REPORT NO. 20

SEGREGATION OF STORAGE

and

NATURAL FLOW

below

BEAR LAKE

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October 30, 1951

WATER SUPPLIES AND WATER RIGHTS BELOW BEAR LAKE

In compact discussions the question has often been raised as to whether natural flow water rights below Bear Lake were being given proper consideration in the various methods suggested for division of the natural flow water of the river above Bear Lake.

In the analysis of supplies and water rights which formed the basis for the first tentative compact, studies were made of 1944, 1945 and 1946 supplies. However, the detailed computations and data of these studies were not preserved but the general conclusions drawn from them were outlined when the tentative draft was presented at the Jackson, Wyoming meeting. Briefly stated, the conclusion was that if the entire river was operated as a unit on a priority of right basis, water rights above Bear Lake would not be cut in favor of any older dated rights below Bear Lake, except for a short period lasting about one week to ten days. The short excepted period is the lag in time that high water runoff in the lower basin precedes high water runoff in the upper basin. If the upstream right were regulated during this period for benefit of the downstream right, by the time the released water reached the lower user, the available upstream supplies would have decreased to a point such that the upstream rights would be cut to an earlier date than the downstream rights. Considering this relation of supplies and rights together with the apparent large return flow from upstream use and time interval involved in transit of water down the river channel, it was recommended that the river system be divided into divisions and the natural flow water administered in each division independent of the other divisions. This recommendation, however, was predicated on a maximum duty of water of one second-foot for each fifty acres of land.

This report has been prepared to provide detailed data for further studies of supplies and rights in continuing compact negotiations. The study has been made for three different years; 1940, 1944 and 1948.

WATER RIGHTS BELOW BEAR LAKE

In general, the tributaries of Bear River below Bear Lake were fully developed before much use was made of the main stem waters. Consequently, little or no tributary regulation is required for benefit of main stem water rights. The decree, "Utah Power & Light Company vs. The Last Chance Canal Company et al," District Court of the United States for the District of Idaho, Eastern Division, dated July 14, 1920 enumerates the principle water rights on the main stem of Bear River between Bear Lake and Cutler Dam. In addition to these rights the decree, "Utah Power & Light Company vs. Richmond Irrigation Company et al," District Court of the First Judicial District of the State of Utah, lists additional rights for pump canals in Cache Valley. However, their pump rights, for the most part, are of quite late date and since daily discharge records are not available, it is believed they can be eliminated from this study without material effect on results.

The tabulations on Pages 5, 6, and 7, show for the main stem of the river, the water rights in order of priority and also rights of canals and canal groups in downstream order between Bear Lake and Cutler Dam.

The decrees further specify transit losses on storage as follows:

One and one-half percent Bear Lake to points between Alexander and Grace Dam.

One percent from Grace Dam to West Cache Canal headgate.

One percent from West Cache Canal headgate to Idaho-Utah State line.

One percent from Idaho-Utah State line to Cutler Dam.

It is also decreed that a one day (24 hours) time interval be allowed from Bear Lake to Alexander and Grace Dam; one day from Grace Dam to West Cache Canal headgate and State line; and, one day from State line to Cutler Dam.

WATER RIGHTS IN ORDER OF PRIORITY STEWART DAM TO CUTLER DAM EXCLUDING BEAR LAKE STORAGE RIGHTS OF MARCH 1, 1911 AND SEPTEMBER 11, 1912

Canal	Date of Priority	July 1 to Sept. 30 Amount c.f.s.	July 1 to Sept. 30 Accumulated c.f.s.	Apr. 20 to June 30 Additional c.f.s.	Apr. 20 to June 30 Accumulated c.f.s.
Gentile Valley	5-1-79	2.2	2.2	0	2.2
Nelson	5-1-80	6.5	8.7	0	8.7
Smith Bosen	5-1-82	5.5	14.2	0	14.2
Riverdale	5-1-82	13.0	27.2	0	27.2
Riverdale-Preston	6-10-83	3.0	30.2	0	30.2
West Cache	7-10-83	5.0	35.2	0	35.2
West Side	3-1-89	333.0	368.2	0	368.2
Budge	5-1-89	11.6	379.8	16.9	396.7
Gentile Valley	6-1-89	33.0	412.8	0	429.7
Johnson	7-30-89	1.6	414.4	2.4	433.7
Last Chance	3-1-97	200	614.4	0	633.7
Gentile Valley	8-31-98	1.9	616.3	0	635.6
West Cache	9-12-99	186	802.3	0	821.6
Johnson	5-1-00	.6	802.9	0.9	823.1
Gentile Valley	2-23-01	35.0	837.9	0	828.1
Last Chance	5-14-01	240.0	1077.9	0	1098.1
West Side	5-14-01	133.0	1210.9	0	1231.1
Riverdale-Preston	6-10-02	6.5	1217.4	0	1237.6
Utah Power	12-1-03	270.0	1487.4	0	1507.6
Gentile Valley	4-18-04	12.0	1499.4	0	1519.6
Hammond	6-1-04	95.0	1594.4	0	1614.6
Utah Power	12-1-06	135.0	1729.4	0	1749.6
Utah Power	12-1-08	135.0	1864.4	0	1884.6
Last Chance	8-9-09	138.2	2002.6	0	2022.8
Last Chance	12-31-09	25.6	2028.2	0	2048.4
Last Chance	7-29-10	54.0	2082.2	0	2102.4
Utah Power	12-2-12	500.0	2582.2	0	2602.4
West Side	5-1-14	43.0	2625.2	0	2645.4
Cub Pumps	12-11-14	100	2725.2	0	2745.4

WATER RIGHTS OF CANALS AND CANAL GROUPS
IN DOWNSTREAM ORDER STEWART TO CUTLER DAM

Section and Canal	Date of Priority	July 1 to Sept. 30 Amount c.f.s.	Accumulated c.f.s.
Stewart to Alexander			
Prior to July 1			
Budge Canal (Apr. 20 to July 1)	5-1-89	28.5	28.5
Johnson Canal (Apr. 20 to July 1)	7-30-89	4.0	32.5
Johnson Canal (Apr. 20 to July 1)	5-1-00	1.5	34.0
After July 1			
Budge Canal (After July 1)	5-1-89	11.6	11.6
Johnson Canal (After July 1)	7-30-89	1.6	13.2
Johnson Canal (After July 1)	5-1-00	.6	13.8
Alexander to Oneida			
Last Chance Canals	3-1-97	200.0	200.0
do	5-14-01	240.0	440.0
do	8-9-09	138.2	578.2
do Beach B	12-31-09	25.6	603.8
do Tanner	7-29-10	54.0	657.8
Gentile Valley Canal	5-1-79	2.2	2.2
do	6-1-89	33.0	35.2
do	8-31-98	1.9	37.1
do	2-23-01	35.0	72.1
do	4-18-04	12.0	84.1

Section and Canal	Date of Priority	July 1 to Sept. 30 Amount c.f.s.	Accumulated c.f.s.
Oneida to Preston			
Nelson	5-1-80	6.5	6.5
Smith Bosen	5-1-82	5.5	12.0
Riverdale	5-1-82	13.0	25.0
Riverdale-Preston	6-10-83	3.0	28.0
West Cache	7-10-83	5.0	33.0
West Cache	9-12-99	186.0	219.0
Riverdale-Preston	6-10-02	6.5	225.5
Preston to Cutler			
Cub River Pumps	12-11-14	100	100
Miscellaneous small pumps not listed.			
Cutler Dam			
West Side Canal	3-1-89	333	333
West Side Canal	5-14-01	133	466
East Side (Hammond) Canal	6-1-04	95	561
West Side Canal	5-1-14	43	604
Power Rights of Cutler Plant	12-1-03	270	270
do	12-1-06	135	405
do	12-1-08	135	540
do	12-2-12	500	1040

CUTLER RESERVOIR

Cutler Reservoir was constructed and filled in 1927, which was after the two decrees were decided by the courts. No known studies were made as to whether or not the construction of this reservoir increased the river losses and all data necessary to make an accurate study at this time are not available. However, it is known the losses between the Idaho-Utah State line and Cutler Dam at times in some years exceed the natural inflow in this reach; but whether or not this loss has been increased is indeterminate. The following approximate monthly acre-feet gains as indicated by inflow based on Bear River near Weston gaging station and outflow based on Bear River near Collinston, West Side Canal near Collinston and Hammond Canal near Collinston gaging stations do not indicate an increase in loss. None of the years in this tabulation may have had similar runoff characteristics and there may also have been considerable variance in diversions by the pump canals in the reach. Changes in contents of Cutler Reservoir were taken into account in 1944, 1945, and 1946.

Gain Weston to Cutler Dam
Acre-Feet

Before Reservoir	June	July	Aug.	Sept.
1924	18,800	500	-4,800	7,300
1925	68,210	4,470	10,390	23,960
1926	5,950	8,340	4,920	9,810
After Reservoir				
1944	62,990	18,960	-7,420	2,730
1945	126,930	16,020	27,510	29,150
1946	69,470	11,030	12,740	32,560

The elevation of the water surface at the old Wheelon diversion dam, which was located about one mile upstream from the present Cutler dam was approximately 4,400 feet elevation and 1,500 to 2,000 acres were flooded. The flow line of the present Cutler Reservoir is 4,404 feet elevation and about

6,200 acres are flooded. The increase in flooded area is therefore 4,200 to 4,700 acres. Prior to the construction of the reservoir the water table over this increased flooded area was from zero to two and a half feet below the ground surface. There was practically no increase in the water table around the reservoir after Cutler reservoir was filled. About one third of the present reservoir water area is less than two feet deep and supports heavy growth of tules and other aquatic plants.

Considering the water loss that probably occurred on the flooded area prior to the construction of the reservoir and the water loss that is now occurring, it is not believed that the construction of the reservoir caused an increase in loss.

SEGREGATION OF BEAR RIVER FLOW STEWART TO COLLINSTON

To study the natural inflow and extent to which natural flow water rights are filled, segregation of flow between storage and natural flow has been prepared for 1940, 1944 and 1948. These are typical of low,medium, and high runoff years during which the supply of storage in Bear Lake was plentiful. Because of the effect of large variable flows in transit between gaging stations and storage changes in temporary pondage reservoirs in connection with power regulation, it is necessary to use period averages to obtain consistent results. Five day period average flows were used except in those months having thirty-one days when a six day period was used in the last of each month.

The method followed in this segregation was first to list total average discharges at all gaging stations, and next, compute the total natural inflow between key gaging stations. To account for credit to natural flow from storage loss, 4 percent of the Bear Lake storage release was used. The total natural inflow for the reach of the river from Stewart to Collinston, was computed by adding total natural flow at Stewart, natural inflow Stewart to

Alexander, natural inflow Alexander to Oneida, natural inflow Oneida to Preston, natural inflow Preston to Cutler, and 4 percent of the Bear Lake storage release. In 1940 the Weston station is used instead of the Preston station.

The total natural flow was then divided among the canals or canal groups according to priority and the date of priority filled noted. However, due to some canals not diverting their full priority or the natural flow available at the headgate not being sufficient to fill the priority, it was necessary to make some adjustments in the actual distribution of priority water among the canals.

The storage for each canal or canal group is then computed by subtracting the assigned natural flow from the total amount being diverted. The Bear Lake storage release is then moved downstream and losses and storage delivered to canals deducted, storage from temporary pondage reservoirs added, and from this at each river gaging station the amount of storage passing the station computed. The natural flow passing the gaging station is computed by subtracting the storage from the total flow passing the station.

While this is not the method now actually employed in distributing the natural flow below Bear Lake, it does reproduce figures showing distribution of flows according to the decrees.

The following detailed explanation shows how the various columns on Plates 1, 2, and 3, were obtained.

1. Gaging Station Records.

Col. 1. Bear River below Stewart Dam

" 2. Rainbow Inlet Canal

" 3. Dingle Inlet Canal

" 6. Bear Lake Outlet Canal

" 8. Total diversions by Johnson and Budge Canal

Col. 10. Contents of Soda Reservoir

" 15. Bear River at Alexander

" 18. Total diversions by Last Chance Canals

" 19. Gentile Valley Canal

" 20. Contents of Oneida Reservoir

" 25. Bear River below tailrace at Oneida

" 29. Total diversions in Smith-Bosen, Riverdale-Preston, Nelson, Riverdale, and West Cache canals.

" 32. Bear River near Preston (near Weston in 1940)

" 34. Diversion by Cub River Pumps

" 36. Contents of Cutler Reservoir

" 42. Total diversion in Hammond and West Side canals

" 45. Bear River near Collinston

2. Natural flow at Stewart Col. 4 = (1) ∕ (2) ∕ (3)

3. Rainbow ∕ Dingle (diverted to Bear Lake) Col. 5 = (2) ∕ (3)

4. Bear Lake Storage Release Col. 7 = (6) - (5)

5. Soda, Oneida and Cutler reservoir release is computed by subtracting the contents on the last day of the period from the contents on the last day of the previous period, which gives total change in 5 or 6 day period. These differences are entered in columns 11, 21, and 37. To convert this to mean daily second-feet, divide by 10 or 12, as the case may be, and enter in columns 12, 22, and 38. Water released is entered as plus quantities and water stored is entered as minus quantities.

