

PECOS RIVER COMPACT

Report of the River Master

Water Year 2023

Accounting Year 2024

Final Report

**Neil S. Grigg
River Master of the Pecos River
905 Edwards Street
Fort Collins, Colorado 80524**

CONTENTS

Map of Pecos River Basin Showing Accounting Reaches

Purpose of the Report and Statement of Shortfall or Overage

Table of Annual and Accumulated Overage or Shortfall

Table 1. General Calculation of Annual Departures, T.A.F. (B.1.a.- d.)

Table 2. Flood Inflows, Alamogordo Dam to Artesia (B.3)

Table 3. Flood Inflows, Artesia to Carlsbad (B.4)

Table 4. Flood Inflows, Carlsbad - State Line (B.5.c)

Table 5. Depletion Due to Irrigation above Alamogordo Dam (C.1.a)

Table 6. Depletion Due to Santa Rosa Reservoir Operations (C.1.b)

Table 7. Carlsbad Springs New Water (B.4.c)

Table 8. Carlsbad Main Canal Seepage Lagged (B.4.c.(1)(e))

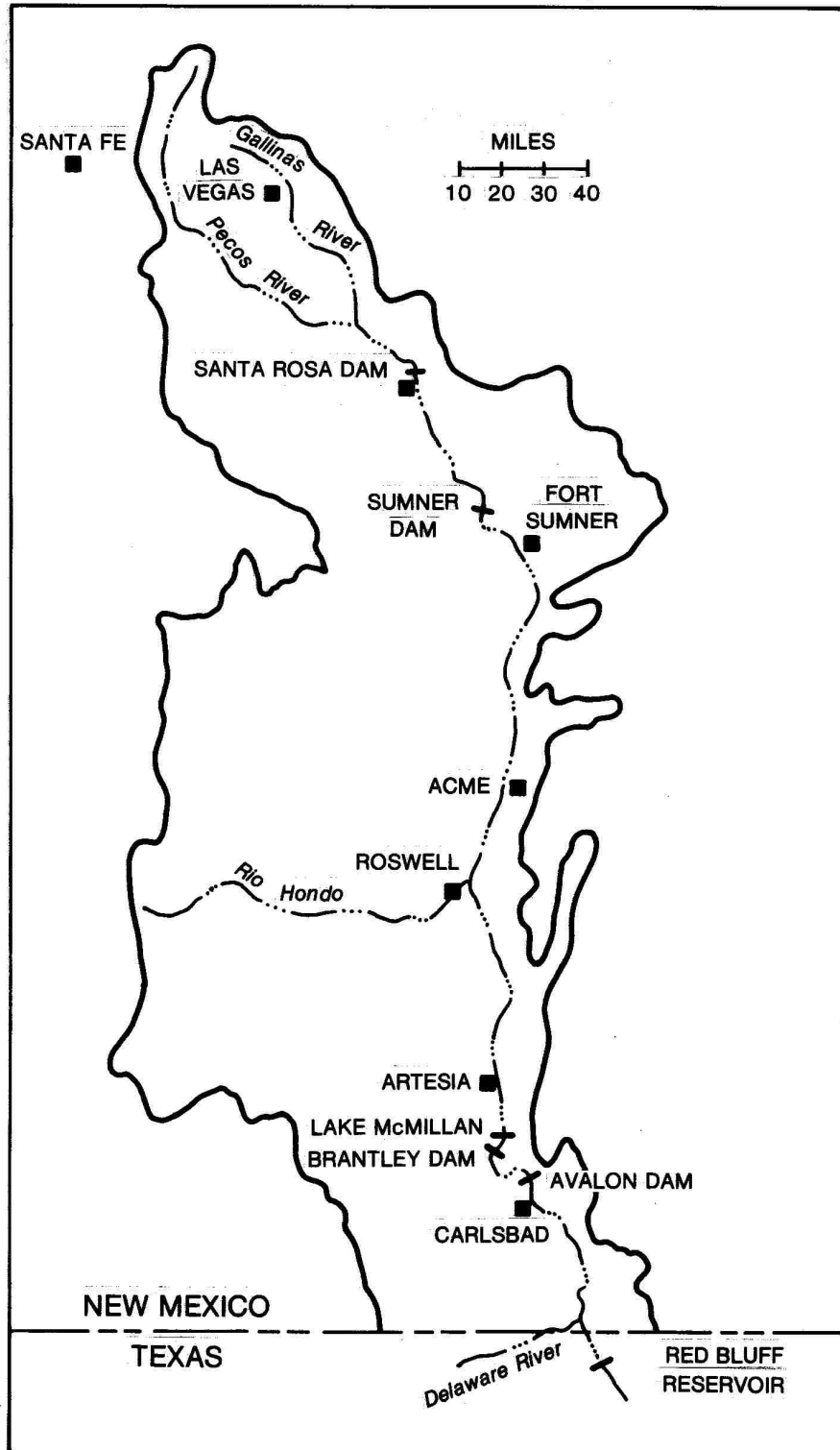
Table 9. Lake Avalon Leakage Lagged (B.4.c.(1)(g))

