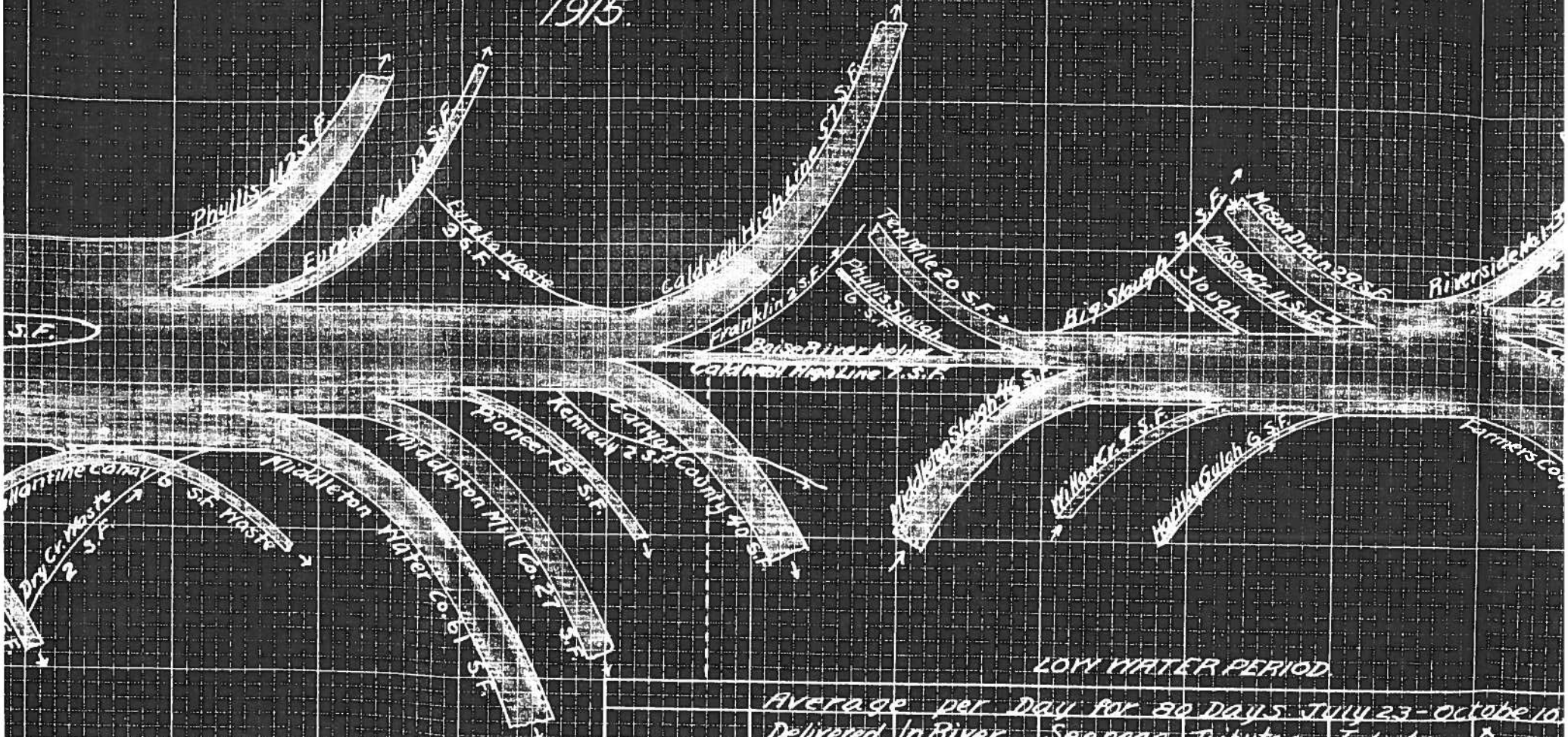
(9) The Riverside Canal has a heading in the river in the canyon above aldwell. Any water diverted here is emptied into Indian Creek. From

BOISE RIVER.

FOR A PERIOD OF 80 DAYS,

JULY 23 TO OCTOBER 10, INCLUSIVE,

1915.



LOW WATER PERIOD

Average per Day for 80 Days. July 23 - October 10

Sections	Delivered to Canals	In River & Tributary	Seepage Gain	Tributary Gain	Total Gain	* Delivered
Sec. 1	860	733	134	43	177	867
Sec. 2	129	134	50	127	177	184
Sec. 3	140	140	22	85	107	162
Total	@1129	945	206	255	461	1213

LINE CANAL, INCLUSIVE.
TO SEIBENBERG CANAL, INC.
TO RIVER AT NOTUS, INC.

* Includes quantities passing to section below.

@ There was delivered to canals 67% more water than available at Highland.

Section 2

In re SRBA Subcase Nos. 63-00179C and 63-32580

EXHIBIT E

to

Statement Regarding Injury and Enlargement,
and Request for Hearing

R E P O R T

ON

CANAL DELIVERIES FROM THE BOISE RIVER

and

DIFFERENT FEATURES AFFECTING THESE DELIVERIES FOR THE PERIOD APRIL 1st TO OCTOBER 15, 1916.

INCLUSIVE.

(Data gathered by the writer, acting as Special Deputy State Engineer in charge of Arrow Rock Storage Water and Water Master of Boise River, under supervision of the State Engineer of Idaho.)

By

A. V. TALLMAN,

IRRIGATION ENGINEER.

part of July all canals diverted as large or as small a quantity of water as they desired. This condition caused a more careless use of water by the individual water user and was partly responsible for the large increase in the return flow to the River. Extension of drain ditches also facilitated the rapid return of waste water to the river and greatly increased the quantity of water availabe for redistribution to canals on the lower end of the river. It was not until August 10th that any attempt was made to cut the river up into separate sections. At that time the river was practically dried up at a point immediately below the Caldwell High Line Canal and this condition prevailed until the end of September.

Section 1. This section includes all of that part of the river that lies between the Government Diversion Dam and a point immediately below the heading of the Caldwell High Line Canal, about one mile below the town of Star.

Section 2. This section includes all of that part of the river that lies immediately below the heading of the Caldwell High Line Canal and the Notus bridge.

During the season of 1915 section 2 is noted as sections 2 and 3, the "Canyon" at Caldwell being the lower end of Section 2 and the upper end of section 3. No attempt was made during the season of 1916 to dry up the river at "the Canyon" as at no time was there an extreme shortage of water for the canals diverting water at that point.

River were established during this season.

During the period April 1st to August 9th inclusive 1916, a complete record was obtained of the quantities of water passing the Nevus bridge and Charts 9 and 9-A give tables showing the net results secured.

SECTION ONE.

Section 1, derives its water supply mainly from the natural flow of the Boise River. Chart 10 shows that there is some tributary and seepage gain, but this gain depends largely upon the amounts of water diverted by certain canals which waste water directly back into the river. Cottonwood Creek is fed principally by surplus water diverted by the Cruzen Canal, while the Boise Sewer water comes partly from the Cruzen Canal and partly from the water pumped by the City of Boise from its filter beds in the channel of the river back of the Natatorium. Strictly speaking this sewer water should be classed as a part of the river flow and not as a tributary.

During part of the season of 1916, Augutst 10th to September 30th inc., the Caldwell High Line Canal diverted practically all of the water reaching that point in the river. In order to so do it was necessary for this canal to maintain three crib dams across three channels of the river. Chart 12 gives a statement of the use made of the natural flow of the river and shows that for the period August 10th to September 30th inclusive 1916, the average daily return flow or gain to

the river in this section was 196 second feet. The total daily deliveries to canals includes the small quantities passing the Caldwell High Line Canal. For the low water period of 1915, the average daily gain to the river for this same section was 133 second feet. Data for 1916, shows an increase of 63 second feet daily over that of 1915. Emphasis should be given the fact that this section diverted practically all of the natural flow of the Boise River for the period August 10th to September 30th inclusive.

SECTION TWO.

In section 2 the following canals divert water from e River:- Riverside, Farmers Co-operative, Canyon, Seibenberg, neer Dixie, Eureka No. 2, Upper Center Point and Lower ter Point.

During the period August 10th to September 30th these ls derived their water supply from the following sources:- River below the Caldwell High Line, Middleton Slough, Creek, Mason Drain, Ten Mile Creek, Hatley Gulch, Willow Indian Creek, Dixie Drain and varying quantities of seepow.

Chart 20 shows graphically the quantity of water passCaldwell High Line Canal, the tributary and seepage flow deliveries to canals diverting water in this section. tities delivered to canals includes the quantity of ssing Notus Bridge.

Engineer of Idaho, a transfer of 21.56 second feet of water was made from decreed rights having their point of diversion in Section 2 of the Boise River, changing the point of diversion to the New York Canal Section 1. This transfer is known locally as the Hillcrest Transfer.

In 1914, State Engineer F. P. King granted a transfer of 59.24 second feet, 19.2 second feet of which was transferred from Section 2 to Section 1. This transfer is hereinafter referred to as the Wise Transfer.

As these transferred rights had priorities over practically all of the decreed rights in Section 1 there rights had to be filled from the natural flow of the river regardless of any deficit that might occur to the canals in Section 1, which had been diverting water for several years past.

During a 70 day period, February 9th to September 16th 1914, five canals having decreed rights in Section 1 lost a total of 3094 acre feet due to the two transfers mentioned above Chart 17 shows the effect of the Wise transfer during the season of 1915, and a total loss of 5979 acre feet sustained by Canals in Section 1.

Due to the agitation caused by the loss to canal rights in Section 1 during the years 1914 and 1915 practically all the rights transferred from Section 2 to Section 1 were transferred back to their original owners in Section 2 prior to the low water period of 1916.

return flow, that could not be taken away from them for this water would waste into the Snake River if not diverted by these canals.

This chart is based on a possible transfer of 263 second feet from Section 2 to Section 1 and shows the losses that would have been sustained by canals in Section 1, had this kind of a transfer been in effect during the season of 1915.

To emphasize the status of these transfers from Section 2 to Section 1, the following statement holds true: A sale of decreed rights diverting water in Section 2 and changing their point of diversion to Section 1 is equivalent to selling the rights of Section 1 to a third party, giving them priorities over rights in Section 1, and Section 2 still having the same available water supply as before the sale was made.

FILING ON TRIBUTARY STREAMS.

The effect of a filing on any of the tributary waters of the Boise River and diverting the same before or after it reached the river, said water rights to pertain to land that is arid at the present time, would be as disastrous to the decreed rights already existing as a transfer from Section 2 to Section 1.

During the next few years it will require the most careful management of the Boise River to give to the water users depending on these waters a full supply during the low water

In re SRBA Subcase Nos. 63-00179C and 63-32580

EXHIBIT F

to

Statement Regarding Injury and Enlargement,
and Request for Hearing

R E P O R T

ON

CANAL DELIVERIES FROM THE BOISE RIVER

AND

DIFFERENT FEATURES AFFECTING THESE DELIVERIES FOR THE PERIOD APRIL 1st TO SEPTEMBER 30, 1917.

INCLUSIVE.

(Data gathered by the writer, acting as Special Deputy State Engineer in charge of Arrowrock Storage Water and Water Master of Boise River, under supervision of the State Engineer of Idaho.)

By

A. V. TALLMAN,

IRRIGATION ENGINEER.

C H A R T S.

No.

1. Map of Boise River.
2. 2-A, 2-B, 2-C, Daily discharge of Boise River during 22 year period.
3. Total monthly and annual flow in acre feet for each irrigation year, 1894-'95 to 1916-'17. Inc.
4. Table in second feet showing average daily flow of Boise River for a 21 year period, average of 4 highest years and average of 4 lowest years.
5. 5-A, 5-B, 5-C, 5-D, Daily discharge of all canals in Sections 1 and 2.
6. 6-A, Daily discharge of all tributary streams feeding water to Boise River below Highland.
7. Hydrogram showing total daily water deliveries, water available at Highland, <u>including storage water,</u> and net gain to River.
8. Hydrogram showing daily natural flow of Boise River passing Highland, tributary and seepage gain to river, and deliveries to canals; also storage water delivered for entire irrigation season.
9. The table on this chart shows the daily natural flow of Boise River passing Highland, deliveries to canals and tributary and seepage flow for irrigation season of 1917.

C H A R T S (Cont.)

10. Hydrogram showing, day by day, natural flow of Boise River passing Highland, tributary and seepage gain to section, and deliveries of same to canals between Highland and Caldwell High Line canal for the period of August 1st to September 22nd inclusive, 1917.
11. Hydrogram showing, day by day, flow of Boise River passing Caldwell High Line Canal, tributary and seepage gain, and deliveries of same to canals between the Caldwell High Line Canal and Notus for the period August 1st to September 22nd inclusive, 1917.
12. Table showing natural flow of Boise River passing Highland and deliveries to canals by days, August 1st to September 22nd, inclusive, 1917, for the section between Highland and the Caldwell High Line Canal.
13. Table showing daily totals of water passing Caldwell High Line Canal, tributary and seepage gain, and deliveries to canals for Section 2 for period August 1st to September 22nd, inclusive, 1917.
14. Table showing return flow available for canal requirements, based on 1917 decree, in Section 2 of Boise River, for the period August 10th to September 22nd, inclusive, 1917.
15. Table showing return flow available and return flow diverted by Pioneer Irrigation District, also canal requirements in Section 2 of Boise River based on 1917 decree.

C H A R T S (Cont.)

16. Table showing time at which decreed rights are subject to cuts below 60% of full right, for 23 year period, 1895-1917 inclusive, also gives number of days cut prior to September 30th of each year.
17. Revised area and capacity table for Arrow Rock Reservoir.
18. Diagram showing average conditions on Boise River for a 53 day period, August 1st to September 22nd, inclusive, 1917.
19. Table in acre feet, showing quantities diverted by 18 canals from Boise River for each month of irrigation season of 1917.
20. Table showing maximum headgate duty of water, in miners inches continuous flow, for 18 canals diverting water from Boise River.
21. Chart showing graphically average maximum duty of water for 18 Boise Valley Canals, and Headgate Duty of Water proposed for all canals diverting water from the Boise River.
22. Table showing average headgate duty of water, in miners inches continuous flow, for 18 canals diverting water from Boise River.
23. Chart showing graphically average duty of water for 18 Boise Valley Canals diverting water from Boise River.
24. Condensed table of original Stewart Decree, showing dates of priority and amount decreed.

25 and 25-A. Reconstructed table of Stewart Decree, eliminating rights supplied by return flow.

PREVIOUS MANAGEMENT.

Prior to the year 1914, the State of Idaho, through the Water Commissioner's Office and the State Engineer's Office, had never systematically regulated the deliveries of the water from the Boise River during the irrigation season, so that all water users had a just and equitable distribution of the waters of this stream.

During the years 1914-'15-'16 and '17, a complete investigation has been carried on throughout the entire irrigation season of each year and the compilation of the data gathered has been largely responsible for the greater efficiency that has been obtained during these past 4 years. At the present time the work performed by Water Masters on Idaho streams is recognized as an Engineering problem, and on most streams, Engineers are now employed to carry on this work.

BOISE RIVER DISCHARGE.

After Arrowrock Dam had been completed, a new method of computing the natural flow of Boise River had to be determined. This method, which has been used successfully through three irrigation seasons is given in detail in my 1916 Report. Briefly:- North Fork Boise River plus South Fork plus 7 small tributaries, totaled for day in question; averaged with preceeding day's total. This total gives the natural flow to be released from Arrowrock Reservoir on the day in question. The quantity released from Arrowrock Reservoir and Moores Creek

gives natural flow.

A study of charts 2, 2-A, 2-B and 2-C, will give a comparison of the daily discharge of Boise River for the full twelve months period for each year from 1895 to 1917, inclusive.

Chart 3 was compiled from the data given in the previous charts and gives the total monthly and annual flow of the Boise River in acre feet for each month and irrigation year, 1894-'95 to 1916-'17, inclusive. In chart 3, the irrigation year was given instead of the calendar year as in the future, Arrowrock Reservoir will begin storing water on November 1st for the following season demands. Chart 4 is a table computed in second feet to show the average daily flow of the Boise River for a 21 year period; average daily flow of 4 highest years, and average daily flow of 4 lowest years.

TEMPORARY DECREES.

A temporary decree for the season of 1917 was issued on July 16 by Judge Ed. L. Bryan. This decree was as follows: It is hereby ordered, That from and after the date hereof, until further order of this Court, all waters of Boise River shall be distributed as follows, to-wit: The various rights as adjudicated in the so-called Stewart Decree shall receive 100% until the natural flow of the waters of Boise River shall decrease, or until all the rights in said Decree cannot receive 100%, at which time the various rights as adjudicated in the so-called Stewart Decree shall first be cut to 75% of the amount of water

decreed by the Stewart Decree as the natural flow of Boise River decreases, beginning with the latest rights and proceeding to the earliest rights in the order fixed in said Stewart Decree, and after all rights shall have been reduced to 75% of the amount fixed in the Stewart Decree, should the natural flow of the waters in Boise River decrease below the amount necessary to supply said 75% of the water rights as decreed in said Stewart Decree, then the various rights, beginning with the latest and preceeding to the earliest as aforesaid, shall be reduced to 60% of the amount specified in said Stewart Decree. 60% of the amount decreed in the Stewart Decree is hereby fixed and determined as the highest duty of water for the year 1917.

LOW WATER PERIOD.

Prior to the low water period of 1917 there was considerable water wasted from the Boise River into the Snake River due to the lateness of the spring weather. Practically no water was used for irrigation purposes prior to May 15th and but very little used during the last half of May. Beginning with the month of June and continuing until the low water period, every canal in the Valley was carrying a peak load and most of the canals had insufficient capacity to take care of the unusual demands during June and July.

Complete records were again obtained during the flood water period and a comparison of these records with those obtained during the season of 1915 make a very interesting study.

The low water period of 1917 began about August 1st and continued to September 22nd, at which time a heavy rain occurred and but little irrigation water was used after that time.

CLASSIFICATION OF RIVER SECTIONS.

The conditions existing on the Boise River during the low water period of the irrigation season of 1917 were very similar to those of 1916, with the exception that there was a greater return flow to the upper section and a decreased return flow to the lower section. The increased return flow to the upper end was probably due to the supersaturated condition of the lands lying adjacent to the River, this facilitating the movement of underground and surface water to the River.

In my opinion the greatest factor that had an effect on the decrease in return flow to the lower section of the river was the elimination of practically all surface waste water by the individual water user. Another factor that also held down the return flow to Section 2 was the small quantity of water stored in Deer Flat Reservoir. Considerable water was also diverted by the Phyllis and Caldwell High Line Canals from the drain ditches that discharge into the Boise River in Section 2, thus further decreasing the quantity of water formerly available in this section.

Section 1. This section includes all of that part of the River that lies between the Government Diversion Dam and a point immediately below the heading of the Caldwell High Line Canal, about one mile below the town of Star.

Section 2. This section includes all of that part of the River that lies between the Caldwell High Line Canal and the Notus Bridge.

DAILY CANAL RECORDS.

Charts 5 to 5-D, inclusive, give the daily discharge, in second feet, of all canals in Section land 2 of the River for the irrigation season of 1917. These charts include all storage water delivered and also all water wasting past Notus Bridge as a delivery.

DAILY TRIBUTARY FLOW.

In order to determine the relationship of the tributary flow to the net gain, data was obtained on all the principal streams feeding water to the River below Highland Rating Station.

Charts 6 and 6-A give the daily discharge in second feet of 13 principal tributary streams, and the total for each day for the irrigation season.

DAILY TRIBUTARY AND SEEPAGE GAINS TO BOISE RIVER.

Chart 7 shows graphically the total daily deliveries to canals, water available at Highland, including storage water, and the net gain to the River.

Chart 8 gives practically the same data as shown in Chart 7 but does separate the storage water from the natural flow. Out of a total of approximately 280,000 acre feet released from Arrowrock Reservoir all but 21,900 acre feet were diverted by the New York Canal, so practically all of the data computed in this

report is based entirely on the natural flow of the River.

Of the 21,900 acre feet passing the Government Diversion Dam, the following canals diverted the following quantities:- Ridenbaugh, 946; Settlers, 994; Farmers Union, 2460; Phyllis, 16,500; and the Farmers Cooperative, 1000 acre feet.

Chart 9 gives a comparison of the natural flow passing Highland, canal deliveries, tributary and seepage flow, and net gain, Highland to Notus. This chart shows that "lagging" in the River is taken into consideration, that is, the natural flow passing Highland on April 30th was delivered to the canals on the following day, or May 1st, etc.

Although the indicated daily net gain in the River may vary somewhat, the averages by months are thoroughly reliable and give a very clear idea of the importance of the tributary and seepage gain to the River. This table shows that the average daily net gain to the entire river from tributary and seepage flow was 1027 second feet. During the season of 1916 this gain averaged 964 second feet, while in 1915 the average gain was 529 second feet.

CANAL REGULATION.

The regulation of water deliveries to canals during the season of 1917 was very much similar to the operations given in detail in my 1914, 1915 and 1916 Reports. Several of the canals had breaks occur in their systems which necessitated considerable wasting of water at short intervals and caused several waves to

go down the River, upsetting the stable condition that the Water Master tried to maintain.

BARBER DAM.

All fluctuations in the Boise River caused by the Barber Dam have practically been eliminated, due to cooperation in the method of operating the Power Plant situated at this Dam.

MODIFICATION OF EMPTYING OF CANAL.

Throughout the season of 1917 the different canalmanagers were very prompt in giving notice to the Water Master of any contemplated cut or break in their respective canal systems and a very strong spirit of cooperation existed throughout the entire River.

DELIVERY OF STORAGE WATER TO OLD DECREED RIGHTS.

The time interval used during the seasons of 1915 and 1916 in delivering storage water from Arrowrock Reservoir to the old canals down the River was used again during the season of 1917. Storage water released from Arrowrock at 9 A. M. arrived at the Ridenbaugh heading at 5 P.M.; Settlers heading 10 P. M.; Farmers Union heading 12 midnight; Phyllis, second day at 5 P. M.; and Farmers Cooperative at Caldwell, 2 days, or 9 A. M. of the third day.

RESULTS OBTAINED.

Only two separate and distinct sections of the Boise River were maintained during the low water period of 1917. This low water period began on August 1st and the Water Master tried to so regulate the upper section of the River that no water

was wasted past the Caldwell High Line Canal. This work was upset several times because of breaks on canals in section 1 and these breaks were responsible for the seemingly large head of water wasted from Section 1 to Section 2.

SECTION 1.

Chart 10 shows graphically the condition that existed in Section 1 of the River during the low water period, August 1st to September 22nd inclusive. The natural flow of the River passing Highland comprises the main water supply for canals diverting water in this section. There is some tributary and seepage gain to this section, but this gain depends largely upon the amounts of water diverted by certain canals which waste water directly back into the River.

Chart 12 gives a statement of the use made of the Natural flow of the River and shows that for the period August 1st to September 22nd, inclusive, 1917, the average daily return flow or gain to the River in this section was 242 second feet. For the low water period of 1916, the average daily gain to the River for this same section was 196 second feet, or a gain of 46 second feet over that of 1916. The low water period of 1915 showed a net gain per day in this section of 133 second feet. The gain for the year 1917 was 109 second feet over that of 1915. Emphasis should be given the fact that this section diverted practically all of the natural flow of the Boise River for the period August 1st to September 22nd, inclusive.

SECTION TWO.

In section 2 the following canals divert water from the River:-Riverside, Farmers Cooperative, Canyon, Seibenberg, Pioneer Dixie, Eureka No. 2, Upper Center Point and Lower Center Point. Chart 11 shows graphically the quantity of water passing the Caldwell High Line Canal, the tributary and seepage gain and the deliveries to canals diverting water in this section. Chart 13 is a table giving daily the quantity of water passing the Caldwell High Line Canal, tributary and seepage gain, and the deliveries to canals diverting water in this section. The large flow of water past the Caldwell High Line Canal during short periods was caused by breaks in some of the larger canals diverting water in Section 1.

This table shows that the average daily tributary and seepage gain in this section during the low water period was 409 second feet. During the low water period of the season of 1916 the average daily gain to this section was 521 second feet, while during the same period of 1915 the average daily gain was 297 second feet.

The decrease in the return flow of 1917 as compared with that of 1916 is partially accounted for by the diversion of water from some of the drain ditches by the Pyhllis and Caldwell High Line Canals.

AVAILABLE RETURN FLOW, SECTION TWO.

In order to quiet any doubt that might arise as to the possibility of drying up the River, at the lower end of Section

1 and still have a sufficient supply for all decreed rights below, Chart 14 was compiled from actual data to show the actual conditions as they existed in Section 2 for the period August 10th to September 22nd, inclusive, 1917. This table proves conclusively that during this period there was a surplus over the canal requirements, based on 60% of decreed rights but not necessarily on canal capacity or duty of water, in Section 2 and that any rights previously transferred to other sections of the River could have been taken care of by return flow.

Chart 15 was compiled to show the quantities of water diverted by the Caldwell High Line Canal and the Phyllis Canal from Five Mile Drain and Wilson Slough. This chart also gives the total daily return flow that would have been available to Section 2 had none of the drain water been diverted prior to its arrival at the River.

This table further shows that there was an average of 150 second feet daily surplus over the canal requirements in Section 2, the requirements being based entirely upon 60% of the decreed rights.

TRANSFERS.

