APPENDICES

Appendix A.

LRG-430 Subfile Order

THIRD JUDICIAL DISTRICT COURT
COUNTY OF DOÑA ANA
STATE OF NEW MEXICO

STATE OF NEW MEXICO *ex rel.* Office of the State Engineer, Plaintiff, vs. ELEPHANT BUTTE IRRIGATION DISTRICT, *et al.*, Defendants.	No. CV 96-888 Hon. Jerald A. Valentine Lower Rio Grande Northern Mesilla Valley Section Subfile No.: LRN-28-011-0078-A Case No(s). 307-NM-9708988

SUBFILE ORDER

The Court, having considered Plaintiff State of New Mexico's Offer of Judgment which has been accepted by the Defendant:

CITY OF LAS CRUCES

finds:

1. The Court has jurisdiction over the parties and the subject matter.

2. The right of the Defendant to divert and use the public waters from the Lower Rio Grande stream system and the Lower Rio Grande Underground Water Basin is as set forth below:

UNDERGROUND WATER ONLY

A. Office of the State Engineer File No(s): LRG-430 *et al.*

(1) Priority: 1905 for all groundwater diverted under LRG-430 and from each alternate point of diversion identified below at paragraph A(4).

(2) Source of Water: Underground waters of the Lower Rio Grande

Event Code: 3597

Underground Water Basin

(3) Purpose of Use: Municipal water supply and related as allowed under New Mexico law.

(4) Points of Diversion for this right:

Well No.: LRG-430 (Well 10) Location: X= 1,478,453 Y= 480,788 Map: LRN-10
Well No.: LRG-430 –S (Well 44) Location: X= 1,486,797 Y= 472,115 Map: LRN-14
Well No.: LRG-430-S-2 (Well 45) Location: X= 1,482,670 Y= 488,434 Map: LRN-11
Well No.: LRG-430-S-3 (Well 58) Location: X= 1,476,541 Y= 467,513 Map: LRN-14
Well No.: LRG-430-S-4 (Well 38) Location: X= 1,488,633 Y= 475,124 Map: LRN-11
Well No.: LRG-430-S-6 (Well 19) Location: X= 1,486,244 Y= 479,464 Map: LRN-11
Well No.: LRG-430-S-7 (Well 20) Location: X= 1,486,695 Y= 477,573 Map: LRN-11
Well No.: LRG-430-S-8 (Well 21) Location: X= 1,485,249 Y= 481,160 Map: LRN-11
Well No.: LRG-430-S-9 (Well 62) Location: X= 1,481,087 Y= 488,247 Map: LRN-11
Well No.: LRG-430-S-10 (Well 23) Location: X= 1,479,845 Y= 489,942 Map: LRN-11, Just off the top right corner
Well No.: LRG-430-S-11 (Well 24) Location: X= 1,486,443 Y= 475,136 Map: LRN-11
Well No.: LRG-430-S-12 (Well 26) Location: X= 1,484,298 Y= 476,633 Map: LRN-11
Well No.: LRG-430-S-13 (Well 25) Location: X= 1,482,036 Y= 486,677 Map: LRN-11
Well No.: LRG-430-S-14 (Well 27) Location: X= 1,484,263 Y= 478,885 Map: LRN-11
Well No.: LRG-430-S-15 (Well 28) Location: X= 1,482,913 Y= 485,134 Map: LRN-11
Well No.: LRG-430-S-16 (Well 29) Location: X= 1,472,362 Y= 476,170 Map: LRN-11
Well No.: LRG-430-S-17 (Well 65) Location: X= 1,471,818 Y= 470,210 Map: LRN-14
Well No.: LRG-430-S-18 (Well 31) Location: X= 1,468,103 Y= 483,005 Map: LRN-10
Well No.: LRG-430-S-19 (Well32) Location: X= 1,479,323 Y= 473,763 Map: LRN-11
Well No.: LRG-430-S-20 (Well 33) Location: X= 1,473,082 Y= 486,300 Map: LRN-10
Well No.: LRG-430-S-21 (Well 35) Location: X= 1,482,053 Y= 470,361 Map: LRN-14
Well No.: LRG-430-S-22 (Well 36) Location: X= 1,448,315 Y= 465,378 Map: LRN-15
Well No.: LRG-430-S-23 (Well 37) Location: X= 1,445,733 Y= 465,407 Map: LRN-15
Well No.: LRG-430-S-25 (Well 54) Location: X= 1,485,224 Y= 484,062 Map: LRN-11
Well No.: LRG-430-S-26 (Well 40) Location: X= 1,509,596 Y= 515,825 Map: LRN-15[1]
Well No.: LRG-430-S-27 (Well 39) Location: X= 1,477,149 Y= 487,939 Map: LRN-10
Well No.: LRG-430-S-28 (Well 41) Location: X= 1,509,550 Y= 518,473 Map: LRN-15[2]

[1] Changes from LRG-430-S-26 to LRG-3289 upon completion of infrastructure and notice to the State Engineer, after which it will no longer serve as a supplemental point of diversion for this right, pursuant to the conditions of the permit as detailed in the Conditions of Approval for Applications LRG-3283 through LRG-3296, attached to the State of New Mexico's Offer of Judgment as Attachment A.

[2] Changes from LRG-430-S-28 to LRG-3288 upon completion of infrastructure and notice to the State Engineer, after which it will no longer serve as a supplemental point of diversion for this right, pursuant to the conditions of the permit as detailed in the Conditions of Approval for Applications LRG-3283 through LRG-3296, attached to the State of New Mexico's Offer of Judgment as Attachment A.

Well No.: LRG-430-S-29 (Well 42) Location: X= 1,513,830 Y= 521,312 Map: LRN-15[3]
Well No.: LRG-430-S-30 (Well 43) Location: X= 1,515,477 Y= 521,302 Map: LRN-15[4]
Well No.: LRG-430-S-31 (Well 57) Location: X= 1,488,480 Y= 478,928 Map: LRN-11
Well No.: LRG-430-S-32 (Well 59) Location: X= 1,466,828 Y= 473,808 Map: LRN-9
Well No.: LRG-430-S-33 (Driving Range) Location: X= 1,482,119 Y= 491,743
Map: LRN-11, Just off the top right corner
Well No.: LRG-430-S-34 (Paz Park) Location: X= 1,482,790 Y= 480,912 Map: LRN-11
Well No.: LRG-430-S-35 (Well 60) Location: X= 1,480,633 Y= 475,342 Map: LRN-11
Well No.: LRG-430-S-36 (Well 46) Location: X= 1,450,354 Y= 465,486 Map: LRN-15
Well No.: LRG-430-S-37 (Well 61) Location: X= 1,486,357 Y= 476,054 Map: LRN-11
Well No.: LRG-430-S-38 (Well 63) Location: X= 1,448,428 Y= 463,098 Map: LRN-15
Well No.: LRG-430-S-39 (Well 64) Location: X= 1,448,327 Y= 457,796 Map: LRN-15
Well No.: LRG-430-S-42 (Well 67) Location: X= 1,474,347 Y= 474,111 Map: LRN-15

on the New Mexico State Plane Coordinate System, Central Zone, 1983 N.A.D.

Not foreclosing additional supplemental points of diversion for this right as may be approved in the future by the Office of the State Engineer pursuant to statute, the points of diversion listed above represent all existing LRG-430 series supplemental wells from which the Defendant may divert. In addition to the points of diversion listed above, Office of the State Engineer permits have been approved, and have not been withdrawn, for three (3) additional supplemental LRG-430 series wells under Office of the State Engineer file numbers LRG-430-S-40, LRG-430-S-41, and LRG-430-S-43 (Well 68) but these wells have not yet been drilled. Additionally, an emergency permit has been approved by the Office of the State Engineer under file number LRG-430-S-44 (Well 71), pursuant to NMSA 1978 Section 72-12-24 (A), authorizing the drilling and use by the Defendant of a supplemental LRG-430 series well prior to publication and a hearing. This well also has not yet been drilled and a permit for this well has not been approved, pursuant to NMSA 1978, Section 72-12-3, by the Office of the State Engineer.

(5) Amount of Water: Diversion from the LRG-430 wells not to exceed 21,869 acre-feet per annum from all points of diversion combined. Further provided that during periods of drought which, for purposes of this

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[3] Adjudicated an LRG-430 right under this subfile pending adjudication as a supplemental point of diversion under City East Mesa Permit Nos. LRG-3283-3285 and 3288-3296, upon which event it will cease to be a supplemental point of diversion for this right.

[4] Adjudicated an LRG-430 right under this subfile pending adjudication as a supplemental point of diversion under City East Mesa Permit Nos. LRG-3283-3285 and 3288-3296, upon which event it will cease to be a supplemental point of diversion for this right.

Offer of Judgment, are defined as years when the annual *pro rata* share of Rio Grande Project water available to acreage supplied with such water within Elephant Butte Irrigation District falls below two (2.0) acre-feet per acre, the Defendant shall not consumptively use the treated effluent derived from the LRG-430 wells listed in paragraph A (4), but shall return the effluent derived from these wells to the stream system. If the preceding year ended with an annual *pro rata* share of less than two (2.0) acre-feet per acre, the system remains in drought until the annual *pro rata* share is greater or equal to two (2.0) acre-feet per acre.

(6) Place of Use: The municipal water utility service area of the City of Las Cruces in Dona Ana County, generally west of the Organ Mountains, as may be extended from time to time in the future pursuant to state statute and upon notice to the State Engineer. The current boundaries of the City of Las Cruces municipal water utility service area are shown on the Hydrographic Survey Map for Subfile No. LRN-28-011-0078-A attached to the State of New Mexico's Offer of Judgment.

3. By signing the State of New Mexico's Offer of Judgment, the Defendant accepted all of the terms and conditions set forth or incorporated in the Offer of Judgment.

4. All terms or conditions set forth or incorporated in the State of New Mexico's Offer of Judgment are incorporated into this Order.

5. The Court enters this Order as a final judgment based on the acceptance by the Defendant of the State of New Mexico's Offer of Judgment, and therefore, pursuant to the Court's procedural orders addressing finality, this Order is final and not subject to appeal.

6. There is no just reason for delay of the entry of a final judgment as to the elements of the claims of the Defendant adjudicated by this Order.

IT IS THEREFORE ORDERED that the rights of the Defendant are as set forth above.

IT IS THEREFORE ORDERED that the Defendant and all those in privity with the Defendant are enjoined from any diversion or use of the public surface and underground waters of the Lower Rio Grande stream system and the Lower Rio Grande Underground Water Basin, under the Office of the State Engineer files identified above, except in strict accordance with the rights set forth hereinabove or in other Orders of the Court.

Jerald A. Valentine

Jerald A. Valentine
DISTRICT JUDGE

Submitted by:

Francis L. Reckard
Special Assistant Attorney General
Post Office Box 25102
Santa Fe, NM 87504-5102
(505) 827-6150
Counsel for Plaintiff State of New Mexico
ex rel. Office of the State Engineer

Approved as to form:

Jay F. Stein
Stein & Brockmann, P.A.
460 St. Michael's Drive
Suite 603
Santa Fe, New Mexico 87505
(505) 983-3880
Counsel for Defendant City of Las Cruces

Office of the State Engineer and City of Las Cruces Well Number Cross-Reference

Office of the State Engineer Well Number	City of Las Cruces Well Number	Office of the State Engineer Well Number	City of Las Cruces Well Number
LRG-00430	10	LRG-00430-S-21	35
LRG-00430-S	44	LRG-00430-S-22	36
LRG-00430-S-2	45	LRG-00430-S-23	37
LRG-00430-S-3	58	LRG-00430-S-25	54
LRG-00430-S-4	38	LRG-00430-S-26	40
LRG-00430-S-6	19	LRG-00430-S-27	39
LRG-00430-S-7	20	LRG-00430-S-28	41
LRG-00430-S-8	21	LRG-00430-S-29	42
LRG-00430-S-9	62	LRG-00430-S-30	43
LRG-00430-S-10	23	LRG-00430-S-31	57
LRG-00430-S-11	24	LRG-00430-S-32	59
LRG-00430-S-12	26	LRG-00430-S-33	Driving Range
LRG-00430-S-13	25	LRG-00430-S-34	Paz Park
LRG-00430-S-14	27	LRG-00430-S-35	60
LRG-00430-S-15	28	LRG-00430-S-36	46
LRG-00430-S-16	29	LRG-00430-S-37	61
LRG-00430-S-17	65	LRG-00430-S-38	63
LRG-00430-S-18	31	LRG-00430-S-39	64
LRG-00430-S-19	32	LRG-00430-S-42	67
LRG-00430-S-20	33		

See the special note about these points of diversion in the margin below.

LRG-00430-S-29
LRG-00430-S-30
LRG-00430-S-28
LRG-00430-S-26
LRG-00430-S-33
LRG-00430-S-10
LRG-00430-S-9
LRG-00430-S-2
LRG-00430-S-27
LRG-00430-S-15
LRG-00430-S-13
LRG-00430-S-20
LRG-00430-S-25
LRG-00430-S-34
LRG-00430-S-8
LRG-00430-S-18
LRG-00430
LRG-00430-S-6
LRG-00430-S-14
LRG-00430-S-31
LRG-00430-S-12
LRG-00430-S-7
LRG-00430-S-16
LRG-00430-S-35
LRG-00430-S-37
LRG-00430-S-42
LRG-00430-S-4
LRG-00430-S-11
LRG-00430-S-32
LRG-00430-S-19
LRG-00430-S-5
LRG-00430-S-17
LRG-00430-S-21
LRG-00430-S-22
LRG-00430-S-3
LRG-00430-S-23
LRG-00430-S-36
LRG-00430-S-38
LRG-00430-S-39

Legend

- Wells
- Las Cruces Service Area as of June 2005

Special Note

LRG-00430-S-26, S-28, S-29 and S-30 are adjudicated as points of diversion for subfile LRN-28-011-0078-A pending satisfaction of conditions stipulated to by the State of New Mexico and the City of Las Cruces as described in the Offer of Judgment. Upon satisfaction of these conditions, they will no longer serve as points of diversion for this subfile.

Large scale hydrographic survey maps for this subfile are attached to copies of the Offer of Judgment on file with the Court, New Mexico Office of the State Engineer, and the City of Las Cruces.

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STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

JOHN R. D'ANTONIO P.E., STATE ENGINEER
DL SANDERS, CHIEF COUNSEL

LITIGATION AND ADJUDICATION PROGRAM
LOWER RIO GRANDE BASIN HYDROGRAPHIC SURVEY
NORTHERN MESILLA VALLEY SECTION
Prepared by James E. Hansen

AUGUST 19, 2005

Subfile Map for the City of Las Cruces

LRN-28-011-0078-A

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LRG-00430-S-42
LRG-00430-S-4
LRG-00430-S-11
LRG-00430-S-32
LRG-00430-S-19
LRG-00430-S
LRG-00430-S-17
LRG-00430-S-21
LRG-00430-S-22
LRG-00430-S-3
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OFFICE OF THE STATE ENGINEER
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LITIGATION AND ADJUDICATION PROGRAM
LOWER RIO GRANDE BASIN HYDROGRAPHIC SURVEY
NORTHERN MESILLA VALLEY SECTION
Prepared by James E. Hansen

AUGUST 19, 2005

Subfile Map for the City of Las Cruces

LRN-28-011-0078-A

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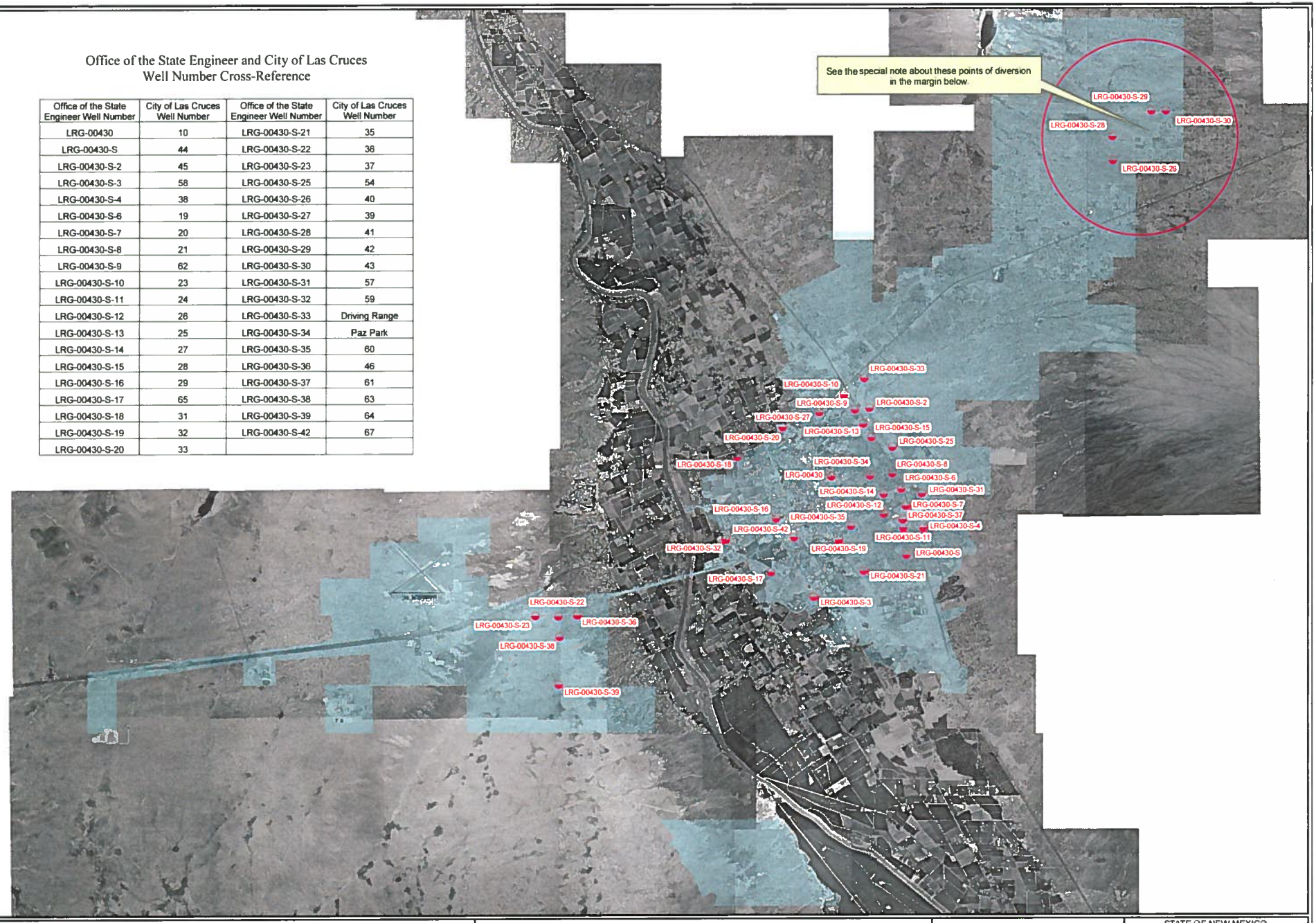
LRG-00430-S-19	32	LRG-00430-S-42	67
LRG-00430-S-20	33		



Legend

- Wells
- Las Cruces Service Area as of June 2005

Special Note

LRG-00430-S-26, S-28, S-29 and S-30 are adjudicated as points of diversion for subfile LRN-28-011-0078-A pending satisfaction of conditions stipulated to by the State of New Mexico and the City of Las Cruces as described in the Offer of Judgment. Upon satisfaction of these conditions, they will no longer serve as points of diversion for this subfile.

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STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
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LITIGATION AND ADJUDICATION PROGRAM
LOWER RIO GRANDE BASIN HYDROGRAPHIC SURVEY
NORTHERN MESILLA VALLEY SECTION
Prepared by James E. Hansen

AUGUST 19, 2005

Subfile Map for the City of Las Cruces

LRN-28-011-0078-A

Appendix B.

LRG-3283 through LRG-3285 and LRG-3288 through LRG-3296 East Mesa Permits

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
SANTA FE

THOMAS C. TURNEY
State Engineer

BATAAN MEMORIAL BUILDING, ROOM 101
POST OFFICE BOX 25102
SANTA FE, NEW MEXICO 87504-5102
(505) 827-6175
FAX: (505) 827-6188

February 4, 2002

HAND DELIVERED

Mayor Ruben Smith
City of Las Cruces
P.O. Box 20000
Las Cruces, New Mexico 88004

Re: Applications No. LRG-3283 thru LRG-3296

Dear Mayor Smith:

Enclosed are your originals of the above numbered applications, seven of which have been approved in full, five of which have been partially approved, and two of which have been denied. I am requiring as a condition on these permits that a water conservation report be submitted to my office for review each year. My water conservation officer will review the report for effective conservation practices and the enforcement and effectiveness of those measures. Within 3 years of approval of these permits, the city is required to reduce residential per capita use to the amount equal to the southwestern states average.

If you are aggrieved by any of these decisions and wish an opportunity to present evidence in support of any application, you should so advise this office in writing before the expiration of thirty days after receipt of this letter and request that the previous action of the State Engineer be set aside and that a date for a hearing be set. In the event a hearing is requested, a reasonable time will be allowed for you to prepare for your case.

If a hearing is necessary on this matter, you will be required to submit a hearing fee that will be required when the hearing is announced.

Sincerely,

Thomas C. Turney
State Engineer

cc: Water Rights

Attachment
Conditions of Approval
for

APPLICATIONS LRG-3283 THROUGH LRG-3296 FOR PERMIT TO APPROPRIATE THE UNDERGROUND WATERS OF THE SOUTHERN JORNADA DEL MUERTO SUB-BASIN OF THE LOWER RIO GRANDE UNDERGROUND WATER BASIN

Applications LRG-3286 and LRG-3287 for Permit to Appropriate are denied for the reason that no pumping at the proposed locations is possible without causing incremental water-level declines greater than 0.1 ft/yr in the critical cell in which these wells are to be located.

Applications LRG-3283, LRG-3284, LRG-3285, LRG-3288, LRG-3289, LRG-3290, LRG-3291, LRG-3292, LRG-3293, LRG-3294, LRG-3295 and LRG-3296 for Permit to Appropriate are approved or partially approved, subject to the following conditions:

1) These applications are approved as follows:
Permit Numbers:
LRG-3283, LRG-3284, LRG-3285, LRG-3288, LRG-3289, LRG-3290, LRG-3291, LRG-3292, LRG-3293, LRG-3294, LRG-3295 and LRG-3296

Priority: November 24, 1981

Source: Shallow underground waters of the Southern Jornada del Muerto sub-basin of the Lower Rio Grande basin

Points of diversion:

Well No.	Sub.	Section	Township	Range
LRG-3283	NW¼NW¼SE¼	30	21 South	3 East
LRG-3284	NE¼NE¼SE¼	30	21 South	3 East
LRG-3285	NW¼NW¼SE¼	29	21 South	3 East
LRG-3288	SW¼SW¼NE¼	6	22 South	3 East
LRG-3289	SW¼SW¼SE¼	6	22 South	3 East
LRG-3290	NW¼NW¼SE¼	2	22 South	2 East
LRG-3291	NE¼NE¼NW¼	2	22 South	2 East
LRG-3292	NW¼NW¼SE¼	35	21 South	2 East
LRG-3293	NE¼NE¼SE¼	35	21 South	2 East
LRG-3294	SW¼SW¼NE¼	36	21 South	2 East
LRG-3295	SW¼SW¼SE¼	26	21 South	2 East
LRG-3296	SW¼SW¼NE¼	26	21 South	2 East

Purpose of Use: Municipal

Place of Use: Within the service area of the City of Las Cruces

Amount of Water: The maximum diversion from each individual well under these permits shall not exceed the following amounts for a total combined diversion and consumptive use of 10,200 acre-feet per annum (subject to Condition 4):

Well No.	Amount (acre-feet per annum)
LRG-3283	700
LRG-3284	450
LRG-3285	450
LRG-3288	800
LRG-3289	800
LRG-3290	1,000
LRG-3291	1,000
LRG-3292	1,000
LRG-3293	1,000
LRG-3294	1,000
LRG-3295	1,000
LRG-3296	1,000

a. No water shall be diverted under these permits until existing permits LRG-430-S-26 and LRG-430-S-28, totaling 3,096 acre-feet per annum, are withdrawn.

b. These permits shall not be exercised to the detriment of valid existing water rights, shall not be contrary to conservation of water within the state, and shall not be detrimental to the public welfare of the state of New Mexico.

2) Prior to the drilling of wells under these permits, the permittee shall submit to the District IV Office of the State Engineer in Las Cruces an acknowledged statement executed by the owner of the land upon which the wells are to be drilled that the permittee has permission to occupy such portion of the owner's land as is necessary to drill and operate the wells.

3) Any wells encountering Total Dissolved Solids (TDS) of 1,000 milligrams per liter or greater during drilling shall be plugged back to at least half the thickness of the freshwater zone to protect water quality.

4) Diversions under these permits will require that depletions to the surface flow of the Rio Grande be offset in the amount of 644 acre-feet per annum reflecting the calculated maximum 100-year effect to the Rio Grande. The 644 acre-feet per annum represents the calculated maximum 100-year effect of ultimately pumping 10,200 acre-feet per annum. Because not all of the depletions occur simultaneously with the diversions, depletion offsets from either the acquisition

and transfer of existing valid water rights or treated effluent (pursuant to a state engineer approved return flow plan) into the Rio Grande must be in accordance with the following schedule:

Time after start of pumping (years)	Required Depletion Offsets (acre-feet per annum)
1	0.0
5	0.3
10	2.8
20	18
30	50
40	100
100	644

These permits expire on February 28, 2102; unless prior to the expiration date of these permits, the permittee has made request to the state engineer to renew one or more of the permits, published notice of such request, and has received an approval from the state engineer for its or their renewal. No return flow credits for the purpose of increasing diversions under these permits will be granted.

5) The State Engineer retains jurisdiction over these permits to oversee the provisions of nos. 1 and 4 above, and may reevaluate the amount of water approved under these permits in no. 1 above in the event that background stresses currently assumed are later found to be less, subject to administrative criteria or additional considerations that may exist at such time.

6) The permittee shall utilize the highest and best technology available and economically feasible for the intended use to ensure conservation of water to the maximum extent practical.

7) The permittee shall submit on or before January 1 of each year, a written report acceptable to the State Engineer on water conservation efforts, overall per capita use and residential per capita use calculations and any changes to the water conservation plan all of which illustrate the effectiveness of the water conservation efforts of the permitee. Within 3 years of approval of these permits, the permittee shall reduce residential per capita use to the amount equal to the southwestern states average.

8) Prior to diversion of water under these permits, the permittee shall install a well monitoring system in the Southern Jornada del Muerto sub-basin, of a type and location(s) acceptable to the State Engineer. Monitored water level measurements shall be taken and reported at a frequency acceptable to the State Engineer.

9) Wells numbered LRG-3283, LRG-3284, LRG-3285, LRG-3288, LRG-3289, LRG-3290, LRG-3291, LRG-3292, LRG-3293, LRG-3294, LRG-3295 and LRG-3296 shall each be equipped with totalizing meters installed before the first branch of the discharge line from each well. The discharge of treated sewage effluent into the Rio Grande generated by diversions from these wells shall also be metered. The type of meters, manner of installation and meter locations must be acceptable to the State Engineer. The permittee shall provide the State Engineer in writing with the make, model, serial number, date of installation and initial meter readings prior to the appropriation of water.

10) Written records of the amount of water diverted from wells numbered LRG-3283, LRG-3284, LRG-3285, LRG-3288, LRG-3289, LRG-3290, LRG-3291, LRG-3292, LRG-3293, LRG-3294, LRG-3295 and LRG-3296 and subsequent discharge of treated sewage effluent into the Rio Grande generated by diversions from these wells shall be submitted to the District IV Office of the State Engineer in Las Cruces on or before the 10th day of each month for the preceding calendar month.

11) A Well Record shall be submitted to the District IV Office of the State Engineer in Las Cruces within ten (10) days following the drilling of wells numbered LRG-3283, LRG-3284, LRG-3285, LRG-3289 (existing well, previously numbered LRG-430-S-26), LRG-3290, LRG-3291, LRG-3292, LRG-3293, LRG-3294, LRG-3295 and LRG-3296 under these permits.

A Well Record for existing well LRG-3288 (previously numbered LRG-430-S-28) has been filed. A Well Record has not been filed and is required prior to any diversions from existing well LRG-3289 (previously numbered LRG-430-S-26).

12) Proof of Completion of Well for wells numbered LRG-3283, LRG-3284, LRG-3285, LRG-3288, LRG-3289, LRG-3290, LRG-3291, LRG-3292, LRG-3293, LRG-3294, LRG-3295 and LRG-3296 shall be filed with the District IV Office of the State Engineer in Las Cruces on or before February 28, 2004.

13) Proof of Application of Water to Beneficial Use shall be filed with the District IV Office of the State Engineer in Las Cruces on or before February 28, 2006.

Date: February 4, 2002

Thomas C. Turney, P.E.
New Mexico State Engineer

Appendix C.

LRG-3275 et al. West Mesa Permit

FILED

NOV 24 1981
4:10PM
STATE ENGINEER FIELD OFFICE
Las Cruces, N.M.

File# LRG-3275
Permit# LRG-3275-POD1 thru POD7
TRN 152474

097030D $5.00

IMPORTANT—READ INSTRUCTIONS ON BACK BEFORE FILLING OUT THIS FORM

APPLICATION FOR PERMIT

To Appropriate the Underground Waters of the State of New Mexico

Date Received November 24, 1981 File No. LRG-3275

1. Name of applicant CITY OF LAS CRUCES
   Mailing address P O DRAWER CLC
   City and State LAS CRUCES, NEW MEXICO 88004
2. Source of water supply Shallow Water Aquifer, located in Lower Rio Grande
   (artesian or shallow water aquifer) (name of underground basin)
3. The well is to be located in the NE ¼ NE ¼ SW ¼, Section 29 Township 23S
   Range 1E N.M.P.M., or Tract No. of Map No. of the District,
   on land owned by The United States of America
4. Description of well: name of driller Unknown at present;
   Outside Diameter of casing 24 inches; Approximate depth to be drilled 1500 feet;
5. Quantity of water to be appropriated and beneficially used 8000 diversion acre feet,
   (consumptive/non-consumptive diversion)
   for Municipal and Industrial Water Supply purposes.
6. Acreage to be irrigated or place of use 0 acres.

Subdivision	Section	Township	Range	Acres	Owner

7. Additional statements or explanations The City of Las Cruces proposes to use this well along with seven (7) other wells for municipal and industrial water supply purposes. These wells will be connected to the system as it now exists or as it will exist in the future. Wells will be constructed as needed.

1

I, KENNETH M. NEEDHAM, affirm that the foregoing statements are true to the best of my knowledge and belief and that development shall not commence until approval of the permit has been obtained.

CITY OF LAS CRUCES, Permittee,

By: Kenneth Needham.

Subscribed and sworn to before me this 24 day of November, A.D., 19 81.

My commission expires May 5, 1985 Beverlye J. Dorsey
Notary Public

LRG-3275
TRN 152474

Number of this permit _____

ACTION OF STATE ENGINEER

After notice pursuant to statute and by authority vested in me, this application is approved provided it is not exercised to the detriment of any others having existing rights; further provided that all rules and regulations of the State Engineer pertaining to the drilling of _____ wells be complied with; and further subject to the following conditions: _____

As per attached conditions.

Proof of completion of well shall be filed on or before March 31, 2012

Proof of application of water to beneficial use shall be filed on or before March 31, 2014

Witness my hand and seal this 9th day of March, A.D., 2010

JOHN R.D'ANTONIO,JR., STATE ENGINEER

BY _____.
J.R. Hennessey, Water Resource Specialist

INSTRUCTIONS

This form shall be executed, preferably typewritten, in triplicate and shall be accompanied by a filing fee of $5.00. Each of triplicate copies must be properly signed and attested.

A separate application for permit must be filed for each well used.

Secs. 1–4—Fill out all blanks fully and accurately.

Sec. 5—Irrigation use shall be stated in acre feet of water per acre per annum to be applied on the land. If for municipal or other purposes, state total quantity in acre feet to be used annually.

Sec. 6—Describe only the lands to be irrigated or where water will be used. If on unsurveyed lands describe by legal subdivision "as projected" from the nearest government survey corners, or describe by metes and bounds and tie survey to some permanent, easily located natural object.

Sec. 7—If lands are irrigated from any other source, explain in this section. Give any other data necessary to fully describe water right sought.

Attachment
Conditions of Approval

Application Nos. LRG-3275-POD 1 through LRG-3275-POD 7 for Permits to Appropriate Underground Water

1) These applications are approved as follows:

Permit Numbers:	LRG-3275-POD 1 through LRG-3275-POD 7 (formerly numbered LRG-3275 thorough LRG-3281)
Priority:	November 24, 1981
Source:	Shallow underground water of the Lower Rio Grande Underground Water Basin.
Points of Diversion:	Well LRG-3275-POD 1 located within the NE¼ NE¼ SW¼ of Section 29, T23S, R01E, NMPM at approximately X=1,451,076 Y=465,526 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 2 located within the SW¼ SW¼ NE¼ of Section 31, T23S, R01E, NMPM at approximately X=1,446,042 Y=460,523 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 3 located within the NE¼ NE¼ SE¼ of Section 31, T23S, R01E, NMPM at approximately X=1,448,363 Y=459,868 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 4 located within the SW¼ SW¼ NE¼ of Section 32, T23S, R01E, NMPM at approximately X=1,451,298 Y=460,486 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 5 located within the SW¼ SW¼ NE¼ of Section 6, T24S, R01E, NMPM at approximately X=1,445,899 Y=455,197 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 6 located within the NE¼ NE¼ SE¼ of Section 6, T24S, R01E, NMPM at approximately X=1,448,308 Y=454,878 ft. (NMSP, Central Zone, NAD83)

	Well LRG-3275-POD 7 located within the SW¼ SW¼ NE¼ of Section 5, T24S, R01E, NMPM at approximately X=1,451,278 Y=455,225 ft. (NMSP, Central Zone, NAD 83)
Purpose of Use:	Municipal
Place of Use:	The municipal water utility service area of the City of Las Cruces, as on-file with the State Engineer.
Amount of Water:	8,000 acre-feet per annum total diversion from all wells combined. The maximum diversion for each individual well under these permits is limited to 2,500 acre-feet per annum.

2) Prior to the drilling of any well under these permits, the permittee shall submit an acknowledged statement executed by the owner of the land upon which the wells are to be drilled that the permittee has permission to occupy such portion of the owner's land necessary to drill and operate the wells.

3) Diversions under these permits require that depletions to the surface flow of the Rio Grande be offset in that amount diverted in any given year, up to 8,000 acre-feet per annum. Surface water depletions may be offset by the acquisition, transfer, and retirement of valid existing water rights or through the use of treated wastewater effluent discharged directly to the Rio Grande pursuant to the City of Las Cruces Return Flow Plan on-file with the State Engineer. The amount of water diverted under these permits is limited to the amount of surface water depletion offsets credited to these permits in a given calendar year. The amount of water that may be diverted under these permits will be reevaluated and determined by the State Engineer on or before March 31st, subject to any offset debt from the previous calendar year(s) and anticipated availability of offsets in the current calendar year. No return flow credits for the purpose of increasing diversions under these permits will be granted.

4) The State Engineer retains jurisdiction over these permits to oversee and administer Condition 3 listed above.

5) Within 2-years of the approval date of this permit, the permittee shall submit a stand-alone Water Conservation Plan acceptable to the State Engineer that outlines a plan to achieve a system gpcpd goal of 180 within 20-years and which shows how the City intends to maintain that level of effort to achieve a more aggressive gpcd goal within 40-years. This Water Conservation Plan must be updated every 10 years and shall also include provisions for reducing water use during periods of extended drought consistent with appropriate drought management plans. The conservation plan must be submitted to:

Water Use & Conservation Bureau
Office of the State Engineer
PO Box 25102
Santa Fe, NM 87504-5102

6) The permittee shall submit, on or before March 1 of each year, a written report acceptable to the Water Use and Conservation Bureau, Office of the State Engineer on water conservation efforts, overall per capita use and residential per capita use calculations using the NMOSE GPCD methodology, and annual AWWA system water audit.

7) The permittee shall submit periodic progress reports on the implementation of its 40-year plan to the State Engineer at a minimum rate of once every 10 years. These updates shall contain a comparison of the observed population changes versus the 2005 projected population estimates as well as revised population projections.

8) A Well Record for wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be submitted to the Office of the State Engineer in Las Cruces within 20-days of the drilling of the wells.

9) Wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be equipped with a totalizing meter of a type and at a location approved by, and installed in a manner acceptable to the State Engineer. The permittee shall provide in writing, the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of the meters, and any replacement meter used to measure the diversion of water. No water shall be diverted from the wells unless equipped with a functional totalizing meter. Any and all wells not is service for which pump equipment has been removed or has not been installed shall be properly capped or otherwise sealed at the top of the casing to prevent groundwater contamination and other safety hazards.

10) Written records of totalizing meter reading from wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be submitted in writing to the Office of the State Engineer in Las Cruces on or before the tenth day of each month for the preceding calendar month.

11) Proof of Completion of wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be submitted to the Office of the State Engineer in Las Cruces on or before March 31, 2012.

12) Proof of Application of Water to Beneficial under these Permits shall be submitted to the Office of the State Engineer in Las Cruces on or before March 31, 2014.

13) This permit shall not be exercised to the detriment of valid existing water rights, shall not be contrary to conservation of water within the state, and shall not be detrimental to the public welfare of the state of New Mexico.

14) The permittee shall utilize the highest and best technology available and economically feasible for the intended use to ensure conservation of water to the maximum practical extent.

Date: March 9, 2010

J.R. Hennessey
Water Resource Specialist
Office of the State Engineer
District IV; Las Cruces

John R. D Antonio, Jr., P.E.
State Engineer

Las Cruces Office
1680 HICKORY LOOP, SUITE J
LAS CRUCES, NM 88005

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER
District 4 Office

Trn Nbr: 152474
File Nbr: LRG 03275

Mar. 09, 2010

JORGE GARCIA
CITY OF LAS CRUCES
P.O. BOX 20000
LAS CRUCES, NM 88004

Greetings:

Enclosed is your copy of the above numbered permit which has been approved subject to the conditions set forth on the approval page thereof.

Proof of Application of Water to Beneficial Use will be due in this office on 03/31/2014. This proof must be signed by an engineer or land surveyor who is registered in the State of New Mexico, and who must be designated and paid by you. As soon as you are ready to have final inspection made, you should send this office the name of the engineer or land surveyor you wish to employ so that we may send him the necessary instructions.

Proof of Completion of Well(s) will be filed in this office after completion and installation of equipment, but in no event later than 03/31/2012. Proof of Completion of Well forms shall be mailed upon request.

Your rights under this permit will expire on 03/31/2014, unless Proofs of Completion of Well(s) and Proof of Application of Water to Beneficial Use are filed or an Application for Extension of Time is received in this office on or before that date.

Sincerely,

J.R. Hennessey
(575)524-6161

Enclosure

nonpbupcw

MEMORANDUM
OFFICE OF THE STATE ENGINEER
DISTRICT 4
February 17, 2010

Files: LRG-3275 through LRG-3281

To: Erek Fuchs, Basin Supervisor

From: J.R. Hennessey, Water Resource Specialist

Subject: Applications for Permits to Appropriate Underground Water Nos. LRG-3275 through LRG-3281

Applicant: City of Las Cruces

1.0 Applications

Applications numbered LRG-3275 through LRG-3281 were filed with the State Engineer on 11/24/1981 for Permits to Appropriate the Underground Waters of the State of New Mexico within the Lower Rio Grande Underground Water Basin in Doña Ana County. The applications propose to drill new wells LRG-3275 through LRG-3281 for the combined diversion of 8,000 acre-feet per annum for municipal and industrial supply uses within the municipal water utility service area of the City of Las Cruces.

Application no. LRG-3282 was filed at the same time as applications LRG-3275 through LRG-3281, but was withdrawn by the applicant on 6/14/2008 because of an error in the location description for the well. The applicant did not wish to amend the application and re-advertise the Notice. This application has been formally withdrawn and will not be considered in this evaluation.

Proposed Wells

Well LRG-3275
Location: Within the NE¼ NE¼ SW¼ of Section 29, T23S, R01E, NMPM
Depth: 1,500 feet
Casing: 24 inches

Well LRG-3276
Location: Within the SW¼ SW¼ NE¼ of Section 31, T23S, R01E, NMPM
Depth: 1,500 feet
Casing: 24 inches

Well LRG-3277
Location: Within the NE¼ NE¼ SE¼ of Section 31, T23S, R01E, NMPM
Depth: 1,500 feet
Casing: 24 inches

Well LRG-3278
Location: Within the SW¼ SW¼ NE¼ of Section 32, T23S, R01E, NMPM
Depth: 1,500 feet
Casing: 24 inches

Well LRG-3279
Location: Within the SW¼ SW¼ NE¼ of Section 6, T24S, R01E, NMPM
Depth: 1,500 feet
Casing: 24 inches

Well LRG-3280
Location: Within the NE¼ NE¼ SE¼ of Section 6, T24S, R01E, NMPM
Depth: 1,500 feet
Casing: 24 inches

Well LRG-3281
Location: Within the SW¼ SW¼ NE¼ of Section 5, T24S, R01E, NMPM
Depth: 1,500 feet
Casing: 24 inches

The applicant was not required to provide point locations for the wells in the applications at the time they were filed. Point locations for the wells were solicited from the City of Las Cruces Utilities department for this evaluation. CLC Utilities provided the locations identified in Table 1.

Well No.	X (ft)	Y (ft)
LRG-3275	1,451,076	465,526
LRG-3276	1,446,042	460,523
LRG-3277	1,448,363	459,868
LRG-3278	1,451,298	460,486
LRG-3279	1,445,899	455,197
LRG-3280	1,448,308	454,878
LRG-3281	1,451,278	455,225

Coordinates are N.M.S.P, Central Zone, NAD83

Table 1. Point Locations for Wells LRG-3275 through LRG-3281

Purpose and Place of Use
Purpose of use is identified as "municipal and industrial water supply" purposes in the applications. Place of use is not specifically defined, instead an additional statement is provided in the applications that states: "These wells will be connected to the system as it now exists or as it will exist in the future." The place of use is understood to be the municipal water utility service area of the City of Las Cruces.

Quantity of Water
8,000 acre-feet per annum from all wells combined.

Notice for Publication
Notice for the application was published in the Las Cruces Sun-News once a week for three consecutive weeks on 12/7/1981, 12/14/1981, and 12/21/1981. Affidavit of Publication was received on 1/6/1982.

Protest:
The El Paso Water Utilities Public Service Board filed a timely protest to the subject applications on 12/30/1981. The City of El Paso withdrew their protest on 6/28/1991. No other protests to the applications remain.

2.0 Evaluation of Requested Quantity of Water
The size of the appropriation requested by the applicant requires this office to consider the City's currently held rights to water, the development of those rights, and future water demand projections for the City of Las Cruces.

Existing Rights
Municipal Rights
The LRG-430 water right is the primary water right used for municipal purposes within the City of Las Cruces municipal water utility service area. The LRG-430 water right is adjudicated, as described below:

Order of District Court

Subfile Order No.:	LRN-28-011-0078-A
Defendant:	City of Las Cruces
Date Filed:	8/31/2005
Purpose of Use:	Municipal water supply and related as allowed under New Mexico Law
Place of Use:	The municipal water utility service area of the City of Las in Doña Ana County, as recorded with the State Engineer, which may be extended in the future pursuant to state statute and upon notice to the State Engineer.
Source:	Underground waters of the Lower Rio Grande Underground Water Basin
Quantity:	21,869 acre-feet per annum
Priority:	12/31/1905
POD(s):	See Subfile Order.

The LRG-430 water right been permitted in permit nos. LRG-430-S-44, LRG-430-POD-56, and LRG-430-S-42 subsequent to the LRN-28-011-0078-A Subfile Order being filed in the LRG Adjudication. Wells LRG-430-S-44 and LRG-430-POD 56 have been permitted as supplemental points of diversion for the LRG-430 right and Permit No. LRG-430-S-42 was issued, which increased the allowable diversion amount at well LRG-

430-S-42. All other elements of the LRG-430 water remain as described in the LRN-28-011-0078-A Subfile Order.

Rights to water currently held by the City of Las Cruces that may be used for municipal or subdivision use are identified in Table 2.

File No.	Use	Status	Amount (AFA)	Comments
LRG-430	Municipal	Adjudicated	21,869	Licensed and Adjudicated
LRG-389	Municipal	Permitted	2,550	Subject to offsets. None yet acquired or identified. Not currently exercised.
LRG-399	Municipal	Permitted	1,700	Subject to offsets. 300.18 AFA acquired. Also offset with treated effluent returned to the Rio Grande. 1,700 was exercised in 2009.
LRG-3283 et al.	Municipal	Permitted	10,200	Subject to offsets. Not currently exercised.
LRG-5818	Subdivision	Permitted	792	42.46 vested, remaining rights subject to offsets. Limited Service Area, see file.
LRG-517	Subdivision	Declared	774	An application is pending to combine the LRG-517 right with LRG-430, but LRG-430 already serves the LRG-517 service area.
Total	Subdivision		1,566	
	Municipal		36,319	

Table 2. Municipal or Subdivision rights owned by the City of Las Cruces.

Irrigation Rights

Surface Water Rights

The City of Las Cruces is currently acquiring and/or leasing irrigation surface water rights from lands within the Elephant Butte Irrigation District (EBID) for future use for municipal water supply within its municipal water utility service area. Legislation enacted in 2003 allows municipalities and other qualifying entities to form Special Water Users' Associations (SWUAs) to use Rio Grande Project water for municipal use in their service area. State Engineer rules governing these leases have not yet been promulgated, nor has the City yet constructed a surface water treatment plant. The City's 40-Year Water Development Plan states that surface water treatment plant construction may begin in the year 2012 (p. 4).

The City currently leases or owns 1,301.5 acres of surface water rights within the EBID (2/4/2010 personal communication w/Adrienne Widmer, CLC Utilities). The City is not currently using surface water for municipal supply, but anticipates using surface rights for

municipal supply in an amount of up to 20,000 acre-feet per annum during full allotment years within the project once its surface water treatment system is built and State Engineer rules are promulgated for SWUAs. If one assumes a full annual allotment of 3.0 acre-feet per annum within the EBID, the City could potentially receive 3904.5 acre-feet per annum from surface water rights that they currently own or lease.

Groundwater Rights
A query of the W.A.T.E.R.S. database for irrigation rights owned by the City of Las Cruces returned the rights listed in Table 3.

File No.	Use	Status	Amount (AFA)	Comments
LRG-2036	Irrigation	PMT	67.7	This is a primary groundwater only.
LRG-2060	Irrigation	DCL	TBD	Part Combined and part primary groundwater right. 1993 Field check in file indicates that the claimed 4 acres was irrigated by city municipal water at that time. No surface rights remain at this location.
LRG-4007	Irrigation	DCL	TBD	This is a combined water right claimed on 32.53 acres. 22.53 acres remains assessed by the EBID.

Table 3. Groundwater Irrigation Rights owned by the City of Las Cruces.

The City may hold title to numerous other groundwater irrigation rights not listed in Table 3 that comprise the groundwater component of a combined irrigation right that is appurtenant to land they own or associated with surface water rights that they have previously acquired. The rights listed in Table 3 only represent the rights on record with this office as being owned by the City of Las Cruces at the time of this evaluation.

Other Sources of Water
Deep Aquifer Production
The City of Las Cruces filed a notice of intention to appropriate non-potable groundwater at depths greater than 2,500 feet pursuant to NMSA 1978 72-12-25 through 72-12-28 on December 21, 2008. The Notice for the application states that it is the intention of the City construct 5 wells to a depth of 5,000 or 6,000 feet below ground surface for the diversion of 5,000 acre-feet per annum for domestic, livestock, irrigation, municipal, industrial, commercial, recreation, subdivision and related uses. These wells have not yet been drilled.

NMSU-City of Las Cruces Water Agreement

The City of Las Cruces water system is interconnected with the New Mexico State University water system, and the City may use water from NMSU's LRG-35 wells, as stipulated in Subfile Order No. LRN-28-014-0001 of the Third Judicial District Court in the LRG Adjudication. An agreement has been in place since March 21, 1983 in which the City may supply water and natural gas to NMSU if needed and NMSU may supply water to the City if needed. The agreement has been supplemented by subsequent agreements dated March 11, 2004; December 18, 2006; and March 12, 2007 (McCoy & Peery, 2008, p. 16). According to these agreements NMSU may sell up to 3,500 acre-feet per annum to the City of Las Cruces for various purposes, but the water is to mainly be used for potential peaking and emergency needs. It is not clear if NMSU has ever provided water to the City of Las Cruces under this agreement. The agreements between NMSU and the City concerning municipal supply to the City's service area are solely between those entities. The state is not a party to the agreements, nor do the agreements have any precedent or authority over the Subfile Orders entered in the Third Judicial Court in the LRG Adjudication for the LRG-430 and LRG-35 water rights.

Population and Water Demand Projections

The City of Las Cruces has a 40-year Water Development Plan on-file with the State Engineer that includes population and water demand projections through the year 2045 (McCoy & Peery, 2008). The City's 40-year Plan was evaluated and found reasonable by the NMOSE Water Use and Conservation Bureau in May 2009 (Chavez, 2009). Specifically, the "high growth rate" provided in the City's 40-year Water Development Plan was found reasonable "so long as permit conditions include periodic reality checks where Las Cruces provides evidence of success of this population projection" (Vogel, 2009, p. 3). The Water Use and Conservation Bureau has provided specific permit conditions to be included in the conditions of approval for these applications that require periodic updates on the status of water conservation and progress toward the implementation of the City's 40-year Plan (see attached). The high growth rate presented in the City's 40-year plan uses a 3% constant growth rate throughout the 40-year projection period. 3% is slightly higher than the University of New Mexico's Bureau of Business and Economic Research projection of decreasing growth for Dona Ana County from 2.32% in 2010 to 1.06% in 2045 (UNM, 2008, p. 62). No additional evaluation of the reasonableness of the population or water demand projections is necessary because it has already been determined by the Water Use and Conservation Bureau that the High Growth Rate projections are reasonable.

The City's 40-year plan identifies the High Growth population projection listed in Table 4. The City's projected total gallons per day per capita water use are identified in Table 5 and water use projections are listed in Table 6.

Year	Population
2010	98,154
2015	114,219
2020	130,283
2025	151,606
2030	172,929
2035	201,231

Year	Population
2040	229,534
2045	267,101

Table 4. City of Las Cruces Population Projections.

Year	Total GPCD
2010	209
2015	202
2020	198
2025	194
2030	190
2035	186
2040	183
2045	180

Table 5. City of Las Cruces GPCD Projections.

Year	Water Demand (AFA)
2010	22,994
2015	25,478
2020	28,477
2025	32,458
2030	36,441
2035	41,729
2040	46,826
2045	53,891

Table 6. City of Las Cruces Water Demand Projections.

