

Lesson 5 - Creating Prescription Maps

Exercise 5-2

Objective: Create a lime prescription map based on the North Central Region recommendations.

1. **File-Open Project_5-1.map.**
2. From the **File** menu, select **Import-Table**. In the **Import Table** dialog box, choose **CSV Files (*.asc, *.tab, *.txt)** in the **Files of type** box and navigate to the **LR_6.5.txt** file to open. Click **Open**. In the popup **Import CSV File** dialog box, click **OK**.
3. Double-click the **LR_6.5.txt** table component in the **Project** pane. *This table shows the relationship between buffer pH and lime requirement:*

Buffer_pH	Lime_Requirement
7	0
6.9	0
6.8	1.2
6.7	2.1
6.6	2.9
6.5	3.8
6.4	4.7
6.3	5.5
6.2	6.4
6.1	7.2
6	8.1
5.9	9
5.8	9.8
5.7	10.7
5.6	11.6
5.5	12.5
5.4	13.4
5.3	14.2
5.2	15.1
5.1	16
5	16.9
4.9	17.8
4.8	18.6

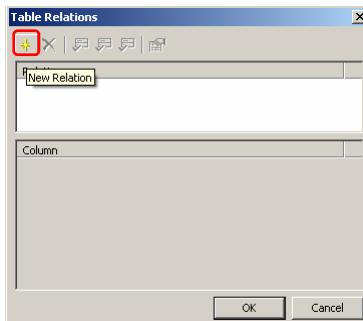
4. Double-click the **Soil_Analysis** table component in the **Project** pane. *Since several points under the column heading of pH_Buf do not have buffer pH test results, 0 is placed by default and should be replaced by 7.*
5. In **Selection Toolbar**, select the **pH_Buf** field in the **Target box**, **Equal to** in the **Operator box**, and enter **0** in the **Argument box**. Click the **Select** button. All rows containing **0** in the **pH_Buf** column will be selected.
6. In **Transform Toolbar**, select the **pH_Buf** field for the **Target box**, **Fill with** for the **Operator box**, and enter **7** in the **Parameter box**. Click **Apply**. All **0** values for **pH_Buf** will be substituted with **7**.
7. Click the **Select None** icon to unselect the selected rows in the table.

Application of Manifold GIS Software for Precision Agriculture
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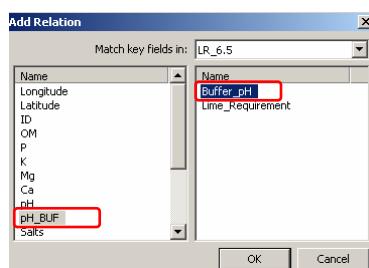
The screenshot shows a software interface for precision agriculture. On the left is a table with 18 columns and 45 records, containing data such as Longitude, Latitude, ID, OM, P, K, Mg, Ca, pH, pH_BUF, Salts, Na, %K, and various nutrient rates and goals. A red box highlights the 'pH_BUF' column. On the right is a 'Project' tree view showing layers like 'Boundary', 'Bray-1 P', 'Bray-1 P 2 Contours', etc. Below the tree is a 'Transform Toolbar' with various icons. At the bottom is a 'Selection Toolbar' with dropdown menus for 'pH_BUF' (set to 'not Equal to 0'), 'Select', 'Fill with', and 'Apply'. A red arrow points from the 'pH_BUF' dropdown in the Selection Toolbar to the highlighted cell in the table.

