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REPORT TO BEAR RIVER COMPACT COMMISSION

on

BEAR RIVER COMPACT REVISIONS DATED 7-29-48

and

ANALYSIS OF STREAM FLOW RECORDS AND COMPACT DELIVERIES

October, 1948

Prepared By

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I N T R O D U C T I O N

The tentative draft of the Bear River Compact was presented to the Bear River Compact Commission at Jackson, Wyoming on June 23 and 24, 1948. The presentation consisted principally of illustrating and explaining the section relating to the division of the waters of the river system. The effect of the tentative compact in operation was illustrated by means of hydrographs showing compact deliveries in 1944 and 1946 as compared to actual diversions during the same years.

The object of the Jackson meeting was to familiarize the Commission with the tentative draft. The various provisions of the compact would be considered at later meetings, following a period of time in which the state officials would have an opportunity to study the compact and consult with their water users. However, in the short discussion following the presentation, several recommendations for revisions in the tentative draft were made by the Commission. These recommendations were as follows:

1. Increase the maximum allotments from a basis of one second-foot to each fifty acres of land to one second-foot to each thirty-five acres of land.
2. Lower the delivery figure to the Chapman Canal lands in Utah from 120 cubic feet per second to 112 cubic feet per second.
3. Changing the non-irrigation season storage clause for the Chapman Canal to wording agreeable to Wyoming.
4. Provide in the compact for domestic and stockwater uses on the tributaries and for reasonable future increases in the same.

There was also discussion on the allocation of ten cubic feet per second to the Upper Utah Section; possible increased depletion of the main stream

supply unless diversions from tributaries were placed under some limitation; and storage above Bear Lake. While no specific recommendations were made by the Commission on these, it was evident that the compact should provide for some limitation on tributary diversions, and if upstream storage was allowed, it should be so limited as to not injure irrigation diversion rights below Stewart Dam.

The Compact Commission requested that the provisions of the compact be revised, incorporating the recommended changes, and that new hydrographs be prepared for the past years of record, showing the revised compact in operation. The compact was revised as recommended, the revisions being dated July 29, 1948, and transmitted to the Commission.

REVISIONS IN TENTATIVE DRAFT

In the revision of the tentative draft, Articles V and VI were rewritten, and several new definitions were added to Article II, in order to produce a clearer definition of the division of the waters among the several river sections. Provisions were included, placing a limitation on increased diversions from tributaries and on upstream storage, in addition to the specific recommendations of the Commission. The changes incorporated in the revision are briefly explained in the following paragraphs.

Maximum Allocation Change:

The basic allocations of the first tentative draft (dated 3-31-48) were not changed, and the increase of maximum allocations from one second-foot to fifty acres to one second-foot to thirty-five acres was done by adding one higher allocation to the allocation tables. The net effect of this is to retain the basic division between the states in close conformity with their primary rights on a basis of one to fifty, and in addition, allow greater diversions during the high water period for flood water rights. This would not be

in conflict with the Idaho decrees and Wyoming law, and places flood water distribution on a proportional total acreage basis. The tables of allocations are graphically shown on Plates 4 and 5, which accompany this report.

Chapman Canal Changes:

In the tentative draft, the maximum allowable delivery in the Chapman Canal to Utah was based on the maximum capacity of that canal. This was revised to allow one cubic foot per second for each seventy acres of land now under irrigation, which would be in conformity with Wyoming adjudication allowance. Since it was to be derived from the Upper Wyoming allocation, the date of priority was omitted, as it takes its respective place in that section's priorities. Diversion, during the non-irrigation season, was made contingent on the canal owners complying with Wyoming law to obtain a storage right.

Domestic and Stock Water on Tributaries:

Provisions relating to domestic and stock water on tributaries were included as necessary. As written, it provides for present uses and possible future reasonable increase for this purpose during both the irrigation season and non-irrigation season.

Limitation on Tributaries:

In the original tentative draft, only interstate tributaries were mentioned. No limitation was placed on possible increased diversions from interstate or intrastate tributaries which might affect flows available for distribution from the main stem of the river. Although no recommendation was made concerning tributaries, a provision placing a limitation on increased diversions from tributaries was incorporated in Article VI of the revision dated 7-29-48. The object of this limitation is to prohibit any increase in acreage, increase in present vested rights, or construction of any storage reservoirs

on tributaries which would materially decrease present excess flows from tributaries that now normally contribute to the main stem supplies. It is believed this provision is liberal enough to allow future storage on some tributaries, where diversions of water to such storage will not result in a material decrease in the tributaries net contribution to the main stem of the river system. The Commission will need adopt some method of checking on tributary contribution, use, and rights.

Upstream-storage Limitation:

Storage provisions in revised Article V are the same as in the first tentative draft, except that it is made conditional on the sections limiting their maximum diversions to one second-foot for each fifty acres. Storage is also further limited to those times when the flows past Stewart are greater than six hundred acre-feet daily. Such a limitation will not materially affect storage for the sections above Stewart Dam in normal years as indicated by the records for the years 1944 to 1947. It would probably eliminate all storage in drought years, such as 1940, 1934, and 1931.

Change in Point of Determination of Divertible Flow for Upper Division:

The point of determination of divertible flow in the first tentative draft was at the Utah-Wyoming State Line near Randolph. This called for deliveries past that point, which with expected return flows, would provide sufficient water to fill the allocations in the Middle Wyoming Section. It was deemed advisable to change the point of determination to a point immediately below the lowest diversion in the Middle Wyoming Section. This eliminates the allowance for return flow, which may have been greatly in error. In the table of allocations in the first report, the total divertible flow was the sum of the allocations for the Upper Wyoming Section, Middle Utah Section, and flow to pass the Utah-

Wyoming State Line near Randolph. In the revised table of allocations, the total divertible flow is now the sum of the allocations to the Upper Wyoming Section, Middle Utah Section, and Middle Wyoming Section.

ADDITIONAL RECOMMENDATIONS

Upper Utah Section:

At the Jackson meeting, a question was raised on the grant of ten second-feet for the Upper Utah Section. It was felt this amount was in excess of the actual rights in this section and did not conform to the general plan of relative priorities in the compact. On July 28, 1948 a reconnaissance was made of the Wright Transmountain Canal and Deer Creek, which is the supply stream. On this date, the total supply in Deer Creek above the point of diversion of the canal, was one cubic foot per second. Of this supply, 0.9 cubic foot per second was being diverted into the canal. On the same date, Yellow Creek was practically dry at the county road bridge on the Bear River-Coalville road. Yellow Creek was also dry at the former Yellow Creek near Evanston gaging station site. This canal should probably be turned off when the water no longer reaches the old gaging site. This is immediately above the lands for which this canal furnishes a supplemental supply. However, if this small supply is to be classed as stock water, the diversion would be allowed as stock water supply for the range lands on the headwaters of Yellow Creek. The claimed date of priority by the Wright Transmountain Canal is 1869.

From the foregoing, it does seem reasonable that if a maximum diversion limitation of 4.00 cubic feet per second is placed on the Wright Transmountain Canal there would be no violation of downstream rights, as the decrease in supply would limit the diversion to only a stock water stream before there would be any possibility of depriving any downstream earlier dated right of water.

The only other irrigation right in the Upper Utah Section is the Hovarka East Fork Canal. This Canal has an 1896 priority for 4,34 cubic feet per second on the basis of one cubic foot per second for each fifty acres of land. A reasonable way of regulating this right would be to have it expire when an equal dated right expires in the Upper Wyoming Section. It can be noted on Plate 3 that the Upper Wyoming Section is entitled to 466 cubic feet per second of 1896 priority. The allocations to the Upper Wyoming Section drops below 466 cubic feet per second in 1944, 1946, and 1947 on the following dates:

1944	July 9
1946	June 23
1947	July 12

On these dates the flow at the Bear River near Utah-Wyoming State Line gaging station was 521, 420, and 416 cubic feet per second, respectively. A reasonable criteria would be that the right should expire when the flow at this gaging station, following high water, decreases to less than four hundred cubic feet per second. Likewise, during the high water period the canal should be allowed a larger flow, while the others are receiving flood waters.

Based on the foregoing, Article V, Paragraph A 1. a., could be rewritten as follows:

- "1. Bear River and tributaries upstream from Utah-Wyoming State Line.
 - a. The State of Utah shall have the right to divert during the irrigation season in the Upper Utah Section, exclusive of water for domestic uses including watering stock and culinary purposes which uses shall be limited to reasonable amounts, not to exceed 4.00 cubic feet per second into the Wright Transmountain Canal; and in addition, not to exceed 6.5 cubic feet per second into the Hovarka East Fork Canal, from the beginning

of the irrigation season until, following the high water period, the flow at the Bear River near Utah-Wyoming State Line gaging station decreases to 650 cubic feet per second, at which time, the diversion shall be decreased to not to exceed 4.34 cubic feet per second, which flow may continue until the flow at the above named gaging station decreases below 400 cubic feet per second; at which time, the canal shall be shut dry for the balance of the irrigation season. All natural flow in excess of that specified above and that necessary for domestic purposes shall be allowed to flow from Utah to Wyoming through the natural water courses or through canals crossing the Utah-Wyoming State Line above Evanston and serving lands in Wyoming."

This provision would require the following additional definitions in Article II.

The "Wright Transmountain Canal" is that canal which diverts water from the left bank of Deer Creek, a tributary to West Fork Bear River, in Summit County, Utah in the Northwest Quarter Sec. 29, T. 2 N., R. 9 E., Salt Lake Base and Meridian, and runs in a northeasterly direction and empties into Yellow Creek in the Northwest Quarter Section 9, T. 2 N., R. 9 E., Salt Lake Base and Meridian.

The "Hovarka East Fork Canal" is that irrigation canal which diverts water from the right bank of East Fork Bear River in Summit County, Utah in the Southeast Quarter Section 16, T. 2 N., R. 10 E., Salt Lake Base and Meridian and runs in a general northerly direction to lands bordering Mill Creek."

Thomas Fork:

In the report to the Commission, dated June 23, 1948, it was stated that the Wyoming adjudications listed a number of water rights on Upper Thomas Fork which were thought to be abandoned. It has been determined, in the field, that there is only one diversion for irrigation from Thomas Fork and tributaries upstream from the Wyoming-Idaho State Line now in existence. This is from the right bank of Thomas Fork about one-third mile east of the State Line and irrigates approximately thirty acres of land in Wyoming. During 1944 and 1945, when records were obtained on Thomas Fork, this ditch was not used and had the appearance of having been abandoned. However, it was cleaned out and used in 1948. There is no record of a water right in the 1944 State of Wyoming Book of Adjudications for this canal. Considering the older Idaho rights downstream, it is not believed any change should be made in the division of Thomas Fork waters, as set forth in the tentative draft.

HYDROGRAPHS AND SUMMARIES SHOWING ACTUAL AND RESULTANT FLOWS AS
PROVIDED BY ARTICLE V - REVISION DATED July 29, 1948

The hydrographs and summaries presented at the Jackson, Wyoming meeting on June 23, 1948, illustrated deliveries to river sections, based on a maximum limitation of one cubic foot per second to each fifty acres of land irrigated. The hydrographs, as prepared, treated the upper and middle divisions separately, did not show supplies at the upper gaging station for each river section, and did not demonstrate some of the effects of provisions relating to unused allocations.

After completing the revision of the tentative draft, the allocations to the various river sections were recomputed, integrating the sections and divisions in downstream order, on both a 1:50 and a 1:35 basis, and taking into

account a new definition of gain in the Middle Wyoming Section, as indicated by records obtained during the current irrigation season. From these computations, new hydrographs were prepared showing actual, compact, and resultant flows in each section and at river gaging stations. The hydrographs, Plates 6 to 29, are included in this report and cover the years 1944, 1946, and 1947. In addition to the hydrographs, summaries of monthly acre-feet have been prepared, showing actual diversions, compact allocations, and net deliveries as provided by the revised compact.

To illustrate the priorities filled by the allocations in all sections of the river on the same date, Plates 30 to 32 were prepared for the years 1944, 1946 and 1947. On these graphs, the priority filled was determined by applying the discharge in second feet indicated by the dashed allocation hydrographs on Plates 6 to 29, to the accumulated rights columns for the respective river sections on Plate 3. Although it is impossible to show on a graph the percent of any right filled, or the magnitude of the various priorities, the graphs do demonstrate that rights in the upper division are always cut to an earlier date of priority than those in the Middle Division. This bears out former determinations that water supplies are sufficient in downstream divisions to fill rights of later dated priority than can be filled in upstream divisions. The section, Stewart Dam to Grace Dam, was not plotted on these plates, but the relation of that section can readily be determined by a comparison with Plates 13, 21, and 29.

In the preparation of the allocation tables in the compact, breaks were not made in the allocation curves to account for rights of small magnitude. This causes peculiar deviations in the priority curves for the Middle Wyoming and Upper Idaho sections. However, the magnitude of these deviations have been shown on the plates by writing 7.2 cfs and 3.2 cfs on the respective curves.

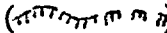
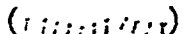

The circle and arrow at the point of beginning for each curve indicates that prior to that date the section was receiving flood waters or water in excess of one second foot to each fifty acres of land.

For all of the years, during the period of this investigation that records have been collected, the water supply in the Bear River Basin has been normal, or better than normal. To indicate the division of the river waters, under the compact for drought years, a study was made to determine the probable divertible flows for 1934 and 1940. Plates 33 to 36 show the flows which each river section would have received on the basis of the determined divertible flow figures for 1934 and 1940. No records are available of amounts actually diverted, except in the Upper Idaho Section. On Plate 34 the hydrograph of Bear River at Harer gaging station is a measure of the total diverted in Idaho. There was, however, about ten second-feet diverted above this station during April and May and about five second-feet during the first half of June. On Plate 36, the hydrograph "Divert Upper Idaho" is the flow at the Harer gaging station plus the daily diversions between the Border and Harer gaging stations. In both of these years, all divertible flow in the Upper division would have been used and there would have been no excess water pass Pixley Dam. Likewise, in the Middle division, there would have been no divertible water pass the Stewart Dam or into the Rainbow Canal.

NOMENCLATURE OF HYDROGRAPHS FOR SECTIONS

The various hydrographs on Plates 6, 7, 8, 10, 11, 14, 15, 16, 18, 19, 22, 23, 24, 26, 27, are identified as follows:

- (1) Flow actually diverted in the section. Represented by the solid line. (————)

- (2) Compact allocation based on all sections demanding and receiving their full allocation. Represented by a short dash line (- - - -) for a maximum limitation of one cfs for each thirty-five acres of land. A compact allocation with a maximum limitation of one cfs for each fifty acres of land is represented by a combination of the horizontal light dotted line (. . . .) and the dash line when below the 1:50 limiting line.
- (3) Resultant compact delivery on 1:35 basis which the section would have received if compact had been in effect, is indicated by short hatching under the line which would be applicable in defining the compact delivery to the section. (). Resultant delivery to a section, when another section is not using its full allocation, is indicated by a dotted line and short hatching. ()
- (4) The resultant compact delivery on a 1:50 basis would be the same as 1:35, but limited in maximum amounts during the high water period, by the light dotted 1:50 horizontal line.
- (5) Actual measured supply above diversions in the section is indicated by the long dash-dot line. (). The "Bear River Supply" on the plates for the Upper Wyoming Section is the total daily recorded flows at the following gaging stations:
- Bear River near Utah-Wyoming State Line
 - Hilliard East Fork Canal
 - Mill Creek below diversions
 - Sulphur Creek near Evanston
 - Yellow Creek below diversions
- (6) The change in supply, due to regulation upstream on a 1:35 basis,

is indicated by the long dash — x line. (— x —).

HYDROGRAPHS FOR FLOWS BELOW RIVER DIVISIONS

Plates 9, 17, and 25 show the actual computed flow, resultant flow due to regulation upstream on a 1:35 basis, and resultant flow due to regulation upstream on a 1:50 basis at the Bear River above Sublette Creek near Cokeville gaging station for the years 1944, 1946, and 1947.

Plates 12, 20, and 28 show the actual total flow, resultant total flow due to regulation upstream on a 1:35 basis, and resultant total flow due to regulation upstream on a 1:50 basis passing the Stewart Dam and into the Rainbow Canal for the years 1944, 1946, and 1947.

HYDROGRAPHS FOR STEWART TO ALEXANDER SECTION

Plates 13, 21, and 29 show for 1944, 1946, and 1947, the five-day average normal flows at the Alexander gaging station, which would occur if Bear Lake storage did not exist. The actual flow past Stewart Dam and into the Rainbow Canal was used as the normal flow supply at the upper end of the section.

The solid line represents the five-day average actual normal flow. The dashed line represents the five-day average normal inflow between Stewart Dam and Alexander. The short dash five-day lines represent the increase or decrease that would result due to regulation above Stewart Dam on a 1:35 basis. The dotted five-day lines represent the increase or decrease due to regulation above Stewart Dam on a 1:50 basis. The short dash line hydrograph is the total diversions into the Budge, Last Chance, and Bench "B" canals. The horizontal long dash lines are total accumulative water rights of the Budge, Johnson, Last Chance and Bench "B" canals.

SUMMARIES IN ACRE FEET OF ACTUAL DIVERSIONS, COMPACT ALLOCATIONS,
AND RESULTANT COMPACT DELIVERIES TO THE SECTIONS

The headings in the summary tables are explained as follows:

Actually diverted - Total diversions as actually recorded.

Compact allocation 1:35 limitation - Total maximum allocation for section with maximum limitation of one second-foot for each thirty-five acres and with all sections demanding full allocations.

Compact allocation 1:50 limitation - Total maximum allocation for section with maximum limitation of one second-foot for each fifty acres and with all sections demanding full allocations.

Resultant compact deliveries 1:35 limitation - Net delivery section would have received under compact as limited by its demand but not exceeding a maximum of one second-foot delivery to each thirty-five acres during periods of high runoff; allocations as provided in the compact during periods of deficient supply; and other compact provisions.

Resultant compact deliveries 1:50 limitation - Net delivery section would have received under compact as limited by its demand but not exceeding a maximum of one second-foot delivery to each fifty acres during period of high runoff; allocations as provided in the compact during periods of deficient supply; and other compact provisions.

GENERAL COMPACT OPERATION IN 1944

Upper Division:

On a basis of 1:35 limitation, neither the Upper Wyoming nor the Middle Utah sections demanded their allocations in the high water period of 1944. However, the Middle Wyoming Section did exceed its limitation by considerable amounts, at times.

Since the two upper sections were not using their full allocations, and divertible water was passing Pixley Dam, the Middle Wyoming Section would be allowed to draw its maximum allocation from May 20 to July 6. On July 7, the Middle Wyoming Section turned off all canals for the balance of the season. Consequently, under the provisions of the compact, all usable divertible flow passing the lowest diversion in the Middle Utah Section would be equally divided between the upper two sections insofar as possible. However, it was not until July 15, that the Upper Wyoming section's demand equaled or exceeded its share. Consequently, the unused water after the Middle Wyoming Section shut off until July 15, could have been all diverted by the Middle Utah Section. From July 15 to August 25, the Upper Wyoming Section and the Middle Utah Section were regulated by their allocations and would have received equal flows. Beginning August 26, the supply at the State line above Evanston was less than fifty cubic feet per second and no water would have been delivered past Woodruff Narrows.

Middle Division:

On a 1:35 limitation basis, the Lower Wyoming Section began exceeding its allocation on July 11. Consequently, after this date, its diversion would be restricted but not cut below 192 second-feet because of divertible water passing Stewart Dam. Beginning August 5, the Section would be entitled to the flow it actually diverted, although it could have diverted as much as 192 second-feet for the balance of the season. The Upper Idaho Section demanded less than its allocation throughout the season.

Lower Division:

In the Stewart Dam to Grace Section, the compact flow was greater than the irrigation demand, prior to July 10. On that date cutting would have started on the 1901 right and all of the 1901 water would expire by August 5. On August 5, cutting would start on the 1897 right, which would have been cut about fifty percent by the end of the irrigation season.

