

Lesson 3 - Processing a Multi-Layer Yield History

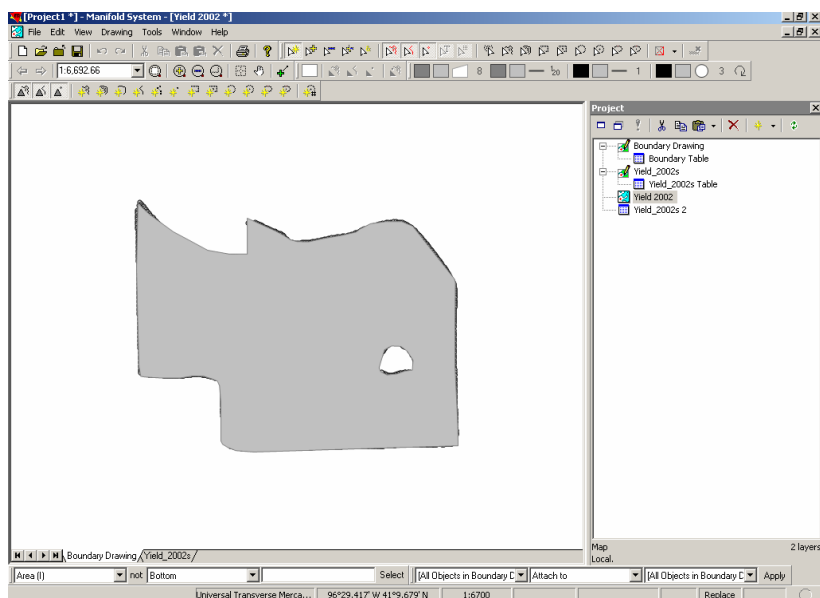
Exercise 3-2

Objective: Import one year of yield data and develop an interpolated normalized surface.

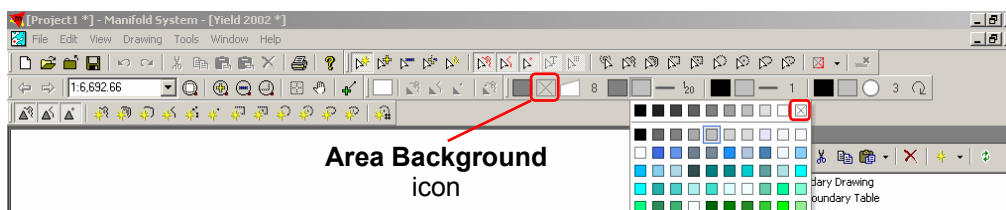
1. For this exercise, **Boundary.zip** and **Yield.zip** files should be downloaded and unzipped. The shape layer, *Boundary*, has four files. The *Yield* archive contains five years of processed yield data. In this field, corn was grown every odd year and soybean was produced in even years.
2. Open **Manifold**. Choose **File-Import-Drawing**. In the popup **Import Drawing** dialog box, select **SHP Files (*.shp)** in the **Files of type** box and navigate to the **Boundary.shp** file. Click **Open**. In the popup **Import SHP File** dialog box, click **OK**.
3. Choose **File-Import-Table**. In the **Import Table** dialog box, select **CSV Files (*.acs, *.scv, *.tab, *.txt)** in the **Files of type** box and navigate to the **Yield_2002s.txt** file. Click **Open**. In the popup **CSV Import** dialog box, click **OK**.
4. Right click the **Yield_2002s** table component in the **Project** pane and select **Copy** in the popup menu. Right click any empty location in the **Project** pane and select **Paste As – Drawing** in the popup menu to convert the table to a drawing. In the **Paste As Drawing** dialog box, click **OK**.

In this example, a header line was used to recognize latitude and longitude coordinate columns. If the header line does not exist in the input file, proper numbered columns should be identified as geographical coordinates.