A sale of decreed rights diverting water in Section 2 and changing their point of diversion to Section 1, is equivalent to selling the rights of Section 1 to a third party, giving them priorities over rights in Section 1, and Section 2 still having the same available water supply as before the sale was made, due to the fact that the return flow to Section 2 is sufficient to

supply the canal requirements, based on decreed rights, which has been referred to earlier in this report and is here emphasized to eliminate any misconstruction of the actual existing conditions.

FILING ON TRIBUTARY STREAMS.

The effect of a filing on any of the tributary waters of the Boise River and diverting the same before or after it reached the Boise River, said water rights being independent of other rights on the Boise River, would be as disastrous to the decreed rights already existing as a transfer from Section 2 to Section 1.

During the past three years the State Engineer's Office has held that all water filings made on tributary streams to the Boise River are subject to prior appropriations on the Boise River and must so state on their water filings. This action of the State Engineer's Office will prove effective in the future in safe-guarding the interests of prior appropriators of the waters of the Boise River drainage area.

EFFECT OF DRAINAGE.

Just what the effect will be on the return flow to the Boise River after all the drainage systems now contemplated are completed, the writer is unable to state. That it will have some material effect in increasing the return flow is undeniable but just to what extent I am not willing to hazard a guess.

VALUE OF CANAL PRIORITIES.

To determine the approximate quantity of storage water required by late appropriators of Boise River to supplement their decreed rights so as to be assured of a sufficient water supply throughout the low water period of each irrigation season, Chart 16 was compiled.

As it is fair to assume that the run-off of the Boise River Drainage Area during the next 23 years will be comparable to the records obtained during the past 23 years, this chart has been computed to show the date the six newest decreed rights, depending on natural flow, would have been subject to cut below 60% of a full right, or cut out entirely.

Data compiled from observations made during the seasons of 1915, 1916 and 1917 show that 1100 second feet of natural flow in the River will fill all of the decreed rights to 60% of a full right, or those depending on natural flow for their supply. The average daily return flow to Section 1 during the low water period of 1917 having increased 46 second feet over that of 1916, would decrease somewhat the number of days of shortage as shown on the chart but no change should be made in these computations until another season's records are obtained to verify the records of the past season.

In determining the quantity of storage water needed to extend these six rights, subject to cut, several additional factors have to be known, such as, acreage under canal, acreage in different drops, class of soil, duty of water during August

and September on like canals having a full water right, etc.

As most of the above factors are known by each one of the canal companies no attempt will be made by the writer to compute the storage requirements unless so requested.

ARROWROCK RESERVOIR.

The necessity for a capacity table showing the exact capacity in acre feet for each foot of elevation of Arrowrock Reservoir led Mr. W. G. Steward of the United States Reclamation Service to compute the data shown on Chart 17. This table is based on data secured during the emptying period for the years 1915, 1916 and 1917 and are quantities established through the use of current meter measurements.

AVERAGE CONDITION ON BOISE RIVER.

Chart 18 shows diagramatically the average conditions that existed on the Boise River during the period August 1st to September 22nd inclusive, 1917, or a period of 53 days. This diagram shows at a glance the major canals diverting water from the River and the main tributary streams feeding water to the River. This diagram shows that there was 65% more water delivered to canals than was available from the natural flow at Highland. In 1916 the same data shows that 62% more water was delivered than available at Highland while the low water period of 1915 shows 67% more water delivered.

DUTY OF WATER.

The proper headgate duty of water for canals diverting

water from the Boise River has been a very much mooted question since the year 1903.

The data secured by the writer, acting as Water Master of Boise River, during the irrigation seasons of 1915, 1916 and 1917, although complete as to the use made of Boise River water, still leaves a great deal of doubt as to the proper duty of water to be applied to the many different canal systems. The one principal factor that causes the greatest uncertainty is the ever changing seasonal conditions. To emphasize this point a study of charts 19, 20, 21, 22 and 23 shows that during the month of April 1915, the average maximum headgate duty of water for the last half of this month for eighteen canals was 0.90 miners inches per acre while the same period of 1917 shows that only 0.02 miners inches per acre was diverted. I might add that from personal observation I am convinced that but very little of the water diverted during April, 1915, was purposely wasted, while all the water diverted during the month of April, 1917, was wasted.

In order to arrive at the maximum quantity of water diverted by the canals diverting water from the Boise River and to ascertain the effect of maximum diversions on the duty of water, charts 20 and 21 were compiled. The data presented in Chart 20 was taken from the Water Masters Reports for the three years involved. This maximum use is based entirely on the maximum diversion for any one of the canals for any one day in the month on which this quantity might be diverted.

It is to be regretted that a duty of water for the

Boise Valley can not be established in acre feet, for if it were possible so to do, it would soon lead to a much higher economic duty. But as most of the lands in the Boise Valley are dependent entirely upon the natural flow of the Boise River, and this flow is a constantly varying quantity during the low water period of each year, it is impossible for most irrigators to postpone the irrigation of certain crops to the proper time for such application, as at the time the water is actually needed the natural flow of the River may decrease to such an extent that his right to the use of water may have expired or may be cut to such an extent that a proper irrigation head can not be obtained. If every water user in the Boise Valley were able to obtain a reservoir water right that would insure a complete seasonal supply so that he could draw on his reserve water supply, the same as he draws on his bank account, a much higher duty would prevail and no necessity for a permanent duty of water would arise.

It is to be regretted that at this time the water users of this Valley are asking the Court to establish a permanent Duty of Water for the Boise Valley lands, for the writer feels that if too high a duty is fixed, this entire question will be before the Courts continuously throughout the future. On the other hand if a duty is fixed, based on maximum requirements, the same condition that has prevailed during the past three irrigation seasons will continue to prevail, and under this maximum duty there has been absolutely no waste of water when the Boise Valley is considered as a whole. The writer's

opinion is that the proper regulation of the deliveries of water to the Canal headings is far more important than the duty of water for the wasts of water can be eliminated, regardless of duty of water, if proper River regulation is followed.

This is best demonstrated by the fact that during the past three seasons, operating under the old Stewart Decree, 1800 second feet of natural flow, plus the return flow, has filled 2755 second feet of rights.

The duty of water as established by an average of the diversions of this 18 canals, covering a three year period, as shown on Charts 22 and 23 does not give sufficient water for the majority of the canals for more than two years out of four years and in the writer's opinion, were this duty established, crop loss would result on a majority of the lands in the Boise Valley.

On Chart 21 will be found a proposed duty of water as established by the writer, from all the data at his command coupled with the 8 years experience he has had in this study. Many water users will think this duty too high and many too low, but it is the best solution he has to offer for this very knotty problem. This proposed duty is offered with the understanding that it is based on average maximum crop requirements and with a stringent ruling on the non-wastage of water and proper River and canal regulation, no water will be diverted from the River unless it can actually be applied to beneficial use.

A maximum quantity of water will take care of all crop requirements whereas an average quantity will not.

The writer herewith takes pleasure in introducing in

his report "Observations on the Duty of Water" made by Mr. J. H. Smith, State Engineer of Idaho, and is of the opinion that they are very pertinent to the duty of water troubles existing in the Boise Valley.

OBSERVATIONS ON THE DUTY OF WATER.

A theoretical duty of water may be established but a practical application of a duty thus established may be found to be wasteful or insufficient.

The engineer desires the highest duty of water with the view of increasing the agricultural area, and for this reason his mind is apt to be somewhat warped.

I believe there are very few persons who will say that our knowledge of irrigation matters, principally the duty of water is not susceptible of a great deal of improvement, and it seems to me that a conscientious, practical irrigator will know more about the economic duty of water than most theorists, - and I might add engineers. The person or persons using water should have in mind the inherent rights of others, depending for subsistence on nature's resources. With this point in mind, the economic duty in the use of water will automatically be established

For me to say what that duty should be, would be presumptious; for at the present time, I consider any duty arbitrarily established, such as the duties we have today, are subject to change from time to time.

With the improvements in methods and additional knowledge acquired through experience, and having inmind the rights

of others, higher duties than now prevail will be had.

It appears to me an injustice, with the prevailing knowledge of these matters, to immediately force, the user of water from an admittedly unscientific basis to one purporting to be scientific, when as a matter of fact, both may be partly wrong. We will all acknowledge that water should be put to the highest beneficial use, and both the water user, engineer, or corporation, should meet on common ground, for a single purpose, laying aside mercenery motives, or seeking some advantage over the other. This is the only method capable of solving such problems. What the duty should be I am unable to say.

STEWART DECREE.

Chart 24 is a condensed table of the Stewart Decree showing dates of priority and amount decreed. A small black circle at the left of each date of priority shows that the right is supplied by return flow in either section one or section two.

RECONSTRUCTED TABLE OF STEWART DECREE.

Charts 25 and 25-A show more clearly the decreed rights that depend upon natural flow for their water supply. All rights filled by return flow in either section one or two, have been eliminated and do not appear on these tables. These tables were computed for the 1915 Report and in order to bring it up to date, it would be necessary to drop the first 8 rights in Chart 25. This is due to the fact that the return flow in Section 1 had increased 109 second feet per day during the low water period of

1917 over that of1915. If we consider this increase, the quantity of natural flow necessary to fill the newest right, to 60% of a full right, on the River, would be 1030 second feet instead of 1142 second feet.

CONCLUSIONS.

1. That tributary flow and seepage gain are important items to be considered in the management of the Boise River.

2. All tributary and seepage waters should be considered as a part of the available water supply of the River.

3. That in extremely low water years the River naturally divides itself into four sections if properly managed.

4. That in extremely high water years the River will naturally divide itself into two sections if properly managed.

5. That during low water periods the tributary and seepage flow will supply the demands of the present existing rights in Section Two.

6. That any water permitted to waste down the River from Section 1 to Section 2, works an injury on canal rights in Section 1.

7. That the return seepage flow to Section 1 is becoming an increasingly important factor.

8. That the transfer or exchange of any right from a lower section to a section above is injurious to the rights already existing in the section above.

9. That filings on tributary streams should be carefully studied before being allowed by the State Engineer.

10. That water rights diverting water in Section 1 may be greatly enhanced in value by proper adjustment of drainage water rights.

11. That the newer decreed rights may clearly determine their storage water requirements.

12. That any arbitrary duty of water established for Boise Valley Canals will not be conducive to waste.

13. That any duty established will be an arbitrary duty.

14. That we have insufficient data upon which to base an exact duty of water and furthermore, probably never will have.

15. That the duty proposed in this Report by the writer is an arbitrary duty.

16. That if a decree is issued on theBoise River rights, special emphasis should be given the non-wastage of water after it is diverted from the River.

17. That formerly a flow of 1653 second feet in the River was considered a necessary quantity of water to fill 60% of the decreed rights of the BoiseRiver, while during the low water period of 1917, 1030 second feet of natural flow filled the same requirements.

18. That, primarily, proper river regulation is more important than canal management, for the canal manager has a serious problem to handle if his River supply is a continuously changing factor.

TABLE IN SECOND FEET SHOWING DAILY FLOW OF BOISE RIVER FOR YEARS 1895 TO 1915, Inc.

CHART 2.

(Taken from U.S.G.S. Records)

SHEET-1

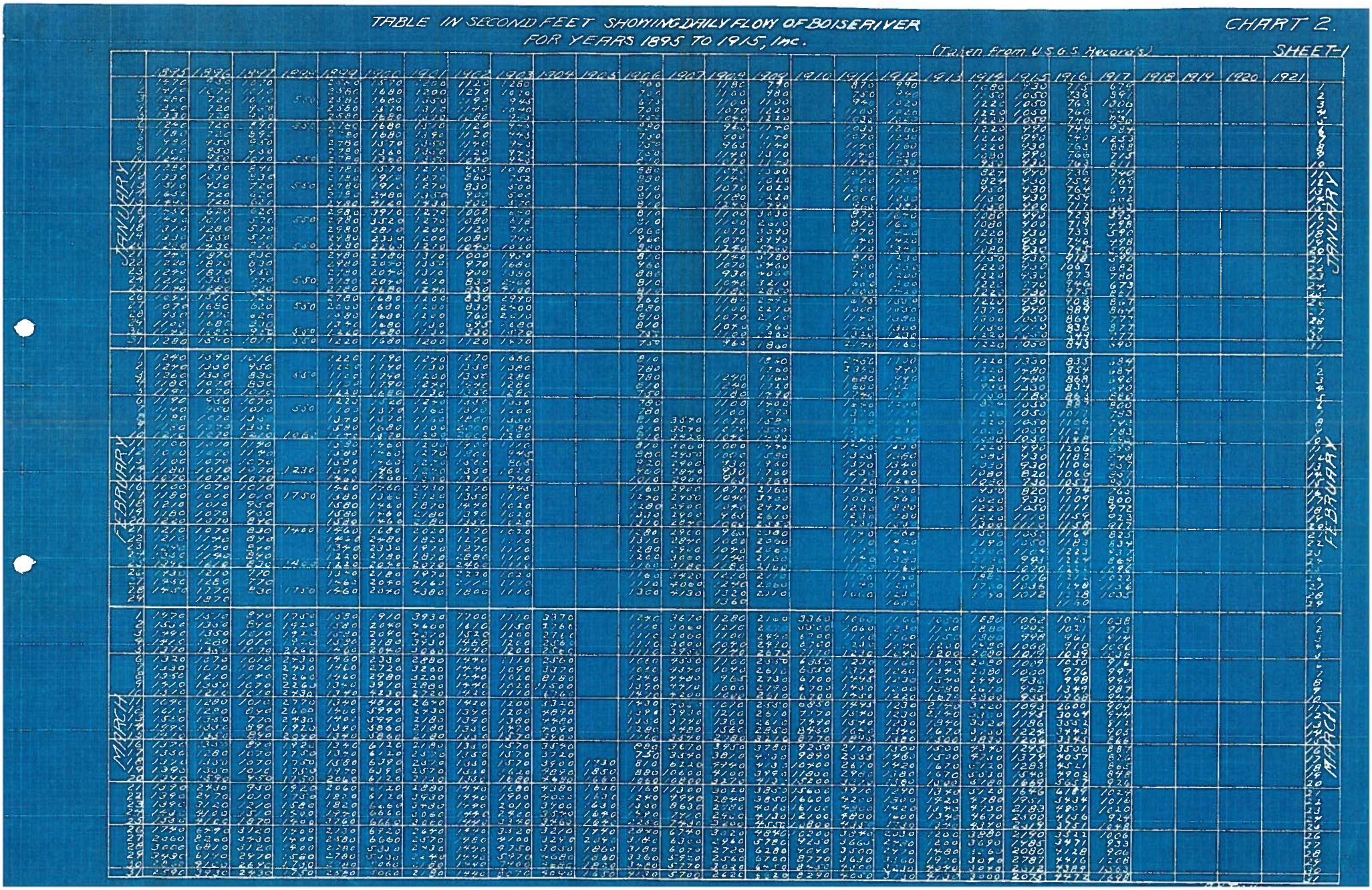


CHART 2A.

SHEET-2

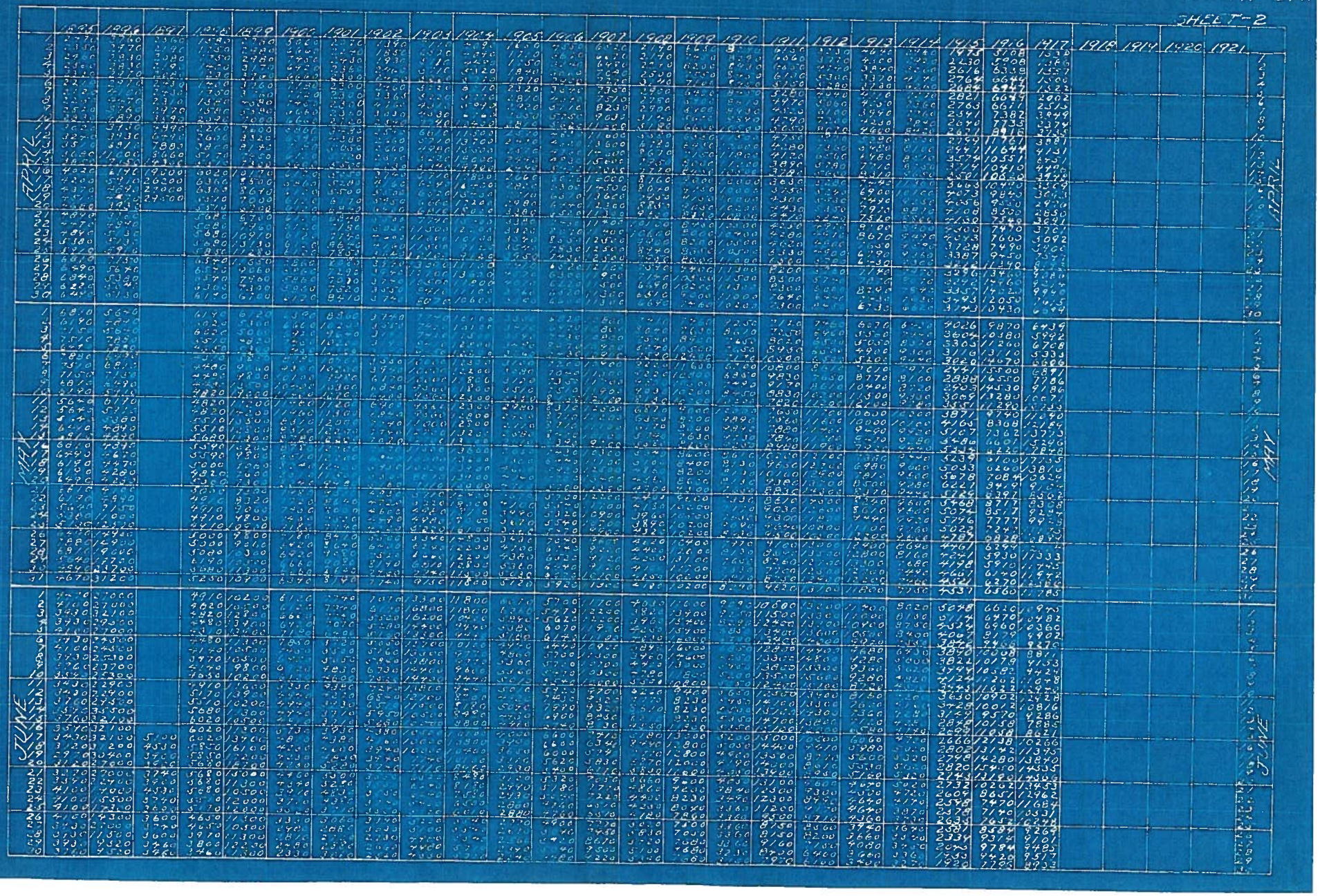
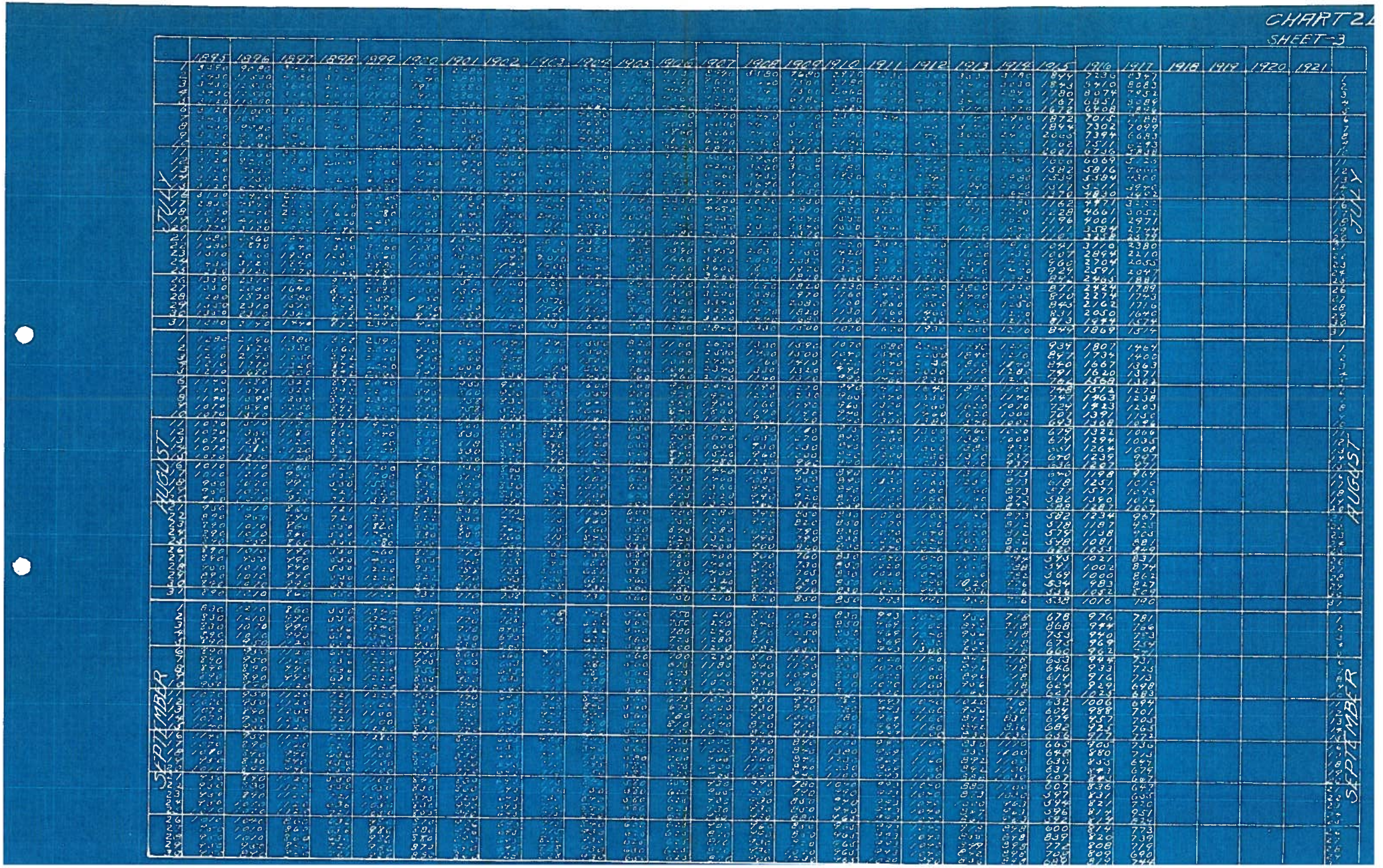
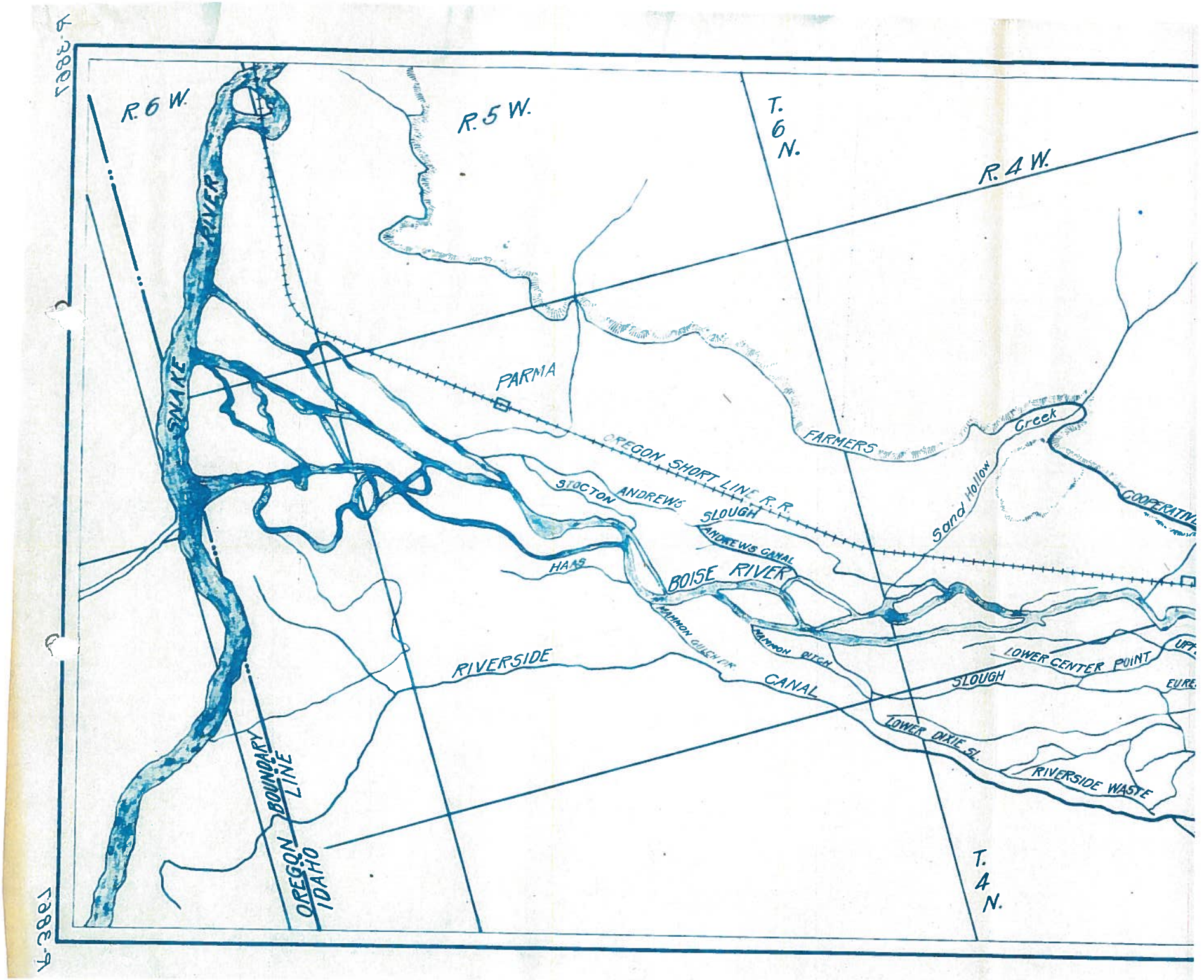
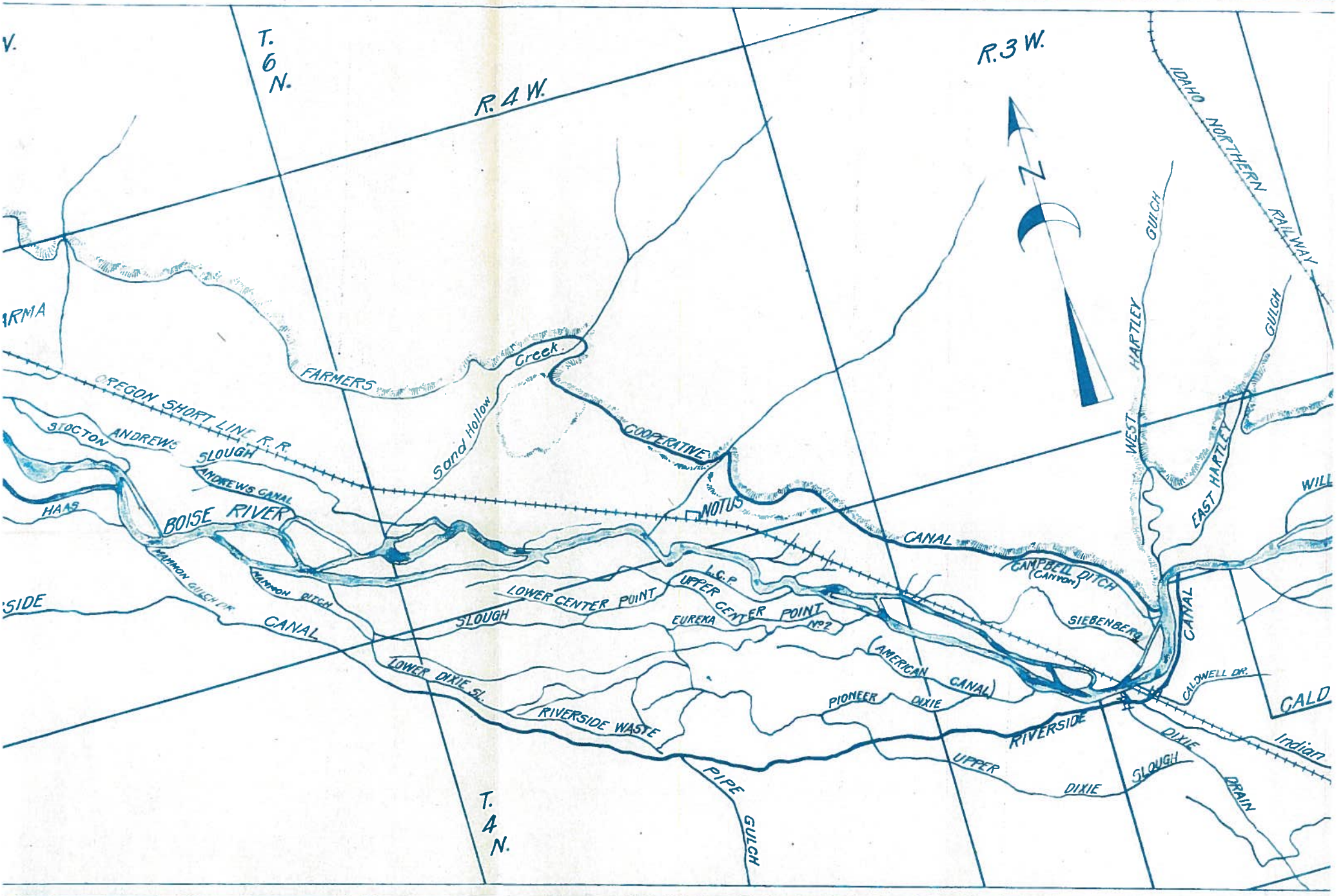


