

Appendix G
Water Use Information

Appendix G1
Public Water System Information

Water Supplier Questionnaire



Socorro-Sierra Regional Water Plan
Water Demand Study
April, 2000

Each of the water systems that supply large and small communities throughout the region deliver a portion of the water that contributes to total demand. So we are asking that you take some time to consider the data that you have about the quantities of water that are supplied by your system and send this data to us.

Please return this to us within one week of receipt.

Here is what we need:

1. Total population served
 - # Residential Hookups
 - # Commercial Hookups
 - # Industrial Hookups
2. Total quantity of water produced at source.
3. Source of water, % quantity from groundwater and surface water.
4. Total delivered to users as measured by customers' water meters.
5. Portion of total water delivered for these uses:
 - Residential
 - Commercial
 - Industrial
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters
7. Treated wastewater discharge location.
8. Is treated wastewater reused? If so, specify uses and quantities.
9. Quantity of water lost through evaporation from wastewater treatment facility.
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info
13. The total number of households served by the water system
14. The total number of businesses served by the water system

15. The approximate number of new customers per year from 1990 onward as well as the total number of customers for those years
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources?
17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?
18. Are there any plans to expand the water system? If yes, please describe.
19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name
21. Geographic area served
22. Contact person
23. Address, phone, fax and Email of contact person

**Please send all available data to:
Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609**

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).

Water Supplier Questionnaire Responses

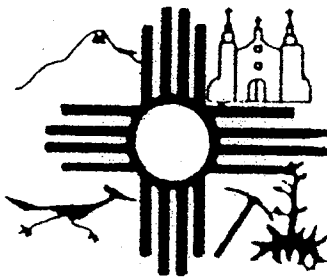
On the following pages are copies of the water suppliers' responses to our questionnaire. In those cases where we did not receive a written response but were able to obtain a telephone response we filled out the survey ourselves. These are labeled Telephone in the top right hand corner. Included in the pocket at the back of this report is a disc with a MS Excel spreadsheet that summarizes all questionnaire responses.

The following water suppliers' questionnaire responses are included in the order they are listed:

City of Socorro
Magdalena
La Joya MDWCA
City of Truth or Consequences
National Utility Co.
Lakeshore Sanitation District
Desert Aire Water
Hillsboro MDWCA
Bosque del Apache NWR
Fort Craig
Didio's Mini Mart
NMSHTD
 (Ft. Craig East and West and Walking Sands Rest Areas)
USBR
Caballo Dairy LLC
State Park Division
 (Caballo Lake Leased Lots, Caballo Lakeside Campground, Caballo Riverside
 Campground, Percha Dam)

The following is a list of references for sources of other information submitted instead of a formal questionnaire response:

New Mexico Tech: Trueline Engineering Report, 2000.
San Antonio MDWCA: 40-yr plan, Suzanne Smith Company, 2000.



CITY OF SOCORRO

P. 1 of 2

RAVI BHASKER
MAYOR

111 SCHOOL OF MINES ROAD
P.O. DRAWER K
SOCORRO, NEW MEXICO 87801
(505) 835-0240

GEORGE PATRICK SALOME, JR.
CITY CLERK

1. Total population served
 - A. Residential Hookups 3040
 - B. Commercial Hookups 400
 - C. Industrial Hookups 48

2. Total quantity of water produced at source
 - A. Industrial Park 386,911
 - B. Sedillo Springs 549,924
 - C. Socorro Springs 33,678
 - D. Eagle Picher 209,869
 - E. School of Mines West 67,514
 - F. School of Mines East 59,093
 - G. Olsen 775,690

3. Source of water, % quantity from groundwater and surface water
100 % groundwater

4. Total delivered to users as measured by customers' water meters
1999 Total 487,876,400 gallons

5. Portion of total water delivered for these uses:
 - A. Residential 69%
 - B. Commercial 21%
 - C. Industrial 5%
 - D. Recreation 3%
 - E. Agriculture 0%
 - F. Municipal Irrigation 1%
 - G. Temporary Construction 1%

6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters
1999 Flow, 278.59 M.G. or 278,590,000 gallons

7. Treated wastewater discharge location
302 Main Street
Socorro, NM 87801

8. Is treated water reused?
No

9. Quantity of water lost through evaporation from wastewater treatment facility
Not measured, but is minimal as two flow meters in and out of the plant are nearly the same as far as the measured flow

10. Any consultant reports or well logs pertaining to water supplied
Please refer to attached

11. Location of source(s)
Refer to Question # 2

12. Water rights info

Please refer to attached

13. The total number of households served by the water system
3034

14. The total number of businesses served by the water system
397

15. The total number of new customers per year from 1990 onward as well as the total number of customers for those years

		New Customers	Total Customers
A.	1990		Data Not Available
B.	1991		Data Not Available
C.	1992		Data Not Available
D.	1993		Data Not Available
E.	1994		Data Not Available
F.	1995		Data Not Available
G.	1996		3220
H.	1997	128	3348
I.	1998	45	3393
J.	1999	75	3468
K.	Thru 4/15/00	19	3487

16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other sources?

100% New Residents

17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?

100% New Businesses

18. Are there any plans to expand the water system?

No, the City of Socorro does not have any plans to expand the water system. It is done as needed to provide for customers.

19. A map and description of their geographic service area
Please refer to attached

20. Official system name
City of Socorro Water & Wastewater Division

21. Geographic area served
City of Socorro

22. Contact person
Jay Santillanes, Division Director

23. Address, phone, fax and Email of contact person
PO Drawer K
Socorro, NM 87801
(505) 838-1606
(505) 838-1607 Fax



HYDROSPHERE
Resource Consultants

Socorro-Sierra Regional Water Plan
Water Demand Study
April, 2000

Each of the water systems that supply large and small communities throughout the region deliver a portion of the water that contributes to total demand. So we are asking that you take some time to consider the data that you have about the quantities of water that are supplied by your system and send this data to us.

Please return this to us within one week of receipt.

Here is what we need:

1. Total population served
 - # Residential Hookups *475 total hookups*
 - # Commercial Hookups
 - # Industrial Hookups *~1100 population*
2. Total quantity of water produced at source. *1999 - 56,143,400 gallons*
3. Source of water, % quantity from groundwater and surface water.
4. Total delivered to users as measured by customers' water meters.
5. Portion of total water delivered for these uses:
 - Residential
 - Commercial
 - Industrial
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters
7. Treated wastewater discharge location.
8. Is treated wastewater reused? If so, specify uses and quantities.
9. Quantity of water lost through evaporation from wastewater treatment facility.
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info
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14. The total number of businesses served by the water system
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- the total number of customers for those years
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources?
 17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?
 18. Are there any plans to expand the water system? If yes, please describe.
 19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name *Magdalena Water Supply*
21. Geographic area served
22. Contact person *Brad Cass, Rita*
23. Address, phone, fax and Email of contact person

Please send all available data to:

**Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609**

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).



HYDROSPHERE
Resource Consultants

**Socorro-Sierra Regional Water Plan
Water Demand Study
April, 2000**

Each of the water systems that supply large and small communities throughout the region deliver a portion of the water that contributes to total demand. So we are asking that you take some time to consider the data that you have about the quantities of water that are supplied by your system and send this data to us.

Please return this to us within one week of receipt.

Here is what we need:

1. Total population served
 - 55 - # Residential Hookups
 - # Commercial Hookups
 - # Industrial Hookups
2. Total quantity of water produced at source.
3. Source of water, % quantity from groundwater and surface water.
4. Total delivered to users as measured by customers' water meters.
5. Portion of total water delivered for these uses:
 - 100% - Residential
 - Commercial
 - Industrial
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters
7. Treated wastewater discharge location.
8. Is treated wastewater reused? If so, specify uses and quantities. *no*
9. Quantity of water lost through evaporation from wastewater treatment facility.
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info
13. The total number of households served by the water system *50*
14. The total number of businesses served by the water system
15. The approximate number of new customers per year from 1990 onward as well as

La Joya
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- the total number of customers for those years | new cust every 3 years
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources?
 17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?
 18. Are there any plans to expand the water system? If yes, please describe. *yes we would like to make a new well*
 19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name
21. Geographic area served *La Joya NM*
22. Contact person *Lorraine Burela*
23. Address, phone, fax and Email of contact person *PO Box 41 La Joya, NM 87028
505 864-2279 Fax 505 861-0266
Lorrbarelj@usn.com*

Please send all available data to:
 Socorro-Sierra Water Demand
 Hydrosphere Resource Consultants, Inc.
 ATTN: Jodi Clark
 PO Box 445
 Socorro, NM 87801
 FAX: 505-835-2609

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).

chart 1

La Joya p. 3 of 4

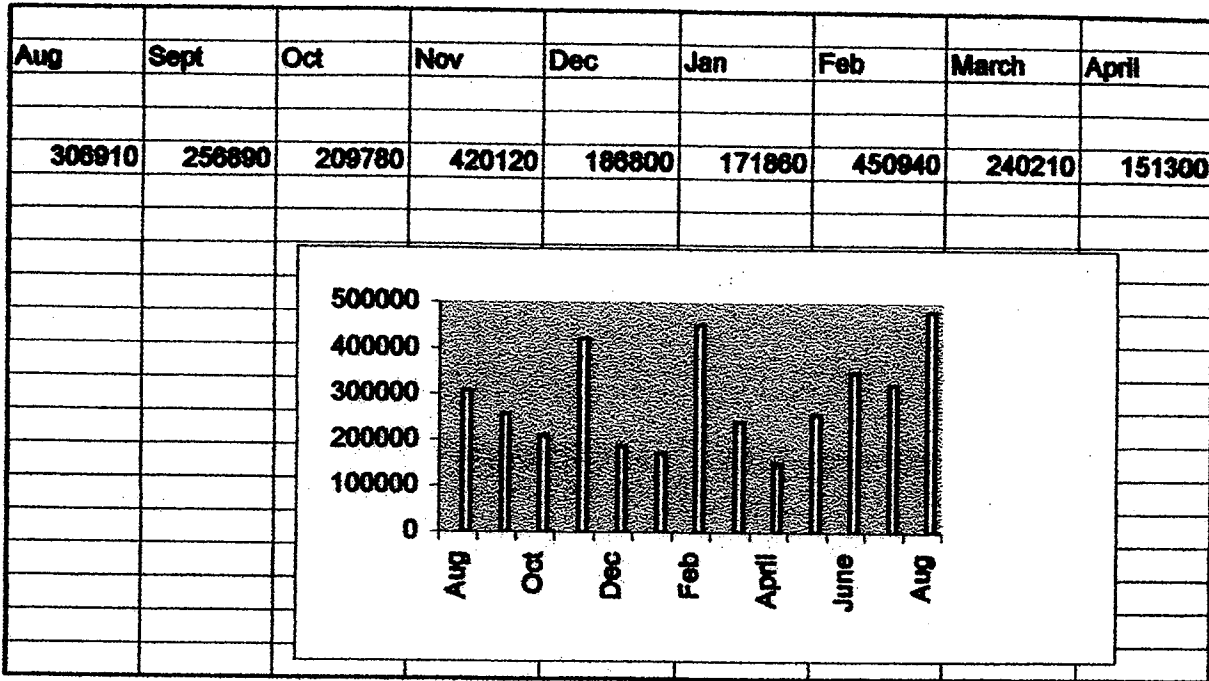


chart 1

La Jolla

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May	June	July	Aug
257260	349610	322390	479670

- 1. 7250 Total Population ← includes Williamsburg as per J.S. 10/31
- A. 2706 Residential Hookups
- B. 506 Commercial Hookups

(2) 3,500,000 Total Pumping Capacity / day

(3) 100% Ground Water Produced

445,021,000 gallons / year Metered

JTM
10/3/2000
see attachment
to r.c. xls

(A) 243,776,000 gallons / year residential

(B) 146,852,000 gallons / year Commercial

(C) 115,228,000 gallons / year Irrigation

(D) 9,165,000 gallons / year Fire Plugs

(6) 310,250,000 gallons / year Treated Effluent discharge • outfall of 001 located @ 1595 animal shelter Road into The Rio Grande.

(8) NOT AT THIS POINT. Provisions have been made to pump an average of 20% of Treated Effluent to Armijo Pond to water Armijo Family Park & eventually pump to the Golf on Marie Street.

(9) N/A

(10) State Engineers office IN has cruces 12 2570.95 acre feet available.

328

TorC Water Use, QA Arithmetic by JS
by jtm on 10/3/2000

Residential	243,776	R+C	R+I	R+I+FP
Commercial	146,852	390,628	289,004	298,169
Irrigation	45,228			
Fire Plugs	9,165			
"Total" from JS	298,169			
True Total	445,021			

Handwritten notes:
5-875-2161 confirmed
by JS on 10/3/00
~~the same as for the total~~

**FAX #: 505-835-2609
ATTN: JODI CLARK
SOCORRO-SIERRA WATER DEMAND
HYDROSPHERE RESOURCE CONSULTANTS, INC.**

PG 1 OF 2

April 19, 2000

National Utility Company
PO Box 245
Elephant Butte NM 87935

Travis Saille
(505) 894-7499 • FAX (505) 894-4512

Serving Elephant Butte in Sierra County

Groundwater is our only source.

In 1999 a total of 904 customers were served. Of these, 857 were residential and 47 were commercial. (36 new customers)

Pumped 53,748,000 gallons		
Delivered:	Residential	37,556,000
	Commercial	12,573,000
	Total	50,129,000

1998: 868 customers, 827 residential and 41 commercial (50 new customers)

Pumped 53,051,000		
Delivered:	Residential	36,856,000
	Commercial	12,434,000
	Total	49,290,000

1997: 818 customers, 777 residential and 41 commercial (31 new customers)

Pumped 51,182,000		
Delivered:	Residential	32,951,000
	Commercial	12,242,000
	Total	45,193,000

1996: 787 customers, 749 residential and 38 commercial (44 new customers)

Pumped 48,907,000

Delivered:	Residential	33,814,000
	Commercial	10,801,000
	Total	44,615,000

1995: 743 customers, 706 residential and 37 commercial (41 new customers)

Pumped 44,805,000

Delivered:	Residential	33,323,000
	Commercial	10,833,000
	Total	44,156,000

We do not have a wastewater facility.

We have three (3) wells in Elephant Butte. One is located in Unit 27, Block 2, Lot 11 and the other wells are located in Unit 5, Block 8, Lot 4.

None of our customers have converted from other water sources.

I hope that this information helps in your water study.

Travis Sailley



HYDROSPHERE
Resource Consultants

Socorro-Sierra Regional Water Plan
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Please return this to us within one week of receipt.

Here is what we need:

1. Total population served *~1100 population*
 - # Residential Hookups
 - # Commercial Hookups *~6 mostly storage lots not heavy usage*
 - # Industrial Hookups
2. Total quantity of water produced at source. *1999 - 35,389,600 gallons*
3. Source of water, % quantity from groundwater and surface water.
4. Total delivered to users as measured by customers' water meters.
5. Portion of total water delivered for these uses:
 - Residential
 - Commercial
 - Industrial
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters
7. Treated wastewater discharge location.
8. Is treated wastewater reused? If so, specify uses and quantities.
9. Quantity of water lost through evaporation from wastewater treatment facility.
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info *- 191.5 af*
13. The total number of households served by the water system
14. The total number of businesses served by the water system
15. The approximate number of new customers per year from 1990 onward as well as

- the total number of customers for those years
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources?
 17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?
 18. Are there any plans to expand the water system? If yes, please describe.
 19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name *Lakeshore Sanitation District*
21. Geographic area served
22. Contact person *Dean Banks*
23. Address, phone, fax and Email of contact person

Please send all available data to:
Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609

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Desert Aire p. 1 of 2
- Telephone



HYDROSPHERE
Resource Consultants

Socorro-Sierra Regional Water Plan
Water Demand Study
April, 2000

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Please return this to us within one week of receipt.

Here is what we need:

1. Total population served
 - # Residential Hookups
 - # Commercial Hookups
 - # Industrial Hookups

~ 55 population
2. Total quantity of water produced at source.
3. Source of water, % quantity from groundwater and surface water.
4. Total delivered to users as measured by customers' water meters.
5. Portion of total water delivered for these uses:
 - Residential
 - Commercial
 - Industrial
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters
7. Treated wastewater discharge location.
8. Is treated wastewater reused? If so, specify uses and quantities.
9. Quantity of water lost through evaporation from wastewater treatment facility.
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info
13. The total number of households served by the water system
14. The total number of businesses served by the water system
15. The approximate number of new customers per year from 1990 onward as well as

- the total number of customers for those years
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources?
 17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?
 18. Are there any plans to expand the water system? If yes, please describe.
 19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name *Desert Aire*
21. Geographic area served
22. Contact person
23. Address, phone, fax and Email of contact person

Please send all available data to:

**Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609**

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).



HYDROSPHERE
Resource Consultants

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Please return this to us within one week of receipt.

Here is what we need:

1. Total population served
 - # Residential Hookups - 70
 - # Commercial Hookups - 0
 - # Industrial Hookups - 0
2. Total quantity of water produced at source. - 5,473,600 gal 1999
3. Source of water, % quantity from groundwater and surface water. 100%
4. Total delivered to users as measured by customers' water meters. - 4,523,000 - 1999
5. Portion of total water delivered for these uses:
 - Residential - 100%
 - Commercial
 - Industrial
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters N/A
7. Treated wastewater discharge location. N/A
8. Is treated wastewater reused? If so, specify uses and quantities. N/A
9. Quantity of water lost through evaporation from wastewater treatment facility. N/A
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info
13. The total number of households served by the water system 70
14. The total number of businesses served by the water system 0

190 11 194
1914 195
1926 196
1932 197
198
1996

- 15. The approximate number of new customers per year from 1990 onward as well as the total number of customers for those years
- 16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources? *100%*
- 17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources? *N/A*
- 18. Are there any plans to expand the water system? If yes, please describe. *NOT AT THIS TIME*
- 19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

- 20. Official System name - *Hillsboro Mutual DWCA*
- 21. Geographic area served - *Hillsboro*
- 22. Contact person - *MAREE WESTLAND*
- 23. Address, phone, fax and Email of contact person
P.O. Box 521 Hillsboro NM, 88042 505-895-5686

Please send all available data to:

Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).

**U.S. FISH & WILDLIFE SERVICE****BOSQUE DEL APACHE NATIONAL WILDLIFE REFUGE****P.O. Box 1246****Socorro, NM 87801****(505) 835-1828****(505) 835-0314 FAX**

July 14, 2000

Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark/Jim McCord
P.O. Box 445
Socorro, NM 87801

Dear Ms. Clark:

First of all, I would like to apologize for being very late with this information. I delegated it and didn't follow-up on it. Some of this information will be taken from records kept and some will be estimated. If you have any questions/concerns, please don't hesitate to contact me.

Total population served: 28+ in the summer, dependent upon number of visitors that stop at the refuge; 48+ in the fall/winter, dependent upon number of visitors that stop at the refuge. Our visitation for the year totals about 120,000 people. There are 3 residences, 2 apartments, 1 bunkhouse, 2 mobile homes, and 20 RV hook-ups located at the headquarters site.

Total quantity of water produced at source: 1,000,000 gals./yr. (Est.)

Source of water (% quantity from groundwater and surface water): 100% from well (groundwater).

Total delivered to users (as measured by customers' water meters): 1,000,000 gals/yr. No water measuring meters on individual systems (only one meter at well).

Portion of total water delivered for these uses:

Residential: 70%

Municipal irrigation: 30%

Total quantity of water returned through a wastewater treatment facility (as measured by plant influent flow meters): N/A

Treated wastewater discharge location: N/A

Is treated wastewater reused? N/A

Quantity of water lost through evaporation from wastewater treatment facility? N/A

Any consultant reports or well logs pertaining to water supplied: No.

Location of sources: N/A

Water rights info: The refuge has water rights dating back to 1906 for a diversion amount of 12,417 acre-feet from the Socorro, Riverside, San Antonio and Interior (Elmendorf) canals and the Low Flow Channel.

The total number of households served by the water system: 6-9 year round and 17 additional in the fall/winter season.

The total number of businesses served by the water system: The Bosque del Apache NWR headquarters office and visitor center, which includes a gift shop/bookstore.

The approximate number of new customers per year from 1990 onward, as well as the total number of customers for those years: About 60,000 from a total of 120,000.

Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources? None.

Are there any plans to expand the water system? No. If yes, please describe.

A map (electronic or hard copy) and description of their geographic service area: Hard copy on file at the refuge office.

Official System Name: Bosque del Apache National Wildlife Refuge - NM State ID#902-28

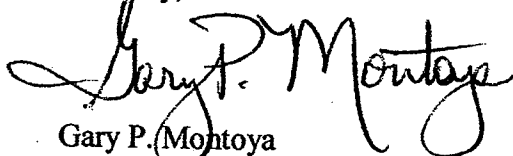
Geographic area served: Bosque del Apache National Wildlife Refuge headquarters area.

Contact person: Michael Browne or Leroy Saavedra

Address, phone, fax and Email of contact person: P.O. Box 1246, Socorro, NM 87801
mike_browne@fws.gov

Also attached are records for flooding of ponds on the refuge and a list of irrigation wells on the refuge. Thank you for your time and consideration.

Sincerely,



Gary P. Montoya
Acting Refuge Manager

Ft. Craig Well

Questions

1. Transient non-community water system, serving 2000 visitors per year, a restroom facility, one RV with usually two volunteers, three outside faucets.

2. Approximately 100 gal/day.

3. 100% ground water.

5. Historical site.

10. Well log, 147 feet total depth, 30 gal/day, 6 inch casing

11. Ft. Craig.

12. Permit from state engineer for domestic use under 72-12-1 regulation.

13. One RV and restroom for visitors.

20. Ft. Craig Well

22. Clarence Seagraves or Brenda Wilkinson

BLM

198 Neel Ave, NW

Socorro, NM 87801

505-835-0412

Fax 505-835-0223

Clarence_Seagraves@nm.blm.gov



HYDROSPHERE
Resource Consultants

Didio's Mini-Mail
Bernardo p. 1 of 2

Socorro-Sierra Regional Water Plan
Water Demand Study
April, 2000

Each of the water systems that supply large and small communities throughout the region deliver a portion of the water that contributes to total demand. So we are asking that you take some time to consider the data that you have about the quantities of water that are supplied by your system and send this data to us.

Please return this to us within one week of receipt.

Here is what we need:

1. Total population served *Household - 4 people - stove*
 - # Residential Hookups *- 1*
 - # Commercial Hookups *- 1*
 - # Industrial Hookups *- 0*
2. Total quantity of water produced at source. *304,166 gals. per year*
3. Source of water, % quantity from groundwater and surface water. *Well + NO surface*
4. Total delivered to users as measured by customers' water meters. *NO Meter*
5. Portion of total water delivered for these uses:
 - Residential *Combined w/ # 2 above*
 - Commercial *stove uses water for fountain machine, coffee machine,*
 - Industrial *- 0 & restroom. We have 1 (one) faucet outside for customers*
 - Recreation (parks and golf courses) *- 0*
 - Agriculture *- 0*
 - Municipal irrigation *- 0*
 - Temporary construction *- 0*
 - Other (specify - internal, mining, livestock, etc.) *- 0*
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters *- 0*
7. Treated wastewater discharge location. *- 0*
8. Is treated wastewater reused? If so, specify uses and quantities. *- 0*
9. Quantity of water lost through evaporation from wastewater treatment facility. *- 0*
10. Any consultant reports or well logs pertaining to water supplied *- 0*
11. Location of source(s) *- 0*
12. Water rights info *- 0*
13. The total number of households served by the water system *- 1*
14. The total number of businesses served by the water system *- 1*

15. The approximate number of new customers per year from 1990 onward as well as the total number of customers for those years -2
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources? -6
17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources? -0
18. Are there any plans to expand the water system? If yes, please describe. NO
19. A map (electronic or hard copy) and description of their geographic service area -0

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name Didios
21. Geographic area served Bernardo Mini Mart
22. Contact person TOMY SALAS
23. Address, phone, fax and Email of contact person

Please send all available data to:
Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609

Tomy & Nettie Salas
16559 B Hwy. 60
Bosque, NM 87006
PH # 864-6786

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).

Reply to Hydrosphere

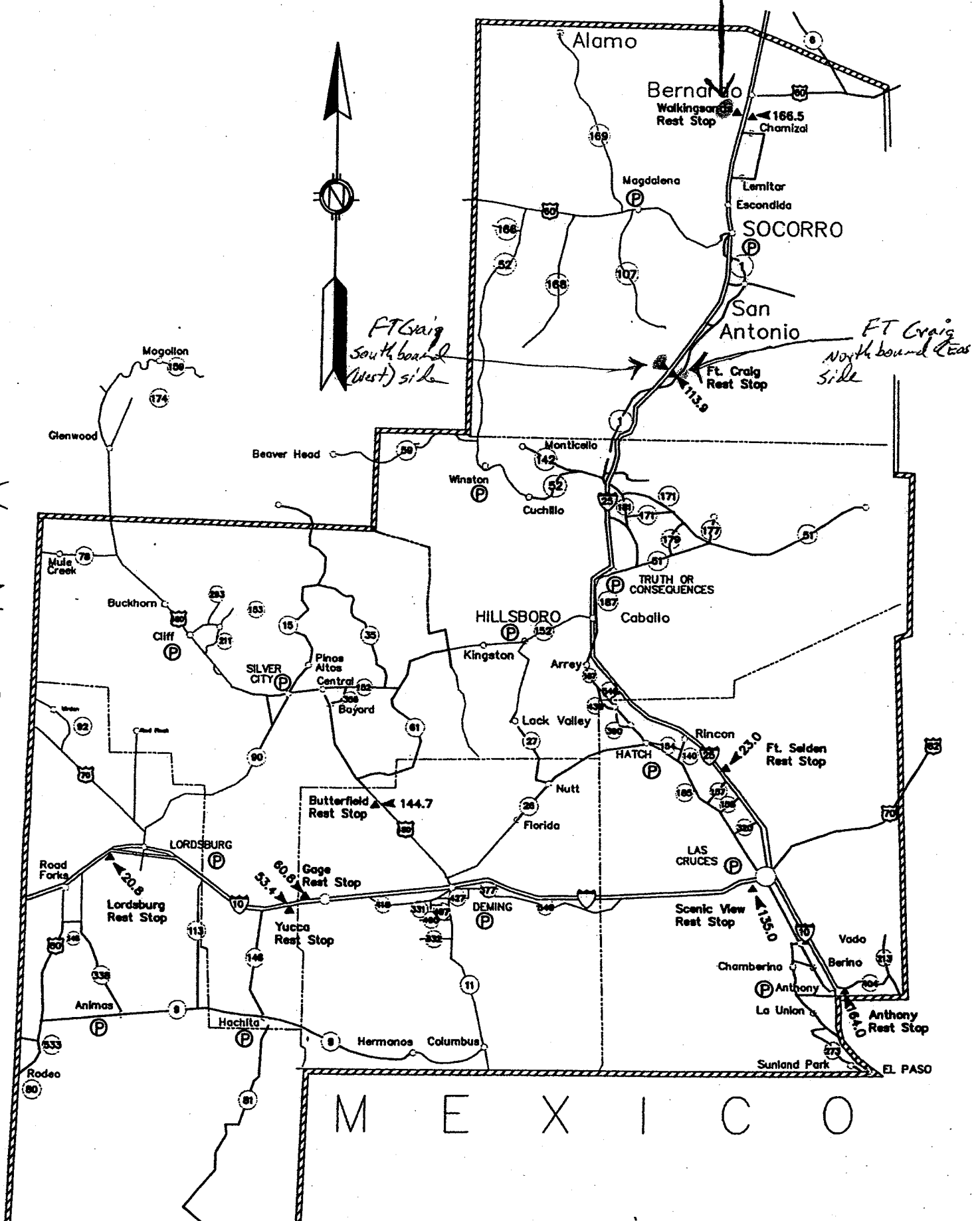
Per your Questionnaire to District One of the New Mexico State Highway and Transportation Department

Question	Ft. Craig - East side	Ft. Craig - West side	Walking Sands - Both Sides one well
1. Total Population Served			
# Residential Hookups	None	None	None
# Commercial Hookups	None	None	None
# Industrial Hookups	None	None	None
2. Total Quantity of water produced at source - 1999			
	568,390 Gal.	312,690 Gal	529,300 Gal.
3. Source of water, % quantity from:			
Groundwater	100%	100%	100%
Surface water	0%	0%	0%
4. Total delivered to users as measured by customers water meters			
	None	None	None
5. Portion of total water delivered for these uses:			
Residential	None	None	None
Commercial	None	None	None
Industrial	None	None	None
Recreation (parks and golf Courses)	None	None	None
Agriculture	None	None	None
Municipal	None	None	None
Temporary Construction	None	None	None
Other - Rest Area Rest Rooms	100%	100%	100%
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters			
	None	None	None
7. Treated wastewater discharge location			
	on site Leach Field	on site Leach Field	on site Leach Field
8. Is treated wastewater reused? If so specify use, etc.			
	No	No	No
9. Quantity of water lost through evaporation from wastewater treatment facility			
	Buried system	Buried system	Buried system
10. Any Consultants reports or well logs pertaining to water supplied			
	None	None	None
11. Location of source(s)			
	Onsite Well	Onsite Well	Onsite Well
12. Water Rights info -			
	3 acre feet a year	3 acre feet a year	3 acre feet a year
We were not able to verify these figures.			
13. The total number of households served by the water system.			
	None	None	None
14. The total number of businesses served by the water system			
	None	None	None

EXHIBIT "C"

Walking Sands Well on Southbound
(West) Side Serves Both Sides

ARIZONA



MEXICO



HYDROSPHERE

Resource Consultants

Socorro-Sierra Regional Water Plan

Water Demand Study

April, 2000

Each of the water systems that supply large and small communities throughout the region deliver a portion of the water that contributes to total demand. So we are asking that you take some time to consider the data that you have about the quantities of water that are supplied by your system and send this data to us.

