December 1, 2020

Mr. Troy Dumler, Chairman
Mr. Lane Malone, Member
Operations Committee
Arkansas River Compact Administration

Re: Compact Year 2020 Summary
Assistant Operations Secretary Report

Gentlemen,

In this report, I will provide my perspective as Assistant Operations Secretary on operations that have occurred over the past Compact Year (CY), including communications, Kansas delivery, the Pueblo Winter Water Storage Program (PWWSP), pass-thru & status accounting, and the water issues matrix. This year has the added complexity of staff from both Kansas and Colorado ("States") working remotely since March. Some things have gotten easier (e.g. attending and navigating virtual meetings) and some things have been more difficult (e.g. arranging to hold the annual meeting virtually and coordinating needed field inspections in Colorado). It is true things have changed, and hopefully some of the better changes will remain going forward.

Communications

The Operations Secretary, Assistant Operations Secretary, and their respective staffs have set a goal of open and frequent communications regarding Arkansas River operational issues to foster a positive, collaborative, and productive working relationship. We continue to work on achieving this goal. General communications are described below, and some topics will be addressed in more detail later in the report.

The Operations and Assistant Operation Secretaries met on April 24th and November 18th. Staff from the U.S. Army Corps of Engineers ("Corps") and Colorado Parks and Wildlife (CPW) attended both meetings. At the April meeting, various topics were discussed including a

presentation by Steve Kastner about a concept to account for sedimentation in Trinidad Reservoir and discussion of how to safely complete inspections of Colorado dryup during the Covid-19 pandemic. At the time, both States were a month into working remotely. Krystal Brown, USGS, joined the group at the November meeting. That discussion included preparation for the ARCA annual meeting and related committee meetings, Compact Year 2020 (CY2020) operations, and a look forward to CY2021 operations.

The States continue to communicate on a regular basis on a variety of topics including John Martin Accounting System (JMAS) data updates, PWWSP operational issues, Offset Account operations, Kansas release, and runoff conditions within the Arkansas River Basin. Working remotely has both enhanced and been a detriment to the communication between the respective State staff. One issue that might be affected is communication between the States related to the CY2021 PWWSP operations. The States have yet to coordinate on the base flow that is used to establish the Compact's share of water flowing through the Arkansas River at Las Animas USGS gage.

1980 Operating Plan

I want to note another significant milestone that was reached in this past CY. The *Resolution Concerning an Operating Plan for John Martin Reservoir* (1980 Operating Plan) was first adopted April 24, 1980; forty (40) years ago this year. The 1980 Operating Plan was adopted at a time of many water issues were converging along with the States' intent to use the limited surface water supplies more efficiently.

On a related note, the first meeting between the States to negotiate the Compact occurred 75 years ago come January 7, 2021. The Compact was negotiated over 17 documented meetings over the next two years leading to the Compact being signed by those negotiators on December 14, 1948. Reading through the meeting documentation provides a greater appreciation of those negotiators and the breadth of the issues considered as they drafted this Compact.

John Martin Reservoir

Elevation-Area-Capacity Table Implementation (EAC): Previous EAC tables were based on cross-sectional areas which were replicated as closely as was possible with each resurvey. However for the EAC implemented on November 1, 2019, there was 3D rendering of JMR using multi-beam sonar below the water surface and LiDAR above the water surface. The results of the latest survey showed that there was additional storage not documented by previous EACs. One of the benefits of using this method is that we will be able to better define where sedimentation is occurring within JMR.

During CY2019, there were discussions occurring primarily with Trinidad Reservoir account holders on how the new EAC implementation would impact their accounts. With new EACs being implemented on November 1st there were two non-irrigation accounts in Trinidad

Reservoir that were impacted more than the irrigation accounts since they usually held most of Trinidad Reservoir content on that date.

As a result of those concerns, the States developed a method to reallocate the reservoir storage change in John Martin Reservoir based on the end of month (EOM) content averaged for each account over the previous Compact Year. We believe that this is a fairer way to reallocate storage changes in the reservoir. This method was communicated to water users in both States through direct outreach and through meetings held in the Arkansas River Basin during CY2019.

The impact of the new EAC implemented in JMR on November 1, 2019 resulted in a storage gain of 2,676 AF based on the storage elevation of 3817.19 feet. It is anticipated that future surveys will show reductions in storage due to sedimentation. The Operations Secretary Report will provide more detail on this reallocation of storage.