Upper Wyoming Section - 1944 - Plate 6

1944	<u>Acre-Feet</u>				
	Actually Diverted	Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	15,534	44,380	39,564	15,534	15,534
June	36,972	59,722	44,984	36,972	36,936
July	22,407	22,671	21,659	20,803	20,803
August	3,842	3,324	3,324	3,324	3,324
September	2,011	2,011	2,011	2,011	2,011
Total	80,766	132,108	111,542	78,644	78,608
ft. per ac.	2.0	3.3	2.8	2.0	2.0
9,949 Acres					

Middle Utah Section - 1944 - Plate 7

1944	<u>Acre-Feet</u>				
	Actually Diverted	Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
	36,000	44,380	39,564	36,000	34,891
	46,520	59,722	44,984	45,520	45,242
	16,961	22,671	21,659	24,376	24,376
	307	3,078	3,078	3,078	3,078
	399	1,392	1,392	1,392	1,392
Total	100,187	131,243	110,677	110,366	108,979
ft. per ac.	2.7	3.6	3.0	3.0	3.0
Acres.					

Middle Wyoming Section - 1944 - Plate 8

1944	<u>Acre-Feet</u>				
	Actually Diverted	Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	7,446	11,662	10,514	9,213	7,382
June	16,701	13,805	10,175	10,175	10,175
July	1,725	9,252	8,993	2,856	2,035
August	0	0	0	0	0
September	0	0	0	0	0
Total	25,872	34,719	29,682	22,244	19,592
Ac. ft. per Ac.	3.1	4.1	3.5	2.6	2.0

8,457 Acres.

Bear River above Sublette Creek Gaging Station - 1944 - Plate 9

1944	<u>Acre-Feet</u>		
	Actual Computed Flow	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	46,982	45,312	47,643
June	49,003	50,769	57,538
July	16,558	10,482	11,821
August	5,095	3,063	3,063
September	3,399	2,380	2,380
Total	121,037	112,006	122,445

Lower Wyoming Section - 1944 - Plate 10

1944	<u>Acre-Feet</u>				
	Actually Diverted	Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	6,028	26,459	18,938	6,028	6,028
June	22,153	26,122	18,327	22,153	18,301
July	21,178	16,253	13,804	16,483	14,866
August	10,750	4,278	4,278	10,623	10,623
September	8,614	3,217	3,217	8,614	8,614
Total	68,723	76,329	58,564	63,901	58,432
Ac. ft. per Ac.	4.5	5.0	3.8	4.2	3.8

15,268 Acres.

Upper Idaho Section - 1944 - Plate 11

1944	<u>Acre-Feet</u>				
	Actually Diverted	Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
	21,453	39,193	27,915	21,453	21,285
	28,832	38,677	27,015	28,832	26,696
	14,747	31,607	27,892	14,747	14,747
	8,521	18,020	18,020	8,521	8,521
	6,982	8,795	8,795	6,982	6,982
	80,535	136,292	109,637	80,535	78,231
per Ac.	3.5	6.0	4.8	3.5	3.4

res.

Rainbow Canal plus Bear River below Stewart - 1944 - Plate 12

1944	Actual Computed Flow	Acre-Feet	
		Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	51,318	50,430	52,044
June	58,407	59,222	71,970
July	21,215	21,917	25,589
August	6,260	4,804	4,804
September	2,598	1,561	1,561
Total	139,798	137,934	155,968

GENERAL COMPASS OPERATION IN 1946

Upper Division:

On a basis of 1:35 limitation, the Upper Wyoming Section exceeded its allocation during the high water period on only two days, June 6 and 7. However, the section would have been allowed this flow, since the other two sections were not demanding their full allocations. On June 23, this section began exceeding its allocation and would consequently have been restricted after that date. Part of the water released in this section would go to the Middle Utah Section and part to the Middle Wyoming Section. The Middle Wyoming Section shut dry on July 5. Consequently, after that date, all divertible flow determined at a point immediately below the last diversion in the Middle Utah Section would be equally divided between the Upper Wyoming and Middle Utah sections insofar as possible. After September 4, the flow at the State Line was less than fifty cubic feet per second and no water would be delivered past Woodruff Narrows. Because the upper two sections were not demanding their full allocations May 2 to June 19, the Middle Wyoming Section could have diverted up to 240 second-feet during that period.

Middle Division:

The Lower Wyoming Section diverted more than its allocation on a basis of 1:35 after June 6, while the Upper Idaho Section diverted less than its allocation throughout the irrigation season. One to two hundred second-feet of water passed Stewart Dam or into the Rainbow Canal after July 1.

The net effect of the compact for 1946, would be to restrict the Lower Wyoming Section to its maximum allocation of 439 second-feet June 7 to 21. Then, since the flow past Stewart Dam was less than 600 acre-feet daily, it would only receive its proportioned allocation June 22 to July 14. Since divertible flow was passing Stewart Dam, the section would not be cut below

192 second-feet after July 15. From August 2 to the end of the irrigation season it would be entitled to the flow actually diverted, although it could have drawn up to 192 second-feet.

Stewart Dam to Grace Section:

Practically all of the 1901 right in this section would have been off from August 1 to August 25. Due to increasing flow after August 25, most of the 1901 right would have been restored for the balance of the irrigation season.

Upper Wyoming Section - 1946 - Plate 14

1946	Actually Diverted	Acre-Feet		Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
		Compact Allocation 1:35	Compact Allocation 1:50		
May	25,438	48,694	45,715	25,438	25,463
June	36,948	39,907	36,729	35,575	33,580
July	12,899	7,512	7,512	8,468	8,468
August	3,896	3,090	3,090	3,090	3,090
September	1,974	1,924	1,924	1,924	1,924
Total	81,155	101,127	94,970	74,495	72,525
Ac. ft. per Ac.	2.0	2.5	2.4	1.9	1.8
39,949 Acres					

Middle Utah Section - 1946 - Plate 15

1946	Actually Diverted	<u>Acre-Feet</u>			
		Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	34,379	48,694	45,715	34,379	33,844
June	31,676	39,907	36,729	33,286	33,286
July	3,096	7,512	7,512	8,467	8,467
August	843	3,090	3,090	3,090	3,090
September	585	1,862	1,862	1,862	1,862
Total	70,579	100,142	94,908	81,084	80,549
Ac. Ft. per Ac.	1.9	2.7	2.6	2.2	2.2
36,572 Acres					

Middle Wyoming Section - 1946 - Plate 16

1946	Actually Diverted	<u>Acre-Feet</u>			
		Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	13,815	11,355	10,514	13,373	10,000
June	9,854	10,879	10,052	12,843	10,068
July	359	4,502	4,502	1,309	1,309
August	0	0	0	0	0
September	0	0	0	0	0
Total	24,028	26,736	25,068	27,525	21,377
Ac. ft. Per Ac.	2.8	3.1	3.0	3.2	2.5
8,457 Acres					

Bear River above Sublette Creek Gaging Station - 1946 - Plate 17

1946	Actual Computed Flow	Acre-Feet	
		Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	43,951	44,512	48,198
June	18,851	15,941	20,650
July	6,067	3,997	3,997
August	4,469	3,063	3,063
September	3,518	2,380	2,380
Total	76,856	69,893	78,288

Lower Wyoming Section - 1946 - Plate 18

1946	Actually Diverted	Acre-Feet			
		Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	9,759	26,993	18,938	26,993	26,993
June	26,410	25,160	18,288	25,158	18,288
July	19,450	12,395	12,395	13,876	13,876
August	9,654	4,318	4,318	9,640	9,640
September	4,056	3,322	3,322	4,056	4,056
Total	69,329	72,188	57,261	79,723	72,853

Ac. Ft. per Ac. 4.5 4.7 3.8 5.2 4.8

15,268 Acres

Upper Idaho Section - 1946 - Plate 19

1946	<u>Acre-Feet</u>				
	Actually Diverted	Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	21,824	39,967	27,915	21,824	20,983
June	28,451	37,289	27,015	28,451	26,277
July	14,800	27,844	27,844	14,800	14,800
August	8,459	19,380	19,380	8,459	8,459
September	5,129	13,795	13,795	5,129	5,129
Total	78,663	138,275	115,949	78,663	75,648
Ac. Ft. per Ac.	3.5	6.1	5.1	3.5	3.3
22,734 Acres.					

Rainbow Canal Plus Bear River Below Stewart Dam - 1946 - Plate 20

1946	<u>Acre-Feet</u>		
	Actual Computed Flow	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	92,602	92,791	96,159
June	24,440	24,194	37,974
July	9,618	13,011	13,222
August	8,309	8,938	8,938
September	10,243	9,074	9,074
Total	145,212	148,008	165,367

GENERAL DIVERSION OPERATION IN 1947

Upper Division:

Neither the Upper Wyoming Section nor the Middle Utah Section diverted more than its allocation during the high water period, and as there was divertible unused water passing the Pixley Dam, the Middle Wyoming Section could have diverted its maximum allocation of 229 second-feet until the section shut off on July 1. From July 1 until July 13, excess water would have passed Pixley Dam, as apparently neither one of the upper two sections desired to divert flows equivalent to its allocation. After July 14, the Upper Wyoming Section diverted more than its allocation. After that date, all divertible flow, as determined at the Enberg Dam, would be divided equally between the Upper Wyoming Section and the Middle Utah Section. The flow at the Utah-Wyoming State Line above Evanston did not drop below fifty second-feet and water would have been delivered through Woodruff Narrows throughout the irrigation season.

Middle Division:

The Lower Wyoming Section ~~exceeded~~ its maximum allocation on a 1:35 basis for only a few days in June. This section also diverted more than its allocation in late July and early August, ^{not} However, it would have been cut below 192 second-feet because there was divertible water passing Stewart Dam. After August 11, it diverted less than it ~~would~~ have for the balance of the season.

The Upper Idaho Section diverted less than its allocation throughout the irrigation season.

Stewart Dam to Grace Section:

There was sufficient supply ~~through~~ the irrigation season to fill all irrigation rights, except for about ~~ten~~ days in the last of July.

Upper Wyoming Section - 1947 - Plate 22

1947	Actually Diverted	<u>Acre-Feet</u>			
		Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:55	Resultant Compact Delivery 1:50
May	28,078	49,061	41,252	28,078	28,078
June	36,995	58,839	44,985	36,995	35,554
July	23,837	23,176	23,176	22,393	22,393
August	8,914	6,737	6,737	7,586	7,586
September	<u>5,407</u>	<u>5,141</u>	<u>5,141</u>	<u>5,141</u>	<u>5,141</u>
Total	103,231	142,954	121,291	100,193	98,752
Ac. Ft. per Ac.	2.6	3.6	3.0	2.5	2.5

39,949 Acres.

Middle Utah Section - 1947 - Plate 23

1947	Actually Diverted	<u>Acre-Feet</u>			
		Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	42,004	49,061	41,251	42,004	38,872
June	41,762	58,839	44,985	41,762	40,831
July	18,228	23,176	23,176	22,909	22,909
August	2,971	6,737	6,737	7,934	7,934
September	<u>1,696</u>	<u>4,344</u>	<u>4,344</u>	<u>4,344</u>	<u>4,344</u>
Total	106,611	142,157	120,493	118,953	114,890
Ac. Ft. per Ac.	2.9	3.9	3.3	3.2	3.1

36,572 Acres.

Middle Wyoming Section - 1947 - Plate 24

1947	<u>Acre-Feet</u>				
	Actually Diverted	Compact Allocation 1:35	Compact Allocation 1:50	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	8,590	12,456	8,479	10,408	7,535
June	11,827	13,597	10,175	14,281	10,175
July	10	9,779	9,779	0	0
August	0	3,758	3,758	0	0
September	0	0	0	0	0
Total	20,427	39,590	32,191	24,689	17,710
Ac. Ft. per Ac.	2.4	4.7	3.8	2.9	2.1

8,457 Acres.

Bear River Above Sublette Creek Gaging Station - 1947 - Plate 25

1947	<u>Acre-Feet</u>		
	Actual Computed Flow	Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	38,106	38,191	41,228
June	56,755	54,782	62,040
July	15,832	12,681	12,819
August	6,959	3,064	3,064
September	4,689	2,380	2,380
Total	124,324	111,098	121,531

Lower Wyoming Section - 1947 - Plate 26

1947	Actually Diverted	<u>Acre-Feet</u>		Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
		Compact Allocation 1:35	Compact Allocation 1:50		
May	8,900	26,822	27,915 18,938	8,900	8,900
June	24,704	26,122	27,015 18,327	23,357	18,298
July	19,767	19,918	15,763	17,853	16,578
August	10,933	5,937	5,937	9,931	9,931
September	<u>4,185</u>	<u>3,860</u>	<u>3,860</u>	<u>4,185</u>	<u>4,185</u>
Total	68,439	82,659	80,490 82,825	64,226	57,892
Ac. Ft. per Ac.	4.5	5.4	5.3 4.1	4.2	3.8
15,268 Acres.					

Upper Idaho Section - 1947 - Plate 27

1947	Actually Delivered	<u>Acre-Feet</u>		Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
		Compact Allocation 1:35	Compact Allocation 1:50		
May	20,309	38,424	27,915	20,309	20,249
June	31,735	38,678	27,015	31,735	26,824
July	12,827	34,074	27,850	12,827	12,827
August	6,593	24,897	24,897	6,593	6,593
September	<u>5,863</u>	<u>16,489</u>	<u>16,489</u>	<u>5,863</u>	<u>5,863</u>
Total	77,327	152,562	124,166	77,327	72,356
Ac. Ft. per Ac.	3.4	6.7	5.5	3.4	3.2
22,734 Acres.					

Rainbow Canal Plus Bear River Below Stewart Dam - 1947 - Plate 28

1947	Actual Computed Flow	Acre-Feet	
		Resultant Compact Delivery 1:35	Resultant Compact Delivery 1:50
May	81,388	81,388	83,351
June	77,774	78,196	95,804
July	31,904	29,919	34,102
August	18,567	15,850	15,850
September	13,882	11,490	11,490
Total	223,515	216,843	240,597

WATER RIGHTS - BEAR RIVER BELOW STEWART DAM

Rights as Adjudicated in C.F.S.

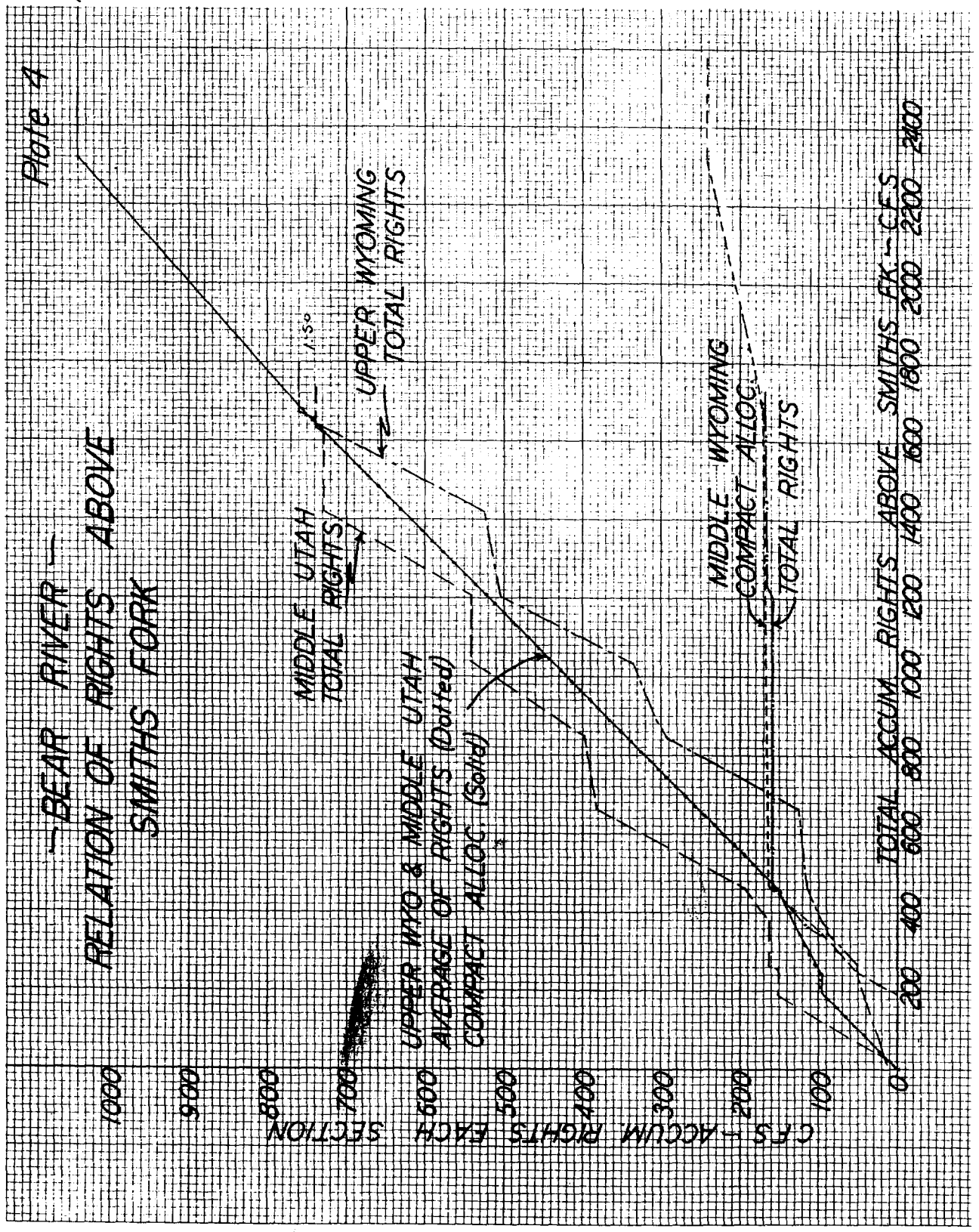
Date	MIDDLE IDAHO SECTION			LOWER IDAHO SECTION			LOWER UTAH SECTION			UTAH BELOW WHEELON DAM	
	Name	Amount	Accum. Irrig.	Name	Amount	Accum. Irrig.	Name	Amount	Accum.	Name	Amount
1862			0			0			0		
63			0			0			0		
64			0			0			0		
65			0			0			0		
66			0			0			0		
67			0			0			0		
68			0			0			0		
69			0			0			0		
1870			0			0	Pumps	1.50	1.50		
71			0			0			1.50		
72			0			0			1.50		
73			0			0			1.50		
74			0			0			1.50		
75			0			0			1.50		
76			0			0			1.50		
77			0			0			1.50		
78			0			0			1.50		
79	Gentile Valley	2.20	2.20			0			1.50		
1880			2.20	Nelson	6.50	6.50	Pumps	6.00	7.50		
81			2.20	Riverdale	13.00	19.50			7.50		
82			2.20	Smith-Bosen	5.50	25.00			7.50		
83			2.20	Riverdale	3.00	28.00			7.50		
84			2.20	West Cache	5.00	33.00			7.50		
85			2.20			33.00			7.50		
86			2.20			33.00			7.50		
87			2.20			33.00			7.50		
88			2.20			33.00			7.50		
89	Budge	11.60	48.40			33.00	West Side	333.00	340.50		
1890	Johnson	1.60	48.40			33.00	Pumps	3.00	343.50		
91	Gentile Valley	33.00	48.40			33.00			343.50		
92			48.40			33.00			343.50		
93			48.40			33.00			343.50		
94			48.40			33.00	Pumps	.50	344.00		
95	Unknown	2.40	50.80			33.00			344.00		
96			50.80			33.00			344.00		
97	Last Chance	200.00	250.80			33.00			344.00		
98	Gentile Valley	1.90	252.70			33.00			344.00		
99			252.70	West Cache	186.00	219.00			344.00		
1900	Johnson	.60	253.30			219.00			344.00		
01	Gentile Valley	35.00	528.30			219.00	West Side	133.00	477.00		
02	Last Chance	240.00	528.30	Riverdale	6.50	225.50			477.00		
03			528.30			225.50	U.F.Wheelon Pl.	270.00	747.00		
04	Gentile Valley	12.00	540.30			225.50	Hammond	95.00	842.00		
05	U.P.Grace Pl.*	500.00	540.30			225.50			842.00		
06			540.30			225.50	U.P.Wheelon Pl.	135.00	977.00		
07			540.30			225.50			977.00		
08	U.P.Grace Pl.*	500.00	540.30			225.50	U.P.Wheelon Pl.	135.00	1112.00		
09	Bench "B"	163.76	704.06			225.50			1112.00		
1910	Last Chance	54.00	758.06	U.P.Oneida Pl.*	1000.00	225.50			1112.00		
11	Bear Lake Stor.	3000.00	3758.06	U.P.Oneida Pl.*	1500.00	225.50			1112.00		
12	Bear Lake Stor.	2500.00	6258.06			225.50	U.P.Wheelon Pl.	500.00	1612.00		
13			6258.06			225.50			1612.00		
14			6258.06	Cub River Pmp.	100.00	325.50	West Side	43.00	1655.00		
15			6258.06			325.50	Pumps	2.00	1657.00	Pumps	1.24
16	U.P. Cove Pl.*	1500.00	6258.06			325.50	Pumps	1.50	1658.50	Pumps	2.00
17			6258.06			325.50	Pumps	30.88	1689.38	Pumps	10.33
18			6258.06			325.50	Pumps	9.00	1698.38	Pumps	2.00
19			6258.06			325.50	Pumps	6.50	1704.88	Pumps	4.60
1920			6258.06			325.50	Pumps	13.00	1717.88	Pumps	8.96
21			6258.06			325.50			1717.88		
22	U.P. Soda Pl.*	1500.00	6258.06			325.50			1717.88		
23			6258.06			325.50	U.P.Wheelon Pl.	2500.00	4217.88		
24			6258.06			325.50			4217.88		
25			6258.06			325.50			4217.88		
26			6258.06	Unknown	.20	325.50			4217.88	Pumps	7.81
27			6258.06			325.70			4217.88		
28			6258.06			325.70			4217.88	Pumps	3.00
29			6258.06			325.70			4217.88	Fish & Wildlife	1000.00
1930			6258.06			325.70			4217.88		
31			6258.06			325.70			4217.88		
32			6258.06			325.70			4217.88		
33			6258.06			325.70			4217.88		
34			6258.06			325.70			4217.88		
35			6258.06			325.70			4217.88		
36			6258.06			325.70			4217.88		
37			6258.06			325.70			4217.88		
38			6258.06			325.70			4217.88		
39	Unknown	.60	6258.66			325.70			4217.88		

