

# RECLAMATION

*Managing Water in the West*

## RIO GRANDE PROJECT

El Paso Field Division  
10737 Gateway Blvd. West, Suite 350  
El Paso, TX 79935



U. S Dept. of the Interior  
Bureau of Reclamation

# RECLAMATION

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## RIO GRANDE PROJECT

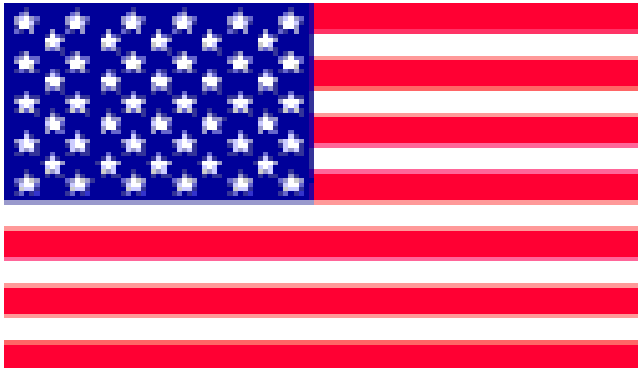
## HISTORICAL PERSPECTIVE OF RIO GRANDE PROJECT



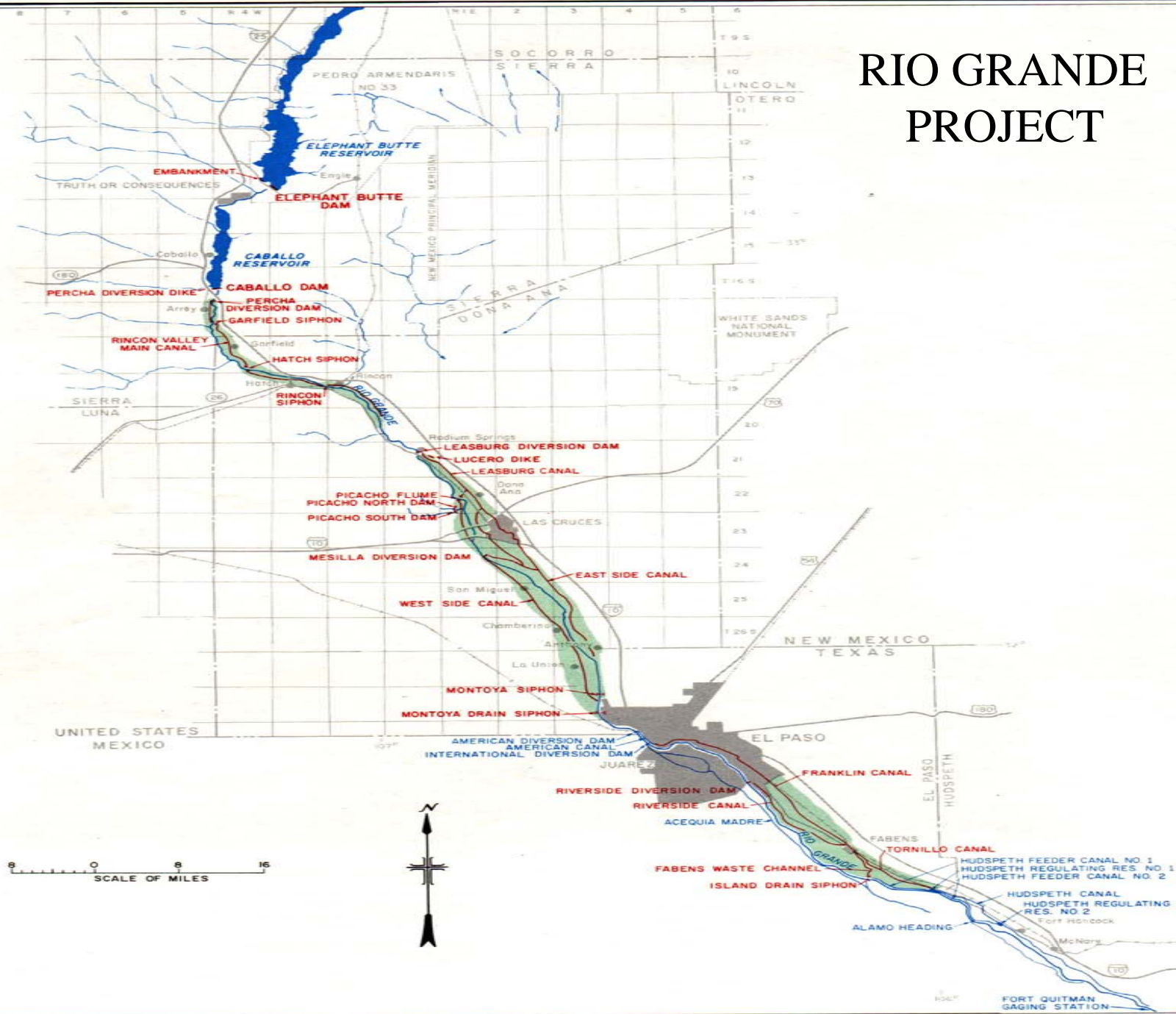
U. S Dept. of the Interior  
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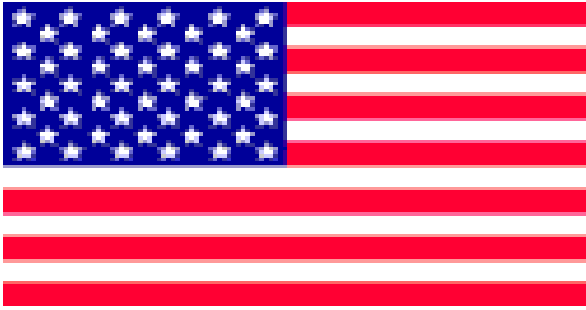
# U. S. BUREAU OF RECLAMATION

## RIO GRANDE PROJECT



# RIO GRANDE PROJECT

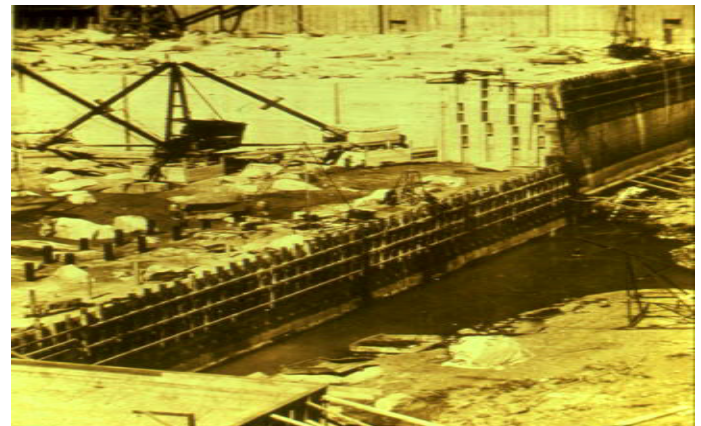




Rio Grande Project  
authorized by U. S. Congress  
on February 25, 1905

Treaty between U. S. and  
Mexico signed on  
May 21, 1906

New Mexico Territory becomes  
A State of the United States  
Of America on January 6, 1912





## Elephant Butte Dam and Reservoir

Completed in 1916

Total Storage Capacity: 2,023,358 acre-feet

Flood Reservation Pool: 50,000 acre-feet

Minimum Recreation Pool: 50,000 acre-feet

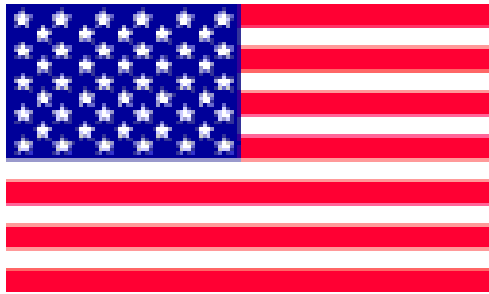












February 1, 1933 Treaty  
Between U. S. and Mexico



Alleviate Flooding in  
El Paso – Juarez Region,  
Build a Flood Control  
Facility

## CABALLO DAM & RESERVOIR

Completed in 1938

Total Storage Capacity: 326,672 acre-feet  
Excl. Flood Control Pool: 100,000 acre-feet  
Min. Fish & Wildlife Pool: 25,000 acre-feet









## Percha Diversion Dam

Completed in 1918

Arrey Canal delivers irrigation  
water to Rincon Valley

16,260 acres of irrigation  
(Elephant Butte Irrig. Dist.)







## Leasburg Diversion Dam

Completed in 1907

Leasburg Canal delivers  
irrigation water to upper  
Mesilla Valley

31,600 acres of irrigation  
(Elephant Butte Irrig. Dist.)





## Mesilla Diversion Dam

Completed in 1916

East Side & West Side Canals  
deliver irrigation water to  
lower Mesilla Valley

53,650 acres of irrigation  
(Elephant Butte Irrig. Dist.  
& El Paso County WI Dist.)