The City of Las Cruces currently owns 36,319 acre-feet per annum of groundwater water rights that may be used for municipal supply within their municipal water utility service area. This does not include their subdivision or currently held irrigation rights. These rights are not considered here because of the limited service area of the subdivision rights and the fact that no infrastructure or State Engineer regulations for using Rio Grande Project surface water for municipal use within the City of Las Cruces service area currently exists.

The City's 40-year Plan contemplates municipal supply water demand to be 53,891 acre-feet per annum in 2045. The difference between projected demand and currently held rights to water that may be used for municipal supply is 17,572 acre-feet per annum. These values were computed using 180 gallons per capita per day (GPCD). During the evaluation of the City's 40-year plan, the Water Use and Conservation Bureau contemplated a 165 GPCD demand in 2045 once stricter water conservation measures are implemented by the City (Vogel, 2009, p. 9). Demand using a 165 GPCD usage would be 49,400 acre-feet per annum in 2045. This projected demand requires an additional 13,081 acre-feet per annum beyond the rights currently held by the City for municipal use.

The 8,000 acre-feet per annum of shallow groundwater requested under the applications is not contrary to conservation of water because Las Cruces has demonstrated a need for additional rights to water to be able to satisfy demand within a 40-year water planning period. This conclusion is in agreement with the Water Use and Conservation Bureau, which concurs that the requested appropriation is not contrary to conservation of water (Vogel, 2009, p. 9).

3.0 Hydrologic Evaluation

Regional Hydrogeologic Setting

The West Mesa area of the Mesilla Basin is located west of the Rio Grande and is bound by the Rough and Ready Hills and Robledo Mountains on the north, by the Mesilla Valley on the east, by the Porrillo Mountains, Aden Hills, and Sleeping Lady Hills on the west, and extends southward to the Mexican border. The area is approximately 750 square miles is size. The major water bearing formation of the West Mesa is the Santa Fe Group, which overlies Tertiary volcanic and associated sedimentary rocks of early Oligocene to Miocene age. Thickness of the Santa Fe Group at the West Mesa area is approximately 3,800 feet in the south-central area to less than 200 feet in the northwest (Myers & Orr, 1985, p. 6). Saturated thicknesses within the Santa Fe Group on the West Mesa range from approximately 3,500 feet in the south central area to zero in the northwest area of the West Mesa (Myers & Orr, 1985, p. 6). Groundwater flow in the area of the West Mesa is generally south-southwestward, which is parallel to the groundwater flow within the Mesilla Valley. Groundwater contours indicate a direct hydrologic connection between the saturated zone of the West Mesa and Mesilla Valley (Wilson et al., 1981, Plate 9).

Local Hydrogeologic Conditions

The proposed well field will be completed in the aquifer within the Santa Fe Group on the West Mesa. The Santa Fe Group is the primary source of fresh groundwater in the Mesilla Basin and is the primary source of water for the City Las Cruces' LRG-430 municipal supply groundwater right. Most of the LRG-430 wells are located within the Mesilla Valley, but LRG-430-S-22, LRG-430-S-23, LRG-430-S-36, LRG-430-S-38, and LRG-430-S-39 are located in the vicinity of the proposed well locations (see attached Well Location Map). Well logs for the existing LRG-430 supply wells in the area of the proposed wells indicate a depth to water of approximately 320 feet. This is roughly equivalent to the elevation difference between the ground surface elevation of the West Mesa and the Rio Grande. The fact that the groundwater elevation on the West Mesa is approximately coincident with the groundwater elevation and Rio Grande in the Mesilla Valley further confirms the hydrologic connection between the aquifer at the proposed well field's location with groundwater of the Mesilla Valley and surface water of the Rio Grande. The Santa Fe Group at the location of the proposed wells consists of Quaternary and Tertiary piedmont-slope, fluvial, playa, and lacustrine deposits composed of clay, silt, sand, gravel, and caliche, as well as igneous rocks (Myers & Orr, 1985, p. 6). The area is also characterized by northeast-trending normal faults through the Santa Fe Group. A normal fault has been previously inferred at or near the location of well LRG-430-S-23, which trends northeast through the east side of Picacho Peak (Myers & Orr, 1985, Figure 3). The proposed wells will be completed within a on the east, down-dropped side of this normal fault.

City of Las Cruces wells LRG-430-S-22, LRG-430-S-23, LRG-430-S-36, LRG-430-S-38, LRG-430-S-39 are all completed in the Santa Fe Group within the previously described graben. Both LRG-430-S-36 and LRG-430-S-38 are currently in use. Meter records indicate that the City of

Las Cruces pumped 211 acre-feet from well LRG-430-S-36 and 222 acre-feet from well LRG-430-S-38 in 2009. Wells LRG-430-S-22 and LRG-430-S-23 were originally drilled as exploratory wells in August 1982 and May 1982 respectively. The USGS used logs from both wells and aquifer test results from well LRG-430-S-22 to characterize the aquifer in the Santa Fe Group in the vicinity of the proposed new wells (see Myers & Orr, 1985). Well LRG-430-S-23 is screened from 440 feet to 640 feet below ground surface and did not produce enough water to support aquifer testing at the time of drilling (Myers & Orr, 1985, p. 12). It appears that the City of Las Cruces has never used this well due to its low production. Well LRG-430-S-22 is screened over several discreet zones from 710 – 1,210 feet below ground surface. The USGS estimated transmissivity within the screened zone of LRG-430-S-22 to be between 5,900 to 6,800 feet squared per day (Myers & Orr, 1985, Figure 10). The cited hydrologic properties from the aquifer testing at well LRG-430-S-22 should approximate the aquifer properties at the proposed well sites because they will be located adjacent to and will likely be completed similarly to well LRG-430-S-22.

Well Capacity and Yield

The applications state that the proposed wells will be completed with a 24-inch casing. Driscoll (1986, Table 9) identifies a 24-inch casing as optimally sized to produce 2,000 – 3,800 gallons per minute. Estimated yields at the existing LRG-430 wells on the West Mesa range from greater than 1,000 gallons per minute (Myers & Orr, 1985, p. 25) to 3,000 gallons per minute[1]. Wilson et al (1981, Plate 12) estimate the potential yield of wells drilled in the area of the proposed wells to be between 1000-2500 gallons per minute. At 60% efficiency, each of the proposed wells would have to produce approximately 1,180 gallons per minute if the proposed appropriation was spread among the seven wells equally. The available evidence suggests that the proposed wells and aquifer will be able to produce the volume of water requested in the applications. It is recommended that the amount of water diverted from each well be limited to the maximum aquifer yield of the area, as reported by Wilson et al. (1981, Plate 12).

Groundwater Quality

Slightly saline groundwater (Total Dissolved Solids (TDS) = 1,000 – 3,000 milligrams per liter) underlies the freshwater thickness on the West Mesa. Wilson et al. (1981) estimates the freshwater thickness in the area of the proposed appropriation to be between ~500 ft to 2,000 ft (Plate 15). It is possible that the proposed wells will encounter groundwater with a TDS of greater than 1,000 milligrams per liter during drilling. The continued exercise of the proposed appropriation may also change the groundwater flow direction in the area, but it is not likely that the upwelling of slightly saline groundwater, if any, due to the drilling of the proposed wells or exercise of the requested appropriation from properly constructed wells will impact wells of other ownership in the area. This is due to the fact that wells of other ownership are located at a significant distance from the proposed wells and are completed to depths above the likely screened intervals of the proposed wells. The aquifer underlying the West Mesa also has a direct connection with groundwater of the Mesilla Valley and the surface water of the Rio Grande, which would further dilute any saline intrusion into the freshwater zone. No impairment is anticipated due to groundwater quality degradation caused by the exercise of the proposed appropriation.

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[1] From LRG-430-S-36 Well Log

Surface Water Depletion Effects

The City of Las Cruces must offset the surface water depletion effects that will be caused by the exercise of the requested appropriation because the Rio Grande is a fully appropriated stream system. A direct hydrologic connection between groundwater on the West Mesa and the Rio Grande can be inferred from groundwater elevation contours (Wilson et al, 1981, Plate 9) and the fact that the elevation of the groundwater table in the area of the proposed well field approximates the elevation of the Rio Grande in the Mesilla Valley. The City is aware of this offset requirement and plans to offset surface water depletions by acquiring and retiring existing rights to water and/or using treated wastewater effluent discharged directly to the Rio Grande to offset surface water depletion effects (Shomaker, 2009, p. 6). The City of Las Cruces currently expects to use return flows from various sources, in accordance with the City of Las Cruces Return Flow Plan on-file, to offset 100% of the pumping that may occur under the requested appropriation (Shomaker, 2009, p. 6). Any proposed return flow in the form of treated wastewater effluent discharged to the Rio Grande used to offset surface water depletions caused by the exercise of the new appropriation will be administered through the City of Las Cruces Return Flow Plan that is already on-file.

It is recommended that the volume of offset required in any given year equal that amount diverted under the new appropriation, up to the 8,000 acre-feet per annum requested. CLC Utilities have been made aware of this option and are agreeable to its implementation. This 1:1 offset to pumping ratio is very conservative considering the fact that the full effect of pumping the new appropriation will not be realized on the Rio Grande and Mesilla Valley surface water system instantaneously. Including a condition in the conditions of approval for the subject applications that requires surface water depletion offsets in that amount diverted in any given year up to 8,000 acre-feet per annum will ensure no additional surface water depletions to the Rio Grande will occur.

Pumping Effects on Nearest Wells of Other Ownership

Method

The NMOSE Theis Computer Program and procedure documented in Fuchs (2000) was used to calculate drawdown effects of the subject applications at the closest wells of other ownership. The NMOSE Theis Computer Program uses the Theis equation, which provides estimates of drawdown within a simulated aquifer throughout time. Several assumptions are inherent to the Theis equation, which include: the aquifer being simulated is homogenous, isotropic, and confined; the pumping well is fully penetrating, has zero radius, and is 100% efficient; the aquifer is infinite in radial extent; groundwater flow is horizontal; and no other stress is occurring. The aquifer on the West Mesa is not homogenous, isotropic, or fully confined, instead the hydrologic properties of the aquifer being simulated vary from place to place and with depth (Myers & Orr, 1985, p. 25). Even so, this method is considered appropriate because conservative parameters can be used in conjunction with the Theis assumptions to create an effective estimate of drawdown effects.

Using Theis to calculate drawdown effects is considered conservative because this method simulates the pumping wells and the observation wells as being completed within the same vertical zone within the aquifer. It is assumed that the proposed wells will be completed similarly to the City's current production wells on the West Mesa and screened below 600 feet

below ground surface. The proposed wells will likely be screened below the total depth of any of the other wells of other ownership in the area. Wells of other ownership in the area are mostly domestic wells completed between 400 – 500 feet below ground surface. The ratio of horizontal to vertical hydraulic conductivity, or anisotropy ratio, in the area of the West Mesa has been estimated by Frenzel and Kaehler (1992, p. C74) to be 200:1, though a ratio of 1,000:1 may better represent basin-fill aquifer systems of the Rio Grande rift region (Hawley & Kennedy, 2004, p. 63). These anisotropy ratios suggest that the proposed wells will derive most of their water from radial or horizontal flow to the well, rather than vertically from more shallow zones where the wells of other ownership are screened.

Theis Simulation Parameters and Results

The NMOSE Theis Computer Program requires aquifer hydrogeologic property inputs such as transmissivity and the aquifer's storage coefficient. Myers & Orr (1985) estimated the aquifers transmissivity within the screened zone of well LRG-430-S-22 to be between 5,900 ft^2/d and 6,800 ft^2/d. These values were obtained from an analysis of the water level recovery that took place after a 3-day step-drawdown test of Well LRG-430-S-22 (Myers & Orr, 1985, Figure 10). The average of these values was used as the transmissivity in the simulation (T= 6,350 ft^2/d). 6,350 ft^2/d is 47,498 gal per day per foot, which was rounded to 47,500 gal per day per foot for input into the program.

Two different simulations were used to model drawdown effects at the closest wells of other ownership. The first simulated the individual effect of pumping one of the proposed wells on the closest well of other ownership and the second simulated the overall effect of pumping the entire requested appropriation. A pumping rate of 2,500 gallons per minute was used in the individual pumping simulation. 2,500 gallons per minute was chosen because it represents the maximum estimated aquifer yield in the area (Wilson et al., 1981; Plate 12). A pumping rate of 8,000 acre-feet per annum, which was rounded up to 5,000 gallons per minute, was used in the second simulation. The 8,000 acre-feet per annum represents the entire volume requested by the applications under review. A theoretical pumping center was used in the second simulation to simulate pumping of all of the proposed wells. The location was obtained by averaging the point locations for the proposed wells, which assumes that each well will contribute equally to the 8,000 acre-feet per annum appropriation.

The storage coefficient for input into the Theis simulation was obtained by multiplying the simulated aquifer thickness by the assigned storativity from LRG Groundwater Model (Barroll, 2007) cell Row 225 Column 97. Well LRG-430-S-22 is located within this cell, and is screened over several discrete zones from 710 to 1,240 feet below ground surface over a total of 260 feet. The storage coefficient was found to be 8.645×10^{-4} over the 260 foot screened interval represented in Layers 3 and 4 of the model.

Boundary conditions can also be input into the NMOSE Theis Computer Program. Two boundary conditions were selected for this evaluation. The first was a no-flow boundary, which represents the western extent of the Santa Fe Group and saturated thickness of the aquifer on the West Mesa. The location of this boundary was inferred from the extent of the active cells in the 2007 LRG Groundwater Model. A constant head boundary condition was also utilized to simulate the Rio Grande. This boundary condition is justified for use in the simulation because

of the direct connection between the saturated zone of the West Mesa with the Mesilla Valley and Rio Grande, as described previously.

Simulation 1: Single Well Effect on the closest well of other ownership
The closest well of other ownership to the proposed wells is LRN12-0141, which is an undeclared pre-basin well. The well is located approximately 2,635 feet northeast of the location of proposed well LRG-3275. LRN12-0141's total depth is not available, but it is assumed to be completed similarly to other domestic wells in the area. Well LRG-12923 is a domestic well located in the same vicinity of well LRN12-0141 and is completed to 400 feet below ground surface. As stated previously, using the Theis equation to simulate drawdown effects at well LRN12-0141 caused by pumping at well LRG-3275 is conservative because well LRG-3275 will very likely be screened below the total depth of well LRN12-0141.

The simulation was run using the NMOSE Theis Computer Program with the input parameters listed in Table 7. Results showed a drawdown of 29.33 feet at well LRN12-0141 over a 40-year period. This equates to an average of 0.73 feet per year, but all of the drawdown is realized at well LRN12-0141 within the first year. A quickly propagating drawdown cone was to be expected because of the relatively high transmissivity and low storativity of the simulated aquifer. Drawdown stabilizes due to the presence of the constant head boundary that represents the Rio Grande. The simulation predicts an ample remaining water column of 154.67 feet at well LRN12-0141 after 40-years (see attached Theis Analysis).

Input Parameter	Value	Source
Transmissivity (T)	47,500 gal per day per foot	Myers & Orr, 1985
Storage Coefficient (S)	8.65×10^{-4}	2007 LRG Groundwater Model
Pumping Rate (Q)	2,500 gallons per minute	Wilson and others, 1981; Plate 12
No-Flow Boundary Condition	Located at Y=0'	2007 LRG Groundwater Model
Constant-Head Boundary Condition	Located at Y=19,374'	Rio Grande location in 2009 aerial photography

Table 7: Theis input parameters for Simulation 1 (single well simulation).

Simulation 2: Effect of Pumping the 8,000 acre-feet per annum Appropriation on the closest well of other ownership
The closest well of other ownership to the theoretical pumping center of the proposed appropriation is well LRG-7250. The well is located approximately 5,017 feet southeast of the pumping center and is completed to 450 feet below ground surface with a 4-inch casing. It is screened from 440 to 450 feet below ground surface, which is likely above the screened zones of the proposed wells. This simulation can also be considered conservative because the proposed wells will likely derive water from a deeper zone within the aquifer, which will result in less drawdown than predicted at well LRG-7250 due to the anisotropic factor of the aquifer.

The simulation was run using the NMOSE Theis Computer Program with the input parameters listed in Table 8. Results showed a drawdown of 38.38 feet over a 40-year period. This equates to an average of 0.96 feet per year, but all of the drawdown will be realized at well LRG-7250 within the first year for the same reasons as the first simulation. The predicted drawdown results in a remaining water column of 118.62 feet after 40-years of pumping.

Input Parameter	Value	Source
Transmissivity (T)	47,500 gal per day per foot	Myers & Orr, 1985
Storage Coefficient (S)	8.65×10^{-4}	2007 LRG Groundwater Model
Pumping Rate (Q)	5,000 gallons per minute	Wilson and others, 1981; Plate 12
No-Flow Boundary Condition	Located at Y=0	2007 LRG Groundwater Model
Constant-Head Boundary Condition	Located at Y=25,615	Rio Grande location in 2009 aerial photography

Table 8: Theis input parameters for Simulation 2 (full appropriation simulation).

Analysis of Drawdown and Drawdown Rates at Closest Wells of Other Ownership

Mesilla Valley Administrative Area (MVAA) Guidelines state that an average decline in the local groundwater table of 1.0 foot per year or less due to a proposed appropriation is acceptable when addressing impacts on existing wells of other ownership (Turney, 1999, p. 3). The MVAA guidelines state that other rights should also be taken into account when addressing impacts on existing wells of other ownership. The only other wells in the vicinity of the new appropriation are the existing City of Las Cruces LRG-430 wells. These wells are all screened deeper than the total depth of the wells of other ownership. It was concluded that enough conservancy was built into the simulations to account for these wells because the proposed wells will also likely be screened deeper than the total depth of the wells of ownership. Drawdown at the wells of other ownership will be less than what was simulated using the Theis equation because of the method's inability to account for the anisotropy factor of the aquifer. Results from both simulations meet the administrative standard of less than 1.0 foot of drawdown set forth in the MVAA Guidelines (See attached Theis Simulation results). It is concluded that the applications will not cause impairment at the closest wells of other ownership.

4.0 Application and Well Renumbering

The subject applications and proposed wells LRG-3275 through LRG-3281 should be renumbered to LRG-3275-POD 1 through LRG-3275-POD 7. Renumbering the applications and wells in this manner reflects the fact that the applicant has requested a single 8,000 acre-feet per annum appropriation to be diverted from seven points of diversion. Individual numbering of each well (i.e. LRG-3275, LRG-3276, LRG-3277, ect) is not necessary because each well will be a point of diversion for the same appropriation. Renumbering the applications and wells will also simplify the future administration of the requested appropriation by consolidating the subject applications under File No. LRG-3275.

5.0 Considerations

- The City of Las Cruces has a 40-Year Water Development on-file with the State Engineer. The Water Use and Conservation Bureau found the population and water demand projections provided in the 40-Year Plan to be reasonable. These projections show that the City will be able to beneficially use the requested appropriation within the 40-year planning period stated therein.
- Granting the subject applications with a condition requiring a 1:1 surface water depletion offset to pumping ratio ensures that the applications will not cause depletions to the Rio Grande.
- The proposed wells will not impair water rights exercised from wells of other ownership.

- Granting of the subject applications will not be contrary to the conservation of water within the state nor detrimental to the public welfare of the state.

6.0 Conclusion

It is recommended that Application Nos. LRG-3275-POD 1 through LRG-3275-POD 7 (aka LRG-3275 through LRG-3281) for Permits to Appropriate Underground Water be approved subject to the following conditions:

Agreed
Edt

1) These applications are approved as follows:

Permit Numbers:	LRG-3275-POD 1 through LRG-3275-POD 7
Priority:	November 24, 1981
Source:	Shallow underground water of the Lower Rio Grande Underground Water Basin.
Points of Diversion:	Well LRG-3275-POD 1 located within the NE¼ NE¼ SW¼ of Section 29, T23S, R01E, NMPM at approximately X=1,451,076 Y=465,526 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 2 located within the SW¼ SW¼ NE¼ of Section 31, T23S, R01E, NMPM at approximately X=1,446,042 Y=460,523 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 3 located within the NE¼ NE¼ SE¼ of Section 31, T23S, R01E, NMPM at approximately X=1,448,363 Y=459,868 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 4 located within the SW¼ SW¼ NE¼ of Section 32, T23S, R01E, NMPM at approximately X=1,451,298 Y=460,486 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 5 located within the SW¼ SW¼ NE¼ of Section 6, T24S, R01E, NMPM at approximately X=1,445,899 Y=455,197 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 6 located within the NE¼ NE¼ SE¼ of Section 6, T24S, R01E, NMPM at approximately X=1,448,308 Y=454,878 ft. (NMSP, Central Zone, NAD83)
	Well LRG-3275-POD 7 located within the SW¼ SW¼ NE¼ of Section 5, T24S, R01E, NMPM at approximately X=1,451,278 Y=455,225 ft. (NMSP, Central Zone, NAD 83)

Purpose of Use:	Municipal
Place of Use:	The municipal water utility service area of the City of Las Cruces, as on-file with the State Engineer.
Amount of Water:	8,000 acre-feet per annum total diversion from all wells combined. The maximum diversion for each individual well under these permits is limited to 2,500 acre-feet per annum.

2) Prior to the drilling of any well under these permits, the permittee shall submit an acknowledged statement executed by the owner of the land upon which the wells are to be drilled that the permittee has permission to occupy such portion of the owner's land necessary to drill and operate the wells.

3) Diversions under these permits require that depletions to the surface flow of the Rio Grande be offset in that amount diverted in any given year, up to 8,000 acre-feet per annum. Surface water depletions may be offset by the acquisition, transfer, and retirement of valid existing water rights or through the use of treated wastewater effluent discharged directly to the Rio Grande pursuant to the City of Las Cruces Return Flow Plan on-file with the State Engineer. The amount of water diverted under these permits is limited to the amount of surface water depletion offsets credited to these permits in a given calendar year. The amount of water that may be diverted under these permits will be reevaluated and determined by the State Engineer on or before March 31st, subject to any offset debt from the previous calendar year(s) and anticipated availability of offsets in the current calendar year. No return flow credits for the purpose of increasing diversions under these permits will be granted.

4) The State Engineer retains jurisdiction over these permits to oversee and administer Condition 3 listed above.

5) Within 2-years of the approval date of this permit, the permittee shall submit a stand-alone Water Conservation Plan acceptable to the State Engineer that outlines a plan to achieve a system gpcpd goal of 180 within 20-years and which shows how the City intends to maintain that level of effort to achieve a more aggressive gpcd goal within 40-years. This Water Conservation Plan must be updated every 10 years and shall also include provisions for reducing water use during periods of extended drought consistent with appropriate drought management plans. The conservation plan must be submitted to:

Water Use & Conservation Bureau
Office of the State Engineer
PO Box 25102
Santa Fe, NM 87504-5102

6) The permittee shall submit, on or before March 1 of each year, a written report acceptable to the Water Use and Conservation Bureau, Office of the State Engineer on water conservation efforts, overall per capita use and residential per capita use calculations using the NMOSE GPCD methodology, and annual AWWA system water audit.

7) The permittee shall submit periodic progress reports on the implementation of its 40-year plan to the State Engineer at a minimum rate of once every 10 years. These updates shall contain a comparison of the observed population changes versus the 2005 projected population estimates as well as revised population projections.

8) A Well Record for wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be submitted to the Office of the State Engineer in Las Cruces within 20-days of the drilling of the wells.

9) Wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be equipped with a totalizing meter of a type and at a location approved by, and installed in a manner acceptable to the State Engineer. The permittee shall provide in writing, the make, model, serial number, date of installation, initial reading, units, and dates of recalibration of the meters, and any replacement meter used to measure the diversion of water. No water shall be diverted from the wells unless equipped with a functional totalizing meter. Any and all wells not is service for which pump equipment has been removed or has not been installed shall be properly capped or otherwise sealed at the top of the casing to prevent groundwater contamination and other safety hazards.

10) Written records of totalizing meter reading from wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be submitted in writing to the Office of the State Engineer in Las Cruces on or before the tenth day of each month for the preceding calendar month.

11) Proof of Completion of wells LRG-3275-POD 1 through LRG-3275-POD 7 shall be submitted to the Office of the State Engineer in Las Cruces on or before March 31, 2012.

12) Proof of Application of Water to Beneficial under these Permits is due on or before march 31, 2014.

13) This permit shall not be exercised to the detriment of valid existing water rights, shall not be contrary to conservation of water within the state, and shall not be detrimental to the public welfare of the state of New Mexico.

14) The permittee shall utilize the highest and best technology available and economically feasible for the intended use to ensure conservation of water to the maximum practical extent.

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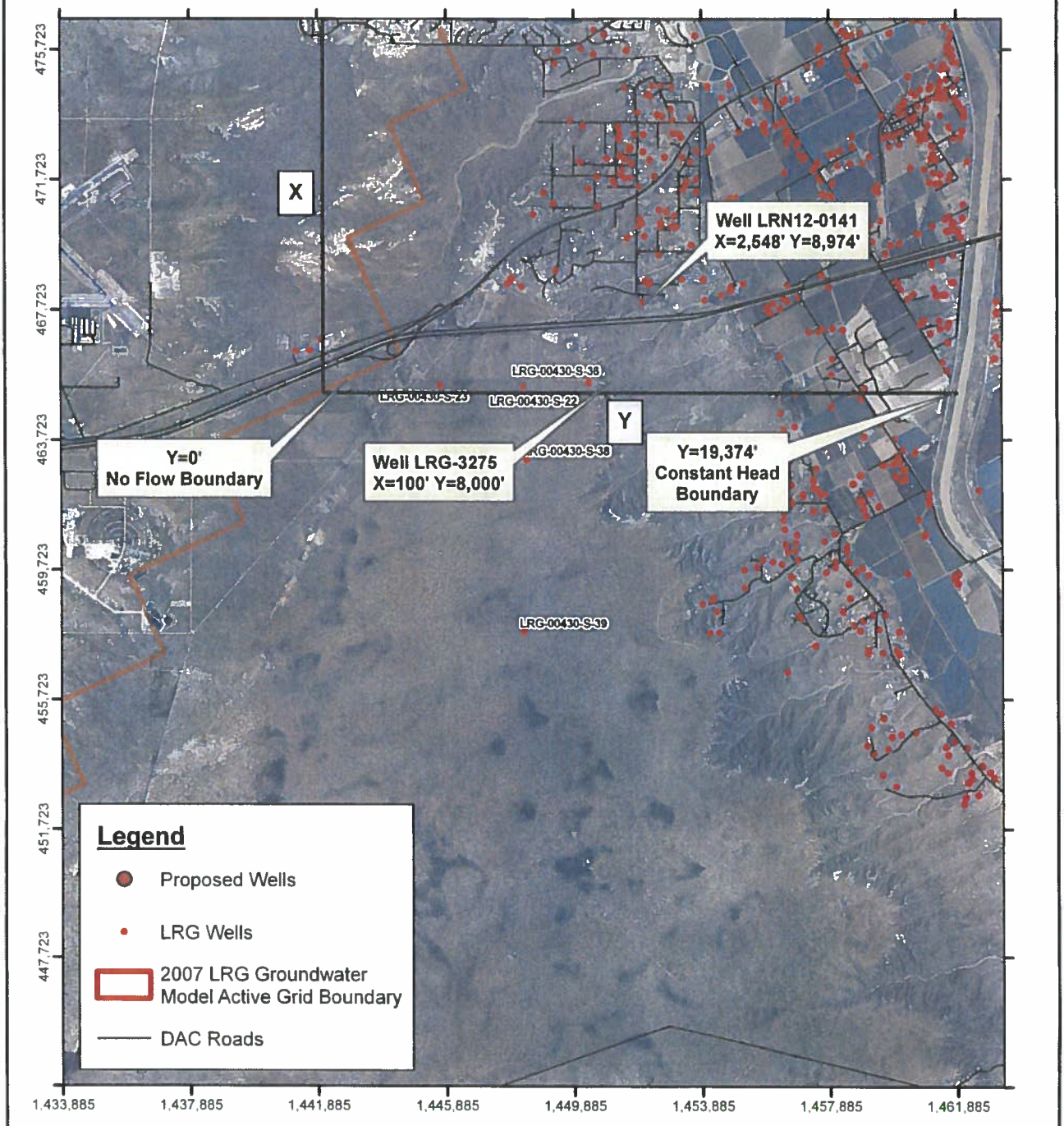


Application Nos. LRG-3275 through LRG-3281 for Permit to Appropriate Underground Water: Simulation No. 1

Applicant: City of Las Cruces
Date Filed: 11/24/1981

0 2,100 4,200 Feet
1 inch = 4,000 feet

Coordinate System
NM State Plane, NAD83, Feet
Aerial Photography - 2005 (1 m resolution)

N

STATE OF NEW MEXICO
Office of the State Engineer
District IV, Las Cruces

Theis Simulation Map

Created By JRH
18-FEB-2010

Office of the State Engineer
Interstate Stream Commission

Theis Analysis - Application Nos. LRG-3275 through LRG-3281 (Simulation No. 1)

Date: 2/17/2010
By: J.R. Hennessey

No Flow Boundary:	y= 0'	T=	47,500 gpd/ft
Constant Head Boundary:	y= 19,374'	S=	0.000865
Q=	2,500 gpm	X -Y	LRG-3275= (100; 8,000)
Time=	40 years	Coordinates:	LRN12-0141= (2,548; 8,974)

	LRG-3275 Drawdown (Pumping)		LRN12-0141 Drawdown (Observation)	
Year	Total (ft)	Rate/Yr (ft)	Total (ft)	Rate/Yr (ft)
1	133.69	133.69	29.33	29.33
2	133.69	0.00	29.33	0.00
3	133.69	0.00	29.33	0.00
4	133.69	0.00	29.33	0.00
5	133.69	0.00	29.33	0.00
6	133.69	0.00	29.33	0.00
7	133.69	0.00	29.33	0.00
8	133.69	0.00	29.33	0.00
9	133.69	0.00	29.33	0.00
10	133.69	0.00	29.33	0.00
11	133.69	0.00	29.33	0.00
12	133.69	0.00	29.33	0.00
13	133.69	0.00	29.33	0.00
14	133.69	0.00	29.33	0.00
15	133.69	0.00	29.33	0.00
16	133.69	0.00	29.33	0.00
17	133.69	0.00	29.33	0.00
18	133.69	0.00	29.33	0.00
19	133.69	0.00	29.33	0.00
20	133.69	0.00	29.33	0.00
21	133.69	0.00	29.33	0.00
22	133.69	0.00	29.33	0.00
23	133.69	0.00	29.33	0.00
24	133.69	0.00	29.33	0.00
25	133.69	0.00	29.33	0.00
26	133.69	0.00	29.33	0.00
27	133.69	0.00	29.33	0.00
28	133.69	0.00	29.33	0.00
29	133.69	0.00	29.33	0.00
30	133.69	0.00	29.33	0.00
31	133.69	0.00	29.33	0.00
32	133.69	0.00	29.33	0.00
33	133.69	0.00	29.33	0.00
34	133.69	0.00	29.33	0.00
35	133.69	0.00	29.33	0.00
36	133.69	0.00	29.33	0.00
37	133.69	0.00	29.33	0.00
38	133.69	0.00	29.33	0.00
39	133.69	0.00	29.33	0.00
40	133.69	0.00	29.33	0.00
		Avg rate of additional drawdown (ft/yr):		0.73
		Less year 1:		0.00
		Total drawdown (ft):		29.33
		Depth of well (ft):		400
		DTW at T=0 (ft):		216
		Remaining Water Column (ft):		154.67

2500.OUT

Simulation No. 1

TIME and DATE
month: 2 day: 15 year: 2010
hour: 13 minute: 56 second: 33

DRAWDOWN AT RANDOM COORDINATES IN AN INFINITE
STRIP, NON - LEAKY AQUIFER USER SPECIFIED BOUNDARIES
AT Y = 0 AND A Y SPECIFIED BY USER
PUMPING MULTIPLE WELLS LOCATED AT POINTS SPECIFIED
BY USER. EACH WELL MAY HAVE A DIFFERENT
PUMPING SCHEDULE. ALL COORDINATES IN THE X - Y PLANE.

(Theis equation)

At y = 0, there is a no-flow boundary
At y = 19374.0, there is a constant head (river) boundary

T = 47500. gpd/ft S = .000865

Number of pumping wells = 1

Coordinates of pumping wells and the no. of pumping rates

Well #	X Coordinate	Y Coordinate	No. of Pumping Rates
1	100.0	8000.0	1

PUMPING SCHEDULES FOR THE WELLS

Well Schedule for Pumping Well Number 1

Pumping Rate		Pumping Time
Q(1) = 2500.0 gpm	for	14600.000 days

Coordinates of Computation Points

(Number of computation points = 2)

Point #	X Coordinates feet	Y Coordinates feet
1	100.0	8000.0
2	2548.0	8974.0

Image Control = .1000000E-02

time variable (t)

t min = 365.000 days; t max = 14600.000 days;
delta t = 365.000 days

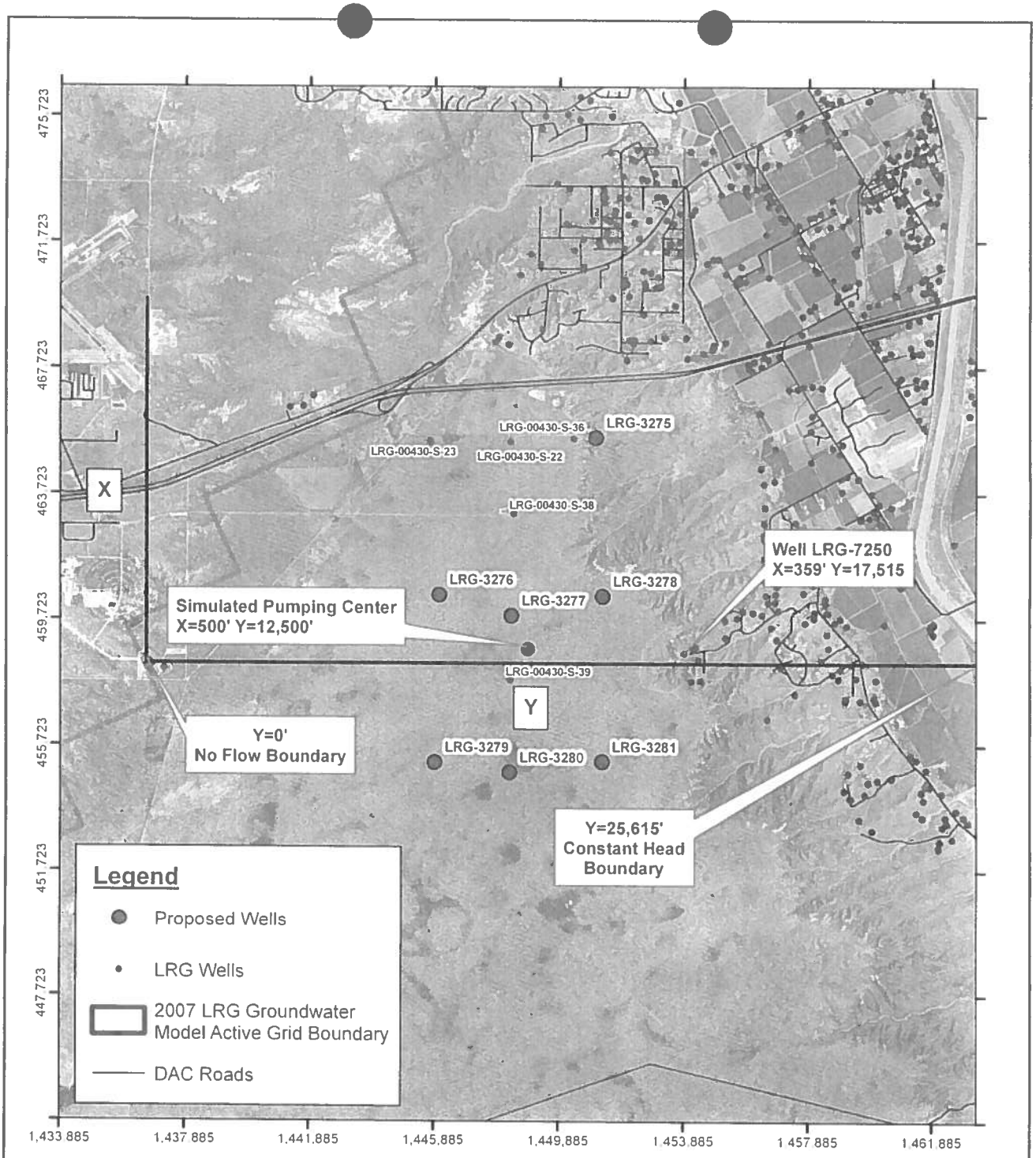
Pumping well 1 overlies comput. point 1
Therefore the computation point has been moved +.5 feet in the X direction

********** RESULTS **********

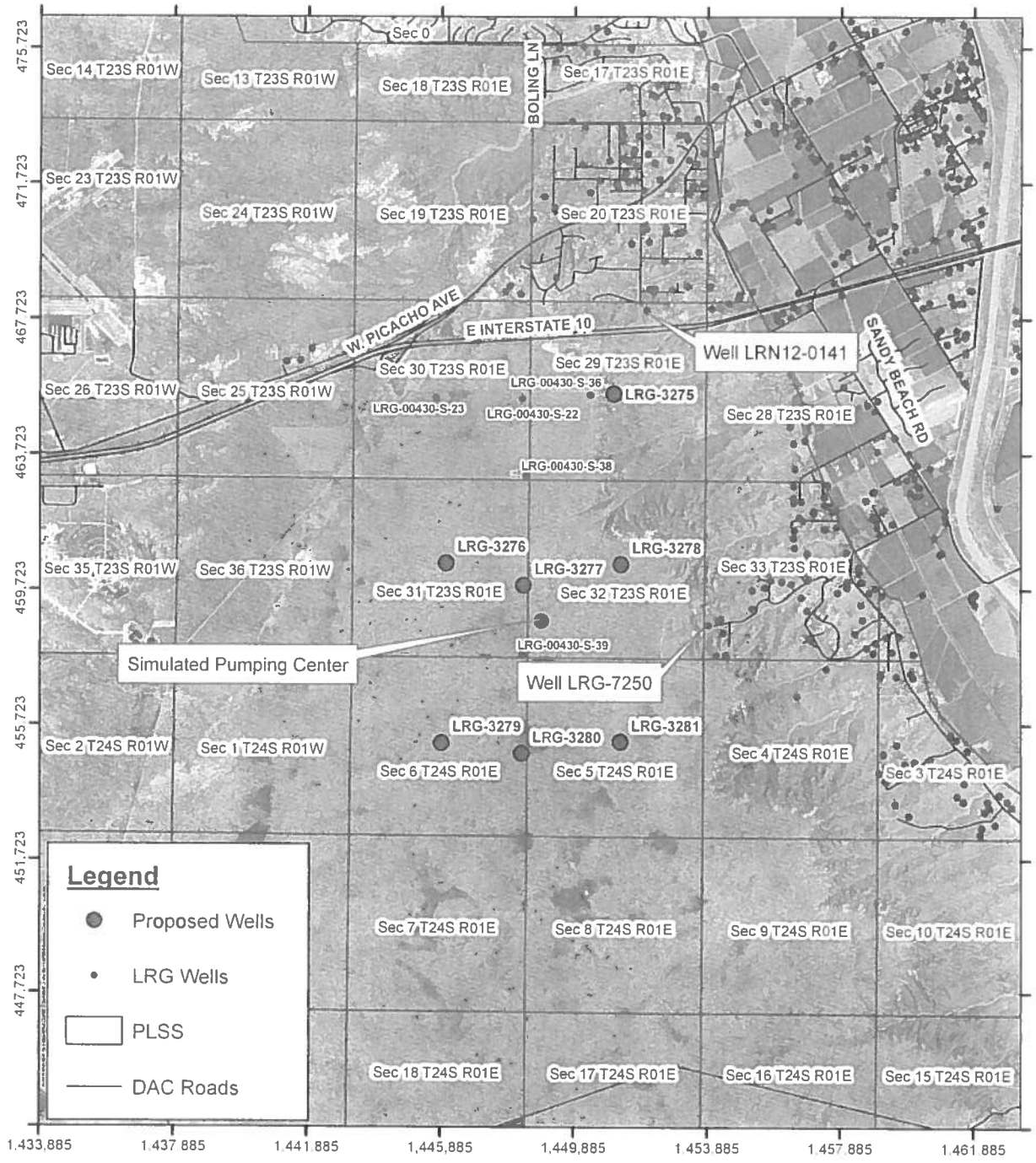
Drawdowns and Coordinates of computation points
Measured in feet

	X = 100.5 Y = 8000.0	X = 2548.0 Y = 8974.0
Time in days		
365.000	133.691	29.328
730.000	133.692	29.329
1095.000	133.692	29.330
1460.000	133.692	29.330
1825.000	133.692	29.329
2190.000	133.690	29.328
2555.000	133.692	29.329
2920.000	133.692	29.329
3285.000	133.690	29.328
3650.000	133.693	29.330
4015.000	133.690	29.327
4380.000	133.693	29.330
4745.000	133.690	29.327
5110.000	133.693	29.330
5475.000	133.690	29.327
5840.000	133.693	29.330
6205.000	133.691	29.328
6570.000	133.691	29.329
6935.000	133.692	29.329
7300.000	133.690	29.327
7665.000	133.693	29.330
8030.000	133.692	29.329
8395.000	133.691	29.329
8760.000	133.693	29.330
9125.000	133.691	29.328
9490.000	133.691	29.329
9855.000	133.693	29.330
10220.000	133.691	29.328
10585.000	133.691	29.329
10950.000	133.693	29.330

11315.000	133.691	29.328
11680.000	133.691	29.329
12045.000	133.693	29.330
12410.000	133.692	29.329
12775.000	133.690	29.327
13140.000	133.692	29.329
13505.000	133.691	29.329
13870.000	133.690	29.327
14235.000	133.691	29.329
14600.000	133.693	29.330



Application Nos. LRG-3275 through LRG-3281 for Permit to Appropriate Underground Water: Simulation No. 2 **Applicant: City of Las Cruces** **Date Filed: 11/24/1981**	Feet 0 2,000 4,000 1 inch = 4,000 feet N Coordinate System NM State Plane NAD83 Feet Aerial Photography - 2005 (1 m resolution)	**STATE OF NEW MEXICO** **Office of the State Engineer** **District IV, Las Cruces** **Theis Simulation Map**	Created By JRH 18-FEB-2010 Office of the State Engineer NM Interstate Stream Commission



Application Nos. LRG-3275 through LRG-3281 for Permit to Appropriate Underground Water

Applicant: City of Las Cruces
Date Filed: 11/24/1981

Feet
0 2,000 4,000
1 inch = 4,000 feet

N

Coordinate System
NM State Plane NAD83 Feet
Aerial Photography - 2005 (1 m resolution)

STATE OF NEW MEXICO
Office of the State Engineer
District IV, Las Cruces

Well Location Map

Created By JRH
18-FEB-2010

Office of the State Engineer
Interstate Stream Commission

Theis Analysis - Application Nos. LRG-3275 through LRG-3281 (Simulation No. 2)

Date: 2/17/2010
By: J.R. Hennessey

No Flow Boundary:	y= 0'	T=	47,500 gpd/ft
Constant Head Boundary:	y= 25,615'	S=	0.000865
Q=	5,000 gpm	X -Y	Pumping Center= (500; 12,500)
Time=	40 years	Coordinates:	LRG-7250= (359; 17,515)

	Pumping Center Drawdown		LRG-7250 Drawdown (Observation)	
Year	Total (ft)	Rate/Yr (ft)	Total (ft)	Rate/Yr (ft)
1	268.35	268.35	38.38	38.38
2	268.35	0.00	38.38	0.00
3	268.35	0.00	38.38	0.00
4	268.35	0.00	38.38	0.00
5	268.35	0.00	38.38	0.00
6	268.35	0.00	38.38	0.00
7	268.35	0.00	38.38	0.00
8	268.35	0.00	38.38	0.00
9	268.35	0.00	38.38	0.00
10	268.35	0.00	38.38	0.00
11	268.35	0.00	38.38	0.00
12	268.35	0.00	38.38	0.00
13	268.35	0.00	38.38	0.00
14	268.35	0.00	38.38	0.00
15	268.35	0.00	38.38	0.00
16	268.35	0.00	38.38	0.00
17	268.35	0.00	38.38	0.00
18	268.35	0.00	38.38	0.00
19	268.35	0.00	38.38	0.00
20	268.35	0.00	38.38	0.00
21	268.35	0.00	38.38	0.00
22	268.35	0.00	38.38	0.00
23	268.35	0.00	38.38	0.00
24	268.35	0.00	38.38	0.00
25	268.35	0.00	38.38	0.00
26	268.35	0.00	38.38	0.00
27	268.35	0.00	38.38	0.00
28	268.35	0.00	38.38	0.00
29	268.35	0.00	38.38	0.00
30	268.35	0.00	38.38	0.00
31	268.35	0.00	38.38	0.00
32	268.35	0.00	38.38	0.00
33	268.35	0.00	38.38	0.00
34	268.35	0.00	38.38	0.00
35	268.35	0.00	38.38	0.00
36	268.35	0.00	38.38	0.00
37	268.35	0.00	38.38	0.00
38	268.35	0.00	38.38	0.00
39	268.35	0.00	38.38	0.00
40	268.35	0.00	38.38	0.00
		Avg rate of additional drawdown (ft/yr):		0.96
		Less year 1:		0.00
		Total drawdown (ft):		38.38
		Depth of well (ft):		450
		DTW at T=0 (ft):		293
		Remaining Water Column (ft):		118.62

Simulation 2

TIME and DATE
month: 2 day: 15 year: 2010
hour: 13 minute: 51 second: 6

DRAWDOWN AT RANDOM COORDINATES IN AN INFINITE
STRIP, NON - LEAKY AQUIFER USER SPECIFIED BOUNDARIES
AT Y = 0 AND A Y SPECIFIED BY USER
PUMPING MULTIPLE WELLS LOCATED AT POINTS SPECIFIED
BY USER. EACH WELL MAY HAVE A DIFFERENT
PUMPING SCHEDULE. ALL COORDINATES IN THE X - Y PLANE.

(Theis equation)

At y = 0, there is a no-flow boundary
At y = 25615.0, there is a constant head (river) boundary

T = 47500. gpd/ft S = .000865

Number of pumping wells = 1

Coordinates of pumping wells and the no. of pumping rates

Well #	X Coordinate	Y Coordinate	No. of Pumping Rates
1	500.0	12500.0	1

PUMPING SCHEDULES FOR THE WELLS

Well Schedule for Pumping Well Number 1

Pumping Rate		Pumping Time
Q(1) = 5000.0 gpm	for	14600.000 days

Coordinates of Computation Points

(Number of computation points = 2)

Point #	X Coordinates feet	Y Coordinates feet
1	500.0	12500.0
2	359.0	17515.0

Image Control = .1000000E-02

time variable (t)

t min = 365.000 days; t max = 14600.000 days;
delta t = 365.000 days

Pumping well 1 overlies comput. point 1
Therefore the computation point has been moved +.5 feet in the X direction

********** RESULTS **********

Drawdowns and Coordinates of computation points
Measured in feet

	X = 500.5 Y = 12500.0	X = 359.0 Y = 17515.0
Time in days		
365.000	268.346	38.378
730.000	268.346	38.379
1095.000	268.346	38.379
1460.000	268.346	38.378
1825.000	268.346	38.379
2190.000	268.346	38.378
2555.000	268.346	38.378
2920.000	268.347	38.379
3285.000	268.346	38.379
3650.000	268.346	38.378
4015.000	268.346	38.379
4380.000	268.346	38.378
4745.000	268.347	38.379
5110.000	268.345	38.378
5475.000	268.346	38.378
5840.000	268.347	38.380
6205.000	268.345	38.378
6570.000	268.346	38.378
6935.000	268.347	38.380
7300.000	268.345	38.378
7665.000	268.346	38.378
8030.000	268.347	38.380
8395.000	268.346	38.379
8760.000	268.345	38.377
9125.000	268.346	38.378
9490.000	268.347	38.380
9855.000	268.346	38.379
10220.000	268.345	38.377
10585.000	268.346	38.378
10950.000	268.346	38.379

11315.000	268.346	38.379
11680.000	268.345	38.377
12045.000	268.346	38.378
12410.000	268.348	38.380
12775.000	268.346	38.379
13140.000	268.345	38.377
13505.000	268.346	38.378
13870.000	268.347	38.380
14235.000	268.346	38.379
14600.000	268.345	38.377

Hennessey, Joseph, OSE

From: Chavez, Calvin T., OSE
Sent: Monday, February 08, 2010 8:33 AM
To: Hennessey, Joseph, OSE
Subject: FW: CLC Conditions - Conservation
Attachments: CONDITIONS OF APPROVAL - CLC-Final.doc

From: Sizemore, Jim L., OSE
Sent: Wednesday, May 13, 2009 2:55 PM
To: Chavez, Calvin T., OSE
Cc: Vogel, Cheri, OSE; Longworth, John W., OSE
Subject: CLC Conditions - Conservation

Hi Calvin,
Attached are the agreed-to Conditions of Approval for conservation and reporting for the City of Las Cruses' West Mesa Wells. These are in addition to the standard condition about using highest and best technology for conservation.
Thx,
Jim

DRAFT – PARTIAL
CONDITIONS OF APPROVAL
CITY OF LAS CRUCES (WEST MESA WELLS)

1. Within 2-years of the approval date of this permit, the permittee shall submit a stand-alone Water Conservation Plan acceptable to the State Engineer that outlines a plan to achieve a system gpcpd goal of 180 within 20-years and which shows how the City intends to maintain that level of effort to achieve a more aggressive gpcd goal within 40-years. This Water Conservation Plan must be updated every 10 years and shall also include provisions for reducing water use during periods of extended drought consistent with appropriate drought management plans. The conservation plan must be submitted to:

   Water Use & Conservation Bureau
   Office of the State Engineer
   PO Box 25102
   Santa Fe, NM 87504-5102

2. The permittee shall submit, on or before March 1 of each year, a written report acceptable to the Water Use and Conservation Bureau, Office of the State Engineer on water conservation efforts, overall per capita use and residential per capita use calculations using the NMOSE GPCD methodology, an annual AWWA system water audit.

3. The permittee shall submit periodic progress reports on the implementation of its 40-year plan to the State Engineer at a minimum rate of once every 10 years. These updates shall contain a comparison of the observed population changes versus the 2005 projected population estimates as well as revised population projections.