* Not included in accum. irrig. total

COMPACT SECTIONS - BEAR RIVER ABOVE STEWART DAM

Basis 1 c.f.s. per 90 acres of land described in Adjudications and Claims

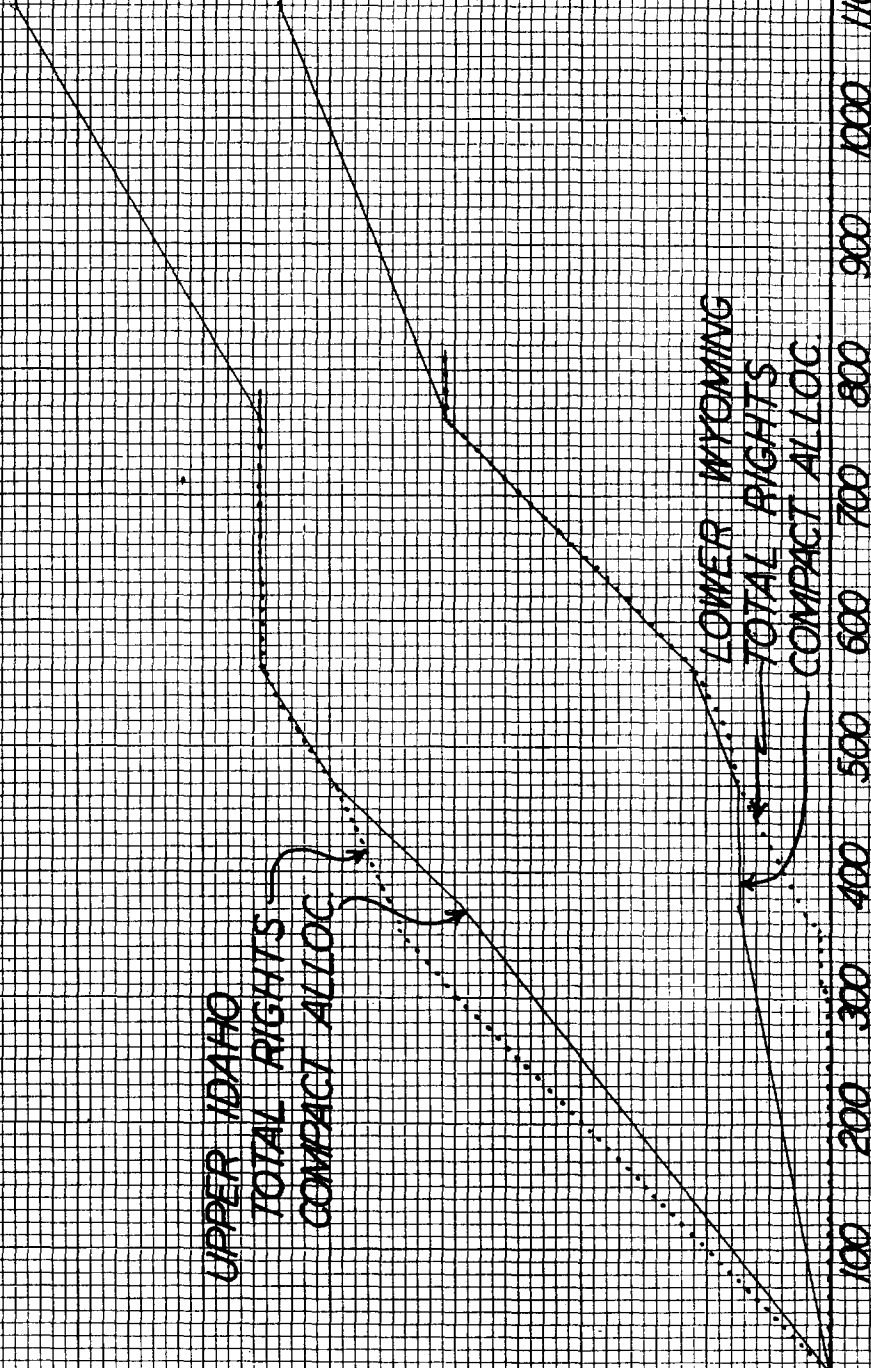
Year of Priority	UPPER UTAH SECTION		UPPER WYOMING SECTION		MIDDLE UTAH SECTION		MIDDLE WYOMING SECTION		LOWER WYOMING SECTION		UPPER IDAHO SECTION	
	Amt.	Accum.	Amt.	Accum.	Amt.	Accum.	Amt.	Accum.	Amt.	Accum.	Amt.	Accum.
1862		0	5.60	5.60	6.14	6.14		0		0		0
63		0		5.60		6.14		0		0		0
64		0		5.60		6.14		0		0		0
65		0		5.60		6.14		0		0		0
66		0		5.60		6.14		0		0		0
67		0		5.60		6.14		0		0		0
68		0		5.60		6.14		0		0		0
69	4.00	4.00	.84	6.44		6.14		0		0		0
1870		4.00		6.44		6.14		0		0		0
71		4.00	5.22	11.66		6.14		0		0		0
72		4.00	3.90	15.56		6.14		0		0		0
73		4.00		15.56		6.14		0		0		0
74		4.00		15.56	32.18	38.32		0		0		0
75		4.00	25.06	40.62	112.70	151.02		0		0		0
76		4.00		40.62		151.02		0		0		0
77		4.00		40.62		151.02		0	2.10	2.10	295.06	295.06
78		4.00	9.16	49.78		151.02	49.60	49.60	6.08	8.18	7.92	302.98
79		4.00		49.78	13.46	164.48	3.80	53.40	.10	8.28		302.98
1880		4.00	37.70	87.48		164.48	42.82	96.22		8.28	41.58	344.56
81		4.00		87.48		164.48	15.96	112.18	7.10	15.38		344.56
82		4.00	7.82	95.30		164.48	6.40	118.58		15.38		344.56
83		4.00	16.00	111.30	27.64	192.12	40.10	158.68	58.87	74.25	49.78	394.34
84		4.00	2.40	113.70		192.12		158.68	13.38	87.63	34.66	429.00
85		4.00	9.54	123.24	191.00	383.12		158.68	24.80	112.43	22.48	451.48
86		4.00	169.26	292.50	16.40	399.52		158.68	12.34	124.77		451.48
87		4.00	15.02	307.52	25.96	425.48		158.68	15.00	139.77		451.48
88		4.00	28.66	336.18	116.26	541.74		158.68	9.38	149.15		451.48
89		4.00	21.36	357.54		541.74		158.68	5.26	154.41		451.48
1890		4.00	34.06	391.60		541.74		158.68	1.30	155.71		451.48
91		4.00	12.02	403.62		541.74		158.68		155.71		451.48
92		4.00	1.79	405.41		541.74		158.68	4.12	159.83		451.48
93		4.00	34.62	440.03		541.74		158.68	5.50	165.33		451.48
94		4.00		440.03		541.74		158.68	6.40	171.73		451.48
95		4.00	6.26	446.29		541.74		158.68		171.73		451.48
96	4.34	8.34	19.92	466.21		541.74		158.68		171.73		451.48
97		8.34	9.08	475.29		541.74		158.68	12.66	184.41	3.20	454.68
98		8.34	11.66	486.95		541.74		158.68	2.38	186.79		454.68
99		8.34		486.95		541.74		158.68		186.79		454.68
1900		8.34	14.28	501.23	187.60	541.74	7.20	158.68	2.70	189.49		454.68
01		8.34	25.24	526.47		729.34		165.88	2.40	191.89		454.68
02		8.34	2.42	528.89		729.34		165.88	.68	192.57		454.68
03		8.34	3.10	531.99		729.34		165.88	15.54	208.11		454.68
04		8.34	84.16	616.15		729.34		165.88	6.46	214.57		454.68
05		8.34	3.80	619.95		729.34		165.88	3.20	217.77		454.68
06		8.34	.80	620.75		729.34		165.88	9.08	226.85		454.68
07		8.34	3.16	623.91		729.34	.12	166.00	4.34	231.19		454.68
08		8.34	10.38	634.29		729.34		166.00	4.06	235.25		454.68
09		8.34	2.40	636.69		729.34		166.00	43.22	278.47		454.68
1910		8.34	9.38	646.07		729.34		166.00	5.70	284.17		454.68
11		8.34	.32	646.39		729.34		166.00	11.17	295.34		454.68
12		8.34	2.11	648.50		729.34		166.00	1.96	297.30		454.68
13		8.34	1.10	649.60		729.34		166.00	2.33	299.63		454.68
14		8.34	54.82	704.42		729.34		166.00		299.63		454.68
15		8.34	22.86	727.28		729.34		166.00	1.52	301.15		454.68
16		8.34	2.04	729.32		729.34		166.00	.68	301.83		454.68
17		8.34	6.27	735.59		729.34		166.00		301.83		454.68
18		8.34	.16	735.75		729.34		166.00		301.83		454.68
19		8.34		735.75	8.24	737.58		166.00		301.83		454.68
1920		8.34	3.18	738.93		737.58		166.00		301.83		454.68
21		8.34	.30	739.23		737.58		166.00		301.83		454.68
22		8.34	.92	740.15		737.58		166.00		301.83		454.68
23		8.34		740.15		737.58		166.00		301.83		454.68
24		8.34		740.15		737.58		166.00		301.83		454.68
25		8.34	.80	740.95		737.58		166.00		301.83		454.68
26		8.34	.61	741.56		737.58		166.00		301.83		454.68
27		8.34		741.56		737.58		166.00	1.99	303.82		454.68
28		8.34		741.56		737.58		166.00		303.82		454.68
29		8.34		741.56		737.58		166.00		303.82		454.68
1930		8.34	17.66	759.22		737.58	3.14	169.14		303.82		454.68
31		8.34	1.66	760.88		737.58		169.14		303.82		454.68
32		8.34		760.88		737.58		169.14		303.82		454.68
33		8.34	.70	761.58		737.58		169.14		303.82		454.68
34		8.34		761.58		737.58		169.14		303.82		454.68
35		8.34		761.58		737.58		169.14		303.82		454.68
36		8.34		761.58		737.58		169.14		303.82		454.68
37		8.34		761.58		737.58		169.14	1.64	305.46		454.68
38		8.34		761.58		737.58		169.14		305.46		454.68
1939		8.34	.90	762.48		737.58		169.14		305.46		454.68



