ANNUAL EVALUATION OF
2013 WATER-LEVEL MONITORING DATA
FROM THE CITY OF LAS CRUCES
WATER SUPPLY WELLS,
LAS CRUCES, NEW MEXICO

prepared by

Steven T. Finch, Jr., CPG
Annie McCoy, CPG

JOHN SHOMAKER & ASSOCIATES, INC.
Water-Resource and Environmental Consultants
2611 Broadbent Parkway NE
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505-345-3407
www.shomaker.com

prepared for

Las Cruces Utilities, New Mexico

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ILLUSTRATION
(follows text)

Figure 1. Aerial photograph showing locations of City of Las Cruces supply wells and landfill monitoring wells, and USGS-monitored observation wells, used for water-level monitoring program.

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(follow illustration)

Appendix A. East Mesa hydrographs
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ANNUAL EVALUATION OF 2013 WATER LEVEL MONITORING DATA FROM THE CITY OF LAS CRUCES WATER SUPPLY WELLS, LAS CRUCES, NEW MEXICO

1.0 INTRODUCTION

Las Cruces Utilities contracted John Shomaker & Associates, Inc. (JSAI) to assist with the City of Las Cruces (City) water-level monitoring program by performing QA/QC evaluation of monthly water-level measurements collected by Las Cruces Utilities staff, performing quarterly field visits to help with data collection, preparing quarterly assessment reports to summarize water-level data and address any QA/QC issues, and preparing an annual report that integrates the City’s water-level data with data from other sources, such as the U.S. Geological Survey (USGS), to define short- and long-term trends.

The City’s supply wells are presented in Table 1 and Figure 1, and can be divided into four regions: East Mesa (Jornada Basin), Interstate-25 Corridor, Valley, and West Mesa. The City’s groundwater wells include active supply wells and inactive wells.

Selected observation wells and piezometers monitored by the USGS, and located near the City’s supply wells, are also discussed in this report. These wells are presented in Table 2 and Figure 1. Also included in this report are water-level data from Las Cruces Foothills Landfill monitoring wells (Table 3, Fig. 1), located in the transition between the Interstate-25 Corridor and East Mesa. Water-level data have been collected at Las Cruces Foothills Landfill monitoring wells on a monthly to annual basis since 1999 using consistent data collection methods and equipment.

Groundwater-level data collected at the City’s supply wells from mid-2011 to present are included in this report. Water-level measuring attempts prior to 2011 lacked defined methodology and QA/QC process, and would therefore be difficult to use to define water-level trends. Since mid-2011, the City’s water-level monitoring program has used a consistent methodology for collecting hand-measurements from supply wells on a monthly basis, and transducers have also recorded water levels on an hourly basis in nine wells (in six wells since mid-2012, and in three additional wells since mid-2013). Las Cruces Utilities has also been monitoring water levels on an hourly basis with transducers in the Jornada Shallow, Middle, and Deep piezometers, having taken over the monitoring task from USGS in early 2013.
Table 1. Summary of City of Las Cruces supply wells

<table>
<thead>
<tr>
<th>well</th>
<th>total depth, ft</th>
<th>screen interval, ft</th>
<th>current status</th>
<th>area</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>381</td>
<td>270 to 370</td>
<td>inactive</td>
<td>Valley</td>
</tr>
<tr>
<td>18</td>
<td>516</td>
<td>315 to 516</td>
<td>active a</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>19</td>
<td>612</td>
<td>348 to 363; 373 to 383; 393 to 460; 532 to 540; 564 to 604</td>
<td>inactive *</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>20</td>
<td>677</td>
<td>380 to 395; 415 to 525; 615 to 673</td>
<td>inactive *</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>21</td>
<td>632</td>
<td>366 to 620</td>
<td>inactive *</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>23</td>
<td>592</td>
<td>452 to 592</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>24</td>
<td>591</td>
<td>381 to 591</td>
<td>inactive *</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>25</td>
<td>620</td>
<td>392 to 438; 460 to 620</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>26**</td>
<td>700</td>
<td>410 to 510; 600 to 700</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>27</td>
<td>524</td>
<td>430 to 455; 457 to 490; 500 to 524</td>
<td>active a</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>28</td>
<td>751</td>
<td>421 to 447; 455 to 489; 541 to 561; 599 to 617; 619 to 649; 667 to 697; 699 to 738</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>29</td>
<td>634</td>
<td>429 to 629</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>30</td>
<td>470</td>
<td>nd</td>
<td>inactive *</td>
<td>Valley</td>
</tr>
<tr>
<td>31</td>
<td>622</td>
<td>465 to 585; 597 to 617</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>32</td>
<td>697</td>
<td>456 to 556; 592 to 672; 677 to 696</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>33</td>
<td>606</td>
<td>406 to 606</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>35</td>
<td>683</td>
<td>325 to 490; 510 to 575; 615 to 680</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>36</td>
<td>1,210</td>
<td>710 to 820; 835 to 890; 970 to 1,020; 1,145 to 1,160; 1,180 to 1,210</td>
<td>inactive</td>
<td>West Mesa</td>
</tr>
<tr>
<td>37</td>
<td>640</td>
<td>440 to 640</td>
<td>inactive *</td>
<td>West Mesa</td>
</tr>
<tr>
<td>38</td>
<td>800</td>
<td>320 to 400; 480 to 780</td>
<td>inactive</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>39</td>
<td>600</td>
<td>380 to 580</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
</tbody>
</table>

