



## **TABLES**



**Table 1.1**  
**Executive Steering Committee**

The following entities were invited to participate on the Executive Steering Committee:

Alliance for the Rio Grande Heritage  
Army Corps of Engineers  
Bureau of Indian Affairs  
Bureau of Reclamation  
City of Albuquerque  
Middle Rio Grande Conservancy District  
Middle Rio Grande Council of Governments  
Middle Rio Grande Water Assembly  
New Mexico Environment Department  
New Mexico Interstate Stream Commission  
New Mexico Office of the State Engineer  
Pueblo of Cochiti  
Pueblo of Isleta  
Pueblo of Jemez  
Pueblo of San Felipe  
Pueblo of Santa Ana  
Pueblo of Santo Domingo  
Pueblo of Sandia  
Pueblo of Zia  
Rio Grande Restoration  
Socorro-Sierra Planning Region  
University of New Mexico, Department of Civil Engineering  
U.S. Fish and Wildlife Service  
U.S. Geological Survey  
Mike Kernodle, Hydrogeologist  
Frank Titus, Hydrogeologist

**Table 2.1**  
**Long-Term Average vs. Recent Climatic Conditions**

<b>Year</b>	<b>Average MRG PDSI reconstruction</b>	<b>Average EI Malpais reconstructed precipitation (inches)</b>	<b>Average Otowi Index Supply (acre-feet per year)</b>
-136-1992	-	14.57	-
622-1992	0	14.59	-
1950-1992	0.08	15.49	933,070
1950-2002	-	-	939,819

**Table 2.2**  
**Average Otowi Index Supply for Selected Periods During the 1900s**

<b>Period (years)</b>	<b>Average Otowi Index Supply (acre-feet/year)</b>	<b>Percentage of 1950-1998 average</b>	<b>PDO phase</b>
1950-1998	963,459	100	
1925-1946	1,112,563	115	Positive (warm)
1947-1976	824,407	86	Negative (cool)
1977-1998	1,171,250	122	Positive (warm)

**Table 3.1**  
**Metadata Database: Summary of Included Data Sets**

**Time Series Data**

USGS Gaging Stations, Flow:	Daily flow for each of 9 stations, including river and tributaries.
USGS Stations, Reservoir Contents:	Daily contents, 2 stations, Cochiti Lake and Elephant Butte Reservoir
EPA records, wastewater:	Monthly NPDES discharge at Rio Rancho, Bernalillo, Albuquerque, Los Lunas, Belen, Socorro
Rio Grande Compact Data:	Rio Grande Compact Commission reported values for: Otowi Index Flow, Elephant Butte Effective Index Supply, Actual Elephant Butte Effective Supply, San Juan-Chama Transmountain diversions, and Credit/Debit Balance
Crop Consumptive Use:	Daily crop use, for reaches 1, 3-6 from USBR ET Toolbox
Riparian Consumptive Use	Daily riparian evapotranspiration, for reaches 1, 3-6 from USBR ET Toolbox
Open Water Consumptive Use	Daily open water evaporation, for reaches 1, 3-6 from USBR ET Toolbox
Cochiti Lake Evaporation	Daily evaporation, calculated by ACOE
Elephant Butte Evaporation	Daily evaporation, calculated by USBR
Groundwater Extraction	USGS groundwater model well file (as replicated in OSE model, well package)
Precipitation	Albuquerque WSFO Airport, Bosque del Apache and Socorro historical monthly Total Precipitation

**Spatial Data**

USGS Gaging Station Locations for the 9 stations used in the Phase 3 modeling
Land Use Area (from LUTA, USBR MRG Assessment), polygon and/or line coverages: <ul style="list-style-type: none"> <li>Vegetation classification for MRGCD Cochiti, Albuquerque, Belen, Socorro divisions, and San Marcial sub-area</li> <li>Vegetation classification for Bernalillo County, Sandoval County, Valencia County, and Socorro County</li> </ul>
Hydrography coverages, including MRGCD drains, canals, river and portions of tributary inflow channels for MRGCD Divisions as listed above
County boundaries for the State of New Mexico, line coverages
Boundary of USGS Middle Rio Grande study area
Transportation line coverage for the State of New Mexico
CDP polygon coverage for the State of New Mexico (cities)
Federal land ownership for lands in the Middle Rio Grande region, polygon coverage
Natural hydrography for the State of New Mexico, line and polygon coverages
Digital geologic map of State of New Mexico – river alluvium
Shaded relief map of the State of New Mexico
1:1,000,000 BLM PLSS map of New Mexico
Hydrologic Unit Codes (HUC) for the State of New Mexico (watersheds: unit code, perimeter, area)
MRGCD Property Boundary Coverage (tax assessment parcel data layer)

Table 3.2

## Existing Gaging Stations for Monitoring Key MRGCD Irrigation System Flows

Gage Name	Gage ID	Operator	Gage Purpose	Period of Record
<b>Cochiti Division</b>				
Cochiti East Side Main Canal	CCCN5	USGS	Canal Heading	1954 - present
Sili Main Canal	SILN5	USGS	Canal Heading	1954 - present
Approximately 10 - 14 return flow points	-----	-----	Returns to River	TBD
Cochiti Main at San Felipe	CMCCN	MRGCD	mid-reach	(1954) 1974 - present
<b>Albuquerque Division</b>				
Albuquerque Main Canal <sup>1</sup>	ALBCN	MRGCD	Canal Heading	1974 - 2003; 2003 - present
Atrisco Feeder Canal	ATFCN	MRGCD	Canal Heading	1974 - present
Algodones Riverside Drain <sup>1</sup>	ALGDR	MRGCD	Return from Cochiti Div.	1974 - 2003; 2003 - present
Lower San Felipe Drain Outfall	SNFDR	MRGCD	Return from Cochiti Div.	TBD
Bernalillo Lateral	BERCN	MRGCD	Canal Heading	TBD
Arenal Main Canal <sup>1</sup>	ARECN	MRGCD	Central Ave. X-Section	1974 - 2003; 2003 - present
Armijo Acequia	ARMCN	MRGCD	Central Ave. X-Section	1958 - present
Atrisco Ditch	ATDCN	MRGCD	Central Ave. X-Section	1958 - present
Albuquerque Riverside Drain @ Central Avenue	ALBDR	MRGCD	Central Ave. X-Section	1954 - present
Corrales Main Canal	CORCN	MRGCD	West side feeder Canal	1974 - present
Upper Corrales Riverside Drain	UCRDR	MRGCD	Drain to River	2001 - present
Corrales Main Canal Wasteway	CORWW	MRGCD	Wasteway to River	1997 - present
Central Avenue Wasteway	CENWW	MRGCD	Wasteway to River	2000 - present
Atrisco Riverside Drain	ATRDR	MRGCD	Drain to River	1997 - present
Lower Corrales Riverside Drain	LCRDR	MRGCD	Derived drain to River	2000 - present
Albuquerque Riverside Drain	ARSDR	MRGCD	Drain to River	1997 - present
Sandia Lakes Wasteway	SANWW	MRGCD	Wasteway to River	2000 - present
Pajarito Lateral	PAJCN	MRGCD	Secondary Canal	2002/03 - present
Gun Club Lateral	GUNCN	MRGCD	Secondary Canal	2002/03 - present
Butte Lateral	BUTCN	MRGCD	Secondary Canal	Anticipated 2004
Indian Lateral	INDCN	MRGCD	Secondary Canal	Anticipated 2004
<b>Belen Division</b>				
Belen Highline Canal	BELCN	MRGCD	Canal Heading	1974 - present
Peralta Main Canal	PERCN	MRGCD	Canal Heading	1974 - present
Chical Lateral	CHICN	MRGCD	Canal Heading	1974 - present
Chical Acequia	CHACN	MRGCD	Canal Heading	1974 - present
Cacique Acequia	CACCN	MRGCD	Canal Heading	1974 - present
Lower San Juan Riverside Drain <sup>1</sup>	LSJDR	MRGCD	Bernardo X-Section <sup>2</sup>	1974 - 2003; 2003 - present
Isleta Drain Outfall	ISLDR	MRGCD	Drain to River	Anticipated 2004
Peralta Main Wasteway	PERWW	MRGCD	Wasteway to River	1999 - present
Feeder #3 Wasteway	FD3WW	MRGCD	Wasteway to River	2000 - present
Belen Riverside Drain	BELDR	MRGCD	Drain to River	2000 - present
New Belen Acequia Wasteway	NBLWW	MRGCD	Wasteway to River	Anticipated 2004
Lower Peralta Riverside Drain #1	LP1DR	MRGCD	Drain to River	2001 - present
Lower Peralta Riverside Drain #2	LP2DR	MRGCD	Drain to River	2003
Sabinal Riverside Drain	SABDR	MRGCD	Drain to River	2001 - present
Storey Wasteway	STYWW	MRGCD	Wasteway to River	2003
San Francisco Riverside Drain	SFRDR	MRGCD	Drain to River	2003
Unit 7 Drain	UN7DR	MRGCD	Return to Socorro Division	2001 - present
<b>Socorro Division</b>				
Socorro Main Canal	SOCCN	USGS/MRGCD <sup>4</sup>	Canal Heading	2001 - present
Socorro Wasteway	SOCWW	MRGCD	Wasteway to LFCC <sup>3</sup>	Anticipated 2004
Brown Arroyo Wasteway	BRNWW	MRGCD	Wasteway to Brn. Arroyo	Anticipated 2004
Socorro Riverside Drain at Bosque del Apache	SOCDR	MRGCD	end of MRGCD reach	2003
Socorro Main Canal South at Bosque del Apache	SMSCN	MRGCD	end of MRGCD reach	2003
San Antonio Ditch at Bosque del Apache	SADCN	MRGCD	end of MRGCD reach	2002
Elmendorf Drain at Bosque del Apache	ELMDR	MRGCD	end-reach	2003

<sup>1</sup> Gage rebuilt in 2003; accuracy improved, position may have changed.

