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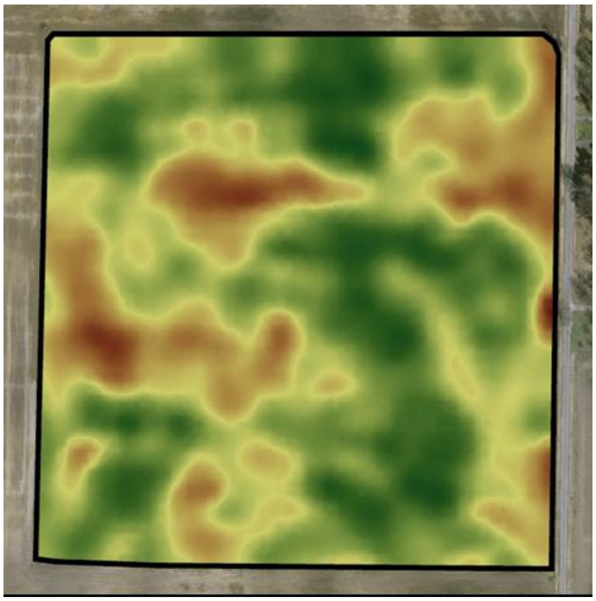
Yield Monitor Data Post-Calibration (Linear and Non-Linear) Examples

Linear post-calibration:
Calibrating to meet a specified range

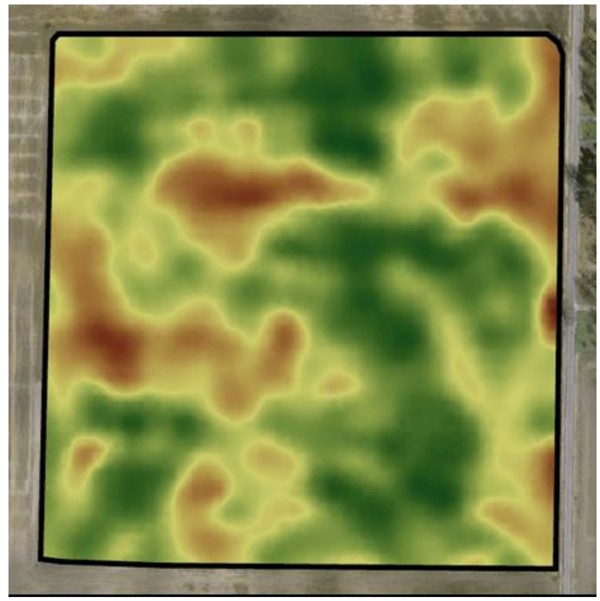
(symbology for all maps in this section shows minimum [darkest reddish] to maximum [darkest green] values with yellow being the midpoint of the range)



2007 soybeans yield b/a

59.1

29.9



2007 soybeans yield b/a calibrated so range is from 35 to 55 b/a.

