PECOS RIVER COMPACT

Report of the River Master

Water Year 2013

Accounting Year 2014

Final Report

June 27, 2014

Neil S. Grigg
River Master of the Pecos River
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PECOS RIVER COMPACT
Supreme Court of the United States
No. 65, Original
Amended Decree

Final Report of the River Master
Water Year 2013 - Accounting Year 2014
June 27, 2014

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:

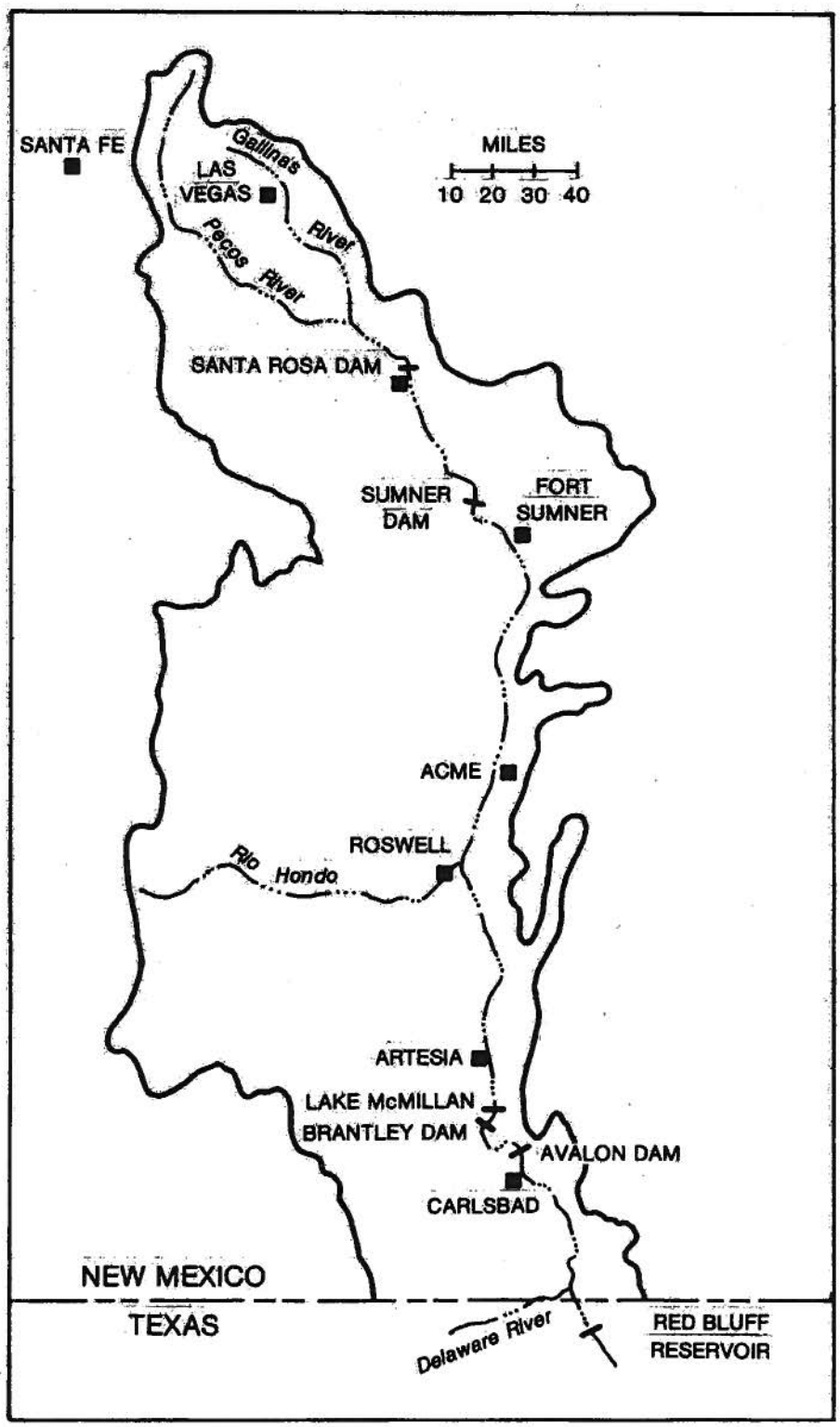
a. The Article III(a) obligation;

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 2013 was a shortfall of 6,200 1,900 acre-feet. The accumulated overage since the beginning of Water Year 1987 is 95,800 acre-feet.

