WEST DIVIDE WATER CONSERVANCY DISTRICT
818 Taughenbaugh Blvd., Suite 101
Rifle, Colorado 81650

MINUTES OF BOARD OF DIRECTORS MEETING
SEPTEMBER 21, 2023

CALL TO ORDER
The regular Board of Directors meeting was called to order at the district office at 9:00 a.m. by President Samuel B. Potter.

ROLL CALL
The following directors were present: President Samuel B. Potter, Vice President Dan R. Harrison and Secretary Richard L. McNeill. Treasurer Tom Jankowsky and Director Kelly Couey were both absent. Also in attendance were Tammy Keenan, Office Manager; Wendy Ryan Colorado River Engineering, Inc.; Edward B. Olszewski, Counsel; Water Commissioner Bill West and Brendon Langenhuizen, Colorado River District, attended via zoom.

PUBLIC COMMENT
There was no comment from the public.

MINUTES
Richard L. McNeill moved the minutes of the August 25, 2023, meeting be approved as amended; Dan R. Harrison seconded; motion carried.

FINANCE REPORT
Bills to be Paid: Richard L. McNeill moved the attached list of bills to be paid; Dan R. Harrison seconded; motion carried.

Financial Statements: Richard L. McNeill moved the August 2023, Financial Statements prepared by Barnes, Pearson & Rudow, LLC be accepted; Dan R. Harrison seconded; motion carried.

Blair and Associates Representation Letter: Richard L. McNeill moved and directed the President to accept and sign the representation letter; Dan R. Harrison seconded; motion carried.

CSAFE Interest Rates: The board reviewed the CSAFE statements and discussed the rates.

2022 AUDIT
Brian Blair of Blair and Associates, P.C. presented the 2022 audit, and addressed questions and concerns; Richard L. McNeill moved acceptance of the audit; seconded by Dan R. Harrison; audit was accepted.

RIVER DISTRICT REPORT
Brendon Langenhuizen presented a timeline of the recent Inter-state discussions and reminded the board of upcoming meetings and seminars. (Presentation attached)

WATER CONTRACTS
ASSIGNMENTS:
Rick L. McNeill moved for approval of the following assignments; seconded by Dan R. Harrison; motion carried; assignments approved.

Cody and Joslin Boe; assignment from **HOUSE4U, INC**, 1.00 a.f., domestic, Silt Interconnect.

Sunrise North 70 Ranch, LLC, A Colorado Limited Liability Company; assignment from **Grant Bros. Ranch LTD**, 12.39 a.f., commercial, General Stored Water.

Redd Summit Ranches, LLC and Fernando Hernandez Herrera; assignment from **Redd Summit Ranches, LLC and Scott B. Christenson**, 2.00 a.f., domestic, Silt Interconnect.

AMENDMENTS:
Oldcastle SW Group Inc. Sievers Pit; General Stored water amending from 29.1 a.f to 6.00 a.f; Rick L. McNeill moved approval of this amended water allotment contract seconded by Dan R. Harrison; motion carried.

CONTRACTS:
There were no new contracts this month.

ROUNDTABLE REPORT
The next meeting will be Monday September 25, 2023.

WATER RESOURCES' REPORT
Bill West reported the Alsbury release was smooth this year and the rain really helped. Both releases happened at the same time and lasted about a week.

HYDROLOGISTS' REPORT
Wendy Ryan provided Water Watch and Augmentation reports and an oral report on ongoing projects.

CRYSTAL RIVER
Wendy has been providing educational talks for the Wild and Scenic steering committee on Augmentation and plans to present to several other groups as well. CVEPA, BWCD, Crystal Valley Water Users, Nature based solution group, Division 5 Engineers, CBRT, Mt. Sopris Conservation District and the Pitkin County BOCC. She will be presenting to the Roundtable on 25th and to the stakeholders on the 28th.

MARTIN RESERVOIRS
Expansion work continues. The geotechnical drilling is almost complete. Groundwater is about 17 feet which is not great but the material is good with lots of clays and gravels. One of the boreholes experienced high water pressure. Wendy attended the pre-application meeting with USACE. ERO and Metcalf Archeological were also on the call. The cultural assessment will probably be pushed until next spring as access to the Oys parcel is still needed.

Wendy met with USBR Small Storage and will change gears and apply for the WaterSMART Drought Resilience Grant by October 31, 2023.

Yield Study
The Yield Study has been completed.

CHEVRON
Wendy has been coordinating with Division 5, USBR and Chevron. September demands were over-augmented to meet peak daily demands. October will be limited to 4 cfs.

ACTIVE CALLS
East Divide /Divide – 6/30 to current
Fourmile Creek – 6/28 to current
Colorado River 9/7-9/1 & 9/18-current

EXECUTIVE SESSION
At 10:35 a.m. Richard L. McNeill moved to go into executive session per CRS 24-6-402(4) for the purpose of potential contractual issues; Dan R. Harrison seconded; motion carried. At 11:00 a.m. the meeting moved out of executive session.

ATTORNEY'S REPORT
Received written and oral reports from counsel. Richard L. McNeill moved to formally reaffirm intent to maintain diligence for Baldy and Alsbury Reservoirs; Dan R. Harrison seconded; motion carried.

NEW BUSINESS
The next meeting is scheduled for October 19, 2023

DIRECTORS' COMMENTS
Dan R. Harrison shared that it's the wrong time to trap and relocate beavers as they don't have enough time to rebuild food stores before winter.

ADJOURN
Meeting adjourned at 11:35 a.m.

SIGNED:

Richard L. McNeill, Secretary

ATTEST:

Samuel B. Potter, President

West Divide Water Conservancy District-General Fund
Bills to be Paid
September 21, 2023

Num	Name	Memo	Account	Amount
DD113	Keenan, Tamara S	Direct Deposit	5221 · Salary	2,352.42
eft	CEBT	TSK Health Ins	5222 · Medical Insurance--Employer	955.26
eft	American Funds		2227 · Simple IRA Payable	107.93
eft	American Funds		2227 · Simple IRA Payable	359.76
eft	Electronic Federal Tax Payment System	84-0976632	2205-FICA/MED/FWT Payable	968.42
eft	Capital One, F.S.B.	Comcast	5390 · Telephone & Internet	202.44
eft	Capital One, F.S.B.	Zoom	5390 · Telephone & Internet	17.29
eft	Capital One, F.S.B.	Postage	5300 · Postage/Box Rent/Etc.	65.07
eft	Capital One, F.S.B.	Dunkin Donuts	5100 · Office Supplies	53.66
eft	Capital One, F.S.B.	Postage paid envelopes and toner	5100 · Office Supplies	3,367.69
5662	Barnes, Pearson & Rudow, PC	August	5150 · Accounting	715.00
5663	Blair & Associates, P.C.	2022 Audit	5180 · Audit Preparation	8,300.00
5633	Bookcliff Professional Building, LLC		5395 · Rent--Office unit	996.35
5633	Bookcliff Professional Building, LLC		5394 · Rent-Prop.Taxes/Ins/Utilities	200.00
				18,661.29

GENERAL STORED WATER

Num	Name	Memo	Account	Amount
2639	Garfield County Clerk and Recorder	Memorandums	7070 · Memorandum Recording Fees	77.00
2640	Mesa County Clerk and Recorder	Memorandum	7070 · Memorandum Recording Fees	13.00
2641	General Fund	3rd Qtr Reimbursement	7062 · Personnel Service Proration	7,418.50
2641	General Fund	3rd Qtr Reimbursement	7063 · Office Rent Proration	1,727.50
2641	General Fund	3rd Qtr Reimbursement	7064 · Directors Fees Proration	1,804.75
2641	General Fund	3rd Qtr Reimbursement	7061 · Accounting Fees Proration	2,626.00
2642	ERO Resources Corp.	Task 1 Wetland Delineation and report	Martin Grant	5,294.82
2643	Olszewski, Massih & Maurer, P.C.	General	7047 · Legal--General	490.00
2643	Olszewski, Massih & Maurer, P.C.	CRWCD	7047 · Legal--General	420.00
2643	Olszewski, Massih & Maurer, P.C.	Contracts	7047 · Legal--General	525.00
2643	Olszewski, Massih & Maurer, P.C.	Crystal River Aug	7048 · Legal--Crystal River	341.25
2643	Olszewski, Massih & Maurer, P.C.	Martin Diligence	7046 · Legal--WD project Diligence	157.50
2643	Olszewski, Massih & Maurer, P.C.	Area A	7047 · Legal--General	376.25
2643	Olszewski, Massih & Maurer, P.C.	Alsbury Diligence	7053 · Legal - Alsbury	227.50
2643	Olszewski, Massih & Maurer, P.C.	WD Project Diligence	7046 · Legal--WD project Diligence	262.50
2644	Colorado River Engineering, Inc.	Task 3 Prelim Investigations	Martin Grant	92.50
2644	Colorado River Engineering, Inc.	Task 5 404 Coordination	Martin Grant	260.00
2644	Colorado River Engineering, Inc.	Task 6 Streamgae Monitoring	Martin Grant	446.25
2644	Colorado River Engineering, Inc.	task 8 Engineering Drawings	Martin Grant	757.25
2644	Colorado River Engineering, Inc.	Task 10 Reporting & Documentation	Martin Grant	130.00
2645	Colorado River Engineering, Inc.	Memos for piezometers	7034 · Hydrology--Alsbury	626.60

West Divide Water Conservancy District-General Fund
Bills to be Paid
September 21, 2023

24,074.17

Fourmile

Num	Name	Memo	Account	Amount
2014	General Fund #1414008103	3rd Qtr Reimbursement	8056 · Rent--office Space Proration	581.50
2014	General Fund #1414008103	3rd Qtr Reimbursement	8058 · Accounting Fees Proration	884.00
2014	General Fund #1414008103	3rd Qtr Reimbursement	8057 · Directors fees Proration	607.50
2014	General Fund #1414008103	3rd Qtr Reimbursement	8059 · Personnel Service Proration	2,497.50
2015	Olszewski, Massih & Maurer, P.C.	General	8050 · Legal--General	691.25
2016	Colorado River Engineering, Inc.	General	8030 · Hydrology	260.00
2016	Colorado River Engineering, Inc.	Oak Meadows Release	8033 · Hydrology -- Martin # 1 & 2	454.35
2016	Colorado River Engineering, Inc.	Site visit; deal with beavers	8080 · Maintenance - Martin Reservoir	394.75
				6,370.85

Silt Interconnect

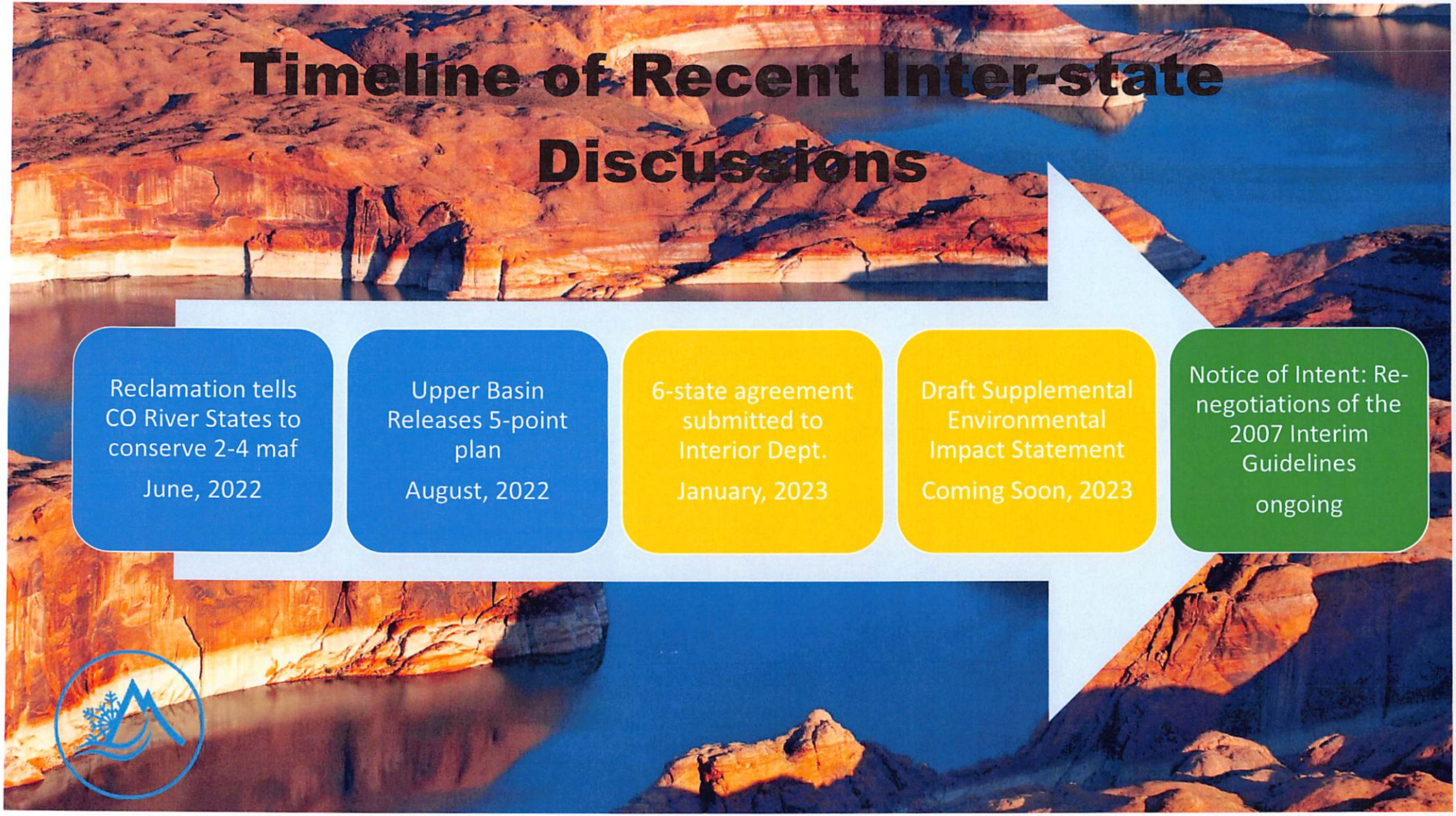
Num	Name	Memo	Account	Amount
551	Garfield County Clerk & Recorder	Memorandum	8000 · Memorandum Recording Fees	13.00
552	General Fund 1414008103	3rd Qtr Reimbursement	8100 · Rent--Office Space Proration	383.00
552	General Fund 1414008103	3rd Qtr Reimbursement	8200 · Personnel Service Proration	1,644.25
552	General Fund 1414008103	3rd Qtr Reimbursement	8400 · Directors Fees Proration	400.00
552	General Fund 1414008103	3rd Qtr Reimbursement	8300 · Accounting Fees Proration	582.00
				3,022.25

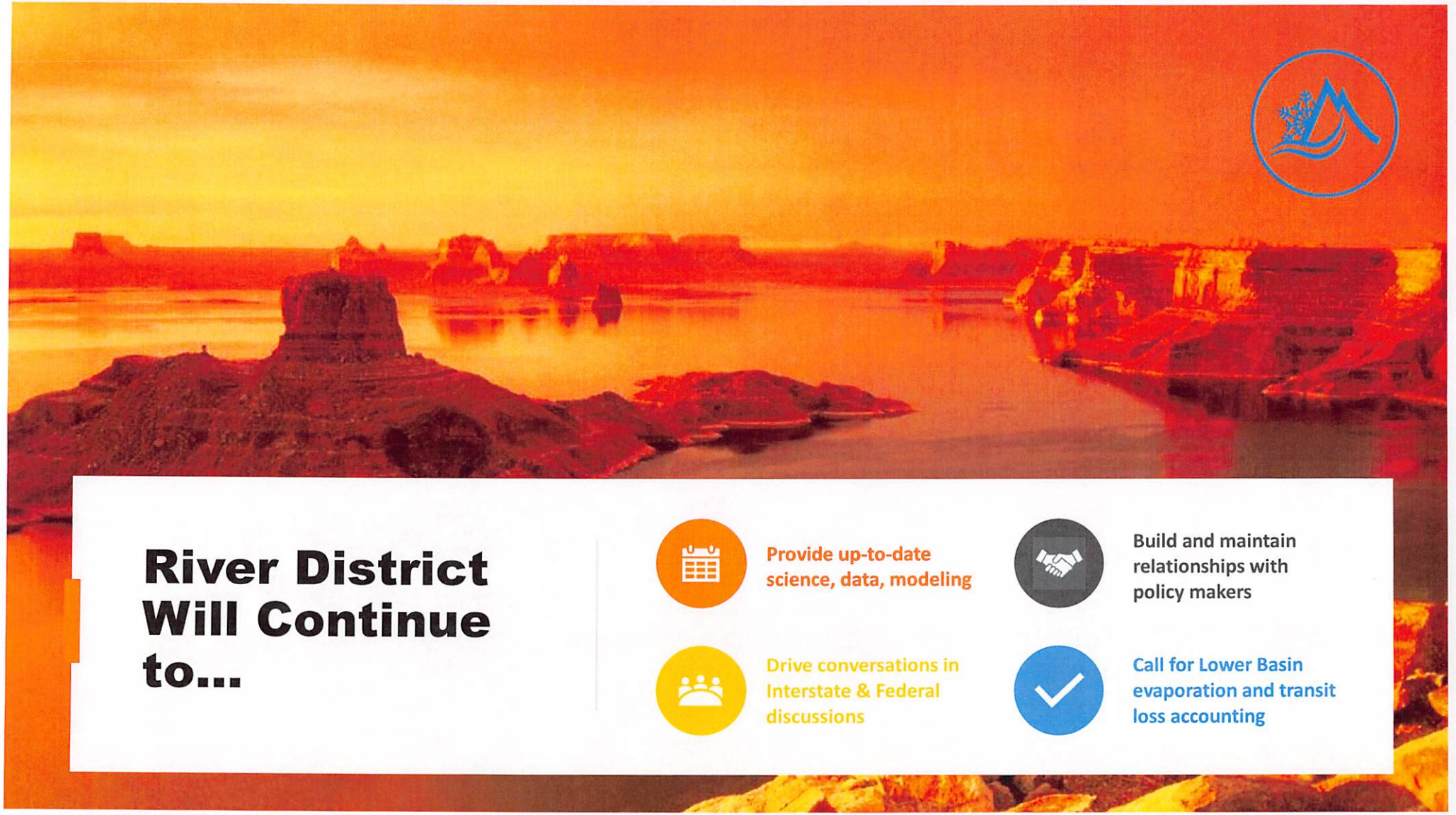
GRAND TOTAL 52,128.56

COLORADO RIVER DISTRICT

West Divide Water CD

Brendon Langenhuizen
Director of Technical Advocacy


Timeline of Recent Inter-state Discussions
Reclamation tells CO River States to conserve 2-4 maf
June, 2022
Upper Basin Releases 5-point plan
August, 2022
6-state agreement submitted to Interior Dept.
January, 2023
Draft Supplemental Environmental Impact Statement
Coming Soon, 2023
Notice of Intent: Re-negotiations of the 2007 Interim Guidelines
ongoing



River District Will Continue to...

- Provide up-to-date science, data, modeling
- Build and maintain relationships with policy makers
- Drive conversations in Interstate & Federal discussions
- Call for Lower Basin evaporation and transit loss accounting

Central Arizona Project
Board and Staff Tour, June 2023

CAP Tour
Colorado River District

Board, Staff, and Guests explore important features on Colorado's West Slope.
336 views
Published 6 days ago
SHARE

Points of Interest

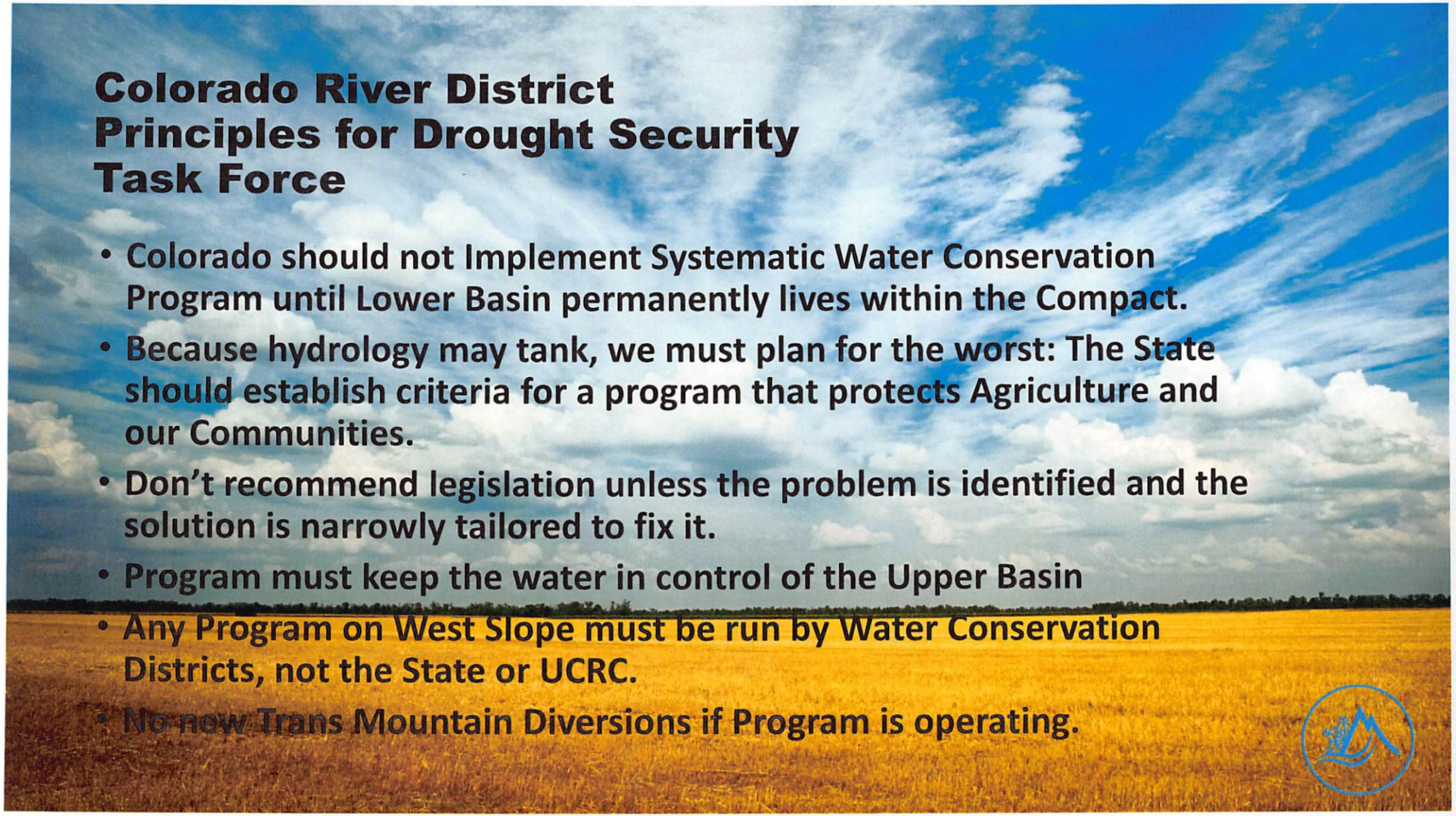
- STOP 1: Grand Junction Regional Airport
- STOP 2: Roller Dam
- STOP 3: Colorado River Water Conservation ...
- STOP 4: Grizzly Creek Rest Area
- STOP 5: Veltus Park
- STOP 6: Cold Mountain Ranch Visit
- STOP 7: Paonia Reservoir & Headgate
- STOP 8: Lake Irwin
- STOP 9: Crested Butte
- STOP 10: Trampe Ranch
- STOP 11: Lake Fork Marina
- STOP 12: Blue Mesa Dam
- STOP 13: Morrow Point Dam
- STOP 14: Gunnison Tunnel West Portal, Sout...
- STOP 15: Fairview Reservoir
- STOP 16: Drop 5 Hydro Powerplant
- STOP 17: Montrose and Delta Canal
- STOP 18: Riverbottom Park
- STOP 19: Honeycrisp Orchard Tour
- STOP 20: Mesa Winds Farm & Winery

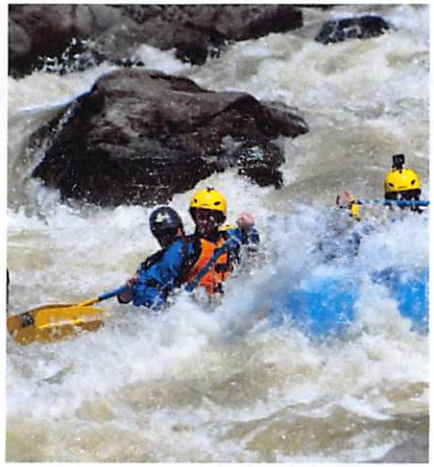
Colorado River Drought Task Force

Voting Members Representing:

- Agricultural Producers
- Water Conservation Districts
- State and Local Governments
- Water Providers
- Environmental Orgs.


Drought Security and Demand Management
Colorado River District Investigation Timeline
Water Bank Work Group
2009 - 2020
Secondary Economic Risk Study
2020
Colorado River Risk Study Phases 1-4
2016-2023
Demand Management Stakeholder Report
2021
Conceptual Market Framework "Punching Bag"
2022

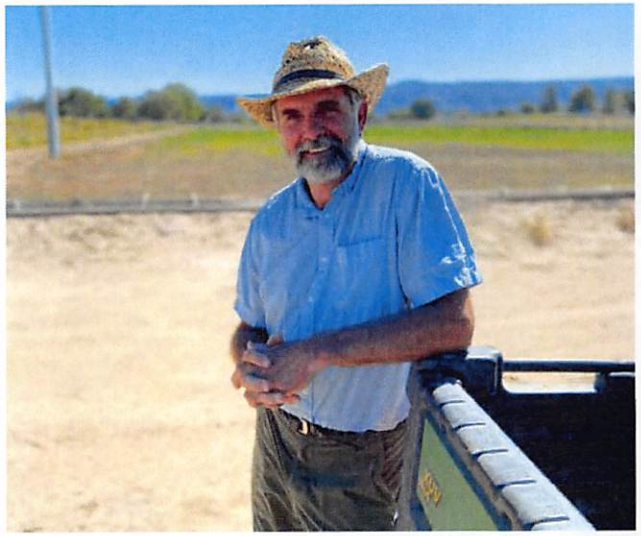

Colorado River District
Principles for Drought Security
Task Force
• Colorado should not Implement Systematic Water Conservation Program until Lower Basin permanently lives within the Compact.
• Because hydrology may tank, we must plan for the worst: The State should establish criteria for a program that protects Agriculture and our Communities.
• Don't recommend legislation unless the problem is identified and the solution is narrowly tailored to fix it.
• Program must keep the water in control of the Upper Basin
• Any Program on West Slope must be run by Water Conservation Districts, not the State or UCRC.
• No new Trans Mountain Diversions if Program is operating.



COLORADO RIVER DISTRICT COMMUNITY FUNDING PARTNERSHIP

High-Impact Projects And Investments For West Slope Water

$4.2 million annually



Community Funding Partnership

Over $7.9 million

99 projects

Leveraging over
$66 million
For West Slope Water

West Slope Growing Water Smart Workshop

Growing Water Smart is a training & assistance program that empowers local leaders to land use planning strategies that incorporate water conservation and the wise use of water assets.

