Supporting Document K-1

Information Given to the Scenario Development Committees

MIDDLE RIO GRANDE WATER ASSEMBLY

Information Packet for Scenario Development Committees (SDCs)

JANUARY 2003

Balance Water Use with Renewable Supply

Information Packet for Scenario Development Committees (SDCs)

CONTENTS

Water Planning Folks -

Scenarios will form the basis of our water plan recommendations. Scenario Development Committees will be developing initial draft scenarios, each with a specified perspective or viewpoint. Again I would encourage everyone to participate to the extent they find possible.

Each SDC contains two representatives from each of the Constituency Groups plus anyone who chooses to participate with the SDC.

With our revised schedule, we want to bring initial draft scenarios out to Community Conversations #6 in early April. The attached document (WA40K.DOC) shows a set of logic and detailed dates leading to that point.

Let me point out four key items from that schedule:

- On Jan 8 we are intending to have Scenario Development Committee (SDC) breakouts during the 5:30 pm Colloquy.

- By Jan 7, we want to have the "final" Constituency Group vision statements so we can distribute them to the appropriate SDCs at the Colloquy.

- On Jan 25 from 9am to 12n, we have arranged for a detailed presentation of the Sandia model, concurrently to all of the SDCs.

- On Feb 5 we have a Colloquy with substantial time dedicated to SDC breakouts. The end of those breakouts should be a deadline for an initial Scenario product from each SDC (e.g., prose synopsis, action list, qualitative size of actions).

Jan 25 9:00 am is tentatively at the UNM Planning and Architecture building, Room 118. The other sessions are 5:30 pm at the Rotunda. As we get closer to the dates, we'll send detailed announcements.

Bob Wessely

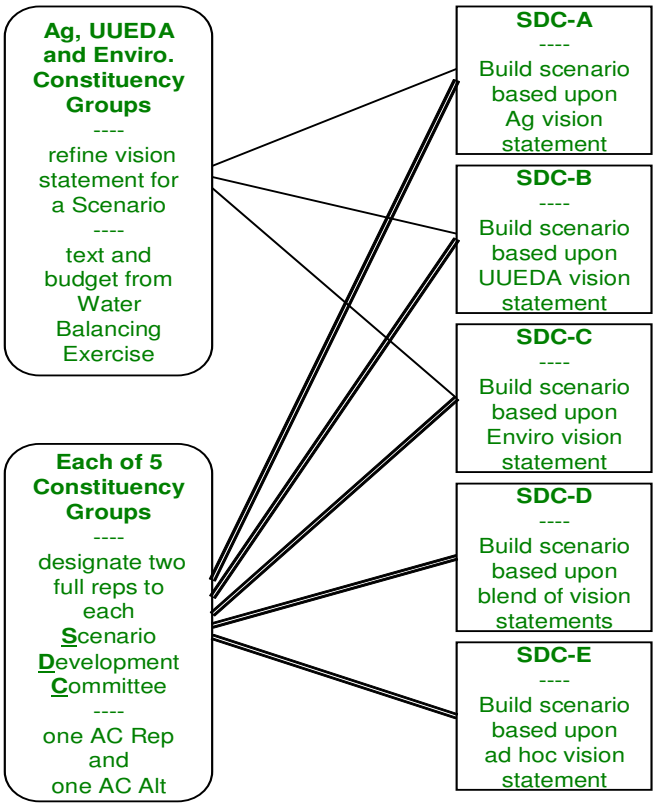
Scenario Development Logic Overview

The Top Level Process

- Bring Five Scenarios to the Public
- Action Committee Approval Mar 2003
- Community Conversations 6 - April 2003
- Refine to a Preferred Scenario
- Regional Forum 6 - May-Jun 2003

A Scenario Contains

- Characterization or Vision Statement
- Timing or Year for Balancing Budget
- List of Participating Alternative Actions
- Intensity of Each Participating Action



Scenario Development Schedule Events

Constituency Gp. Refined Visions
1/7/03
Theme Information

Analysis Light	DBS&A 60% Report	DBS&A 90% Report	DBS&A Final Report	A-Team Notes	A-Team Critique
9/18/02	12/11/02	1/15/03	2/12/03	2/19/02	3/19/02
Alternative Action Technical Information					

Community Conversations 5	Public Opinion Survey - IPP	Regional Forum 5
9/02	1/03	3/1/03
Alternative Action Public Preference Information		

				SDC Special Model Sessions 1/26/03 - 3/4/03			
Kickoff	SDC Sessions	Colloquy SDC Breakout	SNL Model Introduction	Colloquy SDC Breakout	AC Meeting SDC Breakout	Colloquy SDC Breakout	Action Comm. Approval
12/8/02	12/02	1/8/03	1/25/03	2/5/03	2/19/03	3/5/03	3/19/03
Scenario Development Activities							

Community Conversations 6
4/02
Present Scenarios

Scenario Development Process

November 27, 2002

Introduction. At the conclusion of the November 20 Colloquy #3 which further discussed the development of regional water scenarios, an expanded AGang of Six@ was asked to draw upon the results of the discussion and prepare an outline of the process to be followed. The six of us (Reid Bandeen, John Brown, Lee Brown, Elaine Hebard, Mary Murnane and Bob Swartwout) have had extensive electronic communication in developing the following final outline. A separate detailed list of procedures and deadlines will be forthcoming.

Five Scenarios. At least four, and potentially five, scenarios will be created:

- A scenario constructed around the first series of numbers in the Water Balancing Exercise (WBE) created by the Agricultural, Historical and Cultural Preservation Constituency Group for the April, 2002 Water Assembly;
- A scenario constructed around the numbers in the WBE created by the Environmental Constituency Group for the April, 2002 Water Assembly;
- A scenario constructed around the numbers in the Water Balancing Exercise (WBE) created by the Urban Users and Economic Development Constituency Group for the April, 2002 Water Assembly;
- A scenario which is a synthesis of the above three sets of numbers;[1] and
- A fifth scenario, self-generated by those who are collectively interested in creating another scenario that is different from the four above.

Content of Scenarios. All scenarios must accomplish the following tasks:

- $ Present a vision of the regional future which balances future water supplies and demands in accordance with the interim mission and goals of the regional plan;
- $ Tell a plausible story that captures that vision at the same time as it balances supply and demand;
- $ Gather and Asize@ alternative actions into a logical package consistent with the story and vision; and
- $ Fix a time period for achieving balance and describe how the region would adapt to a sustained drought consistent with the vision.

Scenario Development Committees. Each of the first four scenarios will be constructed by a scenario development committee (SDC) consisting of one voting member or alternate from each Constituency Group represented on the Action Committee (a total of five) together with any and all Assembly participants who are interested in a particular scenario. Consensus among SDC participants is most desirable. The fifth scenario will be self-organized.

[1] This scenario may draw upon the WBE numbers created by the Specialists Constituency Group at its discretion.

Middle Rio Grande Regional Water Plan
Interim Mission and Goals

Preamble:

The Water Assembly and the Water Resources Board have adopted the following interim overriding preamble for Middle Rio Grande water planning process mission and goals:

Mission:

The Water Assembly and the Water Resources Board have adopted the following interim overriding mission for Middle Rio Grande water planning process:

Goals:

Based upon extensive public input, the Water Resources Board and the Water Assembly have adopted the following ten interim goals to support the mission of the Middle Rio Grande water planning process:

A. Ensure that the Mission is fulfilled through fair, open and inclusive public planning and implementation processes

B. Preserve Water for a Healthy Native Rio Grande Ecosystem

C. Preserve Water for the Region's Agricultural, Cultural, and Historical Values

D. Preserve Water for Economic and Urban Vitality

E. Preserve Water for the Qualities of Life Valued by Residents in the Region

F. Develop Broad Public and Official Awareness of Water Facts and Issues, Especially the Limited Nature of Water Resources

G. Conserve Water

H. Promote a System of Water Laws and Processes that Support the Regional Water Plan and its Implementation

I. Provide Appropriate Water Quality for Each Use

J. Manage Water Demand Consistent with the Stated Mission

	Environment Advocates	Desired Year 2050 Use Budget					Assumptions
		A		B		C	
	Water Line Item	Number of Units		Per Unit Use		Total Water Use (afpy)	
Inflows to the Middle Rio Grande Region							
1	Rio Grande Native Inflows	N/A		N/A		1,100,000	
2	Tributary and Groundwater Inflows	N/A		N/A		245,000	
3	San Juan/Chama Inflows	N/A		N/A		74,000	
4	Imports from Socorro/Sierra Region	N/A		N/A		0	
5	Imports from Other Sources (must identify the source)					0,000	
6	Urban Storm Drain Inflow	N/A		N/A		8,000	increased urbanization expected to increase runoff
7	*Total Water Income to the Region*	N/A		N/A		**1,427,000**	
Uses of Water within the Region							
8	Elephant Butte Lake Evaporation	13,780 surface acres		9 afpy per surface acre		124,000	
9	Socorro/Sierra Region Current Delivery Rate	N/A		N/A		100,000	
10	Rio Grande Compact Deliveries	N/A		N/A		850,000	
11	*Total Required Deliveries Outside of the Region*	N/A		N/A		**1,074,000**	
Uses of Water within the Region							
12	Riparian Uses	56,250 riparian acres		2.4 afpy per riparian acre		135,000 10,000	includes 10,000 afpy for instream flows
13	Open Water Uses (Other than Elephant Butte)	10,000 open water acres		5 afpy per open water acre		50,000	
14	Irrigated Agriculture Uses	34,000 irrigated acres		2 afpy per irrigated acre		68,000	expect a small increase in irrigation efficiency
15	Office, Business, Commercial, and Industrial Uses					33,000	water for new uses must be obtained by conservation
16	Domestic Uses					57,000	water for new uses must be obtained by conservation
17	*Total Use of Water within the Region*	N/A		N/A		353,000	
18	**Net**	N/A		N/A		**0**	

	Urban Users & Economic Development Advocates Water Line Item	Desired Year 2050 Use Budget A Number of Units	B Per Unit Use	C Total Water Use (afpy)	Assumptions
Inflows to the Middle Rio Grande Region					
1	Rio Grande Native Inflows	N/A	N/A	1,100,000	
2	Tributary and Groundwater Inflows	N/A	N/A	245,000	
3	San Juan/Chama Inflows	N/A	N/A	74,000	
4	Imports from Socorro/Sierra Region	N/A	N/A	10,000	Water transfer through open market
5	Imports from Other Sources (must identify the source)			0,000	
6	Urban Storm Drain Inflow	N/A	N/A	10,000	Increase urbanization will cause more pavement with more rain water run off
7	*Total Water Income to the Region*	N/A	N/A	**1,439,000**	
Uses of Water within the Region					
8	Elephant Butte Lake Evaporation	18,249 surface acres	6.5 afpy per surface acre	117,000	Decrease Elephant Butte's surface size. Possibilities include making lake deeper, moving a portion up north or naturally shrinking size for water conservation.
9	Socorro/Sierra Region Current Delivery Rate	N/A	N/A	90,000	Imported 10,000 above
10	Rio Grande Compact Deliveries	N/A	N/A	850,000	Beneficial changes to Compact deliveries appear to be impossible (UUED Group would like to see if this can be negotiated)
11	*Total Required Deliveries Outside of the Region*	N/A	N/A	**1,057,000**	
Uses of Water within the Region					
12	Riparian Uses	42,000 riparian acres	3.0 afpy per riparian acre	130,000	Increase open space within the bosque and decrease non-native plants to decrease consumptive use
13	Open Water Uses (Other than Elephant Butte)	12,000 open water acres	4 afpy per open water acre	48,000	Reduce evaporation in open ditches and lessen conveyance losses
14	Irrigated Agriculture Uses	34,000 irrigated acres	1.9 afpy per irrigated acre	65,000	Kept ag lands to same 2050 amount; increased efficiency (10%) while maintaining shallow aquifer benefits
15	Office, Business, Commercial, and Industrial Uses	707,000 jobs	.0672 afpy per job	48,000	Used BBER predicted jobs and require increase water efficiency by 30 % from

					today's use.
16	Domestic Uses	1,470,000 persons	.056 afpy per person	82,000	Used FWUP predicted population and require increase water efficiency by 30 % from today's use.
17	*Total Use of Water within the Region*	N/A	N/A	**373,000**	
18	**Net**	N/A	N/A	**9,000**	Water Balanced in 2050. UUED Group used a balanced approached requiring more efficiency out of all water users while maintaining a high quality of life.

	Agricultural / Historical / Cultural Advocates - Scenario I	**Desired Year 2050 Use Budget**			**Assumptions**
		A	B	C	
	Water Line Item	Number of Units	Per Unit Use	Total Water Use (afpy)	
	Inflows to the Middle Rio Grande Region				
1	Rio Grande Native Inflows	N/A	N/A	1,100,000	
2	Tributary and Groundwater Inflows	N/A	N/A	245,000	
3	San Juan/Chama Inflows	N/A	N/A	74,000	
4	Imports from Socorro/Sierra Region	N/A	N/A	0	
5	Imports from Other Sources (must identify the source)				
6	Urban Storm Drain Inflow	N/A	N/A	5,000	
7	*Total Water Income to the Region*	N/A	N/A	**1,424,000**	Inflows stayed constant
	Uses of Water within the Region				
8	Elephant Butte Lake Evaporation	18,249 surface acres	6.5 afpy per surface acre	118,616	Real numbers = 144,000 acft & 6.5 acft per acre evaporation. Reduce the surface area to the legal minimum (12,000 acres), subtract that from the real (22,000) acres, then multiply that by 4 acft evap in the northern part of the state, multiply the 12,000 acres by 6.5.
9	Socorro/Sierra Region Current Delivery Rate	N/A	N/A	100,000	
10	Rio Grande Compact Deliveries	N/A	N/A	850,000	
11	*Total Required Deliveries Outside of the Region*	N/A	N/A	**1,068,616**	
	Uses of Water within the Region				
12	Riparian Uses	42,000 riparian acres	3.0 afpy per riparian acre	126,000	Some riparian losses due to land use change in areas outside the levees, and some losses from the reduction of ditchbank riparian when conveyances are lined or covered.
13	Open Water Uses (Other than Elephant Butte)	10,000 open water acres	5 afpy per open water acre	50,000	Open water changed from ditch/drain covering and/or eliminating, and from less water in the river meaning less evap losses. (fairly small change)
14	Irrigated Agriculture Uses	45,000 irrigated acres	2.1 afpy per irrigated acre	94,500	Some ag acreage losses, although the trend has slowed in recent years. Also, a significant portion of this land is in tribal hands, and is therefore untouchable. Ag land also includes the giant backyards which

						are not subject to land use change.
15	Office, Business, Commercial, and Industrial Uses				33,000	The "per job" line was eliminated as this completely ignored home based businesses and all ag related economies, including the ag dependent retail and wholesale. Line 15 and 16 were combined into "urban" uses.
16	Domestic Uses		898,244 persons	0.0945 afpy per person	84,884	The use was reduced to .0945 afpy per person to reflect a per capita water metering of about 160 gallons per day, well over Tucson and El Paso and Santa Fe, but less than Albq. current 209 gallons per day. This is just conservation that other cities do. Population growth limited by resource, quality of life decisions, and tribal sovereignty.
17	*Total Use of Water within the Region*		N/A	N/A	**355,384**	
18	**Net**		N/A	N/A	**0**	

