Table of Contents

Introduction **7**

Understanding the Management Tree 8

Reading Field Display Files **13**

Reading in Files 14

Creating a Map **17**

Creating a New Map 18

Setting the Map Display 18

Legend Display **21**

Edit Legend 22

Legend Utilities 25

Printing **29**

Printing Maps 30

Batch Printing 39

Booklet Printing 40

Creating Reports 42

Creating Charts 46

Field Boundaries **49**

Working with Field Boundaries 50

Managing Data in the Management Tree **55**

Create New Grower, Farm, and Field Names 56

Field Management 57

Merge Fields 58

Spatial Sorting 60

Split Load/Region 61

Editing Point Data 62

Add Simple Anlaysis 63

Importing **65**

Importing Data 66
Download Imagery from Internet 71
Download Soil Survey Data from Internet 72
3D Surface Files 73
Spatial Files 73
Importing Tiger Data 77
Importing Text Data 78
Importing KML/KMZ Files 79
Batch Importing 80
Query 83
Select Type 84
Select Tools 84
How to query a single layer 86
How to query multiple layers 87
How to print the query results information 87
Management Zone Layers 88
Creating Management Zones 89
Editing Management Zone Layers 90
Prescriptions 93
New Prescription Layer 94
Editing a Prescription 95
Exporting 99
Exporting Items to a Monitor using Device Setup Utility 100
Exporting Maps 104
Exporting Acreage/Production Information for Insurance 108
Backups 111
Creating a Backup 112
Restoring a Project 112
Working with Projects in the Software 114
Backup Scheduling 114
Projects 117
Creating a New Project 118
Project Check In/Check Out 119
Creating New Attributes and Operations 124
Creating Custom Attributes 125
Building a Custom Operation 127

Creating a new Dataset using the new Operation and Attribute 128
Generic Editor **131**
Creating a new Generic Layer 132
Adding new objects to a Generic Layer 132
Editing existing objects in the Generic Editor 135
Soil Sampling **139**
Soil Sampling Sites 140
Mapping Grid Soil Sampling Results 149
Crop Plans **151**
Creating Crop Plans 152
Guidance **155**
Creating guidance lines 156
Creating Terrain Based Guidance Lines 159
Financial Tracking **161**
Creating Financial Entries 162
Viewing Financial Entry Data 164
Interpolation **169**
Interpolation 170
Multi-Year Averages Analysis **179**
Multi-Year Average Analysis 180
Zone Based Analysis **185**
Creating a new Zone Based Analysis 186
Comparison Analysis **191**
Comparison Analysis 192
Comparison Analysis Results Grouping Options 196
Customizing the Comparison Results Layout 197
Multi-Project Comparisons 198
Correlation Analysis **201**
Correlation Analysis 202

3D Mapping **205**
3D Grid Regeneration 206
Regenerating using the Batch Tool 206
3D Terrain View 206
3D Settings 207
Terrain Analysis **209**
Generate Terrain Analysis Dataset 210
Equation Based Analysis **213**
Equation Based Analysis 214
Running Equations Across Multiple Fields 222
Update Analysis Dataset 222
AgFiniti® **224**
AgFiniti Sync 225
Map View 226
Transfer Utilities **228**
Transfer Utilities 229
Exporting Transfer Information 231
Importing Transfer Information 231
Importing Project Defaults 232
Field Trial Module **234**
Building a Field Trial 235
Inserting Field Trials into Prescription Layers 242
Exporting Prescriptions with Field Trials 243
Creating a Field Trial Analysis 243
Plot Prescriptions **250**
Building a Plot Prescription 251
Editing a Plot Prescription 256
Adding a Buffer to a Plot Prescription 257
Modifying Plot Display Settings 258
Exporting Plot Prescriptions 259
Water Management **262**
Creating a Tile Plan Layer 263
Editing Tile Layers 276
Including Tile Layers in Maps and Reports 277
Create Installed Tile Data 279
Syncing With SMS Mobile **281**

Sync with Mobile 282
Crop Scouting **287**
Creating Observation Regions 288
Start Adding Observations 288
Create Observations Using the Generate Observations Wizard 288
Adding / Editing Observations for a Region 290
Adding / Editing Observations using Edit Selected Object(s) button 290
Adding / Editing Observations using the Data Grid 293
Creating a Scouting Report 294
Additional Information 295
Creating and Adding Pests Using Management Item Editor 295
Linked Items **297**
Linking Items 298
Creating As-Applied Data **303**
Create As-Applied Data Settings 304
Backgrounds **309**
Turning Internet Aerial/Road Backgrounds on and off 310
Adding files to your Background list 310
Importing data and setting as a Background 312
NDVI Analysis **315**
Generating an NDVI Dataset 316
Glossary **319**

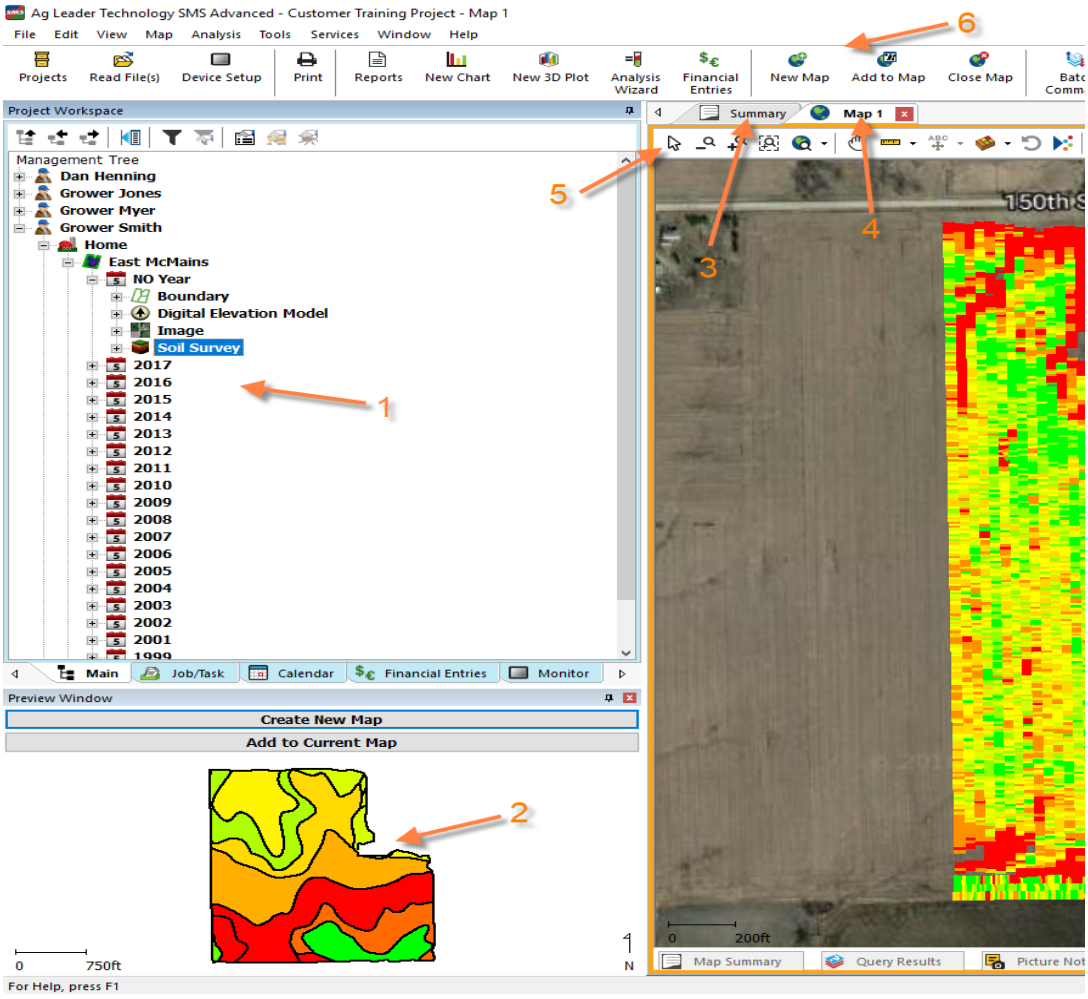
Introduction

In this chapter you will learn about:

- The layout of the software
- The items in the Management Tree and what they are used for

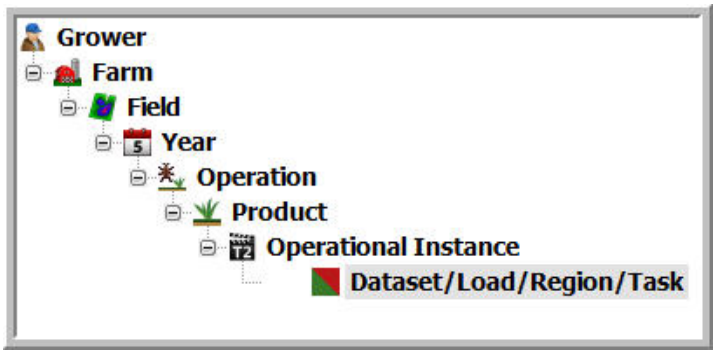
Understanding the Management Tree

Software Layout



1. **Management Tree**- Location for all maps and information currently in software, the further down the tree you click, the more detailed information you will see on the map, and summary
2. **Preview Map**- (optional) Will show a small map of the selected items in the Management Tree
3. **Summary**- Shows a text version of currently selected items on the Management Tree
4. **Workspace Maps**- Toggles between maps and summary information
5. **Map Settings Toolbar**- Displayed in many different screens, all icons can be found in the drop-down menus on the top of the screens as well. When cursor is placed on top of the icons, it will describe the button
6. **Main Toolbar**- quick links to many software operations. All icons can be found in the drop down menus on the top of the screen. When cursor is placed on top of the icons, it will describe the button

Management Tree



There are 8 branches in the Management Tree:

Grower

Usually the name of the owner of the operation. For example, if two brothers farm together (names Frank and Bob), the Growers in the Management Tree may appear as Frank and Bob.

Farm

A grouping of Fields. For example, if a grower cash rents a group of fields from one person (i.e. landlord), he/she may archive all those Fields under this Farm name.

Field

An area that a crop is planted or harvested. Ideally it has a field boundary that does not change from year to year. For example, if you have a 160 acre block of land, each year each half of the 160 is planted with a different crop. Each 80 is planted and fertilized differently each year, the grower may name each half a different field name (I.E. West 80 and East 80).

Year

The year that the data was recorded/created.

Operation

Used to differentiate the different operations that occur during the year. (i.e. Harvest, Planting, Spraying, Soil Sampling).

Site verification can be any swath-based logged data. Site Verification data does not include a logged rate, which differentiates it from many other operations. Site Verification can be used to record planting, tillage, spraying, etc.

Product

The item that was either applied to or collected from the field (i.e. hybrids, varieties).

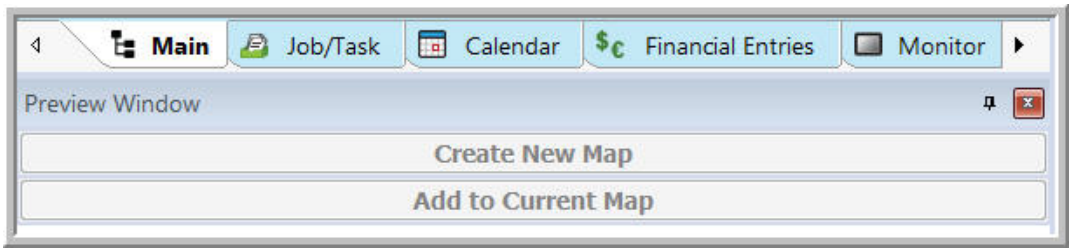
Operational Instance

Used when the same Operation\Product combination occurred in the same year. For example, planting/spraying the same product multiple times in the same year.

Dataset

This is a sub-portion of a Field. Depending on the monitor, these are referred to as Tasks, Loads, or Regions.

Management Tree Tabs



Main

Displays Management Tree, as explained above.

Job/Task

Job/Task Tree allows you to select, view, and edit Jobs and Tasks that you have created. A Job is defined as one or more Tasks that you plan on occurring during a specified time span. A Task is defined as an operation (s) that you plan to occur in a specific field during a specified time span. Multiple Tasks can be added to a Job and multiple operations can be set for a Task.

Calendar

Calendar View provides access to your data based on when it was actually logged or is scheduled. Scheduled tasks can be based on Job/Task entries or crop plans.

Financial Entries

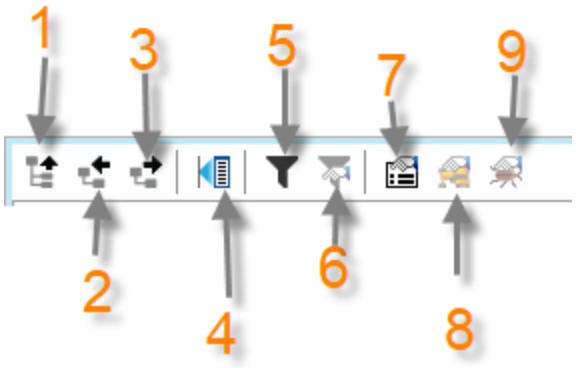
Financial Entries Tree allows you to add, edit, delete, and view Financial Tracking entries. When entries are selected a summary of the entry will be displayed in the summary document.

