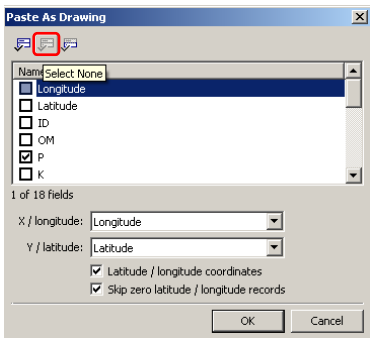
# Lesson 5 - Creating Prescription Maps

## Exercise 5-1

**Objective:** Create a phosphorus prescription map based on the University of Nebraska-Lincoln recommendations.

1. **File-Open** ***Project_5-0.map***. *The required data for this exercise are: field boundary (Exercise 2-3), soil organic matter map (Exercise 4-2), soil analysis data (Exercise 4-1) and yield goal map (Exercise 3-3).*

2. Right click the ***Soil_Analysis*** table component in the **Project** pane and click **Copy**. Right click any empty location in the **Project** pane and select **Paste As-Drawing**. In the popup **Paste As Drawing** dialog box, click the ***Select None*** icon and then check the box next to ***P***. Click **OK**.

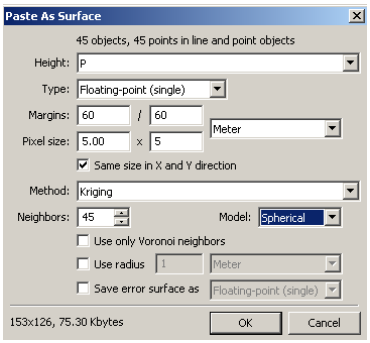



3. Right click the ***Soil Analysis 2*** drawing component in the **Project** pane and select **Rename**. In the popup **Component Name** dialog box, type ***Bray-1 P*** in the **Change to** box and click **OK**.

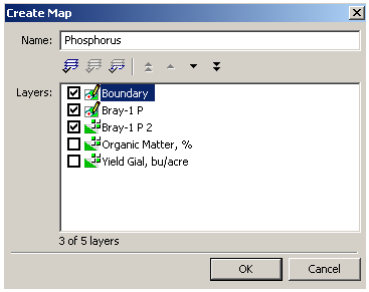
4. Right click the ***Bray-1 P*** drawing component and select **Assign Projection.** In the popup **Assign Projection** dialog box, click **OK**.

5. Right click the ***Bray-1 P*** drawing component in the project pane and choose **Change Projection**. In the popup **Change Projection** dialog box, navigate to ***Universal Transverse Mercator - Zone 14 (N)*** and click **OK**.

6. Right click the ***Bray-1 P*** drawing component and select **Copy**. Right click any empty location in the **Project** pane and choose **Paste As-Surface**. In the popup **Paste As Surface** dialog box, select ***P*** for **Height** box, set ***60*** by ***60*** meter **Margins** and ***5*** by ***5*** meter **Pixel size**. Specify ***Spherical*** variogram model in the **Model** box and click **OK**.



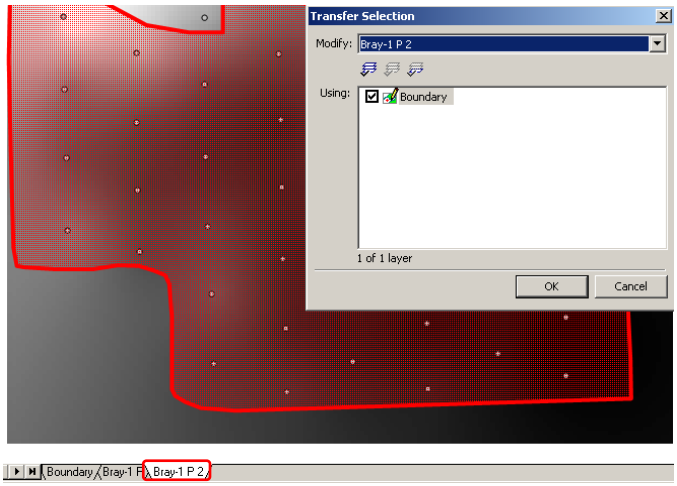

7. Right Click any empty location in the **Project** pane and select **Create-Map**. In the popup **Create Map** dialog box type ***Phosphorus*** in the **Name** box and check the boxes next to the ***Boundary***, ***Bray-1 P*** and ***Bray-1 P 2*** components. Click **OK**.