<sup>2</sup> This gage also forms the basis for estimating return flow to the river from this drain.

<sup>3</sup> Diversions from the Low Flow Conveyance Channel gaged intermittently by USGS.

<sup>4</sup> MRGCD has a new gage here beginning 2001.

TBD - the installation date has not yet been established

**Table 3.3**  
**Summary of USGS River, Conveyance and Tributary Gaging Stations**

STATION NAME (upstream tributary and distant arroyo stations excluded)	Station Code	Station Number	Latitude	Longitude	County	Gage Datum (ft above NGVD)	Approximate Period of Record
Rio Grande At Otowi Bridge, Nm	R	8313000	355229	1060830	Santa Fe	5488.48	1885-1905, 1909-present
Cochiti East Side Main Canal At Cochiti, N. Mex.	C	8313500	353702	1061926	Sandoval		1954-present
Sili Main Canal (At Head) At Cochiti, N. Mex.	C	8314000	353710	1061928	Sandoval		1954-present
Rio Grande At Cochiti, New Mexico	R-d	8314500	353756	1061908	Sandoval	5224.7	1924-1970
Santa Fe River Above Cochiti Lake	T	8317200	353249	1061341	Santa Fe	5505	1970-present
Rio Grande Below Cochiti Dam, N. Mex.	R	8317400	353704	1061926	Sandoval	5226.08	1970 - present
Galisteo Creek Below Galisteo Dam, Nm	T	8317950	352756	1061257	Santa Fe	5450	1970-present
Rio Grande At San Felipe, Nm	R	8319000	352639	1062623	Sandoval	5115.73	1925 - present
Jemez River Below Jemez Canyon Dam, Nm	T	8329000	352324	1063203	Sandoval	5095.6	1936-1938; 1943-present
Rio Grande Near Bernalillo, N. Mex.	R-d	8329500	351705	1063545	Sandoval	5030.57	1941-1969
N Floodway Channel Nr Alameda N M	T	8329900	351158	1063553	Bernalillo	5015	1968-present
Rio Grande Nr Alameda, Nm	R-d	8329928	351054	1063920	Bernalillo		1989-1995
Corrales Riverside Drain Nr Corrales, Nm	D	8329930	351219	1063830	Bernalillo	4995	1996-present
Corrales Main Canal Outfall At Albuquerque, Nm	O	8329931	350941	1064027	Bernalillo	4990	1996-present
Rio Grande At Albuquerque, Nm	R	8330000	350521	1064047	Bernalillo	4946.16	1941 - present
Rio Grande At Rio Bravo Bridge Near Albuquerque, Nm	R-d	8330150	350159	1064023	Bernalillo		1991-1995
Tijeras Arroyo Nr Albuquerque, N. Mex.	T	8330600	350004	1063918	Bernalillo	5000	1951-1968, 1974-present
South Div Channel Abv Tijeras Arroyo Nr Albq, Nm	T	8330775	350009	1063902	Bernalillo	4930	1988-present
Tijeras Arroyo Bl S Div Inlet Nr Albuquerque, Nm	T-d	8330800	350009	1063941	Bernalillo	4933	1974-1988
Rio Grande At Isleta, Nm	R-d	8331000	345421	1064104	Valencia		1925-1929, 1936-1938
Belen Highline Canal Trib Nr Los Lunas, Nm	O-d	8331100	344920	1064910	Valencia	5250	
Rio Grande Near Belen, N. Mex.	R-d	8331500	343910	1064410	Valencia	4797.32	1941-1957
Abo Arroyo Trib. Near Blue Springs, N. Mex.	T	8331660	342647	1062946	Socorro	5960	1996-present
Rio Grande Conveyance Channel Near Bernardo, Nm	D	8331990	342452	1064811	Socorro	4720	1936-1937, 1964-present
Rio Grande Nr Bernardo, N. M.	R-d	8332000	342500	1064800	Socorro	4722.55	1936-1939, 1941-1964
Rio Grande Floodway Near Bernardo, Nm	F	8332010	342501	1064800	Socorro	4722.55	1936-1937, 1943-present
Lower San Juan Riverside Drain	D-d	8332030			Socorro		1954-1975
Bernardo Interior Drain Nr Bernardo, N. M.	D	8332050	342456	1064915	Socorro	4710	1936-1937, 1943-present
Rio Puerco Near Bernardo, Nm	T	8353000	342433	1065109	Socorro	4722.34	1939-present
Rio Salado Near San Acacia, Nm	T-d	8354000	341750	1065359	Socorro	4765	1947-1984
Socorro Main Canal North At San Acacia, Nm	C	8354500	341517	1065343	Socorro	4660.16	1936-present
Rio Grande Conveyance Channel At San Acacia, Nm	LFCC	8354800	341454	1065404	Socorro	4652.5	1954-present
Rio Grande Floodway At San Acacia, Nm	F	8354900	341523	1065318	Socorro	4654.5	1964 - present*
Rio Grande At San Acacia N M	R-d	8355000	341513	1065345	Socorro	4658.1	1936-1964
Nogal Arroyo Fwy Nr Socorro, Nm	T-d	8355200	340547	1065250	Socorro	4620	1969-1977
Arroyo De La Matanza At Socorro N M	T-d	8355300	340151	1065404	Socorro	4760	1969-1977
Rio Grande At San Antonio N M	R-d	8355500	335510	1065100	Socorro	4541.73	1951-1957
Socorro Main C S Near San Antonio, N. Mex.	C-d	8356000	335328	1065154	Socorro	4526.41	1937-1938, 1948-1971
San Antonio Riverside Drain Nr San Antonio, N M	D-d	8356500	335324	1065104	Socorro	4524.33	1948-1971
Elmendorf Int Dr Nr San Antonio N M	D-d	8357000	335212	1065139	Socorro	4518.9	1936-1938, 1948-1971
San Antonio Riverside Drain Nr San Marcial, N M	D-d	8357500	334431	1065528	Socorro	4487.12	1948-1971
Rio Grande Conveyance Channel At San Marcial, Nm	LFCC	8358300	334107	1065940	Socorro	4454	1958-1959, 1964-present
Rio Grande Floodway At San Marcial, Nm	F	8358400	334050	1065930	Socorro	4455.19	1964-present
Rio Grande At San Marcial N M	R-d	8358500	334050	1065930	Socorro	4455.19	1895-1964
Milligan Gulch Nr San Marcial N M	T-d	8358550	333937	1070525	Socorro	4720	1968-1978
Rio Grande At Narrows In Elephant Butte Res N M	R-d	8359500	332310	1070945	Sierra	4363.63	1951-1957
Rio Grande Below Elephant Butte Dam, Nm	R	8361000	330854	1071222	Sierra	4242.09	1915 - present

**CODES:**

R	River	O	Outfall
C	Canal	LFCC	Low Flow Conveyance Channel
D	Drain	F	Floodway
T	Tributary	d	Discontinued station

**Table 3.4  
Potential Agricultural Consumptive Use**

Reach	URGWOM Reach Number	Irrigated Acreage	Potential CU (af/year)	ET rate (af/acre/year)
Cochiti to San Felipe	1	2,963	10,572	3.57
San Felipe to Central Ave	3	7,000	27,025	3.86
Central Ave to Bernardo	4	39,601	157,314	3.97
Bernardo to San Acacia	5	446	1,547	3.47
San Acacia to San Marcial	6	13,490	51,320	3.80
<b>Total</b>		<b>63,500</b>	<b>247,778</b>	

Acreage values were taken from the 1992 LUTA/Extended GIS coverages directly; fallow and idle acreage is omitted. ET rate is taken from the January 2003 ET Toolbox data and represents the 1975-2002 average potential crop consumptive use.

**Table 3.5  
Riparian Consumptive Use**

Reach	URGWOM Reach Number	Riparian Acreage	Potential Riparian CU, (af/year)	Riparian ET rate (af/acre/ year)
Cochiti to San Felipe	1	4,361	15,650	3.59
San Felipe to Central Ave	3	5,590	20,286	3.63
Central Ave to Bernardo	4	18,800	68,304	3.63
Bernardo to San Acacia	5	8,214	29,621	3.61
San Acacia to San Marcial	6	20,563	82,252	4.00
San Marcial to Elephant Butte	7	7,635	30,540	4.00
<b>Total</b>		<b>65,163</b>	<b>246,653</b>	

Acreages are taken directly from the 1992 LUTA/Extended GIS data. Open water ET rate is taken from the ET Toolbox for all reaches. Riparian ET rate is taken from the ET Toolbox for reaches 1 through 5; 4 acre-feet per acre is used for reaches 6 and 7. ET rate is taken from the January 2003 ET Toolbox data and represents the 1975-2002 average.