## AMERICAN DIVERSION DAM

Completed in 1938

Bypass 1906 Treaty water to  
Mexico; divert remaining waters  
to American Canal for U. S.  
waters

Owned and operated by  
U. S. International  
Boundary & Water  
Commission







# INTERNATIONAL DIVERSION DAM

Owned and operated by U. S. International  
Boundary & Water Commission;  
Water diverted into Acequia Madre to  
Satisfy 1906 Treaty requirements for Mexico



## Riverside Diversion Dam

Completed in 1928, removed 2003

Riverside Canal delivers  
Irrigation water to Lower  
El Paso Valley and City  
Of El Paso

39,000 acres of irrigation  
(El Paso County Water  
Improvement Dist. No. 1)







## American Canal Extension

Completed in 1998

Delivers irrigation water to El Paso Valley and City of El Paso

56,000 acres of irrigation  
(El Paso County Water Improvement Dist. No. 1)

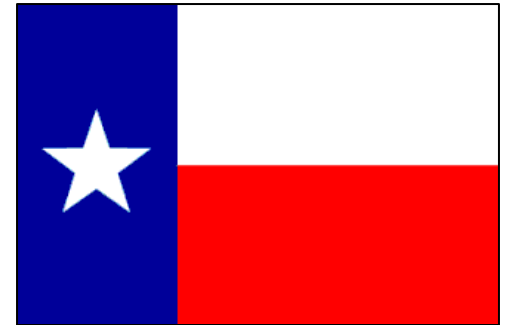
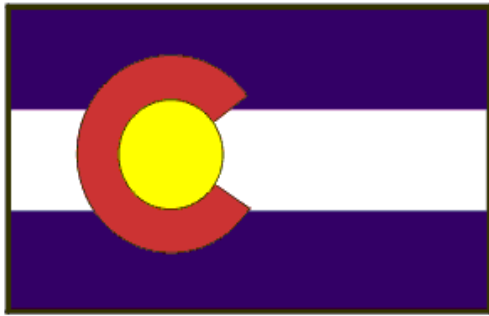








# Rio Grande Compact



- **3 States signed final Compact on Mar. 18, 1938; U. S. Congress ratifies Compact on May 31, 1939**
- **Compact apportions Rio Grande waters among 3 States from headwaters of southern Colorado to Fort Quitman, Texas**
  - **Texas portion of Compact is the Rio Grande Project which irrigates lands in southern New Mexico, far west Texas, and includes water delivery to Mexico under the 1906 Treaty**
- **Compact is administered by the Rio Grande Compact Commission consisting of a commissioner appointed by each State's Governor, and a Federal Representative which serves as Chairperson**
  - **Per Compact accounting regulations, the Rio Grande Project's average normal release is 790,000 acre-feet per year; Elephant Butte & Caballo Reservoirs are key components**

# **RIO GRANDE PROJECT**

## **Sale of Project Water for Miscellaneous Purposes Act – February 25, 1920**

Conversion of agricultural water to other purposes

## **Recreational Facilities at Elephant Butte & Caballo Reservoirs July 25, 1962**

established construction & administration of recreational facilities

## **Authorization of a 50,000 AF Minimum Pool for Recreation at Elephant Butte Reservoir – October 27, 1974**

established minimum recreational pool to be filled with SJ-C water

# RECLAMATION



# **RIO GRANDE PROJECT**

## **Transfer of O&M of Irrigation Distribution System – February 15, 1979 and March 14, 1980**

Elephant Butte Irrig. Dist. and El Paso County Water Improvement Dist. No. 1 assume O&M responsibilities of the Project's canals and distribution system

## **Title Transfer of Canals, Laterals, & Drains to Elephant Butte Irrig. Dist. & El Paso County Water Improvement Dist. # 1 - January 19, 1996**

Elephant Butte Irrig. Dist. & El Paso County Water Improvement Dist. # 1 acquire title and ownership to their respective canals, laterals, and drains of their irrigation delivery systems, make allocation to their farmers

# RECLAMATION

# **RIO GRANDE PROJECT**

## **Court Order No. CIV-90-95 HB/WWD –** **October 17, 1996**

established maximum storage level of 50,000 AF in Caballo Reservoir during winter months and minimize evaporation differences between Caballo and Elephant Butte Reservoirs

## **New Rio Grande Project Operating Agreement** **Signed by Elephant Butte Irrig. Dist. & El** **Paso County Water Improvement Dist. # 1 -** **February 14, 2008**

established new procedures for allocating Project water supply to Elephant Butte Irrigation District, El Paso County Water Improvement District # 1, and Mexico

# **RECLAMATION**

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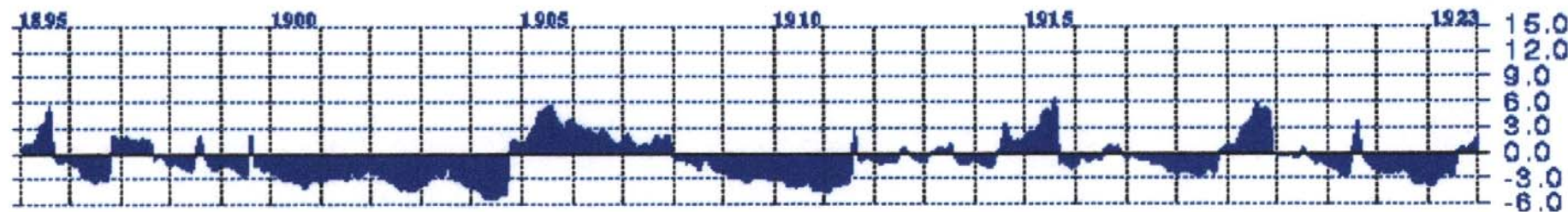
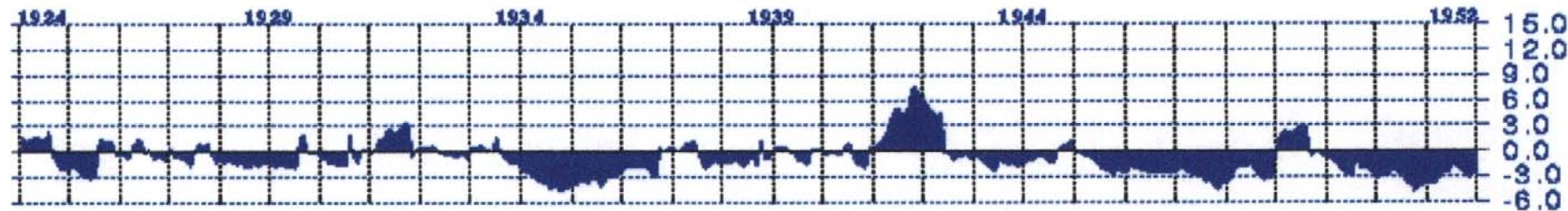
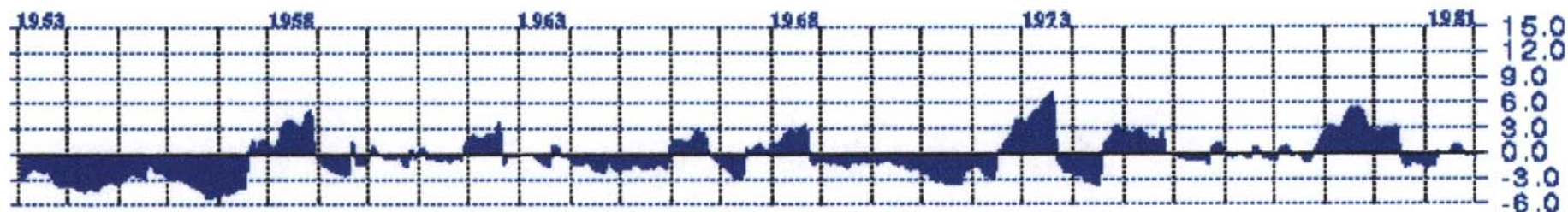
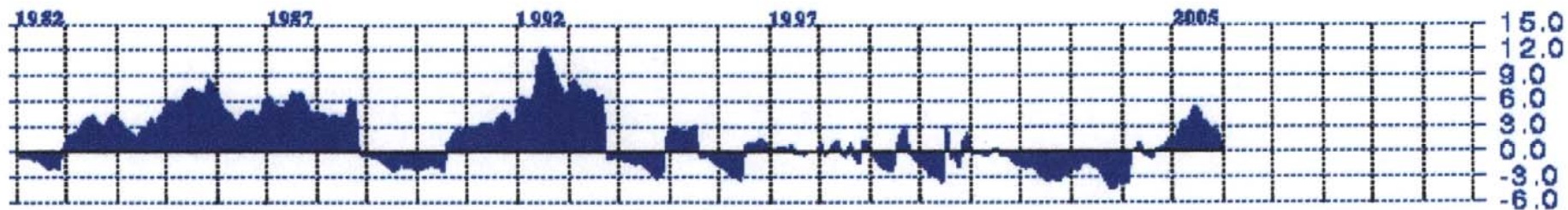
## RIO GRANDE PROJECT

### HYDROLOGIC HISTORY OF UPPER RIO GRANDE BASIN



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# Palmer Drought Severity Index