Neil S. Grigg
River Master of the Pecos River



Map of Pecos River Basin Showing Accounting Reaches

Pecos River Compact		
Accumulated Shortfall or Overage		
	June 27, 2014	
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	-6,200	95,800

Table 1. General Calculation of Annual Departures in TAF (B.1)			
Water Year	2013		
6/27/2014			
	WY 2011	WY 2012	WY 2013
B.1.a. Index Inflows			
(1) Annual flood inflow			
(a) Gaged flow Pecos R bel Alamogordo Dam	87.4	64.9	63.6
(b) Flood Inflow Alamogordo - Artesia (Table 2)	-12.2	-17.2	54.4
(c) Flood Inflow Artesia - Carlsbad (Table 3)	12.8	11.2	39.9
(d) Flood Inflow Carlsbad - State Line (Table 4)	0.5	3.2	23.2
Total (annual flood inflow)	88.5	62.1	181.1
(2) Index Inflow (3-year avg)			110.6
B.1.b. 1947 Condition Delivery Obligation			39.7
(Index Outflow)			
B.1.c. Average Historical (Gaged) Outflow			
(1) Annual historical outflow			
(a) Gaged Flow Pecos River at Red Bluff NM	24.6	17.7	51.0
(b) Gaged Flow Delaware River nr Red Bluff NM	1.0	1.7	12.2
(c) Metered diversions Permit 3254 into C-2713	0.0	0.0	0.7
Total Annual Historical Outflow	25.6	19.4	63.9
(2) Average Historical Outflow (3-yr average)			36.3
B.1.d. Annual Departure			-3.4
C. Adjustments to Computed Departure			
1. Adjustments for Depletions above Alam Dam			
a. Depletions Due to Irrigation (Table 5)	3.3	3.2	2.0
b. Depl fr Operation of Santa Rosa Reservoir (Table 6)	2.7	1.0	8.6
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	93.4	69.1	74.2
(b) Flood Inflow Alamogordo - Artesia	-12.2	-17.2	54.4
(c) Flood Inflow Artesia - Carlsbad	12.8	11.2	39.9
(d) Flood Inflow Carlsbad - State Line	0.5	3.2	23.2
Total (annual flood inflow)	94.5	66.3	191.7
Recomputed Index Inflow (3-year avg)			117.5
Recomputed 1947 Condition Del Outflow			43.3
(Index Outflow)			
Recomputed Annual Departures			-7.0
Credits to New Mexico			
C.2 Depletions Due to McMillan Dike			0.8
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			-6.2

Table 2. Determination of Flood Inflows, Alamogordo Dam to Artesia (B.3)													
Water Year	2013												
5/3/2014													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
Flow bel Sumner Dam	1.2	0.8	16.3	4.5	4.0	5.9	5.7	5.9	10.6	6.7	1.0	1.0	63.6
FtSumner Irrig Div	0.0	0.0	4.6	3.9	3.3	3.8	4.3	5.0	3.8	5.8	0.0	0.0	34.6
Ft Sumner ID Return	0.7	0.5	1.3	1.5	2.2	2.2	2.2	2.2	2.0	1.8	0.9	0.7	18.3
Flow past FS IDist	2.0	1.4	13.0	2.0	2.9	4.3	3.6	3.1	8.8	2.7	1.9	1.7	47.4
Channel loss	0.2	0.2	2.5	1.3	1.4	1.5	1.1	1.6	1.6	0.8	0.7	0.2	13.3
Residual Flow	1.8	1.2	10.5	0.7	1.4	2.8	2.4	1.5	7.2	1.9	1.2	1.5	34.1
Base Inflow	2.2	1.7	2.0	1.8	1.1	0.3	0.6	0.3	0.4	1.7	2.3	1.9	16.2
River Pump Divers	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.6
Residual, Artesia	4.0	2.9	12.3	2.4	2.4	3.0	3.0	1.7	7.5	3.6	3.6	3.5	49.7
Pecos Flow Artesia	3.2	2.7	8.6	2.5	1.3	0.2	2.4	1.5	57.5	14.1	5.9	4.2	104.1
Flood Inflow, AD-Art	-0.7	-0.2	-3.7	0.1	-1.2	-2.8	-0.6	-0.2	50.0	10.6	2.4	0.8	54.4

Note: Whenever the computed flow past the District is less than the return flow, set the flow past the District equal to the return flow (Manual, B.3.d).