8. Double-click the ***Phosphorus*** map component in the **Project** pane. Expand the map using the **Maximize** button and click the **Zoom To Fit** icon.

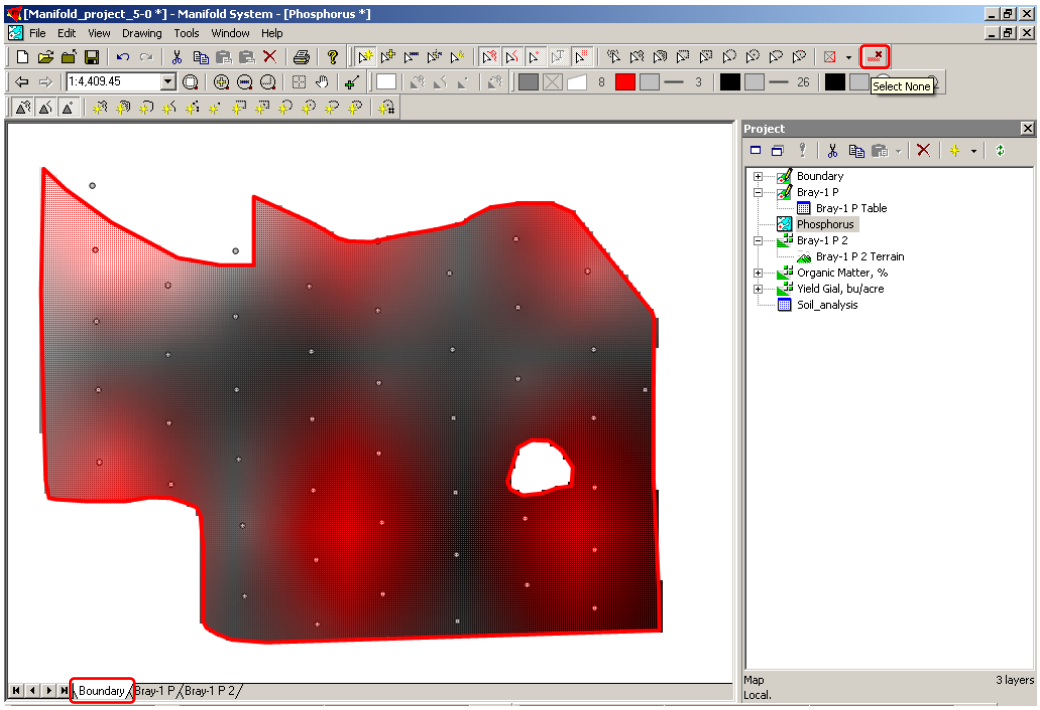
9. Click inside the field's boundary to select the field area. *The selected area turns red.*


10. Click the ***Bray-1 P 2*** tab at the bottom of the viewing window. From the **Surface** menu choose **Transfer Selection**. In the popup **Transfer Selection** dialog box, click **OK**.



