

**PURGATOIRE RIVER WATER CONSERVANCY DISTRICT**

**ARKANSAS RIVER COMPACT ADMINISTRATION – ENGINEERING COMMITTEE**

**MEETING PRESENTATION – 12-8-2020**

**TRINIDAD RESERVOIR SEDIMENTATION MODELING UPDATE**

Content adjustments to Trinidad Reservoir account balances following Corps of Engineers periodic elevation capacity surveys of the reservoir have been debated in the past.

The Division Engineer's Office and the Corps of Engineers have both previously provided the opinion that the PRWCD has authority to dictate resulting reservoir entity account adjustments. The Bureau of Reclamation has previously expressed the opinion that reservoir sedimentation adjustments were anticipated to be limited to the Joint-Use Pool.

It has been proposed that In order to lessen the immediate magnitude of these periodic sedimentation account adjustments due to updated elevation-capacity surveys, more frequent adjustments or allocations be made by accounting for estimated on-going reservoir sedimentation.

At the 2019 Trinidad Project Operating Principles Annual Review meeting and at the 2019 Arkansas River Compact Administration Operations Committee meeting the PRWCD presented the following concept.

- The average annual sedimentation rate for Trinidad Reservoir has been 164 acre-feet (COE).
- Daily reservoir inflows (either PURMADCO or COE calculated) would be the basis for calculating a daily sediment volume.
- Reservoir inflow coefficients were developed based upon the sedimentation rate of 164 acre-feet/year and average daily PURMADCO inflows (1971-2019). The following coefficients provided for an annual sedimentation volume of 164 acre-feet.

PURMADCO Sedimentation Coefficients (10/2019)			
Lower Limit	Upper Limit	Sedimentation Rate	
(cfs)	(cfs)	(cfs)	(af/day)
0	25	0.0	0
26	80	0.1	0.20
81	∞	0.57	1.13

- The daily sediment volume would be accounted for by the DEO in its daily reservoir accounting based upon daily inflow volumes.
- Reservoir inflows not allocated as sedimentation would be either passed through the reservoir or stored as appropriate.
- Reconciliation of reservoir accounting and water entitlements was proposed for any differences between calculated sediment volumes and actual surveyed sediment volumes when new surveys became available.

At the April 24, 2020 Arkansas River Compact Administration – Special Operations Committee meeting, the PRWCD presented the following modified concept.

- Modified reservoir inflow coefficients were developed based upon the sedimentation rate of 164 acre-feet/year and average daily PURMADCO inflows (1971-2019). Based upon these average daily PURMADCO inflows, these coefficients again provided for an annual sedimentation volume of 164 acre-feet.

PURMADCO Sedimentation Coefficients (4/2020)			
Lower Limit	Upper Limit	Sedimentation Rate	
(cfs)		(cfs)	(af/day)
0	25	0.0	0
26	83	0.1	0.20
83	150	0.3	0.60
151	∞	1.0	1.98

- Request was made at this meeting to review the accuracy of these coefficients over actual daily inflows and over actual COE elevation capacity surveys.