55.0

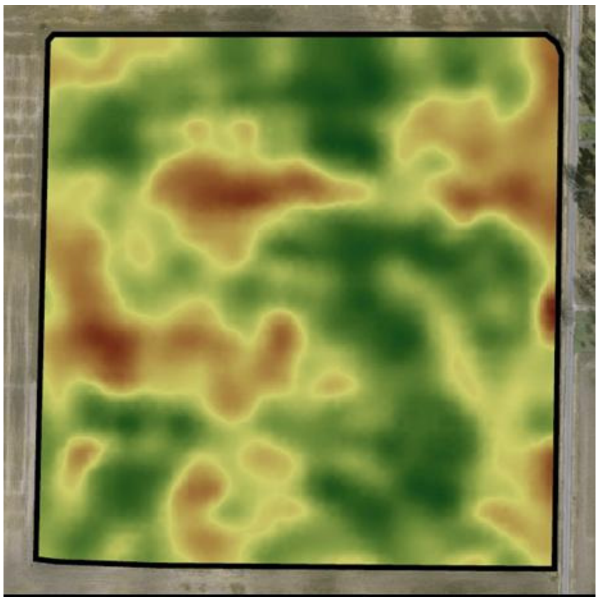
35.0

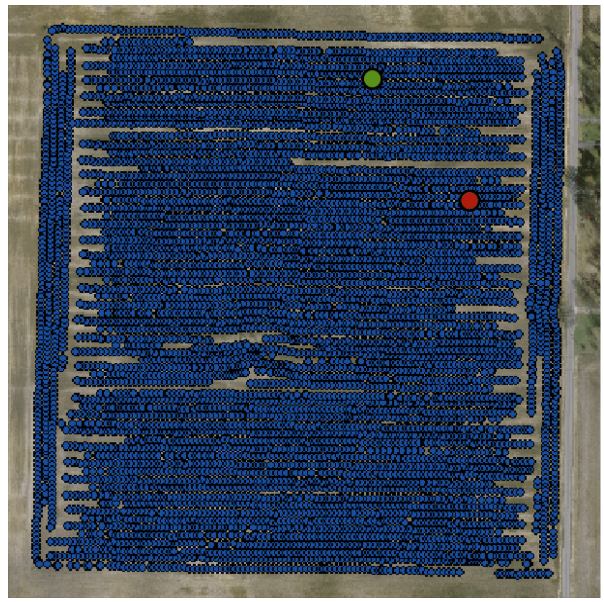
In this example, the map was calibrated by establishing a range of 35.0 to 55.0 b/a, which is a type of linear post-calibration. In linear post-calibration, the symbology and appearance of a map will stay the same but the legend will change to reflect the new yield amounts.

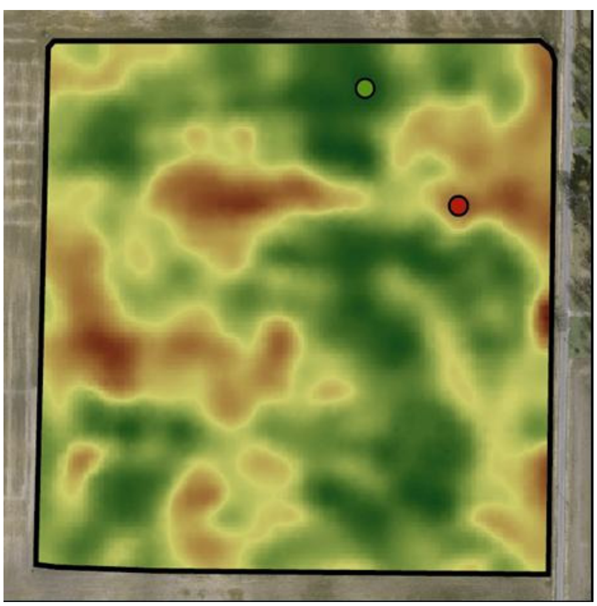
Other types of linear post-calibration are described on following pages.

Calibrating yield differences between two areas

To accomplish this type of variability calibration, locate areas of relatively high and low yield based on a clean yield map. It is important that the locations selected are not in areas void of yield points shown by the raw yield map (blue below on right) as these areas produce less reliable final yield values. In the examples that follow, the green circle represents high yield and the red circle represents low yield, and there are nine yield points spaced four meters apart that are encircled by each area. Make an estimation of what the difference in yield should be between the high and low areas. The average b/a yields in the high (green) and low yielding (red) areas in the example are 58.9 and 36.4, for a difference of 22.5 b/a. If you feel the difference between high and low yield areas is an acceptable difference then calibrating the field average may only be needed. If you feel the variability between the two areas should be different, calibration of the variability should occur.