**Table 3.6  
Open Water Consumptive Use**

Reach	URGWOM Reach Number	Open Water Acreage	Potential Open Water CU (af/year)	Open Water ET rate (af/acre/ year)
Cochiti to San Felipe	1	571	3,200	5.60
San Felipe to Central Ave	3	1,687	9,454	5.60
Central Ave to Bernardo	4	3,354	18,541	5.53
Bernardo to San Acacia	5	873	4,891	5.60
San Acacia to San Marcial	6	2,576	14,509	5.63
San Marcial to Elephant Butte	7	2,371	13,354	5.63
<b>Total</b>		<b>11,432</b>	<b>63,948</b>	

**Table 4.1**  
**Water Budget Flow and Depletion Terms**

<b>Adjusted Inflow, Model Section 1</b>	Otowi Index Supply minus Obligation minus Elephant Butte Evaporation San Juan-Chama flow Santa Fe River above Cochiti Jemez River Galisteo Creek AMAFCA Channels Wastewater returns above county line Net groundwater inflow above San Acacia Ungaged tributaries east of the Rio Grande, entering the river above the county line Effective precipitation above county line
<b>Depletions, Model Section 1</b>	Cochiti evaporation Santa Fe depletions Groundwater pumping depletions above county line Agricultural consumptive use above county line Riparian consumptive use above county line Open water consumptive use above county line
<b>Outflow from Model Section 1</b>	Equals Adjusted Section 1 Inflow – Section 1 Depletions
<b>Adjusted Inflow, Model Section 2 and 3</b>	Section 1 Outflow Rio Puerco Rio Salado Wastewater returns below county line Ungaged tributaries west of the Rio Grande Ungaged tributaries east of the Rio Grande Net groundwater inflow below San Acacia Effective precipitation below county line
<b>Depletions, Model Section 2 and 3</b>	Groundwater pumping depletions below county line Agricultural consumptive use below county line Riparian consumptive use below county line Open water consumptive use below county line
<b>Section 3 Outflow</b>	Equals New Mexico Compact Credit/Debit

Note: Section 1 – Otowi to County Line  
Section 2 – County Line to San Acacia  
Section 3 – San Acacia to Elephant Butte



**Table 4.2**  
**Inflow and Depletion Terms, Phase 2 and Phase 3 Comparison**

Inflow Depletion	Phase 2 Distribution				Phase 3 Distribution			
	Distribution	m (af/y)	s (af/y)	Dependency	Distribution	m (af/y)	s (af/y)	Dependency
Otowi Index Supply	296500 + Beta(0.844,1.522) * 1872965	964,624	489,031		254000 + Beta(0.916, 1.643) * 1920000	945,300	488,600	
San Juan-Chama Project water	Static = 75,844				Static = 81,005			
Santa Fe River above Cochiti	Static = 9,956				Static = 9,580			
Jemez River	7748 + Beta(0.807,1.631) * 115152	45,636	28,040	0.8805 on Otowi Index	(7740 + Beta(0.7933, 1.6992)* 115000)	44,400	28,800	0.85 on Otowi Index
Galisteo Creek	Gamma(3.44,1300, Truncate(928,9505))	4,469	2,360		Weibull(1.7365,4748, Truncate(0,20000))	4,200	2,500	
AMAFCA Channels	Uniform(3072,17845)	10,459	4,265		Gamma(5.62,1692, Truncate(0,36000))	9,500	4,000	
Effective precipitation, entire region	Static = 38,535				Section 1: Normal(26386,7314, Truncate(0,81000))	26,600	7,200	
					Section 2: Normal(6964,1930, Truncate(0,22000))	7,000	1,900	0.64 on Section 1 Effective precip
					Section 3: Normal(16641,4613, Truncate(0,51000))	16,600	4,600	0.54 on Section 1 Effective Precip
Wastewater returns, entire region	Static = 68,941				Static = 66,757			
Rio Puerco	Pearson6(8.15,4.37,11609, Truncate(4753,115422))	30,966	27,107		Lognormal(25832,22432, Truncate(0,230000))	25,800	22,100	
Rio Salado	Pearson6(2.95,2.40,5343, Truncate(110,100000))	10,345	13,449	0.6688 on Rio Puerco	Lognormal(10542,15311, Truncate(0,160000))	10,500	13,300	0.56 on Rio Puerco
Ungaged Tributaries (Westside Inflow)	Pearson6(2.95,2.40,5343, Truncate(110,100000)) * 1.5	15,518		0.5 on Rio Salado	Lognormal(10542,15311, Truncate(0,160000))*1.65	17,000	22,400	0.4 on Rio Puerco
Eastside inflow, Section 1					Static = 420			
Eastside inflow, Section 2					Lognormal(10542,15311, Truncate(0,160000))*0.61	6,300	8,200	0.3 on Rio Puerco
Eastside inflow, Section 3	Pearson6(2.95,2.40,5343, Truncate(110,100000)) /1.02	10,552		0.5 on Rio Salado	Lognormal(10542,15311, Truncate(0,160000))*0.44	4,600	5,900	0.3 on Rio Puerco
Groundwater inflow above San Acacia	Static = 91,589				Static = 49,940			
Groundwater inflow below San Acacia	Static = 16,500				Static = 16,500			
Cochiti Evaporation	Loglogistic(4770,2482,2.46, Truncate(4770, 20220))	7,827	2,235		Normal(6708,977)	6,700	970	
Santa Fe GW pumping depletions	Static = 2,400				Static = 2,676			
GW pumping depletions above San Acacia (Year 2000)	Static = 94,360				Static = 79,600			
Agricultural ET, entire region	Weibull distribution	248,096		-0.3622 on Otowi Index	Reduced to available inflow if inflow insufficient to meet demand	Maximum m 185,833		
Riparian and Open Water ET, entire region	Logistic distribution	246,500			Static = 310,410			
GW pumping depletions below San Acacia	Static = 2,507				Static = 3,300			
Elephant Butte Evaporation	Histogram(28254,260094, {7,12,7,3,3,1,3,3,7})	123,119	74,347	0.4965 on Otowi Index	Histogram(79360,265949, {7,10,7,5,4,6,2,3,9})	163,700	57,600	0.46 on Otowi Index

**Table 4.3  
Agricultural Consumptive Use**

<b>Model Section</b>	<b>Irrigated Agricultural Acreage</b>	<b>ET Rate (af/acre/y)</b>	<b>Potential CU (af/y)</b>	<b>Adjusted ET rate (af/acre/y)</b>	<b>Adjusted CU (af/y)</b>
1 - Cochiti to Socorro County Line	44,291	3.93	173,965	2.95	130,473
2 - Socorro County Line to San Acacia	5,719	3.93	22,494	2.95	16,870
3 - San Acacia to Elephant Butte Res.	13,490	3.80	51,320	2.85	38,490
Total	63,500	-	-	2.93	185,833

**Table 4.4  
Riparian Consumptive Use**

<b>Model Section</b>	<b>Riparian Acreage</b>	<b>ET Rate (af/acre/y)</b>	<b>Riparian CU (af/y)</b>
1 - Cochiti to Socorro County Line	24,565	3.62	89,032
2 - Socorro County Line to San Acacia	12,400	3.62	44,829
3 - San Acacia to Elephant Butte Res.	28,198	4.00	112,792
Total	65,163	3.79	246,653

**Table 4.5  
Open Water Consumptive Use**

<b>Model Section</b>	<b>Open Water Acreage</b>	<b>ET Rate (af/acre/y)</b>	<b>Open Water CU (af/y)</b>
1 - Cochiti to Socorro County Line	5,088	5.52	28,106
2 - Socorro County Line to San Acacia	1,397	5.57	7,787
3 - San Acacia to Elephant Butte Res.	4,947	5.63	27,863
Total	11,432	5.58	63,756