Table 10. Evaporation Loss at Lake Avalon (B.4.f)

Table 11. Change in Storage, Lake Avalon (B.4.g)

Table 12. Data Required for River Master Manual Calculations

Appendix: Response to States' Objections



Map of Pecos River Basin Showing Accounting Reaches

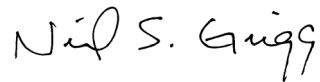
PECOS RIVER COMPACT
Supreme Court of the United States
No. 65, Original
Amended Decree

Final Report of the River Master
Water Year 2022 - Accounting Year 2023
June 22, 2024

Purpose of the Report. In its Amended Decree issued March 28, 1988 the Supreme Court of the United States appointed a River Master of the Pecos River and directed him to "... Deliver to the parties a Preliminary Report setting forth the tentative results of the calculations required by Section III.B.1 of this Decree by May 15 of the accounting year..." and to consider "... any written objections to the Preliminary Report submitted by the parties prior to June 15 of the accounting year..." and to deliver "... to the parties a Final Report setting forth the final results of the calculations required by Section III.B.1 of this Decree by July 1 of the accounting year." This is the required Final Report with the determination of:

- a. The Article III(a) obligation;
- b. Any shortfall or overage, which calculation shall disregard deliveries of water pursuant to an Approved Plan;
- c. The net shortfall, if any, after subtracting any overages accumulated in previous years, beginning with water year 1987.

Result of Calculations and Statement of Shortfall or Overage. The results of the calculations in this Final Report show that New Mexico's delivery in Water Year 2023 was a shortfall of 8,400 acre-feet. The accumulated overage since the beginning of Water Year 1987 is 148,200 acre-feet.



Neil S. Grigg
River Master of the Pecos River

Pecos River Compact		
Accumulated Shortfall or Overage		
	June 22, 2024	
Water Year	Annual Overage or Shortfall, AF	Accumulated Overage or Shortfall, AF
1987	15,400	15,400
1988	23,600	39,000
1989	2,700	41,700
1990	-14,100	27,600
1991	-16,500	11,100
1992	10,900	22,000
1993	6,600	28,600
1994	5,900	34,500
1995	-14,100	20,400
1996	-6,700	13,700
1997	6,100	19,800
1998	1,700	21,500
1999	1,400	22,900
2000	-12,300	10,600
2001	-700	9,900
2002	-3,000	6,900
2003	2,000	8,900
2004	8,300	17,200
2005	24,000	41,200
2006	26,100	67,300
2007	25,200	92,500
2008	6,000	98,500
2009	1,600	100,100
2010	-500	99,600
2011	500	100,100
2012	1,900	102,000
2013	-6,300	95,700
2014	700	96,400
2015	27,300	123,700
2016	27,200	150,900
2017	19,900	170,800
2018	5,300	176,100
2019	-9,800	166,300
2020	-4,700	161,600
2021	-4,400	157,200
2022	-600	156,600
2023	-8,400	148,200