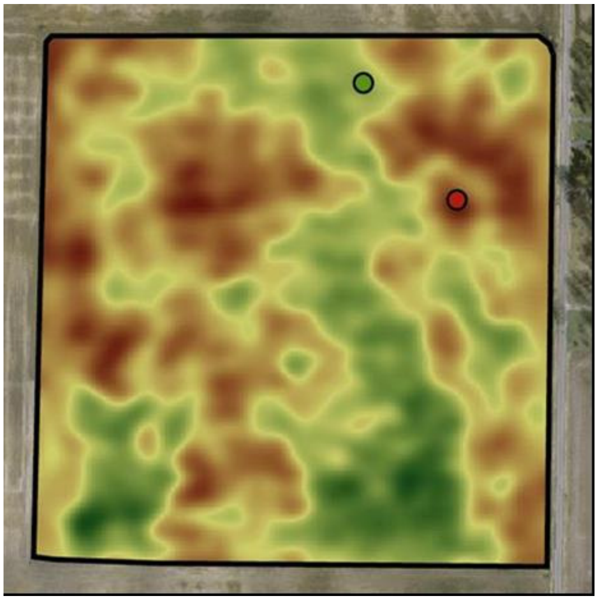




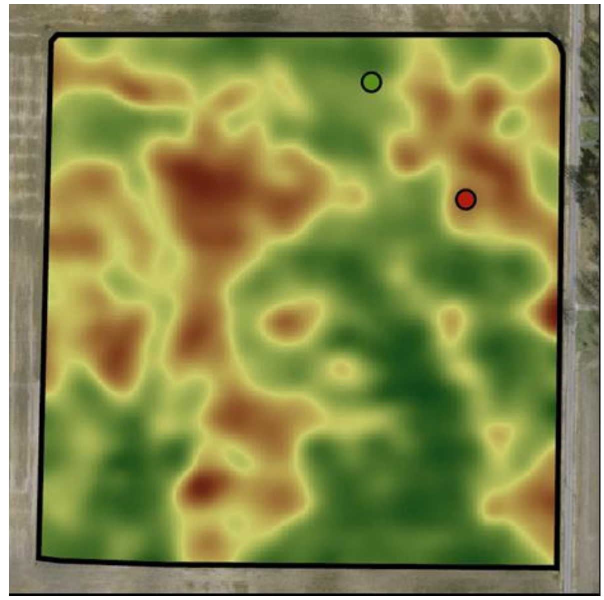


The map to the left and above is the 2007 soybean yield map from the yield monitor data cleaning document. It is a good idea to select calibration areas that consistently produce relatively high or low yields and are relatively close to access points. By viewing the four clean yield maps below, it can be seen that the two areas produce relative high or low yield each year.