**Table 4.6**  
**Base Case Model Output**  
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	Otowi Index Supply	San Juan - Chama	Santa Fe River above Cochiti	Jemez River	Galisteo Creek	AMAFCA Channels	Wastewater returns Section 1	Rio Puerco	Rio Salado	Wastewater returns Section 3	Westside Inflow Section 3
Minimum	254025.3	81005	9580	7740.92	31.79609	731.958	65807	1248.662	73.48559	950	123.0807
Maximum	2161907	81005	9580	122674	16980	33813.43	65807	218317.9	158348.9	950	256261.9
Mean	945331	81005	9580	44375.46	4196.773	9473.381	65807	25770.23	10472.72	950	16996.44
Standard Deviation	488564	0	0	28563.68	2499.473	4013.083	0	21995.76	13886.32	0	22005.53
5th Percentile	297644	81005	9580	9133.418	830.7197	3901.47	65807	5779.16	1039.815	950	1730.466
10th Percentile	349592.8	81005	9580	11370.88	1259.525	4762.882	65807	7480.722	1558.635	950	2520.742
15th Percentile	406351.1	81005	9580	13766.43	1628.432	5476.64	65807	8975.58	2039.656	950	3226.801
20th Percentile	459827.5	81005	9580	16687.3	1960.439	6034.164	65807	10424.5	2502.43	950	3944.799
25th Percentile	523486.4	81005	9580	20043.29	2304.944	6549.262	65807	11695.55	2977.293	950	4798.878
30th Percentile	590469.8	81005	9580	23288.03	2605.148	7051.358	65807	13069.46	3453.832	950	5615.649
35th Percentile	656066.3	81005	9580	26700.59	2908.942	7515.941	65807	14669.29	4009.46	950	6538.416
40th Percentile	722299.3	81005	9580	30723.91	3217.806	7985.474	65807	16112.62	4548.594	950	7526.882
45th Percentile	793440.8	81005	9580	34630.73	3533.223	8428.857	65807	17744.71	5189.279	950	8643.167
50th Percentile	873614.3	81005	9580	38448.96	3827.333	8918.045	65807	19491.32	5876.196	950	9842.062
55th Percentile	951238.4	81005	9580	42633.59	4163.792	9432.118	65807	21458.32	6740.471	950	11218.39
60th Percentile	1031430	81005	9580	47375.81	4481.299	9968.482	65807	23607.86	7821.105	950	12854.57
65th Percentile	1110589	81005	9580	52254.53	4854.24	10569.37	65807	26049.85	8947.655	950	14879.9
70th Percentile	1204994	81005	9580	57897.3	5235.495	11138.11	65807	28898.33	10408.9	950	17244.39
75th Percentile	1299602	81005	9580	64030.33	5698.957	11819.18	65807	32027.16	12304.7	950	20170.09
80th Percentile	1420478	81005	9580	70873.68	6225.313	12622.16	65807	36662.96	14680.57	950	23924.32
85th Percentile	1533668	81005	9580	78911.38	6806.469	13552.33	65807	42341.15	17882.59	950	29680.46
90th Percentile	1676383	81005	9580	88079.56	7590.451	14860.3	65807	50831.5	23540.41	950	38170.89
95th Percentile	1849037	81005	9580	99251.23	8855.819	16821.01	65807	66718.74	35071.45	950	56481.2

**Table 4.6**  
**Base Case Model Output**  
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	<b>Eastside Inflow Section 1</b>	<b>Eastside Inflow Section 2</b>	<b>Eastside Inflow Section 3</b>	<b>Adjusted Groundwater Inflow Sections 1 and 2</b>	<b>Adjusted Groundwater Inflow Section 3</b>	<b>Effective Precipitation Section 1</b>	<b>Effective Precipitation Section 2</b>	<b>Effective Precipitation Section 3</b>	<b>Cochiti Evaporation</b>
Minimum	420	57.53951	41.50391	49940	16500	507.246	289.4167	599.7139	3212.058
Maximum	420	95269.44	68718.94	49940	16500	51042.92	14532.18	33325.46	10527.84
Mean	420	6308.182	4550.164	49940	16500	26554.48	6945.321	16671.07	6719.628
Standard Deviation	0	8283.827	5975.22	0	0	7315.692	1912.457	4570.705	976.4121
5th Percentile	420	648.1679	467.5309	49940	16500	14543.63	3777.772	9160.077	5102.589
10th Percentile	420	963.2004	694.7675	49940	16500	17209.25	4488.81	10718.52	5466.814
15th Percentile	420	1248.054	900.2355	49940	16500	18935.54	4972.331	11897.81	5711.693
20th Percentile	420	1512.669	1091.105	49940	16500	20394.52	5330.117	12777.36	5899.665
25th Percentile	420	1797.053	1296.235	49940	16500	21602.39	5641.299	13574.47	6066.986
30th Percentile	420	2108.286	1520.731	49940	16500	22706.03	5950.054	14259.5	6215.397
35th Percentile	420	2456.983	1772.25	49940	16500	23749.01	6219.198	14873.88	6360.581
40th Percentile	420	2779.285	2004.73	49940	16500	24730.04	6465.625	15488.6	6474.953
45th Percentile	420	3167.494	2284.75	49940	16500	25669.88	6696.792	16103.3	6596.712
50th Percentile	420	3628.406	2617.21	49940	16500	26615.34	6924.355	16664.19	6717.757
55th Percentile	420	4163.466	3003.156	49940	16500	27495.46	7167.507	17271.68	6835.082
60th Percentile	420	4779.464	3447.482	49940	16500	28378.74	7424.038	17865.88	6961.515
65th Percentile	420	5462.671	3940.287	49940	16500	29351.05	7680.964	18422.91	7094.001
70th Percentile	420	6289.761	4536.876	49940	16500	30338.09	7954.994	19104.39	7235.425
75th Percentile	420	7289.136	5257.738	49940	16500	31485.11	8235.952	19792.55	7379.939
80th Percentile	420	8736.32	6301.608	49940	16500	32708.2	8570.733	20553.92	7552.875
85th Percentile	420	10746.14	7751.314	49940	16500	34118.29	8947.56	21459.17	7738.399
90th Percentile	420	14166.59	10218.52	49940	16500	36009.71	9396.019	22505.03	7974.32
95th Percentile	420	20837.25	15030.15	49940	16500	38656.69	10075.71	24128.32	8344.794

**Table 4.6**  
**Base Case Model Output**  
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	<b>Santa Fe GW Pumping Depletion</b>	<b>GW Pumping Depletions Section 1</b>	<b>Agricultural ET Section 1</b>	<b>Agricultural ET Section 2</b>	<b>Agricultural ET Section 3</b>	<b>Riparian ET Section 1</b>	<b>Riparian ET Section 2</b>	<b>Riparian ET Section 3</b>
Minimum	2676	79600	51397.15	6645.589	15162.34	89032	44829	112792
Maximum	2676	79600	130473	16870	38490	89032	44829	112792
Mean	2676	79600	126418.1	16345.71	37293.8	89032	44829	112792
Standard Deviation	0	0	13946.58	1803.276	4114.292	0	0	0
5th Percentile	2676	79600	89550.42	11578.76	26417.69	89032	44829	112792
10th Percentile	2676	79600	128338.1	16593.96	37860.19	89032	44829	112792
15th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
20th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
25th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
30th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
35th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
40th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
45th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
50th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
55th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
60th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
65th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
70th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
75th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
80th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
85th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
90th Percentile	2676	79600	130473	16870	38490	89032	44829	112792
95th Percentile	2676	79600	130473	16870	38490	89032	44829	112792

**Table 4.6**  
**Base Case Model Output**  
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	Open Water ET Section 1	Open Water ET Section 2	Open Water ET Section 3	GW Pumping Depletions Section 3	Elephant Butte Losses	Section 1 Adjusted Inflow	Section 1 Depletion	Section 1 Adjusted Outflow
Minimum	28106	7787	27863	3300	79384.94	116300.9	256750.5	-171715.2
Maximum	28106	7787	27863	3300	265900.7	628273.8	340414.8	289918.7
Mean	28106	7787	27863	3300	163670.2	437969	332551.8	105417.3
Standard Deviation	0	0	0	0	58493.32	104588.9	13965.93	98605.77
5th Percentile	28106	7787	27863	3300	87473.21	259505.8	295892.2	-57449.52
10th Percentile	28106	7787	27863	3300	94679.95	283837.8	333724.8	-30701.92
15th Percentile	28106	7787	27863	3300	101790.2	304653.2	335027.8	-13084.48
20th Percentile	28106	7787	27863	3300	107260.2	327163.2	335395.6	794.9281
25th Percentile	28106	7787	27863	3300	112430.6	350264.3	335656.1	16488.27
30th Percentile	28106	7787	27863	3300	117787.8	374984.4	335858.6	38515.52
35th Percentile	28106	7787	27863	3300	124024.9	400649.7	336037.4	63967.41
40th Percentile	28106	7787	27863	3300	131888.3	425702	336193.8	88956.53
45th Percentile	28106	7787	27863	3300	139429.3	448060	336330.8	111269.8
50th Percentile	28106	7787	27863	3300	149723.6	467802.5	336470.1	131202.7
55th Percentile	28106	7787	27863	3300	161275.6	480387.8	336601.1	143971.3
60th Percentile	28106	7787	27863	3300	175994.5	490001.5	336728.5	153177.2
65th Percentile	28106	7787	27863	3300	187939.8	498850.4	336876.8	162142.3
70th Percentile	28106	7787	27863	3300	197193.2	508408.2	337023.2	171873.4
75th Percentile	28106	7787	27863	3300	214090.5	519851.4	337185	183381.8
80th Percentile	28106	7787	27863	3300	235443.9	533117.6	337364.1	196668.9
85th Percentile	28106	7787	27863	3300	247933.9	547693.5	337560.4	211318.7
90th Percentile	28106	7787	27863	3300	253957.2	562887.4	337794.8	226339
95th Percentile	28106	7787	27863	3300	259873.6	578631.9	338164.5	242060.1