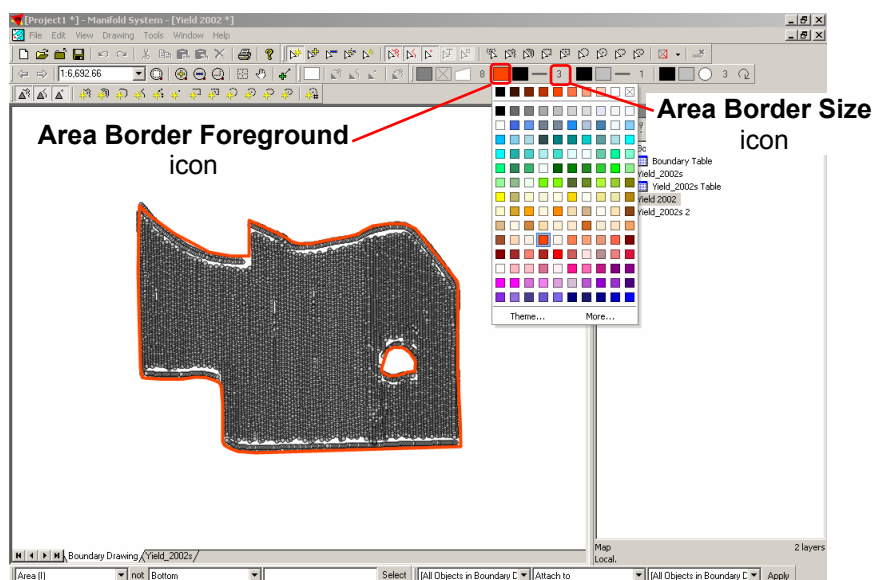
5. Right click **Yield_2002s 2** drawing component in the **Project** pane and select **Assign Projection**. In the popup **Assign Projection** dialog box, click **OK**. Right click the **Yield_2002s 2** drawing component again and select **Change Projection**. In the popup **Change Projection** dialog box, navigate to **Universal Transverse Mercator - Zone 14(N)**. Click **plus** the next to the **Universal Transverse Mercator** folder to see the list of zones. Click **OK**.
6. **Right Click** any empty location in the **Project** pane and select **Create-Map**. In the popup **Create Map** dialog box, write **Yield 2002** in the **Name** box and make sure both checkboxes (next to the **Boundary** and **Yield_2002s** drawing components) are marked. Click **OK**.
7. Double-click the **Yield 2002** map component in the **Project** pane. Expand the map by clicking the **Maximize** button at the top right corner of the map window. Click the **Zoom To Fit** icon. The following screen should appear:



8. Click the **Area Background** icon and select **X**.

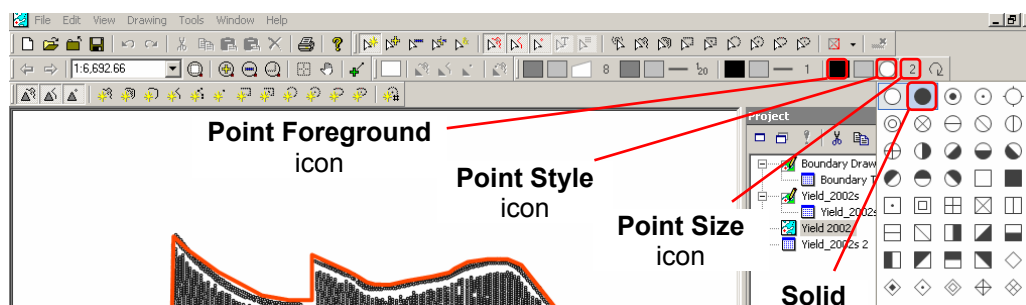


9. Click the **Area Border Foreground** icon and change the color to **Orange**. Click the **Area Border Size** icon and change the border size to **3**.