CHART 2
SHEET-3




R. 6 W.
R. 5 W.
T. 6 N.
R. 4 W.
SNAKE RIVER
PARMA
OREGON SHORT LINE R. R.
FARMERS
Creek
Sand Hollow
COOPERATIVE
STOCTON
ANDREWS
SLOUGH
ANDREWS CANAL
HAAS
BOISE RIVER
MAHMON GULCH DR.
MAHMON DITCH
LOWER CENTER POINT
SLOUGH
RIVERSIDE
CANAL
LOWER DIXIE SL.
RIVERSIDE WASTE
BOUNDARY LINE
OREGON
IDAHO
T. 4 N.


T. 6 N.
R. 4 W.
R. 3 W.
T. 4 N.
N
IDAHO NORTHERN RAILWAY
WEST HARTLEY GULCH
EAST HARTLEY GULCH
FARMERS
Sand Hollow Creek
COOPERATIVE
OREGON SHORT LINE R. R.
STOCTON
ANDREWS SLOUGH
ANDREWS CANAL
HAAS
BOISE RIVER
NOTUS
CANAL
CAMPBELL DITCH (CANYON)
L.G.P.
LOWER CENTER POINT
UPPER CENTER POINT No 2
EUREKA
SIEBENBERG
MAMMON GULCH DR.
MAMMON DITCH
SLOUGH
CANAL
(AMERICAN CANAL)
CALDWELL DR.
LOWER DIXIE SL.
RIVERSIDE WASTE
PIONEER
DIXIE
RIVERSIDE
UPPER DIXIE SLOUGH
DIXIE DRAIN
Indian
PIPE GULCH

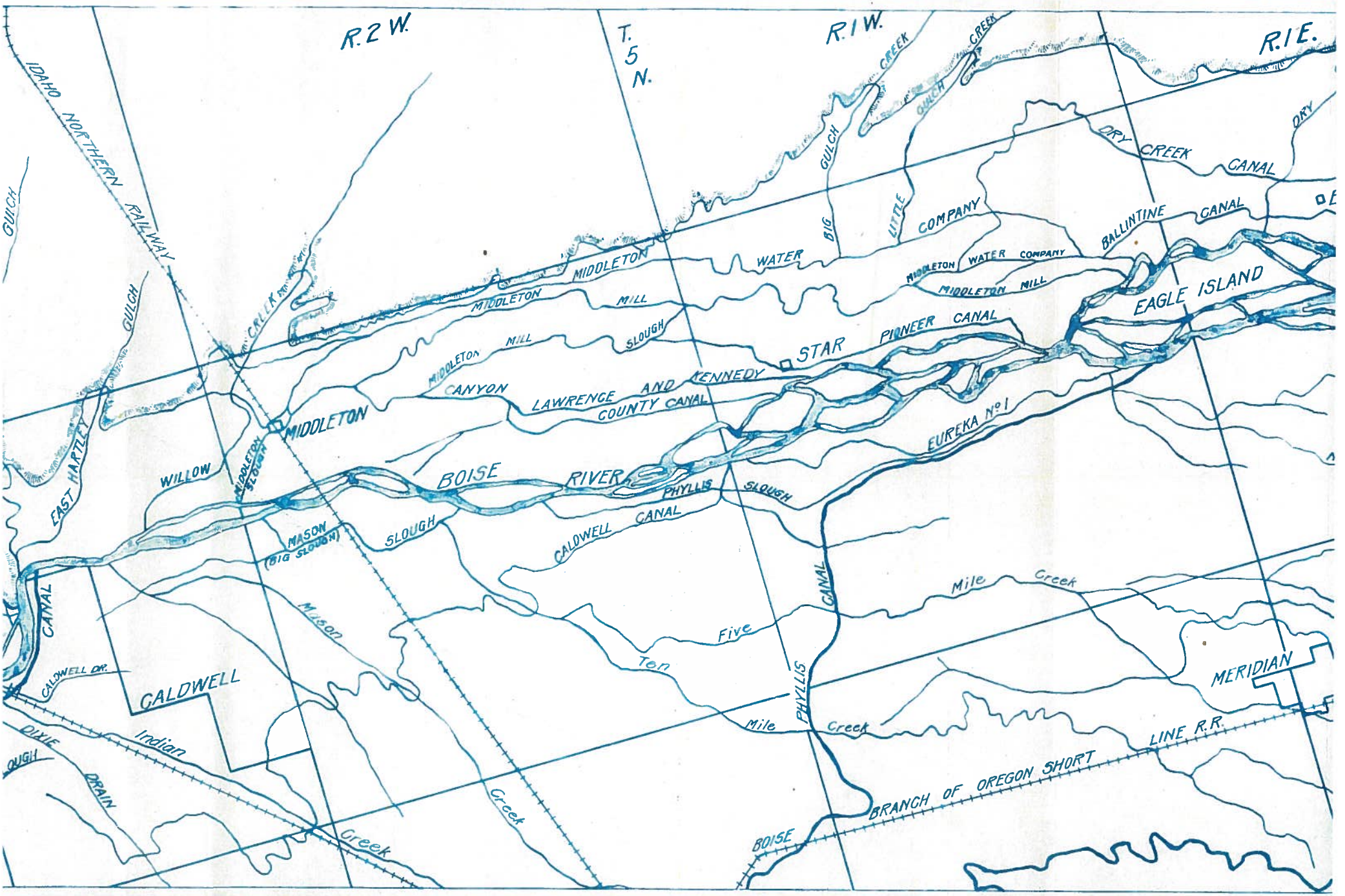
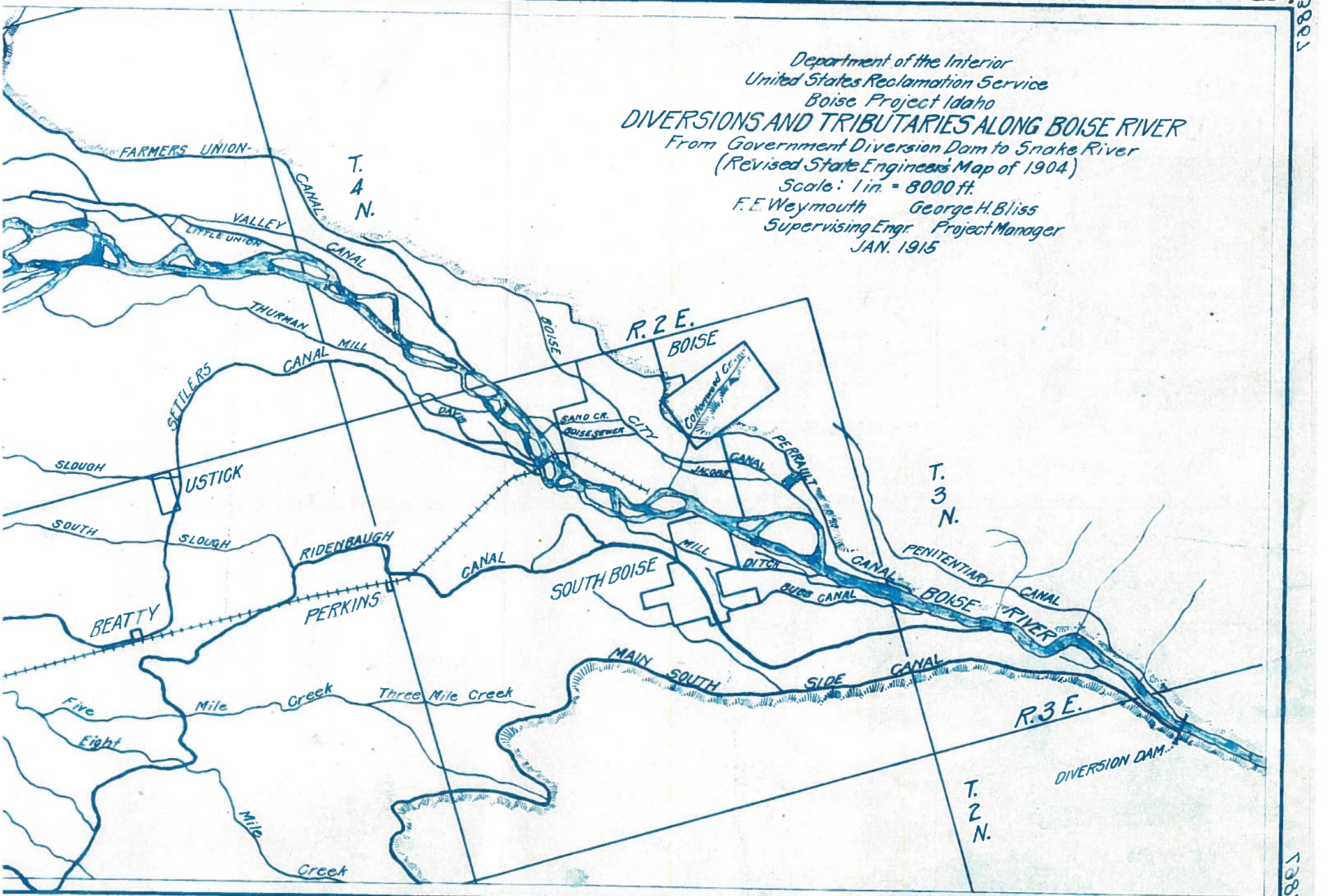

R.2 W.
T. 5 N.
R.1 W.
R.1 E.
IDAHO NORTHERN RAILWAY
GULCH
CREEK
GULCH
BIG GULCH
LITTLE GULCH
DRY CREEK
DRY CREEK CANAL
COMPANY
BALLINTINE CANAL
MIDDLETON WATER COMPANY
MIDDLETON WATER COMPANY
MIDDLETON MILL
EAGLE ISLAND
MIDDLETON
MILL
SLOUGH
STAR
PIONEER CANAL
MIDDLETON MILL
CANYON
LAWRENCE AND KENNEDY COUNTY CANAL
EUREKA No 1
MIDDLETON
MIDDLETON SLOUGH
WILLOW
EAST HARTLEY GULCH
BOISE RIVER
PHYLLIS SLOUGH
MASON (BIG SLOUGH)
SLOUGH
CALDWELL CANAL
CANAL
Mason
Five Mile Creek
Ten Mile Creek
PHYLLIS CANAL
MERIDIAN
CALDWELL DR.
CALDWELL
DIXIE
Indian
DRAIN
Creek
Creek
BOISE
BRANCH OF OREGON SHORT LINE R.R.

CHART I.


Department of the Interior
United States Reclamation Service
Boise Project Idaho
DIVERSIONS AND TRIBUTARIES ALONG BOISE RIVER
From Government Diversion Dam to Snake River
(Revised State Engineer's Map of 1904)
Scale: 1 in. = 8000 ft.
F. E. Weymouth Supervising Engr.
George H. Bliss Project Manager
JAN. 1915
T. 4 N.
R. 2 E.
T. 3 N.
R. 3 E.
T. 2 N.
FARMERS UNION CANAL
VALLEY CANAL
LITTLE UNION
THURMAN MILL CANAL
SETTLERS CANAL
SLOUGH
USTICK
SOUTH SLOUGH
RIDENBAUGH CANAL
BEATTY
PERKINS
BOISE
SAND CR.
BOISE SEWER
CITY
Cottonwood Cr.
DAM
JACOBS
PERRAULT CANAL
MILL DITCH
SOUTH BOISE
BOISE CANAL
PENITENTIARY CANAL
BOISE RIVER
MAIN SOUTH SIDE CANAL
Five Mile Creek
Three Mile Creek
Eight Mile Creek
DIVERSION DAM

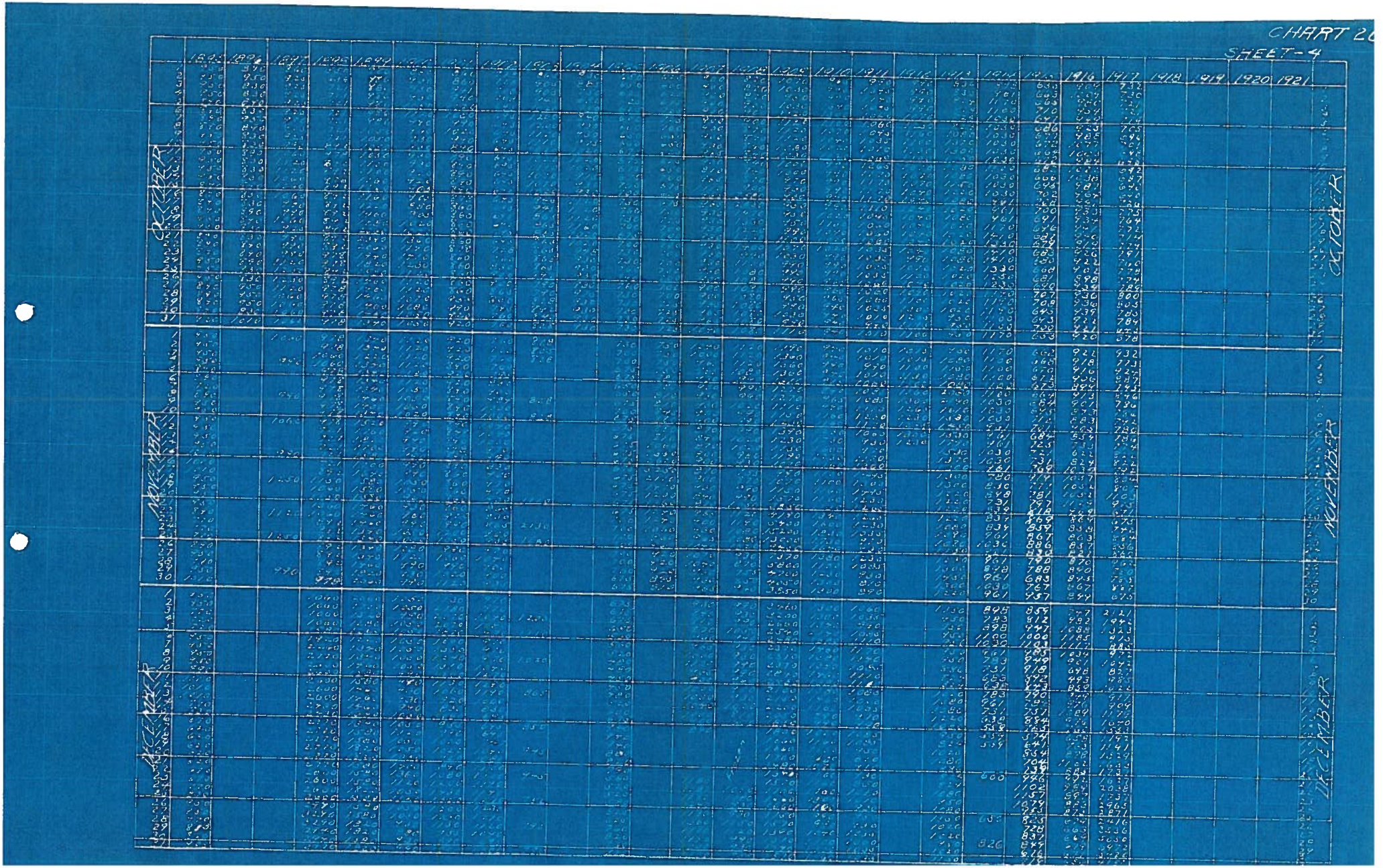

CHART 2
SHEET-4
OCTOBER
NOVEMBER
DECEMBER
1916
1917
1918
1919
1920
1921

CHART 3.

TOTAL MONTHLY FLOW IN ACRE FEET OF BOISE RIVER FOR THE IRRIGATION YEAR, 1894-1895 TO 1916-1917.

Year	November	December	January	February	March	April	May	June	July	August	September	October	Total
1894-95	54000	62700	76100	67800	102000	241000	392000	224600	151000	63300	57500	56600	1,550,000
1895-96	54300	50400	72600	67300	156000	293000	351000	145000	38200	81200	57600	53300	1,265,800
1896-97	[3] 61300	[3] 64600	50100	54800	87300	[4] 476000	[4] 308000	[5] 113200	142000	66400	61900	62700	2,050,100
1897-98	64100 [1]	61500	33800	67200	119000	230000	316000	297000	116000	46300	38900	32800	1,762,600
1898-99	55800	151000	159000	77800	113000	422000	403000	726000	353000	109000	65400	83000	2,921,000
1899-1900	89200	95900	122000	93500	303000	377000	307000	300000	83600	53100	50800	63300	2,340,400
1900-01	61300	64600	78800	77800	176000	303000	221000	229000	116000	37800	44300	35600	1,962,400
1901-02	55600	75600	66800	89700	67900	212000	350000	285000	106000	49100	40600	45300	1,457,500
1902-03	57000	62700	81200	63300	142000	444000	376000	393000	146000	92600	43900	56000	2,460,700
1903-04	67800	57500 [1]	124000	[1] 108000	262000	266000	224000	216000	200000	71300	43400	36500	2,598,500
1904-05	[3] 54000	[3] 54000	[3] 50400	[3] 56700	[3] 59000	174800	227900	245200	78210	39540	34390	42600	1,146,740
1905-06	40700	40090	50400	56700	100000	335000	274000	244000	162000	51600	40800	42000	1,087,290
1906-07	72600 [2]	74000 [2]	[2] 73400	[2] 65000	143000	666000	676000	530000	333000	101000	67300	57400	3,194,700
1907-08	65300	63300	66900	62100	140000	320000	367000	332000	147000	64600	55400	67600	1,830,500
1908-09	59800	58000	137000	110000	231000	469000	600000	494000	225000	63300	56500	62700	2,720,600
1909-10	199000	124000	74900	66600	362000	607000	509000	309000	109000	53500	53400	62700	2,738,600
1910-11	73200	78200	63010	76340	157570	363520	603970	628590	279720	73450	57460	66670	2,463,670
1911-12	66700	61500	78420	70120	97570	342920	687240	675000	172576	83274	65044	64970	2,476,894
1912-13	67820	60680	53800	57400	101500	372000	369000	270000	137000	81400	53900	62700	2,041,700
1913-14	59700	60900	70700	74500	214000	466000	345000	305000	123000	58200	52200	68900	2,122,000
1914-15	57900	44800	59560	59723	97782	196364	274128	191700	83572	40760	39672	42410	1,786,291
1915-16	45626	53346	44936	43262	107456	366062	362372	588764	243818	80702	53686	56618	2,000,712
1916-17	54010	55702	47628	47694	61740	267030	634556	643324	260216	65228	43950	46004	2,245,736
Total	1,543,066	1,571,018	1,792,968	1,746,239	3,942,368	9,018,996	10,991,176	8,996,766	4,224,992	1,462,790	1,186,402	1,330,112	50,748,833
Average	67090	68305	77955	75880	171407	391797	477538	391164	183608	63599	51583	57831	2,206,471

(1) Mean of 4 High Years.
(2) Substituted from 1906
(3) Substituted from 1900.
(4) Missing days substituted from 1900
(5) Missing days substituted from Mean of 21 Years.
(6) " Month " " " " 21 "
(7) Interpolated.

