CLEMSON
PRECISION AGRICULTURE

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Grid Sampling vs. Zone Sampling

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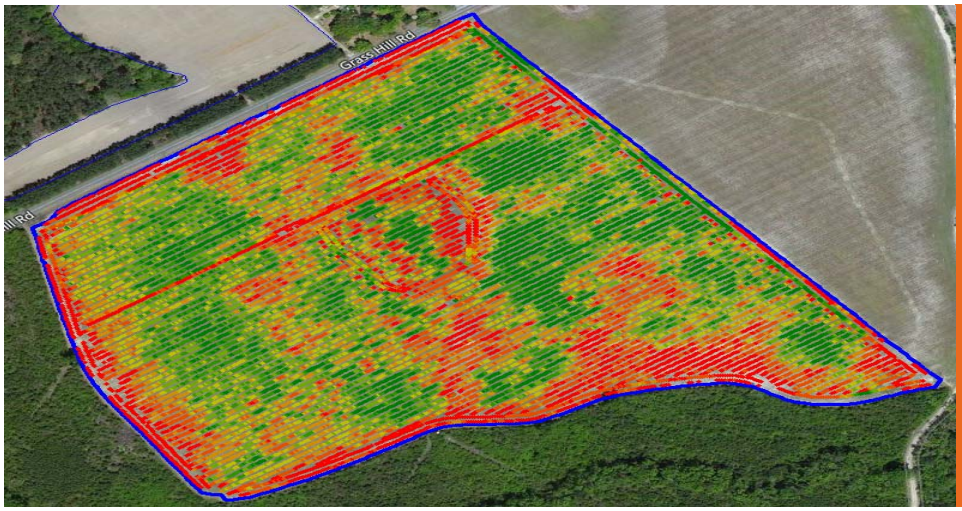
There are advantages and disadvantages to both grid sampling and zone sampling. Both grid sampling and zone sampling show a better picture of a field than just taking a composite sample for the entire field.

First, let's take a look at what grid samples will show us and how the grids are established. An easy way to think of a grid, is to compare it to a checker board. Grid samples are taken around a point in the center of each square in the grid. The area that each point represents will usually range from 2.5 acres to 10 acres. The problem with grid sampling is that soil properties do not change in a straight line or at 90 degree angles. On the other hand, you can make the argument that some of the equipment used to apply variable rate products can only change rates in a straight line. It is recommended that if grids are being used, orient the grid so that it lines up with the direction that the fertilizer spreader or other piece of variable rate equipment will be traveling. Also, it may be a good idea to have the grids sized so that the width of the grid is a multiple of the width of the equipment being used.



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Management zones are more data driven. The key part in remembering how management zones are developed is that there can be different sets of zones for different applications within the same field. For instance, you could have one set of zones for pre-plant fertilizer application, one for seeding rate, and then a third for irrigation. The hard part about management zones is determining what data we should use to develop them. One of our current research projects is designed to answer the question of: what is the best way to classify and develop management zones. Soil sampling in a management zone is a little different than in a grid. Instead of taking a sample from a point in the middle of the zone, cores are taken across the zone and composited. You would zig zag throughout each zone to obtain cores that you would then composite just as you would to obtain a sample for the entire field.

The first picture shows two maps of the same field where both grid samples and zone samples could be taken. The coloring of this map was determined by soil texture, where the lighter color would be a lighter soil texture, i.e. a sandier soil, and the darker color would be a heavier soil, i.e. one with more clay content. The picture also shows the number of samples taken in both scenarios, grid and zone sampling. The management zones for this field were created using soil electrical conductivity while the grids are 2.5 acre squares. As you can see both maps have some similarities, but about one-third of the samples were required for zone sampling versus grid sampling. If the grids would have been bigger than there would be a reduction in samples taken. This reduction of samples would not have been as great but resolution of the grids would have suffered.