	Agricultural / Historical / Cultural Advocates - Scenario II	**Desired Year 2050 Use Budget**			**Assumptions**
		A	B	C	
	Water Line Item	Number of Units	Per Unit Use	Total Water Use (afpy)	
Inflows to the Middle Rio Grande Region					
1	Rio Grande Native Inflows	N/A	N/A	1,100,000	
2	Tributary and Groundwater Inflows	N/A	N/A	245,000	
3	San Juan/Chama Inflows	N/A	N/A	74,000	
4	Imports from Socorro/Sierra Region	N/A	N/A	0	
5	Imports from Other Sources (must identify the source)				
6	Urban Storm Drain Inflow	N/A	N/A	5,000	
7	*Total Water Income to the Region*	N/A	N/A	**1,424,000**	
Uses of Water within the Region					
8	Elephant Butte Lake Evaporation	16,000 surface acres	9.0 afpy per surface acre	144,000	Any solution or reduction is nigh impossible
9	Socorro/Sierra Region Current Delivery Rate	N/A	N/A	100,000	
10	Rio Grande Compact Deliveries	N/A	N/A	850,000	Beneficial changes to Compact deliveries appear to be impossible
11	*Total Required Deliveries Outside of the Region*	N/A	N/A	**1,094,000**	
Uses of Water within the Region					
12	Riparian Uses	45,000 riparian acres	2.5 afpy per riparian acre	112,500	Reduced use by .5ac/ft/acre because of exotics removal. 10,000 less acres turned into ag. Maintenance at 2.0ac/ft/acre
13	Open Water Uses (Other than Elephant Butte)	12,000 open water acres	5.0 afpy per open water acre	60,000	Added 10,000 acres of former riparian as maintenance. Extra water from ag. Conservation
14	Irrigated Agriculture Uses	34,000 irrigated acres	1.8 afpy per irrigated acre	61,200	
15	Office, Business, Commercial, and Industrial Uses	250,000 jobs	0.073 afpy per job	18,250	jobs reduced to fit resource availability
16	Domestic Uses	500,000 persons	0.08 afpy per person	40,000	jobs reduced to fit resource availability
17	*Total Use of Water within the Region*	N/A	N/A	**291,950**	

Balance Water Use with Renewable Supply

18	**Net**		N/A	N/A	**38,050**

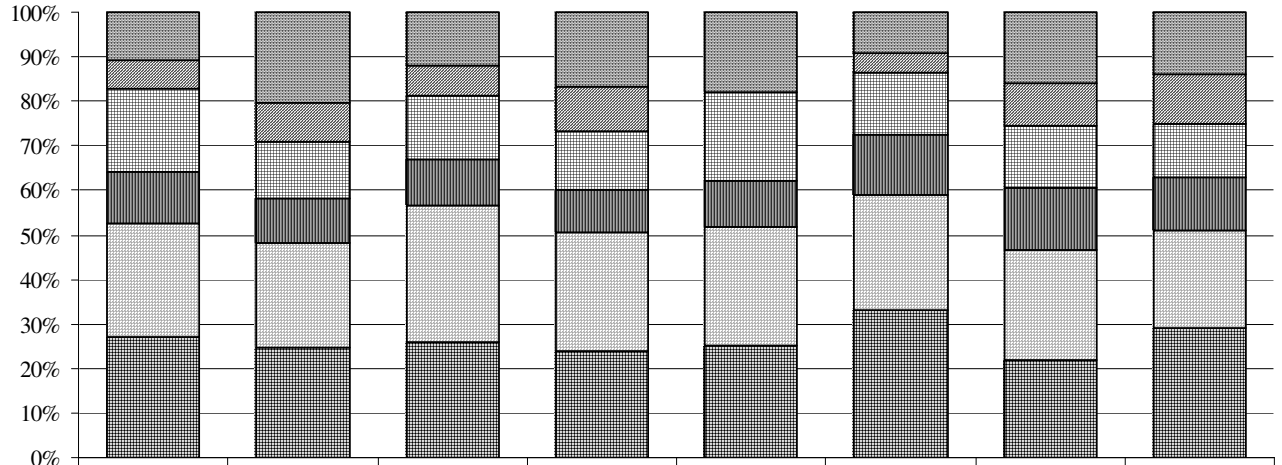
Specialists - "Minimum Scenario"		Desired Year 2050 Use Budget			Assumptions
		A	B	C	
	Water Line Item	Number of Units	Per Unit Use	Total Water Use (afpy)	
Inflows to the Middle Rio Grande Region					
1	Rio Grande Native Inflows	N/A	N/A	1,100,000	
2	Tributary and Groundwater Inflows	N/A	N/A	245,000	
3	San Juan/Chama Inflows	N/A	N/A	74,000	
4	Imports from Socorro/Sierra Region	N/A	N/A	___,000	
5	Imports from Other Sources (must identify the source)			___,000	
6	Urban Storm Drain Inflow	N/A	N/A	5,000	
7	*Total Water Income to the Region*	N/A	N/A	**1,424,000**	No changes
Uses of Water within the Region					
8	Elephant Butte Lake Evaporation	11,964 surface acres	7.96 afpy per surface acre	95,276	12,000 acres (25% reduction); Evap/Acre 9 ð 8 (Evaporation rate reduction of ~ 12% from 9 ð 8 based on reduced surface area) (move storage to Wagon Wheel area for reduced evap in new reservoir. Political feasibility based on 55,000 Ac-ft is authorized minimum recreational at E Butte) Parameters reflect impacts at both storage areas.
9	Socorro/Sierra Region Current Delivery Rate	N/A	N/A	100,000	
10	Rio Grande Compact Deliveries	N/A	N/A	850,000	
11	*Total Required Deliveries Outside of the Region*	N/A	N/A	**1,045,276**	
Uses of Water within the Region					
12	Riparian Uses	45,000 riparian acres	2.39 afpy per riparian acre	107,476	Changed ET/Acre from 3 to 2.39 (20% reduction)
13	Open Water Uses (Other than Elephant Butte)	12,000 open water acres	5.0 afpy per open water acre	60,000	River areas = Rio Grande 6900 acres & Jemez 2600 acres. Conversion to closed onduit (main laterals and drains) was judged to be ~10% due to slope constraints, etc. or about 83.4 miles that could be converted.
14	Irrigated Agriculture Uses	33,970 irrigated acres	1.75 afpy per irrigated acre	59,405	34,000 acres (30% reduction) ; ET/Acre 2.1 to 1.75 (7% reduction); Total Use 100,000 to 59,712 ac-ft. (40% reduction in consumptive use). Additional crop changes, etc. could drive this lower.

15	Office, Business, Commercial, and Industrial Uses	551,196 jobs	0.08 afpy per job	42,197	Jobs. 343,000 to 550,000 (152%) (based on FWUP Series B); Per Job use 0.096 to 0.08 (79%); Total Use 33,000 to 42,197 ac-ft. (111%)
16	Domestic Uses	1,150,943 persons	0.06 afpy per person	69,057	Population - 712,000 to 1,150,943 people (161%) (based on FWUP Series B); Per Capita use 0.08 to 0.06 (75%); Total Use 57,000 to 80,362 ac-ft. (128%) Population was increased based on FWUP Series C. Consumptive use projected as 0.08 to 0.06 ac-ft/person.
17	*Total Use of Water within the Region*	N/A	N/A	**338,135**	
18	**Net**	N/A	N/A	**40,589**	

Specialists - "Maximum Scenario"		Desired Year 2050 Use Budget			Assumptions
		A	B	C	
	Water Line Item	Number of Units	Per Unit Use	Total Water Use (afpy)	
Inflows to the Middle Rio Grande Region					
1	Rio Grande Native Inflows	N/A	N/A	1,100,000	
2	Tributary and Groundwater Inflows	N/A	N/A	245,000	
3	San Juan/Chama Inflows	N/A	N/A	74,000	
4	Imports from Socorro/Sierra Region	N/A	N/A	___,000	
5	Imports from Other Sources (must identify the source)			___,000	
6	Urban Storm Drain Inflow	N/A	N/A	5,000	
7	*Total Water Income to the Region*	N/A	N/A	**1,424,000**	
Uses of Water within the Region					
8	Elephant Butte Lake Evaporation	11,964 surface acres	7.96 afpy per surface acre	144,000	
9	Socorro/Sierra Region Current Delivery Rate	N/A	N/A	100,000	
10	Rio Grande Compact Deliveries	N/A	N/A	850,000	
11	*Total Required Deliveries Outside of the Region*	N/A	N/A	**1,094,000**	
Uses of Water within the Region					
12	Riparian Uses	45,000 riparian acres	2.39 afpy per riparian acre	107,476	Changed ET/Acre from 3 to 2.39 (20% reduction)
13	Open Water Uses (Other than Elephant Butte)	12,000 open water acres	5.0 afpy per open water acre	60,000	River areas = Rio Grande 6900 acres & Jemez 2600 acres. Conversion to closed onduit (main laterals and drains) was judged to be ~10% due to slope constraints, etc. or about 83.4 miles that could be converted.
14	Irrigated Agriculture Uses	33,970 irrigated acres	1.75 afpy per irrigated acre	59,405	34,000 acres (30% reduction) ; ET/Acre 2.1 to 1.75 (7% reduction); Total Use 100,000 to 59,712 ac-ft. (40% reduction in consumptive use). Additional crop changes, etc. could drive this lower.
15	Office, Business, Commercial, and Industrial Uses	707,000 jobs	0.08 afpy per job	54,101	Jobs. 343,000 to 707,000 (206%) (based on FWUP Series B); Per Job use 0.096 to 0.08 (79%); Total Use 33,000 to 54,101 ac-ft. (164%)

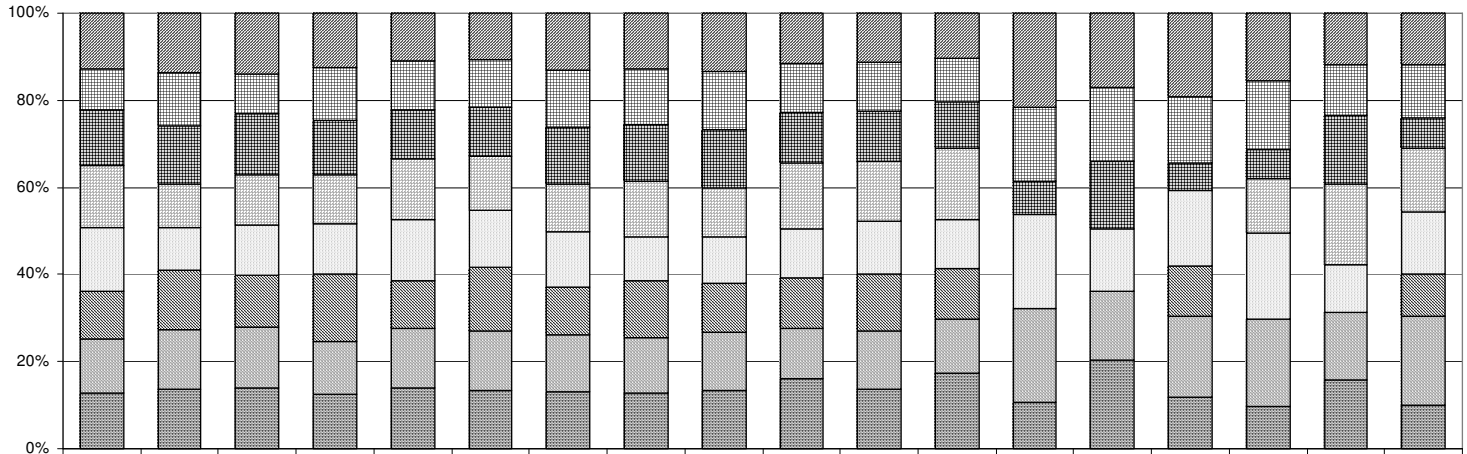
16	Domestic Uses	1,150,943 persons	0.06 afpy per person	69,057	Population - 712,000 to 1,150,943 people (161%) (based on FWUP Series B); Per Capita use 0.08 to 0.06 (75%); Total Use 57,000 to 80,362 ac-ft. (128%) Population was increased based on FWUP Series C. Consumptive use projected as 0.08 to 0.06 ac-ft/person.
17	*Total Use of Water within the Region*	N/A	N/A	**350,039**	
18	**Net**	N/A	N/A	**-20,039**	

Balancing the Budget
Constituency Group Preferences (in acre feet)
compares the percentage each value contributes to a total across categories



	Current Usage	Future Usage (FWUP)	Environmental	Urban Users & Economic Development	Agricultural / Historical / Cultural	Agricultural / Historical / Cultural	Specialists - "Minimum Scenario"	Specialists - "Maximum Scenario"
Domestic Uses	57000	118000	57000	82000	84884	40000	69057	69057
Office, Business, Commercial, and Industrial Uses	33000	52000	33000	48000		18250	42197	54101
Irrigated Agriculture Uses	100000	72000	68000	65000	94500	61200	59405	59405
Open Water Uses (Other than EB)	60000	60000	50000	48000	50000	60000	60000	60000
Riparian Uses	135000	135000	145000	130000	126000	112500	107476	107476
Elephant Butte Lake Evaporation	144000	144000	124000	117000	118616	144000	95276	144000

Comparison of Constituency Group Preferences



	Elephant Butte Lake Evaporation			Riparian Uses			Open Water Uses (Other than EB)			Irrigated Agriculture Uses			Office, Business, Commercial, and Industrial Uses			Domestic Uses		
	acre	afpy per ac	acre feet	acre	afpy per ac	acre feet	acre	afpy per ac	acre feet	acre	afpy per ac	acre feet	jobs	afpy per jol	acre feet	persons	afpy per pe	acre feet
Specialists -"Maximum Scenario"	16,000	9	144,000	45,000	2.39	107,476	12,000	5	60,000	33,970	1.75	59,405	707,000	0.08	54,101	1,150,943	0.06	69,057
Specialists - "Minimum Scenario"	11,964	7.96	95,276	45,000	2.39	107,476	12,000	5	60,000	33,970	1.75	59,405	551,196	0.08	42,197	1,150,943	0.06	69,057
Agricultural / Historical / Cultural Advocates (2)	16,000	9	144,000	45,000	2.5	112,500	12,000	5	60,000	34,000	1.8	61,200	250,000	0.073	18,250	500,000	0.08	40,000
Agricultural / Historical / Cultural Advocates (1)	18,249	6.5	118,616	42,000	3	126,000	10,000	5	50,000	45,000	2.1	94,500				898,244	0.0945	84,884
Urban Users & Economic Development	18,249	6.5	117,000	42,000	3	130,000	12,000	4	48,000	34,000	1.9	65,000	707,000	0.0672	48,000	1,470,000	0.056	82,000
Environmental	13,780	9	124,000	56,250	2.4	145,000	10,000	5	50,000	34,000	2	68,000			33,000			57,000
Future Usage (FWUP)	16,000	9	144,000	45,000	3	135,000	12,000	5	60,000	34,000	2.1	72,000	707,000	0.073	52,000	1,470,000	0.08	118,000
Current Usage	16,000	9	144,000	45,000	3	135,000	12,000	5	60,000	48,000	2.1	100,000	343,000	0.096	33,000	713,000	0.08	57,000

MIDDLE RIO GRANDE WATER ASSEMBLY

from last spring

AGRICULTURAL, HISTORICAL AND CULTURAL INTERESTS

Farming has been practiced in New Mexico for over a thousand years. Long before the Pilgrims arrived at Plymouth Colony, herding and ranching were being practiced here. New Mexico has always been an agriculturally based society and our history and cultures are founded on it. Today, America loses over 1 million acres of farmland a year to urban sprawl, and New Mexico is no exception. The Ag/H/C Group seeks to preserve agricultural practice, economies, lifestyles, and water rights through water planning.