When: October 23-25 in Grand Junction, CO

Applications: Due August 4th, 2023

More info: growingwatersmart.org

SONORAN INSTITUTE

BABBITT CENTER
FOR LAND AND WATER POLICY
A Center of the Lincoln Institute of Land Policy

THE COLORADO RIVER DISTRICT PRESENTS

WANTED:

DURABLE SOLUTIONS ON THE COLORADO RIVER

2023 ANNUAL WATER SEMINAR

AT COLORADO MESA UNIVERSITY

FRIDAY, SEPTEMBER 22

coloradoriverdistrict.org/ annual-water-seminar-2023

COLORADO RIVER DISTRICT

PROTECTING WESTERN COLORADO WATER SINCE 1937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@ColoradoWater
ColoradoRiverDistrict

West Divide Water Conservancy District Project Water Right Yield Study

9/26/2023

Prepared for:
West Divide Water Conservancy District

Prepared by:
Wendy Ryan

Colorado River Engineering, Inc.
P.O. Box 1301
Rifle, CO 81650
(970) 625-4933
CRE Job #1171

TABLE OF CONTENTS

BACKGROUND

The West Divide Project was included as a priority in the Colorado River Storage Act of 1956 and provided beneficial uses of energy generation, domestic, industrial, irrigation, stock watering, and municipal. The contemplated project included several large storage structures on the Crystal River as well as conveyance infrastructure to deliver water from the Crystal River to the Divide Creek area where additional reservoirs were proposed to store the water, in particular Kendig Reservoir, located on West Divide Creek. The project was changed by the Department of Interior in 1966 where the focus shifted from supplemental irrigation to providing water for oil shale development. The project was authorized by Congress in 1968 but was not funded. The project was deemed economically infeasible with the federal government withdrawing support in 1982. Diligence has continued for these conditional water rights by the Colorado River District and West Divide Water Conservancy District in order to retain their quantity and priority to potentially utilize them for other purposes. For example, structures augmented by WDWCD are decreed as alternate points of diversion to the Avalanche Canal and Siphon or Fourmile Canal and Siphon water right which gives these otherwise junior water rights a 1957 appropriation date.

Due to local concerns during diligence proceedings in 2011, all West Divide Project water rights in the Crystal River basin have been abandoned by the Water Court. Conditional water rights for the West Divide project remain on tributaries south of the Colorado River from Fourmile Creek to Battlement Creek. This study was undertaken to determine what yield would be available from these water rights as well as how the water can be utilized as a source of fill for conditional storage rights outside of the Crystal River basin. This study was conducted utilizing Colorado Water Plan grant funds with matching contributions from West Divide Water Conservancy District (POGG1-PDAA 201800000572 and 202000003016).

INTRODUCTION

Conditional water rights were sought for the West Divide Project in 1957. The contemplated project included several large storage structures on the Crystal River (Yank Creek, Thompson Creek, Placita, and Osgood Reservoirs) as well as conveyance infrastructure to several storage structures south of the Colorado River in the vicinity of the Divide Creek drainage. The direct flow water rights for the conveyance structures that are the subject of this yield study are shown in **Table 1** while the related West Divide Project storage water rights are shown in **Table 2**.

Table 1: West Divide Canal and Horsethief Canal Water Rights

WDID	Structure Name	Structure Type	Water Source	Adj Date	Appr Date	Decreed Use(s)	Net Cond (cfs)	Net APEX Cond (cfs)
4501090	W DIVIDE PROJ HORSETHIEF	Ditch	BEAVER CREEK	7/9/1965	4/22/1957	123489	0	50
4501091		Ditch	CACHE CREEK	7/9/1965	4/22/1957	123489	0	50
4501092		Ditch	EAST MAMM CREEK	7/9/1965	4/22/1957	123489	0	50
4501093		Ditch	WEST DIVIDE CREEK	7/9/1965	4/22/1957	123489	550	0
4501103		Ditch	BATTLEMENT CREEK	7/9/1965	4/22/1957	12489	0	50
4500817	W DIVIDE PROJ W DIV CNL	Ditch	BALDY CREEK	7/9/1965	4/22/1957	123489	50	0
4501089		Ditch	GARFIELD CREEK	7/9/1965	4/22/1957	123489	50	0
4501096		Ditch	EAST DIVIDE CREEK	7/9/1965	4/22/1957	123489	200	0

Table 2: West Divide Project Conditional Storage Right Related to West Divide and Horsethief Canals

WDID	Structure Name	Structure Type	Water Source	Adj Date	Appr Date	Decreed Use(s)	Net Cond (AF)	Net APEX Cond (AF)
4503588	W DIVIDE PROJ W MAMM RES	Reservoir	WEST MAMM CREEK	7/9/1965	4/22/1957	12489P	6500	0
4503585	W DIVIDE PROJ KENDIG RES	Reservoir	WEST DIVIDE CREEK	7/9/1965	4/22/1957	12489P	15450	0
4503585	W DIVIDE PROJ KENDIG RES	Reservoir	WEST DIVIDE CREEK	12/31/1979	6/18/1979	1458PQ	2610	0

Delivery canals were contemplated to divert flows from the Crystal River basin to the Divide Creek area where water could continue to be diverted at tributary crossings for subsequent storage in Kendig or Mamm Creek Reservoirs. All of the drainages south of the Colorado River are over appropriated and have water rights senior to the mainstem Colorado River Cameo call near Palisade, CO. This results in administrative calls being placed in most years, even in the wettest of years, once the hydrograph has declined and junior users are physically and legally water supply limited.

Following West Divide Project water right diligence in Case No. 11CW93, which abandoned the Crystal River sourced water rights, the yield of the remaining project water rights in the absence of Crystal River supplies is largely unknown. This study was conducted to quantify the yield of the

tributary direct flow water rights to other West Divide project components by conducting stream gaging measurements over several seasons.

The following tasks (Table 3) were proposed to be completed in the study:

Table 3: Description of Work Tasks

Task No.	Task Description
1	Increase streamflow monitoring in the Divide Creek area to understand water yield and exchange potential from conditional water rights tributary to the Colorado River.
2	Create statistical relationships between tributary gages and the long-term West Divide Creek Raven gage.
3	Quantify the anticipated additional yield to Kendig Reservoir from these additional supplies.
4	Re-evaluate canal alignments to optimize yield and delivery.
5	Evaluate potential service areas that would be created by these supplies.

METHODOLOGY

Methodologies utilized to conduct this study are described by task in the following sections.

Task 1 – Increase Streamflow Monitoring

At the time this project was proposed, there was only one stream gage available on a tributary south of the Colorado River, the West Divide Creek Raven gage operated by the Colorado Division of Water Resources. In recent years, additional gages have been installed on tributaries to the Colorado River with a gage added on lower Divide Creek (USGS Site Number: 09090785). The locations of streamflow monitoring are shown in the attached **Figure 1**. Because previous studies have identified alternative locations for Kendig reservoir, the monitoring locations were positioned to be above most irrigation diversions and in alignment with the preferred Kendig Reservoir alignment.

Colorado River Engineering (CRE) worked with the Bureau of Land Management (BLM) to locate the majority the stream gages on public land. In instances where public land was not available, CRE worked with private landowners and the Water District 45 Commissioner to find suitable locations to place gages and conduct streamflow measurements. At each site, a staff gage and housing for a pressure transducer (In-Situ Level Troll 500) to continuously monitor the water level in the stream were installed (**Figure 2**). Rating curves (stage vs. discharge) were developed by physically measuring the streamflow with a pygmy meter or Price AA meter at various flow rates (**Figure 3**) and developing a relationship between water depth (stage) and the flow rate (discharge). The developed rating curves allow for derivation of the flow rate from continuously

monitored water level in the stream using the site-specific relationship between stage and discharge.

Figure 2: Staff gage and Pressure Transducer Housing.

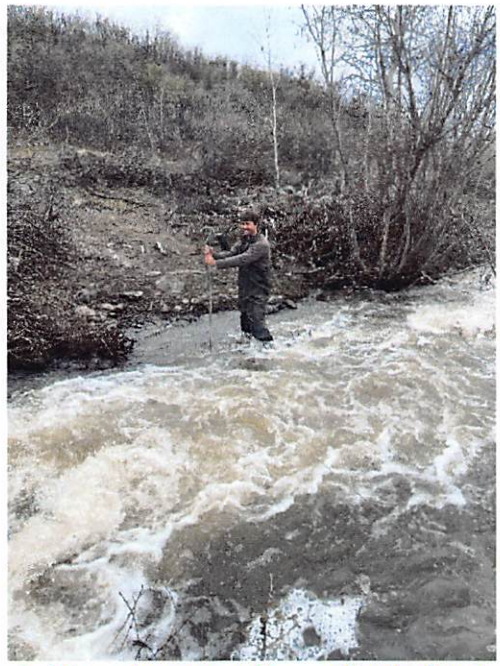


Figure 3: Measuring streamflow on Cache Creek – 2023

Due to the nature of small, mountainous streams, some sites had issues with staff gages moving as rocks and other materials in the stream shifted during runoff seasons. This was particularly an issue in 2023 which saw sustained, high runoff on these tributary streams and significantly

altered the channel geometries. Flow conditions were largely unsafe for monitoring streamflows in 2023; however, best efforts were made to determine the yield to the West Divide project water rights. Additionally, no winter flows were measured as icing in the stream can damage the pressure transducers. Due to the snowmelt driven nature of these streams, spring runoff is the typical period when water would reliably be available to the West Divide Project (WDP) water rights.

Task 2 – Statistical Relationships with Long-Term West Divide Creek Raven Gage

Once the tributary flow datasets were derived, the tributary flow was plotted against the flow measured at the West Divide Creek Raven gage to determine if statistical relationships were strong enough to derive longer time series of tributary flow data and quantify the yield over longer time periods. The analysis looked at relationships of all daily data as well as daily data parsed by month to attempt to improve the statistical relationships.

Task 3 – Quantify the Yield to Kendig Reservoir

The streamflow physically and legally available to the WDP water rights was analyzed using two methods. The first method looked at each decreed water right in the basin and reduced the available flow by the amount decreed to water rights senior in priority to the WDP rights. Alternatively, the available flow also was derived based on all reported diversions from the senior water rights on each tributary. If there was insufficient flow to meet either all of the decreed rights or the reported diversions, no yield was quantified in the analysis. The yield represents a highly conservative estimate of the quantity of streamflow physically and legally available to the subject water rights.

Task 4 - Re-Evaluate Canal Alignments to Optimize Yield and Delivery

Canal alignments were created for the original Kendig reservoir location. Subsequent reservoir feasibility studies conducted have prioritized an alternative location for Kendig reservoir which avoids private property and geologically unstable areas and moves the dam further upstream onto U.S. Forest Service lands (**Figure 1**). Prior to finalizing the streamflow measurement locations, an alternative canal alignment was derived based on the anticipated elevation of Kendig Reservoir. The canal alignment is shown on the attached **Figure 1**. Positioning the stream measurement locations near the canal elevation provided actual flows that may be available to the water rights without the need to account for inflow/outflows at locations downstream of where the canal would be located. While this decision made site access difficult during the spring, it provided data at the appropriate location for considering physical and legal water supply.

Task 5 – Develop Potential Service Areas that can be Created by these Supplies

Each augmentation plan decreed by WDWCD has a defined service area in which augmentation services can be provided with the supplies available. The delineation of service areas where the quantified supplies could potentially be utilized was considered in this study.

RESULTS

The results of the WDP yield study are presented herein by task. Task 1 included most of the time and effort for collecting and processing both the automated stage and manual streamflow measurements. Best efforts were made to access the sites prior to spring runoff and to continue monitoring throughout the study period to maintain the rating curve accuracy. Due to the elevation at these locations, spring conditions often included muddy or snow packed roads that were often impassible until later in the spring.

Task 1 – Increase Streamflow Monitoring

Stream gaging sites were installed at the locations described in **Table 4** and shown on **Figure 1**.

Table 4: Installed Stream Gage Site Metadata.

Name	Lat	Long	Elev (ft)	Contributing Area (mi^2)	Mean Basin Elevation (ft)
Battlement Creek	39.42724	-107.969	6960	9.12	9326
Beaver Creek	39.46112	-107.832	6995	7.77	9450
East Divide	39.40651	-107.492	7751	25	9026
Baldy Creek	39.46235	-107.492	7498	12.8	8996
Cache Creek	39.432	-107.914	7543	8.42	9816
Garfield Creek	39.47386	-107.425	7593	4.95	8838
West Divide Creek (Raven)	39.33108	-107.58	7200	64.2	8732

Table 4 shows the beginning and end date of the data monitoring period for each tributary. As mentioned previously, flow measurements were only conducted during the irrigation season as icing and freezing can damage the pressure transducers. Data files from the pressure transducers and AquaCalc used to conduct manual measurements are provided with this report. The East Mamm site was not able to be monitored because a suitable location could not be located on public land and private landowner access was not granted. East Mamm has the lowest basin mean elevation of 7,673 feet; yields from East Mamm Creek were not anticipated to be significant.

Table 5: Data Collection by Tributary

Station	Begin	End	# Manual Streamflow Measurements
Garfield	5/8/2020	7/25/2023	6
Baldy	7/9/2019	7/25/2023	8
East Divide	6/12/2019	7/25/2023	10
Cache	4/29/2020	7/25/2023	8
Beaver	5/15/2019	7/25/2023	10
Battlement	5/15/2019	7/25/2023	8

Time series of the measured flow data from each site are included in **Appendix A**.

No data are available from Beaver Creek in 2022 due to cows pulling the transducer from the stream. No data are available for Battlement Creek in 2023 due to the station being carried downstream under high water.

Task 2 – Statistical Relationships with Long-Term West Divide Creek Raven Gage

Efforts were made to correlate the streamflow data collected on each tributary to the long-term Division of Water Resources West Divide Creek Raven gage (WSDRAVCO). These analyses did not provide reliable statistical relationships to derive longer tributary flow datasets as the runoff characteristics are too varied. This is seen in **Table 3** by comparing the mean basin elevations and contributing areas. The West Divide Creek gage by far has the largest contributing area with 64.2 square miles. The next largest basin is Baldy Creek with 12.8 square miles of contributing area. Given the differences in the basin characteristics, it is not surprising that the daily gaged data do not correlate well with the Raven gage. The East Divide Creek and Baldy Creek gages had the best correlations to the West Divide Creek gage; however, given the lack of correlation on other tributaries the analysis of yield was restricted to the period of manual data collection shown in **Table 5**. The monthly correlations by tributary are provided in **Appendix B**.

Task 3 – Quantify the Yield to Kendig Reservoir

Throughout the study period, data relating the depth of water in the stream (stage) to the flow rate in cubic feet per second were collected and compiled. These relationships are referred to as "rating curves" and allow for flow estimation from the continuously measured depth of water.

The yield of these water rights was quantified using two different methods. The first reduced the flow by all decreed water rights included in the water right tabulation senior in priority to the West Divide Project rights. The second analysis looked at the diversion records available through CDSS (Colorado Decision Support System) by tributary and reduced the flow by the amount reportedly diverted by senior water rights. The quantified yield for Divide Creek accounted for

both East Divide and West Divide Creek flows and water right diversions. The quantified yield for Garfield Creek accounted for both Garfield and Baldy Creek flows and water right diversions. The annual yield results are included in **Appendix C** with the study period average summarized in **Table 6**.

Table 6: Average West Divide Project Water Right Yields – 2020-2023

West Divide Project Water Right Yields - Study Period Average								
Available Flow - Diversion Based (AF)								
	April	May	June	July	August	September	October	Total
Garfield	0	14	422	92	77	0	0	605
Divide	1837	8474	893	11	21	62	6	11305
Beaver	6	91	158	341	7	1	1	606
Cache	12	5202	1283	70	56	66	50	6739
Battlement	6	25	0	0	0	0	0	32
Total	**1861**	**13807**	**2756**	**516**	**161**	**129**	**58**	**19287**
Available Flow - Tabulation Based (AF)								
	April	May	June	July	August	September	October	Total
Garfield	0	0	0	0	0	0	0	0
Divide	31	3237	0	0	0	0	0	3269
Beaver	0	0	0	0	0	0	0	0
Cache	0	4993	825	0	0	0	0	5817
Battlement	0	0	0	0	0	0	0	0
Total	**31**	**8230**	**825**	**0**	**0**	**0**	**0**	**9086**

The results from the study indicate that on average, the flow available to these water rights ranges from 9,000 acre-feet to 19,000 acre-feet depending upon the methodology used. The tabulation-based method provides the most conservative assessment of the yield from these water rights. It is important to note that while this yield is available on average, these yields are not expected every year. Using the tabulation-based method there was no firm yield to these water rights over the study period. The majority of the quantified yield occurred in 2023 when streams ran high for an extended period with some minor flooding experienced.

The estimated capacity of Kendig Reservoir is 9,000 – 16,500 acre-feet based on previous feasibility analyses. The water rights available to fill Kendig Reservoir include the West Divide Canal rights on Garfield, Baldy, and Divide Creeks. Beaver, Cache, and Battlement Creek flows would be available to each tributary or to West Mamm Reservoir in addition to deliveries from Kendig Reservoir. Given the small yield contribution from Garfield and Baldy Creeks even in a wet year like 2023, construction of a delivery canal would likely be cost prohibitive compared to the water yield. Additional water could be available to Kendig Reservoir from East Divide Creek; however, it is more cost effective to increase storage on East Divide Creek with the Baldy Reservoir enlargement to Alsbury Reservoir and expand the existing East Divide Creek augmentation service area given the small demands on these streams.

Cost Estimation

The CWCB provides a cost estimation tool that is primarily utilized for costing Identified Projects and Processes (IPPs) in Basin Implementation Plans (BMP). The tool was utilized in this investigative study to estimate the cost of construction of these large canals for comparison to the quantified yield. Construction costs are summarized in **Table 7**, below. The cost for the West Divide Canal assumes the two lengths provided in the table with one option starting at Garfield Creek and the second option starting at East Divide Creek, a concrete check dam, a design flow rate of 300-cfs, and a synthetic liner. The Horsethief Canal cost assumes the length of 220,000 feet, a concrete check dam, a design flow of 550-cfs, and a synthetic liner.

With the firm yield of zero for the West Divide Canal water rights, the cost of $8-10 million is cost prohibitive compared to the yield. The Horsethief Canal would have the benefit of utilizing Kendig Reservoir storage as well as the tributary direct flow rights. Previous analysis found the firm yield to Kendig Reservoir to be 500 acre-feet if 1,500 acre-feet is designated as an augmentation pool with first-fill priority. The cost of canal construction would be in addition to the cost of reservoir construction, operations, and maintenance.

Table 7: Canal Construction Cost Estimates.

Structure	Upper	Lower	Length (lf)	Cost
West Divide Canal	Garfield Creek	Kendig Reservoir	165,000	$ 10,615,000
West Divide Canal	East Divide Creek	Kendig Reservoir	75,000	$ 8,176,000
Horsetheif Canal	Kendig Reservoir	Battlement Creek	220,000	$ 23,985,000

Task 4 - Re-Evaluate Canal Alignments to Optimize Yield and Delivery

The updated canal alignment with delivery to the preferred Kendig reservoir alternative is shown on **Figure 1**. This alignment was utilized for locating the stream gaging sites at locations in the vicinity of where the canal would be constructed.

Task 5 – Develop Potential Service Areas that can be Created by these Supplies

Due to the lack of firm yield to these water rights, the only service area delineated was that of the new Kendig Reservoir alignment (**Figure 4,** attached). This delineation assumes that water is delivered into the Divide Creek Highline Canal which optimizes the use of this water by allowing delivery of water supplies to West Divide Creek, Salt Creek, Alkali Creek, and Dry Hollow Creek. If simply released from the outlet, the reservoir would only serve West Divide Creek. The delineation of this service area requires further refining with input from the Division of Water Resources to ensure all controlling water rights and stream dry-up points are accurately represented.

CONCLUSIONS

Stream gaging was conducted from 2020-2023 to better understand the water yield to some of the remaining WDP water rights. The study was conducted during a particularly dry period in the Colorado River basin with the exception of 2023 (**Figure 4**). The study period water years are highlighted in orange showing below average runoff from 2020-2022 which were all less than 75% of the period of record average.

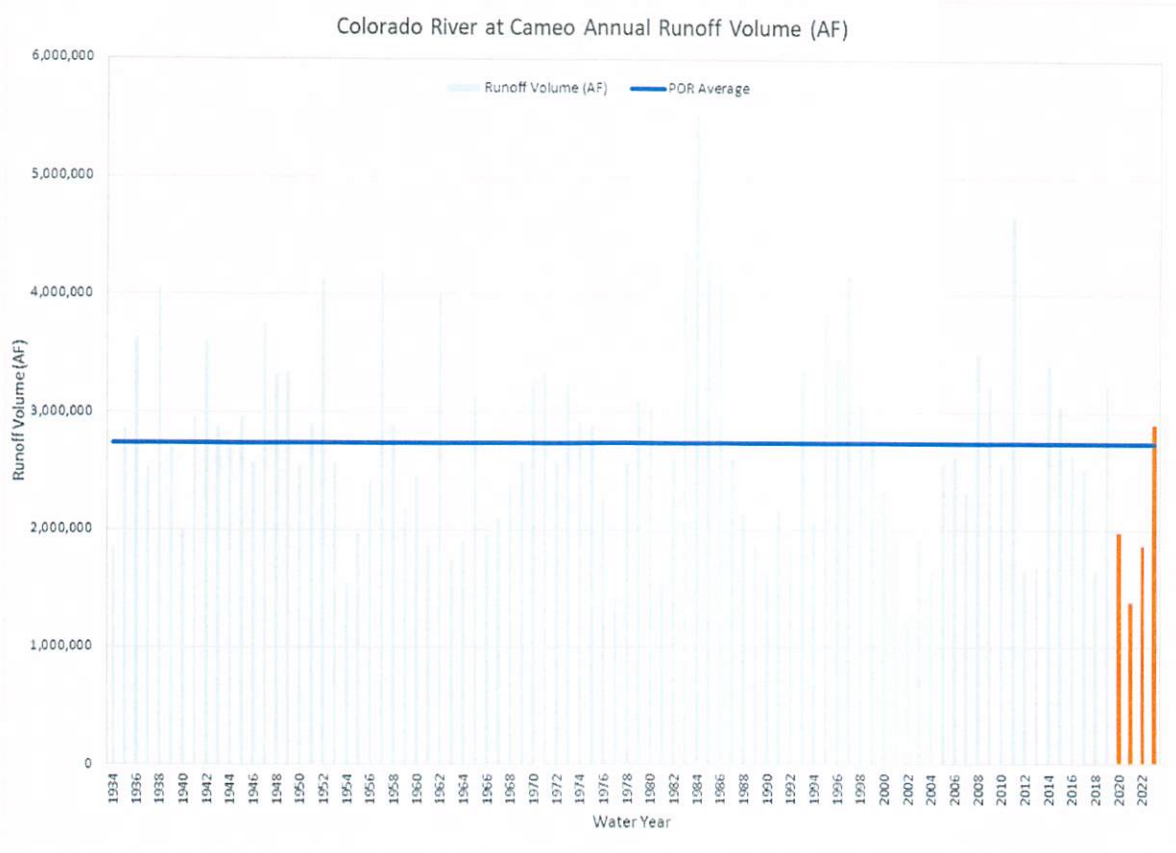
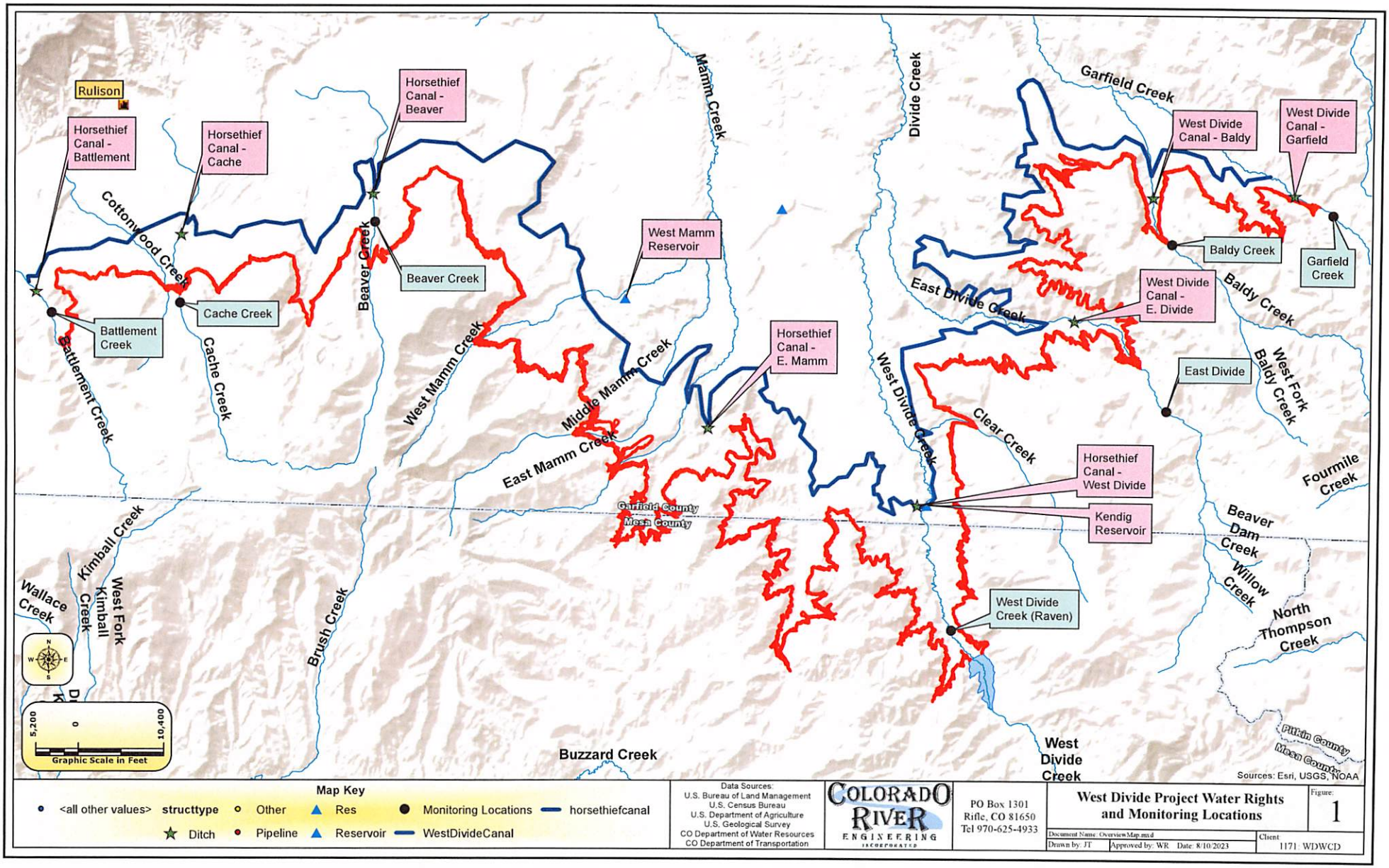


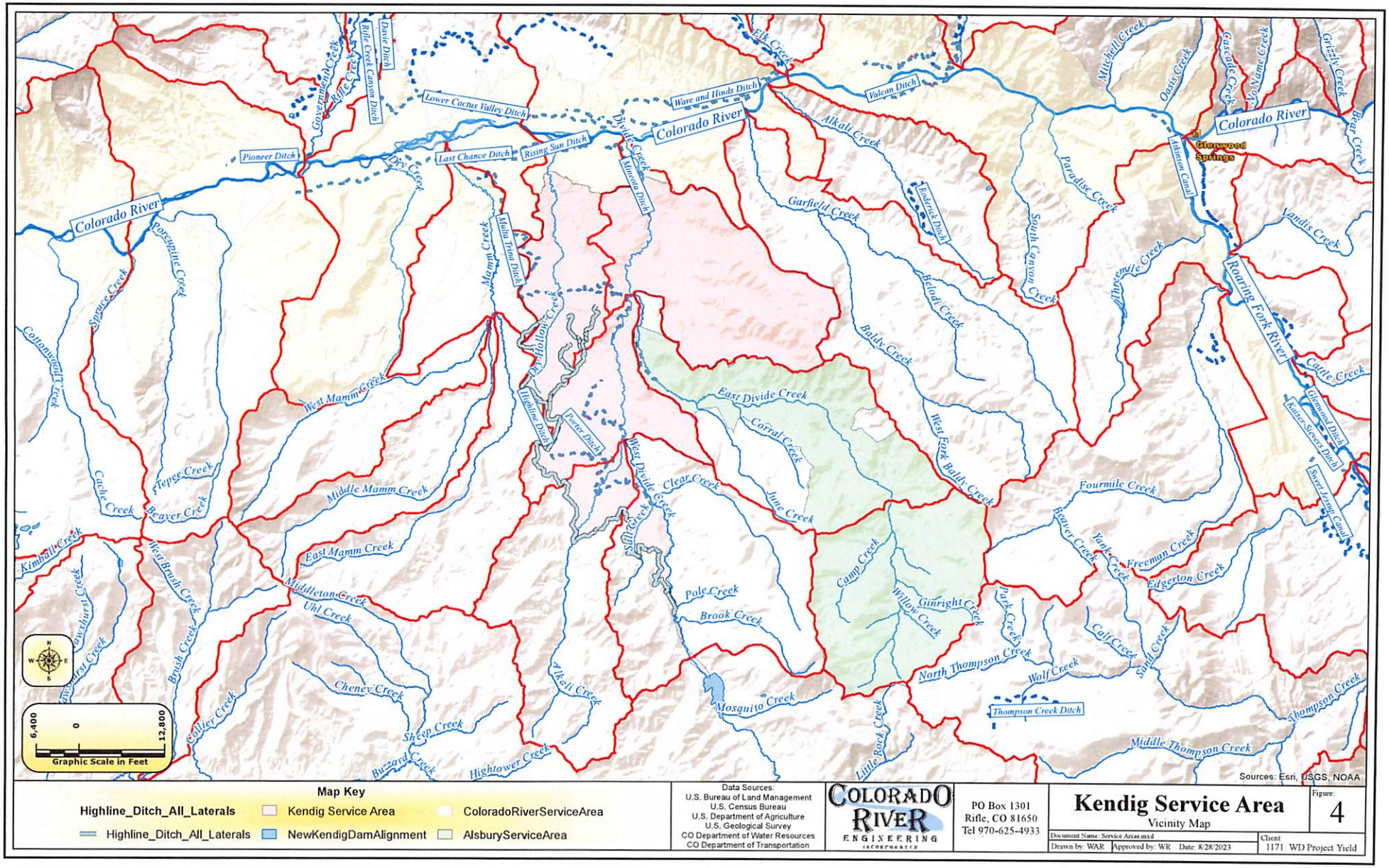
Figure 5: Colorado River at Cameo Runoff Volume Time Series

While these water rights may be of limited utility for delivery of supplies to and from Kendig Reservoir absent Crystal River supplies, there is value in the relatively senior water right priority date that future District contractees may be able to rely upon if alternative supplies can be developed for use in a local plan for augmentation. For example, these water rights can be utilized to decree junior water rights as alternate points of diversion, as is done with the Avalanche and Fourmile Canal and Siphon water rights. While this does not provide adequate protection for a Cameo call, it will protect these users from causing injury to water rights junior in priority to the WDP water rights with a 1957 priority date.