**Table 4.6**  
**Base Case Model Output**  
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	Sections 2 and 3 Adjusted Inflow	Sections 2 and 3 Depletion	Sections 2 and 3 Outflow	Total Inflow	Obligation	Inflow - Obligation	Net Depletions	Credit/Debit
Minimum	-129982.4	218378.9	-381913.4	533378.8	144794.4	380416.8	559380.3	-381913.4
Maximum	1016951	251931	765019.8	3048935	1756906	1484402	855912.1	765019.8
Mean	210581.4	250210.5	-39629.13	1341847	635043.9	706803.4	746432.5	-39629.13
Standard Deviation	116778.3	5917.569	115085.1	516733	403316.2	137003.8	66138.88	115085.1
5th Percentile	26684.02	234567.5	-220902.4	654592.8	169657.1	475286.9	643632.3	-220902.4
10th Percentile	54976.58	251025.2	-191598.1	712570.8	199267.9	507264.2	674584.1	-191598.1
15th Percentile	77299.2	251931	-169070.6	770555.5	231683.6	537808.3	683830.8	-169070.6
20th Percentile	98724.17	251931	-147781.4	830799.5	262699.9	568055.6	691486.6	-147781.4
25th Percentile	118864.1	251931	-126635.2	902267.8	299857	597846.2	697496.6	-126635.2
30th Percentile	143332.1	251931	-106412.5	971382.8	339377.2	627614.1	703440.5	-106412.5
35th Percentile	167091.7	251931	-83569.59	1037802	379200.5	655313.1	709661.6	-83569.59
40th Percentile	190368.4	251931	-60767.74	1106130	420494.5	683521.8	717800.9	-60767.74
45th Percentile	208616.8	251931	-42809.29	1182101	466736.5	709699.7	726104.4	-42809.29
50th Percentile	222672.3	251931	-28956.67	1267307	523266.1	731259.9	736111.2	-28956.67
55th Percentile	235602.7	251931	-16103.47	1347735	582478.3	750827.8	748202.1	-16103.47
60th Percentile	248167.6	251931	-3582.573	1430113	648029.8	766463.9	762531.1	-3582.573
65th Percentile	260552.2	251931	8925.503	1518614	716847.4	779844.8	775601.5	8925.503
70th Percentile	274372.3	251931	22666.36	1613630	804844.5	792051.3	784864.8	22666.36
75th Percentile	289210.8	251931	37321.18	1721009	896613.7	804399.8	800673.4	37321.18
80th Percentile	302504.6	251931	50598.5	1841134	1016274	817899.1	823216.1	50598.5
85th Percentile	319134.1	251931	67203.05	1959288	1128668	834299.5	836334.3	67203.05
90th Percentile	341555.2	251931	89625.02	2108398	1271383	855977.9	842455.9	89625.02
95th Percentile	382236.2	251931	130473.2	2294810	1444037	895781.9	848504.4	130473.2

**Table 4.7**

**New Mexico Riparian Evapotranspiration Rates from the Recent Literature**

	<b>ET rate (cm/year)</b>	<b>ET rate (ft/year)</b>
Cleverly, salt cedar ET (non-flooded and flooded)*	74 to 122	2.43 to 4.0
Dahm, dense salt cedar ET**	111 to 122	3.64 to 4.0
Dahm, less dense salt cedar ET**	74 to 76	2.43 to 2.49
Dahm, mature cottonwood w/extensive understory**	123	4.03
Dahm, mature cottonwood w/closed canopy**	98	3.22
BaseCase model		3.62 to 4.0

\* Cleverly et al., 2002

\*\* Dahm et al., 2002

**Table 4.8**

**Modeled Base Case and Sensitivity Analysis Values for Riparian Evapotranspiration**

	<b>Base Case Model input (af/year)</b>	<b>Sensitivity Model input (af/year)</b>	<b>Difference by Model Section (af/year)</b>	<b>Total Regional Difference (af/year)</b>
Riparian ET Section 1	89,032	78,608	10,424	38,131
Riparian ET Section 2	44,829	39,680	5,149	
Riparian ET Section 3	112,792	90,234	22,558	

**Table 4.9**

**Modeled Base Case and Sensitivity Analysis Values for Agricultural Consumptive Use**

	<b>Base Case Model Average (af/year)</b>	<b>Sensitivity Model Average (af/year)</b>	<b>Average Difference by Model Section (af/year)</b>	<b>Average Total Regional Difference (af/year)</b>
Ag CU Section 1	126,418	103,598	22,820	31,571
Ag CU Section 2	16,346	13,358	2,988	
Ag CU Section 3	37,294	31,531	5,763	



**Table 5.1**  
**Increase in MRGPR Municipal Demand and Wastewater Returns**  
**Outside City of Albuquerque, 2000-2040**

	<b>Valencia Population*</b>	<b>Sandoval Population*</b>	<b>Bernalillo County minus Albuquerque Population</b>	<b>Per Capita Water Use (gallons/day)</b>	<b>Valencia Total Water Demand (af/y)</b>	<b>Sandoval Total Water Demand (af/y)</b>	<b>Bernalillo Outside Albuquerque Total Water Demand (af/y)</b>	<b>Total Change in Demand&gt;Returns (af/y)</b>
Year 2000	66,152	89,908	108,071	200	14,820	20,142	24,211	
Year 2040	149,792	231,435	158,756	150	25,168	38,886	26,675	
<b>Additional demand</b>					10,348	18,744	2,463	<b>31,556</b>
<b>Additional wastewater returns</b>					5,174	9,372	1,232	<b>15,778</b>

\*University of New Mexico, Bureau of Business and Economic Research, Released August 2002  
 "Projected Compound Annual Average Population Growth Rates"

**Table 5.2**

**MRGPR Year 2040 Alternatives as Incorporated into the Probabilistic Model**

<b>Alternative Name</b>	<b>Alternative</b>	<b>Modeled impact</b>
Bosque Management	A-1	17,000 af/y reduction in section 1 riparian ET
Agriculture	Reduction in agricultural acreage	32,618 af/y reduction in section 1 agricultural CU
Agriculture	A-7 A-9 A-10	Additional 4893 af/y reduction in section 1 agricultural CU
Urban Water Use and Conservation	A-18 A-21 A-22 A-24 A-27 A-44 City's SJC DWP	<ul style="list-style-type: none"> <li>• Section 1 GW depletions on river, 79,285 af/y</li> <li>• Section 1 surface water diversion, 89,000 af/y</li> <li>• Section 1 2000 to 2040 additional demands outside Albuquerque, 31,556 af/y</li> <li>• Section 1 wastewater returns to river:               <ul style="list-style-type: none"> <li>○ City 86,792 af/y</li> <li>○ Outside City, year 2000, 4,549 af/y</li> <li>○ Outside City, projected additional 15,778 af/y</li> </ul> </li> </ul>
Wetlands	A-36	No change
Desalination	A-39	22,500 af/y new supply
Reservoir storage	A-45 A-46	No change
Watershed Plans	A-66	No change
Importation of Water	A-69	<ul style="list-style-type: none"> <li>• 17,500 af/y reduction in section 3 riparian ET</li> <li>• 21,375 af/y reduction in Section 3 agricultural CU</li> </ul>

Table 5.3

Average, 10th and 90th Percentile Values for Base Case Inflow and Depletion Terms, Year 2000 Development Conditions

Flow Term	10th percentile flows (af/year), 10,000 model realizations*	Average flow (af/year), 10,000 model realizations*	90th percentile flows (af/year), 10,000 model realizations*
Otowi Index Supply inflow at Otowi	349,593	945,331	1,676,383
Compact Obligation	199,268	635,044	1,271,383
Total Inflow (Cochiti to Elephant Butte) - Obligation	507,264	706,803	855,978
Elephant Butte Losses	94,680	163,670	253,957
Adjusted Model Section 1 inflow**	283,838	437,969	562,887
Jemez River	11,371	44,375	88,080
San Juan-Chama Water	81,005	81,005	81,005
Santa Fe River	9,580	9,580	9,580
Galisteo Creek	1,260	4,197	7,590
AMAFCA inflow	4,763	9,473	14,860
Eastside Inflow, section 1	420	420	420
Wastewater inflow, section 1	65,807	65,807	65,807
Adjusted groundwater inflow, section 1 (and 2)	49,940	49,940	49,940
Effective precipitation, section 1	17,209	26,554	36,010
Model Section 1 Depletion	333,725	332,552	337,795
Cochiti Reservoir Evaporative Losses	5,467	6,720	7,974
SW depletions from Santa Fe GW pumping	2,676	2,676	2,676
SW depletions from Alb. Basin GW pumping***	79,600	79,600	79,600
Agricultural consumptive use, section 1****	128,338	126,418	130,473
Riparian consumptive use, section 1	89,032	89,032	89,032
Open water Consumptive use, section 1	28,106	28,106	28,106
MRGPR Outflow = Adjusted SSPR mainstem inflow*****	-30,702	105,417	226,339
Adjusted SSPR Total Inflow*****	54,977	210,581	341,555
Rio Puerco inflow	7,481	25,770	50,832
Rio Salado inflow	1,559	10,473	23,540
Ungaged tributaries, westside	2,521	16,996	38,171
Ungaged tributaries, eastside section 2	963	6,308	14,167
Ungaged tributaries, eastside section 3	695	4,550	10,219
Wastewater inflow	950	950	950
Effective precipitation	15,207	23,616	31,901
Adjusted groundwater inflow	16,500	16,500	16,500
SSPR depletion	251,025	250,211	251,931
Agricultural consumptive use, section 2****	16,594	16,346	16,870
Agricultural consumptive use, section 3****	37,860	37,294	38,490
Riparian consumptive use, section 2	44,829	44,829	44,829
Riparian consumptive use, section 3	112,792	112,792	112,792
Open water Consumptive use, section 2	7,787	7,787	7,787
Open water Consumptive use, section 3	27,863	27,863	27,863
Surface water depletions from groundwater pumping	3,300	3,300	3,300
SSPR outflow = NM Delivery Credit/Debit	-191,598	-39,629	89,625

\* Base case model run - no regional planning alternatives included.