* Griggs and Walnut Plume recovery well
* transducer installed in well
** not accessible for water-level measurements
nd - no data
Table 1. Summary of City of Las Cruces supply wells (concluded)

<table>
<thead>
<tr>
<th>well</th>
<th>total depth, ft</th>
<th>screen interval, ft</th>
<th>current status</th>
<th>area</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>1,170</td>
<td>661.3 to 724.1; 775.1 to 940.7; 1,087.4 to 1,150.3</td>
<td>active</td>
<td>East Mesa</td>
</tr>
<tr>
<td>41</td>
<td>980</td>
<td>649 to 960</td>
<td>active</td>
<td>East Mesa</td>
</tr>
<tr>
<td>42</td>
<td>1,170</td>
<td>700 to 1,150</td>
<td>active</td>
<td>East Mesa</td>
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<tr>
<td>43</td>
<td>1,150</td>
<td>725 to 1,125</td>
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<td>East Mesa</td>
</tr>
<tr>
<td>44</td>
<td>620</td>
<td>400 to 600</td>
<td>inactive</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>46</td>
<td>1,288</td>
<td>605 to 1,247</td>
<td>active</td>
<td>West Mesa</td>
</tr>
<tr>
<td>54</td>
<td>480</td>
<td>272 to 480</td>
<td>inactive*</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>57</td>
<td>532</td>
<td>408 to 516</td>
<td>inactive*</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>58</td>
<td>696</td>
<td>412 to 514; 554 to 676</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>59</td>
<td>772</td>
<td>575 to 757</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>60</td>
<td>700</td>
<td>350 to 690</td>
<td>inactive*</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>61</td>
<td>1,070</td>
<td>600 to 1,050</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>62</td>
<td>640</td>
<td>400 to 620</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>63</td>
<td>1,290</td>
<td>603 to 1,254</td>
<td>active</td>
<td>West Mesa</td>
</tr>
<tr>
<td>64**</td>
<td>1,290</td>
<td>600 to 1,250</td>
<td>inactive</td>
<td>West Mesa</td>
</tr>
<tr>
<td>65</td>
<td>765</td>
<td>455 to 745</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>67</td>
<td>648</td>
<td>308 to 448; 478 to 628</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>68</td>
<td>1,020</td>
<td>500 to 1,000</td>
<td>active</td>
<td>East Mesa</td>
</tr>
<tr>
<td>69</td>
<td>815</td>
<td>485 to 785</td>
<td>active</td>
<td>East Mesa</td>
</tr>
<tr>
<td>70</td>
<td>683</td>
<td>310 to 660</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>71</td>
<td>725</td>
<td>305 to 705</td>
<td>active</td>
<td>Valley</td>
</tr>
<tr>
<td>Paz Park</td>
<td>378</td>
<td>nd</td>
<td>active</td>
<td>Interstate-25</td>
</tr>
<tr>
<td>CLC Shallow</td>
<td>485</td>
<td>nd</td>
<td>inactive*</td>
<td>Jornada piezometers; East Mesa</td>
</tr>
<tr>
<td>CLC Middle</td>
<td>728</td>
<td>nd</td>
<td>inactive*</td>
<td></td>
</tr>
<tr>
<td>CLC Deep</td>
<td>1,000</td>
<td>nd</td>
<td>inactive*</td>
<td></td>
</tr>
</tbody>
</table>

*    transducer installed in well
**  well not accessible
nd - no data
Table 2. Summary of USGS-monitored observation wells and piezometers

<table>
<thead>
<tr>
<th>well</th>
<th>USGS No.</th>
<th>total depth, ft</th>
<th>current status</th>
<th>area</th>
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</thead>
<tbody>
<tr>
<td>LC-1A</td>
<td>321745106492501</td>
<td>305</td>
<td>nested observation well</td>
<td>Valley</td>
</tr>
<tr>
<td>LC-1B</td>
<td>321745106492502</td>
<td>105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC-1C</td>
<td>321745106492503</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC-2A</td>
<td>321745106492101</td>
<td>310</td>
<td>nested observation well</td>
<td>Valley</td>
</tr>
<tr>
<td>LC-2B</td>
<td>321745106492102</td>
<td>110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC-2C</td>
<td>321745106492103</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC-2F</td>
<td>321745106492106</td>
<td>650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC-3A</td>
<td>321740106481001</td>
<td>332</td>
<td>nested observation well</td>
<td>Valley</td>
</tr>
<tr>
<td>LC-3B</td>
<td>321740106481002</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC-3C</td>
<td>321740106481003</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC-3D</td>
<td>321740106481004</td>
<td>640</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well C</td>
<td>322411106422801</td>
<td>490</td>
<td>monitored well</td>
<td>East Mesa</td>
</tr>
</tbody>
</table>

USGS - U.S. Geological Survey

Table 3. Summary of City of Las Cruces Foothills Landfill monitoring wells

<table>
<thead>
<tr>
<th>well</th>
<th>total depth, ft</th>
<th>screen interval, ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>MW-1</td>
<td>464</td>
<td>434 to 454</td>
</tr>
<tr>
<td>MW-2</td>
<td>435</td>
<td>395 to 435</td>
</tr>
<tr>
<td>MW-3</td>
<td>340</td>
<td>299.5 to 339.5</td>
</tr>
<tr>
<td>MW-4</td>
<td>455</td>
<td>415 to 455</td>
</tr>
<tr>
<td>MW-5</td>
<td>455</td>
<td>390 to 450</td>
</tr>
<tr>
<td>MW-6</td>
<td>435</td>
<td>375 to 435</td>
</tr>
<tr>
<td>MW-7</td>
<td>443</td>
<td>378 to 438</td>
</tr>
<tr>
<td>MW-8</td>
<td>430</td>
<td>370 to 430</td>
</tr>
<tr>
<td>MW-9</td>
<td>415</td>
<td>355 to 415</td>
</tr>
</tbody>
</table>
2.0 DATA COLLECTION METHODS