Because of the hydrologic conditions during the study period, additional data collection may be warranted to further inform the yield of these water rights as 2023 did provide adequate yield to fill Kendig Reservoir. Additional data will provide insight into the likelihood of filling Kendig Reservoir each year. This analysis could be confined to East and West Divide Creeks to better understand the available water supplies over longer time periods. Due to the cost of constructing these long delivery canals and lack of firm yield to some of the tributary water rights, construction of these projects is highly unlikely.

Overall, the demands for augmentation water on these tributaries is small and developing service areas has not yet been a priority for the District. However, the priority date of these water rights has intrinsic value to provide additional protection to District contractees junior water rights. Maintaining the status of these conditional water rights in good standing is recommended as future use of these water rights continues to be considered.


Rulison
Horsethief Canal - Battlement
Horsethief Canal - Cache
Horsethief Canal - Beaver
Mamm Creek
Divide Creek
Garfield Creek
West Divide Canal - Baldy
West Divide Canal - Garfield
Cottonwood Creek
Beaver Creek
Beaver Creek
West Mamm Reservoir
Baldy Creek
Garfield Creek
East Divide Creek
West Divide Canal - E. Divide
Baldy Creek
Battlement Creek
Battlement Creek
Cache Creek
Cache Creek
West Mamm Creek
Middle Mamm Creek
Horsethief Canal - E. Mamm
West Divide Creek
East Divide
West Fork Baldy Creek
Clear Creek
East Mamm Creek
Horsethief Canal - West Divide
Fourmile Creek
Garfield County
Mesa County
Kendig Reservoir
Beaver Dam Creek
Kimball Creek
Wallace Creek
West Fork Kimball Creek
Willow Creek
North Thompson Creek
Brush Creek
West Divide Creek (Raven)
Buzzard Creek
West Divide Creek
Pitkin County
Mesa County
5,200
0
10,400
Graphic Scale in Feet
Sources: Esri, USGS, NOAA
Map Key
<all other values>
structtype
Other
Res
Monitoring Locations
horsethiefcanal
Ditch
Pipeline
Reservoir
WestDivideCanal
Data Sources:
U.S. Bureau of Land Management
U.S. Census Bureau
U.S. Department of Agriculture
U.S. Geological Survey
CO Department of Water Resources
CO Department of Transportation
COLORADO RIVER ENGINEERING INCORPORATED
PO Box 1301
Rifle, CO 81650
Tel 970-625-4933
West Divide Project Water Rights and Monitoring Locations
Figure: 1
Document Name: OverviewMap.mxd
Drawn by: JT
Approved by: WR
Date: 8/10/2023
Client: 1171: WDWCD



Map Key

Highline_Ditch_All_Laterals

Highline_Ditch_All_Laterals | Kendig Service Area | ColoradoRiverServiceArea | NewKendigDamAlignment | AlsburyServiceArea

Data Sources:
U.S. Bureau of Land Management
U.S. Census Bureau
U.S. Department of Agriculture
U.S. Geological Survey
CO Department of Water Resources
CO Department of Transportation

COLORADO RIVER ENGINEERING
INCORPORATED

PO Box 1301
Rifle, CO 81650
Tel 970-625-4933

Kendig Service Area

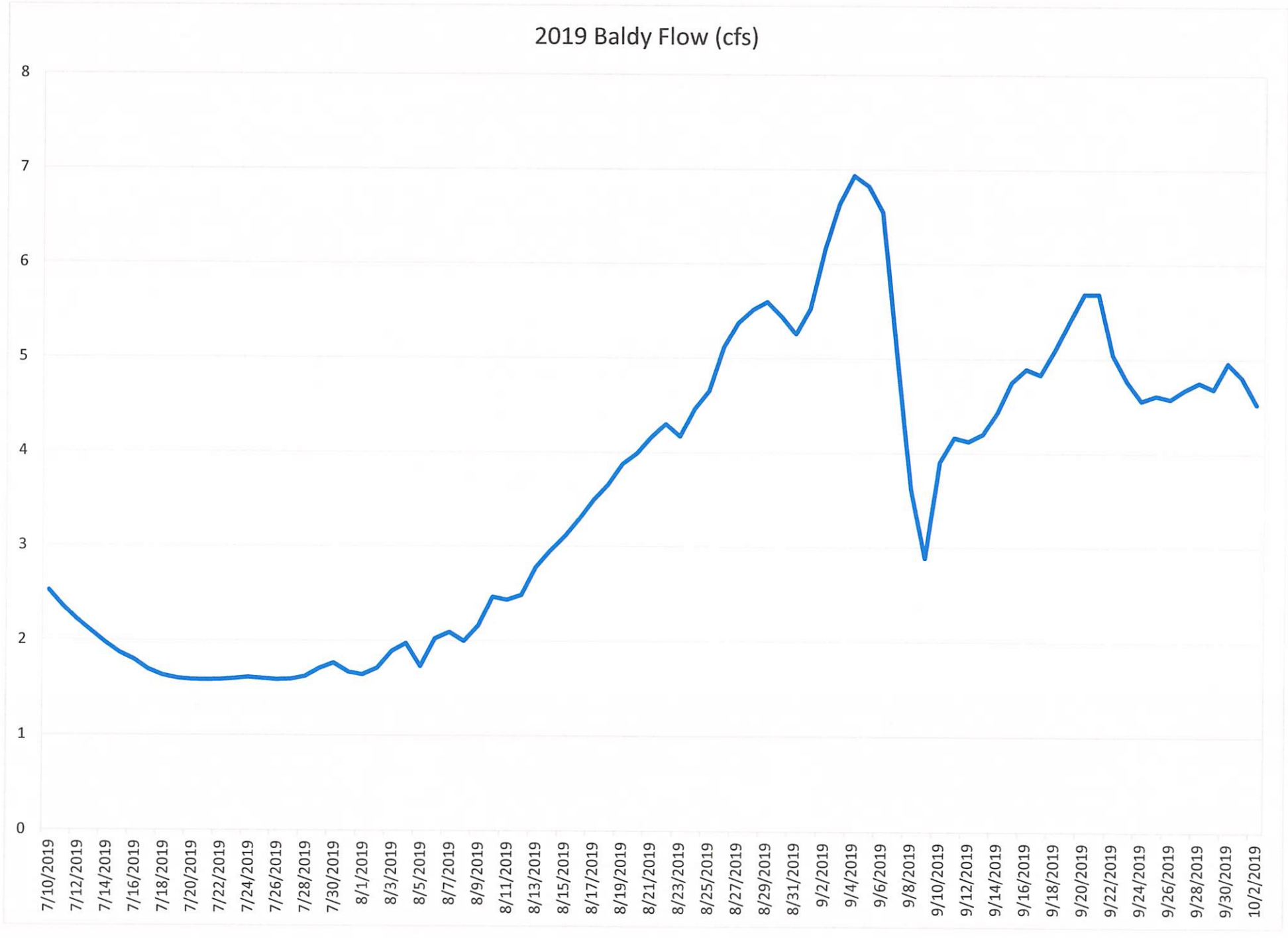
Vicinity Map

Figure: 4

Document Name: Service Areas.mxd
Drawn by: WAR | Approved by: WR | Date: 8/28/2023

Client: 1171 WD Project Yield

Appendix A: Flow Time Series By Stream


2019 Baldy Flow (cfs)
8
7
6
5
4
3
2
1
0
7/10/2019
7/12/2019
7/14/2019
7/16/2019
7/18/2019
7/20/2019
7/22/2019
7/24/2019
7/26/2019
7/28/2019
7/30/2019
8/1/2019
8/3/2019
8/5/2019
8/7/2019
8/9/2019
8/11/2019
8/13/2019
8/15/2019
8/17/2019
8/19/2019
8/21/2019
8/23/2019
8/25/2019
8/27/2019
8/29/2019
8/31/2019
9/2/2019
9/4/2019
9/6/2019
9/8/2019
9/10/2019
9/12/2019
9/14/2019
9/16/2019
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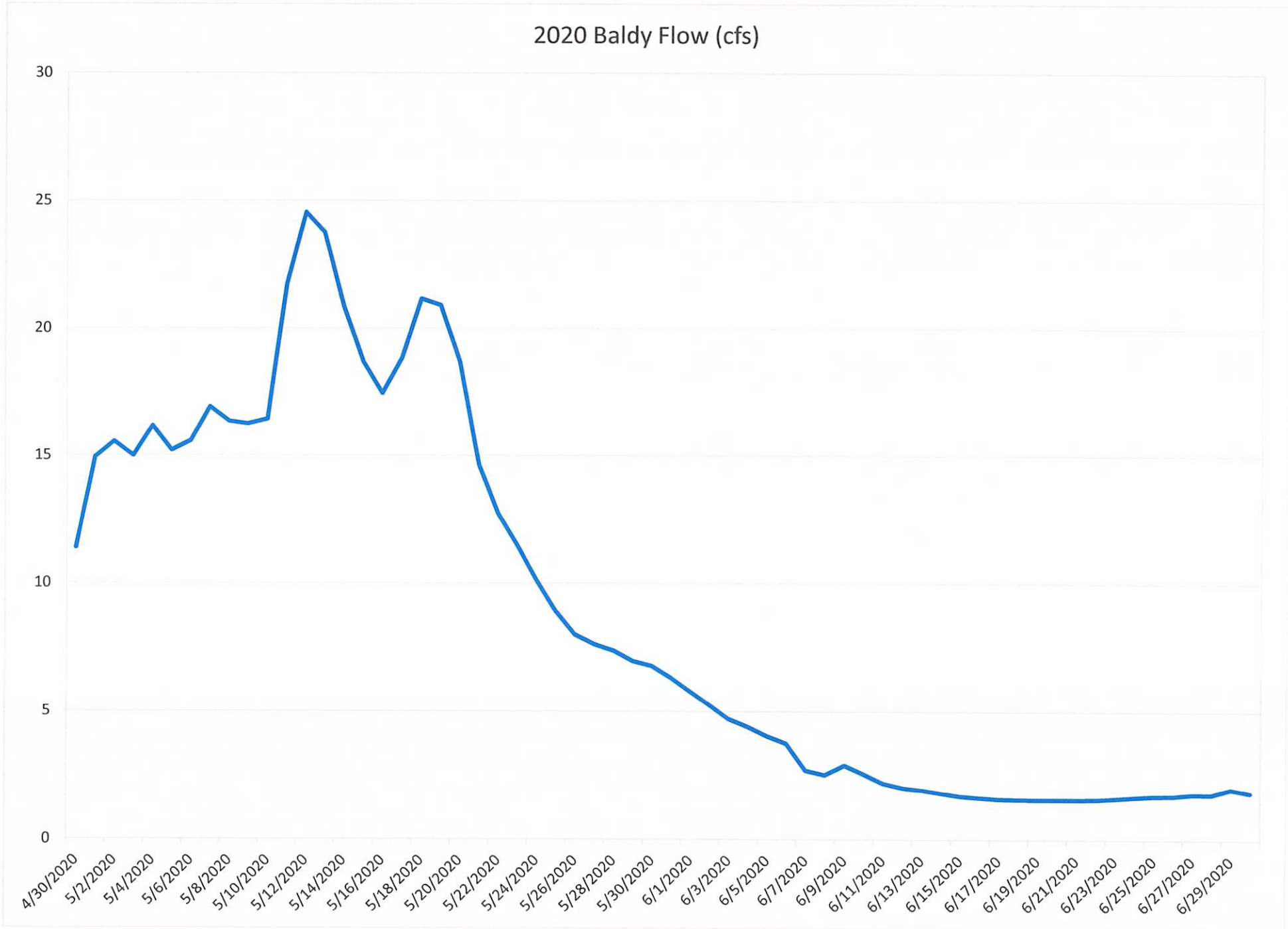
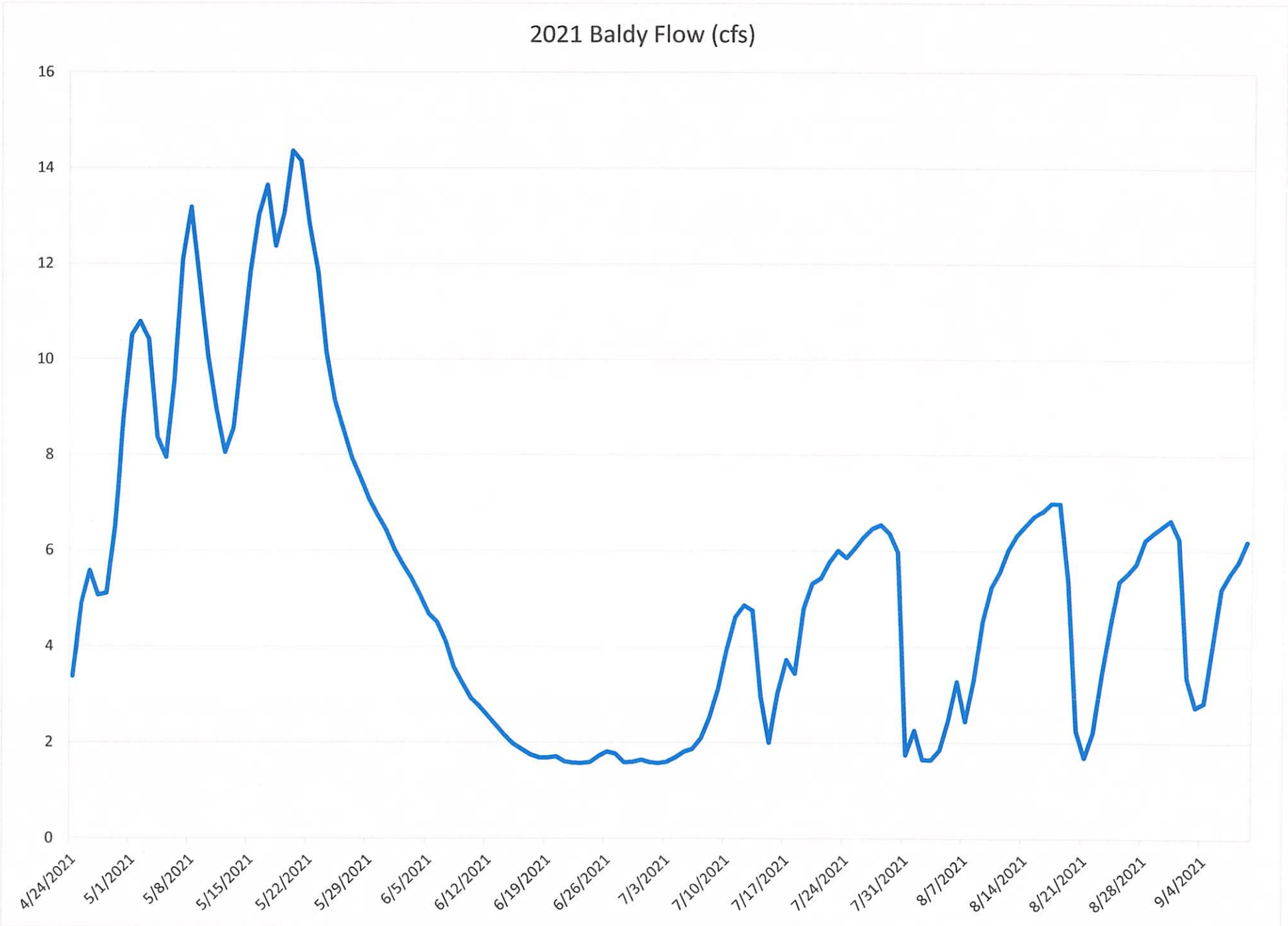
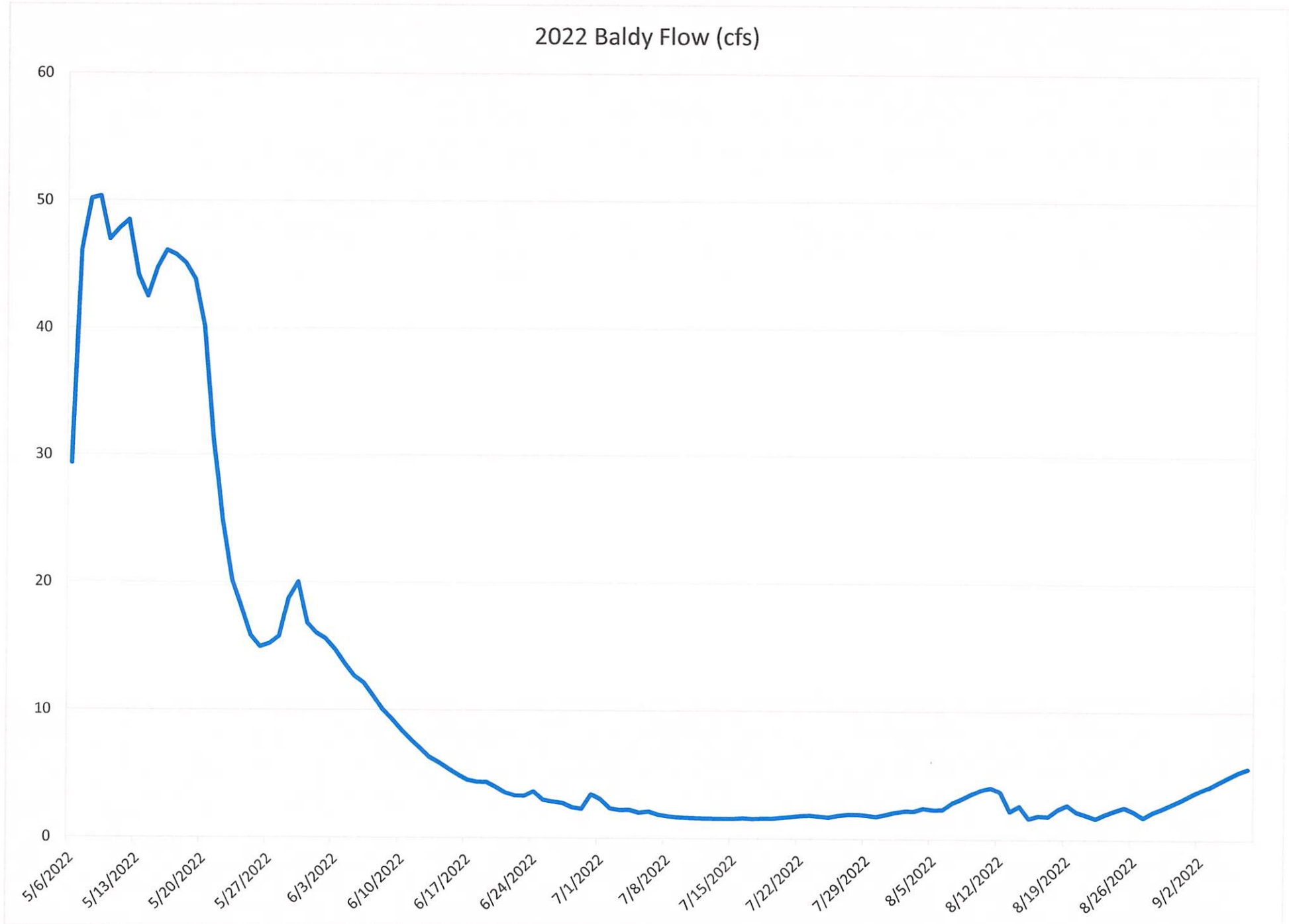
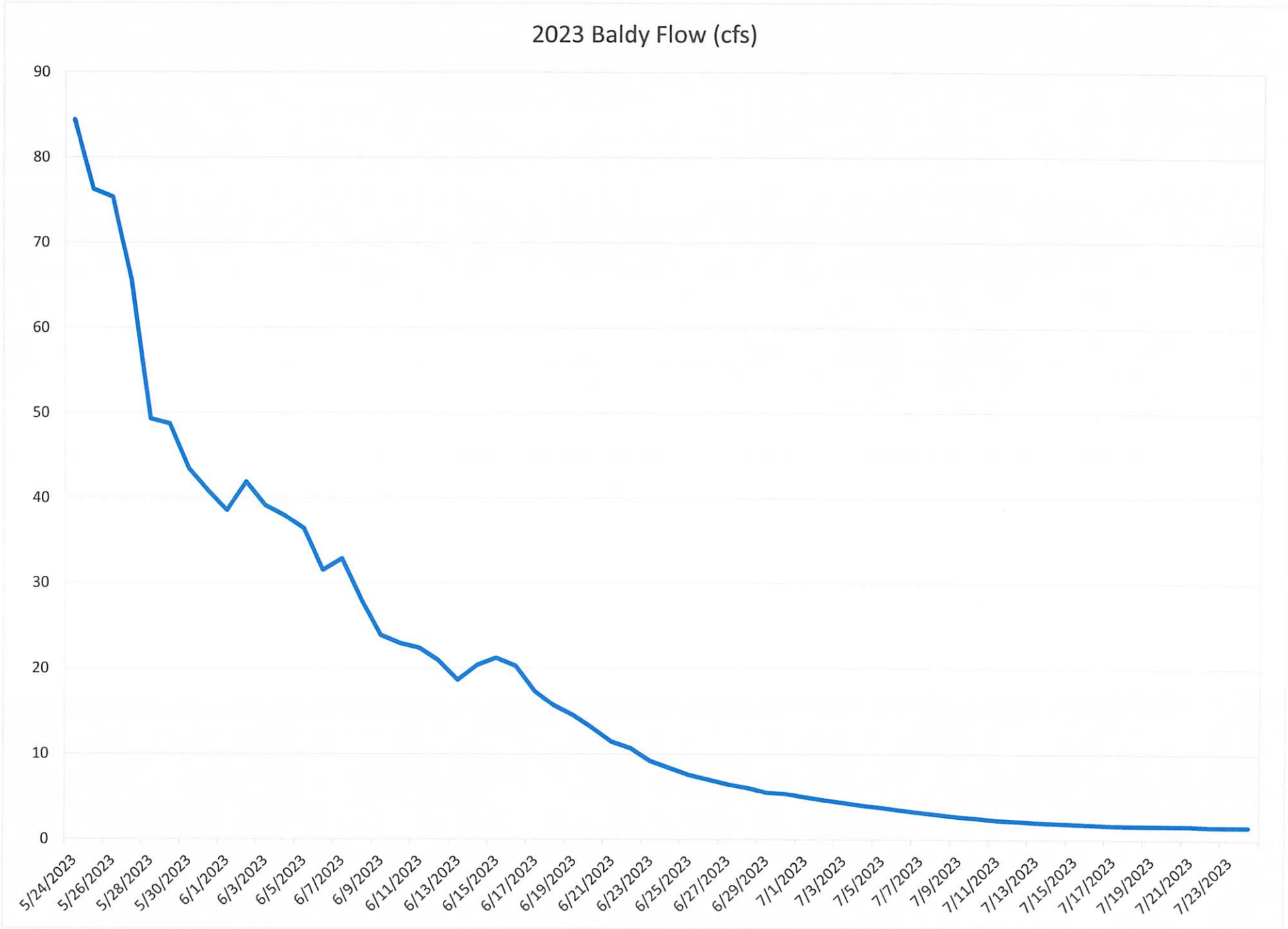
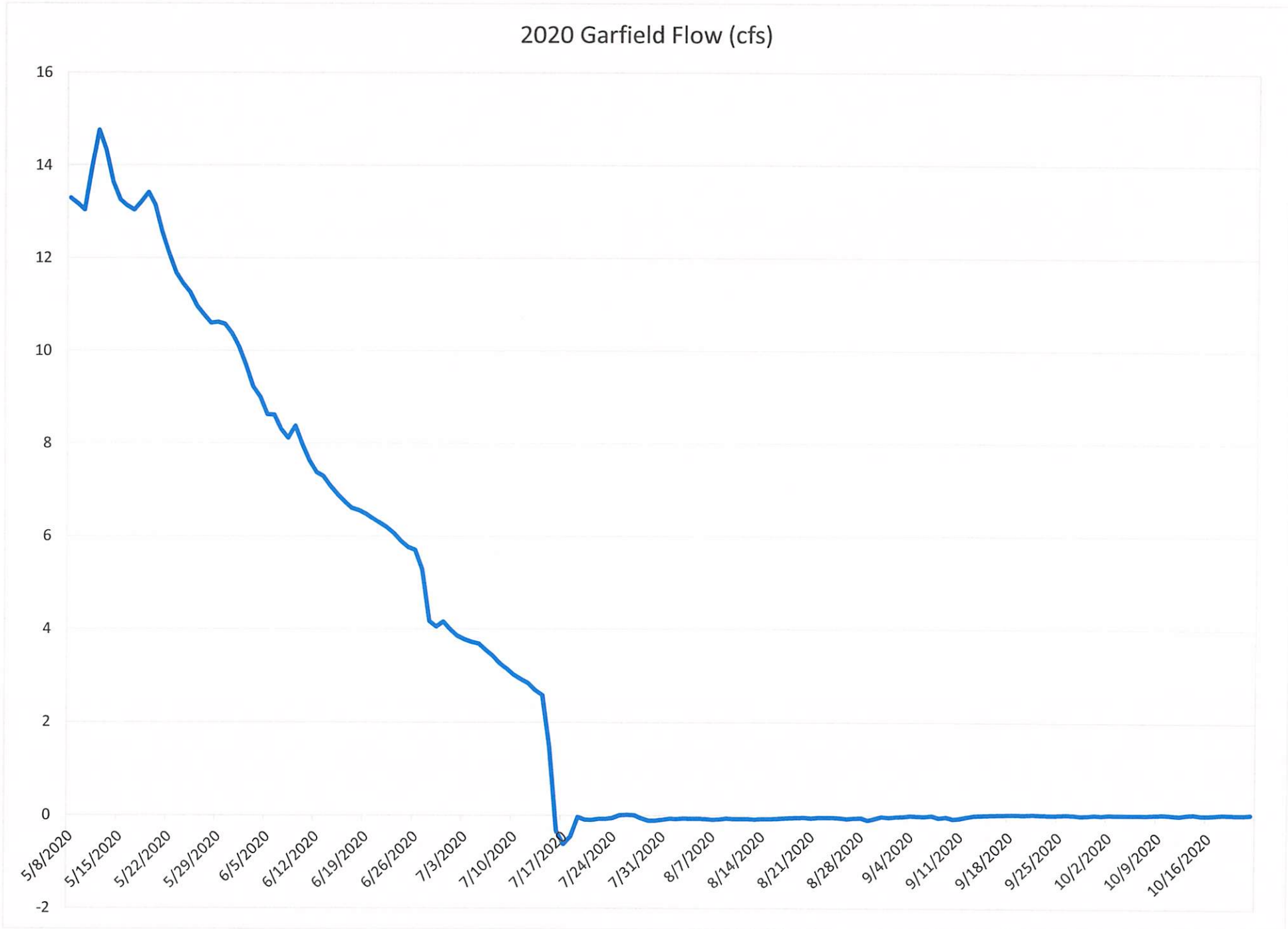
9/28/2019
9/30/2019
10/2/2019