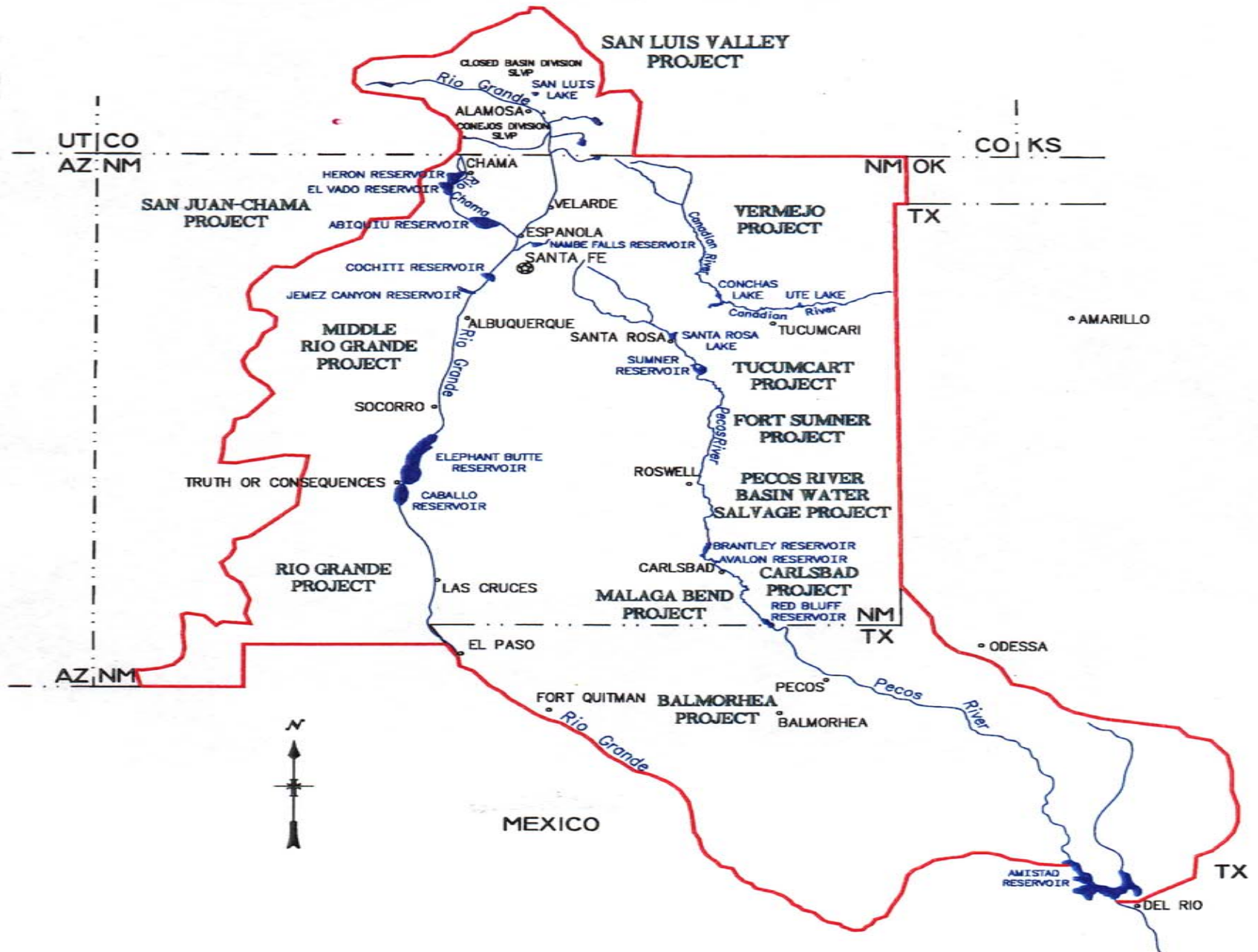


**New Mexico - Division 08: 1895-2005 (Monthly Averages)**



# ALBUQUERQUE AREA OFFICE

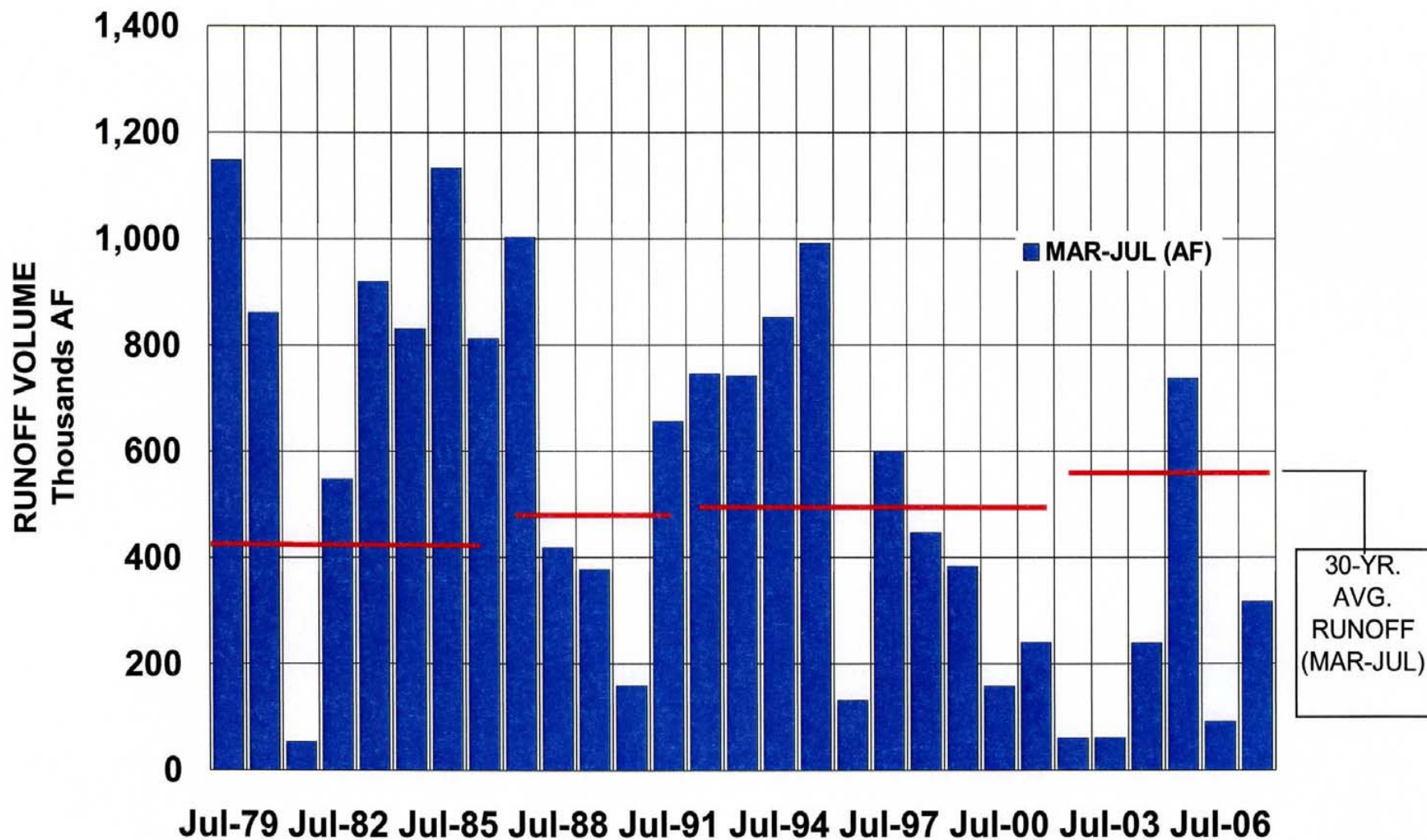
## BUREAU OF RECLAMATION





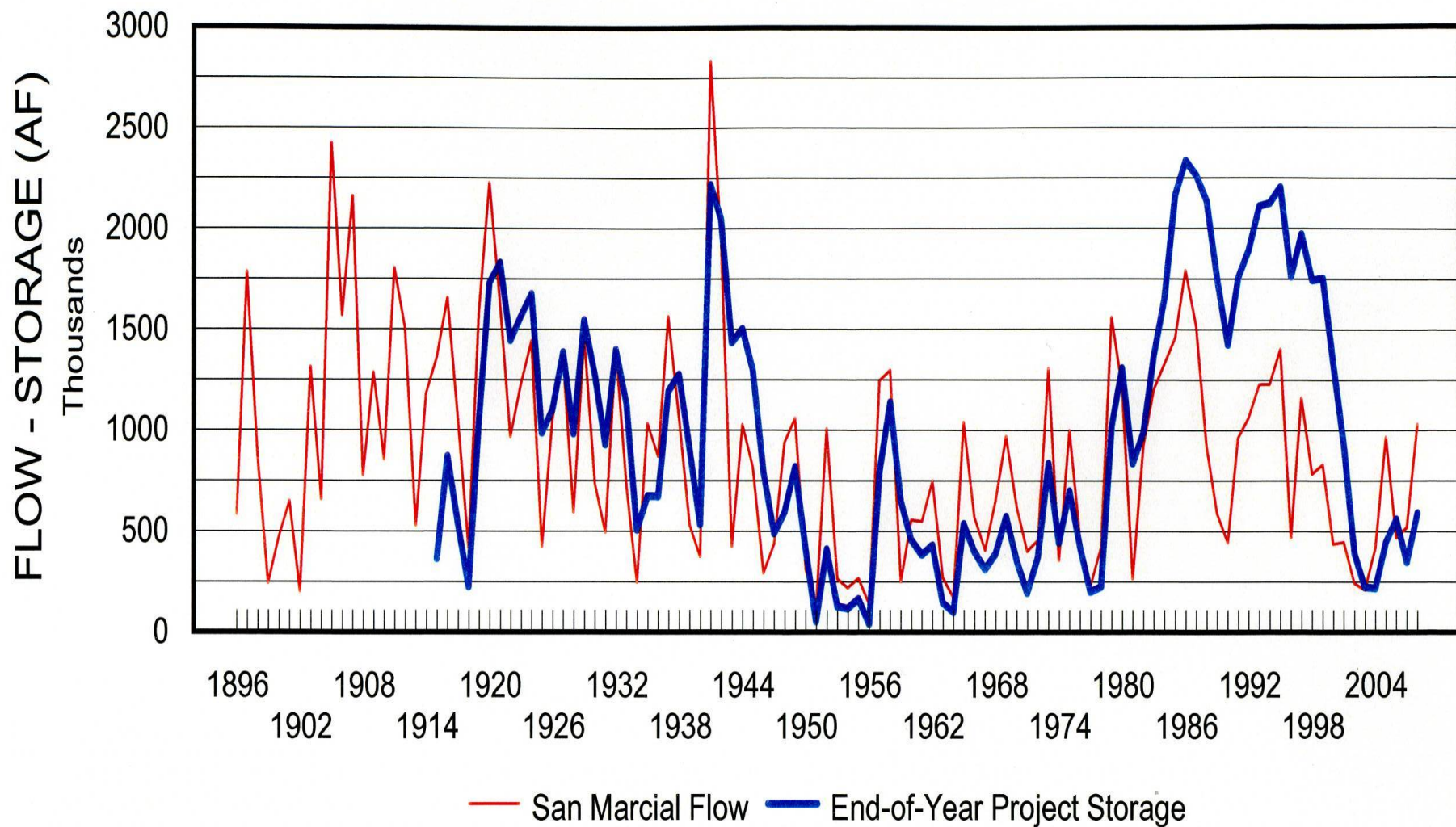
# HISTORICAL RUNOFF - SAN MARCIAL

## 1979 - 2007



# SAN MARCIAL FLOW - RIO GRANDE PROJECT STORAGE

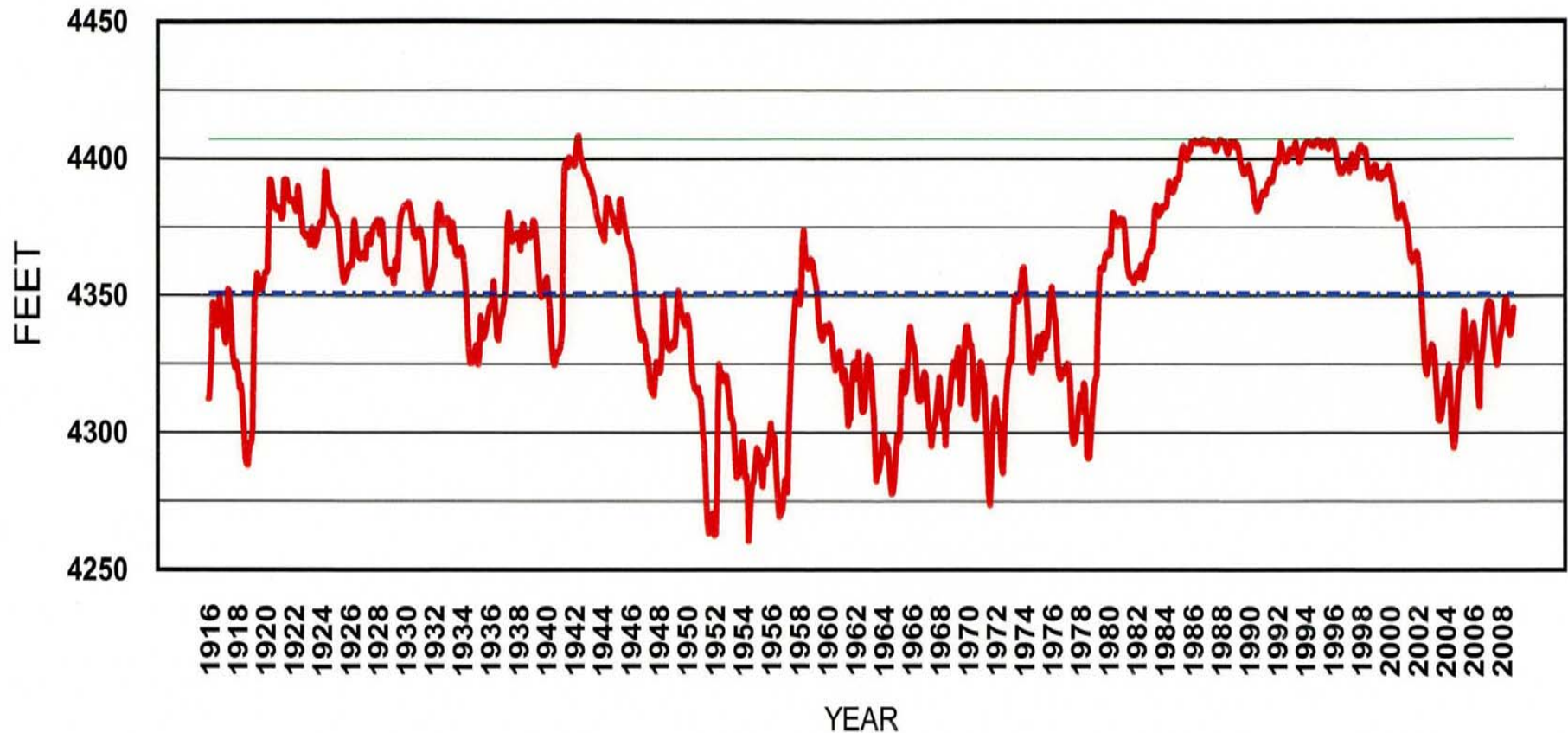
1896 Through 2008\*



\* End-of-year project storage and San Marcial flow for 2008 is a projection based on Rio Grande Project most probable plan.

# ELEPHANT BUTTE RESERVOIR

HISTORICAL END-OF-MONTH ELEVATION\*\*