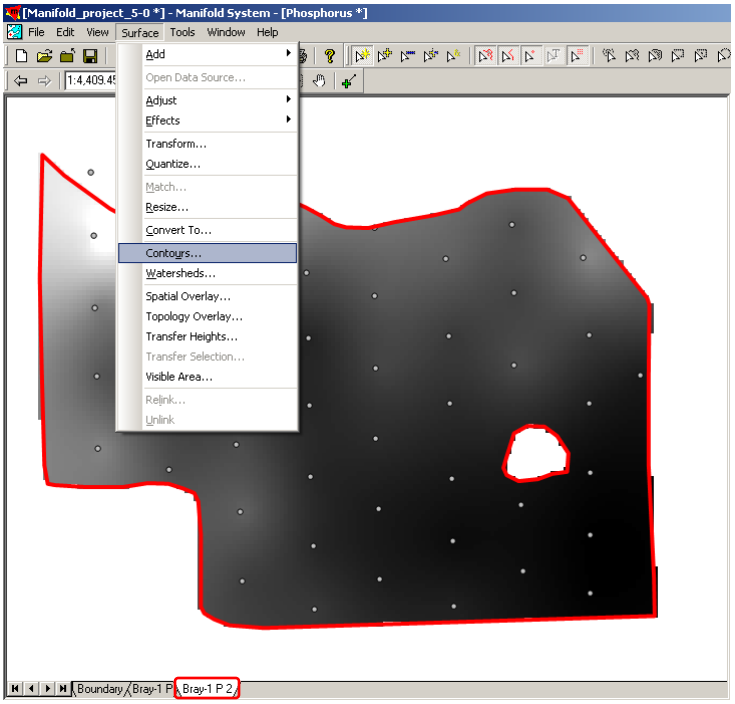

11. From the **Edit** menu choose **Select Inverse** and press the **Delete** button on the keyboard. *This action will remove all interpolated surface points outside the boundary of the field.*

12. Click on the ***Boundary*** tab and then the **Select None** icon to remove the boundary selection.

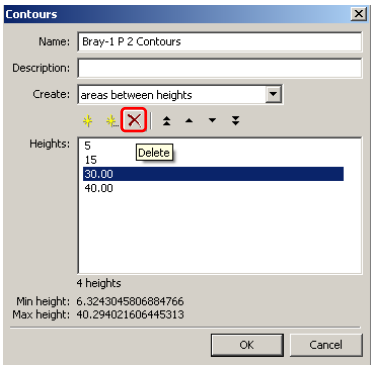



This result is the **map of soil phosphorus test**. Move the pointer from a southwest to a northeast direction and observe the change in the Bray-1 P test values (Z-values).

13. Click on the ***Bray-1 P 2*** tab again. From the **Surface** menu select **Contours**.



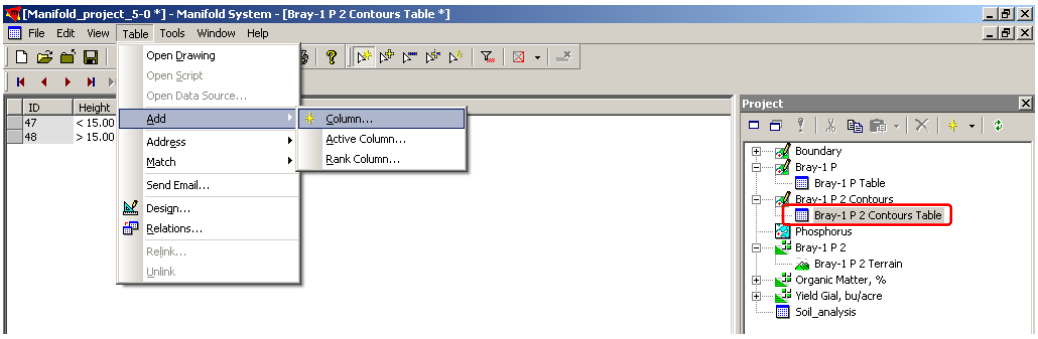

14. In the popup **Contours** dialog box, double click ***10*** in the **Heights** box and enter ***5*** instead. Similarly substitute ***20*** with ***15***. Click the value of ***30*** and click the **Delete** icon two times to remove both ***30*** and ***40***. Click **OK**.



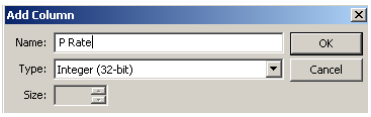

*The UNL fertilizer recommendations for corn provide $P_2O_5$ recommendation rates according to the following table. The action described above allows grouping all Bray-1 P measurements according to the three lines in this table.*

| Bray-1 P | $P_2O_5$, lb/acre |
|---|---|
| ≤5 | 80 |
| 6-15 | 40 |
| >15 | 0 |

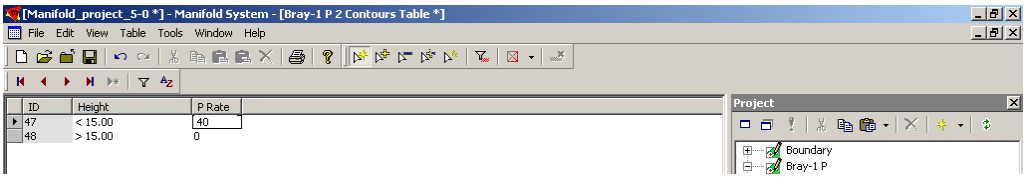
15. Double-click the ***Bray-1 P 2 Contours*** drawing component in the **Project** pane to see the map. Double-click the ***Bray-1 P 2 Contours Table*** component. From the **Table** menu, select **Add-Column**.