H. T. Hillman
Irrig. Engr.

TABLE IN SECOND FEET SHOWING AVERAGE DAILY
FOR A 21 YEAR PERIOD, 1895 TO 1915, I
DAILY FLOW OF 4 HIGHEST YEARS; A
DAILY FLOW OF 4 LOWEST YEA

		DAY																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
JANUARY	Average 21 Yrs. 1895/915	1195	1197	1251	1201	1199	1183	1200	1198	1213	1156	1188	1180	1119	1205	1384	1467	1379	14
	4 Highest yrs. '96, '99, '07, '09	1572	1575	1520	1542	1550	1580	1580	1610	1600	1558	1590	1695	1665	1800	2328	2685	2530	25
	4 Lowest yrs. '98, '02, '05, '15	825	842	866	860	858	885	852	842	852	832	830	806	780	778	770	832	836	9
FEBRUARY	Average 21 Yrs. 1895-1915	1345	1356	1229	1240	1240	1193	1126	1412	1418	1420	1374	1338	1338	1284	1278	1370	1506	15
	4 Highest Yrs. '96, '99, '07, '09	1615	1530	1500	1490	1365	1272	1278	1882	1922	1880	1772	1795	1878	1740	1782	1888	2235	21
	4 Lowest Yrs. '98, '02, '05, '15	990	1040	1040	1052	958	958	922	1052	1230	1230	1190	1189	1160	1090	1070	1270	1318	13
MARCH	Average 21 Yrs. 1895-1915	1857	1942	1951	1973	1971	2027	2085	2395	2617	2395	2428	2470	2439	2459	2561	2698	2793	30
	4 Highest Yrs. '96, '99, '07, '09	2230	2065	2108	2048	2108	2408	2370	2470	2472	2340	2308	2305	2275	2255	2360	2360	2572	33
	4 Lowest Yrs. '98, '02, '05, '15	1438	1408	1482	1392	1457	1450	1682	1869	1513	1569	1578	1644	1585	1440	1452	1361	1307	15
APRIL	Average 21 Yrs. 1895-1915	3869	4012	4118	4144	4253	4349	4509	4679	4871	5772	6358	6458	6525	7231	7578	7982	8074	81
	4 Highest Yrs. '96, '99, '07, '09	4705	5018	5245	5148	5275	5140	5318	5775	5892	7522	7420	8875	9175	10572	9975	10322	9575	90
	4 Lowest Yrs. '98, '02, '05, '15	1511	1862	2013	2116	2056	2500	2647	2805	2975	2641	2558	2042	3100	6472	8054	7421	7353	76
MAY	Average 21 Yrs. 1895-1915	6869	6833	6957	7457	7541	7721	7751	8320	8685	9143	8948	8855	8623	8553	8517	8542	8232	82
	4 Highest Yrs. '96, '99, '07, '09	7505	7155	7600	8525	9120	8710	9492	9728	10572	11532	11222	9878	9445	8855	8200	8498	8492	85
	4 Lowest Yrs. '98, '02, '05, '15	4326	4101	4026	3826	3830	3415	3547	4168	4475	4530	4558	4681	5207	5325	5773	5707	5751	6
JUNE	Average 21 Yrs. 1895-1915	9478	9751	10089	9762	9433	9093	8905	8913	8706	8620	8321	8455	8651	8784	8326	8379	8361	81
	4 Highest Yrs. '96, '99, '07, '09	15125	17900	18050	17800	17000	16675	15225	14875	13900	14075	13400	13588	14312	15770	15682	15752	16285	164
	4 Lowest Yrs. '98, '02, '05, '15	5775	5571	5783	5802	5623	5370	5450	5752	5860	5731	5710	5087	5065	4852	4615	4264	4233	40
JULY	Average 21 Yrs. 1895-1915	4806	4753	4692	4542	4356	4121	3924	3841	3640	3461	3302	3174	3060	2925	2789	2615	2439	23
	4 Highest Yrs. '96, '99, '07, '09	9250	9465	9762	9515	8848	8178	7512	7506	7180	6762	6448	6272	5770	5740	5065	4650	4257	39
	4 Lowest Yrs. '98, '02, '05, '15	2405	2375	2175	2249	2048	2093	2005	2366	1853	2005	1868	1823	1782	1734	1632	1516	1461	13
AUGUST	Average 21 Yrs. 1895-1915	1461	1397	1347	1323	1282	1249	1225	1202	1172	1094	1081	1070	1042	1021	1024	997	950	9
	4 Highest Yrs. '96, '99, '07, '09	2210	1982	2028	1872	1788	1788	1740	1785	1742	1630	1570	1500	1417	1387	1305	1320	1015	12
	4 Lowest Yrs. '98, '02, '05, '15	923	922	898	836	811	825	810	782	694	702	716	740	743	738	717	713	656	65
SEPTEMBER	Average 21 Yrs. 1895-1915	876	907	876	760	873	875	854	839	833	824	824	822	808	838	826	905	903	8
	4 Highest Yrs. '96, '99, '07, '09	1195	1240	1228	1095	1122	1145	1130	1075	1048	1024	1052	1030	1015	1000	1020	1018	972	94
	4 Lowest Yrs. '98, '02, '05, '15	629	676	661	642	630	624	624	612	614	640	652	657	649	667	654	675	641	62
OCTOBER	Average 21 Yrs. 1895-1915	854	872	876	892	914	927	935	935	928	925	939	932	899	950	1004	978	953	90
	4 Highest Yrs. '96, '99, '07, '09	967	942	892	936	975	955	980	980	972	968	960	950	906	1048	1081	976	982	10
	4 Lowest Yrs. '98, '02, '05, '15	640	665	657	650	658	628	628	648	653	733	757	782	738	768	745	704	707	75
NOVEMBER	Average 21 Yrs. 1895-1915	975	979	967	993	950	1038	1046	1017	1044	1022	1050	1072	1062	1102	1104	1267	1076	116
	4 Highest Yrs. '96, '99, '07, '09	1172	1205	1165	1190	1175	1158	1149	1138	1126	1122	1152	1178	1206	1195	1195	1138	1150	117
	4 Lowest Yrs. '98, '02, '05, '15	772	776	795	782	780	780	803	832	844	836	844	770	772	774	766	758	810	82
DECEMBER	Average 21 Yrs. 1895-1915	1236	1229	1182	1240	1210	1204	1196	1202	1244	1210	1207	1169	1168	1088	1058	1073	1126	119
	4 Highest Yrs. '96, '99, '07, '09	1875	1698	1795	1822	1820	1801	1740	1765	1575	1488	1418	1385	1408	1335	1285	1256	1342	134
	4 Lowest Yrs. '98, '02, '05, '15	891	879	930	945	1053	1104	1175	1165	1253	1291	1252	1264	1219	1156	1141	1240	1261	132

CHART 4.

FEET SHOWING AVERAGE DAILY FLOW OF BOISE RIVER
21 YEAR PERIOD, 1895 TO 1915, Inc., AVERAGE
DAILY FLOW OF 4 HIGHEST YEARS; AVERAGE
DAILY FLOW OF 4 LOWEST YEARS.

DAY																						Average
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
1188	1180	1119	1205	1384	1467	1379	1450	1466	1543	1651	1615	1493	1382	1532	1450	1318	1295	1249	1265	1267		1347
1570	1695	1660	1800	2324	2635	2530	2570	2662	3007	3202	3082	2694	2	2	2	1	1	1	1	1		2007
830	806	780	795	790	838	835	845	840	850	822	832	815	796	792	816	812	792	791	795	865		830
1374	1338	1338	1284	1278	1390	1505	1507	1498	1479	1451	1522	1554	1616	1526	1553	1489	1487	1437				1424
1772	1796	1828	1740	1782	1888	2235	2115	2040	2010	1852	1825	1860	1845	1942	2020	2215	2368					1830
1190	1189	1160	1090	1070	1320	1318	1340	1357	1292	1250	1258	1264	1618	1503	1455	1414	1406					1215
2424	2420	2439	2459	2501	2698	2790	3023	3361	3500	3577	3625	3601	3455	3353	3587	3438	3654	3829	3926	3746		2890
2308	2305	2225	2255	2340	2360	2572	3320	4470	4660	4910	4654	4405	4520	4460	5050	5200	5345	5395	4735	4705		3424
1678	1645	1587	1566	1612	1361	1307	1578	1622	1607	1655	1683	1708	1755	1700	1742	1738	1695	1812	1805	1825		1584
5899	6188	6895	7311	7585	7982	8054	8131	8266	7249	7221	7417	7457	7515	7302	7906	7825	7973	7939	7807			6426
7420	8075	9175	10512	9785	10322	9515	9082	8205	7670	7525	8062	9185	9778	9435	10076	9245	8760	8310	7644			7780
3535	3682	3707	3972	3852	4021	4053	4056	4057	4055	4015	4036	4067	4092	4043	4076	4086	4026	4029	4016			3513
8548	8655	8623	8553	8517	8421	8232	8275	8154	8029	7855	7921	7903	8147	8152	8402	8381	8336	8234	8055	8311		8201
11222	9878	9496	8855	8200	8098	8492	8555	8470	8545	8300	8278	9402	10425	10627	11795	11295	12850	12850	13978	15700		9878
4518	4631	5207	5328	5173	5137	5181	5307	5321	5160	4992	4920	4926	4	4446	4554	4987	5	6160	6225	6		4743
8321	8458	8651	8745	8326	8378	8336	8184	7870	7608	7290	6782	6376	5920	5698	5033	6013	5061	5162	4999			7830
13400	13588	14312	15270	15682	15452	16285	16465	16358	15866	14662	12792	11238	10512	10165	10218	13120	9788	9725	9530			14104
5210	5185	5065	4952	4613	4266	4233	4084	3930	3775	3870	3707	3696	3607	3559	3285	3112	2895	2701	2553			4274
3302	3184	3060	2928	2789	2615	2439	2303	2211	2072	1988	1842	1867	1925	1857	1726	1652	1611	1552	1526	1363		2714
6444	6292	5970	5740	5095	4650	4260	3772	3542	3492	3255	3202	2995	2918	2858	2545	2458	2455	2448	2075	2200		5252
1665	1823	1782	1734	1632	1578	1462	1396	1330	1288	1033	1057	1028	1037	1060	956	945	918	913	923	895		1600
1081	1070	1042	1027	1028	987	950	943	941	935	936	917	915	903	891	881	868	856	855	842	838		1051
1570	1500	1417	1367	1332	1320	1315	1282	1200	1214	1210	1200	1225	1206	1188	1155	1130	1094	1080	1060	1072		1441
716	740	743	738	717	713	656	695	688	675	635	663	617	622	688	613	612	607	585	607	585		711
874	872	888	849	826	904	903	895	879	863	863	847	867	864	877	856	866	876	870	872			873
1052	1030	1015	1000	1020	1018	972	949	942	949	925	919	920	960	935	944	947	937	968	979			1024
652	649	649	667	658	678	681	622	614	604	605	606	648	627	654	633	659	662	658	657			644
939	932	929	950	1004	978	953	949	1003	997	1041	990	1005	1030	1042	971	972	982	974	986	970		954
1060	1050	1066	1086	1081	1076	1082	1058	1172	1230	1205	1225	1184	1165	1083	1066	1069	1051	1101	1100	1120		1042
757	782	788	769	747	707	707	723	742	735	742	752	784	812	818	815	840	808	802	782	780		743
1056	1072	1062	1102	1105	1267	1076	1161	1055	1189	1241	1310	1932	1785	1036	1421	1306	1204	1165	1230			1179
1194	1198	1208	1165	1165	1138	1150	1178	1200	1615	1886	2180	4695	4089	4220	2715	2320	2060	1932	1761			1702
844	770	772	732	766	782	810	844	878	886	867	862	831	840	835	838	830	794	808	808			822
1207	1189	1168	1098	1059	1073	1126	1182	1200	1160	1154	1166	1230	1266	1188	1200	1203	1215	1106	1129	1165		1187
1418	1385	1408	1375	1285	1258	1342	1325	1295	1340	1360	1422	1375	1425	1400	1370	1380	1020	1285	1200	1370		1413
1282	1264	1219	1156	1141	1240	1261	1229	1348	1352	1402	1346	1367	1347	1357	1405	1428	1402	1412	1260	1291		1245

STANDARD CROSS SECTION 10 X 10
KEUFFEL & ESSER CO. NEW YORK

CHART 5.

DISCHARGE IN SECOND FEET OF BOISE VALLEY CANALS BY DAYS DURING THE IRRIGATION SEASON OF 1917. INCLUDING STORAGE WATER.

MAY

No.	Name of Canal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1	C.S.P.S.	536	548	526	491	480	478	468	472	473	477	477	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	14,674
2	New York Slough	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	422	13,092
3	Pioneering	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	54
4	Ridenbaugh	0	31	32	17	69	49	60	124	145	120	126	152	162	162	0	86	233	191	217	252	238	237	206	207	242	258	300	321	336	335	249	5,416
5	Enid	0	0	0	0	0	2	3	6	1	3	12	20	22	24	37	29	21	16	5	3	5	0	7	7	8	6	5	5	4	4	4	254
6	Grazer	42	42	40	46	41	41	40	41	26	27	26	28	30	31	33	30	28	24	27	23	25	28	31	30	36	38	40	36	36	38	37	933
7	Peters Ridge	0	0	0	42	0	0	0	0	3	16	6	2	4	7	10	16	12	2	2	2	2	2	2	0	2	2	2	2	2	2	2	86
8	Settlers	0	0	0	8	16	28	30	26	13	2	36	28	34	26	13	33	53	25	10	3	163	201	168	113	0	0	22	21	21	63	64	1,460
9	Thurman Mill	17	20	23	22	21	21	21	21	21	21	16	12	15	15	22	20	20	17	14	14	17	17	20	22	23	27	28	32	24	18	12	647
10	Farmers Union #1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	65	65	66	66	67	64	63	0	0	24	28	20	842
11	Little Union	0	0	0	0	0	0	0	0	0	1	2	3	8	12	17	17	16	16	17	12	13	14	15	17	20	16	16	13	15	15	15	282
12	Dry Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Ballantyne	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Pebble Brook Ditch	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	682
15	Middleton Mores	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Middleton Mill Ditch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Phyllis	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	144	4,464
18	Liberty No. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Pioneer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Conway County	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	Caldwell Highline	22	122	23	22	22	23	23	24	26	46	46	46	46	23	26	38	37	63	63	63	63	63	63	74	74	74	74	75	75	75	75	1,877
22	Farmers Cooperative	33	21	34	27	27	26	24	28	27	33	140	136	137	33	73	119	136	154	166	162	162	196	210	240	240	240	240	240	240	240	240	6,166
23	Tuttle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Seven Bar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Riverside No. 2	15	16	17	24	46	72	69	93	88	94	100	93	87	91	100	136	140	136	137	162	165	168	171	174	171	180	184	180	170	166	0	3,691
26	Pioneer Pete	0	0	0	0	0	0	0	1	1	1	1	2	4	5	5	6	11	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0
27	Eureka No. 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	Union Extension	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Lower Extension	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	Boise Valley No. 2	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	140	4,340
31	Miscellaneous	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	961
	Total	8124	8127	8128	7927	8237	8318	8826	8767	8703	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	8850	274,694

SHEET 5A.

JUNE

No.	Name of Canal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
1	U.S.R.S.	80	662	0	1258	611	616	628	629	633	337	611	611	611	611	611	611	611	611	611	611	611	611	611	611	611	611	611	611	611	611	35555
2	New York Block	271	271	137	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	271	5170
3	Centerdam.	1	2	2	2	3	5	5	5	5	5	5	5	5	5	5	5	7	7	7	7	7	7	7	7	7	7	7	7	7	7	168
4	Aldenbridge	267	352	363	372	380	396	396	396	396	396	388	388	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	387	11478
5	Davis	5	16	16	14	17	17	17	24	30	30	30	30	30	30	30	30	24	24	24	24	24	24	24	24	24	24	24	24	24	24	629
6	Crocker.	39	41	42	40	41	41	41	42	47	47	46	46	46	46	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	1585
7	Bayside, No. 1	5	3	5	3	5	5	13	13	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	431
8	Jeffers.	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	128	4096
9	Thurman Mill	10	7	13	19	25	28	26	26	24	24	24	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	1785
10	Farmers Union Ditch	120	119	123	120	123	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120	4552
11	Little Union.	15	16	14	16	16	17	17	16	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	538
12	Big Creek.	53	40	40	39	36	40	43	43	0	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	1489
13	Butterfield.	3	4	3	2	1	3	4	5	2	5	5	12	8	4	4	5	5	5	4	5	6	6	6	6	6	6	6	6	7	7	134
14	Oklahoma Texas	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	1410
15	Midland Victoria	66	66	70	73	73	74	80	81	87	87	87	82	75	78	80	80	80	80	87	82	82	82	82	82	82	77	77	75	73	73	2356
16	Midland Mathis	63	64	65	66	70	73	75	104	104	90	90	86	75	73	70	70	82	82	82	82	82	82	82	82	82	84	84	81	80	78	2420
17	Pilgrim.	435	436	437	435	437	436	436	440	453	453	461	459	444	447	447	447	447	447	447	447	447	447	436	436	436	455	455	455	455	455	13436
18	Eureka No. 1	0	19	18	17	13	12	12	12	13	13	13	15	16	12	9	10	12	14	16	21	21	22	22	23	22	21	20	23	26	25	498
19	Pioneer.	11	12	13	13	19	23	25	25	25	26	26	26	25	25	24	28	32	36	36	36	36	36	32	28	24	24	23	21	17	17	748
20	Cagnac Tower	41	41	41	41	51	61	65	69	73	77	81	81	81	81	78	76	74	74	74	74	74	74	74	74	74	74	72	70	69	67	2052
21	Cricket Hyde Line	78	80	89	93	96	89	98	94	102	103	102	102	85	100	101	104	105	110	105	102	112	111	111	102	101	100	98	100	102	100	2961
22	Farmers Canal No. 1	331	341	321	321	330	330	337	331	337	337	337	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	338	9982
23	Canyon.	19	13	12	16	26	36	33	30	28	26	26	23	23	22	22	22	22	22	22	22	7	36	36	36	27	26	26	16	19	16	17	16	695
24	Sabinoso.	12	13	13	14	15	16	14	16	16	15	14	11	8	6	8	8	8	9	10	10	10	10	10	10	10	10	10	11	12	11	9	8	324
25	Riverside No. 2	162	160	159	159	170	162	156	160	165	200	204	204	196	196	196	196	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	190	5955
26	Pioneer Dam.	12	13	12	12	13	13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	23	23	23	23	23	23	23	23	23	23	23	23	622
27	Eureka No. 2.	60	60	61	61	57	52	52	52	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	1662
28	Upper Cook Ditch	6	7	5	9	9	5	4	9	9	9	9	7	3	5	5	5	6	7	5	11	9	6	6	7	9	11	6	5	9	9	9	9	230
29	Lower Cook Ditch	5	5	6	6	8	10	10	10	10	10	10	10	11	10	9	9	9	9	9	9	6	6	6	7	7	7	6	5	5	9	5	5	232
30	Pecos River at Mouth	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	24900
31	Miscellaneous	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	930
	Total	2951	3382	3344	3448	3486	3499	3527	3551	3544	3465	3487	3464	3344	3374	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3354	3355163

CHART 10

JULY

No.	Name of Canal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1	U.S.R.S.	135	134	135	135	135	31	0	0	0	0	135	134	134	31	135	135	134	134	134	134	134	134	134	134	134	134	134	134	134	134	134	4342
2	New North Fork	227	227	221	227	227	227	0	0	0	0	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	227	166	166	7008
3	Pennsylvania	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	31
4	Farmers No. 1	394	390	393	393	394	393	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	394	12232
5	Ouray	6	6	6	17	25	25	23	21	19	17	16	13	14	16	18	20	22	21	21	21	21	23	23	25	23	22	22	24	19	16	13	607
6	Cedar	60	53	64	70	77	80	67	60	53	60	53	58	55	57	60	53	62	60	61	56	56	54	57	67	71	74	77	78	81	84	86	2078
7	Farmers No. 2	15	17	16	16	20	24	23	25	25	19	17	18	18	23	19	16	16	18	12	11	11	11	11	11	11	11	11	13	13	13	12	490
8	Ridge	156	156	163	162	160	156	160	162	162	164	164	164	164	164	164	162	162	162	160	162	159	0	0	0	163	167	168	166	166	168	168	4478
9	Farmers No. 3	87	85	85	88	88	85	85	90	92	92	92	93	100	106	102	104	106	102	102	98	98	98	98	98	98	98	98	98	98	98	98	3013
10	Farmers Union No. 1	180	180	182	180	177	177	177	174	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	5513
11	Little Union	21	21	20	22	18	20	23	22	22	21	20	17	19	16	14	14	14	13	11	12	12	11	11	12	12	10	9	9	9	8	7	522
12	Log Creek	56	52	49	50	61	58	58	53	56	56	56	56	0	0	0	54	54	54	56	56	56	56	56	56	56	56	56	56	56	56	56	1663
13	Ballantine	7	8	8	8	8	8	7	7	14	14	14	7	8	8	8	8	8	8	8	10	14	14	14	14	8	8	8	8	8	8	7	322
14	Tylerhead Canal	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	47	1457
15	Middle Park Co.	73	69	69	64	64	65	66	73	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	2413
16	Middle Park Ditch	64	61	64	67	65	73	61	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	1736
17	Empire	456	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	14167
18	Granby No. 1	24	23	28	30	31	30	29	31	28	28	28	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	927
19	Farmers	19	21	23	25	27	27	27	28	28	29	27	26	25	25	26	25	27	27	30	31	30	25	25	25	26	22	21	18	17	16	17	725
20	Carpenter County	76	77	77	76	76	76	76	76	68	62	60	59	60	63	63	63	63	63	61	61	62	60	62	62	62	62	60	59	57	57	57	2022
21	Cattle Supply Co.	76	75	74	67	0	0	90	90	92	92	92	68	68	68	92	92	87	87	83	83	84	84	78	72	75	75	75	71	69	68	68	2504
22	Farmers Co-operative	337	337	334	342	341	344	340	348	339	339	339	346	347	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348	10327
23	Cannon	20	20	20	7	14	26	29	26	25	24	19	20	19	17	25	20	24	24	30	22	30	19	17	25	19	20	22	17	16	13	13	570
24	Carpenter	8	7	7	8	12	9	9	8	10	12	13	12	12	12	5	14	12	12	15	14	12	12	14	12	12	10	10	13	12	11	10	374
25	Arvada No. 2	189	190	174	188	200	174	188	188	200	200	200	188	188	188	188	188	188	188	200	200	200	200	200	200	200	200	200	200	200	200	200	6088
26	Farmers Ditch	16	21	18	0	0	0	17	33	36	26	14	25	20	17	17	17	16	15	16	16	20	23	20	21	21	22	22	19	19	19	17	576
27	Arvada No. 2	30	28	27	28	22	30	39	40	42	29	33	27	25	22	22	21	19	21	20	20	20	20	20	20	20	20	20	20	20	20	20	1000
28	Upper Center Point	10	10	7	7	8	11	15	14	14	14	14	9	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	380
29	Lower Center Point	2	2	2	2	1	5	9	9	10	10	2	3	3	2	2	2	2	2	1	3	3	9	10	14	15	11	13	12	11	11	11	240
30	Boise Rivulet Ditch	1514	1496	1516	1528	1480	1460	1536	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	1560	48,354
31	Miscellaneous	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	961
	Total	4824	4820	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	4824	189578

CHART 56

AUGUST

No	Name of Canal	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1	U.S. No. 5	2088	2093	2078	2082	2072	2057	2045	2069	2054	2029	2052	2016	2131	2196	2165	2169	2160	2163	2033	2016	2043	2020	2033	2	13	1923	1978	1949	1936	1926	1926	63572
2	New York State	166	166	166	166	166	166	166	166	166	166	166	137	137	87	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2003
3	Pennsylvania	7	7	7	7	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	188
4	Pittsburgh	380	392	394	393	380	393	387	385	386	392	392	372	344	324	292	293	315	316	316	314	337	320	320	324	326	328	328	310	322	322	319	11497
5	Ohio	18	19	15	16	15	15	16	18	21	19	22	22	21	20	20	20	21	20	18	18	17	17	21	18	20	20	22	20	20	19	18	478
6	Ohio	78	80	81	84	84	83	74	74	79	78	74	80	82	81	53	84	78	0	0	0	69	67	73	70	70	73	62	57	70	76	76	2168
7	Base City Nat.	12	12	12	10	8	6	12	11	9	8	9	8	7	10	10	10	12	13	13	11	9	9	12	13	12	10	13	14	12	14	12	331
8	Indiana	166	169	169	163	163	164	166	167	167	170	170	166	170	172	172	176	168	168	172	176	177	173	173	173	173	173	173	176	176	176	176	5367
9	Thurman Mill	34	33	36	33	33	33	31	28	28	33	6	21	23	11	26	25	26	26	26	25	26	26	26	26	26	26	26	26	26	26	26	826
10	Farmers Union-Dix	168	173	173	173	173	172	133	141	140	140	143	80	160	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	5278
11	Cattaraugus	11	11	11	14	13	13	13	13	11	8	8	10	11	14	14	14	13	14	12	12	13	13	13	13	12	12	12	12	11	11	11	376
12	Big Creek	43	47	47	47	47	47	43	44	0	17	39	45	38	38	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	1334
13	Ballantine	7	7	7	8	7	7	6	6	7	8	7	8	6	6	6	6	6	6	6	6	6	6	2	2	8	9	12	12	12	12	12	274
14	Eagle Bend Canals	35	35	35	35	35	35	35	35	35	35	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	938
15	Middleton Roberts	59	60	60	58	57	62	63	64	37	29	31	31	32	34	76	76	64	65	67	66	66	63	63	63	66	66	65	64	64	63	53	1268
16	Middleton Williams	69	67	69	67	66	67	67	66	63	66	70	70	71	70	71	71	71	71	69	70	70	70	70	39	39	39	39	39	39	39	39	1262
17	Payne	316	320	320	319	319	319	319	320	319	319	306	302	293	288	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	9600
18	Eureka Mill	10	11	11	12	9	8	8	8	7	8	8	8	8	7	7	7	7	10	10	12	11	10	10	10	10	10	10	10	10	10	10	310
19	Pioneer	12	10	12	13	13	11	13	12	12	13	14	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	377
20	Canyon County	99	100	99	100	101	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	3200
21	Cable High Line	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	1550
22	Farmers Co-operative	108	256	254	262	246	246	221	184	191	123	119	120	131	102	102	106	106	131	122	122	128	141	221	211	177	172	176	181	188	172	204	6144
23	Canyon	15	9	9	11	8	12	9	2	2	6	10	10	11	11	9	7	22	28	18	21	26	20	16	16	8	18	14	18	21	22	22	398
24	Swanberg	7	7	2	16	8	6	9	14	1	2	2	10	7	9	9	8	10	20	18	13	14	12	13	12	12	12	12	8	8	10	8	302
25	Riverside No 2	184	231	227	228	230	225	228	226	227	180	213	226	226	230	234	230	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	6987
26	Pioneer No 1	17	17	17	13	11	17	15	10	10	10	10	10	10	14	10	11	13	23	20	17	12	18	17	17	12	10	8	9	8	10	14	418
27	Eureka No 2	39	38	38	36	32	32	33	20	14	7	2	6	5	8	10	12	10	30	30	33	34	39	30	30	30	31	30	27	29	30	30	922
28	Upper Center Point	14	13	9	7	2	6	10	9	8	2	6	2	2	2	6	6	6	13	25	20	16	12	10	10	10	10	9	9	8	8	6	304
29	Lower Center Point	9	2	4	6	8	6	7	9	14	11	6	7	6	6	7	7	6	6	5	5	7	6	6	6	6	6	6	6	6	6	6	194
30	Satellite of Notre	118	115	112	108	85	82	82	80	70	55	50	90	80	60	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	2790
31	Miscellaneous	23	23	23	23	23	23	23	23	23	23	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	529
	Total	4524	4556	4569	4594	4552	4552	4528	4523	4468	4387	4375	4207	4227	4100	4103	4173	4147	4159	4059	4116	4162	4109	4123	3842	3734	3917	3917	3917	3917	3917	3917	125746

CHART 5D.