BEAR R - RELATION OF RIGHTS IN LOWER WYO. & UPPER IDAHO WITH TOTAL RIGHTS

CFS - ACCUMULATED RIGHTS EACH SECTION

700
600
500
400
300
200
100
0



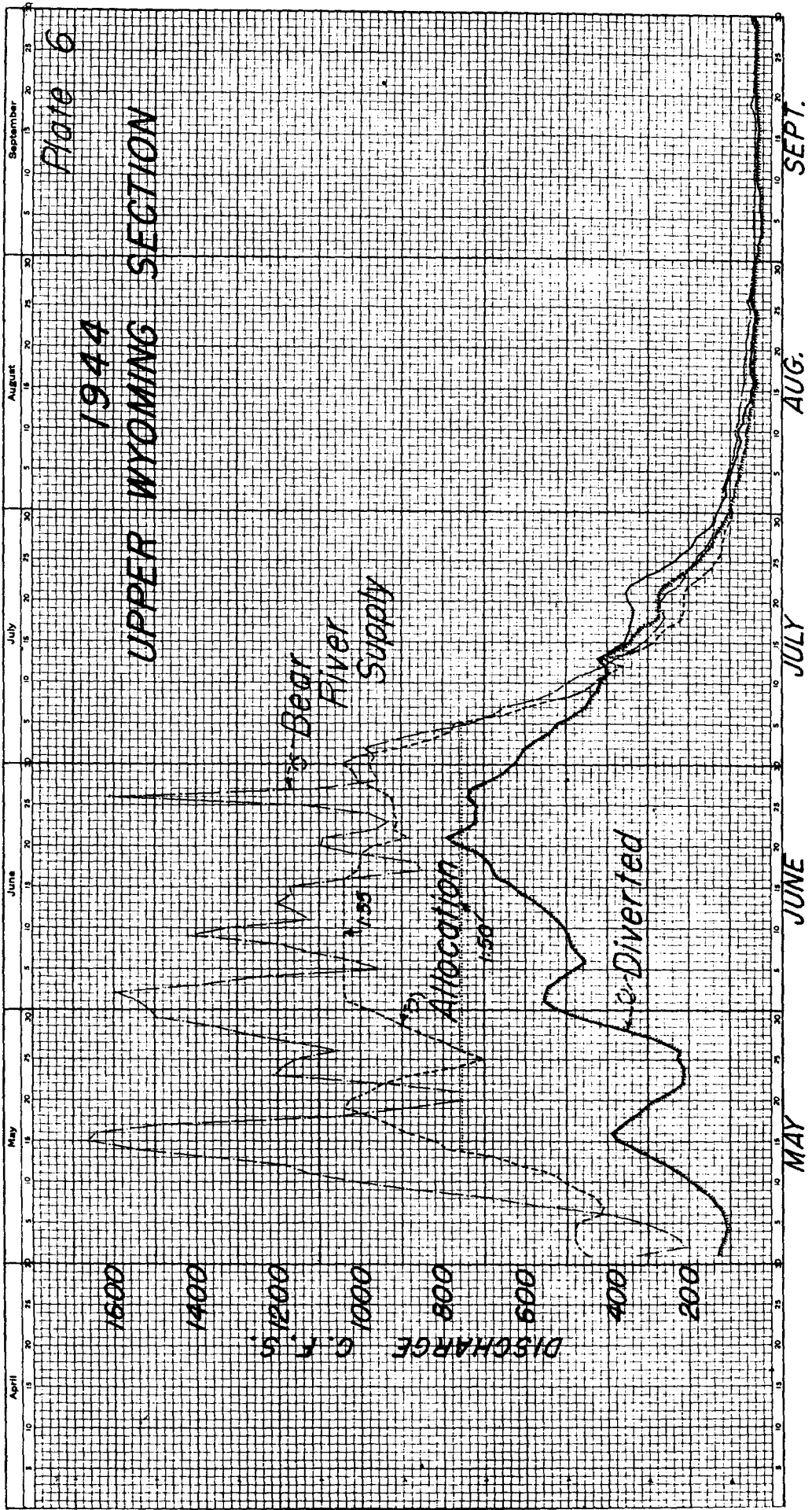
UPPER IDAHO

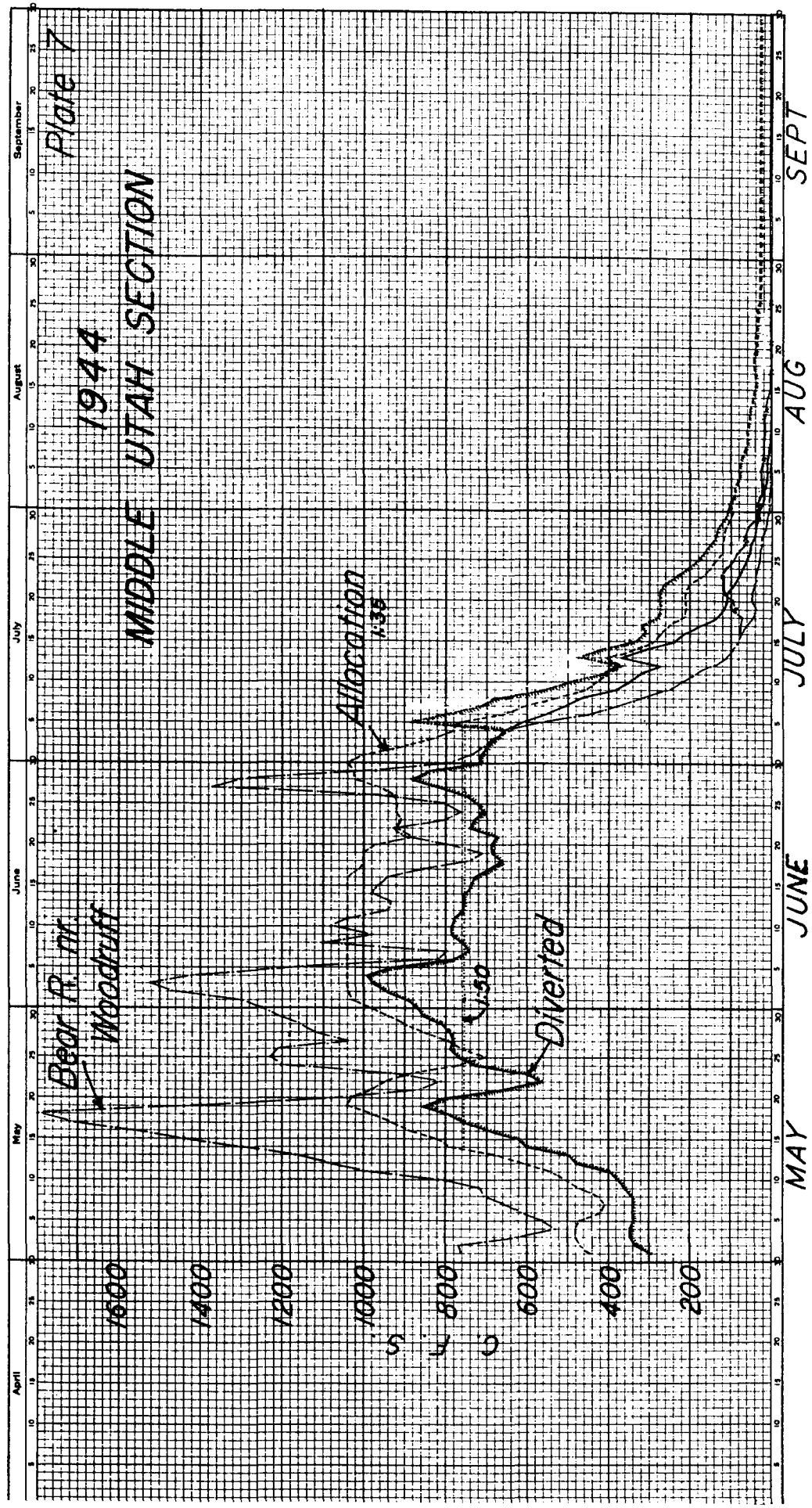
TOTAL RIGHTS
COMPACT ALLOC

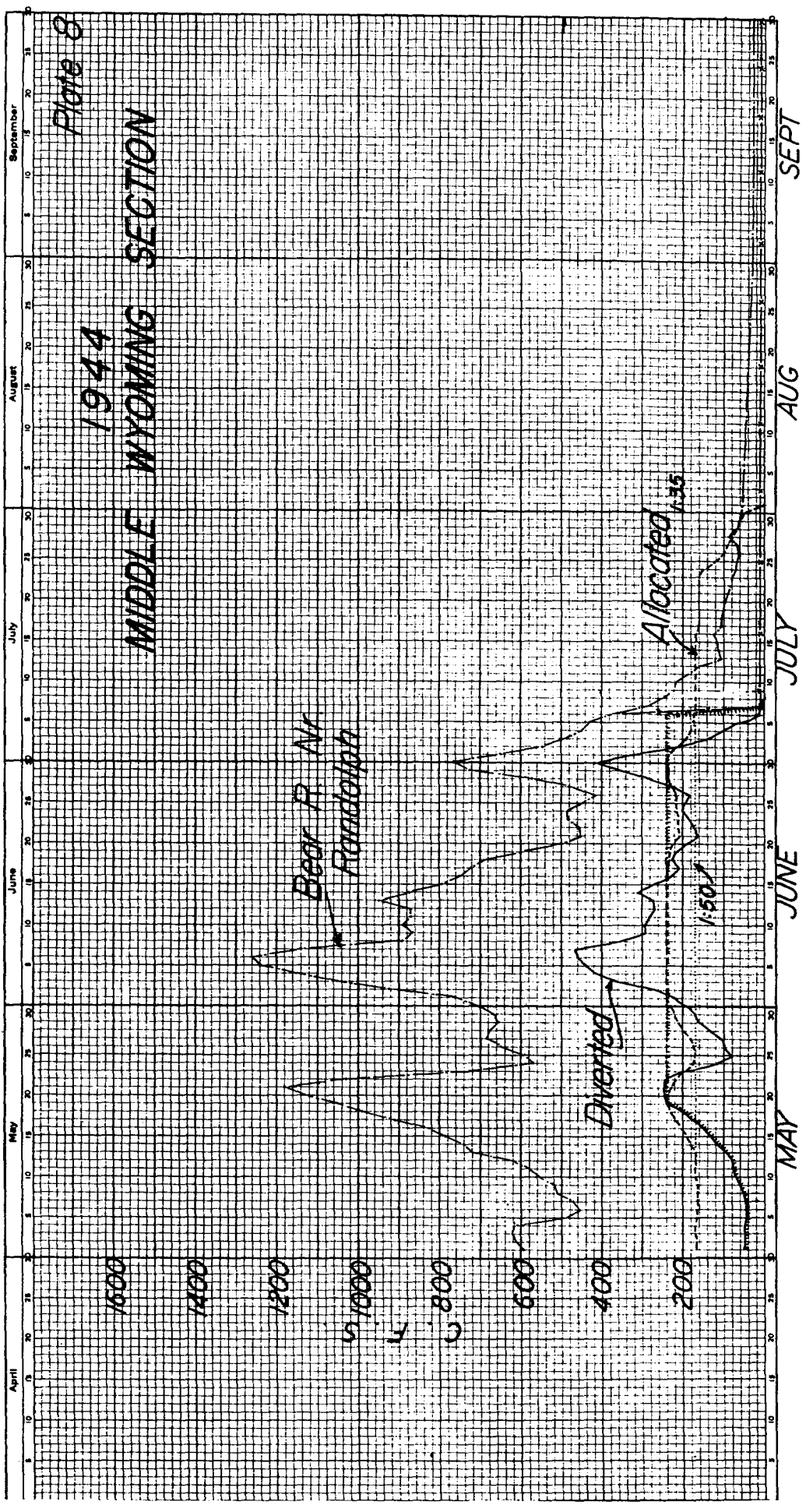
LOWER WYOMING

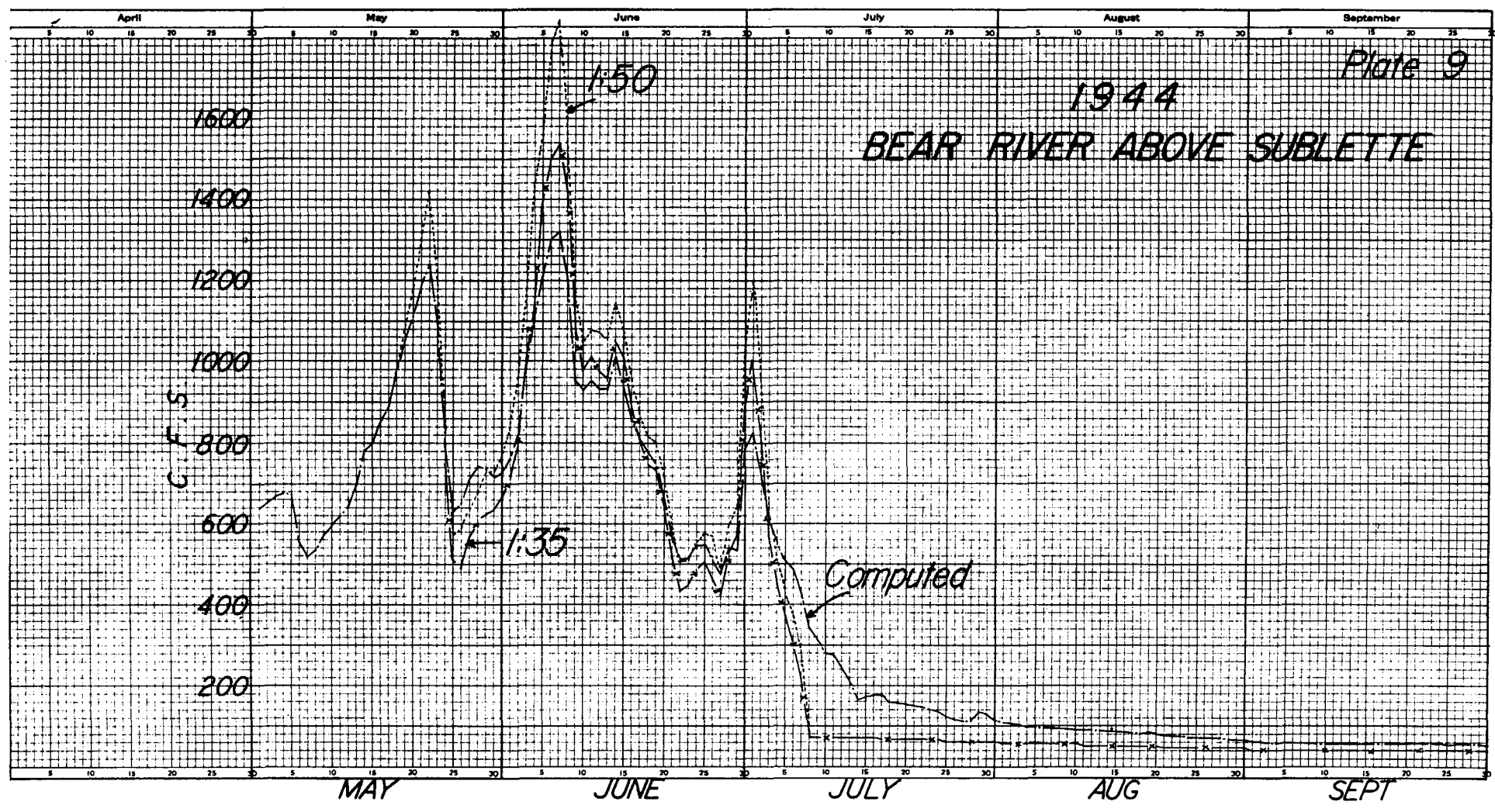
TOTAL RIGHTS
COMPACT ALLOC

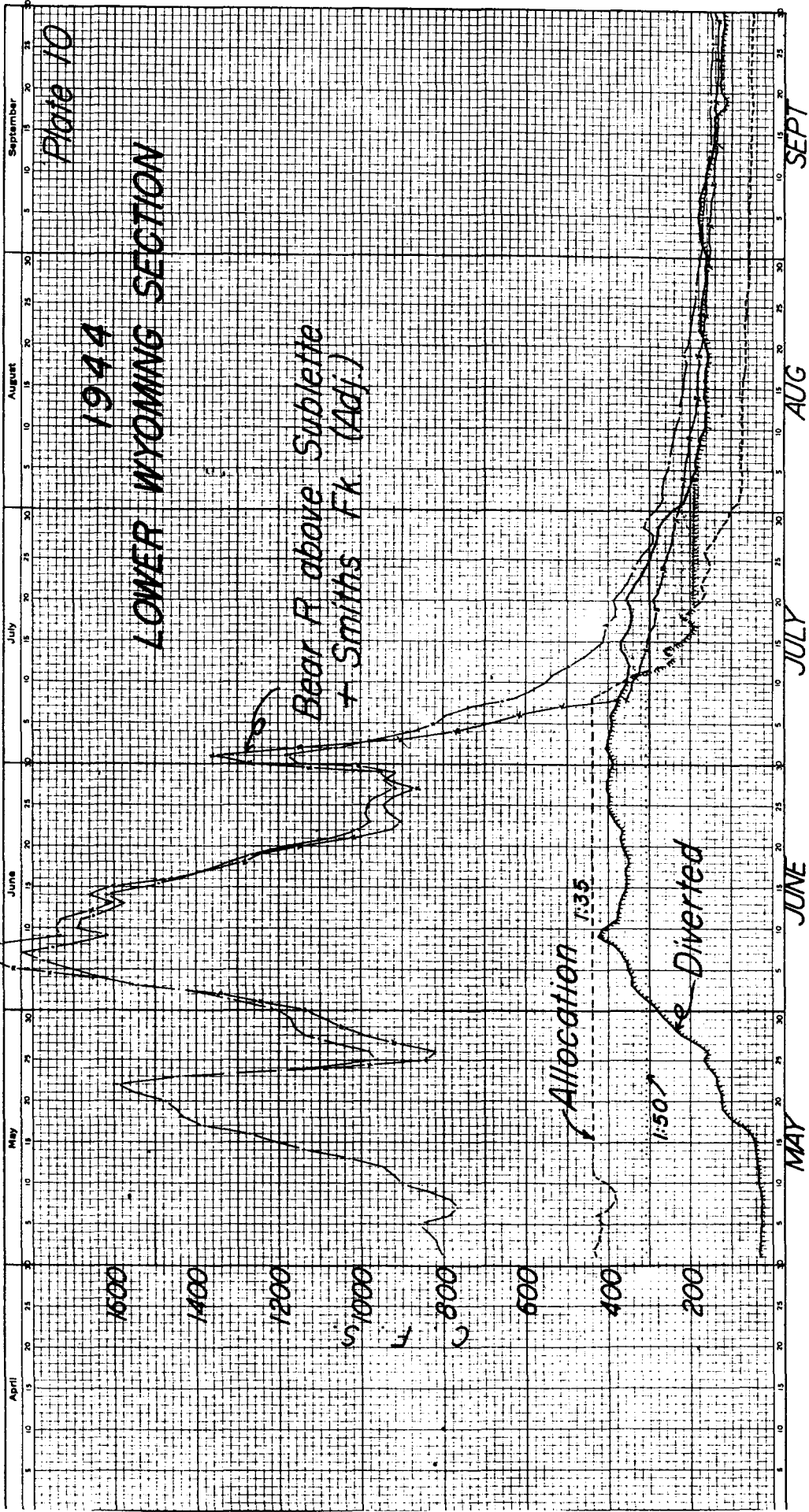