2020 Baldy Flow (cfs)
30
25
20
15
10
5
0
4/30/2020
5/2/2020
5/4/2020
5/6/2020
5/8/2020
5/10/2020
5/12/2020
5/14/2020
5/16/2020
5/18/2020
5/20/2020
5/22/2020
5/24/2020
5/26/2020
5/28/2020
5/30/2020
6/1/2020
6/3/2020
6/5/2020
6/7/2020
6/9/2020
6/11/2020
6/13/2020
6/15/2020
6/17/2020
6/19/2020
6/21/2020
6/23/2020
6/25/2020
6/27/2020
6/29/2020


2021 Baldy Flow (cfs)
16
14
12
10
8
6
4
2
0
4/24/2021
5/1/2021
5/8/2021
5/15/2021
5/22/2021
5/29/2021
6/5/2021
6/12/2021
6/19/2021
6/26/2021
7/3/2021
7/10/2021
7/17/2021
7/24/2021
7/31/2021
8/7/2021
8/14/2021
8/21/2021
8/28/2021
9/4/2021


2022 Baldy Flow (cfs)
60
50
40
30
20
10
0
5/6/2022
5/13/2022
5/20/2022
5/27/2022
6/3/2022
6/10/2022
6/17/2022
6/24/2022
7/1/2022
7/8/2022
7/15/2022
7/22/2022
7/29/2022
8/5/2022
8/12/2022
8/19/2022
8/26/2022
9/2/2022


2023 Baldy Flow (cfs)
90
80
70
60
50
40
30
20
10
0
5/24/2023
5/26/2023
5/28/2023
5/30/2023
6/1/2023
6/3/2023
6/5/2023
6/7/2023
6/9/2023
6/11/2023
6/13/2023
6/15/2023
6/17/2023
6/19/2023
6/21/2023
6/23/2023
6/25/2023
6/27/2023
6/29/2023
7/1/2023
7/3/2023
7/5/2023
7/7/2023
7/9/2023
7/11/2023
7/13/2023
7/15/2023
7/17/2023
7/19/2023
7/21/2023
7/23/2023


2020 Garfield Flow (cfs)
16
14
12
10
8
6
4
2
0
-2
5/8/2020
5/15/2020
5/22/2020
5/29/2020
6/5/2020
6/12/2020
6/19/2020
6/26/2020
7/3/2020
7/10/2020
7/17/2020
7/24/2020
7/31/2020
8/7/2020
8/14/2020
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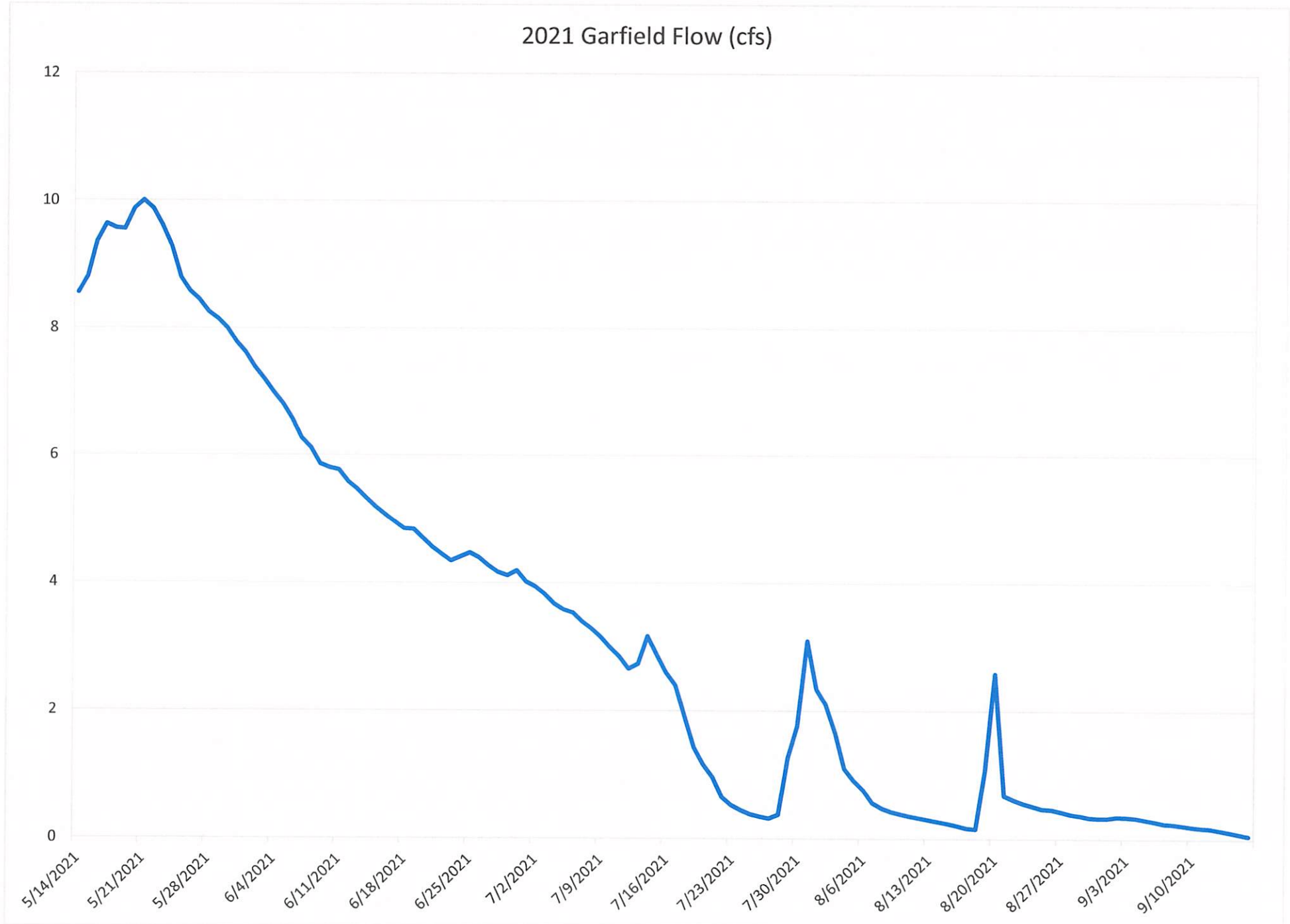
9/11/2020
9/18/2020
9/25/2020
10/2/2020
10/9/2020
10/16/2020


2021 Garfield Flow (cfs)
12
10
8
6
4
2
0
5/14/2021
5/21/2021
5/28/2021
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6/11/2021
6/18/2021
6/25/2021
7/2/2021
7/9/2021
7/16/2021
7/23/2021
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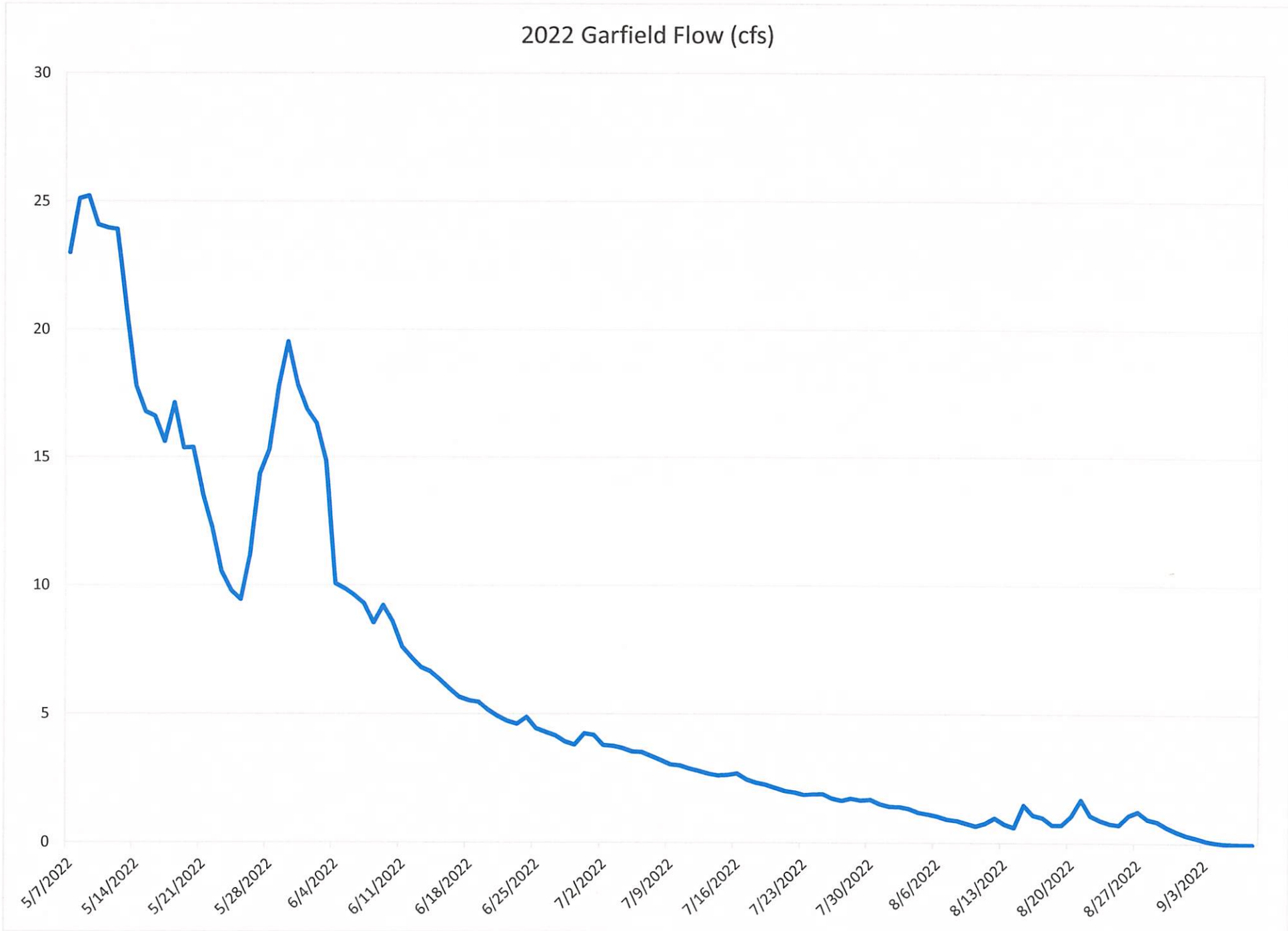
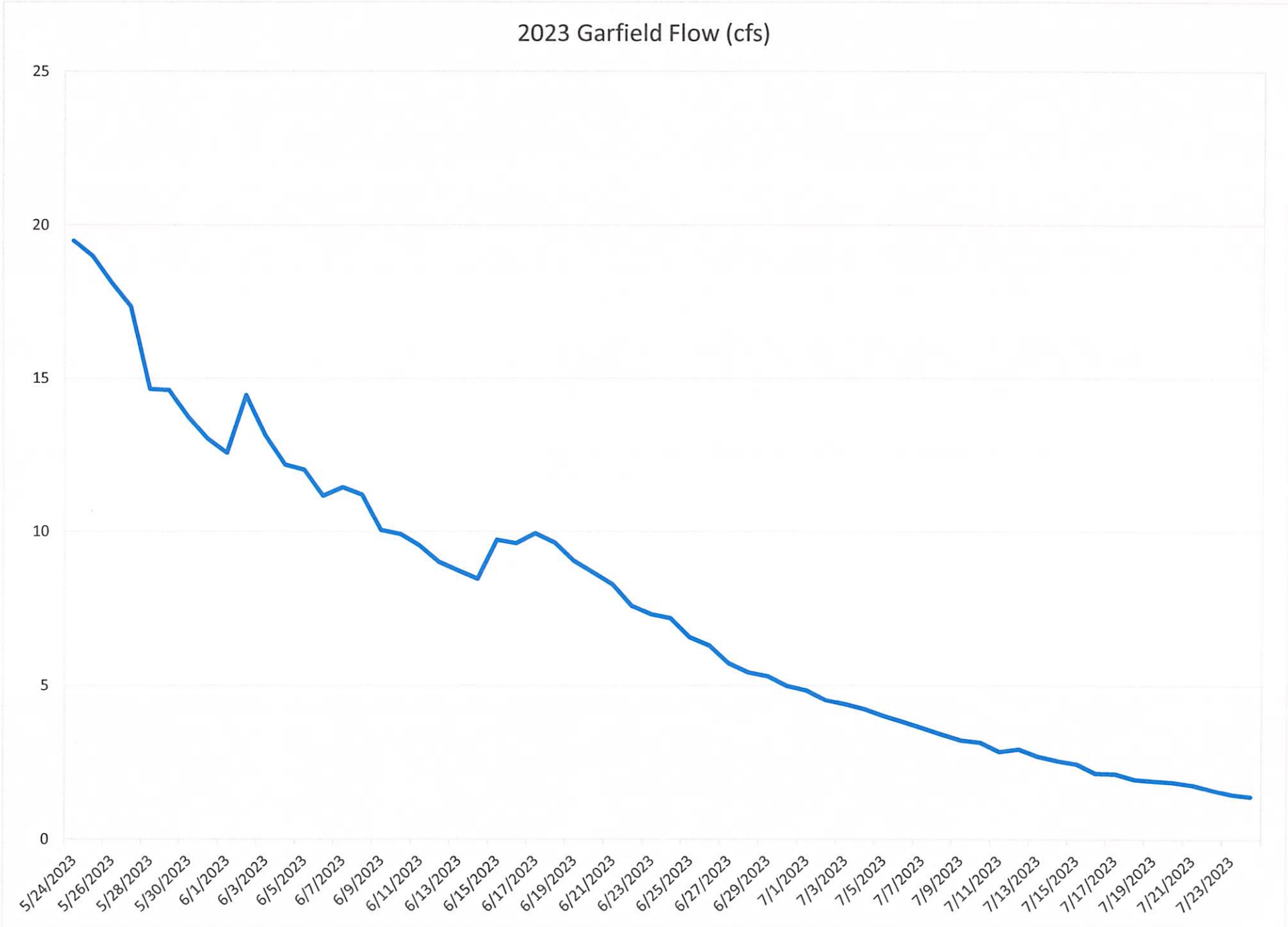
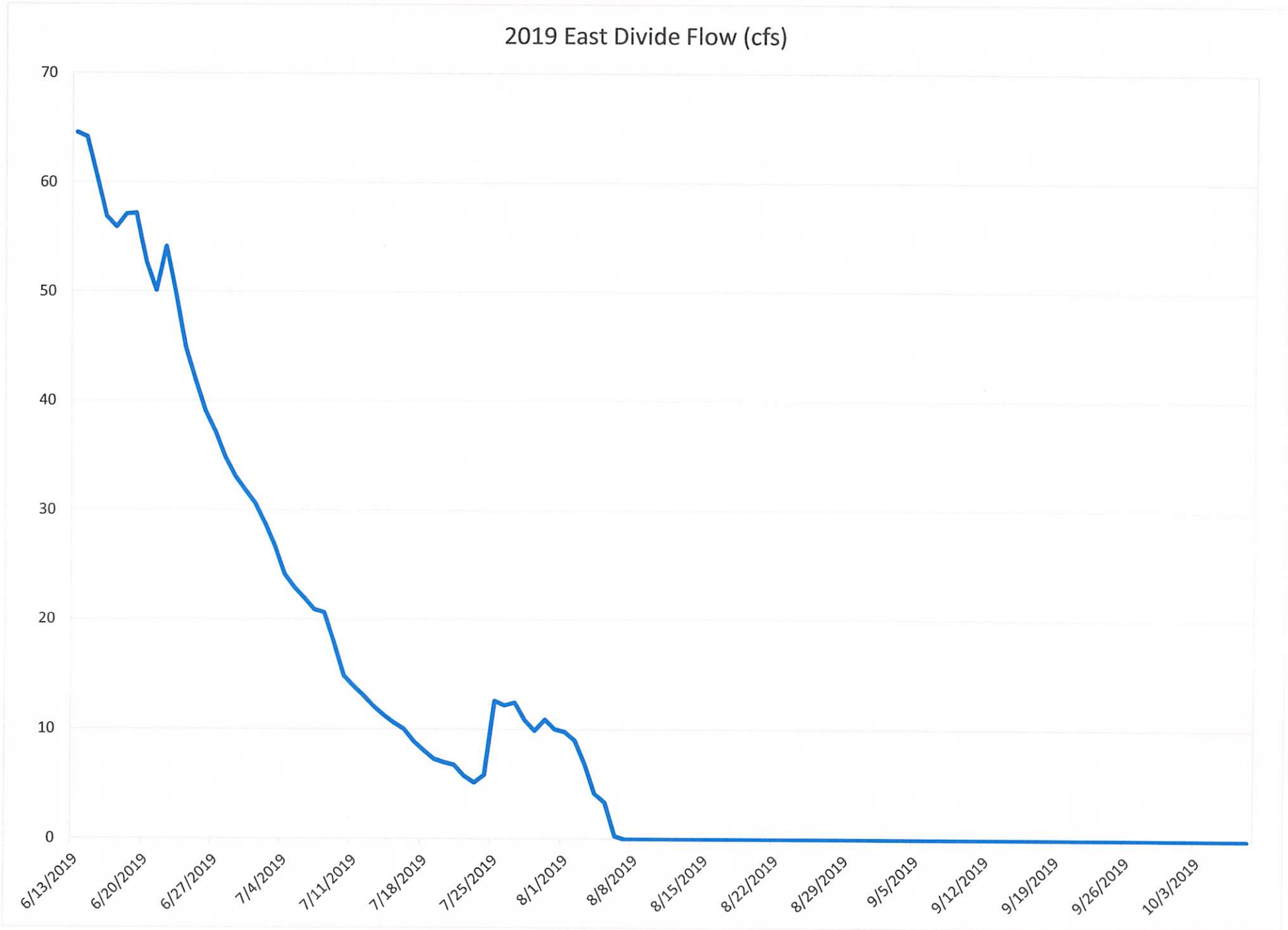
8/13/2021
8/20/2021
8/27/2021
9/3/2021
9/10/2021


2022 Garfield Flow (cfs)
30
25
20
15
10
5
0
5/7/2022
5/14/2022
5/21/2022
5/28/2022
6/4/2022
6/11/2022
6/18/2022
6/25/2022
7/2/2022
7/9/2022
7/16/2022
7/23/2022
7/30/2022
8/6/2022
8/13/2022
8/20/2022
8/27/2022
9/3/2022


2023 Garfield Flow (cfs)
25
20
15
10
5
0
5/24/2023
5/26/2023
5/28/2023
5/30/2023
6/1/2023
6/3/2023
6/5/2023
6/7/2023
6/9/2023
6/11/2023
6/13/2023
6/15/2023
6/17/2023
6/19/2023
6/21/2023
6/23/2023
6/25/2023
6/27/2023
6/29/2023
7/1/2023
7/3/2023
7/5/2023
7/7/2023
7/9/2023
7/11/2023
7/13/2023
7/15/2023
7/17/2023
7/19/2023
7/21/2023
7/23/2023


2019 East Divide Flow (cfs)
70
60
50
40
30
20
10
0
6/13/2019
6/20/2019
6/27/2019
7/4/2019
7/11/2019
7/18/2019
7/25/2019
8/1/2019
8/8/2019
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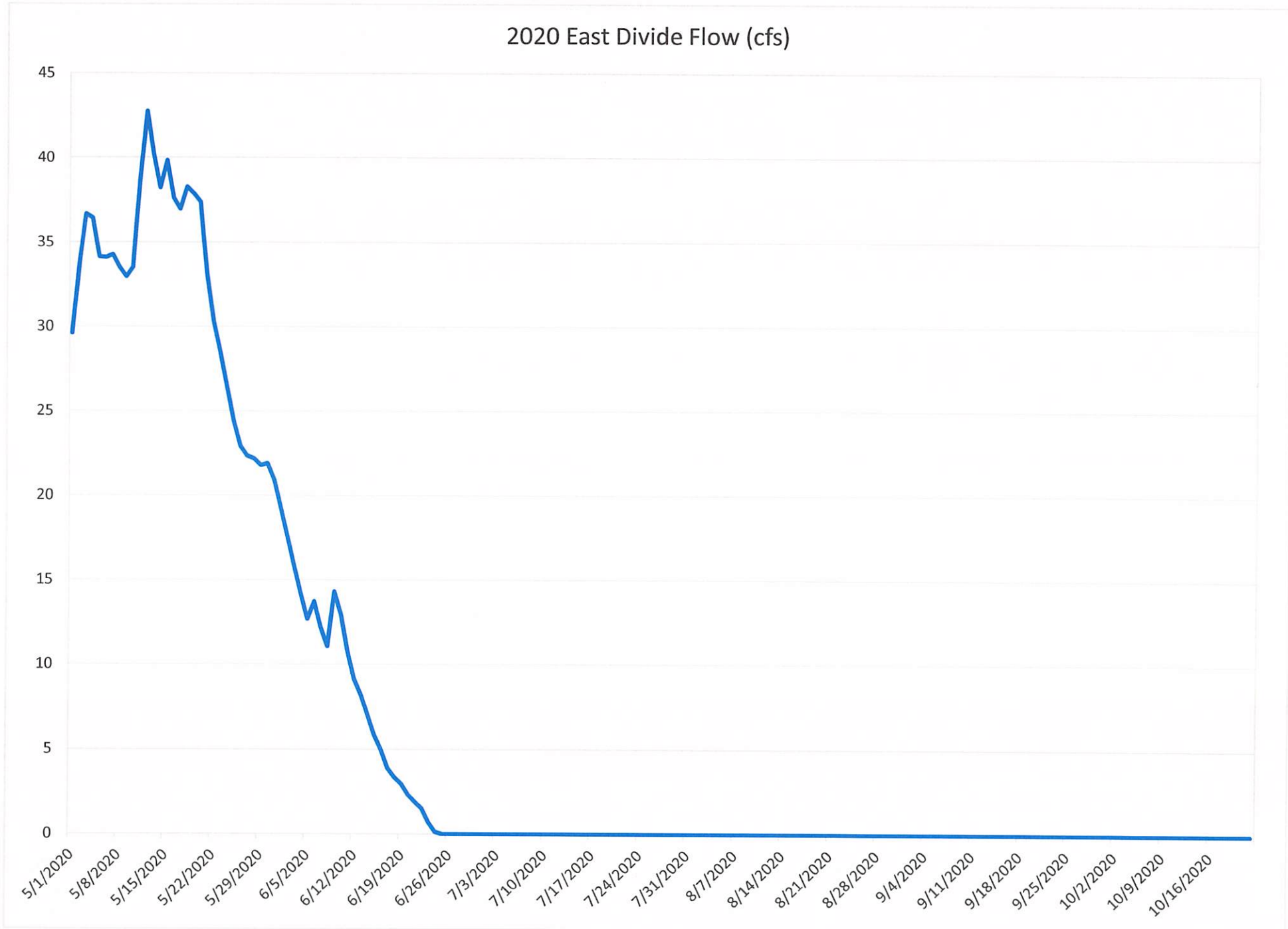
8/29/2019
9/5/2019
9/12/2019
9/19/2019
9/26/2019
10/3/2019