6. Inflow Stewart to Alexander Col. 46 = -(1) - (6) ∕ (8) - (12) ∕ (15)

7. Inflow Alexander to Oneida Col. 47 = -(15) ∕ (18) ∕ (19) - (22) ∕ (25)

8. Inflow Oneida to Preston (Weston 1940) Col. 48 = -(25) ∕ (29) ∕ (32)

9. Inflow Preston (Weston in 1940) to Cutler Col. 49 = -(32) ∕ (34) - (38) ∕ (42) ∕ (45)

10. Storage loss credit to natural flow Col. 50 = 4 percent of Col. 7

11. Total Natural inflow Col. 51 = (4) ∕ (46) ∕ (47) ∕ (48) ∕ (49) ∕ (50)

12. Columns 52 to 58 are determined from Col. 51 and priority of right schedules on Pages 3, 4, and 5.

13. Columns 52 to 57 are inserted in columns 8 (NA); 17; 19 (NA); 28; 41; and 44 and at the same time adjusting these natural flow insertions so that they do not exceed the total diverted. Excess natural flow assigned to a canal in excess of its total diversion is given to the next priority right.

14. The Bear Lake storage release, Col. 7, is then moved downstream and storage and natural flows at gaging stations computed. Natural flow available at Alexander in some cases is less than the natural flow assigned to the Last Chance Canals, which requires a further adjustment in natural flows assigned to the canals on a priority of right basis.

14a. Storage at Alexander Col. 13 = (7) - (8ST) - (9) ∕ (12)

14b. Natural at Alexander Col. 14 = (15) - (13)

14c. Storage at Oneida Col. 23 = (13) - (16) - (19ST) ∕ (22)

14d. Natural at Oneida Col. 24 = (25) - (23)

14e. Storage at Preston Col. 30 = (23) - (26) - (27)

14f. Storage passing Cutler Dam Col. 39 = (30) - (33) - (34) - (35) ∕ (38) - (40)

The storage passing Cutler Dam should be equal to the storage of Bear River at Collinston, Col. 43, however, because a flat 4 percent of the storage released at Bear Lake is not

always equal to the summation of the several storage losses as defined in the decrees, these two columns do not always balance.

COMPARISON OF FLOWS AVAILABLE, PRIORITIES AND ACTUAL DELIVERIES

On Plates 4, 7, and 10, are plotted for the Last Chance Canals, natural flow received, its share of the total natural inflow, and the natural flow available at its headgate, which is the sum of the natural flow at Stewart and the natural inflow Stewart to Alexander. It is to be noted that due to lack of available natural flow at its headgate, this canal was cut to an earlier date of priority than others below Bear Lake, on May 1 to June 10, June 26 to July 5, and Aug. 26 to Sept. 30, 1940; July 26 to 31, Aug. 11 to 15, Aug. 21 to 25, and Sept. 1 to 30, 1944; July 21 to 25, and Aug. 26 to Sept. 30, 1948.

On Plates 5, 8 and 11, are plotted for the Riverdale Canals, the natural flow received, their share of total natural inflow, and the natural inflow Alexander less the natural flow diverted by the Gentile Valley Canal. Sufficient or more than sufficient natural inflow between Alexander and Oneida was available to fill rights of this group of canals at all times, except, May 11 to 20, June 1 to 10, Sept. 1 to 5, 16 to 20, and 26 to 30, 1940; June 26 to July 20, 1944; July 6 to Aug. 10, and Sept. 1 to 10, 1948.

On Plate 6 for the West Side and Hammond canals, are plotted the natural flow received, priority share of total natural flow below Bear Lake and natural inflow Oneida to Cutler Dam. On Plates 9 and 12, the same are plotted except that the natural inflow Preston to Cutler Dam is used. It is to be noted, except for early in the summer and late in September, that the natural inflow below Oneida or Preston is insufficient to fill the priority share of the total natural inflow below Bear Lake due these canals. During this time water would need be released past the upstream canals to fill the rights of

these canals. However, in actual operation due to upstream canals not drawing their full decrees or insufficient flows being available at their headgates, these two canals received at times, water of a later dated priority than upstream canals.

There are many interpretations that can be taken from these graphs in answers to specific questions. However, no attempt is being made in this report to cover the many questions.

Listed on the bottom of Plates 1, 2 and 3, are total storage delivered to each canal and total storage to all canals. It is interesting to note the close agreement of these amounts with the total computed storage for irrigation as given in a previous report, "Analysis of Bear Lake Storage."

Storage to Irrigation

Year	Analysis of Bear Lake Storage Report Plate 5, Column 25, Acre-Feet (Report #10)	This Report Plates 1, 2, 3 Total Storage Acre-Feet	Difference Percent
1940	196,942 May 7	195,544 - May 1 - 9-30	0.7
1944	101,743 July 1	107,328 - May 1 — Sept 30	4.8
1948	85,302 June 14	82,046 - May 1 - Sept 30	4.0

DATE	BEAR RIVER BELOW STEWART	RAINBOW INLET CANAL	DINGLE INLET CANAL	TOTAL PASSING STEWART	RAINBOW + DINGLE	BEAR LAKE OUTLET CANAL	BEAR LAKE STORAGE RELEASE	DIVERTED STEW. TO ALEX.		1½% STOR. LOSS B.L. TO ALEX.	DATE	SODA RES.			BEAR AT AL
												CONTENTS A.F. LAST DAY	CHANGE IN CONT. A.F.	EQUIV. MEAN DAILY S.F.	
	NAT.	NAT.	NAT.	NAT.	NAT.		STOR.	ST.	NR.	STOR.				STOR.	STOR.
	1	2	3	4	5	6	7	8		9		10	11	12	13
MAY											1	6820			
1-5	3	10	0	13	10	6	-4	4	32	0	2-6	6910	+910	+91	83
6-10	3	10	0	13	10	431	421	6	30	6	7-11	6780	-870	-87	322
11-15	2	9	0	11	9	666	657	6	30	10	12-16	8360	-1580	-158	483
16-20	2	9	0	11	9	640	631	0	30	10	17-21	8900	-540	-54	567
21-25	2	9	0	11	9	747	738	0	22	11	22-26	8900	0	0	727
26-31	2	9	0	11	9	851	842	0	23	13	27-1	10,170	-1270	-106	723
JUNE															
1-5	2	9	0	11	9	682	673	6	30	10	2-6	11090	-920	-92	565
6-10	3	17	0	20	17	309	292	1	30	4	7-11	11010	80	8	295
11-15	3	15	0	18	15	531	516	33	0	8	12-16	10950	60	6	481
16-20	3	13	0	16	13	715	702	36	0	11	17-21	9120	1830	183	838
21-25	2	12	0	14	12	1124	1112	36	0	12	22-26	9050	70	7	1066
26-30	2	11	0	13	11	1276	1265	4	30	19	27-1	8560	490	49	1293
JULY															
1-5	2	10	0	12	10	1020	1010	0	7	15	2-6	9500	-940	-94	901
6-10	2	11	0	13	11	1174	1163	10	0	17	7-11	9520	-20	-2	1134
11-15	2	8	0	10	8	1043	1035	14	0	15	12-16	10810	-1290	-129	877
16-20	2	7	0	9	7	883	876	14	0	13	17-21	10800	10	1	847
21-25	2	8	0	10	8	878	870	14	0	13	22-26	8910	1890	189	1032
26-31	2	9	0	11	9	1205	1196	15	0	18	27-1	10360	-1450	-121	1042
AUGUST															
1-5	2	8	0	10	8	962	954	12	0	14	2-6	11210	-850	-85	843
6-10	1	8	0	9	8	858	850	14	0	13	7-11	12020	-810	-81	742
11-15	1	7	0	8	7	769	760	14	0	11	12-16	11150	870	87	822
16-20	1	9	0	10	9	767	758	14	0	11	17-21	10,670	480	48	781
21-25	1	8	0	9	8	911	903	14	0	14	22-26	11,610	-940	-94	781
26-31	1	6	0	7	6	752	746	1	13	11	27-1	11,770	-160	-16	718
SEPTEMBER															
1-5	1	5	0	6	5	375	370	0	0	6	2-6	11,610	160	16	380
6-10	2	5	0	7	5	211	206	0	0	3	7-11	10,710	900	90	293
11-15	2	4	0	6	4	362	358	0	0	5	12-16	11,740	-1030	-103	250
16-20	2	4	0	6	4	176	172	0	0	3	17-21	11,920	-180	-18	151
21-25	2	4	0	6	4	52	48	0	0	1	22-26	10,820	1100	110	157
26-31	2	4	0	6	4	77	73	0	0	1	27-1	10,650	170	17	89

2712

3,094

SEGREGATION OF BEAR RIVER FLO

USING 5 AND 6 DA

All figures in mean daily second-f

VER	LAST CHANCE CANALS			GENTILE VAL. CAN.		DATE	ONEIDA RES.			BEAR RIVER AT ONEIDA			1% STOR. LOSS ON STOR. PASSING ONEIDA	DIVERTED ONEIDA TO PRES			BL AT
							CONTENTS A.F. LAST DAY	CHANGE IN CONTENTS A.F.	EQUIV. MEAN DAILY S.F.								
TOT.	STOR.	NAT.	TOT.	ST.	NR				STOR.	STOR	NAT.	TOT.	STOR	STOR.	NAT.	TOT.	STO
15	16	17	18	19			20	21	22	23	24	25	26	27	28	29	3
						2	9790										
281	0	193	193	0	38	3-7	9840	-50	-5	78	161	239	1	0	140	140	
356	159	+ 34	193	0	39	8-12	10030	-190	-19	144	214	358	1	0	147	147	1
591	76	+ 108	184	0	39	13-17	8950	1080	108	515	128	643	5	70	+ 128	198	4
699	58	+ 132	190	0	34	18-22	10280	-1330	-133	376	125	501	4	83	+ 125	208	2
824	145	+ 97	242	0	36	23-27	10080	200	20	602	125	727	6	86	+ 125	211	5
800	188	+ 77	265	1	37	28-2	10430	-350	-29	505	76	581	5	43	+ 76	119	4
659	175	+ 94	269	0	42	3-7	10780	-350	-35	355	142	497	4	34	142	176	3
462	92	+ 167	259	14	38	8-12	10730	50	5	194	128	322	2	35	+ 128	163	1
582	266	0	266	53	2	13-17	9840	890	89	251	229	480	3	141	33	174	1
915	298	0	298	52	2	18-22	8460	1380	138	626	184	810	6	156	33	189	4
1099	272	0	272	53	2	23-27	8950	-490	-49	692	170	862	7	167	33	200	5
1308	246	15	261	34	37	28-2	8950	0	0	1013	77	1090	10	121	+ 77	198	8
958	153	57	210	34	37	3-7	8720	230	23	737	91	828	7	134	50	184	5
1176	132	0	132	56	2	8-12	10,180	-1460	-146	800	119	919	8	147	33	180	6
908	174	0	174	40	2	13-17	9880	300	30	693	135	828	7	133	33	166	5
870	263	0	263	39	2	18-22	9550	330	33	628	124	752	6	111	33	144	5
1082	247	0	247	45	2	23-27	9450	100	10	750	116	866	8	111	33	144	6
1052	189	0	189	41	2	28-2	10380	-930	-78	734	120	854	7	132	33	165	5
745	155	0	155	43	2	3-7	9740	640	64	709	87	796	7	138	33	171	5
747	126	0	126	44	2	8-12	9130	610	61	633	104	737	6	118	33	151	5
736	116	0	116	40	2	13-17	9040	90	9	675	98	773	8	118	33	151	5
803	104	0	104	41	2	18-22	7890	1150	115	751	118	869	8	114	33	147	6
798	94	0	94	41	2	23-27	10730	-2840	-284	362	151	513	4	106	33	139	2
722	87	4	91	6	37	28-2	10880	-150	-12	613	87	700	6	57	65	122	5
484	0	89	89	0	44	3-7	10130	750	75	455	64	519	5	47	+ 64	111	4
350	4	57	61	0	45	8-12	10130	0	0	293	91	384	3	28	+ 91	119	2
337	0	64	64	0	46	13-17	10380	-250	-25	225	157	382	2	0	93	93	2
148	0	65	65	0	48	18-22	11030	-650	-65	86	197	283	1	0	83	83	
275	0	84	84	0	26	23-27	9930	1100	110	267	180	447	3	0	71	71	2
222	0	82	82	0	15	28-2	10080	-150	-15	74	224	298	1	0	59	59	