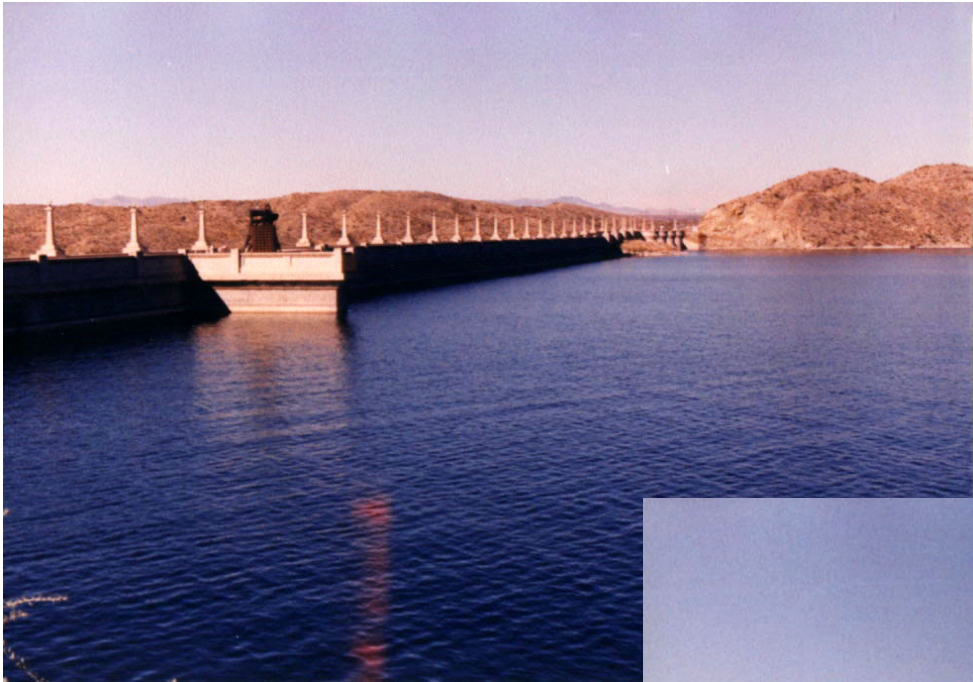


— Elevation \* — Spillway Elevation - - - Historical avg end-of-month elevation

\*\*Data thru May 2008 is actual data; other 2008 data is a projection based on Reclamation's most probable plan.

\* BOR project datum. To obtain mean sea level datum, add 43.3 feet

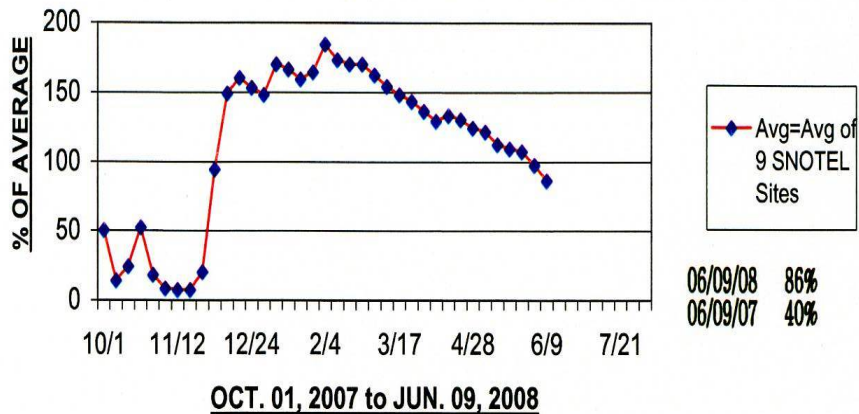




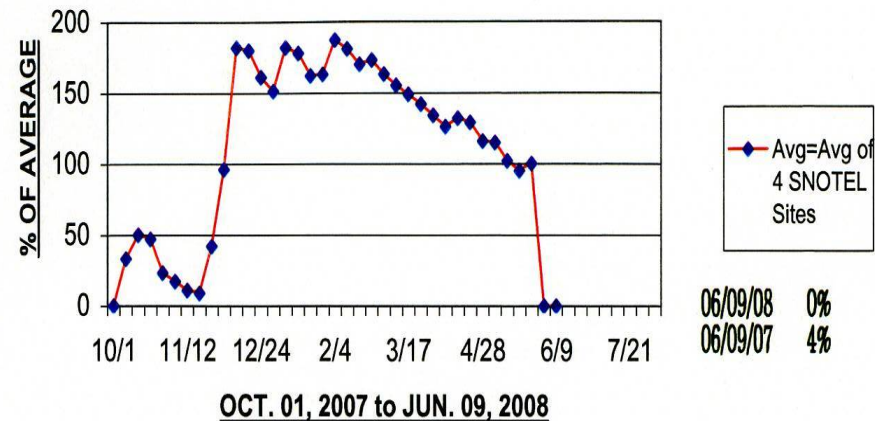




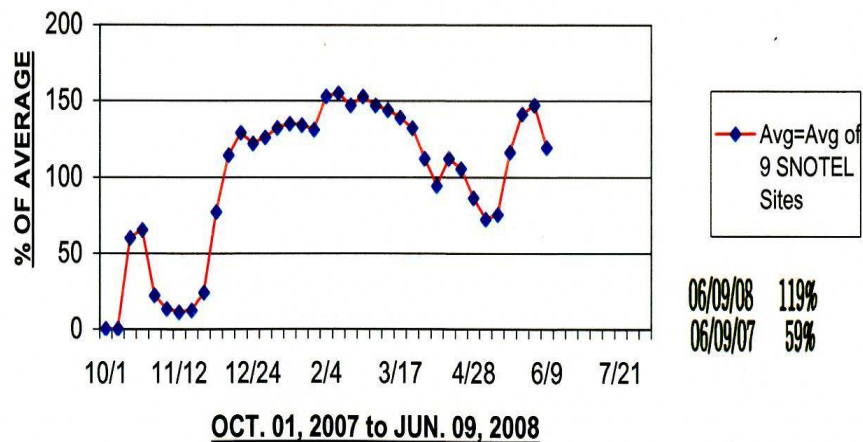
### % OF AVG. SNOW WATER EQUIVALENT vs TIME Upper Rio Grande Basin (Basin Avg.)



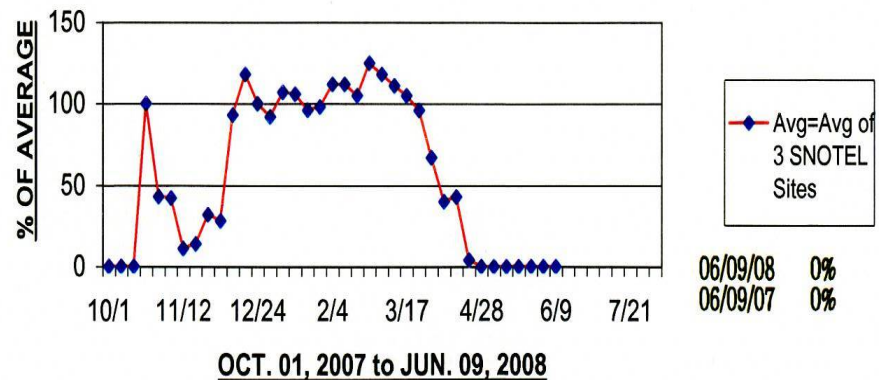
### % OF AVG. SNOW WATER EQUIVALENT vs TIME Rio Chama Basin (Basin Avg.)