JOHN R. D'ANTONIO
STATE ENGINEER

STATE OF NEW MEXICO
OFFICE OF THE STATE ENGINEER

LAS CRUCES OFFICE
1680 HICKORY LOOP, SUITE J
LAS CRUCES, NM 88005
PHONE: (505) 524-6161
FAX: (505) 524-6160
WEB: HTTP://WWW.SEO.STATE.NM.US/

April 21, 2004

FILES: LRG-3275 through LRG-3282

Jorge Garcia, P.E.
Chief Utilities Engineer
City of Las Cruces
P.O. Box 20000
Las Cruces, NM 88005

Dear Jorge:

This office is currently contemplating action on applications LRG-3275 through LRG-3282 filed by the City of Las Cruces on November 24, 1981 in which the City has sought approval for a new appropriation of groundwater in the amount of 8,000 acre-feet per annum from eight new wells proposed to be drilled in an area immediately west of Las Cruces to augment the City's existing municipal water supply. Preliminary review of the applications and other records on file specific to the City's existing groundwater rights and historic rate of actual annual groundwater use increase over the years as reported to this office is such that it is not clear that the City can or will be able to reasonably make use of a new appropriation of this magnitude in a reasonable (40 year) period of time.

Records on file with this office indicate that the City's 40-Year Water Development Plan for the purposes of NMSA 1978 §72-1-9 is maintained in concert with the City's Water and Wastewater Master Plan. The most recent (June 1995) update to this plan available to and on file with this office estimates that about 35,145 acre-feet per annum may be needed to serve the City by the year 2015. As summarized below, the City's existing groundwater rights on record with this office total 37,160 acre-feet per annum.

File no.	Amount (acre-feet per annum)	File status
LRG-430	21,869.0	Licensed
LRG-3283 through LRG-3296	up to 10,200.0 (limited to minor offset requirement)	Permitted

LRG-517	774.0, not exercised, application pending to combine with LRG-430 et al.	Declared
LRG-389	up to 2,550.0 (limited to availability of offsets, none as yet acquired)	Permitted
LRG-399	up to 1,700 (currently limited to 435.5 as per availability of offsets, currently not exercised)	Permitted
LRG-2036	67.7 (irrigation of 20 acres)	Permitted
Total	37,160.7	

Upon considering the City's existing groundwater rights and the actual annual use as reported to this office since the late 1980's and assuming that the average annual rate of use increase is not expected to change significantly in the near or distant future, simple linear regression suggests that by about the year 2097 (~ 93 years from now) the City may be using their existing groundwater rights in entirety. Provided that plans to move in part to surface water treatment for municipal needs within the decade does occur given the City's status as a Special Water User Association as per NMSA 1978 §73-10-48, it seems probable that the City's average annual rate of groundwater use might actually decrease. Alternatively, drought conditions in the region, uncertain demographics and future growth characteristics of the City could result in a potentially rapid rate of groundwater use increase in the near future, however this office does not have sufficient information on file to reasonably support this potential.

At your earliest convenience, please provide this office with an appropriate update to the City's existing 40-Year Water Plan or perhaps a replacement plan to reasonably support the City's projected water needs. In the absence of this additional documentation or if it is the wish of the City, this office will proceed to evaluate applications LRG-3275 through LRG-3282 based on existing information on file.

If you have any questions, please give me a call at 524-6161.

Sincerely,

Erek W. Fuchs

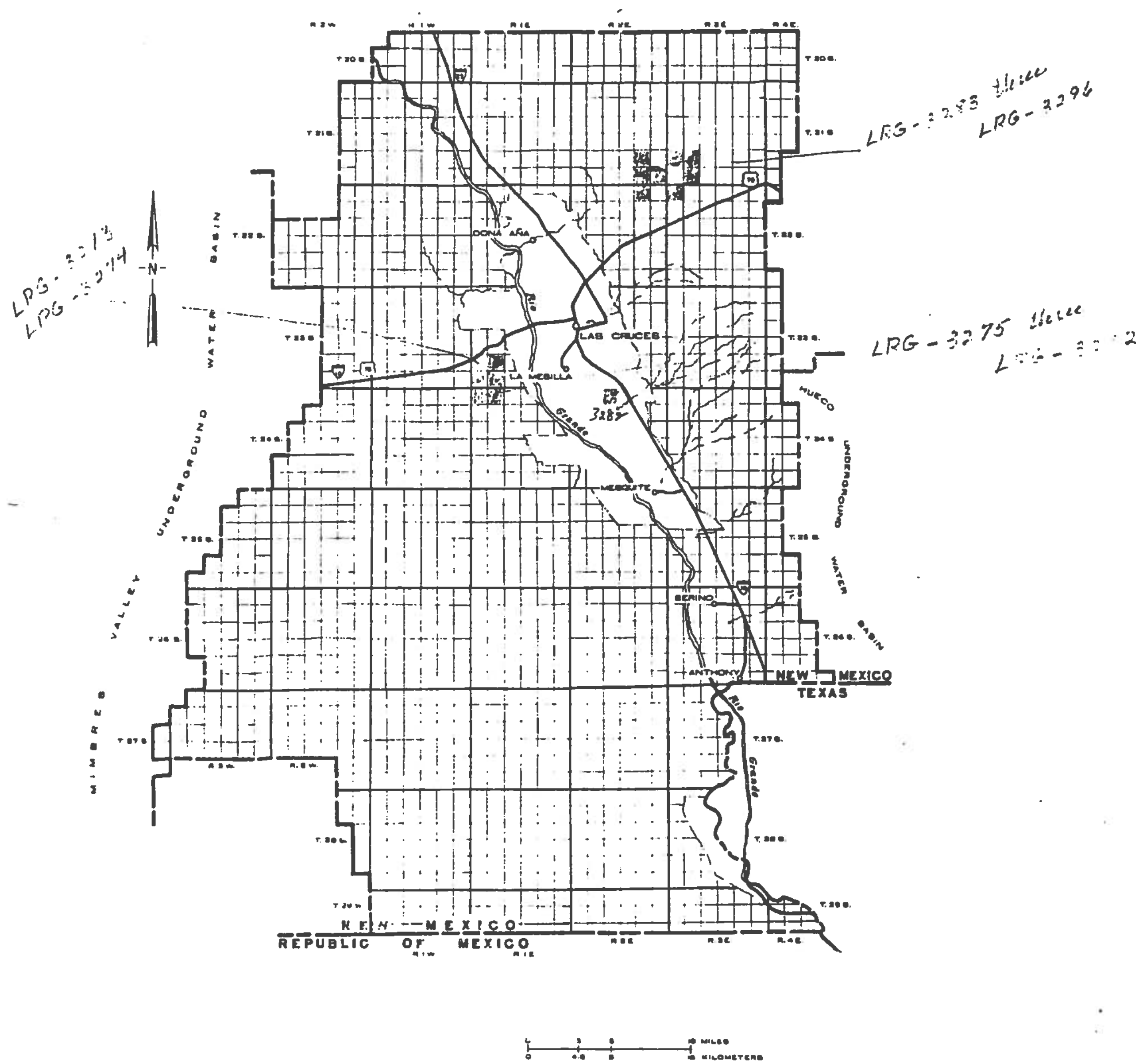
Erek H. Fuchs, M.S.
Lower Rio Grande Basin Supervisor

EHF
cc: Santa Fe

LOWER RIO GRANDE UNDERGROUND WATER BASIN
DOÑA ANA COUNTY

STATE ENGINEER OFFICE

SEPTEMBER 11, 1980



SIMMS & STEIN, P.A.
ATTORNEYS AT LAW

RICHARD A. SIMMS*
JAY F. STEIN
JAMES C. BROCKMANN

*New Mexico Board Certified Specialist in Water Law

SANTA FE OFFICE
STREET ADDRESS:
460 St. Michael's Drive, Suite 603
Santa Fe, New Mexico 87505
MAILING ADDRESS:
Post Office Box 5250
Santa Fe, New Mexico 87502-5250
Telephone: 505-983-3880
Telecopier: 505-986-1028

SUN VALLEY OFFICE
STREET ADDRESS:
126 Aspen Lakes Drive
Hailey, Idaho 83333
MAILING ADDRESS:
Post Office Box 3329
Hailey, Idaho 83333
Telephone: 208-788-9145
Telecopier: 208-788-0927

February 9, 1999

Mr. Calvin Chavez
District Supervisor
State Engineer Office
District 4
133 Wyatt Drive, Suite 3
Las Cruces, NM 88005

Dear Calvin:

Enclosed please find the "Stipulation and Order of Denial to Dismiss Stipulation" filed in 1987. The significant point is the attached "Settlement Agreement" filed on January 23, 1987, which contains the Stipulation between Gerald Strauss and the City of Las Cruces waiving Strauss' right to proceed with his applications in favor of the City's right to go ahead of him. Accordingly, Las Cruces' applications LRG-3275 thru LRG-3282 and LRG-3283 thru LRG-3296 can be acted on and decided by the State Engineer prior to the Strauss applications.

Please call me if you have any questions.

Sincerely,

Jay F. Stein

JFS*pat
Enclosures
cc: Buck Monday (w/encl.)
Jorge Garcia (w/encl.)
Len Stokes (w/encl.)
Paul Ritzma, Esq. (w/encl.)

RECEIVED
99 FEB 11 PM 3:02
STATE ENGINEER OFFICE
LAS CRUCES, NEW MEXICO

BEFORE THE STATE ENGINEER

87 JAN 26 A9:21

IN THE MATTER OF THE APPLICATIONS OF GERALD A. STRAUSS	)))	LRG-2065 THROUGH LRG-2661 LRG-2666 THROUGH LRG-3014

SANTA FE, NEW MEXICO

SETTLEMENT AGREEMENT

This Agreement is entered into by and between Gerald A. Strauss ("Strauss") and the City of Las Cruces ("City") (Strauss and the City are hereinafter referred to as "the parties") on January 23, 1987.

RECITALS

(1) On September 8, 1981, Gerald A. Strauss and Barbara Strauss filed with the New Mexico State Engineer Office Applications LRG-2065 through LRG-2661 and LRG-2666 through LRG-3014 ("Strauss Applications") seeking permits to appropriate 484,920 acre-feet per year of the public waters of the Lower Rio Grande Underground Water Basin of New Mexico for irrigation purposes. The City filed a timely protest with the State Engineer Office to the granting of the Strauss Applications.

(2) On November 24, 1981, the City filed with the State Engineer Office Applications LRG-3275 through LRG-3282 and LRG-3283 through LRG-3296 ("City Applications") seeking permits to appropriate 22,000 acre-feet of the public waters of the Lower Rio Grande Underground Water Basin of New Mexico for the purpose of providing a municipal water supply.

(3) On November 8, 1985, Barbara Strauss transferred to Gerald A. Strauss all of her right, title and interest in the Strauss Applications.

(4) On July 17, 1986, the City filed with the State Engineer Office a Motion for Order to Show Cause, later denominated a Motion to Dismiss, seeking dismissal of the Strauss Applications. On August 29, 1986, Mr. Strauss responded to the City's motion. Subsequently, the State Engineer ordered a hearing on issues raised in the City's motion.

(5) The parties desire to fully and finally resolve the issues raised in the City's Motion to Dismiss and to resolve their differences in a manner that advances the public welfare of the State of New Mexico by assuring an adequate future water supply for the City.

(6) The parties understand that this Agreement herein does not constitute a withdrawal of the Strauss Applications.

AGREEMENTS

In consideration of the mutual agreements set forth herein and for other valuable consideration, the parties agree as follows:

1. Strauss hereby waives, in favor of the City, the priority established by the filing of the Strauss Applications with the State Engineer Office. He agrees that all rights associated with and incident to the priority of the Strauss

Applications shall be waived in favor of the City Applications, and, without limitation, that:

(a) The City Applications shall be heard, considered and acted upon by the State Engineer before the Engineer hears, considers and acts upon the Strauss Applications; and

(b) Any water right permits the State Engineer grants to the City based on the City Applications shall be considered senior to and in all respects superior to any water right permits the State Engineer grants to Strauss based on the Strauss Applications.

2. The City hereby withdraws its Motion to Dismiss the Strauss Applications. After execution and delivery of this Agreement, the City shall submit a Stipulated Order of Denial of the Motion to Dismiss, with prejudice, to the State Engineer for his signature.

3. This Agreement waives the priority and other related rights of the Strauss Applications only for the City Applications and the Agreement does not constitute a waiver of priority and other related rights for the applications of other persons.

4. By executing this Agreement, the City does not waive or otherwise relinquish its right to protest the Strauss Applications pursuant to Section 72-12-3 NMSA 1978 (Repl. 1985), to protect its existing water rights and any water right permits previously granted to the City based on the City Applications.

5. This Agreement constitutes the entire agreement between the parties and there are no other agreements between the parties except as herein specifically set forth.

6. This Agreement shall be binding upon and inure to the benefit of the parties and their respective representatives, successors, assigns, heirs, and legal representatives.

IN WITNESS WHEREOF, the undersigned have executed this Agreement as of the day and year first written above.

APPLICANT GERALD A. STRAUSS

By: _____

Bradford C. Berge, Esq.
Campbell & Black
Post Office Box 2208
Santa Fe, New Mexico 87504-2208
(505) 988-4421

Attorneys for Gerald A. Strauss

CITY OF LAS CRUCES

By: _____

Richard A. Simms
Hinkle, Cox, Eaton, Coffield,
and Hensley
Post Office Box 2068
Santa Fe, New Mexico 87504-2068
(505) 982-4554

Attorneys for the City of
Las Cruces

LRG-3275
- LRG-3282

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Las Cruces District Office
1800 Marquess St.
Las Cruces, New Mexico 88005

RECEIVED
'96 FEB 2 AM 10 54
STATE ENGINEER OFFICE
LAS CRUCES, NEW MEXICO

IN REPLY REFER TO
NMNM70078
2800 (036)

FEB 0 1 1996

Mr. J. B. Nixon
Supervisor District 4
State Engineer Office
133 Wyatt Dr., Suite 3
Las Cruces, NM 88005

Dear Mr. Nixon:

This letter is in reference to the City of Las Cruces right-of-way application NM70078.

The City of Las Cruces has submitted an application to construct eight water wells in the west mesa. The locations are T. 23 S., R. 1 E., Sections 29, 31, 32, and T. 23 S., R. 1 E., Sections 5 and 6, approximately 27 acres on public land. The water wells are to include water and gas pipelines to each well site. This project was scoped in December 1995, and the archeology was completed. Because of some changes, there is an additional area to be surveyed for cultural resources. The City of Las Cruces is contracting the writing of the environmental assessment and hoping to start construction this summer after the grant is received.

For additional information on this project, please call Gilda Fitzpatrick at 525-4454.

Sincerely,

Stephanie Hargrove

Stephanie Hargrove
Area Manager
Mimbres Resource Area

cc:
Jorge A. Garcia, Ph.D., P.E.

SIMMS & STEIN, P.A.
ATTORNEYS AT LAW

RICHARD A. SIMMS*
JAY F. STEIN
JAMES C. BROCKMANN
OF COUNSEL
MARGARET J. KING**
PAUL SCHILLAWSKI

All counsel admitted in New Mexico
*Admitted Pro Hac Vice in the Snake River Basin Adjudication in Idaho; New Mexico Board Certified Specialist in Water Law
**Admitted in Idaho and Colorado

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Telecopier: 208-788-0927

HAND DELIVERED
April 13, 1995

Mr. Thomas C. Turney
New Mexico State Engineer
State Engineer Office
Bataan Memorial Building
Santa Fe, N.M. 87503

Dear Mr. Turney:

I am writing on behalf of the City of Las Cruces to request a meeting between you, Mr. Ken Needham, the Utilities Director for the City of Las Cruces, and representatives of the City including myself and the City's consulting hydrologist, Lee Wilson. The purpose of this meeting is to discuss the need for a schedule for obtaining administrative action on Las Cruces Applications Nos. LRG-3275 thru LRG-3296 which seek a total of 22,000 acre-feet of water. These applications were filed in 1981. Following settlement of the El Paso applications, hearing was requested on October 16, 1991. As set forth below, Las Cruces requires administrative action on these applications by the summer of 1996. Because Las Cruces is not at the head of the hearing list on the Lower Rio Grande Basin, we are requesting that the City's applications be decided out of order.

The City of Las Cruces presently diverts water from Declaration No. LRG-430 et al. Declaration No. LRG-430 provides the City with the right to divert 21,869 acre-feet of water. Last year the City diverted 18,646.02 acre-feet of water under the Declaration. Figures from Las Cruces indicate that the City is diverting slightly in excess of its rate of this time last year. We expect that the City will be diverting approximately 20,000 acre-feet by the end of next year, i.e. within 2,000 acre-feet of its maximum declared right under LRG-430 et al.

The City had expected to have a cushion of 4,250 acre-feet of water from Permits Nos. LRG-389 (2,550 acre-feet) and LRG-399 (1,700 acre-feet). However, it now appears that LRG-389 cannot be pumped. Moreover, pumping LRG-399 would be subject to a "dedication" condition of approval which the City no longer views as a viable option.

The City's concern is prompted by its rapid growth. Las Cruces is now within the top ten fastest growing cities in the United States. The City's revised demographic projections indicate that prior population studies may have underestimated the area's growth potential. The City now must consider a service area population of approximately 214,000 by the year 2021, within the forty-year period provided by the legislature in § 72-1-9.

Accordingly, it will be necessary to pump from the pending Applications which seek new appropriations of water, or to seek alternatives. The Applications may be divided into two categories. Applications LRG-3275 thru LRG-3282 seek 8,000 acre-feet of water from the West Mesa, in the immediate vicinity of the lower Rio Grande. They are expected to have a 50% impact on flows in the lower Rio Grande within 10 years. These Applications are presently unprotested.

Applications LRG-3283 thru LRG-3296 seek the remaining 14,000 acre-feet from the East Mesa and may have a minimal impact on the surface flows of the lower Rio Grande. These Applications are protested. The City requests that a decision on LRG-3283 thru LRG-3296 be made prior to acting on the unprotested West Mesa Applications as anticipated return flows could be used to offset the depletive impacts of pumping West Mesa Applications Nos. LRG-3275 thru LRG-3282. It may be that hearing on the East Mesa Applications is not necessary as the protests were filed in 1981 at the height of the El Paso applications and may not be pursued.

We understand that in taking office this week you will find your desk crowded with matters that require your attention. The meeting that we are requesting need not occur until June of this year. If we were able to obtain a schedule for deciding these matters at that time, the State Engineer would have sufficient time to reach a decision on these applications before Las Cruces would be faced with the prospect of a water shortage.

Thank you for your assistance in this matter.

Sincerely,

Jay F. Stein

JFS*pat
cc: Ken Needham
Marcy Driggers, Esq.
Jerry Leyendecker
Lee Wilson

Fred Duren
John Nixon
Peter Thomas White, Esq. (Hand-Delivered)
Lee Warren, Esq. (Hand-Delivered)

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

ELUID L. MARTINEZ
State Engineer

BATAAN MEMORIAL BUILDING, ROOM 101
POST OFFICE BOX 25102
SANTA FE, NEW MEXICO 87504-5102

June 4, 1992

Stacey J. Goodwin
Simms & Stein, P.A.
P.O. Box 280
Santa Fe, New Mexico 87504

Re: LRG-3275 thru LRG-3882; LRG-3283 thru LRG-3296
City of Las Cruces

Dear Ms. Goodwin:

In response to your request of May 20, 1992, there are several applications filed prior to those you mention that must be acted upon before a hearing can be held on yours. A hearing examiner will be appointed for the above-numbered applications as soon as those prior-filed applications have been disposed of.

Please do not hesitate to contact this office again if further discussion of the matter would be helpful.

Sincerely,

Eluid L. Martinez
State Engineer

By: Kent W. Breese
Kent W. Breese, Engineer
Water Rights Division

KWB:kb

'92 JUN 12 59

SIMMS & STEIN, P.A.
ATTORNEYS AT LAW

RICHARD A. SIMMS
JAY F. STEIN
STACEY J. GOODWIN
JAMES C. BROCKMANN

JULIE FOSTER
LEGAL ASSISTANT

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'92 MAY 26 AM 10 05

OFFICE
EXICO

May 20, 1992

Mr. Paul Saavedra
Water Rights Division
State Engineer Office
Bataan Memorial Building
Room 101
Santa Fe, New Mexico 87503

Re: City of Las Cruces; LRG-3275 thru LRG-3882,
LRG-3283 thru LRG-3296

Dear Paul:

Pursuant to your suggestion, I am writing to follow up on our written and verbal requests for the setting of a prehearing conference and hearing date in the above-referenced matter. As we have been attempting to schedule administrative action for several months, your prompt attention in securing a hearing examiner would be appreciated.

Sincerely,

Stacey J. Goodwin

SJG*pat
cc: Ken Needham

WHITE, KOCH, KELLY & McCARTHY
A Professional Association

STATE ENGINEER
LAS CRUCES, NM

'91 JUN 28 PM 2 01

'91 MAY 17 AM 9 28

STATE ENGINEER OFFICE
SANTA FE NEW MEXICO

Attorneys and Counselors at Law

Sumner S. Koch
William Booker Kelly
John F. McCarthy, Jr.
Kenneth Bateman
Benjamin Phillips
Larry C. White
John N. Patterson
David F. Cunningham
Albert V. Gonzales
Janet Clow
Kevin V. Reilly
Mary M. McInerny
Charles W. N. Thompson, Jr.
M. Karen Kilgore

Of Counsel
L. C. White

Special Counsel
Paul L. Bloom
Peter Hanagan

Holly A. Hart
Aaron J. Wolf
Sandra Brinck Martinez

May 16, 1991

HAND-DELIVERED

Mr. Eluid L. Martinez
New Mexico State Engineer
Bataan Memorial Building
Santa Fe, New Mexico 87501

Re: Protests by the City of El Paso to Pending Applications

Dear Mr. Martinez:

As you know, the City of El Paso, Elephant Butte Irrigation District and New Mexico State University have entered into a settlement agreement concerning pending litigation. One of the terms of the agreement calls for El Paso to dismiss without prejudice its protests to water right applications pending in the State Engineer's Office. Attached to this letter is a list of such protested applications. I believe the list is complete, but if you find we have omitted any protest, please let me know and we will supplement this letter.

Pursuant to the aforementioned settlement agreement, El Paso hereby withdraws its protests to the applications identified in the attached list, without prejudice.

Sincerely,

BENJAMIN PHILLIPS

BP/rms
Enclosure
cc: Steven L. Hernandez, Esq.
Stephen A. Hubert, Esq.
Luis G. Stelzner, Esq.
Frederick Hennighausen, Esq.
Kyle W. Gesswein, Esq.
Ralph W. Richards, Esq.
Richard Simms, Esq.
Edmund G. Archuleta, P.E.
Risher S. Gilbert, Esq.
Herb Prouty, Esq.

APPLICATIONS PROTESTED BY EL PASO

Lower Rio Grande

LRG 370-S-21 through LRG 370-S-22	Moongate Water Company
LRG 412(T) through 412(T5)	B. Davis and Slide-a-ride
LRG 430-S, S-2, S-3, S-21, S-22, S-23, S-28, S-29, S-30	Las Cruces
LRG 454-S-2	Whitaker Dairy
LRG 457-A into 458	L. Gorzeman
LRG 458, et al.	L. Gorzeman
LRG 649 through 654-S	F. Deerman
LRG 1054	W. A. King
LRG 1876-S	Sunshine Dairy
LRG 1905 and 1905-S-5	Doña Ana MDWCA
LRG 2065 through 2661; 2666 through 3104	Strauss Cattle Company
LRG 3164	Dorothy Munoz
LRG 3275 through 3282	Las Cruces
LRG 3283 through 3296	Las Crcues
LRG 3403-A	Stuart Hutson
LRG 3438 through 3439	Hydro Conduit Corp.
LRG 4116-A	DeGraaf Farms
LRG 4116-S	Zwaagstra
LRG 4364-S	John H. Livingston
LRG 4921A and 4921-S-2	Sidco Corp.
LRG 5007-S	River Valley View Water System
LRG 5488 through 5808	State Land Office
LRG 6296	C. E. Johns
LRG 6307-S-2 through 6307-S-3	Sunland Park
LRG 6615	J. E. Dofflemeyer
LRG 6700	J. E. Masterson

Hueco

HU-75	Yanker
HU-91	Merrill
HU-91(T)	Merrill
HU-153 through HU-153-S-2	Lake Section Water Co.
HU-159 through HU-193	Commissioner of Public Lands, NM

Tularosa

T-294	Black Hills Ranch
T-586-S	Charles H. Hartman

1/BP/LRG.WPF

THIRD JUDICIAL DISTRICT COURT

COUNTY OF DONA ANA

STATE OF NEW MEXICO

ORIGINAL COPY

FILED

'90 FEB 12 P7:39

DISTRICT COURT
DONA ANA COUNTY, STATE OF NEW MEXICO
M.C. GONZALES, CLERK

LRG-3275 Harm
LRG-3282

'88 JUN 25 P4:02

CITY OF LAS CRUCES

Plaintiff(s)

V.

REYNOLDS, S.E. etal

Defendant(s).

No. 88-07-CV-CV-88-00489

'88 OCT 6 AM 11 31

CLERK DISTRICT COURT
LAS CRUCES, NM

ORDER OF DISMISSAL

IT IS HEREBY ORDERED that the above case is dismissed without prejudice for lack of prosecution.

IT IS FURTHER ORDERED that for good cause shown, this case may be re-instated upon application being made within thirty days of the filing of this order.

District Judge

CERTIFICATE

I hereby certify that a true and correct copy of the foregoing was mailed to counsel on this day, February 01, 1990.

ASHCROFT, MARILYN C.
P.O. DRAWER CLC
LAS CRUCES, NM 88004

M. C. GONZALES
Clerk of the District Court

By:

'88 MAR 21 PM 12 50

3-21-88

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

BATAAN MEMORIAL BUILDING
STATE CAPITOL
SANTA FE, NEW MEXICO 87503

March 15, 1988

This letter sent to Applicant and Protestants as shown on the attached list.

Re: File Nos.: LRG-3275 thru LRG-3282,
LRG-3283 thru LRG-3296

Dear Ladies and Gentlemen:

Enclosed please find your copy of ORDER of the State Engineer dated March 15, 1988, which is self-explanatory.

Sincerely,

S. E. Reynolds
State Engineer

By: M. B. Compton
M. B. Compton, Chief
Water Rights Division

MBC:kb
encl.
cc: J.B. Nixon
CRRR

I. File Nos. LRG-3275 thru LRG-3282

Applicant:

City of Las Cruces
Utilities Division
P.O. Drawer CLC
Las Cruces, New Mexico 88004

Protestant:

El Paso Water Utilities Public
Service Board
c/o Benjamin Phillips, Esq.
White Koch, Kelly & McCarthy
P.O. Box 787
Santa Fe, New Mexico 87504-0787

II. File Nos. LRG-3283 thru LRG-3286

Applicant:

City of Las Cruces
Utilities Division
P.O. Drawer CLC
Las Cruces, New Mexico 88004

Protestants:

Jornada Water Users Association
c/o F.A. Smith, President
8110 Holman Rd.
Las Cruces, New Mexico 88001

El Paso Water Utilities Public
Service Board
c/o Benjamin Phillips, Esq.
White, Koch, Kelly & McCarthy
P.O. Box 787
Santa Fe, New Mexico 87504-0787

C.R. Hayslett
1345 North Mesilla
Las Cruces, New Mexico 88005

Dewey D. & Jan L. Lackey
P.O. Box 15008
Las Cruces, New Mexico 88004

Mrs. Charles Henry Ferguson
8060 Holman Rd.
Las Cruces, New Mexico 88001

W.K. Miller
7990 Holman Rd.
Las Cruces, New Mexico 88001

Donald L. Hoihjelle
P.O. Box 284
Organ, New Mexico 88052

Lawrence J. Girault
8110 Holman Rd.
Las Cruces, New Mexico 88001

BEFORE THE
STATE ENGINEER OF NEW MEXICO

IN THE MATTER OF THE	)	LRG-3275 through LRG-3282
APPLICATIONS OF THE	)	LRG-3283 through LRG-3296
CITY OF LAS CRUCES	)	

ORDER

THIS MATTER coming before the State Engineer on the Motion to Dismiss Las Cruces' Applications filed by El Paso Water Utilities Public Service Board (El Paso) on January 14, 1988; the City of Las Cruces' Response to El Paso's Motion to Dismiss Las Cruces' Applications, and El Paso's Reply to that Response. On due consideration of the arguments and authorities cited therein; it is found that a factual hearing is required on the question of whether Las Cruces can show a need for water within forty years of the date of application.

IT IS THEREFORE ORDERED that El Paso's Motion to Dismiss Las Cruces' applications is hereby DENIED.

Dated: 3/15/88

S.E. REYNOLDS
State Engineer

WHITE, KOCH, KELLY & McCARTHY
A Professional Association

Attorneys and Counselors at Law

Sumner S. Koch
William Booker Kelly
John F. McCarthy, Jr.
Kenneth Bateman
Benjamin Phillips
Larry C. White
John N. Patterson
David F. Cunningham
Albert V. Gonzales
Bruce R. Kohl
Janet Clow

Of Counsel
L. C. White
William R. Hendley

Special Counsel
Paul L. Bloom

Bruce J. Fort
M. Karen Kilgore
Kevin V. Reilly
Kingsley Martin
Mary M. McInerny
Holly A. Hart
Ann M. Harvey
Aaron J. Wolf

March 10, 1988

HAND-DELIVERED

Mr. S. E. Reynolds
State Engineer Office
Bataan Memorial Building
Room 101
Santa Fe, New Mexico 87503

Re: Applications of the City of Las Cruces
Nos. LRG-3275 through LRG-3282, LRG-3283 through LRG-3296, LRG-389, LRG-399

Dear Mr. Reynolds:

Enclosed for filing are original and three copies of El Paso's Reply In Support Of Its Motion To Dismiss Las Cruces's Applications in the above-referenced matter.

Sincerely yours,

BENJAMIN PHILLIPS

BP/cj
Enclosures

cc w/enclosure: Marcia B. Driggers
Neil C. Stillinger
P. M. Schenkkan

433 Paseo de Peralta P.O. Box 787, Santa Fe, NM 87504-0787 (505) 982-4374 Group III Facsimile (505) 983-4395

BEFORE THE STATE ENGINEER

OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE APPLICATIONS OF THE CITY OF LAS CRUCES, NEW MEXICO.	)	Nos. LRG-3275 through LRG-3282 LRG-3283 through LRG-3296 LRG-389, LRG-399

EL PASO'S REPLY IN SUPPORT OF ITS MOTION TO DISMISS LAS CRUCES'S APPLICATIONS

El Paso's Motion to Dismiss Las Cruces's Applications to appropriate LRG ground water asks the State Engineer to apply to Las Cruces the same criteria he used to deny all of El Paso's LRG and Hueco applications. Because Las Cruces unquestionably has the power of eminent domain to acquire existing water rights of the Rio Grande Project, and because State-sponsored population and water demand forecasters project little increase in use of LRG water for urban, rural, commercial and industrial purposes, Las Cruces's applications should be dismissed. Summary dismissal is appropriate, indeed required, to maintain a semblance of evenhanded enforcement of New Mexico water law.

Las Cruces, in its response, accuses El Paso of oversimplifying and misconstruing the State Engineer's "complex" decision. That decision, according to Las Cruces, rested as

much on El Paso's future water demand, and its alleged preference for surface water, as it did on El Paso's ability to acquire Rio Grande Project surface rights by condemnation or otherwise.

In reality, it is the Las Cruces response which misconstrues the State Engineer's decision, as evidenced by Las Cruces's mischaracterization of several State Engineer findings. For example, Las Cruces claims that the State Engineer found (Finding 19) that Rio Grande Project water was the "most available and practical source of supplemental water" for El Paso. Actually, the State Engineer found only that a 1962 contract contains such a recital. The State Engineer could not have made the finding Las Cruces claims he made because all of the record evidence was to the contrary, and the State Engineer well knows that the 1962 contract was made at a time when New Mexico's unconstitutional water embargo precluded El Paso's use of ground water from New Mexico--clearly the most available and practical water supply source today.

Las Cruces also misstates State Engineer Finding 22 by omitting the qualifying words "to the maximum extent practicable." Obviously, the State Engineer did not and could not find, based on the evidence, that El Paso prefers to condemn Rio Grande Project surface water rights rather than preserve irrigated agriculture as long as reasonably possible and use more reliable and less costly ground water for municipal purposes.

The State Engineer's decision is essentially contained in Finding 23 where he concludes "that no water rights in New Mexico are needed by El Paso" within 40 years (emphasis added). The clear meaning of the State Engineer's decision is that El Paso may need to acquire additional water rights to meet its water production requirement in 2020 even as estimated by the State Engineer's own witnesses, but those water rights may not include new appropriations of ground water in New Mexico because there is a large quantity of surface water rights that El Paso allegedly can acquire by condemnation.

This same analysis must be applied to New Mexico municipalities also seeking to appropriate ground water from the LRG. First, the State Engineer must assess Las Cruces's water production requirement using the population and water demand projections of the same State-sponsored witnesses whose testimony on El Paso population and water demand he accepted without modification in acting upon El Paso's applications. These witnesses, whose testimony was not challenged by a single cross-examination question from Las Cruces, project an increase in urban/rural, commercial and industrial water use in the entire LRG of less than 13,000 acre feet per year between 1990 and 2030, an increase of only 52 percent in forty years. State Exhibit 23, Tbl. 4-1. Las Cruces's claimed existing pre-basin water rights, on the other hand, are approximately 100 percent greater than its current usage. State Engineer files LRG-430 and 2036.

Second, Las Cruces's claimed water rights inventory necessarily understates Las Cruces's ability to meet its future water production requirements, because Las Cruces unquestionably has the power of eminent domain. If the existence of Rio Grande Project water rights and El Paso's alleged power to acquire those rights by condemnation precludes El Paso from appropriating ground water in New Mexico, then Las Cruces's unquestioned power to condemn Project surface rights in New Mexico requires dismissal of the Las Cruces applications to appropriate LRG ground water.

WHEREFORE, the City of El Paso respectfully requests that Las Cruces's applications to appropriate LRG ground water be dismissed.

Respectfully submitted,

WHITE, KOCH, KELLY & McCARTHY, P.A.

By: _____
BENJAMIN PHILLIPS
PAUL L. BLOOM
Post Office Box 787
Santa Fe, New Mexico 87504-0787
(505) 982-4374

VINSON & ELKINS
P. M. SCHENKKAN
First City Center
816 Congress Avenue
Austin, Texas 78701-2496
(512) 495-8500

ATTORNEYS FOR EL PASO

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing document was mailed to all counsel of record this 10th day of March, 1988.

_____
BENJAMIN PHILLIPS

6-4

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing document was mailed to all counsel of record this 10th day of March, 1988.

BENJAMIN PHILLIPS

6-4

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

BATAAN MEMORIAL BUILDING
STATE CAPITOL
SANTA FE, NEW MEXICO 87503

February 24, 1988

This letter sent to Applicant and Protestants as shown on the attached list.

Re: File Nos.: LRG-3275 thru LRG-3282,
LRG-3283 thru LRG-3296

Dear Ladies and Gentlemen:

Enclosed please find your copy of ORDER of the State Engineer dated February 24, 1988, which is self-explanatory.

Sincerely,

S. E. Reynolds
State Engineer

By: D.N. Stone
D.N. Stone
Water Rights Division

DNS:kb
encl.
cc: J.B. Nixon

I. File Nos. LRG-3275 thru LRG-3282

Applicant:

City of Las Cruces
Utilities Division
P.O. Drawer CLC
Las Cruces, New Mexico 88004

Protestant:

El Paso Water Utilities Public
Service Board
c/o Benjamin Phillips, Esq.
White Koch, Kelly & McCarthy
P.O. Box 787
Santa Fe, New Mexico 87504-0787

II. File Nos. LRG-3283 thru LRG-3286

Applicant:

City of Las Cruces
Utilities Division
P.O. Drawer CLC
Las Cruces, New Mexico 88004

Protestants:

Jornada Water Users Association
c/o F.A. Smith, President
8110 Holman Rd.
Las Cruces, New Mexico 88001

El Paso Water Utilities Public
Service Board
c/o Benjamin Phillips, Esq.
White, Koch, Kelly & McCarthy
P.O. Box 787
Santa Fe, New Mexico 87504-0787

C.R. Hayslett
1345 North Mesilla
Las Cruces, New Mexico 88005

Dewey D. & Jan L. Lackey
P.O. Box 15008
Las Cruces, New Mexico 88004

Earl H. Barksdale
8020 Holman Rd.
Las Cruces, New Mexico 88001

Mrs. Charles Henry Ferguson
8060 Holman Rd.
Las Cruces, New Mexico 88001

W.K. Miller
7990 Holman Rd.
Las Cruces, New Mexico 88001

Donald L. Hoihjelle
P.O. Box 284
Organ, New Mexico 88052

Foo Lam
1150 Sharon Circle
Las Cruces, New Mexico 88001

Lawrence J. Girault
8110 Holman Rd.
Las Cruces, New Mexico 88001

BEFORE THE

STATE ENGINEER OF NEW MEXICO

IN THE MATTER OF THE	)	LRG-3275 through LRG-3282
APPLICATIONS OF THE	)	LRG-3283 through LRG-3296
CITY OF LAS CRUCES	)	

ORDER

THIS MATTER coming before the State Engineer on the Motion to Dismiss Las Cruces' Applications filed by El Paso Water Utilities Public Services Board (El Paso) on January 14, 1988, El Paso's February 19, 1988, letter and the City of Las Cruces' Response to El Paso's Motion to Dismiss Las Cruces' Applications,

IT IS HEREBY ORDERED that any reply to the Las Cruces Response must be filed with the State Engineer and served on the parties on or before March 10, 1988. The date of mailing will constitute the filing date.

DATED: February 24, 1988

S.E. REYNOLDS
State Engineer

City of Las Cruces

February 22, 1988

David N. Stone
Water Rights Specialist
Water Rights Division
Room 101
Bataan Memorial Building
Santa Fe, NM 87503

RE: Applications of the City of Las Cruces
Nos. LRG-3275 through LRG-3283 through LRG-3296,
LRG-389, LRG-399

Dear Mr. Stone:

Enclosed are an original and four copies of the response by the City of Las Cruces to El Paso's Motion to Dismiss Las Cruces' Applications. Please return a date stamped copy to our office at your convenience.

In response to Mr. Phillips' letter dated February 19, 1988 directed to Mr. Reynolds (a copy of which is attached for your review), the City is not aware of any New Mexico Rule of Civil Procedure for the District Courts which requires that a response to a Motion be filed within thirty (30) days unless otherwise ordered by the Court or in this case, by a State Engineer Office hearing examiner, which has not occurred.

In further response the City wishes to advise the Water Rights Division that it is finalizing negotiations with an outside attorney to represent it in various water right matters and respectfully requests permission to file an Amended Response if desired by its new attorney.

In advance I thank you for your consideration.

Sincerely,

Marcia B. Driggers
Utilities Attorney

MBD/m
Enclosure as noted

cc w/ enc.: Mr. Benjamin Phillips
Mr. Neil C. Stillinger
Mr. Richard Simms

WHITE, KOCH, KELLY & McCARTHY
A Professional Association

Attorneys and Counselors at Law

Sumner S. Koch
William Booker Kelly
John F. McCarthy, Jr.
Kenneth Bateman
Benjamin Phillips
Larry C. White
John N. Patterson
David F. Cunningham
Albert V. Gonzales
Bruce R. Kohl
Janet Clow

Of Counsel
L. C. White
William R. Hendley

Special Counsel
Paul L. Bloom

Bruce J. Fort
M. Karen Kilgore
Kevin V. Reilly
Kingsley Martin
Mary M. McInerny
Holly A. Hart
Ann M. Harvey
Aaron J. Wolf

February 19, 1988

Mr. S. E. Reynolds
State Engineer Office
Bataan Memorial Building
Room 101
Santa Fe, New Mexico 87503

Re: Applications of the City of Las Cruces
Nos. LRG-3275 through LRG-3283 through LRG-3296,
LRG-389, LRG-399

Dear Mr. Reynolds:

The City of El Paso is a protestant in proceedings on the above-referenced applications. On January 15, 1988, El Paso filed a motion to dismiss these applications and served a copy of the motion on Neil C. Stillinger, Esq. The following day El Paso served a copy of its motion on Robert B. Kelley, Las Cruces City Attorney.

More than thirty days have elapsed since the filing and service of El Paso's motion, without a response having been filed on behalf of Las Cruces. In these circumstances, it would be appropriate for you to treat El Paso's motion as unopposed and to enter an order granting the requested relief; or, alternatively, set a prompt deadline for a response from Las Cruces.

Sincerely,

BENJAMIN PHILLIPS

BP/cj

cc: Neil C. Stillinger, Esq.
Robert B. Kelley, Esq.
P. M. Schenkkan, Esq.

RECEIVED
FEB 22 1988
CITY ATTORNEY

433 Paseo de Peralta P.O. Box 787, Santa Fe, NM 87504-0787 (505) 982-4374 Group III Facsimile (505) 983-4395

23 10:21

BEFORE THE

STATE ENGINEER OF NEW MEXICO

IN THE MATTER OF THE APPLICATIONS OF THE CITY OF LAS CRUCES	LRG-3275 through LRG-3282 LRG-3283 through LRG-3296 LRG-389, LRG-399

RESPONSE TO EL PASO'S MOTION TO DISMISS LAS CRUCES' APPLICATIONS

COMES NOW the applicant, City of Las Cruces ("City"), through the office of the City Attorney and responds to El Paso's Motion to Dismiss Las Cruces' Applications numbered LRG-3275 through LRG-3282 and LRG-3283 through LRG-3296 as follows:

1. El Paso misconstrues and overly-simplifies the State Engineer's decision of December 27, 1987 denying El Paso's Hueco Basin and Lower Rio Grande Basin Applications by concluding that merely because a Municipality has the power to condemn water rights, it therefore has no need for water within the meaning of Section 72-1-9 NMSA 1978 (enacted 1985).

2. The State Engineer's decision of December 27, 1987 is far more complex than El Paso has set forth in its Motion.

3. The State Engineer's decision of December 27, 1987 was rendered after a 58-day hearing on El Paso's Applications during which hearing voluminous amounts of testimony and evidence were introduced on the issues of population, hydrology and public welfare and conservation of water.

4. Not only did the State Engineer's decision of December 27, 1987 make specific findings on population (Finding 14), water need (Finding 15), water availablility (Finding 16) and water quality (Findings 17 and 18), but it also found that Rio Grande Project Water was the most available and practical source of supplemental water for El Paso (Finding 19) and that the maximum use of surface water was the first priority of El Paso's water development plan as set forth by El Paso's own exhibits and witnesses (Finding 22).

5. The City has shown and will show again a need for additional water rights within the 40-year planning period authorized by Section 72-1-9, NMSA 1978 (enacted 1985) and is entitled to evidentiary hearings on its applications and protests thereto.

6. El Paso's Motion to Dismiss misconstrues the State Engineer's decision of December 27, 1987 and its construction of that decision provides no basis for a summary dismissal of Las Cruces' LRG Applications.

WHEREFORE, having fully responded, the City respectfully requests that El Paso's Motion to Dismiss Las Cruces' Applications be dismissed.

Marcia B. Driggers
Utilities Attorney
City of Las Cruces
P. O. Drawer CLC
Las Cruces, N.M. 88004
(505) 526-0432

BEFORE THE

STATE ENGINEER OF NEW MEXICO

IN THE MATTER OF THE	LRG-3275 through LRG-3282
APPLICATIONS OF THE	LRG-3283 through LRG-3296
CITY OF LAS CRUCES	LRG-389, LRG-399

CERTIFICATE OF MAILING

OF RESPONSE TO EL PASO'S MOTION

I hereby certify that a true and correct copy of the City of Las Cruces' response to El Paso's Motion to Dismiss Las Cruces' applications was mailed to Benjamin Phillip, P. O. Box 787, Santa Fe, New Mexico 87504-0787 on this 22nd day of February, 1988.

Marcia B. Driggers
Utilities Attorney
City of Las Cruces
P. O. Drawer CLC
Las Cruces, N.M. 88004
(505) 526-0432

WHITE,
KOCH, KELLY
&
McCARTHY
A Professional Association

Attorneys and Counselors at Law

Sumner S. Koch
William Booker Kelly
John F. McCarthy, Jr.
Kenneth Bateman
Benjamin Phillips
Larry C. White
John N. Patterson
David F. Cunningham
Albert V. Gonzales
Bruce R. Kohl

Of Counsel
L. C. White
William R. Hendley

Special Counsel
Paul L. Bloom

Bruce J. Fort
Janet Clow
M. Karen Kilgore
Kevin V. Reilly
Kingsley Martin
Mary M. McInerny
Holly A. Hart

SEN
1-22-88

January 15, 1988

HAND-DELIVERED

Mr. S. E. Reynolds
State Engineer
State of New Mexico
Bataan Memorial Building
Don Gaspar Avenue
Santa Fe, New Mexico 87503

Re: In the Matter of the Applications of the City of Las Cruces Nos. LRG-3275 through LRG-3282, LRG-3283 through LRG-3296, LRG-389, LRG-399

Dear Mr. Reynolds:

Enclosed for filing are original and three copies of the El Paso Water Utilities Public Service Board's Certificate of Service of Motion to Dismiss Las Cruces' Applications in the above referenced matter.

Very truly yours,

BENJAMIN PHILLIPS

BP/cj
Enclosures
cc w/enclosure: Neil C. Stillinger
Robert B. Kelley

433 Paseo de Peralta P.O. Box 787, Santa Fe, NM 87504-0787 (505) 982-4374 Group III Facsimile (505) 983-4395

BEFORE THE

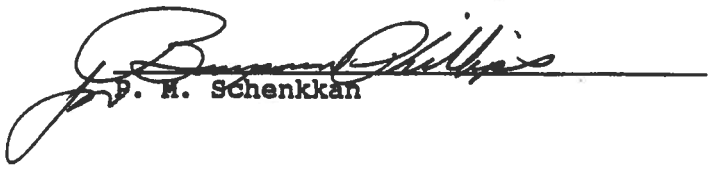
STATE ENGINEER OF NEW MEXICO

IN THE MATTER OF THE	§	LRG-3275 through LRG-3282
APPLICATIONS OF THE	§	LRG-3283 through LRG-3296
CITY OF LAS CRUCES	§	LRG-389, LRG-399

CERTIFICATE OF SERVICE OF MOTION TO DISMISS
LAS CRUCES' APPLICATIONS

I certify that a true copy of the El Paso Water Utilities Public Service Board ("El Paso") Motion To Dismiss Las Cruces' Applications was mailed to Robert B. Kelley, City Attorney, City of Las Cruces, 200 North Church Avenue, Las Cruces, New Mexico 88001, this 15th day of January, 1988.

Respectfully submitted,



P. M. Schenkkan

OF COUNSEL:
VINSON & ELKINS
1800 First City Centre
816 Congress Avenue
Austin, Texas 78701-2496

Benjamin Phillips

OF COUNSEL:
WHITE, KOCH, KELLY &
McCARTHY, P.A.
Benjamin Phillips
P. O. Box 787
Santa Fe, New Mexico 87504-0787

Paul L. Bloom
2756 Unicorn Lane, N.W.
Washington, D.C. 20015

ATTORNEYS FOR EL PASO WATER
UTILITIES PUBLIC SERVICE BOARD

CERTIFICATE OF MAILING

I hereby certify that a true copy of the foregoing was mailed to Robert B. Kelley, City Attorney for the City of Las Cruces and Neil C. Stillinger, attorney for the City of Las Cruces, this 15th day of January, 1988.

Benjamin Phillips

WHITE,
KOCH, KELLY
&
McCARTHY
A Professional Association

Attorneys and Counselors at Law

Sumner S. Koch
William Booker Kelly
John F. McCarthy, Jr.
Kenneth Bateman
Benjamin Phillips
Larry C. White
John N. Patterson
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Of Counsel
L. C. White
William R. Hendley

Special Counsel
Paul L. Bloom

Bruce J. Fort
Janet Clow
M. Karen Kilgore
Kevin V. Reilly
Kingsley Martin
Mary M. McInerny
Holly A. Hart

January 14, 1988

SANTA FE NEW MEXICO

HAND-DELIVERED

Mr. S. E. Reynolds
State Engineer
State of New Mexico
Bataan Memorial Building
Don Gaspar Avenue
Santa Fe, New Mexico 87503

Re: In the Matter of the Applications of the City of Las Cruces Nos. LRG-3257 through LRG-3282, LRG-3283 through LRG-3296, LRG-389, LRG-399

Dear Mr. Reynolds:

Enclosed for filing are original and three copies of the El Paso Water Utilities Public Service Board's Motion to Dismiss Las Cruces' Applications in the above referenced matter.

Very truly yours,

BENJAMIN PHILLIPS

BP/cj
Enclosures
cc w/enclosure: Neil C. Stillinger

433 Paseo de Peralta P.O. Box 787, Santa Fe, NM 87504-0787 (505) 982-4374 Group III Facsimile (505) 983-4395

BEFORE THE

STATE ENGINEER OF NEW MEXICO

IN THE MATTER OF THE	§	LRG-3257 through LRG-3282
APPLICATIONS OF THE	§	LRG-3283 through LRG-3296
CITY OF LAS CRUCES	§	LRG-389, LRG-399

MOTION TO DISMISS LAS CRUCES' APPLICATIONS

Comes now the protestant, El Paso Water Utilities Public Service Board ("El Paso"), and hereby moves for dismissal of applications LRG-3275 through LRG-3282 and LRG-3283 through LRG-3296, filed by the City of Las Cruces ("Las Cruces"). In support hereof, El Paso states:

1. Using State Engineer assumptions, the water users in the Elephant Butte Irrigation District own rights to the use of 274,105 acre-feet of Rio Grande Project water annually. (Duty of water, as assumed by State Engineer, of 3.024 acre-feet per acre times 90,640 acres equal 274,105 acre-feet).

2. Las Cruces unquestionably has the power to condemn water rights. Section 3-27-2, NMSA 1978.

3. According to the State Engineer's decision of December 27, 1987, denying El Paso's applications, a city which has the power to condemn agricultural water rights to meet future demands has no need for water within the meaning of Section 72-1-9 NMSA 1978, enacted 1985.

4. In addition, based on the small increase in water demand which will occur for urban, rural, commercial and industrial purposes in the LRG Basin (Table 4-1 of State Exhibit 23, submitted at hearing on El Paso applications HU-12, etc.), and on the large declared claim to water rights filed by Las Cruces (State Engineer files LRG-430 and 2036), Las Cruces has no need for any new water rights.

Wherefore, El Paso respectfully submits that, in consistency with his own interpretation of Section 72-1-9 as applied against El Paso, the State Engineer must summarily dismiss Las Cruces' LRG applications.

Respectfully submitted,

P. M. Schenkkan

OF COUNSEL:

VINSON & ELKINS
1800 First City Centre
816 Congress Avenue
Austin, Texas 78701-2496

Benjamin Phillips

OF COUNSEL:

WHITE, KOCH, KELLY &
McCARTHY, P.A.
Benjamin Phillips
P. O. Box 787
Santa Fe, New Mexico 87504-0787

Paul L. Bloom
2756 Unicorn Lane, N.W.
Washington, D.C. 20015

ATTORNEYS FOR EL PASO WATER
UTILITIES PUBLIC SERVICE BOARD

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the foregoing was mailed to Neil C. Stillinger, attorney for the City of Las Cruces, this 14th day of January, 1988.