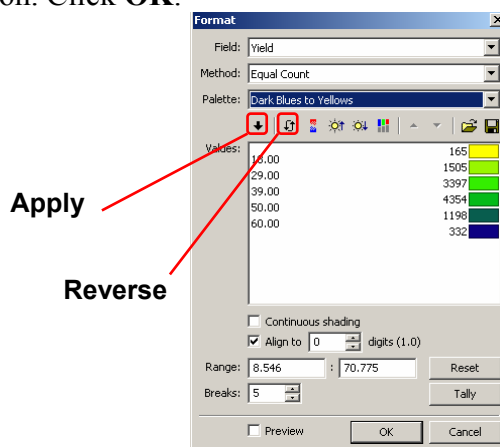


This way, the appearance of the field's boundary is changed.

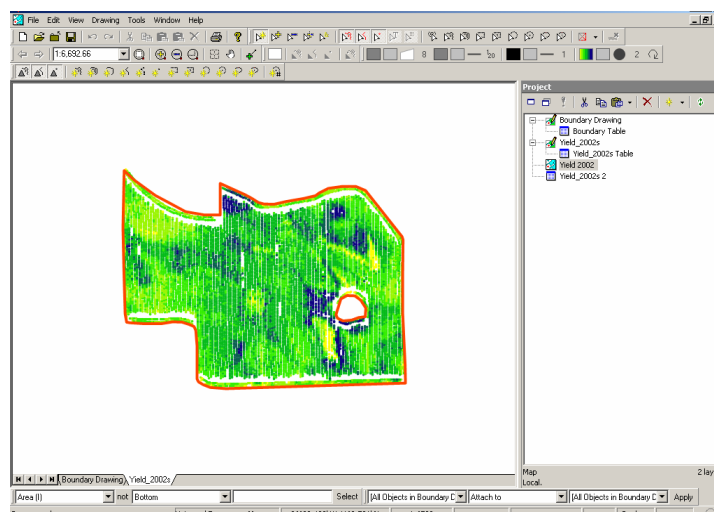
10. Click the **Yield_2002** tab at the bottom of the viewing window. Click the **Point Size** icon and select **2**. Click the **Point Style** and select **Solid**. Click the **Point Foreground** icon and select **Theme**.



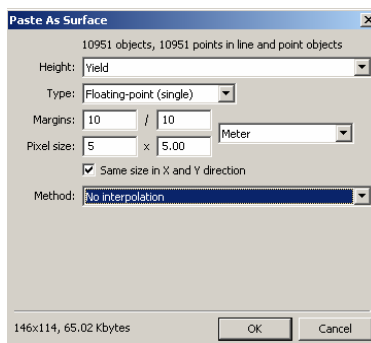
11. In the popup **Format** dialog box, select the **Yield** in **Field** menu box. Choose the **Dark Blues to Yellows** pallet in the drop-down **Palette** menu box. Click the **Apply** icon. Click the **Reverse** icon. Click **OK**.



The modified yield map should appear as follows:

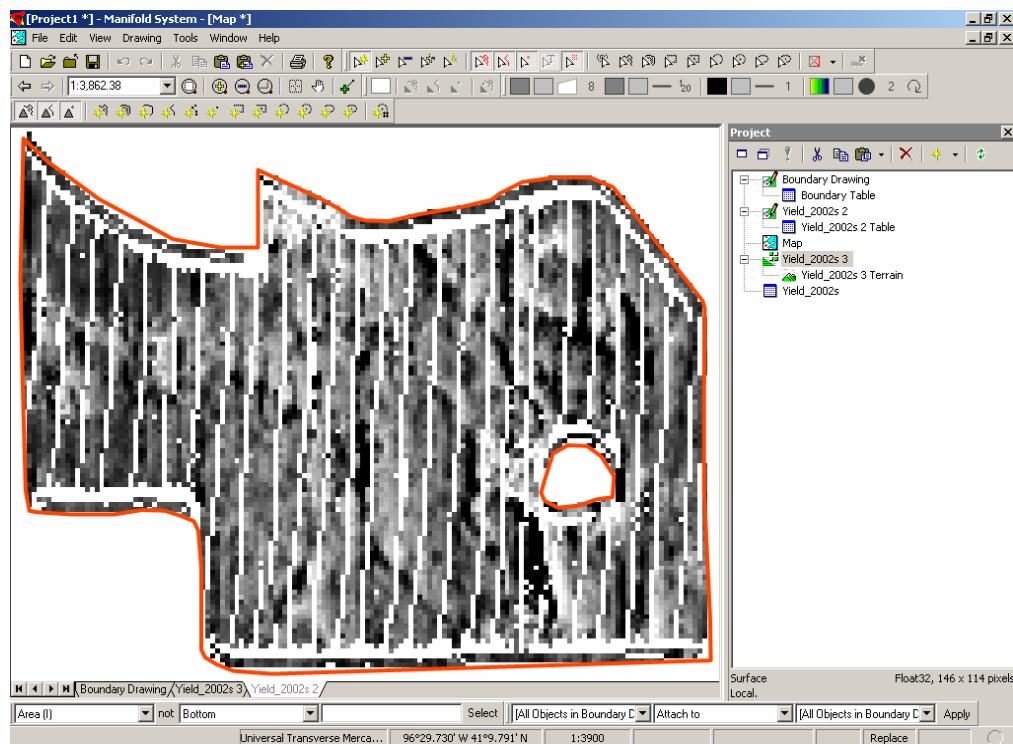


12. Interpolate the map and trim it to the extent of the field. Right click the **Yield_2002s** drawing component in the **Project** pane and select **Copy**. Right click any empty location in the **Project** pane and select **Paste As-Surface**. In the popup **Paste As Surface** dialog box select **Yield** in the **Height** pull down menu. Set the **Margins 10** by **10** meters and the **Pixel size 5** by **5**. Select **No Interpolation** method in the **Method** pull down menu. Click **OK**.

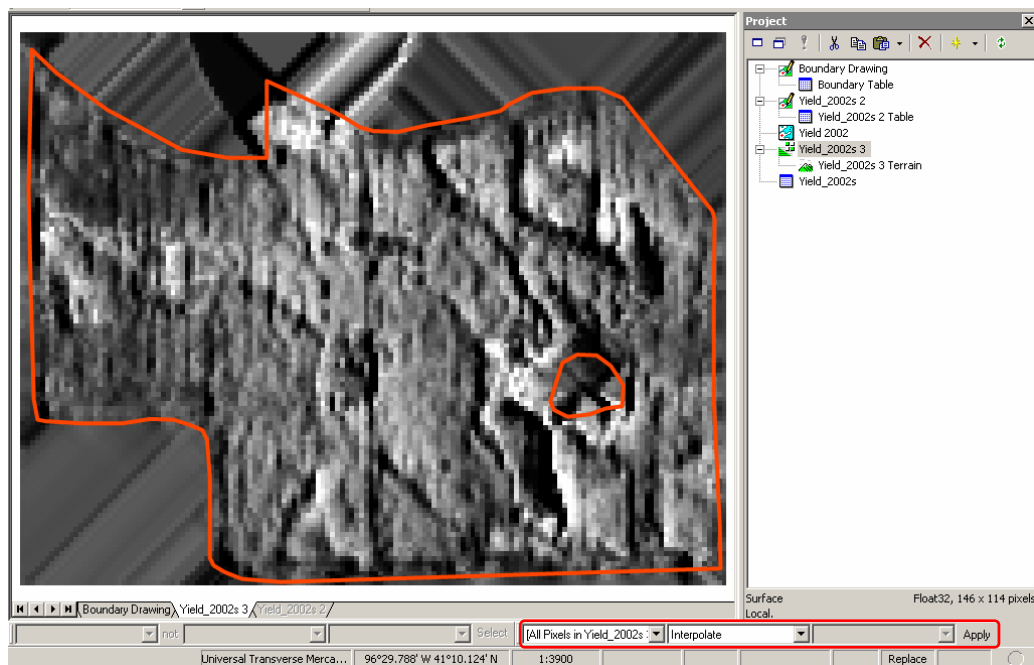


Surface resolution can be higher or lower than 5 m. When larger pixels are selected, certain data details will be smoother. Smaller size of pixels will require a longer time for computation.