39,118 | 6866 | 1,546 | 24,764

STEWART TO COLLINSTON

VERAGE FLOWS

except as noted

IVER TON	1% STOR. LOSS ON STOR. PASSING PRESTON	CUB RIVER PUMPS	1% STOR. LOSS ON STOR. ST. LINE TO CUT.	DATE	CUTLER RES. CONTENTS A.F. LAST DAY	CUTLER RES. CHANGE IN CONTENTS A.F	CUTLER RES. EQUIV. MEAN DAILY S.F.	STORAGE PASSING CUTLER DAM		EAST & WEST CANALS STOR	EAST & WEST CANALS NAT.	EAST & WEST CANALS TOTAL	BEAR RIVER N.R. COLLINSTON STOR	BEAR RIVER N.R. COLLINSTON NAT.	BEAR RIVER N.R. COLLINSTON TOT.	C STEWART
TOT.	STOR.	STOR.	STOR				STOR.	STOR.		STOR	NAT.	TOTAL	STOR	NAT.	TOT.	N
32	33	34	35		36	37	38	39		40	41	42	43	44	45	4
				3	7190											
216	1	0	1	4-8	2100	5090	509	584		0	358	358	577	266	843	2
226	1	0	1	9-13	3600	-1500	-150	-225		216	466	682	-230	252	20	
553	5	0	5	14-18	9720	-6120	-612	-451		269	561	830	-454	475	21	/
436	4	0	4	19-23	9910	-190	-190	-247		338	485	823	-250	270	20	/
548	6	0	6	24-28	10800	-890	-89	29		380	419	799	20	0	20	
585	5	0	5	29-3	12040	-1220	-102	25		320	351	671	20	0	20	
408	4	0	4	4-8	16820	-4780	-478	-169		0	411	411	-174	192	18	/
187	2	0	2	9-13	15730	1090	109	113		147	368	515	113	0	113	/
288	1	37	1	14-18	11160	4570	457	27		498	287	785	19	0	19	
606	5	72	4	19-23	8360	2800	280	21		642	212	854	19	0	19	
686	5	75	4	24-28	6670	1690	169	31		572	282	854	20	0	20	
968	10	28	9	29-3	11,410	-4740	-474	19		292	443	735	18	0	18	
665	7	77	6	4-8	12730	-1320	-132	25		349	333	682	20	0	20	3
718	6	78	6	9-13	12730	0	0	31		524	247	771	21	0	21	/
711	6	78	5	14-18	12460	270	27	28		463	285	748	20	0	20	
638	5	78	4	19-23	12460	0	0	24		400	262	662	20	0	20	-
623	6	76	5	24-28	11410	1050	105	24		625	105	730	21	0	21	/
748	6	75	5	29-3	11410	0	0	32		477	275	752	20	0	20	-/
621	6	72	5	4-8	9440	1970	197	26		652	157	809	20	0	20	-/
605	5	72	5	9-13	7010	2430	243	25		645	163	808	20	0	20	-/
687	5	67	5	14-18	5560	1450	145	19		598	187	785	20	0	20	-
709	6	75	5	19-23	5410	150	15	20		538	197	735	20	0	20	
525	3	74	2	24-28	2300	3110	311	22		462	251	713	19	0	19	-
671	6	73	5	29-3	4280	-1980	-165	14		287	333	620	18	0	18	-
476	4	75	4	4-8	11670	-7390	-739	-419		0	30	30	-415	436	21	9
367	3	58	2	9-13	12730	-1060	-106	24		69	394	463	23	0	23	4
363	2	30	2	14-18	14970	-2240	-224	-35		0	328	328	-38	59	21	/
357	1	0	1	19-23	15560	-590	-59	24		0	184	184	23	484	507	8
389	3	0	3	24-28	14680	880	88	346		0	174	174	354	295	649	11
331	1	0	1	29-3	13830	850	85	156		0	96	96	157	581	738	12

1,334 13,486 1,200 10,424

PUTATION OF TOTAL NATURAL INFLOW					NATURAL FLOW TO CANALS BY PRIORITY						
ALEX. TO ONEIDA	ONEIDA TO PRESTON	PRESTON TO CUTLER	4% BEAR L. STOR REL.	TOTAL NAT. FLOW	BUDGE & JOHNSON	LAST CHANCE CANALS	GENTILE VALLEY	RIVERDALE CANALS	CUTLER CANALS	CUTLER POWER PLANT	PRIORITY FILLED
NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	
47	48	49	50	51	52	53	54	55	56	57	58
194	127	476	0	1027	32	310	72	219	394	0	46% 5-14-01
253	15	686	16	968	32	272	72	219	373	0	30% 5-14-01
167	108	910	28	1341	32	440	72	219	466	106	39% 12-1-03
154	143	592	27	1078	32	343	72	219	412	0	60% 5-14-01
161	32	360	30	691	30	200	32	91	333	0	31% 9-12-99
113	123	208	33	564	30	133	35	33	333	0	67% 3-1-97
184	87	499	27	911	32	235	72	219	353	0	15% 5-14-01
166	28	332	12	731	30	200	37	131	333	0	53% 9-12-99
130	-18	96	21	322	0	0	2	33	287	0	86% 3-1-89
109	-15	59	28	247	0	0	2	33	212	0	64% 3-1-89
139	24	94	44	317	0	0	2	33	282	0	85% 3-1-89
114	76	337	47	602	30	171	35	33	333	0	86% 3-1-97
128	21	246	40	484	13	70	35	33	333	0	26% 3-1-97
29	-21	152	42	282	0	0	2	33	247	0	74% 3-1-89
106	49	108	41	320	0	0	2	33	285	0	86% 3-1-89
103	30	122	35	297	0	0	2	33	264	0	79% 3-1-89
68	-100	100	35	140	0	0	2	33	105	0	32% 3-1-89
112	59	99	48	310	0	0	2	33	275	0	83% 3-1-89
87	-4	83	38	192	0	0	2	33	157	0	47% 3-1-89
101	19	52	34	198	0	0	2	33	163	0	49% 3-1-89
86	65	40	30	222	0	0	2	33	187	0	56% 3-1-89
98	-13	106	30	232	0	0	2	33	192	0	59% 3-1-89
136	141	-30	36	286	0	0	2	33	251	0	75% 3-1-89
124	93	205	30	458	13	44	35	33	333	0	22% 3-1-97
95	68	389	15	663	30	200	37	80	333	0	25% 9-12-99
140	102	283	8	587	13	173	35	33	333	0	86% 3-1-97
180	74	240	14	590	13	176	35	33	333	0	88% 3-1-97
213	157	393	7	864	14	217	72	219	339	0	7% 5-14-01
72	13	346	2	650	13	200	37	68	333	0	18% 9-12-99
88	92	418	3	833	14	200	67	219	333	0	86% 2-23-01

Total storage 195,544 all storage + stor. loss

DATE	BEAR RIVER BELOW STEWART	RAINBOW INLET CANAL	DINGLE INLET CANAL	TOTAL PASSING STEWART	RAINBOW + DINGLE	BEAR LAKE OUTLET CANAL	BEAR LAKE STORAGE RELEASE	DIVERTED STEW. TO ALEX.		1½% STOR. LOSS B.L. TO ALEX.	DATE	SODA RES. CONTENTS A.F. LAST DAY	SODA RES. CHANGE IN CONT. A.F.	SODA RES. EQUIV. MEAN DAILY S.F.	BEAR RIVER AT ALEX.		
	NAT.	NAT.	NAT.	NAT.	NAT.		STOR.	ST.	NA.	STOR.				STOR.	STOR.	NAT.	TOT
	1	2	3	4	5	6	7	8		9		10	11	12	13	14	15
MAY											1	8970					
1-5	12	792									2-6	10,690	-1720	-172			
6-10	12	912									7-11	11,500	-810	-81			
11-15	14										12-16	11,670	-170	-17			
16-20	15										17-21	11,540	130	13			
21-25	13										22-26	9,440	2100	210			
26-31	14										27-1	8,360	1080	90			
JUNE																	
1-5	17										2-6	10,250	-1890	-189			
6-10	17										7-11	11,340	-1090	-109			
11-15	16										12-16	11,280	60	6			
16-20	98	1094	2	1194	1096	15	-1081	0	6	0	17-21	11,210	70	7			51
21-25	349	334	2	685	336	15	-321	0	30	0	22-26	11,210	0	0	-321	965	64
26-30	394	134	2	530	136	15	-121	0	32	0	27-1	10,540	670	67	-54	804	75
JULY																	
1-5	578	96	1	675	97	15	-62	1	14	0	2-6	11,600	-1060	-106	-169	843	67
6-10	529	52	1	581	53	90	33	1	14	0	7-11	9,630	1970	197	223	718	94
11-15	337	77	1	415	78	791	713	9	14	11	12-16	10,140	-450	-45	648	526	117
16-20	192	61	1	254	62	937	875	11	14	13	17-21	9,440	700	70	921	337	125
21-25	134	60	1	195	61	1080	1019	12	13	15	22-26	9,400	-960	-96	896	213	110
26-31	119	57	19	195	76	829	753	6	14	11	27-1	8,960	1440	120	856	259	111
AUGUST																	
1-5	93	48	8	149	56	929	873	0	10	13	2-6	9,150	-90	-9	851	219	107
6-10	91	41	5	137	46	1060	1014	0	10	15	7-11	9,620	-570	-57	942	174	111
11-15	84	32	5	121	37	993	956	0	10	14	12-16	11,360	-1740	-174	768	141	90
16-20	80	24	6	110	30	802	772	0	10	12	17-21	11,130	230	23	783	144	92
21-25	65	23	6	94	29	788	759	0	10	11	22-26	10,340	790	79	827	84	911
26-31	51	23	6	80	29	738	709	0	10	11	27-1	9,960	380	32	730	109	839
SEPTEMBER																	
1-5	45	16	2	63	18	533	515	0	10	8	2-6	11,040	-1080	-108	399	107	506
6-10	34	14	1	49	15	470	455	0	1	7	7-11	10,810	230	23	471	114	585
11-15	26	15	1	42	16	487	471	0	0	7	12-16	10,420	390	39	503	82	585
16-20	24	15	1	40	16	427	411	0	0	6	17-21	11,630	-1210	-121	284	136	420
21-25	23	13	6	42	19	72	53	0	0	1	22-26	10,920	660	66	118	190	308
26-30	24	16	6	46	22	177	155	0	0	2	27-1	10,170	800	80	233	155	388

413

1614

SEGREGATION OF BEAR RIVER FLOW

USING 5 AND 6 DAY A

All figures in mean daily second-feet e

LAST CHANCE CANALS			GENTILE VAL. CAN.		DATE	ONEIDA RES.			BEAR RIVER AT ONEIDA			1% STOR. LOSS ON STOR. PASSING ONEIDA	DIVERTED ONEIDA TO PRES.			BEAR RI AT PRES.	
						CONTENTS A.F. LAST DAY	CHANGE IN CONTENTS A.F.	EQUIV. MEAN DAILY S.F.									
TOR.	NAT.	TOT.	ST.	NB				STOR.	STOR	NAT.	TOT.	STOR.	STOR.	NAT.	TOT.	STOR	NAT
16	17	18	19			20	21	22	23	24	25	26	27	28	29	30	31
						9,740											
					3-7	9,880											
					8-12	9,980											
					13-17	9,180											
					18-22	8,900											
					23-27	8,110											
					28-2	9,410											
					3-7	10,530											
					8-12	10,380											
					13-17	10,180											
0	400	400	0	42	18-22	10,530	-350	-35			381	0	0	90	90		
0	442	442		59	23-27	9,320	1210	121	200	711	511	0	0	158	158	-200	644
261	356	432	0	66	28-2	9,270	50	50	-80	579	499	0	0	152	152	-86	514
0	413	413	0	72	3-7	9,450	-180	-18	-187	579	392	0	0	161	161	-187	442
56	339	425	0	72	8-12	8,240	1210	121	258	496	754	3	0	193	193	258	357
53	267	420	1	72	13-17	9,100	1140	114	608	376	984	6	0	205	205	602	170
21	258	379	3	72	18-22	9,470	630	63	860	217	1077	9	0	182	182	851	79
14	200	334	27	39	23-27	9,860	-390	-39	696	282	978	7	134	37	171	555	288
0	238	238	0	37	28-2	9,930	-3070	-256	600	260	860	6	0	163	163	594	138
72	52	344	13	35	3-7	9,550	380	38	584	321	905	6	126	33	159	452	341
9	139	308	12	35	8-12	10,930	-1380	-138	623	223	846	6	120	33	153	497	175
72*	141	313	13	37	13-17	10,530	400	40	623	156	779	6	89	71	160	528	55
9*	147	263	23	37	18-22	10,330	200	20	661	184	845	7	123	36	159	531	180
6*	84	240	23	37	23-27	10,230	100	10	658	200	858	7	95	73	168	556	231
4	45	189	12	35	28-2	9,220	1010	84	653	248	901	7	114	33	147	532	262
1*	107	138	0	45	3-7	9,180	40	40	408	162	570	4	0	126	126	404	62
3*	114	137	0	43	8-12	9,690	-510	-51	397	180	577	4	0	120	120	393	118
2*	82	134	6	37	13-17	9,500	190	19	464	208	672	5	36	81	117	423	137
0	135	135	0	43	18-22	10,280	-780	-78	206	243	449	2	0	98	98	204	139
0	127	127	0	37	23-27	10,280	-500	-50	68	293	361	1	0	96	96	67	180
0	127	127	0	47	28-2	9,740	1040	104	337	234	571	3	0	91	91	334	158
98																	

1,414 916 8598

[redacted]