JSAI provided training and helped develop data collection methodology and QA/QC measures for the City’s water-level monitoring program. Water-level collection methods were reviewed in detail during JSAI’s June 9, 2011 site visit and instruction seminar. An August 19, 2011 memo prepared by JSAI recommended implementation of the following methods and measures:

- develop field book(s) for operators to use
- plan for resolving oil accumulation (related to food-grade lubricating oil for line-shaft turbine pumps) in selected wells
- replacement of poly-tubes less than 1-1/4-inch diameter with sounding tubes of at least 1-1/4-inch diameter
- use hand tapes provided by JSAI for measuring to nearest 100th of a foot

In 2012, JSAI prepared quarterly assessment reports that included summaries of water-level data and QA/QC evaluation of monthly water-level measurements collected by Las Cruces Utilities staff. The 2012 first quarterly assessment addressed documentation and data entry issues and made the following recommendations:

- use appropriate field form when collecting water-level data
- provide explanation on field form for missing data
- record time of measurement on field form
- assign numbers to water-level measurement devices and identifying device used on field form
- measure non-pumping water levels to 100th of a foot
- review data entries for typographical errors
- enter non-pumping and pumping water-level data into appropriate columns
- include detailed comments such as meter readings, whether pump was operating prior to measurement, etc.
In the first quarter report, JSAI recommended installation of transducers in Wells 10, 21, 37, 44, 57, and 60. Based on this recommendation and further evaluation, transducers are now installed in inactive supply Wells 19, 20, 21, 24, 30, 37, 54, 57, and 60, recording water levels on an hourly basis and enhancing the water-level monitoring program. The second quarter report added the recommendation to calibrate water-level measurement devices on a quarterly basis, or when stretching of the wire is known to have occurred. For the third quarter assessment, JSAI staff met with Las Cruces Utilities field staff to review remaining data collection and documentation issues, review QA/QC methods for data entry and updating spreadsheet, and review, inventory and calibrate equipment. A quarterly report was not prepared as part of the third quarterly assessment.

3.0 RESULTS

Hydrographs for the City’s supply wells and USGS-monitored observation wells are presented in Appendices A through D, organized according to the four regions: East Mesa (Jornada Basin), Interstate-25 Corridor, Valley, and West Mesa. Hydrographs for Las Cruces Foothills Landfill monitoring wells, located in the transition zone between the Interstate-25 Corridor and East Mesa, are presented in Appendix E.

The City’s groundwater wells include active supply wells and inactive wells for which water levels are measured by hand on a monthly basis. Nine inactive supply wells (Wells 19, 20, 21, 24, 30, 37, 54, 57, and 60) have transducers that measure water levels on an hourly basis. Las Cruces Utilities has measured water levels in Las Cruces Foothills Landfill monitoring wells on at least an annual basis since 1999. Las Cruces Utilities also monitors water levels on an hourly basis with transducers in the Jornada piezometers, having taken over the task from USGS in early 2013. Among the USGS-monitored wells, water levels were measured on a monthly basis in Valley nested observation wells, and semi-annually in Well C on the East Mesa.

Table 1 identifies the City’s active and inactive supply wells. For active supply wells, some water-level measurements were collected while the wells were pumping. The pumping water-level data are plotted with a different symbol and color on hydrographs. USGS-monitored observation wells presented in Table 2 were not pumped in 2013. Table 4 presents a summary of the City’s active wells and corresponding observation well(s).
Table 4. Summary of active supply wells and nearby observation wells by region, City of Las Cruces water-level monitoring program

<table>
<thead>
<tr>
<th>region</th>
<th>active well(s)</th>
<th>observation (inactive) well(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Mesa</td>
<td>40, 41, 42, 43</td>
<td>CLC Shallow, Middle, Deep</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>Well C</td>
</tr>
<tr>
<td></td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Interstate-25 Corridor</td>
<td>23, 25, 28, 39, 62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paz Park</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18, 27</td>
<td>19, 20, 21, 54, 57</td>
</tr>
<tr>
<td></td>
<td>61</td>
<td>24, 38, 44, 60</td>
</tr>
<tr>
<td>Valley</td>
<td>31, 33</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>29, 32, 35, 67, 70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>65, 71</td>
<td>LC-3A, -3B, -3C, -3D</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>LC-1(A-C); LC-2(A-C), -2F</td>
</tr>
<tr>
<td>West Mesa</td>
<td>46, 63</td>
<td>36, 37</td>
</tr>
<tr>
<td>Las Cruces Foothills Landfill</td>
<td></td>
<td>MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9</td>
</tr>
</tbody>
</table>
Pumping and non-pumping water-level measurements were collected on a monthly basis at the City’s supply wells in 2013. There were no apparent major outlier data points in the 2013 dataset. When pumping water-level measurements were collected, the instantaneous pumping rates were noted. Some variation in hand-measured water levels can be explained by measurements with different wire-line sounders, which may have stretched to varying degrees, or replacement of reel on sounder. Hydrographs have been labeled accordingly in cases where this issue could be identified based on field notes.