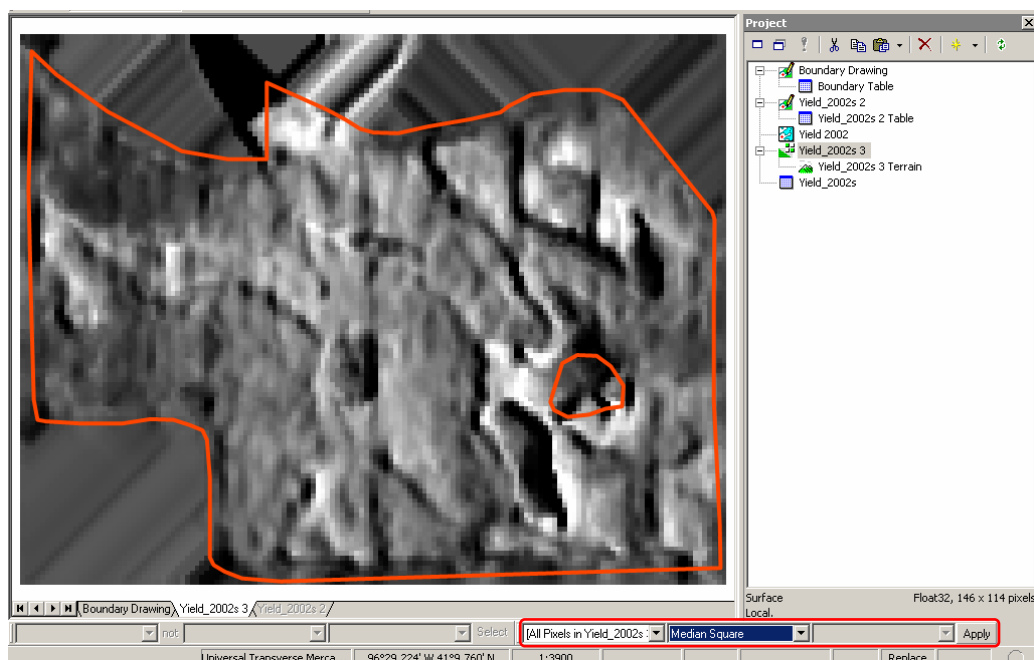
13. Click the **Yield_2002s 3** surface component in the **Project** pane and drag it to the map. Double click the **Yield_2002s** tab at the bottom of the viewing window. *This will hide the yield points from the map and the raw yield data in raster (pixel) format will appear as follow:*



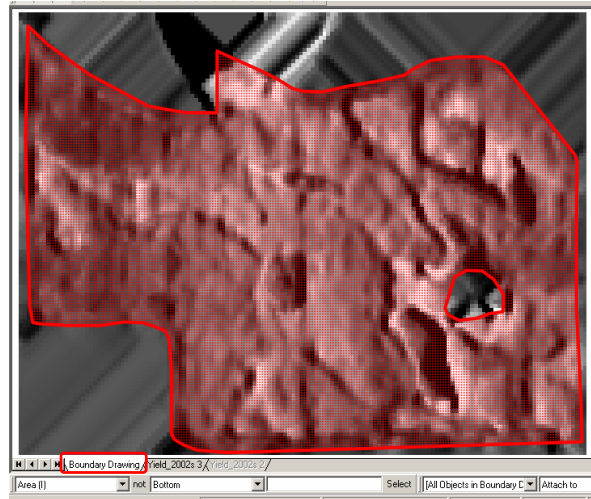
14. Click the **Yield_2002s 3** tab. In **Transform Toolbar**, select **All Pixels in Yield 2002s 3** in the **Target** menu and **Interpolate** in the **Operator** menu. Click **Apply**. This will fill the entire viewing window with yield pixels according to the nearest neighbor rules.