SEPTEMBER

No.	Name of Vessel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
1	U.S.S.	183	178	178	183	183	173	178	178	178	180	180	180	177	169	178	183	183	183	183	183	183	183	183	183	183	183	183	183	183	183	5379
2	New Hampshire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1293
3	Kentucky	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	194
4	Alabama	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	9241
5	Ariz	16	16	16	16	16	16	16	13	13	13	13	13	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	9	9	370
6	Cruzen	74	74	74	74	74	74	74	68	68	68	68	72	72	72	70	67	65	69	67	69	69	69	70	70	70	70	70	70	70	70	2070
7	Fox City No. 1	11	11	11	11	11	12	11	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	256
8	Settles	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	5115
9	Tuscarora	16	16	16	16	16	16	16	16	33	33	33	33	33	20	20	20	16	16	16	16	16	16	16	16	16	16	16	16	16	16	494
10	Farmer Organ	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	6607
11	Little Union	16	16	16	16	16	16	16	16	8	8	8	8	8	6	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	213
12	Dry Creek	31	31	31	31	31	31	31	31	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	881
13	Katherine	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	370
14	Tonopah Extension	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	840
15	Middleton No. 2	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	256
16	Middleton No. 1	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	1160
17	Phyllis	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	7220
18	Eureka No. 1	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	257
19	Eureka	17	17	17	17	17	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	542
20	Canton County	32	32	32	32	32	32	32	32	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	978
21	Calumet Highland	10	10	10	10	10	10	10	0	0	0	24	19	32	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	771
22	Farmer Operator	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	5367
23	Conger	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	300
24	Silverberg	8	10	10	10	10	10	10	10	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	242
25	Alameda No. 2	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	162	4706
26	Pioneer Dixie	18	18	18	18	18	17	17	17	17	16	16	16	14	14	14	13	12	9	9	9	7	7	6	6	6	11	11	11	11	11	396
27	Eureka No. 2	32	30	28	27	27	28	28	28	28	28	27	27	24	24	24	24	24	22	22	22	22	22	22	22	22	22	22	22	22	22	624
28	Wyandotte Point	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	124
29	Lower Pottsville	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	177
30	Burbank Nelson	48	50	52	54	56	56	56	56	56	58	58	58	60	60	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	1683
31	Miscellaneous	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	570
	Total	3651	3627	3618	3558	3516	3329	3514	3484	3789	3767	3809	3824	3824	3781	3627	3520	3502	3603	3572	3496	3502	3502	3502	3502	3502	3502	3502	3502	3502	3502	91857

TRIBUTARY AND RETURN FLOW TO BOISE RIVER DURING IRRIGATION SEASON 1917. CHART 6.

MAY

No.	Name of Tributary	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1	Cottonwood Creek	91	100	108	115	118	109	109	99	78	61	66	92	81	80	72	62	58	58	58	59	60	61	62	63	64	65	66	67	68	69	70	1942
2	Boise Sewer	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	248
3	Boise Valley Waste	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	155
4	Ballantine Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Dry Creek Waste	60	60	60	58	57	53	68	59	72	71	70	69	68	62	60	63	61	62	60	59	58	57	56	55	54	53	52	51	50	49	48	1807
6	Thurman Mill Drain	16	16	16	16	16	17	16	15	15	15	15	15	15	14	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	423
7	Phyllis Steam	6	7	8	5	6	7	8	5	5	5	5	5	6	6	5	5	7	5	6	6	6	6	7	7	8	8	8	10	10	10	10	215
8	Five Mile Creek	22	24	26	20	28	33	30	24	22	22	20	18	16	19	19	15	13	10	20	23	26	26	26	24	22	22	24	25	26	26	26	2372
9	Middleton Mill Steam	32	30	29	27	27	28	26	24	23	23	28	27	24	22	20	22	23	23	27	28	29	27	27	104	110	107	103	100	97	94	91	2709
10	Mason Creek	5	5	6	6	6	7	7	10	10	13	10	9	10	13	6	18	17	18	19	20	20	22	22	8	8	7	8	7	10	1	1	356
11	Mason Drain	19	18	17	17	16	15	14	14	18	19	18	18	20	21	32	29	30	31	32	31	46	64	83	83	25	29	46	62	65	65	61	1227
12	Indian Creek	140	136	135	133	135	136	131	136	134	132	102	99	100	80	72	75	76	75	74	73	72	70	72	73	74	75	76	116	116	125	102	3333
13	Dixie Drain	7	7	8	9	8	9	9	7	7	10	10	11	10	11	11	12	11	12	13	14	14	15	16	16	16	16	17	17	17	17	16	384
	Total	457	456	457	448	430	417	432	408	463	377	361	337	334	328	301	290	301	335	373	373	403	429	473	392	368	368	411	472	484	472	450	14018

JUNE

No.	Name of Tributary	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total
1	Cottonwood Creek	23	19	18	20	20	20	20	20	20	22	24	24	22	22	26	30	28	26	28	30	36	36	36	50	42	42	42	42	60		796
2	Boise Sewer	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		240
3	Boise Valley Waste	21	21	17	13	9	9	16	12	5	8	12	13	17	22	16	16	16	11	5	7	8	8	7	6	6	5	4	4	4		297
4	Ballantine Waste	2	4	3	2	2	3	4	3	2	5	8	12	8	4	4	5	5	6	6	6	6	6	6	5	5	6	7	7	7		144
5	Dry Creek Waste	37	27	20	15	10	8	6	0	0	3	5	7	10	14	7	0	0	0	0	0	0	0	0	3	5	7	8	8	8		182
6	Thurman Mill Drain	10	10	12	10	12	14	15	17	19	21	23	25	23	21	17	2	3	5	7	8	8	9	7	10	11	12	13	12	15		402
7	Phyllis Steam	10	11	11	11	11	11	11	12	12	12	10	12	12	12	11	10	10	9	9	8	8	7	7	7	6	6	6	5	5		297
8	Five Mile Creek	118	36	35	34	33	34	34	27	30	27	30	35	34	38	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40		1557
9	Middleton Mill Steam	62	63	65	64	66	67	69	81	82	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104		3111
10	Mason Creek	6	7	10	9	9	13	13	10	18	12	20	23	20	22	12	13	13	16	25	18	23	12	11	10	7	10	18	20	16		394
11	Mason Drain	59	55	52	49	47	44	45	59	73	69	72	69	67	73	73	78	73	73	78	73	68	68	71	73	73	71	73	73	73		2341
12	Indian Creek	116	114	114	112	110	107	110	107	103	103	100	102	102	102	96	98	96	116	116	116	116	116	116	116	116	116	116	116	116		3208
13	Dixie Drain	17	17	16	17	18	16	15	13	18	19	19	19	20	20	20	20	20	21	21	21	21	21	21	21	21	21	21	21	21		542
	Total	492	416	417	378	349	345	346	329	393	367	378	384	376	396	442	425	412	421	443	449	462	461	447	453	436	435	447	449	473		13771

JULY

No.	Name of Tributary	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1	Cottonwood Creek	36	32	29	25	27	27	26	24	29	33	32	0	0	27	29	27	28	30	32	32	33	29	29	27	30	30	30	32	32	32	30	976
2	Boise Sewer	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	248
3	Boise Valley Waste	8	8	8	8	8	8	8	12	12	8	16	7	8	6	9	12	15	15	16	12	12	12	12	14	14	13	14	15	14	10	10	376
4	Ballantine Waste	2	8	8	8	8	7	7	12	16	14	7	5	5	0	0	6	10	10	10	10	8	7	8	8	12	10	10	8	7	7	7	272
5	Dry Creek Waste	6	5	0	24	28	25	17	0	0	0	16	0	0	23	16	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	158
6	Thurman Mill Drain	10	12	11	10	8	7	7	10	10	25	34	8	6	6	6	7	7	8	8	7	25	23	24	25	25	27	26	26	26	26	26	531
7	Phyllis Steam	6	6	6	6	6	6	6	6	6	6	6	6	6	6	7	6	6	7	6	7	8	8	6	7	7	6	6	6	6	6	6	195
8	Five Mile Creek	26	26	26	26	26	32	32	32	30	30	5	13	4	13	26	26	26	30	32	36	36	36	37	38	38	40	41	41	42	42	42	1126
9	Middleton Mill Steam	92	89	89	85	81	76	72	73	70	69	69	70	70	71	70	72	60	66	67	80	82	86	70	64	58	56	54	54	54	54	54	2753
10	Mason Creek	13	25	18	7	4	3	5	6	7	7	7	31	6	9	6	12	10	4	8	32	20	20	20	30	12	14	13	7	8	9		367
11	Mason Drain	73	77	73	69	86	87	82	82	75	67	83	83	77	66	73	73	68	62	73	77	79	73	73	72	75	77	78	80	79	79	79	2407
12	Indian Creek	116	116	116	116	116	114	116	98	90	92	86	90	88	92	88	88	88	90	94	94	96	96	96	96	96	96	96	96	96	96	96	3068
13	Dixie Drain	21	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	616
	Total	426	452	412	414	428	435	408	388	366	347	324	319	357	373	346	312	352	391	404	410	406	414	415	418	420	422	423	425	422	402	390	12,417

CHART 617.

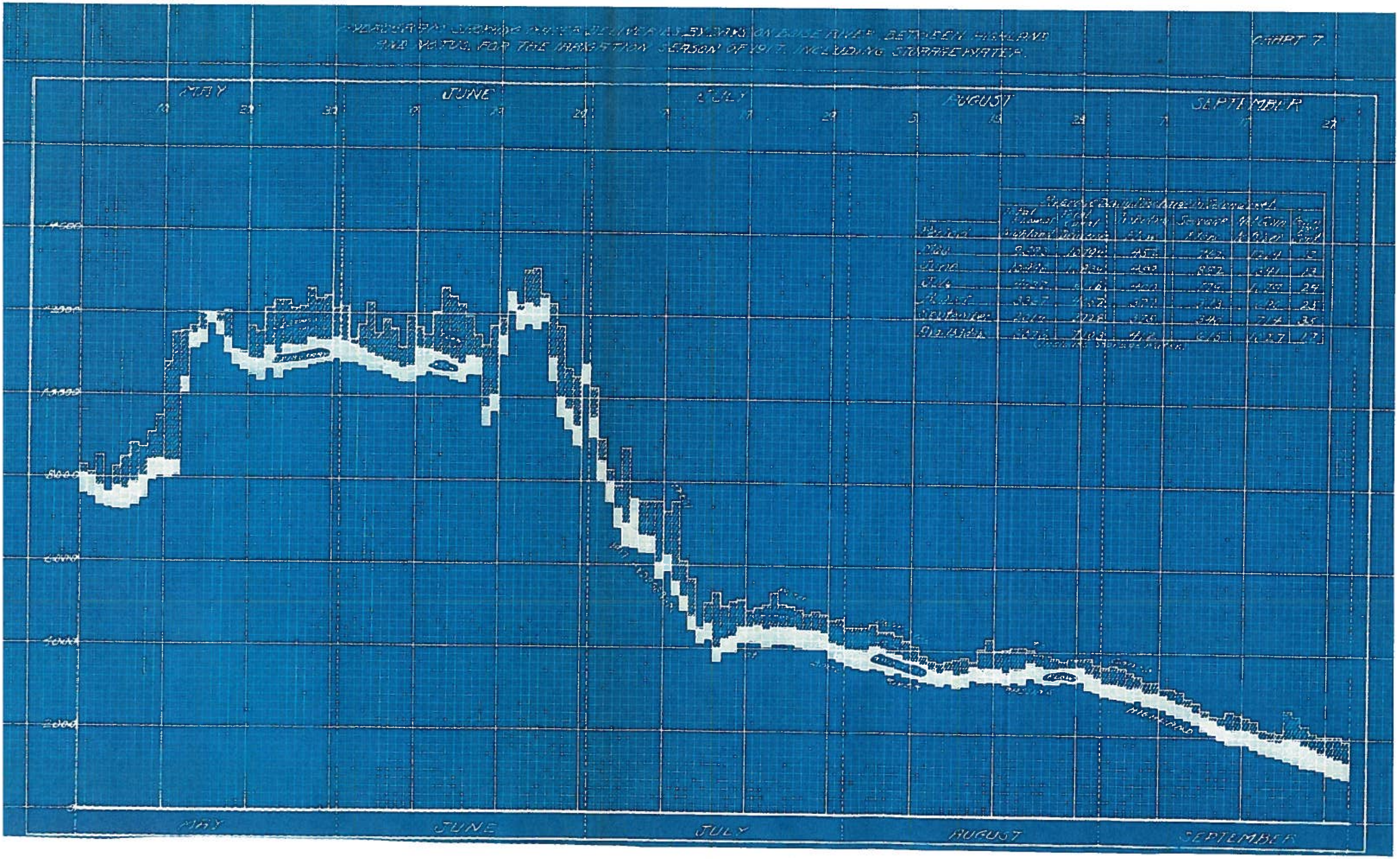
AUGUST

No.	Name of Tributary	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1	Cottonwood Creek	36	37	42	38	37	32	31	30	31	31	31	36	35	41	42	35	46	23	12	7	22	40	35	31	30	28	26	35	40	41	37	1023
2	Boise Sewer	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	248
3	Boise Valley Waste	11	14	10	9	6	3	11	7	3	2	2	0	0	2	2	3	3	2	2	2	2	3	2	1	1	2	2	0	0	0	0	112
4	Dalton Bar Waste	7	7	7	8	2	7	6	5	4	3	4	3	6	6	6	5	6	6	6	6	2	6	5	7	10	11	11	11	11	12	12	214
5	Dry Creek Waste	0	0	1	12	9	3	13	10	29	10	13	7	0	0	2	3	3	2	3	2	1	1	0	0	0	0	0	0	0	0	0	146
6	Thurman Mill Slough	18	18	14	14	16	7	7	6	5	2	4	7	14	8	2	7	7	6	6	6	6	6	6	15	14	14	13	12	9	9	9	293
7	Phyllis Slough	5	7	8	9	8	8	8	8	7	7	6	6	7	7	8	12	12	10	10	10	9	9	8	8	6	6	6	6	6	6	7	245
8	Five Mile Creek	76	60	69	61	76	72	86	87	86	89	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	72	64	60	62	30	72	72	2376
9	Middleton Mill Slough	60	61	30	28	135	111	38	49	72	33	26	30	36	68	26	33	30	42	32	17	26	26	42	35	37	36	38	37	32	34	30	1452
10	Mason Creek	16	22	23	13	22	21	20	17	18	25	20	14	8	8	8	8	6	9	16	16	8	5	8	12	13	11	10	10	11	9	7	436
11	Mason Drain	23	53	23	15	14	24	24	24	23	68	65	66	64	64	64	64	64	64	64	64	64	68	21	59	64	64	64	64	64	64	64	64	64	2108
12	Indian Creek	114	114	114	114	116	116	116	101	114	114	114	78	78	78	78	78	78	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	3450
13	Dixie Drain	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	527
	Total	903	455	446	511	527	509	419	357	405	347	327	332	331	325	320	333	341	325	332	282	326	387	353	395	340	341	335	383	350	409	339	11678

SEPTEMBER

No.	Name of Tributary	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
1	Cottonwood Creek	37	38	32	40	37	37	34	32	34	28	28	31	31	28	28	32	32	34	34	37	38	39	40	41	40	42	42	44	55	46		1163
2	Boise Sewer	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		240
3	Boise Valley Waste	2	2	2	2	5	6	10	10	9	9	10	6	10	15	12	12	12	11	11	10	9	8	7	6	6	5	5	6	6	6		233
4	Dalton Bar Waste	12	8	5	2	8	12	10	12	12	12	11	11	11	11	8	8	7	7	6	6	6	7	7	7	6	6	6	6	6	6		219
5	Dry Creek Waste	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	11	13	10	6	2	0	0		64
6	Thurman Mill Slough	7	6	7	6	6	5	5	5	6	6	5	7	7	6	6	6	7	8	6	4	2	2	2	5	8	6	6	7	7	15		202
7	Phyllis Slough	8	8	8	8	8	7	7	10	10	8	7	5	7	10	10	10	8	8	8	8	8	8	8	8	8	7	7	7	6	6		231
8	Five Mile Creek	28	30	31	30	26	22	26	28	33	30	30	1	3	30	30	30	26	18	16	22	28	23	36	21	16	16	18	26	30	34		574
9	Middleton Mill Slough	31	34	32	29	27	29	29	30	27	28	27	29	25	28	30	29	32	29	32	35	35	22	61	65	121	114	68	67	72	77		1392
10	Mason Creek	5	5	3	3	3	4	3	3	3	27	18	19	19	19	19	19	23	23	23	23	23	23	23	23	5	3	2	3	3	2	2	2		421
11	Mason Drain	64	58	64	27	28	20	20	20	35	58	57	56	65	60	64	68	68	68	67	68	68	67	67	27	123	103	103	103	83	85	82	85		2233
12	Indian Creek	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116		3480
13	Dixie Drain	17	17	17	17	17	17	17	17	17	17	17	17	17	20	20	20	20	20	20	20	20	20	21	21	21	21	21	21	21	21	21	21		585
	Total	333	307	329	318	319	346	340	330	326	320	328	296	346	350	361	372	377	362	374	374	353	331	409	383	409	373	393	414	414	435		11251

CHART 7.



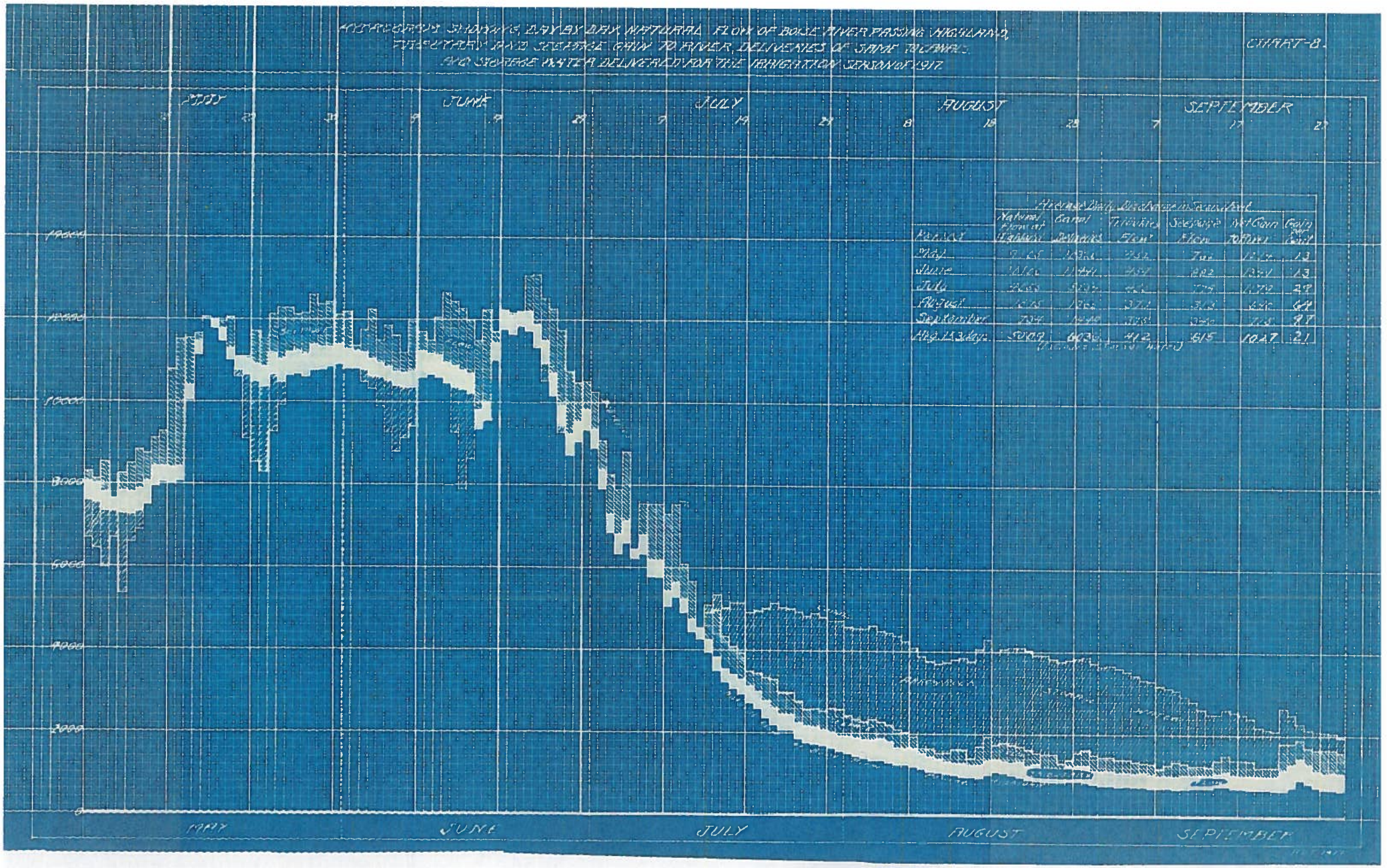

CHART-8.
MAY
JUNE
JULY
AUGUST
SEPTEMBER
JUNE
JULY
AUGUST
SEPTEMBER

TABLE SHOWING WATER AVAILABLE AND DELIVERIES TO ACRE OF, BY DAYS, FOR THE IRRIGATION SEASON OF 1917. STORAGE WATER EXCLUDED.

CHART 9.