One of the things the States did not do was document how the reallocation spreadsheet was used to reallocate the storage gain or how it would be used with a reduction in storage. This is something that the States should work on over the next CY. Steve Kastner, Purgatoire River Water Conservancy District (PRWCD) is working on a concept that would allocate an estimated amount of sedimentation in anticipation of implementing the next updated EAC for Trinidad Reservoir. Given the specific conditions related to that reservoir it might be appropriate. Kansas is reviewing that concept.

JMR Accounts: The attached Figures 1 and 2 show the daily account balances through the CY. Figure 1 is at the same scale as previously reported for comparison purposes. Figure 2 is provided at a scale that the finer details can be seen. For example, LAWMA's transfer from Section II into the Offset Account can be seen on June 30th.

Kansas Delivery

Kansas began the irrigation season on April 1st with approximately 2,618 AF in its Section II account and ended the season on October 31st with an empty account. Kansas made one release that continued to the exhaustion of both the Kansas Section II and Offset Accounts.

A 400 cfs Kansas release was started on June 8th consisting of a concurrent release from the Kansas Section II (300 cfs) and Offset (100 cfs) Accounts. Releases from both accounts continued uninterrupted until July 5th when the Kansas Section II Account was exhausted. A 400 cfs release continued from the Offset Account until that account was effectively exhausted on July 21st. A graphic of this release is shown in Figure 3 attached.

We appreciate the efforts of both Colorado Division 2 and LAWMA related to LAWMA's timely deliveries to the Offset Account which extended the Kansas release. The Kansas Section II release lasted approximately 27 days and the Offset Account lasted approximately 43 days. The release spreadsheet was reviewed and accepted by the States to arrive at the final delivery numbers shown in the table below.

Kansas II & Offset Account Release (6/8-7/21/2020)	
Kansas Section II Account release	15,934 AF
ESF Delivery Efficiency	90.5%
Section II Delivery	14,428 AF
Section II Delivery Transit Loss	1,506 AF
Offset Account released	
- consumable	14,771 AF
- nonconsumable	3,549 AF
Offset Account delivery efficiency	76.35%
Offset net delivery	13,987 AF
Offset consumable delivery	11,278 AF

Pueblo Winter Water Storage Program

As noted in past reports, the States have committed to continue to work on this issue and build upon the work that has already been done. PWWSP issues have held up approval of the Operations Secretary's annual reports since 2007. Although Operations Secretary Bill Tyner (CO) and I agreed to exchange work product in CY2020, other priorities prevented that from occurring. PWWSP remains a topic of discussion and we still intend to provide each State's work product to advance this discussion. Additionally, both States have collectively worked on guidelines on how the river flow at the Arkansas River at Las Animas gage should be split between PWWSP and Compact conservation storage.

Colorado and Kansas have tried to visit the Consolidated Ditch to review if water was being returned to either the Purgatoire River above the Purgatoire River near Las Animas USGS gage or at the tail end of the ditch in the days before November 14th each year. These locations return water to the Arkansas River below the Arkansas River at Las Animas gage. The Consolidated Ditch did not divert in November 2019 so there was no concern with water being diverted around the Arkansas River at Las Animas gage.

As mentioned last year, the Fort Lyon Canal sluiced/sanded their headgate area between November 11th and 15th. During the November 1st to 14th period a baseflow is determined that subsequently is used to calculate the amount of Compact conservation storage water passing through the Arkansas River at Las Animas gage. With the Fort Lyon sluicing, the flows for Arkansas River at Las Animas gage were impacted on November 12th, 13th, and 14th such that the determination of the base flow excluded those days after discussion between States. The higher flows on these days were stored in John Martin Reservoir under Amity's Section III as water that could have otherwise been stored in the Great Plains Reservoirs. John Van Oort did communicate to me (email dated October 30th) that the 35% storage charge was not made against this water. We agreed that the water that should have been charged in November 2019 will be transferred to the appropriate accounts after end of the CY2021 PWWSP period.