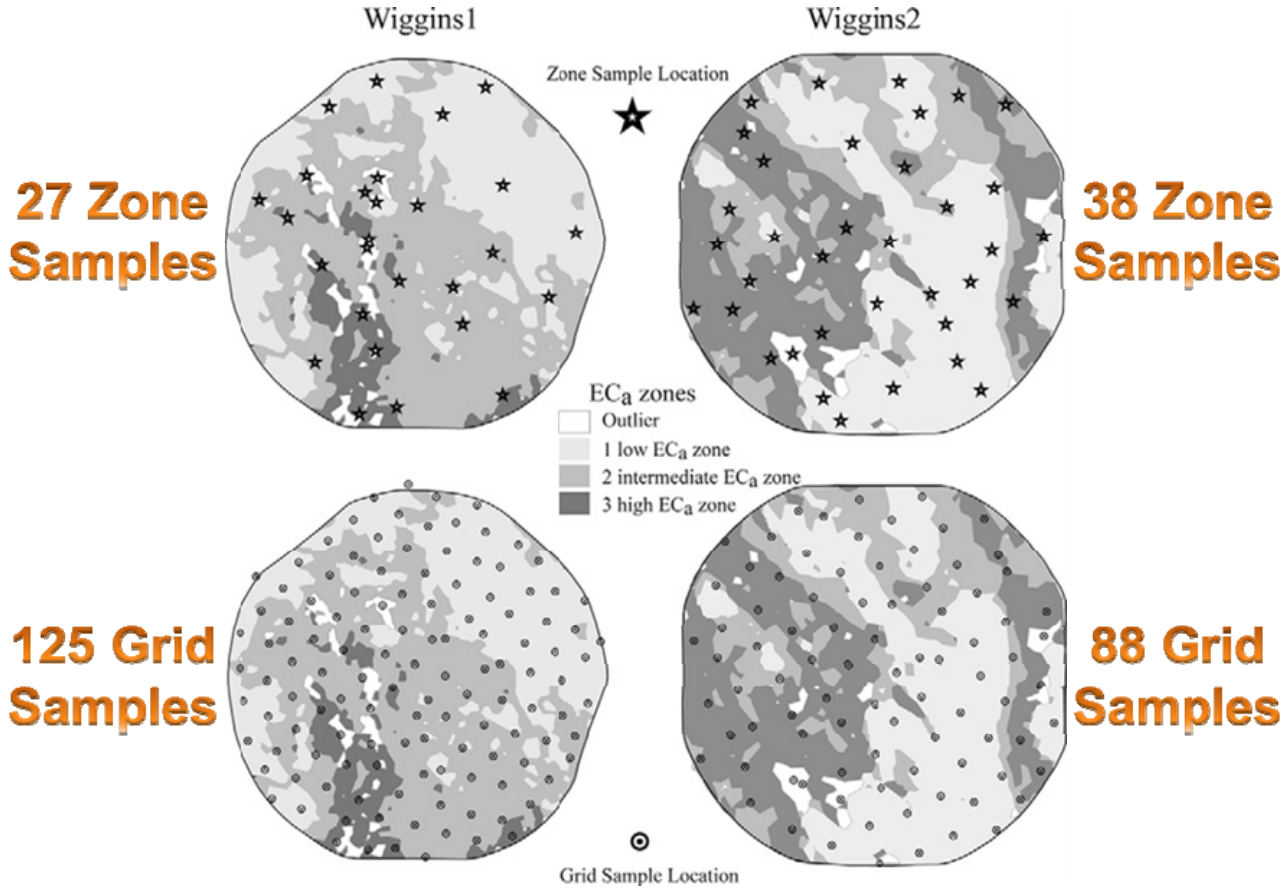

Figure 1. Sample locations for zones and grids for the two test sites.