CFS - ACCUMULATED RIGHTS BOTH SECTIONS

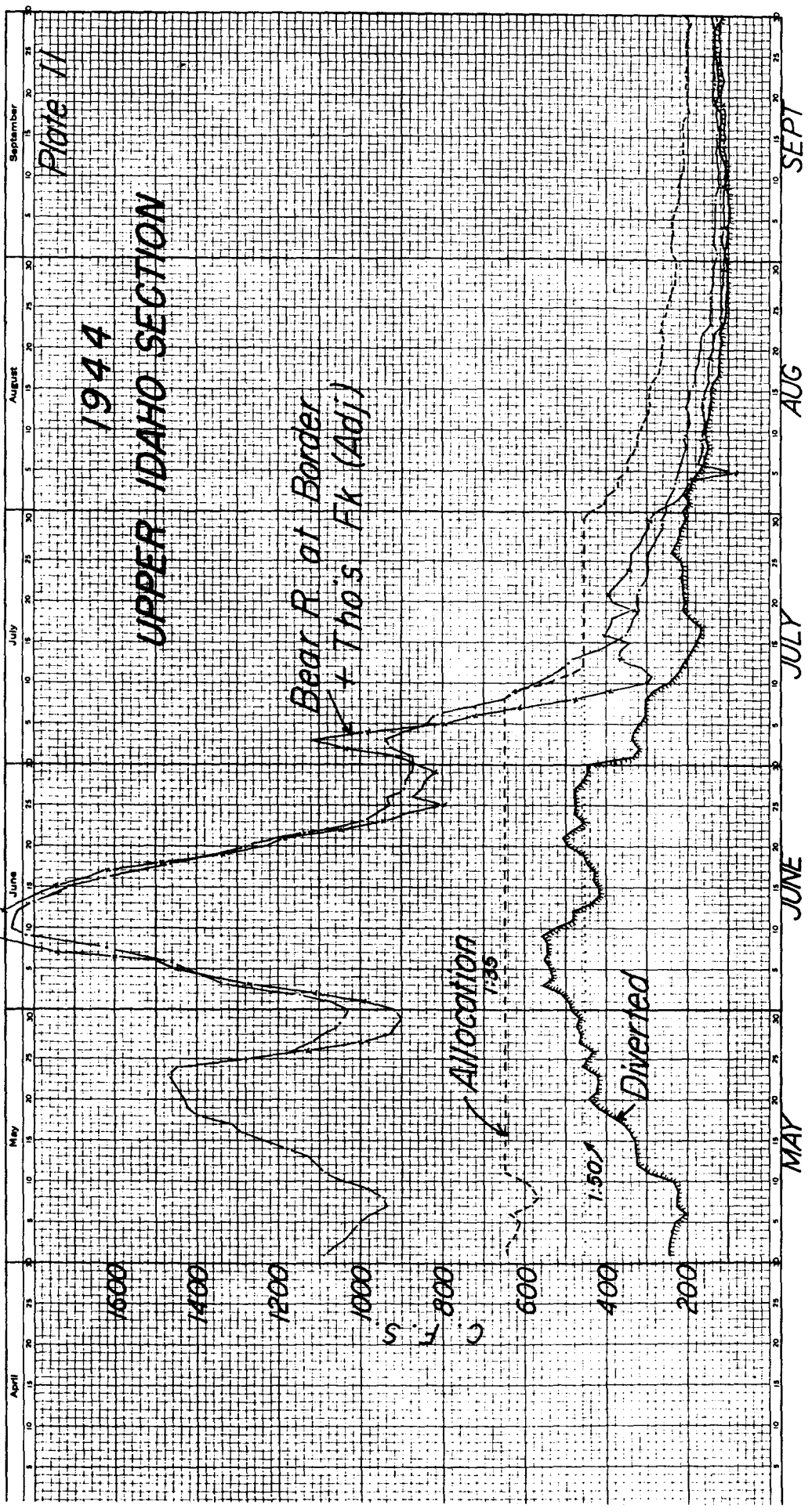






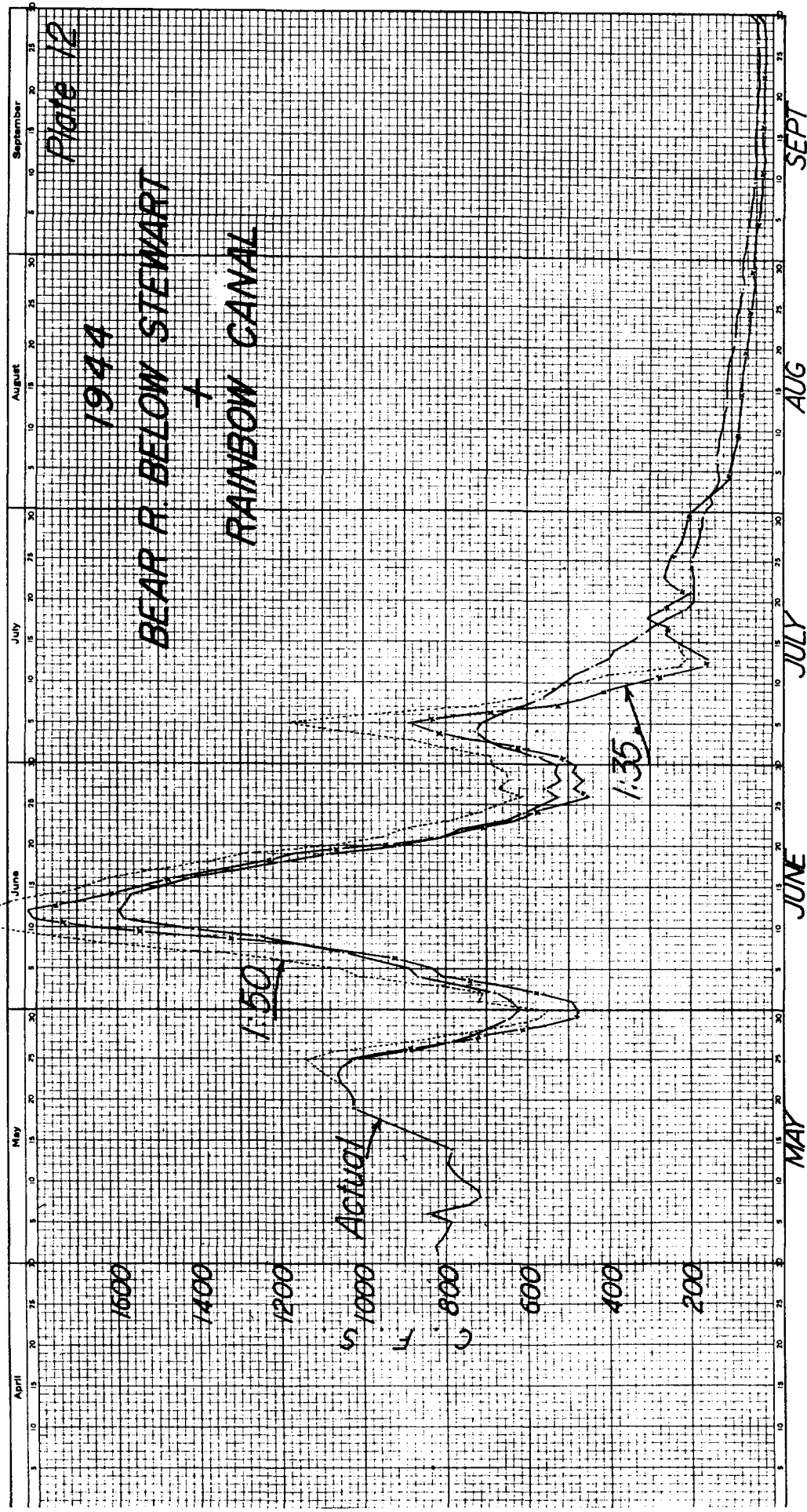






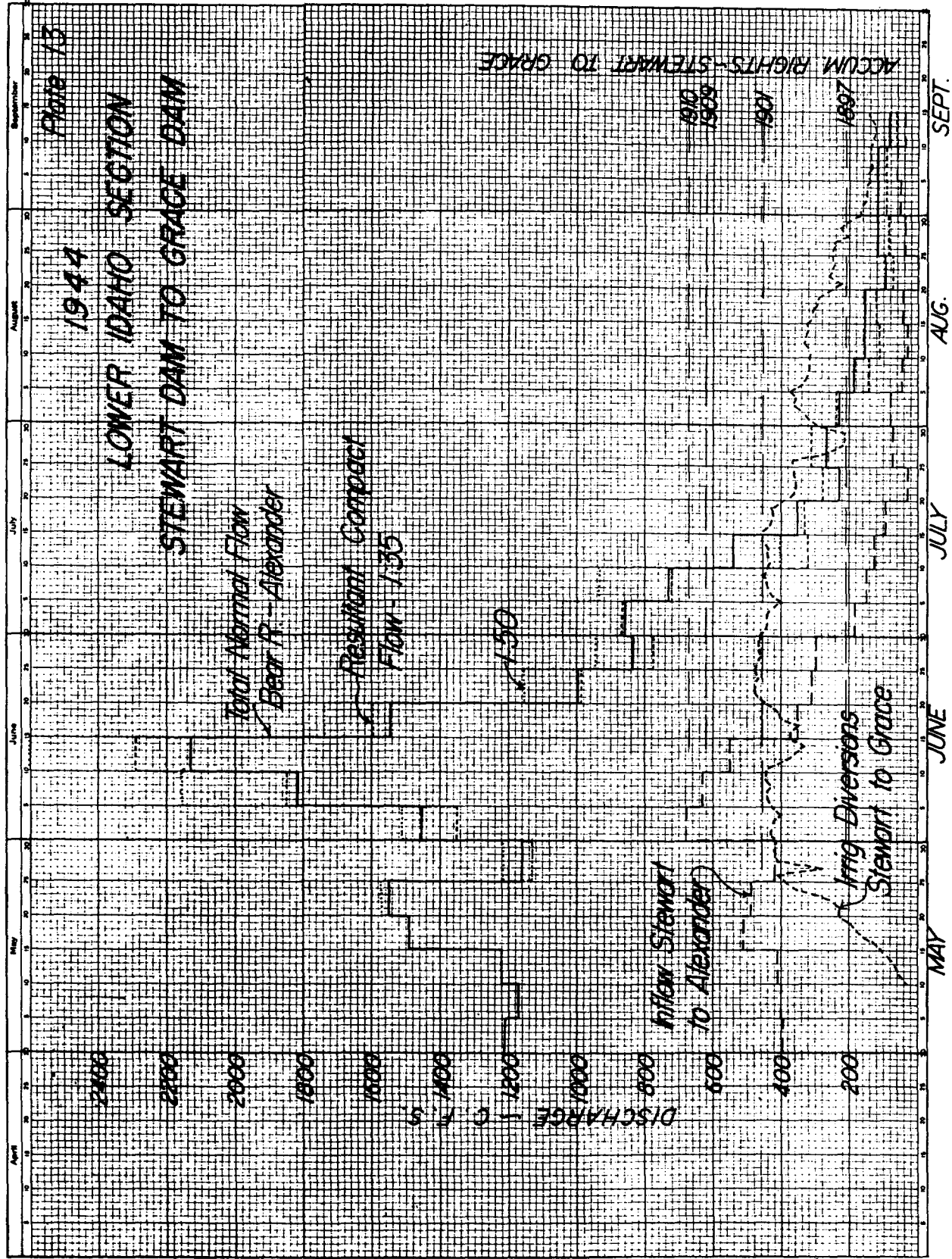
2258

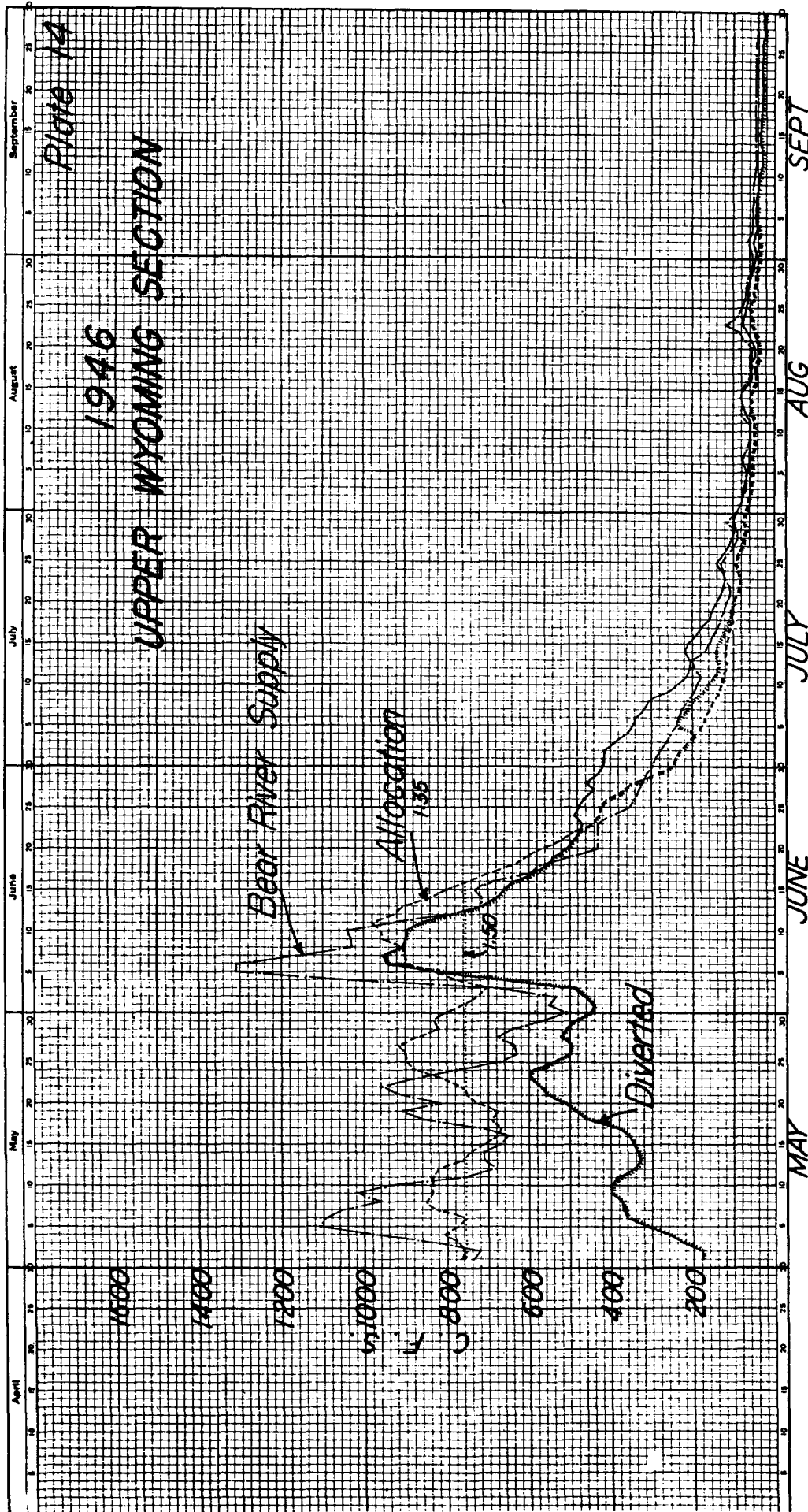
Washington
File #
Title

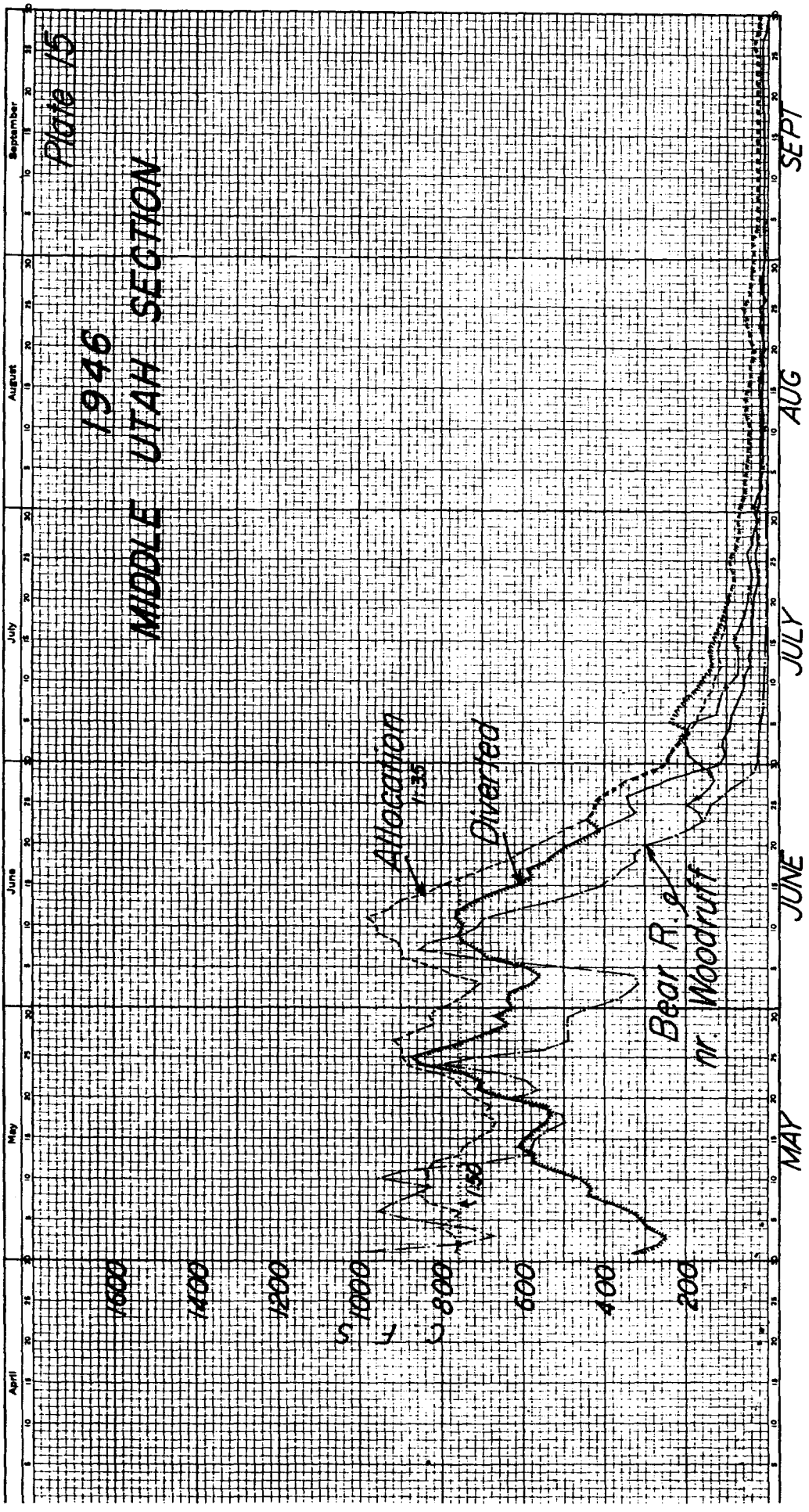


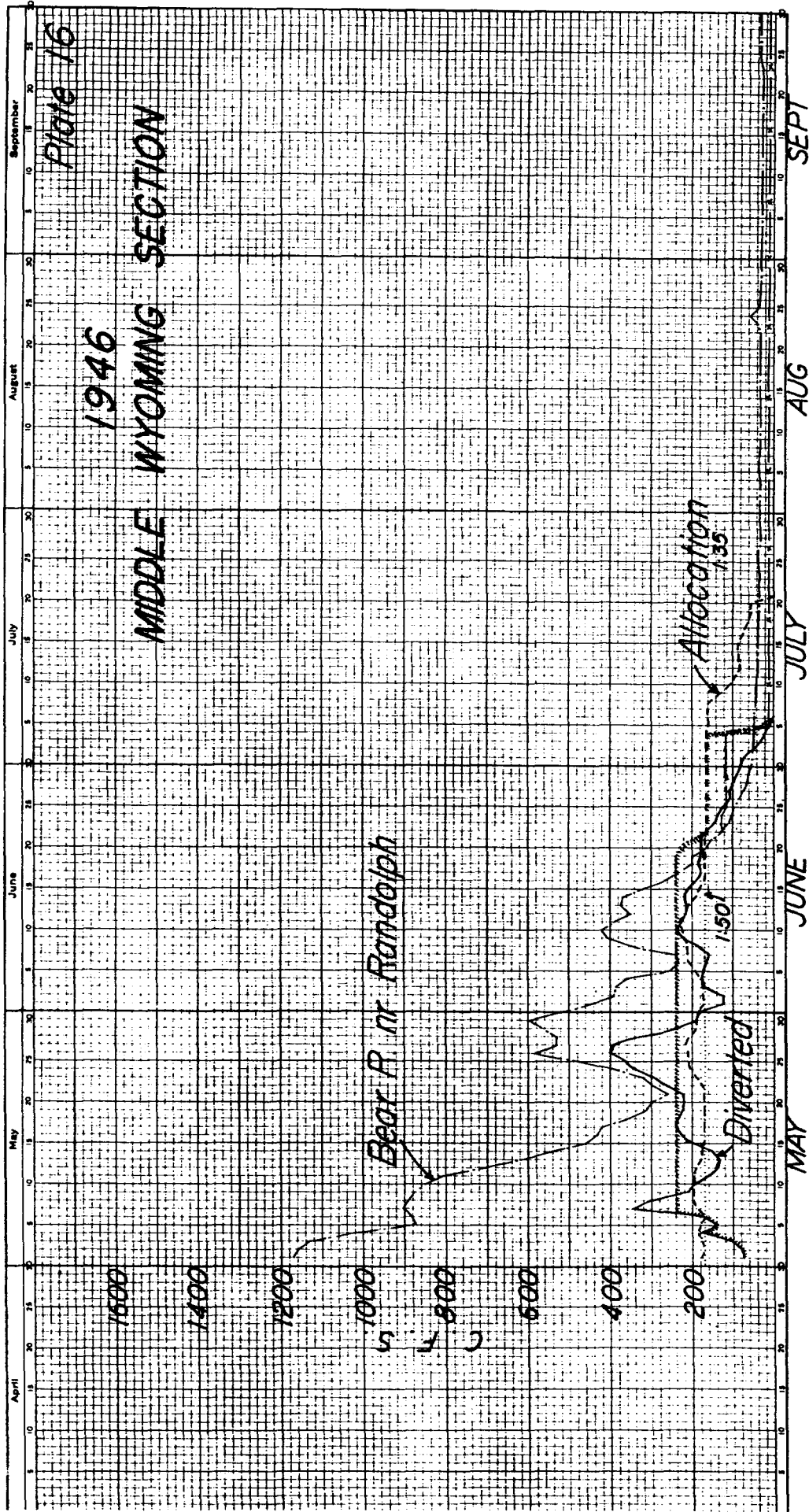
1944

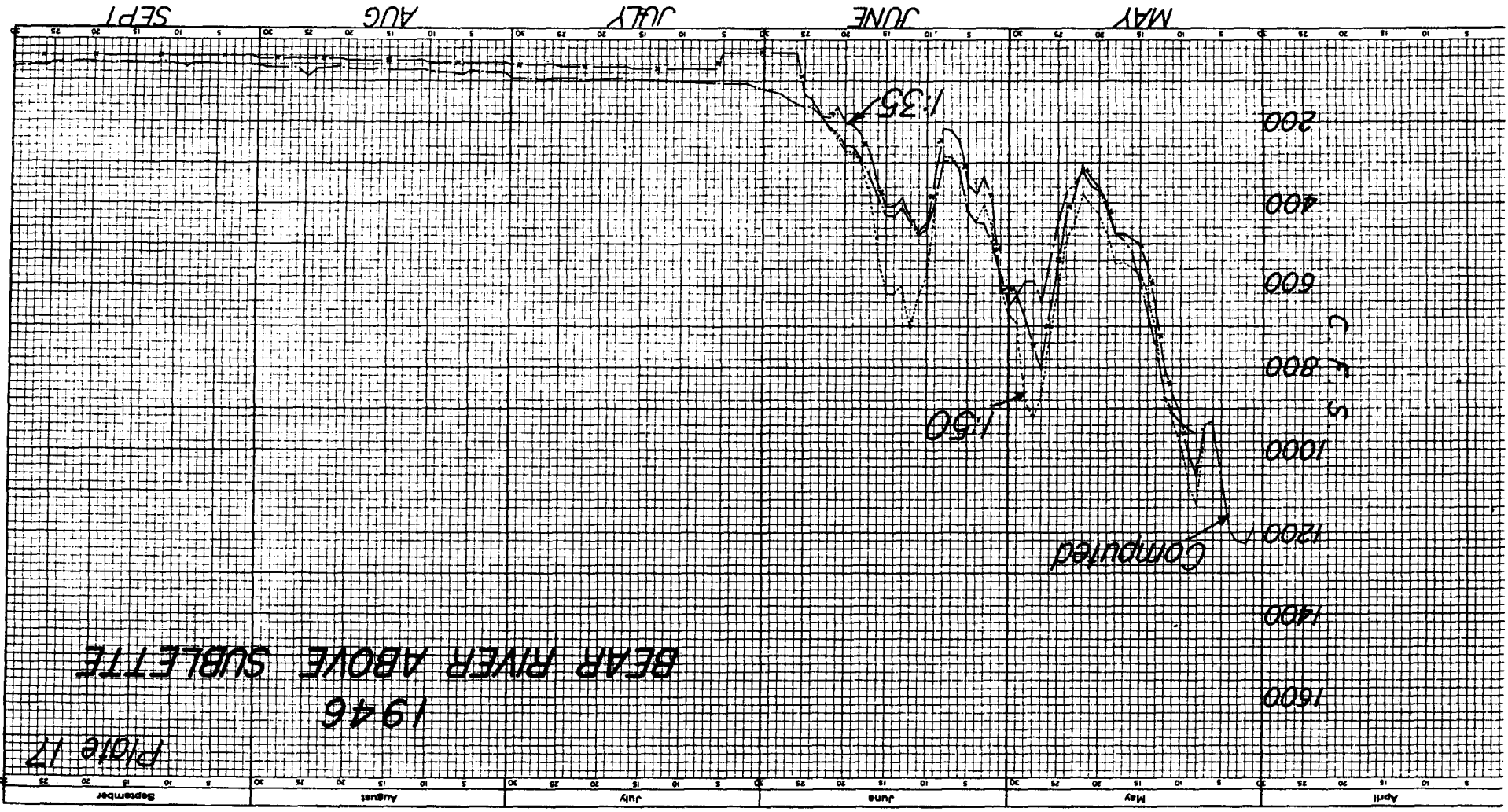