Please return this to us within one week of receipt.

Here is what we need:

1. Total population served *Do Not Know*
 - # Residential Hookups *OCH Complex*
 - # Commercial Hookups *State Park - Very Small Portion*
 - # Industrial Hookups *0%* *At Damsite.*
2. Total quantity of water produced at source. *100%*
3. Source of water, % quantity from groundwater and surface water. *Wells (2)*
4. Total delivered to users as measured by customers' water meters. *No Water Meters*
5. Portion of total water delivered for these uses:
 - Residential
 - Commercial
 - Industrial *0%*
 - Recreation (parks and golf courses)
 - Agriculture *0%*
 - Municipal irrigation *0%*
 - Temporary construction *0%*
 - Other (specify - internal, mining, livestock, etc.) *0%*
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters *State Park has Wastewater Plant - %?*
7. Treated wastewater discharge location. *Elephant Lake*
8. Is treated wastewater reused? If so, specify uses and quantities. *?*
9. Quantity of water lost through evaporation from wastewater treatment facility. *?*
10. Any consultant reports or well logs pertaining to water supplied *Hours Pumps Run*
11. Location of source(s) - *Wells (2) Below Elephant Lake Dam*
12. Water rights info *Pre 1916*
13. The total number of households served by the water system *Do not Know - Very Few @ State Park*
14. The total number of businesses served by the water system *Do not Know - Probably 1 @ State Park*

15. The approximate number of new customers per year from 1990 onward as well as the total number of customers for those years -0-
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources? -0-
17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources? -0-
18. Are there any plans to expand the water system? If yes, please describe. *No*
19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name 908-27
21. Geographic area served *Dam Site & Just Below Dam*
22. Contact person *C. Weisner*
23. Address, phone, fax and Email of contact person *Box 312 HC32
Truth or Consequences, NH
87901
505-894-6661*

Please send all available data to:
Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).



HYDROSPHERE
Resource Consultants

**Socorro-Sierra Regional Water Plan
Water Demand Study
February, 2000**

Each of the water systems that supply large and small communities throughout the region deliver a portion of the water that contributes to total demand. So we are asking that you take some time to consider the data that you have about the quantities of water that are supplied by your system and send this data to us.

Please return this to us within one week of receipt.

Here is what we need:

1. Total population served *100*
 - # Residential Hookups *19*
 - # Commercial Hookups
 - # Industrial Hookups *3 (2 BARN + OFFICE)*
2. Total quantity of water produced at source. ** 50,504,200*
3. Source of water, % quantity from groundwater and surface water. *100% GROUNDWATER*
4. Total delivered to users as measured by customers' water meters. *NO RESIDENTIAL METERS*
5. Portion of total water delivered for these uses:
 - Residential *3,000,000*
 - Commercial
 - Industrial *47,504,200*
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters *NONE*
7. Treated wastewater discharge location.
8. Is treated wastewater reused? If so, specify uses and quantities.
9. Quantity of water lost through evaporation from wastewater treatment facility.
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info
13. The total number of households served by the water system *19*
14. The total number of businesses served by the water system *3*
15. The approximate number of new customers per year from 1990 onward as well as

Socorro-Sierra Regional Water Plan, Demand Study Questionnaire, 10:51 AM, 07/18/00

* METER INSTALLED 1/17/00

TOTAL WATER PRODUCED 1/17/00 THRU 10/3/00.

- the total number of customers for those years
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources?
 17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?
 18. Are there any plans to expand the water system? If yes, please describe. *NO*
 19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name *CABALLO DAIRY*
21. Geographic area served
22. Contact person *STEVE LARA*
23. Address, phone, fax and Email of contact person *P.O. BOX 340
ARROYO, NM 87930
505-267-3061*

Please send all available data to:
 Socorro-Sierra Water Demand
 Hydrosphere Resource Consultants, Inc.
 ATTN: Jodi Clark
 PO Box 445
 Socorro, NM 87801
 FAX: 505-835-2609

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2609).

Post-it™ Fax Note	7671	Date	10/7	# of pages	2
To	<i>Jodi Clark</i>		From	<i>Steve</i>	
Co./Dept.			Co.	<i>Caballo Dairy</i>	
Phone #			Phone #		
Fax #			Fax #		

(LL) Caballo Lake State Park - Leased Lots p. 106

(LS) Caballo Lakeside Campground

(RS) Caballo Riverside Campground

(PD) Percha Dam State Park



HYDROSPHERE
Resource Consultants

- Telephone

Socorro-Sierra Regional Water Plan
Water Demand Study
April, 2000

Each of the water systems that supply large and small communities throughout the region deliver a portion of the water that contributes to total demand. So we are asking that you take some time to consider the data that you have about the quantities of water that are supplied by your system and send this data to us.

Please return this to us within one week of receipt.

Here is what we need:

1. Total population served
 - # Residential Hookups
 - # Commercial Hookups
 - # Industrial Hookups
2. Total quantity of water produced at source.
3. Source of water, % quantity from groundwater and surface water.
4. Total delivered to users as measured by customers' water meters.
5. Portion of total water delivered for these uses:
 - Residential
 - Commercial
 - Industrial
 - Recreation (parks and golf courses)
 - Agriculture
 - Municipal irrigation
 - Temporary construction
 - Other (specify - internal, mining, livestock, etc.)
6. Total quantity of water returned through a wastewater treatment facility as measured by plant influent flow meters
7. Treated wastewater discharge location.
8. Is treated wastewater reused? If so, specify uses and quantities.
9. Quantity of water lost through evaporation from wastewater treatment facility.
10. Any consultant reports or well logs pertaining to water supplied
11. Location of source(s)
12. Water rights info
13. The total number of households served by the water system
14. The total number of businesses served by the water system
15. The approximate number of new customers per year from 1990 onward as well as

1999
LL - 2,927,406 gallons
LS - 2,014,156 gallons
RS - 3,194,350 gallons
PD - 501,987 gallons

- the total number of customers for those years
16. Of all new residential customers each year (from 1990 to now), what percentage were new residents and what percentage were existing residents who converted from other water sources?
 17. Of all new business customers (from 1990 to now), what percentage were new businesses and what percentage were existing businesses who converted from other sources?
 18. Are there any plans to expand the water system? If yes, please describe.
 19. A map (electronic or hard copy) and description of their geographic service area

Please provide this data for the most current year for which complete data is available and for previous years. If you have a demand forecast, please add this as well.

Please also provide the following basic information:

20. Official System name
21. Geographic area served
22. Contact person *Phillip McClelland*
23. Address, phone, fax and Email of contact person

Please send all available data to:
Socorro-Sierra Water Demand
Hydrosphere Resource Consultants, Inc.
ATTN: Jodi Clark
PO Box 445
Socorro, NM 87801
FAX: 505-835-2609

Note: If possible, electronic format (such as Excel or Lotus 123) is preferred.

Thank you for your assistance with this essential research. If you have questions or need additional information, please contact either Jodi Clark or Jim McCord at Hydrosphere offices in Socorro (505-835-2556).

Appendix G2
Historical and Current
Water Use

Table G2-1. Sierra County Water Use 1975 Through 2000

Use Category	Withdrawal (acre-feet)		Depletion (acre-feet)		Return Flow (acre-feet)		Withdrawal (acre-feet)	Total Depletion (acre-feet)	Total Return Flow (acre-feet)
	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water			
2000 Water Year									
Commerical (self-supplied)	0	436	0	388	0	48	436	388	48
Domestic (self-supplied)	0	102	0	102	0	0	102	102	0
Industrial (self-supplied)	0	0.1	0	0.1	0	0	0.1	0.1	0
Irrigated Agriculture	23,869	11,342	11,069	7,149	12,800	4,193	35,211	18,218	16,993
Livestock (self-supplied)	72	631	72	631	0	0	703	703	0
Mining (self-supplied)	0	5	0	1	0	4	5	1	4
Power (self-supplied)	0	0	0	0	0	0	0	0	0
Public Water Supply	0	1,914	0	1,062	0	852	1,914	1,062	852
Reservoir Evaporation	219,325	0	219,325	0	0	0	219,325	219,325	0
Totals	243,266	14,430	230,466	9,333	12,800	5,097	257,696	239,799	17,897
1995 Water Year									
Commerical (self-supplied)	0	546	0	428	0	118	546	428	118
Domestic (self-supplied)	0	119	0	54	0	65	119	54	65
Industrial (self-supplied)	25	0.2	25	0.1	0	0	25	25	0
Irrigated Agriculture	28,650	15,013	13,301	9,796	15,349	5,217	43,663	23,097	20,566
Livestock (self-supplied)	73	488	73	469	0	19	561	542	19
Mining (self-supplied)	0	18	0	4	0	14	18	4	14
Power (self-supplied)	0	0	0	0	0	0	0	0	0
Public Water Supply	0	2,467	0	1,398	0	1,069	2,467	1,398	1,069
Reservoir Evaporation	292,561	0	292,561	0	0	0	292,561	292,561	0
Totals	321,309	18,651	305,960	12,149	15,349	6,502	339,960	318,109	21,851

Table G2-1. Sierra County Water Use 1975 Through 2000

Use Category	Withdrawal (acre-feet)		Depletion (acre-feet)		Return Flow (acre-feet)		Withdrawal (acre-feet)	Total Depletion (acre-feet)	Total Return Flow (acre-feet)
	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water			
1990 Water Year									
Commerical (self-supplied)	0	331	0	243	0	88	331	243	88
Domestic (self-supplied)	0	159	0	71	0	88	159	71	88
Industrial (self-supplied)	25	25	25	25	0	0	50	50	0
Irrigated Agriculture	25,470	11,316	11,940	7,081	13,530	4,235	36,786	19,021	17,765
Livestock (self-supplied)	67	409	67	396	0	13	476	463	13
Mining (self-supplied)	0	166	0	33	0	133	166	33	133
Power (self-supplied)	0	0	0	0	0	0	0	0	0
Public Water Supply	0	2,054	0	1,220	0	834	2,054	1,220	834
Reservoir Evaporation	164,974	0	164,974	0	0	0	164,974	164,974	0
Totals	190,536	14,460	177,006	9,069	13,530	5,391	204,996	186,075	18,921
1985 Water Year									
Commercial	0	34	0	17	0	17	34	17	17
Urban	0	1,438	0	719	0	719	1,438	719	719
Rural	0	233	0	117	0	116	233	117	116
Industrial	0	0	0	0	0	0	0	0	0
Irrigated Agriculture	27,484	7,698	11,627	4,366	15,857	3,332	35,182	15,993	19,189
Livestock	174	280	174	259	0	21	454	433	21
Minerals	0	75	0	48	0	27	75	48	27
Power	0	0	0	0	0	0	0	0	0
Stockpond Evaporation	820	0	820	0	0	0	820	820	0
Military	0	0	0	0	0	0	0	0	0
Fish and Wildlife	0	0	0	0	0	0	0	0	0
Recreation	0	62	0	61	0	1	62	61	1
Reservoir Evaporation	218,971	0	218,971	0	0	0	218,971	218,971	0
Totals	247,449	9,820	231,592	5,587	15,857	4,233	257,269	237,179	20,090

Table G2-1. Sierra County Water Use 1975 Through 2000

Use Category	Withdrawal (acre-feet)		Depletion (acre-feet)		Return Flow (acre-feet)		Withdrawal (acre-feet)	Total Depletion (acre-feet)	Total Return Flow (acre-feet)
	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water			
1980 Water Year									
Urban	0	1,408	0	704	0	704	1,408	704	704
Rural	0	195	0	98	0	97	195	98	97
Irrigated Agriculture	24,810	11,900	10,230	7,490	14,580	4,410	36,710	17,720	18,990
Livestock	228	352	228	327	0	25	580	555	25
Stockpond Evaporation	820	0	820	0	0	0	820	820	0
Commercial	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0
Minerals	0	20	0	4	0	16	20	4	16
Military	0	0	0	0	0	0	0	0	0
Power	0	0	0	0	0	0	0	0	0
Fish and Wildlife	0	0	0	0	0	0	0	0	0
Recreation	0	174	0	174	0	0	174	174	0
Reservoir Evaporation	168,170	0	168,170	0	0	0	168,170	168,170	0
Totals	194,028	14,049	179,448	8,797	14,580	5,252	208,077	188,245	19,832
1975 Water Year									
Urban	0	1,275	0	638	0	637	1,275	638	637
Rural	0	336	0	168	0	168	336	168	168
Irrigated Agriculture	19,720	15,780	7,720	9,340	12,000	6,440	35,500	17,060	18,440
Manufacturing	0	10	0	6	0	4	10	6	4
Minerals	70	20	7	4	63	16	90	11	79
Military	0	0	0	0	0	0	0	0	0
Livestock	222	223	222	223	0	0	445	445	0
Stockpond Evaporation	556	0	556	0	0	0	556	556	0
Power	0	0	0	0	0	0	0	0	0
Fish and Wildlife	0	0	0	0	0	0	0	0	0
Recreation	0	100	0	100	0	0	100	100	0
Reservoir Evaporation	76,500	0	76,500	0	0	0	76,500	76,500	0
Playa Lake Evaporation	0	0	0	0	0	0	0	0	0
Totals	97,068	17,744	85,005	10,479	12,063	7,265	114,812	95,484	19,328

Table G2-2. Socorro County Water Use 1975 Through 2000

Use Category	Withdrawal (acre-feet)		Depletion (acre-feet)		Return Flow (acre-feet)		Withdrawal (acre-feet)	Total Depletion (acre-feet)	Total Return Flow (acre-feet)
	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water			
2000 Water Year									
Commerical (self-supplied)	0	1,274	0	896	0	378	1,274	896	378
Domestic (self-supplied)	0	457	0	457	0	0	457	457	0
Industrial (self-supplied)	0	2	0	2	0	0	2	2	0
Irrigated Agriculture	143,516	33,530	40,411	18,969	103,105	14,561	177,046	59,380	117,666
Livestock (self-supplied)	59	1,014	59	1,014	0	0	1,073	1,073	0
Mining (self-supplied)	0	2	0	2	0	0	2	2	0
Power (self-supplied)	0	0	0	0	0	0	0	0	0
Public Water Supply	0	2,576	0	958	0	1,618	2,576	958	1,618
Reservoir Evaporation	7,570	0	7,570	0	0	0	7,570	7,570	0
Totals	151,145	38,855	48,040	22,298	103,105	16,557	190,000	70,338	119,662
1995 Water Year									
Commerical (self-supplied)	0	1,049	0	676	0	373	1,049	676	373
Domestic (self-supplied)	0	323	0	145	0	178	323	145	178
Industrial (self-supplied)	0	16	0	16	0	0	16	16	0
Irrigated Agriculture	122,538	37,709	36,427	21,425	86,111	16,284	160,247	57,852	102,395
Livestock (self-supplied)	73	887	73	840	0	47	960.00	913	47
Mining (self-supplied)	0	16	0	8	0	8	16	8	8
Power (self-supplied)	0	0	0	0	0	0	0	0	0
Public Water Supply	0	2,184	0	816	0	1,368	2,184	816	1,368
Reservoir Evaporation	7,570	0	7,570	0	0	0	7,570	7,570	0
Totals	130,181	42,184	44,070	23,926	86,111	18,258	172,365	67,996	104,369

Table G2-2. Socorro County Water Use 1975 Through 2000

Use Category	Withdrawal (acre-feet)		Depletion (acre-feet)		Return Flow (acre-feet)		Withdrawal (acre-feet)	Total Depletion (acre-feet)	Total Return Flow (acre-feet)
	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water			
1990 Water Year									
Commerical (self-supplied)	0	144	0	65	0	79	144	65	79
Domestic (self-supplied)	0	319	0	143	0	176	319	143	176
Industrial (self-supplied)	0	2	0	2	0	0	2	2	0
Irrigated Agriculture	103,356	30,962	35,442	20,759	67,914	10,203	134,318	56,201	78,117
Livestock (self-supplied)	72	636	72	613	0	23	708	685	23
Mining (self-supplied)	0	15	0	6	0	9	15	6	9
Power (self-supplied)	0	0	0	0	0	0	0	0	0
Public Water Supply	0	1,996	0	998	0	998	1,996	998	998
Reservoir Evaporation	7,570	0	7,570	0	0	0	7,570	7,570	0
Totals	110,998	34,074	43,084	22,586	67,914	11,488	145,072	65,670	79,402
1985 Water Year									
Commercial	0	773	0	387	0	386	773	387	386
Urban	0	1,918	0	959	0	959	1,918	959	959
Rural	0	400	0	201	0	199	400	201	199
Industrial	0	0	0	0	0	0	0	0	0
Irrigated Agriculture	79,732	15,637	16,151	9,322	63,581	6,315	95,369	25,473	69,896
Livestock	255	361	255	340	0	21	616	595	21
Minerals	0	155	0	77	0	78	155	77	78
Power	0	0	0	0	0	0	0	0	0
Stockpond Evaporation	686	0	686	0	0	0	686	686	0
Military	0	0	0	0	0	0	0	0	0
Fish and Wildlife	9,108	0	7,213	0	1,895	0	9,108	7,213	1,895
Recreation	0	479	0	317	0	162	479	317	162
Reservoir Evaporation	0	0	0	0	0	0	0	0	0
Totals	89,781	19,723	24,305	11,603	65,476	8,120	109,504	35,908	73,596

Table G2-2. Socorro County Water Use 1975 Through 2000

Use Category	Withdrawal (acre-feet)		Depletion (acre-feet)		Return Flow (acre-feet)		Withdrawal (acre-feet)	Total Depletion (acre-feet)	Total Return Flow (acre-feet)
	Surface Water	Ground Water	Surface Water	Ground Water	Surface Water	Ground Water			
1980 Water Year									
Urban	0	2,607	0	1,304	0	1,303	2,607	1,304	1,303
Rural	0	295	0	147	0	148	295	147	148
Irrigated Agriculture	100,870	28,090	31,570	17,020	69,300	11,070	128,960	48,590	80,370
Livestock	324	360	324	353	0	7	684	677	7
Stockpond Evaporation	686	0	686	0	0	0	686	686	0
Commercial	0	18	0	11	0	7	18	11	7
Industrial	0	0	0	0	0	0	0	0	0
Minerals	0	155	0	77	0	78	155	77	78
Military	0	0	0	0	0	0	0	0	0
Power	0	0	0	0	0	0	0	0	0
Fish and Wildlife	6,719	384	6,200	192	519	192	7,103	6,392	711
Recreation	15	902	15	330	0	572	917	345	572
Reservoir Evaporation	0	0	0	0	0	0	0	0	0
Totals	108,614	32,811	38,795	19,434	69,819	13,377	141,425	58,229	83,196
1975 Water Year									
Urban	0	1,523	0	762	0	761	1,523	762	761
Rural	0	197	0	98	0	99	197	98	99
Irrigated Agriculture	92,170	31,250	26,900	18,730	65,270	12,520	123,420	45,630	77,790
Manufacturing	0	98	0	59	0	39	98	59	39
Minerals	0	40	0	8	0	32	40	8	32
Military	0	0	0	0	0	0	0	0	0
Livestock	294	293	294	293	0	0	587	587	0
Stockpond Evaporation	698	0	698	0	0	0	698	698	0
Power	0	0	0	0	0	0	0	0	0
Fish and Wildlife	5,124	6,622	3,250	3,311	1,874	3,311	11,746	6,561	5,185
Recreation	0	0	0	0	0	0	0	0	0
Reservoir Evaporation	0	0	0	0	0	0	0	0	0
Playa Lake Evaporation	0	0	0	0	0	0	0	0	0
Totals	98,286	40,023	31,142	23,261	67,144	16,762	138,309	54,403	83,906

Figure G2-1. Historic and current water use in public supply (PS) OSE water use category. Historic use was derived from OSE water use reports for 1975, 1980, 1985, 1990, 1995, and 2000, and 1999 water use values were obtained by methods described in text.

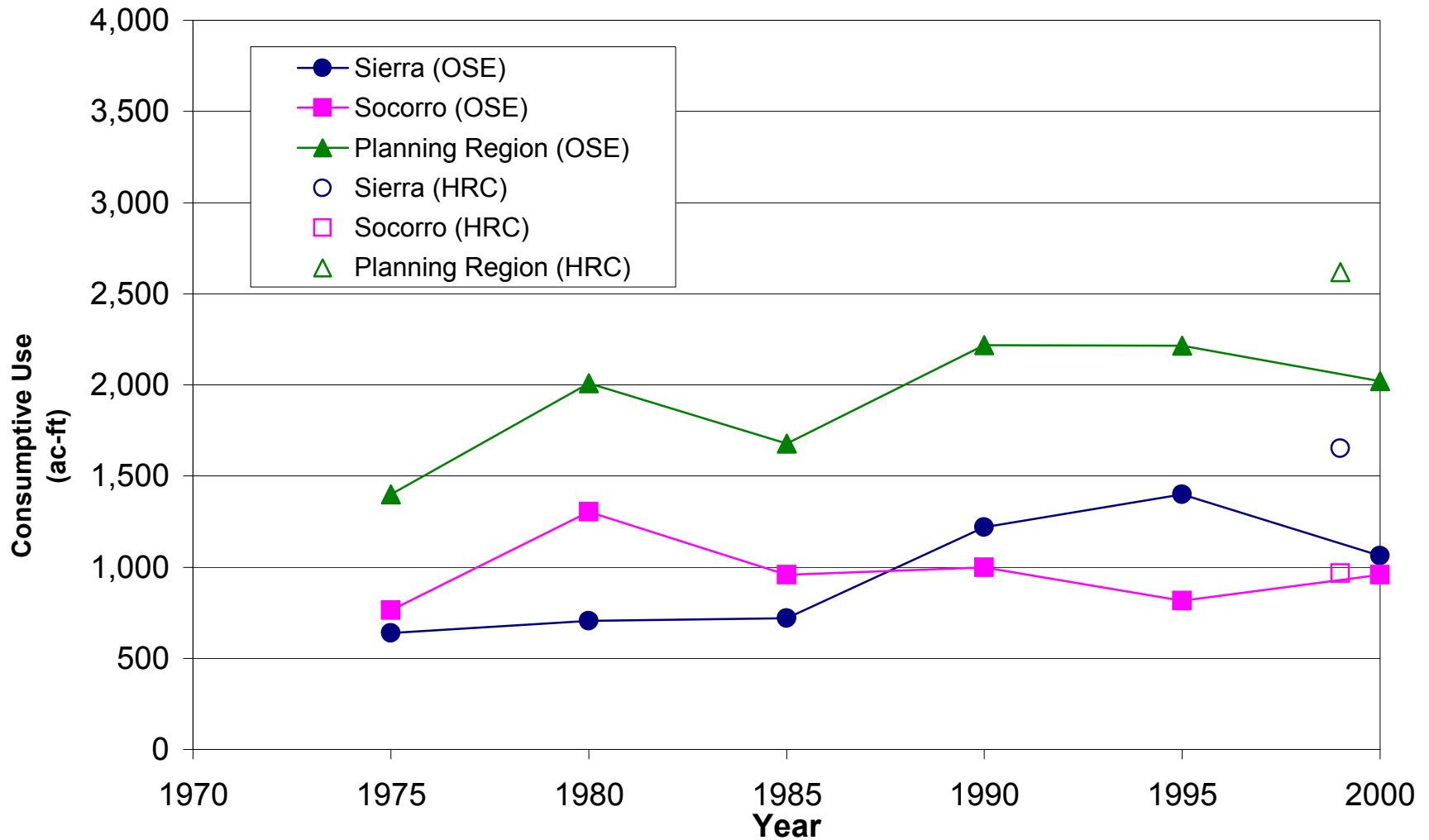


Figure G2-2. Historic and current water use in self-supplied domestic (DO) OSE water use category. Historic use wderived from OSE water use reports for 1975, 1985, 1990, 1995, and 2000, and 1999 water use was obtained by methods described in text.