TEWART TO COLLINSTON

ERAGE FLOWS

cept as noted

R N	1% STOR. LOSS ON STOR. PASSING PRESTON	CUB RIVER PUMPS	1% STOR. LOSS ON STOR. ST. LINE TO CUT.	DATE	CUTLER RES. CONTENTS A.F. LAST DAY	CUTLER RES. CHANGE IN CONTENTS A.F.	CUTLER RES. EQUIV. MEAN DAILY S.F.	STORAGE PASSING CUTLER DAM		EAST & WEST CANALS STOR	EAST & WEST CANALS NAT.	EAST & WEST CANALS TOTAL	BEAR RIVER N.R. COLLINSTON STOR.	BEAR RIVER N.R. COLLINSTON NAT.	BEAR RIVER N.R. COLLINSTON TOT.	COM STEWART TO ALEX. NAT.
TOT.	STOR	STOR.	STOR				STOR.	STOR.		STOR	NAT.	TOTAL	STOR.	NAT.	TOT.	NAT.
32	33	34	35		36	37	38	39		40	41	42	43	44	45	46
				3	7,010											
				4-8	4,030											
				9-13	2,010											
				14-18	11,410											
				19-23	11,410											
				24-28	2,010											
				29-3	11,410											
				4-8	12											
				9-13	17,0											
				14-18	11,0											
79	0	0	0	19-23	11		45			0	395	395			1277	402
44	0	0	0	24-28	11		13	-765		0	717	717	-765	810	45	310
428	0	0	0	29-3	11		35	1136		343	420	773	132	0	132	306
255	0	15	0	4-8			0	-139		327	466	832	-133	161	28	182
612	3	73	3	9-13			18	23		451	409	860	35	0	35	147
772	6	75	5	14-18			0	31		485	370	855	31	0	31	114
930	9	75	8	19-23			28	23		438	365	803	27	0	27	84
843	6	75	5	24-28			0	55		434	333	767	28	0	28	16
732	6	73	5	29-3			5	-92		235	466	701	-84	129	35	67
993	5	75	4	4-8			0	38		330	333	663	31	0	31	67
772	5	75	4	9-13			0	35		378	333	711	25		25	32
883	5	74	5	14-18			0	33		411	333	744	25		25	16
711	5	74	5	19-23			0	25		422	333	755	23		23	32
787	6	75	5	24-28			2	22		448	333	781	21		21	-11
794	5	75	5	29-3			0	23		424	333	757	23		23	28
476	4	74	3	4-8			0	31		292	448	740	29		29	4
511	4	75	3	9-13			0	24		287	430	717	24		24	5
560	5	73	4	14-18			0	36		305	333	638	24		24	3
363	2	29	2	19-23			0	56		115	426	541	52		52	96
252	1	25	0	24-28			0	-15		56	466	522	-30	57	27	18
492	3	25	3	29-3			0	133		0	380	380	133	363	496	10
	82	1,646	710							6,628						

1944

PLATE 2

TATION OF TOTAL TURAL INFLOW					NATURAL FLOW TO CANALS BY PRIORITY						
ONEIDA	ONEIDA TO PRESTON	PRESTON TO CUTLER	4% BEARL. STOR REL.	TOTAL NAT. FLOW	BUDGE & JOHNSON	LAST CHANCE CANALS	GENTILE VALLEY	RIVERDALE CANALS	CUTLER DAM CANALS	CUTLER POWER PLANT	PRIORITY FILLED
RT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	NAT.	
	48	49	50	51	52	53	54	55	56	57	58
											All Canal Rts. filled
2	-12	828	0	2774							
2	91	883	0	2216							
7	81	-88	0	1026	32	303	72	219	396	0	46 % 5-14-01
1	24	185	0	1287	14	440	72	225	466	70	26 % 12-1-03
9	51	58	1	1027	14	322	72	219	400	0	50 % 5-14-01
9	-7	189	28	928	14	258	72	219	365	0	24 % 5-14-01
0	35	273	35	891	14	234	72	219	352	0	14 % 5-14-01
6	36	27	40	620	13	200	37	37	333	0	2 % 9-12-99
6	35	444	30	1047	14	334	72	219	408	0	56 % 5-14-01
7	47	-24	35	463	13	49	35	33	333	0	25 % 3-1-97
3	-21	139	40	550	13	136	35	33	333	0	68 % 3-1-97
3	64	160	38	592	13	178	35	33	333	0	89 % 3-1-97
1	25	141	31	560	13	146	35	33	333	0	73 % 3-1-97
7	92	90	30	532	13	123	35	33	333	0	66 % 3-1-97
9	40	61	28	456	13	42	35	33	333	0	21 % 3-1-97
2	32	367	21	736	13	200	37	153	333	0	65 % 9-12-99
3	54	305	18	708	13	200	37	125	333	0	50 % 9-12-99
5	5	175	19	519	13	105	35	33	333	0	52 % 3-1-97
5	12	259	16	702	13	200	37	119	333	0	46 % 9-12-99
7	8	317	2	783	13	200	37	210	333	0	90 % 9-12-99
3	12	579	6	1003	14	306	72	219	392	0	44 % 5-14-01

Total Storage 107,328

DATE	BEAR RIVER BELOW STEWART	RAINBOW INLET CANAL	DINGLE INLET CANAL	TOTAL PASSING STEWART	RAINBOW + DINGLE	BEAR LAKE OUTLET CANAL	BEAR LAKE STORAGE RELEASE	DIVERTED STEW. TO ALEX.		1½% STOR. LOSS B.L. TO ALEX.	DATE	SODA RES.			BEAR R AT ALE	
												CONTENTS A.F. LAST DAY	CHANGE IN CONT. A.F.	EQUIV. MEAN DAILY S.F.		
	NAT.	NAT.	NAT.	NAT.	NAT.		STOR.	ST.	NA.	STOR.				STOR.	STOR.	NA.
	1	2	3	4	5	6	7	8		9		10	11	12	13	14
MAY								S	N		1	10,120				
1-5	13	1686	5	1704	1691	10	-1681		0	0	8-6	10,[illegible]	-240	-24	-1205	240
6-10	13	1492	4	1509	1496	10	-1486		0	0	7-11	10,530	-170	-17	-1503	220
11-15	12	1486	4	1502	1490	10	-1480		0	0	12-16	10,540	-10	-1	-1481	214
16-20	14	1420	4	1438	1424	10	-1414		0	0	17-21	8,800	+1740	+174	-1240	205
21-25	21	1706	22	1749	1728	10	-1718		0	0	22-26	7,910	+890	+89	-1629	237
26-31	23	1760	17	1800	1777	268	-1509		0	0	27-1	7,440	+470	+47	-1470	240
JUNE																
1-5	24	1654	5	1683	1659	518	-1141		31	0	2-6	9,420	-1980	-198	-1339	222
6-10	26	1361	3	1391	1365	538	-827		31	0	7-11	8,520	+900	+90	-737	176
11-15	27	715	2	744	717	534	-174		31	0	12-16	8,060	+460	+46	-128	998
16-20	28	297	3	328	300	730	400	0	31	6	17-21	8,100	-40	-4	390	592
21-25	28	262	8	298	270	678	408	0	35	6	22-26	10,850	-2750	-275	127	806
26-30	28	227	5	260	232	475	243	3	34	3	27-1	8,780	+2070	+207	444	664
JULY																
1-5	29	189	3	220	192	464	272	27	14	4	2-6	7,800	+980	+98	339	611
6-10	27	215	1	243	216	1113	897	18	14	13	7-11	6,810	+990	+99	965	437
11-15	25	187	0	212	187	1374	1187	3	14	18	12-16	7,770	-960	-96	1270	330
16-20	21	142	0	163	142	1256	1114	6	13	17	17-21	9,020	-1250	-125	966	886
21-25	20	141	3	164	144	1172	1028	14	14	15	22-26	9,820	-800	-80	919	249
26-31	5	161	11	177	172	1155	983	6	14	15	27-1	10,470	-650	-54	908	27[illegible]
AUGUST																
1-5	10	140	12	162	152	1022	850	0	6	13	2-6	9,340	+1130	+113	950	303
6-10	20	123	11	154	134	1111	977	2	14	15	7-11	10,500	-1160	-116	844	20[illegible]
11-15	20	113	9	142	122	1021	899	3	13	13	12-16	10,900	-460	-46	887	225
16-20	17	67	8	92	72	1001	926	3	13	14	17-21	10,280	+680	+68	977	231
21-25	16	36	11	63	47	1003	936	3	13	14	22-26	9,630	+650	+65	1[illegible]	20[illegible]
26-31	15	33	6	54	39	998	959	3	13	14	27-1	10450	-810	-68	37[illegible]	195
SEPTEMBER																
1-5	12	26	1	39	27	934	907	0	10	14	2-6	10,8[illegible]	-[illegible]	-41	550	151
6-10	7	21	1	30	23	935	907	0	10	14	7-11	10,3[illegible]	+540	+54	947	123
11-15	6	18	5	29	23	846	813	0	10	12	12-16	11,400	-1080	-108	733	103
16-20	6	41	6	53	47	642	596	0	10	9	17-21	11,000	+400	+40	627	250
21-25	9	82	4	96	87	703	616	0	10	9	22-26	11,050	-50	-5	624	240
26-31	8	123	3	135	126	668	542	0	10	8	27-1	10,970	-60	+6	540	360

928

2518

SEGREGATION OF BEAR RIVER FLOW

USING 5 AND 6 DAY

All figures in mean daily second-fee

R	LAST CHANCE CANALS			GENTILE VAL. CAN.		DATE	ONEIDA RES.			BEAR RIVER AT ONEIDA			1% STOR. LOSS ON STOR. PASSING ONEIDA	DIVERTED ONEIDA TO PRES.			BEA AT F
							CONTENTS A.F. LAST DAY	CHANGE IN CONTENTS A.F.	EQUIV. MEAN DAILY S.F.								
T.	STOR.	NAT.	TOT.	ST.	NB				STOR.	STOR.	NAT.	TOT.	STOR.	STOR.	NAT.	TOT.	STOR.
S	16	17	18	19			20	21	22	23	24	25	26	27	28	29	30
				S	IN	2	10130										
1	0	12	12		0	3-7	7850	+2280	+326			1280				18	
2	0	8	8		0	8-12	7850	0	0			1112				19	
7	0	12	12		1	13-17	8220	-700	-70			972				18	
4	0	47	47		77	18-22	7550	+1000	+100			1220				84	
+1	0	89	99		63	23-27	6820	+730	+73			1007				102	
4	0	306	306		66	28-2	9840	-3020	-362			626				188	
39	0	336	336		61	3-7	9880	-40	-4			685				135	
9	0	425	425		61	8-12	8590	+1290	+129			888				153	
74	0	432	432		68	13-17	10480	-1890	-189			368				155	
5	0	423	423	0	76	18-22	8900	+1580	+158	548	390	938	5	0	146	146	543
30	0	430	430	0	77	23-27	8240	+660	+66	193	615	808	2	0	96	96	191
2	6	440	446	0	63	28-2	8640	-400	-40	398	485	883	4	0	130	130	394
70	20	440	460	0	59	3-7	8500	+140	+14	333	388	721	3	2	156	156	330
32	21	389	410	0	65	8-12	8020	+480	+48	992	235	1248	10	0	169	169	981
6	54	336	390	0	68	13-17	9450	-1430	-143	873	116	989	9	0	168	168	864
51	208	144	352	22	35	18-22	8770	+680	+68	804	290	1094	9	120	33	153	675
98	95	249	344	0	56	23-27	8410	+360	+36	820	252	1072	9	0	164	164	851
37	68	279	347	0	44	28-2	9090	-680	-57	783	129	912	8	0	169	169	775
52	106	207	313	0	60	3-7	9600	-510	-51	793	181	974	8	0	158	158	785
18	48	219	267	0	41	8-12	9500	+100	+10	806	197	1003	8	0	150	150	798
4	24	200	224	18	37	13-17	7640	+1860	+186	981	148	1129	10	41	112	153	930
8	39	189	228	35	30	18-22	9220	-1580	-158	745	170	915	11	112	33	145	622
4	60	145	205	30	35	23-27	8410	+810	+81	975	201	1176	10	124	33	157	841
3	0	143	143	28	37	28-2	7890	+520	+52	830	281	1110	9	54	99	153	826
	0	127	127	0	65	3-7	9180	-1290	-129	721	185	929	7	0	129	129	714
3	18	122	140	0	66	8-12	9550	-370	-37	892	191	1083	9	0	127	127	883
1	12	109	121	0	68	13-17	9360	+190	+19	712	235	945	7	0	114	114	703
2	0	105	105	0	46	18-22	9130	+230	+23	620	438	1058	6	0	108	108	644
1	0	111	111	0	20	23-27	9500	-370	-37	567	397	964	6	0	107	107	561
1	0	107	107	0	18	28-2	9550	-50	-5	535	439	974	5	0	68	68	530

8,1[illegible]