LOWER IDAHO SECTION STEWART DAM TO GRACE DAM







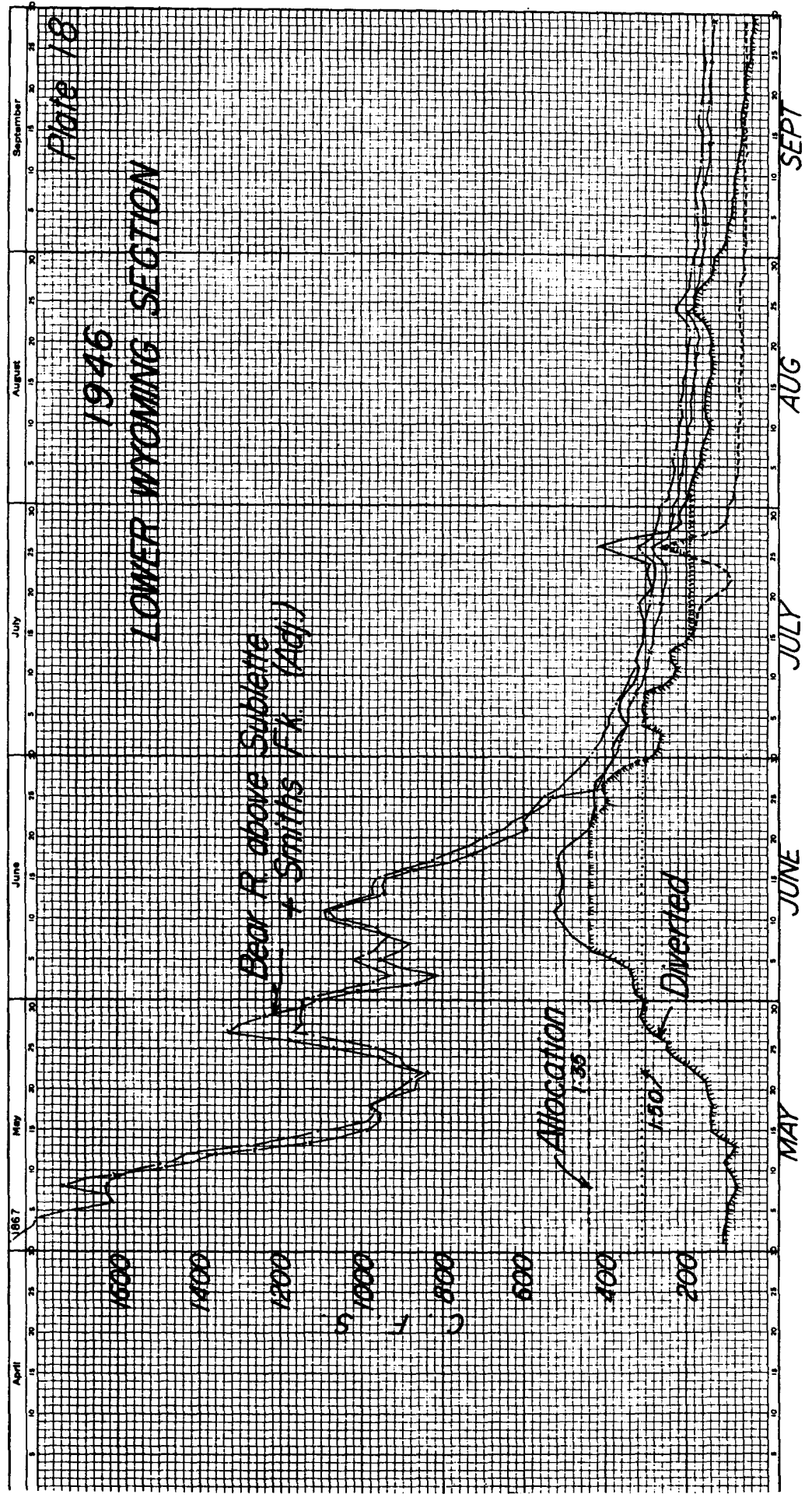


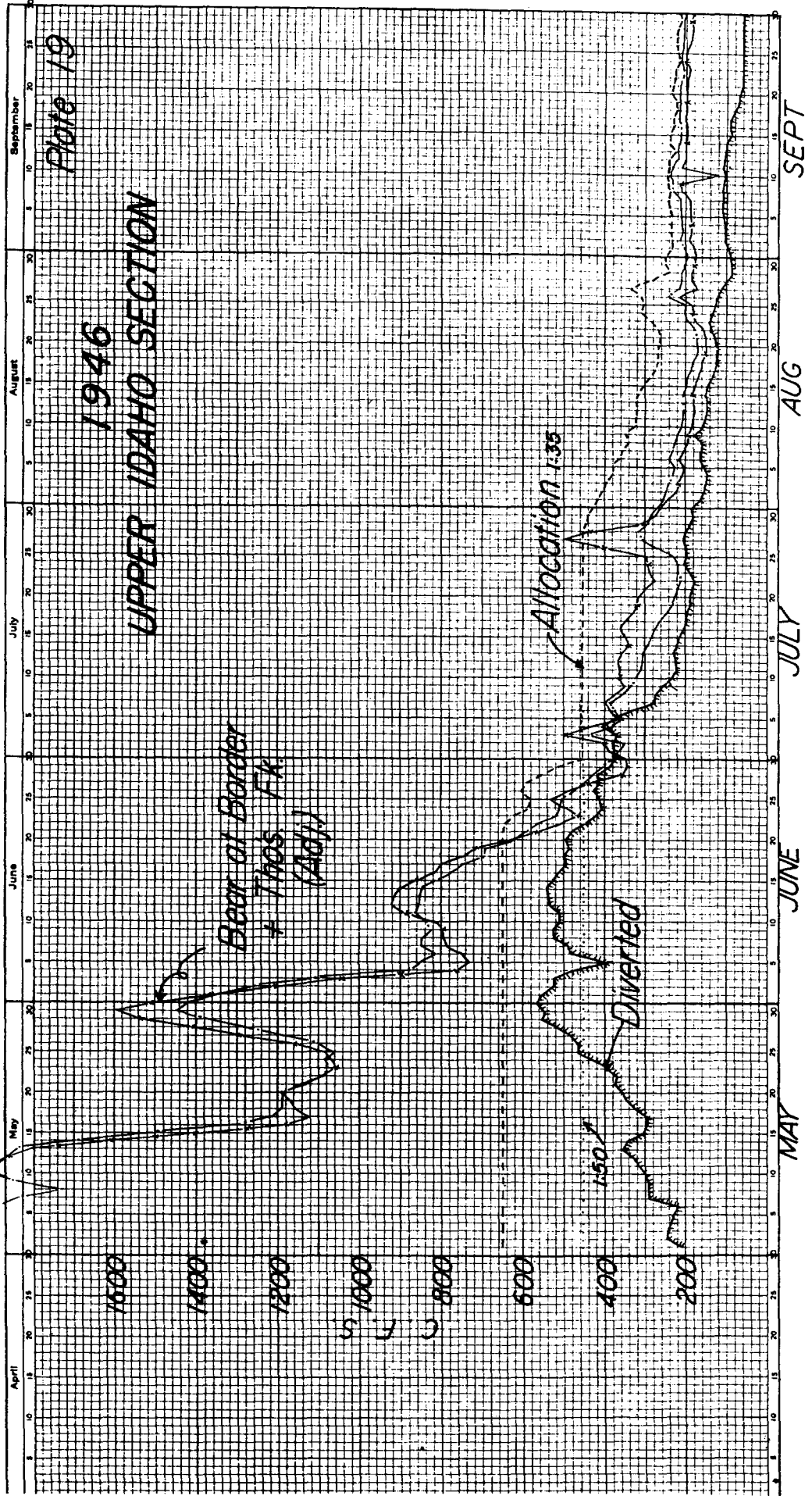


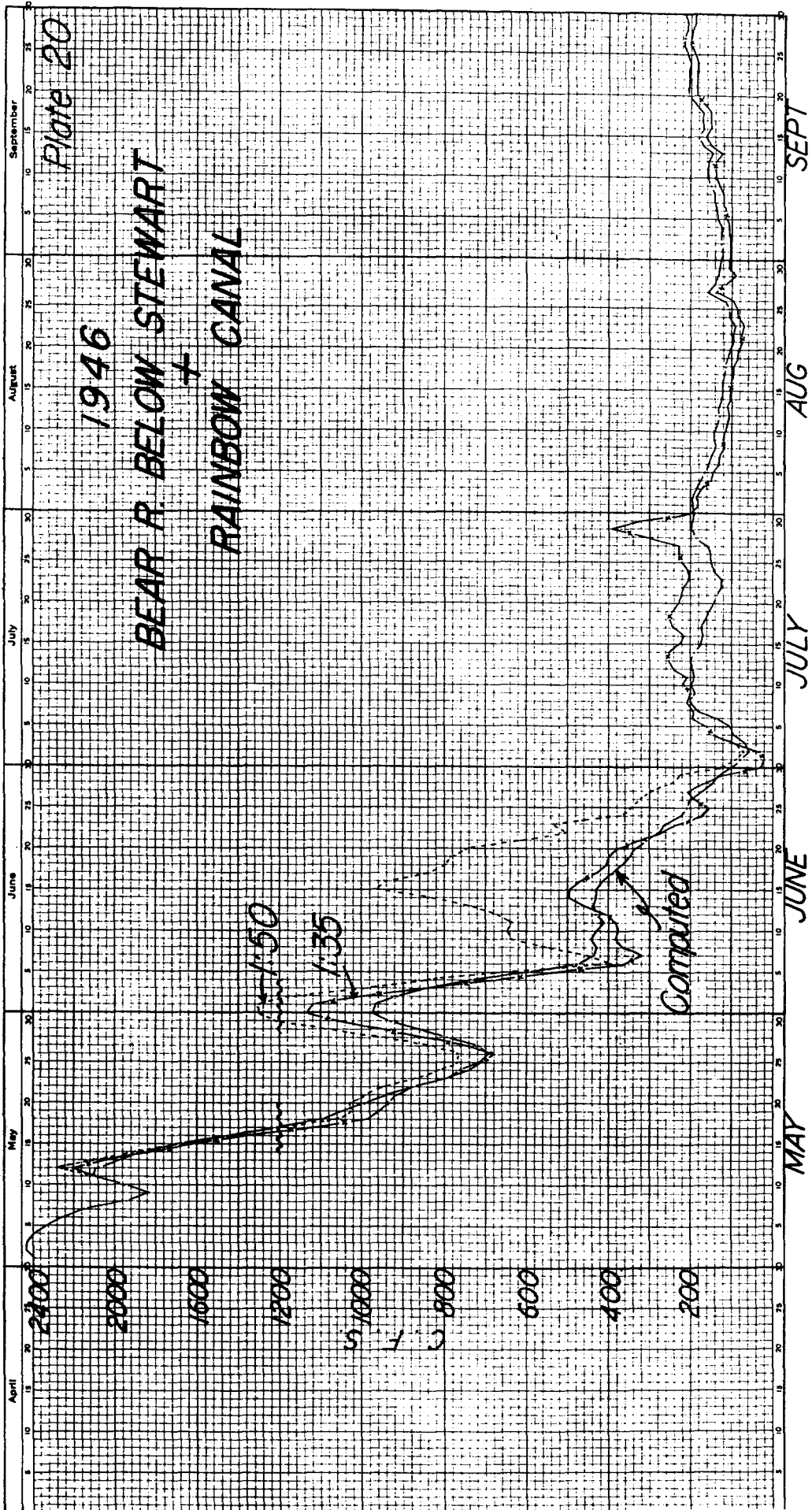
BEAR RIVER ABOVE SUBLETTE
1946

Plate 17

U.S. GEOLOGICAL SURVEY
WASHINGTON







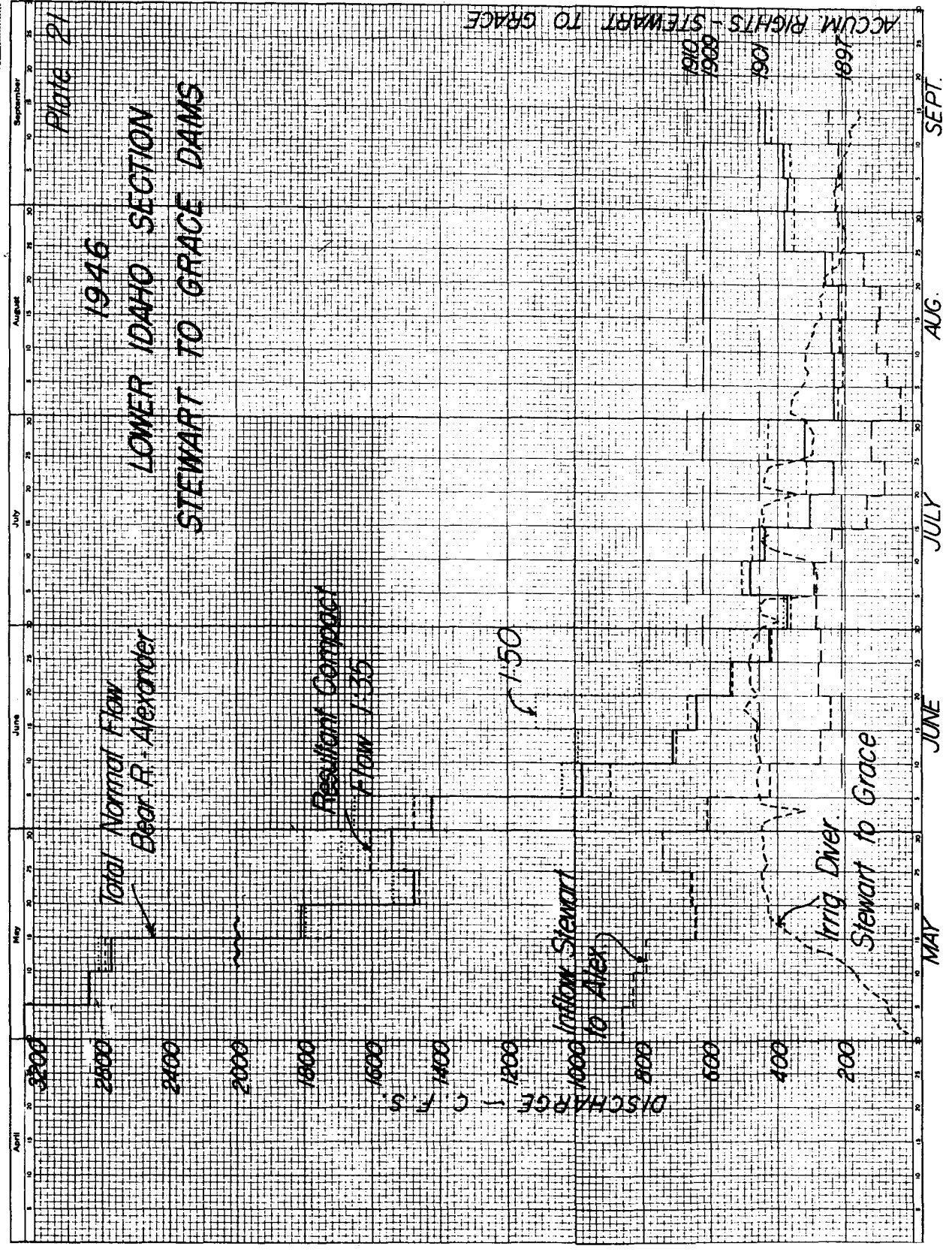
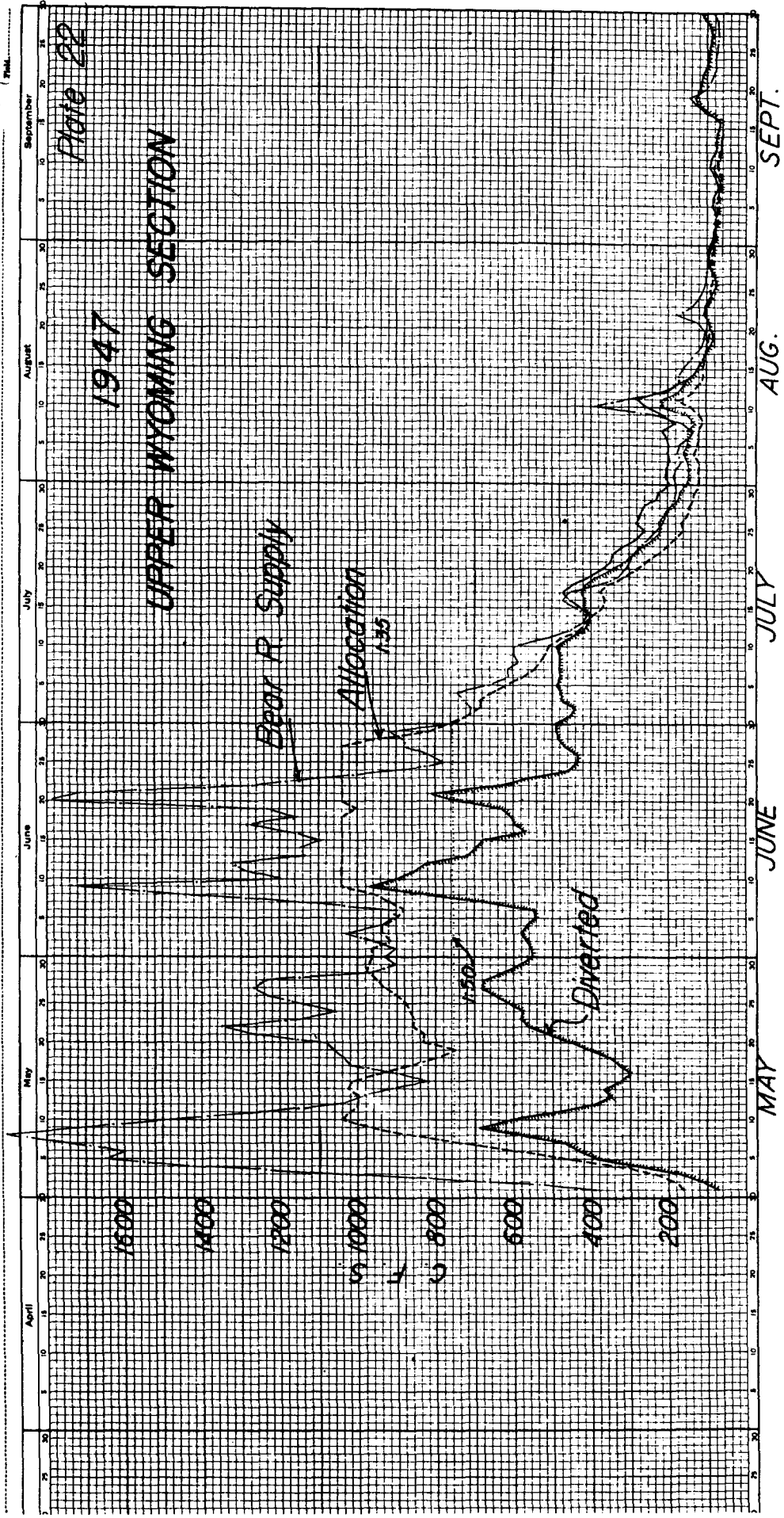


Plate 22

1947

UPPER WYOMING SECTION



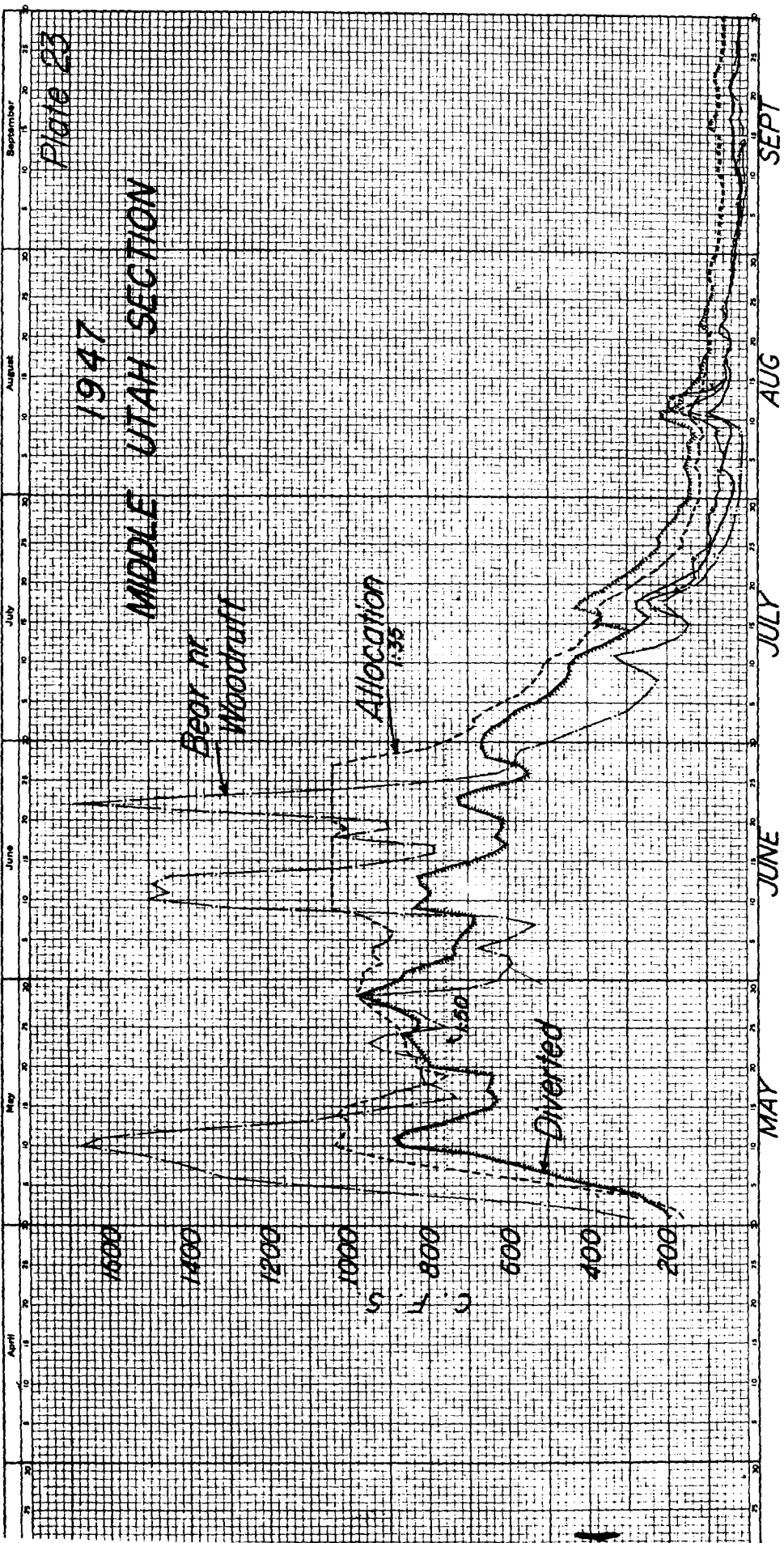
SEPT.