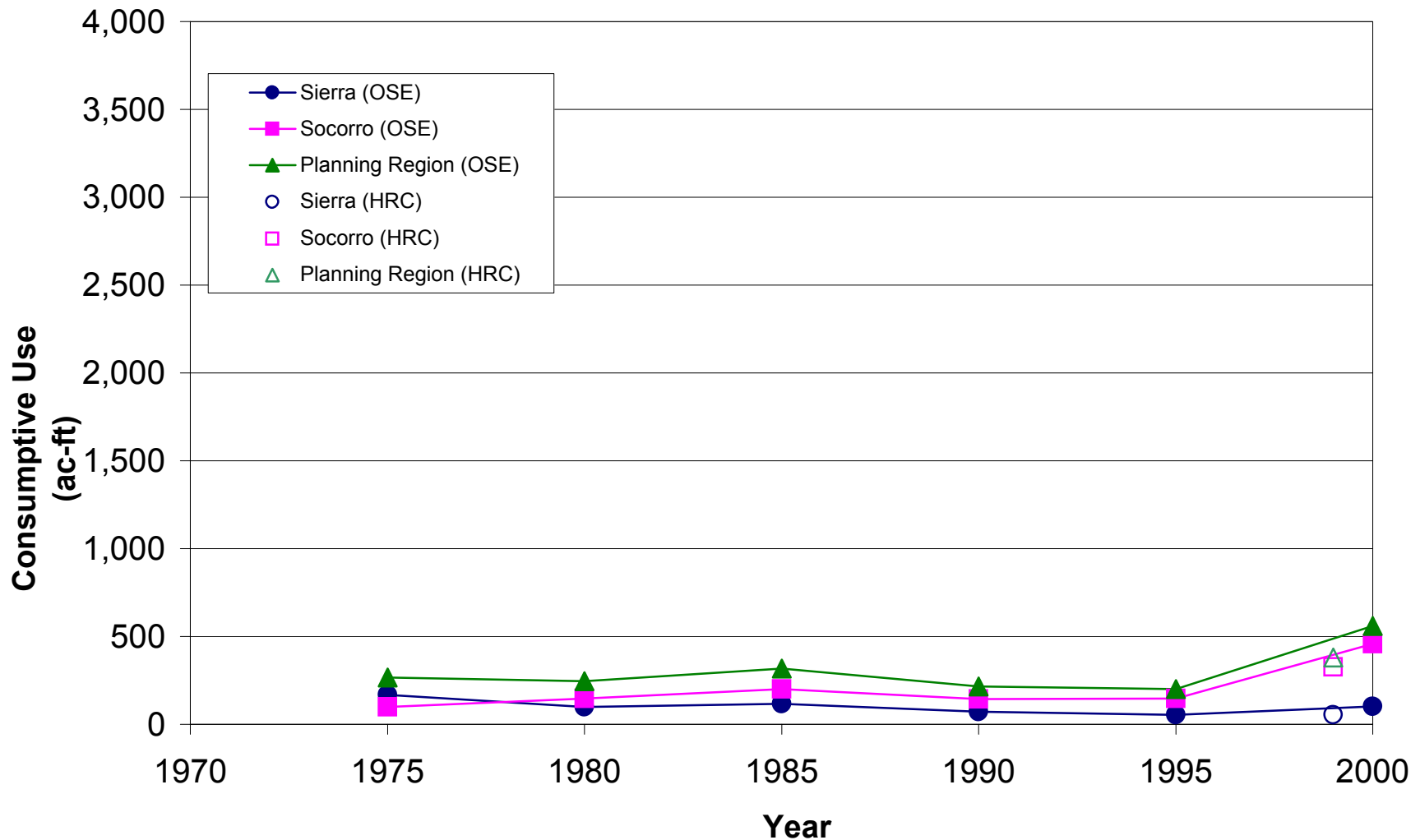


Figure G-3. Irrigated Agriculture consumptive use in Sierra County based on NMDA/USDA data calculated as described in text.

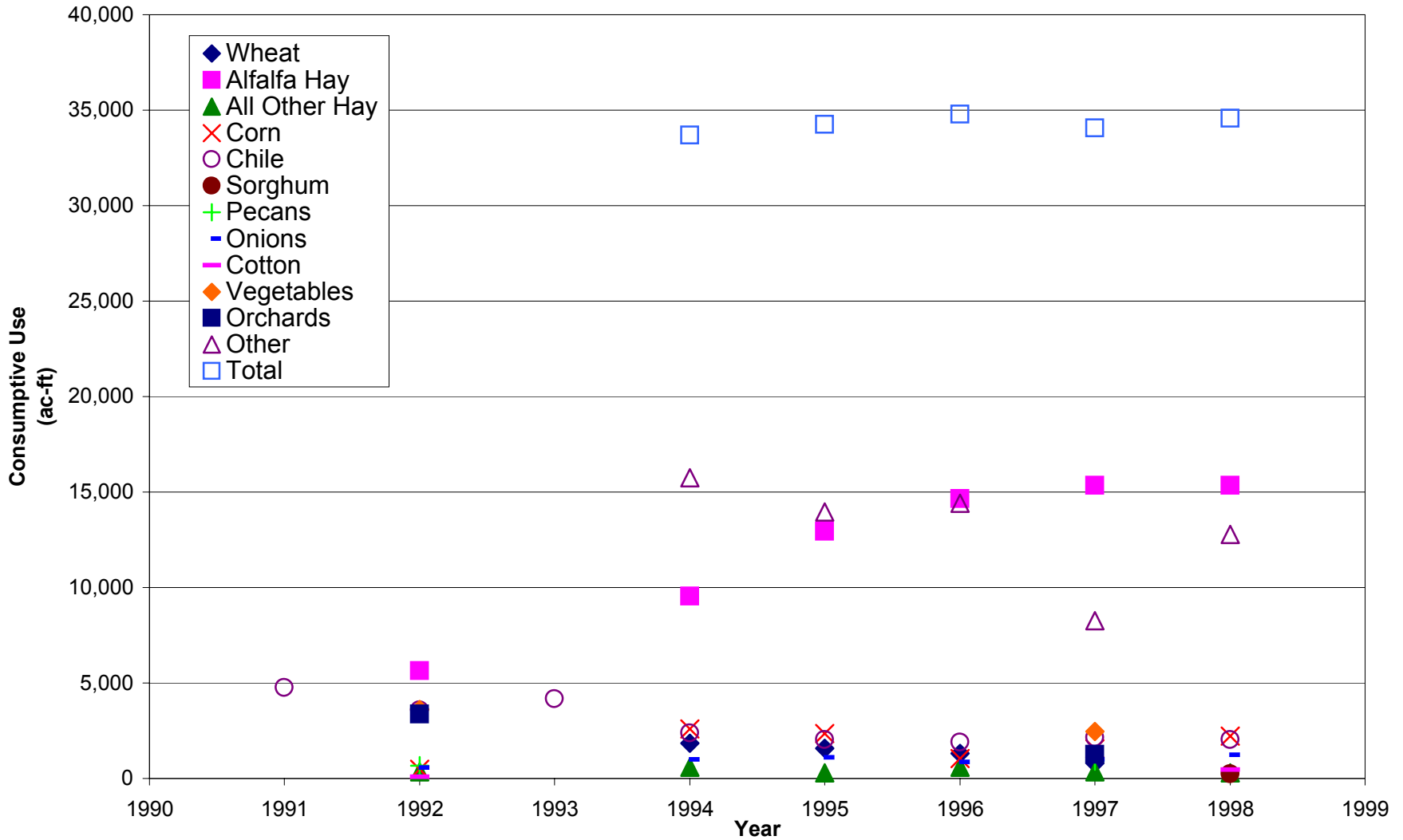


Figure G-4. Irrigated agriculture consumptive use in Socorro County based on NMDA/USDA data calculated as described in text.

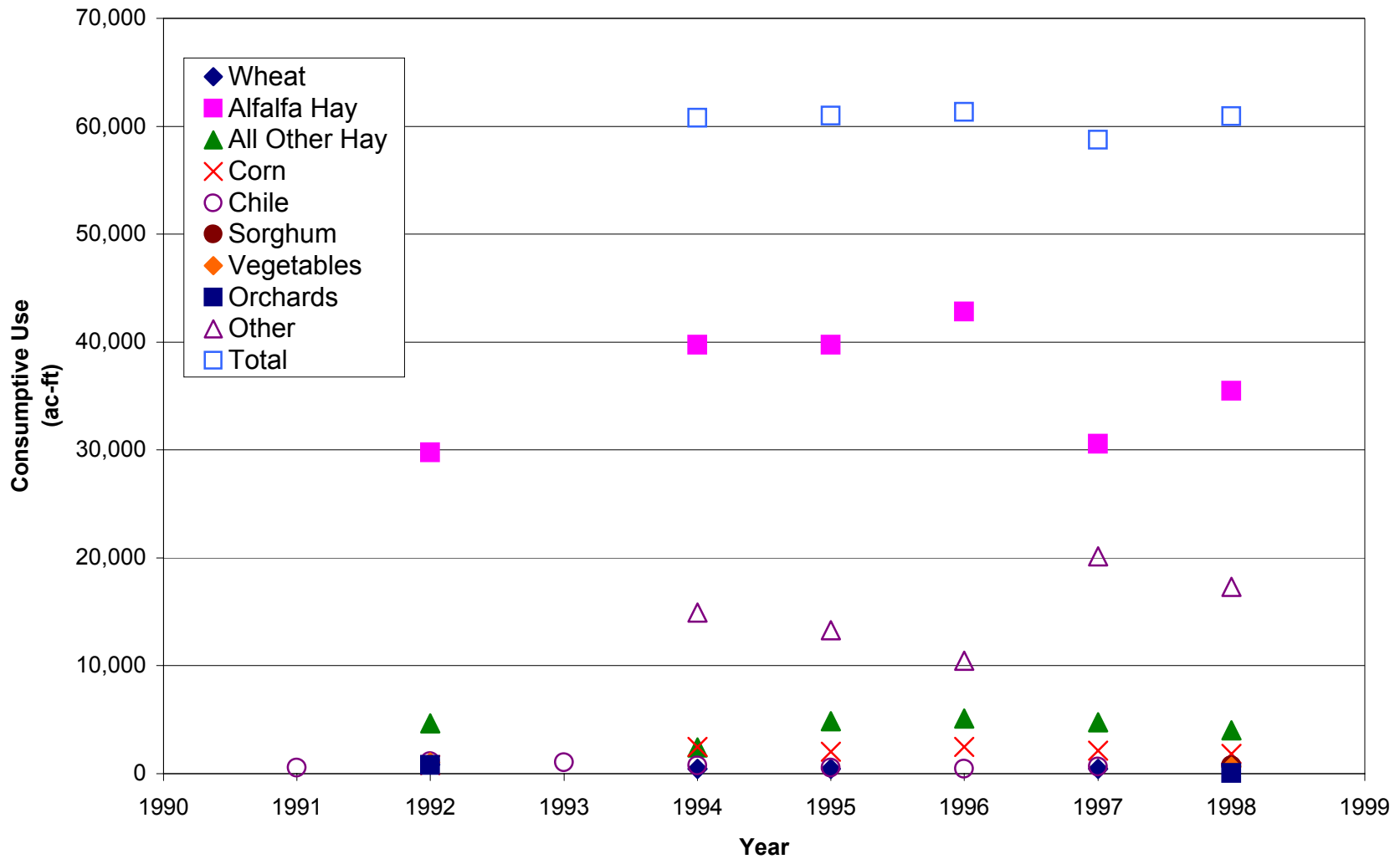


Figure G-5. Irrigated agriculture water consumptive use reported in NMOSE water use reports 1975-2000 and HRC independently estimated values obtained as described in text and Appendix G3. HRC1 illustrates estimates obtained by summing NMDA/USDA crop-specific acreages times crop-specific consumptive water requirements. HRC2 estimates derived from surveyed irrigated acreages times a default crop consumptive water use.

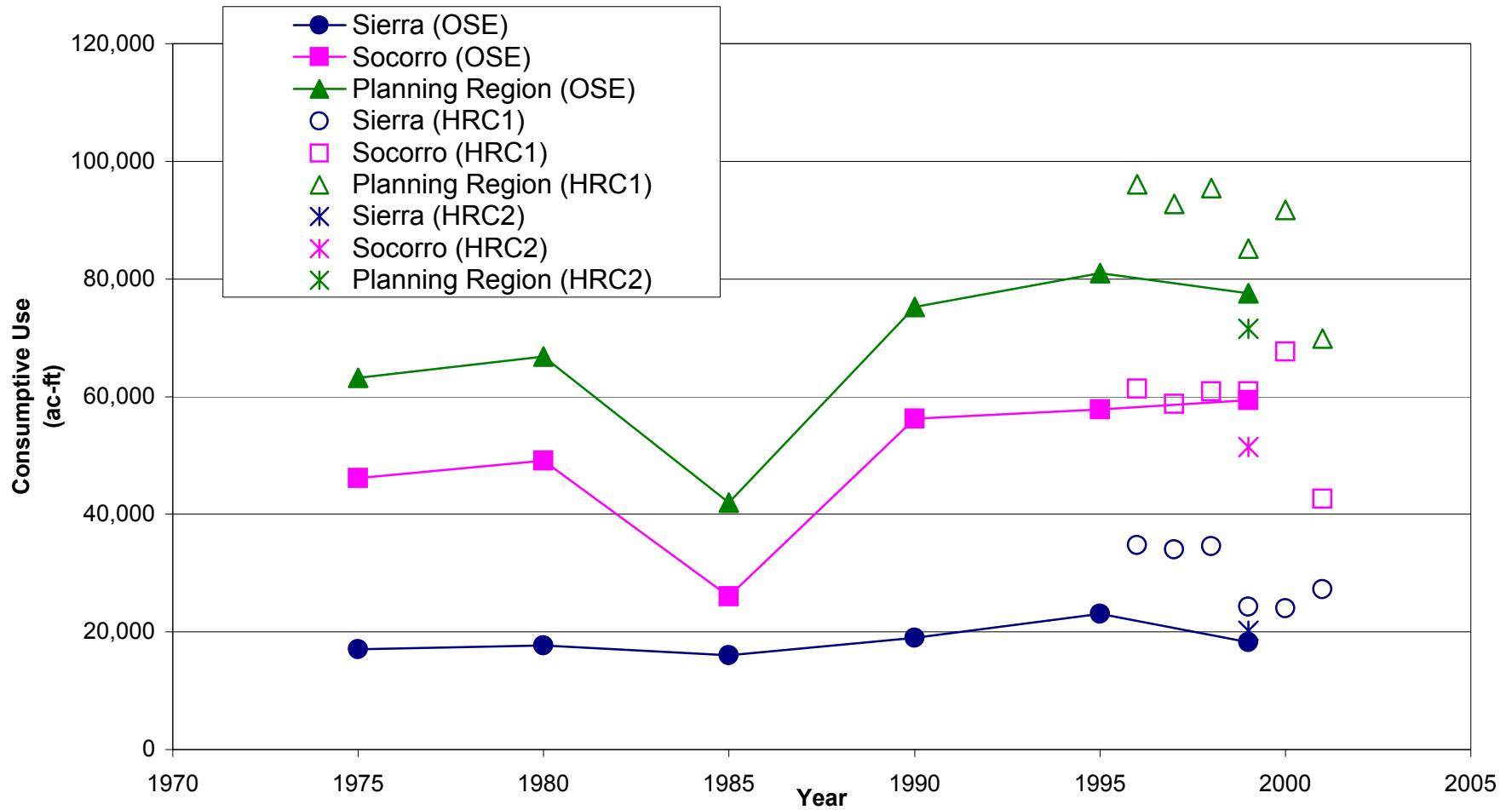


Figure G2-6. Irrigated agriculture water diversions reported by NMOSE for 1975, 1985, 1990, 1995, and 2000.

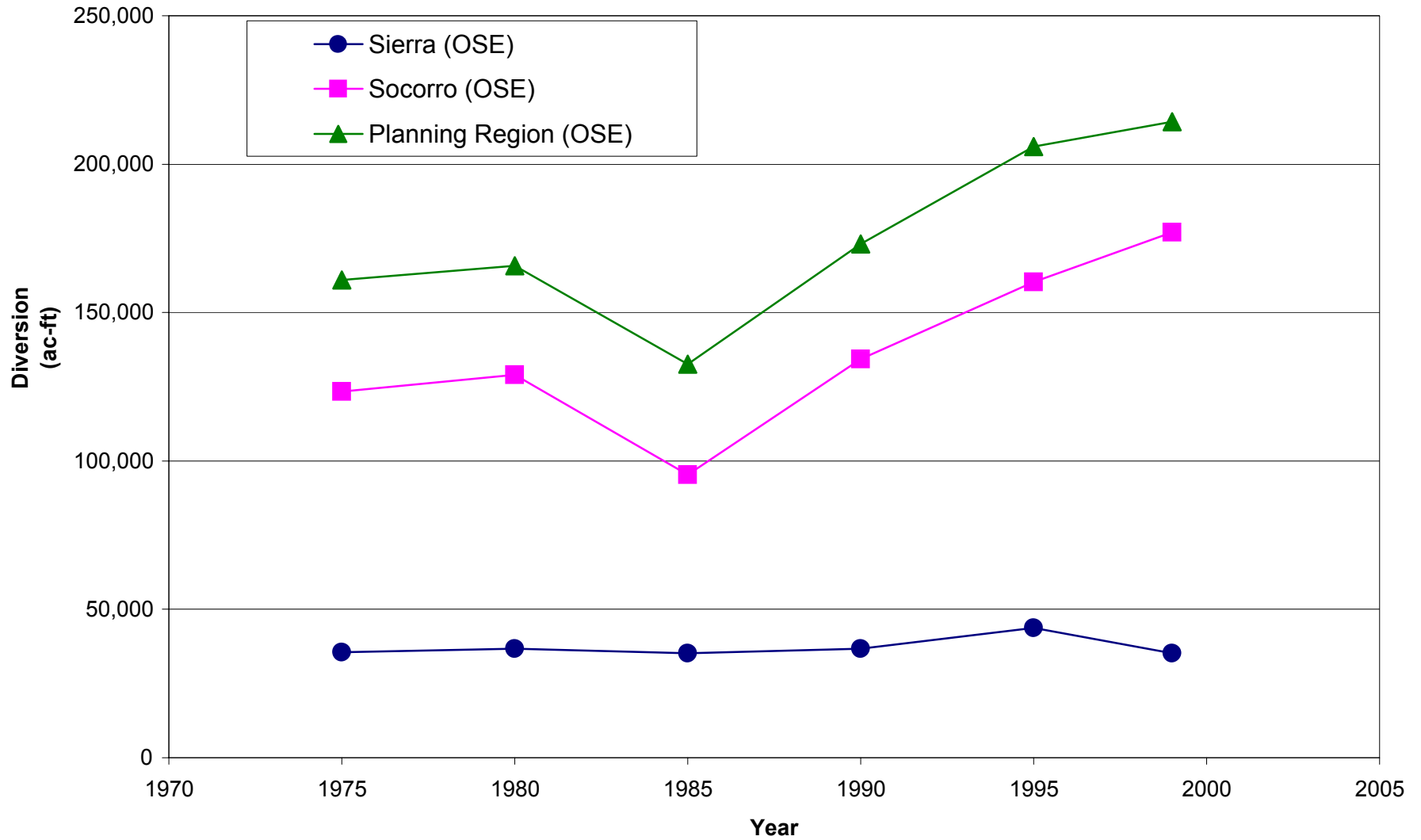


Figure G2-7. Historic water demand by livestock in the Socorro-Sierra planning region reported in NMOSE water use reports for 1975, 1985, 1990, 1995, and 2000 and HRC 1996-2002 values obtained as described in text.

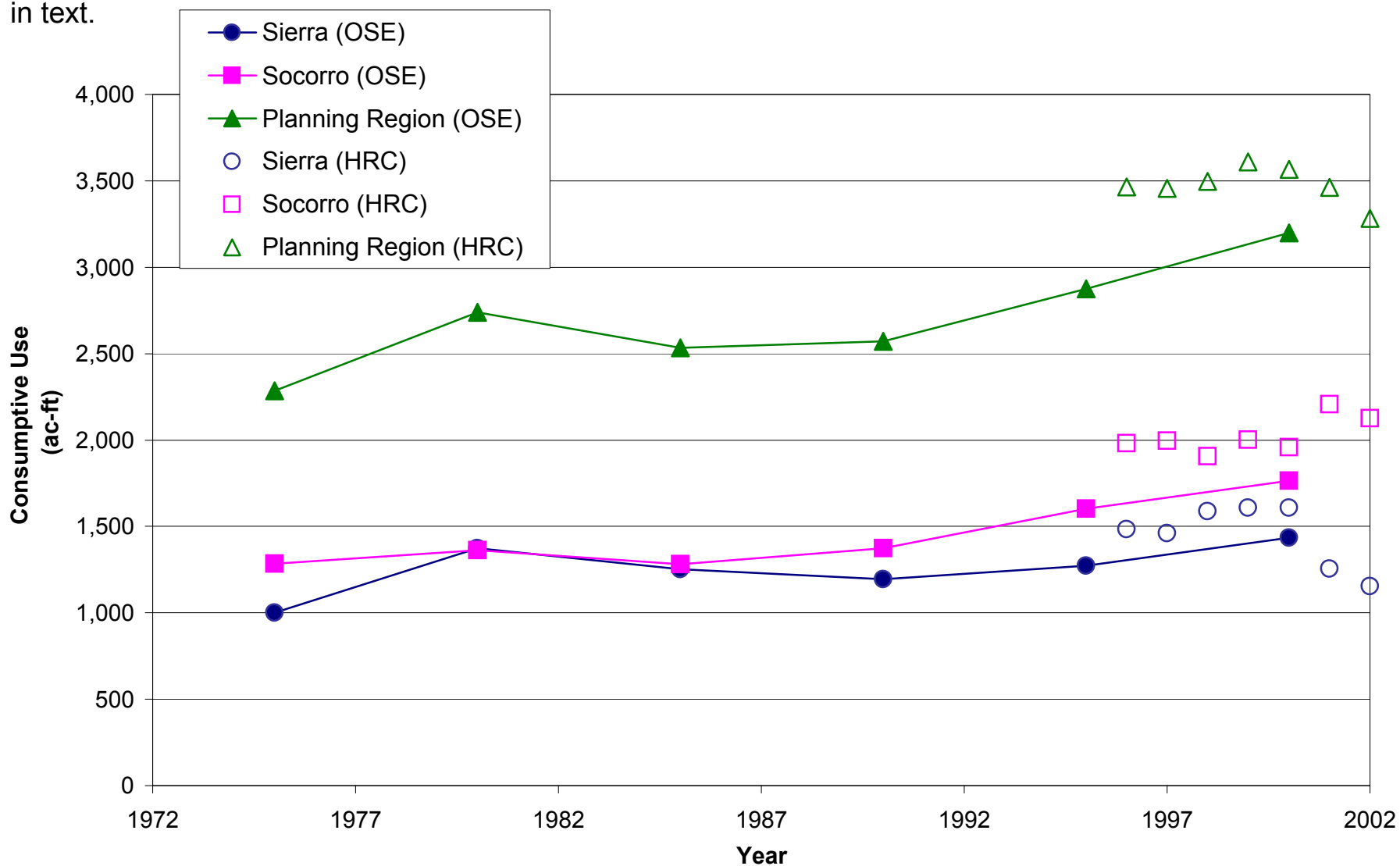


Figure G2-8. Livestock consumptive use in Sierra County based on NMDA/USDA data calculated as described in text.

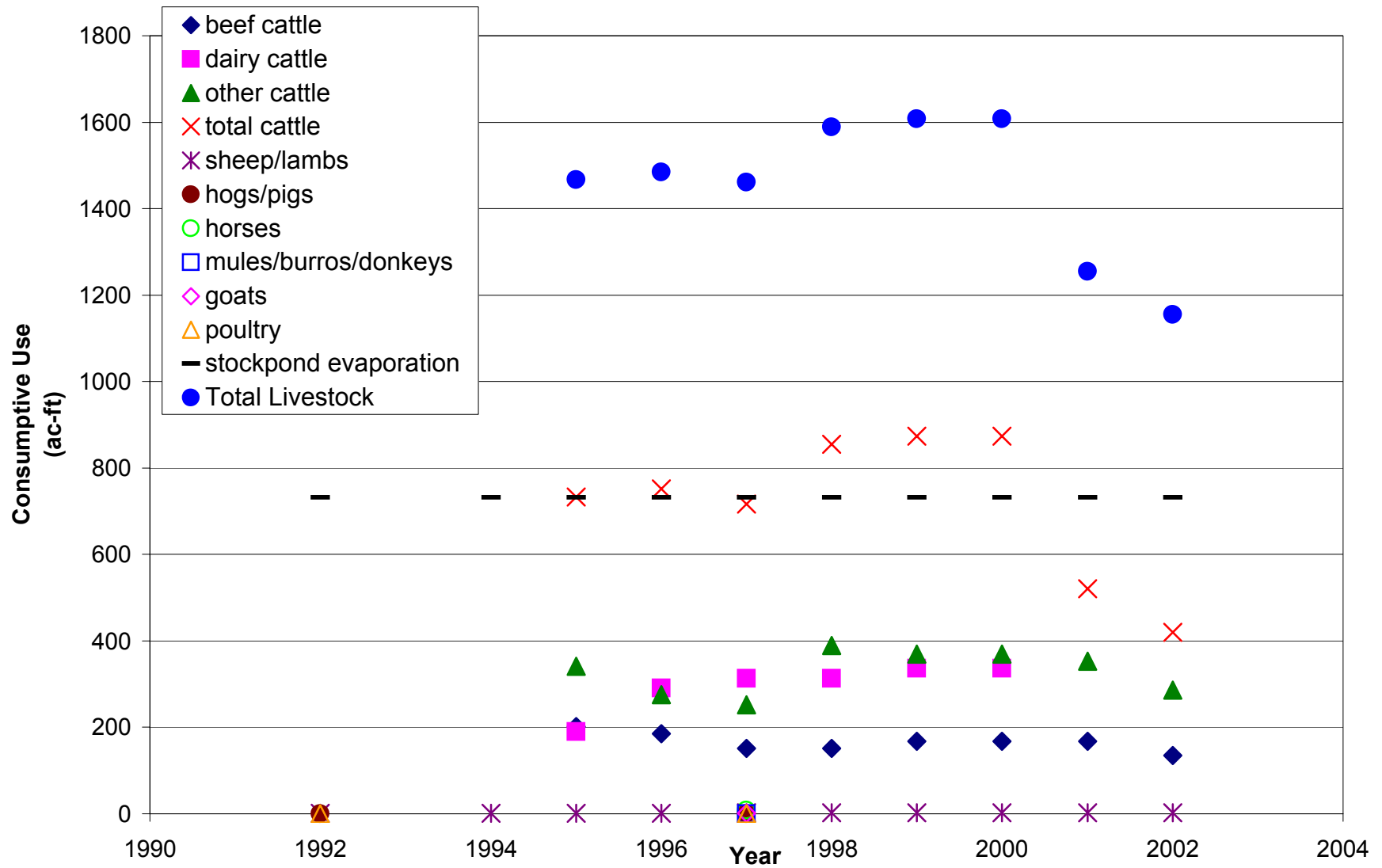


Figure G2-9. Livestock Consumptive Use in Socorro County based on NMDA/USDA data calculated as described in text.