Hydrographs show discrepancies between hand-measured and transducer water-level data (Figs. B3, B5, B7, B10, B18, B20, B22, C4, and D3). These discrepancies are likely due to a shift in the level at which the transducer is set, and/or the level used to calculate depth-to-water from transducer data is inaccurate. The level at which the transducer is set can shift slightly during data download or well maintenance or repair events. Nonetheless, transducers record valuable data on short-term water-level changes. Transducer dataset periods of record appear to be too short to identify any longer-term linear trends at this time.

Short-term water-level trends in 2013, including seasonal trends and overall rises or declines in water levels, are described by region in the following sections. Long-term trends since the beginning of the water-level monitoring program in mid-2011 are also described by region.

3.1 East Mesa

Short-term trends for non-pumping water levels at active supply wells on the East Mesa included water-level rises during the low-demand winter months (2.7 to 4 ft between January and June 2013 at Wells 40 through 43 (Figs. A1 through A4)). These water-level rises were not as large as they were between January and June 2012. Non-pumping water-levels declined slightly, by 2 to 3 ft, between June and July 2013 at Wells 40 through 43 due to high pumping in June, and then rose between July and November 2013, by 4 to 7.7 ft due to a general decrease in pumping between June and November. Other active East Mesa supply Wells 68 and 69 (Figs. A5 and A6) had generally flat trends in 2013; however, all active East Mesa supply wells showed water-level declines between November and December 2013, ranging from 7.3 to 16.1 ft. Well 68 appeared to have a long-term declining trend of about 4.2 ft/yr. More data are needed to identify long-term water-level trends in other East Mesa active supply wells.
Jornada piezometers completed to depths ranging from 485 ft to 1,000 ft showed complicated water-level trends in 2013, with periods of decline from January to May, and June to August, followed by rapid water-level rises (Fig. A7). Las Cruces Utilities staff may want to verify that the levels at which the transducers are set do not shift during data download. Figure A7 suggests that water-level declines between January and May 2013 were due to increased pumping during this period. However, lower pumping in July 2013 did not appear to result in water-level rises.

The water-level data from the Jornada piezometers generally illustrate that drawdown trends are generally not depth specific; however, water-level declines were greater at the Shallow piezometer between October and December 2013. USGS-monitored Well C (USGS No. 322411106422801) showed a decline averaging 4 ft/yr since August 2010, but no data were available for this well for 2013, and the USGS has indicated that they will not continue to measure water levels in this privately-owned well (Fig. A8). Water levels at monitoring well MW-3 at Las Cruces Foothills Landfill within the East Mesa area showed no apparent long-term trend (Fig. E3).

3.2 Interstate-25 Corridor

3.2.1 Active Supply Wells

Active supply Wells 23, 25, 28, 39, and 62, in the northern portion of the Interstate-25 Corridor, do not have a nearby observation well for comparing water-level trends (Fig. 1). Non-pumping water-levels showed short-term water-level rises due to recovery from pumping periods (Figs. B8, B9, B11, B15, and B24). Apparent long-term trends for non-pumping water levels include average water-level rises of 5 ft/yr at Well 25, 3.5 ft/yr at Well 28, 9.4 ft/yr at Well 62, and 0.8 ft/yr at Paz Park Well. A rise in the pumping levels at Well 25 in December 2013 was likely related to a decrease in monthly pumping from 23 acre-feet (ac-ft) in November, to 7 ac-ft in December. A rise in pumping levels occurred at Well 28 between June and August 2013 despite an increase in monthly pumping, from 25 ac-ft in June, to 63 ac-ft in July, and 47 ac-ft in August. Pumping levels rose at Well 62 in the second half of 2013, as pumping was reduced (117 ac-ft in the second half of 2013 compared to 368 ac-ft in the first half of 2013 at Well 62). Pumping levels have historically been within 5 ft of the pump setting in Well 62, but the December 2013 pumping level was about 35 ft above the pump.
Wells 18 and 27 began actively pumping during April 2012 (Figs. B1 and B12). Prior to pumping, long-term water-level rises were observed at Wells 18 and 27. Since active pumping began, pumping water levels have generally been deeper in August. At Well 18, pumping levels rose between August and September 2013 as monthly pumping was reduced from 29 ac-ft to 3 ac-ft. At Well 27, pumping levels rose between October and November 2013 as monthly pumping was reduced from 23 ac-ft to 17 ac-ft.

Nearby Well 26 is typically pumped extensively during the summer, but is not accessible for water-level measurements. Non-pumping water levels at Well 61 have shown little change over time and more data are needed to identify any long-term trends (Fig. B23); Well 61 is screened deeper than other wells in the area (Table 1).

3.2.2 Inactive Wells

Water-level trends varied for inactive supply wells in the Interstate-25 Corridor. Hand-measurements at Well 19 indicated a long-term decline of 1.6 ft/yr, while transducer measurements showed a slight rise between October and December 2012 and slight decline in 2013 (Figs. B2 and B3). Hand-measurements at Well 20 showed no apparent long-term trend, while transducer measurements showed a slight decline between May and August 2013 followed by a slight rise (Figs. B4 and B5). Water-levels declined by 4.1 ft between June 2012 and July 2013 at Well 21 (Fig. B6), coinciding with pumping at Wells 18 and 27. Transducer measurements showed a water-level rise of about 1.8 ft between September and November 2013 at Well 21 (Fig. B7), likely due to modifications in pumping rate and pumping schedule at Wells 18 and 27, and a general decrease in pumping from active supply wells in the southern part of the Interstate-25 Corridor.