MAY

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Ave.
Natural Flow Boise River Passing Highland																																292260	7105
Total Deliveries to Canals																																319213	10329
Total Tributary Flow																																156128	4952
Total Storage Flow	214	66	760	192	437	804	944	713	660	1046	2145	3072	1151	85	320	56	177	661	67	8	802	711	532	1527	1020	850	931	1120	1249	1078	685	23655	762
Total Gain Above Diversion Points	666	534	1151	306	967	1276	944	1124	1123	1433	2769	3907	1505	913	671	202	936	991	306	387	1207	1192	1420	1720	1503	1485	1491	1505	1569	1577	1188	376632	12149

JUNE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	Ave.
Natural Flow Boise River Passing Highland																															362665	12100
Total Deliveries to Canals																															342334	11411
Total Tributary Flow																															17709	590
Total Storage Flow	898	101	555	1190	545	1027	870	470	1162	2418	3048	5716	3381	1460	1301	325	1647	1213	244	801	79	1021	885	1247	1630	1570	1834	1502	955	651	22431	838
Total Gain Above Diversion Points	990	577	972	1698	894	1333	1216	777	1555	1881	3222	4118	2154	2205	1943	1748	2580	1134	670	457	536	1365	1312	1773	1683	2055	2331	1899	1757	1137	40212	1341

JULY

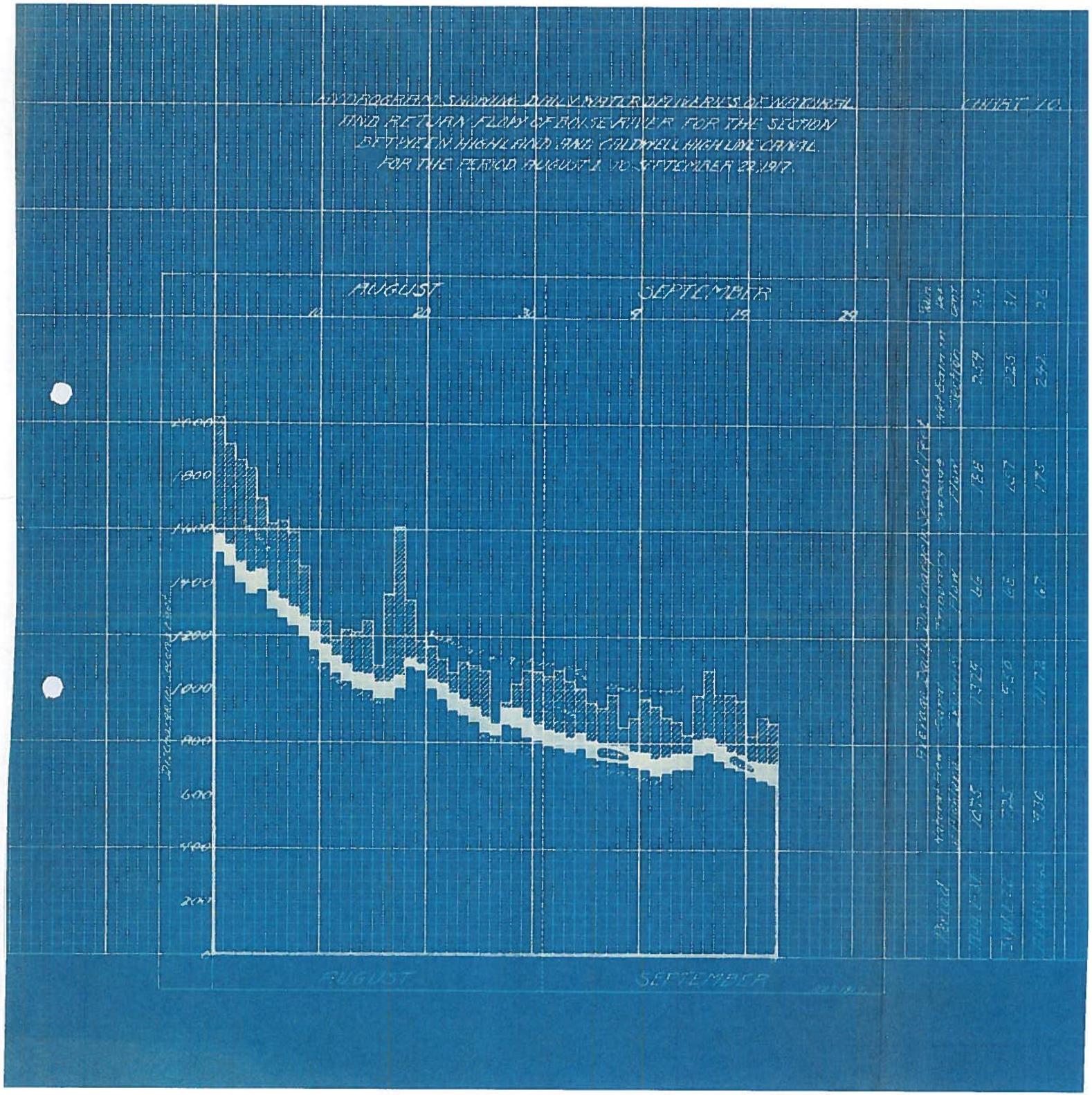
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Ave.
Natural Flow Boise River Passing Highland																																72520	2055
Total Deliveries to Canals																																162848	5234
Total Tributary Flow																																12410	400
Total Storage Flow	886	781	1089	1450	1639	1322	1283	1381	1370	1470	1476	1831	1900	1391	1610	1188	1768	1687	1677	1333	1305	1202	1390	1327	1327	1310	1305	1273	1329			22167	715
Total Gain Above Diversion Points	1341	1150	1404	1572	2185	1989	1245	1717	1793	2256	3243	4175	2612	2160	1883	1534	1895	1039	938	727	975	1077	1105	1284	1165	1203	1242	1212	1254	1067		36548	1179

AUGUST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Ave.
Natural Flow Boise River Passing Highland																																33316	1075
Total Deliveries to Canals																																54714	1765
Total Tributary Flow																																11678	377
Total Storage Flow	512	445	463	438	363	351	398	368	293	100	172	97	164	202	250	96	373	243	4	95	68	326	335	68	328	321	160	151	143	338	385	9491	312
Total Gain Above Diversion Points	915	900	911	949	899	866	816	765	698	457	504	427	570	429	714	251	676	446	444	215	488	674	668	602	483	693	767	724				21308	696

SEPTEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	Ave.
Natural Flow Boise River Passing Highland																															21021	734
Total Deliveries to Canals																															57184	1977
Total Tributary Flow																															11451	396
Total Storage Flow	393	398	353	252	267	235	311	194	256	357	271	240	200	135	290	164	312	314	291	148	237	215	68	64	144	140	111	54	54		10180	346
Net Gain Above Diversion Points	728	759	703	643	586	581	657	529	582	607	549	547	516	485	609	736	660	676	655	527	540	536	419	403	344	371	424	378	354	237	21450	715


HYDROGRAPH SHOWING DAILY WATER DIVERSIONS OF NORTHERN
AND RETURN FLOW OF BOX SEATTLE FOR THE SECTION
BETWEEN HIGHLAND AND LAKE COLDWELL HIGHLINE CANAL
FOR THE PERIOD AUGUST 1 TO SEPTEMBER 28, 1917.
CHART NO.
AUGUST
SEPTEMBER
10
20
30
9
19
29
1800
1600
1400
1200
1000
800
600
400
200
0
AUGUST
SEPTEMBER

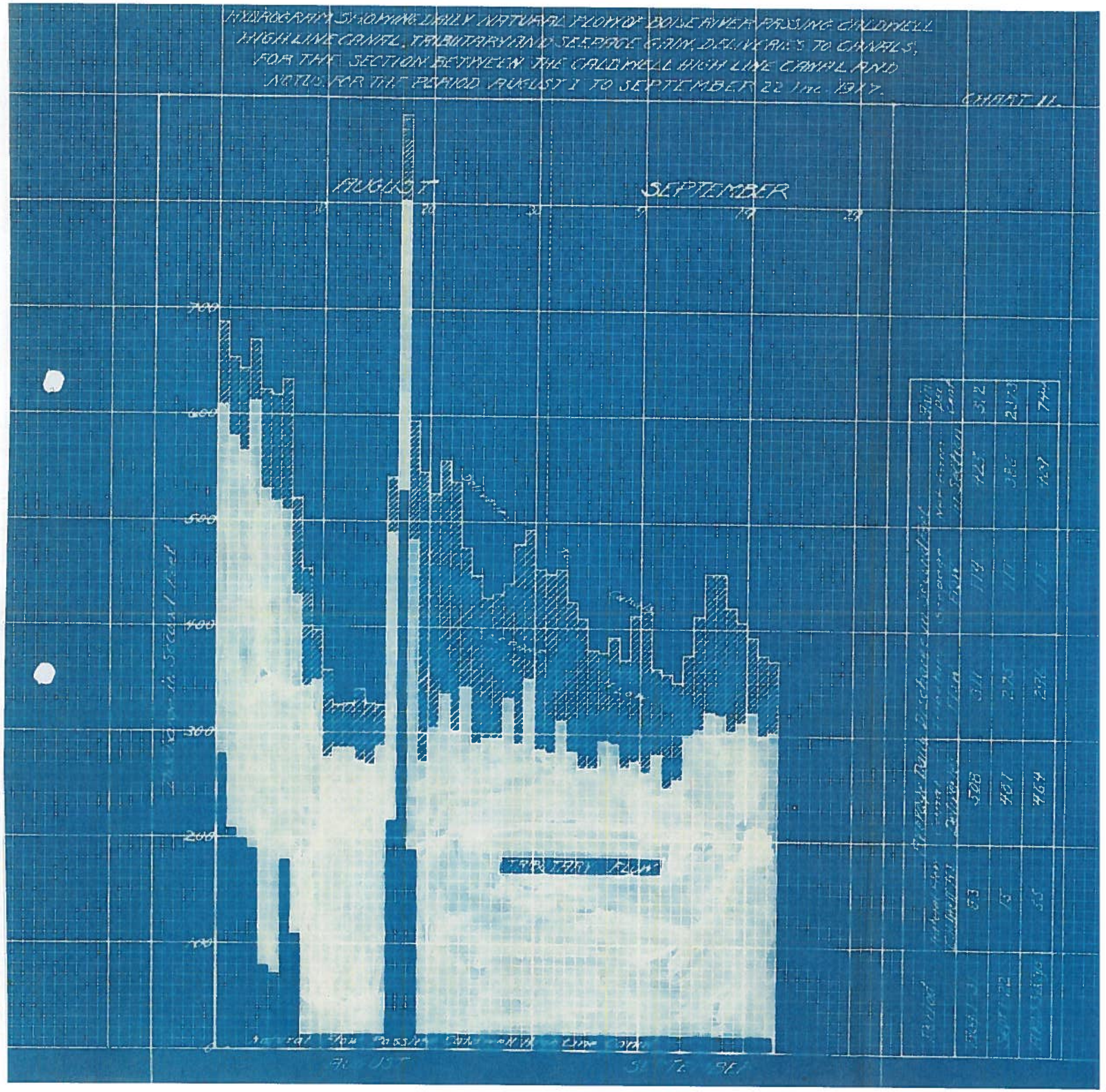

DIAGRAM SHOWING DAILY NATURAL FLOW OF BOULDER RIVER PASSING CALDWELL HIGH LINE CANAL, TRIBUTARY AND SEEPAGE GAIN, DELIVERIES TO CANALS, FOR THAT SECTION BETWEEN THE CALDWELL HIGH LINE CANAL AND MOUTH FOR THE PERIOD AUGUST 1 TO SEPTEMBER 22 INC. 1917.
CHART II.
AUGUST
SEPTEMBER
TRIBUTARY FLOW

EXHIBIT 12

TABLE SHOWING NATURAL FLOW OF BOISE RIVER PASSING HIGHLAND AND DELIVERIES TO CANALS BY DAYS, AUG 1 TO SEPT 22 inc 1917, FOR THE SECTION BETWEEN HIGHLAND AND THE CALDWELL HIGH LINE CANAL.

AUGUST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Mean
Natural Flow Boise River Passing Highland	1240	1160	1140	1040	1130	1200	1220	1180	1200	1230	1250	1080	1020	1040	1050	1030	1040	1020	1000	1000	1020	1040	1060	1060	1040	1020	1000	1000	1000	1000	1000	33336	1075
Deliveries to Canals	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	41211	1329
Tributary Flow	74	80	84	80	77	67	76	70	76	67	69	60	62	65	67	67	70	73	73	36	52	59	63	60	64	60	57	60	63	74	74	2048	66
Seepage Gain between Highland & Caldwell High Line	233	372	181	379	270	247	256	277	183	247	99	95	120	135	181	97	130	98	106	82	120	80	73	127	143	104	10	18	80	171	189	5042	163
Net Gain Highland to Caldwell High Line	307	452	265	459	347	314	332	347	259	314	168	155	182	200	248	164	200	171	179	118	172	139	136	187	207	164	67	78	143	245	263	7090	229

SEPTEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	Mean
Natural Flow Boise River Passing Highland	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	31240	1041
Deliveries to Canals	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	1040	31200	1040
Tributary Flow	64	62	63	62	66	68	67	70	69	69	67	66	65	71	67	64	67	70	73	79	85	73	74	81								1440	68
Seepage Gain between Highland & Caldwell High Line	204	231	204	160	134	125	168	167	145	204	168	140	110	99	150	233	175	177	165	79	168	150										3447	157
Net Gain Highland to Caldwell High Line	268	293	267	222	196	193	235	237	214	273	235	206	175	170	217	297	242	247	238	158	253	223										4887	225

Period	Tributary	Seepage	Total Gain
Aug 1-31	61	199	264
Sept 1-22	69	157	226
Mean 53 days	67	175	242

CHART 13

TABLE SHOWING THE AVAILABLE WATER PASSING THE CALDWELL HIGH LINE CANAL AND DELIVERIES TO CANALS, BY DAYS, AUG. 1 TO SEPT. 22, Inc. 1917, FOR THE SECTION BETWEEN THE CALDWELL HIGH LINE CANAL AND NOTUS.

AUGUST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Avg.
Natural Flow Boise River Passing Caldwell High Line	230	210	200	190	180	170	190	170	150	150	150	150	150	150	150	150	210	230	190	150	150	150	150	150	150	150	150	150	150	150	150	4961	160
Deliveries to Canals	488	494	544	611	614	616	634	723	758	826	809	826	767	774	801	726	654	785	845	846	841	849	837	735	748	743	733	723	734	734	734	23754	766
Tributary Gain	334	371	363	421	438	442	444	534	537	580	582	609	608	660	690	671	631	622	646	660	687	724	687	689	696	650	626	620	596	596	596	18066	583
Seepage Gain Not Gain Caldwell High Line to Notus	79	73	82	99	94	102	110	91	111	94	85	72	44	67	58	39	53	78	109	172	223	224	235	191	160	192	135	168	192	142	171	3547	114
	408	344	448	554	544	554	613	640	738	761	744	727	719	733	749	766	732	729	755	778	910	949	922	880	908	892	761	788	788	738	740	23301	752
	329	271	366	443	450	452	503	549	627	667	659	655	675	666	691	727	679	707	646	606	687	725	687	689	696	650	626	620	596	596	596	19754	637

SEPTEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	Avg.
Natural Flow Boise River Passing Caldwell High Line	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15				330	15
Deliveries to Canals	456	456	432	416	380	378	414	424	414	414	403	407	350	305	412	452	442	446	443	446	443	335	329								8816	401
Tributary Gain	164	240	205	259	254	278	273	251	252	247	264	239	245	253	245	305	302	289	423	369	284	296									6041	275
Seepage Gain Not Gain Caldwell High Line to Notus	168	142	124	140	111	85	103	100	141	153	83	108	90	77	108	131	135	117	96	89	79	69									2745	111
	437	399	401	385	365	363	376	357	398	400	397	342	335	360	387	437	430	406	391	378	360	355									8686	386

AUG 1917

Period	Tributary	Seepage	Total Gain
Aug 1-31	311	114	425
Sept 1-22	276	111	386
Aug 53 days	296	113	409

CHART 1A.

TABLE SHOWING RETURN FLOW ACTUALLY FLOWING INTO BOISE RIVER, AVAILABLE FOR CANAL REQUIREMENTS, BASED ON 10% DEBIT IN SECTION 2 OF BOISE RIVER, FOR THE PERIOD AUGUST 10 TO SEPTEMBER 22 inc. 1917.

AUGUST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Avg.
Available Water Return + Seepage Flow	381	344	311	312	327	312	311	374	455	462	522	510	495	496	534	444	414	396	374	344	340	340	340	340	340	340	340	340	340	340	340	12021	410
Canal Requirements 60% 1917 Decree	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	7128	324
Excess +																																	
Deficit −	+ 57	+ 20	+ 13	+ 12	+ 3	+ 12	+ 13	+ 0	− 31	− 80	− 202	− 186	− 219	− 198	− 190	− 120	− 90	− 72	− 50	− 20	− 16	− 16	− 16	− 16	− 16	− 16	− 16	− 16	− 16	− 16	− 16	+ 1693	+ 86
Canal Requirements 100% 1917 Decree	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	11880	540
Excess +																																	
Deficit −	− 159	− 196	− 229	− 228	− 213	− 228	− 229	− 216	− 185	− 130	− 18	− 30	+ 3	− 18	− 50	− 96	− 126	− 144	− 166	− 196	− 200	− 200	− 200	− 200	− 200	− 200	− 200	− 200	− 200	− 200	− 200	− 2868	− 130

SEPTEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	Avg.
Available Water Return + Seepage Flow	433	441	404	385	403	380	370	367	398	440	347	342	336	360	397	412	437	396	347	378	360	358									8758	386
Canal Requirements 60% 1917 Decree	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324									7128	324
Excess +																																
Deficit −	+ 113	+ 117	+ 80	+ 61	+ 79	+ 56	+ 46	+ 43	+ 74	+ 116	+ 23	+ 18	+ 12	+ 36	+ 73	+ 88	+ 113	+ 72	+ 23	+ 54	+ 36	+ 34									+ 1630	+ 66
Canal Requirements 100% 1917 Decree	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540									11880	540
Excess +																																
Deficit −	− 103	− 99	− 136	− 155	− 137	− 160	− 170	− 173	− 142	− 100	− 193	− 198	− 204	− 180	− 143	− 128	− 103	− 144	− 193	− 162	− 180	− 182									− 3394	− 154

Period	Average Daily Flow in Second Feet				
	Available Return Flow	60% Canal Requirements	Excess	100% Canal Requirements	Deficit
Aug'st 31	410	324	86	540	130
Sept'r 22	386	324	62	540	154
Average	398	324	74	540	142

TABLE SHOWING RETURN FLOW ACTUALLY FLOWING INTO BOISE RIVER, RETURN FLOW DIVERTED BY PIONEER IRRIGATION DISTRICT AND CANAL REQUIREMENTS IN SECTION 2 OF BOISE RIVER, FOR THE PERIOD AUG. 10 TO SEPT. 22 Inc. 1917.

CHART 15.

AUGUST

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total	Avg.
Available Water at River Return & Seepage Flow														381	344	311	312	327	318	311	314	355	344	532	510	543	522	460	434	417	426	461	428	340	9021	291
5 Mile Diverted by Phyllis Canal														0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 Mile Diverted & Returned by Caldwell High Line														43	46	54	52	54	54	55	21	8	39	52	52	30	52	52	52	52	52	44	44	58	1058	34
Wilson Slough Diverted by Caldwell High Line														32	32	30	31	31	30	30	30	30	24	28	28	0	25	26	23	21	21	27	26	26	26	607	20
Total Available Return Flow to Section 2														455	422	376	397	414	396	396	376	396	393	472	613	591	543	602	540	517	503	539	496	507	530	548	524	10686	346
Canal Requirements 60% 1917 Decree														324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	7128	324
Excess +														+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Deficit −														132	98	52	73	90	72	72	52	72	69	148	289	267	219	278	216	193	179	185	172	183	206	224	200	3558	162
Canal Requirements 100% 1917 Decree														540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	11880	540
Excess +														−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Deficit −														84	118	164	143	126	144	144	164	144	147	68	29	51	53	62	0	26	37	45	33	10	8	16	40	1194	54

SEPTEMBER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	Avg.
Available Water at River Return & Seepage Flow	417	441	409	375	360	363	376	367	398	400	367	342	335	360	367	321	337	346	391	328	360	365									8486	386
5 Mile Diverted by Phyllis Canal	0	0	0	0	0	0	0	0	0	0	18	27	27	25	18	0	0	18	24	24	24	24	30								274	11
5 Mile Diverted & Returned by Caldwell High Line	39	45	42	36	27	40	40	44	44	60	30	30	30	30	30	30	30	30	30	30	30	30	30								846	39
Wilson Slough Diverted by Caldwell High Line	23	26	26	26	26	24	24	26	26	26	26	26	26	26	25	25	25	25	25	25	24	23	22								554	25
Total Available Return Flow to Section 2	519	512	477	476	418	425	442	413	484	501	430	425	416	430	452	492	307	485	472	452	433	437									10137	461
Canal Requirements 60% 1917 Decree	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324	324								7128	324
Excess +	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								+	+
Deficit −	195	188	153	152	94	101	118	89	160	177	106	101	92	106	128	168	183	161	148	128	109	113									3009	137
Canal Requirements 100% 1917 Decree	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540	540								11880	540
Excess +	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−								−	−
Deficit −	21	28	63	64	122	111	98	127	56	39	110	115	124	110	88	48	33	55	68	88	107	103									1743	79

AUT 1917

Average Daily Flow in Second Feet

Period	Total Available Return Flow	60% Canal Requirements	Excess	100% Canal Requirements	Deficit
Aug 10-31	486	324	162	540	54
Sept 1-22	461	324	137	540	79
Average	474	324	150	540	66

CHART 16.

TABLE SHOWING TIME AT WHICH DECREED RIGHTS ARE SUBJECT TO CUTS BELOW 60% OF FULL RIGHT FOR 23 YEAR PERIOD 1895-1917 inc.

ALSO GIVES NUMBER OF DAYS EACH DAY FROM JANUARY 1ST TO SEPTEMBER 30TH OF EACH YEAR.

Year	Pioneer Irrig. Dist. Right No. 135 60% = 33.00	New York Stock Water Rights Total Rights 60% = 166	Farmers Union Right No. 126 60% = 66	Settlers Irrig. Dist. Right No. 122 60% = 44.06	Pioneer Irrig. Dist. Right No. 117 60% = 12.0	Riverdale Irrig. Dist. Right No. 106 60% = 222.50
	Second Feet	Second Feet	Second Feet	Second Feet	Second Feet	Second Feet
1895	May 4 5 days	Aug. 10 39 days	Sept. 1 3 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1896	May 12 11 days	Aug. 20 3 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1897	May 14 30 days	Aug. 17 30 days	May 21 12 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1898	July 2 65 days	July 26 66 days	Aug. 19 31 days	Aug. 14 11 days	May 25 77 days	Aug. 23 7 days
1899	Sept. 22 7 days	Sept. 26 3 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1900	July 27 62 days	July 29 63 days	Aug. 10 41 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1901	July 31 62 days	Aug. 3 37 days	Aug. 1 31 days	Aug. 23 21 days	Sept. 30 0 days	Sept. 30 0 days
1902	July 31 62 days	Aug. 2 60 days	Aug. 8 32 days	Aug. 20 31 days	Aug. 23 39 days	Sept. 30 0 days
1903	Aug. 1 56 days	Aug. 6 36 days	Aug. 8 41 days	Aug. 13 35 days	Aug. 16 29 days	Sept. 30 0 days
1904	Aug. 24 7 days	Aug. 24 7 days	Aug. 31 1 day	Aug. 26 7 days	Aug. 28 16 days	Sept. 2 9 days
1905	July 17 76 days	July 18 75 days	July 24 67 days	July 29 62 days	Aug. 2 60 days	Aug. 9 53 days
1906	Aug. 3 59 days	Aug. 3 57 days	Aug. 8 53 days	Aug. 11 45 days	Aug. 16 36 days	Sept. 21 10 days
1907	Sept. 9 22 days	Sept. 24 16 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1908	Aug. 10 51 days	Aug. 10 48 days	Aug. 27 15 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1909	Aug. 12 43 days	Aug. 13 41 days	Aug. 21 22 days	Aug. 23 8 days	Aug. 27 3 days	Sept. 30 0 days
1910	July 31 5 days	Aug. 2 3 days	Aug. 19 21 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1911	Aug. 21 41 days	Aug. 23 39 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1912	Aug. 23 22 days	Aug. 23 22 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1913	Aug. 22 39 days	Aug. 22 39 days	Sept. 15 11 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1914	Aug. 8 57 days	Aug. 9 56 days	Aug. 14 38 days	Aug. 22 30 days	Sept. 1 12 days	Sept. 30 0 days
1915	July 21 72 days	July 21 72 days	July 26 65 days	Aug. 14 38 days	Aug. 3 55 days	Aug. 13 30 days
1916	Aug. 24 38 days	Aug. 29 32 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days	Sept. 30 0 days
1917	Aug. 11 51 days	Aug. 11 45 days	Aug. 26 34 days	Sept. 6 17 days	Sept. 30 0 days	Sept. 30 0 days

SUMMARY TABLE

Pioneer Irrigation District Right No. 135	7 yrs. avg. 66 days	July
	14 " " 43 "	Aug.
	2 " " 13 "	Sept.
	23 " " 48 "	
New York Stock Rights 60% of 277 = 166 Sec. Ft.	4 yrs. avg. 67 days	July
	17 " " 43 "	Aug.
	2 " " 10 "	Sept.
	23 " " 48 "	
Farmers Union Right No. 126, 60% = 66 Sec. Ft.	2 yrs. avg. 67 days	July
	13 " " 37 "	Aug.
	8 " " 2 "	Sept.
	23 " " 27 "	
Settlers Irrig. Dist. Right No. 122. 60% = 44.06 Sec. Ft.	1 yr. avg. 64 days	July
	9 " " 33 "	Aug.
	13 " " 1 "	Sept.
	23 " " 17 "	
Pioneer Irrig. Dist. Right No. 117. 60% = 12.0 Sec. Ft.	5 yrs. avg. 36 days	Aug.
	13 " " 6 "	Sept.
Nampa-Meridian Irrig. Dist. Right No. 106	3 yrs. avg. 39 days	Aug.
	20 " " 0 "	Sept.

447.197

CHART 17.