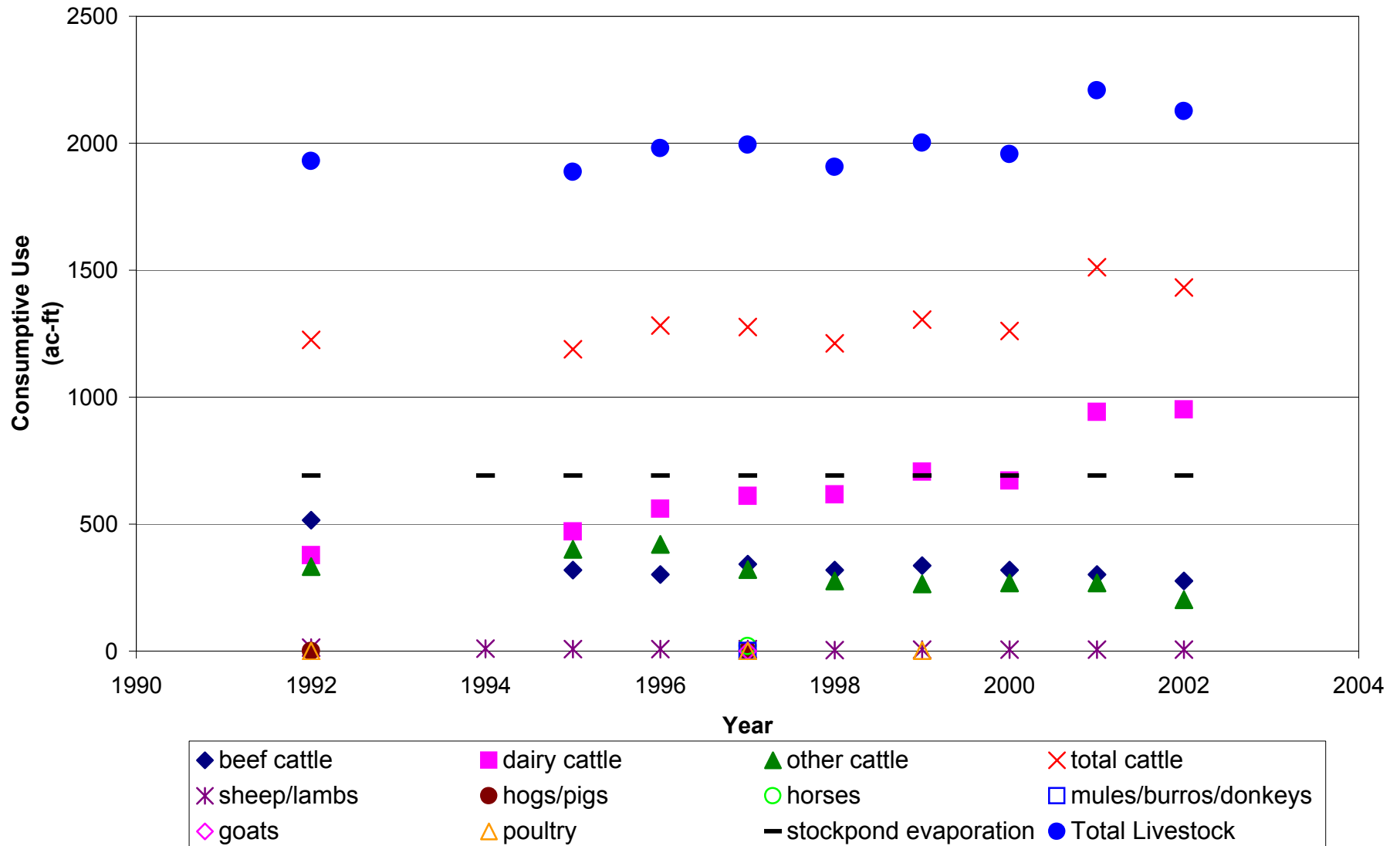


Figure G2-10. Historic water consumptive use by the commercial (CO) category reported in NMOSE water use reports (Sorenson, 1977; Sorenson, 1982; Wilson, 1986; Wilson, 1992; Wilson and Lucero, 1997; Wilson et al, 2003) plus NMT data (Trueline Engineering, 1999).

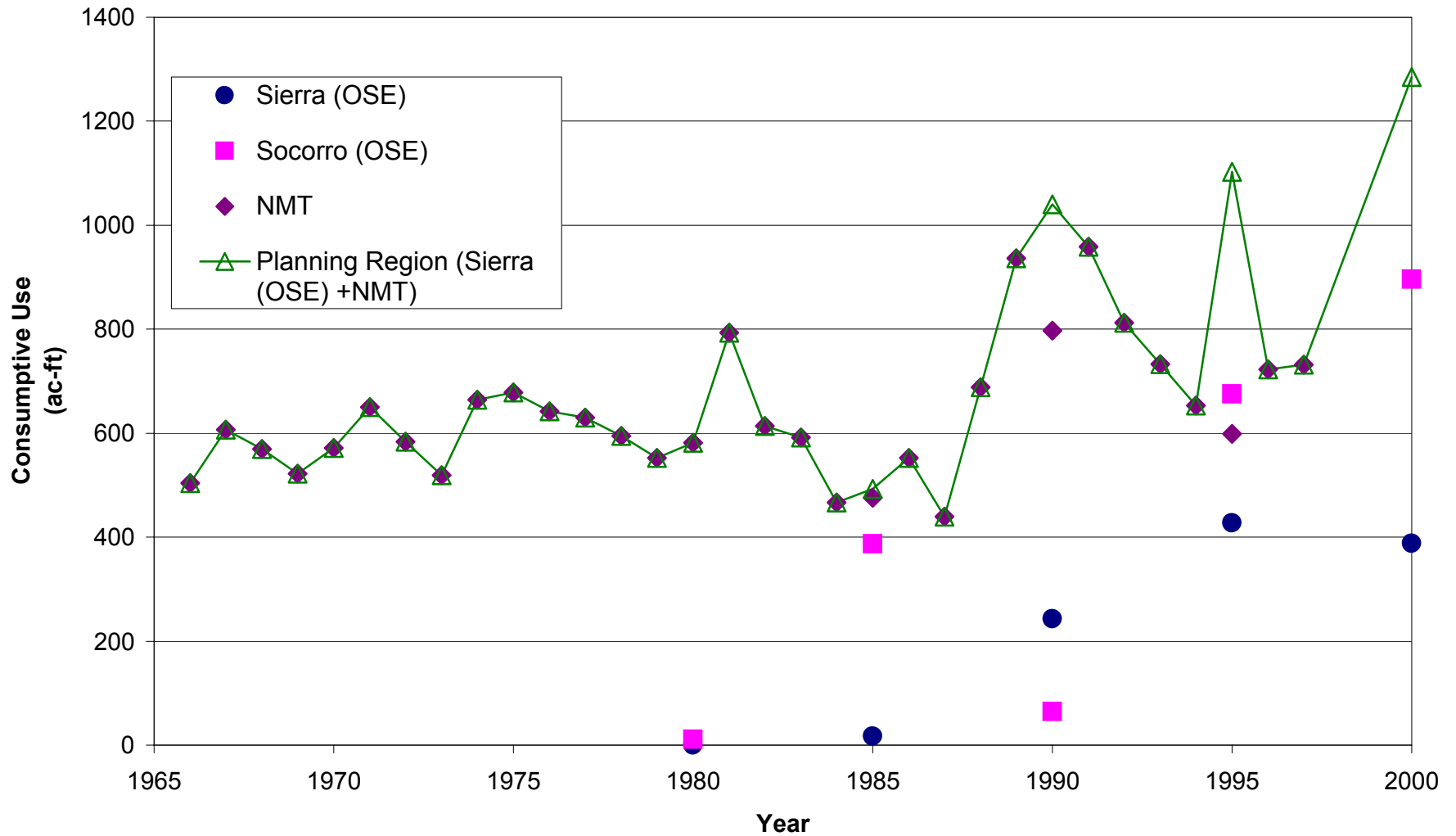


Figure G2-11. Historic water demand by the industrial (IN) category reported in NMOSE water use reports for 1975, 1985, 1990, 1995, and 2000.

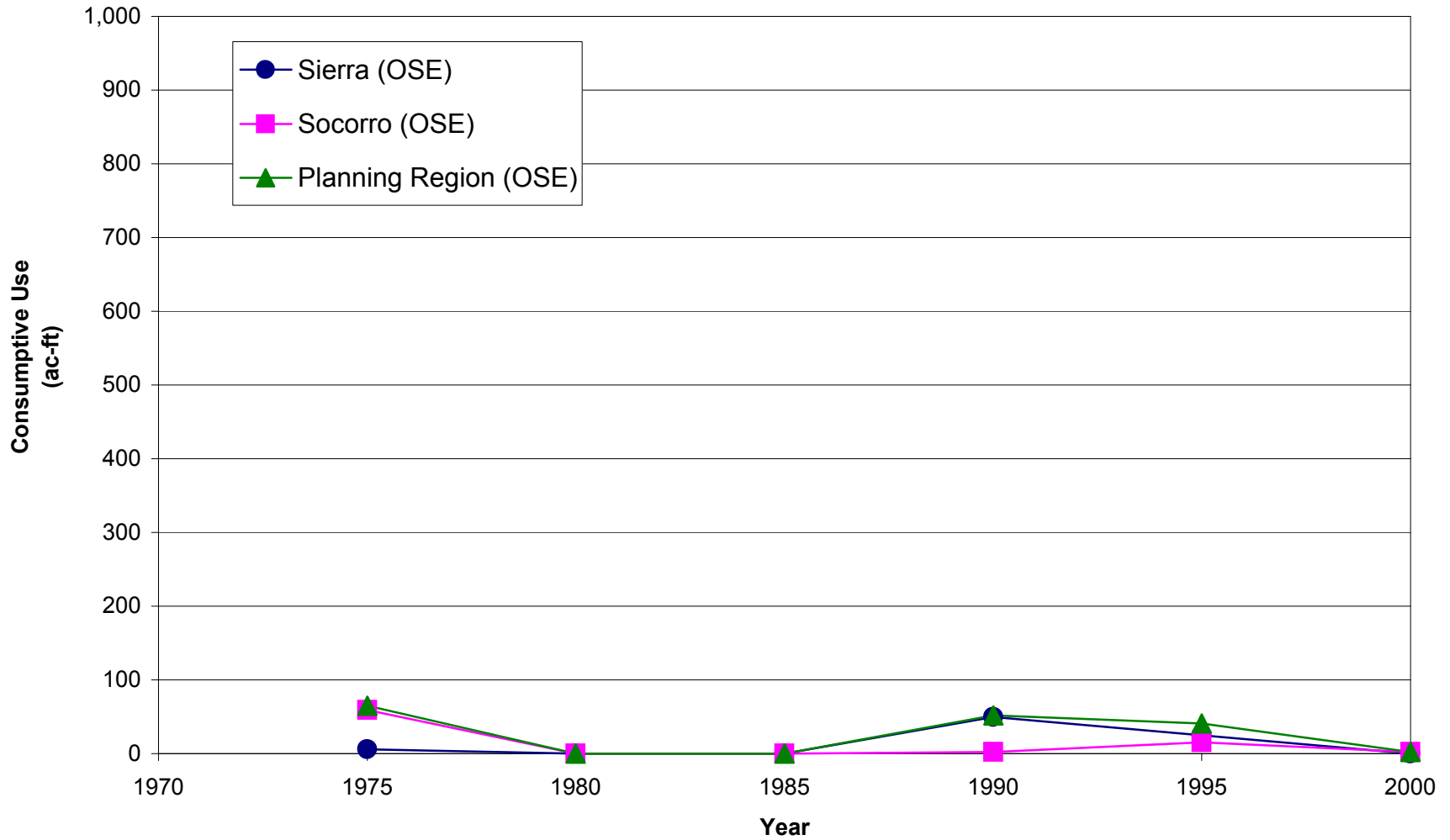


Figure G2-12. Historic water demand by the mining (MI) category reported in NMOSE water use reports for 1975, 1985, 1990, 1995, and 2000.

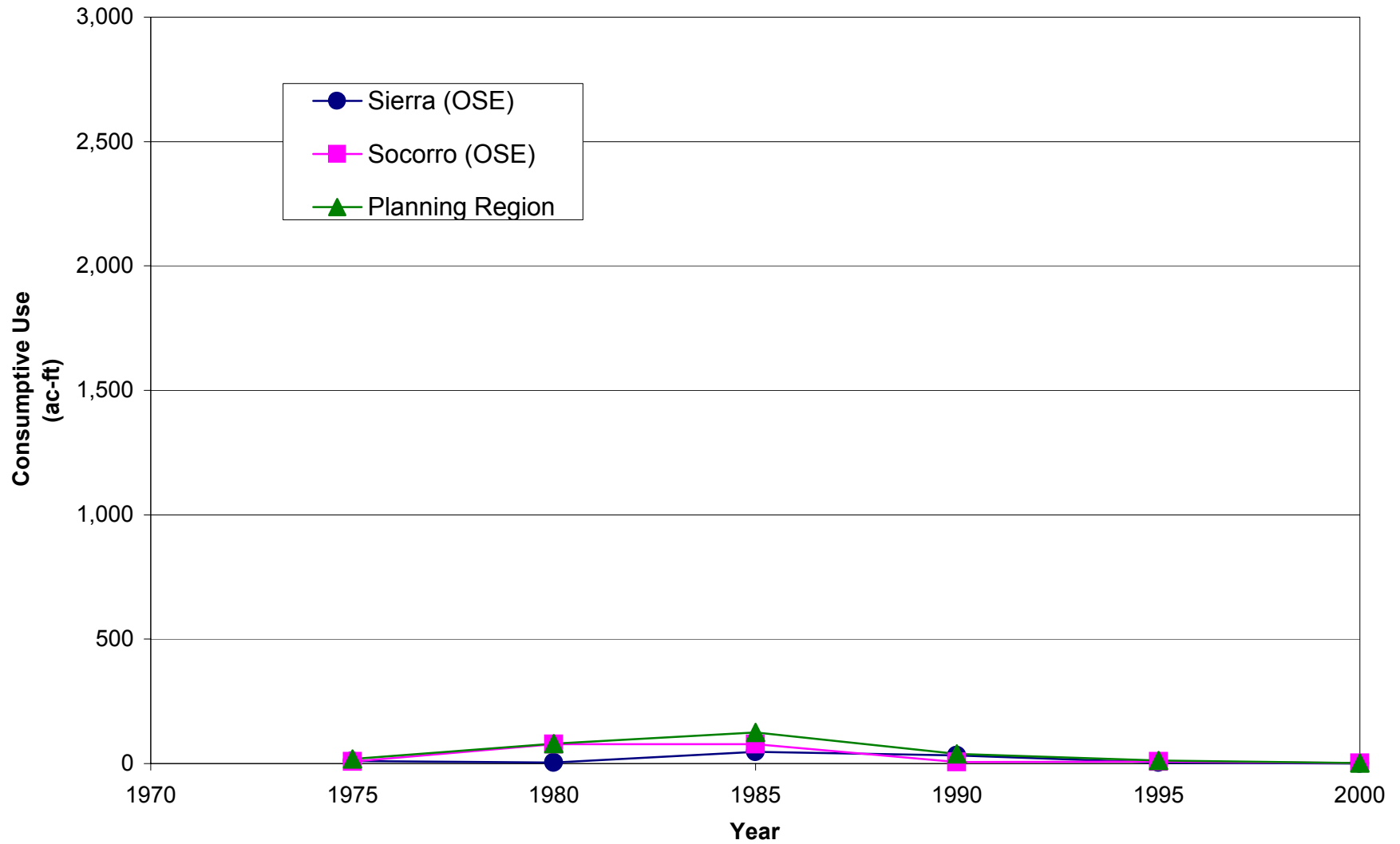


Figure G2-13. Total riparian evapotranspiration (RPET) for Socorro County (from SSPA, 2000).

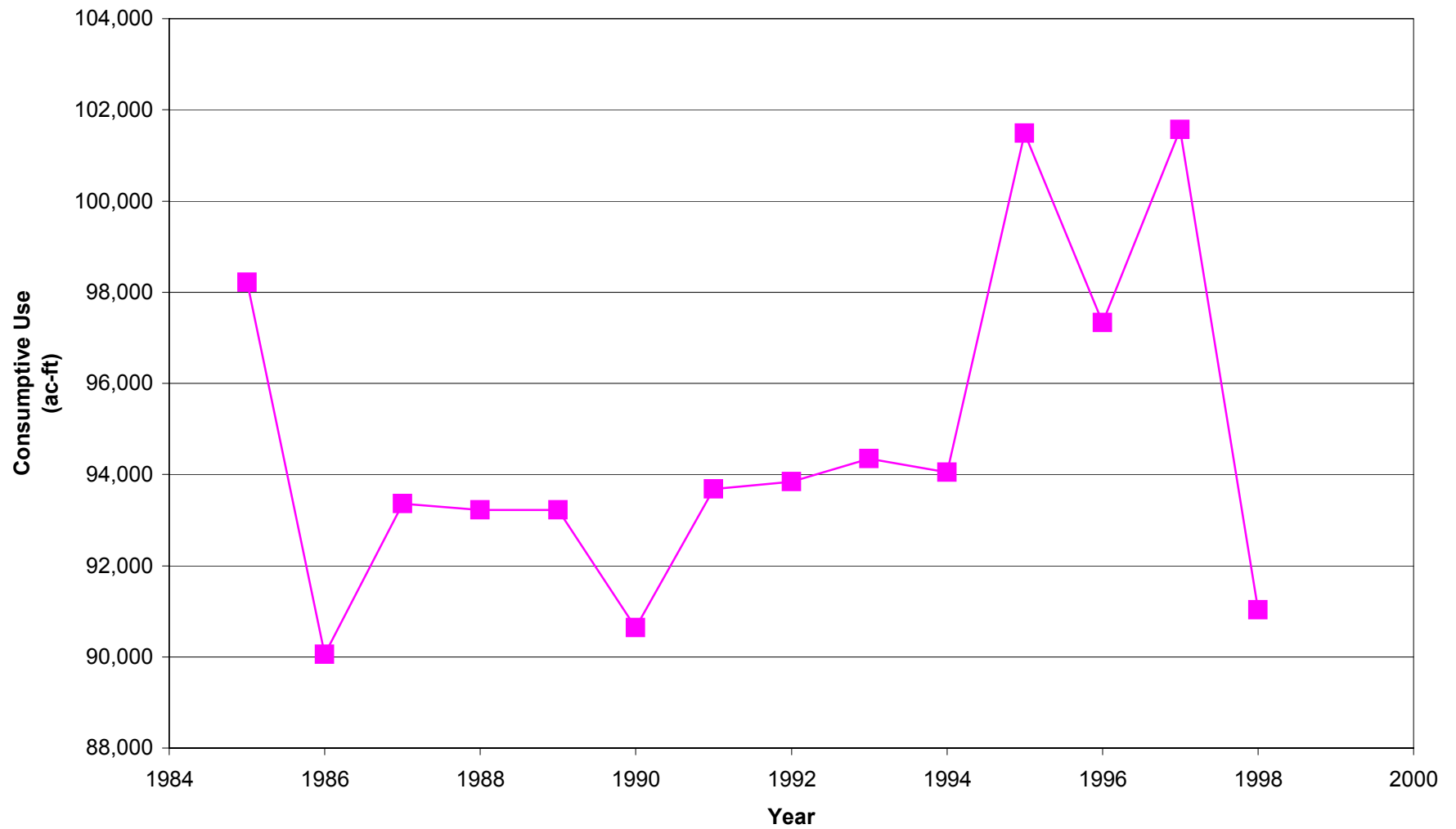


Figure G2-14. Historic open water evaporation in the Socorro-Sierra water planning region.

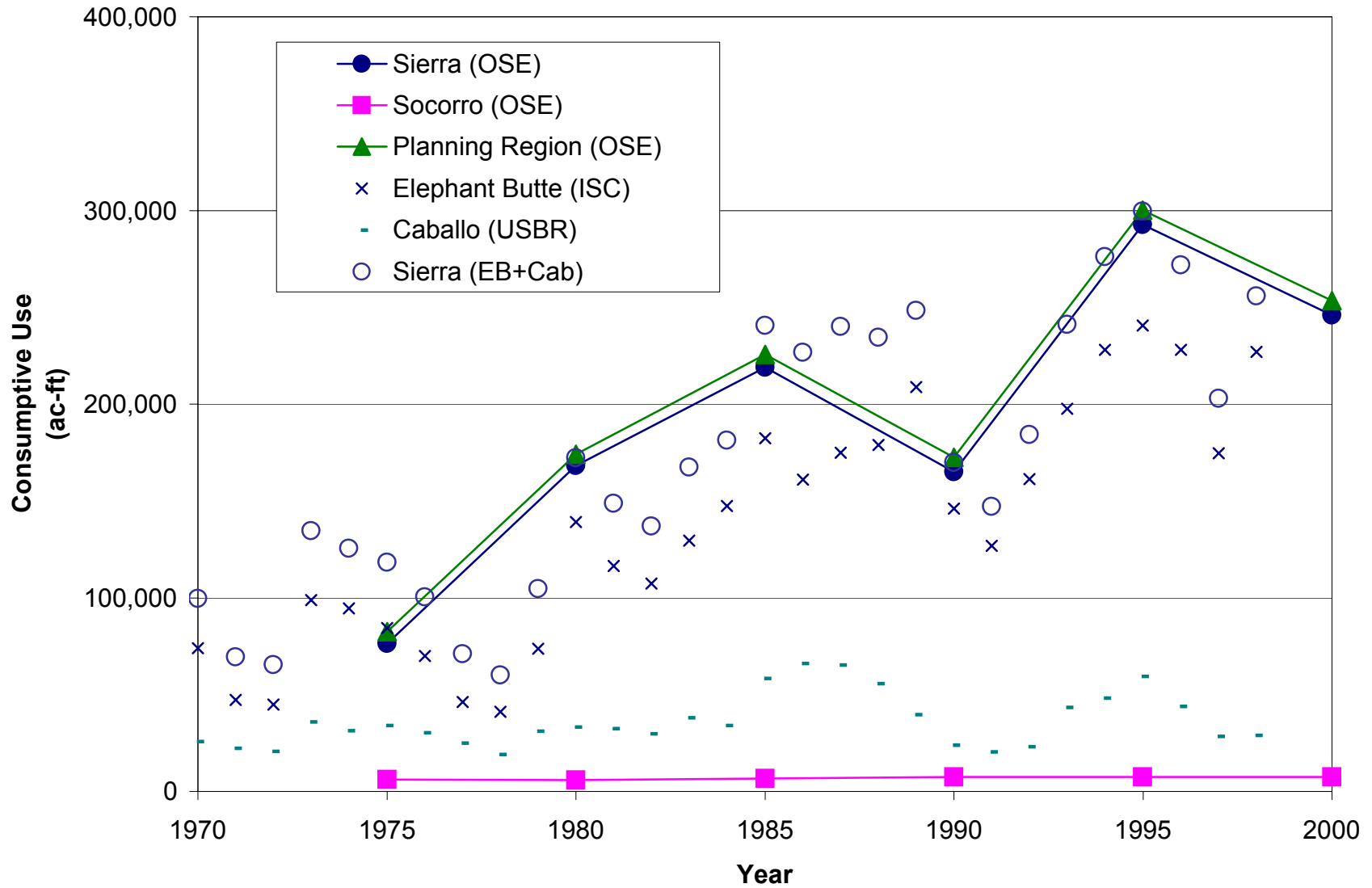


Figure G2-15. Total surface water consumptive use by category for the Socorro-Sierra Planning Region as reported by the OSE, with the exception of RPET, which was obtained from SSPA (2000).

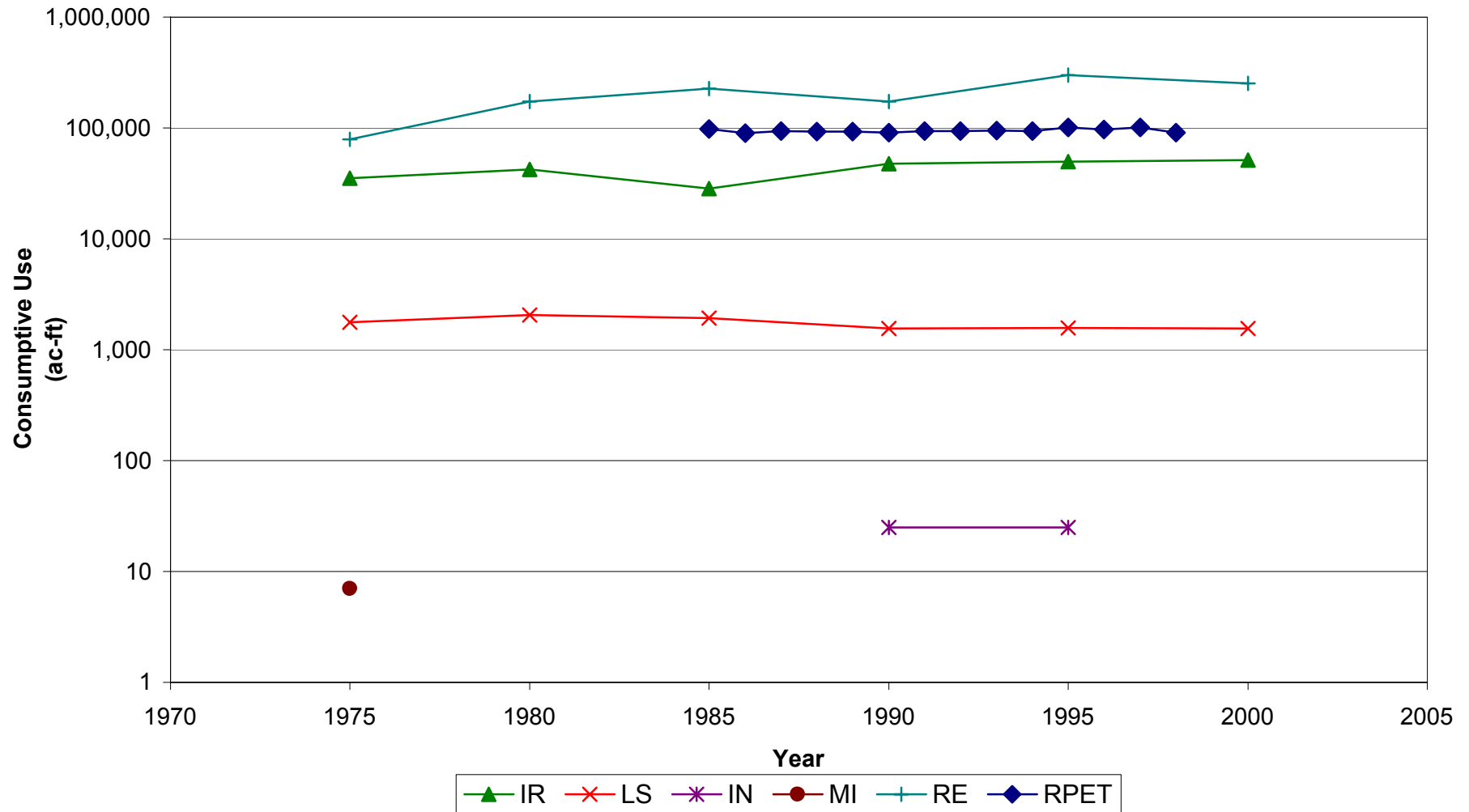


Figure G2-16. Total ground water consumptive use by category for the Socorro-Sierra Planning Region as reported by the OSE.