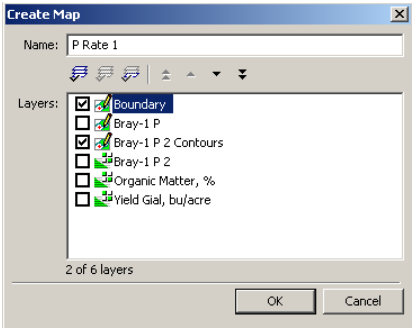

16. In the popup **Add Column** dialog box, type ***P Rate*** in the **Name** box and click **OK**.




17. Double-click the first row of the ***P Rate*** column and enter ***40***. *Since no pixels of the Bray-1 P 2 surface had values less than 5, only two levels appeared in the contour drawing.*

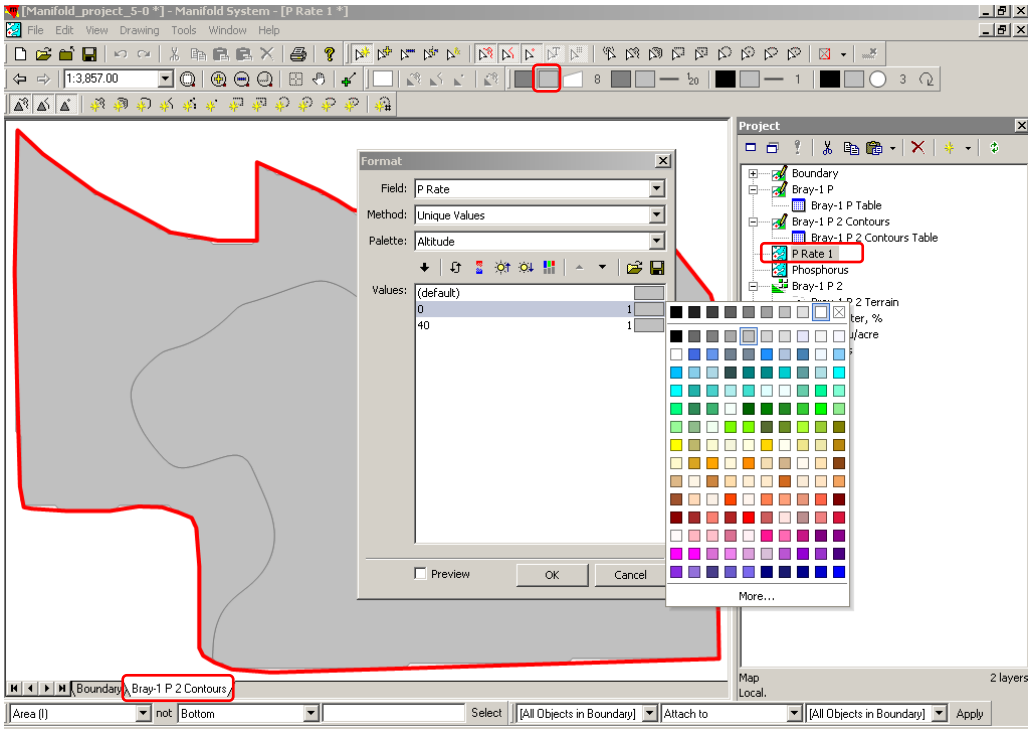



18. Right click an empty location in the **Project** pane and select **Create-Map**. In the popup **Create Map** dialog box, type ***P Rate 1*** in the **Name** box and check the checkboxes next to ***Boundary*** and ***Bray-1 P 2 Contours***. Click **OK**.