Monitor

Displays archived data from the Management Tree as it was recorded in the monitor. The tree is broken down by Monitor, Year, Field name (as named in the monitor which may differ from Management Tree), Operation, Product, and Dataset.

Management Tree Toolbar

Above the Management Tree there are a series of tools that can be used to modify how and what data is displayed in the management tree, and even add new values to selected datasets.



1. **Collapse**- Click this button to collapse the entire management tree, closing all branches that are currently open to the Grower level.
2. **Collapse Item** - Click this button to collapse the management tree up to the currently selected level.
3. **Expand Item**- Click this button to expand the management tree below the currently selected level, opening all branches below the current selection.
4. **Show Management Tree Menu**- Click this button to open the Management Tree Menu. This menu can also be opened by right-clicking your mouse in the Management Tree Window.
5. **Enable/Disable Management Tree Filter**- Click this button to enable/disable the Management Tree Filter. Once a filter is set you can use this button to toggle the filter on/off without having to reset/clear your filter manually.
6. **Edit Management Tree Filter**- Click this button to open a data filter dialog that allows you to select the management items and/or date ranges for data that you would like to be displayed in the Management Tree.
7. **Edit Item**- Click this button to view and/or edit the settings or properties for the selected item in the management tree.
8. **Edit Resource Tracking**- Click this button to assign or edit resources that can be assigned to a dataset, such as Operator, Vehicle, Implement and Containers.
9. **Edit Pest**- Click this button to assign or edit a Pest that can be assigned to a dataset. A pest can be assigned to any dataset, not just to a Crop Scouting dataset.

Reading Field Display Files

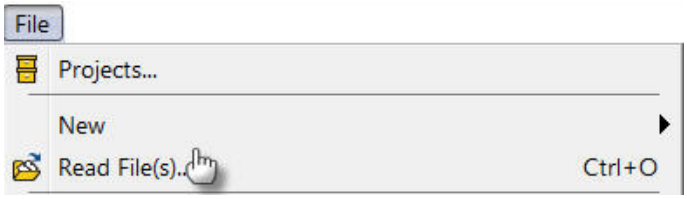
In this chapter you will learn how to:

- Read in files from a field display

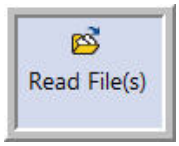
Reading in Files

You can import files into SMS using the Read Files or AgFiniti Sync tools. To learn how to use the AgFiniti Sync tools, please reference the AgFiniti chapter. To read in files from a field display or monitor, follow these steps:

1. Click **File - Read Files**



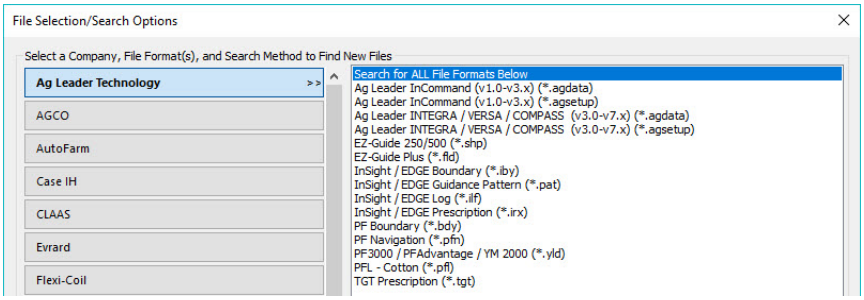
The Read Files icon is also located in the main mapping toolbar.



2. When reading in data from a field display or monitor select the **Read File(s) from a Supported Field Display or Monitor** option and then click **Start Reading Field Display Files...**

If working with files from an Ag Leader® InCommand/Integra/Versa, files can also be wirelessly downloaded from AgFiniti® using the **Download and Read Files from AgFiniti** button or accessed directly from the main toolbar using the **AgFiniti Sync** tool.

3. In the File Selection/Search Options window select the proper format by selecting the appropriate company and file type

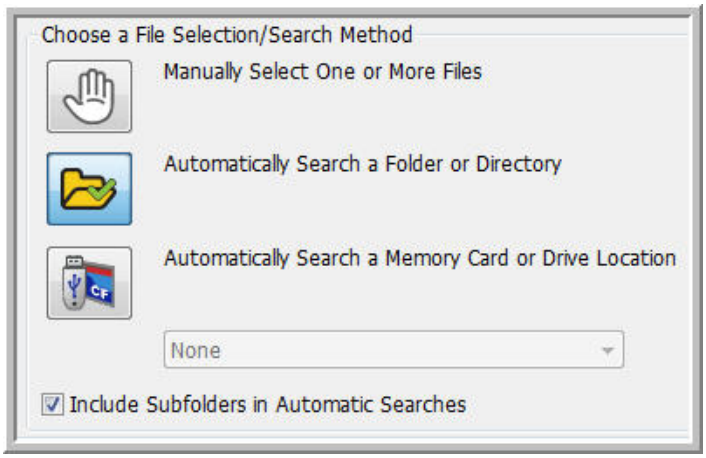


4. Choose the desired file selection/search method by clicking on the icon next to the option. For this example, select **Automatically Search a Folder or Directory**

Manually Select One or More Files: Allows the user to manually select file(s) from a card, drive, or folder.

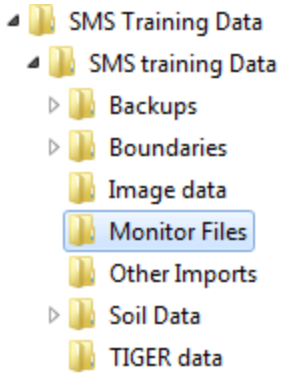
Automatically Search a Folder or Directory: Allows the user to point to a folder or directory and the software will automatically select file(s) for the previously selected file format(s).

Automatically Search a Memory Card or Drive Location: Allows the user to select a drive to search for the previously selected file format.

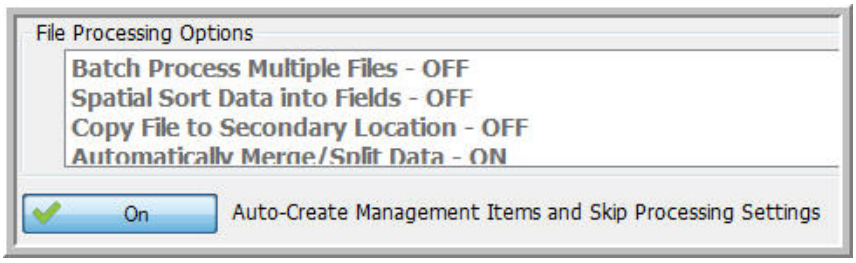


Include Sub folders in Automatic Searches must be checked when importing certain file formats that use a file/folder hierarchy to ensure all data is selected

5. Select the folder that contains the files to be read in. For this example select: **SMS Training Data\Monitor Files.**



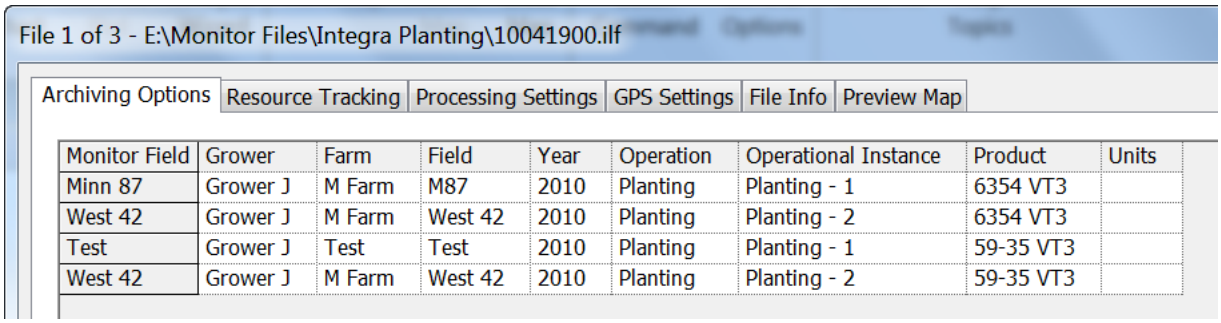
6. Click **On** next to Auto-Create Management Items and Skip Processing Settings. Auto-Create Management Items and Skip Processing Settings will skip the following two windows (management and processing settings) and prevent you from having to click Next through each step as you read data in



7. Verify the proper file processing options have been set and then click on **Start Processing Selected Files...**

By clicking Edit next to File Processing Options the following options can be used. **Batch Process Files** will save the user from clicking Next for each file imported, if importing multiple files at once. **Spatial Sort Loads into Fields while Processing Files** will sort loads in the appropriate field based on the set field boundaries in the Management Tree. The data is sorted by the first point logged in each load. Field boundaries must be set in the software for the spatial sort to organize the data correctly. **Secondary File Copy** will create a zipped copy of the data being read in at the specified path.

8. The following two windows (management and processing settings) will be skipped if Auto-Create Management Items and Skip Processing Settings is turned ON. If left OFF, the following windows allow users to edit the Grower or Farm to save the imported data under and adjust processing settings



Monitor Field	Grower	Farm	Field	Year	Operation	Operational Instance	Product	Units
Minn 87	Grower J	M Farm	M87	2010	Planting	Planting - 1	6354 VT3	
West 42	Grower J	M Farm	West 42	2010	Planting	Planting - 2	6354 VT3	
Test	Grower J	Test	Test	2010	Planting	Planting - 1	59-35 VT3	
West 42	Grower J	M Farm	West 42	2010	Planting	Planting - 2	59-35 VT3	

The File 1 of X (X = # of files selected) windows should now appear. In this window are all the fields that the monitor has information for in this particular file. Shaded lines are fields that have been read into the system and the white lines are showing new information that is being read into the system.

9. Once the software is done processing the information, check to make sure it appears in the management tree correctly

Creating a Map

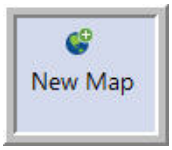
In this chapter you will learn how to:

- Create a map
- Change the map type
- Change mapped attributes/properties

Creating a New Map

To create a new map in the software, follow these steps:

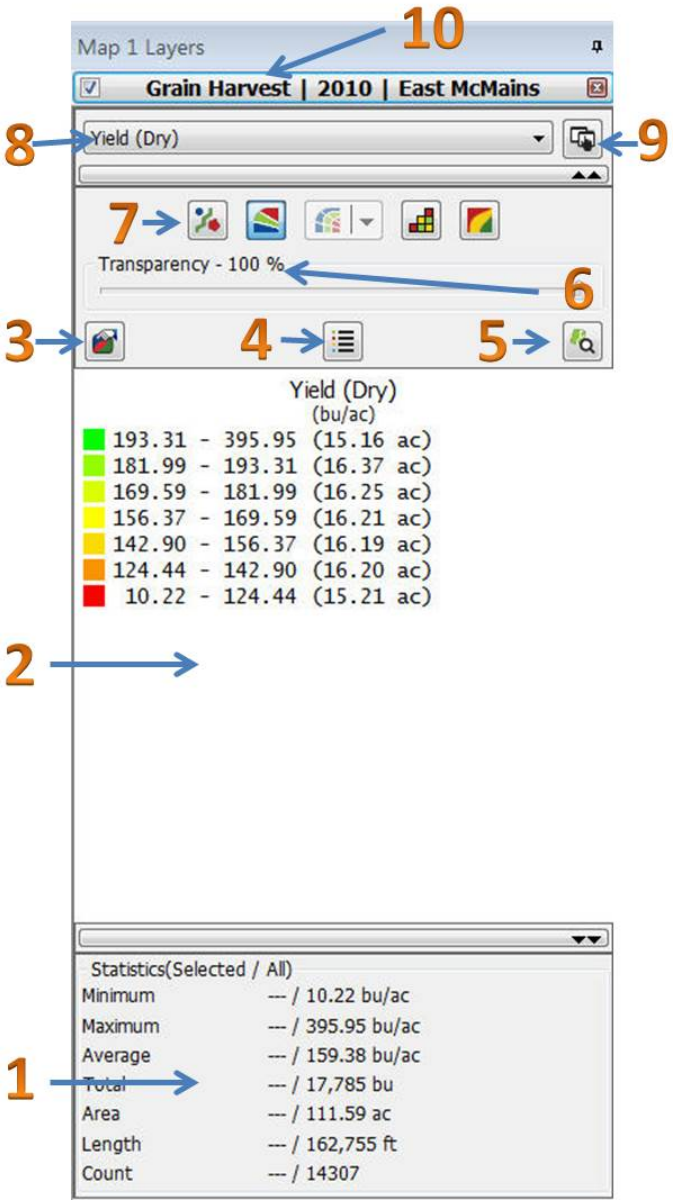
1. Find the appropriate data in the Management Tree to be mapped by left-clicking the "+"
2. Navigate to the appropriate Crop-Product and select it by left-clicking on it. For this example use, **Grower Smith - Home - East McMains - Grain Harvest**
3. To create a map, click one of the following options:

- File - New - Map
- 

The New Map icon in the toolbar above the Management Tree
- The **Create New Map** button below the Management Tree

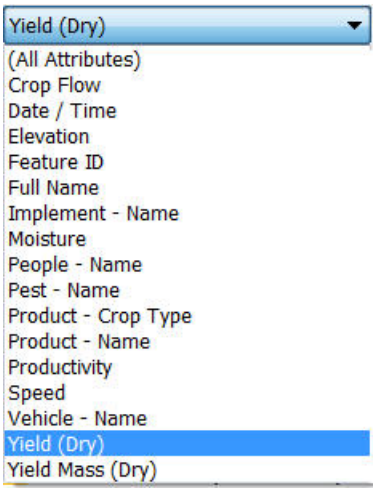
Setting the Map Display

After creating a map, there are several buttons on the right-hand side of the screen that can be used to change and save the look of the map.