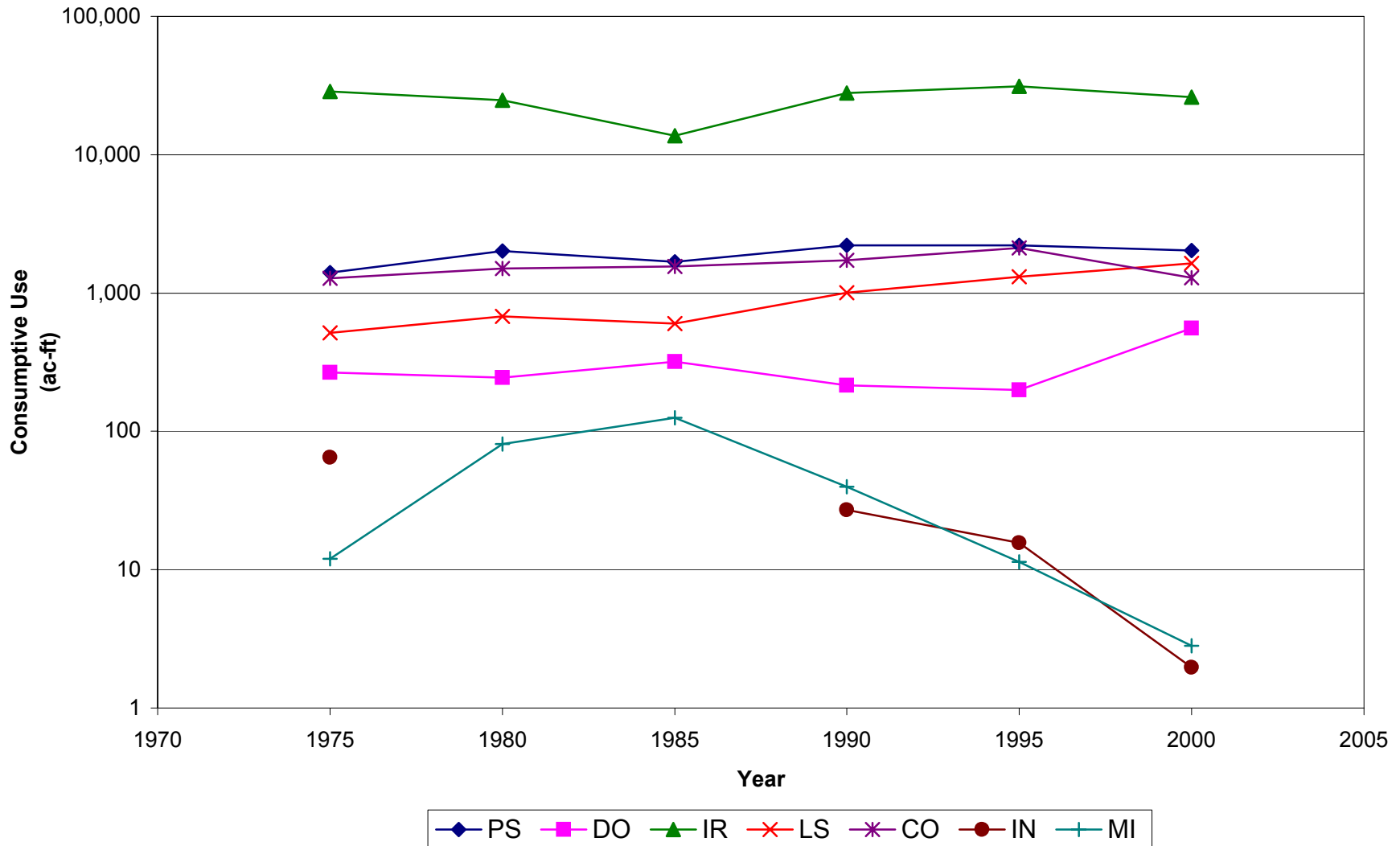
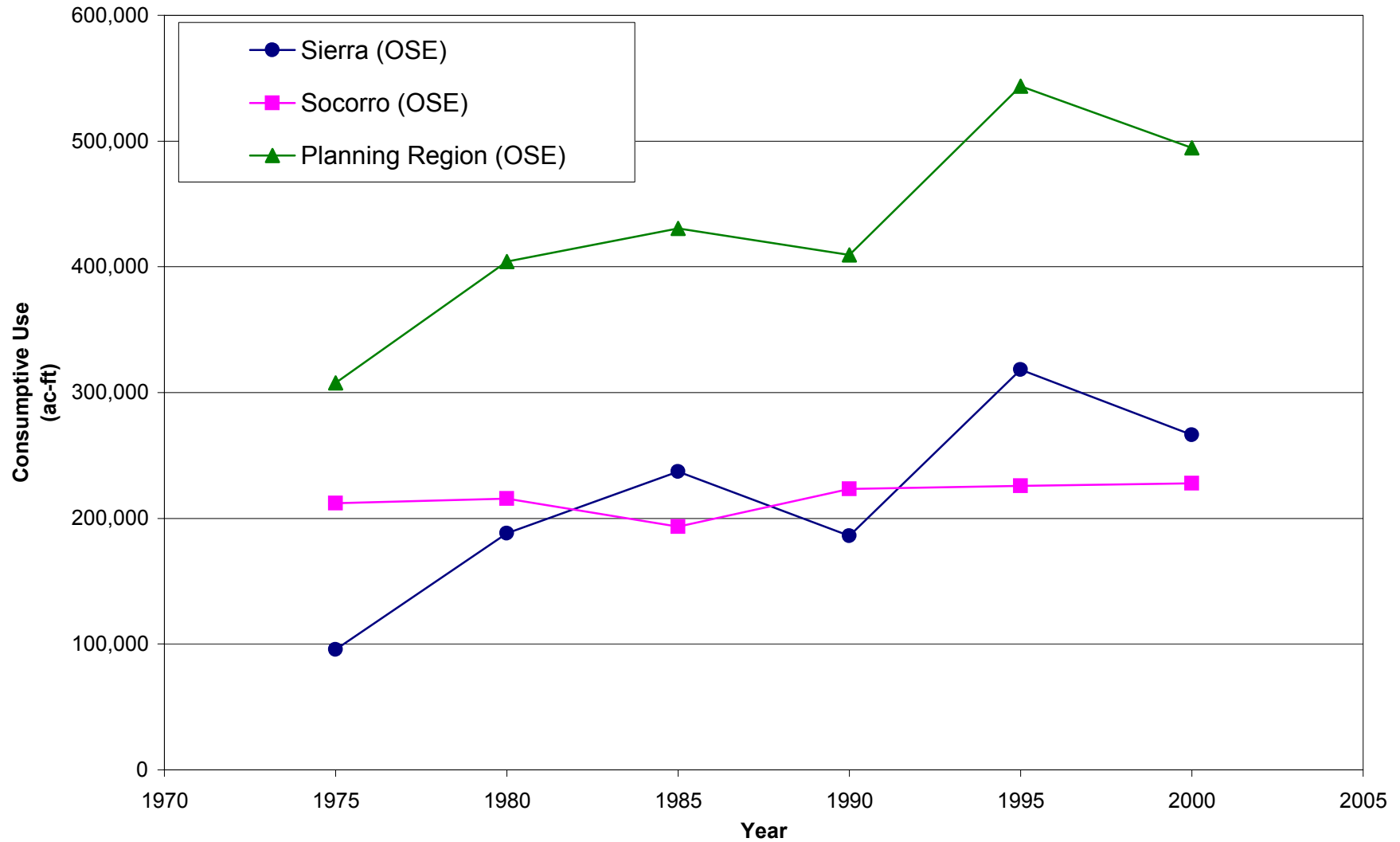


Figure G2-17. Total water consumptive use by county as reported by the OSE. Socorro County value includes riparian evaporation from SSPA, 2003 (Appendix E1)



Appendix G3
Irrigated Agriculture Water Use
Estimation Methods

Crop Consumptive Use (HRC1)

This appendix describes the Blaney-Criddle method (Blaney and Criddle, 1950, 1962) used to compute crop consumptive water use. The Blaney-Criddle method was used to determine consumptive use for crops grown in the planning region. The method uses mean monthly air temperatures (t) in degrees Fahrenheit, monthly percentage of annual daylight hours (p) based on the latitude of the area under study, seasonal consumptive use coefficients (K), and length of growing season to estimate the total consumptive use (U).

$$U=Kf$$

Where, $f = t * p / 100$. Once a value is obtained for U it is necessary to account for effective rainfall (R_e). R_e values can be obtained by following a methodology developed by the US Bureau of Reclamation (USBR). The USBR method expresses effective rainfall as a percentage of the total monthly rainfall and for each one-inch increment in rainfall there is a corresponding decrease in the percentage of effective rainfall. The USBR effective rainfall can be calculated using the equations in Table G3-1:

Table G3-1. USBR effective rainfall

Monthly Rainfall (R) (in)	Effective Rainfall (R_e) (in)
$R \leq 1$	$R_e = 0.95 R$
$1 < R \leq 2$	$R_e = 0.95 + 0.90 (R-1)$
$2 < R \leq 3$	$R_e = 1.85 + 0.82 (R-2)$
$3 < R \leq 4$	$R_e = 2.67 + 0.65 (R-3)$
$4 < R \leq 5$	$R_e = 3.32 + 0.45 (R-4)$
$5 < R \leq 6$	$R_e = 3.77 + 0.25 (R-5)$
$R > 6$	$R_e = 4.02 + 0.05 (R-6)$

Once values for U and R_e have been obtained, R_e should be subtracted from U to obtain the consumptive use value that will be used to determine total water demand. The $U-R_e$ should be converted to feet and multiplied by the acreage of crop to obtain a value for the total crop consumption in acre-feet. The values obtained in this way do not account for any incidental depletions or irrigation efficiency factors.

Cropping acreages were obtained as described in Section 6.1, mean monthly air temperature and mean monthly precipitation were obtained from Kunkel (1984), monthly percentage of daylight hours were obtained from Table B4 in Blaney and Hanson (1965), and crop-specific consumption coefficients and growing seasons were obtained from Table 6 and Table B5 in Blaney and Hanson (1965).

The spreadsheets used for these calculations follow: Table G3-2 Values for calculation of crop specific consumptive use (U), Table G3-3 Crop Acreages, and Table G3-4 Total water crop consumption.

Table G3-2. Values for calculation of crop specific consumptive use.

Socorro						Socorro						
Month	t	p	f	prec	Re	Crop	Growing Season	K FF	K not FF	U	U - R (in)	U - R (ft)
January	37.00	7.10	2.63	0.40	0.38	Wheat	9/15 - 6/25	0.70	0.35	36.10	27.79	2.32
February	42.40	6.91	2.93	0.40	0.38	Alfalfa Hay	4/14 - 10/29	0.85	0.50	45.00	36.69	3.06
March	49.20	8.36	4.11	0.31	0.29	All Other Hay	4/14 - 10/29	0.75	0.50	40.62	32.31	2.69
April	57.40	8.80	5.05	0.38	0.36	Corn	5/15 - 9/25	0.75		32.87	24.56	2.05
May	65.40	9.72	6.36	0.56	0.53	Chile	4/20 - 10/15	0.70		30.68	22.37	1.86
June	74.30	9.70	7.21	0.59	0.56	Sorghum	5/15 - 10/4	0.70		30.68	22.37	1.86
July	78.10	9.88	7.72	1.35	1.27	Vegetables		0.70		30.68	22.37	1.86
August	76.00	9.33	7.09	1.59	1.48	Orchards	4/14 - 10/29	0.65	0.40	34.68	26.38	2.20
September	69.30	8.36	5.79	1.47	1.37							
October	58.40	7.90	4.61	0.92	0.87							
November	45.40	7.02	3.19	0.32	0.30							
December	38.00	6.92	2.63	0.53	0.50							
Total					8.31							
Sierra						Sierra						
Month	t	p	f	prec	Re	Crop	Growing Season	K FF	K not FF	U	U - R	U - R (ft)
January	40.70	7.15	2.91	0.30	0.29	Wheat	9/15 - 6/25	0.70	0.35	39.91	31.67	2.64
February	44.90	6.94	3.12	0.27	0.26	Alfalfa Hay	3/31 - 11/4	0.85	0.50	49.13	40.89	3.41
March	50.70	8.36	4.24	0.26	0.25	All Other Hay	3/31 - 11/4	0.75	0.50	43.87	35.63	2.97
April	59.10	8.78	5.19	0.22	0.21	Corn	5/15 - 9/25	0.75		39.43	31.19	2.60
May	67.50	9.68	6.53	0.42	0.40	Chile	4/15 - 10/15	0.70		36.80	28.57	2.38
June	77.20	9.64	7.44	0.78	0.74	Sorghum	5/15 - 10/4	0.70		36.80	28.57	2.38
July	79.40	9.83	7.81	1.51	1.41	Pecans	3/31 - 11/4	0.90	0.40	50.87	42.63	3.55
August	76.90	9.31	7.16	1.64	1.53	Onions	2/15 - 8/15	0.65	0.40	37.72	29.49	2.46
September	71.20	8.34	5.94	1.57	1.46	Cotton	4/15 - 11/4	0.62	0.40	36.15	27.91	2.33
October	60.90	7.92	4.82	0.97	0.92	Vegetables		0.70		36.80	28.57	2.38
November	48.80	7.06	3.45	0.37	0.35	Orchards	3/31 - 11/4	0.65	0.40	37.72	29.49	2.46
December	40.80	6.99	2.85	0.45	0.43							
Total					8.24							

Table G3-3. Crop acreages from NMDA Agricultural Statistics (Normal Type) and USDA Census of Agriculture (Bold Type).

Socorro											
Crop	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Wheat		354		200	200		200		209	200	
Alfalfa Hay		9733		13000	13000	14000	10000	11600	12931	13070	12000
All Other Hay		1741		900	1800	1900	1767	1500		930	2000
Corn		393		1200	1000	1200	1050	900	1446	1446	
Chile	300	600	550	400	300	250	350	400	200	400	300
Sorghum								400			
Vegetables		554					356		120	100	
Orchards		362					32			30	
Other				5540	4940	3890	7485	6440	6435	7725	
Sum Total Acres	300	13737	550	15700	16300	17350	13755	14800	14906	16176	14300
Total GW Acres					1310	1310	1310	1310			
Total SW Acres					3330	3330	3330	3330			
Total Combined Acres					16600	16600	16600	16600			
Total Irr Acres				21240	21240	21240	21240	21240			
Sierra											
Crop	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Wheat				700	600	500	300		300		
Alfalfa Hay		1659		2800	3800	4300	4500	4500	2900	5000	6000
All Other Hay		116		200	100	200	120	100		100	100
Corn		190		1000	900	400	600	850	730	1000	1000
Chile	2000	1500	1750	1000	850	800	900	850	1500	700	700
Sorghum								100			
Pecans		185					259		380		
Onions		230		400	450	350	400	500	600	900	900
Cotton		37						200	110	100	
Vegetables		1520					1033		50		
Orchards		1375					506		30		
Other				5300	4700	4850	2782	4300	1623		
Sum Total Acres	2000	6812	1750	6100	6700	6550	8618	7100	6600	7800	8700
Total GW Acres					2940	2940	2940	2940			
Total SW Acres					3050	3050	3050	3050			
Total Combined Acres					5410	5410	5410	5410			
Total Irr Acres				11400	11400	11400	11400	11400			

Table G3-4. Total water crop consumption.

Socorro											
Crop	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Wheat		819.87		463.21	463.21		463.21		484.05	463.21	0.00
Alfalfa Hay		29,758.45		39,747.24	39,747.24	42,804.72	30,574.80	35,466.77	39,536.27	39,961.26	36,689.76
All Other Hay		4,687.18		2,423.01	4,846.02	5,115.25	4,757.18	4,038.35	0.00	2,503.78	5,384.47
Corn		804.45		2,456.35	2,046.96	2,456.35	2,149.31	1,842.26	2,959.90	2,959.90	0.00
Chile	559.30	1,118.60	1,025.39	745.73	559.30	466.08	652.52	745.73	372.87	745.73	559.30
Sorghum								745.73	0.00	0.00	0.00
Vegetables		1,032.84						663.70	223.7204	186.4337	0.00
Orchards		795.65						70.33	0	65.93807	0.00
Other				14,914.98	13,299.64	10,472.80	20,151.38	17,338.00	17,324.53	20,797.52	0.00
Total				60,750.53	60,962.37	61,315.20	58,748.39	60,910.89	60,901.35	67,683.77	42,633.53
Total GW Acres					1310	1310	1310	1310			
Total SW Acres					3330	3330	3330	3330			
Total Combined Acres					16600	16600	16600	16600			
Total Irr Acres				21240	21240	21240	21240	21240			
Sierra											
Crop	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Wheat				1,847.62	1,583.68	1,319.73	791.84		791.84	0.00	0.00
Alfalfa Hay		5,653.24		9,541.34	12,948.96	14,652.77	15,334.29	15,334.29	9,882.10	17,038.10	20,445.73
All Other Hay		344.46		593.90	296.95	593.90	356.34	296.95	0.00	296.95	296.95
Corn		493.92		2,599.58	2,339.62	1,039.83	1,559.75	2,209.64	1,897.69	2,599.58	2,599.58
Chile	4,761.04	3,570.78	4,165.91	2,380.52	2,023.44	1,904.42	2,142.47	2,023.44	3,570.78	1,666.36	1,666.36
Sorghum								238.05	0.00	0.00	0.00
Pecans		657.25					920.15		1,350.03	0.00	0.00
Onions		565.20		982.96	1,105.83	860.09	982.96	1,228.70	1,474.44	2,211.65	2,211.65
Cotton		86.06						465.19	255.86	232.60	0.00
Vegetables		3,618.39					2,459.08		119.03	0.00	0
Orchards		3,378.92					1,243.44		73.72	0.00	0
Other				15,738.34	13,956.65	14,402.07	8,261.15	12,768.85	4,819.50	0.00	0.00
Total				33,684.27	34,255.12	34,772.81	34,051.46	34,565.12	24,234.97	24,045.25	27,220.27
Total GW Acres					2940	2940	2940	2940			
Total SW Acres					3050	3050	3050	3050			
Total Combined Acres					5410	5410	5410	5410			
Total Irr Acres				11400	11400	11400	11400	11400			

Irrigation District Acreage and Water Use Estimates (HRC2)

To provide an additional independent check on OSE published estimates for agricultural water use, we directly contacted and surveyed all irrigation districts, acequia associations, and ditch associations in the planning region. From each of these entities, we were able to acquire sufficient information to permit an independent estimate of irrigated acreage. These estimated acreages were then utilized to compute IRR diversion and consumptive use demands using default per-acre values consistent with OSE standards. Table G3-5 lists all of the irrigation systems in the planning region, their estimated irrigated acreages, and their estimated diversion and consumptive use (CU) demands.

The La Joya Acequia Association in Socorro County, and the Animas Ditch Association, the Cuchillo Valley Water Users Association, and the Elephant Butte Irrigation District (EBID) in Sierra County provided direct estimates of irrigated acreage in their service areas. For the other entities listed in Table G3-5, we needed to employ a variety of approaches to estimate irrigated acreages as described below.

All of the ditch associations in Sierra County allocate water to members based on permission to divert the entire ditch flow for a specified number of hours. Summing the permitted hours of all ditch members provides a total “rotation time” for the ditch system. Table G3-5 also lists the rotation time for each ditch association, as well as the average estimated flow rate where it is available. By multiplying a typical ditch flow rate by the rotation time and assuming 2.25 inches of water is applied in each irrigation application¹, we can estimate the quantity of irrigated acreage. This acreage estimation approach was suitable only for those ditches where flow rate information was available: the Monticello Community Ditch and the Palomas Creek Ditch (the ditch commissioners interviewed indicated that the flow rate shown in Table G3-5 represented a “typical” rate in an “average” year, but that rates actually vary significantly). For the San Miguel Ditch, only the rotation time was available. To estimate acreage for the San Miguel Ditch Association, we simply multiplied the rotation time by the average of the acreage: rotation-time ratios for the Cuchillo, Monticello, and Palomas Creek ditches.

For the Middle Rio Grande Conservancy District (MRGCD), we employed two approaches to estimate the irrigated acreage, both of which utilized information provided to us by MRGCD. One method used MRGCD assessment billing records, and the other employed MRGCD diversion and return flow records. The MRGCD generates the revenues required for district administration and maintenance by charging an assessment to water users based on the amount of acreage irrigated. MRGCD provided us with the acreage in Socorro County used for the assessment billing. It is important to note that the acreage subject to assessment does not include land that has had its water rights severed. Nonetheless, much of the land in Socorro County that has had its water rights severed remains undeveloped and irrigable for crop production, and in fact is actually being irrigated using leased water rights. We therefore wished to develop an estimate of irrigable acreage that accounted for such lands. The irrigable acreage was computed

¹ The estimate of 2.25 inches applied per irrigation is based on information provided by Mr. Gene Adkins, NRCS soil and water specialist with the Sierra County USDA service office. Mr. Adkins indicated that in general, the Sierra county ditch associations operate on a “deficit irrigation” basis by applying sub-optimal irrigation quantities due to the constraints associated with the “hourly allocation” of their right to use ditch waters.

using MRGCD average diversion and delivery records (Grogan, MRGCD, 2000, pers. comm.) and assuming a farm delivery allotment of 3.4 ac-ft/acre. From this information, we were able to estimate the amount of MRGCD-irrigable acreage in Socorro County as presented in Table G3-5.

Given that these irrigated (and irrigable) acreages are not disaggregated by crop types, we were unable to develop an irrigation water demand using an approach that employs crop-specific CU requirements. Rather, we simply employed a representative consumptive use requirement for all irrigated lands in each of the districts. In most cases we employed a crop CU demand of 2.1 ac-ft/acre and a diversion demand of roughly 4.9 ac-ft/acre, consistent with the CU and diversion demand model presented by the OSE (Wilson and Lucero, 1997; Fig. 4.1). For EBID, on the other hand, we were told by Mr. Mike Riley (EBID's representative in the Lower Rio Grande Regional Water Planning effort) that EBID historically uses on average 3.0 ac-ft/acre for crop CU; this value was thus applied for the EBID irrigated acreage in Sierra county.

It is interesting to note that these CU and diversion demand values reflect sufficient water supplies to meet all crop CU, deep percolation, and incidental loss demands. As mentioned previously, the ditch associations in Sierra County generally practice deficit irrigation, being unable to deliver sufficient water to meet all CU and other depletion needs. To estimate the amount of water actually delivered to the ditch association fields (in an typical year), we simply multiplied the assumed 2.25 inches of water per irrigation by the acreage and the number of irrigation rotations in an 8-month (March through October) growing season. This estimate of average annual ditch association water delivery is also presented in Table G3-5, which shows that in most cases the water deliveries barely (and in some cases don't) meet the crop CU requirements.

Table G3-5. Independent irrigated agriculture calculations based on phone interviews with irrigation districts and acequia/ditch associations (HRC2).

<i>Irr. Distr. Name</i>	<i>County</i>	<i>Irrigable Acreage</i>	<i>Irrigated Acreage</i>	<i>Flow Rate (cfs)</i>	<i>Total Hours in Rotation</i>	<i>Diversion Demand (ac-ft/yr)</i>	<i>CU Demand (ac-ft/yr)</i>	<i>Practical Avg Delivery (ac-ft/yr)</i>
<i>Sierra County</i>								
Animas Ditch Assoc.	Sierra	150	150	NA	292	748.2	314.4	563
Cuchillo Valley Water Users Assoc.	¹ Sierra	472	472	NA	524	2,359.1	991.2	989
Elephant Butte Irrigation District	² Sierra	2,972	2,972	³ NA	NA	21,220.1	8,916.0	21,220
Monticello Comm. Ditch Assoc.	Sierra	595	595	3.00	450	2,974.0	1,249.6	1,452
Palomas Creek Ditch Assoc.	Sierra	737	737	2.79	600	3,681.4	1,546.8	1,348
San Miguel Ditch Assoc.	Sierra	465	465	NA	404	2,322.6	975.9	1,263
Misc. Surface diversions	⁴ Sierra	200	200	NA	NA	999.6	420.0	1,000
Misc. lands irrigated by GW only	⁵ Sierra	2,740	2,740	NA	NA	9,590.0	5,754.0	9,590
	<i>Sierra Co. Totals</i>	<u>8,330</u>	<u>8,330</u>			<u>43,895</u>	<u>20,168</u>	
<i>Socorro County</i>								
La Joya Acequia Assoc.	Socorro	1,700	588	NA	NA	2,938.8	1,234.8	2,939
MRGCD	Socorro	25,732	⁶ 23,881	⁷ NA	NA	119,356.9	50,150.0	111,005
	<i>Socorro Co. Totals</i>	<u>27,432</u>	<u>24,469</u>			<u>122,296</u>	<u>51,385</u>	
PLANNING REGION TOTAL			32,799			166,191	71,553	

...Acreage for ditch associations estimated assuming: (a) 2.25 inches of water per irrigation (for ditches with flow rate data), or (b) linear scaling based on Cuchillo Water User Association acreage data

...For diversion and consumptive use demands, use representative consumptive irrigation requirement of 2.1 af/ac for planning region(except EBID 3 af/ac), and estimate on-farm and off-farm non-CU depletions based on Wilson and Lucero (1997, Fig. 4.1).

1. Cropped in permanent pasture, orchard, alfalfa; a lot of water lost in creek for 12 miles from diversion dam, 22 miles of ditches
2. Historic CU allotment has been ~3af/acre (according to Mike Riley, EBID)
3. Estimate of 2,972 acres was obtained from Mike Riley of EBID; an alternative estimate of 4,000 was obtained based on map areas
4. Includes Lake Valley (Berenda Creek) and diversion between San Miguel and Palomas Ditch Assoc.
5. Estimate based on 1997 NMDA Ag Statistics published value for acreage irrigated by GW only
6. Estimate based on MRGCD-supplied values (MRGCD, June 30, 2000) for diversions and consumptive use, pro-rated based on map areas; an alternative estimate is anticipated to be available from MRGCD based on satellite photos by February 2000 (Doug Stretch, MRGCD, personal comm., Dec. 2000)
7. From MRGCD assessment billing and water bank records, plus estimated acreage in crop production at Bosque del Apace NWR.

Appendix G4
Population Projections

**POPULATION PROJECTIONS
FOR SIERRA AND
SOCORRO COUNTIES
2000 to 2040**

*JUNE 2003
FINAL*

PREPARED FOR:

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I. Introduction

The total population of a region is a good predictor of water demand. In this task, population was projected for Sierra and Socorro Counties over a 40-year period from 2000 to 2040. The population projections are used to project water demand over the next 40 years.

Projecting population for the regional water planning area involved several steps. First of all, existing estimates of the current population were reviewed. These estimates included 1990 and 2000 Census data and estimates as well as estimates produced in the prior regional water plan. Other data sources were reviewed to obtain comparative figures to either substantiate or provide an alternative to Census estimates.

Second, the consultant team produced projections of the future population using a cohort-component model, which projects population based on anticipated births, deaths and migration in and out of the counties. Historical birth and death rates as well as projected trends were taken into account in the model.

The base year used for the projections was 2000, since that was the most recent year for which there were population counts by age and sex.

Birth and death rates in each county for the 1980 – 2000 period were obtained from the State of New Mexico Department of Health. The projections and assumptions regarding births, deaths and migration were adjusted so that the model accurately projects growth from 1980 to 2000.

As a “reality check” on the projections, the report also reviews the historical trends in population growth and the local economies in Socorro and Sierra Counties. It compares a number of sources for current population estimates. Finally, it summarizes the methodologies used in each part of the projection model, and projects the population from 2000 through 2040.

Seasonal population is a factor in water demand for Sierra County. Estimates of seasonal population are included in the final section of the report.

The tables that correspond to the report graphs can be found in the appendix and contain cross-references.