Benjamin Phillips

'87 FEB 11 PM 2 25

STATE ENGINEER
LAS CRUCES, N.M.

STATE OF NEW MEXICO

STATE ENGINEER OFFICE

SANTA FE

S. E. REYNOLDS
STATE ENGINEER

BATAAN MEMORIAL BUILDING
STATE CAPITOL
SANTA FE, NEW MEXICO 87503

February 9, 1987

Counsel of record and pro se parties

Re: In the Matter of the Applications of Gerald A. Strauss
LRG-2065 through LRG-2661 and LRG-2666 through LRG-3104

Ladies and Gentlemen:

Enclosed please find your copy of Stipulation and Order of Denial of Motion to Dismiss and Settlement Agreement which is referred to as Exhibit A in the stipulation and order. Please note that the State Engineer has ordered that the City of Las Cruces' Motion to Dismiss be denied with prejudice by action dated February 9, 1987.

Sincerely,

S. E. Reynolds
State Engineer

By: D. N. Stone
D. N. Stone
Water Rights Division

DNS*kb
enclosure
cc: J. B. Nixon

BEFORE THE STATE ENGINEER

IN THE MATTER OF THE APPLICATIONS OF GERALD A. STRAUSS	)))	LRG-2065 THROUGH LRG-2661 LRG-2666 THROUGH LRG-3014

STIPULATION AND ORDER OF DENIAL OF MOTION TO DISMISS

STIPULATION

IT IS HEREBY STIPULATED AND AGREED by the movant City of Las Cruces ("City") and by the Applicant Gerald A. Strauss ("Strauss") as follows:

1. The Settlement Agreement between the City and Strauss, dated January 23, 1987, a copy of which is attached hereto as Exhibit A, should be approved and confirmed in all respects by the State Engineer.

2. The City's Motion to Dismiss the applications in this proceeding should be denied and the matters asserted therein may not be litigated by the City in further proceedings before the State Engineer on the Strauss Applications.

87 JAN 26 AM 9:20

STATE ENGINEER OFFICE SANTA FE, NEW MEXICO

GERALD A. STRAUSS

By: _____

Bradford C. Berge, Esq.
Campbell & Black
Post Office Box 2208
Santa Fe, New Mexico 87504-2208
(505) 988-4421

Attorneys for Gerald A. Strauss

By: _____

Richard A. Simms
Hinkle, Cox, Eaton, Coffield
and Hensley
Post Office Box 2068
Santa Fe, New Mexico 87504-2068
(505) 982-4554

Attorneys for the City of
Las Cruces

ORDER

The State Engineer having reviewed the foregoing Stipulation of the parties, having fully considered the matter and having found that the Stipulation should be approved;

IT IS HEREBY ORDERED AND ADJUDGED that the City of Las Cruces' Motion to Dismiss be, and the same hereby is, denied with prejudice.

DATE: 2/9/87

_____
STATE ENGINEER

MEMORANDUM

State Engineer Office
Santa Fe, New Mexico

February 4, 1987

TO S. E. Reynolds

FROM D. N. Stone

SUBJECT Strauss Applications, Addendum to February 3, 1987 Memorandum

The Water Rights Division has provided all counsel of record and pro se parties with copies of State Engineer correspondence, orders and the subpoena. There is no record in the files which show that counsel for Strauss or the City of Las Cruces have done the same. It would therefore be appropriate to allow the other parties to reply to the January 26, 1987 filings. A reply date of February 13, 1987 is therefore recommended.

DNS:rav

MEMORANDUM

State Engineer Office
Santa Fe, New Mexico

February 3, 1987

TO S.E. Reynolds, State Engineer

FROM D.N. Stone, Water Rights Division D.N.S. No Load agree MKG

SUBJECT File No. LRG-2065 thru LRG-2661 and LRG-2666 thru LRG-3104; Strauss

1. On September 8, 1981, Gerald A. Strauss and Barbara W. Strauss filed 1036 applications to appropriate a total of 484,920 af/an of underground waters in the Lower Rio Grande Underground Water Basin for the irrigation of 161,640 acres of land located on the mesa west of the Rio Grande.

2. a) Applications LRG-2666 thru LRG-3104 were protested by 8 parties including the City of Las Cruces, El Paso and E.B.I.D.

   b) Applications LRG-2155 thru LRG-2661 and LRG-2666 thru LRG-3104 were protested by 1 party.

   c) Applications LRG-2245 thru LRG-2661 and LRG-2666 thru LRG-3104 were protested by 2 parties.

   d) Applications LRG-2335 thru LRG-2661 and LRG-2666 thru LRG-3104 were protested by 10 parties.

   e) Applications LRG-2460 thru LRG-2661 and LRG-2666 thru LRG-3104 were protested by 2 parties.

   f) Applications LRG-2776 thru LRG-3104 were protested by 5 parties.

   g) Applications LRG-2505 thru LRG-2549 were protested by 1 party.

   h) Applications LRG-2305 thru LRG-2361 and LRG-2666 thru LRG-3104 were protested by 1 party.

3. On July 3, 1985 an Assignment dated February 12, 1985 was filed conveying interest in Applications LRG-2065 thru LRG-2661 and LRG-2666 thru LRG-3104 from Gerald A. Strauss to Ursula Culp.

4. Change of Ownership of Water Right was filed on November 8, 1985 conveying the interest in Applications LRG-2065 thru LRG-2661 and LRG-2666 thru LRG-3104 from Gerald A. and Barbara W. Strauss to Gerald A. Strauss. The change of ownership was accompanied by a copy of Marital Settlement Agreement filed on March 13, 1984 in the District Court Clerk's Office of Bernalillo County between Barbara Strauss and Gerald Strauss. The change

of ownership was also accompanied by an Assignment dated March 1, 1985 which conveyed interest in Applications LRG-2065 thru LRG-2661 and LRG-2666 thru LRG-3104 from Ursula Culp to Gerald A. Strauss.

5. On July 17, 1986 Richard A. Simms of the Hinkle, Cox, Eaton, Coffield and Hensley law firm filed Entry of Appearance on behalf of the City of Las Cruces and Motion for Order to Show Cause why applications LRG-2065 thru LRG-2661 and LRG-2666 thru LRG-3104 should not be dismissed.

6. On July 21, 1986 the State Engineer entered an Order that the City of Las Cruces file a memorandum in support of its July 17, 1986 motion on or before August 1, 1986 and that Gerald A. Strauss file a response to the motion on or before August 21, 1986.

7. On August 1, 1986 Memorandum Brief was filed by Richard A. Simms, attorney for the City of Las Cruces.

8. On August 5, 1986 Richard A. Simms filed revisions to pages 2, 3 and 4 of the Memorandum Brief filed on August 1, 1986.

9. On August 6, 1986 Benjamin Phillips of the White, Koch, Kelly & McCarthy law firm filed Entry of Appearance on behalf of the El Paso Water Utilities Public Service Board, an original protestant.

10. On August 19, 1986 Steven L. Hernandez of the Martin, Cresswell, Hubert & Hernandez law firm filed Entry of Appearance on behalf of the Elephant Butte Irrigation District.

11. On August 21, 1986 Bradford C. Berge on behalf of Gerald A. Strauss filed Motion for Extension of Time to respond to the July 17, 1986 Motion filed by the City of Las Cruces.

12. On August 21, 1986 Richard Simms filed a Response to Motion for Extension of Time.

13. On August 22, 1986 the State Engineer entered an Order requiring the applicant to file his Answer on or before September 2, 1986.

14. On August 28, 1986 Brad Berge filed Response to Motion for Order to Show Cause on behalf of applicant Strauss.

15. On September 3, 1986 Richard Simms filed Reply to Response to Motion for Order to Show Cause.

16. On September 29, 1986 the State Engineer entered an Order setting a hearing date on October 28, 1986.

17. By letter dated and filed on October 10, 1986 to the State Engineer, Richard Simms advised that a hearing date had been agreed to be set by the State Engineer during the week of November 17, 1986.

18. By letter dated October 13, 1986 and filed October 16, 1986, Richard Simms requested that the State Engineer vacate the October 28, 1986 hearing date and reset at a time convenient in light of the Hueco proceedings.

19. By letter dated and received October 14, 1986 from Brad Berge to the State Engineer, Mr. Berge requested specification of the jurisdictional basis for the hearing and clarification on receipt of evidence for the hearing and requesting postponement of the hearing until completion of discovery.

20. On October 17, 1986 the State Engineer responded to Mr. Berge's October 14, 1986 letter and stated the State Engineer was amenable to postponement of the hearing date until after January 1, 1987. The letter further requested that the applicant and protestant reach agreement concerning a particular hearing date.

21. On December 3, 1986 Ellen Casey of the Hinkle Firm transmitted and filed an original and one copy of a Subpoena Duces Tecum in the Strauss matter and requested issuance of the Subpoena on December 5, 1986 (copy attached).

22. On December 5, 1986 this office received a copy of Notice to Take Deposition (copy attached).

23. On December 8, 1986, M. B. Compton issued Subpoena Duces Tecum of Gerald A. Strauss. A copy of the subpoena was sent by certified mail to Mr. Strauss and his attorney, Bradford C. Berge and copies of the subpoena were sent by regular mail to the remaining counsel of record and prose protestants.

24. On January 26, 1987 Richard A. Simms hand delivered Stipulation and Order of Denial of Motion to Dismiss and Settlement Agreement (copies attached for your reference).

Considerations:

The Settlement Agreement was entered into by Strauss and Las Cruces on January 23, 1987.

The agreement provides for the following:

1. Strauss waives, in favor of Las Cruces, the priority established by the Strauss applications (being September 8, 1981).

2. Las Cruces' applications (filed on November 24, 1981) shall be heard, considered and acted upon by the State Engineer before the Engineer hears, considers and acts on the Strauss applications.

3. Any permit granted by the State Engineer to Las Cruces, based on said applications, shall be considered senior to and in all respects superior to any permits granted by the State Engineer to Strauss.

4. Las Cruces withdraws its Motion to Dismiss the Strauss Applications (Las Cruces will submit a Stipulated Order of Denial of the Motion to Dismiss, with prejudice, to the State Engineer for his signature).

5. The agreement waives the priority and other related rights of the Strauss applications only for the Las Cruces Applications and the agreement does not constitute a waiver of priority and other related rights for the application of any other persons.

6. Las Cruces does not waive or otherwise relinquish its right to protest the Strauss applications (§72-12-3, N.M.S.A. 1978) to protect its existing water rights and way water right permits previously granted to Las Cruces based on the Las Cruces applications.

7. The agreement constitutes the entire agreement between the parties.

8. The agreement shall be binding upon and inure to the benefit of the parties and their respective representatives successors, assigns, heirs, and legal representatives.

There are 318 pending applications for new appropriations of ground water which were filed before the Strauss applications. These 318 applications request a total of 268,792.17 acre-feet per annum for municipal, irrigation, commercial, domestic and stock purposes.

The twenty-one (21) applications filed by the City of Las Cruces were filed on November 24, 1981. There are no applications for new appropriations of ground water filed between the Strauss applications and the Las Cruces applications.

Based on the above consideration, no party would be prejudiced if the settlement agreement were approved and confirmed by the State Engineer and the Las Cruces Motion to Dismiss were denied.

kb,rav

BRUCE KING
Governor

STATE OF NEW MEXICO
NATURAL RESOURCES DEPARTMENT
WATER RESOURCES DIVISION

S.E. Reynolds, State Engineer
Bataan Memorial Building
Santa Fe, New Mexico 87503
(505) 827-2526

January 25, 1982

City of Las Cruces
Utilities Division
P. O. Drawer CLC
Las Cruces, N.M. 88004

El Paso Water Utilities
Public Service Board
c/o John T. Hickerson
General Manager
P. O. Box 511
El Paso, Texas 79961

File Nos. LRG-3275 thru
LRG-3282
Applicant: City of Las Cruces
Protested by: El Paso Water
Utilities Public Service
Board

Dear Gentlemen:

Protest to the granting of the above-numbered applications has been filed in this office.

If an agreement cannot be reached between the applicant and protestant to which the State Engineer can agree, a hearing date will be set by the State Engineer upon receipt of a written request from the applicant.

If a hearing is necessary on this matter, each party will be required to submit a hearing deposit in an amount that will be specified when the hearing is announced by the State Engineer.

We are enclosing a copy of the protest for the applicant's files.

Very truly yours,

S. E. Reynolds
State Engineer

By: Harold Saunders
Assistant Engineer
Water Rights Bureau

HS*kl
encl.
cc: L. T. Putnam
CRRR

MEMORANDUM

State Engineer Office
Deming, New Mexico
January 11, 1982

FILES: LRG-3273; LRG-3274; LRG-3275 thru LRG-3282; LRG-3283 thru LRG-3296

TO D. E. Gray, Chief, Water Rights Bureau

FROM L. T. Putnam, Supervisor, District III

SUBJECT Three (3) Affidavits of Publication

Attached are three (3) Affidavits of Publication for protested Applications for Supplemental Wells Nos. LRG-3273 and LRG-3274 and protested Applications for Permits to Appropriate Nos. LRG-3275 thru LRG-3296, in the name of the City of Las Cruces.

The above applications and protests were forwarded to your office previously.

L. T. Putnam

LTP:jp
Encls: 3 Affidavits

PROOF OF PUBLICATION

82 JAN 6 AM 8 53

OFFICE
III
MEX.

-------Wayne Barnes- , being duly sworn, deposes and says that he is the ---Advertising Director------ of the Las Cruces Sun-News, a newspaper published daily except Saturday in the County of Dona Ana, State of New Mexico; that the notice

---------- Notice is hereby given ----------
---------- LRG-3275 – LRG-3282 ----------
----

as per clipping attached, was published once a week in the regular and entire issue of said newspaper and not in any supplement thereof, for -------three---------- consecutive weeks (day): that the first publication was in the issue dated ---------- Dec. 7 ----------81----- and the last publication was in the issued dated ---------- Dec. 21 ----------19 81 ----

Deponent further states that this newspaper is duly qualified to publish legal notices or advertisements within the meaning of Sec. 3. Chapter 167 , Laws of 1937. And payment of fees for said publication has been made.

(Signed) ---------- Wayne Barnes ----------

---------- Advertising Director ----------

Official Position

STATE OF NEW MEXICO
COUNTY OF DONA ANA ss.

Subscribed and sworn to before me this -Twenty-first----- day of ----December----------81-------

Notary Public in and for
Dona Ana County, N.M.

OFFICIAL SEAL
Signature Linda E. Crawford
LINDA E. CRAWFORD
NOTARY PUBLIC - NEW MEXICO
NOTARY BOND FILED WITH SECRETARY OF STATE
My Commission Expires: May 28, 1983

LEGAL NOTICE

NOTICE is hereby given that on November 24, 1981, City of Las Cruces, P.O. Drawer CLC, Las Cruces, New Mexico 88004 filed eight applications numbered LRG-3275 through LRG-3282 inclusive with the STATE ENGINEER for permit(s) to appropriate 8,000 acre-feet of underground water per annum from the Lower Rio Grande Underground Water Basin by drilling eight wells each approximately 24 inches in diameter and to be drilled to a depth of approximately 1,500 feet, said eight wells are to be located as follows:

Well No.	Well Locations
LRG-3275	NE¼NE¼SW¼ Section 29, Township 23 South, Range 1, East, N.M.P.M.
LRG-3276	SW¼SW¼NE¼ Section 31, Township 23 South, Range 1, East, N.M.P.M.
LRG-3277	NE¼NE¼SE¼ Section 31, Township 23 South, Range 1, East, N.M.P.M.
LRG-3278	SW¼SW¼NE¼ Section 32, Township 23 South, Range 1, East, N.M.P.M.
LRG-3279	SW¼SW¼NE¼ Section 4, Township 24 South, Range 1, East, N.M.P.M.
LRG-3280	NE¼NE¼SE¼ Section 4, Township 24 South, Range 1, East, N.M.P.M.
LRG-3281	SW¼SW¼NE¼ Section 5, Township 24 South, Range 1, East, N.M.P.M.
LRG-3282	NE¼NE¼SW¼ Section 4, Township 24 South, Range 2, East, N.M.P.M.

The applicant states that the City of Las Cruces proposes to use the aforementioned eight wells for municipal and industrial water supply purposes. These wells will be connected to the system as it now exists or as it will exist in the future. Wells to be constructed as needed.

Any person, firm, association, corporation, the State of New Mexico or the United States of America, deeming that the granting of the above application will impair or be detrimental to their water rights, may protest in writing the proposal set forth in said application. The protest shall set forth all protestant's reasons why the application should not be approved and must be filed, in triplicate, with S.E. Reynolds, State Engineer, District III Office, P.O. Box 844, Deming, New Mexico 88031-0844, within ten (10) days after the date of the last publication of this Notice.

Pub. No. 81-1765
Publish: December 7, 14, 21, 1981

EL PASO WATER UTILITIES
PUBLIC SERVICE BOARD

320 SOUTH CAMPBELL ST. • P.O. BOX 511 • EL PASO, TEXAS 79961 • PH. 915/533-9701

December 24, 1981

S. E. Reynolds, State Engineer
District III Office
P.O. Box 844
Deming, New Mexico 88031-0844

Dear Mr. Reynolds:

The City of El Paso ("the City") by and through its Public Service Board, respectfully protests the following applications filed by the City of Las Cruces:

LRG APPLICATION NUMBERS

3275
3276
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'81 DEC 30 AM 11 14
STATE ENGINEER OFFICE
DISTRICT III
DEMING, N. MEX.

"WATER IS PRICELESS — USE IT WISELY"

These protests are filed solely to protect the City's water rights, including rights on Tract 29-53 and rights pursuant to our applications LRG-92 through LRG 357, inclusive. The protests are necessary because the State Engineer has not yet adopted rules for the administration of the Lower Rio Grande Basin, or acted upon the City's applications. The City anticipates that once the State Engineer has adopted reasonable criteria for the administration of the Lower Rio Grande Basin, the above protests would be withdrawn.

In addition, and for the same reasons, the City hereby protests applications LRG-3273 and LRG-3274. These applications are for supplemental wells. It is our understanding that the Engineer may permit the drilling and pumping of these wells prior to issuance of a permit; we have no oojections to such a procedure. Rather, our intention is to be represented in any proceedings which would quantify the vested rights claimed by the City of Las Cruces, since absent administrative criteria such proceedings could establish important administrative precedents for the Lower Rio Grande Basin.

Sincerely,

John P. Hickerson

John T. Hickerson,
General Manager

MEMORANDUM

State Engineer Office
Deming, New Mexico
December 30, 1981

FILES: LRG-3273; LRG-3274; ✓LRG-3275 thru LRG-3282
LRG-3275 thru LRG-3296

TO D. E. Gray, Chief, Water Rights Bureau

FROM L. T. Putnam, Supervisor, District III

SUBJECT Protests

Attached is a Protest in triplicate, filed by El Paso Water Utilities Public Service Board, against all twenty-two (22) Applications for Permit to Appropriate and two (2) Applications for Supplemental Wells numbered above, in the name of the City of Las Cruces.

The protest is timely, as the last date of publication was December 21, 1981.

Applications Nos. LRG-3283 thru LRG-3296 were forwarded to your office by Memorandum dated December 16, 1981.

Also, attached are Applications Nos. LRG-3275 thru LRG-3282 and Applications for Supplemental Wells Nos. LRG-3273 and LRG-3274, in triplicate.

I will forward the Affidavits of Publication to your office, when filed.

L. T. Putnam

LTP:jp
Encls: 1 Protest (3)
10 Appls. (30)

Revised April 1972

Deming, New Mexico

December 2, 19 81

XX. City of Las Cruces

P. O. Drawer CLC

Las Cruces, New Mexico 88004

XXXr Gentlemen:

The following notice shall be published at applicant's expense once a week for three (3) consecutive weeks in a newspaper of general circulation in the stream system, or in case of an underground water appropriation the County wherein the well is to be drilled. First publication should be made as soon as possible after receipt of this notice. Publisher's affidavit of such publication must be filed with the State Engineer within sixty (60) days from the date hereon. If the application is for a new appropriation, failure to file proof of publication within the time allowed shall cause postponement of the priority date of the application to the date of receipt of such proof in proper form. In the case of any other type of application, failure to file proofs within the time allowed will cause the application to be cancelled.

The accuracy as to the content of this Notice is the responsibility of the applicant and the State Engineer is not obligated for any additional expense incurred by the necessity of readvertisement.

Neither issuance of this Notice, nor lack of protest thereto, in any way indicates favorable action by the State Engineer or approval of the application as requested.

L. T. Putnam

L. T. Putnam, Supervisor, District III

NOTE TO PUBLISHER: Immediately after last publication, publisher is requested to file affidavit of such publication with the State Engineer, P. O. Box 844 Deming 88031-0844, New Mexico.

NOTICE is hereby given that on November 24, 1981, City of Las Cruces, P. O. Drawer CLC, Las Cruces, New Mexico 88004

filed ~~application(s) numbered~~ eight applications numbered LRG- 3275 through LRG-3282 inclusive

with the STATE ENGINEER for permit(s) to appropriate 8,000 acre-feet of underground water per annum from the Lower Rio Grande Underground Water Basin by drilling eight wells each approximately 24 inches in diameter and to be drilled to a depth of approximately 1,500 feet, said eight wells are to be located as follows:

Well No.	Well Locations
LRG-3275	NE¼NE¼SW¼ Section 29, Township 23 South, Range 1 East, N.M.P.M.
LRG-3276	SW¼SW¼NE¼ Section 31, Township 23 South, Range 1 East, N.M.P.M.
LRG-3277	NE¼NE¼SE¼ Section 31, Township 23 South, Range 1 East, N.M.P.M.
LRG-3278	SW¼SW¼NE¼ Section 32, Township 23 South, Range 1 East, N.M.P.M.
LRG-3279	SW¼SW¼NE¼ Section 6, Township 24 South, Range 1 East, N.M.P.M.
LRG-3280	NE¼NE¼SE¼ Section 6, Township 24 South, Range 1 East, N.M.P.M.
LRG-3281	SW¼SW¼NE¼ Section 5, Township 24 South, Range 1 East, N.M.P.M.
LRG-3282	NE¼NE¼SW¼ Section 4, Township 24 South, Range 2 East, N.M.P.M.

The applicant states that the City of Las Cruces proposes to use the aforementioned eight wells for municipal and industrial water supply purposes. These wells will be connected to the system as it now exists or as it will exist in the future. Wells to be constructed as needed.

Any person, firm, association, corporation, the State of New Mexico or the United States of America, deeming that the granting of the above application will impair or be detrimental to their water rights, may protest in writing the proposal set forth in said application. The protest shall set forth all protestant's reasons why the application should not be approved and must be filed, in triplicate, with S. E. Reynolds, State Engineer, District III Office, P. O. Box 844, Deming, New Mexico, within ten (10) days after the date of the last publication of this Notice.

88031-0844

Appendix D.

Background on Surface-Water Resources

APPENDIX D.

BACKGROUND ON SURFACE-WATER RESOURCES

JOHN SHOMAKER & ASSOCIATES, INC.
Water-Resource and Environmental Consultants
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Albuquerque, New Mexico 87107
505-345-3407
www.shomaker.com

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APPENDIX

D. BACKGROUND ON SURFACE-WATER RESOURCES

The Rio Grande is the primary source of surface-water flow in the study area. During the summer months there are some ephemeral streams in arroyos that drain the west side of the Organ Mountains. The arroyo streamflow is controlled by infrequent large-magnitude storm events. Another source of water that becomes surface flow is Las Cruces' Jacob A. Hands wastewater treatment plant, which returns treated groundwater to the Rio Grande.

D.1 Rio Grande Project

The Rio Grande Project, constructed in the early 1900s, controls flow in the Rio Grande from Elephant Butte Reservoir south to Fort Quitman, Texas. The Rio Grande Project was designed to supply water to about 178,000 acres of agricultural land in southern New Mexico and the El Paso area, and to supply 60,000 acre-feet per year (ac-ft/yr) of water to Mexico under the terms of the Convention of 1906. In times of drought, the convention has allowed the delivery to be proportionately less based on the amount available to U.S. irrigators.

In Las Cruces area, the Rio Grande Project is managed and operated by Elephant Butte Irrigation District (EBID). EBID boundaries and streamflow gaging stations along the Rio Grande are shown in Figure D1. EBID is the largest supplier of surface water in New Mexico, serving over 8,000 constituents and 90,640 acres of irrigated land. EBID infrastructure includes a network of canals, laterals, drains, and wasteways between Elephant Butte Reservoir and the Texas border that delivers surface-water irrigation through gravity flow.

The Rio Grande Compact of 1938, includes Colorado, Texas, and New Mexico, and determines the distribution of water from the Rio Grande system among these three states. For purposes of the Compact, EBID and Las Cruces area lie within the Texas portion of the Compact (in 1948, the Compact was amended so that the delivery to Texas is measured at the gage below Elephant Butte Dam).

D.2 Surface-Water and Shallow Groundwater Interactions

In Las Cruces area, there are complex interactions between surface-water and shallow groundwater systems. EBID irrigation canals distribute surface water for agricultural uses, while most drains and laterals intercept shallow groundwater and return it to the Rio Grande (Levings, 1998). Surface water from the Rio Grande and irrigation canals leaks and recharges the shallow groundwater system. Some deeper groundwater also flows upward to recharge the shallow groundwater system and contribute water to the Rio Grande. In other places, excess irrigation water also recharges the shallow groundwater system. Arroyo streamflow is diverted into laterals or reaches the Rio Grande, and also recharges the shallow groundwater system. Interactions between surface-water and shallow groundwater systems in the Las Cruces area may be changing, as EBID surface water deliveries become shorter-duration, drains and laterals are more frequently dry, and groundwater levels decline.

D.3 Watersheds Tributary to the Rio Grande in Las Cruces Area

Table D1 summarizes watersheds that are tributary to the Rio Grande in or near Las Cruces area. Sand Hill Arroyo originates on the alluvial fan west of the Organ Mountains in the Hacienda Acres area at an elevation of 4,600 ft above mean sea level (amsl; Fig. D2). Alameda Arroyo and Las Cruces Arroyo originate in the Organ Mountains near Rabbit Ears Peak at an elevation of about 7,300 ft amsl (Fig. D2). Alameda Arroyo and Las Cruces Arroyo terminate on the east side of the Army Corps of Engineers 500-year-design storm-water-detention dam (Fig. D2), where the flow is regulated and then released into Las Cruces Lateral on the east side of the Rio Grande. Surface flow was gaged in Las Cruces Arroyo on the east side of Las Cruces between 1959 and 1965, prior to construction of the detention dam in 1972. The average annual flow was 65 ac-ft, with a low of 15 ac-ft in 1961 and a high of 210 ac-ft in 1959. In each year, the flow in Las Cruces Arroyo is associated with several high-magnitude summer or early fall storms that occur between June and October, and the arroyo is generally dry the rest of the time. The period 1959 to 1965 is one of the driest periods on record for Las Cruces area, with below-average precipitation in each year except 1961 (Fig. D3).

Table D1. Summary of watersheds tributary to the Rio Grande in or near Las Cruces area

watershed	total area, acres	maximum elevation, ft amsl
Sand Hill Arroyo	4,674	4,600
Alameda Arroyo	8,640	7,300
Las Cruces Arroyo (North and South Forks)		7,300
Tortugas Arroyo	13,248	7,200
Fillmore Arroyo	17,459	7,200
Apache Canyon	5,016	5,000
Box Canyon	5,766	4,800

ft amsl - feet above mean sea level

Tortugas Arroyo originates in Fillmore Arroyo in the Organ Mountains at an elevation of about 7,200 ft amsl (Fig. D2). Runoff from the arroyo is impounded by a drainage-detention dam where the flow is regulated and then released into Las Cruces Lateral on the east side of the Rio Grande. The outflow from the Tortugas Reservoir (behind the drainage-detention dam) was gaged between 1962 and 1973. The average annual flow was 158 ac-ft, with a low of 0.5 ac-ft in 1973 and a high of 176 ac-ft in 1969. Maximum instantaneous flows during storm events ranged from 0.5 to 107 cubic feet per second (cfs). In each year, the flow in Tortugas Arroyo is associated with several high-magnitude summer or early-fall storm events that occur between June and October, and the arroyo is dry the rest of the time.

Fillmore Arroyo originates in the Organ Mountains near Baldy Peak, at an elevation of about 7,200 ft amsl (Fig. D2). Like Tortugas Arroyo, runoff from Fillmore Arroyo enters into a drainage detention dam where the flow is regulated and then released into Las Cruces Lateral on the east side of the Rio Grande. No data are available for flows in Fillmore Arroyo.

Apache Canyon originates in the Robledo Mountains at an elevation of about 5,000 ft amsl (Fig. D2). Runoff from Apache Canyon is impounded by a drainage-detention dam where the flow is regulated and then released into Picacho Lateral on the west side of the Rio Grande. No data are available for flows in Apache Canyon.

Box Canyon originates on the southern flanks of the Robledo Mountains at an elevation of about 4,800 ft amsl (Fig. D2). Runoff from Box Canyon is impounded by a drainage-detention dam where the flow is regulated and then released into Picacho Lateral on the west side of the Rio Grande. No data are available for flows in Box Canyon.

D.4 Treated Water Discharges

Las Cruces has a National Pollution Discharge Elimination System (NPDES) discharge permit for the Jacob A. Hands wastewater treatment plant (WWTP). Total annual discharge from the WWTP, which includes return flows from Las Cruces, New Mexico State University (NMSU), Doña Ana Mutual Domestic Water Consumers Association (MDWCA), San Pablo MDWCA, Moongate Water Company, Winterhaven MDWCA, and the Town of Mesilla, ranged from 7,535 to 9,734 ac-ft/yr between 2009 and 2014, and averaged 9,062 ac-ft/yr.

D.5 Surface-Water Gaging Stations

The USGS and EBID have maintained a number of surface-water flow gaging stations along the Rio Grande and associated canals, laterals, and drains, to monitor flows into, within, and out of EBID (Fig. D1; Table D2). Hydrographs showing annual flows in the Rio Grande below Mesilla and at the Leasburg Cable are included as Figures D4 and D5.

Only partial datasets were available through EBID, U.S. Geological Survey (USGS), Bureau of Reclamation (BOR), and the Army Corps of Engineers, for the surface-water flow stations listed in Table D2. Table D3 summarizes the data that were available. Average Rio Grande flow at the Leasburg Cable was 504,911 ac-ft/yr (697 cfs), and average Rio Grande flow at the gage below Mesilla Diversion Dam was 321,416 ac-ft/yr (444 cfs). Maximum flows typically occurred in the mid-1980s, and flows have been below average since the early-2000s (Figs. D4 and D5).

At the head of the Mesilla Valley, water is diverted from the Rio Grande into the 13.7-mile-long Leasburg Canal at the Leasburg Diversion Dam for the irrigation of the upper 31,600 acres in EBID (Fig. D1). Wasteways 1, 1A, 5, and 8 allow water in the Leasburg Canal to spill back into the Rio Grande in the case that a ditch breaks, a farmer cancels an order for water, or storm flows flood the canal. Water is diverted from the Rio Grande into Picacho Lateral between the Leasburg and Mesilla Diversion Dams. Wasteway 40 allows

water in Picacho Lateral to spill back into the Rio Grande in the case that a ditch breaks, a farmer cancels an order for water, or storm flows flood the canal. The Picacho Drain returns flows to the Rio Grande between the Leasburg and Mesilla Diversion Dams. Water is diverted from the Rio Grande into the Eastside and Westside Canals at the Mesilla Diversion Dam for the irrigation of the lower 53,650 acres in EBID. The Eastside Canal is 13.5 miles long and the Westside Canal is 23.5 miles long.

Table D2. Summary of surface-water gaging stations in or near Las Cruces area

station	latitude, NAD 27	longitude, NAD 27
Leasburg Canal at Heading	N32°29.794’	W106°55.322’
Wasteway 1 at Leasburg Canal	N32°29.360’	W106°55.297’
Wasteway 1A at Leasburg Canal	N32°28.789’	W106°55.277’
Rio Grande at the Leasburg Cable	N32°28.617’	W106°55.107’
Wasteway 5 at Leasburg Canal	N32°22.374’	W106°49.993’
Wasteway 8 at Leasburg Canal	N32°20.524’	W106°49.529’
Rio Grande at Picacho Bridge	N32°17.779’	W106°49.451’
Wasteway 40 at Picacho Lateral	N32°16.090’	W106°49.785’
Picacho Drain	N32°14.923’	W106°49.333’
Eastside Canal at Heading	N32°13.706’	W106°47.770’
Westside Canal at Heading	N32°13.534’	W106°46.313’
Del Rio Lateral at Heading	N32°13.681’	W106°47.822’
Rio Grande at the gage below Mesilla Diversion Dam	N32°21.615’	W106°47.823’

Table D3. Summary of surface-water-flow data available through EBID, USGS, BOR, and Army Corps of Engineers

station	time period	average annual flow, ac-ft/yr	average annual flow, cfs	minimum annual flow, ac-ft/yr	minimum annual flow, cfs	year of minimum flow	maximum annual flow, ac-ft/yr	maximum annual flow, cfs	year of maximum flow
Leasburg Canal at Heading	1993 to 2004	189,493	262	104,975	145	2003	248,803	343	1999
Wasteway 1 at Leasburg Canal	1992, 1997 to 2001	16,907	23	9,570	13	1997	25,363	35	2000
Wasteway 1A at Leasburg Canal	1989 to 1992, 1994 to 2001	78,945	109	56,912	79	2001	101,563	140	1999
Rio Grande at Leasburg Cable	1975 to 2015	504,911	697	103,281	143	2013	1,180,068	1,629	1986
Wasteway 5 at Leasburg Canal	1979 to 2004	2,641	4	143	0.2	2003	7,480	10	1987
Wasteway 8 at Leasburg Canal	1979 to 2004	6,601	9	900	1	2004	18,551	26	2002
Rio Grande at Picacho Bridge	1991 to 2004	575,809	795	289,071	400	2003	864,071	1,193	1995

EDIB - Elephant Butte Irrigation District
USGS - U.S. Geological Survey
BOR - Bureau of Reclamation
ac-ft/yr - acre-feet per year
cfs - cubic feet per second

Table D3. Summary of surface-water-flow data available through EBID, USGS, BOR, and Army Corps of Engineers (concluded)

station	available data	average annual flow, ac-ft/yr	average annual flow, cfs	minimum annual flow, ac-ft/yr	minimum annual flow, cfs	year of minimum flow	maximum annual flow, ac-ft/yr	maximum annual flow, cfs	year of maximum flow
Wasteway 40 at Picacho Lateral	1991 to 2000	1,897	3	214	0.3	1999	4,580	6	1992
Picacho Drain	1975 to 1983, 1991 to 2004	2,762	4	206	0.3	2004	3,995	6	1976
Eastside Canal at Heading	1975 to 2004	69,739	96	25,936	36	1978	94,352	130	1995
Westside Canal at Heading	1975 to 2004	183,067	253	74,928	103	1978	242,559	335	1995
Del Rio Lateral at Heading	1975 to 2004	3,494	5	1,111	2	1978	4,984	7	1998
Rio Grande at the gage below Mesilla Diversion Dam	1985 to 2015	321,416	444	88,749	123	2014	897,685	1,239	1986

EDIB - Elephant Butte Irrigation District
USGS - U.S. Geological Survey
BOR - Bureau of Reclamation
ac-ft/yr - acre-feet per year
cfs - cubic feet per second

D.6 Surface-Water Quality

As Las Cruces prepares to use surface water from the Rio Grande for its water supply, it is important to consider surface-water quality issues. Residues of fertilizers, herbicides, and pesticides are the main contaminants present in surface water, and return flow from farms in Las Cruces area is the likely source of contamination. Toxic metals and hazardous organic compounds are other contaminants present in surface water in Las Cruces area, and runoff from urban areas and highways is the likely source.

D.6.1 Surface-Water Quality Deteriorates from North to South

The quality of water in the Rio Grande and the shallow alluvial aquifer deteriorates along the Rio Grande between Caballo Reservoir and the American Diversion Dam downstream of Las Cruces, with especially rapid deterioration between the Mesilla Diversion Dam and the American Diversion Dam (Parsons Engineering Science, Inc., 1997). A USGS study conducted between August 1996 and February 1997 showed little deterioration in surface-water quality through the stretch of the Rio Grande that receives discharge from the Las Cruces WWTP (Table D4; Huff, 1998).

The deterioration in water quality, and increase in total dissolved solids (TDS) concentrations specifically, appear to be related to irrigation return flows and drain flows, industrial wastewater effluents, and natural contamination (saline soils and salts in bedrock; Mills et al., 2002). Contamination from leaky underground storage tanks (LUSTs) and storm-water runoff from developed areas also contribute to water-quality degradation.

D.6.2 Seasonal Fluctuations in Surface-Water Quality

A USGS study conducted between August 1996 and February 1997 showed that between August and February, TDS and manganese concentrations and hardness increased, and aluminum concentrations decreased, in the Rio Grande at Picacho Bridge and Calle del Norte Bridge near Mesilla (Table D4; Huff, 1998). Meanwhile, flow in the Rio Grande decreased between August and December, and increased in February. TDS and manganese concentrations and hardness are higher in the Rio Grande during non-irrigation months when return flows from the drains contribute a higher percentage of the flow in the Rio Grande. Increases in TDS and manganese concentrations and hardness also generally correlate to decreases in flow. Aluminum concentrations appear to be highest during irrigation season.

Table D4. Rio Grande water quality at Picacho Bridge and Calle del Norte Bridge in Las Cruces area (Huff, 1998)

sampling month	number of samples	parameter	units	Rio Grande at Picacho Bridge	Rio Grande at Calle del Norte Bridge near Mesilla
August 1996	4	TDS	mg/L	488 to 754	546 to 692
		hardness	mg/L	130 to 150	130 to 150
		dissolved Al	mg/L	0.006 to 0.02	0.005 to 0.025
		dissolved Mn	mg/L	<0.001 to 0.001	<0.001 to 0.001
		discharge	cfs	1,060; 1,180	1,120 to 1,680
October 1996	2	TDS	mg/L	824; 918	826; 884
		hardness	mg/L	280; 330	280; 310
		dissolved Al	mg/L	0.005	0.005
		dissolved Mn	mg/L	0.002	0.001
		discharge	cfs	186; 210	154; 172
December 1996	2	TDS	mg/L	1,070; 1,080	1,060; 1,070
		hardness	mg/L	370	340; 370
		dissolved Al	mg/L	0.005	0.006; 0.007
		dissolved Mn	mg/L	0.032; 0.034	0.01; 0.011
		discharge	cfs	50; 52	48
February 1997	4	TDS	mg/L	618 to 1,110	614 to 1,090
		hardness	mg/L	190 to 400	20 to 370
		dissolved Al	mg/L	0.004 to 0.005	0.004 to 0.006
		dissolved Mn	mg/L	0.002 to 0.021	0.001 to 0.01
		discharge	cfs	45 to 596	43 to 563

TDS - total dissolved solids
mg/L - milligrams per liter
Al - aluminum
Mn - manganese
cfs - cubic feet per second

D.6.3 Point Source and Non-Point Source Pollution

Contamination of surface waters can be classified by point-source and non-point-source impacts. Examples of point-source impacts include Las Cruces WWTP and specific discharges from Las Cruces storm-drain system into the Rio Grande, or in rare instances, into EBID drains. Examples of non-point-source impacts include uncontrolled storm-water runoff, commercial and industrial sites, and agricultural farmlands and dairies.

The New Mexico Environment Department (NMED), Surface Water Quality Bureau (SWQB), in conjunction with the EPA, has issued NPDES discharge permits for point-source impacts in Las Cruces area (Table D5). The two NPDES permits in Las Cruces area listed on the NMED, SWQB website are the Jacob A. Hands wastewater treatment plant, and the East Mesa water reclamation facility.

Table D5. Summary of NPDES permits issued for point-source impacts in Las Cruces area

facility	NPDES No.
Jacob A. Hands wastewater treatment plan	NM0023311
East Mesa water reclamation facility	NM0030872

D.6.4 USGS Surface Water Quality Data

A USGS study of surface-water quality in the Mesilla Valley, conducted between 1993 and 1995, included a sample from the Rio Grande below Leasburg Dam, near Leasburg, just north of Las Cruces area (Site 16; Healy, 1997). At Site 16 (Healy, 1997), TDS concentrations ranged from 353 to 929 mg/L, sulfate concentrations ranged from 110 to 350 mg/L, and chloride concentrations ranged from 40 to 140 mg/L (Table D6). The NMED Drinking Water Bureau (DWB) secondary standards for TDS, sulfate, and chloride are 500 mg/L, 250 mg/L, and 250 mg/L, respectively. Secondary standards are voluntary, and are related to the aesthetic quality of the water. TDS and sulfate concentrations exceeded NMED/DWB secondary standards in some samples. Total organic carbon concentrations ranged from 4.1 to 7.4 mg/L. There is no NMED/DWB or EPA standard for total organic carbon, but it does provide a medium for the formation of disinfection byproducts, such as trihalomethanes, that may be hazardous to human health. Ten different pesticide analytes were detected at Site 16, but the concentrations were below NMED/DWB standards (Healy, 1997).

Table D6. Summary of surface-water quality data for the Rio Grande below Leasburg Dam, near Leasburg (Site 16; Healy, 1997)

parameter	units	concentration range	number of samples	time period	NMED/DWB secondary standard	NMWQCC secondary standard
TDS	mg/L	353 to 929	32	1993 to 1995	500	1,000
specific conductance	μmhos/cm	628 to 1,450	32	1993 to 1995	ns	ns
sulfate	mg/L	110 to 350	32	1993 to 1995	250	600
chloride	mg/L	40 to 140	32	1993 to 1995	250	250
nitrogen (nitrate + nitrite)	mg/L	<0.05 to 0.37	32	1993 to 1995	10 [a]	10.0 [a]
iron	mg/L	<0.003 to 0.013	32	1993 to 1995	0.3	1.0
manganese	mg/L	<0.001 to 0.04	32	1993 to 1995	0.05	0.2
total organic carbon	mg/L	4.1 to 7.4	32	1993 to 1995	ns	ns

[a] human health standard for nitrate
NMED/DWB - New Mexico Environment Department, Drinking Water Bureau secondary standard
NMWQCC - New Mexico Water Quality Control Commission discharge standard for domestic water supply
mg/L - milligrams per liter
μmhos/cm - micromhos per centimeter
ns - no standard available
TDS – total dissolved solids

D.6.5 Pesticides

A USGS study of pesticides in surface water in the Mesilla Valley, conducted between 1992 and 1995, indicated that the greatest number of pesticide detections and the greatest variety of pesticides were detected during the non-irrigation season, and as much as 27 percent of pesticide detections may come from urban sources (Levings, 1998). In the USGS study, pesticides were detected in one surface-water sample in Las Cruces area. The pesticide chlorpyrifos was detected at a concentration of 0.19 micrograms per liter (μg/L) in Las Cruces WWTP discharge (outflow at the levee road) sample collected on April 26, 1994 (Levings, 1998). The NMED/DWB and EPA do not have a drinking water standard for chlorpyrifos (CAS No. 2921-88-2), which is a suspected endocrine disruptor.

D.6.6 Source-Water Protection

The Las Cruces Storm Water Management code aims to eliminate or reduce pollutants from entering the City's municipal storm sewer system, and control discharges to and from the system. The Storm Water Plan lists wastes that are not to be discharged into the municipal storm sewer system, including the following:

- motor vehicle fluids
- industrial wastes
- domestic sewage
- wastewater from commercial cleaning
- effluent from cooling towers
- waste products generated during concrete or asphalt work
- filter backwash water from fountains or pools
- a number of other types of wastewater and chemicals

The Storm Water Management code requires reporting and cleanup of the spilling, leaking, or discharging in excess of specified quantities of hazardous substances (according to 40 CFR Part 302 and 355). Citizens are encouraged to report leaks, spills, and dumping to the City. Operators of construction sites with a disturbed area of 1 acre or more must complete Storm Water Pollution Prevention Plans (SWPPPs) according to the New Mexico Department of Transportation "Storm Water Management Guidelines for Construction and Industrial Activities." An Operation and Maintenance Plan satisfactory to the City must be prepared. Violations of the Storm Water Management code may result in administrative warnings, or criminal citations issued by officers of the City Codes or Police Department.

D.7 REFERENCES

Huff, G.F., 1998, Water-quality data for the Rio Grande between Picacho Bridge near Las Cruces and Calle del Norte Bridge near Mesilla, New Mexico, 1996-97: U.S. Geological Survey open-file report 98-66, 58 p. plus map.

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Mills, S.K., Phillips, F.M., Hogan, J., and Hendricks, J.M.H., 2002, The salt of the earth: using environmental tracers to quantify causes of salinity in semi-arid region basins, preliminary results from the Rio Grande: abstract presented at New Mexico Water Research Symposium, August 13, 2002, sponsored by New Mexico Water Resources Research Institute.

Parsons Engineering Science, Inc., 1997, Rio Grande conveyance system, water management and source water protection study, Part 1, data evaluation report: engineer's report prepared by Parsons Engineering Science and Boyle Engineering Corporation for the New Mexico-Texas Water Commission.

ILLUSTRATIONS

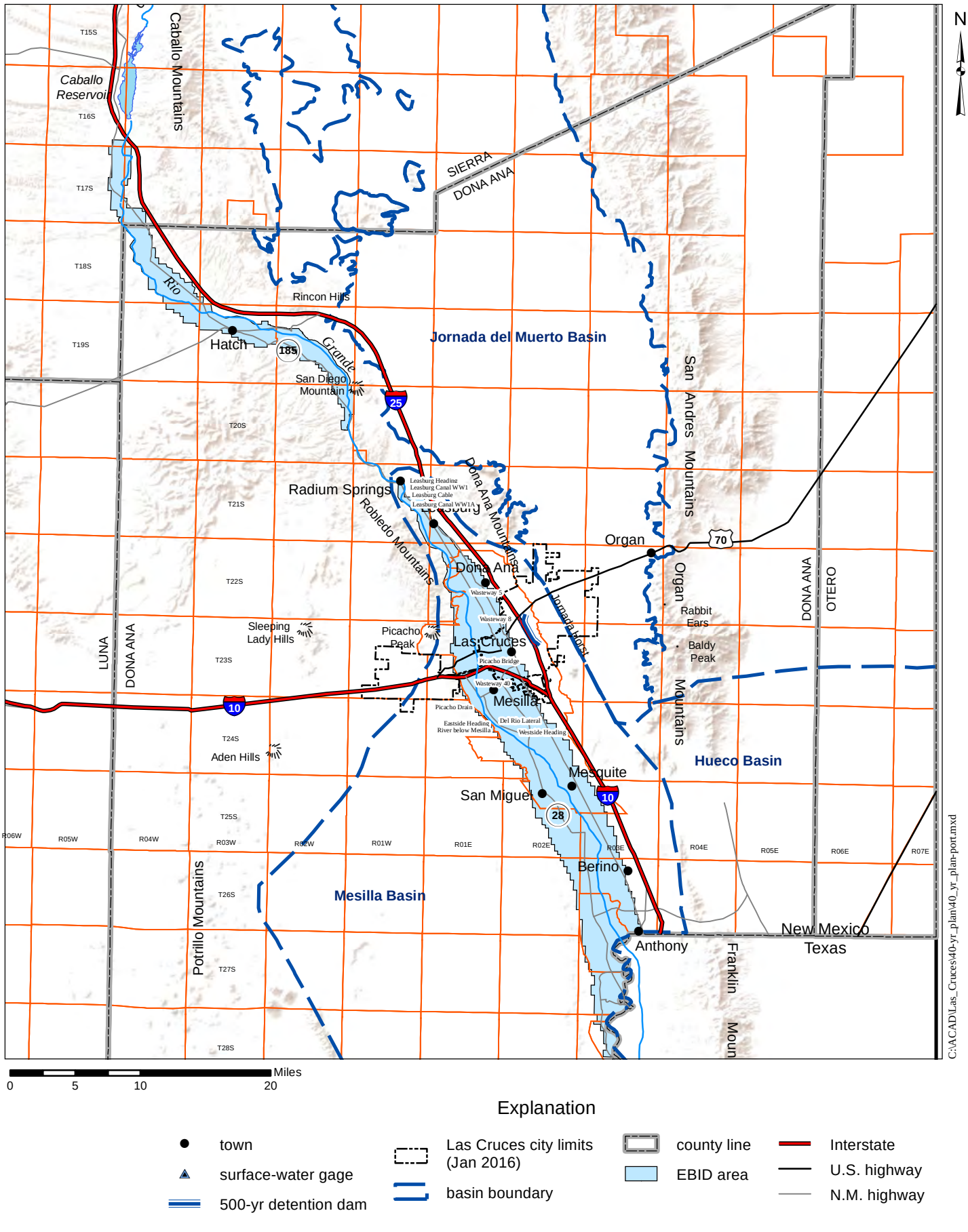

Figure D1. Map of the Mesilla Basin and southern part of the Jornada del Muerto Basin showing Elephant Butte Irrigation District (EBID) boundaries, Las Cruces city limits, and surface-water gaging stations.