WATER MANAGERS INTERESTS

The Manager's Constituency is made up of, as its name describes, organizations that are responsible for obtaining and distributing water to ultimate users of water. Members can include government-owned and investor-owned water utilities, cooperative-type water utilities, and other organizations and associations that manage water for the benefit of their customers or members that are end users of water.

SPECIALISTS INTERESTS

This Constituency Group consists of professionals who have specialized in the water resource field as a matter of training or practice, e.g. hydrologists, hydrogeologists, engineers, ecologists, economists, lawyers, and other pertinent disciplines.

ENVIRONMENTAL ADVOCATES INTERESTS

The Environmental Advocates Constituency Group is charged with advocating for a water plan that incorporates environmentally sustainable water-use practices such as the maintenance and increase of riparian areas, keeping the river wet, and the survival of the Rio Grande's unique riverine habitat.

URBAN USERS AND ECONOMIC DEVELOPMENT ADVOCATES INTERESTS

The Urban Users And Economic Development Advocates (UUEDA) support sensible water planning to sustain an urban life style, a healthy economy in the rural and urban regions, and a quality of life which includes preservation of open-space. This group promotes a conservative use of water and recognizes its responsibility to preserve water for all uses -- urban, agricultural, and environmental-- within the region. It incorporates the interests of developers and rural economic promoters, together with those of apartment dwellers, home-owners and business. The UUEDA is made up of individuals with diverse backgrounds and is always looking for input from the community at large. If you have a home or a business within the region, we encourage you to come join our group!

From June 2001 **<u>*AGRICULTURAL*, HISTORICAL AND CULTURAL INTERESTS</u>**

Acequias Grazing Livelihoods

Farmland preservation
Forest health
Timber harvest
Watershed mgt.
Urban-rural interface
Historical site preservation
Cultural heritage
Protecting agricultural use zoning
Flood protection
Access to public lands
Aquifer recharge
Fuel wood use
Erosion Control
Water right preservation
Water quality protection
Irrigation, tie to acequia water
Wildlife mgt
Plant mgt.
Food and feed production
Wildfire control
Preventing inappropriate industrial development
Water quantity for agricultural uses
Subdivision of agricultural land --
fate of pre-1907 water rights

WATER MANAGERS INTERESTS

Conservation, Reuse, Reclamation
Rural
Domestic
Industrial
Commercial
Recreation
Water rights
Tribal issues and concerns
Quantity -- Capacity development
Quality protection
BMPs
Equity among users
Specific utility issues
Equity and implementation
Drought planning
Supply and demand
Agriculture
Endangered species
San Juan/Chama water
Water law -- process

URBAN USERS AND ECONOMIC DEVELOPMENT ADVOCATES INTERESTS

Water and education
Long-term -- place for children to live and work
Economic development
job growth
quality jobs
Property rights issues
urban
outside urban areas
rural, regional
Developing areas outside Albuquerque
Affordable and safe drinking water supply
Rural economic development
Technical studies, e.g., reverse osmosis
Ability to set priorities and use during drought
Reduction of storm water runoff, better management
Small Business
Outside county
inside county
Sustainable growth

SPECIALISTS INTERESTS

Long-term planning
Hydrology
Scientific data
Different Expertise
hydrology
geology
planning
legal
engineering
environmental
ecological
economics
water operations/river
historical
local/national
Documentation and transference of knowledge
Future vision of NM -- preservation, uniqueness
Public interests
Practical solutions
(technical and economic feasibility)
Flexible future
Provide leadership
Environmental management

ENVIRONMENT ADVOCATES INTERESTS

Concerns about water in the Middle Rio Grande Region

- Maintaining and preserving wildlife habitat
- Groundwater management
- Connecting land use planning and water planning
- Aquifer management (Water banking withdrawals)
- Endangered species protection
- Securing an entitlement of water for the river
- Insuring sufficient water quality to support life
- Time delays of pumping effect
- Maintaining adequate water supply in quality and quantity at reasonable costs
- Maintaining ecosystem integrity
- Maintaining water quality of the aquifer and river – specifically radiological, non-radiological, agricultural contaminants
- Legislative proposals that are "green friendly"
- Minimizing, restricting, and/or limiting growth and development in order to meet water demands
- Education about lifestyle and population management
- "Keep it wild" with trees and forests
- Influence Federal legislation
- Managing flows in the river that supports river ecosystems
- Consider the carrying capacity of our natural systems
- Tie in environmental advocacy with traditional and agricultural uses of water
- Restoration of the Bosque through removal of non-native vegetation and other healthy management techniques in the Bosque
- Create a more natural hydrograph
- Do something about channelization, aggredation/degregation
- Remove dams when and where possible
- MRG region needs something like the Arizona groundwater management act
- Stop groundwater mining
- Examine basin wide system
- Restrict domestic wells legislation
- Metering all water uses
- water law reform to create a sustainable relationship between supply and demand
- Development of systems that lower evaporation levels of river and all surface water
- Protect agro-ecology
- Create expensive water through economic disincentives for use and incentives for conservation
- Prioritize water uses and prepare for draught
- Severance tax on water mining
- Reduction in water use by industrial and military
- Impact of apparent reduction in flows from San Juan/Chama project by facilitating an evaluation now
- Relationship between issues and downstream communities (Texas, Mexico)
- No more golf courses
- Overgrazing

MIDDLE RIO GRANDE WATER ASSEMBLY

Public Preference Tabulation from Community Conversations 5 (Sep. 2002)

Alternative Action		Alt. Id No.	ALTS Working Team Rating	Dot Preferences				Card Preferences			
				Totals		Ranking		Totals		Ranking	
				M	L	M	L	M	L	M	L
1. Change Water Use	Develop markets for locally-grown produce, and low-water alternative crops.	A-11	***H***	11	13	17th	11th	5	7	23rd	17th
	Preserve, but continue to draw deep-well water for drinking purposes only.	A-15	***L***	8	2	23rd	31st	9	5	12th	22nd
	Increase building densities (as compared to typical suburban density) and infill development through adoption of local government land use policies and regulations.	A-28	***H***	5	23	29th	7th	7	10	18th	8th
	Adopt policies to integrate land use and transportation planning and water resource management in all government jurisdictions in the Middle Rio Grande water planning region.	A-30	***H***	39	11	2nd	12th	19	6	2nd	19th
2. Decrease or Regulate Water Demand	Meter and manage surface water distribution flows through all irrigation systems to conserve water.	A-7	***M+***	9	20	19th	8th	9	9	12th	13th
	Meter all water supply wells, including domestic wells, throughout the water planning region.	A-8	***L***	10	63	18th	1st	9	15	12th	3rd
	Develop conveyance alternatives for water transportation in agricultural irrigation systems.	A-9	***H***	8	2	23rd	31st	8	7	16th	17th
	Develop and employ alternatives to maximize irrigation efficiency on all irrigated land in the region.	A-10	***H***	17	2	7th	31st	11	0	8th	39th
	Adopt and implement local water conservation plans and programs in all municipal and county jurisdictions, including drought contingency plans.	A-18	***H***	34	1	3rd	38th	16	0	5th	39th
	Examine a variety of water pricing mechanisms and adopt those that are most effective at conserving water. The mechanisms to be examined include: a) price water to reflect the true value; b) institute a moderately increasing block price schedule; c) institute a steeply increasing block price schedule; and d) other feasible incentives and subsidies for conserving water.	A-21	***H***	12	32	13th	4th	10	10	10th	8th
	Provide local government programs that offer subsidies for adoption of water efficient technologies and utilization of water saving devices.	A-22	***H***	12	2	13th	31st	4	3	29th	30th
	Establish region-wide educational programs, including public and private school curricula, to encourage voluntary conservation of water.	A-56	***H***	9	3	19th	26th	8	0	16th	39th
	Fund acequias to develop and implement water conservation programs.	A-60	***L***	9	5	19th	21st	5	10	23rd	8th
	Reduce the allowed pumping from domestic wells and restrict drilling of domestic wells where surface waters or the aquifer could be impaired.	A-61	***M***	2	11	38th	12th	2	11	36th	6th
3. Water Funding	Establish dedicated and continuing funding for Regional Water Planning as an ongoing process and as a basis for water management at local, regional and state levels.	A-58	***L***	3	4	34th	23rd	2	8	36th	15th
	Establish a State-based water severance tax for water projects, planning and conservation.	A-59	***M+***	6	27	27th	5th	5	8	23rd	15th

4. Implementation of Water Plan	Develop a sustainable and coordinated growth management plan for adoption and implementation by local governments in the middle Rio Grande region in order to: 1) reduce water consumption; 2) minimize impact on water resources; 3) encourage conservation-oriented economic development and 4) ensure adequate water supplies for any proposed development.	A-52	***H***	32	4	4th	23rd	18	11	4th	6th
	Through open and inclusive processes, ensure public involvement in water planning by continuing regular public information/dissemination programs and public relations campaigns, and citizen planning committees. Keep the public engaged in this process.	A-53	***M***	2	0	38th	41st	4	5	29th	22nd
	Establish a regional water management authority to provide professional water resource management and to administer or assist in a water banking program.	A-67	***L***	6	15	27th	10th	3	12	32nd	5th
	Establish and integrate a regional Geographical Information System (GIS) database of publicly accessible information on water resources and photo imagery covering the water planning region.	A-73	***L***	1	8	41st	15th	1	6	42nd	19th
	Active water resource management by the OSE/ISC	A-143	***L***	3	7	34th	19th	5	5	23rd	22nd
	Address groundwater/surface water interactions in the statutes for administering water rights	A-144	***M+***	3	2	34th	31st	3	1	32nd	37th
5a. Increase Water Supply	Restore Bosque habitat and manage vegetation in the Bosque to reduce evapotranspiration by selectively removing vegetation and promoting native plants.	A-1	***H***	77	0	1st	41st	19	3	3rd	30th
	Develop economic potential of non-native species removal, harvesting, and output of products by local industries.	A-2	***L***	0	3	44th	26th	2	5	36th	22nd
	Promote, through incentives, on-site residential and commercial greywater reuse and recycling	A-24	***M+***	16	1	9th	38th	13	2	7th	34th
	Reuse treated wastewater for non-potable uses.	A-27	***M+***	17	0	7th	41st	11	2	8th	34th
	Establish erosion prevention measures and use soil and vegetation management techniques to reduce runoff and increase infiltration throughout the watershed, including forested mountains and uplands.	A-33	***L***	12	3	13th	26th	9	5	12th	22nd
	Enhance and expand local government storm water management plans and programs to control runoff using swales, terraces, and retention structures to minimize erosion, enhance infiltration and recharge, and prevent pollution of surface and ground water.	A-34	***L***	5	2	29th	31st	2	4	36th	27th
	Create constructed wetlands where feasible for groundwater recharge, water harvesting, and habitat improvement, and hydrological management of the Rio Grande.	A-36	***L***	8	3	23rd	26th	3	6	32nd	19th
5b. Increase Water Supply	Increase monitoring and modeling of surface water system to improve water management at the watershed level, and retain excess water flow from Elephant Butte Reservoir during wet cycles.	A-38	***H***	9	1	19th	38th	5	0	23rd	39th
	Utilize technological advances for treating deep saline and brackish water for potable or non-potable use in the region.	A-39	***H***	5	8	29th	15th	7	13	18th	4th
	Continue evapotranspiration studies and apply findings to vegetation management programs in the water planning region.	A-40	***L***	3	8	34th	15th	1	8	42nd	15th
	Conduct research on innovative water supply enhancement techniques such as weather modification.	A-42	***M***	2	41	38th	2nd	0	28	44th	1st
	Encourage on-site rainwater harvesting	A-44	***L***	12	3	12th	26th	7	4	18th	27th

	Reduce open water evaporation in storage reservoirs by retaining water at higher elevations or latitudes, or by reducing surface areas.	A-45	***H***	23	4	5th	23rd	20	3	1st	30th
	Inject water treated to drinking water standards for aquifer storage in appropriate locations throughout the water planning region.	A-46	***H***	13	17	12th	9th	6	10	21st	8th
	Implement local and regional watershed management plans through all land and water agencies in the planning area.	A-66	***M+***	1	0	41st	41st	3	0	32nd	39th
	Acquire additional water rights without condemnation from various sources from within or outside the water planning region, and import water from other basins where possible.	A-69	***M***	7	27	26th	5th	6	17	21st	2nd
6. Water Quality Protection	Expand use of centralized wastewater collection and treatment systems into all areas of urban and suburban development within the water planning region.	A-26	***H***	4	8	33rd	15th	4	2	29th	34th
	Identify, protect and monitor areas vulnerable to contamination (quality issue) and restrict groundwater supply wells in sensitive areas.	A-47	***H***	5	5	29th	21st	2	0	36th	39th
	Enforce wellhead protection programs on all public water supply wells within local government jurisdictions.	A-50	***L***	1	6	41st	20th	2	3	26th	30th
7. Water Rights	Establish more equitable accounting for evaporative losses in Rio Grande Compact water.	A-51	***M***	15	2	10th	31st	5	1	23rd	37th
	Change state water law to include in-stream flow as a beneficial use.	A-63	***M+***	14	36	11th	3rd	14	10	6th	8th
	Identify, quantify, and adjudicate all water rights and all wet water quantities in the water planning region.	A-71	***H***	19	9	6th	14th	11	4	8th	27th
Totals				**509**	**444**			**315**	**279**		

WATER BALANCE SPREADSHEET

9th Version of the WBE

Water Line Item	Number of Units	X	Per Unit Use	=	Total Water Use (afpy)
Inflows to the Middle Rio Grande Region					
Rio Grande Native Inflows	N/A		N/A		1,100,000
Tributary and Groundwater Inflows	N/A		N/A		245,000
San Juan/Chama Inflows	N/A		N/A		74,000
Imports from Socorro/Sierra Region	N/A		N/A		0
Imports from Other Sources (must identify the source)					
Urban Storm Drain Inflow	N/A		N/A		5,000
Total Water Income to the Region	N/A		N/A		1,424,000
Required Deliveries to Outside of the Region					
Elephant Butte Lake Evaporation	16,000 surface acres		9.0 afpy per surface acre		144,000
Socorro/Sierra Region Current Delivery Rate	N/A		N/A		100,000
Rio Grande Compact Deliveries	N/A		N/A		850,000
Total Required Deliveries Outside of the Region	N/A		N/A		1,094,000
Uses of Water within the Region					
Riparian Uses	45,000 riparian acres		3.0 afpy per riparian acre		135,000
Open Water Uses (Other than Elephant Butte)	12,000 open water acres		5.0 afpy per open water acre		60,000
Irrigated Agriculture Uses	48,000 irrigated acres		2.1 afpy per irrigated acre		100,000
Office, Business, Commercial, and Industrial Uses	343,000 jobs		0.096 afpy per job		33,000
Domestic Uses	713,000 persons		0.08 afpy per person		57,000
Total Use of Water within the Region	N/A		N/A		385,000
Budget Reconciliation: Inflows minus Required Deliveries minus Use within Region					
Net	N/A		N/A		-55,000