2020 East Divide Flow (cfs)
45
40
35
30
25
20
15
10
5
0
5/1/2020
5/8/2020
5/15/2020
5/22/2020
5/29/2020
6/5/2020
6/12/2020
6/19/2020
6/26/2020
7/3/2020
7/10/2020
7/17/2020
7/24/2020
7/31/2020
8/7/2020
8/14/2020
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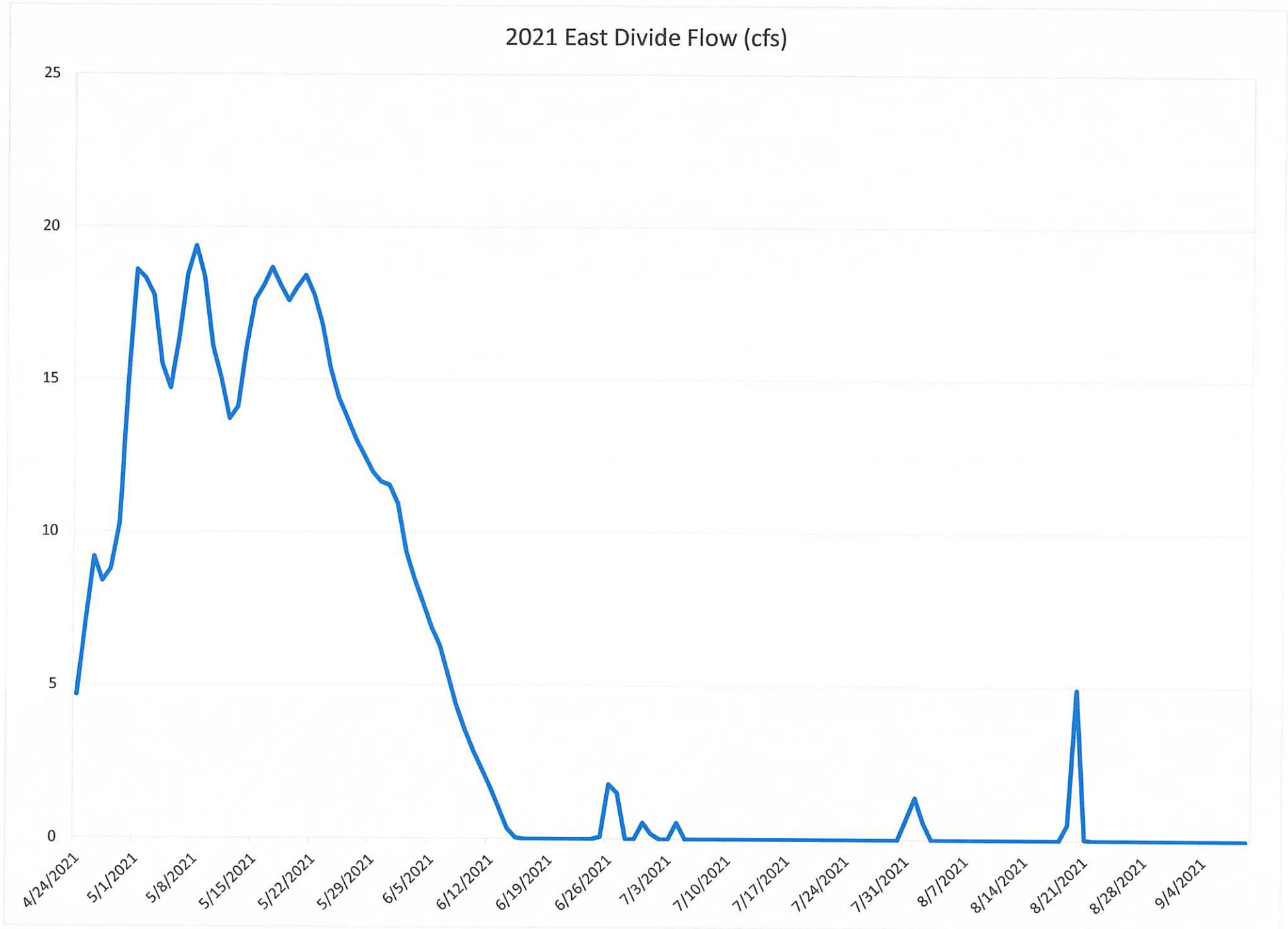
9/11/2020
9/18/2020
9/25/2020
10/2/2020
10/9/2020
10/16/2020


2021 East Divide Flow (cfs)
25
20
15
10
5
0
4/24/2021
5/1/2021
5/8/2021
5/15/2021
5/22/2021
5/29/2021
6/5/2021
6/12/2021
6/19/2021
6/26/2021
7/3/2021
7/10/2021
7/17/2021
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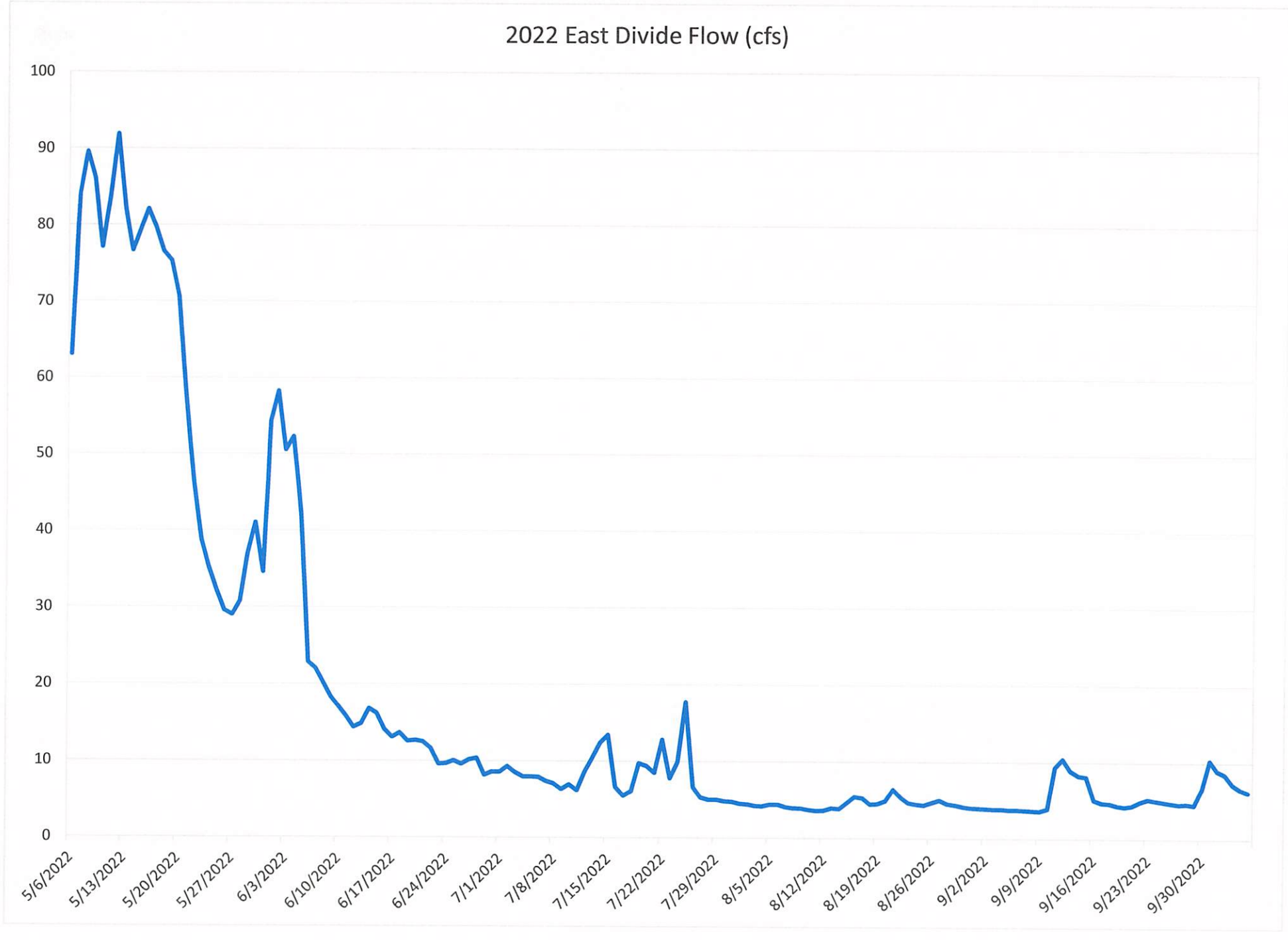
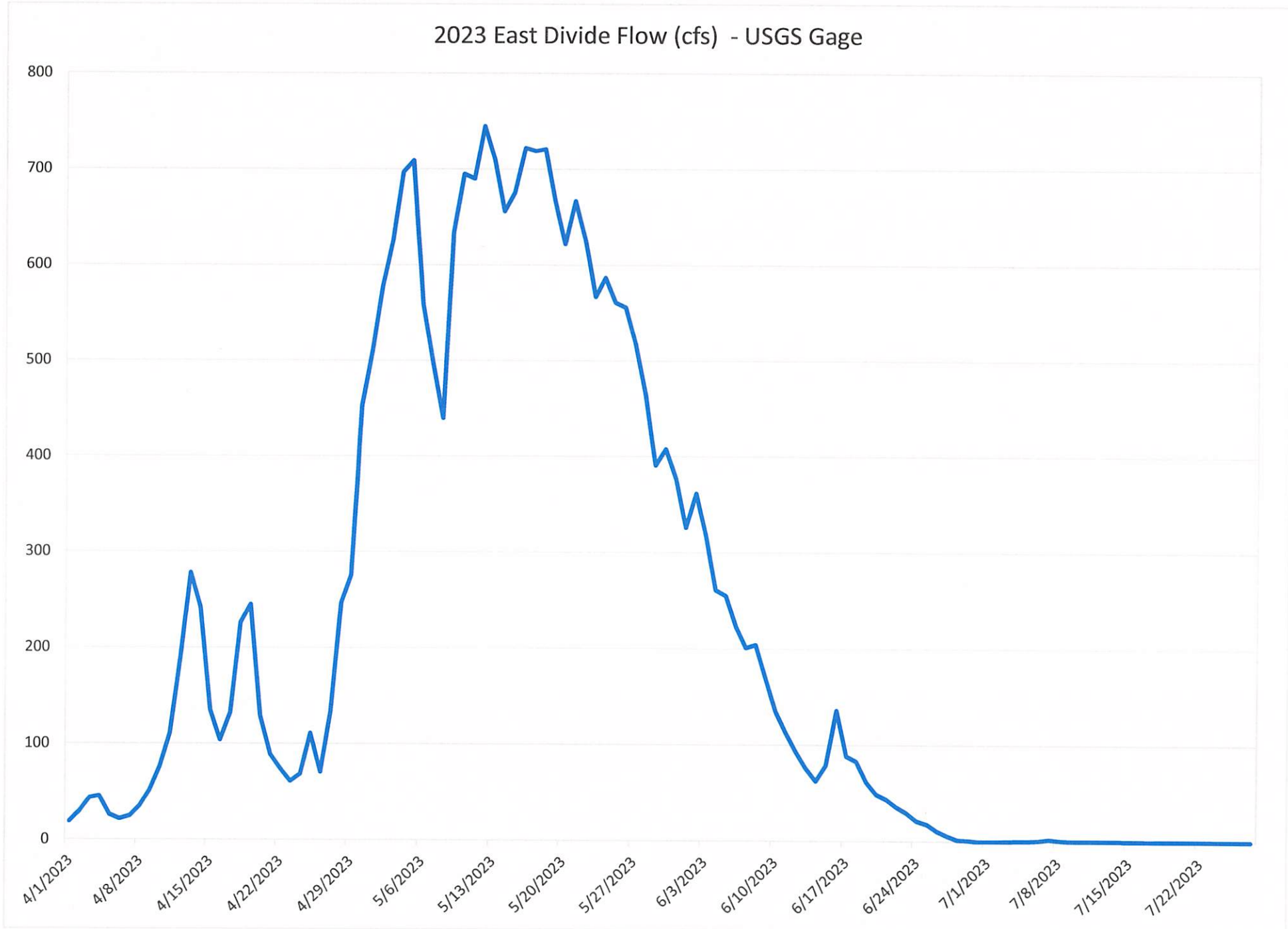
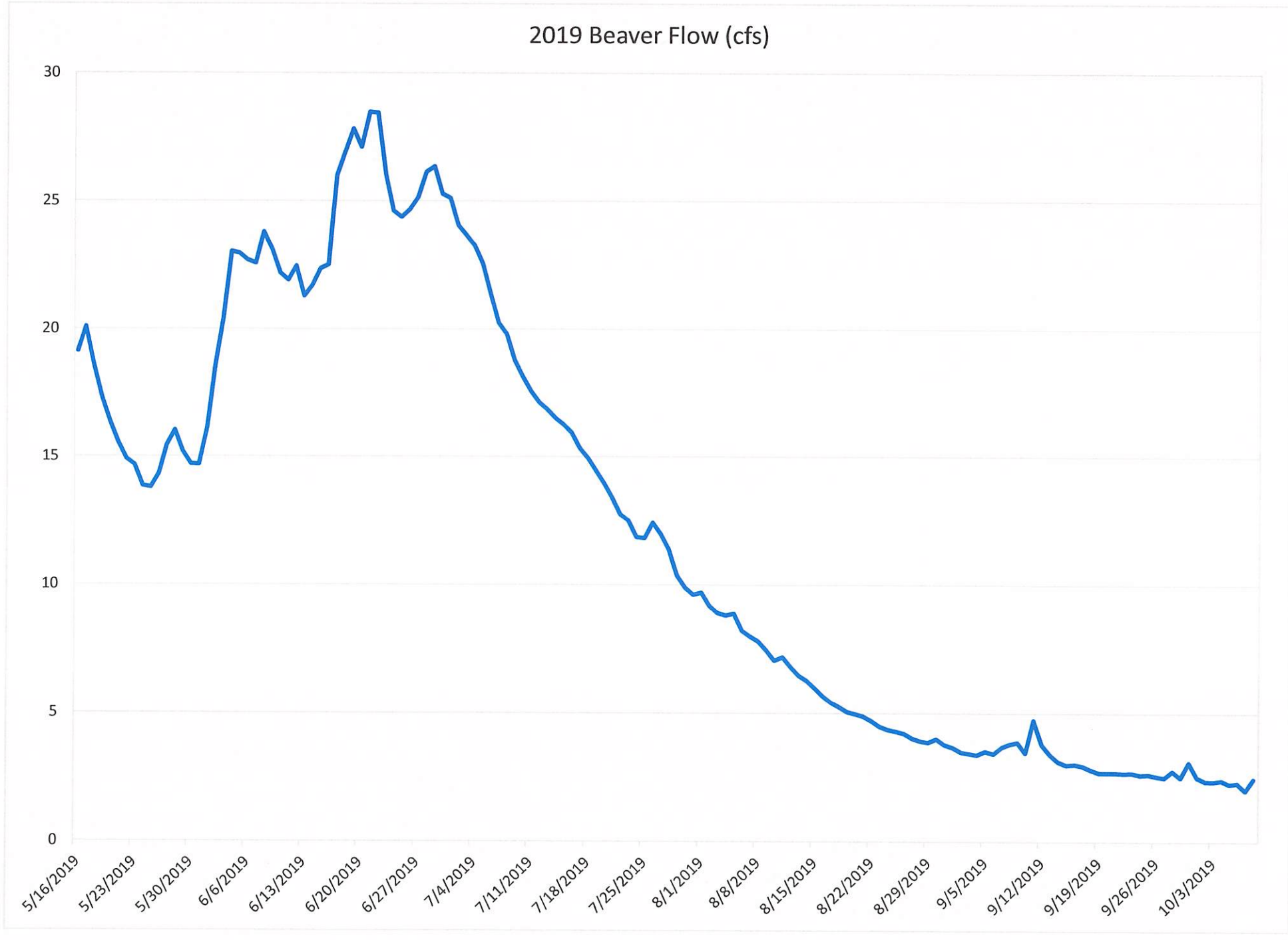
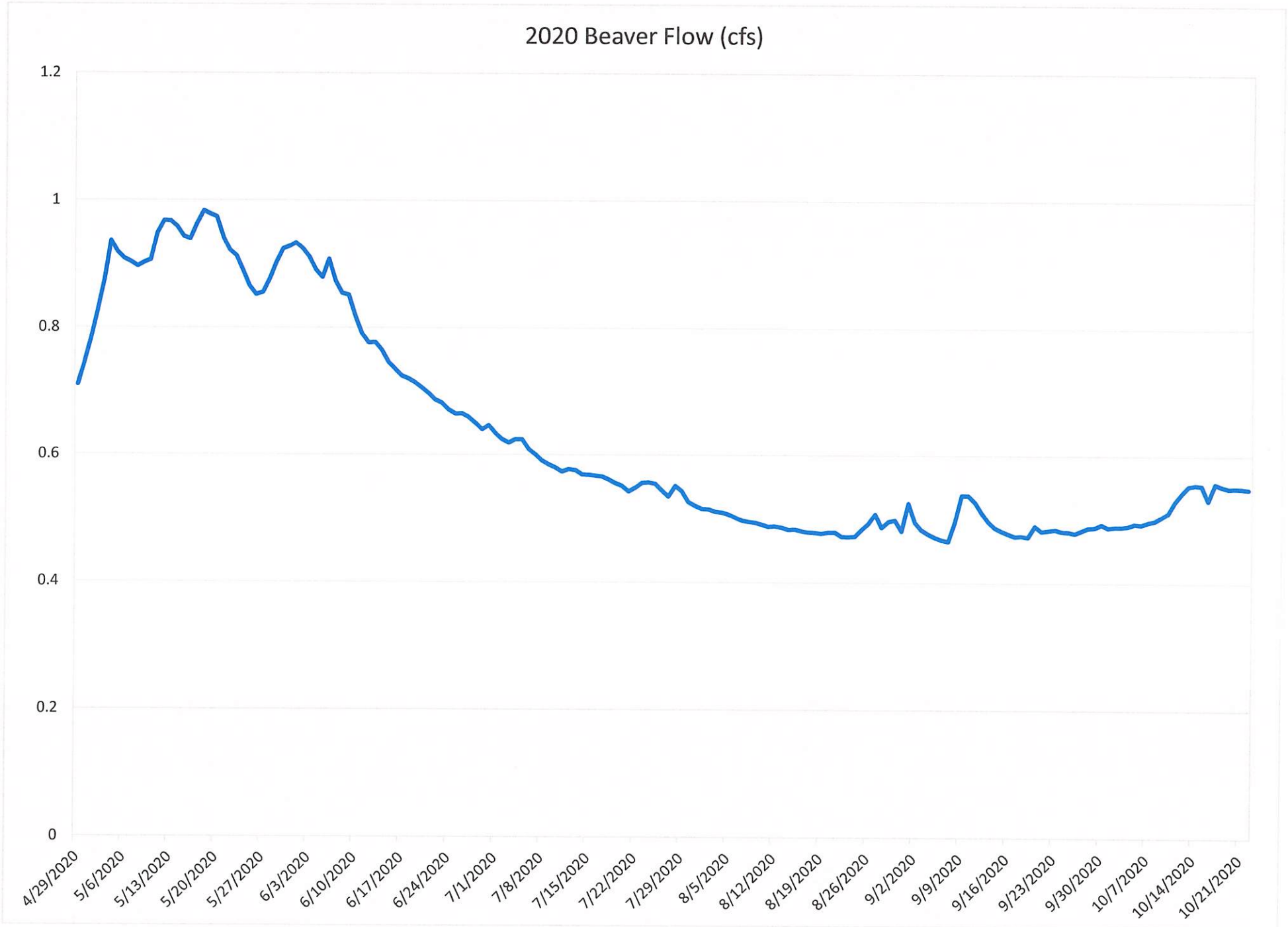
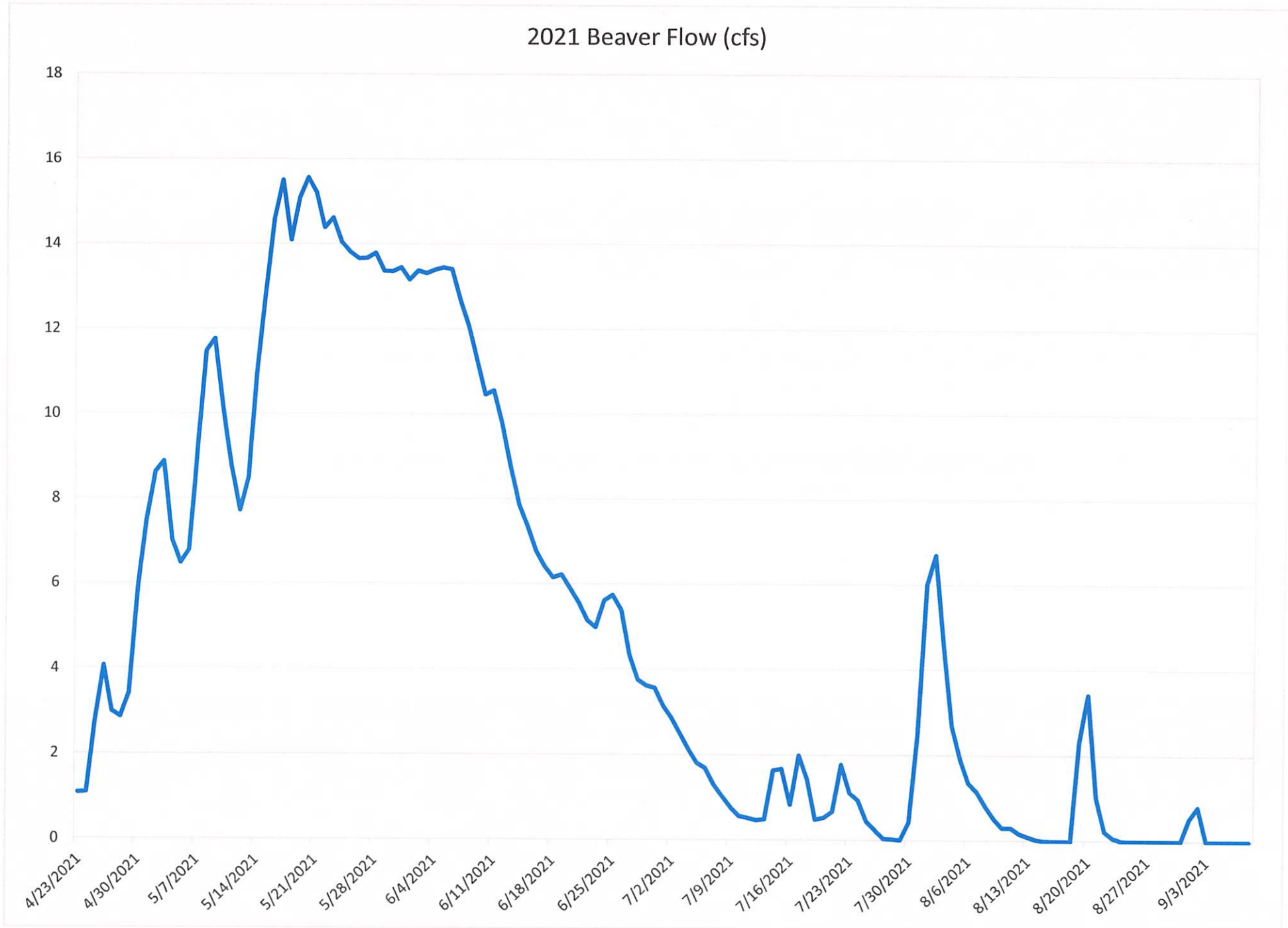
8/28/2021
9/4/2021

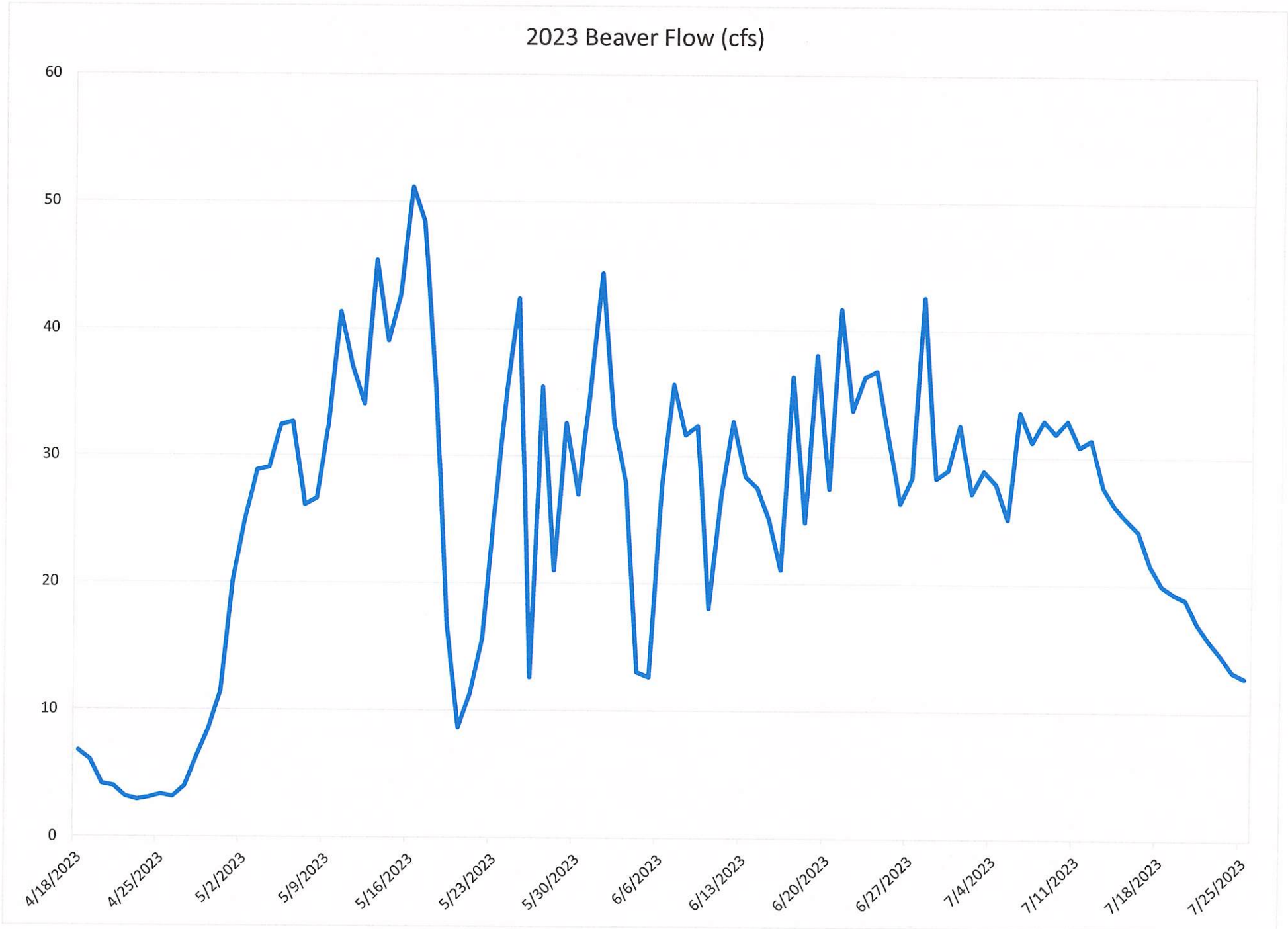

2022 East Divide Flow (cfs)
100
90
80
70
60
50
40
30
20
10
0
5/6/2022
5/13/2022
5/20/2022
5/27/2022
6/3/2022
6/10/2022
6/17/2022
6/24/2022
7/1/2022
7/8/2022
7/15/2022
7/22/2022
7/29/2022
8/5/2022
8/12/2022
8/19/2022
8/26/2022
9/2/2022
9/9/2022
9/16/2022
9/23/2022
9/30/2022