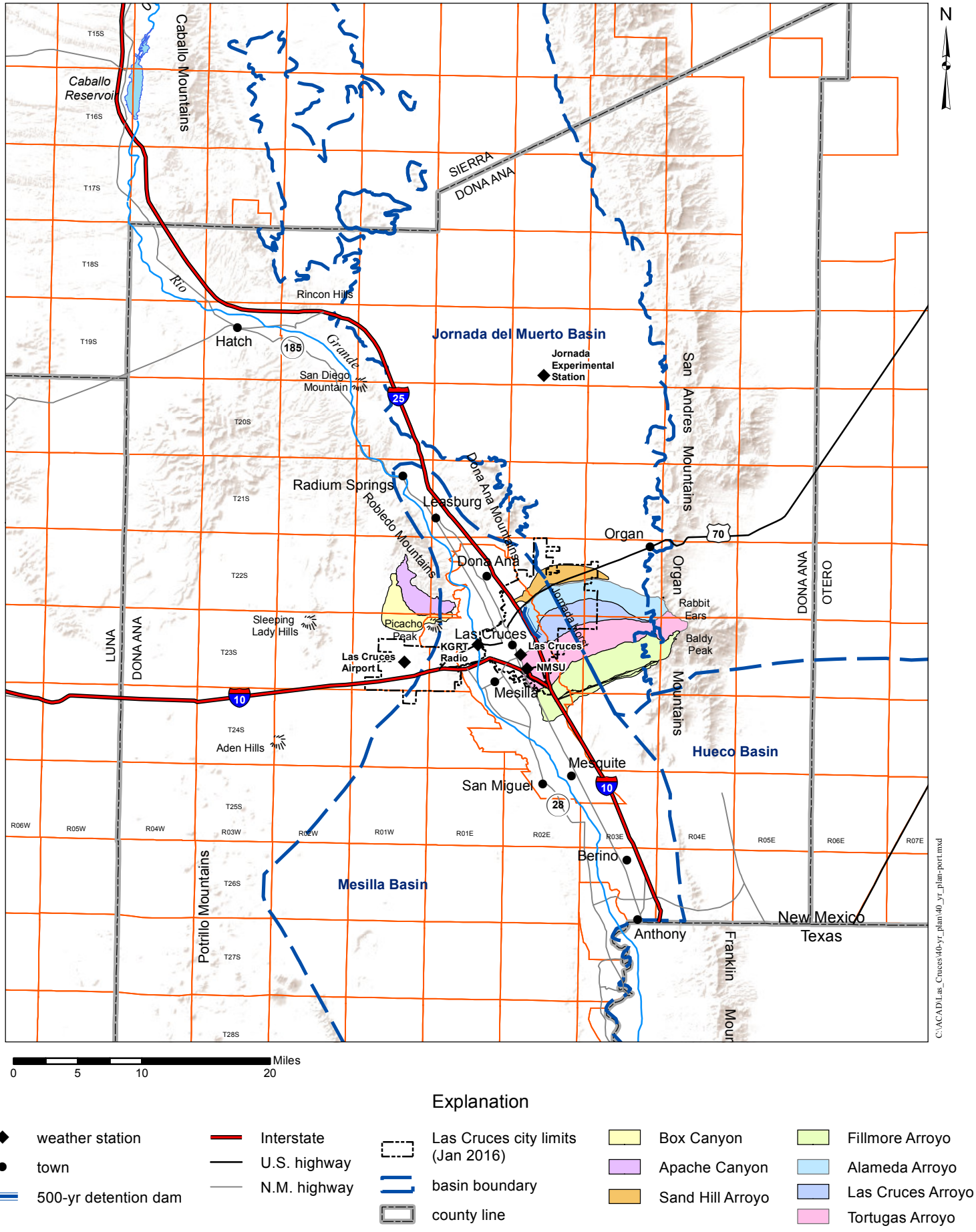

Figure D2. Map of the Mesilla Basin and southern part of the Jornada del Muerto Basin showing Las Cruces city limits, weather stations, referenced watersheds, and 500-year detention dam.

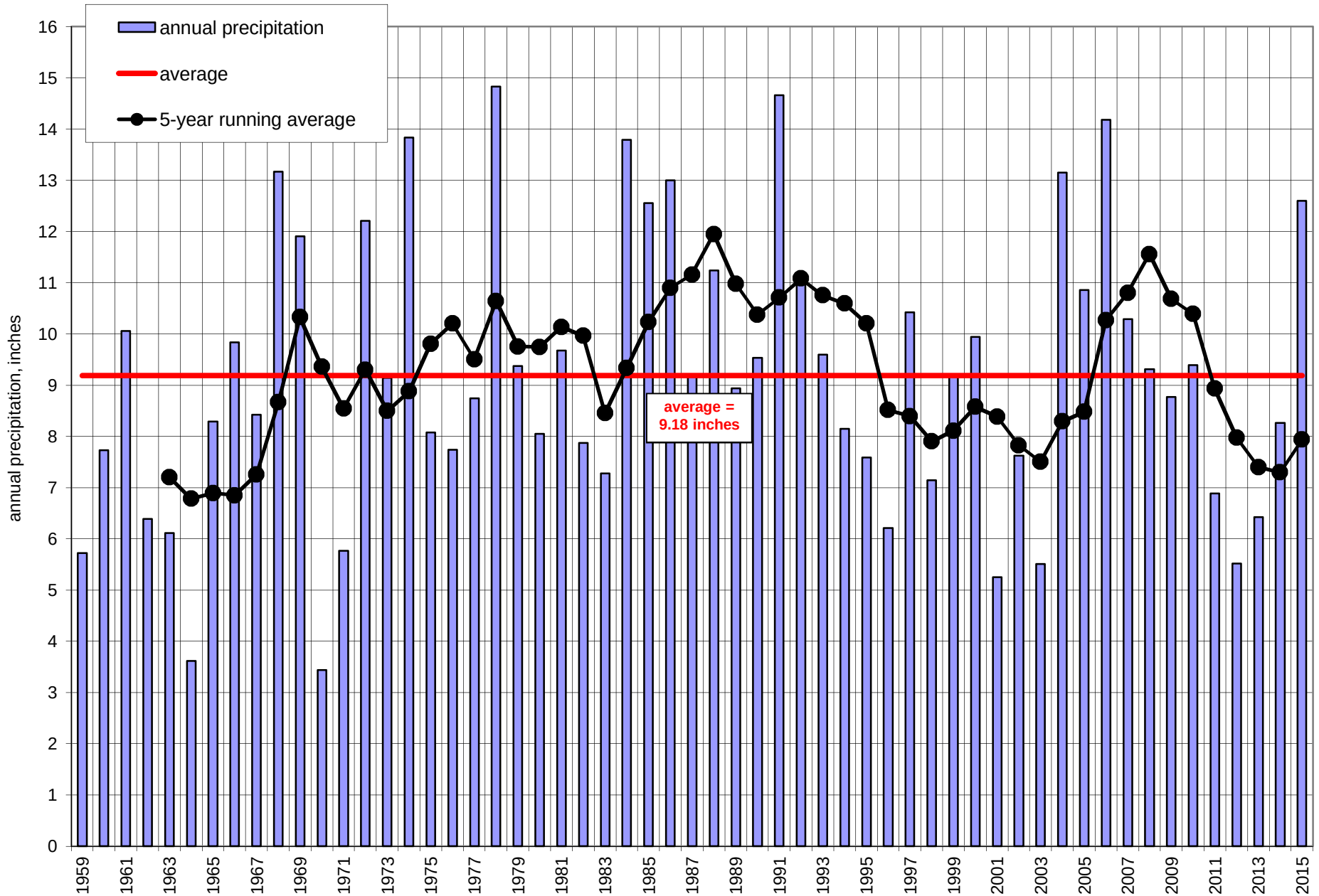

Figure D3. Annual precipitation for the period of record 1959 to 2015 at the New Mexico State University weather station ID No. 298535.

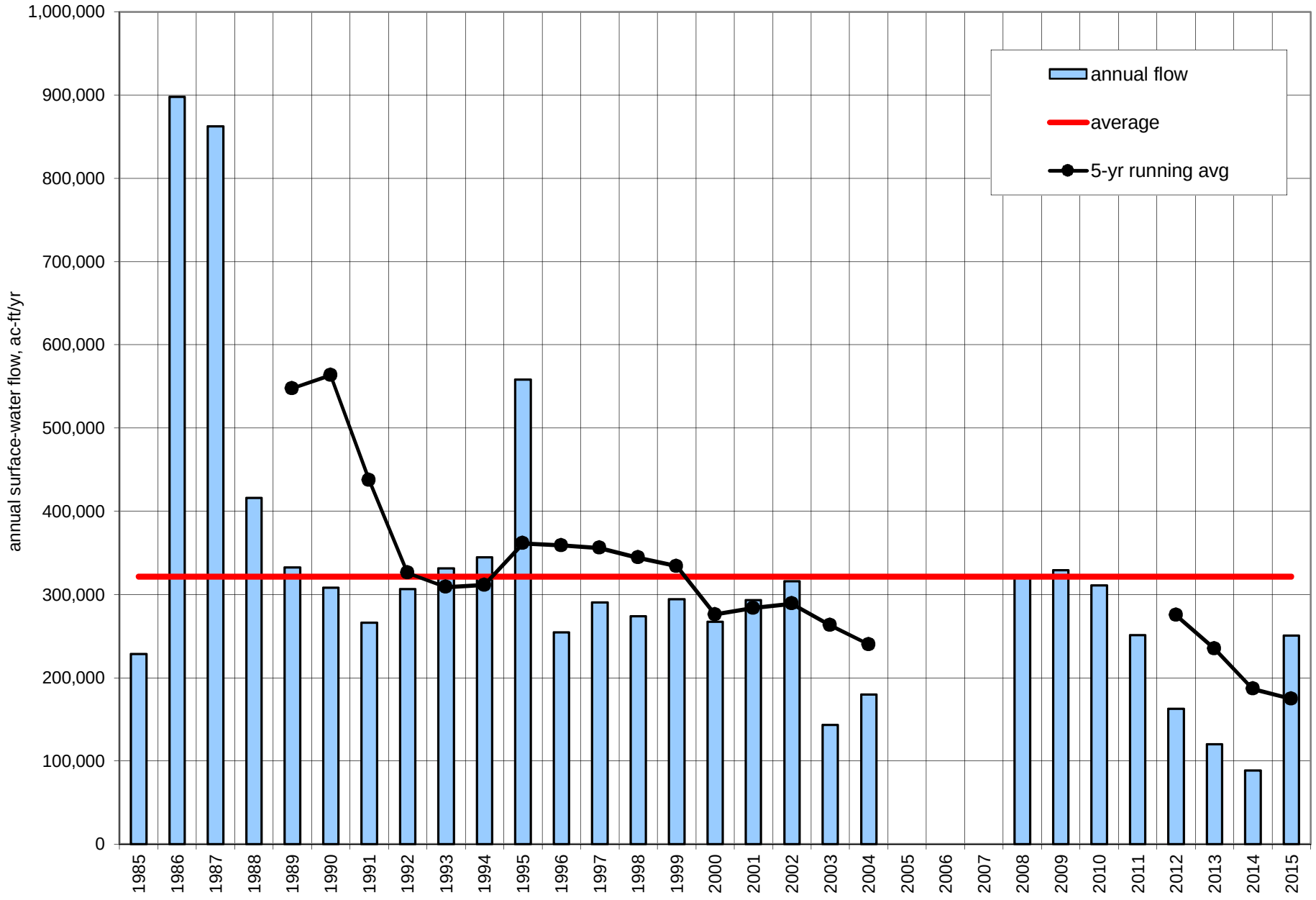

Figure D4. Annual surface-water flow at the Rio Grande below Mesilla surface-water gage.

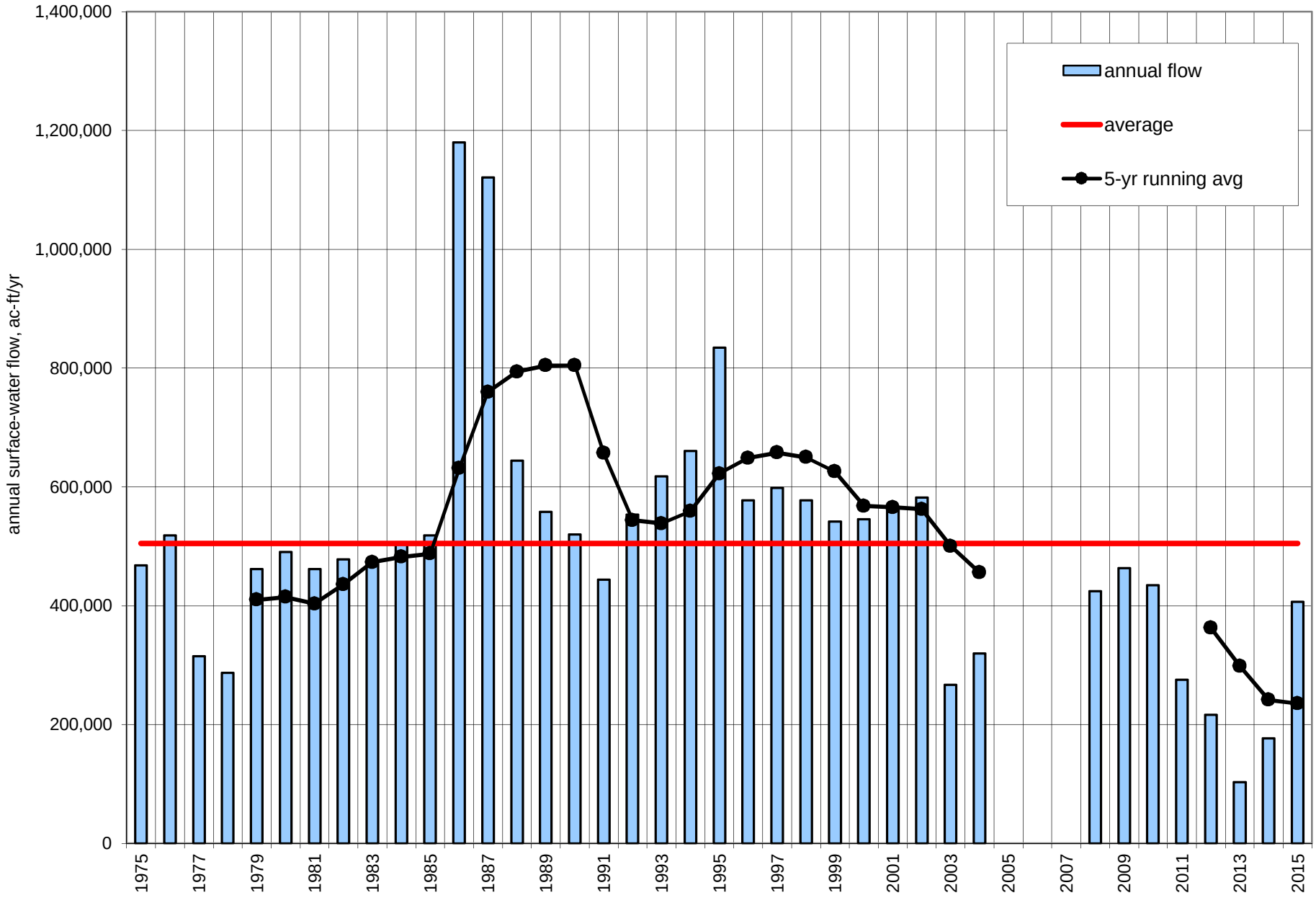

Figure D5. Annual surface-water flow at the Rio Grande at the Leasburg Cable surface-water gage.

Appendix E.

Background Hydrogeology of the Mesilla Basin

APPENDIX E.

BACKGROUND HYDROGEOLOGY OF THE MESILLA BASIN

JOHN SHOMAKER & ASSOCIATES, INC.
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APPENDIX

E. BACKGROUND HYDROGEOLOGY OF THE MESILLA BASIN

Aside from the East Mesa (in southern Jornada Basin), Las Cruces is in the Mesilla Basin, which covers about 1,110 square miles (mi^2) in Doña Ana County, and is bounded on the southwest by the Potrillo Mountains, on the northwest by the Robledo Mountains, on the east by the Jornada Horst, and on the southeast by the Franklin Mountains and Hueco Basin (Fig. E1; see also Hawley and Kennedy, 2004). The Rio Grande flows through the Mesilla Basin, forming a floodplain several hundred feet to 5 miles wide (Weeden and Maddock, 1999). The Jornada Horst, which separates the Mesilla Basin from the southern part of the Jornada del Muerto Basin, coincides with a bedrock high that limits groundwater flow between the two basins.

The major water-bearing units of the Mesilla Basin are the Quaternary-age Rio Grande floodplain alluvium, and the thick, unconsolidated Quaternary- to Tertiary-age Santa Fe Group basin-fill sediments. Figure E2 presents a geologic map of the Mesilla Basin and Jornada Basin, and Figure E3 presents a west-east geologic cross-section through the City of Las Cruces area in the Mesilla Basin and Jornada Basin. Depth to groundwater in the Basin ranges from several feet near the Rio Grande to over 300 ft. The Basin trends north-south and is bounded by high-angle normal faults, on which the valley floor has moved down relative to the surrounding mountains (Hawley and Lozinsky, 1992; Weeden and Maddock, 1999; Hawley and Kennedy, 2004). The faults are related to the Rio Grande Rift, a zone of east-west extension that has been active over the last 30 million years (Hawley and Lozinsky, 1992). The East Robledo and East Potrillo faults form the western edge of the Basin (Frenzel and Kaehler, 1990), while the eastern edge of the Basin is generally defined by the partially-buried Jornada Horst, which is composed of Tertiary-age volcanic rocks underlain by Permian-age sedimentary rocks, and separates the Mesilla Basin from the Jornada del Muerto Basin to the east. The Jornada Horst acts as a partial barrier to groundwater flow, resulting in a water table in the Mesilla Basin (on the west side of the horst) that is lower than the water table in the Jornada del Muerto Basin (on the east side of the horst; Hawley et al., 1969; King et al., 1971; Wilson et al., 1981; Mack, 1985; Frenzel and Kaehler, 1990; Hawley and Lozinsky, 1992; Woodward and Myers, 1997). The bedrock underlying the Santa Fe Group sediments of the Mesilla Basin includes Lower Tertiary-age volcanic and sedimentary rocks, Mesozoic- and Paleozoic-age sedimentary rocks, and Precambrian-age crystalline rocks. These bedrock aquifers, which all have relatively low permeability, are described below from deepest to shallowest.

E.1. Bedrock Aquifers of the Mesilla Basin

Precambrian-age crystalline rocks, including igneous and metamorphic rocks, are exposed in the Organ Mountains and yield small quantities of water where they are weathered or fractured. Paleozoic- and Mesozoic-age sedimentary rocks, mainly composed of limestone with minor shale, quartzite, conglomerate, sandstone, siltstone, and evaporites, underlie parts of the Mesilla Basin (King and Hawley, 1975). These sedimentary rocks, when unweathered, have very low permeability. Secondary permeability may result from weathering, fracturing, or dissolution of limestone and evaporites. Secondary permeability may be high in isolated areas, allowing for migration of water with water quality substantially different from that in the Santa Fe Group. For example, groundwater flowing through limestone with relatively high secondary permeability may dissolve salts in the limestone, thereby increasing the salinity of the groundwater, which may then migrate upwards into the Santa Fe Group.

Lower Tertiary-age rocks include conglomerates of the Love Ranch Formation, which crops out in the Rincon Hills and San Diego Mountain north of the Mesilla Basin (Kottlowski et al., 1956). The Love Ranch Formation is overlain by the Lower Tertiary-age Palm Park Formation, which consists of volcanics, volcaniclastics, and travertine deposits. The Palm Park Formation is overlain by the Lower Tertiary-age Bell Top and Thurman Formations, which consist of volcanic and sedimentary rocks and are exposed in the Doña Ana Mountains, the southern Organ Mountains, and Picacho Peak. Some or all of these Lower Tertiary-age rocks probably underlie the Mesilla Basin, and although there has been little groundwater exploration in these rocks, permeabilities are probably very low (Frenzel and Kaehler, 1990). Stock wells completed in the Lower Tertiary-age rocks in the region produce very small quantities of water (King and Hawley, 1975; Conover, 1954; Wilson et al., 1981).

E.2. Rio Grande Alluvium and Santa Fe Group Aquifer

The Quaternary-age Rio Grande alluvium and Quaternary- to Tertiary-age Santa Fe Group are the two major water-bearing formations in the Mesilla Basin. In the Mesilla Basin, the Santa Fe Group has been described in terms of three units that were deposited in different ways and have different aquifer characteristics (Hawley and Lozinsky, 1992). The Lower Santa Fe Group consists of alluvial, eolian, playa-lake, and basin-floor sand and clay beds that are less permeable than the Middle and Upper Santa Fe Group sediments, with a total thickness of 1,000 ft or less. The Middle Santa Fe Group consists of alluvial, eolian, playa-lake, basin-floor, and alluvial fan sand and clay beds that are less permeable than the Upper Santa Fe Group due to a greater degree of cementation (Hawley et al., 2001), with a total thickness of 1,500 ft or less.

The Upper Santa Fe Group consists of interbedded alluvial fan sand and gravel with relatively high permeability, and a total saturated thickness of 750 ft or less. The Middle and Upper Santa Fe Group both include localized basalt. The Rio Grande alluvium includes river channel and floodplain sand and gravel beds with a total saturated thickness of 100 ft or less (Leggat et al., 1962).

A summary of aquifer characteristics for the Rio Grande alluvium and Santa Fe Group in the Mesilla Basin and Jornada del Muerto Basin is presented as Table E1. Transmissivity values from tests of wells completed in the Rio Grande alluvium range from 12,600 ft^2/day to 15,200 ft^2/day (Wilson et al., 1981). Many of the wells drilled into the Rio Grande alluvium are actually completed in both the alluvium and the underlying Upper Santa Fe Group where the two are hydraulically connected and fairly similar in character (Wilson et al., 1981). In the Santa Fe Group, the main aquifer is the upper 1,500 ft, and in some places the upper 2,500 ft, of saturated thickness (Weeden and Maddock, 1999). Hydraulic conductivity within the Santa Fe Group decreases with depth, and many thin horizontal clay layers impede the vertical movement of groundwater.

E.3. USGS Groundwater Level Monitoring in the Mesilla Basin

The USGS measures water levels in numerous monitoring wells in the Las Cruces area in the Mesilla Basin. The Las Cruces area includes T.22S., T.23S., T.24S., R.1E., R.2E., R.3E., and T.23S., R.1W., in the Mesilla Basin. Figure E4 shows locations of selected monitor wells in the Mesilla Basin, and Figures E5 through E22 are hydrographs for selected monitor wells. These monitoring wells were chosen based on periods of record that span at least 10 years extending to within 5 years of the present. Water-level trends in three general parts of the Las Cruces area, from north to south, are described below and summarized in Tables E2, E3, and E4.

E.3.1 Water-Level Trends in the Northern Las Cruces Area

Hydrographs for Mesilla Basin USGS-monitored wells completed in the Rio Grande alluvium and the Santa Fe Group in the northern part of the Las Cruces area, from the junction of Highway 28 and Highway 70 north to the northern boundary of T.22S., show general declining trends (Table E2).

E.3.2 Water-Level Trends in the Central Las Cruces Area

Hydrographs for Mesilla Basin USGS wells completed in the Rio Grande alluvium and the Santa Fe Group in the central part of the Las Cruces area, from the junction of Highways 70 and 28 south to the junction of Interstate 10 and Highway 28, show variable trends (Table E3).

Table E1. Summary of aquifer characteristics for the Rio Grande alluvium and Santa Fe Group in the Mesilla Basin and Jornada del Muerto Basin

aquifer, basin	saturated thickness, ft	well yield, gpm	hydraulic conductivity, ft/day	specific yield or storage coefficient, dimensionless	transmissivity of aquifer in wells, ft^2/day	transmissivity of aquifer, ft^2/day	specific capacity, gpm/ft
Rio Grande alluvium, Mesilla Basin	40 to 100	500 to >2,500 [a]	100 to 350 [b] 94 [d]	0.2 [d]	12,600 to 15,200 [a]	3,760 to 35,000 [h]	59 [d] 10 to 217 [a]
Santa Fe Group, Mesilla Basin	1,500 to 2,500 [e]	500 to >2,500 [a]	11 to 67 [f,g]	0.2 [d]/ 0.0004 [i]	2,700 to 19,300 [a,e]	16,500 to 167,500 [h]	20 to >100 [a]
Santa Fe Group, Jornada del Muerto Basin	< 250 to 1,000	480 to 1,160 [a]	10 to 54 [a]	0.2 [d]/ 0.0004 [i]	5,000 to 15,000 [a]	< 2,500 to 54,000 [h]	20 to > 100 [a]

[a] Wilson et al., 1981
[b] Hamilton and Maddock, 1993
[d] specific yield for model layer 1, Frenzel and Kaehler, (1990)
[e] Weeden and Maddock, 1999
[f] Frenzel, 1992
[g] John Shomaker & Associates, Inc., unpublished report, January 1999
[h] multiplied saturated thickness of aquifer by hydraulic conductivity
[i] storage coefficient for model layer 2, Frenzel and Kaehler (1990)
gpm - gallons per minute
gpm/ft - gallons per minute per foot of drawdown

Table E2. Summary of water-level trends in selected groundwater level monitoring wells in the northern Las Cruces area, Mesilla Basin

USGS well ID No.	T.R.S.qqq	period of record	number of measure-ments	minimum depth to water for period of record, ft	maximum depth to water for period of record, ft	general trend
322312106503601	22S.1E.16.433	1946 to 2015	687	4.8	18.7	decline since 1996; reported “dry” after 2011
322047106505001	22S.1E.33.341	1946 to 2015	691	4.5	17.4	decline since 1988; reported “dry” after 2011
322040106485301 322040106485302	22S.1E.35.334	1946 to 2015	692	7.6	26.6	decline since 1988
322045106461001	22S.2E.31.444	1965 to 2015	46	217.00	256.9 [a]	decline since 1965
322011106473301	23S.1E.1.411	1977 to 2015	81	44.9	78.0	decline since 1997

[a] omitting pumping water levels
T.R.S.qqq - township, range, section, quarter (1/4), quarter (1/16), quarter (1/64)

Table E3. Summary of water-level trends in selected groundwater level monitoring wells in the central Las Cruces area, Mesilla Basin

USGS well ID No.	T.R.S.qqq	period of record	number of measure-ments	minimum depth to water for period of record, ft	maximum depth to water for period of record, ft	general trend
321853106504001	23S.1E.9.433	1946 to 2015	677	2.2	18.3	unclear
321934106482601	23S.1E.11.214	1976 to 2015	86	10.5	28.7 [a]	decline since 1995
321827106473501	23S.1E.13.411	1976 to 2015	82	25.1	66.4 [a]	decline since 1995
321745106492501	23S.1E.22.232A	1984 to 2015	179	5.6	19.4	decline since 2001
321745106492502	23S.1E.22.232B	1984 to 2015	271	2.2	17.6	decline since 2010
321745106492503	23S.1E.22.232C	1984 to 2015	175	2.5	17.8	decline since 2010
321745106492101	23S.1E.22.241A	1984 to 2015	157	14.6	38.8	decline since 1995
321745106492102	23S.1E.22.241B	1984 to 2015	256	7.2	24.7	decline since 1995
321745106492103	23S.1E.22.241C	1984 to 2015	159	4.5	19.1	decline since 2009
321745106492106	23S.1E.22.241F	1984 to 2015	133	19.7	43.5	decline since 2002
321956106453101	23S.2E.5.342	1972 to 2015	94	218.0	243.8	unclear
321914106462501	23S.02E.7.411	1972 to 2015	96	73.4	100.0	decline since 1995
321853106452101	23S.2E.8.443	1972 to 2015	91	210.8	233.3 [a]	unclear
321832106451301	23S.2E.17.243	1972 to 2015	57	169.1	187.7 [a]	unclear

[a] omitting pumping water levels

T.R.S.qqq - township, range, section, quarter (1/4), quarter (1/16), quarter (1/64)

E.3.3 Water-Level trends in the Southern Las Cruces Area

Hydrographs for Mesilla Basin USGS wells completed in the Rio Grande alluvium and the Santa Fe Group, on the south side of City of Las Cruces and in Mesilla, from the junction of Interstate 10 and Highway 28 south to the southern boundary of T.24S., show variable trends (Table E4).

Table E4. Summary of water-level trends in selected groundwater level monitoring wells in the southern Las Cruces area, Mesilla Basin

USGS well ID No.	T.R.S.qqq	period of record	number of measure-ments	minimum depth to water for period of record, ft	maximum depth to water for period of record, ft	general trend
321619106495801	23S.1E.27.334	1946 to 2014	688	2.7	11.1	relatively flat
321624106460201	23S.2E.29.331	1976 to 2015	77	23.9	60.1 [a]	decline since 1976
321628106451501	23S.2E.29.441	1981 to 2014	24	63.3	82.4	decline since 1994
321518106471701	24S.1E.1.223	1989 to 2015	26	10.5	27.9	decline since 1989

[a] omitting pumping water levels

T.R.S.qqq - township, range, section, quarter (1/4), quarter (1/16), quarter (1/64)

E.3.4 Summary of Water-Level Trends in the Las Cruces Area

Water levels in the Las Cruces area are generally declining; declining trends began as early as the 1960s or 1970s in several wells, and as recently as 2010 in several wells. Rates of decline in inactive (observation) wells in the Mesilla Basin are generally on the order of 1 to 2 feet per year (JSAI, 2015). Las Cruces Utilities (LCU) has maintained a water-level monitoring program, under which groundwater-level data have been collected at the City's supply wells based on a defined methodology and QA/QC process from mid-2011 to present. The monitoring program includes monthly hand-measurements collected at 37 wells in the Mesilla Basin, plus transducer measurements recorded on an hourly basis in 12 wells. Monitoring program wells are located in the Valley of the Mesilla Basin, on the West Mesa of the Mesilla Basin. Water-level trends in these wells, plus USGS-monitored piezometers located close to the Rio Grande in Las Cruces, are analyzed in annual reports prepared for LCU (JSAI, 2015).

E.4 Groundwater Flow in the Mesilla Basin

Groundwater flow in the Mesilla Basin is generally to the southeast, parallel with the trend of the Rio Grande, with groundwater flowing from higher elevations to lower elevations. There is a relatively steep water-table gradient from the Organ Mountains down to the Rio Grande (Wilson et al., 1981; Frenzel and Kaehler, 1990). The cone of depression created by Las Cruces municipal pumping wells interrupts the regional groundwater-flow pattern by causing groundwater to flow toward the depression in the northwest part of T.23S., R.2E.

Natural discharge from the Mesilla Basin occurs near El Paso, Texas at a bedrock high referred to as the El Paso Narrows, where groundwater drains from the alluvial aquifer and evaporates. Some of the groundwater is forced to the surface due to diminished aquifer transmissivity. It is difficult to quantify groundwater discharge from the basin because the complex interactions between the shallow groundwater and surface-water systems are annually and seasonally dependent on surface-water releases from Caballo Reservoir (Weeden and Maddock, 1999; Nickerson and Myers, 1993).

E.5 Recharge to the Mesilla Basin

Return flow to an aquifer from irrigation water that has been applied to crops is not considered recharge in this report because this type of return flow does not bring new water into the system. Recharge is assumed to occur from precipitation events when "new" water is added to the system, and from direct movement of water from streams or irrigation canals into an aquifer.

E.5.1 Slope-Front and Mountain-Front Recharge

Most of the groundwater recharge to the Rio Grande alluvium and Santa Fe Group in the Mesilla Basin occurs through slope-front or mountain-front recharge, in which storm flows in ephemeral stream channels (arroyos) flow down the steep hillsides into channels with relatively flat gradients (Frenzel and Kaehler, 1990). A substantial amount of water can infiltrate through these channel sediments into the groundwater system before reaching the main channel of the Rio Grande. Slope-front recharge, where steep hillsides are underlain by Santa Fe Group sediments, occurs on the west side of the Rio Grande. Mountain-front recharge, where steep hillsides are underlain by bedrock, occurs along the western boundary of the Mesilla Basin, off the East and West Potrillo Mountains, Aden Hills, and Sleeping Lady Hills, and the eastern boundary off the Doña Ana Mountains, Organ Mountains, and Franklin Mountains.

Using an empirical method based on mean annual runoff, drainage basin area, mean annual winter precipitation, and the slope of the basin (Hearne and Dewey, 1988), Frenzel and Kaehler (1990) estimate the total slope-front and mountain-front recharge to the Mesilla Basin to be about 11,084 acre-feet per year (ac-ft/yr), most of which occurs on the eastern side of the Basin. Frenzel and Kaehler (1990) emphasize that their estimate has a potential error of plus 100 percent or minus 50 percent. Weeden and Maddock (1999) recalculated recharge using the same equation, but with different values for surface area and precipitation. They calculated combined slope-front and mountain-front recharge at 12,967 ac-ft/yr for the Basin.

Some subsurface water also enters the Mesilla Basin from the Jornada del Muerto Basin to the east (Shomaker and Finch, 1996), and the Mimbres Basin to the west (Hawley et al., 2000). In addition, there is a source of upwelling geothermal water entering the Basin from the Jornada Horst, a bedrock high separating the Jornada del Muerto Basin from the Mesilla Basin (Shomaker and Finch, 1996).

E.5.2 Recharge from the Rio Grande

Recharge has also historically entered the Rio Grande alluvial aquifer from the Rio Grande and associated irrigation canals. The complex relationship between the Rio Grande, irrigation canals, and the underlying shallow alluvial aquifer, depends on irrigation practices, weather and precipitation patterns, releases of water from Caballo Reservoir upstream, and pumping rates (Wilson et al., 1981). A gain in streamflow of 15 to 25 cubic feet per second (cfs) (10,867 to 18,112 ac-ft/yr) in the reach of the Rio Grande between Leasburg Diversion Dam and Las Cruces, and a relatively rapid loss of 35 to 45 cfs (25,356 to 32,601 ac-ft/yr) between Las Cruces and Mesilla Diversion Dam, have been observed (Nickerson, 1995). In the 28-mile reach between Las Cruces and Anthony, loss of streamflow of 1.0 to 4.8 cfs per river mile has been observed (20,300 to 97,400 ac-ft/yr; Wilson et al., 1981). A gradual gain of at least 10 cfs (7,245 ac-ft/yr) between Anthony and Canutillo, Texas, and a rapid loss of 20 to 30 cfs (14,489 to 21,734 ac-ft/yr) between Canutillo and El Paso, Texas, have been observed (Nickerson, 1995).

E.6 Groundwater Quality in the Mesilla Basin

Groundwater quality in the Mesilla Basin depends on natural factors such as the type of bedrock in the recharge zone and the presence of geothermal water, and man-made influences including irrigation along the Rio Grande, and point-source and non-point source pollution.

In the northern part of the Mesilla Basin, from T.24S. northward, groundwater quality is generally of good quality and suitable for irrigation and municipal use. TDS concentrations in 54 percent of all groundwater samples collected by the USGS in the Mesilla Basin north of Mesquite (T25S) had TDS concentrations less than the NMED/DWB secondary standard of 500 mg/L. TDS concentrations in groundwater south of Mesquite, and on the east side of the Basin between Las Cruces and El Paso, are generally much greater than in the northern part of the Basin (Wilson et al., 1981). Sulfate, chloride, boron, and nitrate concentrations were generally lower than the NMED/DWB standards throughout the Mesilla Basin.

Naturally-occurring contaminants dissolved from minerals in the bedrock include arsenic, radium, uranium, and fluoride. These contaminants may exceed maximum contaminant levels in some wells in the Las Cruces area. Groundwater in the northern part of the Basin is moderately hard to very hard. Total hardness concentrations in most samples exceeded 120 mg/L (Wilson et al., 1981).

E.6.1 Brackish Groundwater

In general, the shallow groundwater in the Rio Grande alluvium is brackish (TDS of 1,000 to 10,000 mg/L) due to the concentrating effects of evapotranspiration, and the evaporation of irrigation water. The brackish part of the upper saturated zone can range from 100 to 250 ft thick, and is usually thinnest near the Rio Grande. Beneath this upper brackish zone, there is a relatively thick layer of fresh water, estimated to be as much as 2,000 ft thick in the Las Cruces area. It is suspected that brackish zones underlie the fresh water in some places. From 1953 to 1956, and 1963 to 1965, the BOR, and from 1972 to 1975, Wilson et al. (1981) conducted a study of water salinity in numerous irrigation wells in the Mesilla Basin. Average specific conductance in shallow wells in the Basin was fairly high, between 1,740 and 2,150 microSiemens per centimeter (μS/cm), and varied only slightly from year to year, with no general increase or decrease over time.

The groundwater flowing into the Mesilla Basin from the northwest has a specific conductance between 1,400 and 2,310 μS/cm. Water flowing in from the southwestern margin generally has a specific conductance less than 1,940 μS/cm, except along faults where geothermally-influenced water with specific conductance values as high as 7,400 μS/cm may exist. Groundwater in the region just west of Las Cruces has relatively low specific conductance values less than 900 μS/cm (Anderholm, 1990).

Specific conductance measurements give an approximation of TDS concentrations. Specific conductance values given in the units micromhos per centimeter (μmhos/cm) multiplied by 0.54 to 0.96 (depending on the ionized substances in solution) would equal the TDS concentration in milligrams per liter (Hounslow, 1995). For example, a specific conductance of 1,330 μmhos/cm would be approximately equivalent to 1,000 mg/L.

Groundwater flowing west into the Mesilla Basin from the igneous rocks of the Organ Mountains tends to have lower TDS concentrations than groundwater flowing into the Mesilla Basin from the San Andres Mountains to the north, which are composed of more soluble sedimentary rocks. There is also a significant source of geothermal water with high chloride concentrations on the east side of the Mesilla Basin (Anderholm, 1990).

E.6.2 USGS Groundwater Quality Data for the Mesilla Basin

USGS groundwater quality data indicate that sulfate, chloride, and manganese concentrations exceeded NMED/DWB secondary standards in a handful of wells sampled in the Las Cruces area between August 1947 and March 1995 (Table E5). More recent data are in the QA/QC process, and are not yet available to the public. Table E6 summarizes the USGS groundwater quality data for the Las Cruces area in the Mesilla Basin.

E.6.3 City of Las Cruces Groundwater Quality Data for the Mesilla Basin

Groundwater quality data for City of Las Cruces municipal wells completed in the Mesilla Basin indicate relatively high groundwater quality and are summarized in Table E7. The locations of the City of Las Cruces wells are shown in Figure E23.

Tetrachloroethene (PCE) has exceeded the NMED/DWB standard of 0.005 mg/L in Wells 18, 19, 21, and 27. These wells are completed in the Valley in a part of the aquifer that is contaminated by the Griggs and Walnut PCE plume, which is an EPA Superfund site. Wells 18 and 27 began actively pumping during April 2012 as recovery wells for the Griggs and Walnut PCE plume, and nearby Wells 19, 20, 21, and 57 are not currently in service.

Lead concentrations exceeded the NMED/DWB standard of 0.015 mg/L in the distribution system in a series of sampling events in 1993 and 1994, as well as several events in 2003, 2006, and 2012, but remained below the NMED/DWB standard between 2013 and present (Table E7). Copper concentrations exceeded the NMED/DWB secondary standard of 1.0 mg/L in the distribution system in one sampling event in 1993 and one sampling event in 1994, but remained below the NMED/DWB secondary standard between 1995 and present. City well-water ranged from moderately hard to very hard, with hardness concentrations ranging from 119 to 541 mg/L (Table E7).

Table E5. Summary of USGS monitoring wells with sulfate, chloride, and manganese concentrations that exceed NMED/DWB secondary standards between August 1947 and March 1995 in the Las Cruces area, Mesilla Basin

well T.R.S.qqq	location	parameters that exceed NMED/DWB standards
23S.1E.3.442	northwest of Las Cruces, east of Rio Grande	sulfate, chloride
22S.1E	northwest of Las Cruces, east of Rio Grande	sulfate, manganese
23S.2E.18	central part of Las Cruces	sulfate
24S.2E.7	west of San Pablo, east of Rio Grande	sulfate
24S.2E.8	west of San Pablo, east of Rio Grande	sulfate
24S.2E.9	San Pablo, east of Rio Grande	sulfate
23S.1E.11	west of Las Cruces, east of Rio Grande	manganese
23S.1E.20	west of Las Cruces, west of Rio Grande	manganese
23S.1E.21	west of Las Cruces, west of Rio Grande	manganese
23S.1E.22	west of Las Cruces, west of Rio Grande	manganese
23S.1E.23	west of Las Cruces, east of Rio Grande	manganese

NMED/DWB - New Mexico Environment Department, Drinking Water Bureau secondary standard
T.R.S.qqq - township, range, section, quarter, quarter, quarter

Table E6. Summary of USGS groundwater quality data for the Las Cruces area in the Mesilla Basin

parameter	units	number of samples	time period	concentration range	NMED/DWB secondary standard
TDS	mg/L	220	5/6/1947 to 3/16/95	234 to 2,290	500
specific conductance	μmhos/cm	354	5/6/1947 to 3/16/95	393 to 6,390	ns
sulfate	mg/L	353	5/6/1947 to 3/16/95	20 to 1,900	250
chloride	mg/L	353	5/6/1947 to 3/16/95	11 to 760	250
fluoride	mg/L	215	5/6/1947 to 3/16/95	0.1 to 2.3	2.0
iron	mg/L	110	8/13/47 to 3/16/95	0.003 to 2.5	0.3
manganese	mg/L	133	5/16/72 to 3/16/95	0.005 to 3.3	0.05

NMED/DWB - New Mexico Environment Department, Drinking Water Bureau secondary standard
TDS - total dissolved solids
mg/L - milligrams per liter
μmhos/cm - micromhos per centimeter
ns - no standard available

Table E7. Summary of groundwater quality in the City of Las Cruces wells in the Mesilla Basin

parameter	units	time period	Las Cruces Mesilla Basin wells sampled (City well No.)	concentration range	summary	NMED/DWB standard
TDS	mg/L	1986 to 2012	21, 32, 36, 66	313 to 884	exceeded NMED/DWB secondary standard in Well 21 in 1990	500[1]
sulfate	mg/L	1990 to 2011	10, 18-33, 35-39, 44-46, 54, 57-63, 65, 66, 67, 71	47 to 296	exceeded NMED/DWB secondary standard in Well 19 in 1994, Well 21 in 1990 and 1994	250[1]
chloride	mg/L	1986 to 2004	21, 32, 36, 63, 65	53 to 170	below NMED/DWB secondary standard	250[1]
fluoride	mg/L	1994 to 2014	10, 18-33, 35, 36, 38, 39, 44-46, 54, 57-63, 65, 67, 71	0.20 to 0.96	below NMED/DWB secondary standard	2[1]
nitrate	mg/L	1993 to 2015	10, 18-33, 35, 36, 38, 39, 44-46, 54, 57-63, 65, 67, 71	<1.0 to 4.7	below NMED/DWB standard	10
arsenic	mg/L	1994 to 2014	distribution system, 10, 18-33, 35, 36, 38, 39, 44-46, 54, 57-63, 65, 67, 71	<0.005 to 0.0067	below NMED/DWB standard	0.01
cyanide	mg/L	1994 to 2014	10, 18-33, 35, 36, 38, 39, 44-46, 54, 57-63, 65, 67, 71	<0.1	below laboratory detection limits	4
iron	mg/L	1994	10, 20, 26, 32, 33, 44	<0.02 to 0.09	below NMED/DWB secondary standard	0.3[1]
manganese	mg/L	1994	10, 20, 26, 32, 33, 44	<0.05	below laboratory detection limits	0.05[1]
copper	mg/L	1993 to 2015	distribution system, 59, 66	<0.05 to 3.84	exceeded NMED/DWB secondary standard in distribution system on 6/15/1993 and 5/3/1994	1.0[1]
lead	mg/L	1993 to 2015	distribution system, 63, 66	0.0002 to 0.306	exceeded NMED/DWB standard in distribution system on 6/15/1993, 4/15/1994, 4/25/1994, 4/26/1994, 5/3/1994, 6/18/1994, 6/27/1994, 9/29/2003, 9/15/2006, 9/27/2006, 10/3/2006, 8/21/2012, 8/27/2012	0.015
uranium	mg/L	2003 to 2010	10, 19-21, 23-25, 29, 31-33, 35, 36, 38, 39, 44, 60-62, 71	0.003 to 0.132	exceeded NMED/DWB standard in Wells 10, 19, 20, 21, 24, 38, 44 in 2003 and 2005	0.03
gross alpha particles	pCi/L	2004 to 2013	10, 18, 19-21, 23-25, 29, 31-33, 35, 36, 38, 39, 44-46, 60-63, 65, 70, 71	0.4 to 47	exceeded NMED/DWB standard in Well 19 in 2004, and Well 20 in 2005, 2006, and 2007	15
hardness	mg/L	1996, 1997, 2011	10, 18-21, 23-26, 28, 29, 31-33, 35, 38, 39, 44, 45, 54, 57-62, 63, 65	119 to 541	moderately hard to very hard	ns
benzene	mg/L	1993 to 2015	distribution system, 9, 10, 18-33, 35, 36, 38, 39, 44-46, 54, 57-63, 65, 67, 71	<0.0005	below laboratory detection limit of 0.0005 mg/L	0.005
tetrachloroethene (PCE)	mg/L	1991 to 2015	18, 19, 21, 24, 27, 36, 65, 67, 71	<0.0005 to 0.032	exceeded NMED/DWB standard in Well 18 in 77 events between 1991 and 2015; Well 27 in 56 events between 1991 and 2015; Well 19 in 2004; Well 21 in 2003	0.005

[1] NMED/DWB secondary standard is a non-enforceable standard associated with aesthetic quality of water
(2) uranium concentrations should be reported in mg/L to compare them to the NMED/DWB standard for uranium, reported in mg/L
(3) NMED/DWB standard for uranium is 0.03 mg/L
NMED/DWB - New Mexico Environment Department, Drinking Water Bureau
TDS - total dissolved solids
mg/L - milligrams per liter
ns - no standard available
pCi/L - picoCuries per liter

Uranium concentrations exceeded the NMED/DWB standard of 0.03 mg/L in a number of City wells located in the Valley in 2003, 2005, 2006, and 2007 (Table E7). The gross alpha particle activity in City Well 20 exceeded the standard of 15 pCi/L in 2005 and 2007 (Table E7). The source of elevated uranium and gross alpha is naturally-occurring, and may be related to upwelling of deep groundwater along faults. Wells 10, 19, 20, 21, 24, 38, 44 are not currently in service due to elevated uranium concentrations.

E.7 Sources of Groundwater Contamination in the Mesilla Basin

There are several recognized sources of groundwater contamination in the Mesilla Basin, including leaky underground storage tank (LUST) sites, septic tanks and cesspools, landfills, dairies, agricultural and municipal chemicals (including pesticides and herbicides), and chemicals released by other waste disposal practices.

E.7.1 Leaky Underground Storage Tank Sites

LUST sites can introduce contaminants such as gasoline, diesel fuel, and fuel oil, associated toxic chemicals like benzene, toluene, ethylbenzene, and xylenes (referred to as BTEX, collectively) and fuel additives such as methyl-tert-butyl ether (MTBE), into the groundwater system. The potential health effects of MTBE are not yet well understood, but it is extremely soluble in water and can move very rapidly in an aquifer. There are 130 LUST sites in the Las Cruces area: 29 active sites and 101 sites requiring no further action (https://www.env.nm.gov/ust/lists.html).

E.7.2 Griggs and Walnut Groundwater Contamination Plume

As noted in the **Section E.6.3 City of Las Cruces Groundwater-Quality Data for the Mesilla Basin**, City Wells 18, 19, 21, and 27 have been contaminated by the Griggs and Walnut PCE Plume, which is an EPA Superfund site (Fig. E23). PCE is the main contaminant associated with the plume (EPA, 2003). The plume has contaminated soil and groundwater in a 0.25 to 0.5 square mile area in the vicinity of East Hadley Avenue and East Griggs Avenue. Possible sources of the contamination include the former Armory, former Crawford Airport, and the Doña Ana County yard, which could have involved parts-cleaning operations and the use of PCE (EPA, 2003). Wells 18 and 27 began actively pumping during April 2012 as recovery wells for the Griggs and Walnut PCE plume.

E.7.3 Sources of Nitrate Contamination

Nitrate occurs as a byproduct of the degradation of ammonia and organic nitrogen compounds, found in animal and human waste products. Thus, nitrate contamination is associated with septic tanks, fertilizers, feedlots, and dairies. Ingestion of water with a nitrate concentration of 10 mg/L or greater can cause the rare but deadly disease methemoglobinemia, or "blue baby syndrome," in children (Earp and Koschal, 1986). The highest nitrate concentration detected in the City's water supply to date is 4.7 mg/L (Table E7).

E.7.4 Landfills

The Mesilla Basin includes a number of closed and active landfills. Contamination from landfills depends on many factors, including the type of waste in the landfill, the patterns of groundwater flow through or under the landfill, and the character of the ground beneath the landfill. The closed Las Cruces Foothills Landfill on Las Cruces' East Mesa has nine groundwater monitoring wells that straddle the boundary between the Mesilla and Jornada del Muerto Basins. A sub-set of these wells are sampled semi-annually. PCE has persisted in several of the landfill monitoring wells, at concentrations above the NMED Groundwater Protection Standard (GWPS) of 0.005 mg/L, since 1999. Methylene chloride has persisted in one of the landfill monitoring wells at concentrations above the GWPS of 0.005 mg/L, since 2007.

E.8 Aquifer Sensitivity to Contamination in the Mesilla Basin

The sensitivity of the Rio Grande alluvium and Santa Fe Group aquifers of the Mesilla Basin to contamination from surface and shallow subsurface contamination sources depends on factors such as depth to water, soil type, and the character of vadose zone sediments. Creel et al. (1998) used these factors to designate areas of "very slight," "slight," "moderate," "severe," and "extreme" aquifer sensitivity in the Las Cruces area. These areas are shown on Figure E23. The Rio Grande alluvium has severe to extreme sensitivity to contamination because the aquifer consists of high-transmissivity gravels and sands, and the depth to the water table can be less than 20 ft. The Santa Fe Group has moderate to severe sensitivity to contamination, generally a lower level of sensitivity than the Rio Grande alluvium, because interfingered, horizontal clay layers are effective in retarding downward flow of contamination from the surface, and the depth to the water table is typically more than 100 ft.

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ILLUSTRATIONS

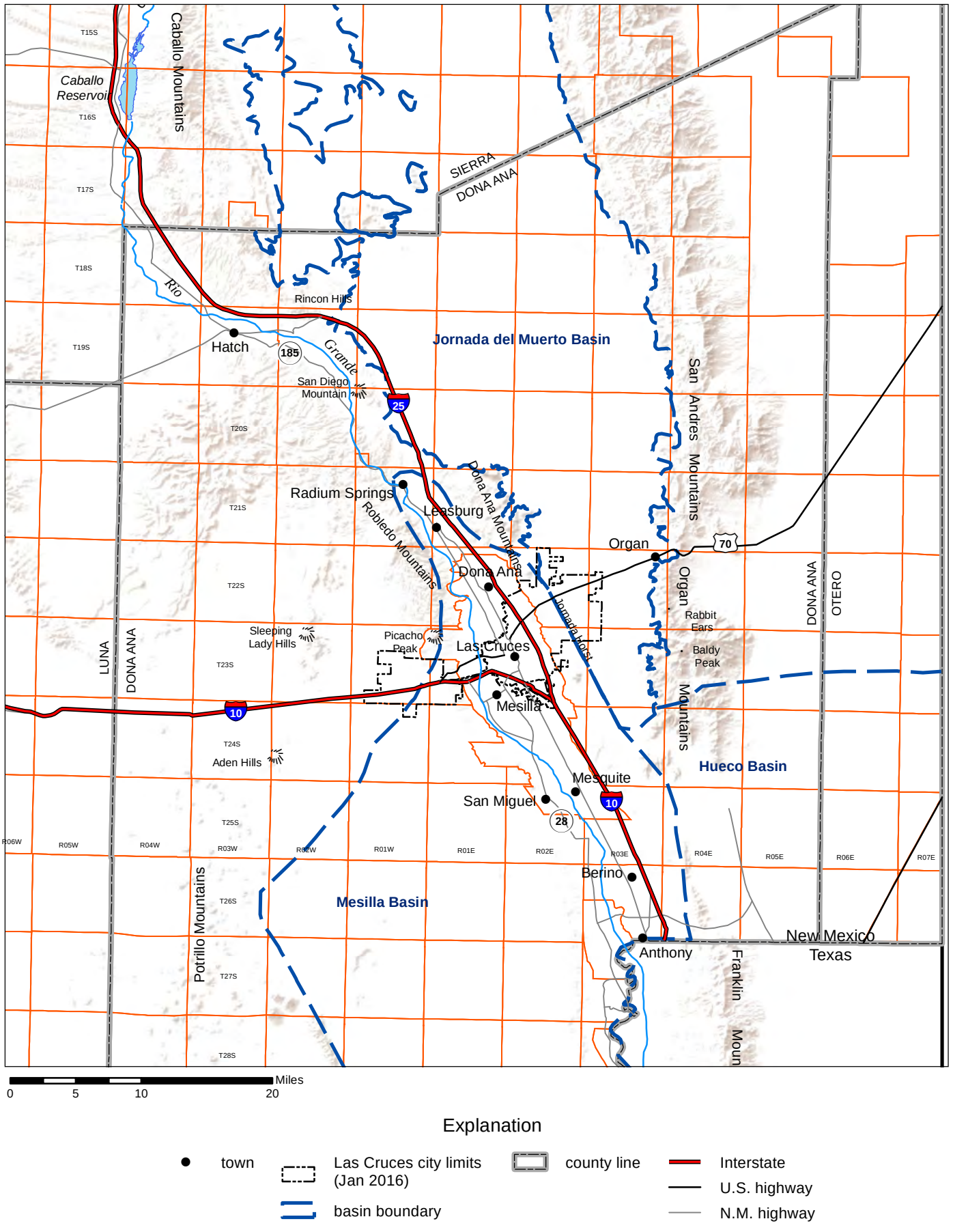

Figure E1. Map of the Mesilla Basin and southern part of the Jornada del Muerto Basin.