Table 3. Determination of Flood Inflows, Artesia to Carlsbad (B.4)													
Water Year	2013												
6/27/2014													
	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	0.5	0.0	0.0	0.0	0.5
Fourmile Draw nr Lakew	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	3.8
South Seven Rivers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	6.9
Rocky Arroyo at Hwy Br	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	20.5	0.0	0.0	0.0	21.4
Flood Inflow, Art-DS3	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	31.7	0.0	0.0	0.0	32.6
Pecos R at Dam Site 3	1.4	1.2	1.3	4.3	4.2	3.1	1.4	3.4	37.9	15.1	1.6	1.2	76.2
CB Sprgs New Water (from Table 7)	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-21.4
Total Inflow, DS3 - CB	-0.4	-0.5	-0.5	2.5	2.4	1.3	-0.3	1.7	36.1	13.4	-0.1	-0.6	54.9
Evap Loss, Lake Avalon (from Table 10)	0.2	0.3	0.5	0.6	0.6	0.6	0.2	0.5	0.1	0.3	0.2	0.1	4.3
Storage Chg, Lake Avalon (from Table 11)	0.4	0.2	0.1	-1.3	-0.3	0.1	0.8	-1.3	4.1	-4.4	0.9	0.6	-0.1
Carls ID diversions	0.0	0.0	0.0	4.9	3.8	2.5	0.0	3.7	4.0	14.1	0.0	0.0	33.0
93% CID diver	0.0	0.0	0.0	4.5	3.6	2.4	0.0	3.4	3.7	13.1	0.0	0.0	30.7
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 Csbad	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	25.2	0.0	0.0	0.0	25.8
Pecos b Dark Canyon	0.7	0.6	0.6	0.5	0.4	0.7	2.0	0.5	37.9	5.4	1.3	1.3	51.7
Pecos R at Carlsbad	0.7	0.6	0.6	0.5	0.4	0.7	1.4	0.5	12.7	5.4	1.3	1.3	25.9
Total Outflow	1.4	1.3	1.3	4.4	4.3	3.9	2.6	3.3	20.7	14.5	2.4	2.1	62.1
Flood Inflow, DS3-CB	1.8	1.8	1.7	1.9	1.9	2.6	2.9	1.6	-15.4	1.2	2.6	2.7	7.2
Flood Inflow, Art-CB	1.8	1.8	1.7	1.9	1.9	2.6	3.8	1.6	16.3	1.2	2.6	2.7	39.9

Table 4. Summary Table for Computations, Carlsbad to State Line (B.5)						
Water Year	2013					
6/27/2014						
	BCB - RB	BCB - RB*	Del R	DC		
	RM	USGS	USGS			
Jan	0.1	0.1	0.0	0.0		
Feb	0.0	0.1	0.0	0.0		
Mar	0.0	0.1	0.0	0.0		
Apr	0.0	0.1	0.0	0.0		
May	0.0	0.1	0.0	0.0		
Jun	0.2	0.2	0.0	0.0		
Jul**	0.0	-0.2	4.0	0.7		
Aug	0.0	0.2	0.0	0.0		
Sep**	0.0	-12.0	6.4	11.7		
Oct	0.1	3.3	0.0	0.0		
Nov	0.0	0.2	0.0	0.0		
Dec	0.0	0.0	0.0	0.0		
Total	0.4	-7.8	10.4	12.4		
Summary of flood inflows, Carlsbad to State Line, TAF						
Red Bluff - Carlsbad + Dark C RM calcs)					12.8	
Delaware River (USGS Computation)					10.4	
Total Flood Inflow, Carlsbad to State Line					23.2	
* USGS calculations BCB-RB for comparison only.						
** Dark Canyon Draw flow adjusted, see Appendix for discussion						

Table 5. Depletions Due to Irrigation Above Sumner Dam (C.1.a)								
Water Year	2013							
5/3/2014								
	APR	MAY	JUN	JUL	AUG	SEPT	OCT	TOTAL
Precip Las Vegas FAA AP	0.08	0.22	1.28	4.41	1.56	7.31	0.30	15.16
Eff prec Las Veg FAA AP	0.08	0.22	1.21	3.55	1.46	4.10	0.29	10.91
Precip Pecos Natl Monument	0.08	0.30	0.84	1.96	1.96	7.02	0.60	12.76
Eff Precip Pecos RS	0.08	0.29	0.82	1.80	1.80	4.10	0.59	9.48
Precip Santa Rosa	0.01	0.19	2.01	2.64	0.69	8.51	0.08	14.13
Eff Precip Santa Ro	0.01	0.19	1.84	2.32	0.67	4.10	0.08	9.21
Average eff precip, ft	0.00	0.02	0.11	0.21	0.11	0.34	0.03	0.82
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	0.34	0.25	0.09	0.16	0.00	0.08	1.11
Acres (most recent inventory)	11529							
Streamflow depletion (actual use), AF	12791							
1947 depletion, AF	10804							
Difference (actual use - 1947 depletion), TAF	2.0							
Adjustment to Gaged Flow, Pecos River below Sumner Dam, TAF =						2.0		