The easternmost wells in the Interstate-25 Corridor include Wells 54 and 57 (Fig. 1). No apparent long-term trend was observed in the hand-measured water levels at Well 54, although the non-pumping water levels in the well are only 2 to 7 ft above the top of the screen interval (Fig. B17). Transducer measurements at Well 54 showed a slight water-level decline in June 2013, followed by a rise of about 2.6 ft between September and December 2013 likely due to a general decrease in pumping from active supply wells in the southern part of the Interstate-25 Corridor (Fig. B18). Hand-measurements at Well 57 showed a long-term declining trend at an average rate of 2 ft/yr (Fig. B19), while transducer measurements showed little change in water levels between May and December 2013 (Fig. B20).
Hand-measured water levels at Well 24 showed a long-term declining trend at an average rate of 3.5 ft/yr (Fig. B9). Hand-measurements and transducer measurements at Well 24 showed that water levels in the well are affected by nearby pumping, with water-levels declining in spring and summer and rising in the winter (Fig. B10). Well 60 showed trends similar to Well 24: a long-term declining trend at an average rate of 2.8 ft/yr and seasonal effects of regional pumping (Figs. B21 and B22). Hand-measured water levels at Well 38 showed a long-term declining trend at an average rate of 1.8 ft/yr (Fig. B14), similar to Wells 19 and 57. Hand-measured water levels at Well 44 showed relatively large fluctuations in water levels that appear to reflect seasonal effects of regional pumping, but did not show any clear long-term trend (Fig. B16).

3.3 Valley

3.3.1 Active Supply Wells

Most active supply wells in the Valley region show no clear long-term trends (Wells 32, 33, 35, 58, 59, 67, 70, and 71). Fluctuations in pumping water levels at Well 35 reflect monthly pumping that peaked at 120 ac-ft and 118 ac-ft in May and June 2013, respectively, and declined to 87 ac-ft in October 2013. The only apparent long-term trends were rises in non-pumping water levels at Wells 29 and 65 (Fig. C2, average 2.2 ft/yr; Fig. C11, average 8.9 ft/yr), and a decline in non-pumping water levels at Well 31 (Fig. C5; average 2.4 ft/yr).

3.3.2 Inactive Wells

Wells 10 and 30 are the only inactive supply wells in the Valley (Fig. 1). Well 10 is located along the east margin of the Valley region and showed slight seasonal trends and no apparent long-term trend (Fig. C1). Hand-measurements and transducer measurements were collected at Well 30 (Figs. C3 and C4). Between spring and summer, 15 to 20 ft of drawdown was observed at Well 30 in 2012 and 2013 (Fig. C4). Drawdown at Well 30 due to regional summer pumping was followed by recovery in fall and early winter in 2012 and 2013 (Figs. C3 and C4).
Water-level trends at the shallow nested observation Wells LC-1(A, B, and C) and LC-2(A, B, C, and F), located next to the Rio Grande, were compared to the water levels and pumping at nearby active supply Well 59 (Figs. C15 and C16). Trends at the shallow nested observation Wells LC-3(A, B, C, and D) were compared to the water levels observed at nearby active supply Well 65 and Valley pumping (Fig. C17). The water levels at the shallow piezometers showed responses to surface-water infiltration from the Rio Grande and associated irrigation ditches, and the deeper piezometers (LC-2(A, F), LC-3(A, D)) showed water-level responses to nearby pumping. Long-term water-level trends at nested observation wells include declines at LC-1A (Fig. C15; average 2.0 ft/yr), LC-2A (Fig C16; average 2.8 ft/yr), LC-2B (Fig. C16; average 2.6 ft/yr), and LC-3B (Fig. C17; average 3.0 ft/yr). At nested piezometers LC-1(A, B, and C), LC-2(A, B, C, and F), and LC-3(A, B, C, and D), deeper piezometers showed deeper water levels than the adjacent shallow piezometers. The vertical separation in depth to water between shallow and deep piezometers is a result of regional pumping removing groundwater storage and depressurizing the lower aquifer in relation to the water table.

3.4 West Mesa

3.4.1 Active Supply Wells

Active West Mesa region supply wells include Wells 46 and 63 (Fig. 1). Non-pumping water levels in Well 46 showed a long-term water-level decline at an average rate of 11.8 ft/yr (Fig. D4); however, there was too much oil to measure water levels at Well 46 after February 2013. In contrast to declines at Well 46, there was no apparent trend observed from non-pumping water-levels measured at Well 63 (Fig. D5).

3.4.2 Inactive Wells

Inactive West Mesa region supply wells include Wells 36, 37, and 64 (Fig. 1). Due to a welded cap, there was no access for collecting water-level measurements from Well 64. Short-term water-level trends included declines of 11 to 15 ft between August and September in 2012 and 2013 at Well 36 (Fig. D1). Hand-measured water levels at Well 37 showed a long-term declining trend at an average rate of 1.4 ft/yr (Fig. D2), while transducer measurements showed slight declines in water levels between July and December 2012, and in summer 2013, with a slight rise in spring 2013 (Fig. D3). More data are needed to determine a clear relationship between West Mesa pumping and any short-term water-level trends in inactive Wells 36 and 37.
3.5 Las Cruces Foothill Landfill

With the exception of monitoring wells MW-3 and MW-9, monitoring wells at Las Cruces Foothills Landfill represent a geologic transition between the East Mesa and Interstate-25 Corridor called the Jornada Horst (MW-1, MW-2, and MW-4 through MW-8). Monitoring well MW-9 is in the area just west of the Jornada Horst, and MW-3 is on the East Mesa (Fig. 1).