Longitude	Latitude	ID	OM	P	K	Mg	Ca	pH	pH_BUF	Salts	Na	%K	
-96.495892	41.167422	13	2.7	32	383	236	2049	6	6.7	0.32	16	5.7	
-96.495916	41.166736	14	3.1	8	265	365	2022	5.7	6.6	0.26	9	3.6	
-96.495928	41.165975	15	2.9	10	347	2508	5.8	6.6	0.35	8	4		
-96.495925	41.165249	16	3.2	22	392	298	2361	5.9	6.7	0.3	10	5.2	
-96.495905	41.164551	17	3.7	29	500	283	1877	5.6	6.4	0.25	9	6.4	
-96.495905	41.163821	18	2.7	9	440	248	1758	6	6.7	0.25	7		
-96.496875	41.166006	19	2.6	10	480	245	2024	6.3	6.9	0.28	8	7.8	
-96.496872	41.165649	20	2.6	9	399	307	2309	5.7	6.7	0.39	8	5.3	
-96.496857	41.166357	21	2.6	10	356	531	2932	6.1	6.8	0.55	9	4	
-96.496803	41.167081	22	3.3	39	309	247	2046	5.9	6.7	0.3	8	4.6	
-96.497844	41.166141	46	2.9	25	163	296	2805	6.4	6.9	0.31	30	2.1	
-96.497822	41.167473	47	2.8	69	299	276	2559	6.6	7	0.27	12	4.8	
-96.497835	41.166723	48	6.4	7	309	352	2753	5.8	6.7	0.28	10	3.7	
-96.49784	41.166011	49	10	9	265	592	2210	6.1	6.8	0.29	38	3.4	
-96.497848	41.165252	50	3.2	33	626	224	1779	5.4	6.5	0.28	9	8.7	
-96.494912	41.163505	51	3	17	451	523	3181	6.1	6.8	0.35	10	4.7	
-96.494905	41.164168	52	2.8	7	324	268	1677	5.8	6.6	0.22	7	5	
-96.494923	41.164897	53	2.9	7	338	275	2119	6.1	6.8	0.23	10	5.2	
-96.494905	41.165643	54	2.8	8	457	454	250	6	6.8	0.28	9	5.7	
-96.494895	41.166344	55	2.8	3	293	521	2372	5.7	6.8	0.43	9	3.8	
-96.494888	41.167028	56	2.9	11	386	302	2205	5.6	6.6	0.25	8	5.1	
-96.493931	41.167478	94	2.6	22	422	256	1853	5.6	6.5	0.22	6	5.8	
-96.49395	41.166759	95	2.7	21	424	295	1937	5.6	6.7	0.27	8	6.3	
-96.493971	41.166007	96	3.3	22	437	246	2396	6.5	7	0.32	6	7.4	
-96.493997	41.165272	97	2.7	14	364	304	2764	6.9	7	0.37	7	5.4	
-96.493987	41.164539	98	2.4	9	341	288	1852	6.1	6.9	0.25	6	5.8	
-96.493994	41.163797	99	2.7	8	380	399	2258	6.1	6.8	0.29	7	5.2	
-96.492978	41.163491	100	2.6	14	296	352	2030	5.9	6.7	0.26	7	4.2	
-96.492967	41.164179	101	1.9	4	300	578	3185	7.6	7	0.54	7	3.6	
-96.492954	41.164833	102	2.8	9	313	574	2587	6.2	6.8	0.36	9	3.7	
-96.492959	41.165617	103	2.5	9	415	280	1784	5.9	6.7	0.24	5	6.5	
-96.492945	41.166325	104	3.2	8	322	337	1963	6.2	6.9	0.32	5	5.2	
-96.492954	41.167129	105	2.8	22	439	407	2586	6	6.8	0.3	7	5.5	
-96.492018	41.167467	106	2.7	7	354	471	2520	6.1	6.8	0.29	9	4.4	
-96.492027	41.166752	107	2.6	8	307	315	1925	5.6	6.6	0.24	7	4.4	
-96.492045	41.165997	108	2.1	26	271	446	2638	6.4	6.9	0.32	9	3.5	
-96.492004	41.164549	109	2.1	9	251	611	2897	6.1	7	0.35	11	2.9	
-96.491084	41.164195	112	1.9	5	138	329	264	1835	5.7	6.6	0.25	7	4.9

8. From **Table** menu select **Relations**. In the popup **Table Relations** dialog box, click the **New Relation** icon.



9. In the popup **Add Relation** dialog box, select the **LR_6.5** table from the list of **Make key fields in** box. Click the **pH_Buf** field in the left list of names and the **Buffer_pH** field in the right list of names. Click **OK**. The table will be related using these two columns.



10. Back in the **Table Relations** dialog box, check **Lime_Requirement** in the **Columns** box and click **OK**.

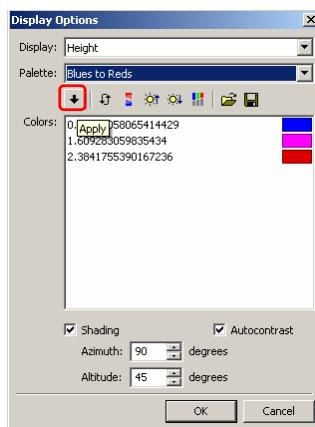


11. In the **Soil_Analysis** table, scroll to the right to observe the new column with the **Lime_Requirement** heading. This column was taken from the **LR_6.5** table.