### % OF AVG. SNOW WATER EQUIVALENT vs TIME Sangre de Cristo Mtn Basins (Basin Avg.)

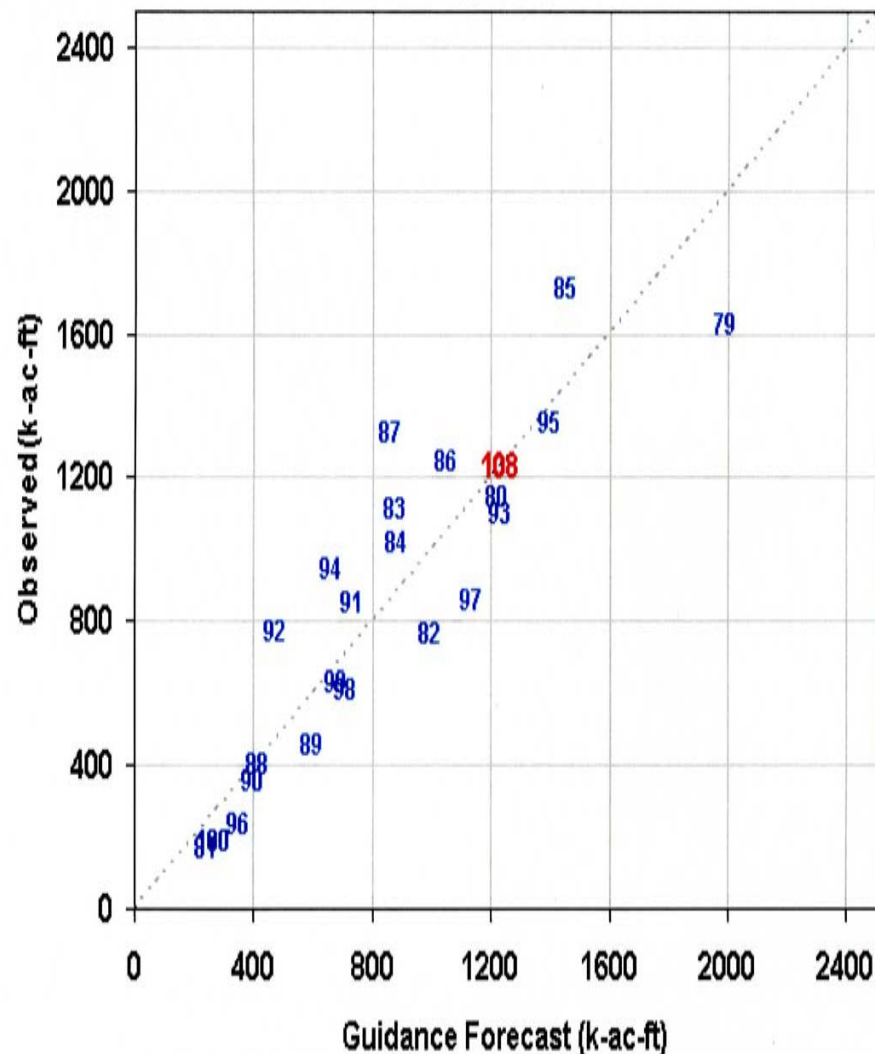


### % OF AVG. SNOW WATER EQUIVALENT vs TIME Jemez River Basin (Basin Avg.)





Rio Grande at Otowi Bridge (nm): Mar-Jul Volume



Guidance Forecast (k-ac-ft)

This is an automated product based solely on SNOTEL data, provisional data are subject to change.

Each number (e.g. "99", "104") represents an individual year (e.g. "1999", "2004") from the calibration set of the guidance forecast equation for today's date. The most recent guidance forecast is shown in red. This product is not meant to replace or supercede the official forecasts produced in coordination with the National Weather Service and should only be used for planning purposes.

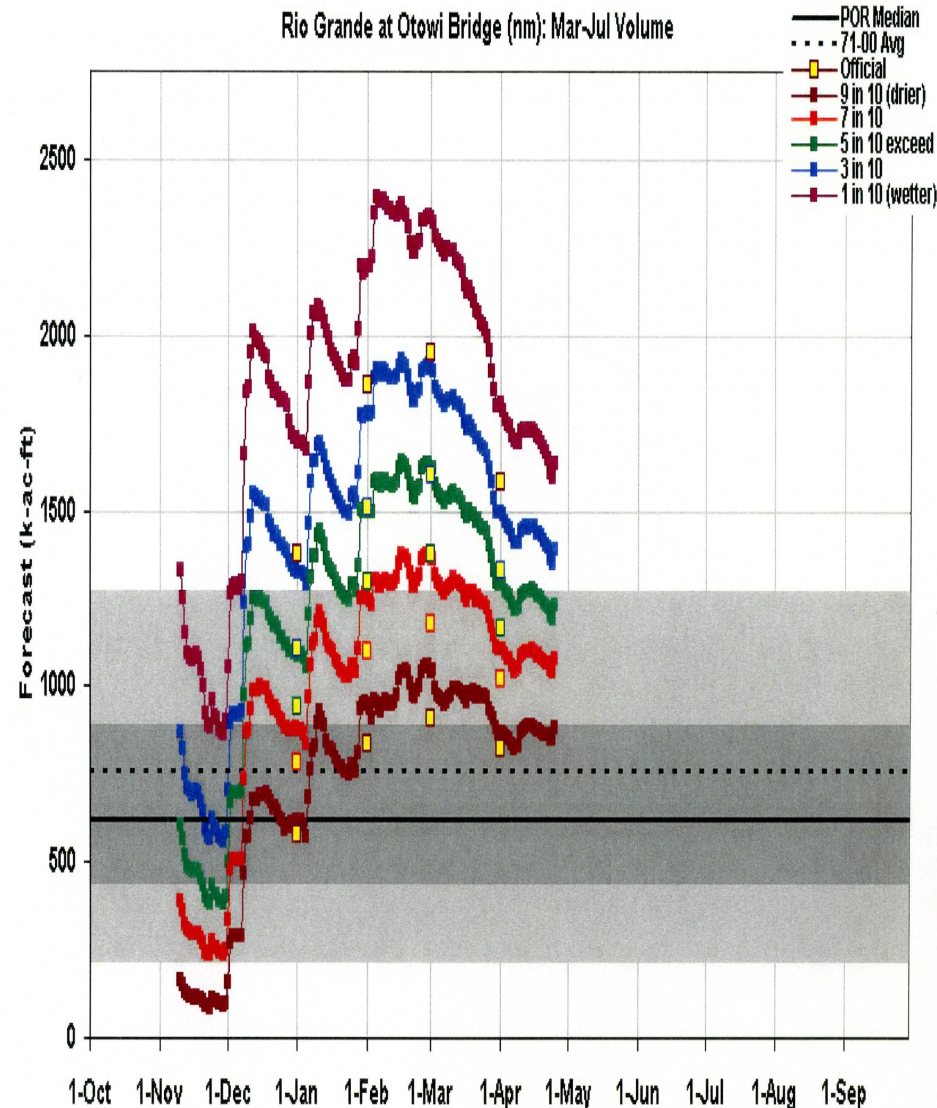
Science Contact: Tom.Pagano@por.usda.gov 503 414 3010

[http://www.wcc.nrcs.usda.gov/wsf/daily\\_forecasts.html](http://www.wcc.nrcs.usda.gov/wsf/daily_forecasts.html)

Generated 11:59 Apr 25 2008



Rio Grande at Otowi Bridge (nm): Mar-Jul Volume



Created 11:59 Apr 25 2008



This is an automated product based solely on SNOTEL data, provisional data are subject to change.

This product is a statistically based guidance forecast combining indices of snowpack and precipitation.

Yellow squares are the official outlooks. Gray background is the historical period of record variability.

This product does not consider climate information such as El Nino or short range weather forecasts, or a variety of other factors considered in the official forecasts. This product is not meant to replace or supercede the official forecasts produced in coordination with the National Weather Service.

Science Contact: Tom.Pagano@por.usda.gov 503 414 3010 [www.wcc.nrcs.usda.gov/wsf/daily\\_forecasts.html](http://www.wcc.nrcs.usda.gov/wsf/daily_forecasts.html)

# SPRING RUNOFF FORECASTS

2008

## RIO GRANDE BASIN

(ACRE-FEET)

FORECAST POINT	Rio Grande nr Del Norte	Rio Chama at El Vado Reservoir	Rio Grande at Otowi Bridge	Jemez River at Jemez Canyon Reservoir	Rio Grande at San Marcial
FORECAST PERIOD	APR-SEP	MAR-JUL	MAR-JUL	MAR-JUL	MAR-JUL
<b>30-YEAR AVERAGE RUNOFF *</b>	531,000	237,000	757,000	45,000	<b>573,000</b>
JANUARY 1 FORECAST	690,000 130%	295,000 124%	940,000 124%	36,000 80%	750,000 131%
FEBRUARY 1 FORECAST	790,000 149%	390,000 165%	1,300,000 172%	50,000 111%	1,050,000 183%
MARCH 1 FORECAST	850,000 160%	400,000 169%	1,380,000 182%	52,000 116%	1,150,000 201%
APRIL 1 FORECAST	745,000 140%	375,000 158%	1,170,000 155%	41,000 91%	980,000 171%
MAY 1 FORECAST **	680,000 128%	330,000 139%	1,040,000 137%	36,000 80%	695,000 121%
JUNE 1 FORECAST	655,000 123%	305,000 129%	965,000 127%	33,000 73%	665,000 116%
70% Exceedance: (drier)					920,000 122%
90% Exceedance: (minimum - driest)					860,000 114%
JUNE 1, 2007					450,000 85%
					178,000 75%
					530,000 70%
					38,000 84%
					410,000 72%

\* based on 1971-2000 runoff data.

\*\* last official forecast for 2008 spring runoff.



BASED ON 2008 MARCH THROUGH JULY WATER SUPPLY OUTLOOK REPOF Jun 1

2008 MAR-JUL @ SAN MARCIAL (NRCS forecast)

116%

665 KAF

2008 MAR-JUL @ SAN MARCIAL (regulated forecast)

118%

676 KAF

\*\* Based on 30-yr (1971-2000) avg of 573,000 Acre-feet.