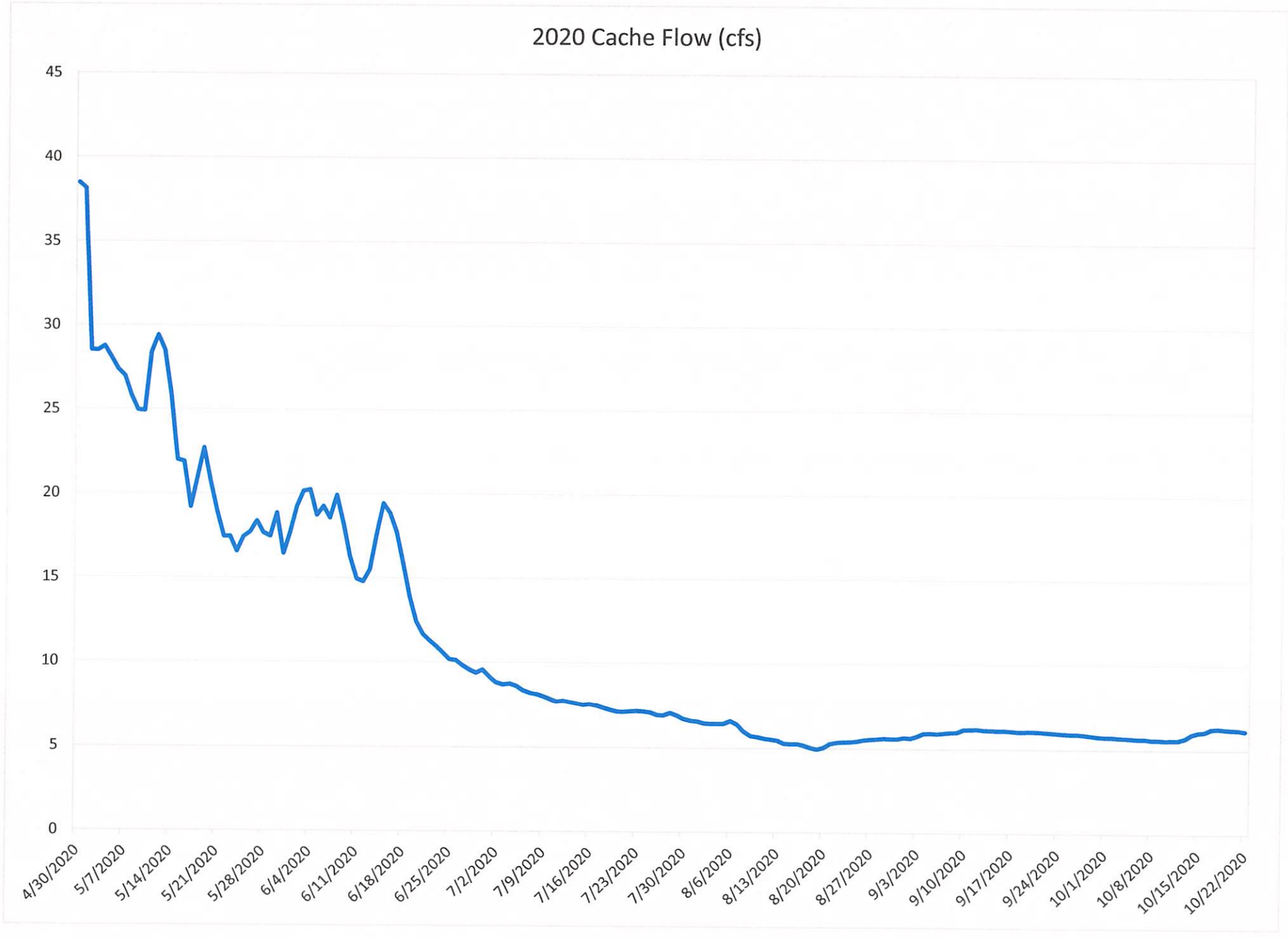

2023 East Divide Flow (cfs) - USGS Gage
800
700
600
500
400
300
200
100
0
4/1/2023
4/8/2023
4/15/2023
4/22/2023
4/29/2023
5/6/2023
5/13/2023
5/20/2023
5/27/2023
6/3/2023
6/10/2023
6/17/2023
6/24/2023
7/1/2023
7/8/2023
7/15/2023
7/22/2023

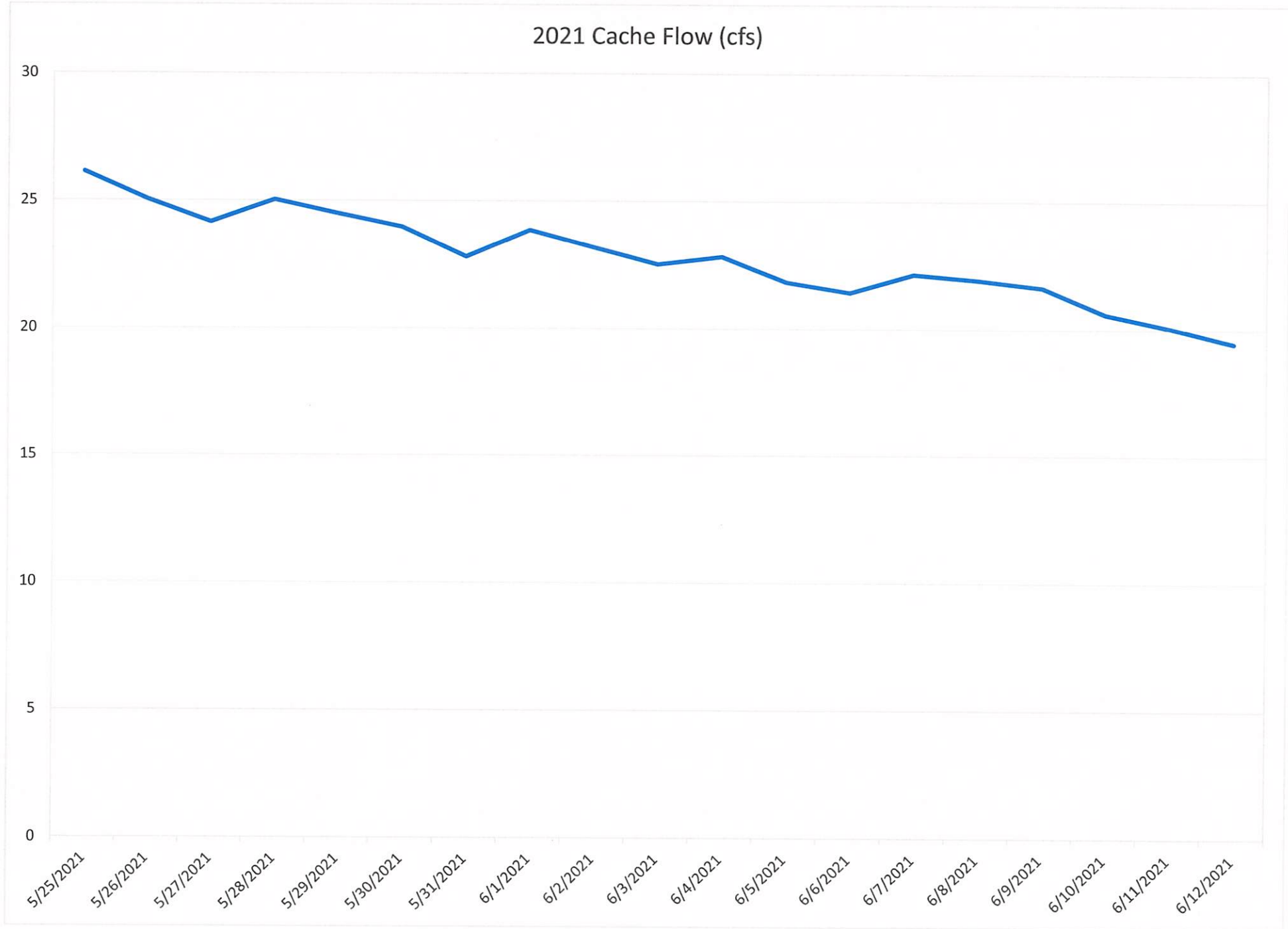

2019 Beaver Flow (cfs)
30
25
20
15
10
5
0
5/16/2019
5/23/2019
5/30/2019
6/6/2019
6/13/2019
6/20/2019
6/27/2019
7/4/2019
7/11/2019
7/18/2019
7/25/2019
8/1/2019
8/8/2019
8/15/2019
8/22/2019
8/29/2019
9/5/2019
9/12/2019
9/19/2019
9/26/2019
10/3/2019

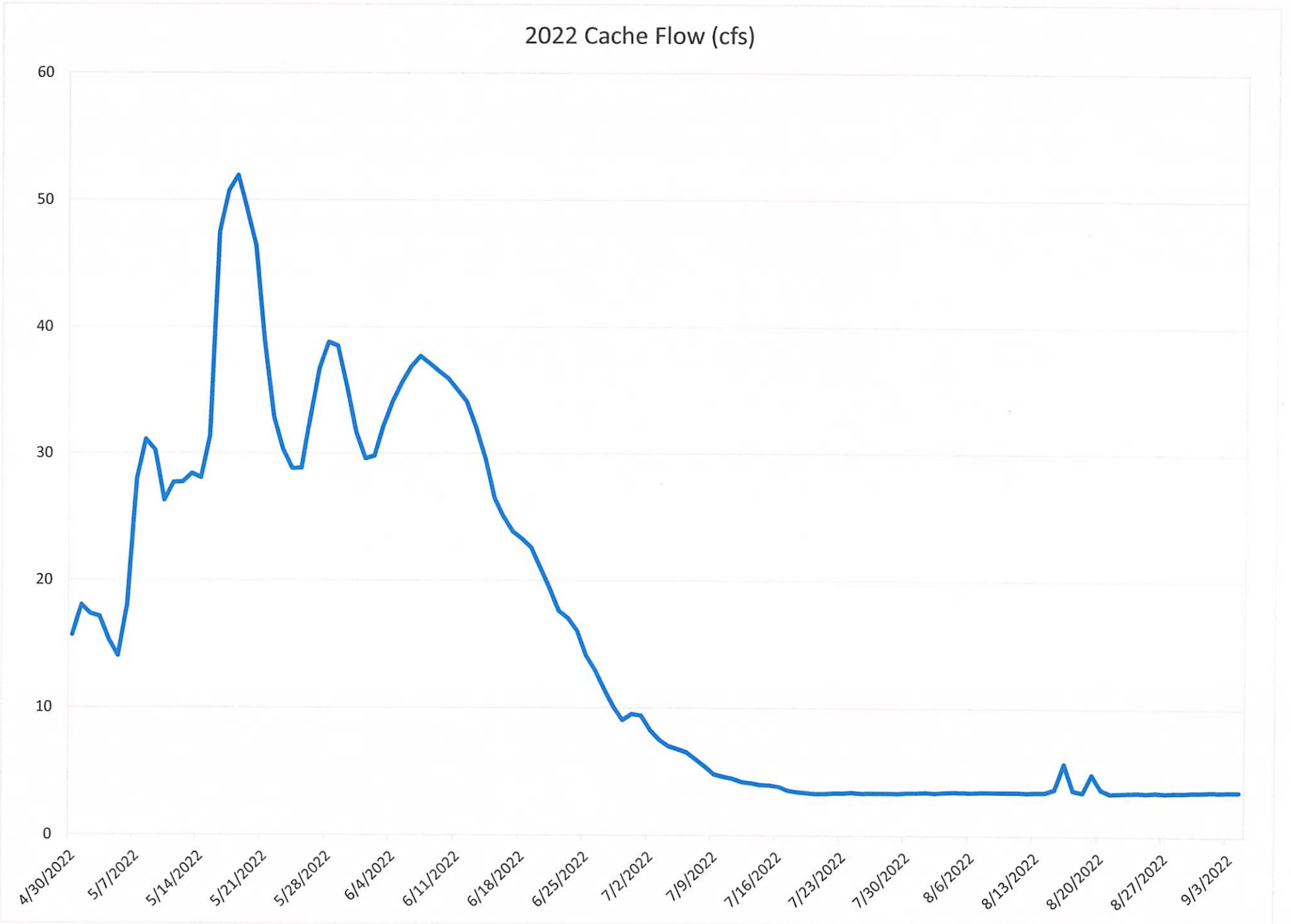

2020 Beaver Flow (cfs)
1.2
1
0.8
0.6
0.4
0.2
0
4/29/2020
5/6/2020
5/13/2020
5/20/2020
5/27/2020
6/3/2020
6/10/2020
6/17/2020
6/24/2020
7/1/2020
7/8/2020
7/15/2020
7/22/2020
7/29/2020
8/5/2020
8/12/2020
8/19/2020
8/26/2020
9/2/2020
9/9/2020
9/16/2020
9/23/2020
9/30/2020
10/7/2020
10/14/2020
10/21/2020

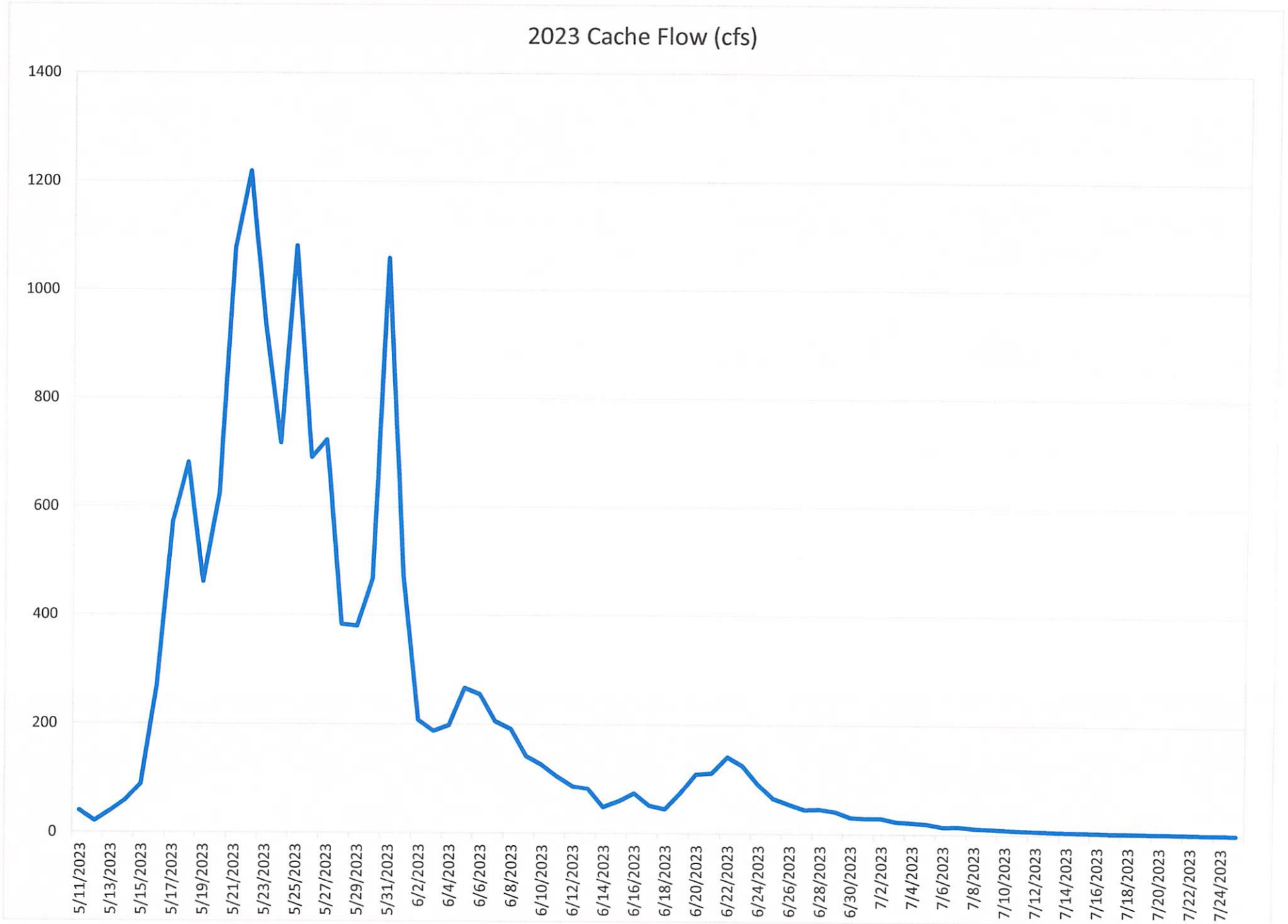

2021 Beaver Flow (cfs)
18
16
14
12
10
8
6
4
2
0
4/23/2021
4/30/2021
5/7/2021
5/14/2021
5/21/2021
5/28/2021
6/4/2021
6/11/2021
6/18/2021
6/25/2021
7/2/2021
7/9/2021
7/16/2021
7/23/2021
7/30/2021
8/6/2021
8/13/2021
8/20/2021
8/27/2021
9/3/2021

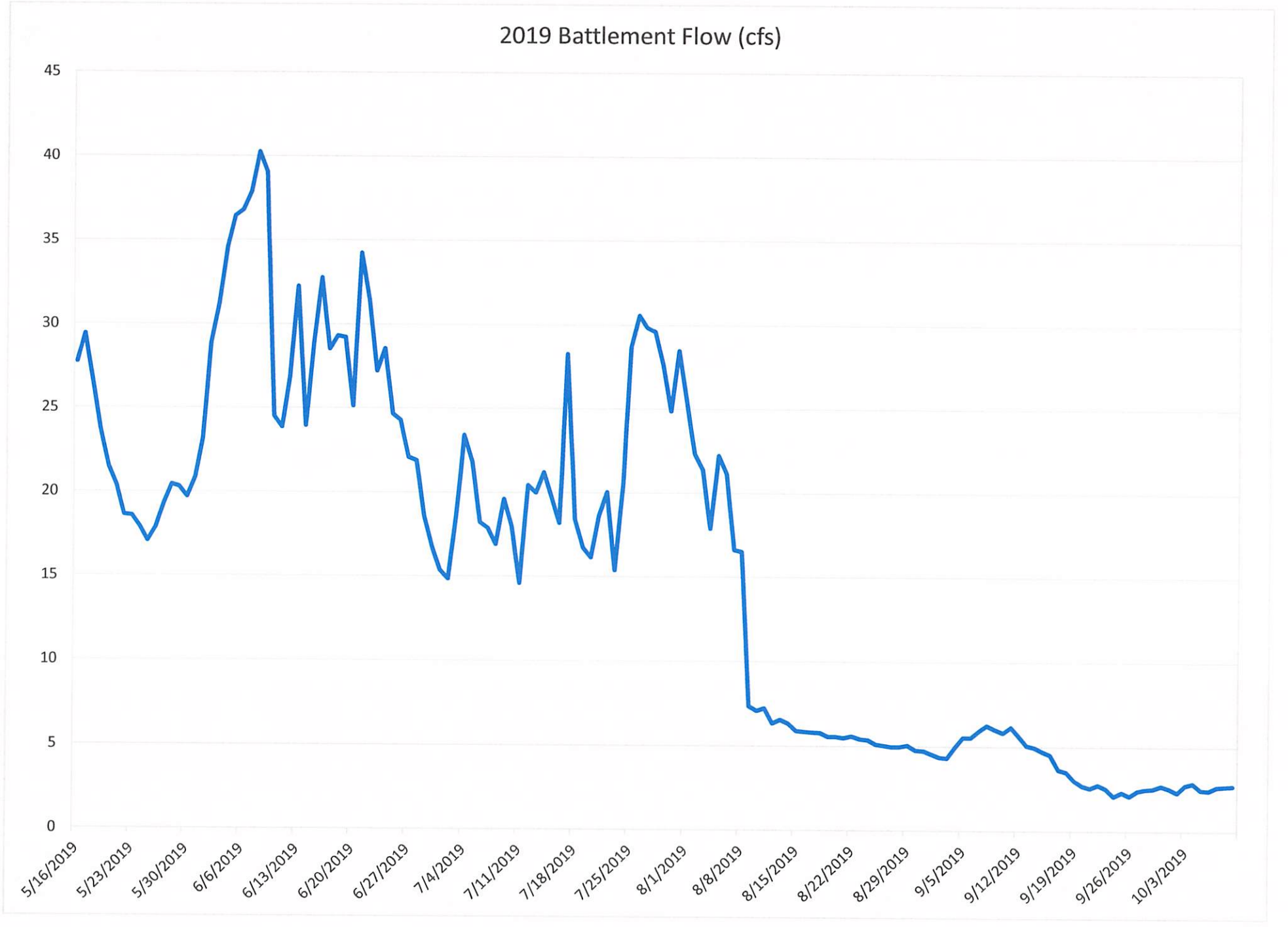

2023 Beaver Flow (cfs)
60
50
40
30
20
10
0
4/18/2023
4/25/2023
5/2/2023
5/9/2023
5/16/2023
5/23/2023
5/30/2023
6/6/2023
6/13/2023
6/20/2023
6/27/2023
7/4/2023
7/11/2023
7/18/2023
7/25/2023

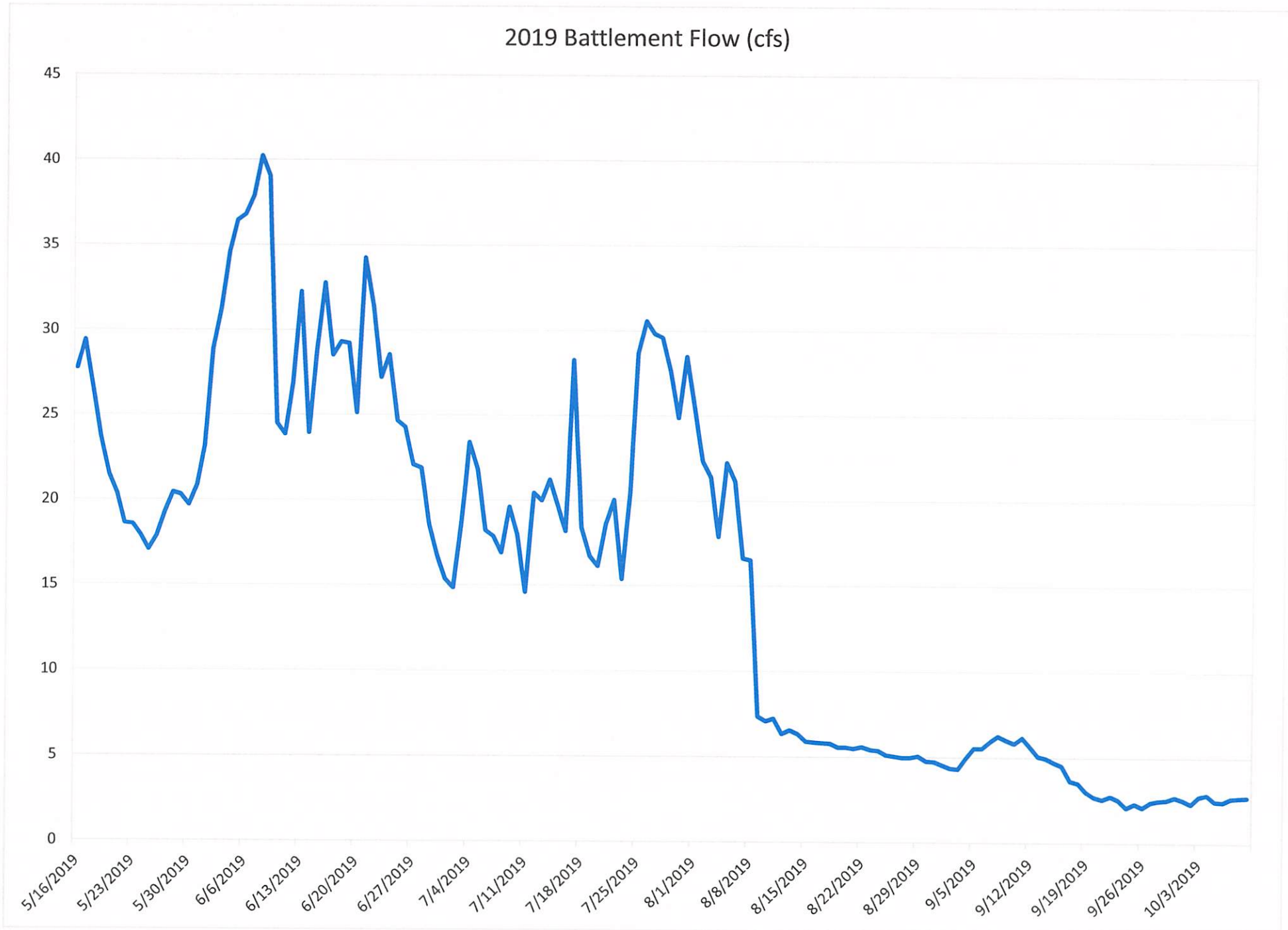

2020 Cache Flow (cfs)
45
40
35
30
25
20
15
10
5
0
4/30/2020
5/7/2020
5/14/2020
5/21/2020
5/28/2020
6/4/2020
6/11/2020
6/18/2020
6/25/2020
7/2/2020
7/9/2020
7/16/2020
7/23/2020
7/30/2020
8/6/2020
8/13/2020
8/20/2020
8/27/2020
9/3/2020
9/10/2020
9/17/2020
9/24/2020
10/1/2020
10/8/2020
10/15/2020
10/22/2020

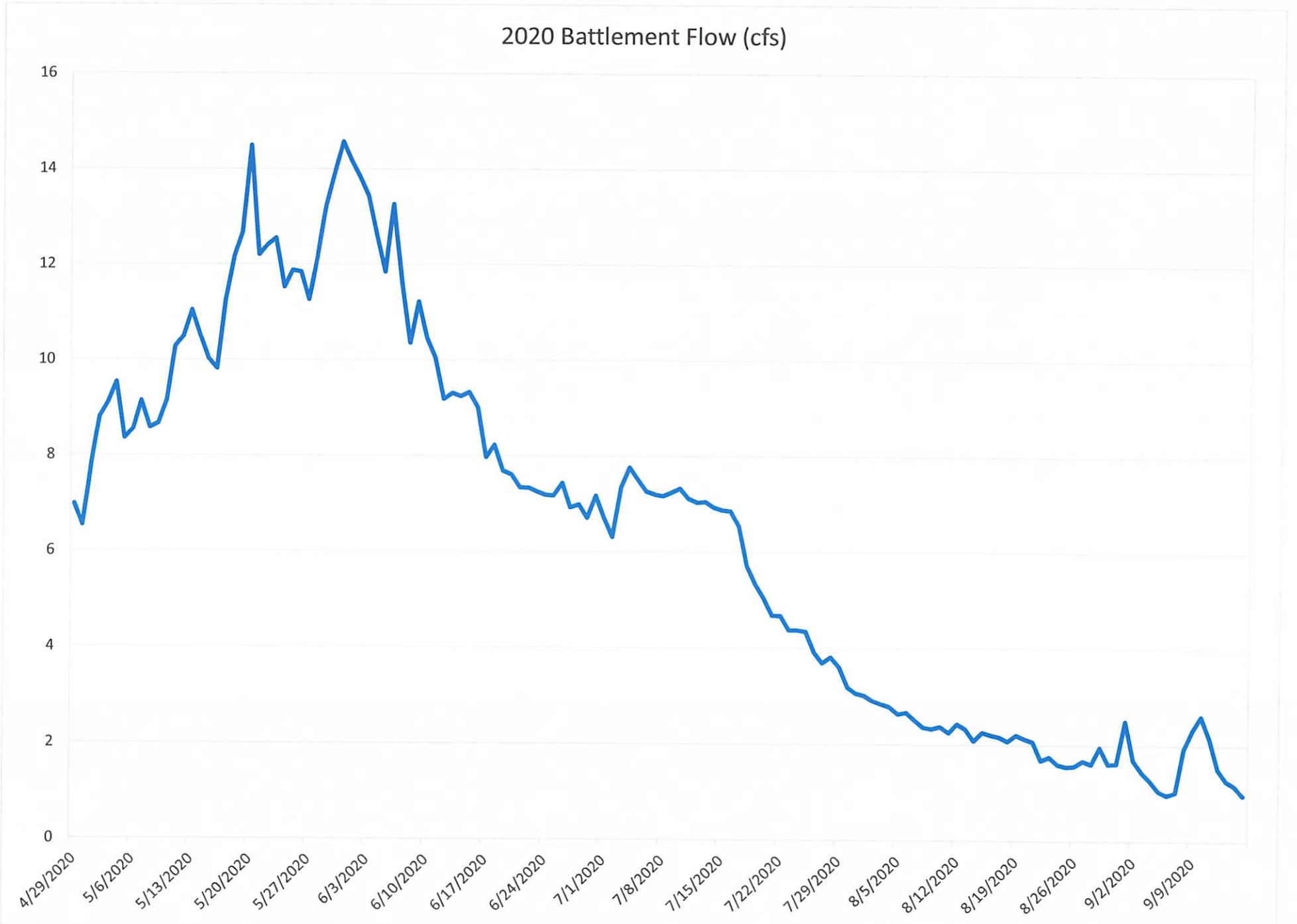

2021 Cache Flow (cfs)
30
25
20
15
10
5
0
5/25/2021
5/26/2021
5/27/2021
5/28/2021
5/29/2021
5/30/2021
5/31/2021
6/1/2021
6/2/2021
6/3/2021
6/4/2021
6/5/2021
6/6/2021
6/7/2021
6/8/2021
6/9/2021
6/10/2021
6/11/2021
6/12/2021