Water levels at MW-3, located on the East Mesa on the eastern edge of the Foothills Landfill, showed no apparent long-term trend (Fig. E3). Water levels at monitoring wells on the Jornada Horst generally showed no apparent long-term trends, except for MW-4, which had a declining trend at an average rate of 0.9 ft/yr (Fig. E4), and MW-5, which had a rising trend at an average rate of 1.4 ft/yr (Fig. E5). West of the Jornada Horst, MW-9 had a declining trend at an average rate of 2.2 ft/yr (Fig. E9). The water-level declines observed at MW-9 are likely due to effects of regional pumping from the Interstate-25 Corridor.

4.0 DISCUSSION

A summary of the analysis of water-level trends is presented as Table 5. Long-term water-level declines occurred at a number of inactive wells, and no long-term water-level rises were observed at inactive wells, except at MW-5 along the Jornada Horst.

On the East Mesa, the only well that showed a long-term declining trend for non-pumping water levels was active supply Well 68, at an average rate of 4.2 ft/yr. Jornada piezometers showed complicated water-level trends in 2013, and more data are needed to identify any long-term trends at Jornada piezometers.

Active supply wells in the northern part of the Interstate-25 Corridor generally showed long-term water level rises ranging from 0.8 to 9.4 ft/yr (Fig. 1). Active supply Wells 18, 27, and 61, located in the southern part of the Interstate-25 Corridor showed no apparent long-term trends. Inactive wells in the southern part of the Interstate-25 Corridor showed long-term water-level declines ranging from 1.6 to 3.5 ft/yr. The water-level responses in Wells 20, 21, and 60, near plume recovery Wells 18 and 27, suggest plume capture is occurring.
Table 5. Summary of City of Las Cruces active supply wells and nearby observation wells by region

<table>
<thead>
<tr>
<th>region</th>
<th>active well(s)</th>
<th>average decline (-) or rise (+), ft/yr</th>
<th>observation (inactive) well(s)</th>
<th>average decline (-) or rise (+), ft/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Mesa</td>
<td>40, 41, 42, 43</td>
<td>na</td>
<td>CLC Shallow, Middle, Deep</td>
<td>na</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>-4.2</td>
<td>Well C</td>
<td>-4.0</td>
</tr>
<tr>
<td></td>
<td>69</td>
<td>na</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interstate-25 Corridor</td>
<td>23, 25, 28, 39, 62</td>
<td>+5.0 at Well 25, +3.5 at Well 28, +9.4 at Well 62</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paz Park</td>
<td>+0.8 (a)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18, 27</td>
<td>na</td>
<td>19, 20, 21, 54, 57</td>
<td>-1.6 at Well 19, -2.0 at Well 57</td>
</tr>
<tr>
<td></td>
<td>26, 61</td>
<td>na</td>
<td>24, 38, 44, 60</td>
<td>-3.5 (a) at Well 24, -1.8 at Well 38, -2.8 (a) at Well 60</td>
</tr>
<tr>
<td>Valley</td>
<td>31, 33</td>
<td>-2.4 at Well 31</td>
<td>10</td>
<td>(a)</td>
</tr>
<tr>
<td></td>
<td>29, 32, 35, 67, 70</td>
<td>+2.2 at Well 29</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>na</td>
<td>30</td>
<td>(a)</td>
</tr>
<tr>
<td></td>
<td>65, 71</td>
<td>+8.9 at Well 65</td>
<td>LC-3A, -3B, -3C, -3D</td>
<td>-3.0 at LC-3B</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>na</td>
<td>LC-1(A-C); LC-2(A-C), -2F</td>
<td>-2.0 at LC-1A, -2.8 at LC-2A, -2.6 at LC-2B</td>
</tr>
<tr>
<td>West Mesa</td>
<td>46, 63</td>
<td>-11.8 at Well 46</td>
<td>36, 37, 64</td>
<td>-1.4 at Well 37</td>
</tr>
<tr>
<td>Las Cruces Foothills Landfill</td>
<td></td>
<td>MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8, MW-9</td>
<td>-0.9 at MW-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+1.4 at MW-5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-2.2 at MW-9</td>
</tr>
</tbody>
</table>

(a) - apparent seasonal fluctuations in water levels
na - no apparent average trend
A number of active wells in the Valley, plus inactive Wells 10 and 30, showed water-level rises between fall 2012 and spring 2013, reflecting regional changes in seasonal pumping from municipal and irrigation wells. Active Well 31 and inactive nested piezometers in the Valley region (LC-1(A-C), LC-2(A, B, C, and F), and LC-3(A-D)) showed long-term water-level decline rates of approximately 2 to 3 ft/yr. Additional data are needed from inactive Wells 10 and 30 to determine any long-term water level trends at these wells.

