Information Regarding GIS Maps - August 13, 2010
Presented by E² Inc. for the San Luis Valley Ecosystem Council (SLVEC)

Background: Maps were created from a database titled “2009_SLV_Well_Test_Results” provided by Dr. Perry Cabot from Colorado State University. It is assumed that the database contains information from EPA’s 2009 well testing results and that contaminant units are listed in parts per million (ppm). According to the database, 337 wells were tested for contaminants. Of these wells, 170 wells appear to have been tested only for nitrate and bacterial contamination, which could impact the results shown on Map #3 and Map #4.¹ Well depths were measured, though this information is not included in the scope of the mapping effort.

Map #1 – This map shows all points that were tested. According to the database, 337 wells were tested.

Map #2 – This map shows test results for nitrate contamination. Note that 10 ppm is the U.S. Environmental Protection Agency (EPA)’s Maximum Contaminant Level (MCL) for nitrate. Of the 337 wells tested, five wells exceed the MCL for safe drinking water.

Map #3 – This map shows the test results for any presence of the following contaminants: arsenic, cadmium, sodium, iron and total dissolved solids. Please note that this map does not evaluate whether these contaminants are above or below EPA MCLs for safe drinking water. The map simply identifies whether these contaminants are present in any quantity. The map does not account for the 170 wells that were not tested for the contaminants listed above.

While the scope of this work was limited to polishing the three maps above, E² Inc. was able to conduct additional analysis and mapping. We offer the following materials in the hope that they may helpfully inform the SLVEC SLV LEAP HIGH Project.

1) Information regarding EPA MCLs for safe drinking water and analysis of the number of wells with MCL exceedances. See table below.

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>EPA MCL² (ppm)</th>
<th>Number of Wells Exceeding EPA MCL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum</td>
<td>.05 to .20</td>
<td>26</td>
</tr>
<tr>
<td>Beryllium</td>
<td>.004</td>
<td>0</td>
</tr>
<tr>
<td>Cadmium</td>
<td>.005</td>
<td>7</td>
</tr>
<tr>
<td>Copper</td>
<td>1.3</td>
<td>1</td>
</tr>
<tr>
<td>Fluoride</td>
<td>4.0</td>
<td>0</td>
</tr>
<tr>
<td>Iron</td>
<td>0.3</td>
<td>49</td>
</tr>
<tr>
<td>Lead</td>
<td>.015</td>
<td>2</td>
</tr>
<tr>
<td>Manganese</td>
<td>.05</td>
<td>89</td>
</tr>
<tr>
<td>pH</td>
<td>6.5-8.5</td>
<td>32</td>
</tr>
<tr>
<td>Sodium</td>
<td>* unknown³</td>
<td>not determined</td>
</tr>
</tbody>
</table>

¹ Of the 170 wells tested only for nitrate and bacteria contamination, two wells exceeded the MCL for nitrate (16.54 ppm and 13.8 ppm) and bacteria was present in one well.
³ EPA does not list an MCL for sodium on the Agency’s website.
Contaminant | EPA MCL (ppm) | Number of Wells Exceeding EPA MCL
--- | --- | ---
Sulfate | 250 | 2
Total Dissolved Solids | 500 | 4
Zinc | 5 | 2
Nitrate | 10 | 5
Arsenic | .010 | 12

2) Map #4 – This additional map shows wells that exceeded MCLs for safe drinking water for one or more contaminant (138 wells). It also identifies wells without contaminants exceeding EPA MCLs and wells that were not tested for all contaminants (199 wells). See note above regarding 170 of the 337 wells which were not tested for all contaminants.

3) Breakout Maps #5-9 – These maps provide greater detail for Map #3. The maps show test results for arsenic, cadmium, sodium, total dissolved solids and iron and indicate MCLs (when known).

4) Alternate Map #1 – This map shows all of the points tested and whether the wells were tested for all contaminants, or only nitrate and bacteria.
2009 Well Testing Results
Arsenic

- > 0.010 ppm* (12 wells)
- 0.005 - 0.010 ppm (30 wells)
- < 0.005 ppm (85 wells)
- Not Detected (40 wells)
- Not Tested for this Contaminant (170 wells)

* EPA's Maximum Contaminant Level for safe drinking water

This map has been funded in whole or partly through the U.S. Environmental Protection Agency (EPA)'s Technical Assistance Services for Communities (TASC) program and the San Luis Valley Ecosystem Council (SLVEC). Its contents do not necessarily reflect EPA's policies, actions or positions.
2009 Well Testing Results
Cadmium

- > 0.005 ppm* (7 wells)
- 0.0002 - 0.005 ppm (97 wells)
- < 0.0002 ppm (32 wells)
- Not Detected (31 wells)
- Not Tested for this Contaminant (170 wells)

Rio Grande Watershed

* EPA's Maximum Contaminant Level for safe drinking water
2009 Well Testing Results
Presence of Arsenic, Cadmium, Sodium, Iron, and/or Total Dissolved Solids

- All 5 Present (49 wells)
- Any 4 Present (72 wells)
- Any 3 Present (41 wells)
- Any 2 Present (5 wells)
- None present or no data (170 wells)*

* 170 wells were not tested for all contaminants
**2009 Well Testing Results**

**Iron**
- $> 0.300 \text{ ppm}^*$ (49 wells)
- 0.300-0.100ppm (47 wells)
- $< 0.100 \text{ ppm}$ (34 wells)
- Not Detected (37 wells)
- Not Tested for this Contaminant (170 wells)

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* EPA's Maximum Contaminant Level for safe drinking water

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2009 Well Testing Results
Exceeding EPA's Maximum Contaminant Level (MCL) for Safe Drinking Water

Contaminants > MCL (total wells)
- 7 Contaminants > MCL (1 well)
- 4 Contaminants > MCL (2 wells)
- 3 Contaminants > MCL (16 wells)
- 2 Contaminants > MCL (49 wells)
- 1 Contaminant > MCL (70 wells)
- None > MCL (199 wells)*

* 170 wells were not tested for all contaminants

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2009 Well Testing Results

Nitrate

- > 10.0 ppm*
- 5.0 - 10.0 ppm
- < 5.0 ppm
- Trace Quantity
- Not Detected

* EPA's Maximum Contaminant Level for safe drinking water
2009 Well Testing Results

- Wells Tested for all Contaminants
- Wells Not Tested for all Contaminants*

Río Grande Watershed

* 170 wells were not tested for all contaminants

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2009 Well Testing Results

- Wells Tested*
- Rio Grande Watershed

* 170 wells were not tested for all contaminants
2009 Well Testing Results
Total Dissolved Solids

- > 500 ppm* (4 wells)
- 100 - 500 ppm (131 wells)
- < 100 ppm (31 wells)
- Not Tested for this Contaminant (170 wells)

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* EPA’s Maximum Contaminant Level for safe drinking water