1,386

1,564

4,613

STEWART TO COLLINSTON

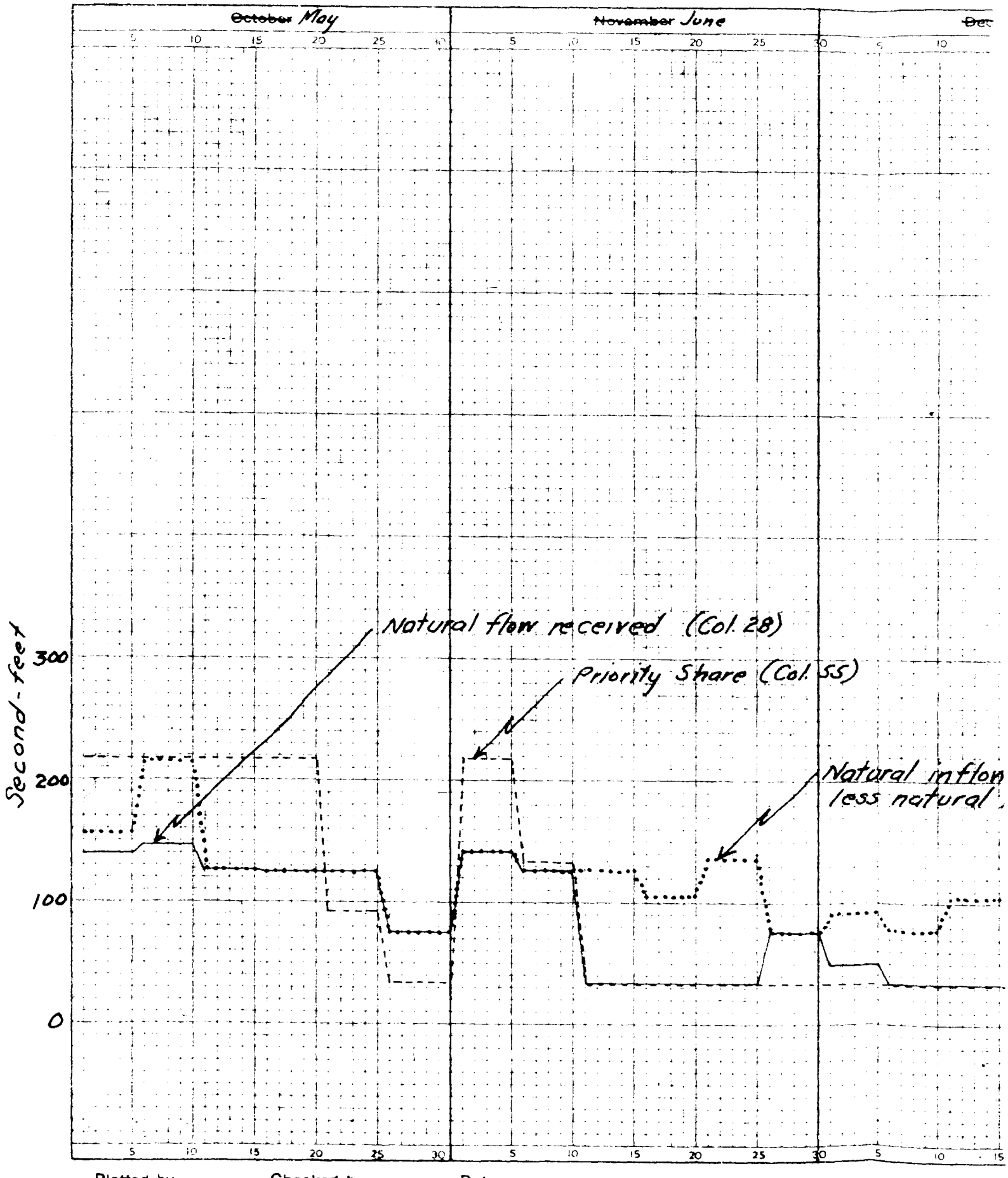
ERAGE FLOWS

cept as noted

ER ON	1% STOR. LOSS ON STOR. PASSING PRESTON	CUB RIVER PUMPS	1% STOR. LOSS ON STOR. ST. LINE TO CUT.	DATE	CUTLER RES. CONTENTS A.F. LAST DAY	CUTLER RES. CHANGE IN CONTENTS A.F.	CUTLER RES. EQUIV. MEAN DAILY S.F.	STORAGE PASSING CUTLER DAM	EAST & WEST CANALS STOR	EAST & WEST CANALS NAT.	EAST & WEST CANALS TOTAL	BEAR RIVER NR. COLLINSTON STOR.	BEAR RIVER NR. COLLINSTON NAT.	BEAR RIVER NR. COLLINSTON TOT.	CO STEWART
TOT.	STOR.	STOR.	STOR.				STOR.	STOR.	STOR	NAT.	TOTAL	STOR.	NAT.	TOT.	NA
32	33	34	35		36	37	38	39	40	41	42	43	44	45	46
				3	4030										
350		0		4-8	5820	-1790	-179				65			2964	7
362		0		9-13	8770	-2950	-295				212			3700	6
1162		0		14-18	7670	+1100	+110				330			3432	6
476		0		19-23	16500	-8830	-883				509			3658	6
216		0		24-28	12260	+4240	+424				772			3602	6
825		0		29-3	10750	+1510	+156				885			3007	6
813		0		4-8	15080	-4330	-433				633			2400	5
889		0		9-13	9870	+5210	+521				792			1892	7
313		0		14-18	9650	+220	+22				852			507	2
864	5	0	5	19-23	11410	-1760	-176	792	0	574	574	792		1218	2
882	2	0	2	24-28	10530	+880	+88	275	0	269	269	275		2356	5
787	4	0	4	29-3	4330	+6200	+620	828	172	561	739	833	442	1275	4
579	3	14	3	4-8	5970	-1640	-164	-242	388	466	854	-240	269	29	4
1061	10	57	10	9-13	10530	-4560	-456	85	394	436	830	79	0	79	1
866	9	75	8	14-18	14240	-3710	-371	70	332	431	762	67	0	67	1
905	9	75	8	19-23	12260	+1980	+198	396	385	333	718	393	0	393	1
879	9	70	8	24-28	14820	-2540	-254	308	202	466	668	308	14	322	8
840	8	58	7	29-3	14240	+560	+47	578	171	452	623	578	0	578	1
844	8	52	7	4-8	14510	-280	-28	353	337	337	674	359	0	359	1
850	8	50	7	9-13	14800	-280	+28	429	332	344	676	428	0	428	
1016	10	51	9	14-18	12820	+1980	+198	681	377	333	710	687	0	687	1
720	6	65	5	19-23	10310	+2510	+251	372	425	333	758	366	0	366	1
989	9	50	8	24-28	9420	+880	+88	443	419	333	752	446	0	446	1
942	8	50	8	29-3	7890	+1540	+128	472	413	333	746	476	0	476	1
768	7	50	7	4-8	9430	-1540	-154	204	292	466	758	203	9	212	1
971	9	50	9	9-13	10750	-1320	-132	434	250	466	716	438	38	476	1
814	7	30	7	14-18	12820	-2070	-207	291	166	466	632	297	82	379	7
971	6	0	6	19-23	15650	-2830	-283	349	0	435	435	352	386	738	1
894	6	0	6	24-28	14900	+850	+85	634	0	416	416	687	686	1373	1
930	5	0	5	29-3	13670	+1150	+115	635	0	368	368	625	616	1251	1

1,012 8,1[illegible] 1,410 51,778

9-279-e Dec. 1917 UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL



Plotted by ..... Checked by ..... Date .....

RVEY (WATER RESOURCES BRANCH) HYDROGRAPH FOR

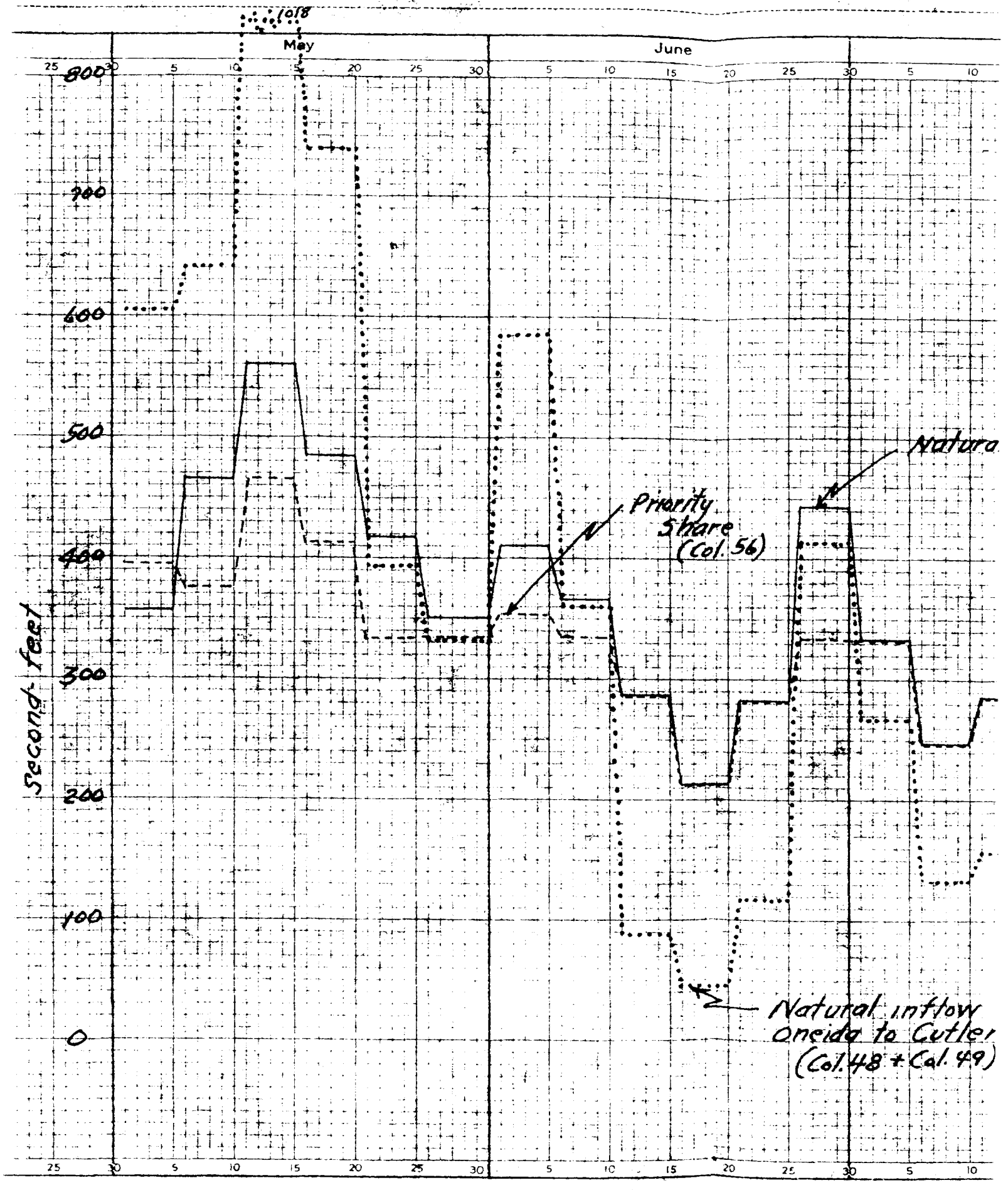
July ~~January~~ Aug ~~February~~ Sept.

20 25 30 5 10 15 20 25 30 5 10 15 20 25 30

RIVERDALE CANALS
1940

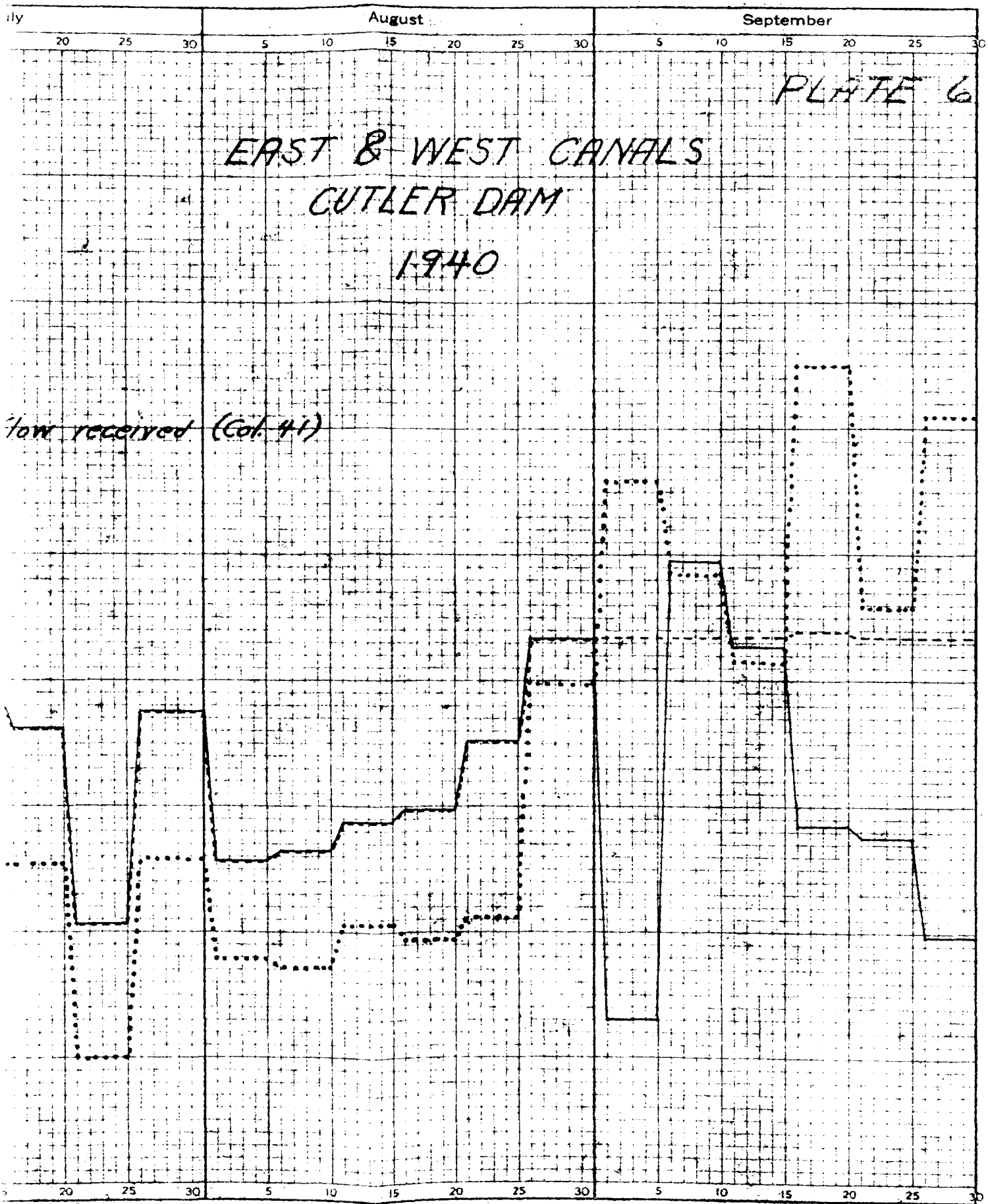
Alexander to Oneida
w to Gentile Valley Canal (Col. 47 - Col. 19 No.)