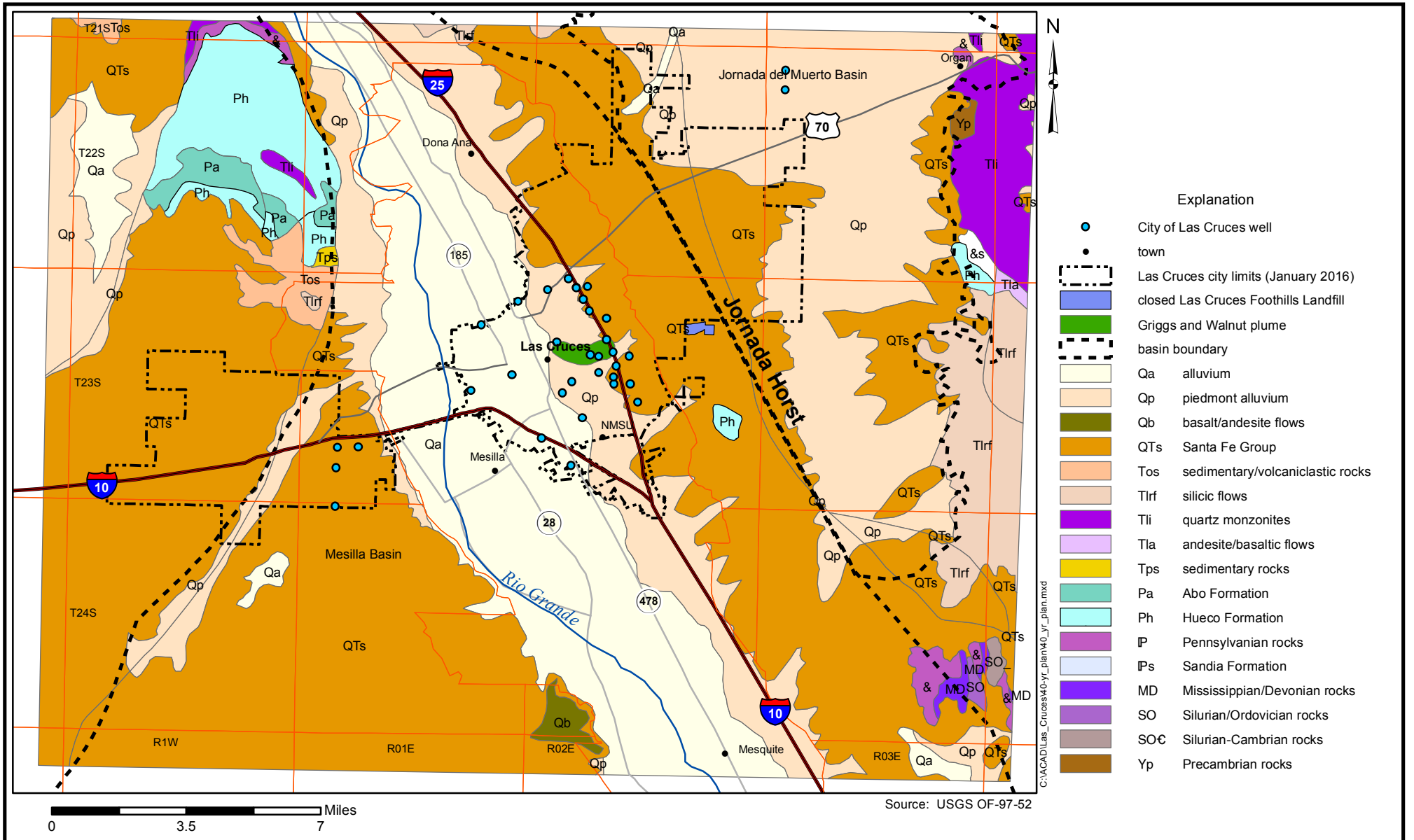

Figure E2. Geologic map of the northern part of the Mesilla Basin and southern part of the Jornada del Muerto Basin showing the Las Cruces city limits.

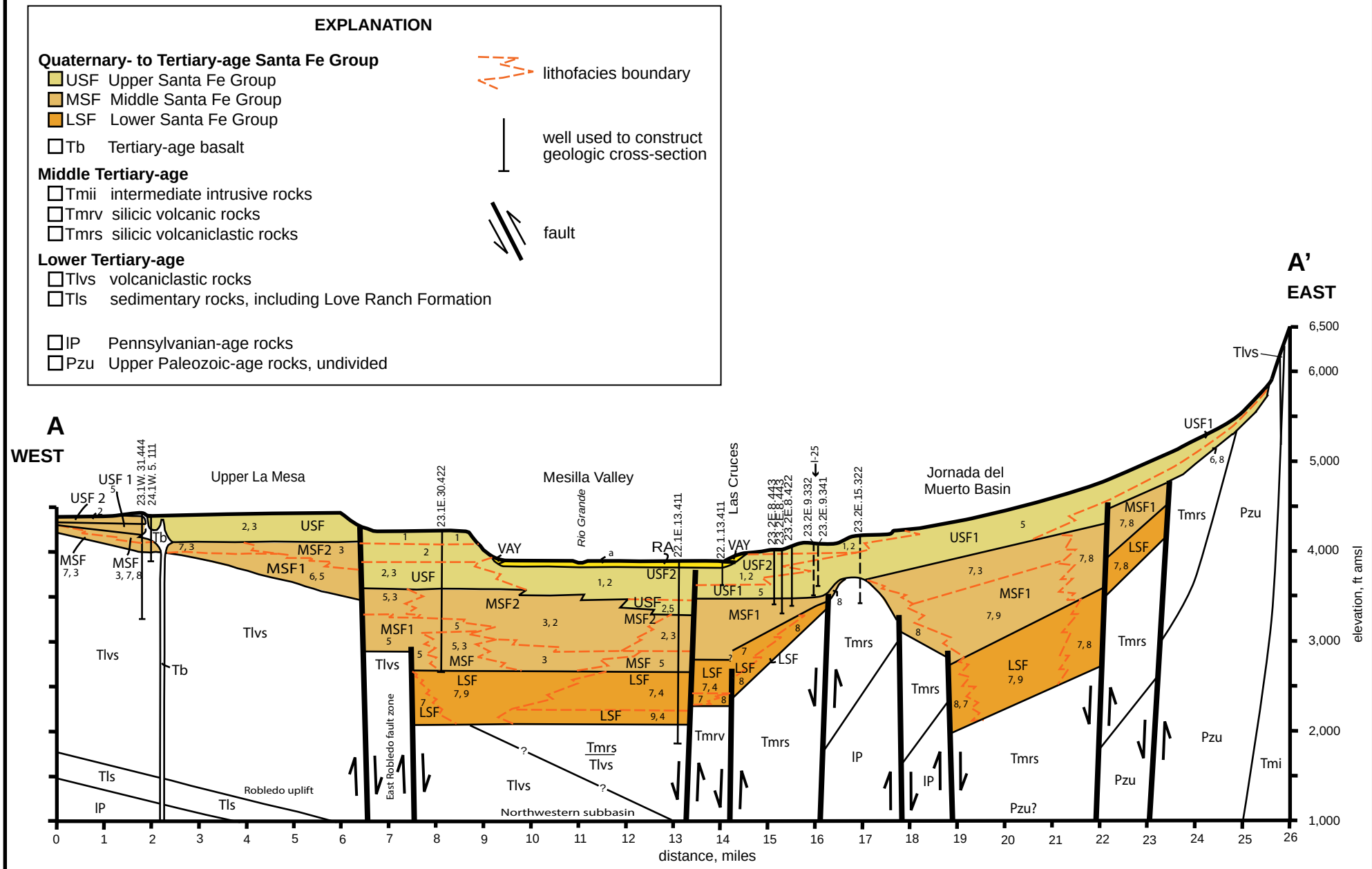

Figure E3. West-east hydrogeologic cross-section A-A' of the Las Cruces area after cross-section E-E' of Hawley and Kennedy (2004).

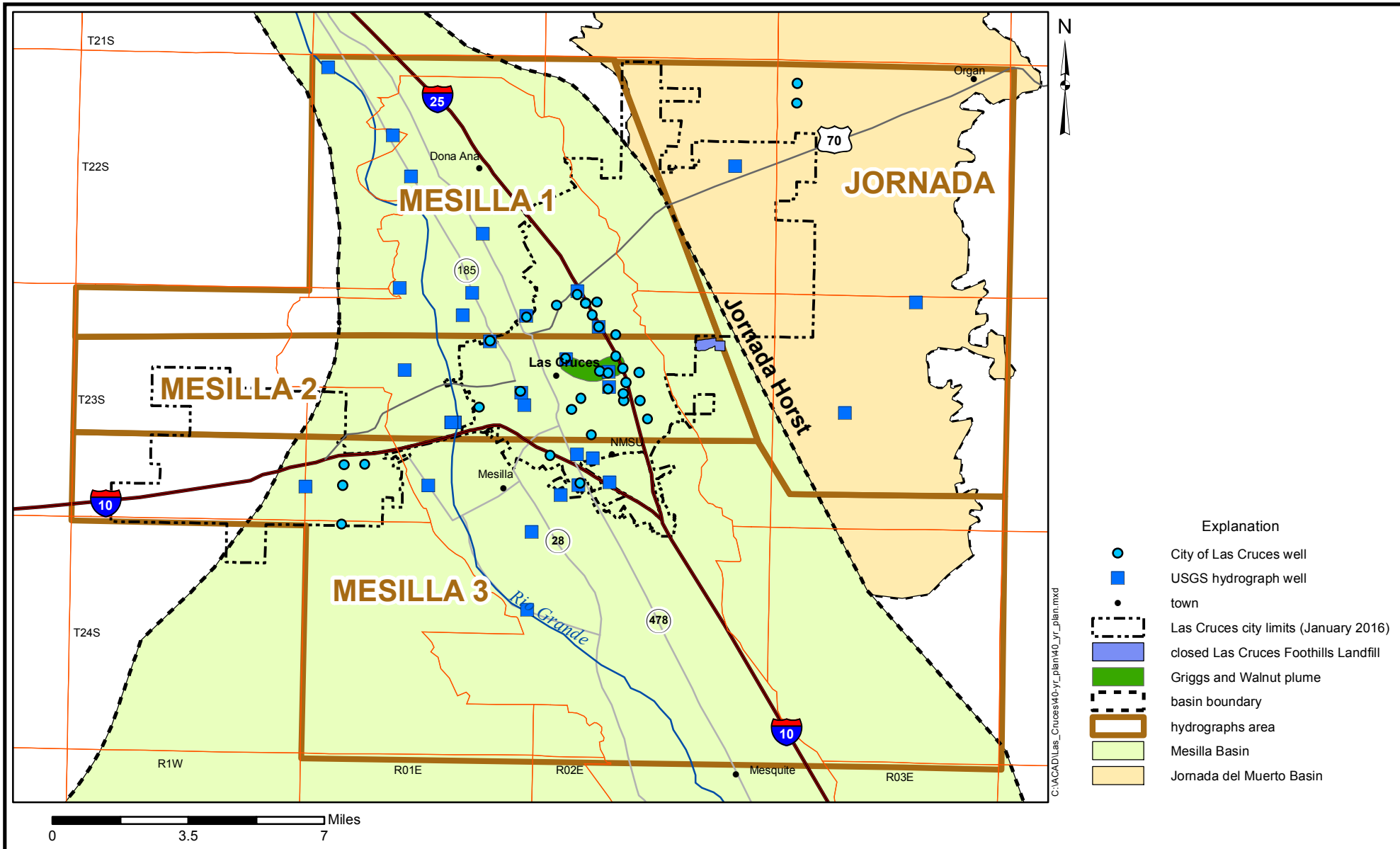

Figure E4. Map of the northern part of the Mesilla and southern part of the Jornada del Muerto Basins showing selected USGS groundwater monitoring wells, City of Las Cruces wells, Las Cruces city limits, and the four general areas for which groundwater hydrographs are described.

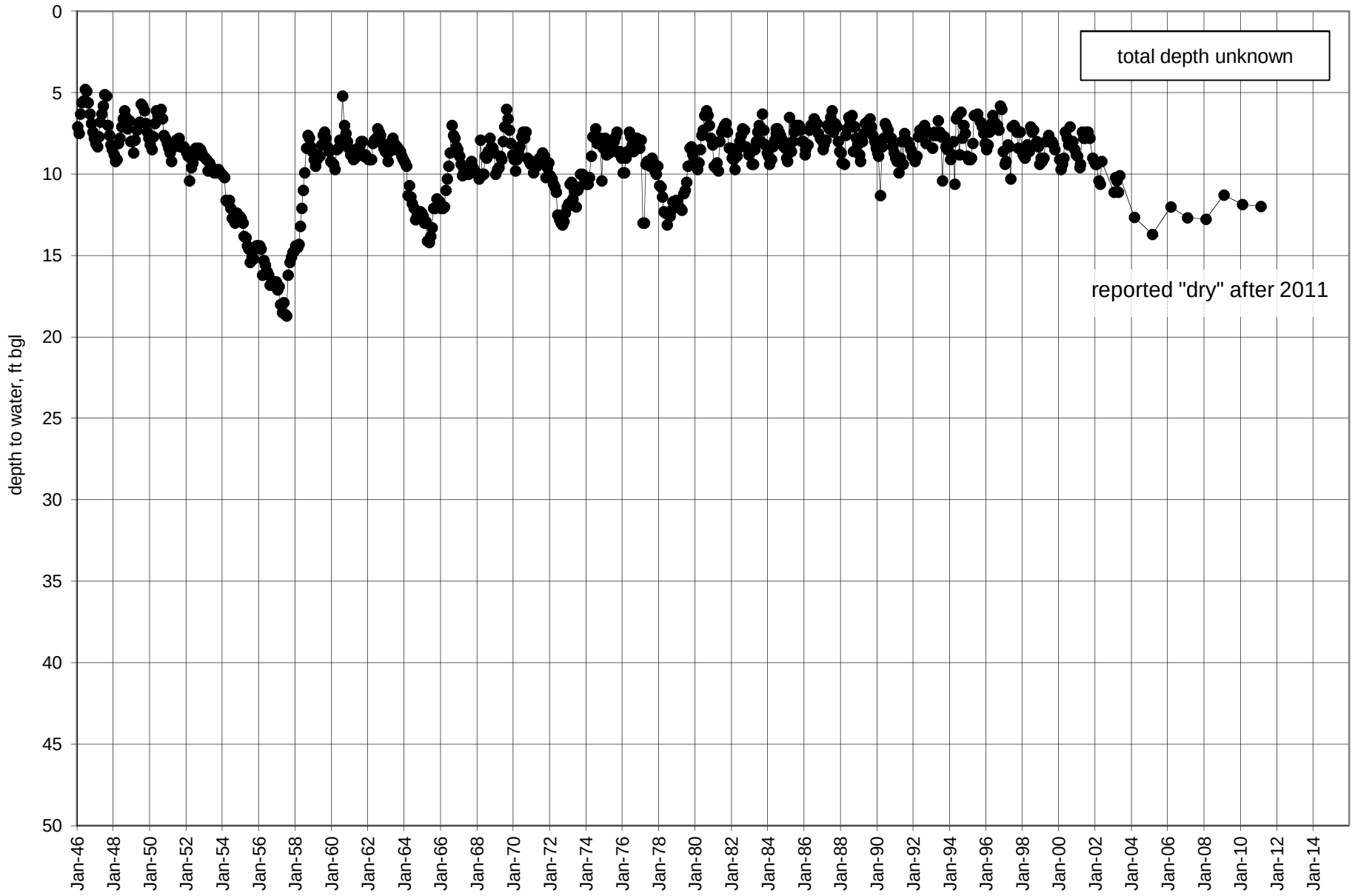

Figure E5. Groundwater hydrograph for USGS-monitored Well 322312106503601 (USBR-19), T22S.R01E.16.433, Mesilla Basin, New Mexico.

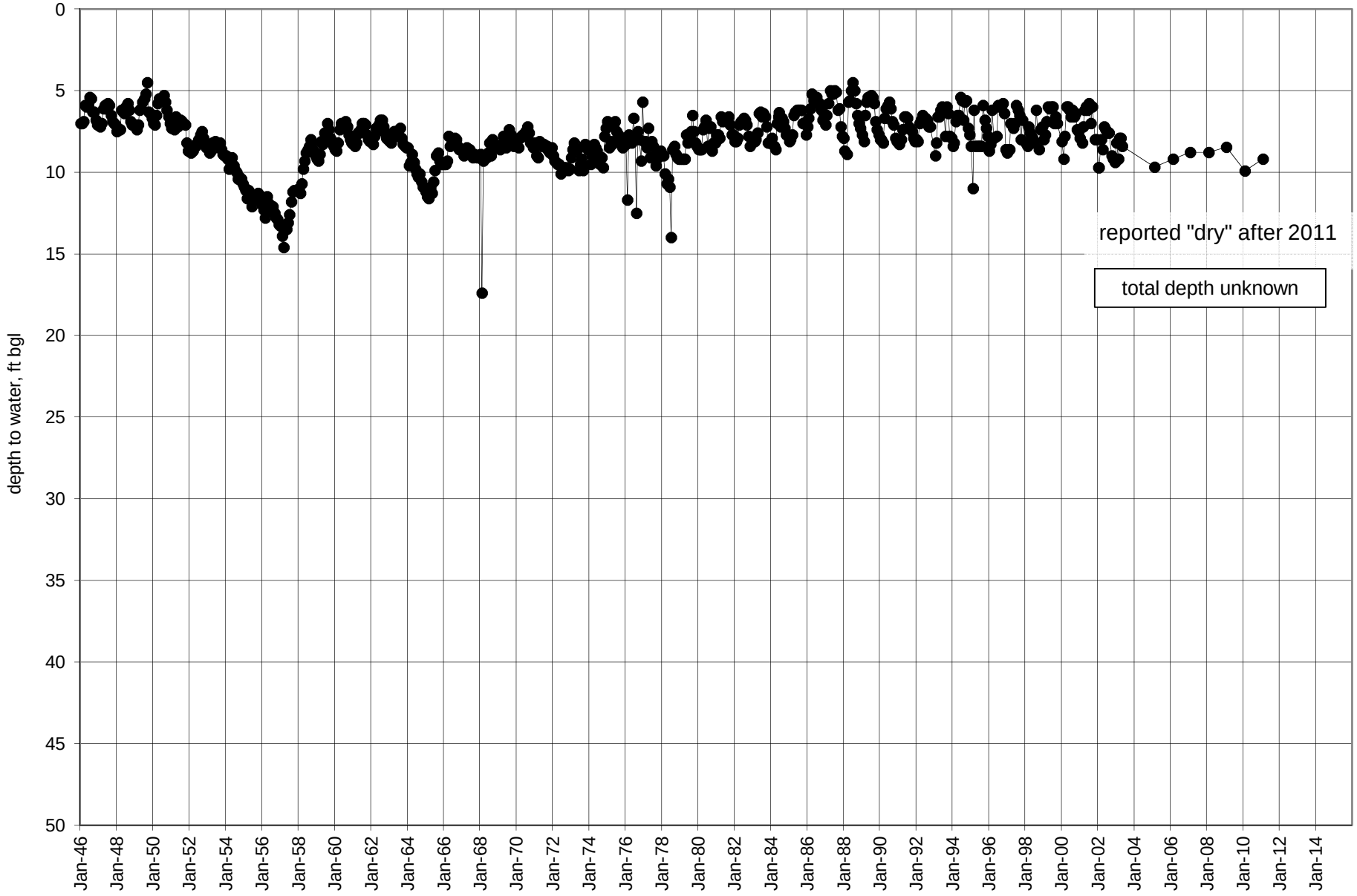

Figure E6. Groundwater hydrograph for USGS-monitored Well 322047106505001 (USBR-15), T22S.R01E.33.341, Mesilla Basin, New Mexico.

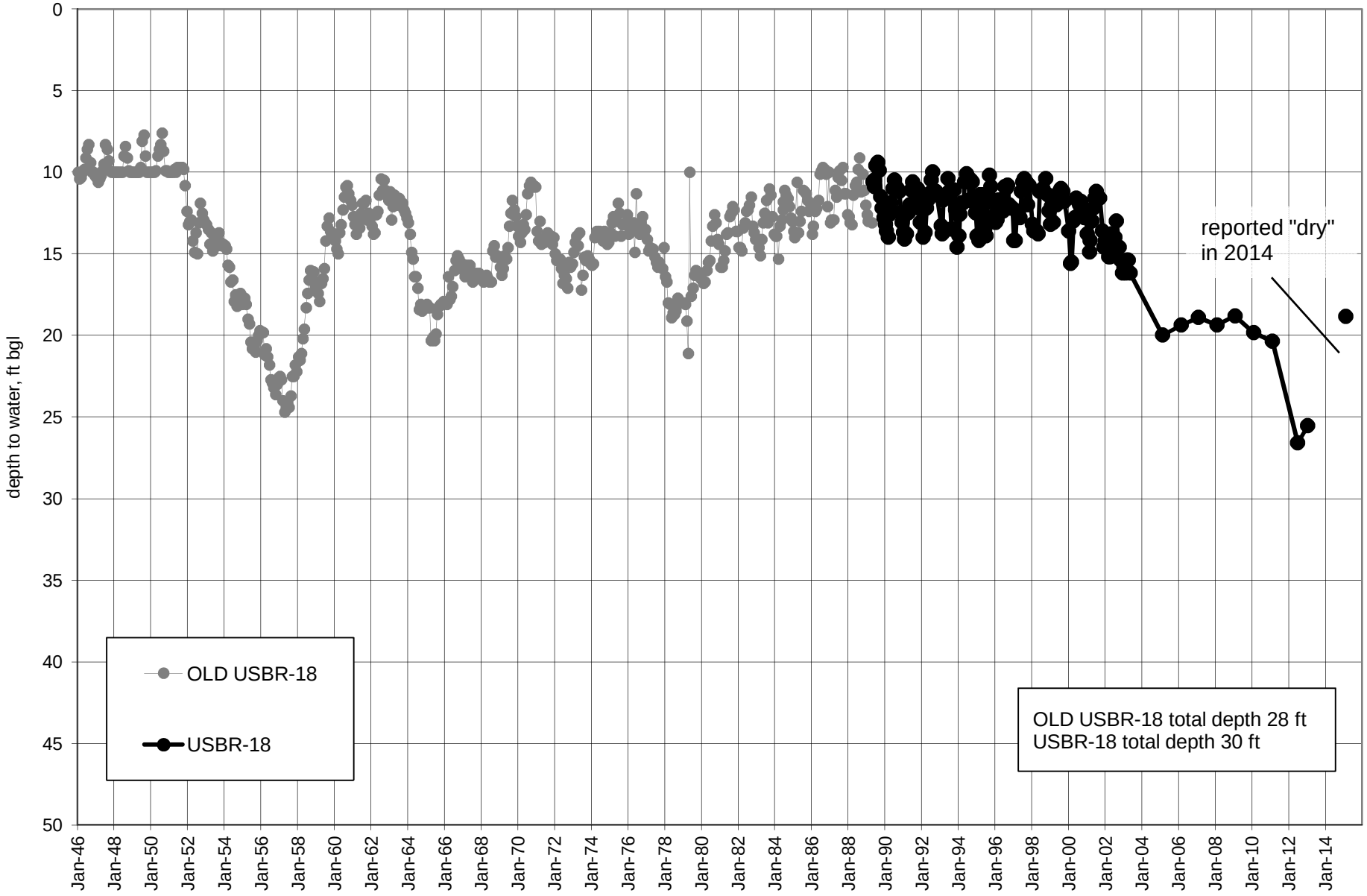

Figure E7. Groundwater hydrograph for USGS-monitored Well 322040106485301 (OLD USBR-18) and Well 322040106485302 (USBR-18), T22S.R01E.35.334, Mesilla Basin, New Mexico.

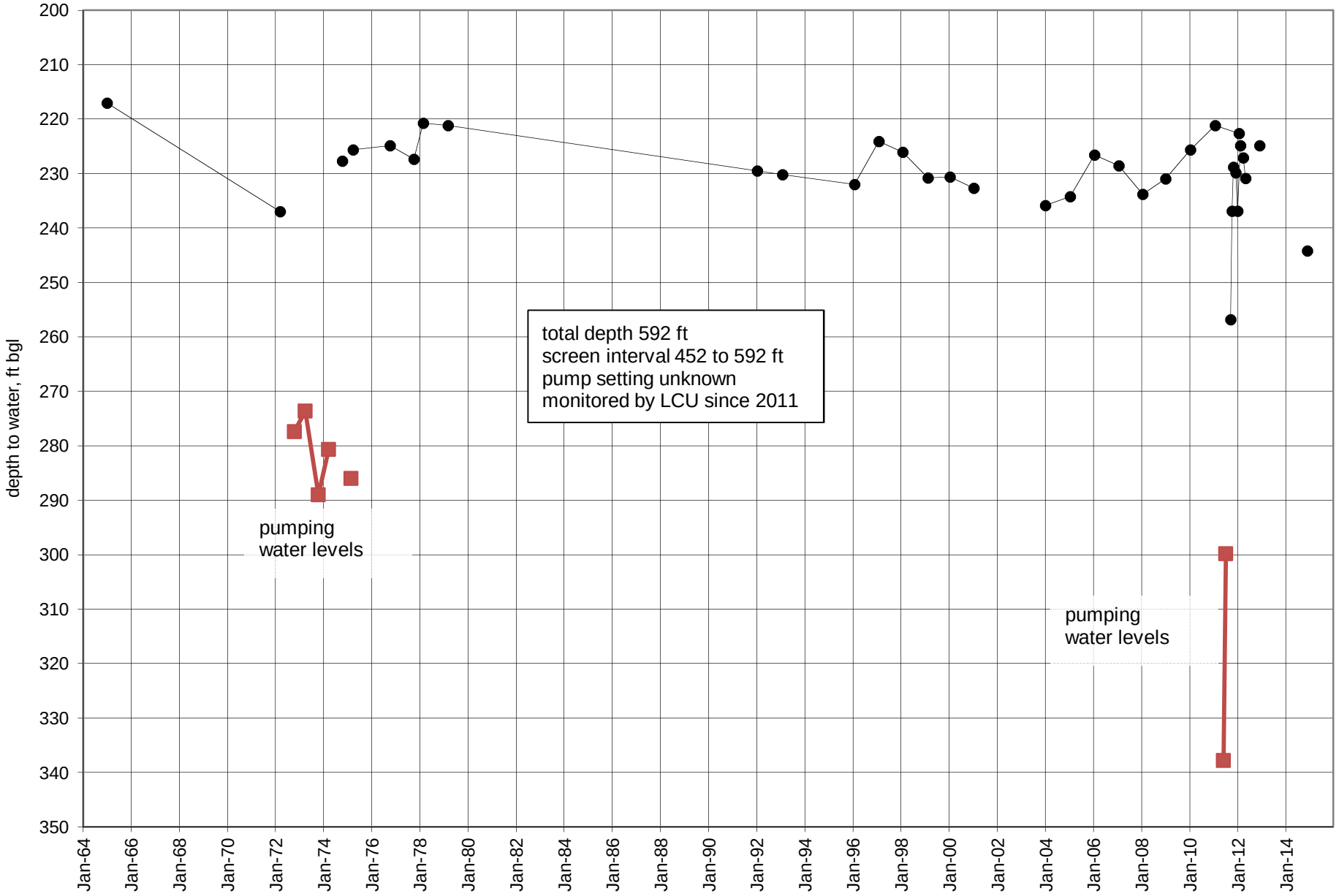

Figure E8. Groundwater hydrograph for USGS-monitored Well 322045106461001 (Las Cruces Well 23), T22S.R02E.31.444, Mesilla Basin, New Mexico.

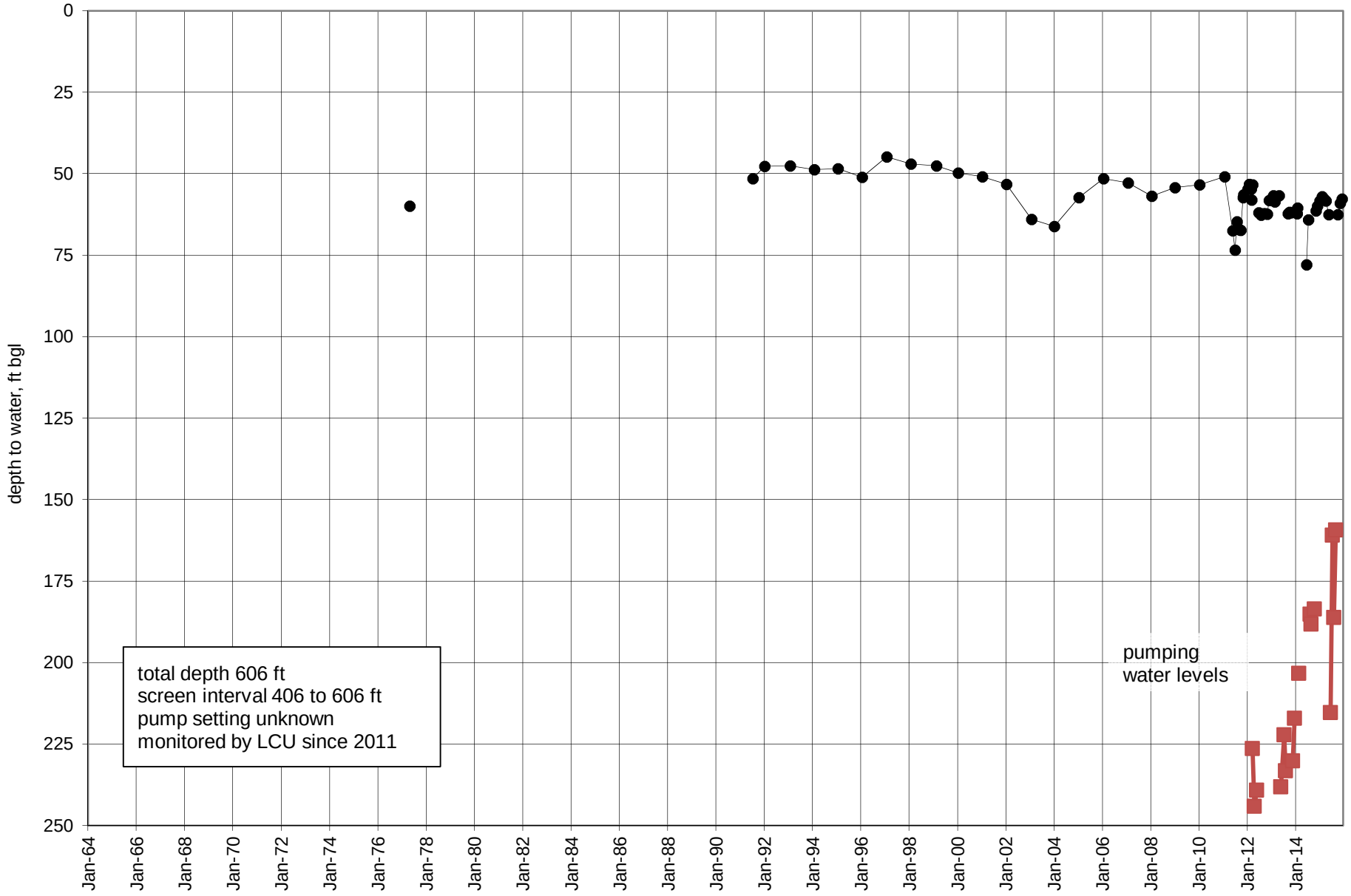

Figure E9. Groundwater hydrograph for USGS-monitored Well 322011106473301, T23S.R01E.01.411 (Las Cruces Well 33), Mesilla Basin, New Mexico.

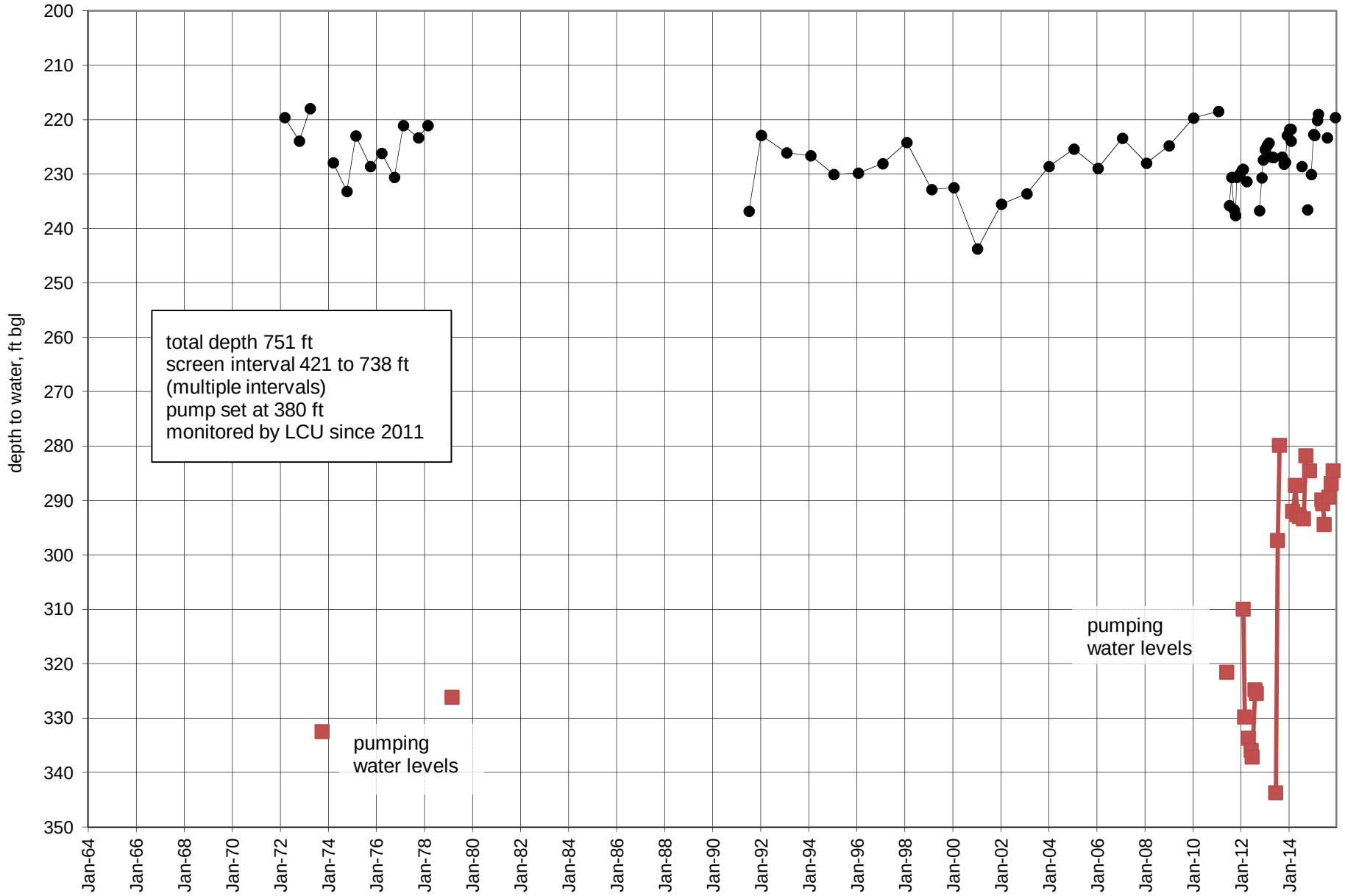

Figure E10. Groundwater hydrograph for USGS-monitored Well 321956106453101, T23S.R02E.05.342 (Las Cruces Well 28), Mesilla Basin, New Mexico.

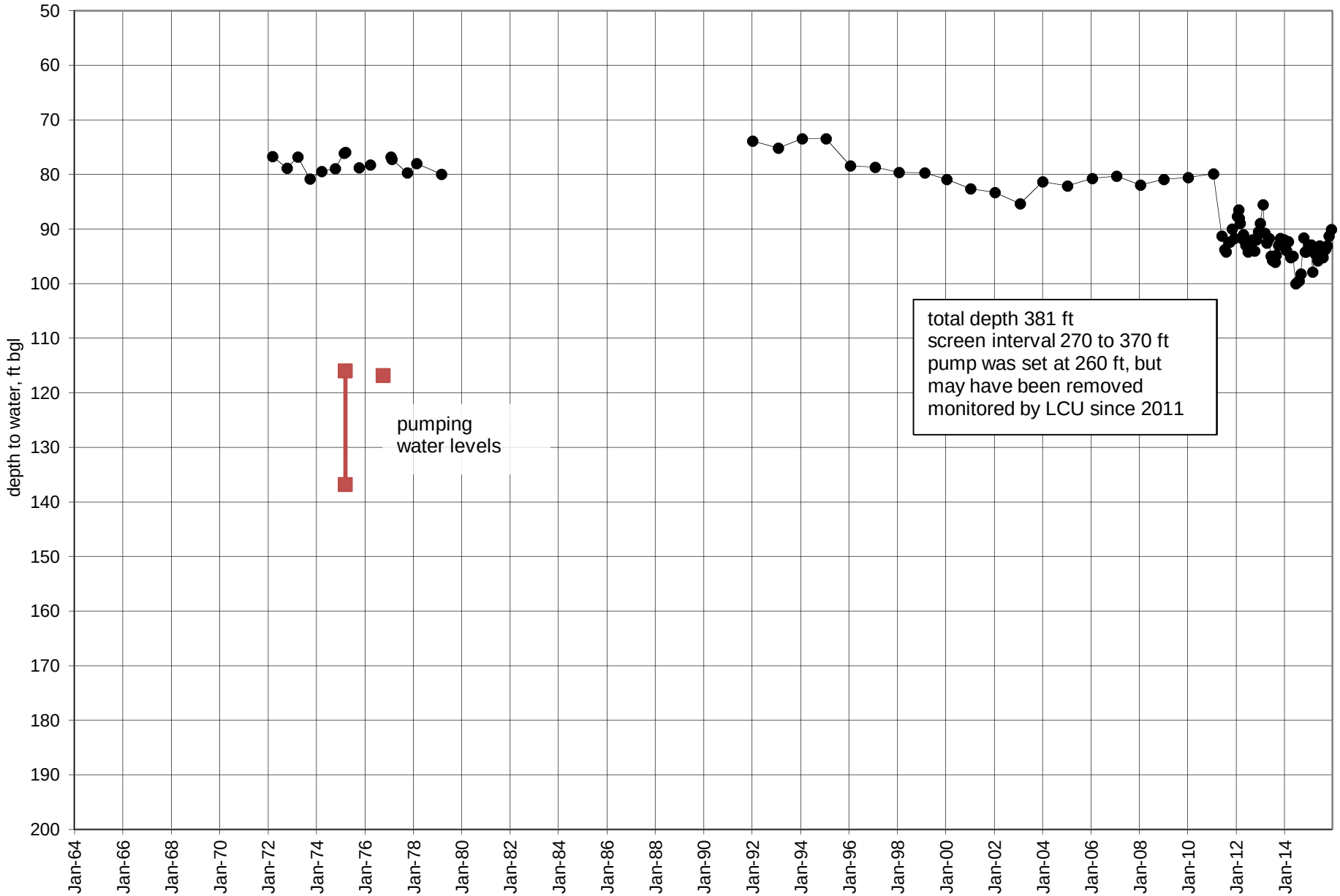

Figure E11. Groundwater hydrograph for USGS-monitored Well 321914106462501 (Las Cruces Well 10), T23S.R02E.07.411, Mesilla Basin, New Mexico.

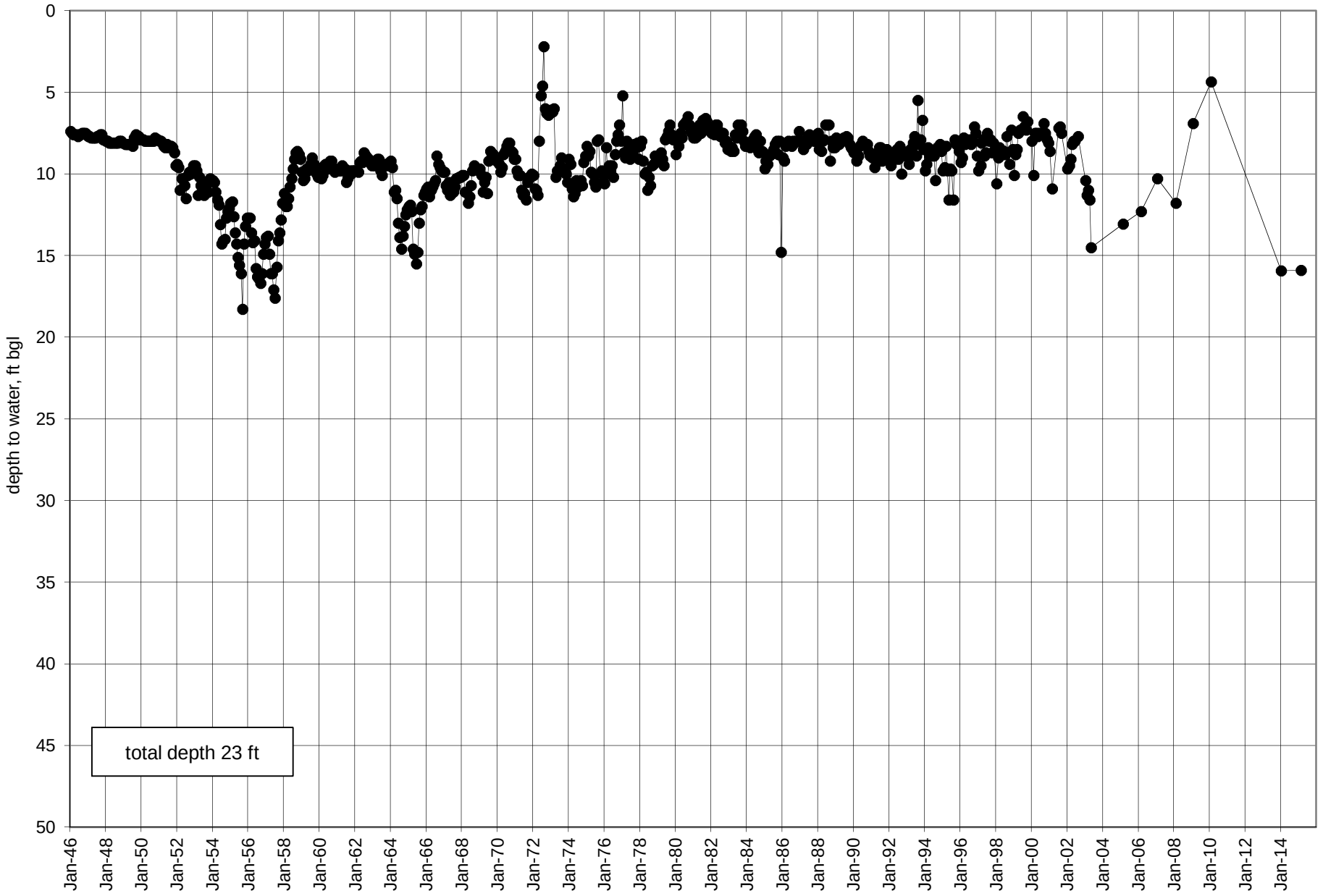

Figure E12. Groundwater hydrograph for USGS-monitored Well 321853106504001 (USBR-16), T23S.R01E.09.433, Mesilla Basin, New Mexico.

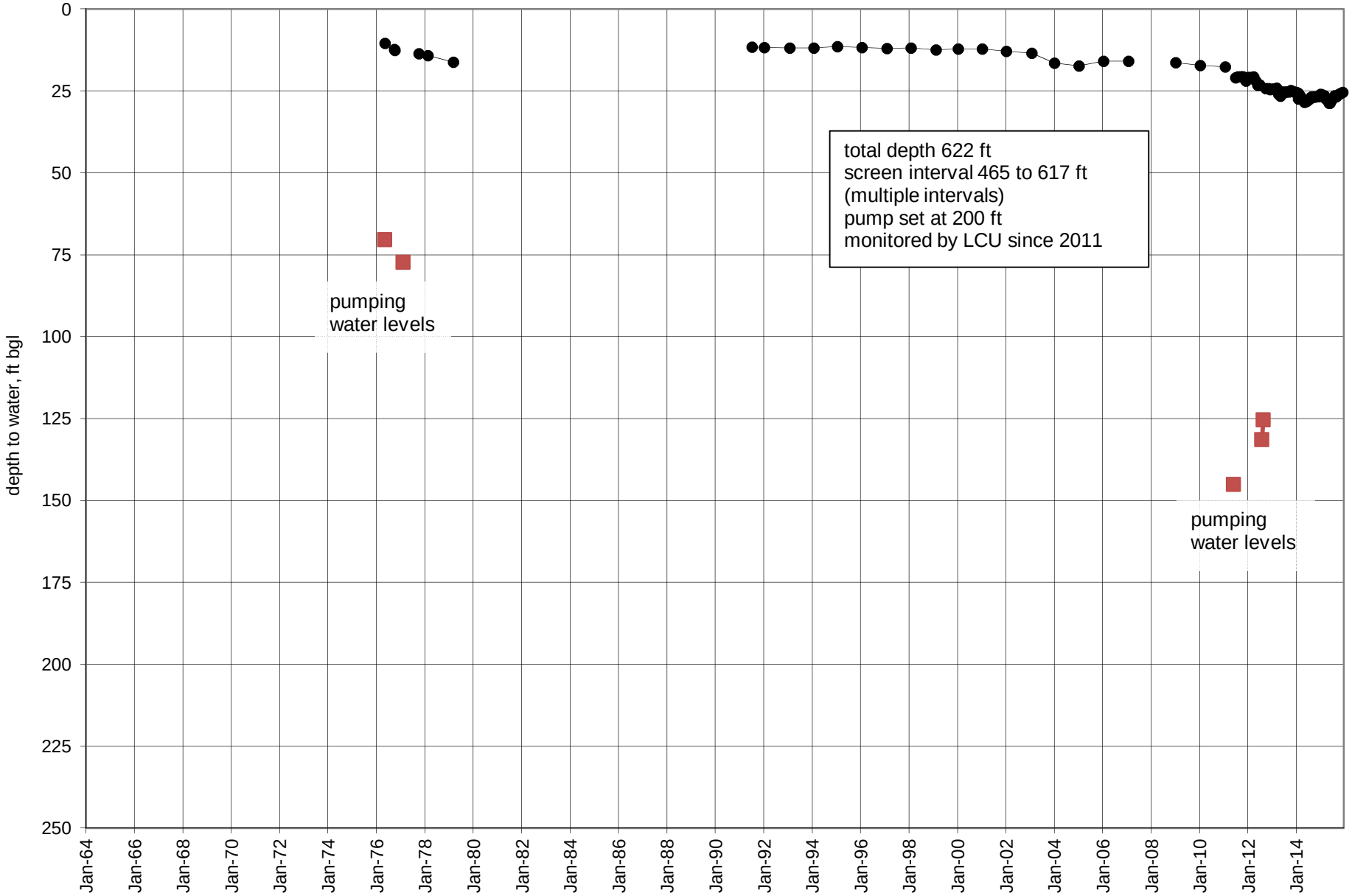

Figure E13. Groundwater hydrograph for USGS-monitored Well 321934106482601 (Las Cruces Well 31), T23S.R01E.11.214, Mesilla Basin, New Mexico.

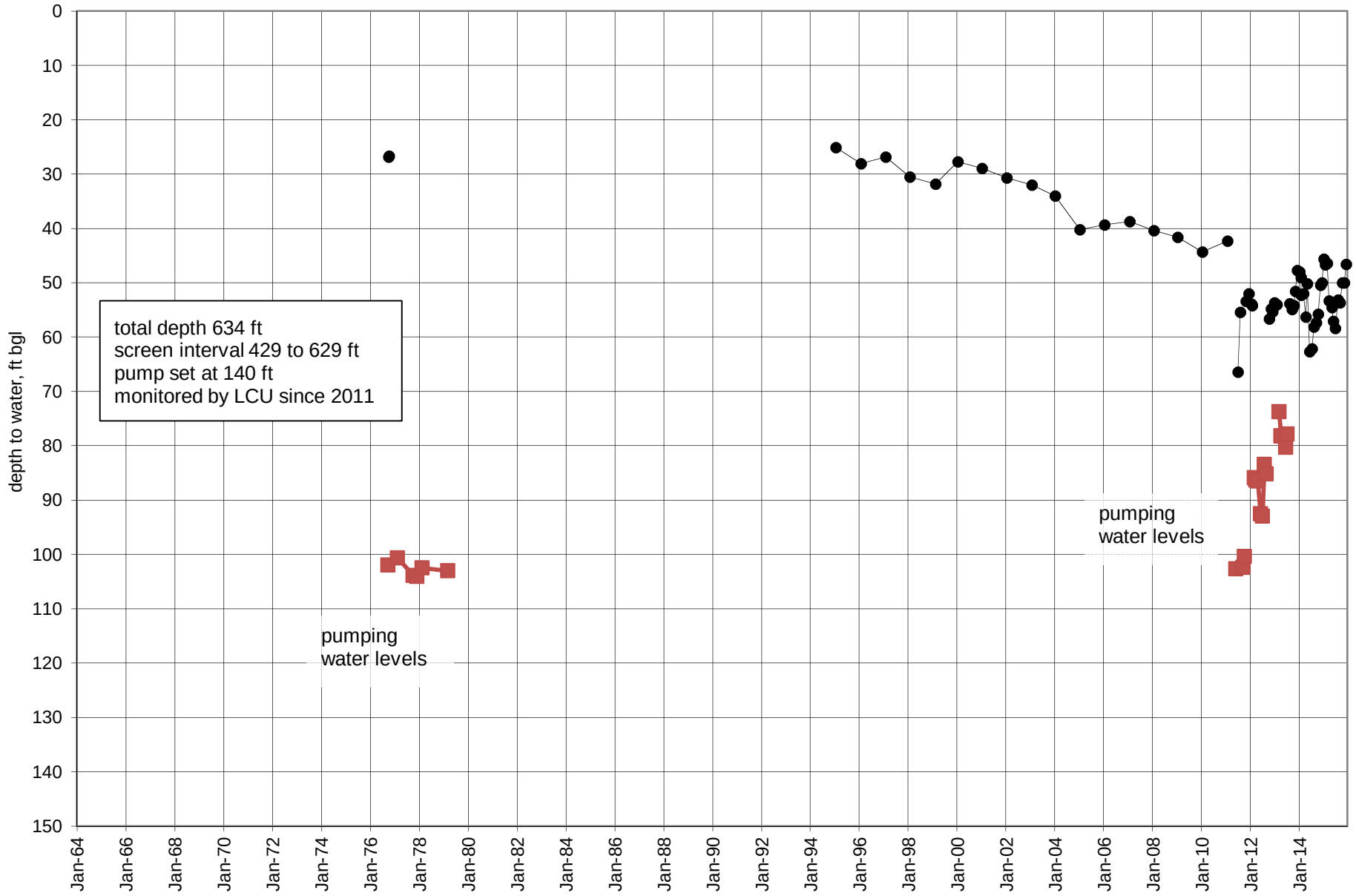

Figure E14. Groundwater hydrograph for USGS-monitored Well 321827106473501 (Las Cruces Well 29), T23S.R01E.13.411, Mesilla Basin, New Mexico.