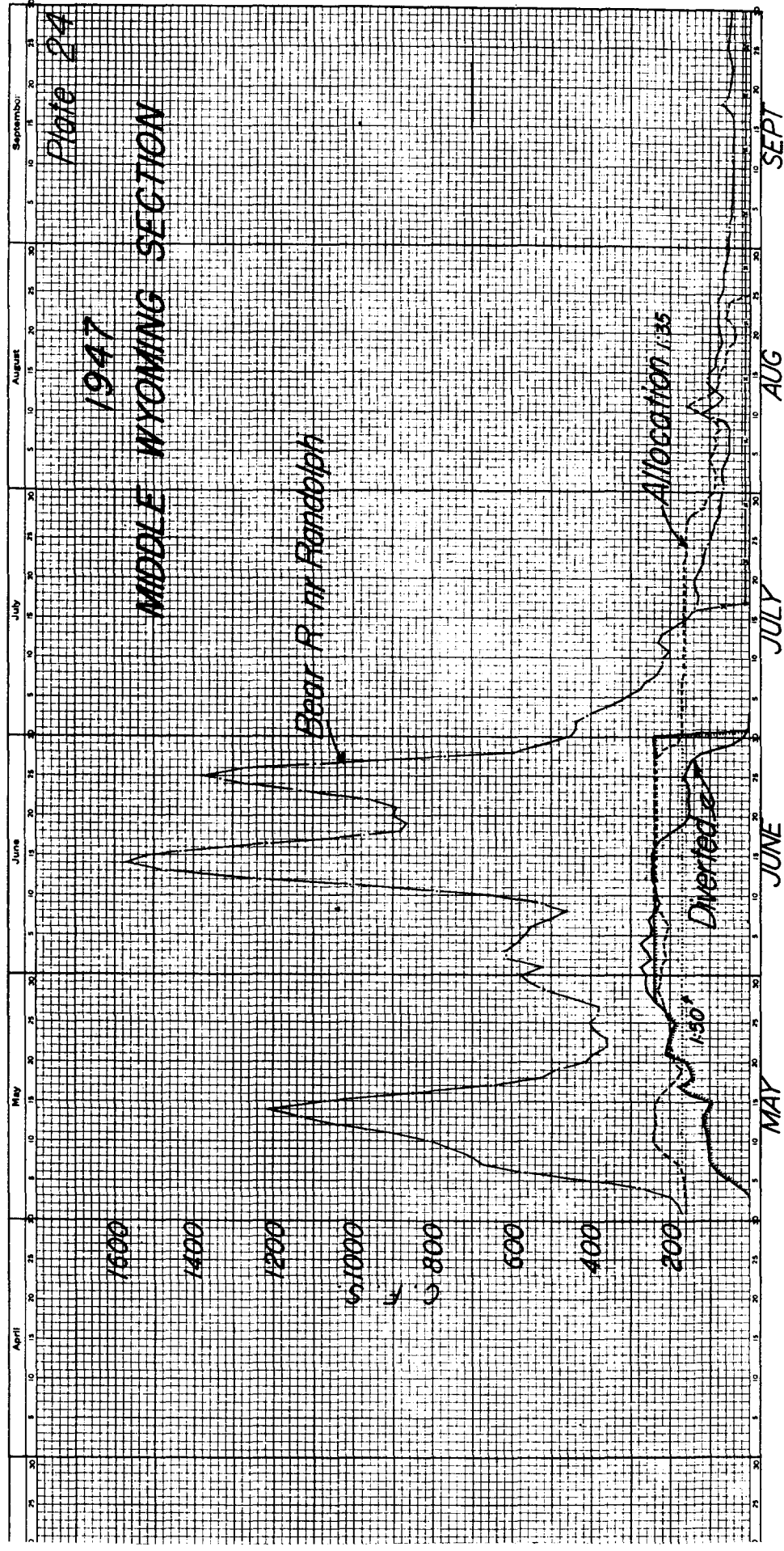
AUG.