Note: water per job is going to be broken out as commercial, industrial and municipal

Population Projection (Current BBER 2002 to 2030, and BBER 1997 from 2030 to 2060)

Information from Bureau of Business and Economic Research, University of New Mexico and Mid Region Council of Governments

Migrant Status of MRG Residents 5 Years Prior to Census 2000						**Percent - Migrant Status of MRG Residents 5 Years Prior to Census 2000**				
Population 5 years and Older						*Population 5 years and Older*				
Migration Status	Bernalillo	Sandoval	Valencia	Total MRG	NEW MEXICO	Bernalillo	Sandoval	Valencia	Total MRG	NEW MEXICO
Total	**518,381**	**83,382**	**61,142**	**662,905**	**1,689,911**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**
Stayers	**253,614**	**47,166**	**34,435**	**335,215**	**919,717**	**48.90%**	**56.60%**	**56.30%**	**50.60%**	**54.40%**
All Migrants	**264,767**	**36,216**	**26,707**	**327,690**	**770,194**	**51.10%**	**43.40%**	**43.70%**	**49.40%**	**45.60%**
Intrastate migrant	*186,226*	*23,035*	*20,662*	*229,923*	*526,221*	*70.30%*	*63.60%*	*77.40%*	*70.20%*	*68.30%*
same county	154,634	9,710	10,110	174,454	400,128	83.00%	42.20%	48.90%	75.90%	76.00%
same state	31,692	13,325	10,552	55,569	126,093	17.00%	57.80%	51.10%	24.20%	24.00%
Interstate Migrants	*65,944*	*12,263*	*5,145*	*83,352*	*206,186*	*24.90%*	*33.90%*	*19.30%*	*25.40%*	*26.80%*
Other US State	65,562	12,223	5,145	82,930	205,267	99.40%	99.70%	100.00%	99.50%	99.60%
Northeast	5,846	1,607	358	7,811	15,329	8.90%	13.10%	7.00%	9.40%	7.50%
Midwest	11,261	2,054	693	14,008	29,457	17.20%	16.80%	13.50%	16.90%	14.40%
South	20,712	3,392	1,188	25,292	72,497	31.60%	27.80%	23.10%	30.50%	35.30%
West	27,743	5,170	2,906	35,819	87,984	42.30%	42.30%	56.50%	43.20%	42.90%
US Territory	382	40	0	422	919	0.60%	0.30%	0.00%	0.50%	0.40%
Foreign Migrant	*12,697*	*918*	*900*	*14,515*	*37,787*	*4.80%*	*2.50%*	*3.40%*	*4.40%*	*4.90%*

Bureau of Business and Economic Research, University of New Mexico

New Mexico and MRG Population, 1910 to 2000

from Bureau of Business and Economic Research, University of New Mexico

	Projections from BBER 2002	BBER 1996 ISC Projection	Series A (MRGCOG 1999)	Series B (MRGCOG 1999)	Series C (MRGCOG 1999)	Focus 2050* (MRGCOG 1998)
Bernalillo County						
2000	558,437	551,504	561,724	557,045	555,140	
2005	595,954	581,203				
2010	631,839	611,248	663,050	633,107	619,581	
2015	666,114	642,486				
2020	698,832	675,208	770,097	713,473	694,249	
2025	729,750	708,927				
2030	759,000	739,646	863,952	780,012	762,188	
2040		789,583	960,863	839,570	824,877	
2050		822,977	1,068,973	894,432	886,670	1,081,907
2060		853,909				
Sandoval County						
2000	90,775	93,284	97,347	95,893	95,009	
2005	108,538	109,715				
2010	126,294	128,396	139,803	125,608	123,764	
2015	144,377	148,049				
2020	162,409	170,199	175,260	146,654	144,133	
2025	179,998	194,719				
2030	197,182	221,662	200,191	160,624	158,480	
2040		284,894	224,067	171,968	167,652	
2050		363,519	250,684	180,415	162,140	253,963
2060		457,562				
Valencia						
2000	66,699	66,699	70,631	69,576	68,935	
2005	76,512	76,582				
2010	86,708	87,575	98,083	87,371	86,089	
2015	97,330	99,646				
2020	108,064	112,909	118,703	97,663	95,984	
2025	118,593	126,701				
2030	128,922	142,089	131,559	102,949	101,576	
2040		177,399	142,192	105,598	102,949	
2050		219,834	153,552	106,119	95,370	155,410
2060		271,925				
MRG Region						
2000	715,911	711,487	729,702	722,514	719,084	
2005	781,004	767,500				
2010	844,841	827,219	900,936	846,086	829,434	
2015	907,821	890,181				
2020	969,305	958,316	1,064,060	957,790	934,366	
2025	1,028,341	1,030,347				
2030	1,085,104	1,103,397	1,195,702	1,043,585	1,022,244	
2040	1,028,341	1,251,876	1,327,122	1,117,136	1,095,478	
2050	1,085,104	1,406,330	1,473,209	1,180,966	1,144,180	1,491,280
2060		1,583,396				

Source: Bureau of Business and Economic Research, University of New Mexico and Mid Region Council of Governments' Future Water Use Projections

BBER 1996 INTERSTATE STREAM COMMISSION PROJECTION (1960-2060)
MRGCOG (MRCOG) 2000 PROJECTIONS (HIGH AND LOW) FOR WATER PLANNING (APPENDIX A) (2000-2050)
BBER 2002 COUNTY PROJECTIONS (2000-2030)

	NEW MEXICO	Bernalillo	Sandoval	Valencia	MRG
1910	327,301	23,606	8,579	13,320	45,505
1920	360,350	29,855	8,863	13,795	52,513
1930	423,317	45,430	11,144	16,186	72,760
1940	531,818	69,391	13,898	20,245	103,534
1950	681,187	145,637	12,438	22,481	180,556
1960	951,023	262,199	14,201	39,085	315,485
1970	1,017,055	315,774	17,492	40,576	373,842
1980	1,303,303	420,262	34,400	30,769	485,431
1990	1,515,069	480,577	63,319	45,235	589,131
2000	1,819,046	556,678	89,908	66,152	712,738

Summary of water use in acre-feet, in New Mexico counties, 2000.

Brian Wilson, et al, Office of State Engineer (in production)

CN	COUNTY	CATEGORY	WSW	WGW	TW	DSW	DGW	TD	RFSW	RFGW	TRF
1	Bernalillo	Commercial (self-supplied)	0.00	5,503.14	5,503.14	0.00	4,575.47	4,575.47	0.00	927.67	927.67
1	Bernalillo	Domestic (self-supplied)	0.00	5,572.84	5,572.84	0.00	5,572.84	5,572.84	0.00	0.00	0.00
1	Bernalillo	Industrial (self-supplied)	0.00	382.06	382.06	0.00	91.41	91.41	0.00	290.65	290.65
1	Bernalillo	Irrigated Agriculture	61,932.00	3,304.00	65,236.00	16,353.00	1,876.00	18,229.00	45,579.00	1,428.00	47,007.00
1	Bernalillo	Livestock (self-supplied)	20.90	802.81	823.71	20.90	802.81	823.71	0.00	0.00	0.00
1	Bernalillo	Mining (self-supplied)	0.00	458.70	458.70	0.00	367.40	367.40	0.00	91.30	91.30
1	Bernalillo	Power (self-supplied)	0.00	839.53	839.53	0.00	541.91	541.91	0.00	297.62	297.62
1	Bernalillo	Public Water Supply	66.63	118,309.90	118,376.50	33.32	52,472.00	52,505.32	33.31	65,837.88	65,871.20
1	Bernalillo	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	62,019.53	135,172.96	197,192.50	16,407.22	66,299.84	82,707.06	45,612.31	68,873.12	114,485.44
43	Sandoval	Commercial (self-supplied)	10.00	2,079.14	2,089.14	10.00	2,000.03	2,010.03	.0.00	79.11	79.11
43	Sandoval	Domestic (self-supplied)	0.00	2,829.84	2,829.84	0.00	2,829.84	2,829.84	0.00	0.00	0.00
43	Sandoval	Industrial (self-supplied)	0.00	3,611.81	3,611.81	0.00	738.43	738.43	0.00	2,873.38	2,873.38
43	Sandoval	Irrigated Agriculture	61,513.00	824.00	62,337.00	17,971.00	450.00	18,421.00	43,542.00	374.00	43,916.00
43	Sandoval	Livestock (self-supplied)	124.02	134.57	258.59	124.02	134.57	258.59	0.00	0.00	0.00
43	Sandoval	Mining (self-supplied)	0.00	438.20	438.20	0.00	350.37	350.37	0.00	87.83	87.83
43	Sandoval	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43	Sandoval	Public Water Supply	159.16	12,219.79	12,378.95	59.48	9,897.42	9,956.90	99.68	2,322.37	2,422.05
43	Sandoval	Reservoir Evaporation	10,370.00	0.00	10,370.00	10,370.00	0.00	10,370.00	0.00	0.00	0.00
		County Totals	72,176.18	22,137.35	94,313.53	28,534.50	16,400.66	44,935.16	43,641.68	5,736.69	49,378.37
61	Valencia	Commercial (self-supplied)	0.00	810.42	810.42	0.00	732.79	732.79	0.00	77.63	77.63
61	Valencia	Domestic (self-supplied)	0.00	3,716.42	3,716.42	0.00	3,716.42	3,716.42	0.00	0.00	0.00
61	Valencia	Industrial (self-supplied)	0.00	48.05	48.05	0.00	44.55	44.55	0.00	3.50	3.50
61	Valencia	Irrigated Agriculture	161,883.00	7,103.00	168,986.00	44,022.00	3,846.00	47,868.00	117,861.00	3,257.00	121,118.00
61	Valencia	Livestock (self-supplied)	48.08	869.06	917.14	48.08	869.06	917.14	0.00	0.00	0.00
61	Valencia	Mining (self-supplied)	0.00	1.40	1.40	0.00	1.40	1.40	0.00	0.00	0.00
61	Valencia	Power (self-supplied)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

61	Valencia	Public Water Supply	0.00	5,607.49	5,607.49	0.00	2,864.83	2,864.83	0.00	2,742.66	2,742.66
61	Valencia	Reservoir Evaporation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		County Totals	161,931.08	18,155.84	180,086.92	44,070.08	12,075.05	56,145.13	117,861.00	6,080.79	123,941.79

Key: CN=county number; WSW=withdrawal, surface water; WGW=withdrawal ground water; TW=total withdrawal; DSW=depletion, surface water; DGW=depletion, ground water; TD=total depletion; RFSW=return flow, surface water; RFGW=retum flow, ground water; TRF=total retum flow.

Current and Historical Water Use

Shomaker, et al

Figure 50. Distribution of withdrawals by category in total region, 1995

	percentage	acre-feet
agriculture	46.99%	281,940
riparian vegetation	15.52%	93,120
public water supply	25.30%	151,800
open water evaporation	9.17%	55,020
livestock	0.29%	1,740
self-supplied domestic	1.29%	7,740
self-supplied commercial	0.98%	5,880
self-supplied industrial	0.32%	1,920
power	0.04%	240
mining	0.10%	600
	100.00%	600,000

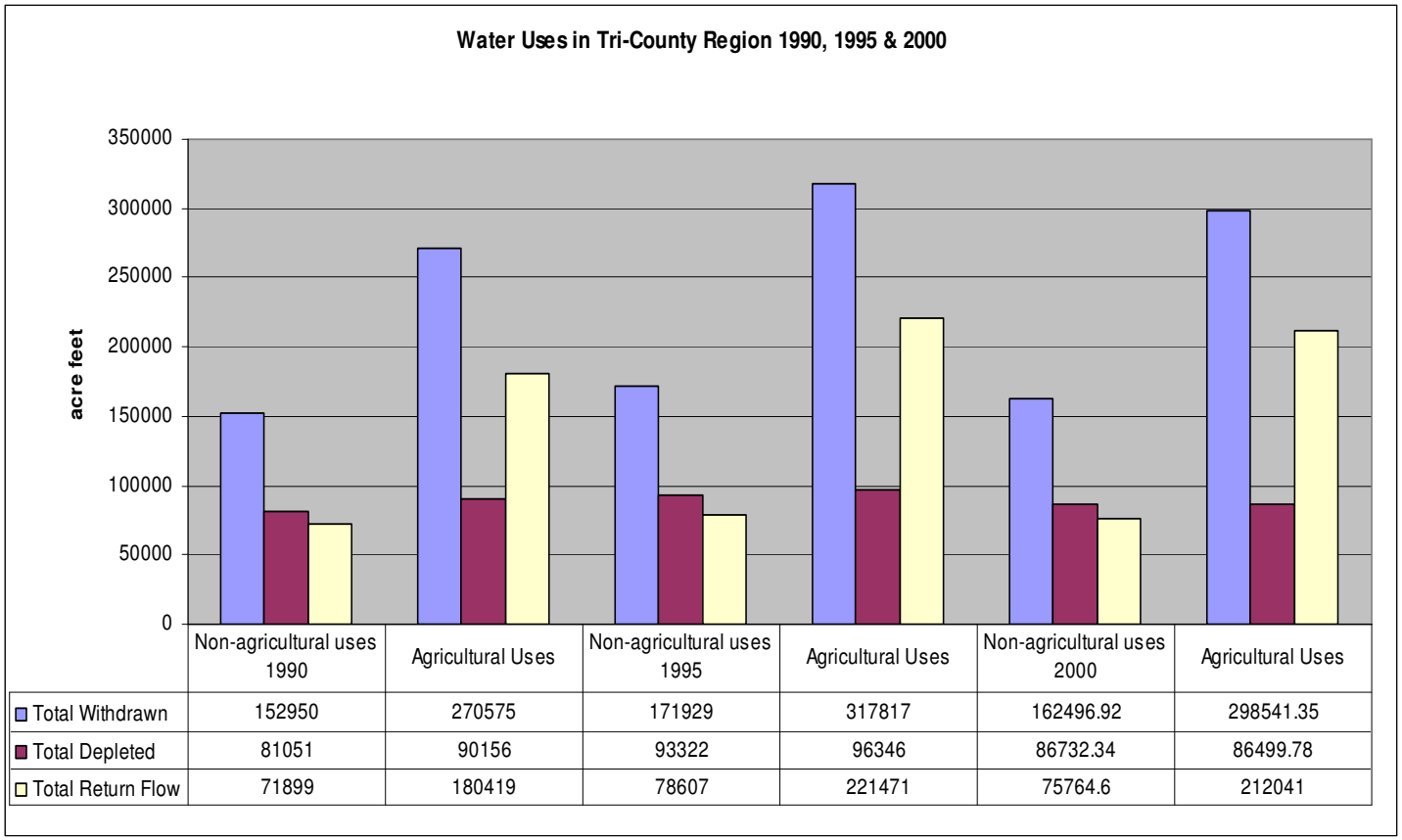
Total withdrawals in region in 1995 were 600,000 acre-feet