II. Historical Trends in Population Growth and the Local Economy

A. Population History and Characteristics

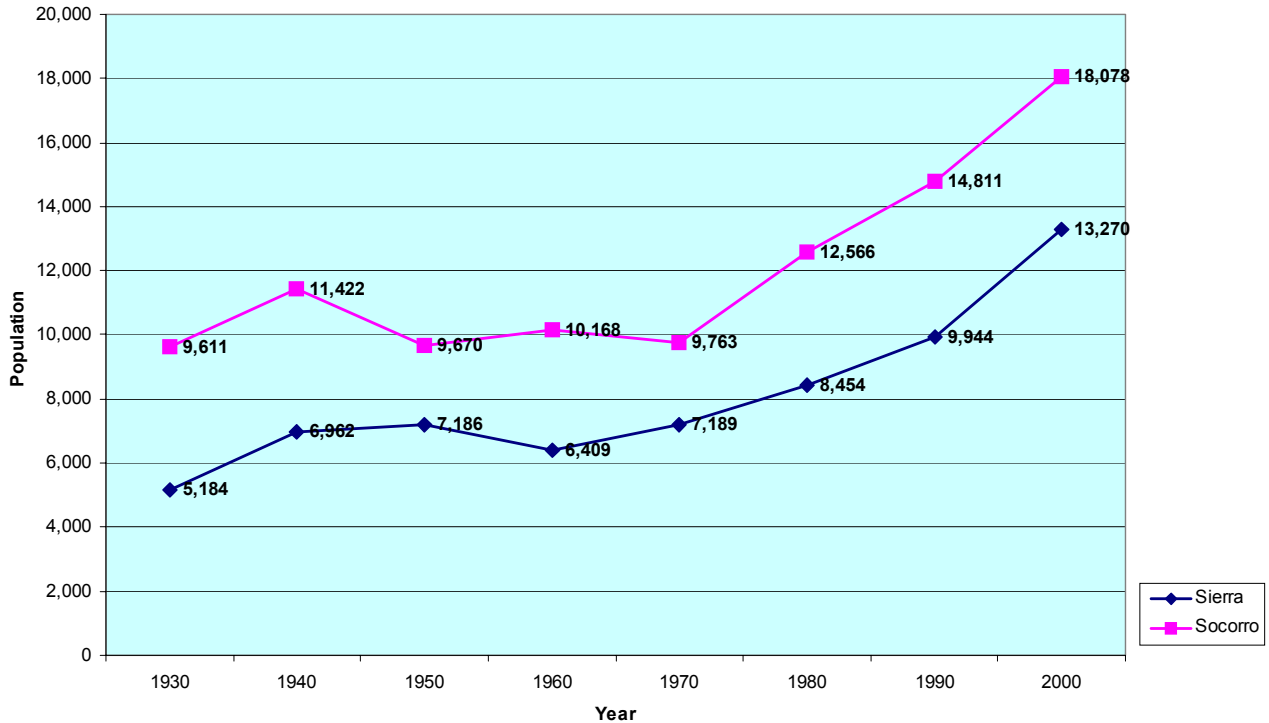
The study area for the Socorro and Sierra County Regional Water Plan encompasses all of both counties, including the Elephant Butte Irrigation District (EBID), which was excluded from previous studies.

1. Population

a. Socorro County

The total population of Socorro County according to 2000 Census figures was 18,078, nearly double the 1930 population of 9,611. During the entire 70-year period the average annual growth rate was 0.91 percent. In comparison, the New Mexico population grew faster, at an average yearly rate of 2.1 percent a year, in the 70 years between 1930 and 2000. The average yearly growth rate in Socorro County, however, obscures the rises and dips in the population over the intervening years.

Figure 1. Population History 1930-2000



For example, from 1930 to 1940 the population grew at an average yearly rate of 1.74 percent. By 1950, however, it had dropped back nearly to the 1930 population total. The population was fairly stable in the 20-year period between 1950 and 1970, fluctuating between 9,670 and 9,763. Then in 1970 it began a sharp rise to reach 18,078 by 2000, at an average growth rate of 2.07 percent a year.

b. Sierra County

The total population of Sierra County was 13,270 in 2000, two and one-half times its 1930 population. Over the 70-year period Sierra County experienced an average annual growth rate of 1.35 percent, which was faster than Socorro County but slower than the state as a whole. Again, however, this average obscures the ups and downs in growth over the intervening years.

Sierra County grew at an average annual rate of 2.93 percent between 1930 and 1940. This growth rate leveled off to 0.4 percent between 1940 and 1950, when the total population reached 7,186. The population decreased slightly over the next decade, falling to 6,409 by 1960. The population has been on the upswing since then, however, increasing at an average yearly rate of 1.8 percent. The rate of increase has also grown or stayed even each decade since 1960 (see Figure 1; Appendix Table A - 1).

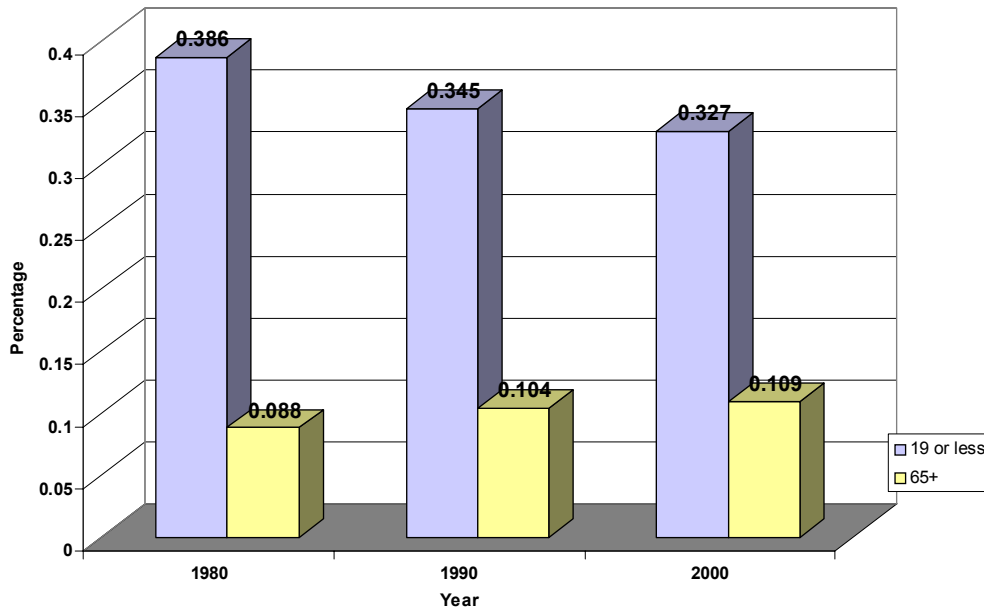
2. Age Structure, Birth, and Death Rates

a. Socorro County

The population of Socorro County in 2000 was slightly younger than both the state and the U.S. population. More than 32 percent of the county's population was 19 or younger, although this percentage has been decreasing since 1980. In comparison, 31 percent of all New Mexicans and 29 percent of all U.S. residents were 19 or younger. Following the national trend, the county population is aging, with those 65 and older making up 10.9 percent of the county population in 2000, less than both the statewide percentage of 11.7 percent and the U.S. percentage of 12.4 percent.

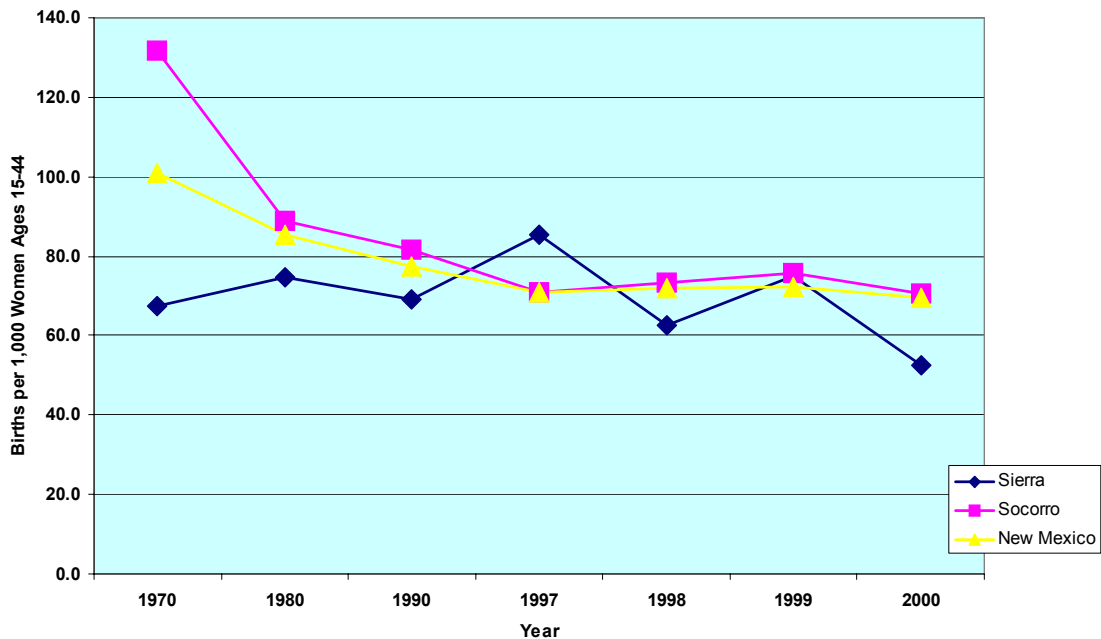
The bulk of the population, however, falls into the working age group, ages 20 to 64. This group made up over half of the Socorro County population in 2000, and an even larger percentage of the New Mexico and U.S. populations. (See Figure 2; Appendix Table A - 2).

Figure 2. Socorro County Age Structure



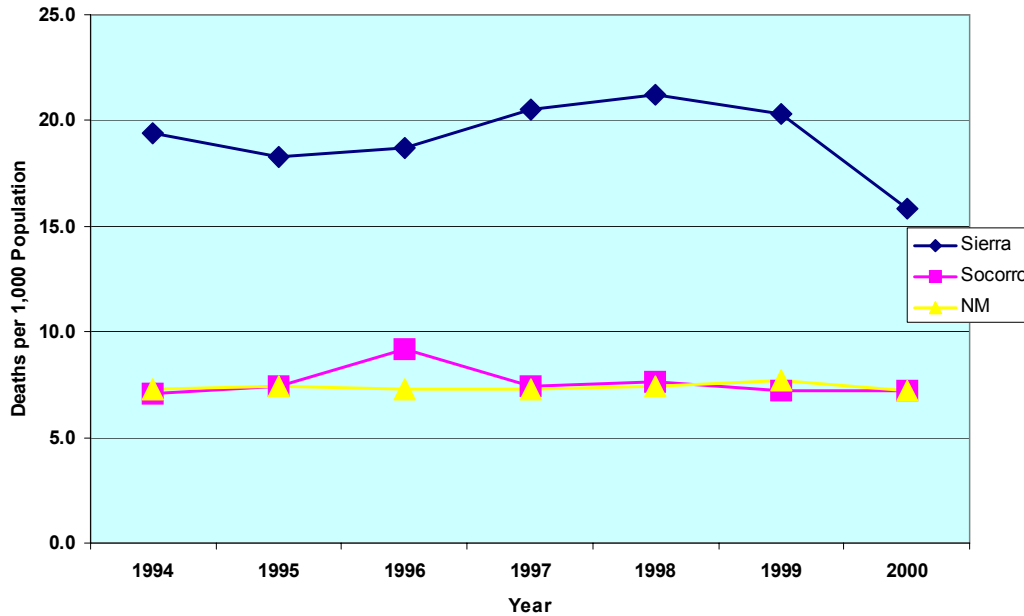
Socorro County's fertility rate (the number of births per 1,000 women ages 15-44) has generally been declining, from a high of 131.8 in 1970 to a low of 70.6 in 2000. The Socorro County fertility rate has nearly converged with the New Mexico rate since 1997. (See Figure 3; Appendix Table A - 3)

Figure 3. Fertility Rates 1970-2000



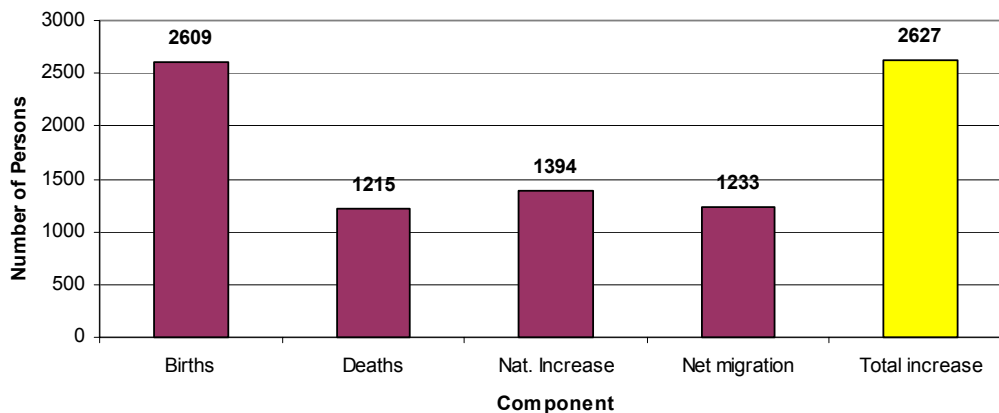
The crude death rate in Socorro County (deaths per 1,000 population) ranged from 7.1 in 1990 and 1994 to 9.2 in 1996 (an anomaly), but dropped back to 7.4 in 1997 and 7.2 percent in 2000. Since 1997, mortality rates in Socorro County have been similar to the statewide rate. (See Figure 4; Appendix Table A - 4)

Figure 4. Crude Death Rates 1994-2000



Overall, the county experienced 2.1 births for every death during the 1990's. Thus, over half of Socorro's population increase between 1990 and 2000 came from natural increase (births minus deaths). Migration contributed the other 47 percent of the increase. (See Figure 5; Appendix Table A - 5)

Figure 5. Components of Population Increase Socorro County 1990-2000

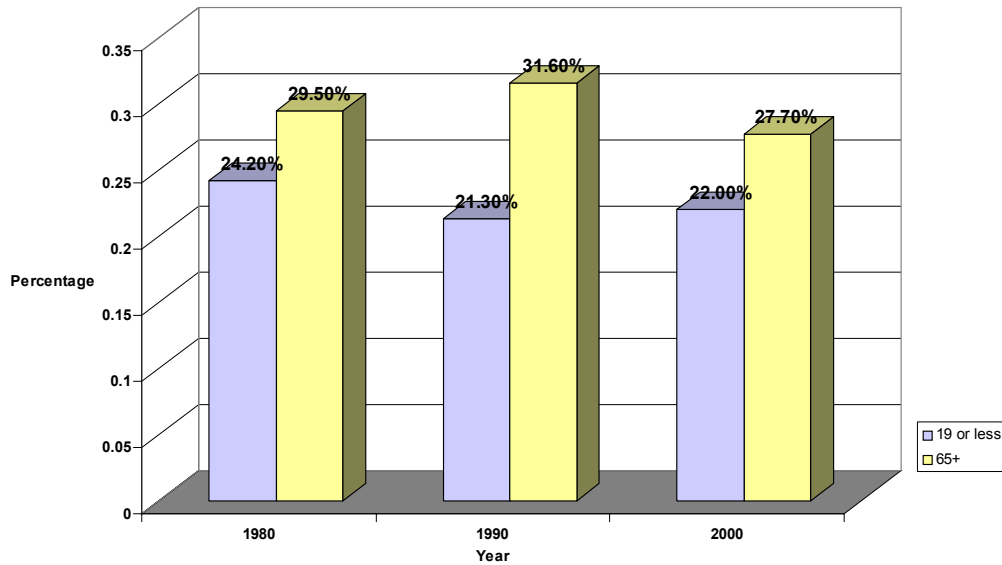


b. Sierra County

By contrast, the Sierra County fertility rate has fluctuated since 1970. The low of 52.7 births per 1,000 women ages 15-44 was in 2000, and the high of 85.4 in 1997, the only year in which Sierra County’s fertility rate exceeded the state rate. (See Figure 3; Appendix Table A - 3).

A critical difference, however, is that fewer women in Sierra County are within the child-bearing ages. Less than a quarter were ages 20 to 44 in 1990, compared with at least 35 percent of the state and national populations. This resulted in fewer births per total population and has a bearing on population growth from natural increase. (See Figure 6; Appendix Table A - 2).

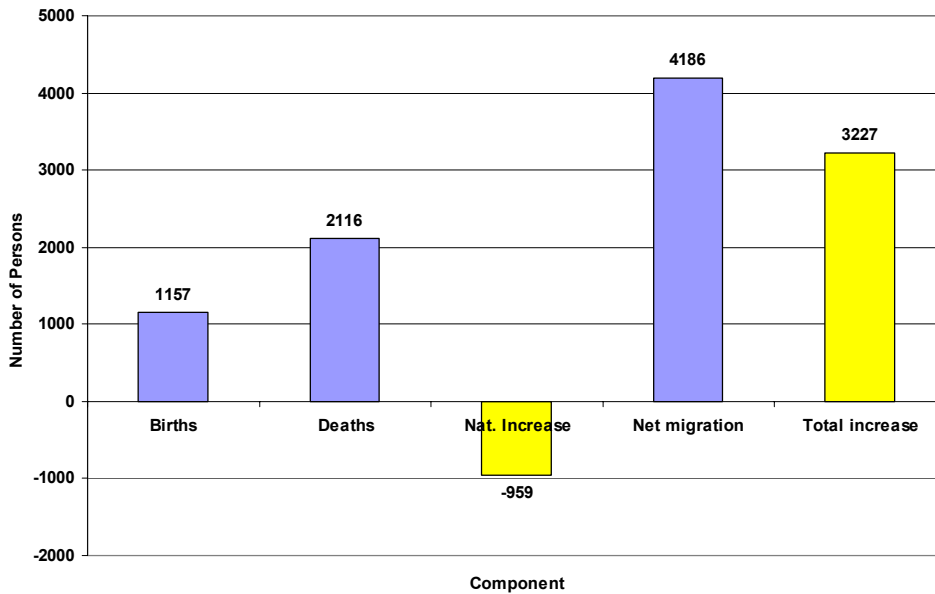
Figure 6. Sierra County Age Structure



Sierra County’s population growth has resulted largely from in-migration. Close to 28 percent of the Sierra County population in 2000 was 65 or older, compared with 10.9 percent in Socorro County and 12.4 percent in the U.S. as a whole. As might be expected, given the older age of the population, the crude death rates (number of deaths per 1,000 total population) range from two to three times the state rate.

Birth and death rates have significant implications for Sierra County’s population growth. As the county experiences only 0.5 births for every death, due to the older population, it does not gain population from natural increase (births minus deaths). Instead, the population increase comes from migration into the county. In fact, migration must remain high to maintain a positive growth rate in Sierra County (See Figure 7; Appendix Table A - 5).

Figure 7. Components of Population Increase Sierra County 1990-2000



Source: Sierra County Health Profile, New Mexico Department of Health, 2002

B. Trends in Local Economic Growth

1. Job Data by Industry

Job growth is an important consideration in projecting population increases. Jobs provide an economic incentive for residents to remain in the county and increase migration into an area as families move in to fill new jobs.

a. Socorro County

The number of civilian jobs in Socorro County, as reported by the U.S. Bureau of Economic Analysis, grew from 3,245 in 1970 to 6,501 in 1990, a 100 percent increase. The county added an average of 162 jobs each year since 1970 for an average annual growth rate of 3.3 percent. This compares with a 52 percent total increase in population¹--or an average annual growth rate of 2.1 percent—during the same period.

Thus, over the past 20 years until 1990, the number of jobs grew twice as much as the reported population. (see Table A - 6, appendix)

The rising percentage of the county population in the civilian labor force (those employed or looking for a job)² during the same time period could account for this. Only 30 percent of the Socorro population was in the labor force in 1970. That grew to 39 percent in 1980 and to 45 percent in 1990. Thus, as jobs expanded, an increasing percentage of the current residents may have filled them. (See Table A - 7, appendix).

¹ Population as reported by the U.S. Census.

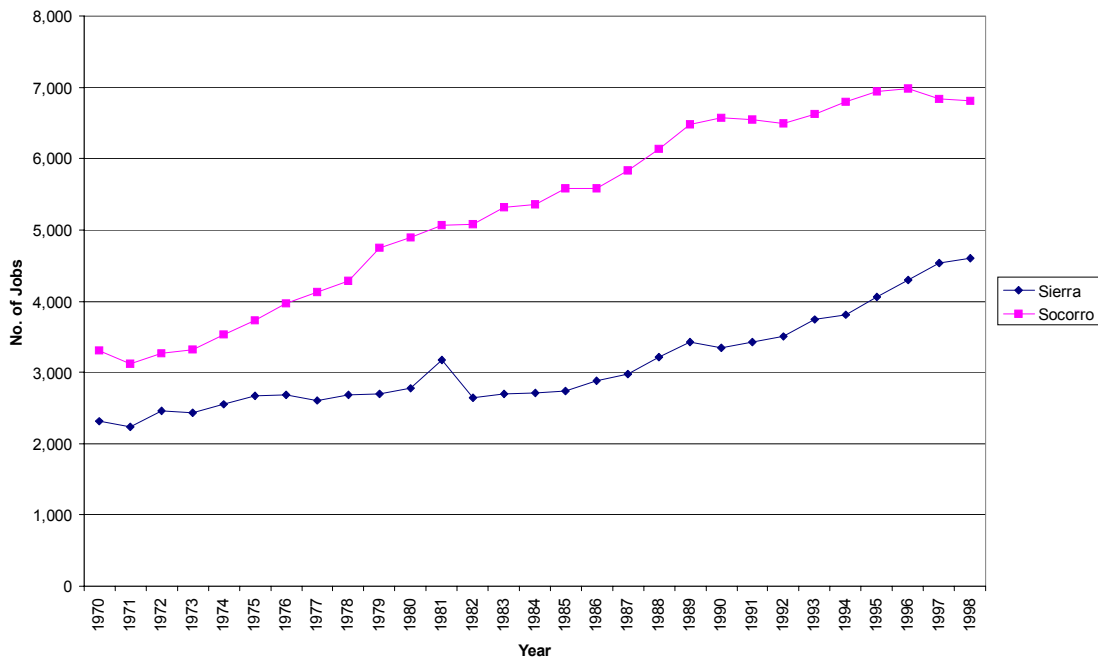
² Reported by the New Mexico Department of Labor

After 1990, however, the number of jobs in the county peaked at 6,925 in 1996 and then decreased over the next two years to 6,779³ in 1998. So over the last eight years, the county added an average of only 35 jobs per year at a yearly growth rate of 0.5 percent, much less than during the previous two decades. At the same time, the percentage of county residents in the labor force fell to 37 percent.

This appears to be partially confirmed by other figures. In 1980, 61 percent of the county population ages 15-64 was in the labor force. This rose to 67 percent in 1990. In 1980, however, the number of employed residents (4,580) outstripped the number of jobs in the county (3,245) by 1,335 persons. This may be because many commuted out of the county to work or held more than one part-time job. By 1990 this trend had reversed, and the number of jobs in the county (6,501) grew larger than the number of employed residents (6,126). The reasons for this need to be explored further.

From 1994 through 1998 (the latest year for which data were available) self-employment grew from 20 to 24 percent of all jobs, while wage and salary jobs decreased from 80 to 76 percent. The latter, however, still comprised the majority of the jobs. (See Table A - 8, appendix.)

Figure 8. Number of Jobs 1970-1998



³ Totals from 1995 to 1998 exclude agricultural services and mining as they were unreported. The same trend is evident when these are estimated, however.

b. Sierra County

Between 1970 and 1990, the number of jobs in Sierra County grew from 2,277 to 3,193, a 40 percent increase, according to BEA figures. Over this time period, the county added an average of 46 jobs per year for an average yearly increase of 1.7 percent. Over the same period, the population grew at a comparable average annual rate of 1.6 percent (see Table A - 9, appendix).

After 1990, however, the number of jobs increased at a faster pace, adding an average of 146 jobs per year through 1998. This was an average annual growth rate of 3.9 percent over the eight-year period. The increase in jobs likely spurred migration into the county or resulted in retaining more of the current working-age population.

The percentage of residents in the civilian labor force was about 30 percent in 1970. This dropped slightly in 1980, then rose to 35 percent and remained there through 1999 (see Table A - 7, appendix).

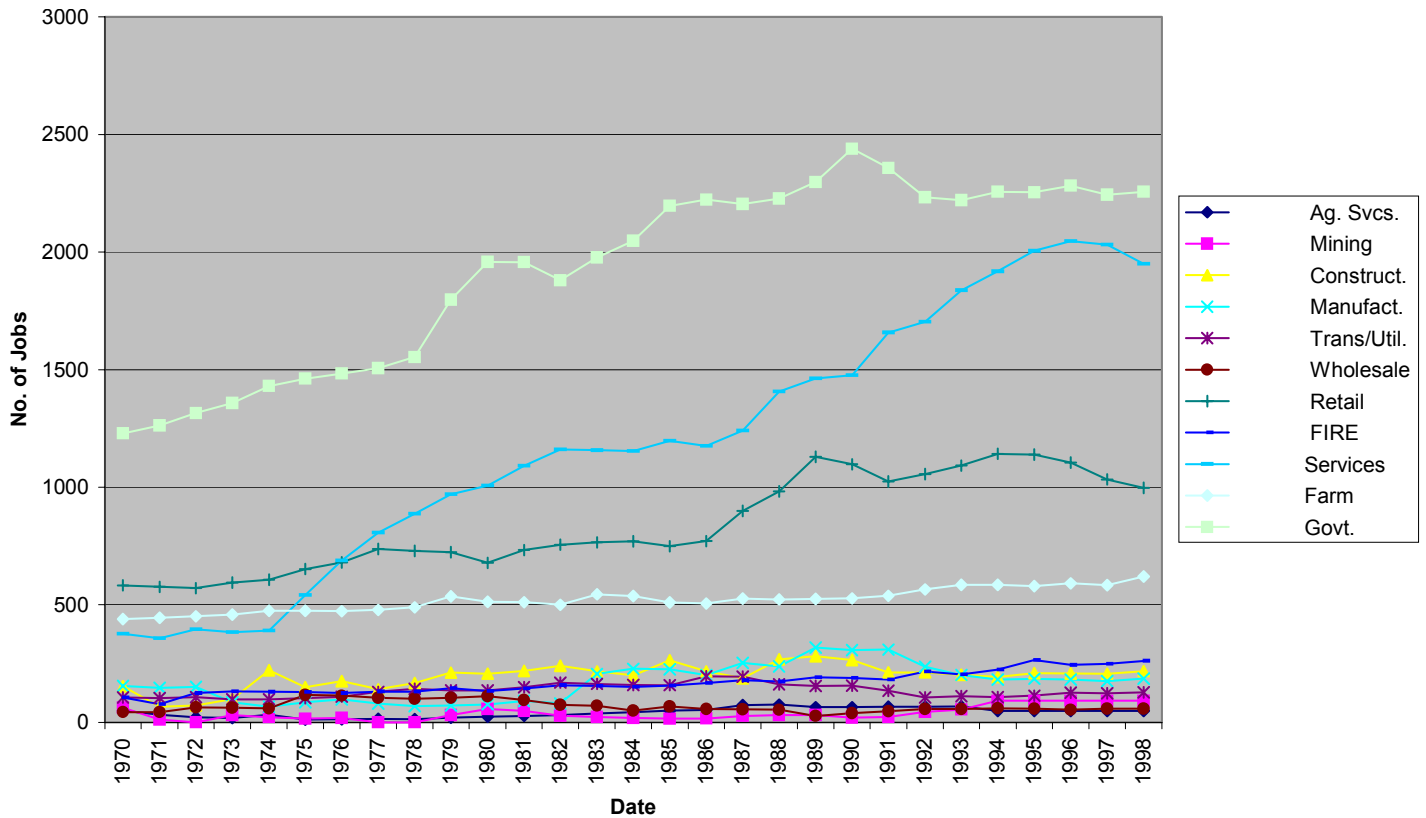
An even smaller percentage of Sierra County's jobs derive from wage and salary employment than in Socorro County. Roughly one third of all jobs come from self-employment while two thirds come from wage and salary positions. Self-employment's share of jobs has decreased slightly from 1994 to 1998 (33 percent to 31 percent) (see Table A - 8, appendix).

2. Main Regional Economies

a. Socorro

Four main industries—government, retail, farming, and services—have produced more than 80 percent of the jobs in Socorro County since 1970, although their respective shares have changed through the years. From 1970 to 1998, state and local government provided 28 percent of the county jobs while service jobs expanded from a 12 percent share to equal it. Over the same period, retail dipped from an 18 percent to 15 percent share, farming and agricultural services from 15 to 10 percent, and the federal government from an 8 percent to 3 percent share.