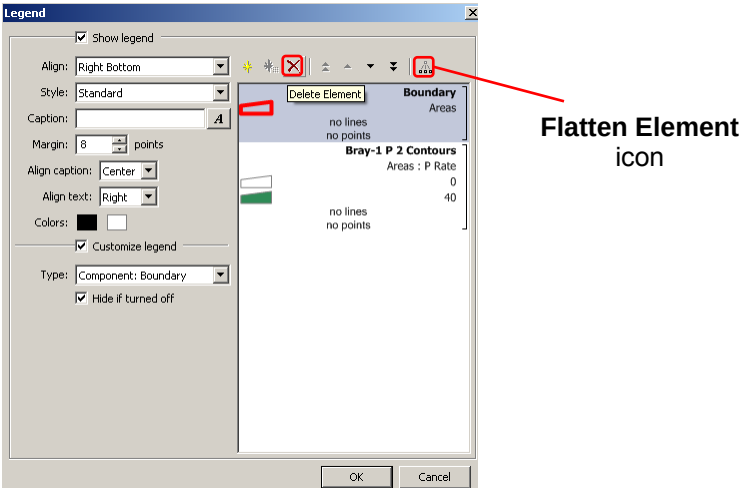



19. Double-click the new ***P Rate 1*** map component in the **Project** pane. Click the **Maximize** button and **Zoom To Fit** icon. Click the ***Bray-1 P 2 Contours*** tab.

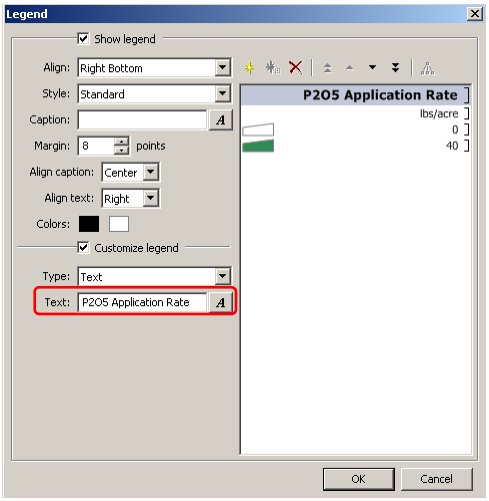
20. Click the **Area Background** icon and select ***Theme***. In the popup **Format** dialog box, select ***P Rate*** in the **Field** box. Double-click the gray rectangle next to 0 in the **Values** box and choose the ***White*** color. Double-click the gray rectangle next to 40 and choose the ***Green*** color. Click **OK**.



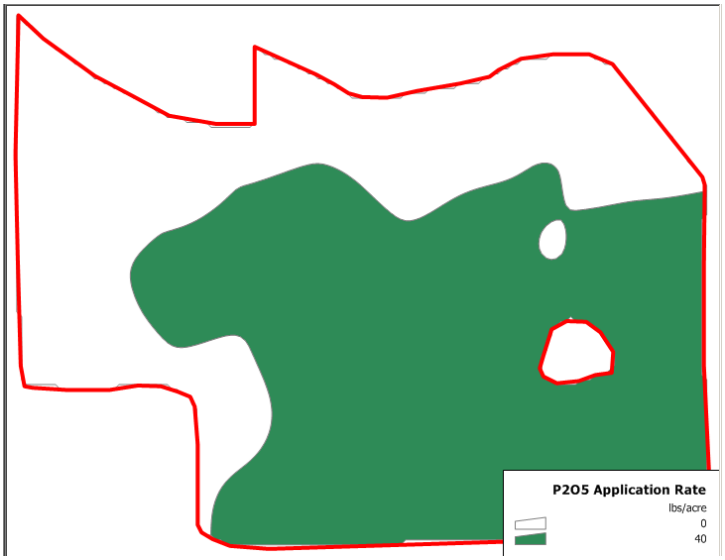

21. From the **View** menu select **Legend**. In the popup **Legend** dialog box, check the checkboxes next to ***Show legend*** and ***Customized legend***. Click the **Delete Element** and then the **Flatten Element** icons.