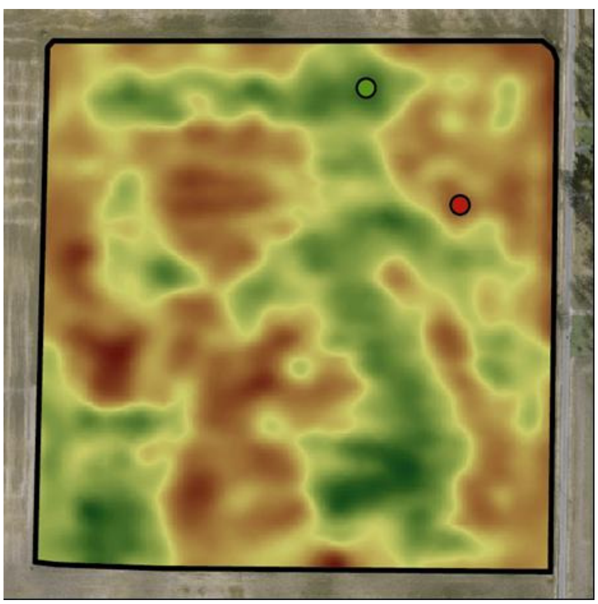
Yield map comparison



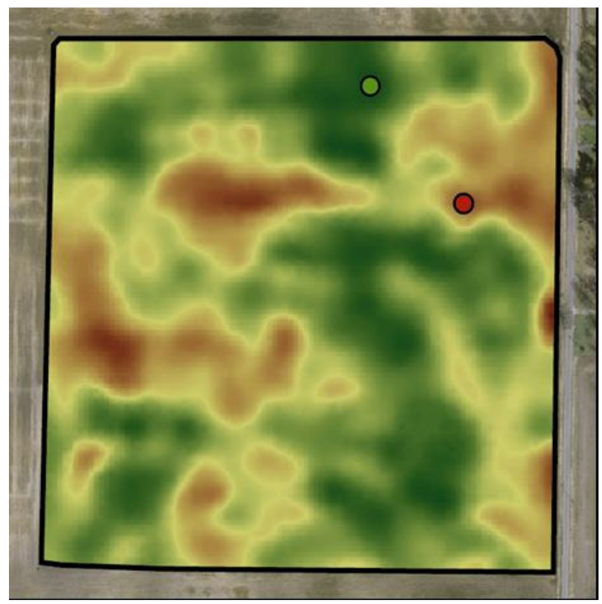
2004 corn



2005 soybeans

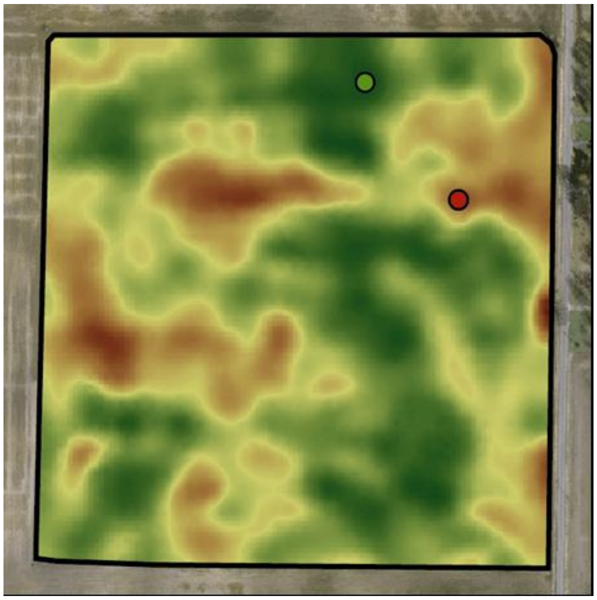


2006 corn

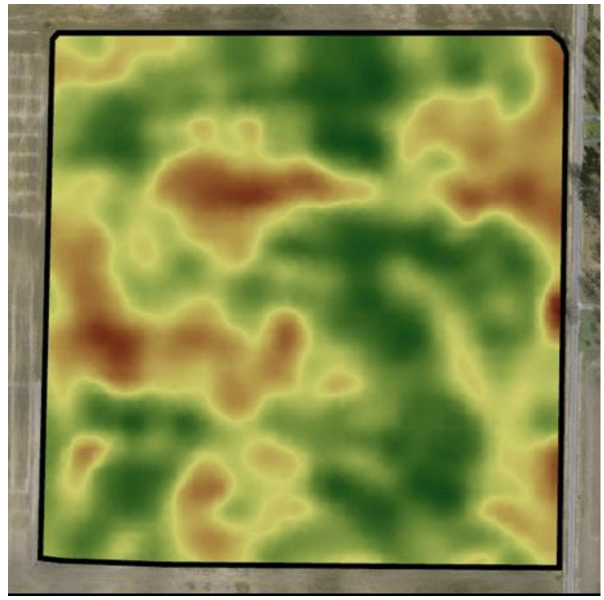


2007 soybeans

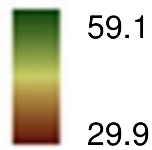
For this example, the field variability will be calibrated based on differences between the two areas being changed; in one case the difference is changed from the original 22.5 b/a to 15 b/a, and, in another case, the difference is change to 35 b/a. You can make difference estimations by going to the locations in the field during the time you feel it is best or by viewing a clean yield map after the season (whichever is preferable); you are not estimating yield, just the difference between higher and lower yielding areas. The entire yield map is calibrated/scaled to fit your specified variability; the field average will be changed in this process but can be changed back to the original value or to any other value (without affecting the new variability). In these examples, the field average was modified after variability calibration to be the same as before variability calibration (for comparative purposes here). With this two-area calibration, the appearance of the map will not change (because the linear changes are proportional) but the yield variability will change as can be viewed in the legends.



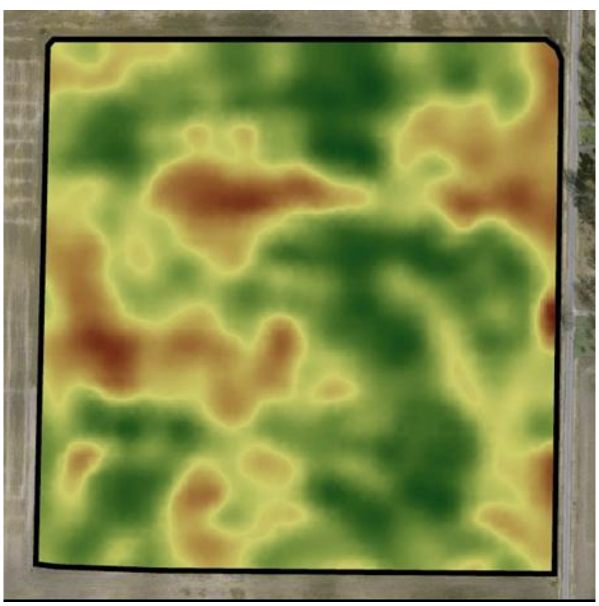
2007 soybeans
green = relatively high yield values
blue = relatively low yield values



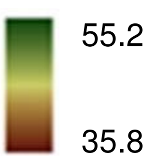
Original variability between
high and low areas = 22.5 b/a