\* Actual historical data

YEAR	COCHITI RELEASE	NET LOSSES	SAN MARCIAL	LOSSES	EVAP	ELEPHANT BUTTE CONTENT	RELEASE	EVAP	LOSSES	CABALLO IRRIG. DEMAND	EXCESS RELEASE	TOTAL RELEASE	CABALLO CONTENT	
<b>2007</b>														<b>2007</b>
JAN	38	-14	52	5	2	558	1	1	-3	0	0	0	45	JAN
FEB	40	-3	44	-1	4	598	0	1	-2	0	0	0	47	FEB
MAR	86	28	57	-14	7	609	54	1	4	76	0	76	19	MAR
APR	73	8	66	-15	10	556	124	2	6	74	0	74	61	APR
MAY	161	29	133	4	10	601	73	3	6	56	0	56	68	MAY
JUN	84	38	46	-11	14	571	73	4	-7	104	0	104	40	JUN
JUL	50	34	16	-13	11	461	128	3	1	105	0	105	59	JUL
AUG	44	29	15	-15	9	397	86	3	4	105	0	105	33	AUG
SEP	40	23	17	-12	7	358	61	1	0	77	0	77	16	SEP
OCT	32	21	11	-5	6	326	42	1	-2	39	0	39	21	OCT
NOV	32	5	27	-4	4	352	0	1	-2	0	0	0	22	NOV
DEC	56	23	33	-27	3	409	0	1	-3	0	0	0	24	DEC
<b>TOTAL</b>	<b>736</b>	<b>221</b>	<b>515</b>	<b>-109</b>	<b>87</b>	<b>642</b>	<b>642</b>	<b>22</b>	<b>2</b>	<b>637</b>	<b>0</b>	<b>637</b>	<b>38</b>	<b>TOTAL</b>
<b>AVG</b>	<b>454</b>	<b>137</b>	<b>317</b>	<b>55%</b>		<b>483</b>							<b>38</b>	<b>AVG</b>
<b>2008</b>														<b>2008</b>
JAN	45	-3	48	-1	3	455	1	1	-2	0	0	0	26	JAN
FEB	57	3	54	-4	5	482	25	1	3	7	0	7	41	FEB
MAR	140	55	84	-32	8	495	95	2	7	89	0	89	38	MAR
APR	215	78	137	-33	12	536	117	3	6	95	0	95	51	APR
MAY	260	61	199	-0	16	615	104	3	3	103	0	103	46	MAY
JUN	255	78	177	7	18	625	141	8	-4	129	0	129	55	JUN
JUL	72	-7	79	-7	18	561	132	3	1	133	0	133	50	JUL
AUG	68	16	52	-9	18	480	123	3	3	132	0	132	35	AUG
SEP	55	17	38	-6	12	449	63	1	0	78	0	78	20	SEP
OCT	47	7	40	-4	10	467	16	1	-2	25	0	25	11	OCT
NOV	52	-7	59	1	5	520	0	1	-2	0	0	0	12	NOV
DEC	53	-7	60	2	3	574	0	1	-3	0	0	0	14	DEC
<b>TOTAL</b>	<b>1318</b>	<b>292</b>	<b>1027</b>	<b>-86</b>	<b>128</b>	<b>819</b>	<b>819</b>	<b>28</b>	<b>11</b>	<b>790</b>	<b>0</b>	<b>790</b>	<b>33</b>	<b>TOTAL</b>
<b>AVG</b>	<b>941</b>	<b>265</b>	<b>676</b>	<b>118%</b>		<b>522</b>							<b>33</b>	<b>AVG</b>
<b>2009</b>														<b>2009</b>
JAN	40	-7	47	0	4	617	0	1	-3	0	0	0	16	JAN
FEB	44	-4	48	-0	8	635	22	1	-2	0	0	0	40	FEB
MAR	75	15	60	-1	10	558	128	2	2	119	0	119	45	MAR
APR	157	37	120	-2	16	581	83	2	2	79	0	79	45	APR
MAY	250	55	195	-4	18	662	100	3	2	90	0	90	50	MAY
JUN	197	67	130	-6	24	638	137	4	2	131	0	131	50	JUN
JUL	119	51	68	-7	18	559	136	4	-1	133	0	133	50	JUL
AUG	78	34	44	-9	14	484	113	2	-3	124	0	124	40	AUG
SEP	55	23	32	-6	12	453	58	1	-2	78	0	78	20	SEP
OCT	47	17	30	-2	10	450	25	1	-2	35	0	35	11	OCT
NOV	52	-7	59	2	5	502	0	1	-2	0	0	0	12	NOV
DEC	53	-7	60	2	3	556	0	0	-3	0	0	0	14	DEC
<b>TOTAL</b>	<b>1167</b>	<b>274</b>	<b>894</b>	<b>-33</b>	<b>142</b>	<b>803</b>	<b>803</b>	<b>22</b>	<b>-9</b>	<b>790</b>	<b>0</b>	<b>790</b>	<b>32</b>	<b>TOTAL</b>
<b>AVG</b>	<b>798</b>	<b>225</b>	<b>573</b>	<b>100%</b>		<b>558</b>							<b>32</b>	<b>AVG</b>

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## RIO GRANDE PROJECT

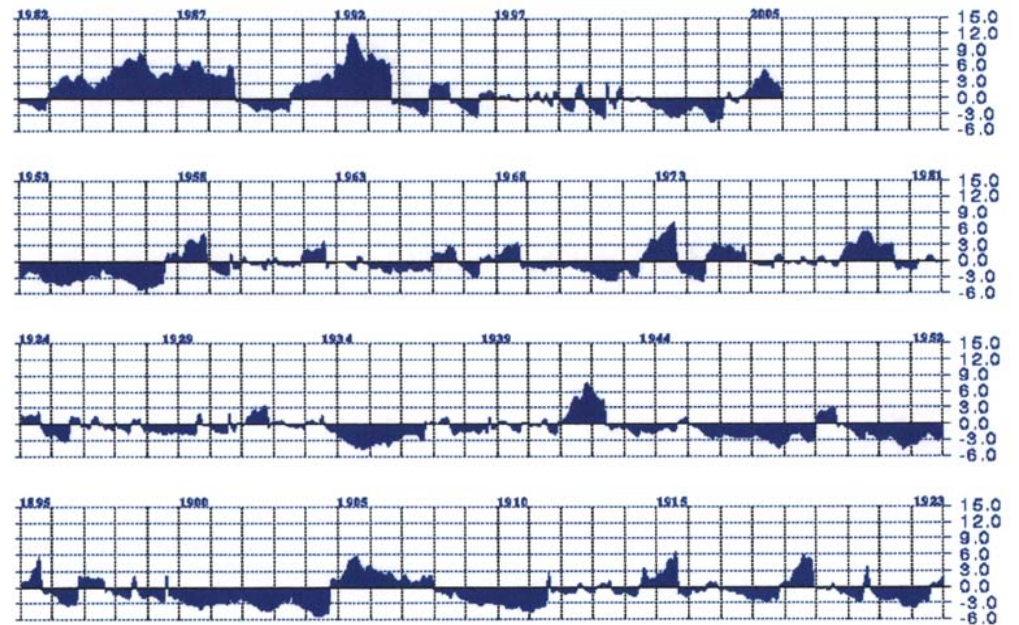
## RIO GRANDE PROJECT AND CLIMATE CHANGE



U. S Dept. of the Interior  
Bureau of Reclamation



**Palmer Drought Severity Index**

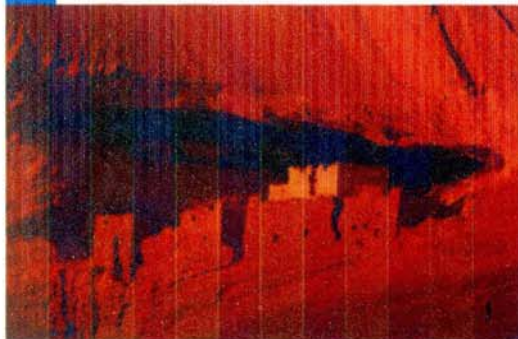
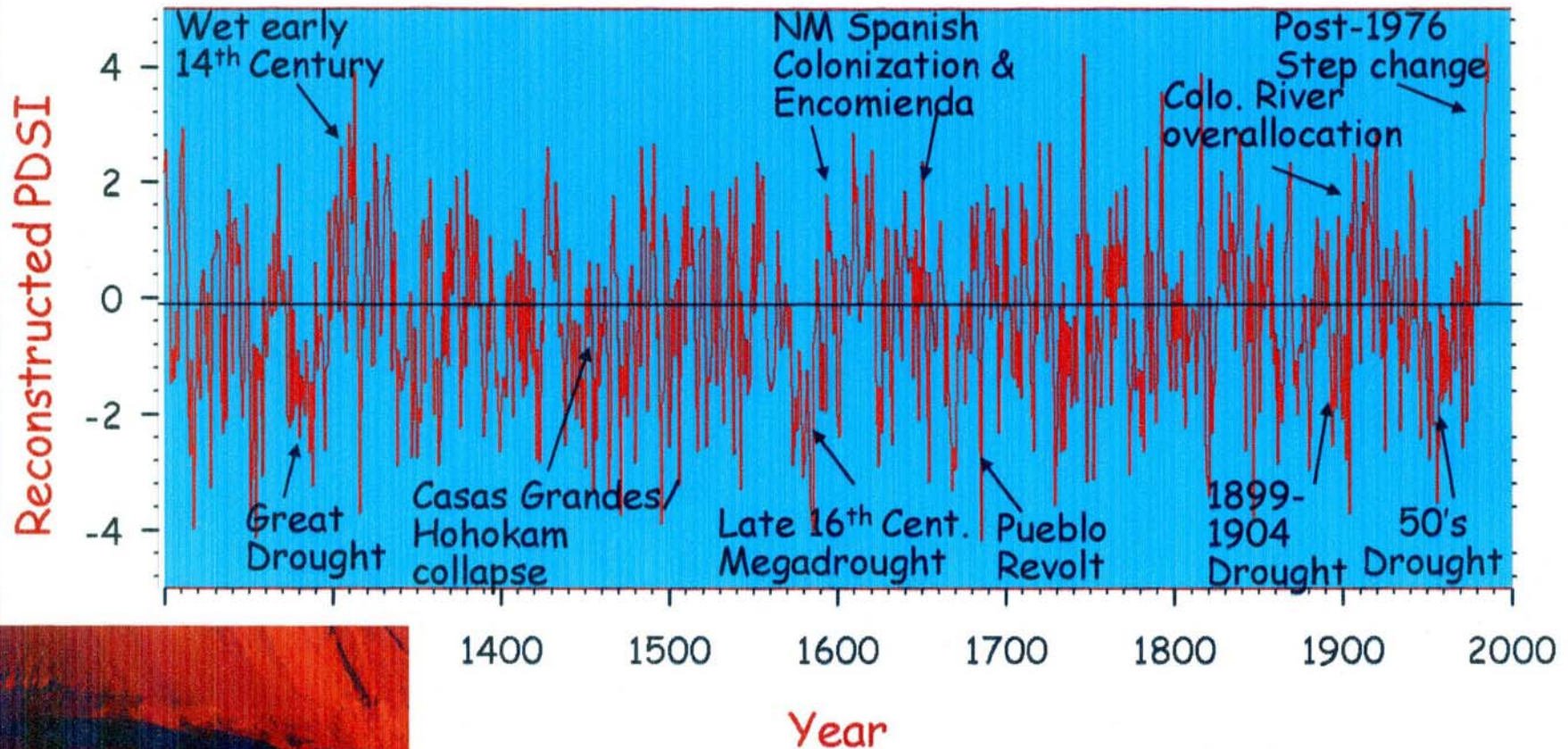


**New Mexico - Division 08: 1895-2005 (Monthly Averages)**



But, such droughts are just part of the naturally recurring range of events in the West...