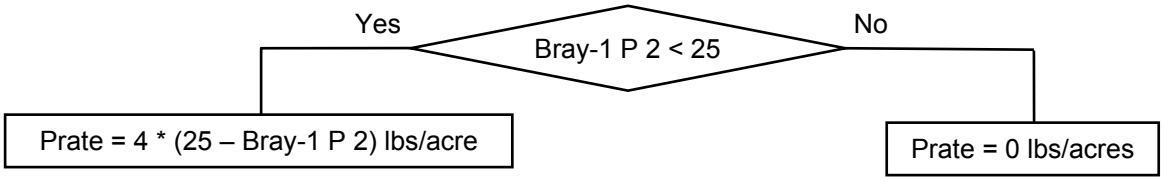

22. After flattening, a **Text** box on the left side of the popup **Legend** dialog box will appear. Click the ***Bray-1 2 Counters*** line on the right and enter ***$P_2O_5$ Application Rate*** in the **Text** box on the left. Click ***Areas: P Rate*** on the right and enter ***lbs/acre*** in the **Text** box on the left side. Click **OK**.



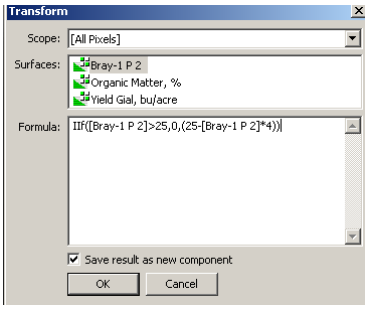

*Following is the resulting phosphorous prescription map that is based on tabular recommendations:*



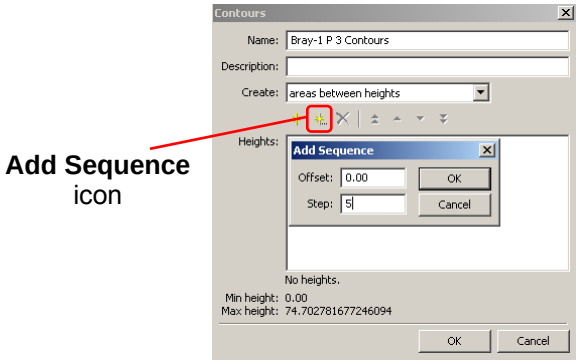

23. Double-click on the ***Phosphorus*** map component in the **Project** pane to start making another prescription map that is based on the following UNL recommendation algorithm:




24. From the **Surface** menu select **Transform**. In the popup **Transform** dialog box type ***IIf([Bray-1 P 2]>25,0,(25-[Bray-1 P 2])*4)***, check checkbox next to **Save result as new component**, and click **OK**.

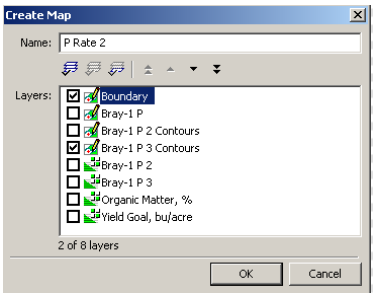



Double-click the ***Bray-1 P 3*** surface component in the **Project** pane. From the **Surface** menu select **Contours**. In the popup **Contours** dialog box, click the first line in the **Heights** box and click the **Delete** icon repeatedly to remove all intervals. Then click the **Add Sequence** icon. In the popup **Add Sequence** dialog box, reduce the increment to ***5*** in the **Step** box. Click **OK**.



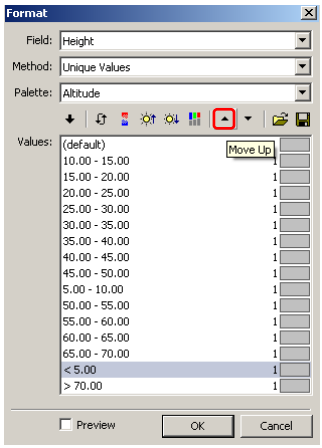

*With this action, the number of increment intervals will be 15 instead of 8 when the default 10 unit increments were used.*

25. Right click any empty location in the **Project** pane and select **Create-Map**. In the popup **Create Map** dialog box, type ***P Rate 2*** in the **Name** box and check the checkboxes next to ***Boundary*** and ***Bray-1 P 3 Contours***. Click **OK**.