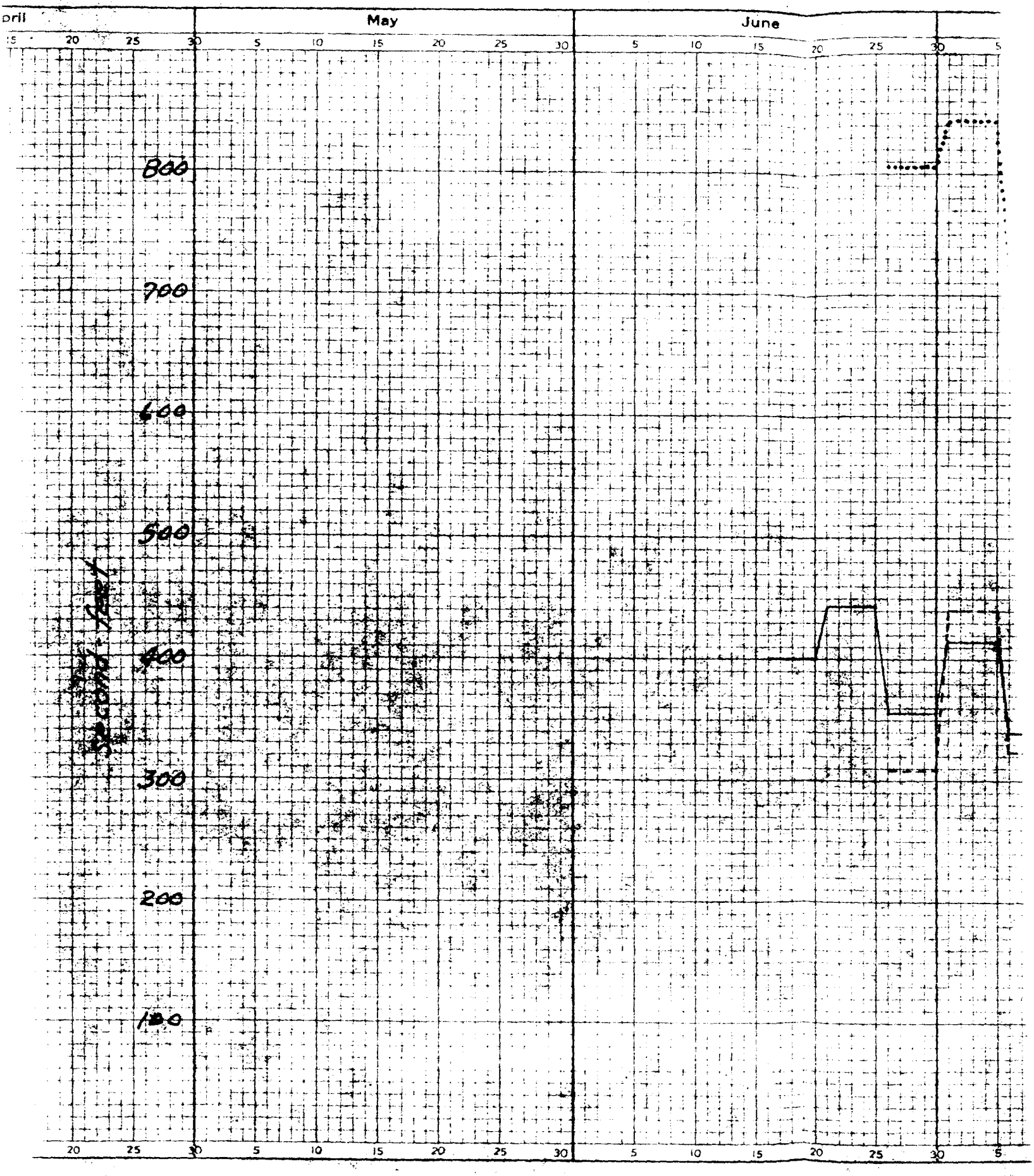
20 25 30 5 10 15 20 25 30 5 10 15 20 25 5 10


1018
May
June
800
700
600
500
400
300
200
100
0
Second-feet
Priority Share (Col. 56)
Natural inflow Oneida to Cutler (Col. 48 + Col. 49)

File No.

Field



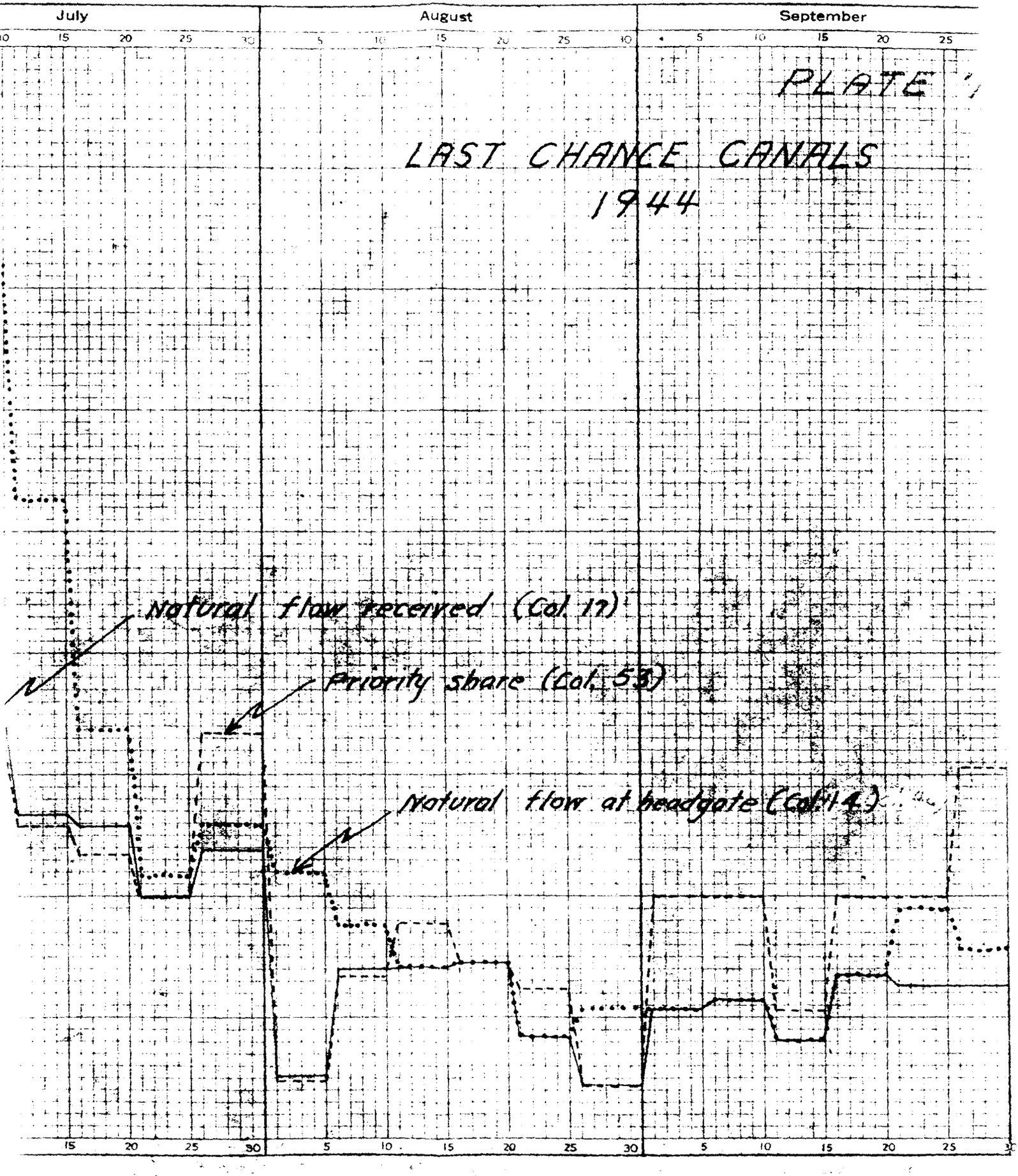

April
May
June
15
20
25
30
5
10
15
20
25
30
5
800
700
600
500
400
300
200
100
20
25
30
5
10
15
20
25
30
5
10
15
20
25
30
5