Table 1. General Calculation of Annual Departures in TAF (B.1)			
Water Year	2023		
6/22/2024			
	WY 2021	WY 2022	WY 2023
B.1.a. Index Inflows			
(1) Annual flood inflow			
(a) Gaged flow Pecos R bel Alamogordo Dam	53.1	78.5	122.7
(b) Flood Inflow Alamogordo - Artesia (Table 2)	45.7	22.1	-6.4
(c) Flood Inflow Artesia - Carlsbad (Table 3)	45.0	15.4	10.5
(d) Flood Inflow Carlsbad - State Line (Table 4)	29.7	3.2	3.8
Total (annual flood inflow)	173.5	119.2	130.6
(2) Index Inflow (3-year avg)			141.1
B.1.b. 1947 Condition Delivery Obligation (Index Outflow)			56.1
B.1.c. Average Historical (Gaged) Outflow			
(1) Annual historical outflow			
(a) Gaged Flow Pecos River at Red Bluff NM	65.2	33.2	33.7
(b) Gaged Flow Delaware River nr Red Bluff NM	10.8	1.6	1.2
(c) Metered diversions Permit 3254 into C-2713	0.4	0.5	0.5
Total Annual Historical Outflow	76.4	35.3	35.4
(2) Average Historical Outflow (3-yr average)			49.0
B.1.d. Annual Departure			-7.1
C. Adjustments to Computed Departure			
1. Adjustments for Depletions above Alam Dam			
a. Depletions Due to Irrigation (Table 5)	-0.4	1.3	3.3
b. Depl fr Operation of Santa Rosa Reservoir (Table 6)	1.9	2.8	3.1
c. Transfer of Water Use to Upstream of AD	0	0	0
Recomputed Index Inflows			
(1) Annual flood inflow			
(a) Gaged flow Pecos R bel Alamogordo Dam	54.6	82.6	129.1
(b) Flood Inflow Alamogordo - Artesia	45.7	22.1	-6.4
(c) Flood Inflow Artesia - Carlsbad	45.0	15.4	10.5
(d) Flood Inflow Carlsbad - State Line	29.7	3.2	3.8
Total (annual flood inflow)	175.0	123.3	137.0
Recomputed Index Inflow (3-year avg)			145.1
Recomputed 1947 Condition Del Outflow (Index Outflow)			58.4
Recomputed Annual Departures			-9.4
Credits to New Mexico			
C.2 Depletions Due to McMillan Dike			1.0
C.3 Salvage Water Analysis			0
C.4 Unappropriated Flood Waters			0
C.5 Texas Water Stored in NM Reservoirs			0
C.6 Beneficial C.U. Delaware River Water			0
Final Calculated Departure, TAF			-8.4

Table 3. Determination of Flood Inflows, Artesia to Carlsbad (B.4)													
Water Year	2023												
6/20/2024													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
Rio Penasco at Dayton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fourmile Draw nr Lakew	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
South Seven Rivers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rocky Arroyo at Hwy Br	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Flood Inflow, Art-DS3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Pecos R at Dam Site 3	0.1	0.1	3.9	10.5	8.2	10.5	13.1	10.6	9.3	8.7	1.0	1.1	77.2
CB Sprgs New Water (from Table 7)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	9.6
Total Inflow, DS3 - CB	0.9	0.9	4.7	11.3	9.0	11.3	13.9	11.4	10.1	9.5	1.8	1.9	86.8
Evap Loss, Lake Avalon (from Table 10)	0.0	0.0	0.0	0.5	0.4	0.6	0.7	0.5	0.4	0.1	0.2	0.2	3.5
Storage Chg, Lake Avalon (from Table 11)	0.0	0.0	1.1	0.3	-0.5	0.1	0.7	-0.5	0.2	-0.4	0.4	0.4	1.8
Carls ID diversions	0.0	0.0	2.2	10.2	8.9	10.2	13.8	10.0	6.9	9.9	0.0	0.0	72.0
93% CID diver	0.0	0.0	2.0	9.4	8.2	9.5	12.8	9.3	6.4	9.2	0.0	0.0	66.9
Other depletions	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	1.4
Dark Canyon at Carlsbad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	1.1
Pecos b Dark Canyon	1.7	1.2	1.1	1.4	1.7	1.8	2.6	2.7	2.8	4.2	1.6	1.7	24.6
Pecos R at Carlsbad	1.7	1.2	1.1	1.4	1.7	1.8	2.6	2.7	2.8	3.1	1.6	1.7	23.5
Total Outflow	1.8	1.3	4.3	11.8	10.0	12.1	17.0	12.3	9.8	12.2	2.3	2.4	97.2
Flood Inflow, DS3-CB	0.9	0.4	-0.4	0.5	1.0	0.8	3.1	0.8	-0.3	2.7	0.4	0.5	10.4
Flood Inflow, Art-CB	0.9	0.4	-0.4	0.5	1.0	0.8	3.1	0.9	-0.3	2.8	0.4	0.5	10.5