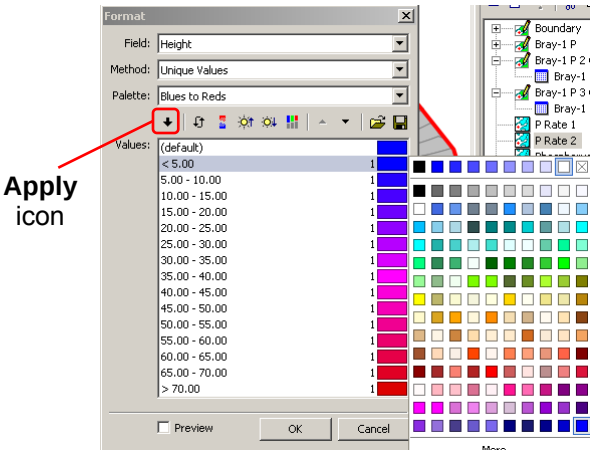



26. Double-click the new ***P Rate 2*** map component in the **Project** pane. Click the **Maximize** button and the **Zoom To Fit** icon. Click the ***Bray-1 P 3 Counters*** tab.

27. Click the **Area Background** icon and select **Theme**. In the popup **Format** dialog box click on ***< 5.00*** line in the **Values** box and click the **Move Up** icon repeatedly until the line is moved right below the ***default*** line. Then, click the ***5.00-10.00*** line in the **Value** box and move it just below the ***< 5.00*** line.

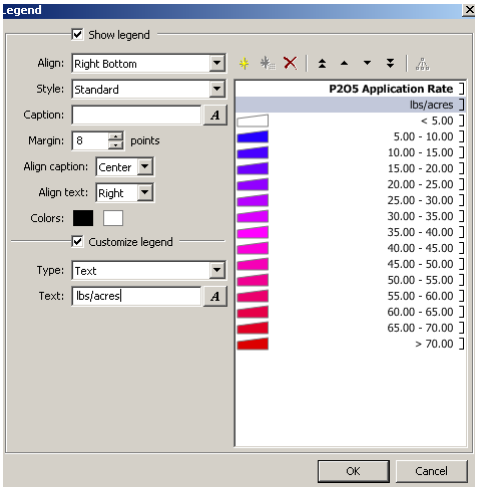



28. Select **Blues to Reds** from drop-down menu in the **Palette** box. Click the **Apply** icon. Double-click the rectangle next to the ***< 5.00*** line in the **Values** box and select the ***White*** color. Click **OK.**

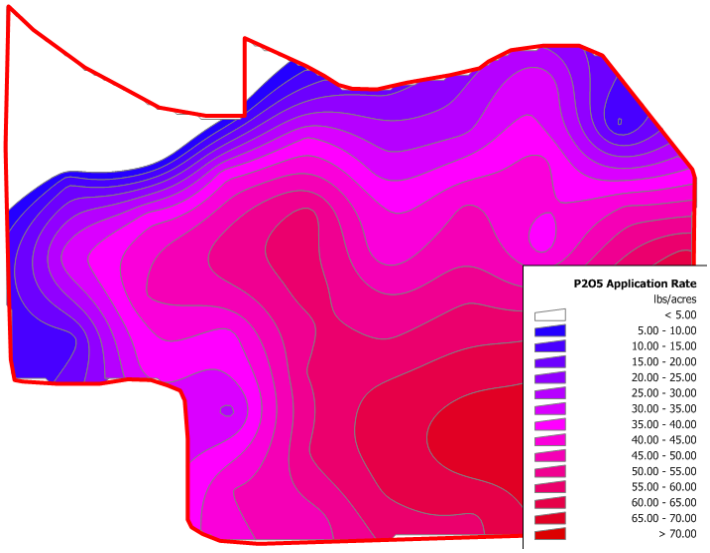



29. From the **View** menu select **Legend**. In the popup **Legend** dialog box, check the checkboxes next to **Show legend** and **Customized legend**. Click the **Delete Element** and then the **Flatten Element** icons.

30. After element flattening, click the ***Bray-1 2 Counters*** on the right and enter ***$P_2O_5$ Application Rate*** in the **Text** box on the left side. Click ***Areas: P Rate*** on the right and write ***lbs/acre*** in the **Text** box on the left. Click **OK**.




*Following is the resulting phosphorous prescription map that is based on equation recommendations. This map can be transferred to certain VRT controllers or exported to be further processed by third-party software.*




31. From the **Window** menu, select **Close All**. Double-click the ***P Rate 1*** and ***P Rate 2*** map components in the **Project** pane. From the **Window** menu, select **Tile Vertically**. Visually compare the two maps.

32. **File-Save As *Project_5-1.map***.