\*\* The sum of Otowi Index supply inflow, San Juan Chama inflow, Section 1 tributary inflow, and other inflows, minus the Compact obligation and Elephant Butte losses.

\*\*\*As computed for year 2000.

\*\*\*\* Average is smaller than 10th percentile as a result of the distribution. Median and 90th percentile values are equal.

\*\*\*\*\*The sum of MRGPR Outflow (compact obligation and EB losses have been removed from this term) and Sections 2 and 3 tributary and other inflows. Identified SSPR inflow and depletion terms are limited to those occurring within the Study Area.

Note, the individual 10<sup>th</sup>/90<sup>th</sup> percentile inflow terms don't add up to the 10<sup>th</sup>/90<sup>th</sup> percentile total inflow. To illustrate why this occurs, consider the maximum MRGPR inflow. Maximum planning region inflow is unlikely to correspond to the maximum inflow for each individual inflow term. One of the inflow terms may be at maximum, but the rest are somewhere below maximum.

In general, for flows above the median, the total will be smaller than the sum of the individual flows at that percentile. Below the median, the total will be larger than the sum of the individual flows at that percentile. The difference between total and the sum of the individual flows increases as you move toward the tails of the distributions.

Table 5.4

Average, 10th and 90th Percentile Values for Inflow and Depletion Terms Under MRGPR Preferred Scenario, Year 2040 Development Conditions

Flow Term	10th percentile flows (af/year), 10,000 model realizations*	Average flow (af/year), 10,000 model realizations*	90th percentile flows (af/year), 10,000 model realizations*
Otowi Index Supply inflow at Otowi	349,593	945,331	1,676,383
Compact Obligation	199,268	635,044	1,271,383
Total Inflow (Cochiti to Elephant Butte) - Obligation	507,264	706,803	855,978
Elephant Butte Losses	94,680	163,670	253,957
Adjusted Model Section 1 inflow**	347,650	501,781	626,699
Jemez River	11,371	44,375	88,080
San Juan-Chama Water	81,005	81,005	81,005
Santa Fe River	9,580	9,580	9,580
Galisteo Creek	1,260	4,197	7,590
AMAFCA inflow	4,763	9,473	14,860
Eastside Inflow, section 1	420	420	420
Wastewater returns, Section 1	107,119	107,119	107,119
Adjusted groundwater inflow, section 1 (and 2)	49,940	49,940	49,940
Effective precipitation, section 1	17,209	26,554	36,010
Desalination inflow	22,500	22,500	22,500
Model Section 1 Depletion	399,455	398,282	403,525
Cochiti Reservoir Evaporative Losses	5,467	6,720	7,974
SW depletions from Santa Fe GW pumping	2,676	2,676	2,676
SW depletions from Alb. Basin GW pumping***	79,285	79,285	79,285
SW depletions from GW pumping outside of the CofA	31,556	31,556	31,556
Agricultural consumptive use, section 1****	90,827	88,907	92,962
Riparian consumptive use, section 1	72,032	72,032	72,032
Open water Consumptive use, section 1	28,106	28,106	28,106
Direct diversion for City of Albuquerque	89,000	89,000	89,000
MRGPR Outflow = Adjusted SSPR mainstem inflow	-32,620	103,499	224,421
Adjusted SSPR Total Inflow*****	53,059	208,663	339,637
Rio Puerco inflow	7,481	25,770	50,832
Rio Salado inflow	1,559	10,473	23,540
Ungaged tributaries, westside	2,521	16,996	38,171
Ungaged tributaries, eastside section 2	963	6,308	14,167
Ungaged tributaries, eastside section 3	695	4,550	10,219
Wastewater inflow	950	950	950
Effective precipitation	15,207	23,616	31,901
Adjusted groundwater inflow	16,500	16,500	16,500
SSPR depletion	212,150	211,336	213,056
Agricultural consumptive use, section 2****	16,594	16,346	16,870
Agricultural consumptive use, section 3****	16,485	15,919	17,115
Riparian consumptive use, section 2	44,829	44,829	44,829
Riparian consumptive use, section 3	95,292	95,292	95,292
Open water Consumptive use, section 2	7,787	7,787	7,787
Open water Consumptive use, section 3	27,863	27,863	27,863
Surface water depletions from groundwater pumping	3,300	3,300	3,300
SSPR outflow = NM Delivery Credit/Debit	-154,641	-2,672	126,582

\* MRGPR Preferred Scenario model run

\*\* The sum of Otowi Index supply inflow, San Juan Chama inflow, Section 1 tributary inflow, and other inflows, minus the Compact obligation and Elephant Butte losses.

\*\*\* As computed for Year 2040 under implementation of the CofA DWP.

\*\*\*\* Average is smaller than 10th percentile as a result of the distribution. Median and 90th percentile values are equal.

\*\*\*\*\* The sum of MRGPR Outflow (compact obligation and EB losses have been removed from this term) and Sections 2 and 3 tributary and other inflows. Identified SSPR inflow and depletion terms are limited to those occurring within the Study Area.

Note, the individual 10<sup>th</sup>/90<sup>th</sup> percentile inflow terms don't add up to the 10<sup>th</sup>/90<sup>th</sup> percentile total inflow. In general, for flows above the median, the total will be smaller than the sum of the individual flows at that percentile. Below the median, the total will be larger than the sum of the individual flows at that percentile.

**Table 5.5**

**Socorro-Sierra Planning Region Proposed Planning Alternatives**

<b>Alternative</b>	<b>Agricultural CU Change (af/year)</b>	<b>Riparian CU Change (af/year)</b>	<b>Open Water CU Change (af/year)</b>	<b>Change in Elephant Butte Losses (af/year)</b>	<b>Reduction in Regional Demand (af/year)</b>
Alternative 1A				-11,855	11,855
Alternative 1B			-1,649		1,649
Alternatives 2, 3, and 4	-2,768				2,768
Alternative 5A		-16,240			16,240
Alternative 5B		-4,060			4,060
Alternative 5C		-20,300			20,300
All Alternatives A	-2,768	-16,240	-1,649	-11,855	32,512
All Alternatives B	-2,768	-4,060	-1,649	-11,855	20,332
All Alternatives C	-2,768	-20,300	-1,649	-11,855	36,572

\* Average reduction in agricultural, riparian, and open water consumptive use as a function of each alternative.

Table 5.6

Average, 10th and 90th Percentile Values for Inflow and Depletion Terms Under SSPR Planning Alternatives, Year 2000 Development Conditions

Flow Term	10th percentile flows (af/year), 10,000 model realizations*	Average flow (af/year), 10,000 model realizations*	90th percentile flows (af/year), 10,000 model realizations*
Otowi Index Supply inflow at Otowi	349,593	945,331	1,676,383
Compact Obligation	199,268	635,044	1,271,383
Total Inflow (Cochiti to Elephant Butte) - Obligation	507,264	706,803	855,978
Elephant Butte Losses	78,882	151,748	249,416
Adjusted Model Section 1 inflow**	298,607	449,891	579,203
Jemez River	11,371	44,375	88,080
San Juan-Chama Water	81,005	81,005	81,005
Santa Fe River	9,580	9,580	9,580
Galisteo Creek	1,260	4,197	7,590
AMAFCA inflow	4,763	9,473	14,860
Eastside Inflow, section 1	420	420	420
Wastewater inflow, section 1	65,807	65,807	65,807
Adjusted groundwater inflow, section 1 (and 2)	49,940	49,940	49,940
Effective precipitation, section 1	17,209	26,554	36,010
Model Section 1 Depletion	333,725	332,552	337,795
Cochiti Reservoir Evaporative Losses	5,467	6,720	7,974
SW depletions from Santa Fe GW pumping	2,676	2,676	2,676
SW depletions from Alb. Basin GW pumping***	79,600	79,600	79,600
Agricultural consumptive use, section 1****	128,338	126,418	130,473
Riparian consumptive use, section 1	89,032	89,032	89,032
Open water Consumptive use, section 1	28,106	28,106	28,106
MRGPR Outflow = Adjusted SSPR mainstem inflow	-16,755	117,339	242,601
Adjusted SSPR Total Inflow*****	68,987	222,503	355,227
Rio Puerco inflow	7,481	25,770	50,832
Rio Salado inflow	1,559	10,473	23,540
Ungaged tributaries, westside	2,521	16,996	38,171
Ungaged tributaries, eastside section 2	963	6,308	14,167
Ungaged tributaries, eastside section 3	695	4,550	10,219
Wastewater inflow	950	950	950
Effective precipitation	15,207	23,616	31,901
Adjusted groundwater inflow	16,500	16,500	16,500
SSPR depletion	226,308	225,494	227,214
Agricultural consumptive use, section 2****	16,594	16,346	16,870
Agricultural consumptive use, section 3****	35,092	34,526	35,722
Riparian consumptive use, section 2	44,829	44,829	44,829
Riparian consumptive use, section 3	92,492	92,492	92,492
Open water Consumptive use, section 2	7,787	7,787	7,787
Open water Consumptive use, section 3	26,214	26,214	26,214
Surface water depletions from groundwater pumping	3,300	3,300	3,300
SSPR outflow = NM Delivery Credit/Debit	-153,522	-2,990	128,043