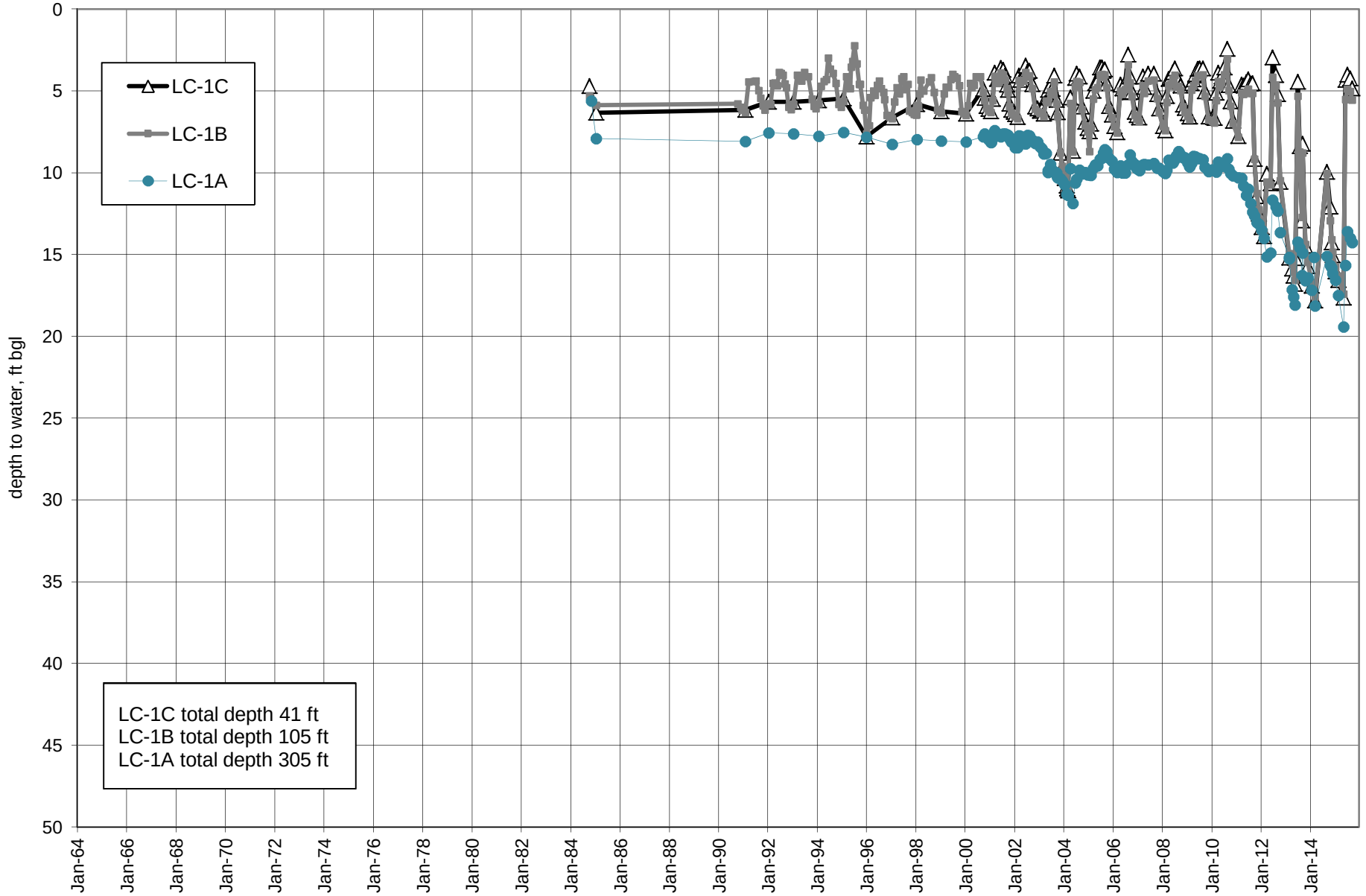

Figure E15. Groundwater hydrograph for USGS-monitored Well 321745106492501 (LC-1A), Well 321745106492502 (LC-1B), and Well 321745106492503 (LC-1C), T23S.R01E.22.232, Mesilla Basin, New Mexico.

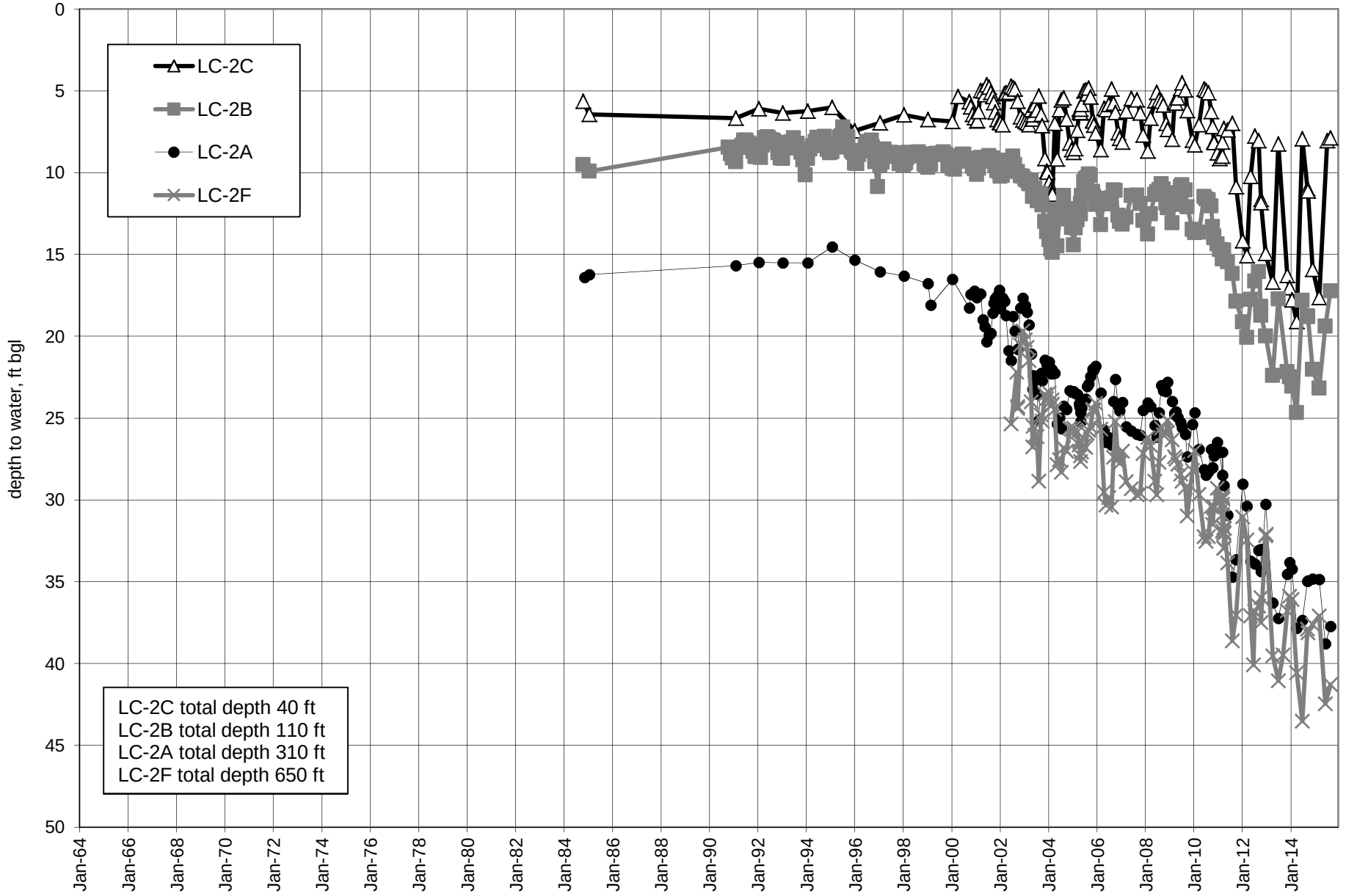

Figure E16. Groundwater hydrograph for USGS-monitored Well 321745106492101 (LC-2A), Well 321745106492102 (LC-2B), Well 32174510649103 (LC-2C), and Well 32174510649106 (LC-2F), T23S.R01E.22.241, Mesilla Basin, New Mexico.

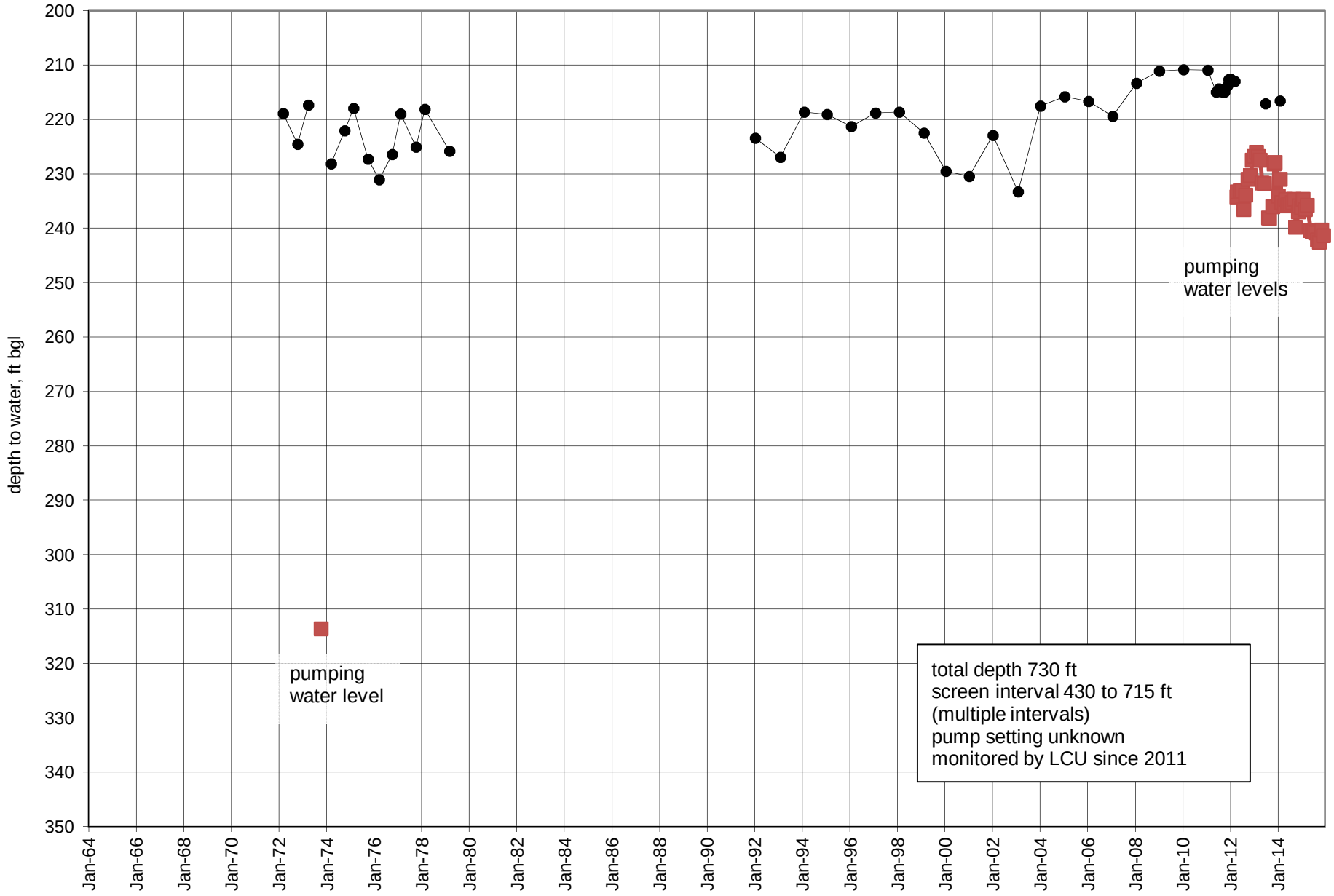

Figure E17. Groundwater hydrograph for USGS-monitored Well 321853106452101 (Las Cruces Well 27), T23S.R02E.08.443, Mesilla Basin, New Mexico.

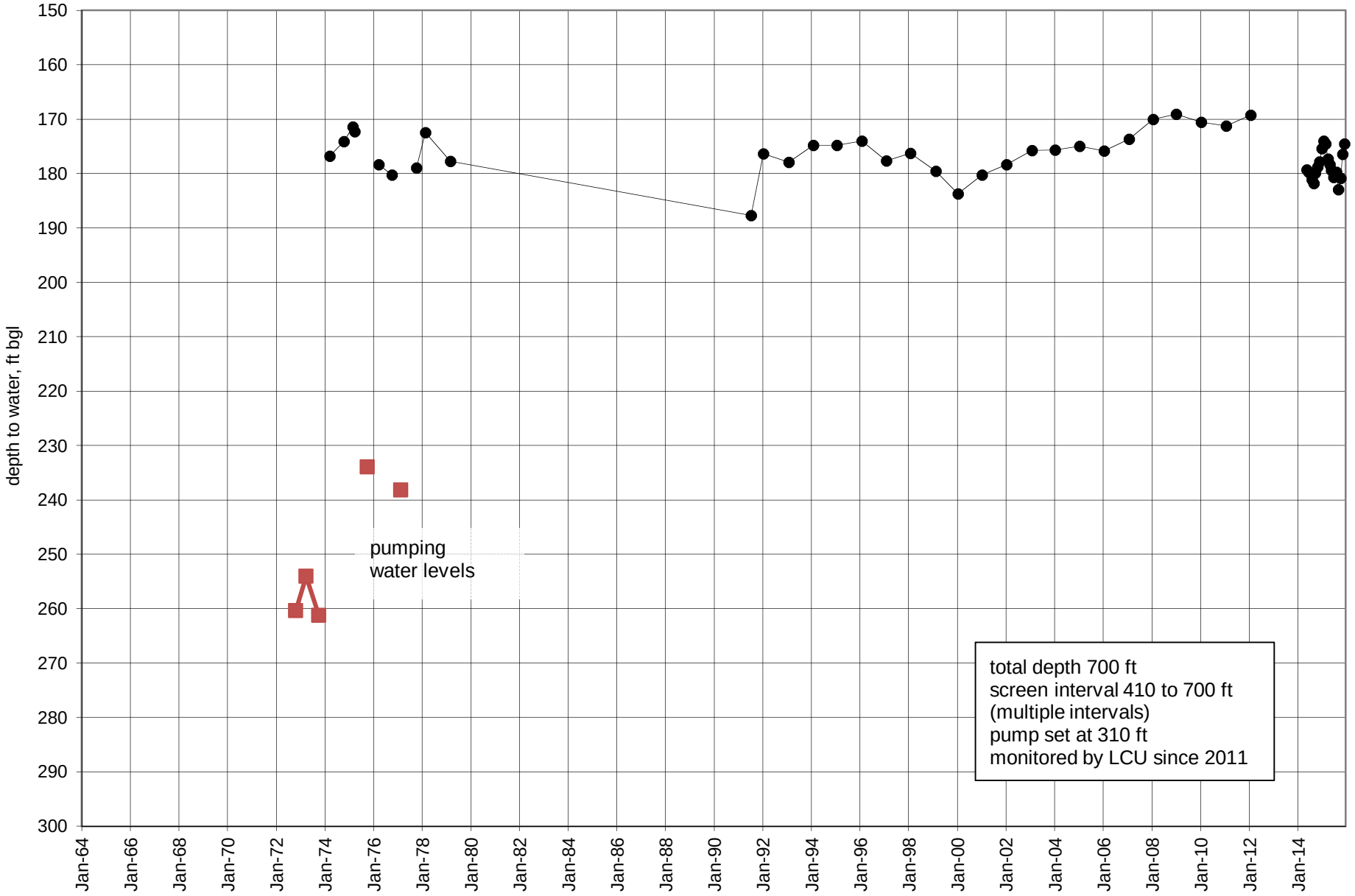

Figure E18. Groundwater hydrograph for USGS-monitored Well 321832106451301 (Las Cruces Well 26), T23S.R02E.17.243, Mesilla Basin, New Mexico.

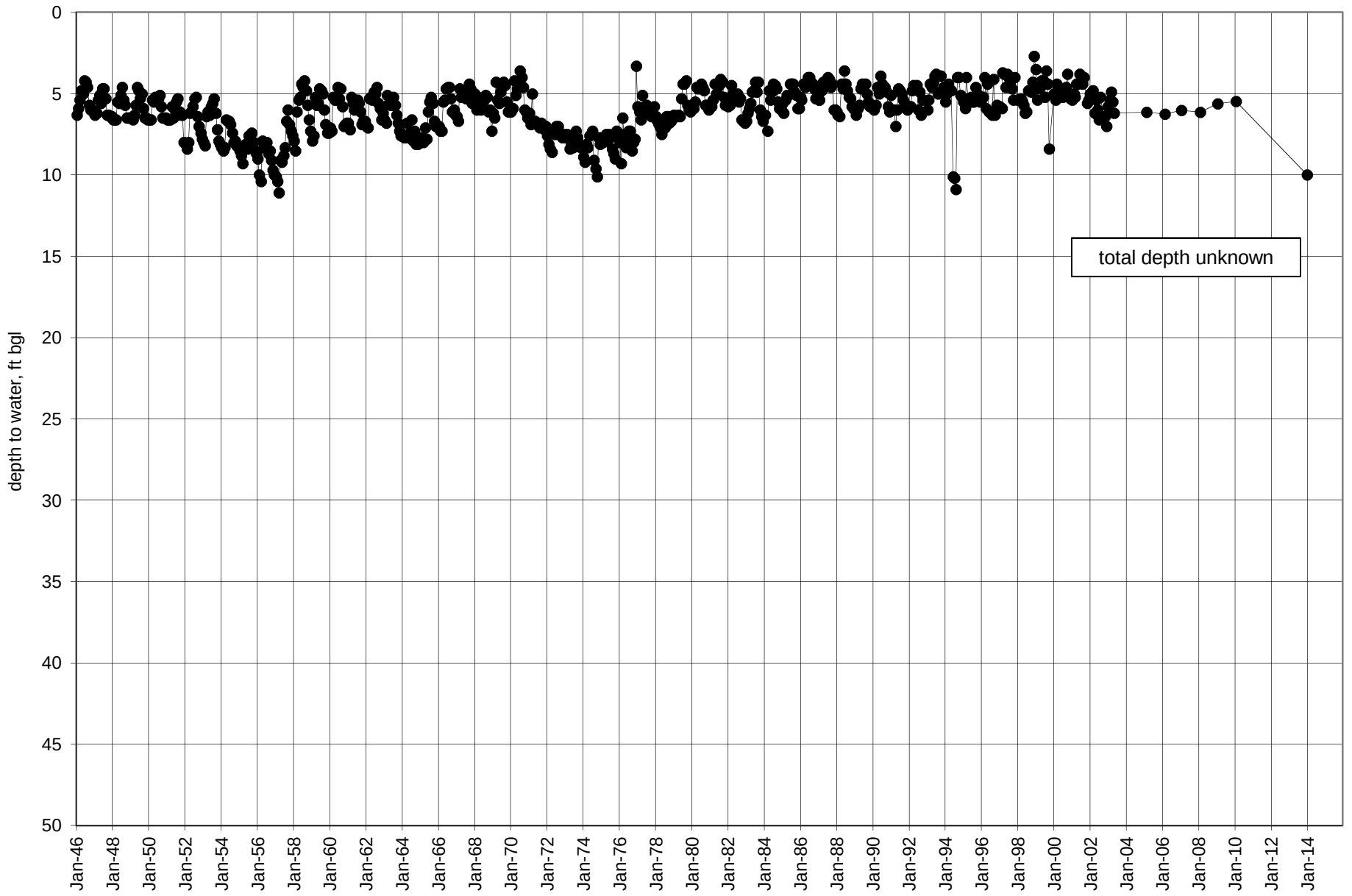

Figure E19. Groundwater hydrograph for USGS-monitored Well 321619106495801 (USBR-11), T23S.R01E.27.334, Mesilla Basin, New Mexico.

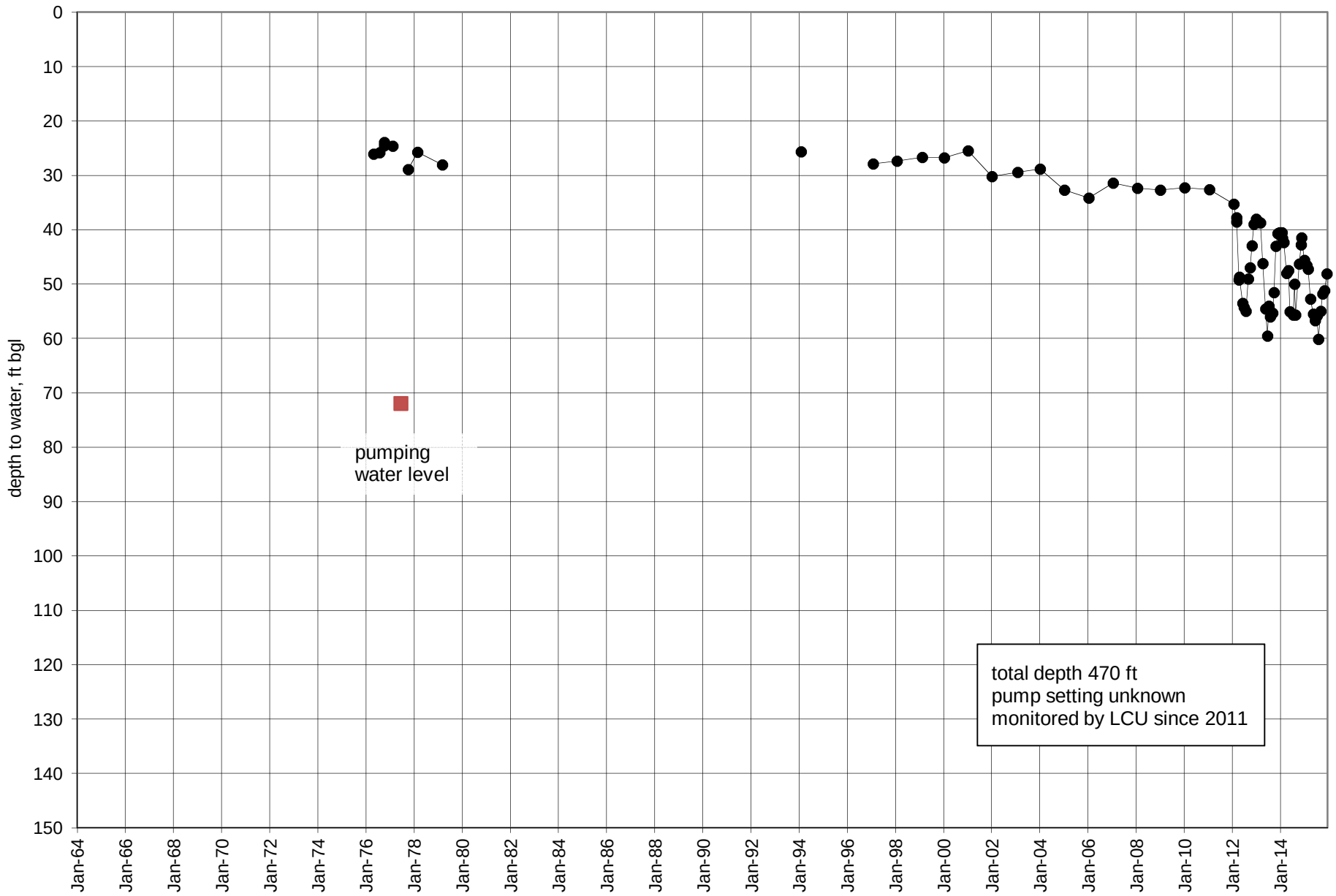

Figure E20. Groundwater hydrograph for USGS-monitored Well 321624106460201 (Las Cruces Well 30), T23S.R02E.29.331, Mesilla Basin, New Mexico.

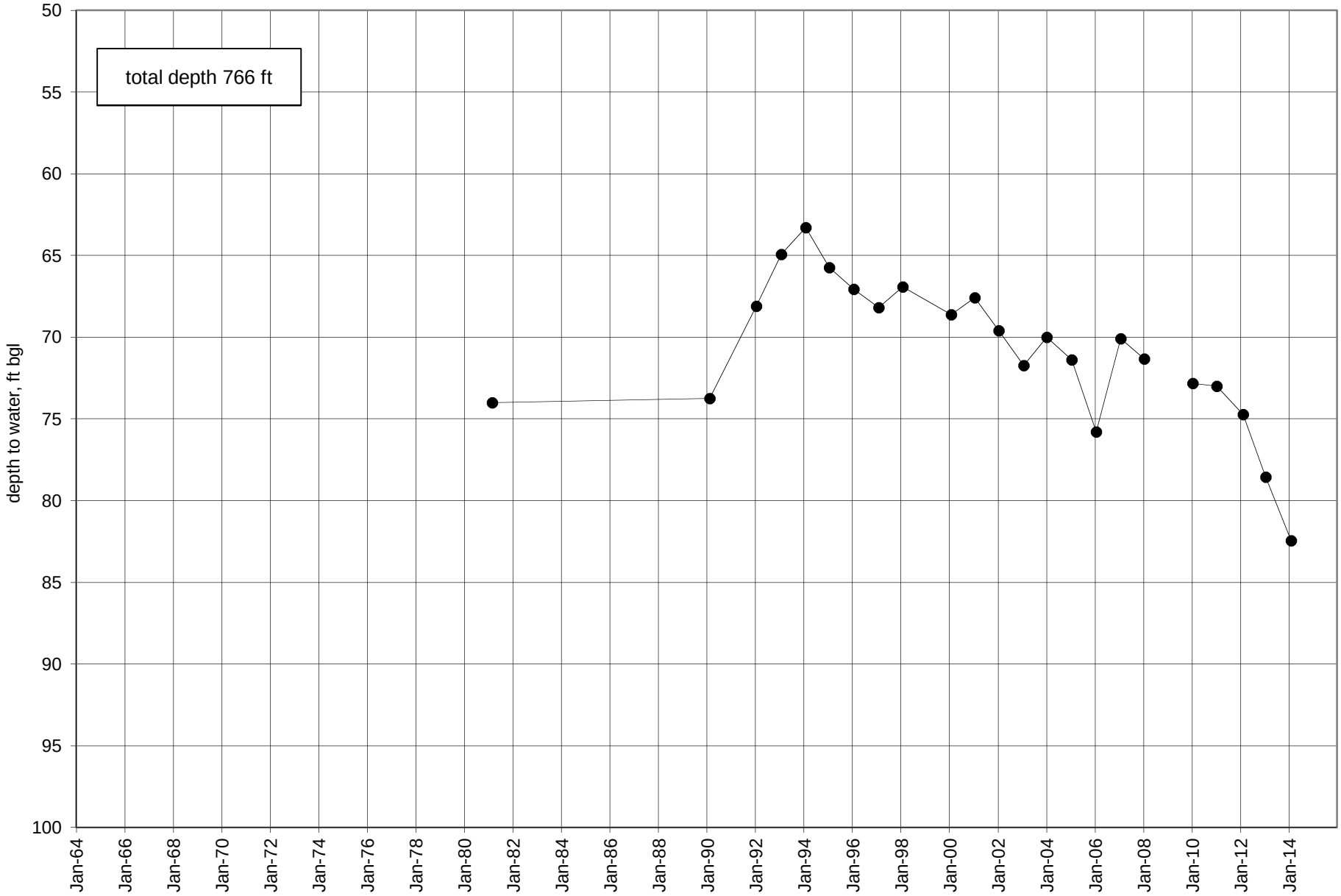

Figure E21. Groundwater hydrograph for USGS-monitored Well 321628106451501 (NMSU Well 10), T23S.R02E.29.441, Mesilla Basin, New Mexico.

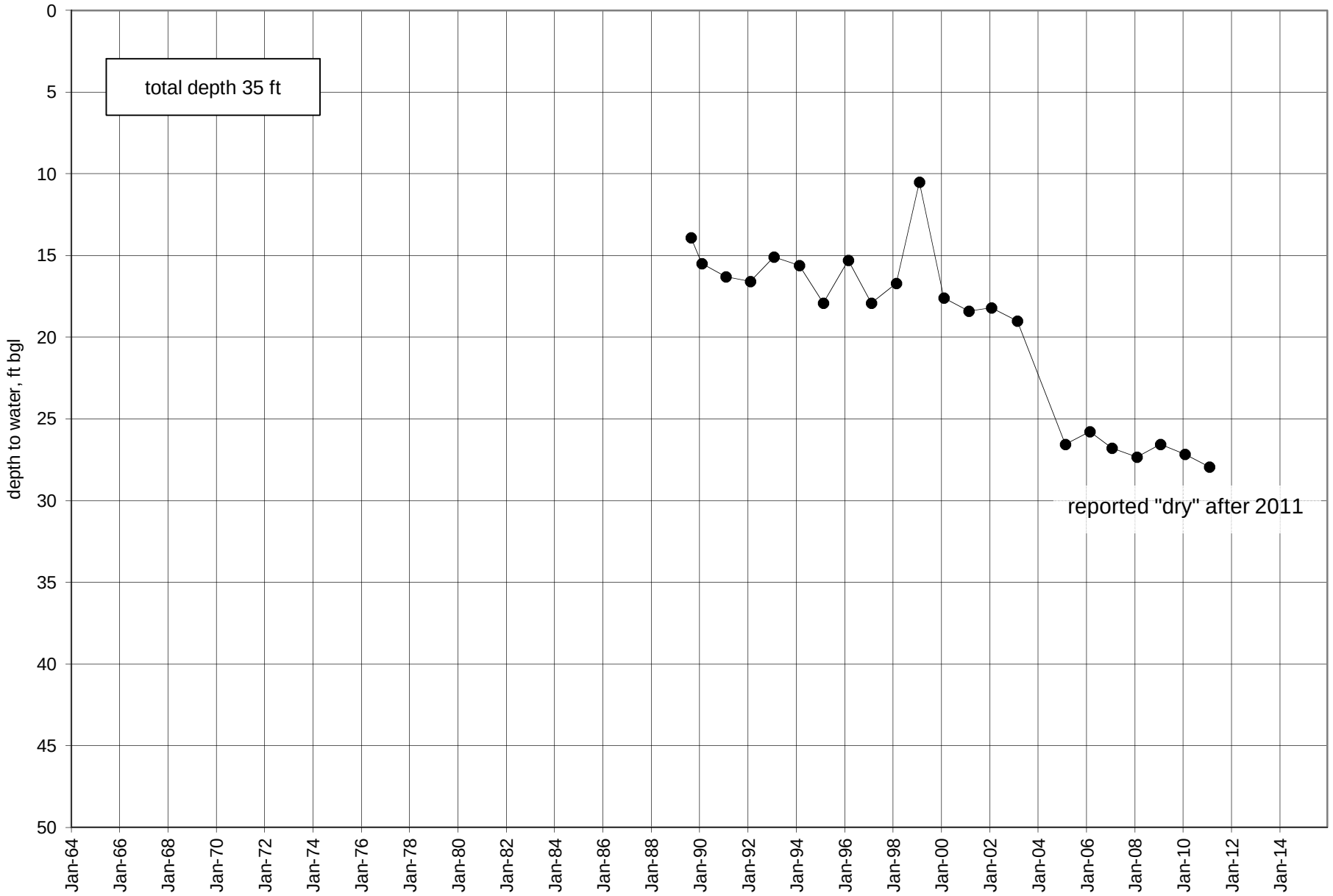

Figure E22. Groundwater hydrograph for USGS-monitored Well 321518106471701 (USBR-46), T24S.R01E.01.223, Mesilla Basin, New Mexico.

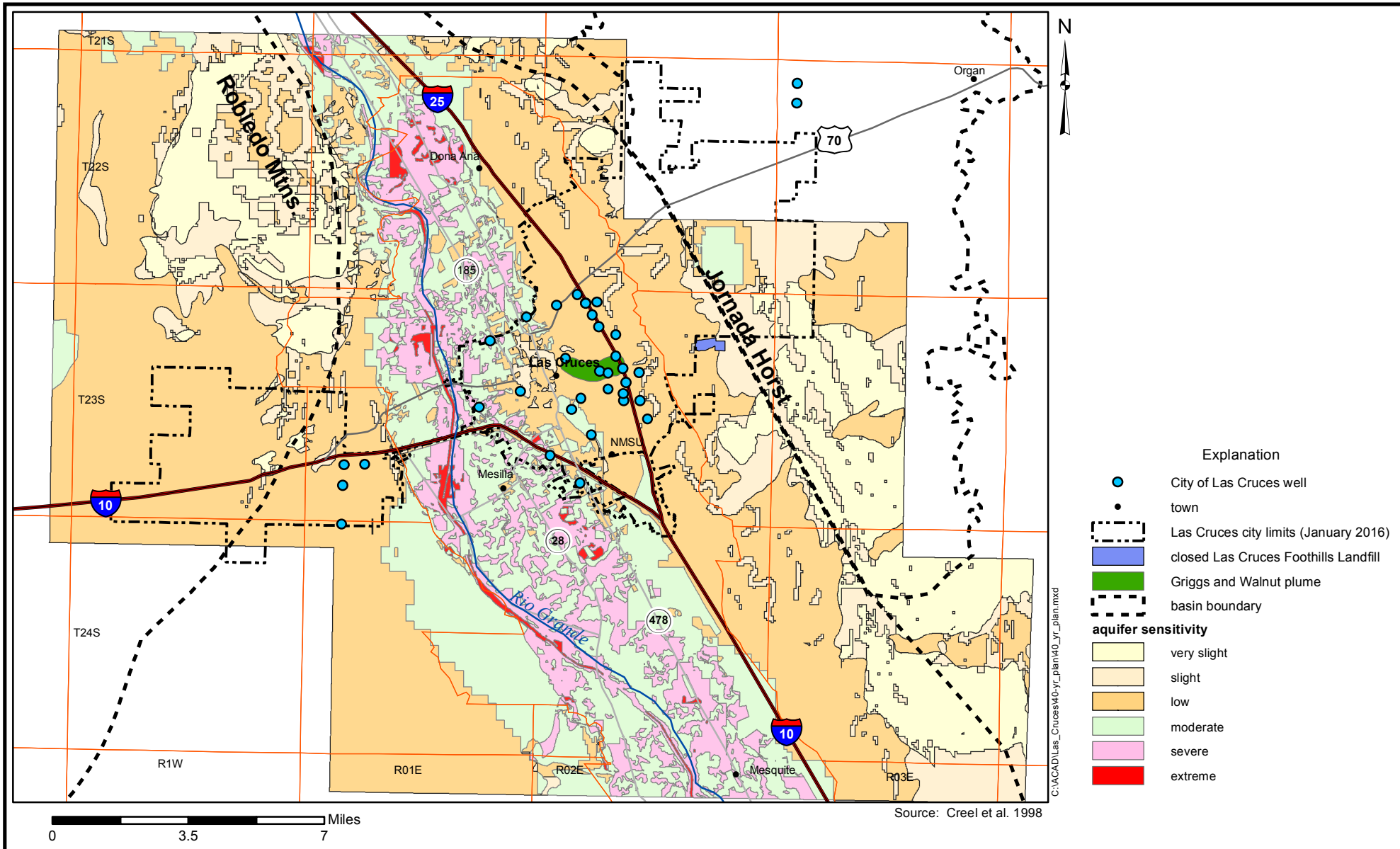

Figure E23. Map of the Las Cruces area showing City of Las Cruces wells, the closed Las Cruces Foothills Landfill, the Griggs and Walnut contamination plume, and aquifer sensitivity.

Appendix F.

Background Hydrogeology of the Jornada del Muerto Basin

APPENDIX F.

BACKGROUND HYDROGEOLOGY OF THE JORNADA DEL MUERTO BASIN

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Albuquerque, New Mexico 87107
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APPENDIX
F. BACKGROUND HYDROGEOLOGY OF THE JORNADA DEL MUERTO BASIN

The East Mesa area of Las Cruces is in the Jornada del Muerto Basin, which is a north-south-trending basin that covers about 3,344 mi^2 in Doña Ana County and Sierra County. The Jornada del Muerto Basin is bounded on the east by the San Andres Mountains and Organ Mountains and on the west and southwest by the Caballo, San Diego, and Doña Ana Mountains, and the Jornada Horst (Fig. F1). The southern termination of the Jornada del Muerto Basin is near Fillmore Arroyo, southeast of Las Cruces. As with the Mesilla Basin, the faults bounding the Jornada del Muerto Basin are related to the Rio Grande Rift. In the southern part of the Jornada del Muerto Basin near Las Cruces, the basin is bounded on the east by a steeply-dipping normal fault along the front of the Organ Mountains, and on the west by the Jornada Horst. As with the Mesilla Basin, the Quaternary- to Tertiary-age Santa Fe Group is the major water-bearing unit in the Jornada del Muerto Basin. The surrounding and underlying bedrock is much less permeable. Figure F2 presents a geologic map of the southern Jornada del Muerto and Mesilla Basins, and Figure F3 presents a west-east geologic cross-section through the Las Cruces area in the Jornada del Muerto and Mesilla Basins. Depth to groundwater in the Jornada del Muerto Basin typically ranges from 300 ft to 560 ft (Figs. F4 through F9).

In the Jornada del Muerto Basin, the Santa Fe Group has been described in terms of three units that were deposited in different ways (Shomaker and Finch, 1996; Hawley, 1984). The Lower Santa Fe Group consists of alluvial, eolian, playa-lake, and basin-floor sand and clay beds that are less permeable than the Middle and Upper Santa Fe Group sediments, with a total thickness of 1,000 ft or less. The Middle Santa Fe Group consists of alluvial, eolian, playa-lake, basin-floor, and alluvial fan sand and clay beds that are less permeable than the Upper Santa Fe Group due to a greater degree of cementation (Hawley et al., 2001), with a total thickness of about 1,300 ft. The Upper Santa Fe Group consists of interbedded alluvial fan sand and gravel with relatively high permeability, and a total saturated thickness of 100 to 160 ft. The Santa Fe Group is thickest in the south-central part of the Jornada del Muerto Basin, north of Highway 70 and about 5 miles west of Organ, New Mexico (Fig. F2), reaching a total saturated thickness of over 2,000 ft (Shomaker and Finch, 1996).

A summary of aquifer characteristics for the Santa Fe Group in the Jornada del Muerto Basin is presented as Table F1. In the Santa Fe Group, the main aquifer is the combined Upper and Middle Santa Fe Group, with a total saturated thickness of less than 250 to 1,000 ft. Hydraulic conductivities range from 10 to 54 feet per day (ft/d) (Table F1; Wilson et al., 1981). As in the Mesilla Basin, hydraulic conductivity within the Santa Fe Group decreases with depth, and many thin horizontal clay layers impede the vertical movement of groundwater.

Table F1. Summary of aquifer characteristics for the Rio Grande alluvium and Santa Fe Group in the Mesilla Basin and Jornada del Muerto Basin

aquifer, basin	saturated thickness, ft	well yield, gpm	hydraulic conductivity, ft/day	specific yield or storage coefficient, dimensionless	transmissivity of aquifer in wells, ft^2/day	transmissivity of aquifer, ft^2/day	specific capacity, gpm/ft
Rio Grande alluvium, Mesilla Basin	40 to 100	500 to > 2,500 [a]	100 to 350 [b]/ 94 [d]	0.2 [d]	12,600 to 15,200 [a]	3,760 to 35,000 [h]	59 [d] 10 to 217 [a]
Santa Fe Group, Mesilla Basin	1,500 to 2,500 [e]	500 to > 2,500 [a]	11 to 67 [f]	0.2 [d]/ 0.0004 [i]	2,700 to 19,300 [a, e]	16,500 to 167,500 [h]	20 to >100 [a]
Santa Fe Group, Jornada del Muerto Basin	< 250 to 1,000	480 to 1,160 [a]	10 to 54 [a]	0.2 [d]/ 0.0004 [i]	5,000 to 15,000 [a]	< 2,500 to 54,000 [h]	20 to >100 [a]

[a] Wilson et al., 1981
[b] Hamilton and Maddock, 1993
[d] specific yield for model layer 1, Frenzel and Kaehler (1990)
[e] Weeden and Maddock, 1999
[f] Frenzel, 1992
[h] multiplied saturated thickness of aquifer by hydraulic conductivity
[i] storage coefficient for model layer 2, Frenzel and Kaehler (1990)
gpm - gallons per minute
gpm/ft - gallons per minute per foot

F.1 Groundwater-Level Monitoring in the Jornada del Muerto Basin

Las Cruces Utilities measures water levels in a number of monitoring wells in the Jornada del Muerto Basin in the Las Cruces area. Figure F4 shows locations of selected monitor wells in the Jornada del Muerto Basin, and Figures F5 through F9 are hydrographs for the selected monitor wells. These wells were chosen based on periods of record that extend to within 5 years of the present. Water-level trends in the Quaternary- to Tertiary-age Santa Fe Group sediments of the Jornada del Muerto Basin are discussed below and summarized in Table F2. Hydrographs for Jornada del Muerto Basin wells completed in the Santa Fe Group to the northeast of Las Cruces generally show declining trends.

F.2 Groundwater-Flow Patterns in the Jornada del Muerto Basin

Currently, the general direction of groundwater flow in the southern Jornada del Muerto Basin is west to southwest. Historically, the groundwater-flow direction in the southern Jornada del Muerto Basin was to the west and southwest, toward the Rio Grande.

The gradient is steepest in the mountains, and becomes very gradual in the flat part of the valley. As in the Mesilla Basin, the regional flow pattern is interrupted by cones of depression, in this case along the Highway 70 corridor of residential and commercial development between Organ and Las Cruces. Natural discharge from the basin occurs as groundwater flow across the western boundary of the basin, and was estimated by Shomaker and Finch (1996) to be 2,860 ac-ft/yr.

F.3 Recharge in the Jornada del Muerto Basin

Recharge to the southern Jornada del Muerto Basin occurs as mountain-front recharge, sub-surface groundwater inflow, and geothermal upwelling. A recharge rate of about 5,200 ac-ft/yr has been calculated for the southern part of the basin (Shomaker and Finch, 1996). A substantial portion of that recharge was inflow from the northern part of the Jornada del Muerto Basin, where much of it quickly flows into the Rio Grande and is removed from the aquifer before it reaches well fields in the southern part of the basin near Organ and Butterfield Park. Groundwater flowing from the northern part of the Basin into the part near Las Cruces was estimated to be about 1,329 ac-ft/yr (Shomaker and Finch, 1996). About 59 ac-ft/yr has been estimated to flow upward into the Santa Fe Group in the Basin from geothermal vents at the base of the Santa Fe Group.

Table F2. Summary of water-level trends in selected groundwater-level monitoring wells in the Las Cruces area, Jornada del Muerto Basin

well ID No.	T.R.S.qqq	period of record	number of measurements	minimum depth to water for period of record, ft	maximum depth to water for period of record, ft	general trend
USGS 322411106422801	22S.2E.11.344	1984 to 2012	11	318.4	373.3	decline since 1984
CLC Shallow	22S.2E.1	2010 to 2015	>21,000 (transducers recording hourly)	385.1	393.2	slight decline between 2011 and 2012; stable 2012 to 2015
CLC Middle	22S.2E.1	2010 to 2015		385.1	392.4	
CLC Deep	22S.2E.1	2010 to 2015		385.1	392.3	
CLC Well 41 (LRG-3289)	22S.3E.6	2011 to 2015	55	443.7	469.0	decline since 2012
CLC Well 43 (LRG-430-S-30)	21S.3E.32	2011 to 2015	55	509.5	553.8	decline since 2012
CLC Well 68 (LRG-3290)	22S.2E.2	2011 to 2015	53	343.5	368.0	decline since 2011

T.R.S.qqq - township, range, section, quarter (1/4), quarter (1/16), quarter (1/64)
USGS - U.S. Geological Survey

F.4 Groundwater Quality in the Jornada del Muerto Basin

A review of USGS groundwater-quality data indicates that total dissolved solids (TDS) concentrations in the southern part of the Jornada del Muerto Basin ranged from 191 to 1,560 mg/L, and specific conductance values from 274 to 2,480 μmhos/cm, for samples taken between 1948 and 1976. The wide range of TDS concentrations in the Jornada del Muerto Basin reflects the presence of pockets of brackish to saline (TDS of 10,000 mg/L or more) groundwater along faults, where deep water flows upward, and pockets of very fresh groundwater in recharge zones near arroyos.

Nitrate concentrations exceeding the New Mexico Environment Department, Drinking Water Bureau (NMED/DWB) standard of 10 mg/L have been measured in the Organ water-supply wells, as well as other wells in the Organ and Butterfield Park areas (Terracon, 2003; Daniel B. Stephens & Associates, Inc., 1996).

F.4.1 City of Las Cruces Wells

In 1988, John Shomaker & Associates, Inc. (JSAI) measured water quality from several depth intervals in Las Cruces municipal Well 40, located on the East Mesa (Table F3). TDS concentration increased with depth, with a TDS concentration of 652 mg/L in the 730 to 750 ft depth interval, and a TDS concentration of 9,187 mg/L in the 1,850 to 1,870 ft depth interval. Potable water (TDS concentration less than 1,000 mg/L) was found in all samples above 1,130 ft, and the screen was set in the interval from 661 to 1,150 ft.

Groundwater-quality data for Las Cruces city wells in the Jornada del Muerto Basin indicate relatively good water quality, and are summarized in Table F4. The locations of the wells are shown on Figure F5.

F.4.2 Las Cruces Landfill

The closed Las Cruces Foothills Landfill on Las Cruces' East Mesa (Fig. F10) has nine groundwater monitoring wells that straddle the boundary between the Mesilla and Jornada del Muerto Basins. A sub-set of these wells are sampled semi-annually. Tetrachloroethene (PCE) has persisted in several of the landfill monitoring wells, at concentrations above the NMED Groundwater Protection Standard (GWPS) of 0.005 mg/L, since 1999. Methylene chloride has persisted in one of the landfill monitoring wells at concentrations above the GWPS of 0.005 mg/L, since 2007.

Table F3. Results of 1988 groundwater quality analyses for Las Cruces Well 40, T.22S., R.3E., Section 6.4333 (Shomaker, 1989)

constituent	units	730 to 750 ft bgl sample	910 to 930 ft bgl sample	1,110 to 1,130 ft bgl sample	1,590 to 1,610 ft bgl sample	1,850 to 1,870 ft bgl sample	completed well, sampled after 48-hour pumping test	NMED/ DWB standard
sodium	mg/L	77.7	62.4	102.7	485.8	1,261.8	33.7	ns
potassium	mg/L	<0.1	<0.1	<0.1	4.7	23.5	<0.1	ns
total hardness	mg/L	246	211	104	675	4,241	242	ns
calcium	mg/L	65.3	60.7	23.5	177	1,219.8	71.1	ns
magnesium	mg/L	20.2	14.4	11.0	56.6	291.1	15.7	ns
iron (total)	mg/L	4.24	1.28	1.94	0.36	0.09	0.16	0.31[1]
chloride	mg/L	51.8	32.5	29.9	569.7	3,572.5	13.5	250[1]
fluoride	mg/L	0.64	0.53	0.87	1.46	0.91	0.42	2.0[1]
nitrate	mg/L	0.68	0.82	0.47	0.67	0.04	0.95	10
sulfate	mg/L	155.7	139.6	67.1	796.1	1,712.5	138.5	250[1]
TDS	mg/L	652	514	450	2,509	9,187	395	500[1]
arsenic	mg/L	0.002	<0.001	0.004	0.003	<0.001	0.003	0.01
barium	mg/L	0.06	0.05	0.03	0.25	0.14	0.03	2
cadmium	mg/L	<0.005	<0.005	<0.005	<0.005	0.016	<0.005	0.005
chromium	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.1
lead	mg/L	0.020	0.008	0.010	<0.005	0.034	<0.005	0.015
mercury	mg/L	0.0002	<0.0002	<0.0002	0.0003	0.0003	0.0006	0.002
selenium	mg/L	<0.001	<0.001	<0.001	0.001	0.002	<0.001	0.05
silver	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.1[1]

[1] NMED/DWB secondary standard is a non-enforceable standard associated with aesthetic quality of water
NMED/DWB - New Mexico Environment Department, Drinking Water Bureau secondary standard
TDS - total dissolved solids
ft bgl - feet below ground level
mg/L - milligrams per liter
ns - no standard

Table F4. Summary of groundwater quality for the City of Las Cruces wells in the Jornada del Muerto Basin

parameter	unit	time period	Jornada del Muerto Basin City wells sampled	concentration range	summary	NMED/DWB standard
total dissolved solids (TDS)	mg/L	1989, 1994, 2010 to 2012	40, 68, 69, 72	211 to 395	below NMED/DWB secondary standard	500[1]
sulfate	mg/L	1989, 1994, 2001, 2003, 2011, 2012	40-43, 68, 69, 72	44 to 146	below NMED/DWB secondary standard	250[1]
chloride	mg/L	1989 to 1994	40, 41, 42, 43, 68, 69	9 to 14	below NMED/DWB secondary standard	250[1]
fluoride	mg/L	1989 to 2014	40, 41, 42, 43, 68, 69, 72	0.23 to 0.88	below NMED/DWB secondary standard	2[1]
nitrate	mg/L	1989 to 2015	40, 41, 42, 43, 68, 69, 72	<1.0 to 1.9	below NMED/DWB standard	10
arsenic	mg/L	1989 to 2014	40, 41, 42, 43, 68, 69, 72	0.0014 to 0.0045	below NMED/DWB standard	0.01
cyanide	mg/L	1994 to 2014	40, 41, 42, 43, 68, 69, 72	<0.1	below detection limit	4
iron	mg/L	1989 to 2011	40, 41, 68, 69	<0.05 to 1.35	exceeded NMED/DWB secondary standard in Well 41 in 2 sampling events in 1992	0.3[1]
manganese	mg/L	1992 to 2011	40, 41, 68, 69	<0.05 to 0.72	exceeded NMED/DWB secondary standard in Well 41 in 3 sampling events in 1992	0.05[1]
copper	mg/L	1993, 2012	40, 72	<0.05	below detection limit	1.0[1]
lead	mg/L	1989 to 1993, 2012	40, 41, 72	<0.005	below detection limit	0.015
uranium	mg/L	2005	40, 41, 43	0.004 to 0.005	below NMED/DWB standard	0.03
gross alpha particles	pCi/L	2002 to 2013	40, 41, 42, 43, 68, 69, 72	0.5 to 5.6	below NMED/DWB standard	15
hardness	mg/L	1989 to 2003	40, 41, 42, 43, 68, 69, 72	60 to 416	moderately hard to very hard	ns
benzene	mg/L	1993 to 2015	40, 41, 42, 43, 68, 69, 72	<0.0005	below detection limit	0.005
tetrachloroethene (PCE)	mg/L	1993 to 2015	40, 41, 42, 43, 68, 69, 72	<0.0005	below detection limit	0.005

[1] NMED/DWB secondary standard is a non-enforceable associated with aesthetic quality of water

NMED/DWB - NM Environment Department, Drinking Water Bureau
pCi/L - picoCuries per liter
mg/L - milligrams per liter
ns - no standard available

F.4.3 Groundwater Contamination in the Jornada del Muerto Basin

Other sources of groundwater contamination in the area of the Jornada del Muerto Basin near Las Cruces include septic tanks and wells in the vicinities of Butterfield Park and Organ, Leaky Underground Storage Tank (LUST) sites, and the NASA White Sands Test Facility contamination plume. Many older wells are poorly constructed with leaky annular seals that allow groundwater contaminated by septic tanks to migrate downwards and contaminate deeper parts of the aquifer. There are two LUST sites in Organ on file with the New Mexico Environment Department, Petroleum Storage Tank Bureau (NMED/PSTB), both of which have "No Further Action" status. The NASA White Sands Test Facility contamination plume is a 4-mile-long plume of halogenated solvents and N-nitrosodimethylamine located about 18 miles northeast of Las Cruces. The contamination plume resulted from material test area releases during the 1960s and 1970s. The plume is monitored and remediated by a series of monitoring and interceptor wells.