Table 4. Summary Table for Computations, Carlsbad to State Line (B.5)						
Water Year		2023				
5/10/2024						
		BCB - RB	Del R	DC		
Jan		0.1	0.0	0.0		
Feb		0.0	0.0	0.0		
Mar		0.0	0.0	0.0		
Apr		0.0	0.0	0.0		
May		0.2	0.0	0.0		
Jun		0.0	0.0	0.0		
Jul		0.0	0.0	0.0		
Aug		0.2	0.9	0.0		
Sep		0.3	0.0	0.0		
Oct		0.4	0.0	1.1		
Nov		0.1	0.0	0.0		
Dec		0.0	0.0	0.0		
Total		1.4	1.0	1.1		
Summary of flood inflows, Carlsbad to State Line, TAF						
Red Bluff - Carlsbad + Dark C						2.5
Delaware River						1.0
Total Flood Inflow, Carlsbad to State Line						3.5

Table 5. Depletions Due to Irrigation Above Sumner Dam (C.1.a)								
Water Year	2023							
5/5/2024								
	APR	MAY	JUN	JUL	AUG	SEPT	OCT	TOTAL
Precip Las Vegas FAA AP	0.11	1.76	1.39	0.80	1.33	1.72	0.94	8.05
Eff prec Las Veg FAA AP	0.11	1.63	1.31	0.78	1.25	1.60	0.91	7.59
Precip Pecos Natl Monument	M	0.83	1.48	0.91	1.98	0.78	0.09	6.07
Eff Precip Pecos RS		0.81	1.39	0.88	1.81	0.76	0.09	5.74
Precip Santa Rosa	0.01	1.96	1.73	0.70	0.78	1.14	0.40	6.72
Eff Precip Santa Ro	0.01	1.80	1.60	0.68	0.75	1.10	0.39	6.33
Average eff precip, ft	0.00	0.12	0.12	0.07	0.11	0.10	0.04	0.55
Consumptive use, ft	0.19	0.36	0.36	0.30	0.27	0.18	0.11	1.77
Unit depletion rate (CU less eff precip), ft	0.19	0.24	0.24	0.24	0.16	0.08	0.07	1.22
Acres (most recent inventory)	11529							
Streamflow depletion (actual use), AF	14110							
1947 depletion, AF	10804							
Difference (actual use - 1947 depletion), TAF	3.3							
Adjustment to Gaged Flow, Pecos River below Sumner Dam, TAF =						3.3		

Table 6. Depletions Due to Santa Rosa Reservoir Operations (C.1.b)

[illegible]

Table 7. Carlsbad Springs New Water [B.4.c.(2)]					
Water Year	2023				
5/5/2024					
		TAF	AF/day	cfs	Totals
Pecos R bel DC		24.6	67.4	34.0	34.0
Dark Canyon		1.1	3.0	1.5	1.5
Pecos R bel Lake Avalon		0.1	0.2	0.1	0.1
Depletion, cfs					2.0
CID lag seep, cfs (from Table 8)					6.7
Return flow, cfs					1.0
Lake Av lagged seep, cfs (from Table 9)					10.4
PR seepage, cfs					3.0
Carls new water, cfs					13.24
Carls new wat, TAF					9.6
Carls new wat monthly, TAF					0.8

Table 8. Carlsbad Main Canal Seepage Lagged [B.4.c.(2)(e)]													
Water Year	2023												
5/5/2024													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
WY 2023													
CID, TAF	0.0	0.0	2.2	10.2	8.9	10.2	13.8	10.0	6.9	9.9	0.0	0.0	72.0
days/mo	31	28	31	30	31	30	31	31	30	31	30	31	365
cfs	0	0	35.7	170.7	144.2	170.8	223.8	163.4	115.3	161.3	0.0	0.0	98.8
cfs, qtr avg			12.3			161.7			168.1			54.3	
WY 2022		1Q	2Q	3Q	4Q								
FLows, cfs				104.7	43.8								
SEVEN %				7.3	3.1								
WY 2023 lagged		1Q	2Q	3Q	4Q								
FLows, cfs		12.3	161.7	168.1	54.3								
SEVEN %		0.9	11.3	11.8	3.8								
LAG		2.7	6.5	9.8	7.7	Avg =	6.7	cfs					