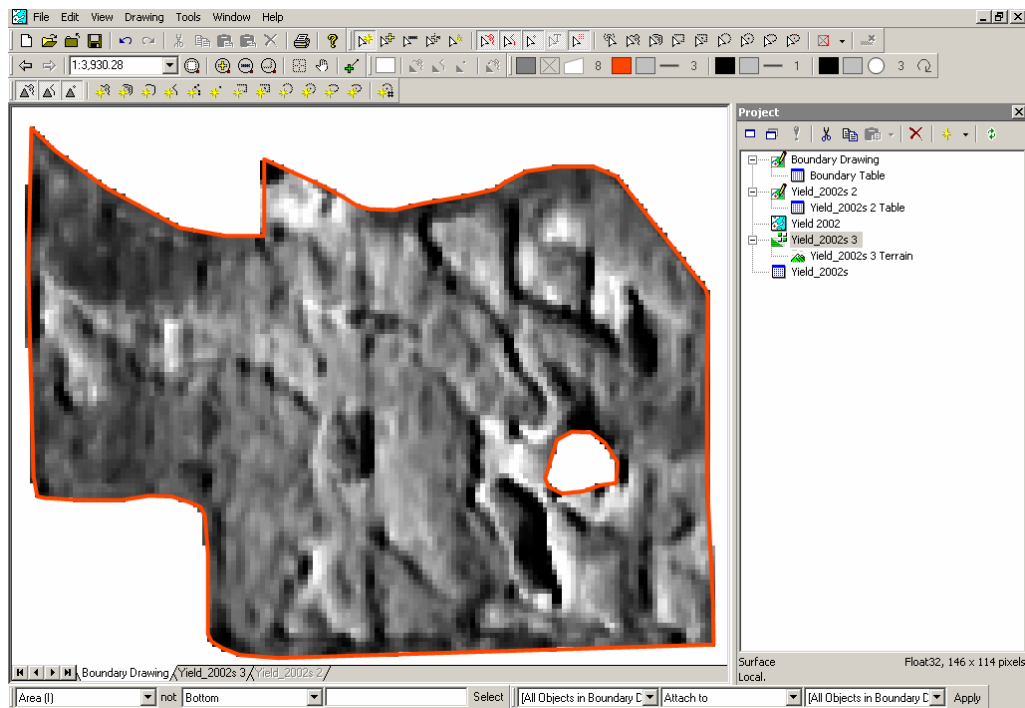
15. In **Transform Toolbar** select **All Pixels in Yield 2002s 3** in the **Target** menu and **Median Square** in the **Operator** menu. Click **Apply**. This will cause the surface to appear smooth without the averaging effect.



16. To select the boundary that should be used to retain pixels inside the field, click the **Boundary Drawing** tab. Click inside the boundary to be selected.

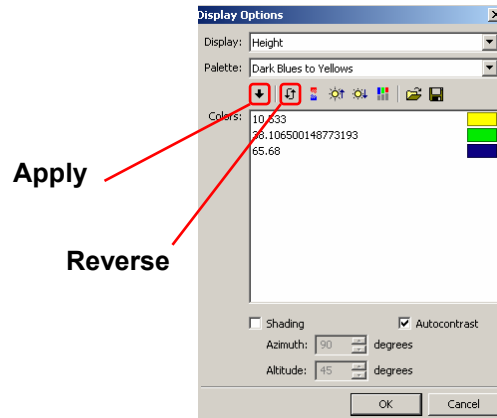


17. Click the **Yield 2002s 3** Surface tab. From the **Surface** menu, choose **Transfer Selection**. In the popup **Transfer Selection** dialog box, click **OK**. From the **Edit** menu, choose **Select Inverse**. Press the **Delete** key on the keyboard. Click the **Boundary Drawing** tab again and click the **Select None** icon.