Figure 52. Distribution of consumptive use by category in whole region, 1995

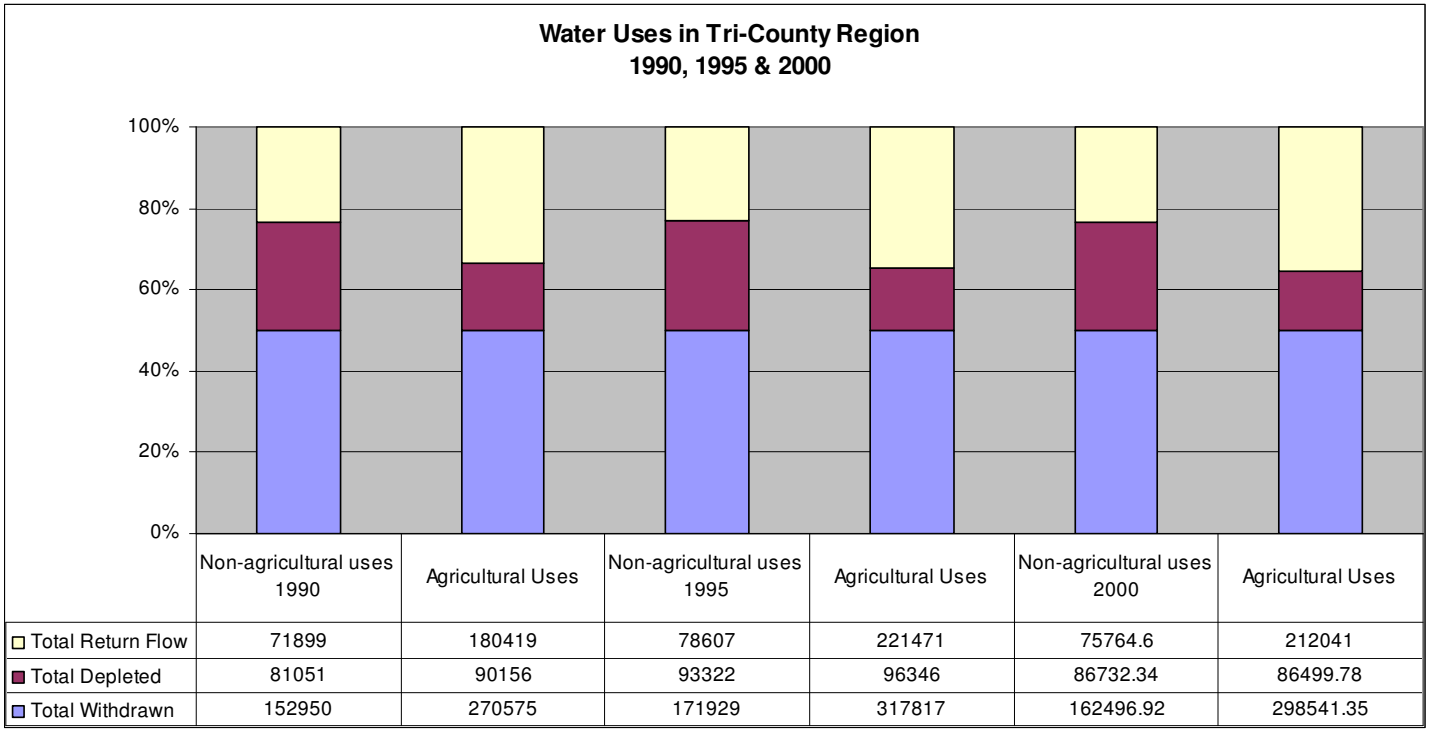
	percentage	acre-feet
agriculture	27.52%	93,568
riparian vegetation	28.14%	95,676
public water supply	25.20%	85,680
open water evaporation	16.26%	55,284
livestock	0.48%	1,632
self-supplied domestic	1.13%	3,842
self-supplied commercial	1.06%	3,604
self-supplied Industrial	0.11%	374
self-supplied power	0.05%	170
mining	0.05%	170
	100.00%	340,000

Total consumptive use in region in 1995 was 340,000 acre-feet

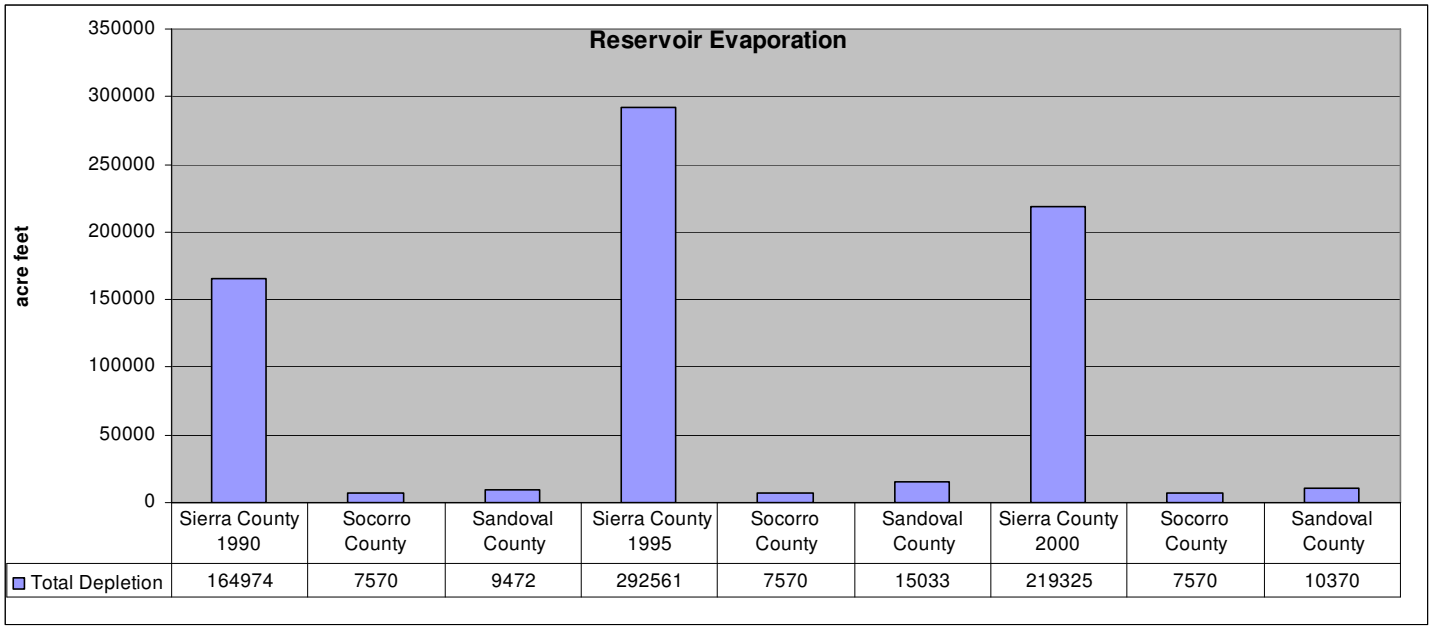
Note: Charts omit depletion of water in Cochiti and Jemez reservoirs = 10,370 in 2000, nor include EB evap



	Non-agricultural uses 1990	Agricultural Uses	Non-agricultural uses 1995	Agricultural Uses	Non-agricultural uses 2000	Agricultural Uses
Total Withdrawn	152950	270575	171929	317817	162496.92	298541.35
Total Depleted	81051	90156	93322	96346	86732.34	86499.78
Total Return Flow	71899	180419	78607	221471	75764.6	212041



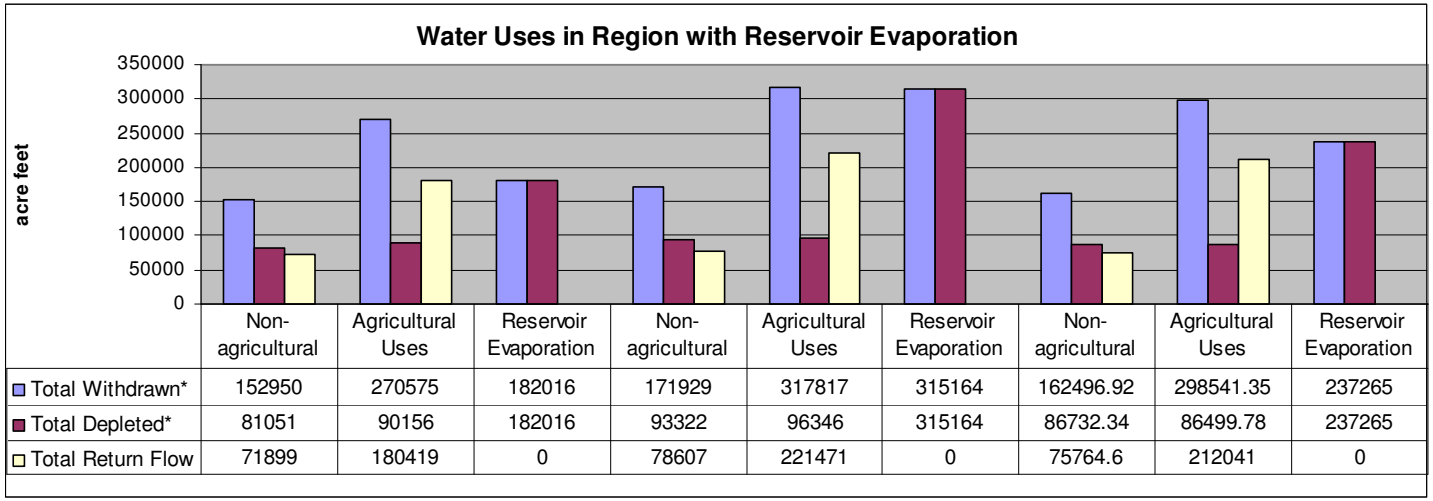
	Non-agricultural uses 1990	Agricultural Uses	Non-agricultural uses 1995	Agricultural Uses	Non-agricultural uses 2000	Agricultural Uses
Total Return Flow	71899	180419	78607	221471	75764.6	212041
Total Depleted	81051	90156	93322	96346	86732.34	86499.78
Total Withdrawn	152950	270575	171929	317817	162496.92	298541.35



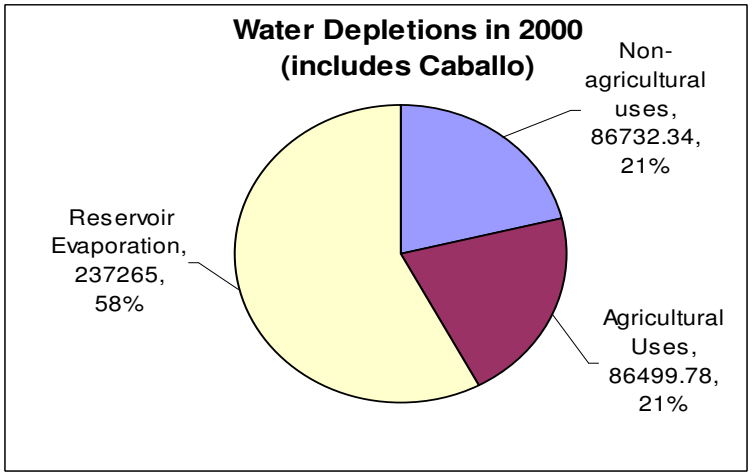
Note: includes Caballo Reservoir (don't have data to separate it out!)

	2000			2002 thru Oct	
	average surface	surface	Depletion	surface	Depletion
Caballo Reservoir	3,889.00	11,613.00	25,434	3,011	25,243
Elephant Butte Reservoir	30,973.00	36,584.00	193,891	9,724	110,446

2002 information come from:
Monthly Evaporation Data
http://elpaso.uc.usbr.gov/info/wo/Reservoirs/Evaporation/



	Non-agricultural	Agricultural Uses	Reservoir Evaporation	Non-agricultural	Agricultural Uses	Reservoir Evaporation	Non-agricultural	Agricultural Uses	Reservoir Evaporation
Total Withdrawn*	152950	270575	182016	171929	317817	315164	162496.92	298541.35	237265
Total Depleted*	81051	90156	182016	93322	96346	315164	86732.34	86499.78	237265
Total Return Flow	71899	180419	0	78607	221471	0	75764.6	212041	0



MIDDLE RIO GRANDE WATER ASSEMBLY

Information Packet for Scenario Development Committees (SDCs)

Supplemental Data Packet

JANUARY 2003

Balance Water Use with Renewable Supply

From BRIAN WILSON, et al, Office of State Engineer
Compiled by Elaine M. Hebard - 11/26/2002

1990

Non-agricultural uses	**TW**	**TD**	**TRF**
Public Water Supply.	138,356.00	73,039.00	65,317.00
Commercial (self-supplied).	5,141.00	3,236.00	1,905.00
Domestic (self-supplied).	7,875.00	4,248.00	3,627.00
Industrial (self-supplied).	764.00	200.00	564.00
Mining (self-supplied).	627.00	217.00	410.00
Power (self-supplied).	187.00	111.00	76.00
	152,950.00	**81,051.00**	**71,899.00**
Agricultural Uses			
Livestock	1,800.00	1,678.00	122.00
Irrigated Ag	268,775.00	88,478.00	180,297.00
	270,575.00	**90,156.00**	**180,419.00**
Reservior Evap.	**9,472.00**	**9,472.00**	**0.00**
Totals	**432,997.00**	**180,679.00**	**252,318.00**

TW = total withdrawal; TD = total depletion; TRF = total return flow

Note: Reservoir Evaporation = Jemez and Cochiti

1995

Non-agricultural uses	**TW**	**TD**	**TRF**
Public Water Supply.	155,712.00	84,880.00	70,832.00
Commercial (self-supplied).	5,454.00	3,651.00	1,803.00
Domestic (self-supplied).	7,994.00	3,945.00	4,049.00
Industrial (self-supplied).	2,137.00	587.00	1,550.00
Mining (self-supplied).	379.00	96.00	283.00
Power (self-supplied).	253.00	163.00	90.00
	171,929.00	**93,322.00**	**78,607.00**
Agricultural Uses			
Livestock	1,899.00	1,769.00	130.00
Irrigated Ag	315,918.00	94,577.00	221,341.00
	317,817.00	**96,346.00**	**221,471.00**
Reservior Evap.	**15,033.00**	**15,033.00**	**0.00**
Totals	**504,779.00**	**204,701.00**	**300,078.00**

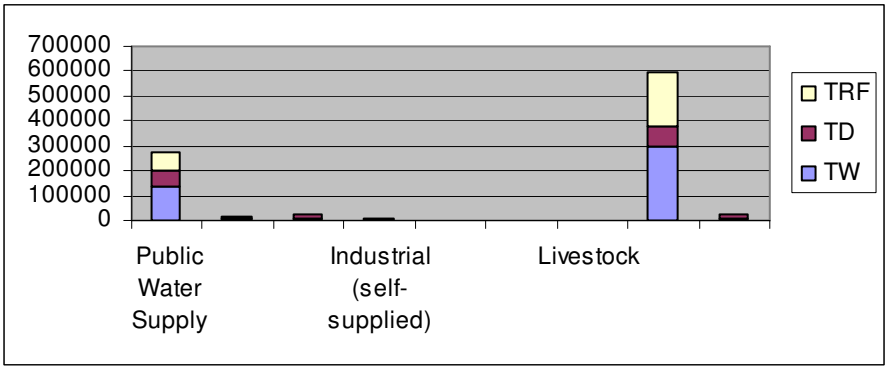
TW = total withdrawal; TD = total depletion; TRF = total return flow