Table 6. Depletions Due to Santa Rosa Reservoir Operations (C.1.b)													
Water Year	2013												
5/3/2014													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
LS 2001 table (USBR), add 4,200 feet to value shown; LSR 1997 tables used (COE); Add 4,600 feet to value shown													
Lk Sumner ga ht, avg	45.89	48.29	44.43	38.66	38.06	36.56	38.06	37.71	50.89	58.62	58.93	60.29	
LS content, AF, avg	11122	13933	9708	5673	5351	4585	5351	5166	17577	32147	32858	36099	
LS area, acres, avg	1045	1292	891	554	535	487	535	524	1512	2279	2311	2462	
LS evap, inches	3.78	5.69	10.25	12.74	16.65	18.05	13.48	12.90	9.54	8.17	3.97	2.60	117.81
.77 LS Evap	2.91	4.38	7.89	9.81	12.82	13.90	10.38	9.93	7.35	6.29	3.06	2.00	90.72
LS Precip, inches	0.23	0.05	0.00	0.00	0.05	1.40	3.70	0.90	8.83	0.28	0.27	0.08	15.79
Net LS Evap, inches	2.68	4.33	7.89	9.81	12.77	12.50	6.68	9.03	-1.48	6.01	2.79	1.92	74.93
LSum Evaploss, TAF	0.23	0.47	0.59	0.45	0.57	0.51	0.30	0.39	-0.19	1.14	0.54	0.39	5.39
L S Rosa ga ht, avg	90.59	90.61	86.28	83.17	82.69	84.82	92.49	100.86	126.29	146.11	145.74	145.50	
LSR content, AF, avg	4825	4832	3529	2777	2677	3156	5532	10122	47582	101195	99808	98914	
LSR area, acres, avg	351	351	264	213	204	246	395	701	2117	3773	3735	3709	
LSR evap, inches	3.72	4.98	8.58	10.11	12.79	14.27	10.70	10.51	7.79	6.39	4.05	3.76	97.65
.77 LSR Evap	2.86	3.83	6.61	7.78	9.85	10.99	8.24	8.09	6.00	4.92	3.12	2.90	75.19
LSR precip, inches	0.23	0.46	0.02	0.01	0.19	2.01	2.64	0.69	8.51	0.08	0.54	0.11	15.49
Net LSR Evap, inches	2.63	3.37	6.59	7.77	9.66	8.98	5.60	7.40	-2.51	4.84	2.58	2.79	59.70
LSR Evaploss, TAF	0.08	0.10	0.14	0.14	0.16	0.18	0.18	0.43	-0.44	1.52	0.80	0.86	4.17
Total evaploss, TAF	0.31	0.56	0.73	0.59	0.73	0.69	0.48	0.83	-0.63	2.66	1.34	1.25	9.56
Sum contents, AF	15947	18765	13237	8450	8028	7741	10883	15288	65159	133342	132666	135013	
1947 area, acres	972	1016	834	700	700	674	793	939	2867	4600	4600	4600	
1947 evaploss, TAF	0.22	0.37	0.55	0.57	0.74	0.70	0.44	0.71	-0.35	2.30	1.07	0.74	8.05
current-1947evaploss	0.09	0.20	0.18	0.02	-0.01	-0.01	0.04	0.12	-0.28	0.36	0.27	0.52	1.51
						Annual adjustment for excess evaporation =							1.5
ADJUSTMENT FOR EXCESSIVE STORAGE IN SANTA ROSA RESERVOIR													
			2012	2012	2013	2013							
			Gage	Storage	Gage	Storage							
EndYear Sumner Sto			4244.34	9629	4260.94	37728							
EndYear S R Sto			4690.53	4804	4745.44	98691							
Sum				14433		136419							
Sto Adjustment, TAF						7.1							
Adjustm Ex Evap, TAF						1.5							
Total Adjustment,TAF						8.6							
	Storage adjustment												
	Both equal or less than 129.3 TAF, adjustment is zero												
	~~Both greater than 129.3 TAF, subtract previous from current year~~												
	Current year less than 129.3 TAF, previous greater than 129.3 TAF, subtract previous year from 129.3 TAF												
	Current year greater than 129.3 TAF, previous year less than 129.3 TAF, subtract 129.3 TAF from current year												

Table 7. Carlsbad Springs New Water [B.4.c.(2)]					
Water Year	2013				
6/27/2014					
		TAF	AF/day	cfs	Totals
Pecos R bel DC		51.7	141.2	71.2	71.2
Dark Canyon		25.8	70.6	35.6	35.6
Pecos R bel Lake Avalon		27.8	75.9	38.3	38.3
Depletion, cfs					2.0
CID lag seep, cfs (from Table 8)					2.5
Return flow, cfs					1.0
Lake Av lagged seep, cfs (from Table 9)					22.3
PR seepage, cfs					3.0
Carls new water, cfs					-29.5
Carls new wat, TAF					-21.4
Carls new wat monthly, TAF					-1.8