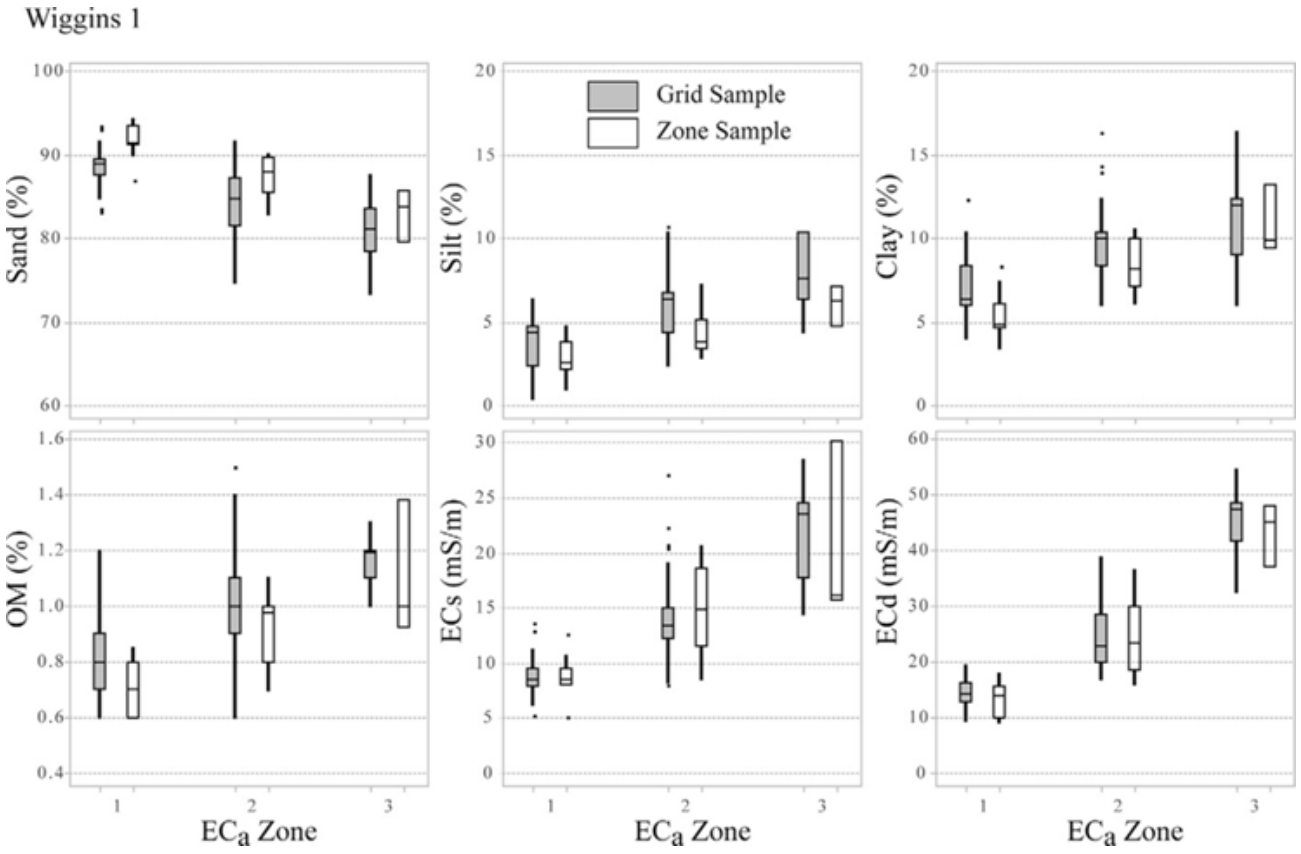

Figure 2. Relationship between soil texture, organic matter, shallow EC (ECs), and deep EC (ECd) for grid sampling and zone sampling.

Grid Sampling vs. Zone Sampling cont.

In the article, *How Well Does Zone Sampling Based on EC Maps Represent Soil Variability?*, D.L. Shaner, et.al. discuss the results shown above. In this study, a field was sampled using both management zones created using soil EC and grids, shown in Figure 1. The results from this study are shown in Figure 2.

The graphs in Figure 2 show the soil texture, organic matter, and soil EC results for both grids and zones. The main conclusion from this data is that using grids and taking more samples may not give a better understanding of the soil properties for a field. It also shows about a one-third reduction in samples taken when going from grids to management zones.

Now it would seem that you would always want to use management zones instead of grids to take soil samples but this is not the case. First, not all fields are good candidates for management zones because they may not be big enough to justify breaking up into zones, or the soil characteristics of the field may be so scattered that you would end up with a lot of very small zones. Whether or not to use management zones is a case by case or field by field decision. Also, grids do a better job when trying to level the pH of a field. The typical recommendation, if you are trying to level the pH of a field, is to use grids for the first year or two and then switch to management zones.

Team Member Spotlight

Ben Fogle just began working at Edisto REC as the Precision Ag technician within the past couple of weeks. He is from Neeses, SC where his family farms around 500 acres at Hideaway Farms. Ben graduated from Clemson University in December of 2016 with a major in Agricultural Mechanization and Business. As a student, Ben worked as an intern for Amadas Industries in Suffolk, VA for 3 years during the summer semesters. While there, his main responsibilities were working on and troubleshooting prototype peanut combines and technology being developed to help growers. It is this experience that is going to make him a huge asset to the Precision Ag program at Edisto REC and also to the experiment station as a whole.

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Upcoming Events

February 16- Precision Ag Solutions Clinic

presented by: Blanchard Equipment and Clemson Precision Ag