2000

Non-agricultural uses	population	TW	TD	TRF
Public Water Supply.	604,350	136,362.94	65,327.05	71,035.91
Commercial (self-supplied).		8,402.70	7,318.29	1,084.41
Domestic (self-supplied).	106,518	11,951.53	11,951.53	0.00
Industrial (self-supplied).		4,041.92	874.39	3,167.53
Mining (self-supplied).		898.30	719.17	179.13
Power (self-supplied).		839.53	541.91	297.62
	710,868	**162,496.92**	**86,732.34**	**75,764.60**
Agricultural Uses				
Livestock		1,981.78	1,981.78	0.00
Irrigated Ag		296,559.57	84,518.00	212,041.00
		298,541.35	**86,499.78**	**212,041.00**
Reservoir Evap.		**10,370.00**	**10,370.00**	**0.00**
Totals		**471,408.27**	**183,602.12**	**287,805.60**

TW = total withdrawal; TD = total depletion; TRF = total return flow

2000	TW	TD	TRF
Public Water Supply	136,362.94	65,327.05	71,035.91
Commercial (self-supplied)	8,402.70	7,318.29	1,084.41
Domestic (self-supplied)	11,951.53	11,951.53	0.00
Industrial (self-supplied)	4,041.92	874.39	3,167.53
Mining (self-supplied)	898.30	719.17	179.13
Power (self-supplied)	839.53	541.91	297.62
Livestock	1,981.78	1,981.78	0.00
Irrigated Agriculture	296,559.57	84,518.00	212,041.00
Reservoir Evaporation	10,370.00	10,370.00	0.00
	471,408.27	**183,602.12**	**287,805.60**



1990

	TW	TD	TRF
Non-agricultural uses	152,950.00	81,051.00	71,899.00
Agricultural Uses	270,575.00	90,156.00	180,419.00
Reservior Evap.	9,472.00	9,472.00	0.00

1995

	TW	TD	TRF
Non-agricultural uses	171,929.00	93,322.00	78,607.00
Agricultural Uses	317,817.00	96,346.00	78,607.00
Reservior Evap.	15,033.00	15,033.00	0.00

2000

	TW	TD	TRF
Non-agricultural uses	162,496.92	86,732.34	75,764.60
Agricultural Uses	298,541.35	86,499.78	212,041.00
Reservoir Evap.	10,370.00	10,370.00	0.00

Shomaker

1995	**Figure 50. withdrawals**		**Figure 52. consumptive use**	
	percentage	*acre-feet*	*percentage*	*acre-feet*
15agriculture	46.99%	281,940	27.52%	93,568
1riparian vegetation	15.52%	93,120	28.14%	95,676
public water supply	25.30%	151,800	25.20%	85,680
open water evaporation	9.17%	55,020	16.26%	55,284
livestock	0.29%	1,740	0.48%	1,632
self-supplied domestic	1.29%	7,740	1.13%	3,842
self-supplied commercial	0.98%	5,880	1.06%	3,604
self-supplied industrial	0.32%	1,920	0.11%	374
power	0.04%	240	0.05%	170
mining	0.10%	600	0.05%	170
	100.00%	600,000	100.00%	340,000

150,960 = riparian and open water (reservoir evap?)

340,000-150,960 = 189,040 consumptive use

204,701 total depletions

WA-SDC Supplemental Data Packet.doc

Summary County Water Data 2000

preliminary from Brian Wilson, July 29, 2002; partially updated with 11/5/02 info

from Wilson's summary

	population	**WSW**	**WGW**	**DSW**	**DGW**	*TW*	***TD***	***TRF***
Bernalillo County								
Public Water Supply	507,265	66.63	118,309.88	33.32	52,472.00	118,376.50	52,505.32	65,871.20
Commercial (self-supplied)		0.00	5,503.14	0.00	4,575.47	5,503.14	4,575.47	927.67
Domestic (self-supplied)	49,413	0.00	5,572.84	0.00	5,572.84	5,572.84	5,572.84	0.00
Industrial (self-supplied)		0.00	382.06	0.00	91.41	382.06	91.41	290.65
Livestock		20.90	802.81	20.90	802.81	823.71	823.71	0.00
Mining (self-supplied)		0.00	458.70	0.00	367.40	458.70	367.40	91.30
Power (self-supplied)		0.00	839.53	0.00	541.91	839.53	541.91	297.62
Reservoir Evaporation		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Irrigated Agriculture		61,932.00	3,304.00	16,353.00	1,876.00	65,236.00	18,229.00	47,007.00
Totals	**556,678**	**62,019.53**	**135,172.96**	**16,407.22**	**66,299.84**	**197,192.48**	**82,707.06**	**114,485.44**

Sandoval County								
Public Water Supply	64,111	159.16	12,219.79	59.48	9,897.43	12,378.95	9,956.90	2,422.05
Commercial (self-supplied)		10.00	2,079.14	10.00	2,000.03	2,089.14	2,010.03	79.11
Domestic (self-supplied)	23,927	0.00	2,662.27	0.00	2,662.27	2,662.27	2,662.27	0.00
Industrial (self-supplied)		0.00	3,611.81	0.00	738.43	3,611.81	738.43	2,873.38
Livestock		116.13	124.80	116.13	124.80	240.93	240.93	0.00
Mining (self-supplied)		0.00	438.20	0.00	350.37	438.20	350.37	87.83
Power (self-supplied)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reservoir Evaporation		10,370.00	0.00	10,370.00	0.00	10,370.00	10,370.00	0.00
Irrigated Agriculture		61,513.00	824.57	17,971.00	450.00	62,337.00	18,421.00	43,916.00
Totals	**88,038**	**72,168.29**	**21,960.58**	**28,526.61**	**16,223.33**	**94,128.30**	**44,749.93**	**49,378.37**

WA-SDC Supplemental Data Packet.doc

WA-SDC Supplemental Data Packet.doc

Valencia County Totals								
Public Water Supply	32,974	0.00	5,607.49	0.00	2,864.83	5,607.49	2,864.83	2,742.66
Commercial (self-supplied)		0.00	810.42	0.00	732.79	810.42	732.79	77.63
Domestic (self-supplied)	33,178	0.00	3,716.42	0.00	3,716.42	3,716.42	3,716.42	0.00
Industrial (self-supplied)		0.00	48.05	0.00	44.55	48.05	44.55	3.50
Livestock		48.08	869.06	48.08	869.06	917.14	917.14	0.00
Mining (self-supplied)		0.00	1.40	0.00	1.40	1.40	1.40	0.00
Power (self-supplied)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reservoir Evaporation		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Irrigated Agriculture		161,883.00	7,103.00	44,022.00	3,846.00	168,986.00	47,868.00	121,118.00
Totals	**66,152**	**161,931.08**	**18,155.84**	**44,070.08**	**12,075.05**	**180,086.92**	**56,145.13**	**123,941.79**

Note: Wilson's Summary for Sandoval County totals includes UC, so won't match summary (domestic = 2,829.84; livestock, etc.)

Key: WSW=withdrawal, surface water; WGW=withdrawal, ground water; DSW=depletion, surface water; DGW=depIetion, ground water; TD = total depletion; TRF = total return flow; SAA=surface area, average.

	SAS	**SAA**	**EGR**	**R**	**ENR**	**MSW**	**WSW**	**DSW**
Caballo Reservoir—Rio Grande	11,613.00	3,889.00	7.83	1.29	6.54	Y	25,434.00	25,434.00
Elephant Butte Res—Rio Grande	36,584.00	30,973.00	7.37	1.11	6.26	Y	193,891.00	193,891.00

SAS=surface area at spillway elevation; SAA=surface area, average; EGR=gross evaporation rate in feet/year; R=rainfall in feet/year; ENR=net evaporation rate in feet/year; MSW-surface water evaporation is measured (y/n); WSW=withdrawal, surface water; DSW=depletion, surface water.

WA-SDC Supplemental Data Packet.doc

Summary County Water Data 1990

1990 Summary	TW	TD	TRF
Bernalillo County Totals			
Public Water Supply	125,483	64,919	60,564
Commercial (self-supplied)	3,562	2,142	1,420
Domestic (self-supplied)	3,711	2,359	1,352
Industrial (self-supplied)	485	145	340
Livestock	789	733	56
Mining (self-supplied)	325	87	238
Power (self-supplied)	179	103	76
Reservoir Evaporation	0	0	0
Irrigated Agriculture	77,764	20,992	56,772
	212,298	**91,480**	**120,818**
Sandoval County Totals			
Public Water Supply	9,650	6,797	2,853
Commercial (self-supplied)	1,999	1,065	934
Domestic (self-supplied)	404	206	198
Industrial (self-supplied)	194	46	148
Livestock	421	400	21
Mining (self-supplied)	298	128	170
Power (self-supplied)	8	8	0
Reservoir Evaporation	9,472	9,472	0
Irrigated Agriculture	50,189	17,879	32,310
	72,635	**36,001**	**36,634**
Valencia County Totals			
Public Water Supply	3,223.00	1,323.00	1,900
Commercial (self-supplied)	1,026.00	671	355
Domestic (self-supplied)	2,314.00	1,041.00	1,273
Industrial (self-supplied)	85	9	76
Livestock	590	545	45
Mining (self-supplied)	4	2	2
Power (self-supplied)	0	0	0
Reservoir Evaporation	0	0	0
Irrigated Agriculture	140,822	49,607	91,215
	148,064	**53,198**	**94,866**

Totals			
Public Water Supply	138,356	73,039	65,317
Commercial (self-supplied)	7,875	4,248	3,627
Domestic (self-supplied)	5,141	3,236	1,905
Industrial (self-supplied)	764	200	564
Livestock	1,800	1,678	122
Mining (self-supplied)	627	217	410
Power (self-supplied)	187	111	76
Reservoir Evaporation	9,472	9,472	0
Irrigated Agriculture	268,775	88,478	180,297
	432,997	**180,679**	**252,318**
TOTAL:			
Bernalillo County Totals	212,299	91,479	120,820
Sandoval County Totals	72,634	35,999	36,635
Valencia County Totals	148,064	127,478	157,455
	432,997	**180,675**	**252,320**

WA-SDC Supplemental Data Packet.doc

WA-SDC Supplemental Data Packet.doc

Irrigated Agriculture. Withdrawals and depletions in acre-feet, in New Mexico counties, 2000. Compiled by A. A. Romero, New Mexico Office of the State Engineer.

1	RG	Inside MRGCD but exclusive of MRG	D	0.000	1.115	0	130	0	0	130
1	RG	MRGCD only	F	1.782	1.782	5556	0	2403	801	8760
1	RG	Outside MRGCD	D	0.000	1.115	0	100	0	0	100
43	RG	MRGCD only	F	1.985	1.985	5410	0	499	166	6,075
43	RG	Outside MRGCD (Dixon Apples)	S	1.591	0.000	50	0	0	0	50
61	RG	Inside MRGCD but exclusive of CD	D	0.000	1.128	0	35	0	0	35
61	RG	MRGCD only	F	2.028	2.028	13,838	0	5,220	1,740	20,798
					River Basin Subtotals	24,854	265	8,122	2,707	35,948
43	RG	Cuba & Vicinity	F	0.978	0.978	1,585	70	0	0	1,655
43	RG	Jemez Basin	F	1.278	0.000	1,570	0	0	0	1,570
										3,225
										39,173

0.85	0	0		N	0			171
0.4796	0.4775	0.229	Y	N	29572	32359	61932	2976
0.85	0	0		N	0			131
0.480	0.478	0.229	Y	N	24,457	26,761	51,218	687
0.600	1.000	0.000	N		133	0	133	0
0.8500	0.0000	0.0000	-	N	0			46
0.5000	0.4775	0.2467	Y	N	77,299	84,584	161,883	7,057
					131,461	143,704	275,166	11,068
0.500	0.700	0.350	N	N	3,100	1,329	4,429	137
0.500	0.700	0.350	N		4,013	1,720	5,733	0
					7,113	3,049	10,162	137

Key: CN=county number; RVB=river basin; T=type of irrigation system, i.e., drip (D), flood (F), or sprinkler (S); CIRSW=consumptive irrigation requirement for acreage irrigated with surface water; CIRGW=consumptive irrigation requirement for acreage irrigated with ground water; ASWO=acreage irrigated with surface water only; AGWO=acreage irrigated with ground water only; ASWC=surface water component of acreage irrigated with

combined water, i.e., both surface and ground water; AGWC=ground water component of acreage irrigated with combined water; TAI=total acreage irrigated; EF=on-farm efficiency; EC=off-farm conveyance efficiency; EJ=project efficiency; MSW=surface water withdrawals are measured (y/n); MGW=groundwater withdrawals are measured (y/n); TFSW=total farm withdrawal, surface water; **CLSW=surface water conveyance losses from stream or reservoir to farm headgate;** TPWSW=total project withdrawals, surface water; TPWGW=total project withdrawals, ground water.

Totals from above

	TFWSW	CLSW	TPWSW	TPWGW	Total withrawals	
MRG	131,461	143,704	275,166	11,068	286,234	286,234
RP y RJ	7,113	3,049	10,162	137	10,299	10,299
Estancia	0			171	171	296,533
Totals	138,574	146,753	285,328	11,376	296,704	

	TW	TD	TRF
From Summary Sheet:	296,559.57	84,518.00	212,041.00

WA-SDC Supplemental Data Packet.doc

Papadopulos

Table 3.9 - Riparian and Wetland Community Types from San Marcial to Elephant Butte

Plant Community	Total Acreage
Mature Cottonwood Forest	358
Mature Cottonwood Forest	358
Mature Willow Forest	84
Mid-aged cottonwood-willow or saltcedar-Russian Olive Stands	415
Monotypic saltcedar stands	2,385
Young successional stage stands	2,113
Emergent marsh	427
Open water	2,870
Dead flooded saltcedar	1,118
Wet meadow	1,543
Total	11,313

Table 3.8 - Crop and Riparian Consumptive Use, Average from 1985 - 1998

Reach	Crop Consumptive Use (acre-feet/year)	Riparian Consumptive Use (acre-feet/year)
Cochiti to San Acacia		
Cochiti to San Felipe	10,221	20,529
Jemez River	0	9,624
San Felipe to Central Avenue	27,468	33,812
Central Avenue to Bernardo	152,396	63,921
Bernardo to San Acacia	1,491	27,191
Total above San Acacia	191,576	155,078
San Acacia to Elephant Butte		
San Acacia to San Marcial	56,520	49,452
San Marcial to Elephant Butte		41,971
Total	**248,096**	**246,500**

Table 3.4 Average of MRGCD Water Distribution Data Reported to USBR

Net Supply (acre-feet)	Operational Spills (acre-feet)	Transportation Losses (acre-feet)	Delivered to Farms (acre-feet)
572,130	**191,754**	**193,476**	**173,333**

WA-SDC Supplemental Data Packet.doc

Table 3.7 - Crop and Riparian Acreage 1				
Reach	Crop Acres	Riparian Acres	**crop mrg**	**riparian mrg**
Cochiti to San Felipe	2,869	5,146	2,869	5,146
Jemez River		1,971		1,971
San Felipe to Central Avenue	7,085	8,388	7,085	8,388
Central Avenue to Bernardo	38,389	15,931	38,389	15,931
Bernardo to San Acacia	438	7,298	**48,343**	**31,436**
San Acacia to San Marcial	14,770	13,323		
Total	**63,551**	**52,057**		

Water Balancing Spreadsheet	
	acreage
Riparian	45,000
Open Water	12,000
Irrigated Agriculture	48,000
Office, ... Industrial	
Municipal	