JULY

JUNE

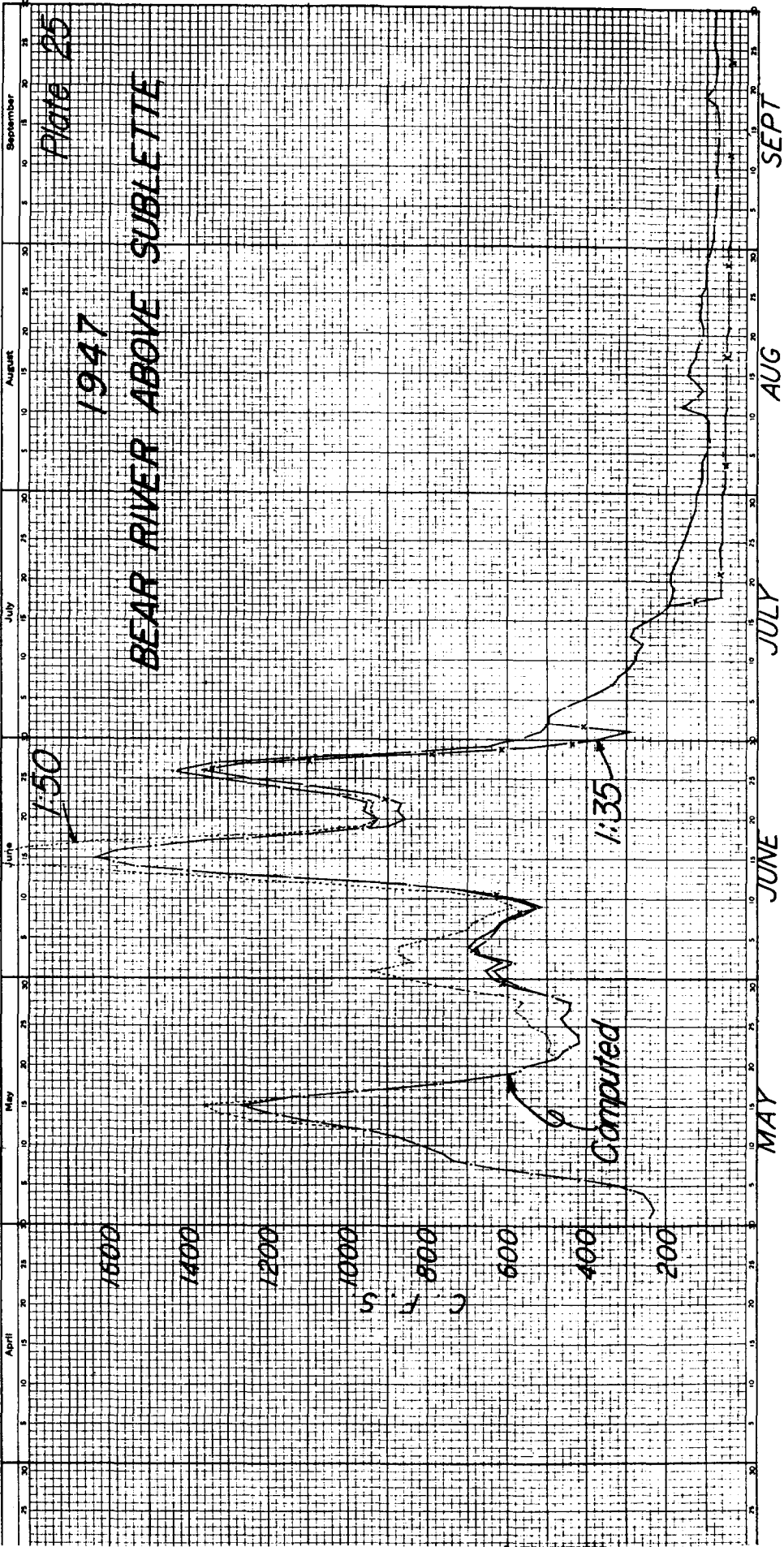
MAY

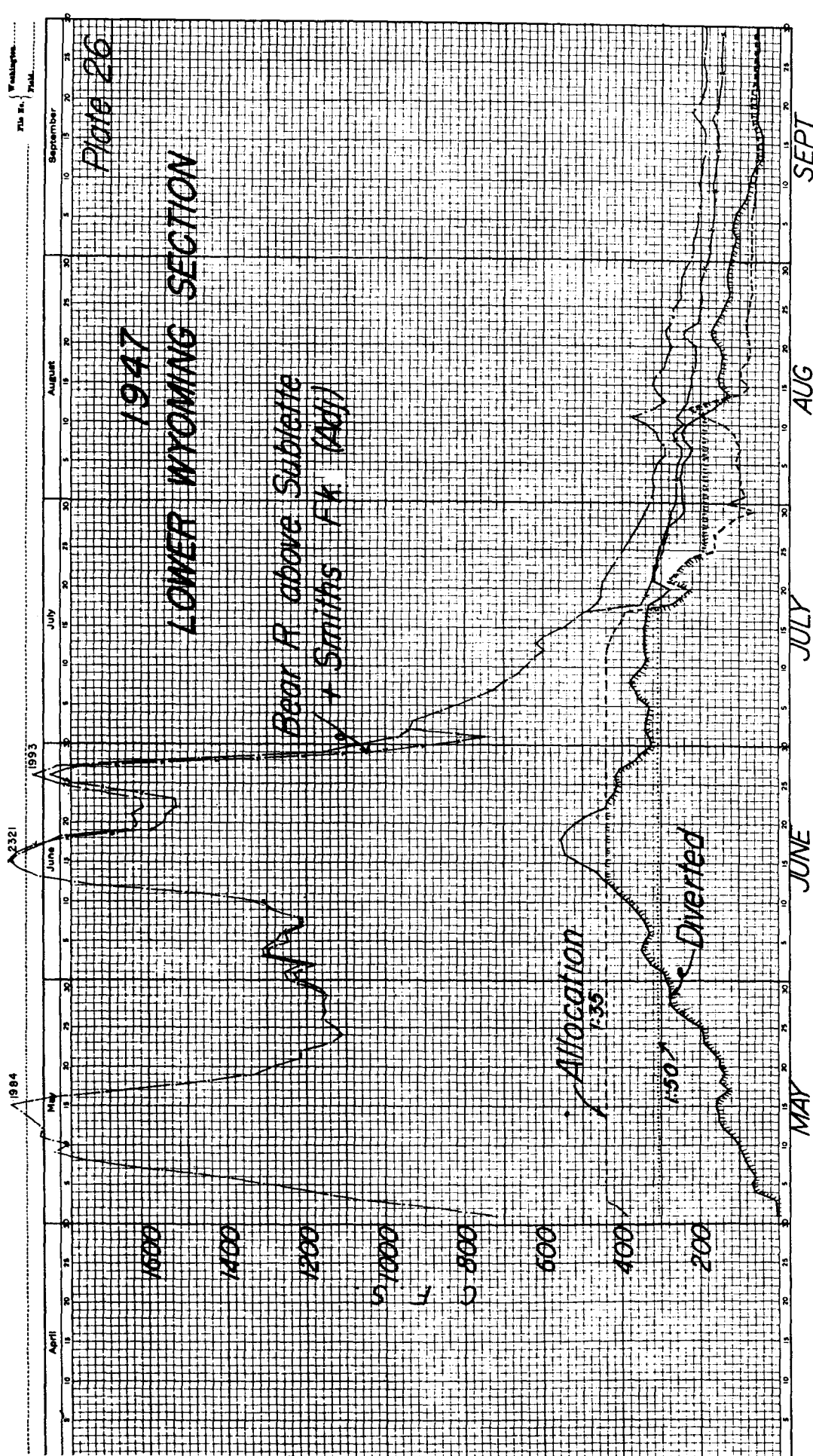


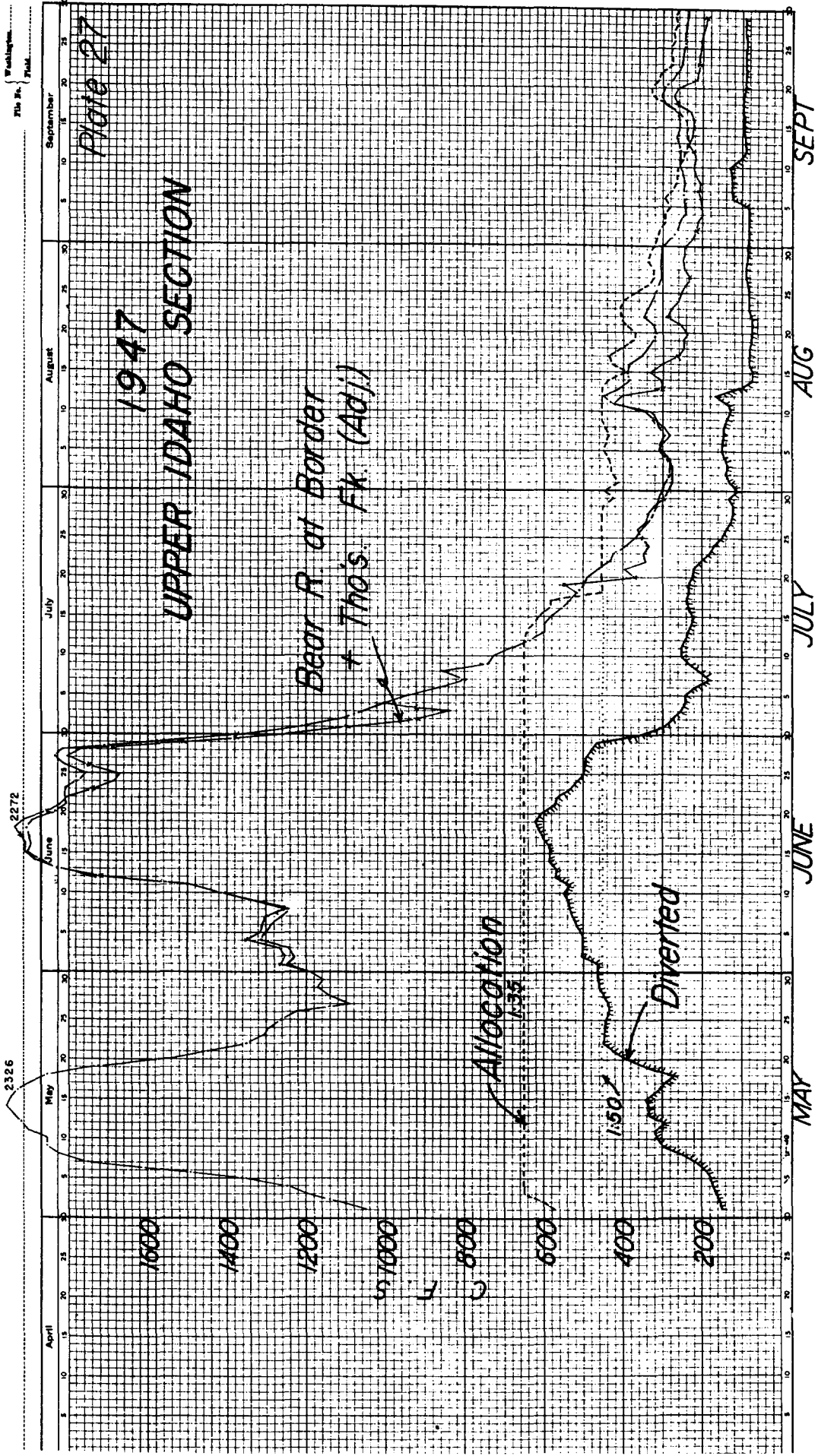


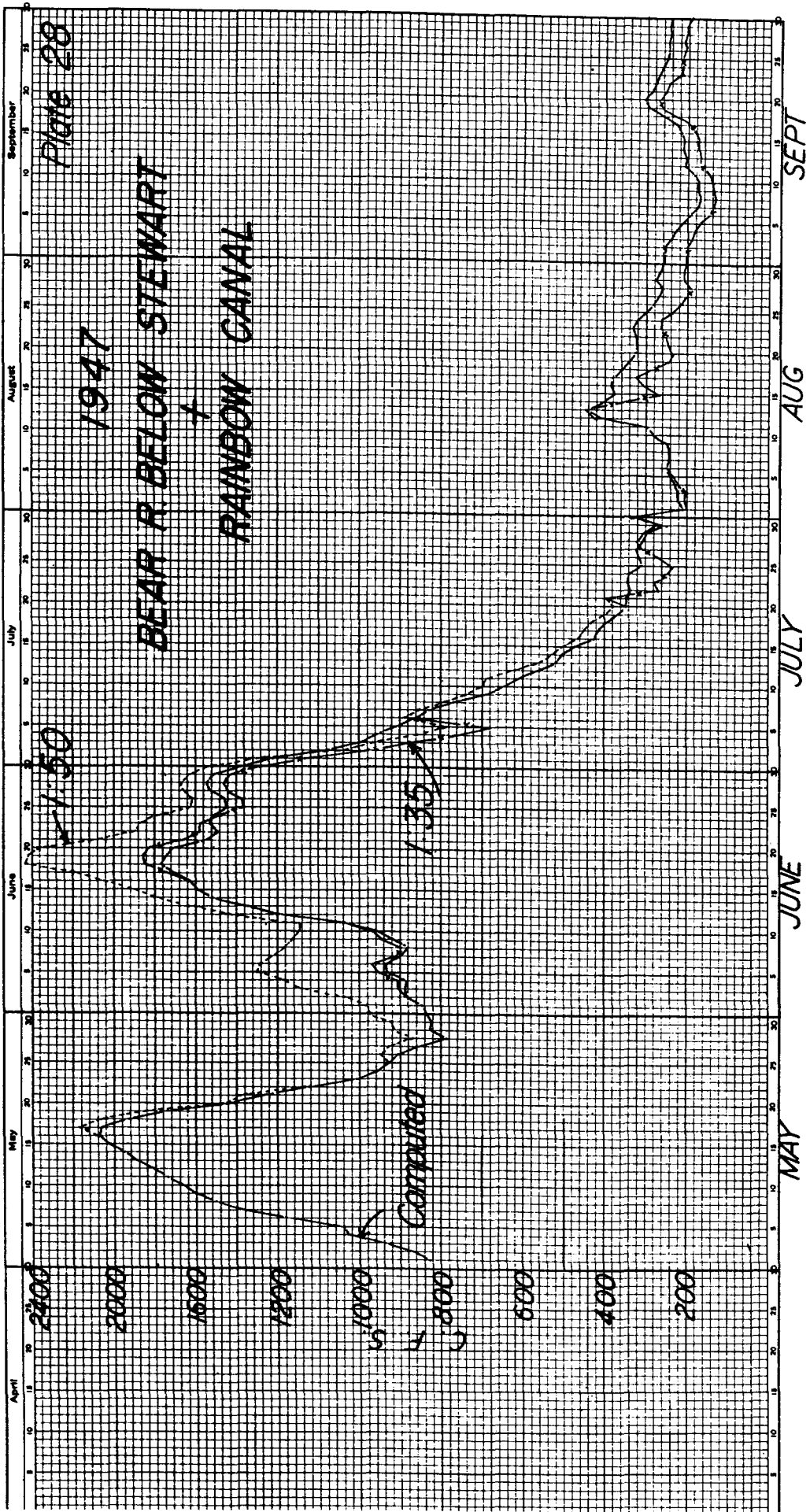
1600
1400
1200
1000
800
600
400
200

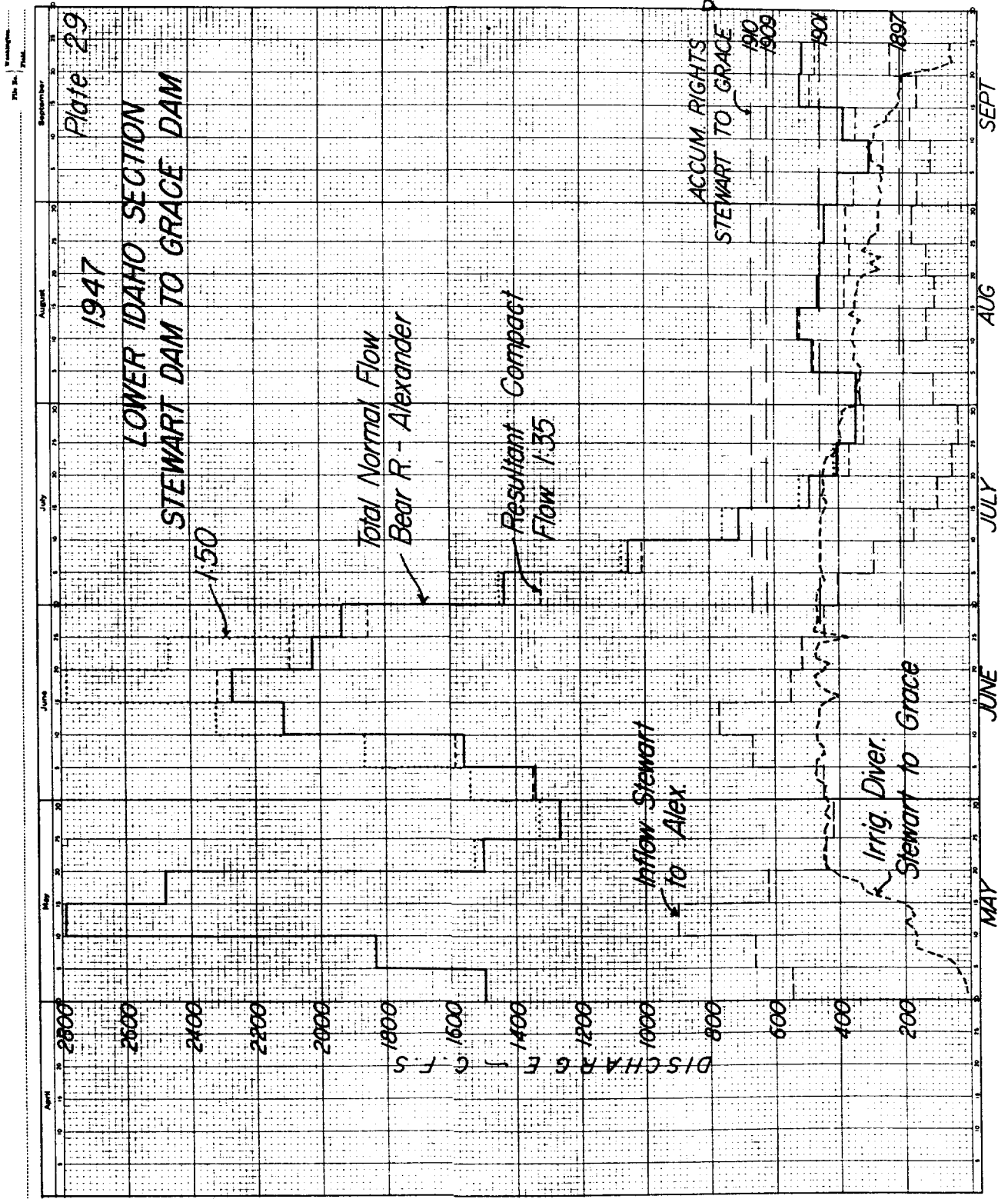
APRIL MAY JUNE JULY AUGUST SEPTEMBER

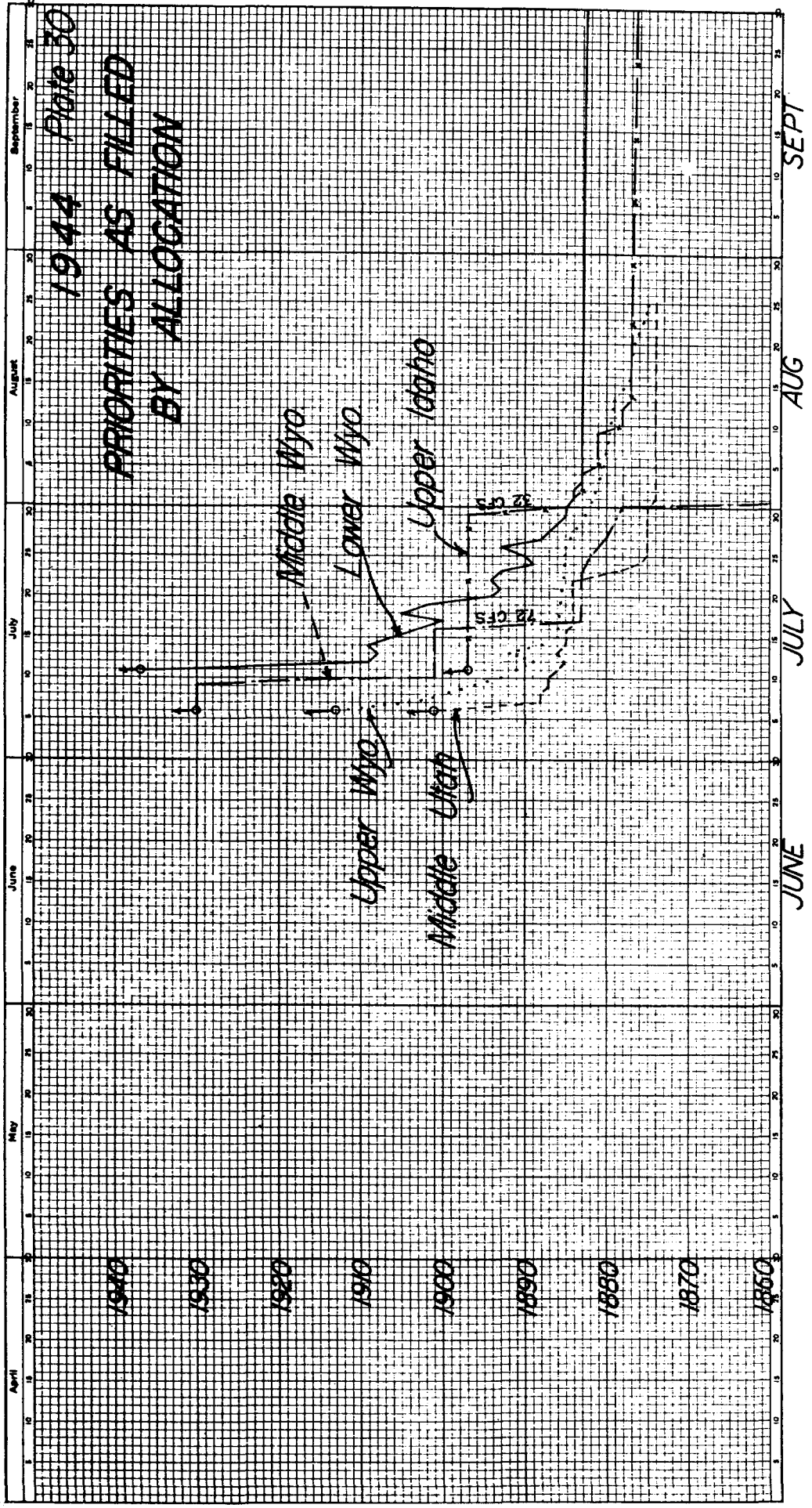


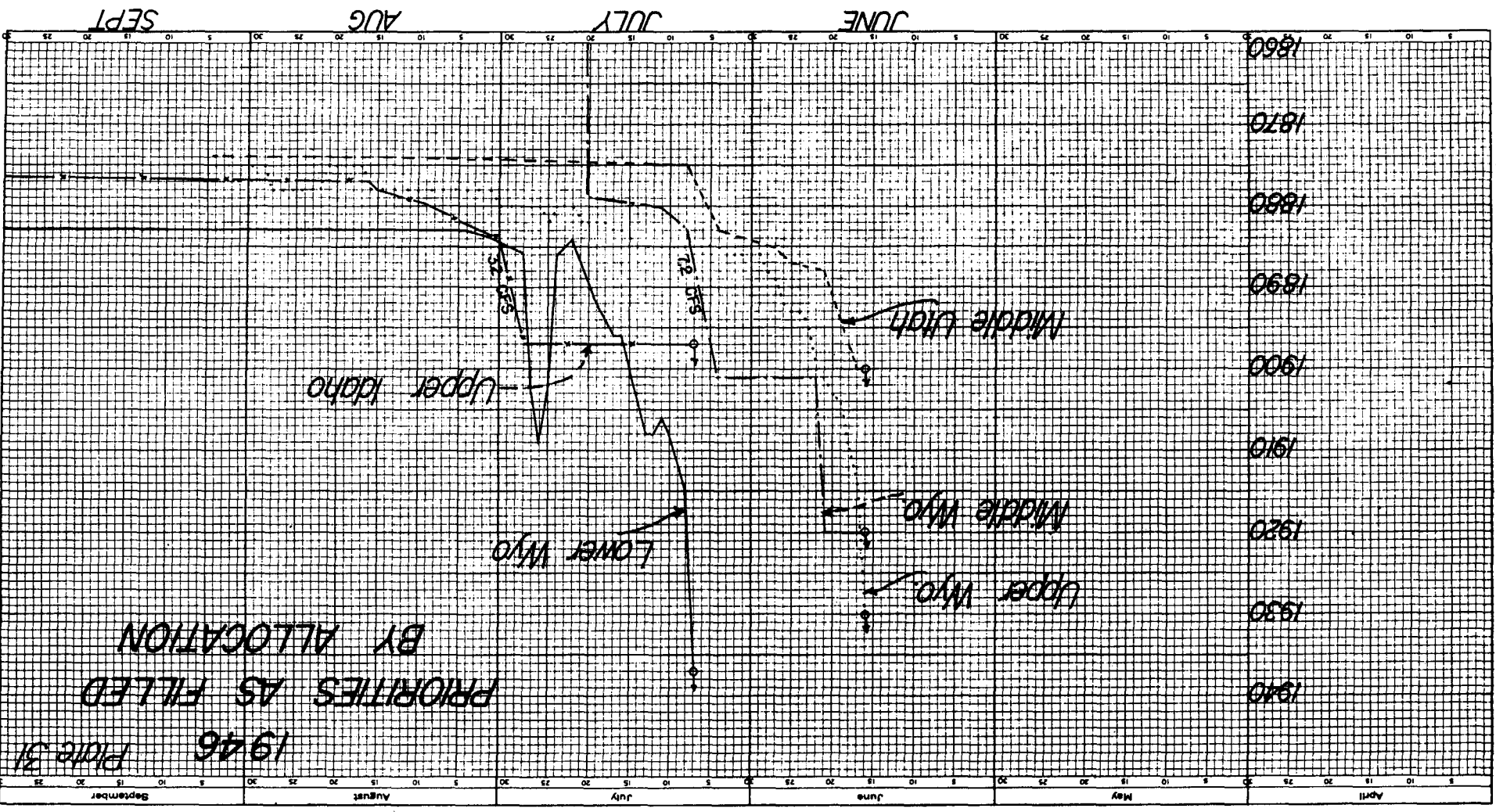




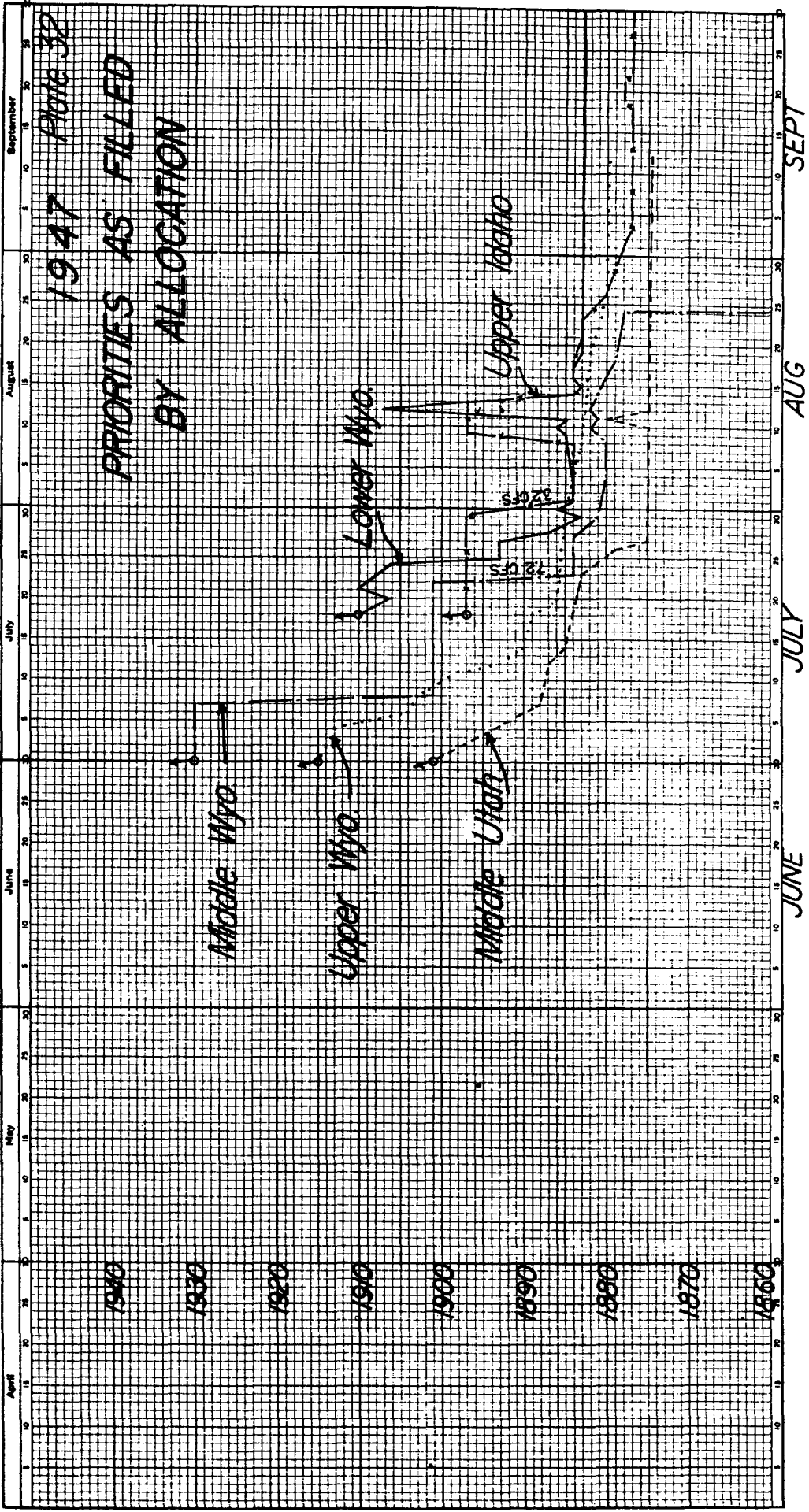


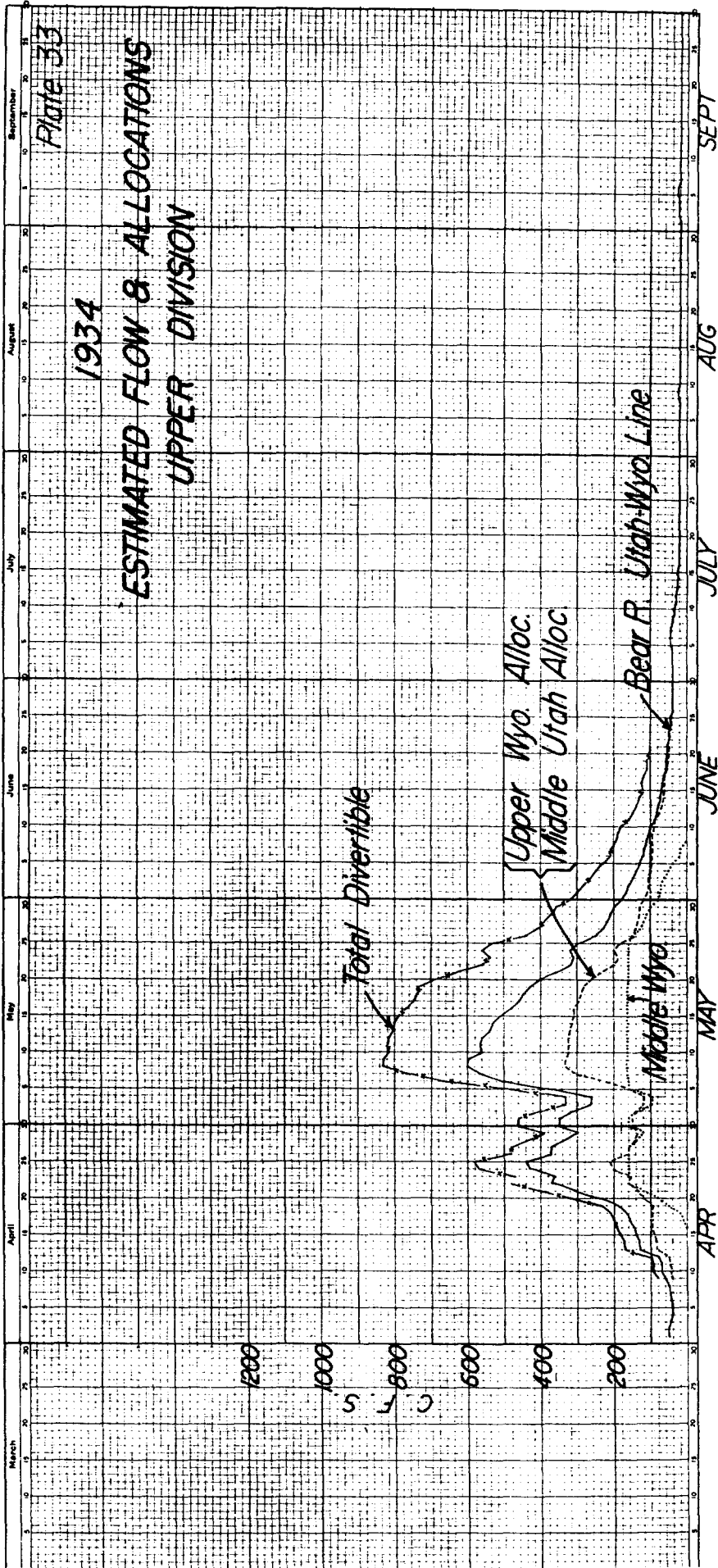


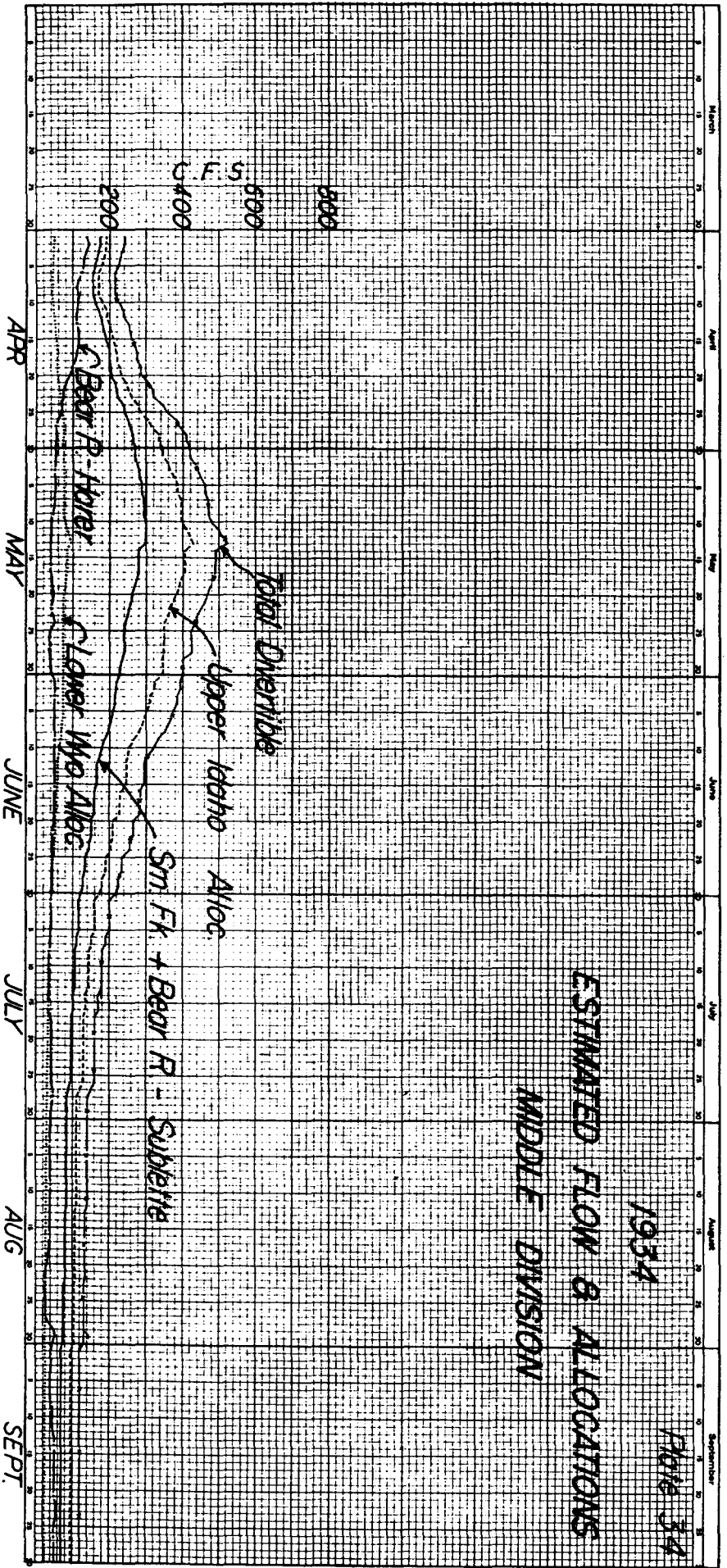




1946
 PRIORITIES AS FILLED
 BY ALLOCATION
 Plate 31







ESTIMATED FLOW & ALLOCATIONS
MIDDLE DIVISION
1954

Plate 34

200 100 0