Map 1 Layers
10
Grain Harvest | 2010 | East McMains
8
Yield (Dry)
9
7
Transparency - 100 %
6
3
4
5
Yield (Dry)
(bu/ac)
193.31 - 395.95 (15.16 ac)
181.99 - 193.31 (16.37 ac)
169.59 - 181.99 (16.25 ac)
156.37 - 169.59 (16.21 ac)
142.90 - 156.37 (16.19 ac)
124.44 - 142.90 (16.20 ac)
10.22 - 124.44 (15.21 ac)
2
Statistics(Selected / All)
Minimum --- / 10.22 bu/ac
Maximum --- / 395.95 bu/ac
Average --- / 159.38 bu/ac
1
Total --- / 17,785 bu
Area --- / 111.59 ac
Length --- / 162,755 ft
Count --- / 14307

1. **Quick Statistics** This area will give you details about the currently mapped layer and any user made selections.
2. **Legend Display** This area will display the colors and legend ranges of the current mapped layer.
3. **Edit Layer Options** This tool will allow you to modify tooltips, query options, labels, display and drawing options, grid and interpolation settings, directional arrows and grid settings.
4. **Edit Legend** This tool will allow you to change the ranges and display colors of the legend. Read the Legends chapter for more detail.
5. **Zoom Map to Layers Extent** This can be used to zoom the map back to the default zoom level.
6. **Transparency** The transparency bar shows the map in varying levels of opaqueness. This tool is helpful when multiple layers have been mapped, and you wish to see details from multiple layers.
7. **Map Type**The software can display 5 different map types:
   - **Base Map** - Points are mapped as dots
   - **Swath Map** - Points are mapped according to the size of the swath
   - **Section/Row Map** - Points are displayed as each individual section/row was recorded (may not be available with for all layers)
   - **Grid Map** - Points are displayed in squares with some smoothing
   - **Contour Map** - Points are displayed in polygons with further smoothing
8. **Attribute List**

This pick list shows the different items that can be mapped for the layer. The example below shows information available from a yield monitor.



9. **Select Mappable Attributes/Properties**

Select Mappable Attributes/Properties can be used to define the attributes and/or properties shown in the Attribute List.

10. **Layer Display Menu**

The Layer Display Menu can be used to make a copy of the current layer. This tool can also be used to rename or reorder the layers displayed.

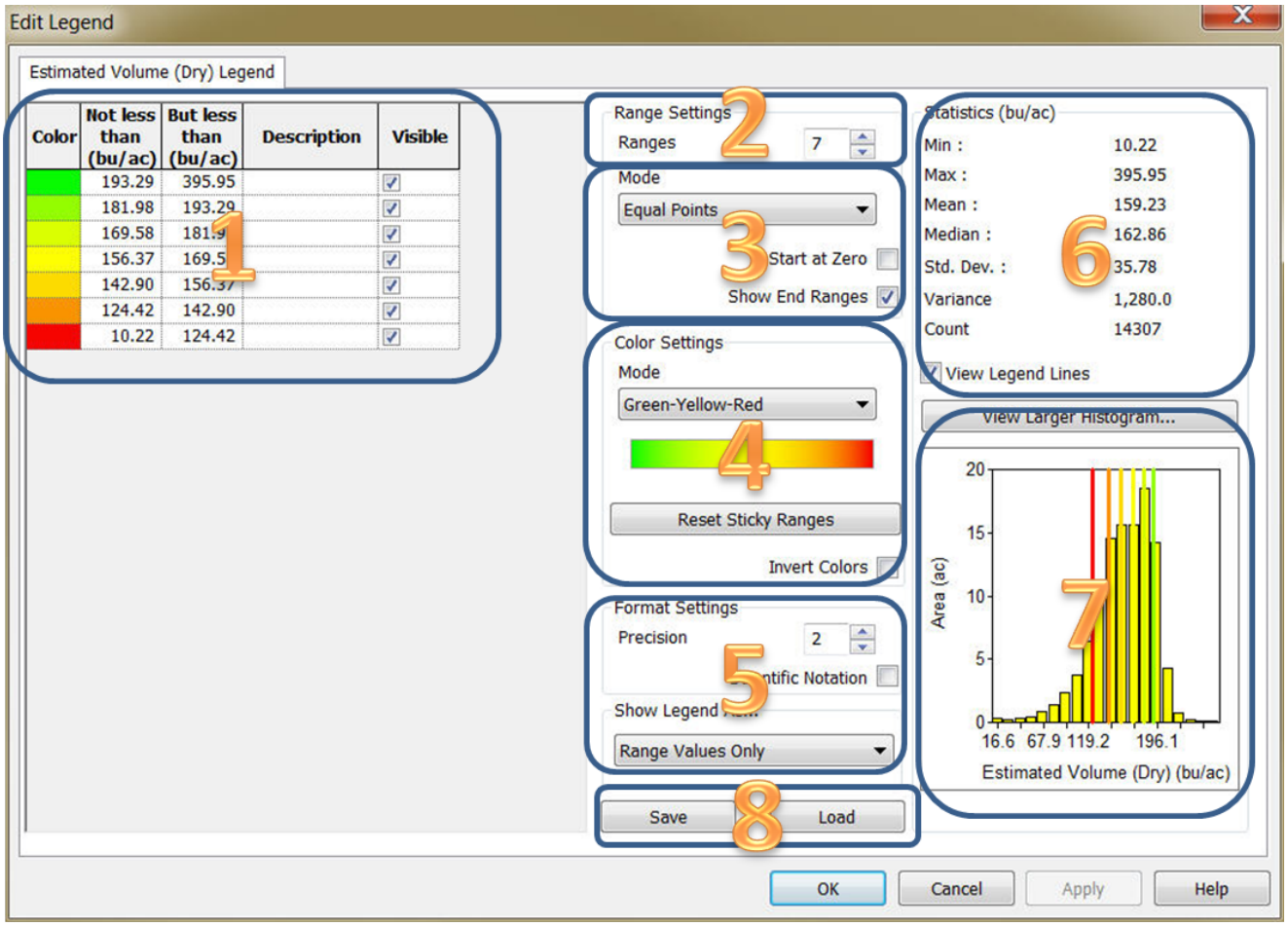
Legend Display

In this chapter you will learn about the legend window and how to use the Legend Editor to modify and customize your maps. With the Legend Editor, you can:

- Change the color scheme of your map
- Change the range settings and ranges of your data
- Give a description to each range
- Save and load custom legends

Edit Legend

To modify the legend of a mapped layer, click the **Edit Legend** button that appears over the legend window, or double click anywhere in legend and the Edit Legend dialog will open, as seen below:



1. **Ranges**
   - **Not Less Than (Units)**Displays the lowest value for a range. Click on a value to edit it. If the value entered is not appropriate the incorrect value will be highlighted in red and you will receive an error message when you click OK to apply the legend.
   - **But Less Than (Units)** Displays the highest value for a range. Click on a value to edit it. If the value entered is not appropriate the incorrect value will be highlighted in red and you will receive an error message when you click OK to apply the legend.
   - **Value (Units)- prescription/buffer legends only** Displays the ranges that have been set and the entered value. Click on the value in a row to edit it. The values are sorted from highest (top) to lowest (bottom). As values are entered in they automatically shift up or down based on the value relative to the values already entered
   - **Description** A text description can be entered for each legend range that will be displayed instead of , or in addition to, the range values.
   - **Visible** Allows the user to hide/show individual legend ranges by clicking on the check box
2. **Range Settings**

Allows you to set the number of ranges for a legend. Certain operations and attributes have limits on the number of ranges that can be set. For example, a yield map can have a maximum of 40 ranges.

3. **Mode Settings**

Provides the following methods to distribute the data into the selected number of ranges:

- **Equal Points**

Adjusts the min/max values for all ranges so that each range contains an equal number of points.

- **Equal Spacing**

Takes the difference between the min/max values and divides this value by the number of ranges to distribute the data evenly in the legend.

- **Standard Deviation**

Uses the standard deviation for the dataset to set the min/max values for each range, with the highest value being +infinity and the lowest value -infinity. The deviation factor can be set to fit the type and range of data values that your data contains, but must be between .05 and 3.

- **Custom**

Allows the user to key in a manually entered value for ranges, or use the Custom Legend Generator, which allows three out of four range variables to be entered and the fourth calculated by the system.

- **Natural Breaks**

Data classification method that tries to determine the optimal natural grouping of data to define the range values.

- **Percentage Based**

Allows the user to select the number of ranges in the legend and what percentage of the raw data values should fall into each range. The entered percentages will have to total 100%.

- **Start at Zero** Sets the lowest range value to zero.
- **Show End Ranges** Sets the bottom and top range values to display; if unchecked, in the legend window the bottom value will be replaced with " Below " and the top value with " Above ".

4. **Color Settings**

Displays the color for each range in the legend. To use a pre-defined color scheme click the drop-down list and select one of the software color schemes. To manually select colors, double-click the left mouse button on a color or go to the Color Edit dialog, where you can change the color for the range. If you manually edit a range color then the word "Sticky" will appear in the cell with the color. This is now a "Sticky" range which means that if you change the Color Setting to another mode, the "Sticky" range color will stay the color that you set, even though all the ranges around it that weren't edited manually will change. Click the Reset Sticking Ranges button to remove all user defined colors.

5. **Format Settings**

- **Precision** Allows you to set the number of digits that are displayed to the right of the decimal place for a range value
- **Scientific Notation** Allows you to set the range value to display in scientific notation format. For example 48.0 would be 4.8e+001.
- **Show Legend As** Use this option to choose if you want Range Values Only, Description Text Only or a combination of the two displayed in the legend.

6. **Statistics**

Displays statistical values for the legend dataset, which can be used to help make decisions on selecting the legend range settings. A histogram is also provided to see how the values in the dataset are distributed as well as where the current ranges fall.

7. **Histogram**

Displays a histogram with Area on the X-axis and the current legend attribute on the Y-axis.

- **View Legend Line** Turns the legend lines on the histogram on and off.
- **View Larger Histogram**Click this button to open a large dialog containing the histogram.

8. **Save Options**

- **Save Button** Takes you to the Save Legend dialog where you can save a legend and set legend defaults.
- **Save Legend As**
    - **Current Layer Default** This selection will set the default legend for the current layer. If you have a special test plot where you would like to set a special legend, different from your normal legends, then you would set this default selection.
    - **Current Operation Default** This selection will set the default legend for the current operation. There are three choices for Legend Types:
        - **Crop Type Based Legend Type** is saved across all datasets for one crop type per operation. Example, if you save a legend for Rate Applied for a Planting operation, and create/save the legend for a field planted with Corn with Crop Type Based Legend Type selected; then all other fields under the Planting Operation with a crop type of Corn will share the same legend display settings for Rate Applied.
        - **Product Based Legend Type** is saved across all datasets for one product per operation. Example, if you save a legend for Rate Applied for a Planting operation, and create/save the legend for a field planted with a product named DKC63-45 with Product Based Legend Type selected; then all other fields under the Planting Operation with a product name of DKC63-45 will share the same legend display settings for Rate Applied.
            - Product Based Legend Type is saved per product under an operation. For the Planting operation if there are multiple product names under a field, Crop Type Based Legend Type would be recommended for saving a user-defined legend.
        - **All Crops/Products Legend Type** is saved across all datasets for all crops and products for the currently mapped operation. Example, if you save a legend for Estimated Volume Dry and save it all All Crop/Products every dataset in the management tree under Grain Harvest will use the same Estimated Volume Dry legend.
            - **Keep Legends Already Assigned to a Specific Crop Type/Product** - checking this box when using the All Crops/Products Legend type will retain any custom legends previously assigned to specific crop types and products.
- **Load Button** Takes you to the Load Legend dialog where you can load a previously saved legend.