Water-level trends were variable in supply wells on the West Mesa, and more data are necessary to identify any overall trends for the region. Active supply Well 46 showed relatively large drawdowns in non-pumping water levels, while nearby active supply Well 63 showed no apparent long-term trend. The westernmost inactive well, Well 37, showed a long-term water-level decline at an average rate of 1.4 ft/yr, while nearby inactive Well 36 showed no apparent long-term trend.

Overall, evaluation of water-level trends in combination with 2013 monthly pumping data showed that short-term water-level trends in many inactive wells were related to regional pumping, and fluctuations in pumping levels in active supply wells were typically related to variations in pumping rates at these wells.

5.0 RECOMMENDATIONS

Continued water-level monitoring will help define long-term trends that are beginning to emerge after several years of consistent monitoring. Continued monitoring will help define trends on the East Mesa, where active supply Well 68 showed an average decline rate of 4.2 ft/yr, other active supply wells showed no apparent long-term trends, and observation wells showed complicated trends. Additional data from the Interstate-25 Corridor, Valley, and West Mesa regions will further define apparent long-term water-level rises and declines observed in these regions, as well as sub-regions such as the northern and southern parts of the Interstate-25 Corridor.

Some past variation in hand-measured water levels can be explained by measurements with different wire-line sounders, which may have stretched to varying degrees. As recommended in the second quarterly assessment report and 2012 annual report, water-level measurement devices should be calibrated on a quarterly basis, or when stretching of the wire is
known to have occurred. Las Cruces Utilities staff has been calibrating water-level measurement devices, which has improved the quality of the water-level dataset. It is also recommended that the same water-level measurement device be used for each monitoring event at each individual well, to the extent that this is possible, for continuity of the datasets for individual wells.

As recommended in the 2012 annual report, wells for which measuring water levels has been attempted repeatedly without success, such as Wells 26 and 64, should be equipped with adequate access and/or sounding tubes. The problem of too much oil to measure water levels in Well 46 should be addressed so that water-level monitoring can continue at this well, which has shown declines in non-pumping water levels. Las Cruces Utilities may want to consider gaining access to Well C, the privately-owned well formerly monitored by USGS on the East Mesa, in order to continue measuring water levels at this well. Well C showed an average decline rate of 4.0 ft/yr between 2010 and February 2012.

Hydrographs showed discrepancies between hand-measured and transducer water-level data. The level at which the transducer is set can shift slightly during data download, or well maintenance or repair events. It is important to set the transducer back to the same level after removal, and make note if its reference point has changed, so the dataset can be corrected. It is difficult to obtain an accurate measurement of the level at which a transducer is set in a well, and it is recommended that hand measurement(s) be used as a benchmark.

The comparison of water-level trends and monthly pumping provides a good assessment of the effects of local and regional pumping on water levels. It is recommended to evaluate pumping data from other users in the area for the next annual report.
ILLUSTRATION
Figure 1. Aerial photograph showing locations of City of Las Cruces supply wells and landfill monitoring wells, and USGS-monitored observation wells, used for water-level monitoring program.
Appendix A.

East Mesa hydrographs
Figure A1. Graph of water-level data collected by the City of Las Cruces for Well 40, and monthly pumping at Wells 40, 41, 42, and 43, on the East Mesa.
Figure A2. Graph of water-level data collected by the City of Las Cruces for Well 41, and monthly pumping at Wells 40, 41, 42, and 43, on the East Mesa.
Figure A3. Graph of water-level data collected by the City of Las Cruces for Well 42, and monthly pumping at Wells 40, 41, 42, and 43, on the East Mesa.
Figure A4. Graph of water-level data collected by the City of Las Cruces for Well 43, and monthly pumping at Wells 40, 41, 42, and 43, on the East Mesa.
Figure A5. Graph of water-level data collected by the City of Las Cruces for Well 68, and monthly pumping at Wells 68 and 69.
Figure A6. Graph of water-level data collected by the City of Las Cruces for Well 69, and monthly pumping at Wells 68 and 69.
Figure A7. Graph of water-level data for Jornada piezometers (CLC Shallow, Middle, and Deep), and monthly pumping at nearby active supply Wells 40, 41, 42, and 43.

(no discernible linear trend)
Figure A8. Graph of water-level data for Well C (USGS 322411106422801).

average decline
4.0 ft/yr since August 2010
Appendix B.

Interstate-25 Corridor hydrographs
Figure B1. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 18.
Figure B2. Graph of water-level data collected by the City of Las Cruces for Well 19, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B3. Graph of water-level data collected by the City of Las Cruces for Well 19, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).

(no discernible linear trend in transducer data; see Fig. B2 for linear trend in hand measured data for period of record)
Figure B4. Graph of water-level data collected by the City of Las Cruces for Well 20, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B5. Graph of water-level data collected by the City of Las Cruces for Well 20, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).

- Transducer water level
- Hand measured water level
- South I-25 Corridor monthly pumping

TD 677 ft
Screen 380-673 ft (multiple intervals)

Started using different sounder

No discernible linear trend
Figure B6. Graph of water-level data collected by the City of Las Cruces for Well 21, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B7. Graph of water-level data collected by the City of Las Cruces for Well 21, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B8. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 23.
Figure B9. Graph of water-level data collected by the City of Las Cruces for Well 24, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B10. Graph of water-level data collected by the City of Las Cruces for Well 24, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).

(no discernible linear trend in transducer data; see Fig. B9 for linear trend in hand measured data for period of record)
Figure B11. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 25.