WA-SDC Supplemental Data Packet.doc

Table 4.1 - Comparison of Agricultural and Riparian Consumptive Use Estimates in Water Budget Studies

	Agricultural		Riparian and Open Water		
	above San Acacia (acre-feet)	below San Acacia (acre-feet)	above San Acacia (acre-feet)	San Acacia to San Marcial (acre-feet)	San Marcial to Elephant Butte(f) (acre-feet)
RGJI, 1938 (1936-1937 Condition)	139,300 (d)	20,700 (d)	326,334	185,088	114,796 (d)
Thorn, 1993 (1974-1992 Average)	120,900		146,500		
Gould, 1997 (1993)	98,600		205,400 (a)		
MRG Assembly, 1999 (1972-1997 Average)	100,000	(c)	195,000 (b)	(c)	
USBR ET Toolbox, 2000 (1985-1998 Average)	191,600 (d)	56,500 (d)	155,000 (d)	49,400 (d)	41,858 (d)
Wilson, 1997 (1995)	139,700 (total) (e)				

a Consists of 135,600 riparian and 69,800 open water

b Includes 135,000 riparian and 60,000 open water for reach Otowi to San Acacia

c Assumes total 100,000 for both agricultural and riparian/open water below San Acacia (excluding Elephant Butte evaporation)

d Not adjusted for effective precipitation

e Total project depletion for surface water (114,133 acre-feet) and groundwater (25,208 acre-feet) and non-MRGCD (323 acre-feet) for Sandoval, Bernalillo, Valencia and Socorro counties

f Reservoir evaporation not included

WA-SDC Supplemental Data Packet.doc

MIDDLE RIO GRANDE WATER BUDGET

July 18, 2001 (rev.8/15/01)

Averages for 1972-1997

-

EL GRUPO TECNICO - Frank Titus & Mike Kernodle

PARTICIPANTS:

Kevin Bean		
Lee Brown	UNM/Econ	
Cliff Crawford	UNM/Biol	
Cliff Dahm	UNM/Biol	964
Susan Gorman	Consultant	76
Jaci Gould	USBOR/engr	75
	ISC	
Bob Grant	Commissioner	
Sterling Grogan	MRGCD/Biol	
Steve Hansen	USBOR/engr	
Steve Harris	RiverAdvocate	82
Andrew Kelton	{planner?]	**1197**
Mike Kernodle	USGS/GWmodl	
Ed Korzdorfer	USNRCS	8
Andy Lieuwen	OSE/wtr-rights	128
Jim McCord	HydrolConsult	190
Joe Quintana	MRGCOG/engr	
John Shomaker	Hydrogeol	-68
Gail Stockton	USCOE/engr	97
John Stomp	ABQ/wtr-mgr	-27
Frank Titus	Hydrogeol	
Jeff Whitney	USFWS/biol	

WA's Water Budget

Annual Surface Water Inflow	
Mainstem Inflow	1,100
San Juan-Chama Water	55
Tributary Inflow	95
Ungaged tributaries	Unknown
Storm-drain inflow from Abq.	5
Municipal Wastewater Inflow	70
Discharge from shallow aquifer	220
	1,545
Recharge to shallow aquifer	295
Open-water Evaporation	60
Mainstem Inflow	100
San Juan-Chama Water	100
Adj. Base Groundwater Inflow1	140
	850
TOTAL INFLOW	**1545**
Reservoir Evaporation	
Riparian Depletions (Otowi to San Acacia)	
Crop Depletions	
Groundwater Recharge and Discharge	
Riparian Depletions	
(Wastewater Returns)	295
Groundwater Depletion	10
(Effective Precipitation)2	50
EB Reservoir Evaporation	-135
Discharge to drainage ditches	-220
acre-feet	
SCHEDULED DELIVERY3	40
REACH OUTFLOW	110
MEAN AVAILABLE SUPPLY4	128,730
consumed (evaporated) 90	226,810
wastewater to river 70	226,810
septic tank to shallow 10	
Outflow to shallow	30,650
GW mined from aquifer	**613,000**

Papadopulos

Mean Annual Values in acre-feet/year

Otowi to Bernardo			Bernardo to EB		
			650	Deep Aquifer	
			869	Deep GW inflow	40
			219	Mountain front recharge	110
				GW pumped 18	128,730
				consumed (evaporated)	226,810
				wastewater to river	226,810
				septic tank to shallow	
				Outflow to shallow	30,650
				GW mined from aquifer	**613,000**
Irrigated Agriculture & turf	869				
Riparian ET, irr agri & open water	1				
SA	58				
EB Evaporation	27				
Surface Water Outflow from EB	954				
TOTAL INFLOW					
Shallow Aquifer					
Recharge	58				
Septic-tank return flow	115				
Inflow from deep aquifer	-1				
Riparian ET	3				
Discharge to drainage ditches	-12				
	123				

Papadopolus Figure 5.26 Summary of Mean Depletions

a) Mean depletions to river system under present land use and groundwater development conditions

Reservoir Evaporation (1950-1998 average)	21%	128,730
Crops	37%	226,810
Riparian	37%	226,810
Urban (groundwater depletion with wastewater offset)	5%	30,650
Total Mean River Depletions: approximately 613,000 acre-feet per year		**613,000**

b) Mean total Middle Rio Grande depletions (including depletion from groundwater storage), under present land use and groundwater development conditions

Reservoir Evaporation (1950-1998 average)	19%	128,060
Crops	34%	229,160
Riparian	33%	222,420
Urban (groundwater depletion with wastewater offset)	14%	94,360
Total Mean Basin Depletions: Approximately 674,000 acre-feet per year		**674,000**

Note: this shows a net average depletion to groundwater of 60,000 af per year, and a consumptive use, for the entire region, of 674,000 af per year

To consider: If region has a maximum of 405,000 acre-feet under the Compact to consume, plus San Juan/Chama, then the difference195,000

Shomaker		
1995 Consumptive Use		
Riparian		95,676
Agriculture	*93,568*	
Self-Supplied Livestock	*1,632*	95,200
Public Water Supply	*85,680*	
Self-Supplied Dom.	*3,842*	89522
Open Water Evap.		55,284
Self-Supplied Com.	*3,604*	
Self-Supplied Industrial	*374*	
Self-Supplied Power	*170*	
Self-Supplied Mining	*170*	4,318
Total Consumptive Use		**340,000**

Water Balancing Spreadsheet	
caveat: may not be current numbers	
Inflows to the Middle Rio Grande Region	
Rio Grande Native Inflows	1,100,000
Tributary and Groundwater Inflows	245,000
San Juan/Chama Inflows	74,000
Imports from Socorro/Sierra Region	0
Urban Storm Drain Inflow	5,000
Total Water Income to the Region	*1,424,000*
Uses of Water within the Region	
Riparian Uses	135,000
Open Water Uses (Other than Elephant Butte)	60,000
Irrigated Agriculture Uses	100,000
Office, Business, Commercial, and Industrial Uses	33,000
Domestic Uses	57,000
Total Use of Water within the Region	*385,000*
Required Deliveries to Outside of the Region	
Elephant Butte Lake Evaporation	144,000
Socorro/Sierra Region Current Delivery Rate	100,000
Rio Grande Compact Deliveries	850,000
Total Required Deliveries Outside of the Region	*1,094,000*
Budget Reconciliation: Inflows minus Required Deliveries minus Use within Region	***-55,000***

Water Budget of the Middle Rio Grande	
WATER SOURCE	SUPPLY (106 m3/yr)
Average Otowi Flow	1360
San Juan-Chama Diversion	70
WATER USE	DEPLETION (106 m3/yr)
Open-water evaporation	270
Riparian plant transpiration	220
Irrigated agriculture	165
Urban consumption (ground water)	85
Net aquifer recharge	85
	825

Sources and average annual water depletion from 1972 to 1997 for the Middle Rio Grande reach (the 64,000–km2 drainage between Otowi Gage north of Santa Fe and Elephant Butte Dam). Flow records at the Otowi gage, the inflow point for the Middle Rio Grande reach, are more than a century old. Water supplemented from the San Juan-Chama diversion project began in 1972 and increased Otowi flow by 70 million m3/y (average flow without this water was about 1400 million m3/y). Major municipal water systems in the basin currently pump ground water at a rate of 85 million m3/y. Maximum allowable depletion for the reach is 500 million m3/y when adjusted annual flow exceeds 1900 million m3/y, decreasing progressively to 58 million m3/y in severe drought years (inflows of 120 million m3/y at Otowi Gage).

Water in a Changing World

Robert B. Jackson, Stephen R. Carpenter, Clifford N. Dahm, Diane M. McKnight, Robert J. Naiman, Sandra L. Postel, and Steven W. Running

CONCLUSIONS:

1. On average for this period, the flow past Elephant Butte Dam plus the change in storage in the lake exceeded the Rio Grande Compact delivery requirements by about 13,000 acre-feet, which is 1.6 percent above the compact requirement. (At the end of 1997, we had a credit of 105,500 acre-feet at the dam.)
2. 2. But to do this we were mining groundwater at a rate of 70,000 acre-feet per year.
3. 3. Additionally, 2000+ years of tree-ring data from El Malpais and Sandia Crest show that during the period since about 1850 precipitation has been markedly higher than at any other time in the record.

COMPARISON DATA:

A. The Papadopulos report (Aug. 2000), done for the State Engineer and the US Army Corps of Engineers, collected an extensive set of data covering a longer time period, and used probability analyses & modeling to reach the following similar conclusions.

1. On average the flow past Elephant Butte Dam plus change in lake storage exceeded the compact delivery requirements by about 19,000acre-feet per year.
2. To do this their model showed a groundwater mining rate of about 60,000 acre-feet per year.

B. The Shomaker & Assoc. Report. (June 2000), done for the Water Assembly, used extensive data collected for this region to reach quite similar conclusions re supply, depletions & groundwater mining for Sandoval, Bernalillo & Valencia county part of the Middle Rio Grande.

WA-SDC Supplemental Data Packet.doc

9th Version of the WBE

Water Line Item	Number of Units	X	Per Unit Use	=	Total Water Use (afpy)
Inflows to the Middle Rio Grande Region					
Rio Grande Native Inflows	N/A		N/A		1,100,000
Tributary and Groundwater Inflows	N/A		N/A		245,000
San Juan/Chama Inflows	N/A		N/A		74,000
Imports from Socorro/Sierra Region	N/A		N/A		0
Imports from Other Sources (must identify the source)					
Urban Storm Drain Inflow	N/A		N/A		5,000
Total Water Income to the Region	N/A		N/A		1,424,000
Required Deliveries to Outside of the Region					
Elephant Butte Lake Evaporation	16,000 surface acres		9.0 afpy per surface acre		144,000
Socorro/Sierra Region Current Delivery Rate	N/A		N/A		100,000
Rio Grande Compact Deliveries	N/A		N/A		850,000
Total Required Deliveries Outside of the Region	N/A		N/A		1,094,000
Uses of Water within the Region					
Riparian Uses	45,000 riparian acres		3.0 afpy per riparian acre		135,000
Open Water Uses (Other than Elephant Butte)	12,000 open water acres		5.0 afpy per open water acre		60,000
Irrigated Agriculture Uses	48,000 irrigated acres		2.1 afpy per irrigated acre		100,000
Office, Business, Commercial, and Industrial Uses	343,000 jobs		0.096 afpy per job		33,000
Domestic Uses	713,000 persons		0.08 afpy per person		57,000
Total Use of Water within the Region	N/A		N/A		385,000
Budget Reconciliation: Inflows minus Required Deliveries minus Use within Region					
Net	N/A		N/A		-55,000

Note: water per job is going to be broken out as commercial, industrial and municipal

WA-SDC Supplemental Data Packet.doc

New Mexico and Tri-County Population, 1910 to 2000
New Mexico and Tri-County Historical Average Annual Growth Rate, 1910 to 2000
New Mexico and Tri-County Components of Change: 1990 - 2000
Population Estimation: Population Balancing Equation

New Mexico and Tri-County Population, 1910 to 2000

	NEW MEXICO	Bernalillo	Sandoval	Valencia
1910	327,301	23,606	8,579	13,320
1920	360,350	29,855	8,863	13,795
1930	423,317	45,430	11,144	16,186
1940	531,818	69,391	13,898	20,245
1950	681,187	145,637	12,438	22,481
1960	951,023	262,199	14,201	39,085
1970	1,017,055	315,774	17,492	40,576
1980	1,303,303	420,262	34,400	30,769
1990	1,515,069	480,577	63,319	45,235
2000	1,819,046	556,678	89,908	66,152

New Mexico and Tri-County Historical Average Annual Growth Rate, 1910 to 2000

	NEW MEXICO	Bernalillo	Sandoval	Valencia
1910 - 1920	0.96%	2.35%	0.33%	0.35%
1920 - 1930	1.61%	4.19%	2.29%	1.60%
1930 - 1940	2.28%	4.23%	2.21%	2.23%
1940 - 1950	2.47%	7.40%	-1.11%	1.05%
1950 - 1960	3.33%	5.87%	1.32%	5.52%
1960 - 1970	0.67%	1.86%	2.08%	0.37%
1970 - 1980	2.48%	2.85%	6.75%	-2.76%
1980 - 1990	1.50%	1.34%	6.09%	3.85%
1990 - 2000	1.83%	1.47%	3.50%	3.80%

a In 1981: Cibola County was organized from a part of Valencia County.

b In 1949: Los Alamos County was formed from a part of Sandoval and Santa Fe counties. Part of Sandoval County annexed to Santa Fe County prior to 1950.

Source: U.S. Dept. of Commerce, Bureau of the Census.

Table prepared by: Bureau of Business and Economic Research, University of New Mexico.