F.4.4 Aquifer Sensitivity in the Jornada del Muerto Basin

Because the water table is fairly deep, typically 200 to 650 ft deep, in the Jornada del Muerto Basin, and there is no highly permeable floodplain alluvium, the aquifer is not as sensitive to contamination from LUSTs, septic tanks, landfills, or agricultural operations as it is in the Mesilla Basin. Creel et al. (1998) designated areas of slight and moderate aquifer sensitivity in the Jornada del Muerto Basin (Fig. F10). However, as mentioned in Section F.4.3, above, poorly-constructed wells in the Organ and Butterfield Park areas may provide conduits for contamination of the deeper aquifer by septic tanks.

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ILLUSTRATIONS

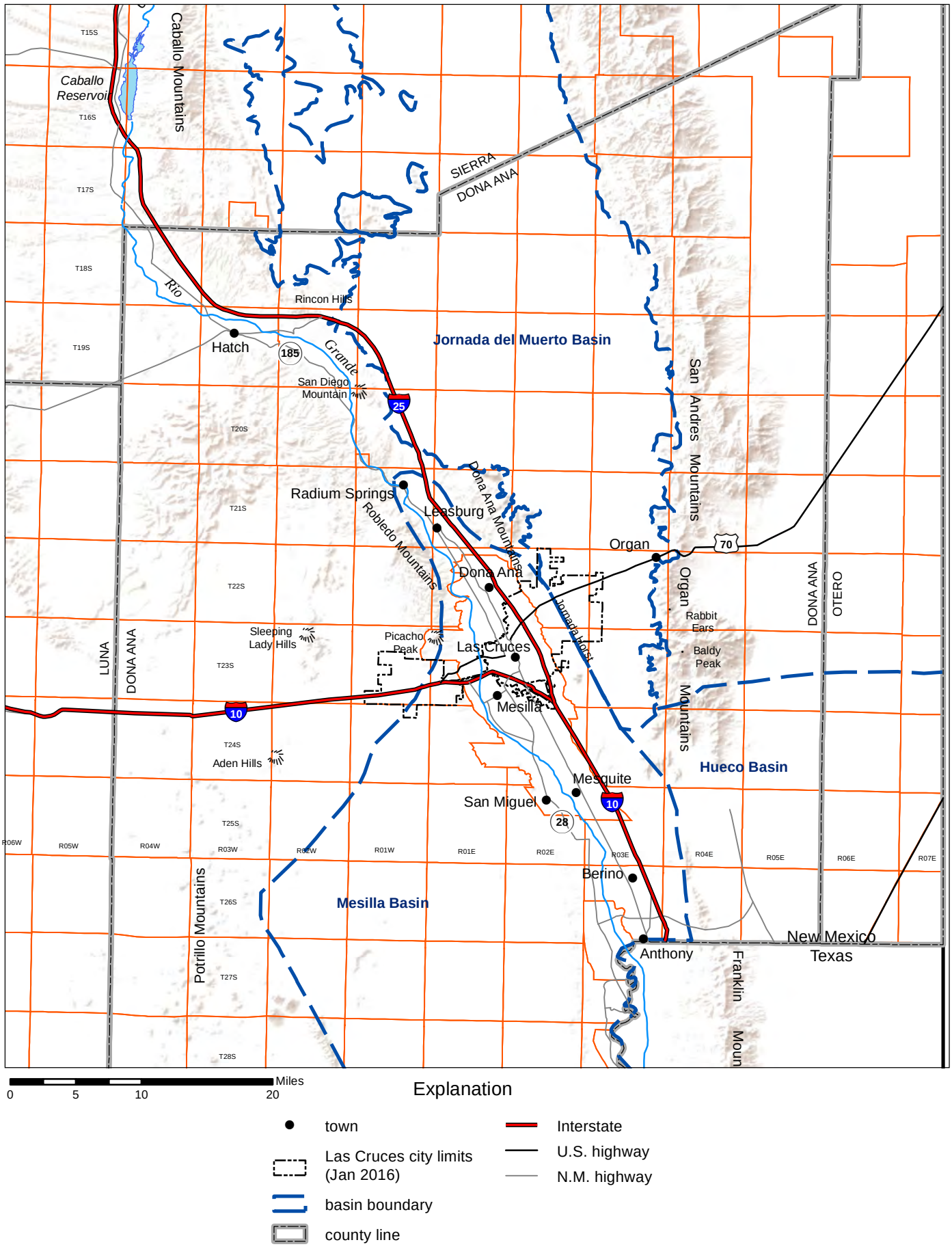

Figure F1. Map of the Mesilla Basin and southern part of the Jornada del Muerto Basin.

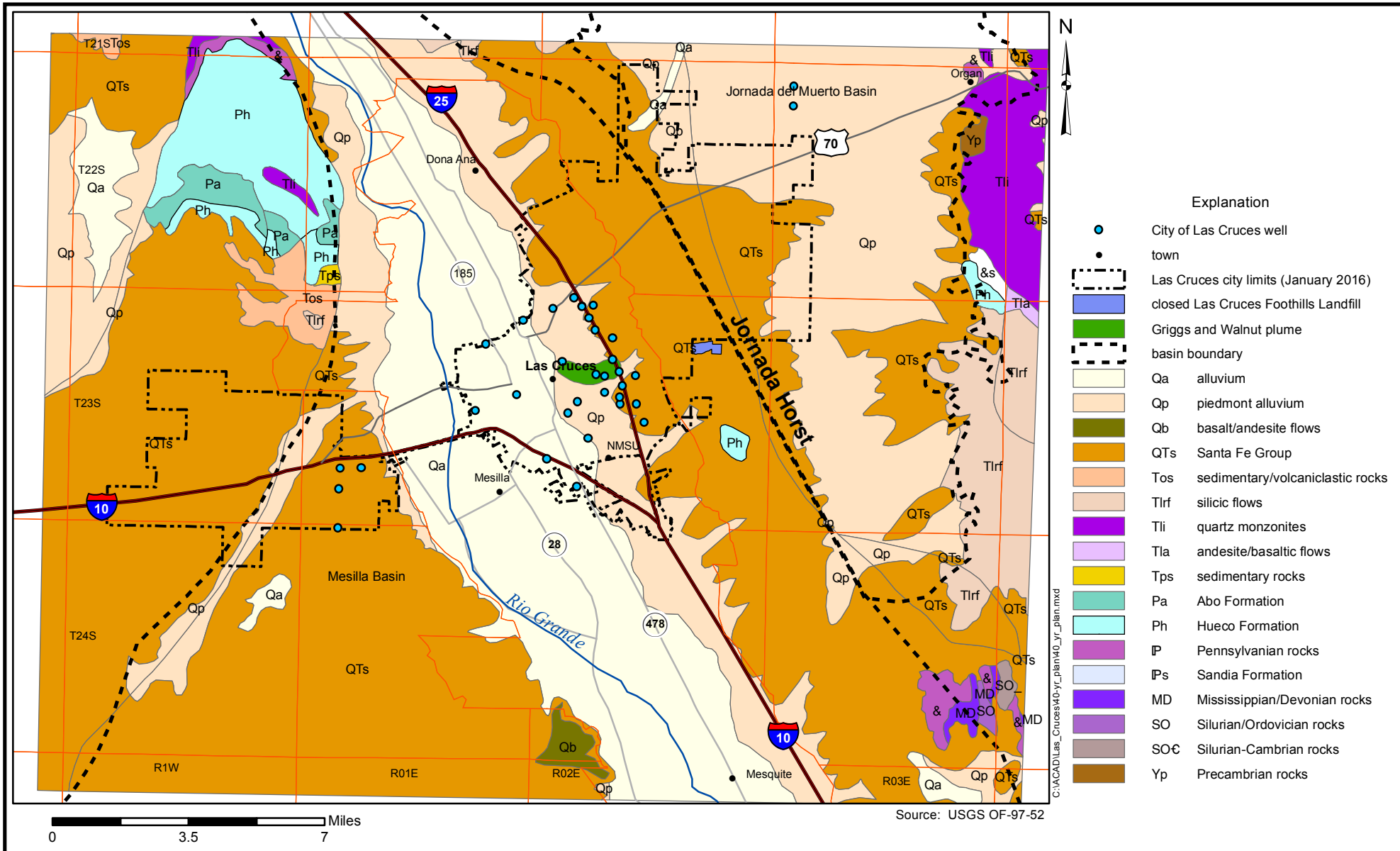

Figure F2. Geologic map of the northern part of the Mesilla Basin and southern part of the Jornada del Muerto Basin showing the Las Cruces city limits.

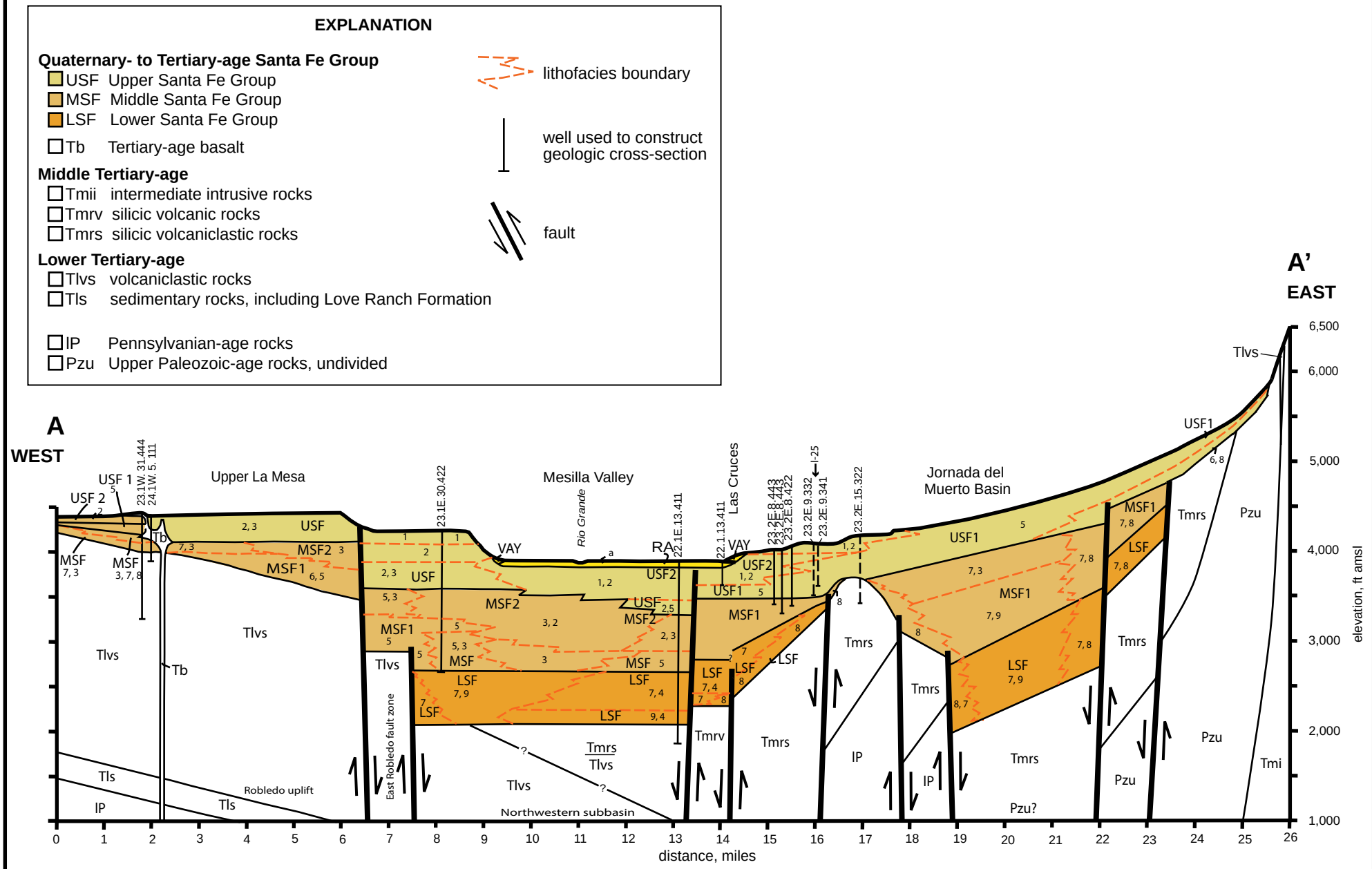

Figure F3. West-east hydrogeologic cross-section A-A' of the Las Cruces area (after cross-section E-E' of Hawley and Kennedy (2004).

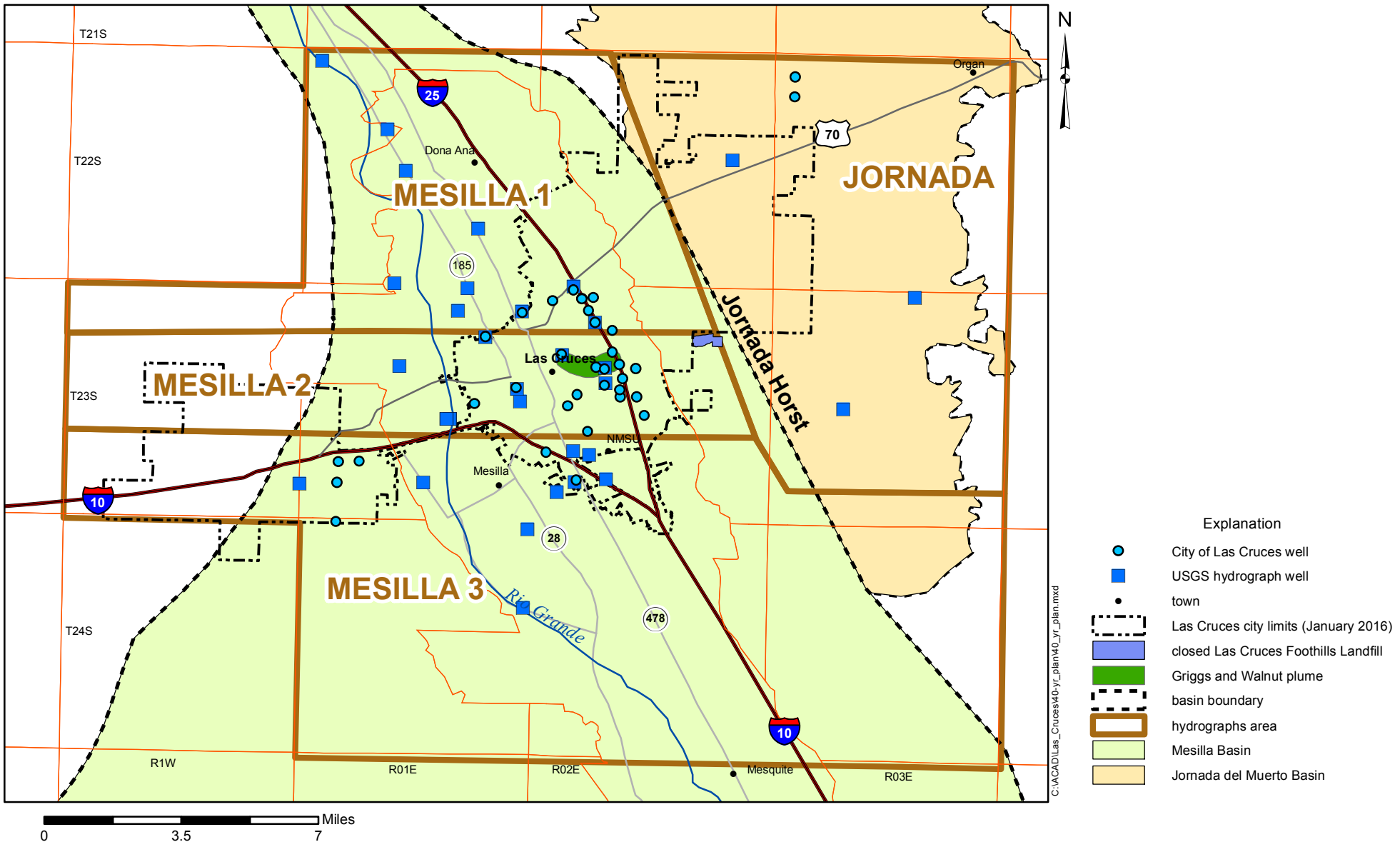

Figure F4. Map of the northern part of the Mesilla and southern part of the Jornada del Muerto Basins showing selected USGS groundwater monitoring wells, City of Las Cruces wells, Las Cruces city limits, and the four general areas for which groundwater hydrographs are described.

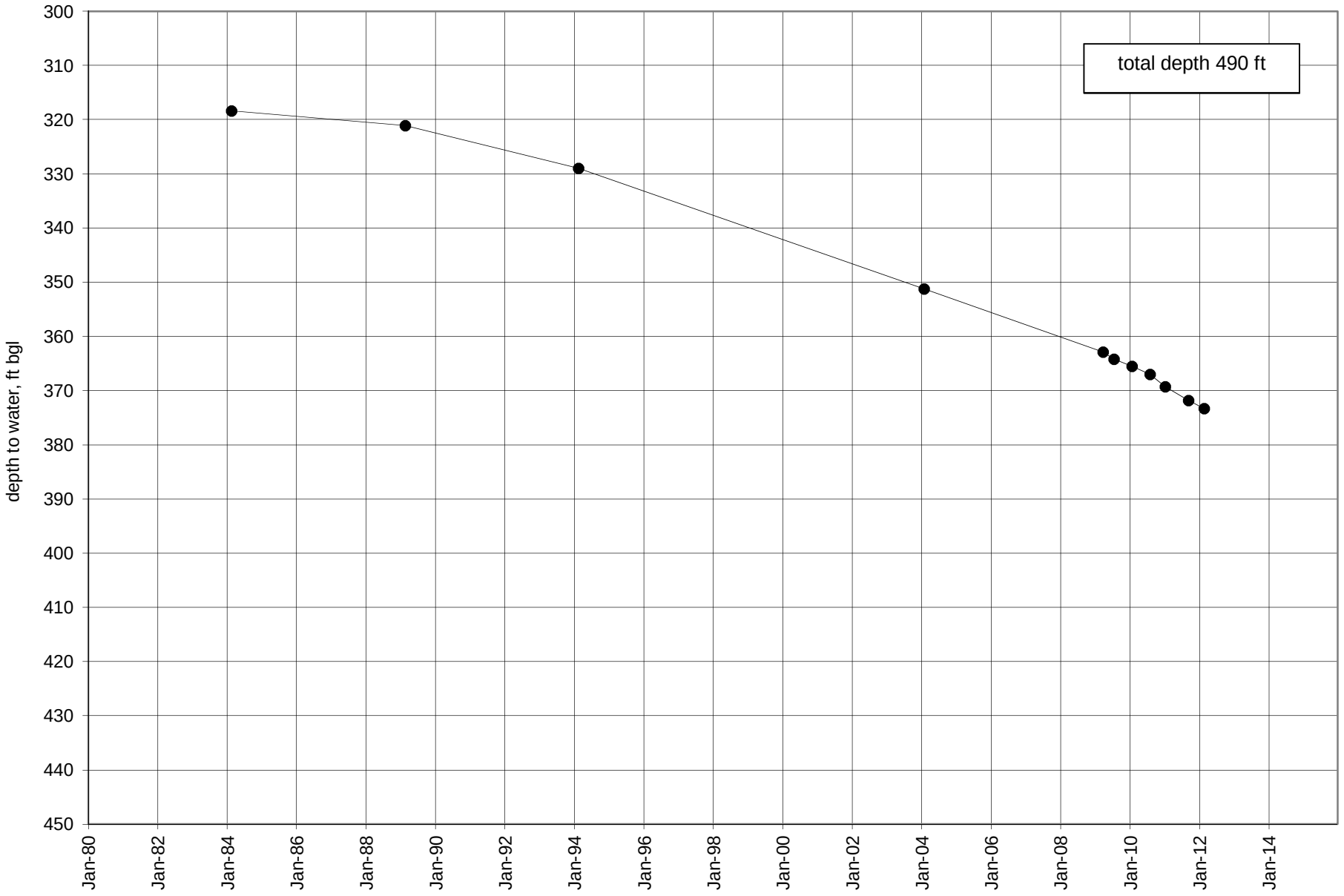

Figure F5. Groundwater hydrograph for USGS-monitored Well 322411106422801 (Well C), T22S.R02E.11.344, Jornada del Muerto Basin, New Mexico.

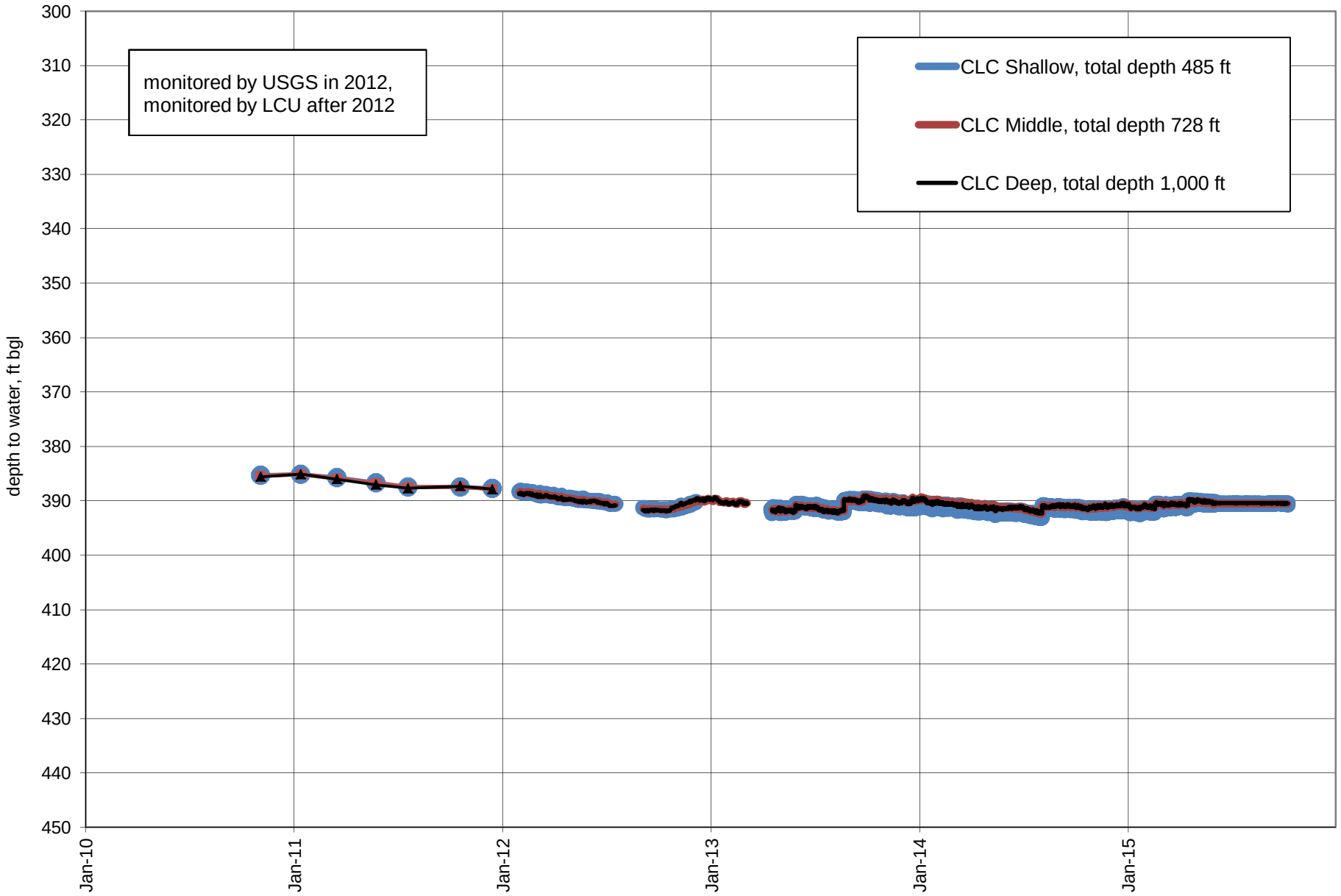

Figure F6. Groundwater hydrograph for Jornada piezometers (CLC Shallow, Middle, and Deep), Jornada del Muerto Basin, New Mexico.

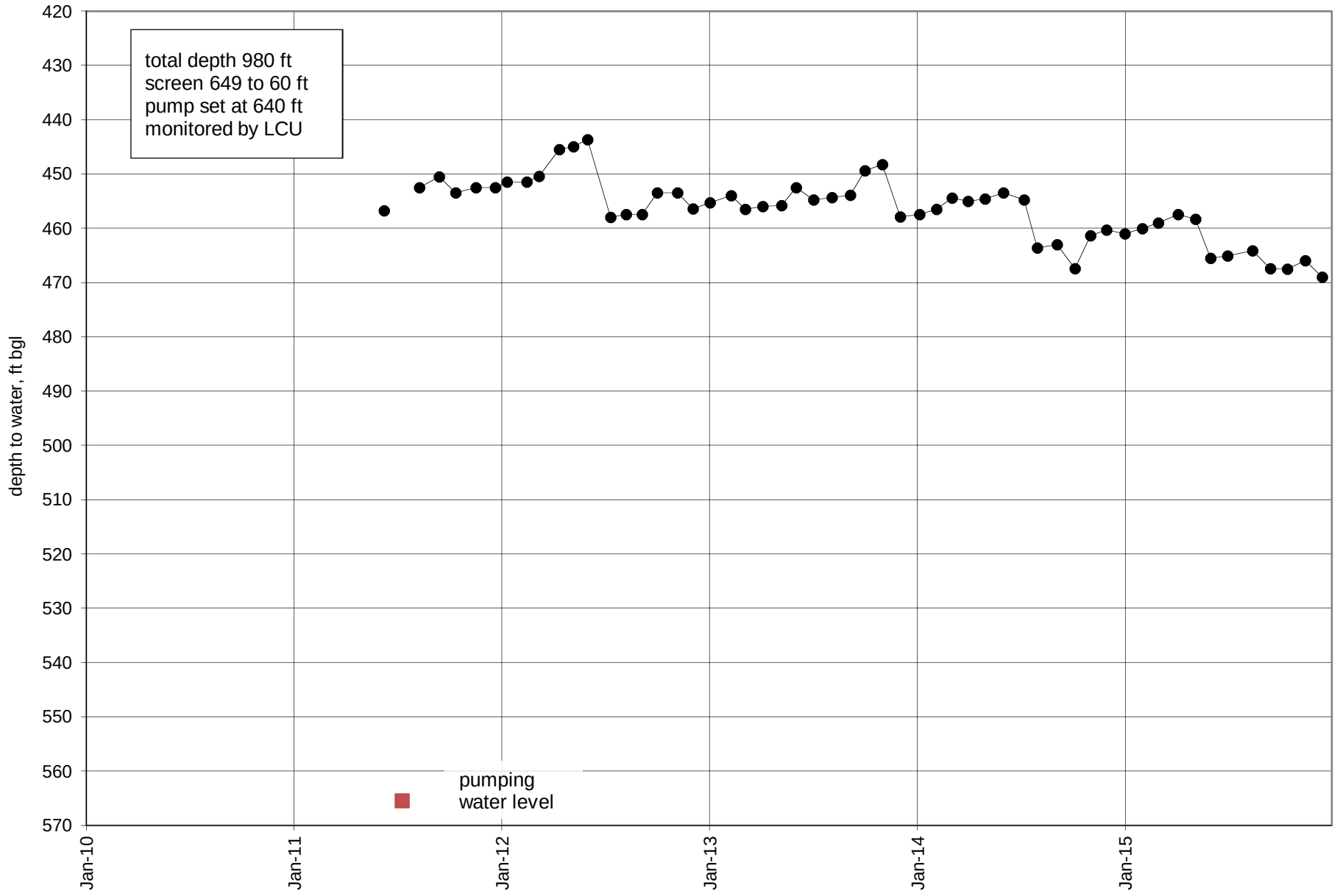

Figure F7. Groundwater hydrograph for CLC Well 41, Jornada del Muerto Basin, New Mexico.

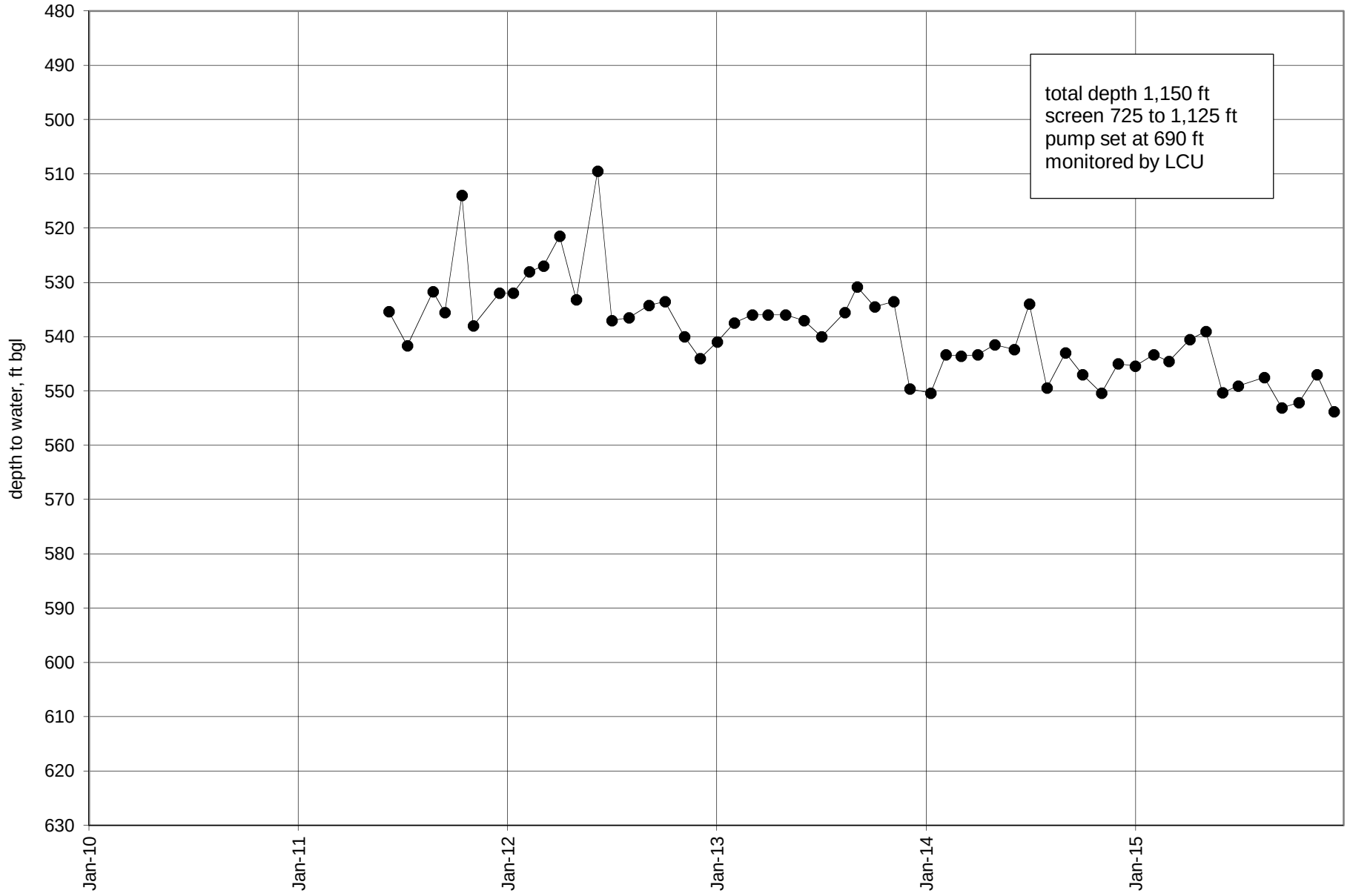

Figure F8. Groundwater hydrograph for CLC Well 43, Jornada del Muerto Basin, New Mexico.

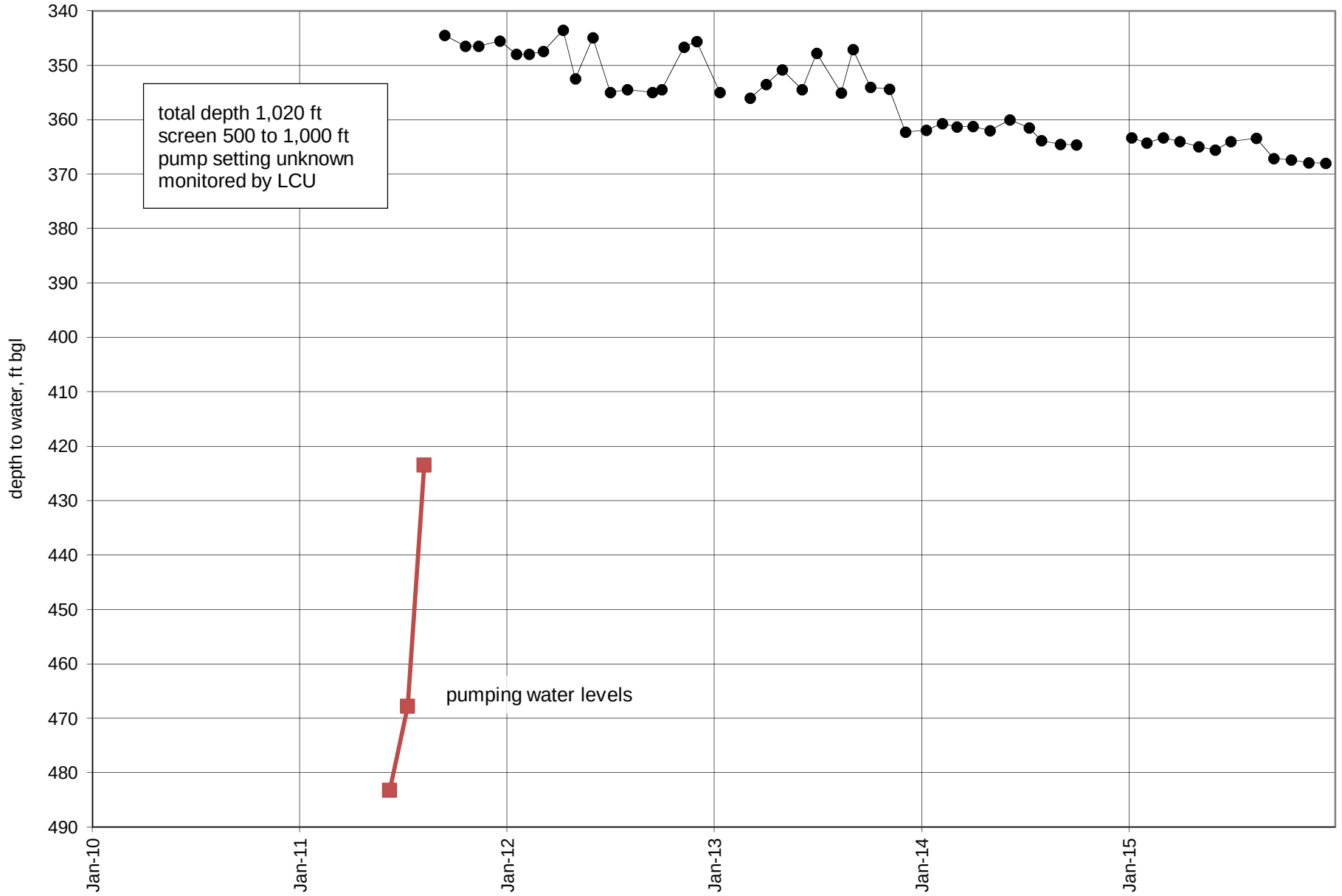

Figure F9. Groundwater hydrograph for CLC Well 68, Jornada del Muerto Basin, New Mexico.

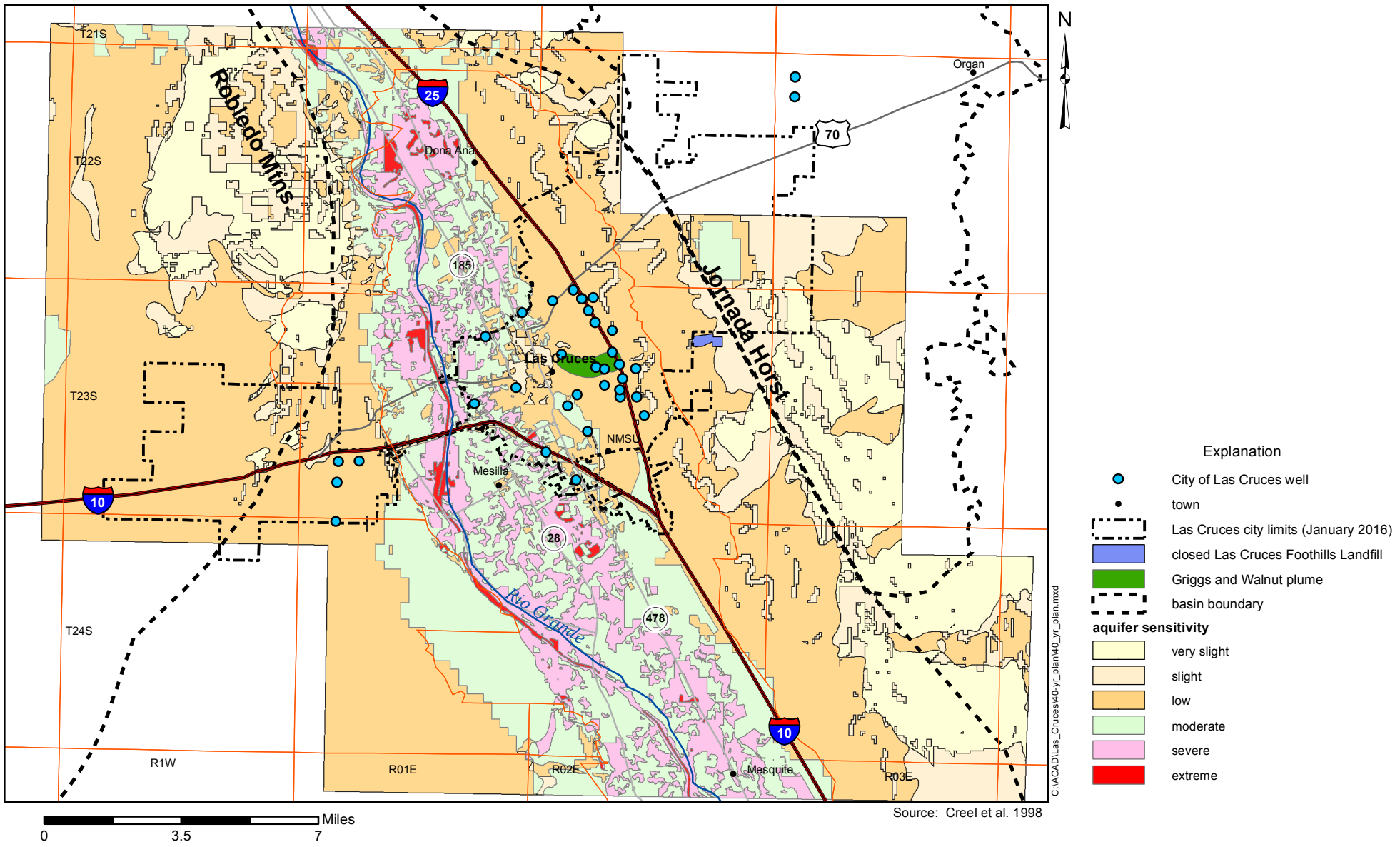

Figure F10. Map of Las Cruces area showing City of Las Cruces wells, the closed Las Cruces Foothills Landfill, the Griggs and Walnut contamination plume, and aquifer sensitivity.

Appendix G.

Existing Wells

APPENDIX G.

EXISTING WELLS

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APPENDIX G.

TABLE

page

APPENDIX G.

EXISTING WELLS

Table G1 presents a summary of data for existing wells connected to the Las Cruces water system. All wells are equipped with chlorine-gas injection systems to disinfect the groundwater.

Table G1. Summary of data for existing Las Cruces wells

NMOSE File No.	City well number	completion date	total depth, ft	casing diameters, inches	screen interval(s), ft	non-pumping water level, ft	pumping water level, ft	date of water-level measurement	current pumping capacity based on current equipment, [b] gpm
LRG-430	10	1951	381	16/12	270 to 370	93.80	152	7/21/15	500 [c]
LRG-430-S	44	1987	620	16	400 to 600	165.30	nd	7/1/15	800 [c]
LRG-430-S-2	45 (11)	1990	503	12	nd	297	371	June 1990	190 [c]
LRG-430-S-3	58 (12, 34)	1992	688	18/16	412 to 514; 554 to 676	63.80	142.60	7/1/15	1,560
LRG-430-S-4	38 (17)	1984	780	16/10	320 to 400; 480 to 780	260.65	336	7/1/15	1,150 [c]
LRG-430-S-5	18	1960	632	16	nd	196.90	218.20	7/22/15	176[a]
LRG-430-S-6	19	1962	612	16/12/8	348 to 363; 373 to 383; 393 to 460; 532 to 540; 564 to 604	225.40	250	7/2/15	725 [c]
LRG-430-S-7	20	1963	677	16/12/8	380 to 395; 415 to 525; 615 to 673	238.80	327	7/21/15	900 [c]
LRG-430-S-8	21	1962	632	16	366 to 620	233.30	331	7/21/15	1,100 [c]
LRG-430-S-9	62 (22)	1995	681	16	400 to 620	236.45	323.30	7/22/15	700
LRG-430-S-11	24	1966	591	16/12/8	381 to 591	209.91	310	7/1/15	690 [c]
LRG-430-S-12	26	1969	620	16/12	392 to 438; 460 to 620	225.00	258.80	7/23/15	1,050
LRG-430-S-13	25	1969	700	16/12	410 to 510; 600 to 700	180.68	262	7/1/15	650
LRG-430-S-14	(27	1971	730	20/14/12	430 to 455; 457 to 490; 500 to 535; 550 to 580; 605 to 640; 660 to 680; 695 to 715	216.64	240.70	7/22/15	170[a]
LRG-430-S-15	28	1971	751	20/14/12	421 to 447; 455 to 489; 541 to 561; 599 to 617; 619 to 649; 667 to 697; 699 to 738	219.00	294.45	7/2/15	500
LRG-430-POD57	29B	2016	880	16	440 to 860	58.44	196.05	5/31/16	1,650
LRG-430-S-17	65	1997	765	16	455 to 745	43.70	150.25	7/1/15	1,170
LRG-430-POD58	31B	2016	880	16	380 to 860	23.71	76.97	10/16/16	1,550
LRG-430-POD59	32B	2016	920	16	470 to 900	77.77	294.62	9/3/16	1,050
LRG-430-S-20	33	1978	606	14/10	406 to 606	62.60	161.00	7/23/15	300
LRG-430-S-21	35	1981	678	16/10	325 to 490; 510 to 575; 615 to 680	59.70	124.36	7/1/15	900
LRG-430-S-22	36	1982	1,210	16/10	710 to 820; 835 to 890; 970 to 1,020; 1,145 to 1,160; 1,180 to 1,210	327.35	351	7/9/15	450 [c]
LRG-430-S-23	37	1982	640	nd	nd	320.11	nd	7/9/15	300 [c]
LRG-430-S-25	54	1972	480	12	272 to 480	266.05	323	7/1/15	500 [c]
LRG-430-S-27	39	1986	600	16	380 to 580	146.85	262.35	1/12/13	650
LRG-430-S-29	42	1998	1,170	18/16	700 to 1,150	517.35	642	7/1/15	1,670
LRG-430-S-30	43	1998	1,150	18/16	725 to 1,125	549.10	670	7/1/15	1,500
LRG-430-S-31	57	1990	532	12	408 to 516	288.45	376	7/1/15	450 [c]
LRG-430-POD56	59B	2008	760	18/16	490 to 740	46.50	105.90	7/22/15	1,650
LRG-430-S-33	Driving Range	1997	480	10	nd	305	nd	2/1/97	nd
LRG-430-S-34	Paz Park	1994	378	12	260 to 370	171.80	nd	7/21/15	500
LRG-430-S-35	60	1994	700	16/12	350 to 690	110.60	nd	7/23/15	1,409 [c]

[a] not currently in service due to contamination from Griggs and Walnut tetrachloroethylene (PCE) plume
[b] capacity of wells can be greater than what they are currently equipped to pump
[c] not currently in service
gpm - gallons per minute
nd - data not available
ndy - data not yet available

Table G1. Summary of data for existing Las Cruces wells (concluded)

NMOSE File No.	City well number	completion date	total depth, ft	casing diameters, inches	screen interval(s), ft	non-pumping water level, ft	pumping water level, ft	date of water-level measurement	current pumping capacity based on current equipment,[b] gpm
LRG-430-S-36	46	1982	1,288	18/16	605 to 1,247	354.65	394.25	2/8/13	2,300
LRG-430-S-37	61	1995	1,070	16/12	600 to 1,050	202.25	348.05	7/1/15	1,100
LRG-430-S-38	63	1996	1,290	18/16	603 to 1,254	328.40	395.20	7/16/15	3,100
LRG-430-S-39	64	1996	1,290	18	600 to 1,250	334	388	8/12/02	nd [c]
LRG-430-S-42	67	2002	648	16	308 to 448; 478 to 628	57.10	137.70	7/1/15	1,900
LRG-430-S-43	70	2006	683	18/16	310 to 660	55.90	219.30	7/22/15	2,800
LRG-430-S-44	71	2006	725	18/16	305 to 705	43.65	119.50	7/2/15	2,900
LRG-3288	40	1988	1,170	16	661.3 to 724.1, 775.1 to 940.7, 1,087.4 to 1,150.3	482.65	574.75	7/1/15	1,350
LRG-3289	41	1993	980	16	649 to 960	465.10	565.50	7/2/15	1,440
LRG-3290	68	2005	1,020	16	500 to 1,000	364.00	504.80	7/1/15	520
LRG-3291	69	2005	815	16	485 to 785	332.65	429.55	7/1/15	1,050
LRG-3292	72	2012	1,020	16	620 to 1,000	322	nd	5/25/12	1,192
LRG-5818-S-7	66	2012	1,200	16	519 to 1,182	155	nd	2012	1,800
LRG-5039		1964	550	8	nd	350	nd	1964	500
LRG-5039-S		1969	550	8	nd	nd	nd	nd	500
LRG-5039-S-2		1990	600	12	350 to 600	333	nd	1990	300
LRG-47		1960	670	12	nd	nd	nd	nd	nd
LRG-47-S		1979	617	8	402 to 615	396	nd	1979	nd [c]
LRG-47-S-2		1989	570	12	468 to 568	407	nd	1989	nd
LRG-47-S-3		2000	800	18	500 to 800	430	nd	2000	320
LRG-47-S-5		1995	570	16	400 to 570	403	nd	1995	250
LRG-47-S-6		2006	860	10	540 to 860	329	nd	2006	400
LRG-48		1963	350	6	nd	25	nd	1963	nd
LRG-48-S		1965	483	6	nd	25	nd	1965	nd [c]
LRG-48-S-2		2001	460	8	420 to 460	43	nd	2001	500
LRG-50		1955	90	20	nd	nd	nd	nd	nd
LRG-50-S		1959	433	12	nd	181	nd	1959	nd [c]
LRG-50-S-2		1960	361	6	nd	nd	nd	nd	nd [c]
LRG-50-S-3		1961	351	6	nd	nd	nd	nd	nd [c]
LRG-50-S-4		1964	320	6	nd	nd	nd	nd	nd
LRG-50-S-5		1964	329	6	nd	nd	nd	nd	nd [c]
LRG-50-S-6		1969	468	6	nd	48	nd	1969	nd [c]
LRG-50-S-7		1972	350	6	nd	31	nd	1972	nd [c]
LRG-50-S-11		1990	570	10	490 to 570	50	nd	1990	nd
LRG-50-S-12		1995	580	10	500 to 580	92	nd	1995	800
LRG-50-S-13		2000	590	12	490 to 590	34	nd	2000	1000
LRG-1882		1968	342	4	nd	nd	nd	nd	nd [c]
LRG-1882-S		1971	373	6	nd	nd	nd	nd	nd
LRG-1882-POD4		2008	350	8	290 to 350	73	nd	2008	275
LRG-4278		1994	800	nd	nd	356	nd	1994	nd [c]

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