Table 9. Lake Avalon Leakage Lagged [B.4.c.(2)(g)]													
Water Year	2023												
5/5/2024													
WY 2023	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
Elev NM rept	58.00	58.00	68.45	73.11	73.04	73.08	73.51	73.47	73.40	73.27	73.15	73.85	
ga ht, avg*	1.00	1.00	11.45	16.11	16.04	16.08	16.51	16.47	16.40	16.27	16.15	16.85	
cfs	0.0	0.0	0.0	15.0	14.7	14.9	16.9	16.7	16.4	15.8	15.2	18.6	
days	31	28	31	30	31	30	31	31	30	31	30	31	365
cfs avg	0.0			14.8			16.7			16.5			12.0
WY 2022		1Q	2Q	3Q	4Q								
cfs				15.3	3.9								
WY 2023 lagged		1Q	2Q	3Q	4Q								
cfs		0.0	14.8	16.7	16.5								
lag cfs		3.9	8.1	13.3	16.3	Avg =	10.4	cfs					
* Computed as WS elev by NM Report minus Gage datum at 3157.0 (USBR datum)													

Table 10. Evaporation Loss at Lake Avalon [B.4.d.(1)]														
Water Year	2023													
4/30/2024														
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT	
Av WS NM Rept	58.00	58.00	68.45	73.11	73.04	73.08	73.51	73.47	73.40	73.27	73.15	73.85		
Avalon ga ht, avg, ft*	1.00	1.00	11.45	16.11	16.04	16.08	16.51	16.47	16.40	16.27	16.15	16.85		
Avg area Avalon, ac**	0	0	27	584	576	580	631	626	618	603	589	671		
Panevap Brantley, in.	4.65	5.60	9.72	12.24	12.25	17.66	16.76	13.69	11.07	7.77	4.80	4.34	120.55	
Lakeevap Brantley, in.	3.58	4.31	7.48	9.42	9.43	13.60	12.91	10.54	8.52	5.98	3.70	3.34	92.82	
Precip Brantley, in.	0.55	0.00	0.00	0.02	0.73	0.26	0.45	0.61	1.09	3.55	0.63	0.28	8.17	
Netevap, inches	3.03	4.31	7.48	9.40	8.70	13.34	12.46	9.93	7.43	2.43	3.07	3.06	84.65	
Evaploss Av, TAF	0.00	0.00	0.02	0.46	0.42	0.64	0.65	0.52	0.38	0.12	0.15	0.17	3.54	
* Computed as WS elev by NM Report minus Gage datum at 3157.0 (USBR datum)														
** Based on 2006 USBR Area and Capacity Table														

[illegible]

APPENDIX

RESPONSE TO STATES'
OBJECTIONS

Response to states' objections for Accounting Year 2024

New Mexico's objections

Table 3. Determination of Flood Inflows, Artesia to Carlsbad (B.4)

New Mexico found an error in Table 3 where the calculated Total Outflow for October included the Pecos below Dark Canyon Gage value of 4.2 TAF rather than the Pecos River at Carlsbad value of 3.1 TAF and resulted in double-counting of the 1.1 TAF of Dark Canyon inflows. New Mexico computed a revised Flood Inflow for Art-CB of 10.4 TAF.

Table 1. General Calculation of Annual Departures in TAF (B.1).

New Mexico provided a revised Table 1 that showed an annual departure of approximately -8.3 TAF instead of -8.5 TAF for Water Year 2023.

River Master response

The River Master's analysis confirmed New Mexico's finding of an error and accepted its conclusion.

Texas's objections

Table 3. Determination of Flood Inflows, Artesia to Carlsbad (B.4)

Texas found the same error as New Mexico in Table 3, and its objection is accepted. Texas computed a slightly different value (10.7 TAF) than New Mexico (10.4 TAF) for Flood Inflow, Art-CB. This appears to stem from an error in entering the value for Pecos River below Dark Canyon of 24.5 TAF, rather than the Table 12 value of 24.6 TAF. This, together with rounding differences, seems to explain the difference between the values of the two states.

Table 1. General Calculation of Annual Departures in TAF (B.1).

Texas entered its Table 3 result into Table 1 and computed a value of -8.4 TAF for the Annual Departure for Water Year 2023.

River Master response

The River Master confirmed Texas' analysis and recomputed the Annual Department, as explained below.

Results after considering states' objections

Table 1 was modified to include the corrections shown above. The final departure for WY 2023 computed by the River Master is -8.4 TAF. The de minimis difference compared to New Mexico's value seems due to rounding.