## Cook's Southwest Drought Index

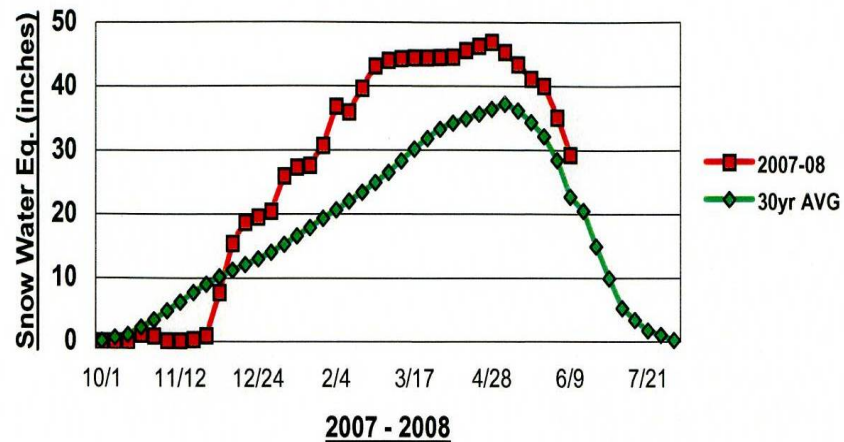


*courtesy of Julio  
Betancourt, USGS, Tucson*



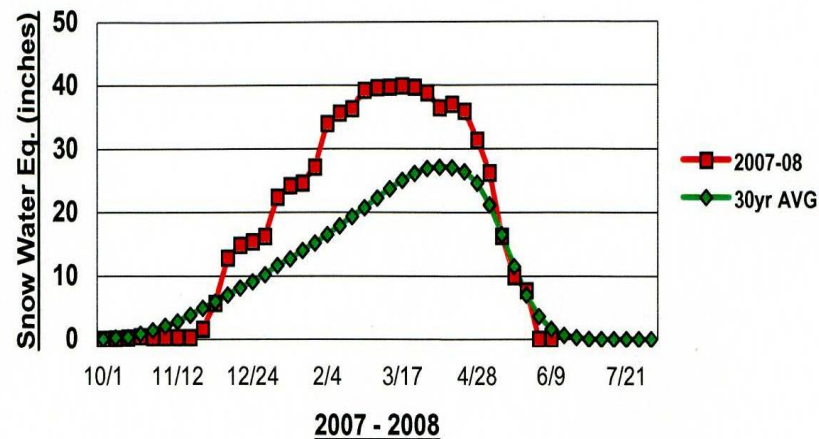
### WOLF CREEK SUMMIT SNOTEL

Elevation: 11,000 FT



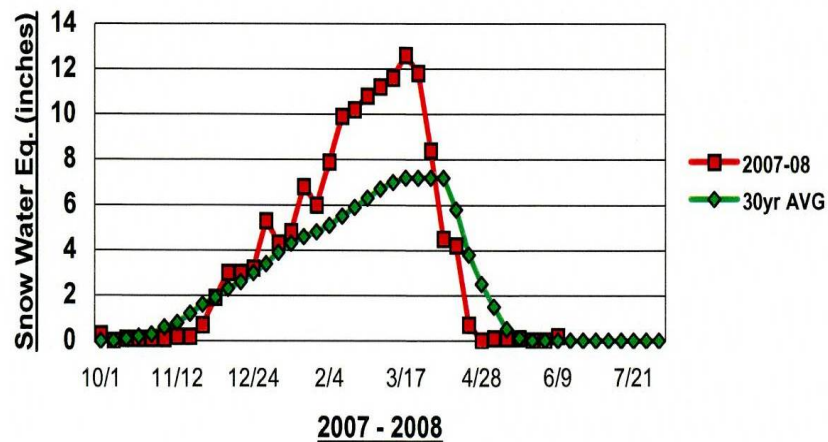
### CUMBRES TRESTLE SNOTEL

Elevation: 10,040 FT



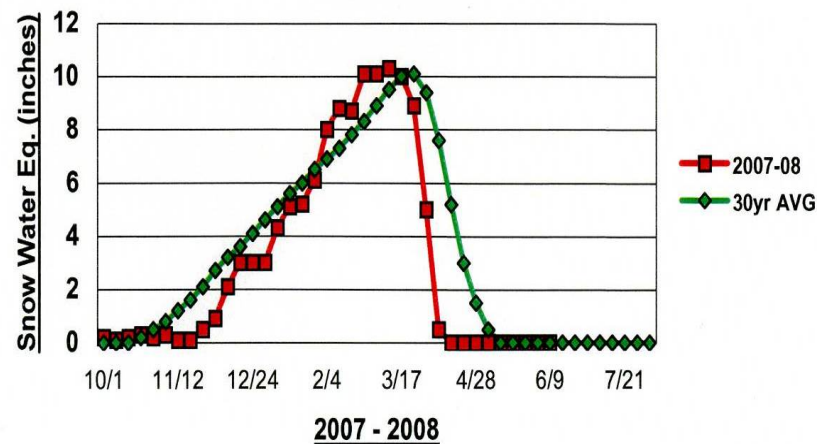
### RED RIVER PASS #2 SNOTEL

Elevation: 9,850 FT



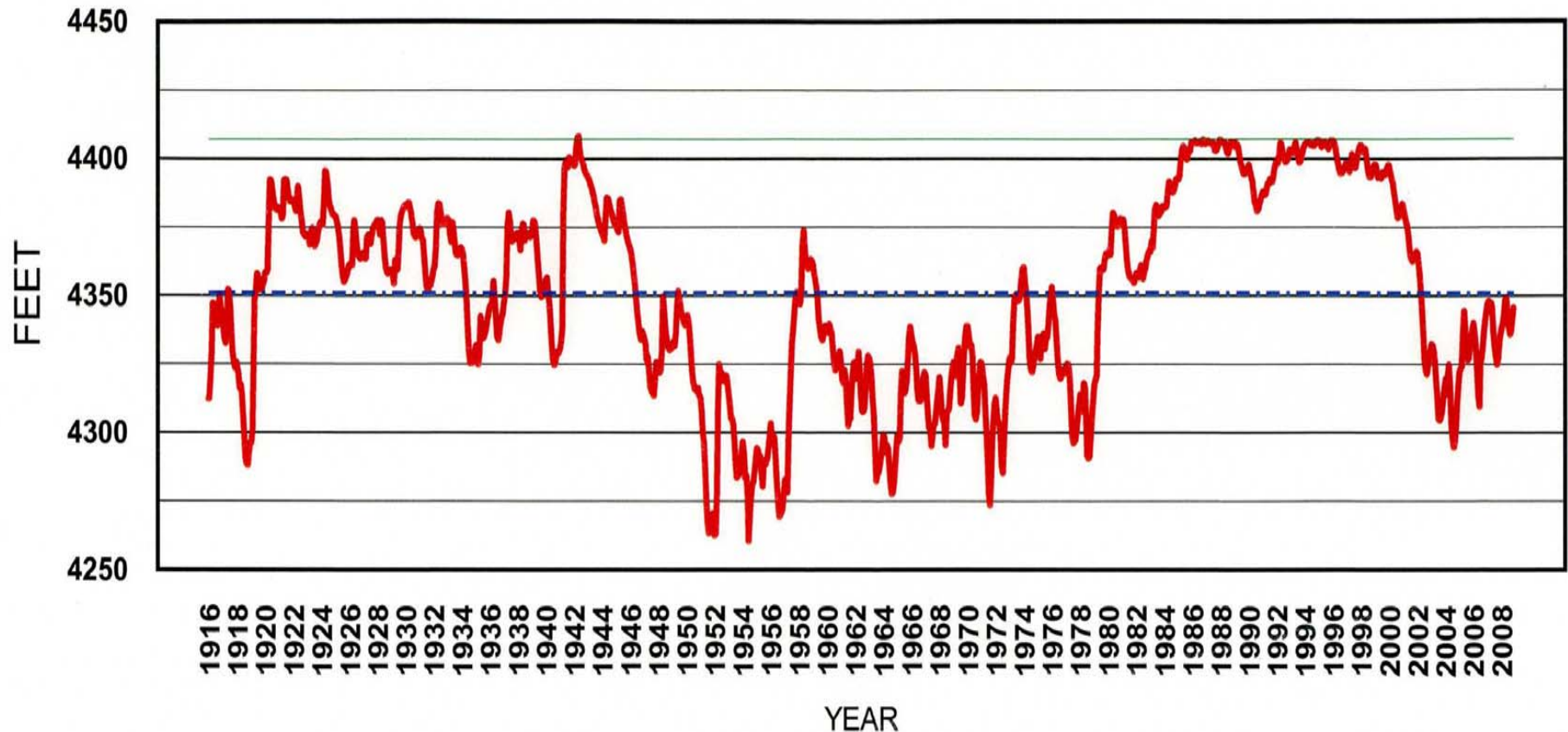
### QUEMAZON SNOTEL

Elevation: 9,500 FT



# ELEPHANT BUTTE RESERVOIR

HISTORICAL END-OF-MONTH ELEVATION\*\*



— Elevation \* — Spillway Elevation - - - Historical avg end-of-month elevation

\*\*Data thru May 2008 is actual data; other 2008 data is a projection based on Reclamation's most probable plan.