File No. | Washington
Field

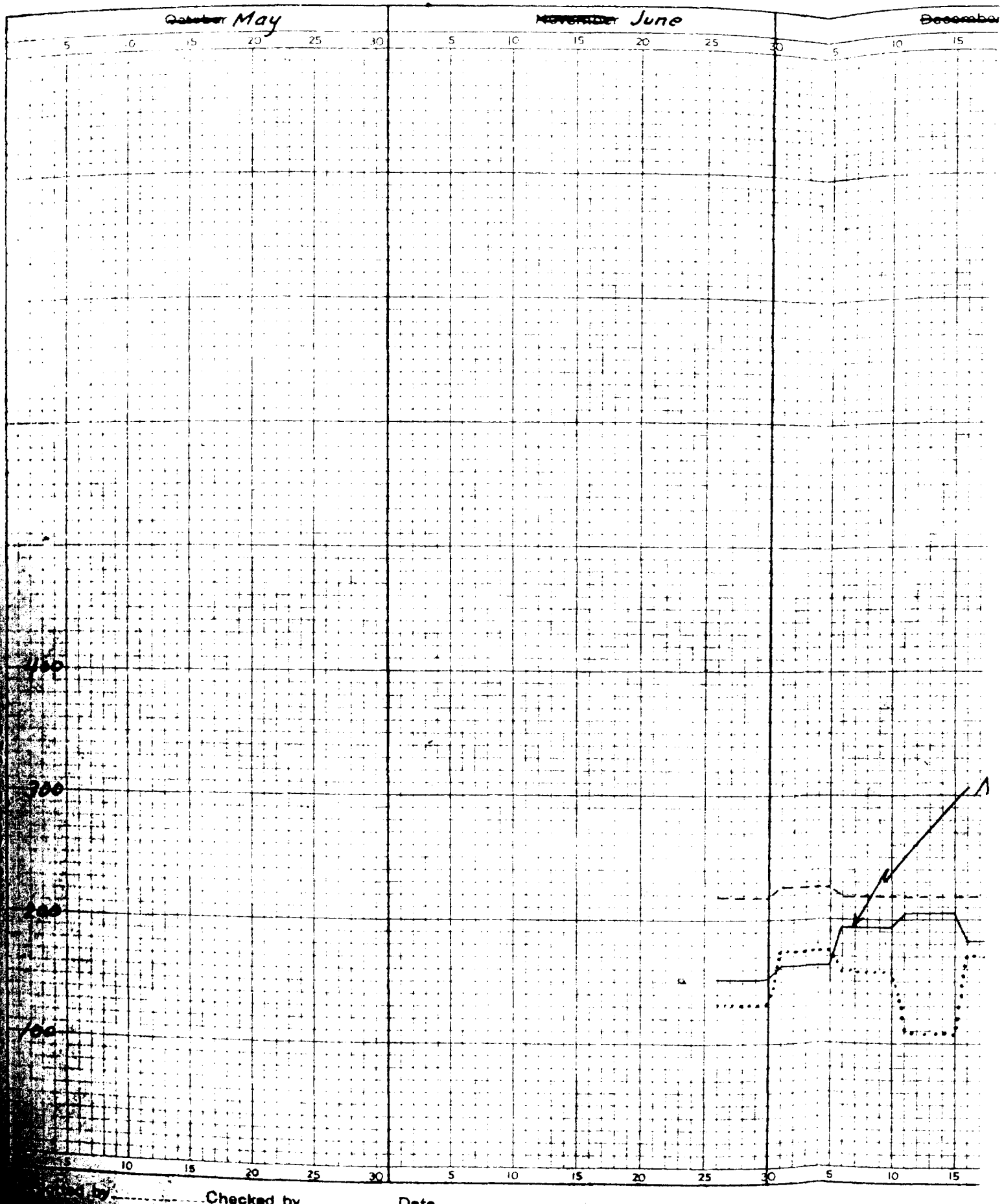
July | August | September

PLATE 1

LAST CHANCE CANALS
1944

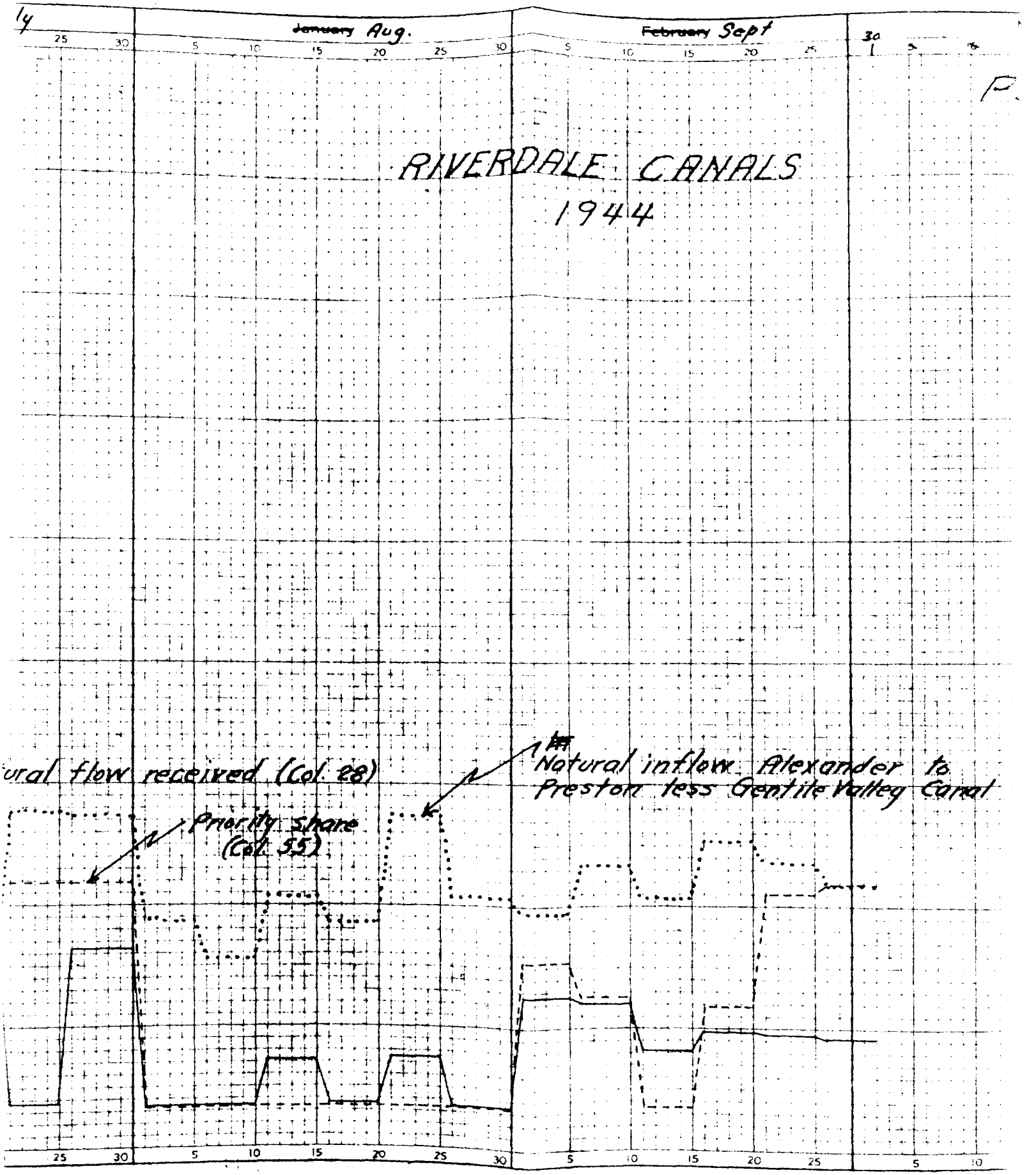


9.279-e-Dec., 1917 UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SUR

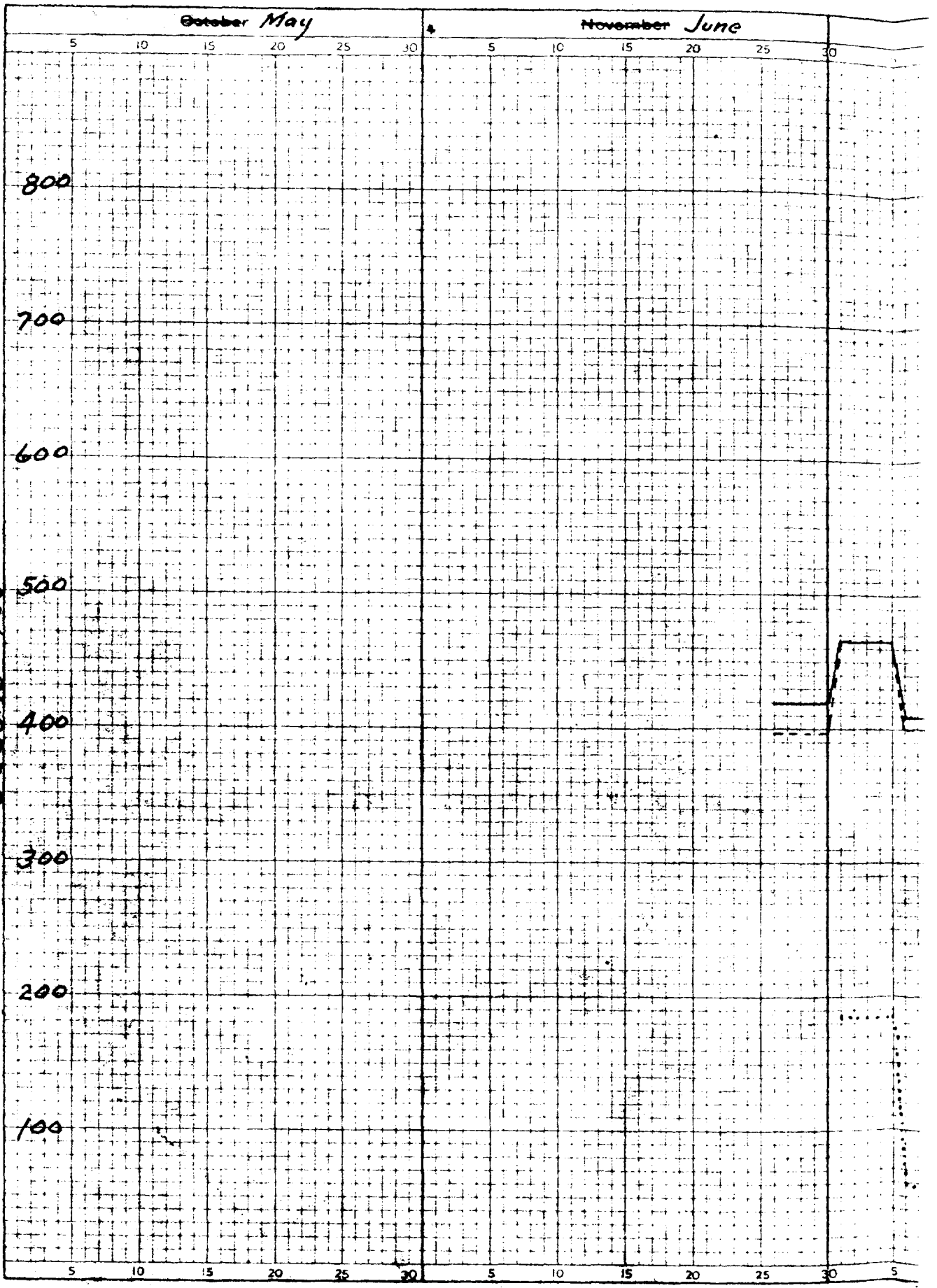


Checked by..... Date.....

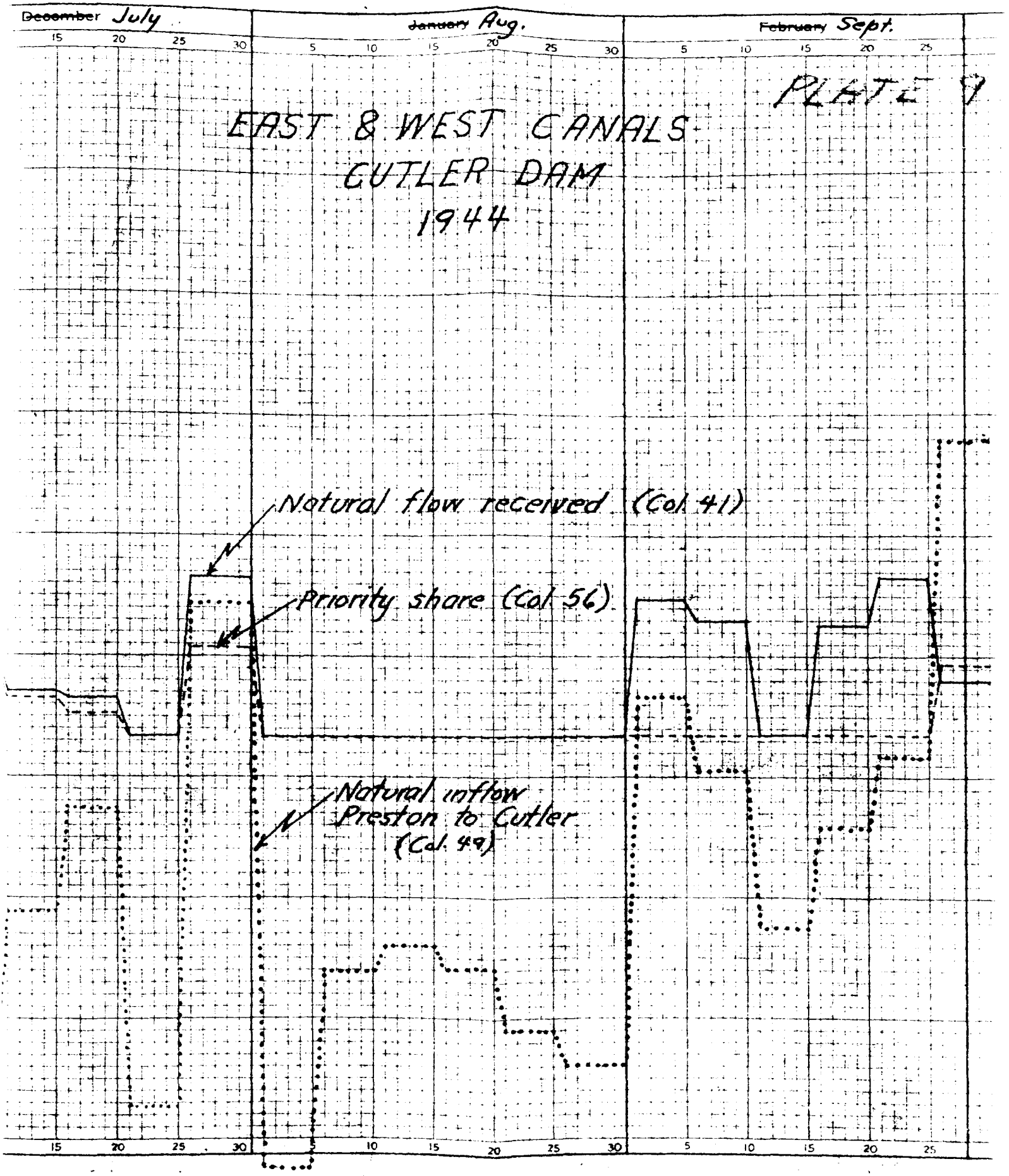
(WATER RESOURCES BRANCH) HYDROGRAPH FOR

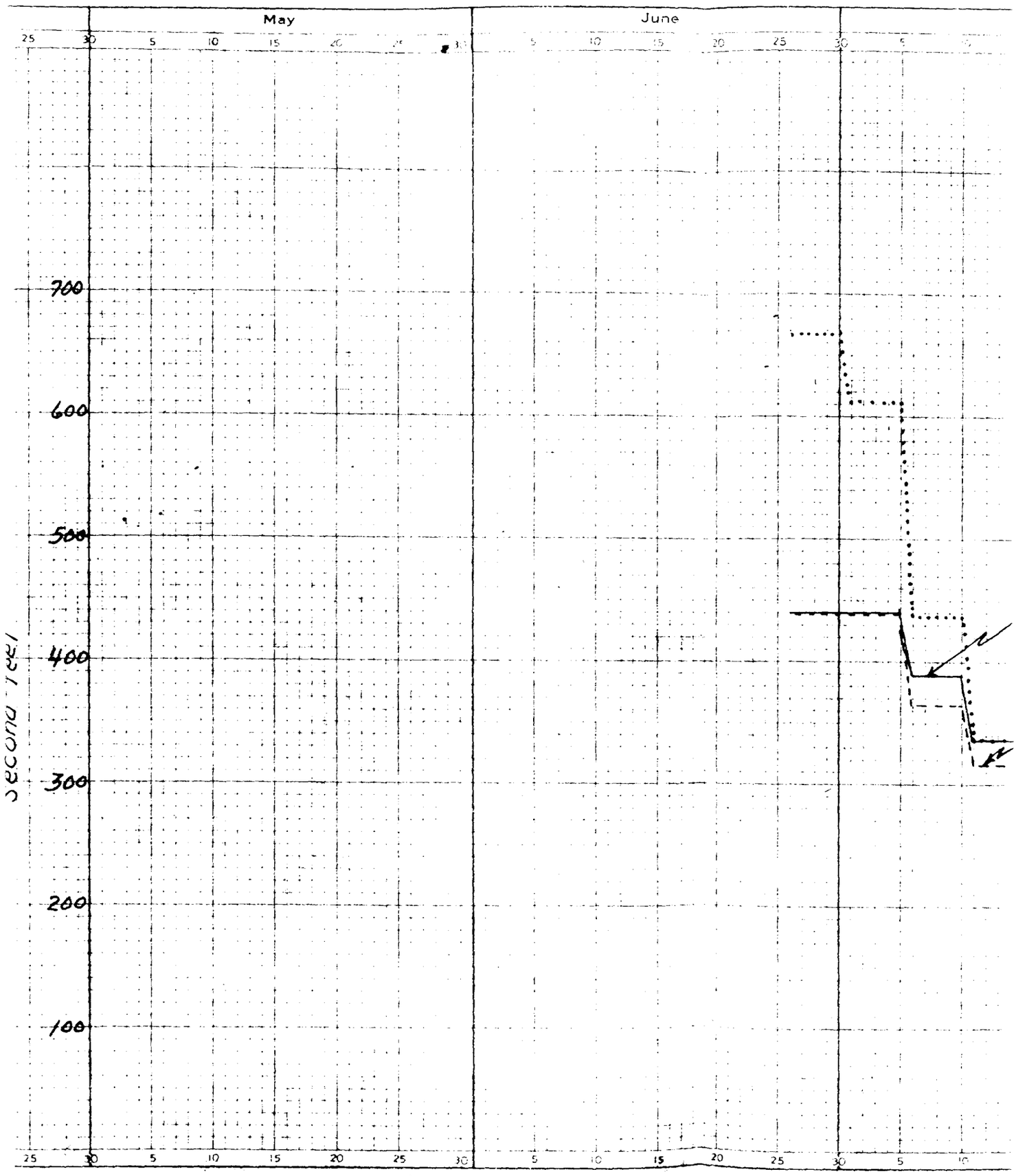


9-279-e—Dec., 1917 UNITED STATES DEPARTMENT OF THE INTERIOR GEOL



Plotted by..... Checked by..... Date.....