This dialog allows you to select a saved legend and load it as the current legend in the Edit Legend dialog.

- **Enter Name or Select from List**

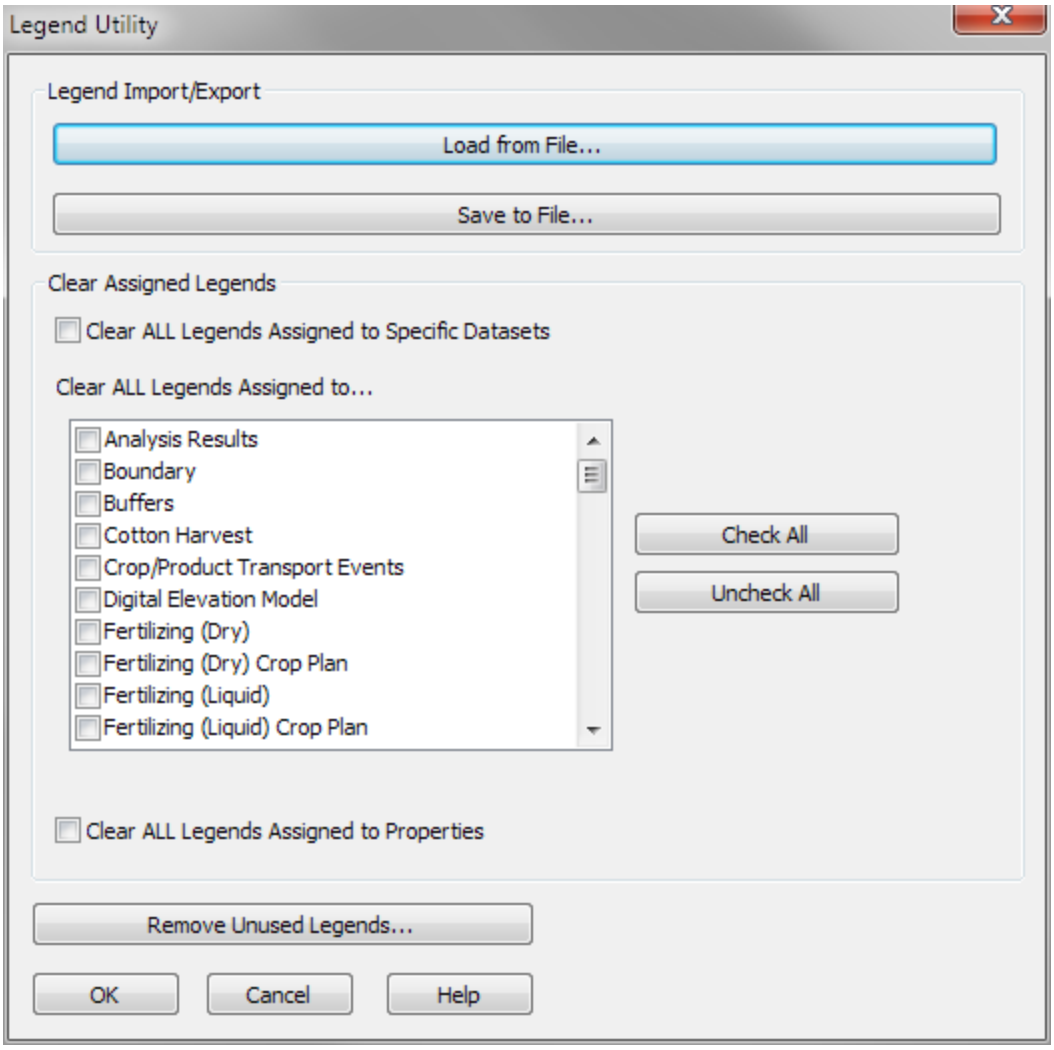
Click on the name of the previously saved legend you wish to load.

- **Legend List Window**

Displays a list of all the legends saved in the system.

Legend Utilities

This dialog provides tools for importing/exporting legends in the system as well as the ability to reset the default legends for data types and datasets. Go to the **Services** menu and select **Legend Utility** to access the tools below:



Legend Import/Export

- **Load from File... Button**

Click this button to load a legend from a selected source. This is useful if someone gives you a legend that they created in the software, such as a consultant, your neighbor, or the local CO-OP.

- **Save to File... Button**

Click this button to save an existing legend file in the software for export. This is useful if you want to trade a custom legend with a neighbor or consultant, so they are using the same legends as you when working with their data or yours.

Reset Associated Legends

- **Clear All Legends Assigned to Specific Datasets**

Select this item if you would like to reset the legends back to the system default for datasets that you may have set a specific legend for. Click OK to proceed with the reset.

- **Clear All Legends Assigned To**

Select this item and check each operation that you would like to set back to system defaults

- **Clear All Legends Assigned to Properties**

Select this item if you would like to reset the legends back to the system defaults for all properties that you may have set a specific legend for.

- **Remove Unused Legends... Button**

Click the check box to select unused legends to be deleted from the system.

Printing

In this chapter you will learn how to:

- Print maps
- Create and print custom maps
- Create and print reports
- Create and print charts
- Run Batch Printing
- Use Booklet Printing

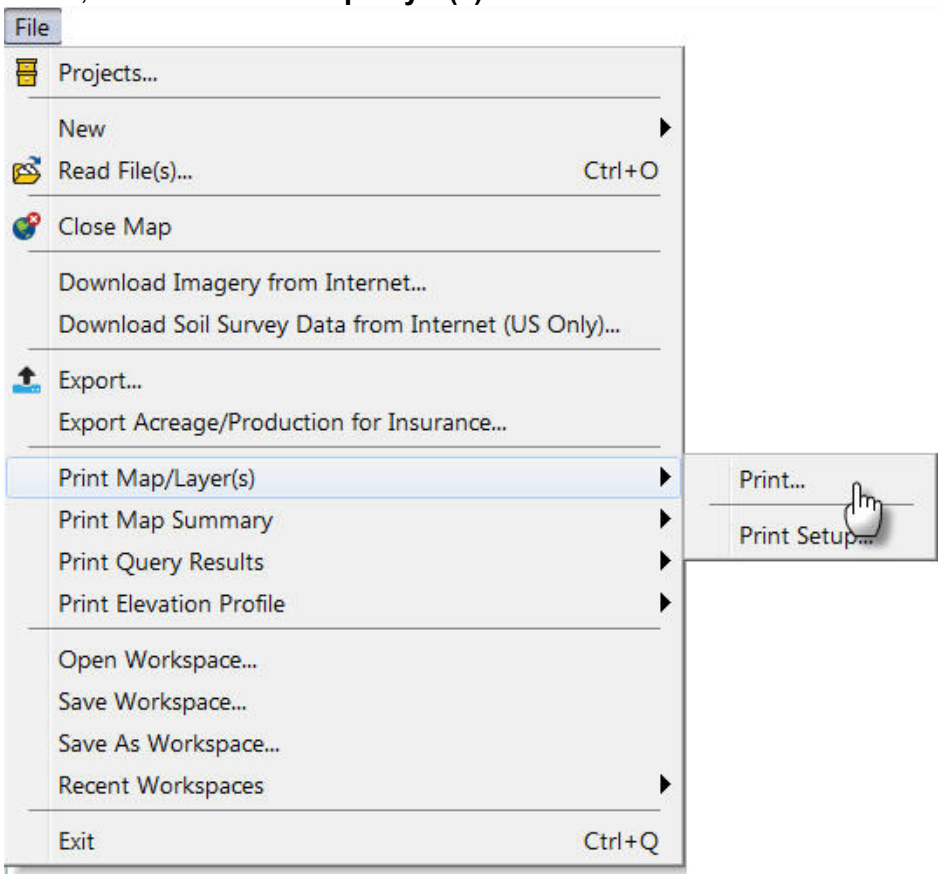
Printing Maps

Printing maps can be accomplished several different ways. The software provides pre-defined layouts in addition to allowing for custom layouts to be generated.

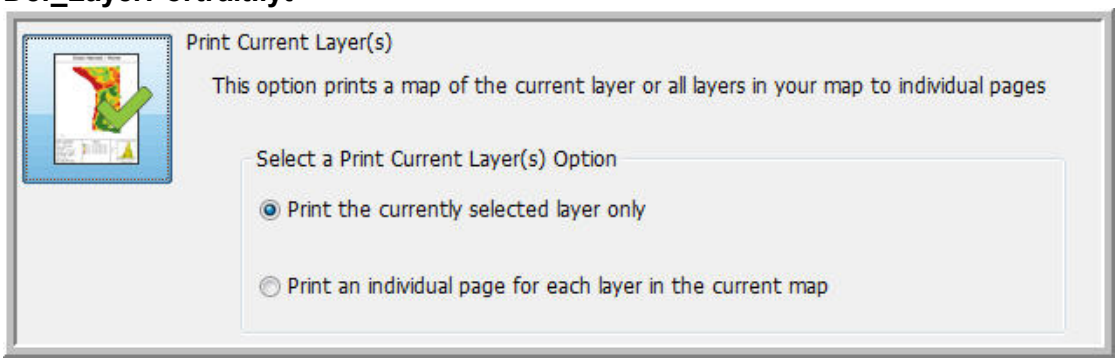
Printing a base map

1. To print a map start by creating a new map of the layer you want to print
2. Adjust the appearance of the map to match what you want to print, such as the attribute viewed, legend, and style of map (base, swath, grid, and contour)
3. Once the map appears the desired way, click the **Print** icon 

in the main toolbar or click on the **File Menu**, and select **Print Map/Layer(s) - Print**



4. In the Print Options window, click on **Print Current Layer(s)**, and then click **Print Current Layer(s) - Def_LayerPortrait.lyt**



5. A print preview of the map layout will now appear. If the appearance is acceptable, click **Print** at the bottom of the screen. Select what output you want:

- **Print**- will print the map to your default printer
- **Print to image**- will allow you to select the desired image format and where to save the new image at on your computer
- **Print to PDF**- will use the software PDF printer that is installed when you install the software and allows you to name and select where to save the electronic document to.

Custom Layout

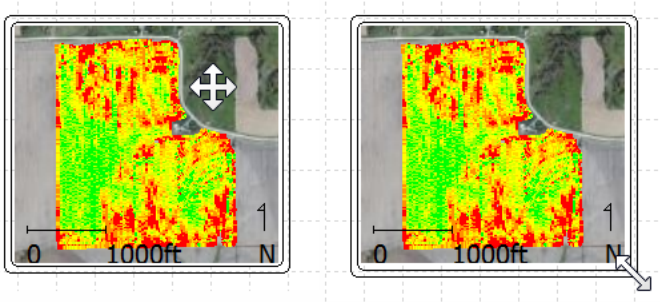
Custom Layouts can be created to print maps in different styles than the pre-loaded layouts.

1. In Step 4, Current Layer was selected as the map layout. Notice that there were other options to display the map. For example, choose **Custom Layout**
2. Using the icons in the second toolbar a custom print layout can be created and tailored to only include user selected objects, such as maps, legends, summaries, logos, titles, etc..

a. **Add Map**- current map showing on the workspace layer
b. **Add Legend** - current legend showing for the map on the workspace
c. **Add Summary** - summary information for the map layer on the workspace
d. **Add Field Summary** - adds a summary that will show individual datasets summary
e. **Add Attribute Area** - option to show individual attribute data for a field (All soil testing sites)
f. **Add Analysis Area** - if an analysis function was used to create the layer being printed this text box can display function descriptions (such as analysis name and attributes created), the input dataset used and settings (such as grid size and interpolation settings), or temporary results(prompts) used in the function (Advanced only)