\* BOR project datum. To obtain mean sea level datum, add 43.3 feet



**RIO GRANDE PROJECT HISTORICAL  
ALLOCATION OF PROJECT WATER SUPPLY**

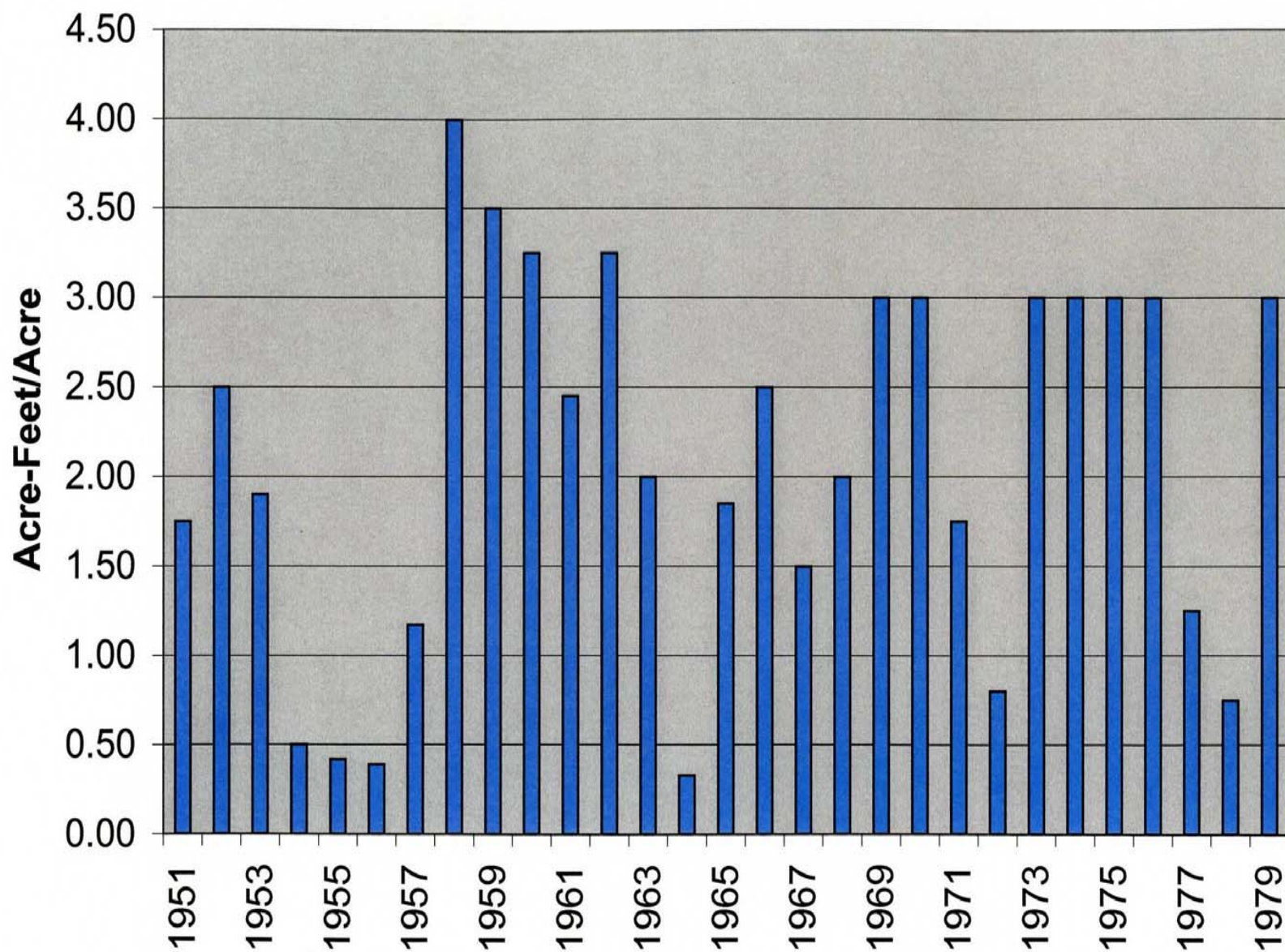
WTreeers  
03/05/2008

YEAR	EO FEB. TOTAL RIO GRANDE PROJECT STORAGE (acre-feet)	SAN MARCIAL SPRING RUNOFF (Mar-Jul) (acre-feet)	INITIAL ALLOTMENT TO PROJECT LANDS (acre-foot/acre)	FINAL ALLOTMENT TO PROJECT LANDS (acre-foot/acre)	INITIAL ALLOTMENT TO PROJECT CANAL HEADINGS (acre-feet)	FINAL ALLOTMENT TO PROJECT CANAL HEADINGS (acre-feet)	EO OCT. TOTAL RIO GRANDE PROJECT STORAGE (acre-feet)	MEXICO DIVERSION AT ACEQUIA MADRE HEADING (acre-feet)	INITIAL RELEASE DATE FROM CABALLO DAM	CABALLO DAM TOTAL YEARLY RELEASE (acre-feet)
								*		
1951	452,730	17,877	1.00	1.75			32,900	33,059	03/06	469,450
1952	103,920	832,160	0.21	2.50			370,950	49,890	03/20	543,975
1953	468,600	143,170	1.00	1.90			99,990	37,760	03/10	528,628
1954	184,460	76,720	0.42	0.50			91,480	10,147	03/20	244,165
1955	169,850	68,920	0.21	0.42			129,700	8,185	03/20	219,157
1956	212,180	59,885	0.33	0.39			31,040	7,864	03/18	246,140
1957	77,130	600,680	0.10	1.17			645,760	23,290	03/20	397,103
1958	857,510	988,030	1.75	4.00			1,007,170	60,050	03/01	737,125
1959	1,185,120	72,590	3.00	3.50			575,670	60,110	03/02	687,414
1960	713,550	410,900	2.25	3.25			405,820	60,320	03/02	705,162
1961	492,870	269,550	1.25	2.45			223,080	48,610	03/10	561,697
1962	486,570	448,250	1.75	3.25			269,580	60,057	03/05	651,941
1963	513,170	116,765	1.85	2.00			109,440	39,693	03/05	517,172
1964	194,790	67,930	0.25	0.33			58,670	6,653	03/15	206,085
1965	172,340	598,290	0.17	1.85			340,940	36,658	03/20	505,598
1966	627,430	328,380	1.75	2.50			312,910	49,618	03/05	610,341
1967	454,710	74,090	1.25	1.50			223,340	29,829	02/27	456,517
1968	386,860	238,560	1.00	2.00			277,530	39,677	02/27	505,691
1969	466,970	358,710	1.25	3.00			387,410	59,884	02/27	667,669
1970	614,620	257,960	2.00	3.00			223,870	60,065	02/23	661,125
1971	435,640	112,837	1.50	1.75			75,540	34,847	02/26	498,375
1972	283,380	77,630	0.60	0.80			258,910	16,077	03/01	260,911
1973	457,960	914,090	1.00	3.00			707,340	60,000	03/09	617,461
1974	915,650	95,430	3.00	3.00			376,650	60,050	03/02	640,843
1975	507,700	617,850	1.00	3.00			534,490	60,052	01/24	580,617
1976	762,230	204,260	2.50	3.00			353,910	60,172	01/16	679,676
1977	482,460	43,374	1.00	1.25			140,460	24,824	03/03	416,496
1978	268,220	248,610	0.25	0.75			112,160	14,903	03/10	356,167
1979	328,690	1,148,880	0.67	3.00		790,000	855,640	60,055	03/08	568,687
1980	1,080,400	861,894	3.00	3.00		790,000	1,178,400	60,033	01/17	658,686
1981	1,339,860	54,256	3.00	3.00	750,650	750,650	774,380	60,262	02/04	608,166
1982	878,660	548,573	3.00	3.00	790,000	790,000	866,140	59,257	01/27	635,642
1983	1,070,130	920,545	3.00	3.00	790,000	790,000	1,289,750	60,621	02/03	648,386
1984	1,424,200	831,291	3.00	3.00	902,000	902,000	1,515,500	58,588	02/09	653,150
1985	1,747,700	1,133,599			902,000	902,000	2,121,600	60,276	02/20	677,398
1986	2,322,200	812,686			902,000	902,000	2,290,800	66,163	04/01	1,396,165
1987	2,336,900	1,003,319			902,000	902,000	2,168,400	65,866	02/03	1,376,099
1988	2,383,900	419,098			902,000	902,000	2,060,100	61,935	01/20	838,008
1989	2,151,900	378,144			890,900	890,900	1,705,300	58,854	02/13	736,866
1990	1,801,000	159,213			931,841	931,841	1,319,400	58,353	02/12	680,107
1991	1,509,660	656,638			931,841	931,841	1,580,080	59,242	02/19	625,956
1992	1,830,380	745,950			931,841	931,841	1,802,720	58,080	01/09	734,982
1993	1,980,230	742,508			931,841	931,841	1,978,640	63,763	01/12	823,263
1994	2,155,690	852,845			931,841	931,841	2,003,860	60,167	01/11	893,384
1995	2,203,730	991,736			931,841	931,841	2,083,050	63,618	01/17	1,096,146
1996	2,263,420	131,980			931,841	931,841	1,689,550	60,063	01/12	774,335
1997	1,814,910	600,666			931,841	931,841	1,814,980	59,442	01/21	798,621
1998	2,036,000	447,172			931,841	931,841	1,636,860	60,628	01/16	808,661
1999	1,803,410	384,225			931,841	931,841	1,658,810	58,308	01/27	735,467
2000	1,804,980	159,000			931,841	931,841	1,243,900	60,611	01/20	751,373
2001	1,359,370	241,000			931,841	931,841	856,910	61,037	02/02	786,549
2002	974,610	61,095			738,139	931,841	323,190	60,324	02/19	801,147
2003	456,140	62,029			74,860	317,495	170,490	26,948	03/17	364,528
2004	288,480	240,387			43,667	353,944	128,010	27,613	03/12	398,612
2005	331,000	738,095			138,549	931,841	362,060	58,091	03/09	676,031
2006	517,170	92,521			351,560	472,426	436,950	27,112	03/08	434,228
2007	644,990	316,979			369,466	760,391	346,170	51,245	03/07	636,730

bold number means full irrigation supply for Rio Grande Project water users.

\* derived from International Boundary & Water Commission (IBWC) - U. S. Section, Yearly Flow Data Publications.

## Rio Grande Project Historical Allocation (1951-1979)





# Rio Grande Project Historical Allocation (1979-2007)