Figure 9. Sierra County Jobs by Sector 1970-98



The remaining 15 percent of jobs came from manufacturing, construction, transportation/utilities, FIRE (finance, insurance, and real estate), mining, agricultural services, and the wholesale industry. Of these only three added jobs since 1990: mining, (71 jobs); FIRE (73 jobs), and wholesale (19 jobs). (See Table A - 10, appendix).

From an overall economic standpoint, the county’s basic industries—those that bring in dollars from outside the state and tend to drive the economy—do not seem to be experiencing strong growth. These industries would include the federal government, some farming, manufacturing, transportation/utilities, mining, and wholesale. Thus, job growth would be unlikely to be dramatic enough to increase population migration into the county.

Large government employers in the area include the public school districts, the New Mexico Institute of Mining and Technology, the U.S. Army National Guard, U.S. Fish and Wildlife, U.S. Department of Agriculture, and the U.S. Postal Service.

Large private employers include First State Bank, the Alamo Navajo School Board, Associated University, Bureau of Land Management, Dicapari Minerals Corp., Engineered Structures, Furr’s Supermarket, McDonald’s, Rak’s Building Supply, the Roadrunner Lounge, S&M Ford Company, Sierra Blanca Pizza Co., Socorro Electric

Coop, Socorro General Hospital, Socorro Good Samaritan Village, Sonic Drive-In, Super 8 Motel, Tripps Inc.

b. Sierra County

As in Socorro County, the four main economic sectors—services, government, retail, and farming and agricultural services—accounted for 76 percent of all jobs in Sierra County in 1998, according to BEA data. The services sector has surpassed the government sector since 1982. Construction and FIRE (finance, insurance, real estate) together produced another 15 percent. The remaining industries each produce 4 percent or less of the jobs in the county: transportation/utilities, wholesale, mining, agricultural services and manufacturing (see Table A - 10, appendix).

Unlike Socorro County, however, most of the top sectors have grown fairly steadily since 1970. The number of service jobs nearly tripled from 421 in 1970 to 1,254 in 1998. Despite a dip in 1982, the government sector added a total of 315 jobs over the past 28 years to reach a total of 899 in 1998. Retail increased 57 percent over the same time period for a total of 915 jobs in 1998. The remaining industries stayed fairly flat.

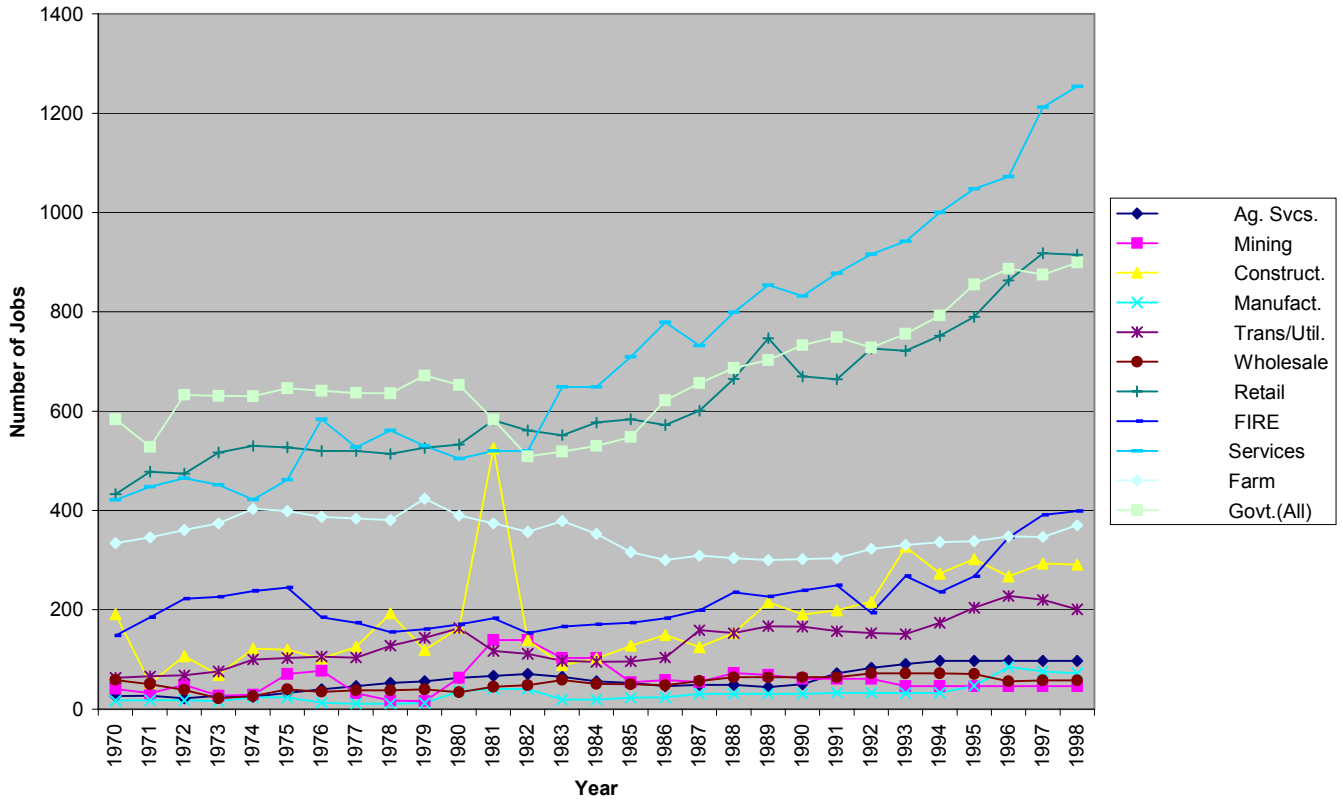
The economic impact of agriculture and ranching on the county, however, should not be underestimated, as pointed out in the 1992 report, “Economic and Social Importance of Cattle Ranching in Southwest New Mexico.” Moreover, farming ranked close to the FIRE and construction industries in terms of the total amount of personal income earned.

Again, except for the federal government and potentially some services, the growing industries are not ones that would typically drive a local economy to create more jobs. More likely, these sectors are increasing due to the influx of retirees who move into the area seeking a warmer climate and pleasant surroundings.

Large government employers in Sierra County include the New Mexico Veterans Center, T or C Municipal Schools, City of Truth or Consequences, the U.S. Bureau of Reclamation, the U.S. Natural Resources Conservation Service, and the U.S. Postal Service.

Large private employers in Sierra County include Bullocks Fine Foods, Café Rio, Dam Site, Inc., Henry E. and Carl M. Duran (vegetables and melons), Furr’s Supermarket, First Sierra Bank, Inn at the Butte, McDonald’s, Sierra Health Care Center, Sierra Vista Hospital, Smithco Construction, Sonic Drive-in and Sunset Farms.

Figure 10. Sierra County Jobs by Sector 1970-98



III. Current Estimates and Future Projections

A. Verification of Current Estimates and Future Projections

In both counties, there were confounding factors that led the consultant team to attempt to confirm or revise the 1990 Census count of population. The Regional Water Planning Steering Committee believed the 1990 count for Socorro County to be too low, thus invalidating subsequent estimates and projections of the county population. While the committee did not raise similar issues for Sierra County, the large influx of seasonal visitors who stay for half the year yet claim residence elsewhere (and thus do not figure in the local Census count) also complicates the projection of water demand based on population.

In view of these issues, the team looked for data from other sources such as private market research firms, national agencies, county assessors, and school enrollment data to confirm counts, estimates, and projections.

1. Socorro County Verification

General population estimates: The 1990 Census population count, adjusted by the Bureau of Business and Economic Research (BBER) at the University of New Mexico⁴ was 14,811. BBER estimates of undercount by race and ethnicity were factored into updated 1990 population estimates.

- BBER estimated that it undercounted the population by 11.5 percent for Native Americans, 2.2 percent for Anglos, and 3.5 percent for Hispanic populations or 3.9 percent overall. Correcting for that produced a new population figure of 15,447 for 1990. Other private sources that also estimate populations such as Claritas, Inc., use Census data as the base from which to project future populations.

BBER projected the 2000 population to be 16,752. Claritas estimated 16,594. Another source of 2000 figures came from the U.S. Environmental Protection Agency and New Mexico Environment Department (EPC/NMED) which estimated the population served by local water systems based on personal inspections of those facilities. Their estimate of the population served by private and public water systems in Socorro County based on inspections between 1995 and 2000 was 16,235 (See Table A - 1 in appendix). These numbers are very similar. Consultants for this project projected 18,243 persons for the high series and 18,124 for the low series. The subsequent U.S. Census count for 2000 was 18,078 and is used throughout this report.

- **Assessor data:** Socorro County assessor data listing the number of single family residences and mobile homes were available for 1999; only data on mobile homes

⁴ Corrected for age-reporting errors resulting from the an omission of “April 1” as a reference date in the Census questions that asks for the age of individual household members.

were available for 1990, limiting comparison over the ten-year period and to U.S. Census figures. According to the assessor data, the number of mobile homes increased from 1,287 in 1990 to 1,460 in 1999. Socorro County, however, assesses mobile homes on private lots as single family dwellings, so its overall totals of mobile homes are low. The U.S. Census classifies these same dwelling units as mobile homes and counted a total of 1,733 in 1990 (see Appendix Table A - 2).

The 1990 Census counted 3,875 single family and semi-detached homes in 1990 for Socorro County. The county assessed taxes on 6,949 single family homes in 1999, a potential increase of more than 2,628 homes in the county over ten years (after adjusting for the mobile home discrepancy). Such comparisons are speculative as the data come from two different sources. It is an indicator of growth in the county, however.

In addition to 3,875 single family and semi-detached houses, the 1990 Census counted 643 units in apartments/condominiums, 1,733 mobile homes, and 38 “other” structures. Multiplying the number of all housing units counted by the Census in 1990 (6,289) by the average household size of 2.75, after subtracting 1,072 vacant units, yielded a 1990 population of 14,347. This is close to the adjusted population count of 14,811.

For 1999, one could do the same for the single family, apartments, and mobile homes counted by the county assessor. Assuming the same vacancy rate of 17 percent and the projected average household size of 2.61 would yield a population of 19,609 in 1999, or 1,531 more than the 2000 Census count. The method is crude, but offers some ballpark comparisons.

- **School enrollment:** School enrollment figures for 1990 (kindergarten through 12th grades) were used to check against the U.S. Census count of school-age children, including public, private, and home school enrollment. The major public school districts in which Socorro County children live are Socorro Consolidated Schools, Magdalena Municipal Schools, and Belen Consolidated Schools. Also extending into the eastern part of the county are the Mountainair, Corona, and Carrizozo districts. Each district also has a home school population, and there are also private schools, such as the Alamo Band BIA School.

The 1990/1991 school year enrollment figures from Socorro and Magdalena, including private schools and home schooling, totaled only 2,930 compared with a 1990 Census count of 3,272 of children 5-17 years (See Appendix Table A - 3). Although comparable figures were not available from Belen for 1990, this district accounts for most of the remaining students. Enrollment in the Socorro and Magdalena districts for the 2000/2001 school year increased by approximately 18 students since 1990.

Estimated enrollment of Socorro County children in the Belen district was 436 for the 2000/2001 school year, based on school bus student counts. This brought the Fall 2000 total enrollment for all six districts to 3,386. This figure shows an increase of

114 school-age children over the 1990 Census figure or about 3 percent. This would indicate that the population is growing, but not dramatically.

- **Jobs Data:** According to the Census count, 5,867 people, or 40 percent of the population in Socorro County, were employed in 1990. At the same time, the Bureau of Economic Affairs reported there were 6,501 jobs in Socorro County. Given that some people commute out of the county to work, other county residents commute to Socorro, and that two or more part-time jobs may be held by the same person, these figures show a comparable number of jobs and employed workers.

In conclusion, the verification process did not find wide discrepancies between the 1990 Census count and other sources of data. Given that, the researchers decided to increase the 1990 population figure for Socorro only by the percentage undercount estimated by BBER. This figure was then used as the starting 1990 population for the computer model.

2. Sierra County Verification

- **General Population Estimates:** The 1990 Census population count, adjusted by the BBER⁵, was 9,944. Researchers there estimated an undercount of 1.8 percent, which brought the final total to 10,140.

For the year 2000, BBER projected the population to reach 11,338; Claritas projected 11,058; and the consultant team projected 11,179 for the high series. The EPA/NMED water utility database, however, showed that private and public water systems in the county recorded that they served a population of 14,952 during inspections carried out from 1995 through 2000 (See Table A - 5, in appendix). The consultant team believes this discrepancy of approximately 3,700 persons is the result of seasonal visitors to the county. The subsequent 2000 census counted a population of 13,270 in Sierra County, higher than all the projections. It narrowed the discrepancy between the population count and number of persons served by the water systems to 1,682.

According to the county assessor, the seasonal population in Sierra County consists of two groups, a) winter visitors, the so-called snowbirds, who come in October and leave mid-March or April, staying in single family dwellings and mobile homes, and b) summer weekend visitors who come intermittently through September. The winter visitors in particular would likely be included in the EPA/NMED water system database, but not in the Census count as their principal residence would be outside the county.

While the population projections do not take these seasonal visitors into account in the computer model, they should be considered in estimating future water demand.

⁵ Corrected for age-reporting errors resulting from an omission of "April 1" as a reference date in the Census question that asks for the age of individual household members.

- **Assessor data:** Again, only 1999 data were available from the county assessor. For 1999, the county assessed 5,761 single family dwellings, 526 mobile homes in mobile home parks, and 507 multi-family units. The 1990 Census data reported 3,250 single family and semi-detached homes, 2,369 mobile homes, 783 apartments, and 55 “other.” According to the assessor, however, the county classifies many mobile homes—especially those on permanent foundations—as single family residential for tax purposes. Thus, data from the two different sources are difficult to compare. Combining the numbers of single family residences and mobile homes, however, shows an overall increase of 11.9 percent from 1990 to 1999.

In another crude comparison, multiplying the total number of units counted in the 1990 Census by the 2.15 average household factor (after adjusting for vacancies) yielded a total 1990 population of 9,520, which is close to the Census count of 9,944. Doing the same for the 6,794 units reported by the county assessor for 1999 would yield a population of 10,126. This is nearly identical to the 1990 base rate used by the project team.

- **School Enrollment:** The only school district in Sierra County, the Truth or Consequences School District reported an enrollment of 1,471 students in grades kindergarten through 12 for the 1990/1991 school year. An additional 55 students were estimated to be enrolled in private schools or home schooling, bringing the total to 1,526. This is almost 9 percent higher than the Census count of 1,401 persons ages 5-17 years old.

For the 2000/2001 school year, the district reported 1,764 students enrolled in grades K through 12, including private schools and home schooling. This was an increase of 16 percent over the ten-year period.

In conclusion, the chief discrepancy in population estimates is between the general population estimates and the estimated population served by the water utilities in the county. This is most likely due to seasonal visitors who use the water but do not list Sierra County as their permanent residence on Census forms. The seasonal population figures should be projected separately and included in projections of current and future water demand.

IV. Projections of Year-Round Population

Projections were produced by a cohort-component model, *fivfiv*, which uses births, deaths and migration as the components of population change. Population is projected in five-year increments for five-year age and sex cohorts. Information regarding fertility and mortality were obtained from New Mexico Vital Records and Health Statistics. Migration was estimated based on the 1990 to 2000 trend and economic activity that would alter migration patterns in the future. The assumptions used for each component of the model are described below.

A. Fertility

Birth statistics from the New Mexico Department of Health were used in the model. Two statistics were used. Total fertility is the total number of children that a woman has over her lifetime. Distribution of births by age indicates the number of births in a given year that would occur in each age group from ages 15 through 45+. New Mexico Health Statistics report births in age cohorts from 10 through 49 years. For purposes of this model, births in the 10 to 14 years cohort were included in the 15-19 age cohort.

The team used the actual birth rates as inputs to the model through 2000, the last year data were available. After that, they reviewed county, state, and national trends to input assumptions for the future.

As noted earlier in this report, the Socorro County fertility rate declined from 131.8 per 1,000 women of childbearing ages in 1970 to 70.6 in 2000.

By contrast, the Sierra county fertility rate has fluctuated, but remained approximately the same over time, although there are fewer women of childbearing age in the county compared with the state and national populations.

Table 1. Total Fertility

<i>County</i>	<i>1990-95 Average</i>	<i>1995-2000 Average</i>
Birth Rates by Age (Births per 1,000)		
Sierra		
15-19	92.2	84.6
20-24	180.3	155.5
25-29	135.2	125.3
30-34	76.1	77.9
35-39	26.9	25.4
40-44	5.2	3.6
45+	0.0	0.0
Total Fertility	2.42	2.13
Socorro		
15-19	93.4	74.1
20-24	161.4	150.7
25-29	108.1	122.5
30-34	85.7	68.6
35-39	29.5	54.1
40-44	6.5	5.4
45+	0.0	0.0
Total Fertility	N/A	N/A

Table 2. Distribution of Births by Age

<i>County</i>	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>
Distribution of Births by Age (Percent)						
Sierra						
10-14	0.0	0.0	1.0	0.9	0.0	0.34
15-19	24.2	16.3	19.2	27.0	21.7	14.47
20-24	39.6	4.7	32.3	31.5	26.7	28.12
25-29	28.6	29.6	24.2	20.7	23.3	28.7
30-34	4.4	16.3	15.2	15.3	17.5	19.23
35-39	3.3	3.1	8.1	3.6	9.2	7.70
40-44	0.0	0.0	0.0	0.9	1.7	1.36
45-49	0.0	0.0	0.0	0.0	0.0	0.07
Total Births	91	98	99	111	120	128
Socorro						
10-14	0.4	0.0	0.75	0.8	0.4	0.40
15-19	21.9	18.5	20.75	27.3	22.5	21.69
20-24	35.2	31.9	28.68	31.2	29.2	32.53
25-29	24.7	26.2	20.38	18.6	20.2	25.30
30-34	12.1	18.1	20.00	14.6	15.7	14.06
35-39	5.7	4.8	7.92	6.3	10.1	5.62
40-44	0.0	0.4	1.51	1.2	1.9	0.40
45-49	0.0	0.0	0.00	0.0	0.0	0.00
Total Births	247	248	265	253	267	249

B. Mortality

Mortality is introduced into the model as life expectancy at birth by sex and year. This information is available by state, and statewide rates were assumed for both counties. Historical life expectancy for New Mexico was compared to U.S. life expectancy rates, and then U.S. life expectancy rate projections were used to project NM rates from 2000 through 2040.

Life expectancy in New Mexico is higher than the U.S. average. Female life expectancy in New Mexico is increasing faster than the national average, and male life expectancy is staying at a constant rate above the national average. These trends are projected to continue for New Mexico.

Three year averages for 1979-81 and 1989-91 and projected life expectancy at birth for each projection year are shown below.

Because of its large elderly population, Sierra County experiences more deaths than births. Natural increase in the county is negative, meaning that population increase depends on migration into the county.

In contrast, Socorro County experiences twice as many births as deaths. Thus more than half of the county's population increase between 1990 and 2000 came from natural increase.

Table 3. Expectation of Life at Birth, 1980 through 2040

	<i>NM</i>	<i>Female US</i>	<i>NM/US</i>	<i>NM</i>	<i>Male US</i>	<i>NM/US</i>
1979-1981	79.0	77.9	1.014	70.3	70.3	1.000
1989-1991	79.7	78.8	1.011	72.5	71.8	1.010
1995	80.7	79.3	1.017	72.9	72.5	1.005
2000	81.5	79.7	1.023	73.4	73.0	1.005
2005	82.5	80.2	1.028	73.9	73.5	1.005
2010	83.3	80.6	1.034	74.5	74.1	1.005
2015	84.3	81.1	1.040	75.2	74.8	1.005
2020	85.2	81.5	1.045	75.9	75.5	1.005
2025	85.2	82.0	1.045	76.6	76.2	1.005
2030	83.5	82.4	1.045	77.3	76.9	1.005
2035	84.0	82.9	1.045	78.0	77.6	1.005
2040	84.4	83.3	1.045	78.7	78.3	1.005

C. Migration

Net migration into or out of Sierra and Socorro Counties was estimated for the time periods from 1980 to 1990 and 1990 to 2000. Migration rates and age and sex characteristics of migrants were determined by projecting the population change from 1980 and 1990 and from 1990 to 2000 without migration and then comparing the projection results with actual 1990 and 2000 population figures. The difference between the projected and actual population for each age and sex cohort was assumed to be the result of migration.

The results show that in both counties, there is net out-migration in the 20-24 and 25-29 age groups for both males and females. Sierra County experienced very high out-migration in these age groups from 1980 to 1990, and a much lower rate from 1990 to 2000. Out-migration in Socorro County is much less in these age groups, possibly because of incoming students to New Mexico Tech. In all other age groups, net migration is positive. Overall, migration results in a population increase in both counties. To minimize the impact of variations in migration rates between decades, the average migration rate was used.

Table 4. Estimated Yearly Migration Rates per 1000

<i>Age</i>	<i>Sierra County</i>			<i>Socorro County</i>		
	<i>Female</i>	<i>Male</i>	<i>Total</i>	<i>Female</i>	<i>Male</i>	<i>Total</i>
0-4	12.18	19.01	14.73	4.94	-2.03	1.51
5-9	19.66	28.10	21.02	11.93	7.87	9.92
10-14	33.97	37.43	26.24	6.42	20.80	13.67
15-19	17.19	26.48	15.04	10.80	26.27	19.08
20-24	-34.30	-28.70	-30.52	-8.33	12.78	3.54
25-29	-8.58	-21.48	-15.09	-3.68	-20.00	-12.10
30-34	31.89	27.38	26.63	-1.42	-21.03	-11.35
35-39	42.38	42.12	33.04	10.95	1.32	6.16
40-44	47.04	65.07	36.84	14.29	16.72	15.60
45-49	53.39	58.87	37.32	14.85	14.84	14.84
50-54	58.27	66.90	42.44	20.84	22.19	21.50
55-59	58.32	57.33	45.71	12.39	20.40	15.56
60-64	45.29	56.56	46.67	8.31	16.95	12.71
65-69	39.16	61.93	47.67	8.11	22.69	15.04
70-74	25.04	43.00	32.37	2.50	19.67	11.21
75+	6.41	28.27	15.29	17.59	21.33	19.20
Total	26.31	33.43	23.26	7.50	9.16	8.35

D. Projections

Three sets of projections were completed for each county: a high series, a mid-series and a low series. The mid-series was developed through the projection model. The projections and assumptions regarding births, deaths, and migration were adjusted so that the model accurately projects growth from 1980 to 2000.

Growth rates in the high and low series were modified to trend and converge with projected state growth rates. High and low series projections included the following modified assumptions about growth rates.

1. Mid-Series

- Migration rates were assumed to be the average of 1980-1990 and 1990-2000 migration rates for all age cohorts throughout the project period.
- Life expectancy will follow the trend identified in Section IV.B.
- Fertility rates will increase somewhat beyond 2000 levels and remain constant through the remainder of the projection period.

2. High Series

- Growth rates in both Socorro and Sierra Counties are higher in each time period than either the mid-range projection or the statewide projected growth rates, paralleling the projected state trend over the projection period.

3. Low Series

- Growth rates in Sierra County are assumed to trend to the average projected state growth rate for the period from 2000 – 2030 and remain constant at the average 30-year growth rate through 2040.
- Growth rates in Socorro County trend with the projected state growth rate in each time period through 2030, and remain at the projected 2025 – 2030 growth rate through 2040.

E. Projection Results

A summary of total population by county by year is shown below. The chart on the following page illustrates projected growth compared with historical trends.

Table 5. Projected Population, High Series

<i>Year</i>	<i>Sierra County</i>	<i>Socorro County</i>	<i>Total</i>
2000	13,270	18,078	33,348
2005	14,868	19,862	36,735
2010	16,577	21,715	40,302
2015	12,984	23,741	38,740
2020	20,809	25,702	48,531
2025	23,201	27,552	52,778
2030	25,616	29,246	56,892
2035	28,006	31,043	61,084
2040	30,320	32,626	64,986

Table 6. Projected Population, Mid Series

<i>Year</i>	<i>Sierra County</i>	<i>Socorro County</i>	<i>Total</i>
2000	13,270	18,078	33,348
2005	14,831	19,781	36,617
2010	16,435	21,373	39,818
2015	18,284	23,010	43,309
2020	20,344	24,649	47,013
2025	22,534	26,256	50,815
2030	24,750	27,713	54,493
2035	26,884	29,115	58,034
2040	28,907	30,481	61,428

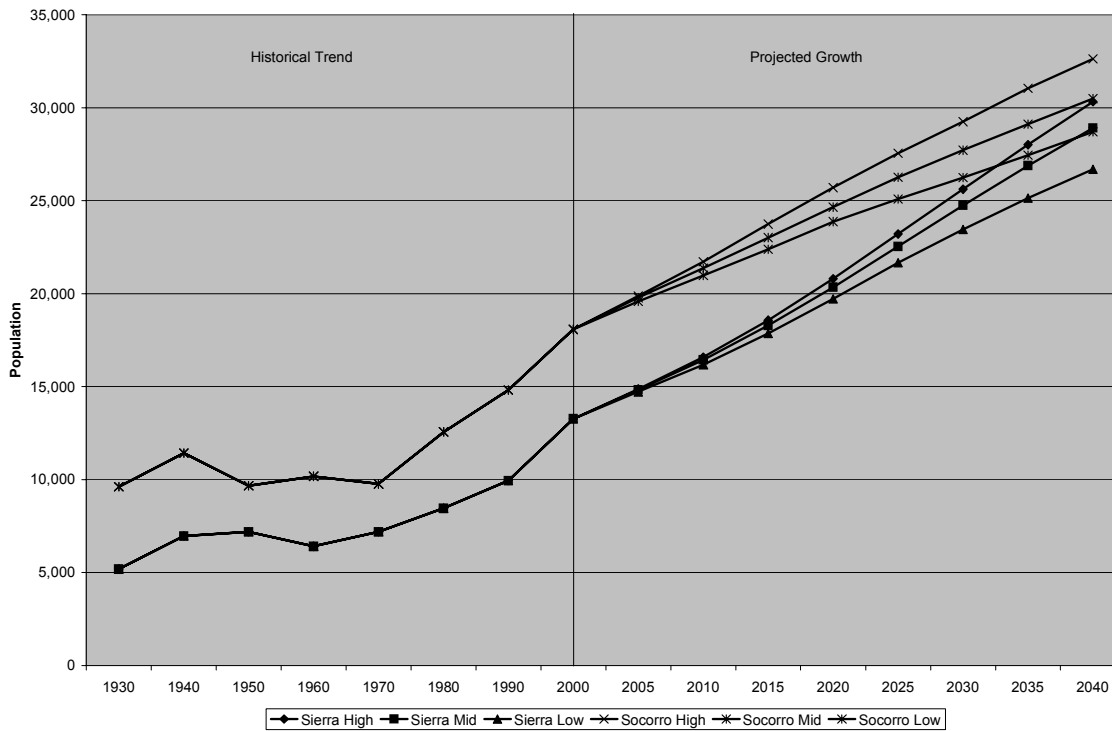
Table 7. Projected Population, Low Series

<i>Year</i>	<i>Sierra County</i>	<i>Socorro County</i>	<i>Total</i>
2000	13,270	18,078	33,348
2005	14,723	19,571	36,299
2010	16,176	20,980	39,166
2015	17,860	22,380	42,255
2020	19,718	23,873	45,611
2025	21,664	25,091	48,780
2030	23,454	26,240	51,724
2035	25,142	27,442	54,619
2040	26,687	28,700	57,427

The mid-range projection for Sierra County in 2040 is 28,907, with an average annual growth rate of 2.0 percent. The mid-range projection for Socorro County is 30,481, with an average annual growth rate of 1.3 percent.