**average rise 5.0 ft/yr**

- **Non-pumping water level**
- **Pumping water level**
- **Monthly pumping**
- **Linear (Non-pumping water level)**

**TD 620 ft**

**screen 392-438; 460-620 ft**

**pump set at 360 ft**
Figure B12. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 27.
Figure B13. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 28.
Figure B14. Graph of water-level data collected by the City of Las Cruces for Well 38, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).

average decline 1.8 ft/yr

TD 800 ft
screen 320-400; 480-780 ft
pump set at 440 ft
Figure B15. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 39.
Figure B16. Graph of water-level data collected by the City of Las Cruces for Well 44, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B17. Graph of water-level data collected by the City of Las Cruces for Well 54, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B18. Graph of water-level data collected by the City of Las Cruces for Well 54, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B19. Graph of water-level data collected by the City of Las Cruces for Well 57, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B20. Graph of water-level data collected by the City of Las Cruces for Well 57, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).

(no discernible linear trend in transducer data; see Fig. B19 for linear trend in hand measured data for period of record)
Figure B21. Graph of water-level data collected by the City of Las Cruces for Well 60, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).
Figure B22. Graph of water-level data collected by the City of Las Cruces for Well 60, and monthly pumping in the southern part of the I-25 Corridor (Wells 18, 27, 26, 61, and Paz Park).

(no discernible linear trend in transducer data; see Fig. B21 for linear trend in hand measured data for period of record)
Figure B23. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 61.
Figure B24. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 62.
Figure B25. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Paz Park Well.
Appendix C.

Valley hydrographs
Figure C1. Graph of water-level data collected by the City of Las Cruces for Well 10, and monthly pumping in the Valley.

TD 381 ft
screen 270-370 ft
pump was set at 260 ft, but may have been removed

(no discernible linear trend)
Figure C2. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 29.
Figure C3. Graph of water-level data collected by the City of Las Cruces for Well 30, and monthly pumping in the Valley.
Figure C4. Graph of water-level data collected by the City of Las Cruces for Well 30, and monthly pumping in the Valley.

- Transducer water level
- Hand measured water level
- Valley monthly pumping

TD 470 ft
Screen interval unknown

(no discernible linear trend)
Figure C5. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 31.
Figure C6. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 32.

**Legend:**
- Non-pumping water level
- Pumping water level
- Monthly pumping

**Notes:**
- TD 697 ft
- Screen 456-696 ft (multiple intervals)
- Pump set at 300 ft
- No discernible linear trend
Figure C7. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 33.
Figure C8. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 35.
Figure C9. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 58.

TD 696 ft
screen 412-514; 554-676 ftpump set at 250 ft

(no discernible linear trend)
Figure C10. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 59.
Figure C11. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 65.
Figure C12. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 67.
Figure C13. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 70.
Figure C14. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 71.

(no discernible linear trend)

TD 725 ft
screen 305-705 ft
pump setting unknown

JOHN SHOMAKER & ASSOCIATES, INC.
Figure C15. Graph of water-level data for nested observation Well LC-1(A-C) and City of Las Cruces Well 59, and monthly pumping at Well 59.

average decline 2.0 ft/yr
Figure C16. Graph of water-level data for nested observation Well LC-2 (A-F) and City of Las Cruces Well 59, and monthly pumping at Well 59.

Average decline: 2.6 ft/yr
Average decline: 2.8 ft/yr
Figure C17. Graph of water-level data for nested observation Well LC-3 (A-D) and City of Las Cruces Well 65, and monthly pumping in the Valley.

average decline
3.0 ft/yr
Appendix D.

West Mesa hydrographs
Figure D1. Graph of water-level data collected by the City of Las Cruces for Well 36, and monthly pumping on the West Mesa.

- TD 1,210 ft
- Screen 710-1,210 ft (multiple intervals)
- Pump set at 500 ft

(no discernible linear trend)

used new sounder
Figure D2. Graph of water-level data collected by the City of Las Cruces for Well 37, and monthly pumping on the West Mesa.

average decline
1.4 ft/yr

TD 640 ft
screen 440-640 ft
not currently equipped

JOHN SHOMAKER & ASSOCIATES, INC.
Figure D3. Graph of water-level data collected by the City of Las Cruces for Well 37, and monthly pumping on the West Mesa.

(no discernible linear trend in transducer data; see Fig. D2 for linear trend in hand measured data for period of record)
Figure D4. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 46.

- Average decline: 11.8 ft/yr
- Note: too much oil to measure water levels after February 2013
- TD 1,288 ft
- Screen 605-1,247 ft
- Pump set at 500 ft
Figure D5. Graph of water-level data and monthly pumping data collected by the City of Las Cruces for Well 63.

(no discernible linear trend)

TD 1,290 ft
screen 603-1,254 ft
pump set at 520 ft
Appendix E.

Las Cruces Foothills Landfill hydrographs
Figure E1. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-1.

(no discernible linear trend)
Figure E2. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-2.

(no discernible linear trend)
Figure E3. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-3. (no discernible linear trend)
Figure E4. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-4.

average decline
0.9 ft/yr
Figure E5. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-5.

average rise
1.4 ft/yr
Figure E6. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-6.

(no discernible linear trend)
Figure E7. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-7.
Figure E8. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-8.

(no discernible linear trend)
Figure E9. Graph of water-level data for Las Cruces Foothills Landfill monitoring well MW-9, and monthly pumping in the I-25 Corridor.

average decline
2.2 ft/yr