December July
January Aug.
February Sept.
15 20 25 30 5 10 15 20 25 30 5 10 15 20 25
PLATE 9
EAST & WEST CANALS
CUTLER DAM
1944
Natural flow received (Col 41)
Priority share (Col 56)
Natural inflow
Preston to Cutler
(Col 49)
15 20 25 30 5 10 15 20 25 30 5 10 15 20 25

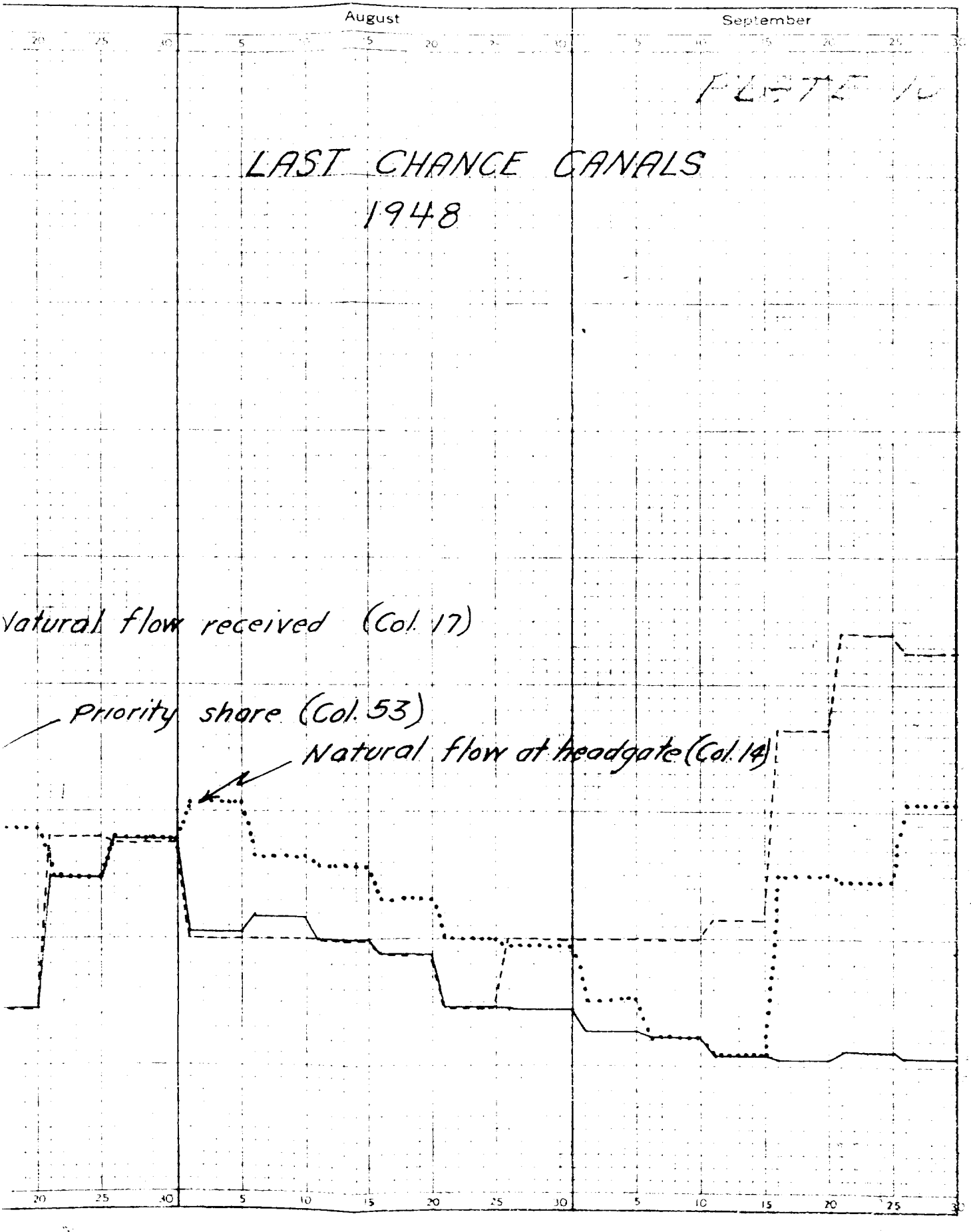

May
June
25
30
5
10
15
20
25
30
5
10
15
20
25
30
5
10
700
600
500
400
300
200
100
SECOND FEET

File No. Washington

Field

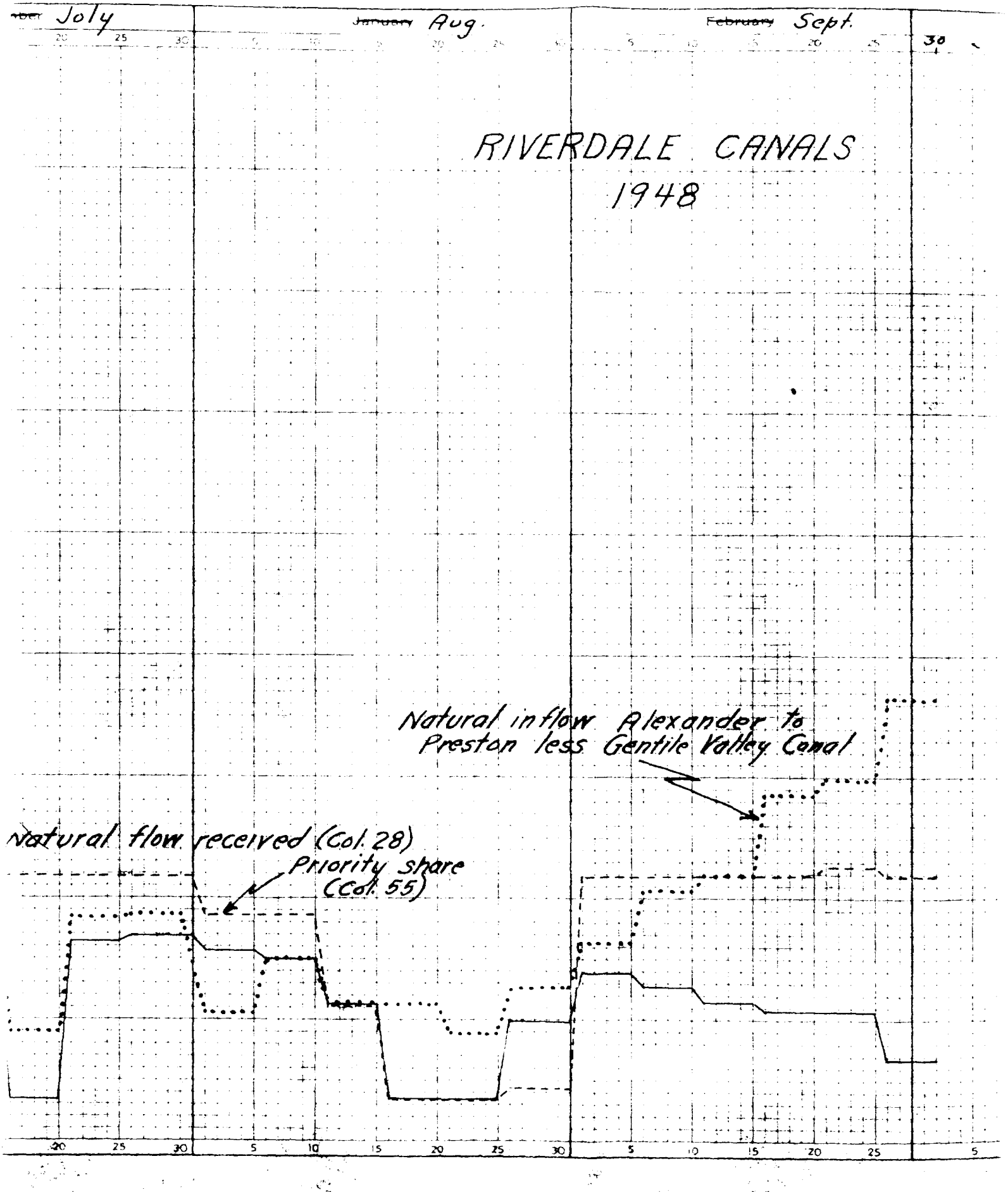
PLATE VI

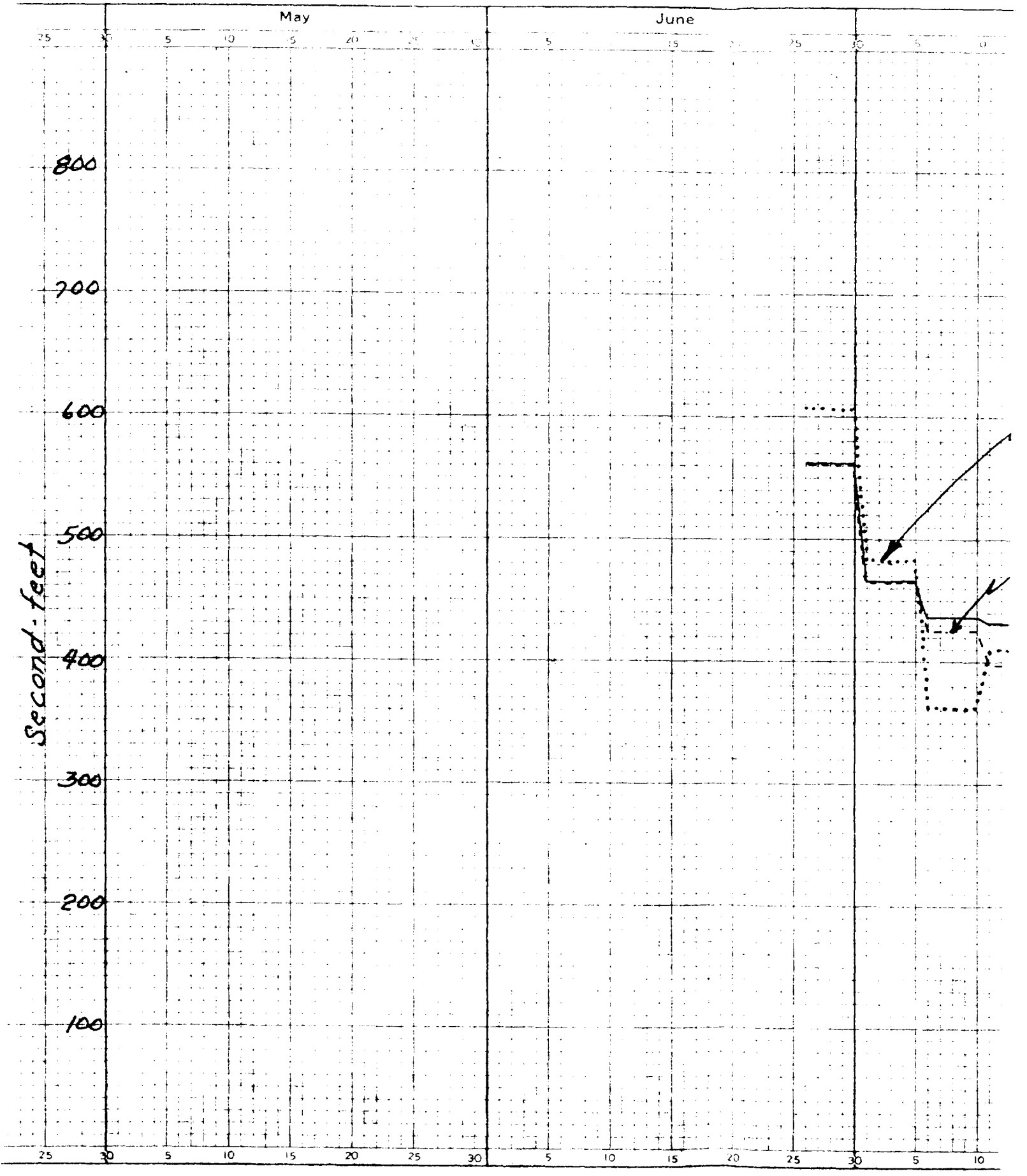
LAST CHANCE CANALS
1948



9-279-e Dec., 1917 UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICA

Plotted by ..... Checked by ..... Date .....


~~ober~~ July
~~January~~ Aug.
~~February~~ Sept.
RIVERDALE CANALS
1948
Natural inflow Alexander to Preston less Gentile Valley Canal
Natural flow received (Col. 28)
Priority share (Col. 55)


May
June
800
700
600
500
400
300
200
100
Second-feet
25
30
5
10
15
20
25
30
5
10
15
20
25
30
5
10

File No. Washington

Field