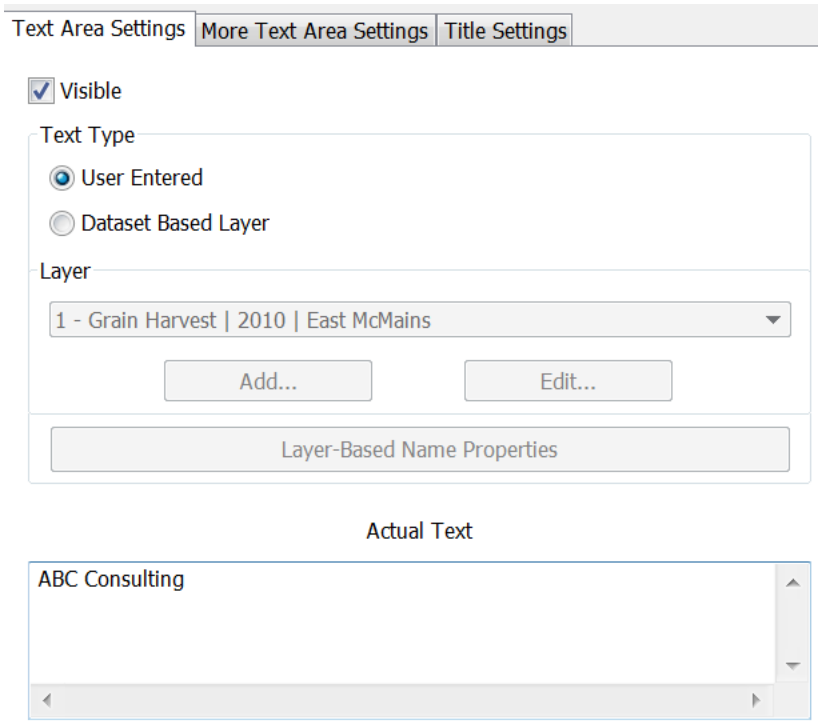
g. **Add Tile Run Depth Settings** - adds a table with details for each run in the tiling dataset
h. **Add Histogram**- gives a graphical representation of area per attribute
i. **Add Chart** - allows ability to start a chart to add to the map layout
j. **Add 3D Plot** - allows ability to insert a 3D plot of the current layer (Advanced only)
k. **Add Image** - allows an image to be placed on the layout
l. **Add Text** - allows a text box to be added to the map for user entered text
m. **Add Linked Item** - allows linked images to be added to the layout
n. **Add Picture Notes**- allows any set picture notes to be added to the print layout
o. **Add Query** - allows a query results area to be added to the print layout

3. To start, click on an icon, and then on the page layout, click and release. The object will appear. If the cursor is positioned on the top of the map, the cursor will appear as 4 directional arrows, allowing the object to be repositioned, if the cursor is placed on the edge of the object, it will appear as 2 arrows, allowing it to be resized



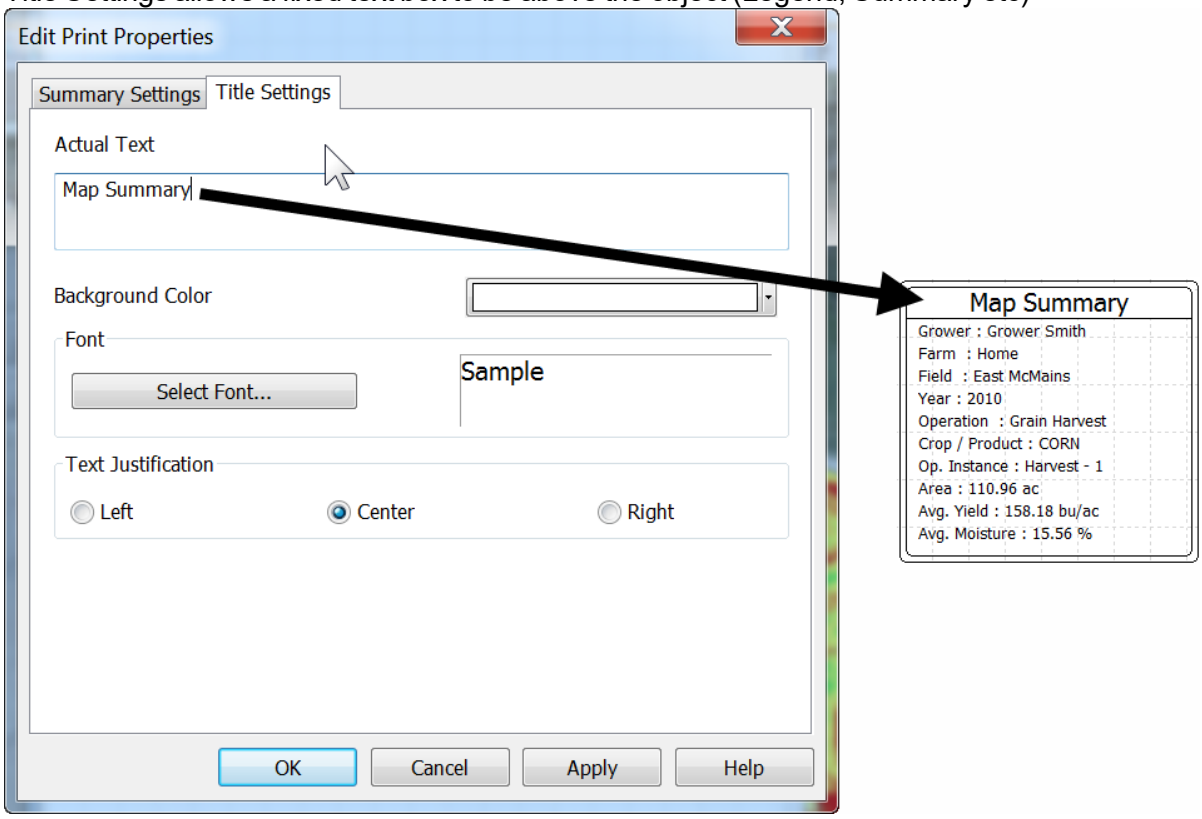
When adding an object, click and hold the cursor, and drag to the desired size in one step.

4. Repeat the previous step until the map layout appears as desired
5. To modify additional settings for any of the objects added to the custom print layout, **double click** on the object or **right click** and choose **Edit Print Properties**. For example, to modify the title double click over the Title Box.



- **Text Area Settings** can be based on the "Actual Text" (user defined), where each map will have the same text, or as a "Dataset Based Layer, where the text will change based on the map displayed
- **More Text Area Settings** gives options for size, font, color and appearance of the text being displayed

6. At the bottom the border thickness of the box (0 = no border) can be changed
7. Title Settings allows a fixed text box to be above the object (Legend, Summary etc)

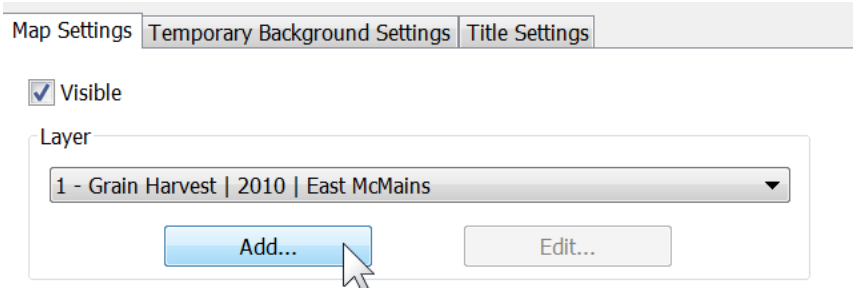


8. Once a layout is created it can be saved for future use by going to the **File** menu**- Save Layout**
9. Give the layout a distinct name for future use

Additional Layers

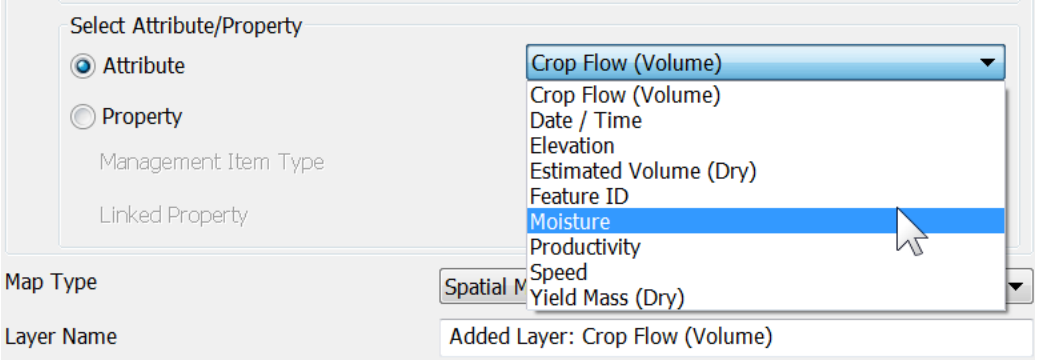
There are times that viewing more than one map is necessary. This can be accomplished by adding layers from the map properties box. The map that is currently being viewed, is going to serve as a link to the other maps to be created. Each type of map (Grain Harvest, Planting, etc...) will have its own type of custom layout to be created.

1. To add other maps to the layout (for example Yield and Moisture on the same page) **Double click** on the map you wish to modify and the Edit Print Properties dialog will open.

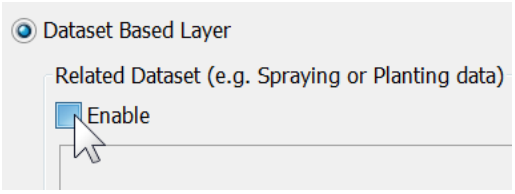


Layer 1 is the current mapped attribute, from the main mapping window. This will serve as a link to related data for other attributes, or layers.

2. Click on **Add** in the Edit Print Properties window. Adding a layer that is specifically yield, will ensure that regardless of map shown on the mapping window, the Yield data will show in the print layout
3. In the window that appears, if the additional information is in the same layer as the current map (like yield and moisture are in a Grain Harvest layer) use the combo box to select the desired attribute.



4. If the additional information is in another type of map, check the **Enable** button to select an attribute from another layer (Advanced only)



5. In the following window, choose the filter settings that will allow the desired map to be added to the print layout

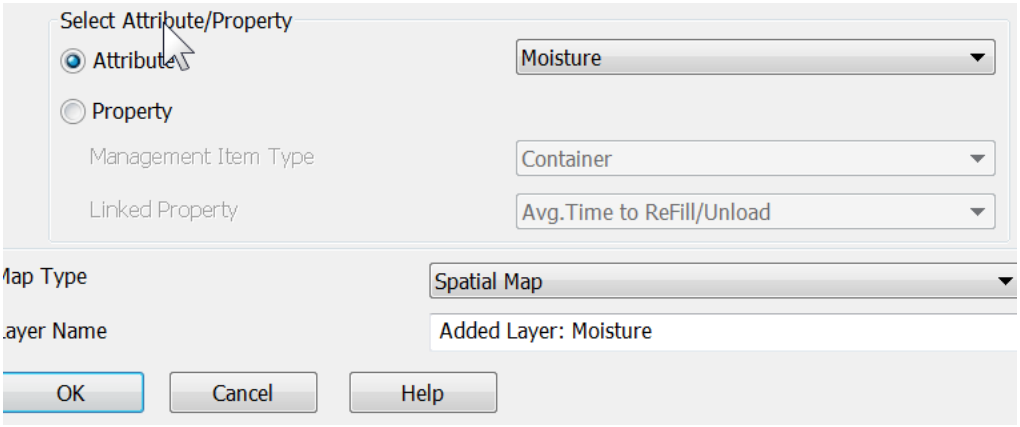
Management Item	Iteration Type	Current Selection
Grower	Same	
Farm	Same	
Field	Same	
Year	Same	
Operation	Same	
Product - Crop Type	All	
Product	All	
Pest	All	
Operational Instance	All	
Dataset	All	

Settings that may need to be changed will be based on the relationship to the existing map. If the needed map is under the same Grower, leave the iterative filter set to "Same" likewise for the Farm and Field. If the data is under a different operation (Planting) chose "Fixed." A new box will appear asking what operation needs to be

referenced. For this example chose "Planting." All other settings can stay as-is. Below are definitions for the selection options:

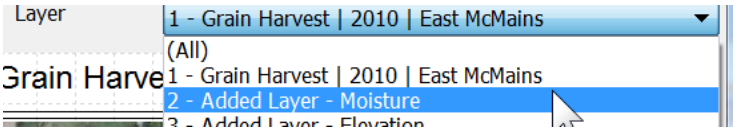
- **Same** - Uses the same selection that was used when the print layout was designed. So if you used Grower A, for example, then only Grower A will be used for the selection
- **Fixed** - Only the selected management item will be used as a reference when iterating through the data
- **Any** - Any management item can be used when this is selected for an item
- **All** - Use all available items for a selected management item
- **Most Current**- The latest year or dataset for a field or operation will be used. Will automatically update each time the print layer is used

6. Once the new layer has been selected, choose the desired map style for the attribute/property to be displayed as
7. Assign a name for the layer
8. Click **OK** twice and to return to the layout