Table 8. Carlsbad Main Canal Seepage Lagged [B.4.c.(2)(e)]													
Water Year	2013												
5/3/2014													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
WY 2013													
CID, TAF	0.0	0.0	0.0	4.9	3.8	2.5	0.0	3.7	4.0	14.1	0.0	0.0	33.0
days/mo	31	28	31	30	31	30	31	31	30	31	30	31	365
cfs	0	0.0	0.0	81.8	62.1	42.7	0.0	59.7	67.6	228.5	0.0	0.0	45.2
cfs, qtr avg			0.0			62.2			42.1			77.0	
WY 2012		1Q	2Q	3Q	4Q								
FLOWS, cfs				47.9	0.0								
SEVEN %				3.4	0.0								
WY 2013 lagged		1Q	2Q	3Q	4Q								
FLOWS, cfs		0.0	62.2	42.1	77.0								
SEVEN %		0.0	4.4	2.9	5.4								
LAG		0.6	2.2	2.9	4.4	Avg =	2.5	cfs					

Table 9. Lake Avalon Leakage Lagged [B.4.c.(2)(g)]													
Water Year	2013												
6/21/2014													
WY 2013	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
Elev NM rept	75.30	75.65	75.82	74.95	74.19	73.59	74.37	73.77	76.15	74.49	73.05	74.30	
ga ht, avg*	18.30	18.65	18.82	17.95	17.19	16.59	17.37	16.77	19.15	17.49	16.05	17.30	
cfs	25.5	27.1	28.0	23.8	20.2	17.3	21.0	18.2	29.5	21.6	14.7	20.7	
days	31	28	31	30	31	30	31	31	30	31	30	31	365
cfs avg	26.9			20.4			22.8			19.1			22.3
WY 2012		1Q	2Q	3Q	4Q								
cfs				18.2	20.6								
WY 2013 lagged		1Q	2Q	3Q	4Q								
cfs		26.9	20.4	22.8	19.1								
lag cfs		23.3	22.6	22.7	20.5	Avg =	22.3	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	2013													
5/3/2014														
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOT	
Av WS NM Rept	75.30	75.65	75.82	74.95	74.19	73.59	74.37	73.77	76.15	74.49	73.05	74.30		
Avalon ga ht, avg, ft*	18.30	18.65	18.82	17.95	17.19	16.59	17.37	16.77	19.15	17.49	16.05	17.30		
Avg area Avalon, ac**	758	783	794	734	684	647	696	658	818	704	615	691		
Panevap Brantley, in.	4.65	5.60	9.91	12.86	15.12	15.44	11.34	12.48	7.94	7.37	4.80	4.34	111.85	
Lakeevap Brantley, in.	3.58	4.31	7.63	9.90	11.64	11.89	8.73	9.61	6.11	5.67	3.70	3.34	86.12	
Precip Brantley, in.	0.86	0.05	0.00	0.00	0.41	0.70	5.64	0.17	4.26	0.11	0.75	0.76	13.71	
Netevap, inches	2.72	4.26	7.63	9.90	11.23	11.19	3.09	9.44	1.85	5.56	2.95	2.58	72.41	
Evaploss Av, TAF	0.17	0.28	0.50	0.61	0.64	0.60	0.18	0.52	0.13	0.33	0.15	0.15	4.25	
* Computed as WS elev by NM Report minus Gage datum at 3157.0 (USBR datum)														
** Based on USBR Area and Capacity Table in effect January 1, 1997														

Table 11. Change in Storage, Lake Avalon [B.4.d.(2)]														
(Gage heights are end of month)														
Water Year	2013													
5/3/2014														
	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOT
	2012	2013												
WS NM Rept	75.0	75.5	75.8	75.9	74.1	73.6	73.8	74.9	73.0	78.2	72.5	73.9	74.8	
Gage EOM, ft*	18.0	18.5	18.8	18.9	17.1	16.6	16.8	17.9	16.0	21.2	15.5	16.9	17.8	
Storage, AF**	2494	2871	3106	3185	1857	1525	1656	2494	1147	5219	848	1722	2347	
Change sto, TAF		0.4	0.2	0.1	-1.3	-0.3	0.1	0.8	-1.3	4.1	-4.4	0.9	0.6	-0.1
* Computed as WS elev by NM Report minus Gage datum at 3157.0 (USBR datum)														
** Based on USBR Area and Capacity Table in effect January 1, 1997														