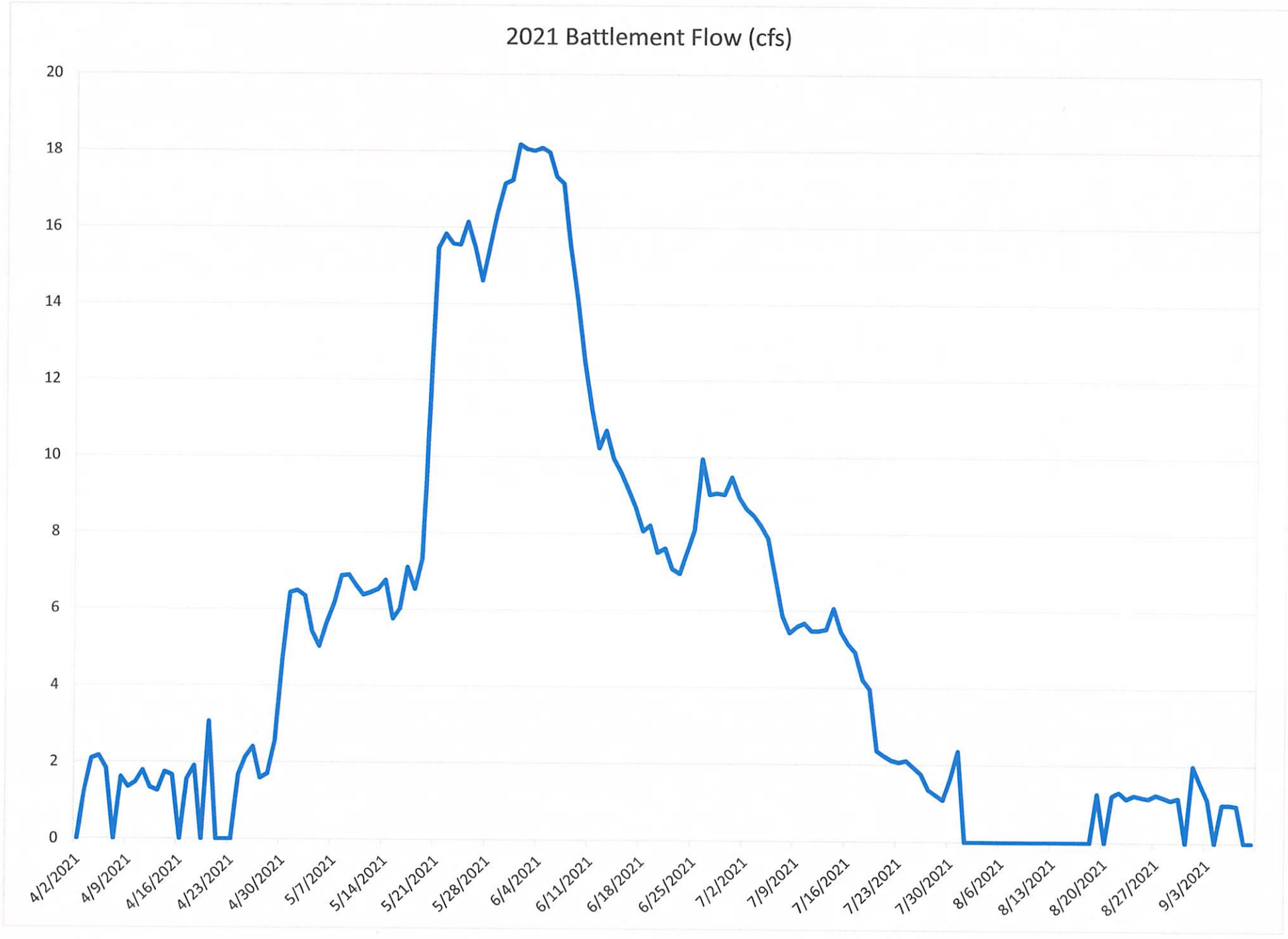

2022 Cache Flow (cfs)
60
50
40
30
20
10
0
4/30/2022
5/7/2022
5/14/2022
5/21/2022
5/28/2022
6/4/2022
6/11/2022
6/18/2022
6/25/2022
7/2/2022
7/9/2022
7/16/2022
7/23/2022
7/30/2022
8/6/2022
8/13/2022
8/20/2022
8/27/2022
9/3/2022

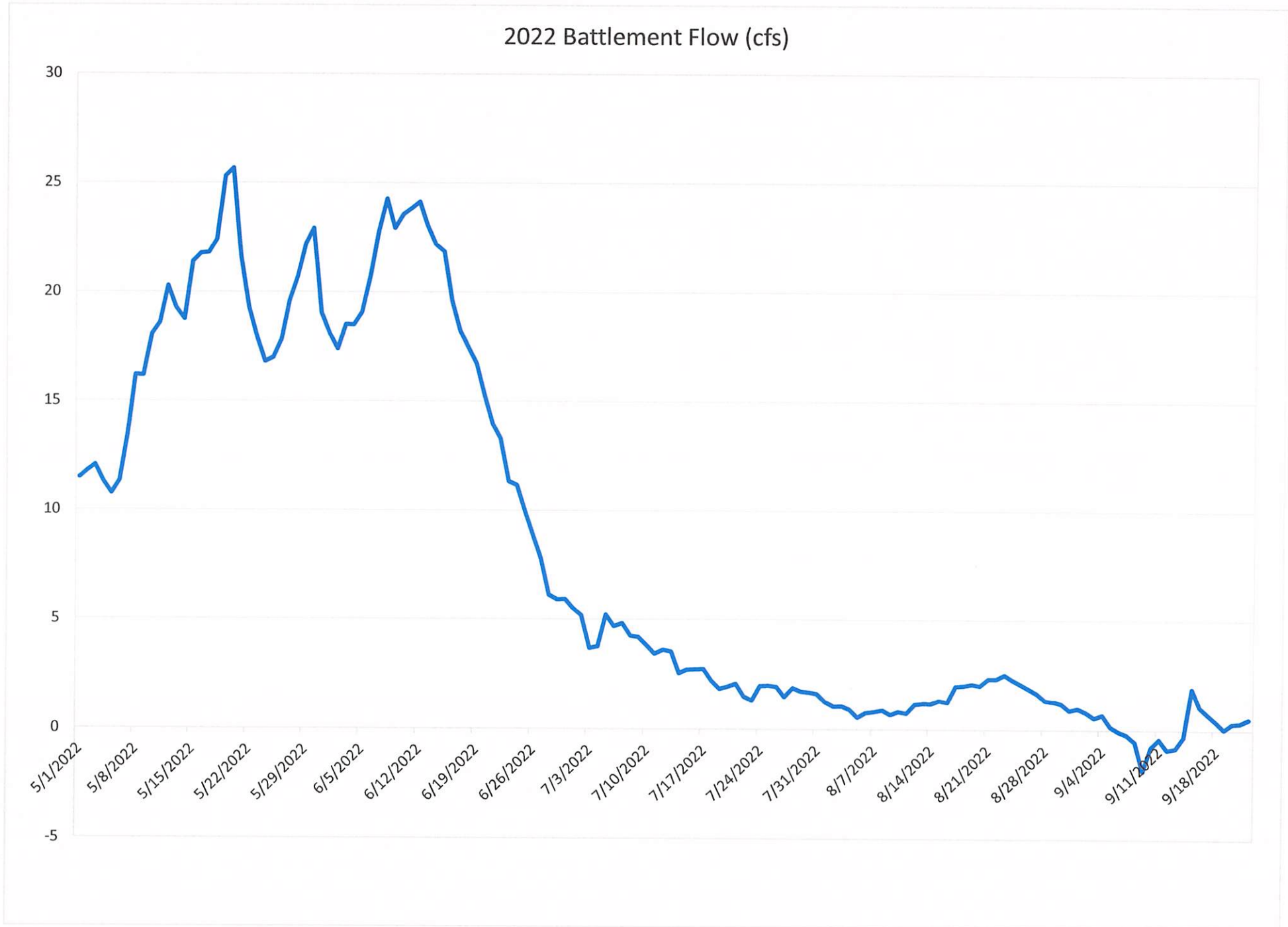

2023 Cache Flow (cfs)
1400
1200
1000
800
600
400
200
0
5/11/2023
5/13/2023
5/15/2023
5/17/2023
5/19/2023
5/21/2023
5/23/2023
5/25/2023
5/27/2023
5/29/2023
5/31/2023
6/2/2023
6/4/2023
6/6/2023
6/8/2023
6/10/2023
6/12/2023
6/14/2023
6/16/2023
6/18/2023
6/20/2023
6/22/2023
6/24/2023
6/26/2023
6/28/2023
6/30/2023
7/2/2023
7/4/2023
7/6/2023
7/8/2023
7/10/2023
7/12/2023
7/14/2023
7/16/2023
7/18/2023
7/20/2023
7/22/2023
7/24/2023


2019 Battlement Flow (cfs)
45
40
35
30
25
20
15
10
5
0
5/16/2019
5/23/2019
5/30/2019
6/6/2019
6/13/2019
6/20/2019
6/27/2019
7/4/2019
7/11/2019
7/18/2019
7/25/2019
8/1/2019
8/8/2019
8/15/2019
8/22/2019
8/29/2019
9/5/2019
9/12/2019
9/19/2019
9/26/2019
10/3/2019


2019 Battlement Flow (cfs)
45
40
35
30
25
20
15
10
5
0
5/16/2019
5/23/2019
5/30/2019
6/6/2019
6/13/2019
6/20/2019
6/27/2019
7/4/2019
7/11/2019
7/18/2019
7/25/2019
8/1/2019
8/8/2019
8/15/2019
8/22/2019
8/29/2019
9/5/2019
9/12/2019
9/19/2019
9/26/2019
10/3/2019

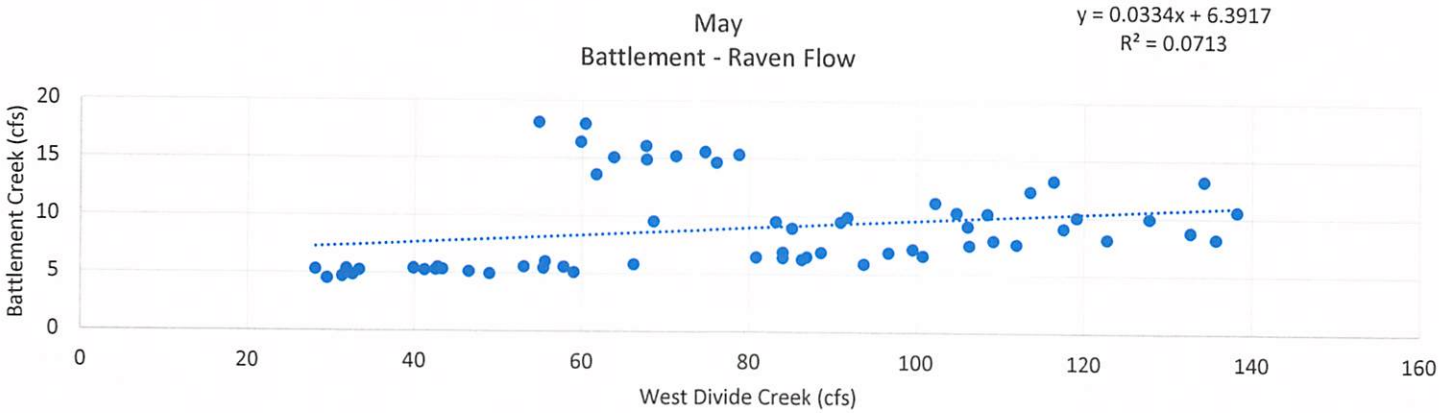

2020 Battlement Flow (cfs)
16
14
12
10
8
6
4
2
0
4/29/2020
5/6/2020
5/13/2020
5/20/2020
5/27/2020
6/3/2020
6/10/2020
6/17/2020
6/24/2020
7/1/2020
7/8/2020
7/15/2020
7/22/2020
7/29/2020
8/5/2020
8/12/2020
8/19/2020
8/26/2020
9/2/2020
9/9/2020

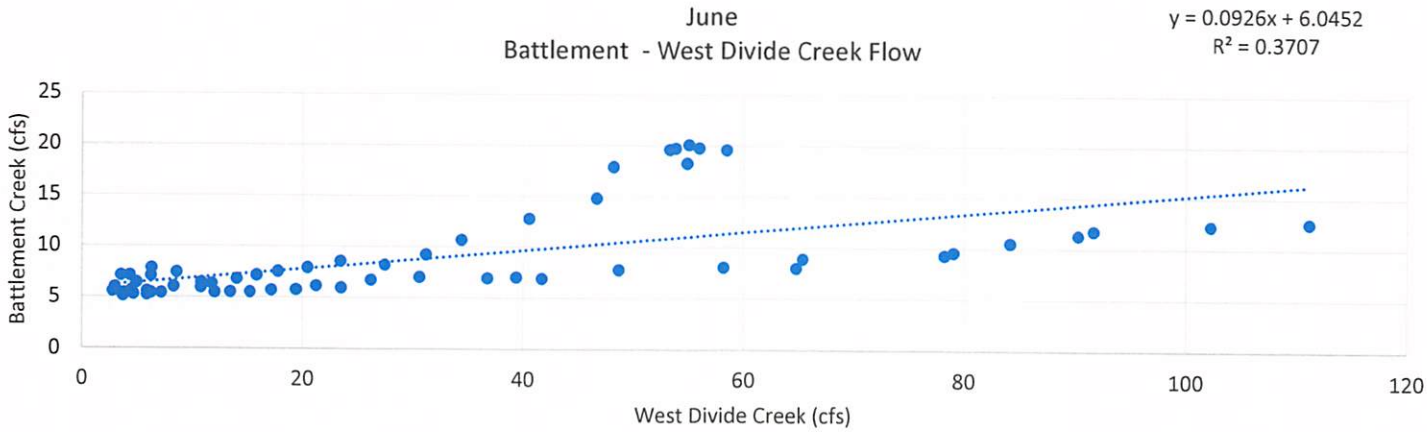

2021 Battlement Flow (cfs)
20
18
16
14
12
10
8
6
4
2
0
4/2/2021
4/9/2021
4/16/2021
4/23/2021
4/30/2021
5/7/2021
5/14/2021
5/21/2021
5/28/2021
6/4/2021
6/11/2021
6/18/2021
6/25/2021
7/2/2021
7/9/2021
7/16/2021
7/23/2021
7/30/2021
8/6/2021
8/13/2021
8/20/2021
8/27/2021
9/3/2021

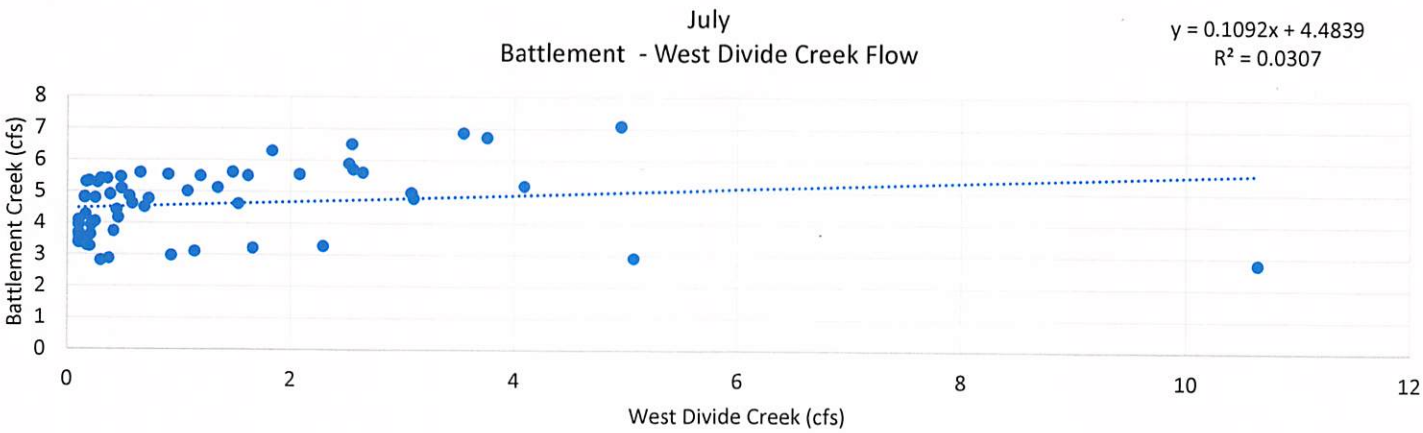

2022 Battlement Flow (cfs)
30
25
20
15
10
5
0
-5
5/1/2022
5/8/2022
5/15/2022
5/22/2022
5/29/2022
6/5/2022
6/12/2022
6/19/2022
6/26/2022
7/3/2022
7/10/2022
7/17/2022
7/24/2022
7/31/2022
8/7/2022
8/14/2022
8/21/2022
8/28/2022
9/4/2022
9/11/2022
9/18/2022