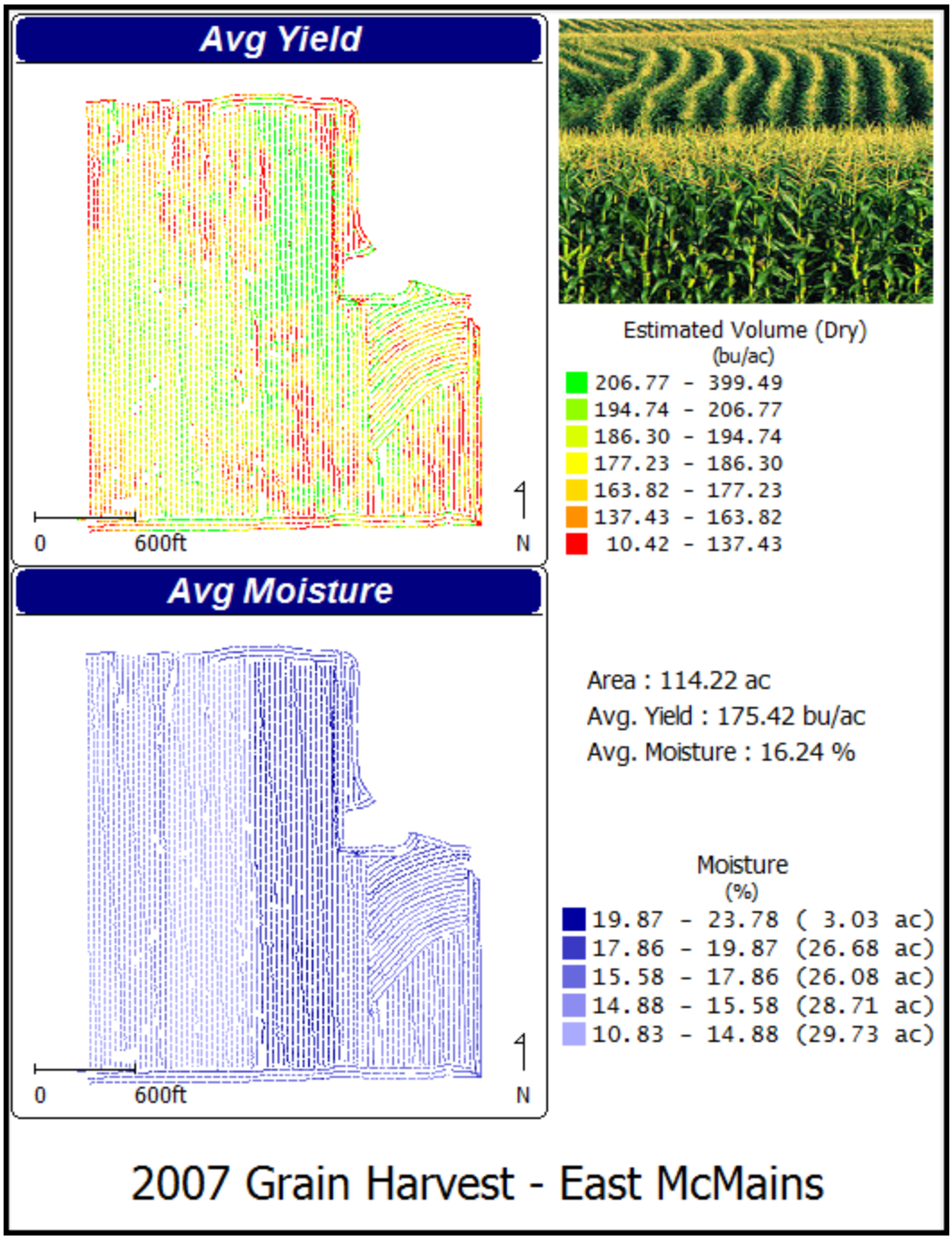
If displaying a map of Hybrids, use Property, change to Product or Dataset and set the linked property to Name.

9. When returning to the custom layout window, a new map may need to be added to the map. Click the Add Map icon and size the map accordingly. To select the appropriate layer, use the combo box at the top of the window. Keep in mind that Layer 1 is the current map displayed, if the goal is to have (in this example) Yield and Moisture to always be displayed. If the "Added Layer" items are used to display these maps, they will always load appropriately, regardless of the map being displayed on the main mapping window



The map and legend boxes will need to be linked to the same layer to represent the data correctly on the map.

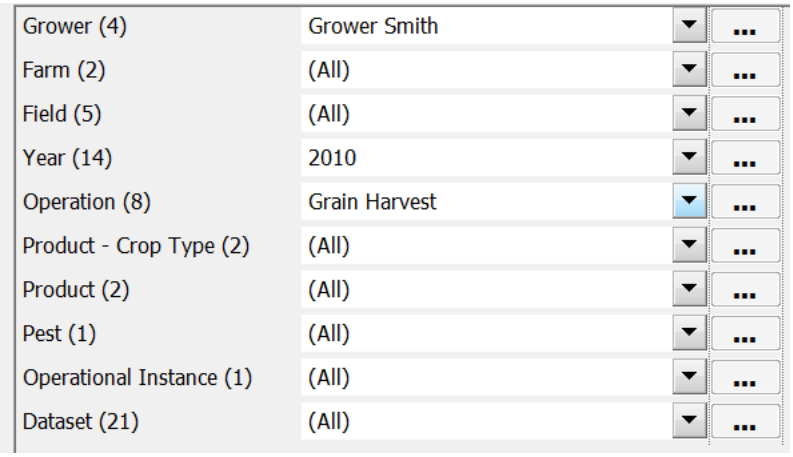
10. This shows the final map


Avg Yield
0
600ft
N
Estimated Volume (Dry)
(bu/ac)
206.77 - 399.49
194.74 - 206.77
186.30 - 194.74
177.23 - 186.30
163.82 - 177.23
137.43 - 163.82
10.42 - 137.43
Avg Moisture
0
600ft
N
Area : 114.22 ac
Avg. Yield : 175.42 bu/ac
Avg. Moisture : 16.24 %
Moisture
(%)
19.87 - 23.78 (3.03 ac)
17.86 - 19.87 (26.68 ac)
15.58 - 17.86 (26.08 ac)
14.88 - 15.58 (28.71 ac)
10.83 - 14.88 (29.73 ac)
2007 Grain Harvest - East McMains

Batch Printing

Batch printing is used to the print similar map types, all Grain Harvest Maps for instance, at the same time without having to map each field individually.

1. If you are going to use a custom print layout during batch printing, you will need to create and save that layout before starting the batch print process.
2. Next go to **Tools - Batch Command Utility**
3. Select the **Print Map Layer(s)** option from the menu that appears
4. On the following screen, select the appropriate filters. In this example, use **Grower Smith, all Farms and Fields, 2010 Grain Harvest, All Products, Operational Instances, and Datasets** will be printed. Click **Next** when complete



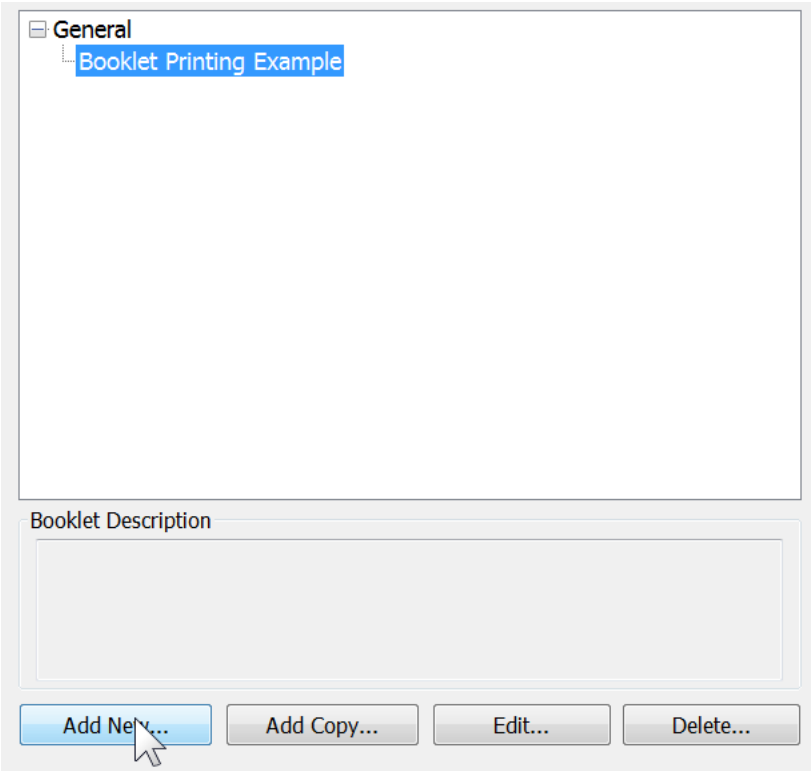
If Batch Printing planting maps of hybrids/varieties Merge Filter Result Datasets by should be set to Field. This will insure all products are displayed on the same map layout.

5. In the following screen, a preview of the data found by the filter will be displayed. If this looks appropriate, click **Finish**
6. A print preview will appear. If a custom layout is needed go to **File- Load Layout** and select the layout that is desired
7. Select the desired printer by clicking on the **Print All** button in the lower left hand corner. You have the same printing options in Batch as when working with single fields.

Booklet Printing

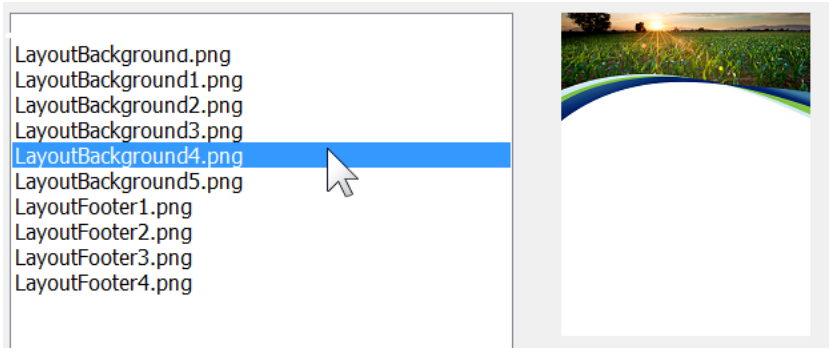
Booklet printing is an optional module that can be purchased and used to pull together features such as analysis results, charts, reports, and maps. Booklet Printing will enable analysis items, such as Comparison and Correlation Analyses (within a project, or across many projects) to be printed, results for Grower / Year / Farm / Field levels. This will allow maps and/or reports and/or charts to be grouped based on the appropriate level. Before beginning this process, it is suggested to have all analyses made, and all document settings in place. Also any analysis equations or multi-year average should be saved to the tree to be pulled in the Booklet.

1. To begin, go to the **Analysis** menu - **Booklet Printing**
2. In the Booklet Type Selection window, click **Add New**



3. This will begin the wizard process to create a new booklet setup. In the first window, give the Booklet a name, and description if needed. There is also an option to assign all of the booklets created with different groupings. Click **Next**.
4. On the Booklet Title Page dialog, there is an option to design a custom cover page. Check **Add Booklet Title Page**
5. In the cover page editor, custom logos or images, and text can be added to design a customized cover. There is also a default cover page layout saved in the **Data/Data_x/Settings/PrintLayouts** folder. To load this layout, click on **File, Load Layout**
6. In the layout there is a software image that can be replaced with a .png file that is saved in the same folder. To change the image double click on the image and a window will appear that will prompt the loaded additional images
7. On the Edit Print Properties box, click **Select Image**

8. On the Select Image File dialog box, choose **Layout Background.png**



Additional images can be added to this list by selecting the Add button.

9. To modify the text, **Right Click** on the text and Edit the Print Properties and update the text as needed
10. Once finished, click **OK** and on the screen following click **Next**
11. The **Booklet Item Selection** window will contain all options for adding items to the booklet. The left-hand side is where the settings are available to be selected, the right-hand side displays the items that have been added to the booklet

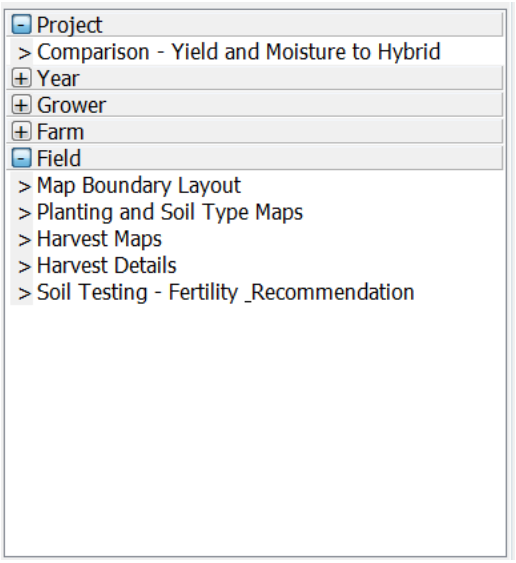
Definitions of each item:

- **Project** - Correlation or Comparison Analyses that will be applied over the entire project or even across multiple projects
- **Year** - This could include a report from a years production, a chart, or a comparison or correlation analysis.
- **Grower** - Items based off grower level, can be a Map Boundary Layout of all the fields for a grower, map information, reports, or analysis results
- **Farm** - Many of the same options as the Grower level, however if multiple farms are in the management tree, each farm could have its own report, or map boundary layout
- **Field** - Many of the same options as the Farm level, however if multiple fields are in the management tree, each field could have its own report, map, or map boundary layout

12. Using the settings above, a map of all field boundaries for a grower could be placed on one map, or each field boundary could have its own individual map. To make a map of all of a Grower's field boundaries, select **Grower** as the Management Item Type then select **Map Boundary Layout** and click **Add**. If an individual map of each field is desired, select **Field** as the Management Item Type, select

Map Boundary Layout, and click **Add**

13. Below are examples of other layouts and booklet printing results:



Project - This comparison will compare all Yield and Moisture data to Hybrid maps across all years, growers, farms, and fields. (If results for only wanted for the current year, instead of adding at the Project level, add it to the year or grower level)

For this example, no data will be displayed at the Year, Grower or Farm level groupings of the booklet.