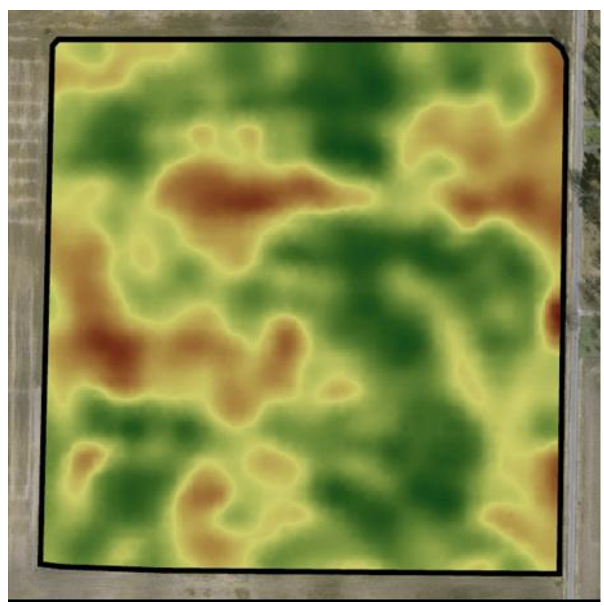
field average = 47.5



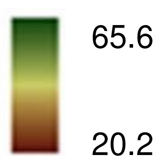
Variability calibration;
difference between high
and low areas = 15 b/a



field average = 47.5



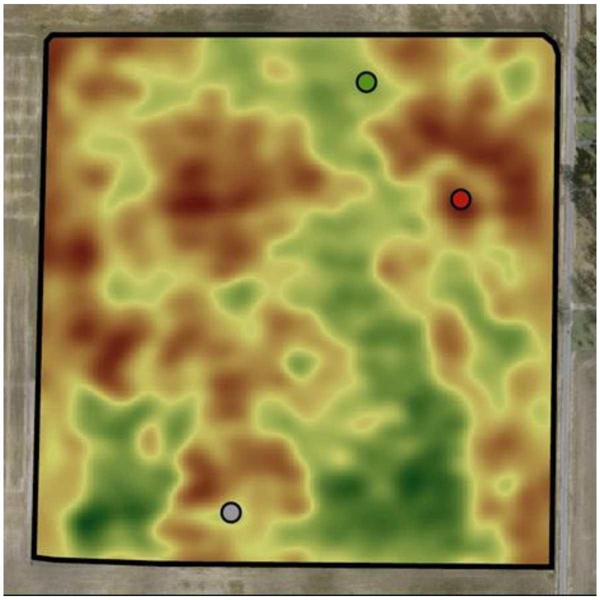
Variability calibration;
difference between high
and low areas = 35 b/a



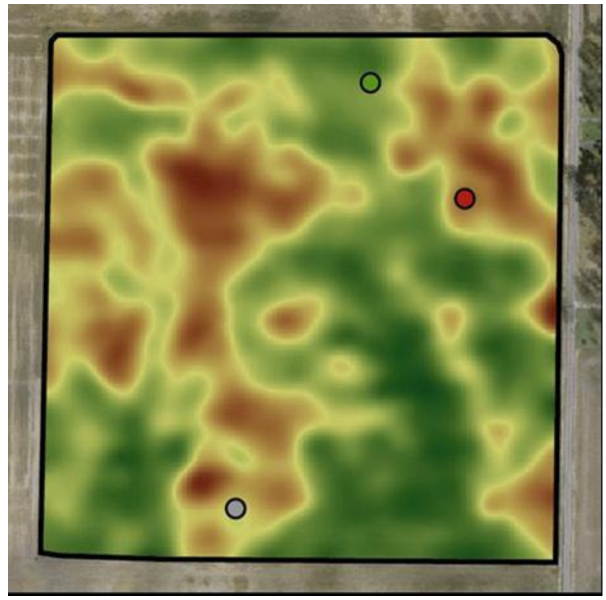
field average = 47.5

Example of Non-Linear Yield Monitor Data Post-Calibration;
Calibrating for yield differences between three areas

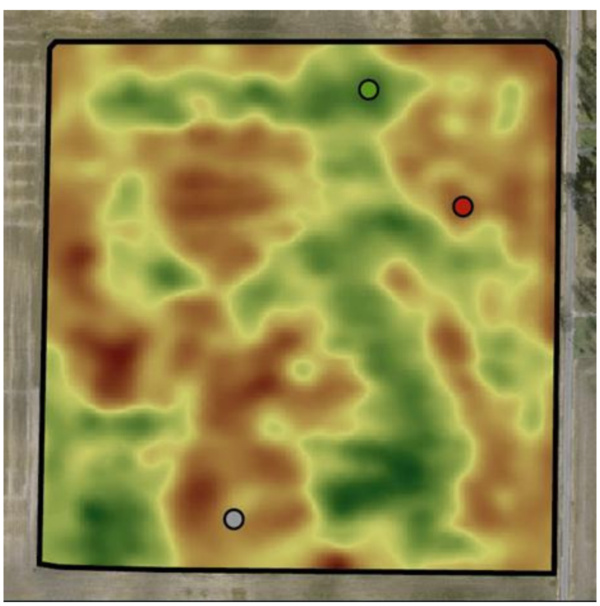
Non-linear calibration uses three or more yield areas (in this example, there will be three areas used). In addition to the areas of relatively high and low yield, find an area that consistently yields somewhere between that corresponds to shades of light green to yellow to light reddish-brown (a different color ramp can be used if you prefer). The gray points below represent the medium yield area which consistently corresponds to shades between dark green and dark reddish-brown.