CY2021 PWWSP: For the current CY, flows at the Purgatoire River near Las Animas were noticeable increased starting late day on November 8th and remained above the base Purgatoire River flows until late day on November 12th. The Consolidated Ditch was visited by Lonnie Spady, Division 2, and he found issues with weeds were preventing the Consolidated from getting surface water to lands east of the Purgatoire River. Mr. Spady reported that the Consolidated tried dumping the weeds to the Purgatoire River which can be seen by the initial spike in flow in Figure 4 below. The Consolidated Ditch continued to run water into the Purgatoire River. I have expressed my concern about this water being taken out of the Arkansas River at Las Animas flows and will continue to work with Division 2 on this issue. Mr. Spady also reported that the seep ditch and tail end of the Consolidated ditches had very little water returning to the Arkansas River. He reported his findings during the November 20, 2020 meeting between the OS and AOS and in an email exchange earlier in November.

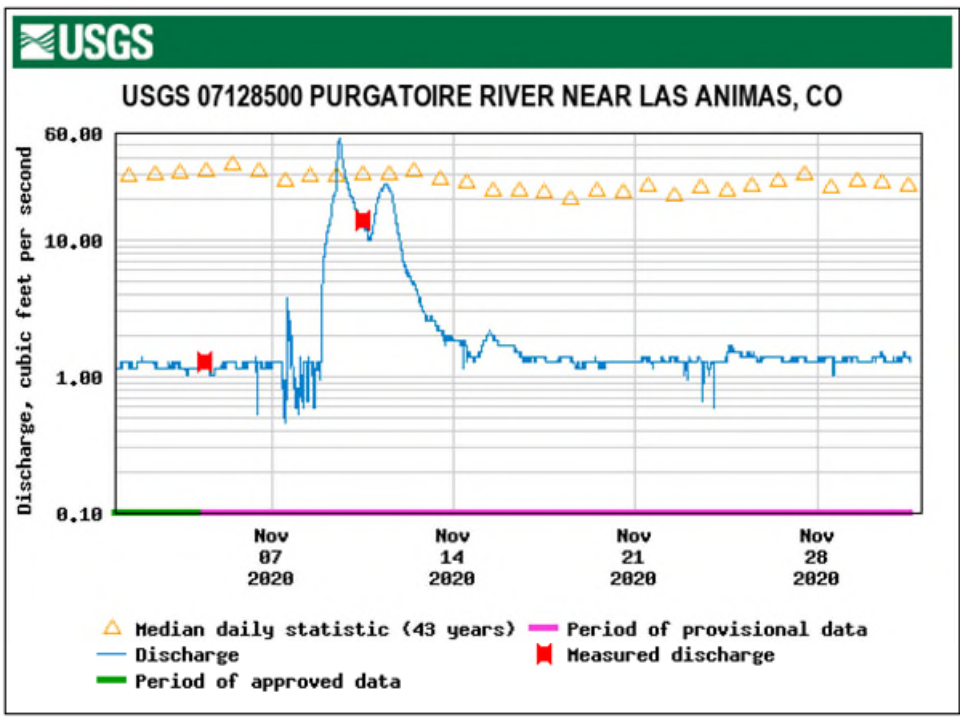

Figure 4 November 1st through November 31st flows for Purgatoire near Las Animas (graphic from USGS website from 12/1/2010)

Pass-thru and Status Accounting

A spreadsheet is used to track: river flows; JMAS (John Martin Accounting System) inflows and releases; and Corps JMR evaporation, storage, & releases. The spreadsheet calculates: (a) gaged and ungaged inflows, (b) pass-thru, and (c) the reservoir "status." The pass-thru represents that amount of JMR inflows which are not stored in any account and are released downstream. The reservoir "status" represents the difference between the amount considered

stored in JMAS and the Corps JMR content. This spreadsheet was updated by Garden City Field Office staff and was provided to the OS on November 15th for inclusion in the Operations Secretary's report. When reviewing this spreadsheet, I noticed an unusual circumstance of having a "status" account balance while there was Compact conservation storage. Usually, Compact conservation storage takes any adjustments to balance the reservoir to the Corps content. I will take a closer look at this period later.

ARCA Special Engineering Committee

Both States were active in the Special Engineering Committee (SEC) over the past Compact Year. Several meetings were held with the primary focus on the proposed Colorado multi-purpose account. As proposed, there are multiple sources and purposes for various entities in Colorado that would like to utilize such an account, if approved. The States have narrowed the sources and are exploring a possible pilot project. There are other SEC work tasks, including flood spill issues and PWWSP that remain priorities for SEC but we took this year to focus on the proposed pilot project.