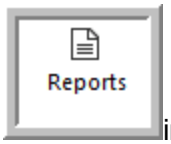
Field - The first map that will appear during the field series is the Boundary. Following it, will be a Planting and Soil Type map, a Yield Map, and then a summary report (renamed to say Harvest Details). Having a report on this level will show the details one field at a time. Finally, any fields that have soil testing and recommendations will be included after the harvest information. For fields that have no soil testing information this will be skipped.

The field level information will be repeated for every field that is found that fits the filter and then start over, in this case, starting with the boundary for the field.

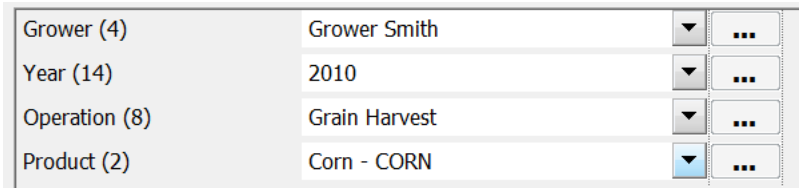
Creating Reports

Reports are a simple text summary of operations that are in the management tree. There are several pre-defined reports in the New Reports Menu that will each provide different grouping, or level of detail, in the final report. See the Crop Scouting chapter for details on generating scouting reports in the software.

New Summary Report

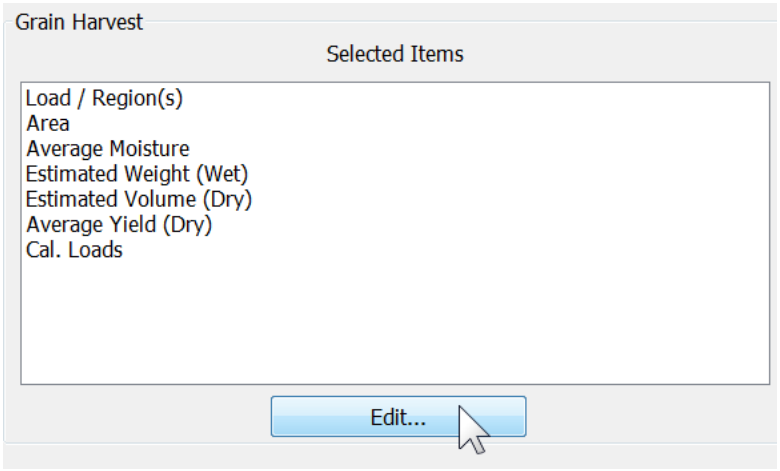
1. To access the report options, you click on the **New Report** icon 

in the main toolbar, or go to **File - New - Reports**
2. The Report Type Selection Dialog contains all available report options. Select a report type and click **Next**
3. This screen contains the options for filtering the data that will be included in the final report. For this example, create a **Grain Harvest** Summary for **Grower Smith** for **2010**. Click **Next**

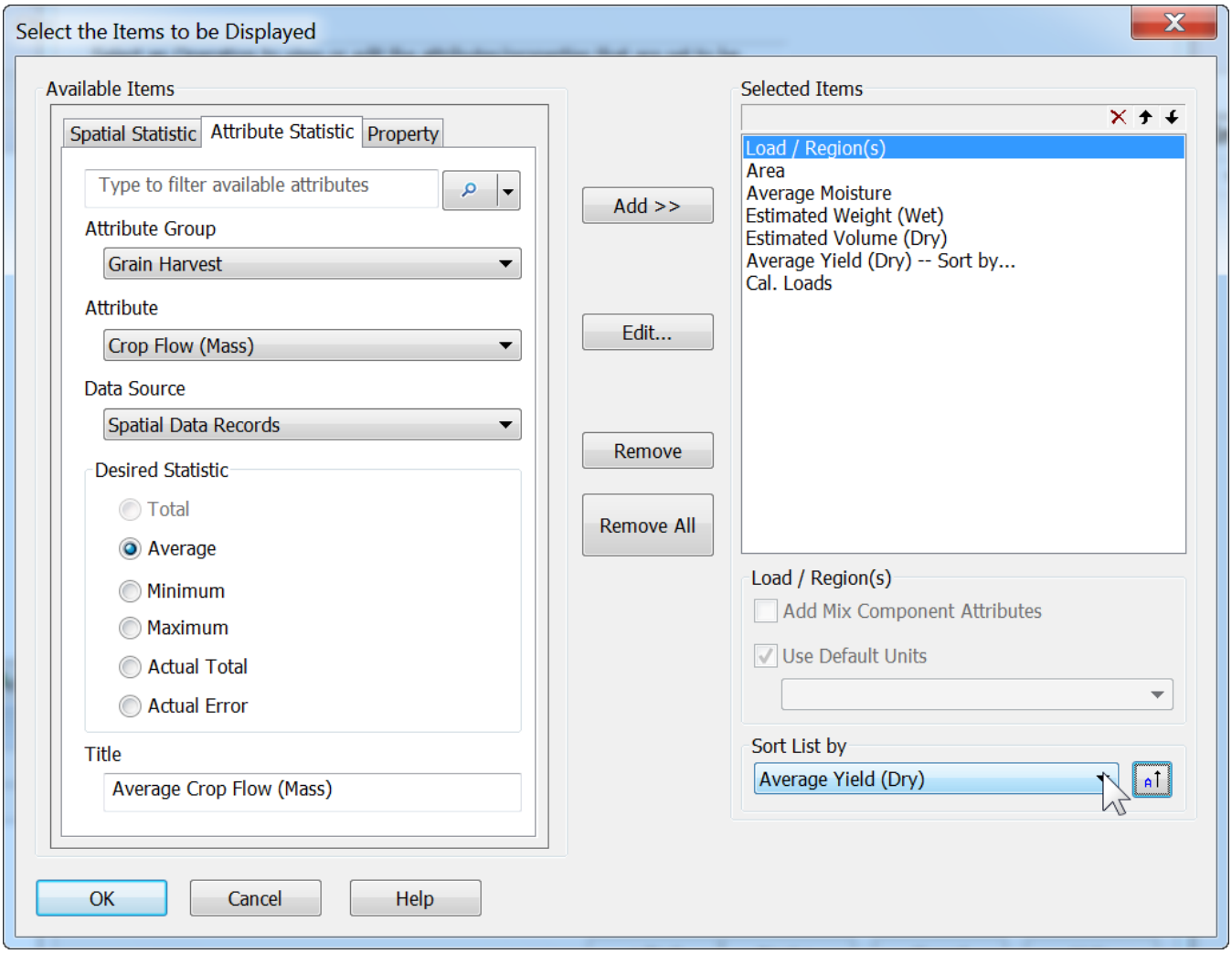


Data can also be filtered by the date range on the right. For example, a report could be run for just the month of October 2010. The current Management Tree filter can also be applied by checking Apply Management Tree Filter

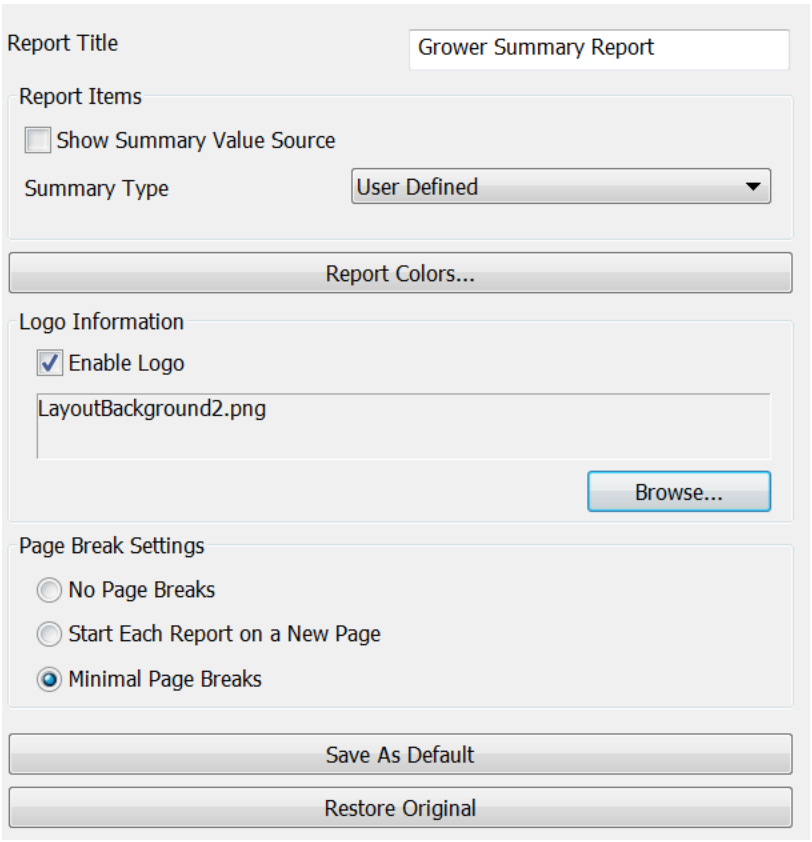
4. A window will appear that has a preview of all the information that fit the previous criteria. If correct, click **Next**. If changes are needed, click **Back**. If anything needs to be removed from this report, highlight the appropriate information and **Delete** as necessary
5. The Report Item Selection dialog will now open and will display the list of attributes that will be included in the final report. To modify, click the **Edit** button. If the default attributes are appropriate, click **Next**



6. If Edit is clicked in the Report Item Selection window, on the right hand of this screen are the items that will be included in the report. Selecting the attributes and properties from the left side of the screen will enable custom settings for use in the report. Highlight and click **Add** and they will appear in the right side of the screen. Click **OK** when finished



7. The Report Options dialog will now open. On this screen changes can be made to the Report Title, Summary Source, Report Colors, Logo settings, and page break settings. After all setting changes have been made there is an option to save these settings as a default for future use. Click **Finish** to see the report



Save as default will save all user defined settings as the default and will be used each time this report type is run in the future. Restore Original will reset the report to the factory settings.

8. Final Report

Grower Summary Report

Grower :	**Grower Smith**
Year :	**2010**
Operation :	**Grain Harvest**

Product: CORN

Farm	Field	Load / Region(s	Area ac	Averag Moistur %	Estimated Weight (We lb	Estimated Volume (Dr bu	Average Yield (Dry bu/ac	Cal. Load
Home	East McMain	7	113.40	15.56	1,016,803	17,937	158.18	2
Rented	Boender Wes	10	70.70	14.79	548,270	9,754.8	137.98	5
	Totals	**17**	**184.10**	**15.27**	**1,565,073**	**27,692**	**150.42**	**7**
				Average			Average	

Product: SOYBEANS

Farm	Field	Load / Region(s	Area ac	Averag Moistur %	Estimated Weight (We lb	Estimated Volume (Dr bu	Average Yield (Dry bu/ac	Cal. Load
Home	West McMain	1	93.94	9.414	266,444	4,440.7	47.27	0
Rented	Boender East	3	92.61	10.36	170,295	2,838.3	30.65	0
	Totals	**4**	**186.55**	**9.886**	**436,740**	**7,279.0**	**39.02**	**0**
				Average			Average	

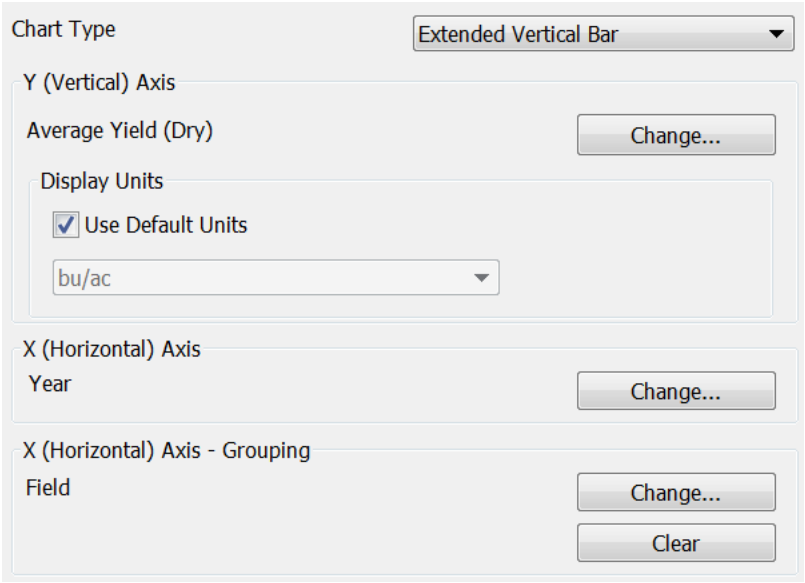
9. To print this report, Click the **Print** Icon in the main toolbar. Reports can be printed to the default printer, Software PDF Printer or saved as an HTML document.