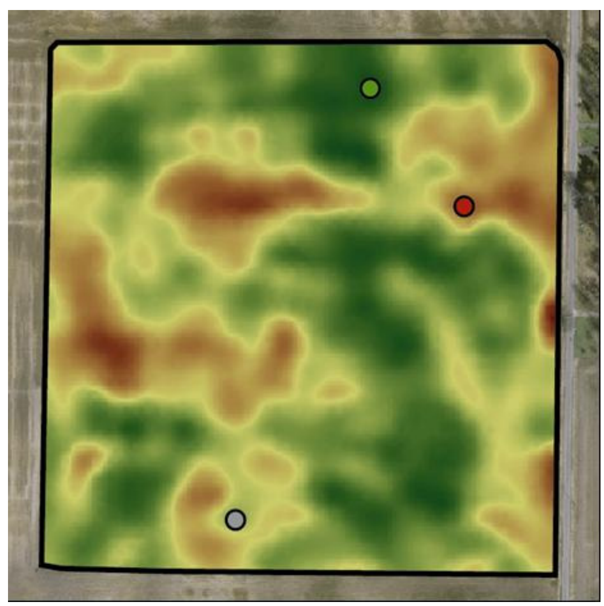
2004 corn



2005 soybeans



2006 corn



2007 soybeans

The three sets of calibration yield points used for this example have the following values:

blue points: low yield = 36.4 b/a
gray points: medium yield = 47.9 b/a
green points: high yield = 58.9 b/a

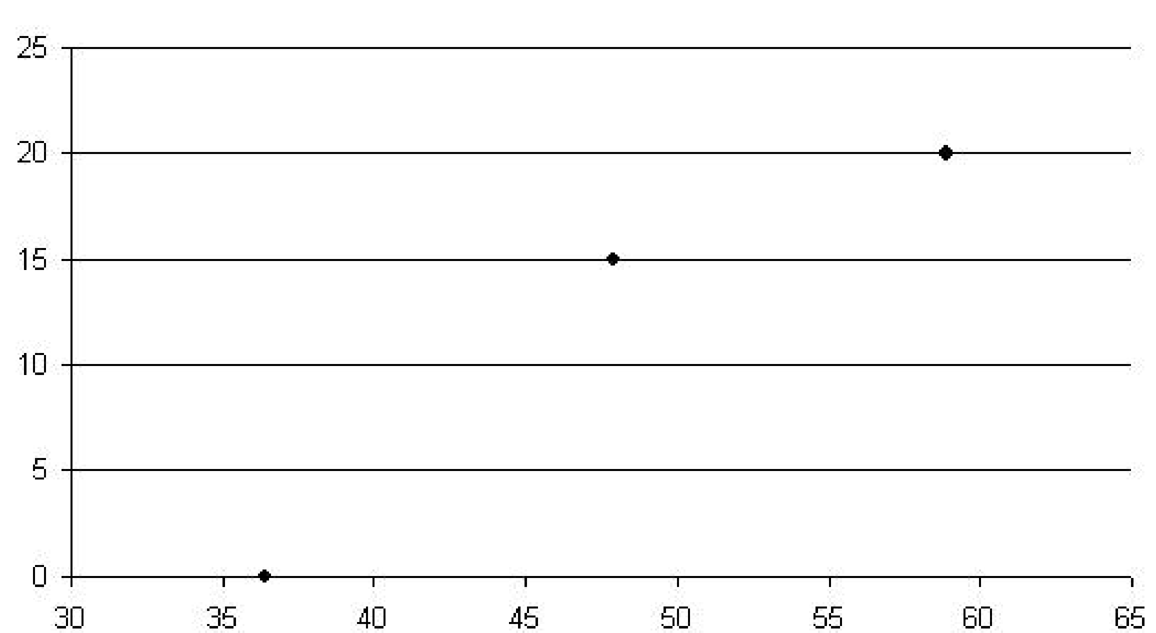
The average yield of the area is very evenly spaced. Suppose it was a very good year and areas more upslope (which is where the medium points are located) have yields that become closer to the higher-yielding lower ground areas than usual but the usual lowest yielding areas still yield about the same. In this type of year the field average yield would increase in addition to the variability changing. In this case, calibration values might be as follows:

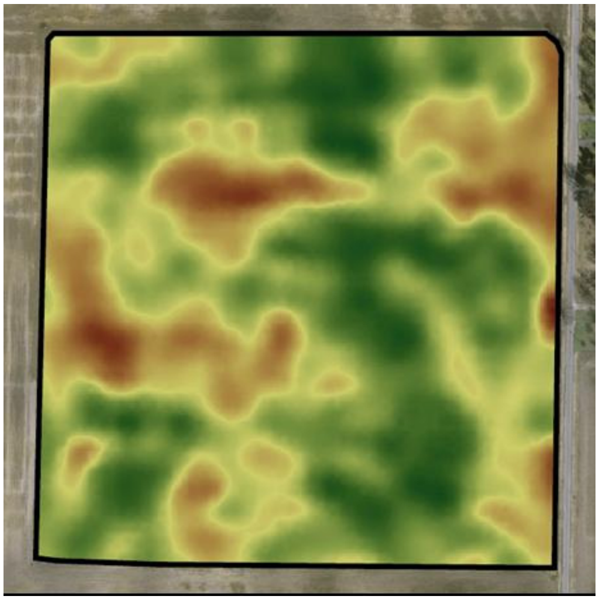
Calibration values:

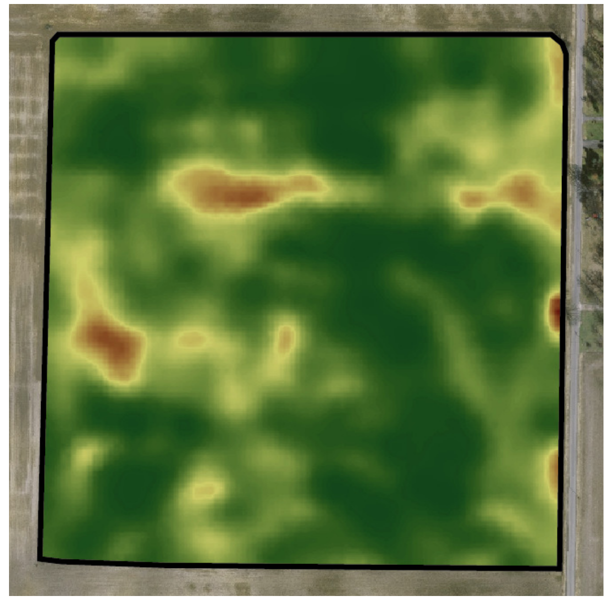
difference between low and medium = 15.0
difference between low and high = 20.0
field average calibrated to be 55.0

With these calibration values, the difference between medium and high yielding areas will only be 5.0 b/a as oppose to the original 11.0 b/a and the relationships between low, medium, and high yielding areas become less linear.

The plot below shows the calibration is non-linear and that the difference between the medium and high yield area will be less than it was prior to post-calibration. A curve is fit that best fits the calibration points to base differences on.







2007 soybeans; no post-calibration

59.1

29.9

field average = 47.5

Non-linear variability calibration; difference between low and medium areas = 15 b/a, difference between low and high areas = 20 b/a.

61.6

28.7

field average = 55 b/a

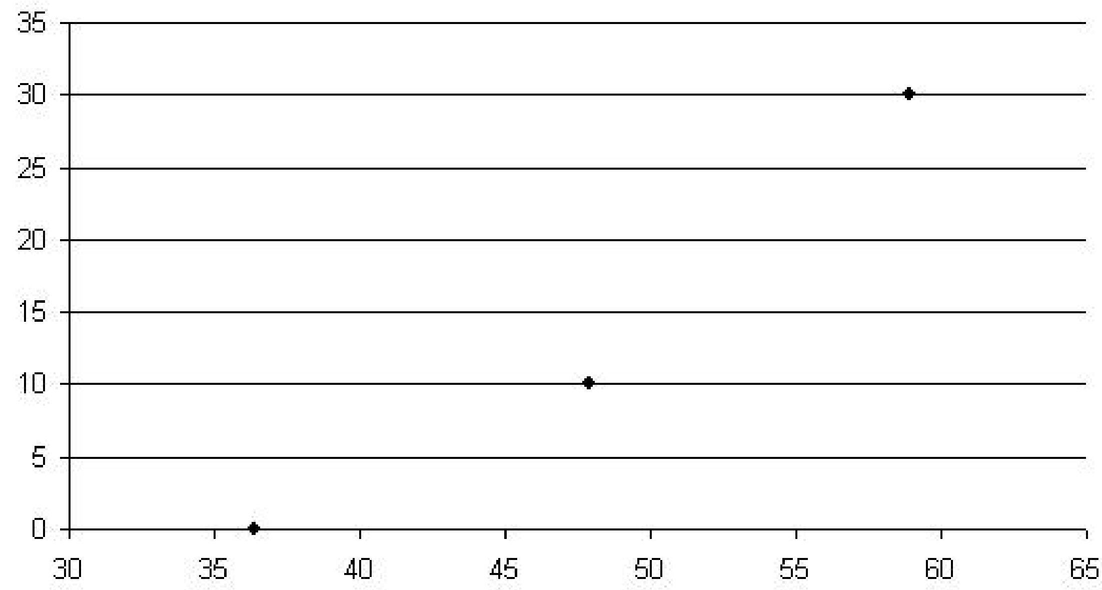
In non-linear calibration the appearance of the map will change. Remember that yellow is the midpoint of the range of yield values, so now the field has more yield values that have a higher yield than the amount that represent the midpoint of the range and a higher field average.