Table 12. Data Required for River Master Manual Calculations													
Water Year	2013												
6/27/2014													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
STREAMFLOW GAGING RECORDS, TAF													
Pecos R b Sumner Dam	1.2	0.8	16.3	4.5	4.0	5.9	5.7	5.9	10.6	6.7	1.0	1.0	63.6
Fort Sumner Main C	0.0	0.0	4.6	3.9	3.3	3.8	4.3	5.0	3.8	5.8	0.0	0.0	34.6
Pecos R nr Artesia	3.2	2.7	8.6	2.5	1.3	0.2	2.4	1.5	57.5	14.1	5.9	4.2	104.1
Rio Penasco at Dayton	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.5
Fourmile Draw nr Lakewood	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.8	0.0	0.0	0.0	3.8
South Seven Rivers nr Lkwd	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.0	0.0	0.0	6.9
Rocky Arroyo at Hwy Br nr	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	20.5	0.0	0.0	0.0	21.4
Pecos R at Dam Site 3	1.4	1.2	1.3	4.3	4.2	3.1	1.4	3.4	37.9	15.1	1.6	1.2	76.2
Pecos bel Avalon Dam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6	3.2	0.0	0.0	27.8
Carlsbad Main Canal	0.0	0.0	0.0	4.9	3.8	2.5	0.0	3.7	4.0	14.1	0.0	0.0	33.0
Dark Canyon at Carlsbad	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	25.2	0.0	0.0	0.0	25.8
Pecos below Dark Canyon	0.7	0.6	0.6	0.5	0.4	0.7	2.0	0.5	32.6	5.4	1.3	1.3	46.4
Pecos R at Red Bluff	2.0	1.5	1.4	0.9	0.7	1.0	2.3	1.0	26.2	9.3	2.4	2.4	51.0
Delaware R nr Red Bluff	0.1	0.1	0.1	0.1	0.0	0.0	4.1	0.2	6.8	0.3	0.3	0.2	12.2
GAGE HEIGHTS													
Avalon gage ht, end mo	75.50	75.80	75.90	74.10	73.60	73.80	74.90	73.00	78.20	72.50	73.90	74.80	
Avalon gage ht, avg	75.30	75.65	75.82	74.95	74.19	73.59	74.37	73.77	76.15	74.49	73.05	74.30	
Sumner Lake ga ht, end mo	47.15	49.40	39.46	38.12	38.22	33.83	37.42	36.29	59.63	58.28	59.61	60.94	
Sumner Lake gage ht, avg	45.89	48.29	44.43	38.66	38.06	36.56	38.06	37.71	50.89	58.62	58.93	60.29	
Lake S Rosa ga ht, end mo*	90.61	90.61	83.35	82.96	82.33	85.39	98.19	102.06	146.30	145.92	145.63	145.44	
Lake S Rosa ga ht, avg*	90.59	90.61	86.28	83.17	82.69	84.82	92.49	100.86	126.29	146.11	145.74	145.50	
* values are referred to 4600 foot level													
PRECIPITATION, INCHES													
Brantley Lake	0.86	0.05	0.00	0.00	0.41	0.70	5.64	0.17	4.26	0.11	0.75	0.76	13.71
Las Vegas FAA AP	0.08	0.23	0.06	0.08	0.22	1.28	4.41	1.56	7.31	0.30	0.65	0.29	16.47
Pecos National Monument	0.52	0.32	0.27	0.08	0.30	0.84	1.96	1.96	7.02	0.60	1.92	0.58	16.37
Santa Rosa*	0.23	0.46	0.02	0.01	0.19	2.01	2.64	0.69	8.51	0.08	0.54	0.11	15.49
Lake Santa Rosa	0.23	0.46	0.02	0.01	0.19	2.01	2.64	0.69	8.51	0.08	0.54	0.11	15.49
Sumner Lake	0.23	0.05	0.00	0.00	0.05	1.40	3.70	0.90	8.83	0.28	0.27	0.08	15.79
	* Note: data from Santa Rosa dam was substituted for missing Santa Rosa data												
PAN EVAPORATION, INCHES													
Lake Santa Rosa	3.72	4.98	8.58	10.11	12.79	14.27	10.70	10.51	7.79	6.39	4.05	3.76	97.7
Lake Sumner	3.78	5.69	10.25	12.74	16.65	18.05	13.48	12.90	9.54	8.17	3.97	2.60	117.8
Brantley Lake	4.65	5.60	9.91	12.86	15.12	15.44	11.34	12.48	7.94	7.37	4.80	4.34	111.9
OTHER REPORTS													
Base Acme-Art, TAF (USGS)	2.2	1.7	2.0	1.8	1.1	0.3	0.6	0.3	0.4	1.7	2.3	1.9	16.2
Pump depl Ac-Artesia, TAF	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.6
Pumping, C-2713, Malaga B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.7
NM irrig inv, acres (3/9/2000)													11529
NM Transfer water use, TAF													
NM salvaged water, TAF													0.00
Texas, water stored NM, TAF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
Texas, use Del water, TAF													