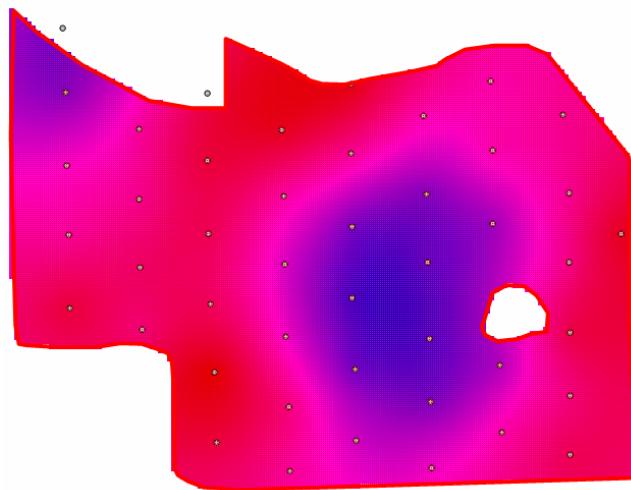
[lah_Manifold_project_5-3 *] - Manifold System - [Soil_analysis *]												
	pH	pH_BUF	Salts	Na	%K	%Mg	%Ca	%Na	%H	CEC	Lime_R...	
2049	6	6.7	0.22	16	5.7	11.4	59.3	0.4	23.2	17.3	2.1	
2022	5.7	6.6	0.26	9	3.6	16.1	53.6	0.2	26.5	18.9	2.9	
2508	5.8	6.6	0.35	8	4	17.6	56	0.2	22.3	22.4	2.9	
2361	5.9	6.7	0.3	10	5.2	12.8	61	0.2	20.7	19.3	2.1	
1877	5.6	6.4	0.25	9	6.4	11.8	46.8	0.2	24.9	20.1	4.7	

12. Right click the **Lime_Requirement** column heading and select **Flatten** to make this column permanent. Close both tables.
13. Right click the **Soil_Analysis** table component in the **Project** pane and click **Copy**. Right click an empty location in the **Project** pane and select **Paste As-Drawing**. In the popup **Paste As Drawing** dialog box click on the **Select None** icon and then check the checkboxes next to **pH** and **Lime_Requirement**. Click **OK**.
14. Right click the **Soil Analysis 2** drawing component in the **Project** pane and select **Rename**. In the popup **Component Name** dialog box, type **Soil pH** in the **Change to** box and click **OK**. Right click the **Soil pH** drawing component and select **Assign Projection**. In the popup **Assign Projection** dialog box, click **OK**. Right click the **Soil pH** drawing component again and choose **Change Projection**. In the popup **Change Projection** dialog box select **Universal Transverse Mercator - Zone 14 (N)**. Click **OK**.
15. Again, right click the **Soil pH** drawing component in the **Project** pane and select **Copy**. Right click any empty location in the **Project** pane and select **Paste As-Surface**. In the popup **Paste As Surface** dialog box choose **Lime_Requirement** in the **Height** box, set **60** by **60** meter **Margins** and **5** by **5** meter **Pixel size**. Specify the **Spherical** variogram model in the **Model** box and click **OK**.
16. Right click the **Soil pH 2** surface in the project pane and select **Rename**. In the popup **Component Name** dialog box, type **Lime Requirement** in the **Change to** box. Click **OK**. Right click an empty location in the **Project** pane and select **Create-Map**. In the popup **Create Map** dialog box, type **Lime Rate** in the **Name** box and check the checkboxes next to **Boundary**, **Soil pH** and **Lime Requirement**. Click **OK**.

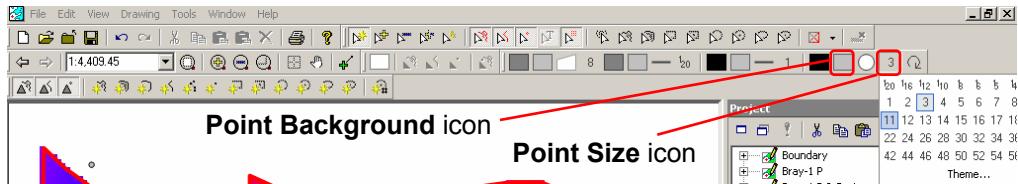
17. Double-click the **Lime Rate** map component in the **Project** pane. Expand the map using the **Maximize** button and click the **Zoom To Fit** icon. Click inside the boundary to select the field area.
18. Click the **Lime Requirement** tab. From the **Surface** menu choose **Transfer Selection**. In the popup **Transfer Selection** dialog box, click **OK**. From the **Edit** menu, choose **Select Inverse**. Press the **Delete** button on the keyboard.
19. From the **View** menu select **Display options**. In the popup **Display options** dialog box, select **Blues to Reds** in the **Palette** box. Click the **Apply** icon and **OK**.



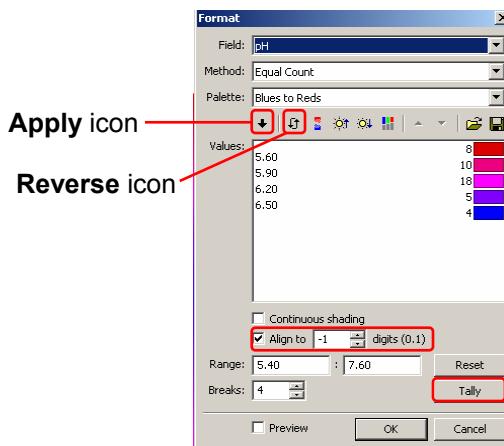
As a result, the following lime requirement map will appear. The blue area requires little or no lime.