Conversely, if it is a drought year the medium values will tend to yield lower than normal and closer to the lower yielding higher ground area than usual, so calibration values could be as follows:

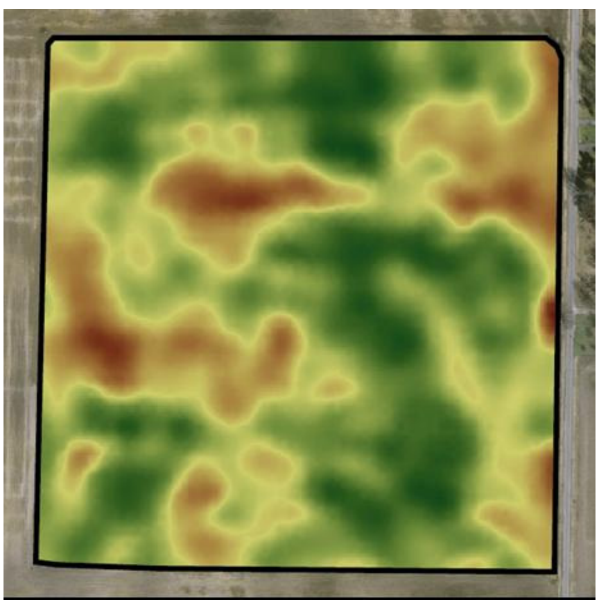
Calibration values:

difference between low and medium = 10.0
difference between low and high = 30.0
field average calibrated to be 35.0

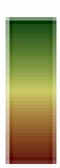
The nonlinear relationship of the points is reversed based on these calibration values. The shape of a curve fit to the points will now result in the medium yield will becoming closer in value to the lower yield area after calibration.



Now (as shown below) the appearance of the maps changes and the field has more yield values that have a lower yield than the amount that represent the midpoint of the range and a lower field average.



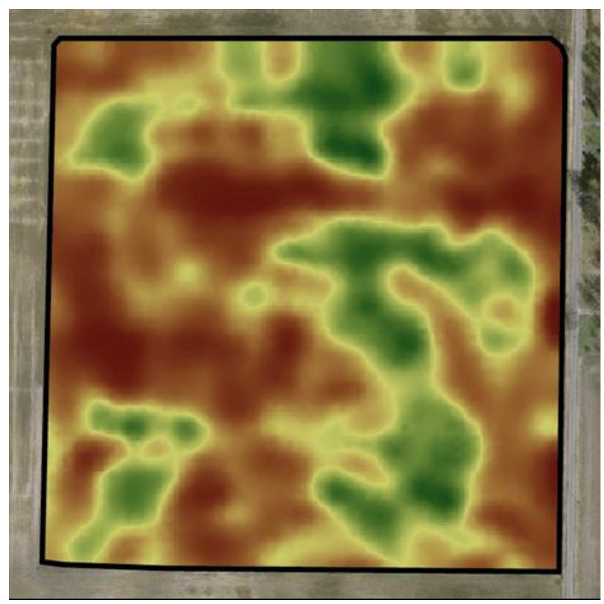
2007 soybeans; no post-calibration



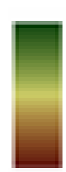
59.1

29.9

field average = 47.5



Non-linear variability calibration;
difference between low and medium areas = 10 b/a,
difference between low and high areas = 30 b/a.



54.8

23.3

field average = 35.0 b/a