The Sierra County population in 2040 is projected to be 30,320 in the high series (an average annual growth rate of 2.2 percent) and 26,687 in the low series (an annual average growth rate of 1.8 percent). For Socorro County, the high series projection for 2040 was 32,626 (an average annual growth rate of 1.4 percent), and the low series was 28,700 (an average annual growth rate of 1.2 percent).

Figure 11. Sierra County and Socorro County Population Trends and Projections, 1930-2040



Appendices

Table A - 1. Total Population History*(Figure 1)*

<i>County</i>	<i>1930</i>	<i>1940</i>	<i>1950</i>	<i>1960</i>	<i>1970</i>	<i>1980</i>	<i>1990</i>	<i>2000</i>
Sierra	5,184	6,962	7,186	6,409	7,189	8,454	9,944	13,270
Socorro	9,611	11,422	9,670	10,168	9,763	12,566	14,811	18,078

Source: U.S. Department of Commerce, Bureau of Census through New Mexico Bureau of Business and Economic Research

Table A - 2. 2000 Percentage Distribution by Age*(Figures 2, 6)*

<i>County</i>	<i>0 to 4</i>	<i>5 to 19</i>	<i>20 to 44</i>	<i>45 to 64</i>	<i>65+</i>
Sierra	4.8%	17.2%	23.0%	27.4%	27.7%
Socorro	7.0%	25.7%	34.4%	22.0%	10.9%
NM	7.2%	23.9%	35.0%	22.2%	11.7%
US	6.8%	21.8%	36.9%	22.0%	12.4%

Source: U. S. Census through New Mexico Bureau of Business and Economic Research, printed in New Mexico Vital Statistics Reports.

Table A - 3. County Fertility Rates 1970-2000*(Births per 1,000 women ages 15-44) (Figure 3)*

	<i>1970</i>	<i>1980</i>	<i>1990</i>	<i>1995</i>	<i>2000</i>
Sierra	67.3	74.7	69.0	74.6	52.7
Socorro	131.8	89.0	81.7	75.1	70.6
New Mexico	100.8	85.4	77.6	71.6	69.5

Source: New Mexico Department of Health and U.S. Census Bureau

Table A - 4. Crude Death Rates*(total per 1,000 population) (Figure 4)*

	<i>1987</i>	<i>1988</i>	<i>1989</i>	<i>1990</i>	<i>1991</i>	<i>1992</i>	<i>1993</i>	<i>1994</i>	<i>1995</i>	<i>1996</i>	<i>1997</i>	<i>1998</i>	<i>1999</i>	<i>2000</i>
Sierra	17.6	18.8	20.5	20.8	20.1	20.8	21.0	19.4	18.3	18.7	20.5	21.2	20.3	15.8
Socorro	8.3	7.7	8.0	7.1	8.7	8.0	8.0	7.1	7.4	9.2	7.4	7.6	7.2	7.2
NM	6.9	6.9	7.0	7.0	7.3	7.0	7.2	7.3	7.4	7.3	7.3	7.4	7.7	7.2

Source: New Mexico Department of Health

Table A - 5. Population Components
(Figures 5, 7)

	<i>1990-2000</i>				
	<i>Births</i>	<i>Deaths</i>	<i>Nat. Increase</i>	<i>Net migration</i>	<i>Total increase</i>
Sierra	1,157	2,116	-959	4,186	3,227
Socorro	2,609	1,215	1,394	1,233	2,627

Source: New Mexico Bureau of Business and Economic Research

Table A - 6. Socorro County Jobs by Industry

<i>Socorro County Jobs</i>		<i>70's</i>									
<i>By Industry</i>	<i>1970</i>	<i>1971</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>	<i>1978</i>	<i>1979</i>	
Nonfarm Employment	2,863	2,676	2,824	2,860	3,055	3,261	3,500	3,654	3,800	4,205	
Private Employment	1,634	1,414	1,510	1,503	1,625	1,800	2,017	2,148	2,247	2,409	
Ag Services, Forestry, Fishing, Other	50	33	22	19	33	12	13	14	13	20	
Mining	62	12	L	31	22	15	18	L	L	30	
Construction	153	66	72	99	221	149	175	140	166	211	
Manufacturing	154	147	150	85	66	85	97	79	69	72	
Transportation/ Public Utilities	106	103	107	98	98	102	109	129	143	136	
Wholesale Trade	44	43	63	62	59	116	113	104	100	104	
Retail Trade	582	576	570	594	606	652	680	737	729	724	
Finance, insurance, real estate	106	77	124	132	130	128	124	131	131	145	
Services	377	357	395	383	390	541	688	806	887	970	
Government and Government Enterprises	1,229	1,262	1,314	1,357	1,430	1,461	1,483	1,506	1,553	1,797	
Federal, civilian	261	229	217	251	314	330	339	344	371	392	
Military	56	74	65	72	72	69	64	62	62	68	
State and Local	912	959	1,032	1,034	1,044	1,062	1,080	1,100	1,120	1,337	
State	N	N	N	N	N	N	N	N	N	797	
Local	N	N	N	N	N	N	N	N	N	540	
Farm Employment	438	444	451	458	474	474	472	478	489	535	
Select Total (Excludes military)	3,245	3,046	3,210	3,246	3,457	3,666	3,908	4,070	4,227	4,673	
<i>Socorro County Jobs</i>		<i>80's</i>									
<i>By Industry</i>	<i>1980</i>	<i>1981</i>	<i>1982</i>	<i>1983</i>	<i>1984</i>	<i>1985</i>	<i>1986</i>	<i>1987</i>	<i>1988</i>	<i>1989</i>	
Nonfarm Employment	4,386	4,551	4,576	4,769	4,816	5,076	5,072	5,310	5,611	5,953	
Private Employment	2,428	2,595	2,697	2,793	2,769	2,880	2,850	3,106	3,385	3,656	
Ag Services, Forestry, Fishing, Other	24	27	31	37	44	50	52	73	75	64	
Mining	57	48	28	23	18	15	16	27	31	30	
Construction	207	219	241	217	199	263	216	187	268	281	
Manufacturing	76	90	81	206	227	225	201	252	237	318	
Transportation/ Public Utilities	100	104	169	163	159	158	196	194	161	154	
Wholesale Trade	111	95	74	71	50	67	57	56	53	27	
Retail Trade	678	732	755	765	769	749	770	899	981	1,128	
Finance, insurance, real estate	133	144	158	154	150	156	167	178	173	192	
Services	1,006	1,090	1,160	1,157	1,153	1,197	1,175	1,240	1,406	1,462	
Government and Government Enterprises	1,958	1,956	1,879	1,976	2,047	2,196	2,222	2,204	2,226	2,297	
Federal, civilian	378	347	337	307	283	258	235	211	211	215	
Military	72	80	72	73	68	73	77	80	81	79	
State and Local	1,508	1,529	1,470	1,596	1,696	1,865	1,910	1,913	1,934	2,003	
State	981	992	923	1,053	1,151	1,307	1,352	1,354	1,367	1,438	
Local	527	537	547	538	545	558	558	559	567	565	
Farm Employment	513	510	499	544	536	509	505	526	522	524	
Select Total (Excludes military)	4,827	4,981	5,003	5,240	5,284	5,512	5,500	5,756	6,052	6,398	

Socorro County Jobs

90's

By Industry	1990	1991	1992	1993	1994	1995	1996	1997	1998
Nonfarm Employment	6,049	6,011	5,926	6,043	6,219	6,371	6,398	6,286	6,217
Private Employment	3,611	3,654	3,694	3,823	3,963	4,118	4,116	4,043	3,961
Ag Services, Forestry, Fishing, Other	64	66	66	67	48	D	D	D	D
Mining	20	23	45	54	91	D	D	D	D
Construction	264	212	212	202	193	209	208	207	218
Manufacturing	307	309	236	201	182	185	182	175	186
Transportation/ Public Utilities	156	134	106	111	107	113	126	123	127
Wholesale Trade	39	47	57	57	60	58	53	58	D
Retail Trade	1,097	1,024	1,056	1,091	1,141	1,138	1,105	1,033	997
Finance, insurance, real estate	188	182	215	203	224	264	244	248	261
Services	1,476	1,657	1,703	1,837	1,917	2,004	2,046	2,031	1,949
Government and Government Enterprises	2,438	2,357	2,232	2,220	2,256	2,253	2,282	2,243	2,256
Federal, civilian	256	240	242	232	217	214	216	217	222
Military	75	71	71	70	66	66	64	62	58
State and Local	2,107	2,046	1,919	1,981	1,973	1,973	2,002	1,964	1,976
State	1,517	1,439	1,327	1,318	1,374	1,341	1,315	1,233	1,241
Local	590	607	592	600	599	632	687	731	735
Farm Employment	527	537	565	584	584	579	591	583	620
Select Total (Excludes military)	6,501	6,477	6,420	6,620	6,737	6,884	6,925	6,807	6,779

Source: U.S. Bureau of Economic Analysis

Notes:

D = Not shown to avoid disclosures of confidential information

N = Data not available for this year

L = Less than 50 jobs

Table A - 7. Civilian Labor Force, Employment, Unemployment 1970-1999*Civilian Labor Force, Employment, Unemployment 1970-1999*

<i>Socorro County</i>	<i>1970</i>	<i>1975</i>	<i>1980</i>	<i>1985</i>	<i>1990</i>	<i>1995</i>	<i>1999</i>
Population History		9,763		12,566		14,811	16,752
Civilian Labor Force	3,006	3,513	4,909	5,398	6,612	6,490	6,274
Pop. Percentage in Labor Force	0		0		0		0
Employment	2,634	3,173	4,580	4,958	6,126	5,978	5,941
Unemployment	372	340	329	440	487	512	333
Rate	12.4%	9.7%	6.7%	8.2%	7.4%	7.9%	5.3%
<i>Sierra County</i>							
Population History		7,189		8,454		9,944	11,338
Civilian Labor Force	2,167	2,516	2,373	2,265	3,432	3,677	3,996
Pop. Percentage in Labor Force	0		0		0		0
Employment	2,093	2,349	2,281	2,057	3,288	3,514	3,838
Unemployment	74	167	92	208	144	163	128
Rate	3.4%	6.6%	3.9%	9.2%	4.2%	4.4%	3.2%

Sources: New Mexico Department of Labor, U.S. Census

Table A - 8. County Employment by Place of Work

<i>Socorro County by Type of Employment</i>	<i>1994</i>		<i>1995</i>		<i>1996</i>		<i>1997</i>		<i>1998</i>	
Total full-time and part-time employment	6,803	100%	6,950	100%	6,989	100%	6,869	100%	6,837	100%
Wage and Salary employment	5,412	80%	5,417	78%	5,448	78%	5,308	77%	5,226	76%
Proprietor's employment (Self)	1,391	20%	1,533	22%	1,541	22%	1,561	23%	1,611	24%
Farm proprietor's	423	6%	416	6%	419	6%	417	6%	437	6%
Nonfarm proprietor's	968	14%	1,117	16%	1,122	16%	1,144	17%	1,174	17%
<i>Sierra County by Type of Employment</i>										
Total full-time and part-time employment	3,812	100%	4,072	107%	4,318	100%	4,571	100%	4,667	100%
Wage and Salary employment	2,567	67%	2,747	72%	2,934	68%	3,159	69%	3,212	69%
Proprietor's employment (Self)	1,245	33%	1,325	35%	1,384	32%	1,412	31%	1,455	31%
Farm proprietor's	221	6%	220	6%	223	5%	225	5%	236	5%
Nonfarm proprietor's	1,024	27%	1,105	29%	1,161	27%	1,187	26%	1,219	26%

Source: U.S. Bureau of Economic Analysis

Table A - 9. Sierra County Jobs by Industry

<i>Sierra County Jobs 1970-1998</i>		<i>70's</i>									
<i>By Industry</i>		<i>1970</i>	<i>1971</i>	<i>1972</i>	<i>1973</i>	<i>1974</i>	<i>1975</i>	<i>1976</i>	<i>1977</i>	<i>1978</i>	<i>1979</i>
Nonfarm Employment		1,982	1,984	2,097	2,063	2,146	2,271	2,303	2,215	2,306	2,276
Private Employment		1,398	1,356	1,464	1,432	1,516	1,625	1,662	1,578	1,670	1,604
Ag. Services, forestry, fishing, other		26	27	22	27	25	33	40	46	53	56
Mining		41	32	49	27	29	71	77	32	17	16
Construction		191	52	107	69	122	120	102	126	193	119
Manufacturing		17	18	18	16	24	24	13	11	11	12
Transportation/ Public Utilities		63	66	68	76	100	103	106	104	128	144
Wholesale Trade		59	50	39	22	26	40	35	38	38	40
Retail Trade		433	478	474	517	530	527	520	520	514	526
Finance, insurance, real estate		148	185	222	226	238	245	185	174	155	161
Services		421	448	465	452	422	462	584	527	561	530
Government and Government Enterprises		584	528	633	631	630	646	641	637	636	672
Federal, civilian		101	132	129	125	124	135	129	125	126	130
Military		40	53	49	51	50	49	46	43	40	41
State and Local		443	443	455	455	456	462	466	468	470	501
State		N	N	N	N	N	N	N	N	N	N
Local		N	N	N	N	N	N	N	N	N	N
Farm Employment		334	346	361	374	403	399	387	384	381	424
Select Total (excludes military)		2,277	2,277	2,409	2,386	2,499	2,621	2,644	2,555	2,647	2,659
<i>Sierra County Jobs 1970-1998</i>		<i>80's</i>									
<i>By Industry</i>		<i>1980</i>	<i>1981</i>	<i>1982</i>	<i>1983</i>	<i>1984</i>	<i>1985</i>	<i>1986</i>	<i>1987</i>	<i>1988</i>	<i>1989</i>
Nonfarm Employment		2,384	2,802	2,341	2,277	2,353	2,419	2,586	2,665	2,898	3,121
Private Employment		1,731	2,219	1,832	1,758	1,823	1,871	1,964	2,008	2,211	2,418
Ag. Services, forestry, fishing, other		63	67	71	65	56	53	46	49	D	44
Mining		63	139	D	D	103	54	59	55	73	69
Construction		164	525	139	89	102	128	149	125	153	215
Manufacturing		36	41	D	D	19	23	24	31	D	D
Transportation/ Public Utilities		163	117	111	97	95	96	104	159	153	167
Wholesale Trade		34	45	48	59	51	50	48	57	64	D
Retail Trade		533	582	561	552	577	584	572	601	665	747
Finance, insurance, real estate		171	183	153	166	171	174	183	199	235	227
Services		504	520	D	D	649	709	779	732	799	854
Government and Government Enterprises		653	583	509	519	530	548	622	657	687	703
Federal, civilian		146	137	127	126	127	127	138	129	124	111
Military		39	42	44	42	43	45	46	50	50	50
State and Local		458	404	338	351	360	376	438	478	513	542
State		186	114	59	68	66	81	143	166	187	193
Local		282	290	279	283	294	295	295	312	326	349
Farm Employment		390	374	357	379	353	316	300	309	304	300
Select Total (excludes military)		2,725	3,134	1,905	1,884	2,663	2,690	2,840	2,924	3,083	3,276

Sierra County Jobs 1970-1998

90's

By Industry	1990	1991	1992	1993	1994	1995	1996	1997	1998
Nonfarm Employment	3,033	3,101	3,170	3,404	3,476	3,734	3,970	4,224	4,297
Private Employment	2,300	2,352	2,442	2,648	2,683	2,879	3,083	3,349	3,398
Ag. Services, forestry, fishing, other	50	72	83	91	97	D	D	D	D
Mining	61	D	D	D	46	D	D	D	D
Construction	191	199	216	327	273	302	267	293	291
Manufacturing	D	D	33	32	33	47	85	76	72
Transportation/ Public Utilities	166	157	153	151	174	204	228	220	201
Wholesale Trade	D	D	D	D	72	71	56	58	D
Retail Trade	670	664	726	722	752	790	863	918	915
Finance, insurance, real estate	239	249	194	268	236	267	346	391	399
Services	832	878	916	942	1,000	1,048	1,072	1,212	1,254
Government and Government Enterprises	733	749	728	756	793	855	887	875	899
Federal, civilian	104	93	93	95	100	101	106	96	116
Military	51	48	47	48	45	45	43	42	39
State and Local	578	608	588	613	648	709	738	737	744
State	221	243	219	225	254	252	306	284	278
Local	357	365	369	388	394	457	432	453	466
Farm Employment	302	304	323	331	336	338	348	347	370
Select Total (excludes military)	3,193	3,224	3,325	3,572	3,767	3,877	4,109	4,348	4,362

Source: U.S. Bureau of Economic Analysis

Notes:

D = Not shown to avoid disclosures of confidential information

N = Data not available for this year

L = Less than 50 jobs

Table A - 10. Socorro County Jobs by Percentage

<i>Socorro County Jobs</i>	<i>1970%</i>	<i>1975%</i>	<i>1980%</i>	<i>1985%</i>	<i>1990%</i>	<i>1995%</i>	<i>1998%</i>
State/Local Government	28%	29%	31%	34%	32%	29%	29%
Retail	18%	18%	14%	14%	17%	17%	15%
Farm	13%	13%	11%	9%	8%	8%	9%
Services	12%	15%	21%	22%	23%	29%	29%
Fed. Civil.	8%	9%	8%	5%	4%	3%	3%
Manufact.	5%	2%	2%	4%	5%	3%	3%
Construct.	5%	4%	4%	5%	4%	3%	3%
Trans/Util.	3%	3%	3%	3%	2%	2%	2%
FIRE	3%	3%	3%	3%	3%	4%	4%
Mining	2%	0%	1%	0%	0%	1%	1%
Ag. Svcs.	2%	0%	0%	1%	1%	1%	1%
Wholesale	1%	3%	2%	1%	1%	1%	1%
Total (excludes military)	100%	100%	100%	100%	100%	100%	100%

Source: U.S. Bureau of Economic Analysis

Note: Military jobs ranged from only 40-50 each year

Table A - 11. Sierra County Job Percentages Total

<i>Sierra County Jobs</i>	<i>1970%</i>	<i>1975%</i>	<i>1980%</i>	<i>1985%</i>	<i>1990%</i>	<i>1995%</i>	<i>1998%</i>
State/Local Govt.	19%	18%	17%	14%	18%	18%	16%
Retail	19%	20%	20%	22%	20%	20%	20%
Services	18%	18%	18%	26%	25%	26%	27%
Farm	15%	15%	14%	12%	9%	8%	8%
Construct.	8%	5%	6%	5%	6%	8%	6%
FIRE	6%	9%	6%	6%	7%	7%	9%
Fed. Govt.	4%	5%	5%	5%	3%	3%	3%
Trans/Util.	3%	4%	6%	4%	5%	5%	4%
Wholesale	3%	2%	1%	2%	2%	2%	1%
Mining	2%	3%	2%	2%	2%	1%	1%
Ag. Svcs.	1%	1%	2%	2%	2%	2%	2%
Manufact.	1%	1%	1%	1%	1%	1%	2%
Total (excludes military)	100%	100%	100%	100%	100%	100%	100%

Source: U.S. Bureau of Economic Analysis

Note: Military jobs ranged from about 40 to 50 each year.

Table A - 12. EPA/NMED Population Data Base For Water Use (1995-2000)

	<i>Population Served</i>	<i>Inspection Date</i>	<i>Business Customers</i>
<i>Socorro County Systems</i>			
La Joya MDWCA	132	1,998	
Magdalena Water System	1,170	1,998	75
Polvadera MDWA	1,700	1,995	8
San Acacia MDWA	225	1,995	
NM Boys' Ranch	70		
San Antonio NDWA	820	1,998	
Socorro Water System	9,200	1,999	448
<i>Population Served by Systems</i>	<i>13,317</i>		
<i>Estimated Self-served (1)</i>	<i>3,449</i>		<i>531</i>
<i>(Exclude Business Customers)</i>	<i>531</i>		
<i>Total Population</i>	<i>16,235</i>		

	<i>Population Served</i>	<i>Inspection Date</i>	<i>Business Customers</i>
<i>Sierra County Systems</i>			
Hillsboro MDWCA	192	2,000	
Lakeshore Sanitation District	1,425	1,998	
National Utilities (Elephant Butte)	2,980	2,000	857
Desert Aire Water Co. (Elephant Butte)	55	1,995	
Truth or Consequences	9,830	1,996	515
<i>Population Served</i>	<i>14,482</i>		<i>1,372</i>
<i>Estimated Self-served</i>	<i>1,842</i>		
<i>(Exclude Business Customers)</i>	<i>1,372</i>		
<i>Total Population</i>	<i>14,952</i>		

1) Self-supplied data is estimated from 1990 Census data.

Source: New Mexico Environment Department, Hydrosphere

Table A - 13. Assessor Data

Socorro County Assessor Data	<i>Socorro Assessor Data</i>		<i>Census Housing Data (Claritas)</i>		<i>Socorro Assessor Data</i>	
	<i>1990</i>	<i>1990</i>	<i>1990</i>	<i>1990</i>	<i>1999</i>	<i>1999</i>
	<i>Residential</i>	<i>Mobile Homes</i>	<i>Residential</i>	<i>Mobile Homes</i>	<i>Residential</i>	<i>Mobile Homes</i>
Socorro District 1(In)		722			2,357	767
Socorro District 1(Out)		351			958	376
Veguita District		110			3,127	227
Magdalena District 12 (In)		72			331	84
Magdalena District 12 (Out)		27			144	4
Lincoln District		5			19	2
Torrance District		0			13	0
Total	<i>Not available</i>	1,287	3,875	1,733	6,949	1,460

1) Claritas estimates for 1999 are extremely low for residential. They include single detached housing and semi-detached. Socorro assessor says they do not count apartments in residential count.

Sierra County Assessor Data	<i>Sierra Assessor Data</i>		<i>Census Housing Data (Claritas)</i>		<i>Sierra Assessor Data</i>		
	<i>1990</i>	<i>1990</i>	<i>1990</i>	<i>1990</i>	<i>1999</i>	<i>1999</i>	<i>1999</i>
	<i>Residential</i>	<i>Mobile Homes</i>	<i>Residential*</i>	<i>Mobile Homes</i>	<i>Residential</i>	<i>Mobile Homes*</i>	<i>Multi- family</i>
T or C					2481		
Williamsburg					254		
Elephant Butte					1015		
T or C metes and bounds					209		
Sierra County					1802		
Total	<i>Not available</i>	<i>Not available</i>	3,250	2,369	5,761	526	507

Note: Sierra County tax assessor classifies mobile homes on a permanent foundation as single family residential.

Table A - 14. School-Age Population

Socorro County School-Age Population	1990/91	1999/00	2000/01
<i>Census (5-17 Years of Age)</i>	3,272		
<i>County School Enrollment</i>			
Socorro Public Schools	2,059	2,242	2,120
Socorro Private Schools	129	0	0
Socorro Home Schooling*	15	51	54
Magdalena Public Schools	343	385	336
Magdalena Private Schools (Alamo Band BIA School)	360	389	412
Magdalena Home Schooling*	<u>16</u>	12	<u>18</u>
<i>Subtotal</i>	2,922		2,940
Belen Public Schools	no data		436
Belen Private Schools	no data		no data
Belen Home Schooling	no data		no data
Carizzozo, Mountainair, and Corona Districts reach slightly into Socorro County, but only have a few students each from the county (estimated).	8		10
<i>County Total</i>	2,930		3,386
<i>Census difference</i>	-342		

Sierra County School-Age Population	1990/91	1999/00	2000/01
<i>Census (5-17 Years of Age)</i>	1,401		
Truth or Consequences School District	1,471	1,761	1,700
Private Schools	36	33	33
Home Schooling*	19	38	31
<i>County Total</i>	1,526		1,764
<i>Census difference</i>	125		

*1990 home school enrollment for Socorro, Magdalena, and T or C is estimated from 1992 data

Sources: New Mexico Department of Education and respective school districts.

Components of Change, High Series

Table A - 15. Components of Population Change, Sierra County, 1990 to 2040 (Rate per 1000)

<i>Year</i>	<i>Birth Rate</i>	<i>Death Rate</i>	<i>Natural Increase</i>	<i>Net Migration</i>	<i>Population Increase</i>
1990-95	10.0	20.9	(10.9)	20.4	9.5
1995-2000	10.6	20.9	(10.3)	20.3	10.0
2000-05	10.7	20.8	(10.1)	19.3	9.2
2005-10	10.7	20.2	(9.5)	19.0	9.5
2010-15	10.5	18.9	(8.4)	19.7	11.3
2015-20	10.4	18.0	(7.6)	20.0	12.4
2020-25	9.8	17.9	(8.1)	19.9	11.8
2025-30	10.7	19.0	(8.3)	19.5	11.2
2030-35	10.3	19.3	(8.9)	19.0	10.1
2035-40	10.1	19.8	(9.7)	18.8	9.1

Table A - 16. Components of Population Change, Socorro County, 1990 to 2040 (Rate per 1000)

<i>Year</i>	<i>Birth Rate</i>	<i>Death Rate</i>	<i>Natural Increase</i>	<i>Net Migration</i>	<i>Population Increase</i>
1990-95	16.4	7.7	8.7	8.4	17.1
1995-2000	14.9	7.8	7.1	9.1	16.2
2000-05	15.0	8.0	7.0	9.2	16.2
2005-10	14.5	8.3	6.2	9.3	15.5
2010-15	13.8	8.5	5.3	9.5	14.8
2015-20	13.1	8.9	4.1	9.6	13.8
2020-25	12.7	9.8	2.8	9.8	12.6
2025-30	12.4	11.5	0.9	9.9	10.8
2030-35	12.3	12.3	0.0	9.9	9.9
2035-40	12.1	12.8	(0.7)	9.9	9.2

Components of Change, Low Series

Table A - 17. Components of Population Change, Sierra County, 1990 to 2040 (Rate per 1000)

<i>Year</i>	<i>Birth Rate</i>	<i>Death Rate</i>	<i>Natural Increase</i>	<i>Net Migration</i>	<i>Population Increase</i>
1990-95	9.9	21.0	(11.0)	19.9	8.9
1995-2000	10.4	21.0	(10.6)	19.3	8.7
2000-05	10.1	18.6	(8.5)	29.8	21.2
2005-10	8.8	17.8	(9.0)	29.5	20.5
2010-15	8.9	17.2	(8.3)	29.6	21.3
2015-20	8.6	16.9	(8.4)	29.7	21.4
2020-25	8.8	17.1	(8.9)	29.4	20.5
2025-30	7.7	17.8	(10.1)	28.9	18.8
2030-35	7.5	19.2	(11.7)	28.3	16.5
2035-40	9.8	23.4	(13.5)	17.1	3.6

Table A - 18. Components of Population Change, Socorro County, 1990 to 2040 (Rate per 1000)

<i>Year</i>	<i>Birth Rate</i>	<i>Death Rate</i>	<i>Natural Increase</i>	<i>Net Migration</i>	<i>Population Increase</i>
1990-95	15.5	7.7	7.8	8.4	16.1
1995-2000	15.0	7.9	7.1	8.7	15.8
2000-05	14.6	8.1	6.5	8.8	15.3
2005-10	14.0	8.4	5.6	8.9	14.5
2010-15	13.2	8.6	4.6	9.2	13.8
2015-20	12.6	9.6	3.0	9.3	12.3
2020-25	12.2	10.8	1.4	9.5	10.9
2025-30	12.5	12.3	.2	9.5	9.7
2030-35	12.3	13.4	(1.2)	9.5	8.3
2035-40	12.1	14.3	(2.2)	9.6	7.3

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