REVISED
AREA AND CAPACITY TABLE FOR ARROWROCK RESERVOIR.
(Capacities derived from the Areas of Inflow and Outflow)

Compiled by [illegible]
[illegible]

Elev.	Storage in Acre Feet	Diff.	Elev.	Storage in Acre Feet	Diff.	Elev.	Storage in Acre Feet	Diff.	Elev.	Storage in Acre Feet	Diff.	Elev.	Storage in Acre Feet	Diff.	Elev.	Storage in Acre Feet	Diff.	Elev.	Storage in Acre Feet	Diff.
2956	0		3001	2900	155	3046	13220	390	3091	44300	1000	3136	163700	1700	3181	176900	2400			
57	2	2	2	3060	160	47	15620	400	92	45300	1000	37	167400	1700	82	179300	2400			
58	6	4	3	3230	170	48	16030	410	93	46300	1000	38	169100	1700	83	201700	2400			
59	11	5	4	3405	175	49	16450	420	94	47300	1000	39	170800	1700	84	204100	2400			
2960	19	8	3005	3585	180	3050	16880	430	3095	48300	1000	3140	172500	1700	3185	206500	2400			
61	29	10	6	3770	185	51	17320	440	96	49600	1100	41	174300	1800	86	209000	2500			
62	41	12	7	3960	190	52	17770	450	97	50700	1100	42	176100	1800	87	211500	2500			
63	55	14	8	4150	190	53	18230	460	98	51800	1100	43	177900	1800	88	214000	2500			
64	71	16	9	4345	195	54	18700	470	99	52900	1100	44	179700	1800	89	216500	2500			
2965	89	18	3010	4545	200	3055	19180	480	3100	54000	1100	3145	181500	1800	3190	219000	2500			
66	109	20	11	4750	205	56	19670	490	1	55200	1200	46	183400	1900	91	221600	2600			
67	131	22	12	4960	210	57	20170	500	2	56400	1200	47	185300	1900	92	224200	2600			
68	155	24	13	5180	220	58	20680	510	3	57600	1200	48	187200	1900	93	227000	2800			
69	181	26	14	5400	220	59	21200	520	4	58800	1200	49	189100	1900	94	230400	3400			
2970	209	28	3015	5620	220	3060	21730	530	3105	60000	1200	3150	191000	1900	3195	232000	1600			
71	237	30	16	5850	230	61	22270	540	6	61300	1300	51	193000	2000	96	234600	2600			
72	272	33	17	6080	230	62	22820	550	7	62600	1300	52	195000	2000	97	237200	2600			
73	308	36	18	6320	240	63	23380	560	8	63900	1300	53	197000	2000	98	239800	2600			
74	347	39	19	6570	250	64	23950	570	9	65200	1300	54	199000	2000	99	242400	2600			
2975	390	43	3020	6820	250	3065	24530	580	3110	66500	1300	3155	201000	2000	3200	245000	2600			
76	434	45	21	7090	260	66	25130	600	11	67800	1300	56	203000	2000	1	247600	2600			
77	482	48	22	7340	260	67	25750	620	12	69100	1300	57	205000	2000	2	250600	3000			
78	533	51	23	7610	270	68	26380	630	13	70400	1300	58	207000	2000	3	253600	3000			
79	587	54	24	7880	270	69	27030	650	14	71700	1300	59	209000	2000	4	256200	2600			
2980	645	58	3025	8150	280	3070	27690	660	3115	73000	1300	3160	211000	2000	3205	258800	2600			
81	705	60	26	8430	280	71	28360	670	16	74400	1400	61	213100	2100	6	261500	2700			
82	770	65	27	8720	290	72	29050	690	17	75800	1400	62	215200	2100	7	264200	2700			
83	838	70	28	9030	300	73	29750	700	18	77200	1400	63	217300	2100	8	267000	2800			
84	915	75	29	9360	310	74	30460	710	19	78600	1400	64	219400	2100	9	270600	2900			
2985	995	80	3030	9670	310	3075	31180	720	3120	80000	1400	3165	221500	2100	3210	273500	2900			
86	1075	80	31	9980	310	76	31910	730	21	81400	1400	66	223700	2200	11	276500	3000			
87	1160	85	32	10300	320	77	32650	740	22	82800	1400	67	225900	2200						
88	1250	90	33	10620	320	78	33400	750	23	84200	1400	68	228100	2200						
89	1345	95	34	10950	330	79	34150	750	24	85600	1400	69	230300	2200						
2990	1445	100	3035	11280	330	3080	34920	770	3125	87000	1400	3170	232500	2200						
91	1550	105	36	11620	340	81	35700	780	26	88400	1400	71	234800	2300	2967	Canal & Lateral Sites.				
92	1660	110	37	11970	350	82	36490	790	27	89800	1400	72	237100	2300						
93	1780	120	38	12330	360	83	37290	800	28	91200	1400	73	239400	2300	3015	C.L. of Lower Valley.				
94	1905	125	39	12690	360	84	38100	810	29	92600	1400	74	241700	2300	3165	C.L. of Upper Valley.				
2995	2035	130	3040	13060	370	3085	38920	820	3130	94000	1400	3175	244000	2300	3203	Crest of Spillway Weir.				
96	2170	135	41	13430	370	86	39750	830	31	95400	1400	76	246300	2300	3277	Upper Horizontal Crest.				
97	2310	140	42	13800	370	87	40590	840	32	96800	1400	77	248600	2300						
98	2455	145	43	14180	380	88	41440	850	33	98200	1400	78	250900	2300						
99	2605	150	44	14560	380	89	42300	860	34	99600	1400	79	253200	2300						
3000	2760	155	3045	14950	390	3090	43170	870	3135	101000	1400	3180	255500	2300						

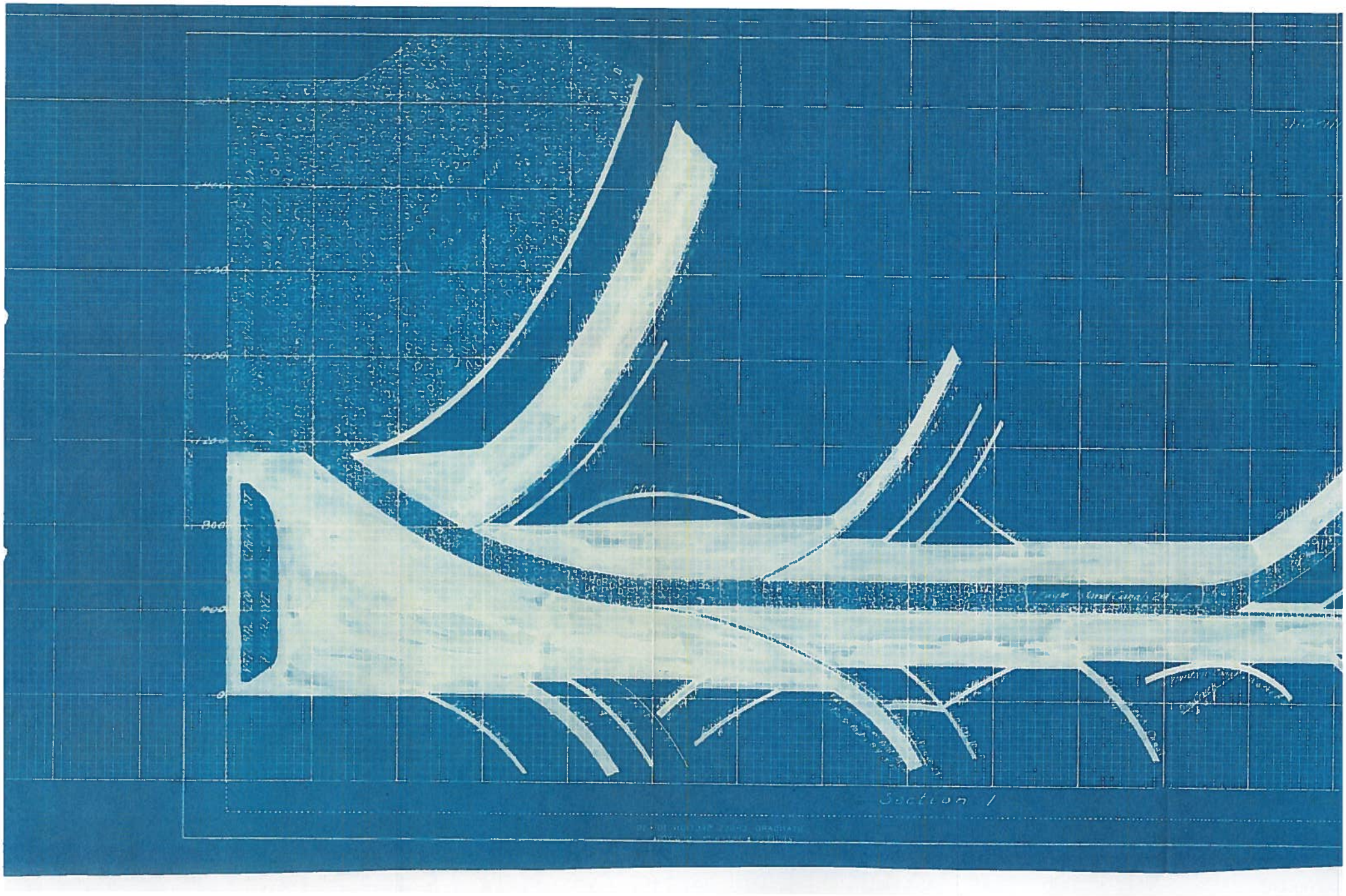

Section 1

CHART 18.

DIAGRAM

SHOWING AVERAGE CONDITIONS ON

BOISE RIVER

FOR A PERIOD OF 33 DAYS

OCT. 1 TO SEPT. 22 INCLUSIVE

1917

Section	Acre Feet Delivered to Canals	Acre Feet Return Flow	Acre Feet Seepage Gain	Acre Feet Tributary Gain	Acre Feet Net Gain	Acre Feet Diversion	Acre Feet Return to River
Section 1	1128	780	172		780	1083	697
Section 2	320	351	44	245	640	331	351
Total	1464	1131	216	245	1420	1414	1048

Section 1 - Diversion to Return Flow.

Section 2 - Return Flow to Mouth of Boise River.

Section 2

TABLE, INDICATING DEPTH, SHOWING QUANTITIES DIVERTED BY 15 CANALS FROM BOISE RIVER, FOR EACH MONTH OF IRRIGATION SEASON OF 1917.

CHART 19.

Canal	April	May	June	July	August	September	Total	Area Irrig.	Ac. Ft. per Ac. 1917	Ac. Ft. per Ac. 1916
Ridenbaugh	00	11238	22916	24056	21389	17482	97160	25000	3.88	4.17
Settlers	00	2960	8208	9826	7534	4530	32478	12300	2.64	3.31
Farmers Union	00	1352	7312	8816	6764	3792	28036	8900	3.19	3.62
Rose Valley	00	332	1786	2042	1170	1108	6438	2715	2.37	4.24
Dry Creek	00	550	2978	2966	2198	1722	10466	2720	3.85	4.66
Ballentyne Middleton	00	34	328	594	248	138	1782	578	3.63	3.47
Middleton Middleton	00	1830	4716	4230	3616	1550	15942	4782	2.78	3.23
Mill Ditch	00	1402	4540	5960	3444	2320	15666	3245	4.83	4.65
Phyllis	3792	17354	26012	27504	23029	17438	117276	23000	5.12	4.95
Pioneer	00	402	1436	1650	1234	594	5466	1286	4.25	5.15
Gangrene	00	1572	4104	4160	2754	1838	14428	3790	3.74	4.76
Barnes Cage	00	8248	19774	20654	14228	5714	68638	15460	4.49	4.58
Conyers	00	545	1374	1156	796	618	4502	1352	3.33	3.34
Seiberling	00	204	884	676	612	494	2750	767	3.59	4.68
Pioneer Dec.	00	518	1174	1092	838	704	4326	3042	1.42	1.76
Cascade 2	00	138	1934	2230	1810	1264	9126	2570	3.55	4.15
Upper C Pont	00	172	960	1254	824	548	3756	1636	2.29	3.73
Lower C Pont	00	68	464	446	388	222	1586	1209	1.15	1.41
Total	3792	50150	112326	113366	90235	62679	434548	113389	3.84	4.33

Month	Flow Rec Diverted		Mean Monthly Gage Ht.		Mean Monthly Velocity		Run Off in Inches on Area	
	1916	1917	1916	1917	1916	1917	1916	1917
April	3792	3792	.34	.03	.28	.02	7.1	0.9
May	91879	50150	.81	.44	.65	.36	18.7	11.5
June	77162	112326	.83	.99	.69	.82	17.2	25.8
July	70065	113366	.77	1.02	.76	.84	21.3	26.1
August	56570	90235	.74	.80	.61	.65	17.6	20.8
September	33978	62679	.65	.55	.54	.46	15.1	14.3
Total	434448	434548	.633	.384	.59	.52	100.0	100.0

TABLE SHOWING MAXIMUM HEADGATE DUT
FOR 18 CANALS DIVERTING WATER
DURING THE IRRIGATIO

Canal	APRIL 1-15 1915 Sec Ft	Inches	1916 Sec Ft	Inches	1917 Sec Ft	Inches	APRIL 16-30 1915 Sec Ft	Inches	1916 Sec Ft	Inches	1917 Sec Ft	Inches	MAY 1915 Sec Ft	Inches	1916 Sec Ft	Inches	1917 Sec Ft	Inches	JUNE 1915 Sec Ft	Inches	1916 Sec Ft	Inches	1 Sec Ft	Inches
Highland	245	0.98	134	0.27	0	.0	280	0.82	371	0.74	0	.0	305	0.61	304	0.73	349	0.69	402	0.80	450	0.86	391	
Sellers	90	0.36	168	0.41	0	.0	145	0.52	124	0.30	0	.0	136	0.55	157	0.62	108	0.24	162	0.66	169	0.68	161	
Kennedine	62	0.25	91	0.22	0	.0	124	0.22	172	0.41	0	.0	110	0.68	138	0.78	91	0.21	202	0.40	174	0.43	176	
Box Valley	27	0.40	27	0.29	0	.0	54	1.08	54	1.06	0	.0	54	1.08	54	1.08	54	1.08	54	1.08	54	1.08	54	
Big Creek	29	0.53	14	0.26	0	.0	55	1.01	42	0.87	0	.0	47	0.80	53	0.98	28	0.51	60	1.10	44	0.82	44	
Ballentine Middleton	0	.0	0	.0	0	.0	10	0.87	14	1.21	0	.0	2	0.35	6	0.70	2	0.35	12	1.04	12	1.04	2	
Sutter Co.	96	0.89	70	0.68	0	.0	122	2.22	92	2.22	0	.0	82	1.76	96	2.09	62	1.34	106	2.02	84	2.26	62	
Middleton Parrott	14	0.21	4	0.06	0	.0	82	1.46	78	1.40	0	.0	76	1.12	80	1.23	48	0.74	82	1.26	72	1.09	64	
Phyllis	221	0.61	177	0.72	0	.0	334	0.74	315	0.72	150	0.34	389	1.69	395	0.90	221	0.96	401	0.81	413	1.14	401	
Pioneer	7	0.35	10	0.39	0	.0	40	1.65	28	1.09	0	.0	34	1.32	34	1.32	24	0.93	36	1.44	40	1.54	36	
Canyon Co.	0	.0	0	.0	0	.0	145	1.39	67	0.88	0	.0	68	0.84	85	1.12	61	0.80	70	0.92	90	1.19	51	
Sunset Gap	230	1.74	61	0.20	0	.0	300	0.97	274	0.98	0	.0	304	0.98	312	1.01	306	0.99	313	1.01	311	1.02	321	
Canyon	21	0.28	0	.0	0	.0	19	0.82	26	0.94	0	.0	17	0.82	32	1.53	22	0.90	29	1.01	24	0.97	30	
Sebastiani	17	1.11	0	.0	0	.0	16	1.04	6	.0	0	.0	16	1.04	14	0.92	11	0.72	12	1.29	12	1.03	16	
Pierce Line	0	.0	1	0.02	0	.0	32	0.52	26	0.37	0	.0	33	0.54	32	0.52	16	0.26	30	0.49	31	0.50	22	
Eureka No. 2	27	0.33	12	0.27	0	.0	33	0.64	38	0.74	0	.0	57	1.11	44	0.86	41	1.19	56	1.63	52	1.45	41	
Green River	16	0.96	7	.0	0	.0	18	1.02	17	1.16	0	.0	13	1.02	10	1.16	5	0.76	16	1.32	12	1.34	11	
Lincoln No. 1	0	.0	0	.0	0	.0	16	0.38	8	.0	0	.0	16	0.38	16	0.38	7	0.17	17	0.85	12	0.61	12	
Total		7.66		3.11		.0		16.17		13.89		0.34		19.64		16.59		11.96		17.57		17.21		
Average		0.42		0.17		.0		0.90		0.77		0.02		0.81		0.92		0.66		0.97		0.95		

Summary of Average Flow in Miners Inches per Acre

Year	April 1-15	April 16-30	May	June	July	Aug
1915	0.42	0.90	0.81	0.97	0.83	0.
1916	0.17	0.77	0.92	0.95	0.97	0.
1917	0.00	0.02	0.66	0.95	1.01	0.
Average	0.20	0.57	0.80	0.96	0.94	0.

TABLE SHOWING MAXIMUM HEADGATE DUTY OF WATER, IN MINER INCHES CONTINUOUS FLOW, BY MONTHS, FOR 19 CANALS DIVERTING WATER FROM BOISE RIVER, BASED ON MAXIMUM DIVERSIONS DURING THE IRRIGATION SEASONS OF THE YEARS 1915, 1916, 1917.

CHART 20

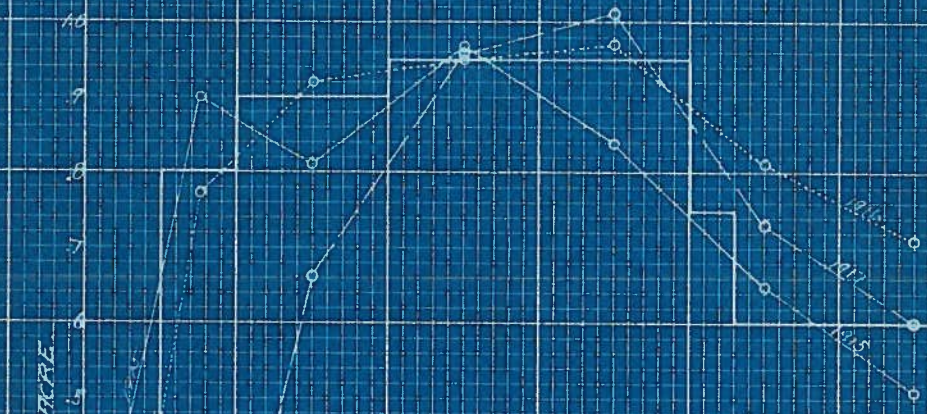
	MAY				JUNE			JULY			AUGUST			SEPTEMBER			
	1915	1916	1917	1915	1916	1917	1915	1916	1917	1915	1916	1917	1915	1916	1917	Acres Irrigated
	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	Sec ft / Inches	
	365 .061	341 .073	349 .069	342 .080	380 .086	291 .080	377 .080	398 .076	345 .061	323 .066	384 .077	395 .079	329 .060	323 .062	341 .069	25000
	136 .085	132 .064	108 .044	162 .060	143 .048	161 .065	161 .063	153 .062	152 .068	114 .046	135 .055	164 .067	83 .038	102 .046	114 .046	12300
	140 .068	145 .078	92 .032	206 .104	146 .073	112 .052	113 .051	136 .077	128 .073	84 .053	105 .061	141 .080	98 .051	81 .040	97 .042	8000
	54 1.00	54 1.00	54 1.00	54 1.00	54 1.00	54 1.00	54 1.00	54 1.00	54 1.00	37 .69	32 .592	32 .591	32 .592	32 .592	32 .592	2720
	47 .880	52 .928	28 .451	60 1.10	54 .899	41 .727	58 1.07	58 1.07	41 .722	47 .880	46 .844	21 .380	21 .350	32 .577	32 .583	2220
	11 .835	8 .620	2 .335	12 1.04	12 1.02	7 .660	16 1.87	8 .870	16 1.38	12 1.01	8 .670	12 1.02	8 .651	12 1.02	12 1.02	575
	82 .676	96 .889	52 .432	126 1.03	53 .873	52 .858	102 1.67	103 1.37	128 2.35	72 1.19	70 2.01	92 2.64	69 2.51	96 3.72	72 2.78	3704
	76 .717	80 1.23	48 .731	82 1.26	71 1.09	101 1.60	66 1.05	70 1.08	75 1.15	38 .651	60 1.22	67 1.34	34 .652	43 .846	46 .874	3245
	399 1.09	395 1.90	221 .896	401 1.91	415 3.44	201 1.60	333 2.75	439 3.97	470 4.07	184 2.44	340 4.83	416 8.21	162 3.35	136 2.76	152 3.72	22001
	34 1.32	34 1.32	24 .903	36 1.40	30 1.54	30 1.20	24 .993	30 1.23	31 1.26	23 1.05	26 1.01	30 1.01	17 .660	26 1.01	16 .622	1286
	65 .892	65 1.16	41 .830	70 1.22	90 1.19	61 1.07	58 1.09	70 1.03	87 1.45	55 1.10	64 1.44	58 1.76	33 .652	50 1.70	42 1.55	3296
	309 .998	312 1.01	236 .899	343 1.01	311 1.00	351 1.17	252 1.03	320 1.10	357 1.45	120 .850	292 1.91	306 2.95	182 2.59	122 2.23	154 3.37	15500
	17 .862	12 1.82	25 .890	28 1.01	24 .887	30 1.37	17 .862	22 1.01	30 1.89	24 1.30	29 1.03	22 1.01	19 .851	19 .864	27 1.09	1385
	16 1.01	12 1.20	11 1.22	12 1.29	16 1.84	16 1.65	13 1.05	23 1.90	19 1.84	13 1.05	25 1.03	26 1.30	16 1.05	15 1.12	16 1.28	767
	32 1.32	32 1.32	16 1.26	36 1.94	31 1.30	32 1.38	32 1.44	41 1.81	33 1.51	25 1.05	32 1.35	23 1.31	17 1.07	23 1.67	19 1.39	3017
	57 1.11	44 1.86	41 1.29	56 1.69	54 1.45	61 1.20	44 1.86	52 1.09	54 1.65	41 1.81	49 1.93	60 2.11	26 1.51	36 1.74	32 1.84	1860
	13 1.02	10 1.16	5 1.10	15 1.18	11 1.14	11 1.20	12 1.33	11 1.33	11 1.38	10 1.46	12 1.46	23 1.86	6 1.03	18 1.90	7 1.07	435
	10 1.38	10 1.38	7 1.37	12 1.85	10 1.81	11 1.93	13 1.99	10 1.38	10 1.57	10 1.38	6 1.23	8 1.34	8 1.21	8 1.34	8 1.23	1309
	1464	1639	1196	1752	1721	1729	1514	1749	1621	1171	1462	1678	923	1275	1255	113350
	.881	.992	.866	.957	.935	.936	.894	.977	.801	.865	.881	.983	.851	.971	.969	

Summary of Average Flow in Miner Inches per Acre Irrigated

April 1-15	April 16-30	May	June	July	August	September
.952	.990	.881	.957	.894	.865	.851
.017	.077	.092	.935	.997	.891	.071
.000	.002	.866	.936	1.01	1.23	.860
.020	.057	.880	.936	.994	.880	.861

CHART 21.

CHART SHOWING AVERAGE MAXIMUM DUTY OF WATER IN MINERS INCHES PER ACRE FOR 18 BOISE VALLEY CANALS FOR YEARS 1914, 1916 AND 1917. ALSO PROPOSED AVERAGE DUTY OF WATER FOR ALL CANALS.



RATE IN INCHES PER ACRE

APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER

PROPOSED DUTY.

APRIL 1-15 = 0.70 INCHES PER ACRE.
APRIL 15-30 = 0.80 " " " "
MAY 1-31 = 0.90 " " " "
JUNE 1-30 = 0.95 " " " "
JULY 1-31 = 0.95 " " " "
AUGUST 1-10 = 0.75 " " " "
AUGUST 11-31 = 0.60 " " " "
SEPT. 1-30 = 0.60 " " " "
OCT. 1-31 = 0.60 " " " "

TABLE SHOWING AVERAGE
FOR 18 CANALS
DURIN

Canal	APRIL 1-15 1915 Sec. ft.	Inches	1916 Sec. ft.	Inches	1917 Sec. ft.	Inches	APRIL 16-30 1915 Sec. ft.	Inches	1916 Sec. ft.	Inches	1917 Sec. ft.	Inches	MAY 1915 Sec. ft.	Inches	1916 Sec. ft.	Inches	1917 Sec. ft.	Inches	1915 Sec. ft.	Inches
Rideout	151	176	36	086	0	0	244	068	279	160	0	0	459	033	202	022	121	036	301	0
Sellers	79	011	55	022	0	0	161	041	93	036	0	0	341	018	12	050	79	017	197	0
Escalante	19	001	7	004	0	0	85	024	55	031	0	0	21	015	10	021	12	009	107	0
Bassetts	10	019	6	0	0	0	54	110	42	023	0	0	36	055	101	102	10	015	57	0
Dayton	5	009	6	011	0	0	24	101	34	022	0	0	32	039	12	077	9	016	42	0
Ballantine and Yon	0	0	0	0	0	0	1	026	5	021	0	0	1	007	5	020	1	009	5	0
Morris Mansion Mitchell	21	019	8	007	0	0	52	127	20	001	0	0	29	023	50	270	19	225	20	0
	8	012	3	004	0	0	55	085	36	044	0	0	20	025	34	103	23	030	59	0
Phyllis	93	021	72	018	0	0	61	014	129	038	72	020	200	056	360	081	280	004	218	0
Pioneer	1	001	1	001	0	0	75	091	17	006	0	0	10	027	13	130	8	031	25	0
Canyon Co.	0	0	21	0	0	0	34	075	26	014	0	0	21	030	22	095	25	033	59	0
Farmers Co.	110	032	25	008	0	0	235	071	184	059	0	0	206	076	390	093	134	043	248	0
Cooper	7	025	0	0	0	0	11	040	21	040	0	0	12	025	31	028	9	013	102	0
Schenberg	2	006	0	0	0	0	9	059	0	0	0	0	7	026	11	012	2	002	16	0
Pioneer Div.	0	0	1	002	0	0	20	030	15	012	0	0	15	044	15	014	8	013	18	0
Enchantes	7	013	7	013	0	0	30	032	25	029	0	0	42	089	80	039	16	035	45	0
Upper Point	3	023	0	0	0	0	10	022	0	000	0	0	11	033	10	022	0	000	11	0
Lower Point	0	0	0	0	0	0	0	000	0	0	0	0	0	000	0	000	0	000	0	0
Total		2.54		0.89		0		1033		794		0.20		0.26		1.58		0.26		1
Average		0.14		0.05		0		0.58		0.44		0.01		0.16		0.09		0.06		0.7

Year	Summary of Average Flow in Miner's I April 1-15	April 16-30	May	June
1915	0.14	0.58	0.46	0.70
1916	0.05	0.44	0.09	0.67
1917	0.00	0.01	0.26	0.76
Average	0.06	0.34	0.45	0.71

TABLE SHOWING AVERAGE HEADGATE DUTY OF WATER, IN MINER'S INCHES CONTINUOUS FLOW, BY MONTHS, FOR 18 CANALS DIVERTING WATER FROM BOISE RIVER, BASED ON AVERAGE DIVERSIONS DURING THE IRRIGATION SEASONS OF THE YEARS 1915, 1916, 1917.