RESPONSE TO STATES' OBJECTIONS

Final Report, Accounting Year 2014

NEW MEXICO'S OBJECTIONS

New Mexico did not have any objections but expressed concern about resolution of the Dark Canyon flood flow accounting (Manual B.5.a.(3)). This is discussed below at "Change in USGS gaging records and adjustment to flood inflow."

TEXAS'S OBJECTIONS

1. Table 9. Lake Avalon Leakage Lagged - WY 2013 - B.4.c.(1)(g)

Texas found that the quarterly average for Q1 had been computed with 29 days for February. This objection is accepted and the revision made in Table 9. Table 7 was revised accordingly.

2. Table 4. Summary Table for Computations, Carlsbad to State Line (B.5).

Delaware River flood inflows. Texas recomputed Delaware River flood inflows by inspecting when rainfall occurred. This is not required by the River Master's Manual Section B.5.b., which states: "Use the daily records furnished by the USGS for the gaging station, Delaware River near Red Bluff, N.M. and select flood inflows by inspection of daily data." The River Master inspected the analyses of Texas and USGS but without regard to the rainfall in the reach. It was apparent that the main difference in the calculations could be explained by how USGS estimated the recession curves of flood hydrographs. If they are estimated to last longer, then base flows are set lower and a higher flood inflow is computed. By re-computing the flood inflows for the main flood periods in July and September the River Master estimated 10.6 TAF (like Texas) for the longer-duration base inflows and 10.3 (like USGS) for the shorter recession curves. While estimates of flood recession curves involve complex hydrology, it is the River Master's judgment that the shorter recession estimates of USGS are more consistent with previous flood accounting and, accordingly, the objection is rejected.

Carlsbad to Red Bluff flood inflows. Texas presented a set of estimates of flood inflows that indicates 0.7 TAF instead of the 0.3 TAF in the Preliminary Report. The River Master examined each flood event scalped by Texas. For the event in early January, Texas's contention that the early rainfall should be considered is accepted, and the recalculation of this event added 37 AF. The event in February shows a *de minimus* flood inflow or none at all no matter how it is analyzed and was not considered. For the event in early May, Texas indicated a precipitation event on May 10, but this was not reported by New Mexico for the three stations near the reach and the bar on Texas's graph was so small the River Master could not tell which gage was being reported. For the event in the latter part of May, the rainfall curves provided by New Mexico showed rain occurring only a day after the peak so this was disregarded by the River Master in the Preliminary Report. Texas showed a small rainfall event the previous day, but it is so

small that the River Master could not determine which gage it was from and it did not appear on New Mexico's display. So this event is considered to be in the category of an operational rise (using language from the River Master's Manual) and is not considered flood inflow. Texas presented estimates for June that seem to differ by about 0.1 TAF from the River Master's estimate, but the curves are difficult to follow and Texas also considered a raingage that is out of the basin. Texas scalped some very small events in July which are difficult to follow due to the small rainfall events involved and the uncertainty over which gages were involved. These are not included in the Final Determination. The event in mid-August scalped by Texas appears to explain the largest difference between Texas's and the River Master's estimates. In the Preliminary Report, the River Master did not include this event because rainfall was shown on August 12, some four days before the August 16 peak. Rainfall occurred again on August 17, after the rise in flow. Texas showed rain occurring on August 15, but it appears to be the Orogrande gage, which is not in the basin. Therefore, this event is considered as an operational rise.

As a result of the adjustment for January, the River Master is revising the flood inflow shown on Table 4 to 0.4 TAF.

3. Table 1. General Calculation of Annual Departures in TAF (B.1) and Table 4. Summary Table for Computations, Carlsbad to State Line (B.5).
Texas presented a revised total of -6.2 TAF instead of the Preliminary Report's -6.1 TAF. See "Final Calculated Departure" below for the result of considering all objections and the adjustment to gaged flows reported by USGS.