Water Issues Matrix

As previously reported, this matrix is a joint work product of the States which is designed to track various disputed issues. These disputed issues are primarily concerned with JMR related operations and accounting, of which approximately half have been resolved. An updated Water Issues Matrix was not produced for this report.

Summary

This past Compact Year has offered its challenges. Communication between the States has been valuable to work through issues that arose and to continue to work on those long-standing issues. Communication was also essential when dealing with our federal partners with flow measurements along the Arkansas River and other issues. I look forward to working with the Operations Secretary and others on the issues before us in this upcoming year.

Sincerely,

Kevin L. Salter, P.E.
Assistant Operations Secretary

Figure 1 Graphical representation of JMR Accounts over CY2020 showing top of conservation storage

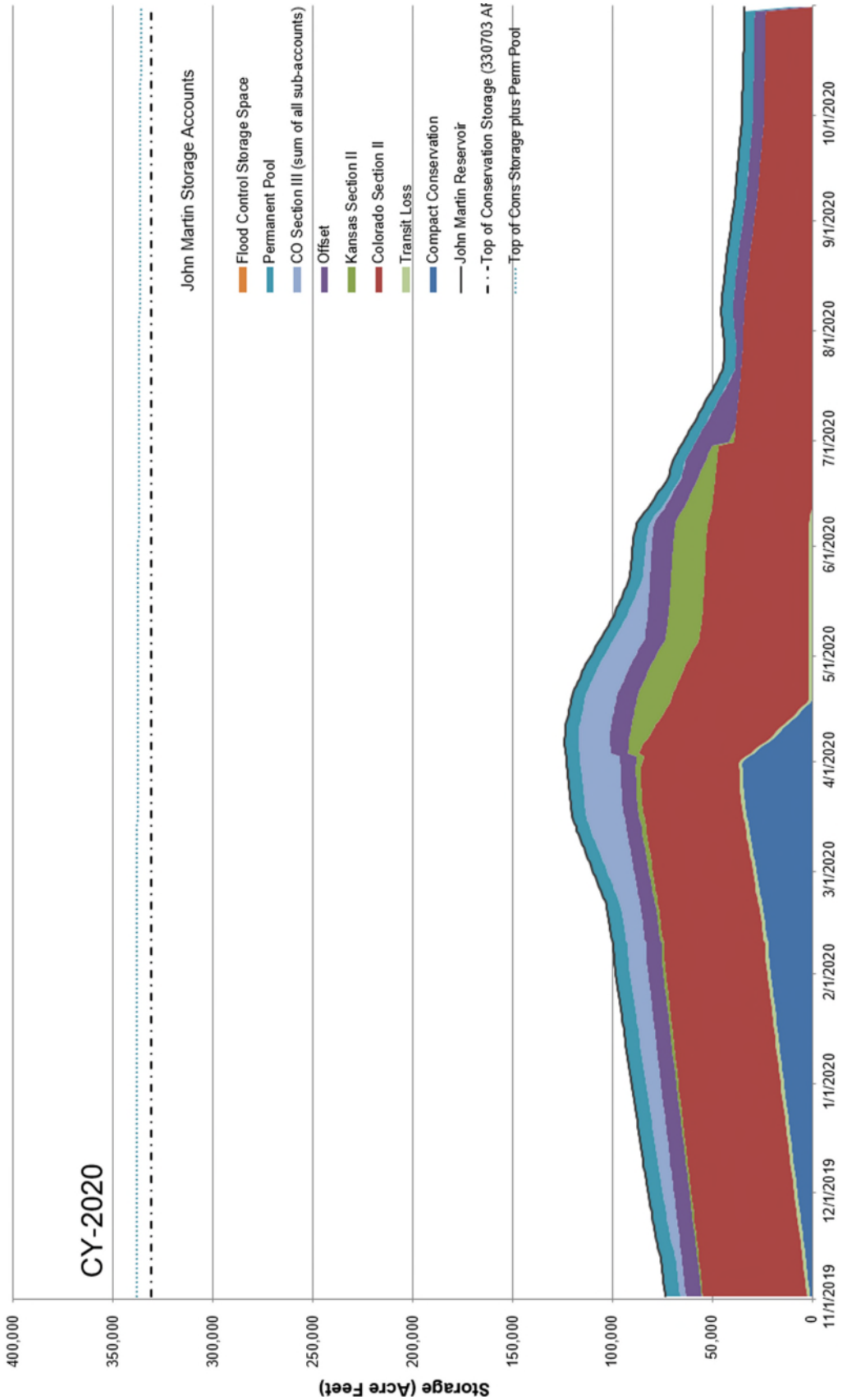

Figure 2 Graphical representation of John Martin Accounts over CY2020

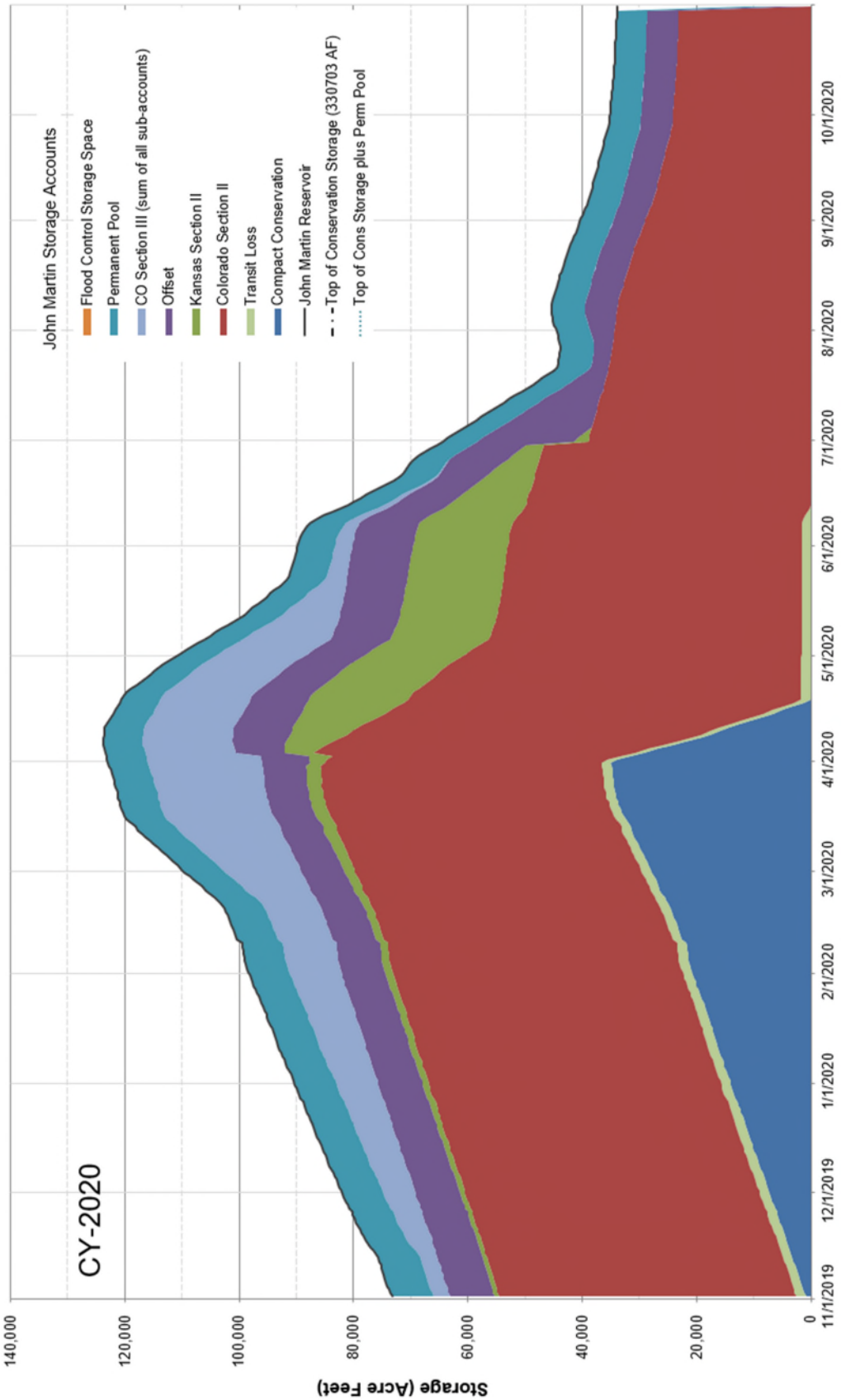

Figure 3 Hydrograph of the Kansas CY2020 Release at the Stateline