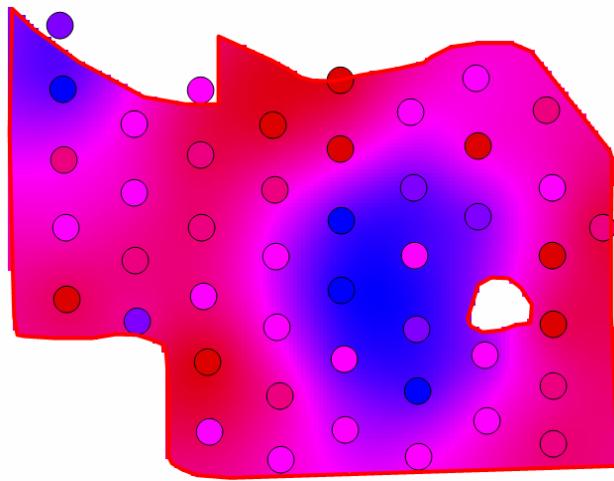
20. Click the **Boundary** tab and the **Select None** icon.
21. Click the **Soil pH** tab, the **Point Size** icon, and select **11**.



22. Click the **Point Background icon** and select **Theme**. In the popup **Format** dialog box, set the value of **Align to** equal **-1** to set the divider with 0.1 pH precision. Click **Tally**. Select **Blues to Reds** from the drop-down menu in the **Palette** box. Click the **Apply** icon and **Reverse** icon. Click **OK**.

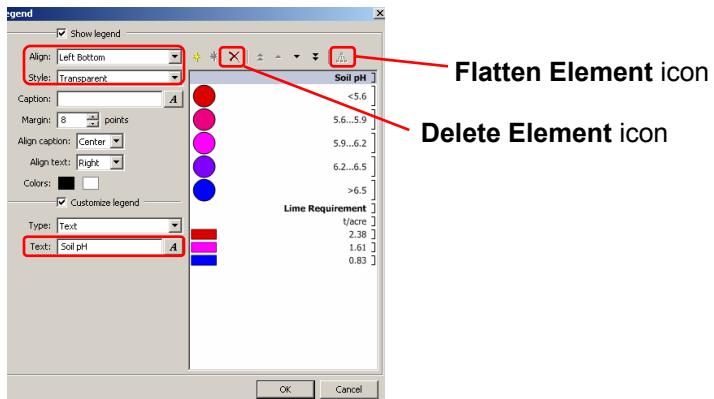


The lime requirement map with the soil pH values should appear as shown below:

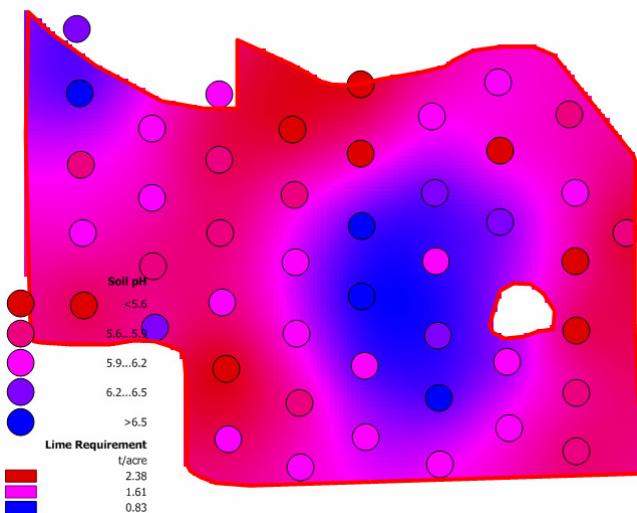


23. From the **View** menu select **Legend**. In the popup **Legend** dialog box check the checkboxes next to **Show legend** and **Customize legend**. Select **Transparent** from the drop-down menu in the **Style** box. Choose **Left Bottom** from drop-down menu in the **Align** box. Click the **Delete Element** icon to remove the boundary element.

24. Click the **Flatten Element** icon to start modifying the legend. First, click the **Points: pH** line in the box on the right and click the **Delete Element** icon to get it removed. Then, click the **Lime Requirement** in the legend box to be selected and click the **Flatten Element** icon again. Click the **Heights** line in the legend box and type *t/acre* in the **Text** box on the left side. Click the first number under *t/acre* and type **2.38** in the **Text** box. Click the second number under *t/acre* and type **1.61** in the **Text** box. Finally, click the third number under *t/acre* and type **0.83**. Click **OK**. By changing the numbers presented in the legend we can round the numbers to three significant digits.



The final lime requirement map with soil pH measurements and legend displayed is shown below.



25. File-Save As *Project_5-2.map*.