CHANGE IN USGS GAGING RECORDS AND ADJUSTMENT TO FLOOD INFLOW

In the Preliminary Report the River Master explained the procedure that was used to adjust the Flood Inflow, Carlsbad to State Line (Section B.5.a.(3) of the River Master's Manual). The procedure is required during periods of Dark Canyon Draw discharges and when the initial scalped flood inflow in the Carlsbad to State Line reach is negative. The calculation showed a large negative flood inflow and the River Master requested USGS to assess the reported gaged flows. USGS reported on June 26 with lower values for two days in September on the Pecos River below Dark Canyon gage. The USGS email message from D. Michael Roark, Hydrologist, is copied here for the record:

"The record has been revised for this site by changing the rating for this gage. Attached is a tab delimited file with the daily values, which can be brought into excel quickly.

Our database only has two high water measurements for this site and the upper end of the rating was based on the highest of the two measurements. This was a slope-area indirect measurement that was computed after the 2004 floods. The slope-area computed discharge was 73,000. Since there were only two measurements at this site it was considered important to do a step backwater analysis to verify the rating. It has taken a bit of time to complete that task. From the step-back water analysis and the survey for

the analysis it was determined that at a flow of a little over 20,000 cfs the flow brakes [*sic*] out over a very flat area of farm fields. Since the upper end of the rating was a straight line in log space from the area of the rating where there were measurements to the slope-area indirect measurement, the old rating overestimated high flows.

Points were taken from the water surfaces computed by the step-backwater analysis to redraw the upper end of the rating which brings the rating with a slight curve up to 20,000 cfs and then breaks over to the slope area measurement. We are confident that the new rating is much more accurate than the previous rating."

As a result of the modified gaging values, the River Master recomputed the scalped flood inflow for September. The sheet that follows entitled "Hydrograph scalping to support Table 4 shows the calculation. The first step was to scalp the flood inflow in the reach using the revised Pecos River below Dark Canyon gaged flows. The result is still a negative value for the flood period. Therefore, following the required procedure, the Dark Canyon flow is subtracted from the Pecos River below Dark Canyon flow and the scalping is performed again. For September 12 there is a large negative net flow at Pecos River below Dark Canyon and no way to consider that daily result in determining the scalped flood inflow from Carlsbad to State Line. After disregarding that single day result, the resulting flood inflow was 11.7 TAF for the month (see the following worksheet). As shown, the adjustment in gaged flows did not change the Preliminary Report's value very much because the main change was for September 12, and the large negative value for Pecos River below Dark Canyon flow on that day could not be considered and remains unexplained.

Table 12 was revised to show the USGS changed report for gaged flow at Pecos River below Dark Canyon.

New Mexico expressed concern about the River Master Manual's procedure for the adjustment in periods such as this. The flood event during September 2013 provides an opportunity for the states to study the procedure which is used to account for flood inflow in the Carlsbad to State Line reach in a manner which is accurate and also consistent with the 1947 condition.

FINAL CALCULATED DEPARTURE

The Preliminary Report's Final Calculated Departure was a shortfall of 6.1 TAF. After considering the states' objections, the Final Determination is a shortfall of 6.2 TAF.

Hydrograph scalping to support Table 4

	31	244	12				7				24	0	24		
SEP	1	245	12				7.1								
	2	246	12				7.2								
	3	247	12				6.9								
	4	248	13				6.4								
	5	249	14				6.3								
	6	250	13				6.3								
	7	251	12				6								
	8	252	11				5.6								
	9	253	11				13								
	10	254	9.9				9.9	9.9	0	DCD	PRBDC				
	11	255	9.6				73	10	63		(revised)				
	12	256	9.7	9.7	0		6070	11	6059	11200	-5141				
	13	257	5100	12	5088		2970	11	2959	1490	1469	11	1457.6		
	14	258	1560	15	1545		284	12	272						
	15	259	250	17	233		84	12	72						
	16	260	200	20	180		29	13	16						
	17	261	180	22	158		19	13	6						
	18	262	121	25	96		14	14	0						
	19	263	72	27	45		14								
	20	264	52	30	22		14								
	21	265	43	32	11		14								
	22	266	35	35.0	0	7378.2	549								
	23	267	199				783								
	24	268	684				767								
	25	269	733				735								
	26	270	719				807								
	27	271	778				799								
	28	272	787				779								
	29	273	762				780								
	30	274	769				774								
OCT	1	275	771				767								
	2	276	767				633								
	3	277	690				560								

Scaped FIF is still negative for this period.
DCD flows subtracted from PRBDC flows.
Scaping of PRBDC now shows 1,458 cfs-days.
PRaRB was 7,378 cfs-days. Difference is now
7,378 - 1,458 = 5,920 cfs-days or 11,742 AF.
Use this value for DCD for September.

Discussion. The downward revision in the gaged flow at PRbDC did not affect the resul very much because the main reduction was for September 12 (one day only) and for tha day, the difference between PRaRB andPRbI was negative and was set to zero.