Appendix B: Correlations to West Divide Creek Raven Gage

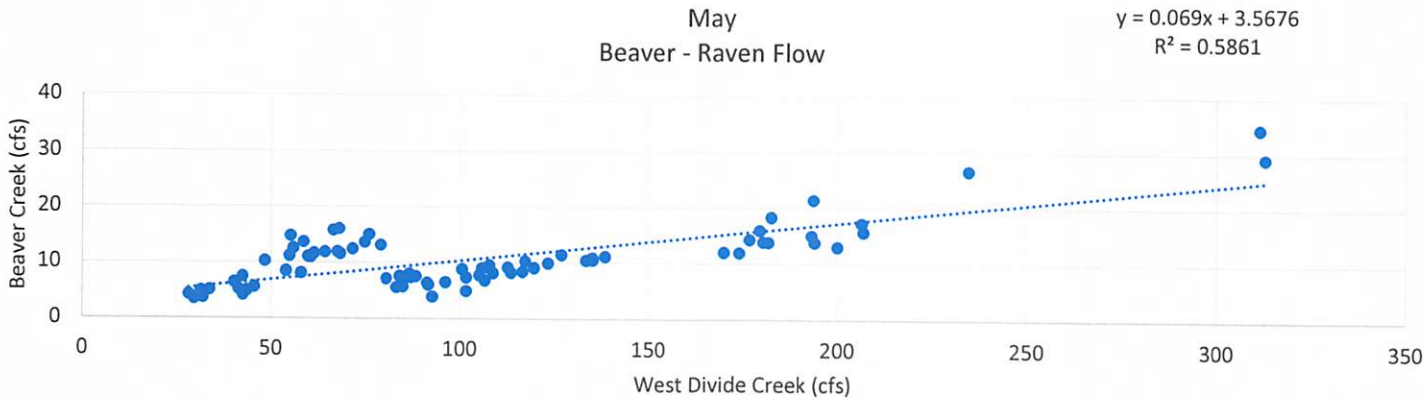
Battlement Creek

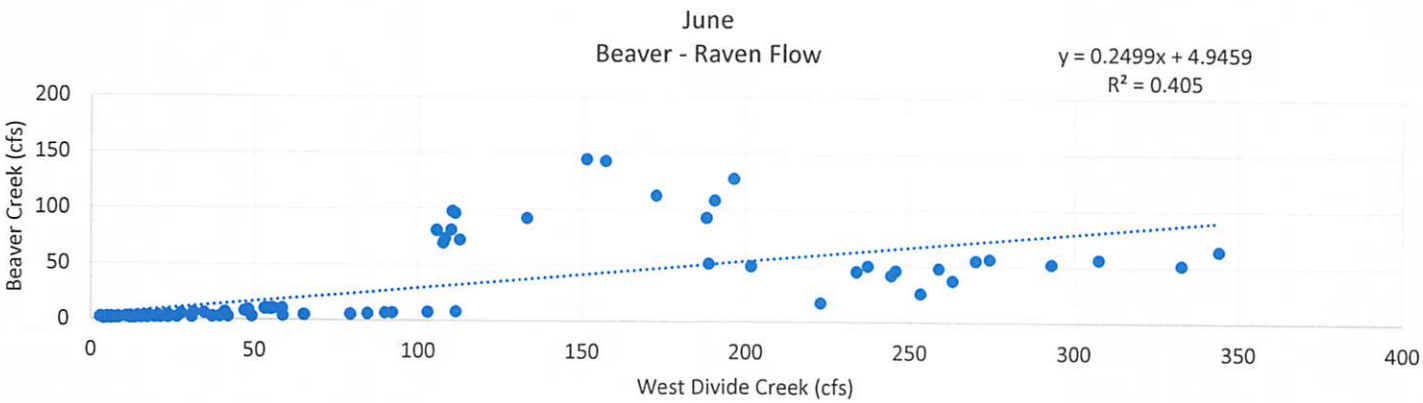


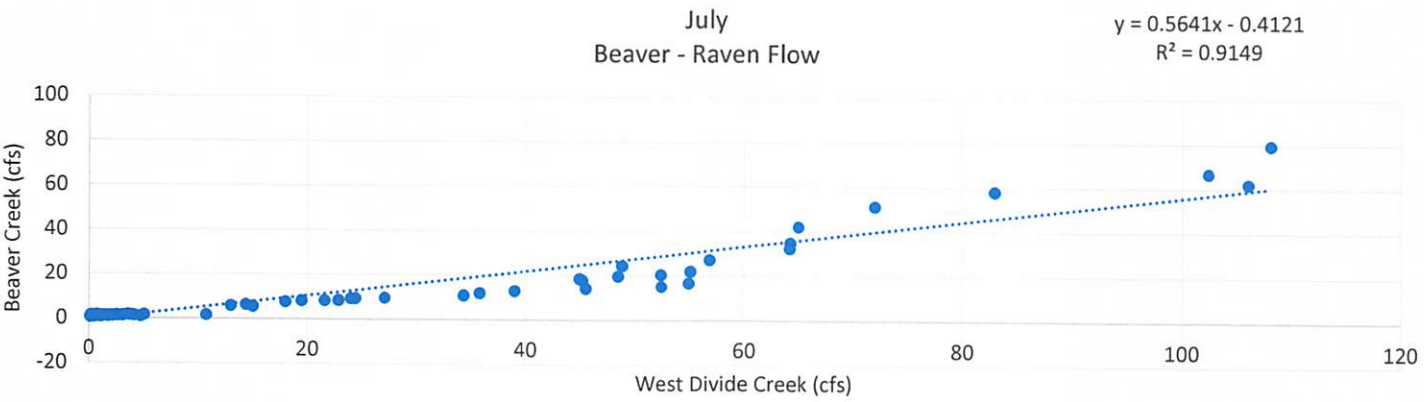




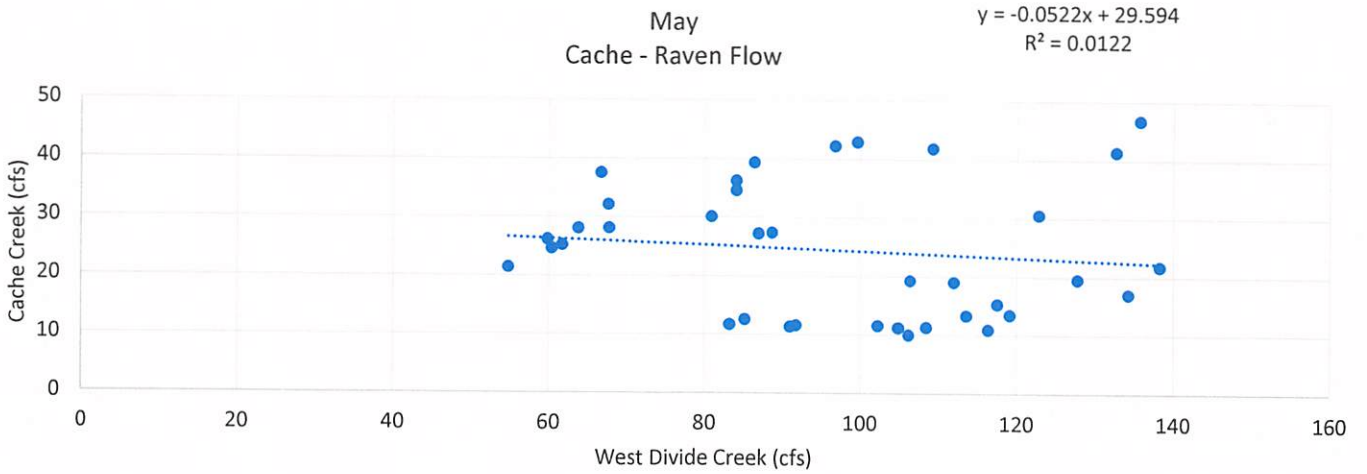
Beaver Creek

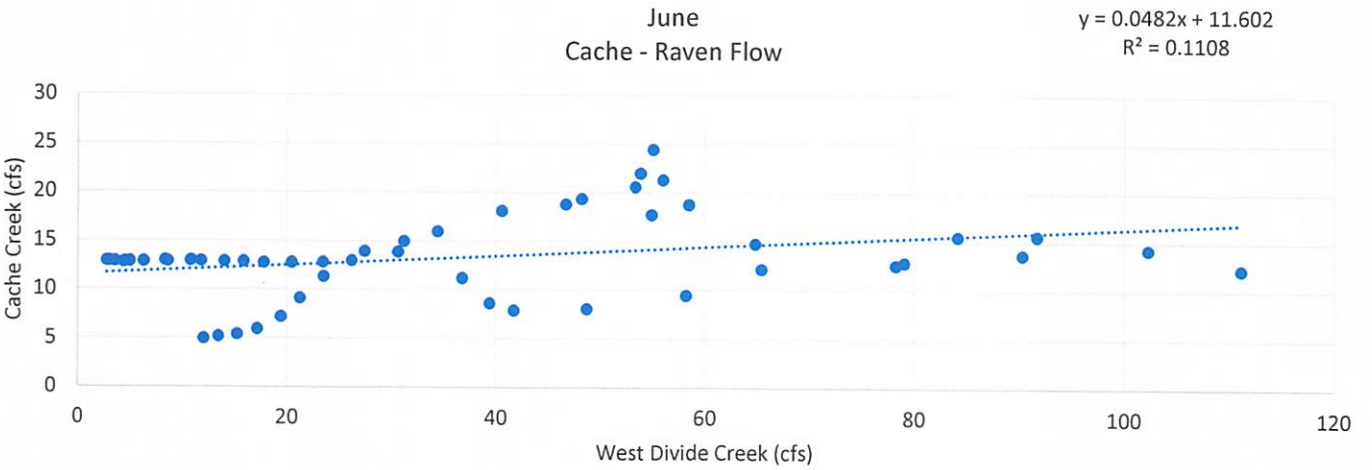


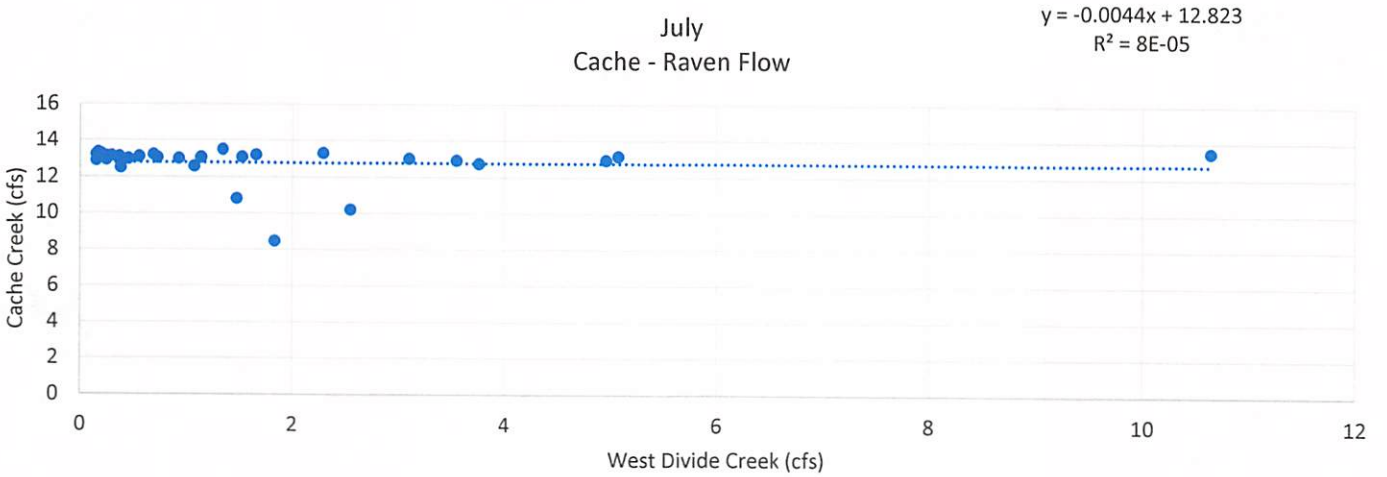




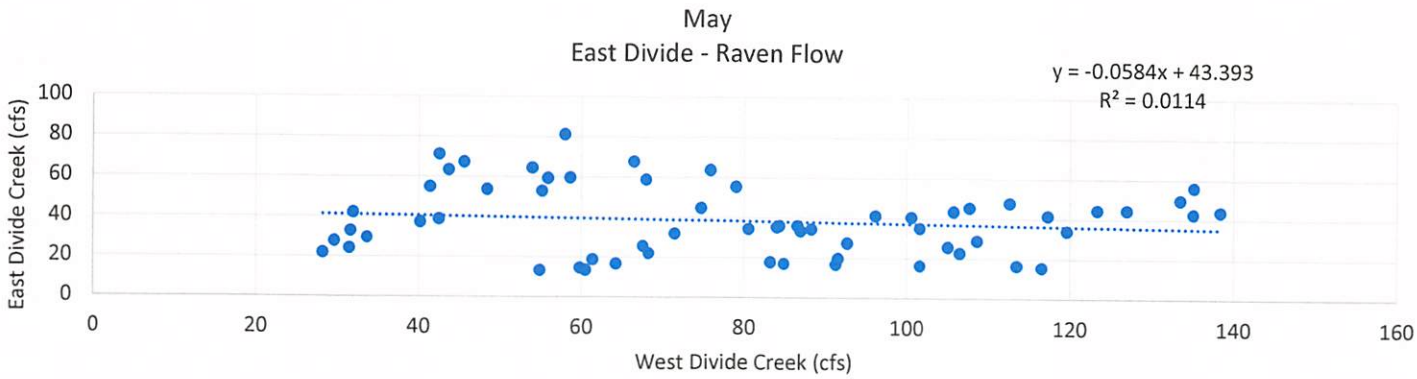
Cache Creek

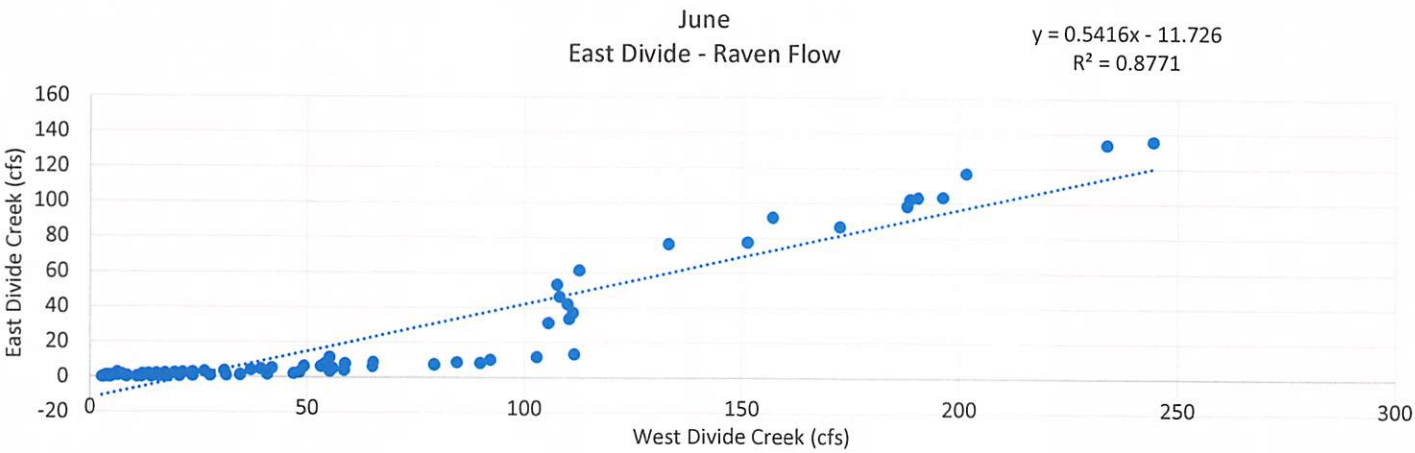

May
Cache - Raven Flow
y = -0.0522x + 29.594
R² = 0.0122
Cache Creek (cfs)
West Divide Creek (cfs)
0
10
20
30
40
50
0
20
40
60
80
100
120
140
160

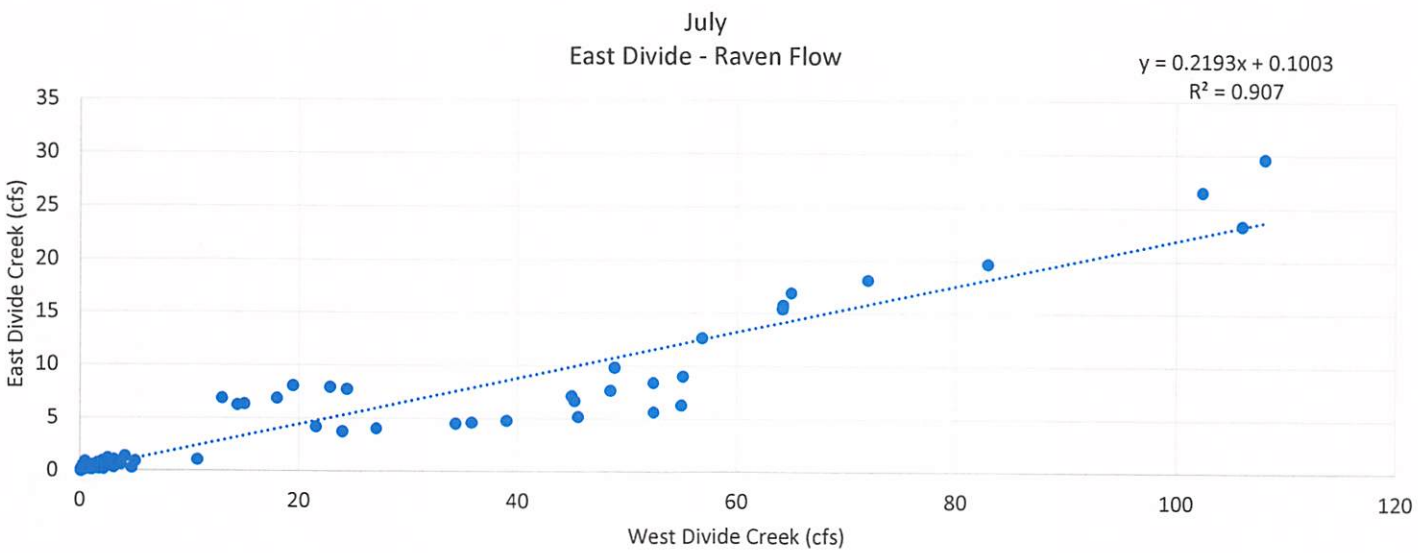

June
Cache - Raven Flow
y = 0.0482x + 11.602
R² = 0.1108
Cache Creek (cfs)
West Divide Creek (cfs)
0
5
10
15
20
25
30
0
20
40
60
80
100
120


July
Cache - Raven Flow
y = -0.0044x + 12.823
R² = 8E-05
Cache Creek (cfs)
West Divide Creek (cfs)
0
2
4
6
8
10
12
14
16
0
2
4
6
8
10
12

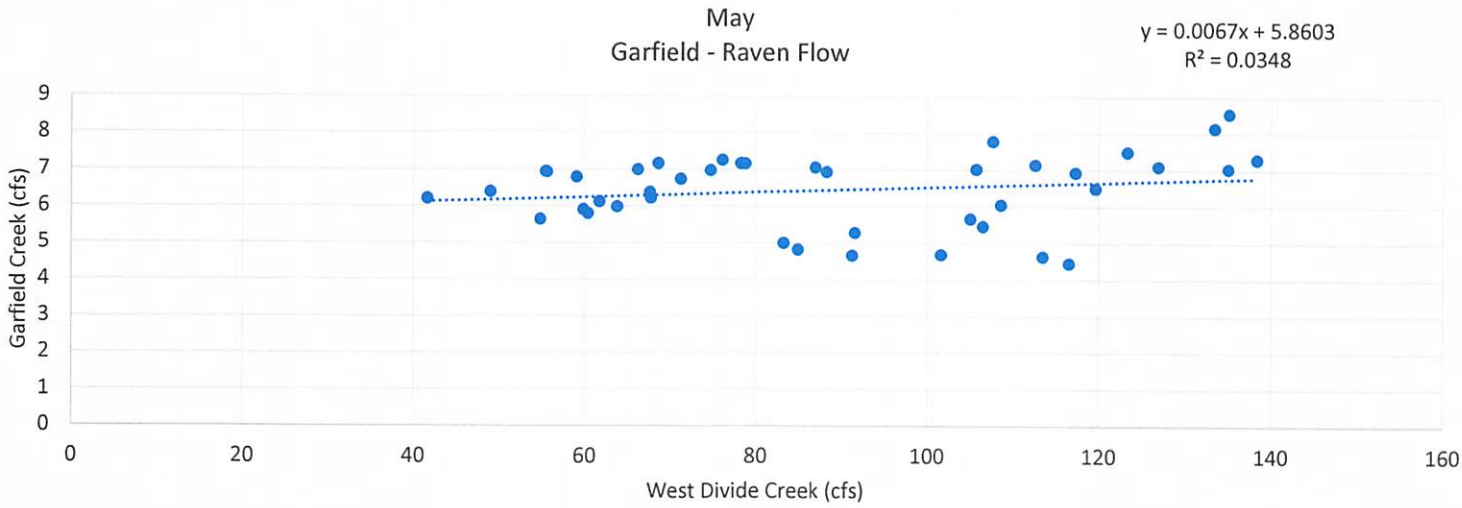
East Divide Creek

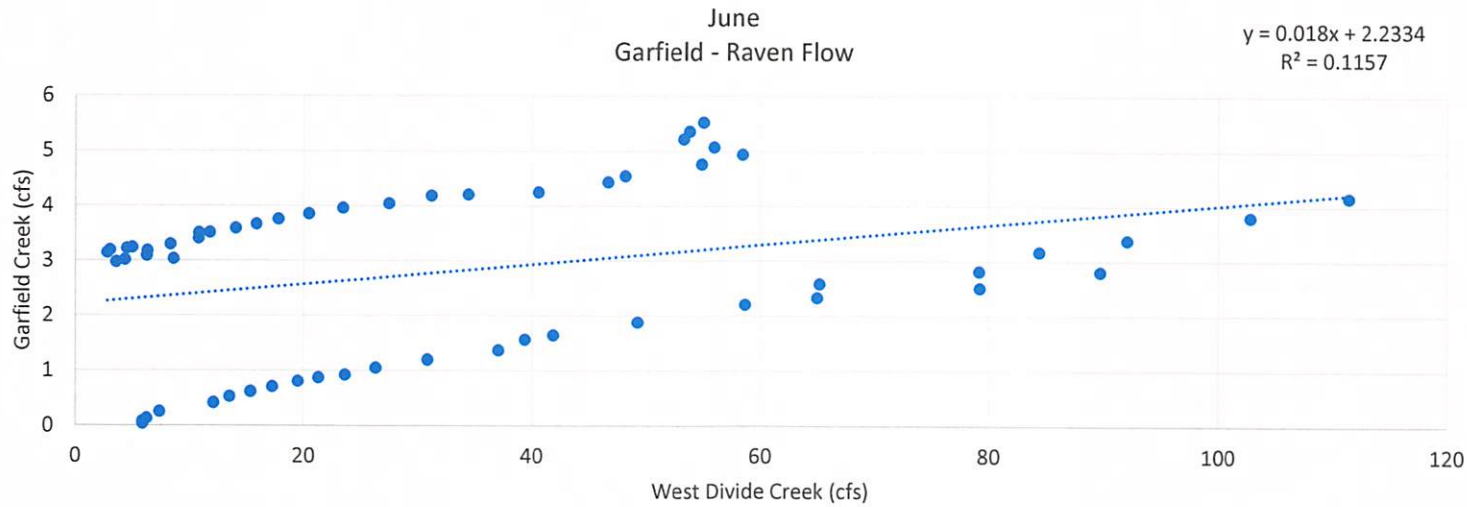


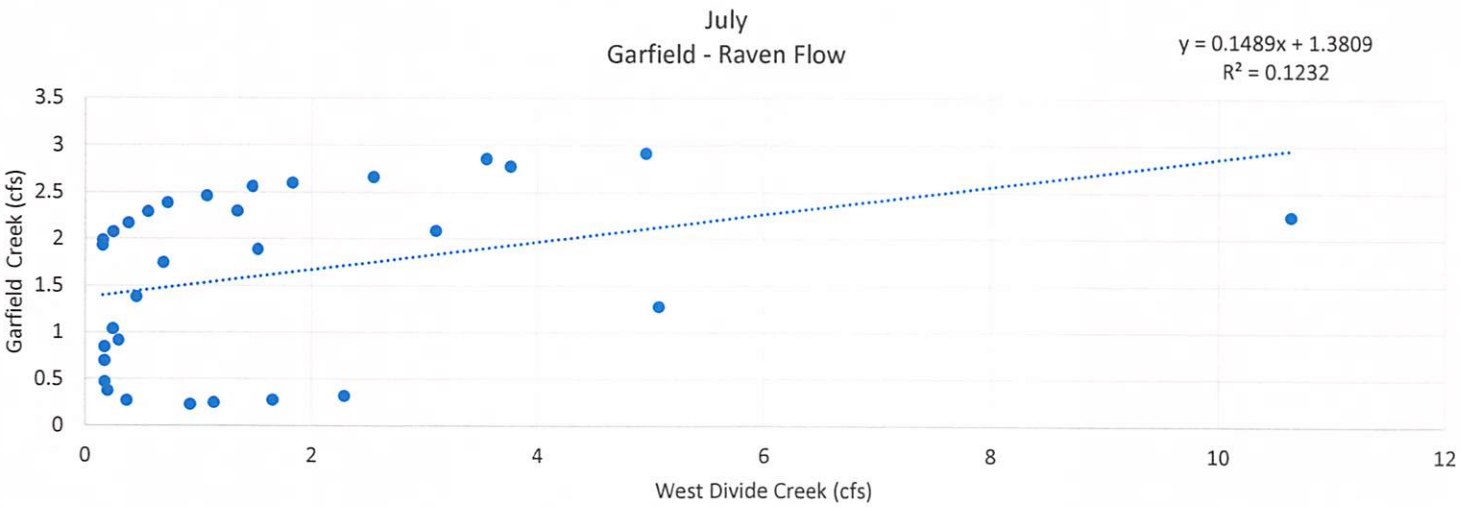




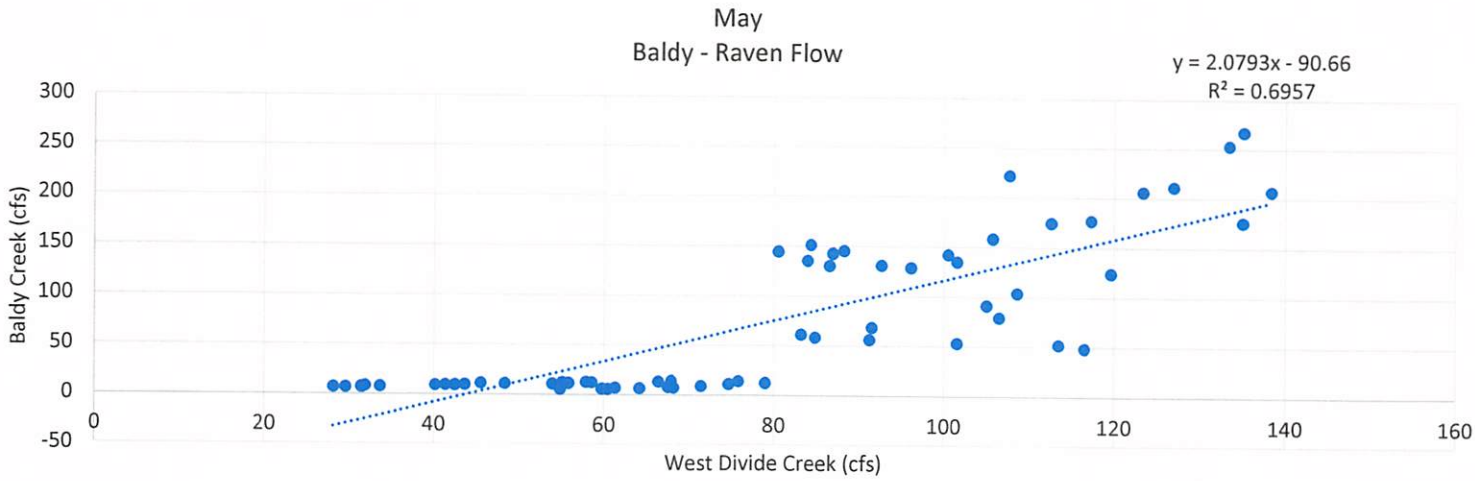
Garfield Creek

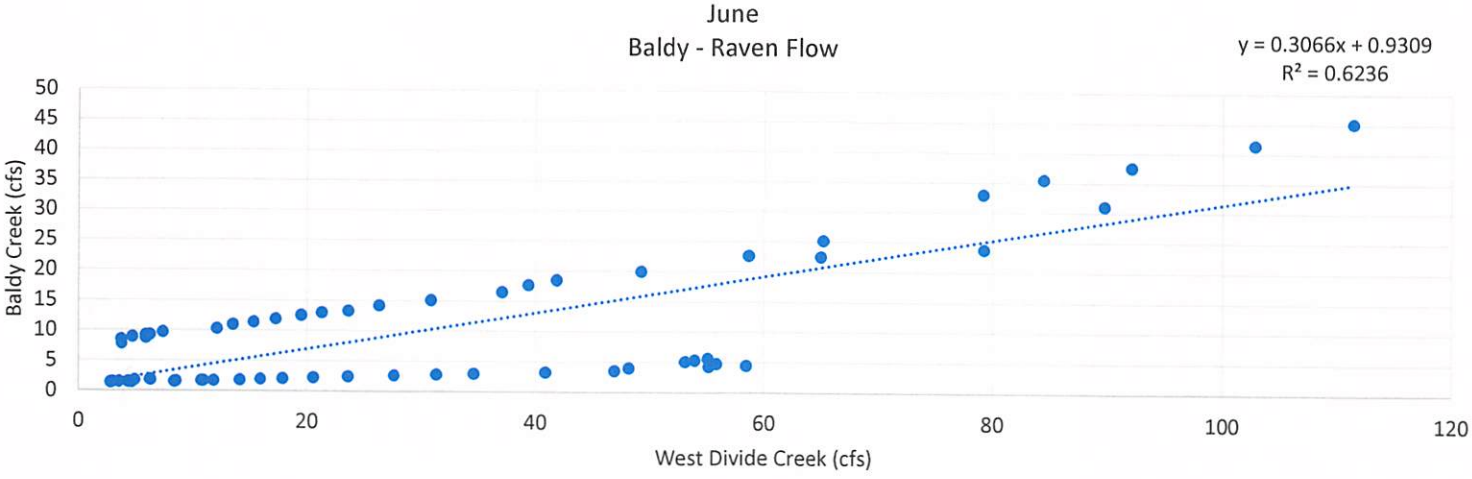


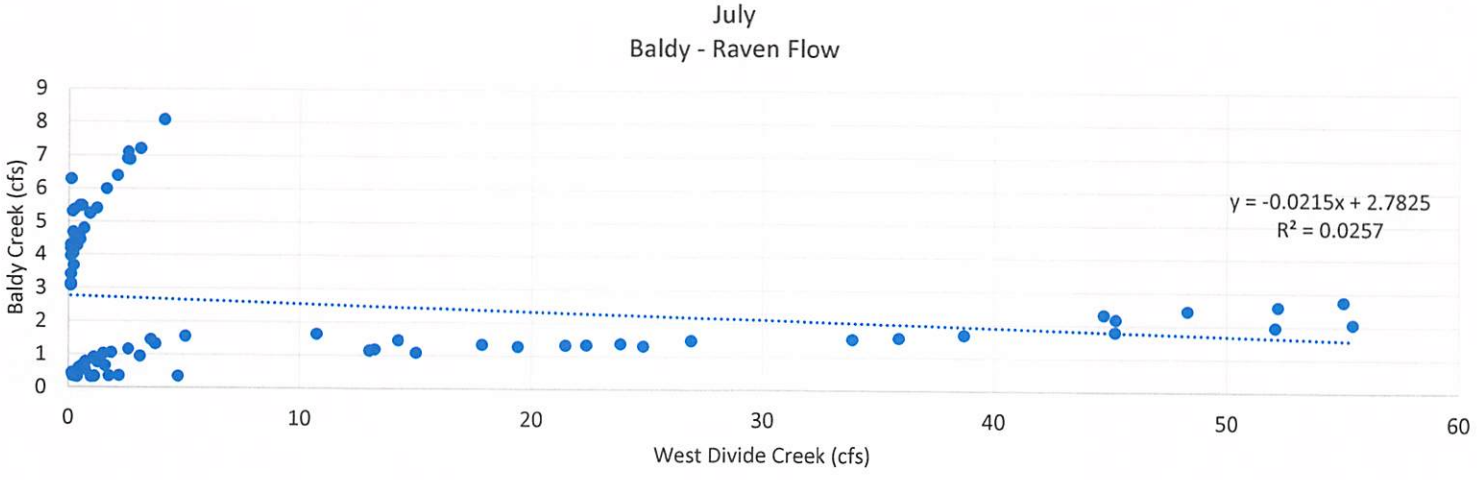




Baldy Creek


May
Baldy - Raven Flow
y = 2.0793x - 90.66
R² = 0.6957
Baldy Creek (cfs)
West Divide Creek (cfs)
300
250
200
150
100
50
0
-50
0
20
40
60
80
100
120
140
160


June
Baldy - Raven Flow
y = 0.3066x + 0.9309
R² = 0.6236
Baldy Creek (cfs)
West Divide Creek (cfs)
50
45
40
35
30
25
20
15
10
5
0
0
20
40
60
80
100
120


July
Baldy - Raven Flow
y = -0.0215x + 2.7825
R² = 0.0257
Baldy Creek (cfs)
West Divide Creek (cfs)
9
8
7
6
5
4
3
2
1
0
0
10
20
30
40
50
60

Appendix C: Water Yield Time Series

Garfield and Baldy Creek Water Right Yields

Available Flow - Diversion Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	56.9	0.0	0.0	0.0	0.0	0.0	56.9
2021	0.0	0.0	258.4	367.7	307.5	0.0	0.0	933.6
2022	0.0	0.0	278.3	0.0	0.0	0.0	0.0	278.3
2023	0.0	0.0	1152.4	0.0	0.0	0.0	0.0	1152.4
Avg	**0.0**	**14.2**	**422.3**	**91.9**	**76.9**	**0.0**	**0.0**	**605.3**

Available Flow - Tabulation Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Avg	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Divide Creek Water Right Yields

Available Flow - Diversion Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	32.7	86.0	248.0	25.5	392.2
2023	7347.9	33897.2	3570.9	12.9	0.0	0.0	0.0	44828.8
Avg	**1837.0**	**8474.3**	**892.7**	**11.4**	**21.5**	**62.0**	**6.4**	**11305.3**

Available Flow - Tabulation Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2023	125.6	12949.9	0.0	0.0	0.0	0.0	0.0	13075.5
Avg	**31.4**	**3237.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**3268.9**

Beaver Creek Water Right Yields

Available Flow - Diversion Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	0.0	0.0	0.0	0.0	2.8	4.1	6.9
2021	13.2	215.3	163.7	4.0	21.0	0.0	0.0	417.2
2022	**NO DATA**							
2023	4.5	58.0	310.5	1020.5	0.0	0.0	0.0	1393.6
Avg	**5.9**	**91.1**	**158.1**	**341.5**	**7.0**	**0.9**	**1.4**	**605.9**

Available Flow - Tabulation Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	**NO DATA**							
2023	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Avg	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Cache Creek Water Right Yields

Available Flow - Diversion Based (AF)

	April	May	June	July	August	September	October	Total
2020	44.4	102.3	330.4	281.9	217.9	262.6	200.3	1440.0
2021	0.0	0.0	76.1	0.0	0.0	0.0	0.0	76.1
2022	2.4	17.4	22.4	0.0	5.8	0.0	0.0	48.0
2023	0.0	20687.3	4704.2	0.0	0.0	0.0	0.0	25391.4
Avg	**11.7**	**5201.7**	**1283.3**	**70.5**	**55.9**	**65.7**	**50.1**	**6738.9**

Available Flow - Tabulation Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2023	0.0	19970.7	3299.0	0.0	0.0	0.0	0.0	23269.7
Avg	**0.0**	**4992.7**	**824.7**	**0.0**	**0.0**	**0.0**	**0.0**	**5817.4**

Battlement Creek Water Right Yields

Available Flow - Diversion Based (AF)

	April	May	June	July	August	September	October	Total
2020	1.5	0.0	0.0	0.0	0.0	0.0	0.0	1.5
2021	16.7	26.8	0.0	1.1	0.0	0.0	0.0	44.6
2022	0.0	49.1	0.0	0.0	0.0	0.0	0.0	49.1
2023	**NO DATA**							
Avg	**6.1**	**25.3**	**0.0**	**0.4**	**0.0**	**0.0**	**0.0**	**31.7**

Available Flow - Tabulation Based (AF)

	April	May	June	July	August	September	October	Total
2020	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2023	**NO DATA**							
Avg	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**