New Mexico and Tri-County Components of Change: 1990 - 2000

	Census 1990	Census 2000	Total Change	Natural Increase	Residual or Net Migrant	Share of Migration in Total Change
NEW MEXICO	1,515,041	1,819,046	304,005	158,212	145,793	48%
Bernalillo	480,577	556,678	76,101	44,770	31,331	41%
Sandoval	63,319	89,908	26,589	7,832	18,757	71%
Valencia	45,235	66,152	20,917	4,982	15,935	76%
	589,131	712,738	123,607	57,584	66,023	53%

Population Estimation: Population Balancing Equation

The overall growth or decline of a population is determined by its mortality, fertility and migration.

$$\mathbf{Pt - P(t\text{-}n) = (B - D) + (IM - OM)}$$

Where:

Pt = population at the end of the time period
P(t-n) = population at the beginning of the time period
B = births during time period
D = deaths during time period
IM = number of inmigrants during time period
OM = number of outmigrants during time period
(B-D) = natural increase
(IM-OM) = net migration

Uses of Population Balancing Equation

Population Estimation

$Pt = P(t\text{-}n) + (B - D) + (IM - OM)$

Migration Estimation (residual)

$+ (IM - OM) = (Pt - P(t\text{-}n)) + (B - D)$

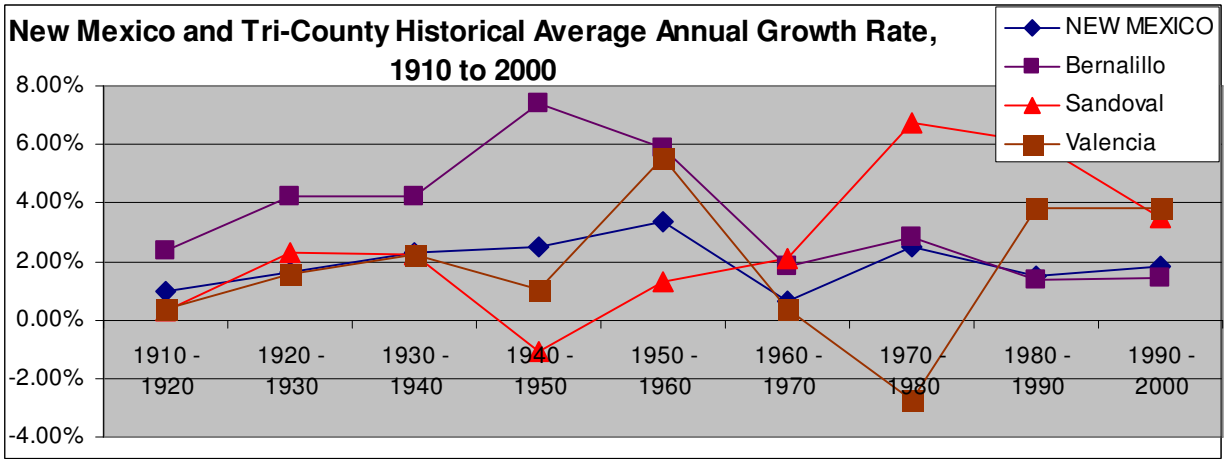
Population	1990	2000	2000 Wilson	*pws*	*dom*
Bernalillo	480,577	556,678	556,678	*507,265*	*49,413*
Sandoval	63,319	89,908	88,038	*64,111*	*23,927*
Valencia	45,235	66,152	66,152	*32,974*	*33,178*
	589,131	**712,738**	**710,868**	***604,350***	***106,518***

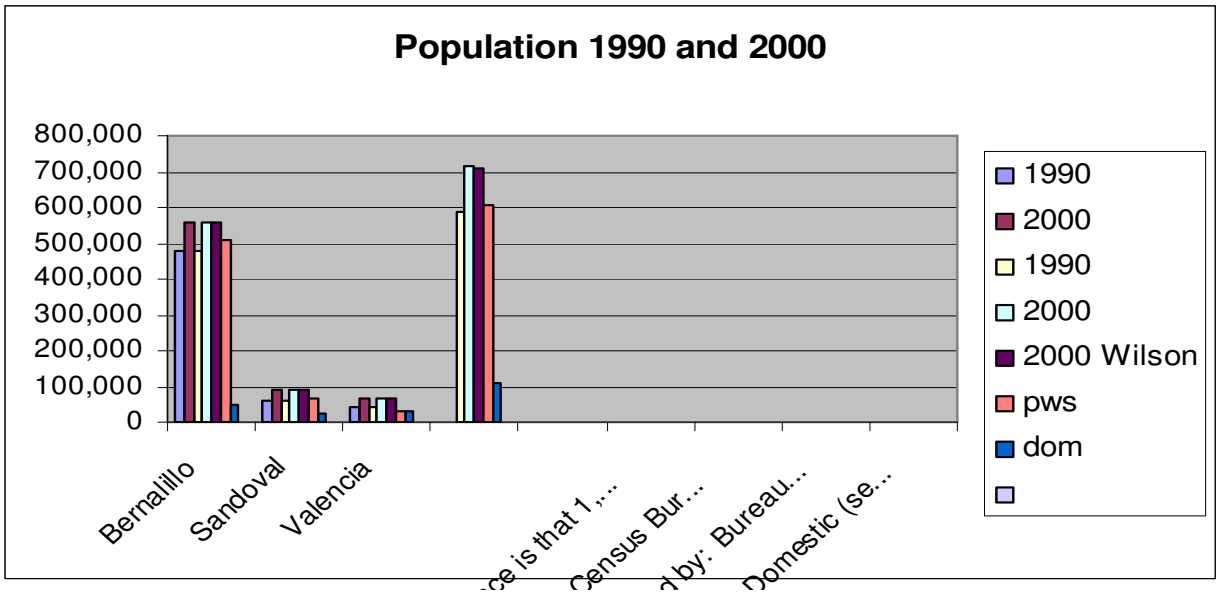
Note: Difference is that 1,870 domestic are in UC but still in County (Wilson)

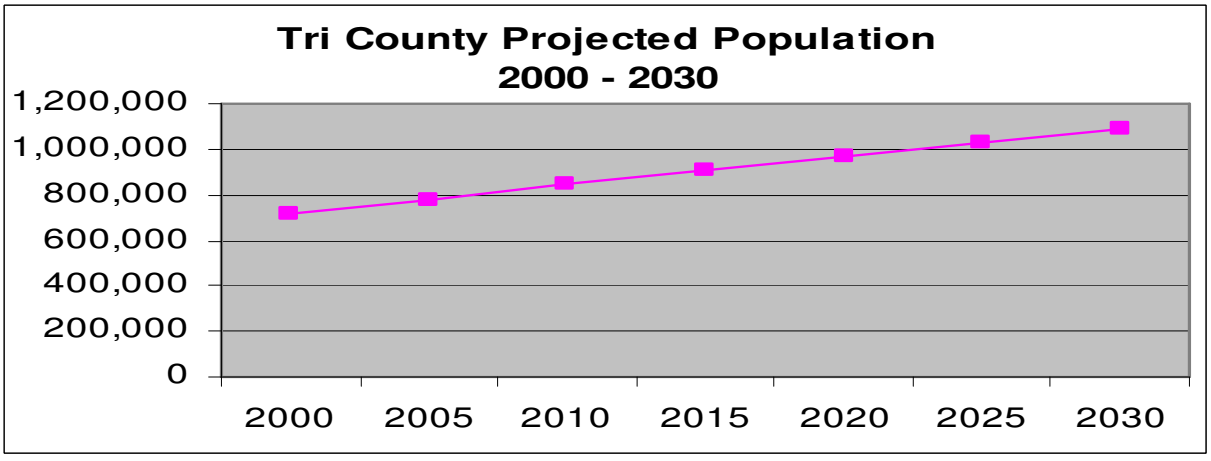
Source: U.S. Census Bureau Summary File

Table prepared by: Bureau of Business and Economic Research, UNM

Also Wilson, Domestic (self-supplied) & Public Water Supply Withdrawals and depletions


New Mexico and Tri-County Historical Average Annual Growth Rate, 1910 to 2000
NEW MEXICO
Bernalillo
Sandoval
Valencia
8.00%
6.00%
4.00%
2.00%
0.00%
-2.00%
-4.00%
1910 - 1920
1920 - 1930
1930 - 1940
1940 - 1950
1950 - 1960
1960 - 1970
1970 - 1980
1980 - 1990
1990 - 2000


Population 1990 and 2000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Bernalillo
Sandoval
Valencia
1990
2000
1990
2000
2000 Wilson
pws
dom


Tri County Projected Population 2000 - 2030
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2000
2005
2010
2015
2020
2025
2030

Projected Population: New Mexico Counties
July 1, 2000 - July 1, 2030

	Midyear Population	Compound Annual Growth Rate (%)	Annual Number			Annual Rate			Yearly Change	Share of Migration (%)
			Births	Deaths	Migrants	CBR	CDR	NMR		
Bernalillo										
2000	558,437		8,363	3,919	3,212	15.0	7.0	5.8		
2005	595,954	1.30	8,501	4,209	3,212	14.5	7.5	5.4	7,503	42.8%
2010	631,839	1.17	8,703	4,738	3,212	13.9	7.9	5.1	7,177	44.8%
2015	666,114	1.06	8,850	5,207	3,212	13.4	8.2	4.8	6,855	46.9%
2020	698,832	0.96	8,976	5,644	3,212	12.9	8.4	4.6	6,544	49.1%
2025	729,750	0.87	9,066	6,095	3,212	12.5	8.7	4.4	6,184	51.9%
2030	759,000	0.79	9,216	6578	3,212	12.3	9.0	4.2	5,850	54.9%
Sandoval										
2000	90,775		1238	586	2887	14.1	6.5	31.8		
2005	108,538	3.57	1,360	695	2887	13.3	7.4	26.6	3,553	81.3%
2010	126,294	3.03	1,565	900	2887	13.4	7.9	22.9	3,551	81.3%
2015	144,377	2.68	1,823	1,093	2887	13.4	8.2	20.0	3,617	79.8%
2020	162,409	2.35	2,003	1,284	2887	12.6	8.5	17.8	3,606	80.1%
2025	179,998	2.06	2,113	1,482	2887	12.1	8.8	16.0	3,518	82.1%
2030	197,182	1.82	2,241	1,691	2887	11.7	9.1	14.6	3,437	84.0%
Valencia										
2000	66,699		988	406	1,362	14.8	6.1	20.4		
2005	76,512	2.75	1,053	452	1,362	14.8	6.5	17.8	1,963	69.4%
2010	86,708	2.50	1,223	548	1,362	15.2	6.8	15.7	2,039	66.8%
2015	97,330	2.31	1,404	642	1,362	15.2	7.1	14.0	2,124	64.1%
2020	108,064	2.09	1,525	740	1,362	14.5	7.3	12.6	2,147	63.4%
2025	118,593	1.86	1,587	843	1,362	13.6	7.6	11.5	2,106	64.7%
2030	128,922	1.67	1,652	949	1,362	13.2	7.8	10.6	2,066	65.9%
Tri County										
2000	715,911		10,589	4,911	7,461	14.63	6.53	19.33		
2005	781,004	2.54	10,914	5,356	7,461	14.20	7.13	16.60	13,019	64.5%
2010	844,841	2.23	11,491	6,186	7,461	14.17	7.53	14.57	12,767	64.3%
2015	907,821	2.01	12,077	6,942	7,461	14.00	7.83	12.93	12,596	63.6%
2020	969,305	1.80	12,504	7,668	7,461	13.33	8.07	11.67	12,297	64.2%
2025	1,028,341	1.59	12,766	8,420	7,461	12.73	8.37	10.63	11,807	66.2%
2030	1,085,104	1.43	13,109	9,218	7,461	12.40	8.63	9.80	11,353	68.3%

Source: University of New Mexico, Bureau of Business and Economic Research. (10/16/02)

Measures of Fertility = Crude Birth Rate (CBR) and Age Specific Fertility Rate (ASFR)

CBR = crude birth rate = number of births during a year divided by the midyear population multiplied by 1000.
ex. CBR = (25,950 / 1,819,046) * 1000 = 14.3 per 1000 people in New Mexico in 2000

Measures of Mortality = Crude Death Rate (CDR) and Age-Specific Death Rater (ASDR)

CDR = c**rude death rate** = number of deaths during a year divided by the midyear population multiplied by 1000.
ex. (5,761 / 745,253) * 1000 = 7.7

Measures of Migration = Gross Migration, Net Migration and Migration Rates

NMR = net migration rate: the **difference** between the **inmigration rate** (number of migrants into a community divided by the population of that community multiplied by 1,000) and the **outmigration rate** (number of people leaving a community divided by the population of that community multiplied by 1,000)

Cohort Component Method = projecting the components of population change, mortality, fertility and migration separately, then combining them using the population balancing equation

Source: University of New Mexico, Bureau of Business and Economic Research. Released August 2002.

Based upon assumptions:

** no war, epidemic or other cataclysmic event*
** declining fertility*
** declining migration rate - constant number of migrants based on average between 1990 & 2000*
** improving mortality conditions; increasing life expectancy*

2000 to 2030 - Rates (also Column C)						
	As of July 1…					
	2000-2005	2005-2010	2010-2015	2015-2020	2020-2025	2025-2030
NEW MEXICO	1.52	1.39	1.27	1.14	1.02	0.93
Bernalillo	1.30	1.17	1.06	0.96	0.87	0.79
Sandoval	3.57	3.03	2.68	2.35	2.06	1.82
Valencia	2.75	2.50	2.31	2.09	1.86	1.67

Source: University of New Mexico, Bureau of Business and Economic Research.

Released August 2002.

Table prepared by: Bureau of Business and Economic Research, University of New Mexico.

Projected Distribution							
	2000 to 2030						
	2000	2005	2010	2015	2020	2025	2030
Bernalillo	30.6	30.2	29.9	29.6	29.3	29.1	28.9
Sandoval	5	5.5	6	6.4	6.8	7.2	7.5
Valencia	3.7	3.9	4.1	4.3	4.5	4.7	4.9
Tri County	39.3	39.6	40	40.3	40.6	41	41.3

Source: University of New Mexico, Bureau of Business and Economic Research.

Migrant Status of Tri-County Residents 5 Years Prior to Census 2000					
Population 5 years and Older					
Migration Status	Bernalillo	Sandoval	Valencia	Total Tri	NEW MEXICO
Total	**518,381**	**83,382**	**61,142**	**662,905**	**1,689,911**
Stayers	**253,614**	**47,166**	**34,435**	**335,215**	**919,717**
All Migrants	**264,767**	**36,216**	**26,707**	**327,690**	**770,194**
Intrastate migrant	*186,226*	*23,035*	*20,662*	*229,923*	*526,221*
same county	154,634	9,710	10,110	174,454	400,128
same state	31,692	13,325	10,552	55,569	126,093
Interstate Migrants	*65,944*	*12,263*	*5,145*	*83,352*	*206,186*
Other US State	65,562	12,223	5,145	82,930	205,267
Northeast	5,846	1,607	358	7,811	15,329
Midwest	11,261	2,054	693	14,008	29,457
South	20,712	3,392	1,188	25,292	72,497
West	27,743	5,170	2,906	35,819	87,984
US Territory	382	40	0	422	919
Foreign Migrant	*12,697*	*918*	*900*	*14,515*	*37,787*

Percent - Migrant Status of Tri-County Residents 5 Years Prior to Census 2000					
Population 5 years and Older					
Migration Status	Bernalillo	Sandoval	Valencia	Total Tri	NEW MEXICO
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Stayers	**48.9%**	**56.6%**	**56.3%**	**50.6%**	**54.4%**
All Migrants	**51.1%**	**43.4%**	**43.7%**	**49.4%**	**45.6%**
Intrastate migrant	*70.3%*	*63.6%*	*77.4%*	*70.2%*	*68.3%*
same county	83.0%	42.2%	48.9%	75.9%	76.0%
same state	17.0%	57.8%	51.1%	24.2%	24.0%
Interstate Migrants	*24.9%*	*33.9%*	*19.3%*	*25.4%*	*26.8%*
Other US State	99.4%	99.7%	100.0%	99.5%	99.6%
Northeast	8.9%	13.1%	7.0%	9.4%	7.5%
Midwest	17.2%	16.8%	13.5%	16.9%	14.4%
South	31.6%	27.8%	23.1%	30.5%	35.3%
West	42.3%	42.3%	56.5%	43.2%	42.9%
US Territory	0.6%	0.3%	0.0%	0.5%	0.4%
Foreign Migrant	*4.8%*	*2.5%*	*3.4%*	*4.4%*	*4.9%*

Table prepared by: Bureau of Business and Economic Research, University of New Mexico.

1985	1995
Stayers = 47.2%	Stayers = 48.9%
Movers = 52.8%	Movers = 51.1%

IRS-Based Migration Estimates between 1999 - 2000			
	inmigration	outmigration	net migration
NEW MEXICO	102,604	108637	-6,033
Bernalillo	26,681	29,008	-2,327
Sandoval	7,730	6173	1,557
Valencia	3907	3453	454
Tri-County	38,318	38,634	-316