\* SSPR full implementation of alternatives model run

\*\* The sum of Otowi Index supply inflow, San Juan Chama inflow, Section 1 tributary inflow, and other inflows, minus the Compact obligation and Elephant Butte losses.

\*\*\* As computed for Year 2000.

\*\*\*\* Average is smaller than 10th percentile as a result of the distribution. Median and 90th percentile values are equal.

\*\*\*\*\* The sum of MRGPR Outflow (compact obligation and EB losses have been removed from this term) and Sections 2 and 3 tributary and other inflows. Identified SSPR inflow and depletion terms are limited to those occurring within the Study Area. Note, the individual 10<sup>th</sup>/90th percentile inflow terms don't add up to the 10<sup>th</sup>/90th percentile total inflow. In general, for flows above the median, the total will be smaller than the sum of the individual flows at that percentile. Below the median, the total will be larger than the sum of the individual flows at that percentile.

Table 5.7

**Average, 10th and 90th Percentile Values for Inflow and Depletion Terms Under Joint Implementation of the MRGPR, SSPR, and JySPR Water Planning Alternatives, Year 2040 Development Conditions**

Flow Term	10th percentile flows (af/year), 10,000 model realizations*	Average flow (af/year), 10,000 model realizations*	90th percentile flows (af/year), 10,000 model realizations*
Otowi Index Supply inflow at Otowi	349,593	945,331	1,676,383
Compact Obligation	199,268	635,044	1,271,383
Total Inflow (Cochiti to Elephant Butte) - Obligation	507,264	706,803	855,978
Elephant Butte Losses	78,882	151,748	249,416
Jemez Y Sangre Planning Region additional depletions	-19,730	-19,730	-19,730
Adjusted Model Section 1 inflow**	342,689	493,973	623,285
Jemez River	11,371	44,375	88,080
San Juan-Chama Water	81,005	81,005	81,005
Santa Fe River	9,580	9,580	9,580
Galisteo Creek	1,260	4,197	7,590
AMAFCA inflow	4,763	9,473	14,860
Eastside Inflow, section 1	420	420	420
Wastewater returns, Section 1	107,119	107,119	107,119
Adjusted groundwater inflow, section 1 (and 2)	49,940	49,940	49,940
Effective precipitation, section 1	17,209	26,554	36,010
Desalination inflow	22,500	22,500	22,500
Model Section 1 Depletion	399,455	398,282	403,525
Cochiti Reservoir Evaporative Losses	5,467	6,720	7,974
SW depletions from Santa Fe GW pumping	2,676	2,676	2,676
SW depletions from Alb. Basin GW pumping***	79,285	79,285	79,285
SW depletions from GW pumping outside of the CofA in excess of Year 2000 pumping	31,556	31,556	31,556
Agricultural consumptive use, section 1****	90,827	88,907	92,962
Riparian consumptive use, section 1	72,032	72,032	72,032
Open water Consumptive use, section 1	28,106	28,106	28,106
Direct diversion for City of Albuquerque	89,000	89,000	89,000
MRGPR Outflow = Adjusted SSPR mainstem inflow	-38,403	95,691	220,953
Adjusted SSPR Total Inflow*****	47,339	200,855	333,579
Rio Puerco inflow	7,481	25,770	50,832
Rio Salado inflow	1,559	10,473	23,540
Ungaged tributaries, westside	2,521	16,996	38,171
Ungaged tributaries, eastside section 2	963	6,308	14,167
Ungaged tributaries, eastside section 3	695	4,550	10,219
Wastewater inflow	950	950	950
Effective precipitation	15,207	23,616	31,901
Adjusted groundwater inflow	16,500	16,500	16,500
SSPR depletion	208,808	207,994	209,714
Agricultural consumptive use, section 2****	16,594	16,346	16,870
Agricultural consumptive use, section 3****	35,092	34,526	35,722
Riparian consumptive use, section 2	44,829	44,829	44,829
Riparian consumptive use, section 3	74,992	74,992	74,992
Open water Consumptive use, section 2	7,787	7,787	7,787
Open water Consumptive use, section 3	26,214	26,214	26,214
Surface water depletions from groundwater pumping	3,300	3,300	3,300
SSPR outflow = NM Delivery Credit/Debit	-157,670	-7,138	123,895

\* Joint implementation of the MRGPR, SSPR, and JySPR alternatives; retirement of SSPR agricultural acreage is omitted from the Joint Analysis scenario

\*\* The sum of Otowi Index supply inflow, San Juan Chama inflow, Section 1 tributary and other inflows, minus the compact obligation, EB losses, and additional Jemez y Sangre Planning Region depletions.

\*\*\* As computed for Year 2040 under implementation of the CofA DWP.

\*\*\*\* Average is smaller than 10th percentile as a result of the distribution. Median and 90th percentile values are equal.

\*\*\*\*\* The sum of MRGPR Outflow (compact obligation and EB losses have been removed from this term) and Sections 2 and 3 tributary and other inflows. Identified SSPR inflow and depletion terms are limited to those occurring within the Study Area.

Note, the individual 10<sup>th</sup>/90th percentile inflow terms don't add up to the 10<sup>th</sup>/90th percentile total inflow. In general, for flows above the median, the total will be smaller than the sum of the individual flows at that percentile. Below the median, the total will be larger than the sum of the individual flows at that percentile.

Table 6.1

Inflow and Depletion Terms, Base Case and Drought Scenario Comparison

Inflow Depletion	Base Case Distribution				Drought Distribution			
	Distribution	m (af/y)	s (af/y)	Dependency	Distribution	m (af/y)	s (af/y)	Dependency
Otowi Index Supply	254000 + Beta(0.916, 1.643) * 1920000	945,300	488,600		244600 + Beta(0.603, 0.97) * 1272600	730,000	383,900	
San Juan-Chama Project water	Static = 81,005				75% of the Base Case calculated value			
Santa Fe River above Cochiti	Static = 9,580				no change			
Jemez River	(7740 + Beta(0.7933, 1.6992)* 115000)	44,400	28,800	0.85 on Otowi Index	(7724 + Beta(0.73, 1.72)* 82620)	32,100	20,600	0.85 on Otowi Index
Galisteo Creek	Weibull(1.7365,4748, Truncate(0,20000))	4,200	2,500		no change			
AMAFCA Channels	Gamma(5.62,1692, Truncate(0,36000))	9,500	4,000		no change			
Effective precipitation, Section 1	Normal(26386,7314, Truncate(0,81000))	26,000	7,200		no change			
Effective precipitation, Section 2	Normal(6964,1930, Truncate(0,22000))	7,000	1,900	0.64 on Section 1 Effective precip	no change			
Effective precipitation, Section 3	Normal(16641,4613, Truncate(0,51000))	16,600	4,600	0.54 on Section 1 Effective Precip	no change			
Wastewater returns, entire region	Static = 66,757				no change			
Rio Puerco	Lognormal(25832,22432, Truncate(0,230000))	25,800	22,100		Lognormal(31457,33995, Truncate(0,230000))	30,400	29,300	
Rio Salado	Lognormal(10542,15311, Truncate(0,160000))	10,500	13,300	0.56 on Rio Puerco	Lognormal(11692,12024, Truncate(0,160000))	11,800	11,800	0.56 on Rio Puerco
Ungaged Tributaries (Westside Inflow)	Lognormal(10542,15311, Truncate(0,160000))*1.65	17,000	22,400	0.4 on Rio Puerco	Lognormal(11692,12024, Truncate(0,160000))*1.65	19,300	19,600	0.4 on Rio Puerco
Eastside inflow, Section 1	Static = 420				no change			
Eastside inflow, Section 2	Lognormal(10542,15311, Truncate(0,160000))*0.61	6,300	8,200	0.3 on Rio Puerco	Lognormal(11692,12024, Truncate(0,160000))*0.61	7,200	7,300	0.3 on Rio Puerco
Eastside inflow, Section 3	Lognormal(10542,15311, Truncate(0,160000))*0.44	4,600	5,900	0.3 on Rio Puerco	Lognormal(11692,12024, Truncate(0,160000))*0.44	5,200	5,300	0.3 on Rio Puerco
Groundwater inflow above San Acacia	Static = 49,940				no change			
Groundwater inflow below San Acacia	Static = 16,500				no change			
Cochiti Evaporation	Normal(6708,977)	6,700	970		no change			
Santa Fe GW pumping depletions	Static = 2,676				no change			
GW pumping depletions above San Acacia	Static = 79,600				no change			
Agricultural ET, entire region	Reduced to available inflow if inflow insuff. to meet demand	180,000			Reduced to available inflow if inflow insuff. to meet demand	165,000		
Riparian and Open Water ET, entire region	Static = 310,410				no change			
GW pumping depletions below San Acacia	Static = 3,300				no change			
Elephant Butte Evaporation	Histogram(79360,265949, (7,10,7,5,4,6,2,3,9))	163,700	57,600	0.46 on Otowi Index	ExtremeValue(107135,28215)	124,000	35,700	0.46 on Otowi Index