CHART 22.

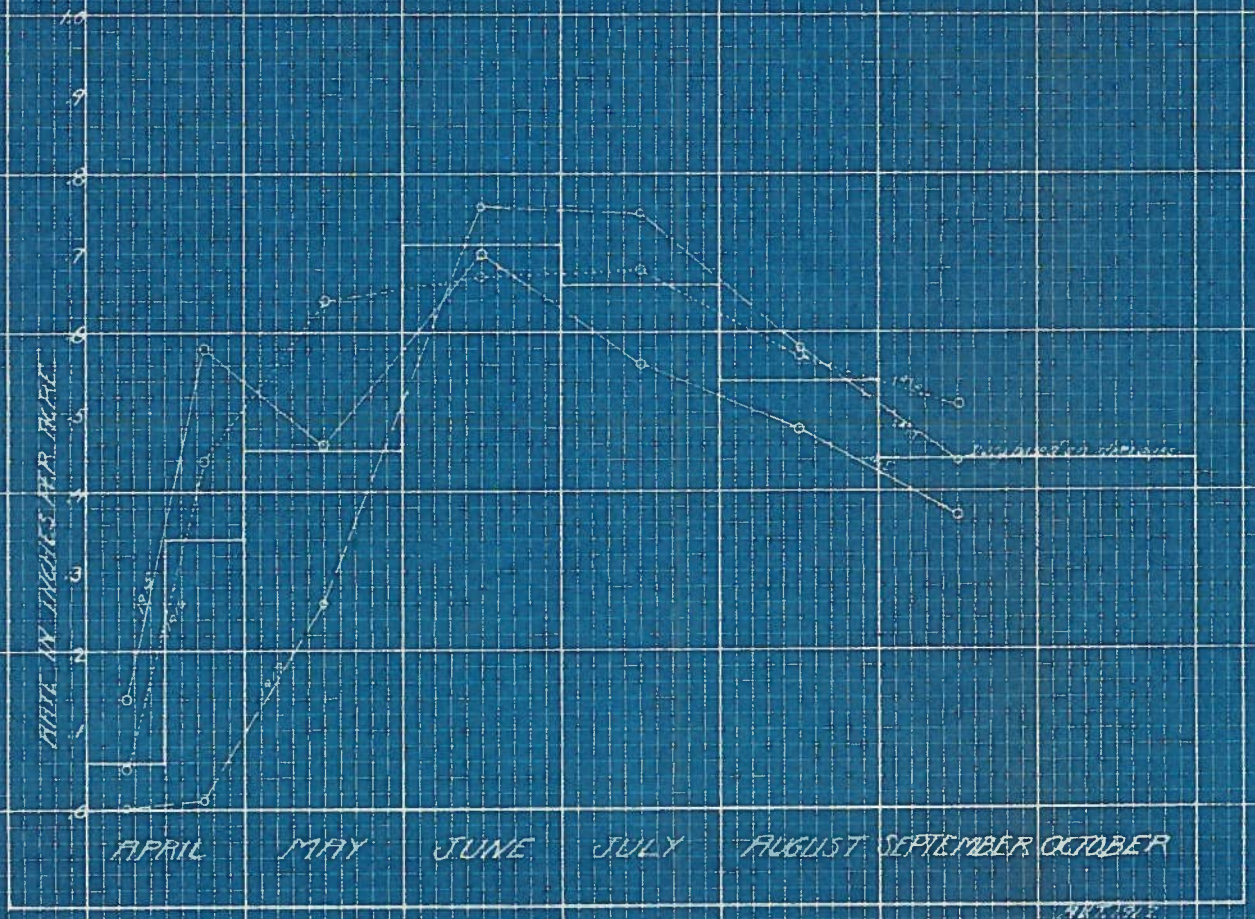
	MAY			JUNE			JULY			AUGUST			SEPTEMBER			
	1915	1916	1917	1915	1916	1917	1915	1916	1917	1915	1916	1917	1915	1916	1917	Acres irrigated
	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	Second feet / Inches per acre	
1	458 .032	712 .050	401 .028	367 .043	362 .060	382 .064	340 .026	344 .024	338 .026	336 .026	330 .025	346 .027	204 .020	311 .030	324 .032	25000
2	144 .010	172 .012	78 .005	137 .016	115 .019	132 .022	128 .010	135 .009	182 .014	85 .007	165 .013	120 .009	67 .007	116 .011	61 .006	12500
3	61 .004	40 .003	42 .003	117 .014	111 .018	102 .017	65 .005	120 .008	101 .008	66 .005	97 .008	82 .006	33 .003	77 .007	50 .005	8500
4	30 .055	12 .022	10 .018	5 .010	34 .068	28 .056	43 .084	57 .100	57 .100	33 .059	21 .038	21 .038	32 .058	33 .059	22 .040	2720
5	36 .039	11 .012	9 .010	20 .022	36 .040	30 .034	40 .043	40 .043	30 .032	34 .037	21 .023	25 .027	25 .027	37 .040	27 .029	3770
6	1 .001	0 .000	1 .001	5 .043	7 .060	5 .043	6 .051	5 .043	7 .060	7 .060	7 .060	7 .060	4 .035	7 .060	7 .060	576
7	78 .003	50 .002	57 .002	60 .022	22 .008	29 .010	26 .009	77 .026	102 .035	42 .014	52 .018	42 .014	27 .009	37 .013	36 .012	27000
8	49 .025	46 .023	33 .017	59 .041	65 .045	61 .042	47 .032	49 .034	52 .036	36 .025	44 .030	32 .022	23 .016	32 .022	32 .022	27135
10	450 .056	360 .045	280 .035	118 .017	350 .050	445 .064	260 .037	350 .050	445 .064	150 .021	220 .031	320 .045	111 .016	160 .023	234 .034	22000
9	12 .007	23 .013	8 .005	25 .017	26 .018	25 .017	18 .012	30 .020	25 .017	18 .012	18 .012	17 .011	8 .005	16 .011	16 .011	1780
4	21 .030	21 .030	23 .033	50 .028	62 .035	68 .038	53 .030	57 .032	67 .038	46 .026	68 .038	70 .039	40 .022	54 .030	37 .021	3750
2	226 .070	192 .060	134 .042	228 .064	209 .059	229 .064	132 .037	201 .056	193 .054	118 .033	214 .060	192 .054	92 .026	148 .041	145 .041	6500
3	22 .045	21 .043	9 .018	14 .057	11 .045	23 .093	7 .028	16 .065	19 .077	8 .032	12 .049	13 .053	8 .032	16 .065	12 .049	1392
2	7 .044	10 .062	6 .037	10 .065	16 .104	11 .072	8 .052	17 .110	11 .071	8 .052	10 .065	10 .065	7 .046	12 .078	8 .052	1567
2	18 .025	15 .021	8 .011	18 .029	19 .031	19 .031	18 .029	14 .023	18 .029	14 .023	15 .024	13 .021	10 .016	18 .029	13 .021	3042
2	48 .048	30 .030	18 .018	45 .088	38 .074	49 .095	28 .055	33 .064	33 .064	28 .055	31 .060	28 .055	23 .045	28 .055	21 .041	2560
	11 .086	7 .055	5 .039	11 .086	12 .094	8 .063	12 .094	10 .078	12 .094	10 .078	9 .070	9 .070	6 .047	9 .070	6 .047	1280
2	5 .019	8 .030	1 .004	11 .042	10 .038	8 .031	7 .027	8 .031	7 .027	7 .027	3 .011	8 .031	3 .011	6 .023	4 .015	1302
20	5.24	11.56	3.72	12.63	11.94	13.65	10.09	12.21	13.66	8.61	10.41	10.12	6.02	8.77	7.06	113398
21	0.46	0.64	0.26	0.70	0.67	0.76	0.5	0.68	0.75	0.48	0.57	0.58	0.37	0.51	0.44	

Summary of Average Flow in Miner's Inches per Acre Irrigated

April 15 to April 30	May	June	July	August	September
0.14	0.58	0.46	0.70	0.56	0.49	0.39
0.05	0.44	0.64	0.67	0.68	0.57	0.54
0.00	0.01	0.26	0.76	0.29	0.58	0.44
0.06	0.34	0.45	0.71	0.66	0.54	0.44

CHART 23.

CHART SHOWING AVERAGE DUTY OF WATER IN MINERS INCHES PER ACRE FOR 18 BOISE VALLEY CANALS FOR YEARS 1915, 1916 & 1917. ALSO AVERAGE DUTY BASED ON AVERAGES.



STEWART DECREE.

CHART 27.

No	Date	Name	Amt. Decreed Sec. Ft.	Inches
1	6-1-64	Thomas Davis	2.20	110
2	6-1-64	Jacobs Canal Co	20.00	1000
3	6-1-64	Middleton Mill Ditch	12.80	640
4	6-1-64	Thomas Andrews	3.30	165
5	6-1-64	Catlin & Mace	2.86	143
6	6-1-64	T.C. Catlin	3.30	165
7	6-1-64	C.C. Harding	3.30	165
8	6-1-64	Pioneer Dairy Ditch Co	20.00	1000
9	6-1-65	Seibenberg Ditch Co	13.42	671
10	6-1-65	Allen V. Webster	1.20	60
11	6-1-65	J.F. Yargan	.66	33
12	6-1-65	Graham & Gilbert	4.40	220
13	6-1-65	Eureka Water Co.	33.32	1666
14	6-1-65	New Union Ditch Co	13.76	688
15	6-1-65	Boise Valley Irrig. Ditch	54.50	2724
16	6-1-65	Mullenbaugh & Rossi	9.20	460
17	6-1-65	Mckenbaugh & Ross (Amend)	265.80	13290
18	6-1-65	Denver & Idaho Land Co	.80	40
19	6-1-65	Martha Bowman	2.88	144
20	6-1-65	Bird Bowman	6.40	320
21	6-1-65	G.W. Goss	2.90	145
22	6-1-65	Robert McGuire	3.20	160
23	6-1-65	C.W. Cooper	3.20	160
24	6-1-65	J.W. Roland	2.40	120
25	6-1-65	Draper & Wells	3.54	177
26	6-1-65	Thomas J. Palmer	1.60	80
27	6-1-65	Noah W. Palmer	1.58	79
28	6-1-65	J.N. Tucker	7.00	350
29	6-1-65	Thomas Andrews	6.00	300
30	6-1-66	J. Renault & R. Johnson	50.00	2500
31	6-1-66	William P. Kennedy	2.60	130
32	6-1-66	Manville & Leonard	3.50	175
33	6-1-66	Boise City Canal Co	38.06	1903
34	6-1-66	Franklin Ditch Co	15.40	770
35	6-1-67	Canyon Co Water Co	75.80	3790
36	6-1-68	Martha E. McCarthy	14.10	705
37	6-1-68	H.D & Dora Goodman	3.70	185
38	6-1-68	T.T. Johnson	3.20	160
39	6-1-68	Moss, Allen, Riley & Hess	8.54	427
40	6-1-68	S.S. Gray	1.40	70
41	6-1-64	John Mummon	1.80	90
42	6-1-64	Isaac Bedal	1.60	80
43	6-1-64	Frederick Ode	3.60	180
44	6-1-64	Prior Burnett	8.50	425
45	6-1-69	Pioneer Dairy Ditch Co	35.44	1772
46	6-1-69	Mason Creek Ditch Co	37.20	1860
47	6-1-69	T.W. Boone	3.50	175
48	6-1-70	W.J. Hamming	2.60	130
49	6-1-70	Pioneer Canal	25.72	1286
50	6-1-69	Barnes Lumber Co	2.24	112
51	6-1-70	Thomas Andrews	1.30	65
52	6-1-71	Catlin & Mace	7.86	393
53	6-1-71	Peter Meeres	1.80	90
54	6-1-71	Middleton Mill Ditch Co	33.70	1685
55	6-1-72	J.F. Yargan	.70	35
56	6-1-72	J.F. Yargan	1.40	70
57	6-1-73	Mary C. Davis	4.40	220
58	6-1-72	Edward N. Hart	3.30	165
59	6-1-74	J.W. Boone	2.20	110
60	6-1-75	Farmers Cooperative D Co	10.00	500
61	6-1-76	Edward & Mary Choate	2.30	115
62	6-1-76	John Cecil	.44	22
63	6-1-77	Thomas Aikens	5.20	260
64	6-1-77	W.H. Conway	.90	45
65	6-1-77	Middleton Water Co	117.08	5854
66	7-1-77	Pioneer Irrigation District	200.00	10000
67	5-1-78	Nampa-Meridian Irrig. D	170.00	8500
68	6-1-78	John Mummon	4.20	210
69	6-1-78	Julia Mummon	3.36	168
70	6-1-78	Charles Allen	8.40	420
71	6-1-78	R.A. Stockton	4.40	220
72	6-1-79	New Dry Creek Ditch Co	31.32	1566
73	6-1-79	D. Mumford	4.00	200
74	6-1-80	Smith Stockton	1.76	88
75	6-1-80	Isham Joplin	2.40	120
76	10-20-80	Joseph Gobie	.90	45
77	10-29-80	Franklin Ditch Co	27.60	1380
78	6-1-82	Allen V. Webster	.90	45
79	6-1-82	Susie Campbell	.60	30
80	6-1-82	J.T. Barber	1.60	80
81	6-1-82	Sonora Joplin	3.40	170
82	6-1-82	S.W. Hutchinson	.44	22
83	6-1-82	Johnson	.44	22
84	6-1-82	Andrew J. Joplin	2.86	143
85	6-1-82	James L. Greene	2.20	110
86	6-1-83	Farmers Cooperative Ditch	20.00	1000
87	6-1-83	Frances M. Joplin	.90	45
88	6-1-83	W.H. Black	12.00	600
89	11-9-83	Eureka Ditch Co No. 2	21.70	1085
90	6-1-84	Pioneer Irrig. District	53.10	2655
91	6-1-84	Riverside Irrig. Dist	20.00	1000
92	10-17-84	Settlers Canal Co.	94.06	4953
93	6-1-86	New Dry Creek Ditch	15.22	761
94	6-1-86	Thomas Davis	13.40	670
95	1-23-87	Wm. C. L. & T. Young	4.00	200
96	10-1-87	Pioneer Irrig. Dist.	47.80	2390
97	6-1-88	New Dry Creek Ditch Co	7.86	393
98	6-1-88	A.K. Linder	4.00	200
99	6-1-88	Levi Smith	1.30	65
100	6-1-88	Charlotte Calhoun	1.40	70
101	6-1-88	Ed. T. Linder	1.46	73
102	6-1-88	Lizzie Everett	1.20	60
103	6-1-88	Jessie Wilson.	1.40	70
104	6-1-88	Thomas Andrews	.90	45
105	7-1-88	Farmers Coop Ditch Co	50.00	2500
106	8-20-88	Nampa-Meridian Irrig. D	370.84	18542
107	5-1-89	Chas. S. Miller	.06	3
108	5-1-89	Lemmis L. Moseley	.02	1
109	5-1-89	S.B.J. Uhler & C.B. Taylor	2.40	120
110	5-1-89	South Boise Mutual Irrig Co	6.60	330
111	5-1-89	Estate of J.H. Gallagher	2.74	141
112	5-1-89	Wm. H. Fogarty	.05	2
113	5-1-89	Grace Call	.10	5
114	5-1-89	Samuel H. Canfield	.03	1
115	6-1-89	Seneca Joplin	.06	3
116	6-1-89	Sonora Joplin	1.20	60
117	9-1-90	Pioneer Irrig. District	200.00	10000
118	6-1-91	W.H. Conway	2.20	110
119	6-1-91	Thomas Davis	.54	27
120	6-1-91	Middleton Mill Ditch Co	17.00	850
121	6-1-91	Thomas Andrews	3.50	175
122	6-1-91	Settlers Canal Co	73.44	3672
123	6-1-91	Thomas Aiken	.80	40
124	5-1-93	Riverside Irrig. District	80.00	4000
125	6-1-94	R.H. Stockton	1.76	88
126	7-2-94	Farmers Union Ditch Co	110.00	5500
127	5-1-95	Charles Rose & Brackett	1.00	50
128	7-1-95	Mathew Casey	.66	33
129	7-1-96	Farmers Coop Ditch Co	83.50	4175
130	10-1-99	Riverside Irrig District	20.00	1000
131	3-23-00	New Kirk Canal Co	219.10	10955
132	5-17-00	Canyon Ditch Co	10.00	500
133	6-1-01	Riverside Irrig. District	70.00	3500
134	10-25-01	Canyon Ditch Co.	5.54	277
135	4-1-04	Pioneer Irrig District	56.34	2817

• Indicates Rights supplied by return flow to River.

H. Foltman

CHART 25.

RECONSTRUCTED TABLE OF STEWART DECREE SHOWING THE ORDER AND PRIORITIES OF THE DIFFERENT RIGHTS EXISTING IN SECTION ONE OF BOISE RIVER AND DEPENDING ON THE NATURAL FLOW PASSING HIGHLAND, FOR THE PERIOD JULY 19 TO OCTOBER 31 Inc. 1915, OR THE 60% PERIOD.

SHEET 1.

No. of Decreed Right Stewart Decree	No. of Right based on 1915 Results	Name	Amount Decreed 100%	Amount Decreed 60%	Quantities Passing Highland necessary to fill 60% of Decree
33	1	Boise City Canal Co.	38.06	22.83	22.83
34	2	Franklin Ditch Co.	15.40	9.24	32.07
35	3	Canyon Co. Water Co.	75.80	45.48	77.55
36	4	Martha E. McCarthy	14.10	8.46	86.01
37	5	Goodman and Goodman	3.70	2.22	88.23
40	6	S. S. Gray	1.40	.84	89.07
42	7	Isaac Bedal	1.60	.96	90.03
46	8	Mason Creek Ditch Co.	37.20	22.32	112.35
48	9	W. J. Hamming	2.60	1.56	113.91
49	10	Pioneer Canal (Star)	25.72	15.44	129.35
50	11	Barber Lumber Co.	2.24	1.34	130.69
52	12	T.C. Catlin and Pollette Mace	7.86	4.72	135.41
53	13	Peter Meeres	1.80	1.08	136.49
54	14	Middleton Mill Ditch Co.	33.70	20.22	156.71
55	15	J. F. Yaryan	.70	.42	157.13
56	16	J. F. Yaryan	1.40	.84	157.97
57	17	Mary C. Davis	4.40	2.64	160.61
58	18	Edward N. Hart	3.30	1.98	162.59
61	19	Edward and Mary Clark	2.30	1.38	163.97
62	20	John Cecil	.44	.26	164.23
63	21	Thomas Aikens	5.20	3.12	167.35
64	22	W. H. Conway	.90	.54	167.89
65	23	Middleton Water Co.	114.08	68.45	236.34
67	24	Nampa-Meridian Irrig. D.	170.00	102.00	338.34
72	25	New Dry Creek Ditch Co.	31.32	18.79	357.13
75	26	Isham Joplin	2.40	1.44	358.57
76	27	Joseph Goble	.90	.54	359.11
77	28	Franklin Ditch Co.	27.60	16.56	375.67
78	29	Allen V. Webster	.90	.54	376.21
79	30	Susie Campbell	.60	.36	376.57
80	31	J. T. Barber	1.60	.96	377.53
81	32	Sonora Joplin	3.40	2.04	379.57
82	33	S. W. Hutchinson	.44	.26	379.83
83	34	Johnson	.44	.26	380.09
84	35	Andrew J. Joplin	2.86	1.72	381.81

Rights 1 to 32 inc. Stewart Decree, taken care of by Return Flow in Sect. 1.

O.K. Tallman

CHART 25 A.

SHEET 2.

No. of Decree Right Stewart Decree	No. of Right based on 1915 Results	Name	Amount Decreed 100%	Amount Decreed 60%	Quanities Passing High land necessary to fill 60% of Decree
85	36	James L. Granam	2.20	1.32	383.13
87	37	Francis M. Joplin	.90	.54	383.67
90	38	Pioneer Irrigation District	53.10	31.86	415.53
92	39	Settlers Canal Co.	99.06	59.44	474.97
93	40	New Dry Creek Ditch Co.	15.22	9.13	484.10
94	41	Thomas Davis	13.40	8.04	492.14
97	42	New Dry Creek Ditch Co.	7.86	4.72	496.86
98	43	A.V. Linder	4.00	2.40	499.26
99	44	Leri Smith	1.30	.78	500.04
100	45	Charlotte Calhoun	1.40	.84	500.88
101	46	Ed. J. Linder	1.46	.88	501.76
102	47	Lizzie Everett	1.20	.72	502.48
103	48	Jessie Wilson	1.40	.84	503.32
106	49	Nampa-Meridian Irrig. D.	370.84	222.50	725.82
107	50	Charles S. Miller	.06	.04	725.86
108	51	Lommis L. Hoseley	.02	.01	725.87
109	52	S. & J. Utter & C.B. Taylor	2.40	1.44	727.31
110	53	South Boise Mutual Irrig. Co	6.00	3.60	730.91
111	54	Estate of J.H. Gallaher	2.94	1.76	732.67
112	55	Anna H. Fogarty	.05	.03	732.70
113	56	Grace Call	.10	.06	732.76
114	57	Samuel H. Canfield	.03	.02	732.78
115	58	Sonora Joplin	.06	.03	732.81
116	59	Sonora Joplin	1.20	.72	733.53
117	60	Pioneer Irrigation District	200.00	120.00	853.53
118	61	W. H. Conway	2.20	1.32	854.85
119	62	Thomas Davis	.54	.32	855.17
120	63	Middleton Mill Ditch Co.	17.00	10.20	865.37
122	64	Settlers Canal Co.	73.44	44.06	909.43
123	65	Thomas Aiken	.80	.48	909.91
126	66	Farmers Union Ditch Co.	110.00	66.00	975.91
127	67	Charles Rein & Jane Keoh	1.00	.60	976.51
128	68	Mathew Casey	.66	.40	976.91
131	69	New York Canal Co.	219.10	131.46	1108.37
135	70	Pioneer Irrig. District.	56.34	33.80	1142.17

A.U.T.

In re SRBA Subcase Nos. 63-00179C and 63-32580

EXHIBIT G

to

Statement Regarding Injury and Enlargement,
and Request for Hearing

Caldwell, Idaho, ~~August 13~~ July 6, 1915.

The Board of Directors of the Pioneer Irrigation District met in regular session; present, L.E. Greensley, A.G. Street and W.A. Shupe, Directors, and J. Jester Jr., Secretary.

Claims amounting to $2397.52 were allowed, for $157.75 of which time checks had been issued; and in payment of the balance, $2245.77, maintenance warrants numbered 689 to 823 were drawn.

The following resolution was presented by A.G. Street, seconded by W.A. Shupe, and unanimously carried:

Whereas Walter Griffiths is demanding that the Mason Creek ditch right and the Franklin Ditch right together with 26.53 inches of water decreed to the Caldwell Highline Canal, be turned into the headgate of the Caldwell Highline Canal; and

Whereas, under present arrangements, the turning of the said Franklin rights and said Mason Creek rights into said Highline Canal gives the lands under said Highline Canal, within the Pioneer Irrigation District a pro rata share of the use of the waters belonging to said District, and heretofore 26.53 inches of water has been turned into the Phyllis Canal, in order to give the lands under the Phyllis Canal their pro-rata share of the waters of the District; and

Whereas it is for the best interests of the District that the waters be diverted as they have heretofore been diverted,

Be It Therefore

Resolved that it is hereby Ordered that the State Engineer of the State of Idaho be requested, and he is hereby requested, to continue ~~continue~~ diverting said waters as they have been heretofore diverted, towit:

decreed Water in Phy

In addition to the amount decreed to the Phyllis Canal, to divert the 26.53 inches

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aforesaid into the Phyllis Canal, and to divert the Franklin and Mason Creek rights into the Caldwell Highline Canal; and the President of the Board is hereby instructed to notify the said State Engineer of this resolution.

It appearing to the Board of Directors of the Pioneer Irrigation District that Wilson Slough Drain divides the land hereinafter described so that the owner thereof is entitled to a bridge across said Drain under the general resolution of this Board passed July 7, 1914,

Be It Therefore

Resolved That the Reclamation Service of the United States be authorized and directed to construct a bridge in accordance with the plans and specifications for Land Locked lands, on file in its office in Boise, Idaho, across Wilson Slough Drain, on the following described lands, to-wit:

North half (N½) of the Southwest quarter (SW¼) of Section one (1), Township three (3), North of Range three (3), West of Boise Meridian, in Canyon County, Idaho; now belonging to Charles K. McMichael, and that the expense of said construction be paid out of the $350,000 drainage fund now in the hands of the Reclamation Service of the United States.

Mr. Hannan, of the College of Idaho, appeared before the Board asking that the ditch across the College campus be put under ground. He offered to pay one-half the cost of the materials and cover the tile if the District will pay the other half of cost of materials and lay the tile.

The matter was taken under advisement.

No further business appearing, the Board adjourned to meet July 15th, 1915.

Attest:

J. Jester Jr.,
Secy.

L E Greenseer
President.

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