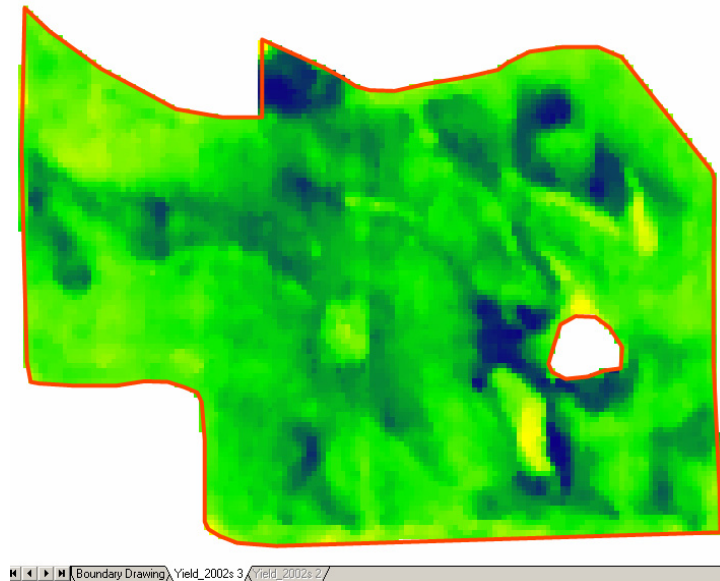


This process allows deleting every pixel of the interpolated surface outside the field boundary. The resulting surface can be used for calculations, or to create a contour map.

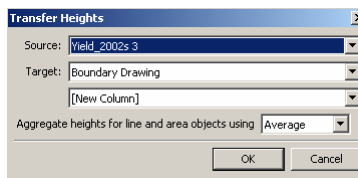
18. Click the **Yield 2002s 3** surface tab. From the **View** menu, choose **Display Options**. In the popup **Display Options** dialog box choose **Dark Blues to Yellows** from the drop-down **Palette**. Click the **Apply** icon. Click the **Reverse** icon. Unselect **Shading**. Click **OK**.



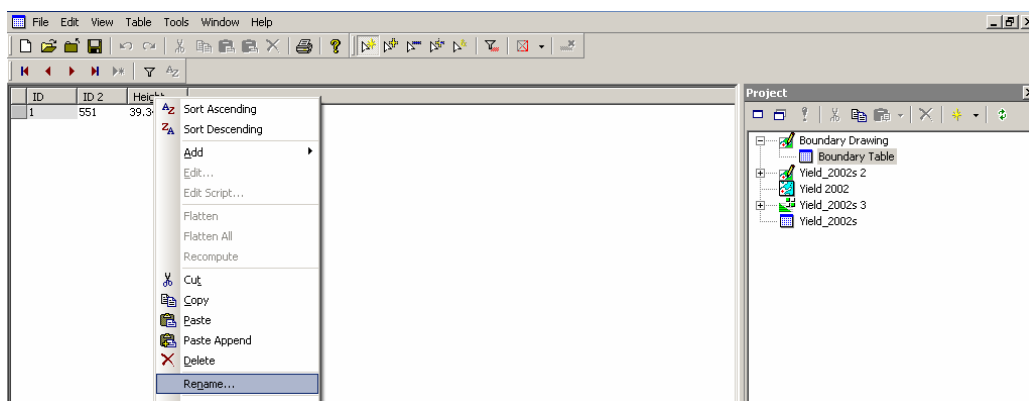
The resulting colored Yield2002s 3 surface is shown below:



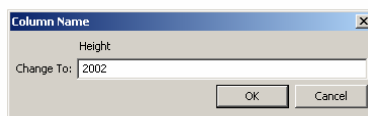
From the **Surface** menu, choose **Transfer Heights**. In the popup **Transfer Heights** dialog box, make sure **Boundary Drawing** is listed as the target and click **OK**. *This process will calculate the average yield and record it as a new column in the database table related to the Boundary Drawing.*



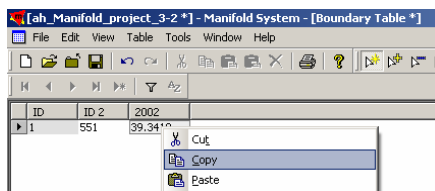
19. Double click the **Boundary Table** component in the **Project** pane. Right click the **Height** column heading and choose **Rename**.



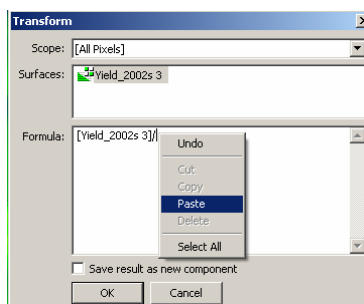
20. In the popup **Column Name** dialog box, type **2002** in the **Change To** box and click **OK**.



21. Double click the value corresponding to the average yield, then right click it and select **Copy**.

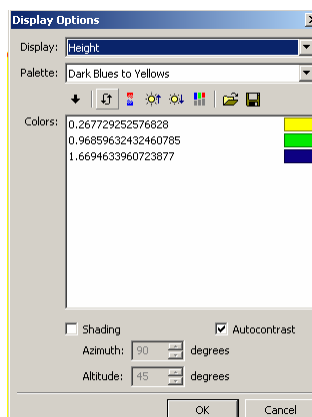


22. Double click the **Yield 2002** map component in the **Project** pane. Click the **Yield_2002s 3** tab. From the **Surface** menu choose **Transform**. In the popup **Transform** dialog box, double click **Yield_2002s 3** in the **Surface** box. At the end of appeared in **Formula** box **[Yield_2002s 3]**, type **/** and then right click and choose **Paste**. Click **OK**.

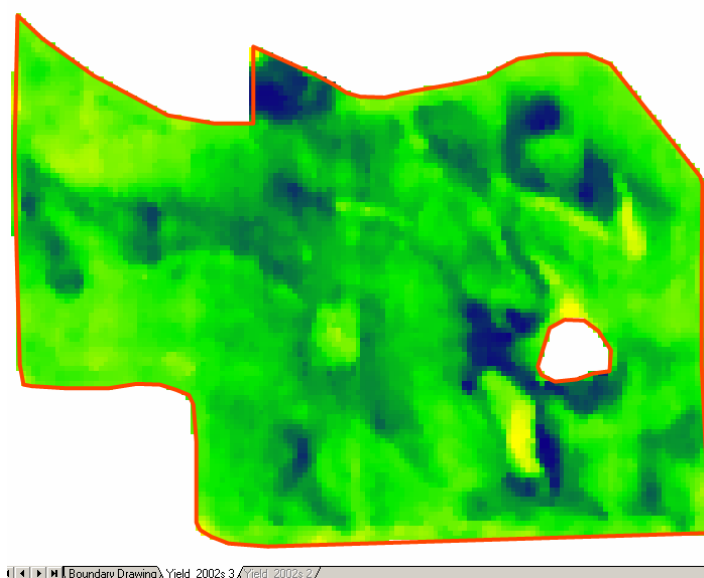


This formula will normalize the surface with respect to the field average.

23. From the **View** menu, choose **Display Options**. In the popup **Display Options** dialog box, click the **Apply** icon and **Reverse** icon. Click **OK**.



The normalized yield surface will look similar to the raw yield surface.



24. Save As **Project 3-2.map**.

25. Repeat the same steps for other years.