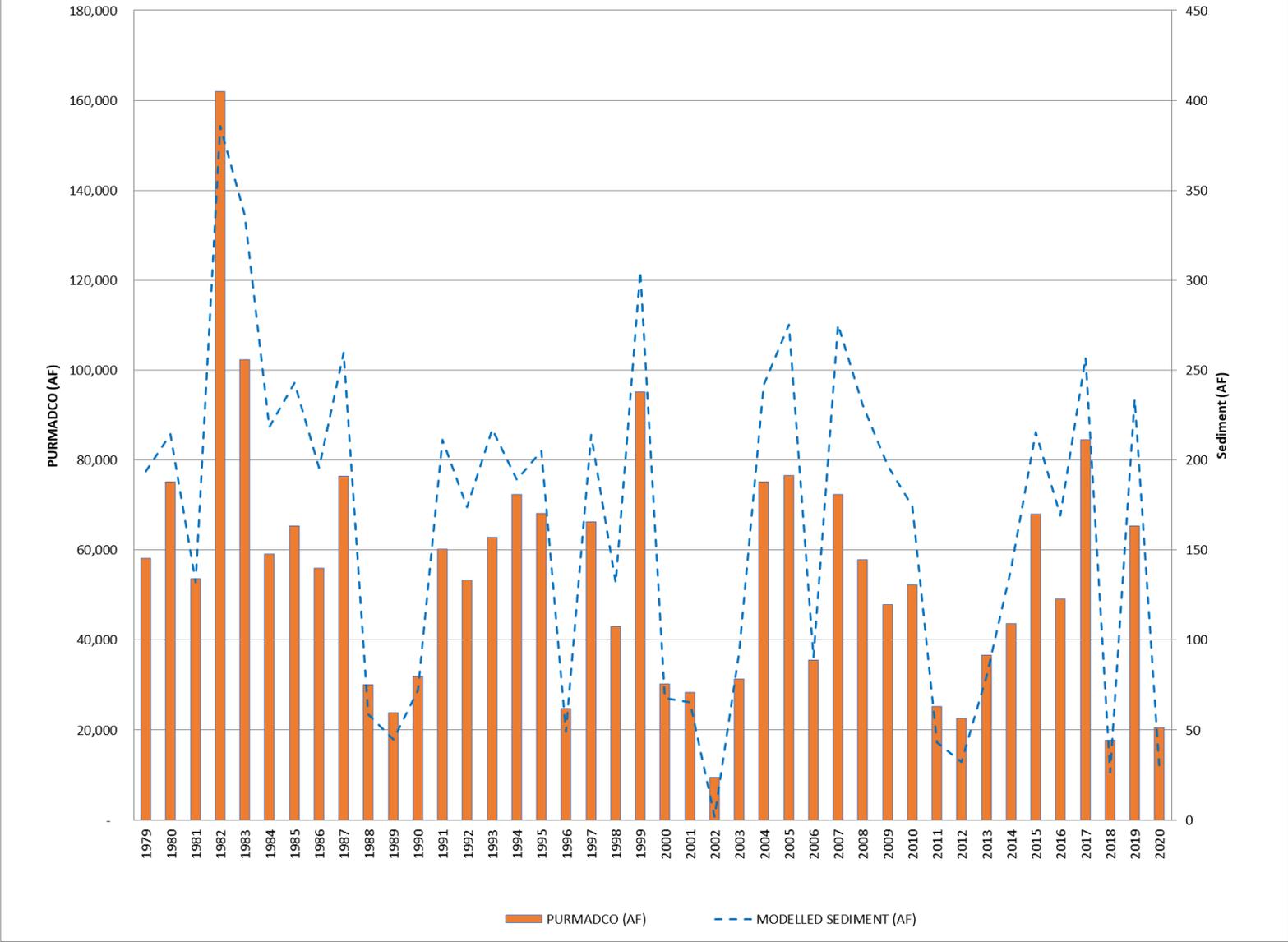
Trinidad Project Operating Principles Annual Review Meeting 2020 and the 2020 Arkansas River Compact Administration Engineering Committee meeting. The following modified concept is presented.

- It was determined that the individual COE elevation capacity reservoir surveys would not provide accurate enough information.
- The most recent COE survey conducted in 2018. This survey was likely more accurate than previous surveys having used recent technology. A longer calibration period was sought than the immediately prior survey.
- It was determined to utilize the total sedimentation volume determined to have occurred by the COE between 1979 and 2018 of 6,733 acre-feet as a targeted model amount for the same period as opposed to sedimentation per individual COE survey.
- Actual daily inflows (not long term average daily inflows as used previously) (PURMADCO) were utilized for this 1979-2018 period.
- The following reservoir inflow coefficients were derived based upon these actual daily flow values to obtain the targeted 6,733 acre-feet of total sedimentation volume over the 1979-2018 period.

PURMADCO Sedimentation Coefficients (10/2020)			
Lower Limit	Upper Limit	Sedimentation Rate	
(cfs)	(cfs)	(cfs)	(af/day)
0	25	0.0	0
26	83	0.1	0.20
83	150	0.3	0.60
151	∞	1.22	2.42

- The following graph provides visualization of the results on an annual frequency for the 1979-2018 study period (with non-calibration years 2019 & 2020 additionally added).

### TRINIDAD RESERVOIR MODELED SEDIMENTATION



- The sooner implementation begins within the current intra-elevation-capacity survey period (2019-?), the easier to ultimately assess the usefulness and accuracy of the proposed sedimentation accounting.
- Prerequisite for implementation, (1) concurrence by the stakeholder parties and (2) agreement between the PRWCD and the City on Trinidad and the Colorado Parks & Wildlife regarding ongoing overall Trinidad Reservoir discussions required.