**Table 6.2**

**Average, 10th and 90th Percentile Values for Drought Scenario Inflow and Depletion Terms, Year 2000  
Development Conditions**

Flow Term	10th percentile flows (af/year), 10,000 model realizations*	Average flow (af/year), 10,000 model realizations*	90th percentile flows (af/year), 10,000 model realizations*
Otowi Index Supply inflow at Otowi	270,794	730,044	1,323,590
Compact Obligation	154,352	460,187	920,354
Total Inflow (Cochiti to Elephant Butte) - Obligation	455,564	643,530	811,662
Elephant Butte Losses	83,444	123,992	172,748
Adjusted Model Section 1 inflow**	255,122	404,694	548,194
Jemez River	9,631	32,104	62,687
San Juan-Chama Water	60,754	60,754	60,754
Galisteo Creek	1,260	4,197	7,590
AMAFCA inflow	4,763	9,473	14,860
Eastside Inflow, section 1	420	420	420
Wastewater inflow, section 1	65,807	65,807	65,807
Adjusted groundwater inflow, section 1 (and 2)	49,940	49,940	49,940
Effective precipitation, section 1	17,209	26,554	36,010
Model Section 1 Depletion	263,203	322,060	337,691
Cochiti Reservoir Evaporative Losses	5,467	6,720	7,974
SW depletions from Santa Fe GW pumping	2,676	2,676	2,676
SW depletions from Alb. Basin GW pumping***	79,600	79,600	79,600
Agricultural consumptive use, section 1	56,888	115,926	130,473
Riparian consumptive use, section 1	89,032	89,032	89,032
Open water Consumptive use, section 1	28,106	28,106	28,106
MRGPR Outflow = Adjusted SSSPR mainstem inflow	-33,372	82,634	211,512
Adjusted SSSPR Total Inflow****	57,864	197,478	336,063
Rio Puerco inflow	6,808	30,414	63,871
Rio Salado inflow	2,777	11,777	24,281
Ungaged tributaries, westside	4,465	19,282	40,570
Ungaged tributaries, eastside section 2	1,705	7,149	14,598
Ungaged tributaries, eastside section 3	1,230	5,156	10,530
Wastewater inflow	950	950	950
Effective precipitation	15,207	23,616	31,901
Groundwater inflow	16,500	16,500	16,500
SSPR depletion	220,709	245,759	251,931
Agricultural consumptive use, section 2	7,356	14,989	16,870
Agricultural consumptive use, section 3	16,782	34,199	38,490
Riparian consumptive use, section 2	44,829	44,829	16,870
Riparian consumptive use, section 3	112,792	112,792	112,792
Open water Consumptive use, section 2	7,787	7,787	7,787
Open water Consumptive use, section 3	27,863	27,863	27,863
pumping	3,300	3,300	3,300
SSPR outflow = NM Delivery Credit/Debit	-183,050	-48,281	84,810

\* Drought model run - no regional planning alternatives included.

\*\* The sum of Otowi Index supply inflow, San Juan Chama inflow, Section 1 tributary inflow, and other inflows, minus the Compact obligation and Elephant Butte losses.

\*\*\* As computed for Year 2000.

\*\*\*\* The sum of MRGPR Outflow (compact obligation and EB losses have been removed from this term) and Sections 2 and 3 tributary and other inflows. Identified SSSPR inflow and depletion terms are limited to those occurring within the Study Area.

Note, the individual 10<sup>th</sup>/90<sup>th</sup> percentile inflow terms don't add up to the 10<sup>th</sup>/90<sup>th</sup> percentile total inflow. In general, for flows above the median, the total will be smaller than the sum of the individual flows at that percentile. Below the median, the total will be larger than the sum of the individual flows at that percentile.

**Table 6.3**

**Average, 10th and 90th Percentile Values for Drought Scenario Inflow and Depletion Terms Under Full Implementation of the Joint MRGPR, SSPR, and JySPR Water Planning Alternatives, Year 2040 Development Conditions**

Flow Term	10th percentile flows (af/year), 10,000 model realizations*	Average flow (af/year), 10,000 model realizations*	90th percentile flows (af/year), 10,000 model realizations*
Otowi Index Supply inflow at Otowi	270,794	730,044	1,323,590
Compact Obligation	154,352	460,187	920,354
Total Inflow (Cochiti to Elephant Butte) - Obligation	455,564	643,530	811,662
Elephant Butte Losses	83,444	123,992	172,748
Jemez Y Sangre Planning Region additional depletions	-19,730	-19,730	-19,730
Adjusted Model Section 1 inflow**	299,204	448,776	592,276
Jemez River	9,631	32,104	62,687
San Juan-Chama Water	60,754	60,754	60,754
Santa Fe River	9,580	9,580	9,580
Galisteo Creek	1,260	4,197	7,590
AMAFCA inflow	4,763	9,473	14,860
Eastside Inflow, section 1	420	420	420
Wastewater returns, section 1	65,807	65,807	65,807
Adjusted groundwater inflow, section 1 (and 2)	49,940	49,940	49,940
Effective precipitation, section 1	17,209	26,554	36,010
Desalination inflow	22,500	22,500	22,500
Model Section 1 Depletion	376,573	397,607	403,479
Cochiti Reservoir Evaporative Losses	5,467	6,720	7,974
SW depletions from Santa Fe GW pumping	2,676	2,676	2,676
SW depletions from Alb. Basin GW pumping***	79,600	79,600	79,600
SW depletions from GW pumping outside of the CofA in excess of Year 2000 pumping	31,556	31,556	31,556
Agricultural consumptive use, section 1	66,989	88,233	92,962
Riparian consumptive use, section 1	89,032	89,032	89,032
Open water Consumptive use, section 1	28,106	28,106	28,106
Direct diversion for City of Albuquerque	89,000	89,000	89,000
MRGPR Outflow = Adjusted SSPR mainstem inflow	-83,911	51,169	189,864
Adjusted SSPR Total Inflow****	8,503	166,013	314,363
Rio Puerco inflow	6,808	30,414	63,871
Rio Salado inflow	2,777	11,777	24,281
Ungaged tributaries, westside	4,465	19,282	40,570
Ungaged tributaries, eastside section 2	1,705	7,149	14,598
Ungaged tributaries, eastside section 3	1,230	5,156	10,530
Wastewater inflow	950	950	950
Effective precipitation	15,207	23,616	31,901
Groundwater inflow	16,500	16,500	16,500
SSPR depletion	195,020	207,038	209,714
Agricultural consumptive use, section 2	12,157	16,012	16,870
Agricultural consumptive use, section 3	25,742	33,905	35,722
Riparian consumptive use, section 2	44,829	44,829	16,870
Riparian consumptive use, section 3	112,792	112,792	112,792
Open water Consumptive use, section 2	7,787	7,787	7,787
Open water Consumptive use, section 3	27,863	27,863	27,863
pumping	3,300	3,300	3,300
SSPR outflow = NM Delivery Credit/Debit	-193,793	-41,026	104,649

\* Drought model run, including joint implementation of the MRGPR, SSPR, and JySPR alternatives; retirement of SSPR agricultural acreage is omitted from the Joint Analysis scenario.

\*\* The sum of Otowi Index supply inflow, San Juan Chama inflow, Section 1 tributary and other inflows, minus the compact obligation, EB losses, and additional Jemez y Sangre Planning Region depletions.

\*\*\* As computed for Year 2040 under implementation of the CofA DWP.

\*\*\*\* The sum of MRGPR Outflow (compact obligation and EB losses have been removed from this term) and Sections 2 and 3 tributary and other inflows. Identified SSPR inflow and depletion terms are limited to those occurring within the Study Area.

Note, the individual 10th/90th percentile inflow terms don't add up to the 10th/90th percentile total inflow. In general, for flows above the median, the total will be smaller than the sum of the individual flows at that percentile. Below the median, the total will be larger than the sum of the individual flows at that percentile.