Creating Charts

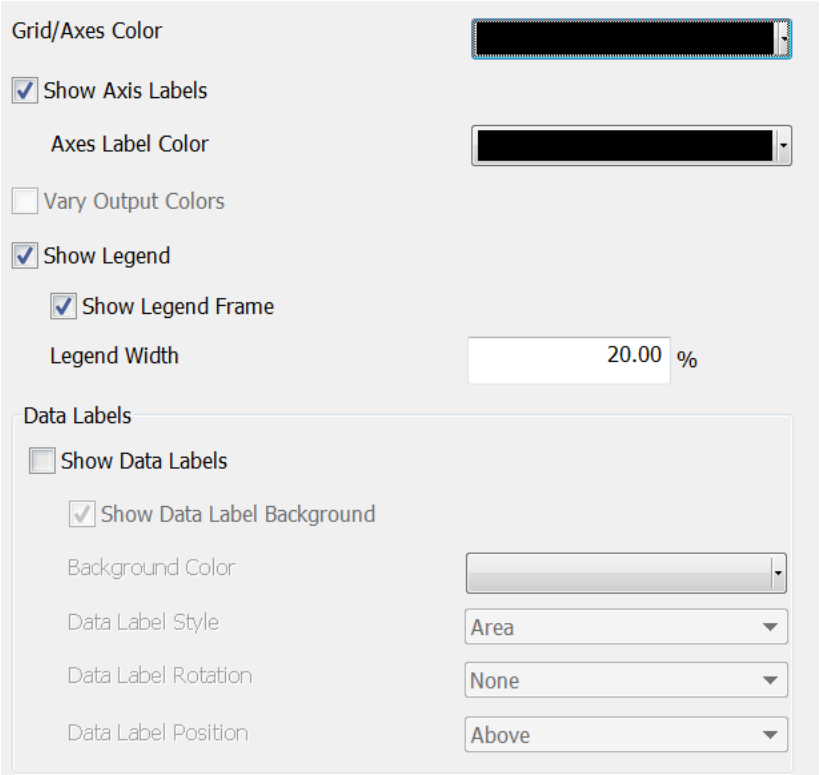
Charts are a way to graphically show information stored in the management tree. There are pre-defined charts in the Chart Type Selection window that can be used to get started.

New Chart Comparison

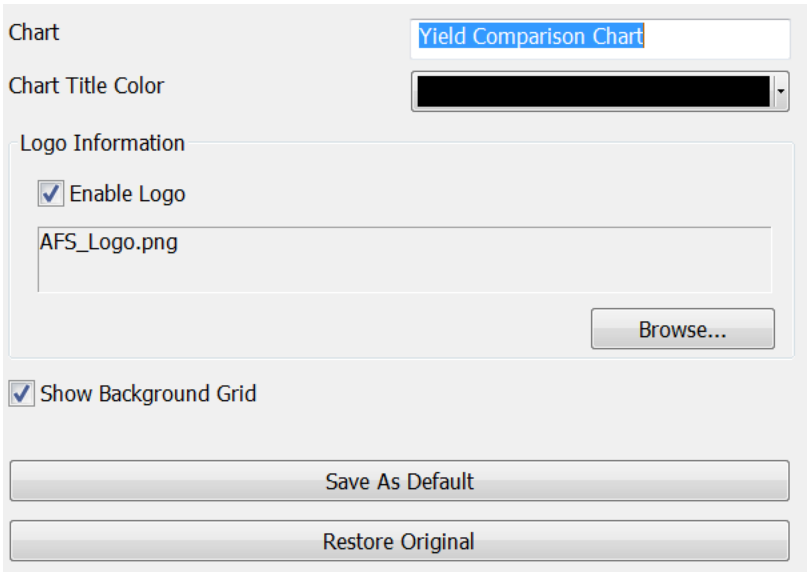
1. To create a new Chart, click on the **New Chart** icon in the main toolbar, or go to **File** menu and select **New - Chart**
2. The Chart Type Selection window will open where all default reports will be listed. Select a type of chart to create, and click **Next**
3. The Select Data Filters screen contains the options to filter the data from the management tree to show the appropriate information. For this example, create a chart for **Dan Henning, All Farms and Fields, 1997, Soybeans, Grain Harvest**. Click **Next**
4. A window will appear that has a preview of all the information that fit the previous window. If correct, click **Next**. If changes are needed, click **Back**, or if anything needs to be removed from this chart, Highlight and Delete as necessary
5. The Chart Axes dialog contains settings for the appearance of the chart such as style of chart, Y axis setting, X axis, and (if applicable) X Axis Grouping. Make any desired changes, and click **Next**



6. In the Chart Axes/Data Label Options screen, modifications can be made to the appearance of the chart such as color settings, legend settings, size proportion, and label settings. Make any desired changes, and click **Next**



7. Finally, the screen containing page settings appears. On this screen changes can be made to chart title, logo settings, and page break settings. After all setting changes have been made, there is an option to save these settings as the default for future use. Click **Finish** to see the chart



8. To print this chart, click the **Print** Icon on the top toolbar

Field Boundaries

In this chapter you will learn to:

- Import Boundaries
- Freeze Boundaries
- Trace Boundaries
- Create Boundaries
- Edit Boundaries

Working with Field Boundaries

Boundaries are used in the software for clipping purposes, prescriptions, spatial sorting, and split load/region and can be created in many ways. Field boundaries created in the field with a field display or mobile mapping software are typically more accurate than hand drawn boundaries, but if driven boundaries are not available there are tools within the software to generate boundaries from previously recorded GPS information, such as planting or harvest.

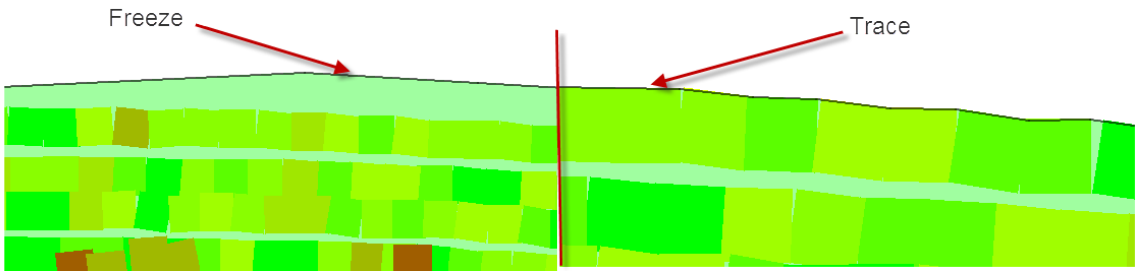
Importing Boundaries

Boundaries can be created on several ag displays/monitors and mobile programs and then imported into the software. Boundaries created in monitors will be able to be read in by going to **File - Read Files** and reading that information off of the card from the monitor. Boundaries from third party software's will generally come as the shape file format. Shape files can be imported in one at a time (**File -Read Files- Import from a Generic Source- Shape File)** or in batch using the Batch Command Utility **(Tools - Batch Command Utility)**. Batch importing is available in the Advanced Software only. To learn more, please read the Importing chapter.

There are a few things to note, when importing shape files (spatial files). On the Select Import Type dialog box, verify that the Import Data Type is set to **Boundary** and that **Set As Frozen Field Boundary** is checked.

Freeze and Trace Boundary

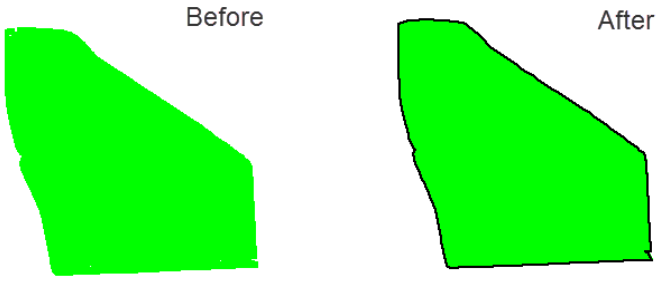
Freeze Boundary and Trace Boundary are two tools used to automatically create field boundaries based off of data that has already been read into the software. From the example below, it can be seen that Freeze Boundary adds approximately half a swath width to the field boundary. Trace Boundary on the other hand looks at the data as a smart rectangle map and "traces" along the end of the swath. While Trace Boundary can be more accurate with acres, it will take more time to create the field boundaries.



Freeze Boundary

To create a field boundary using the Freeze Boundary tool:

1. Right-click on a Field Name. For this example, use **Grower Myer - Myer Farm - Taden**.
2. Select **Freeze Boundary**



There is also an option for Freeze Boundary under Tools - Batch Command Utility.

Trace Boundary

To create a field boundary using the Trace Boundary tool:

1. Right-click on an Operation. For this example use: **Grower Myer - Myer Farm - OMA'S63 - Grain Harvest)**
2. Select **Trace Boundary...**

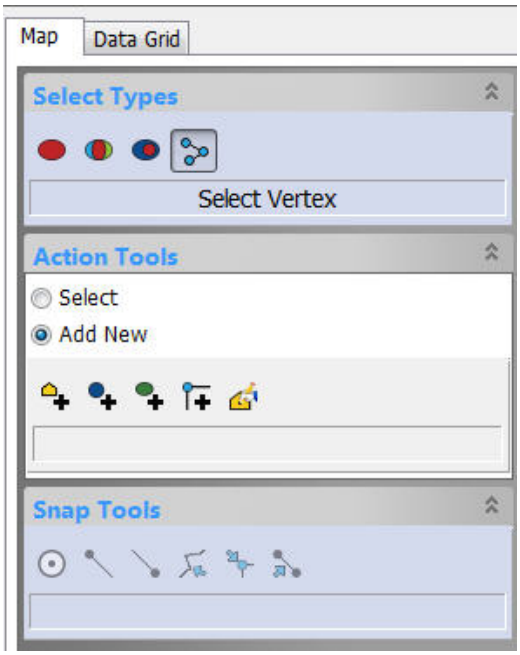
There is also an option for Trace Boundary under Tools - Batch Command Utility.

If the Boundary has already been imported, but **Set As Frozen Field Boundary** was left unchecked, the polygon(s) can still be set as the Field Boundary by right-clicking on the dataset in the Management Tree and selecting **Set as Field Boundary**.

User-Defined Boundaries

There is also an option to manually create field boundaries in the software.

1. Create a map of a reference layer (i.e. satellite image, yield map)
2. Go to **File - New - Boundary Layer**
3. Select the **Add Tool** that fits the need



The Add Polygon tool is the most commonly used.

4. Draw a polygon where the field boundary should be by **left-clicking** along the boundary edges
5. **Right-click** to finish the object

It may be necessary to use a combination of the Zoom tools, Pan, and Move to fine tune where the points are. Several shortcut keys are available in the editor window, see the glossary for complete information.

6. Once the boundary is done, click **File - Set Field Boundary...**
7. Choose the correct **Grower - Farm - Field**
8. Click **Accept**

Setting the Field boundary sets the layer as the frozen field boundary that appears when the Field name is selected in the Management Tree and is also used for clipping options.

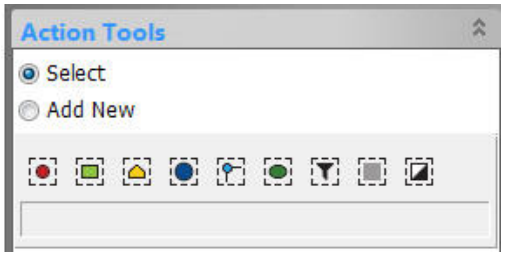
9. Click **File - Save**
10. Choose the correct destination for the layer

11. Click **Accept**

Editing Boundaries

Some maps may need to be cleaned up after using the Freeze Boundary or Trace Boundary tools. Follow these steps to edit the map.

1. Freeze the boundary for a Field **(Dan Henning - Henning Farms - EEAST)**
2. Create a new map of the **EEAST** Field
3. Click the **Edit Layer** icon to modify the boundary 
4. Use the Selection Tool that best fits the need. For this example choose **Select Polygon**



5. Make a polygon around the points that are to be deleted by clicking the **Left Mouse Button**
6. Click the **Right Mouse Button** to finish the polygon
7. Click on the **Delete Selection** tool

Vertices that make up the field boundary can be added and moved. To add a vertex, use the Add Vertex tool. To move a point(s), use the selection tools as the example above then click and drag to move the vertices to the desired location.Many of the **Add**, **Select** and **Divide By** tools are also available by right-clicking over the map in the Editor window.

8. After editing the Field, click **Save** at the bottom of the screen
9. Click **OK** to overwrite the original boundary

Managing Data in the Management Tree

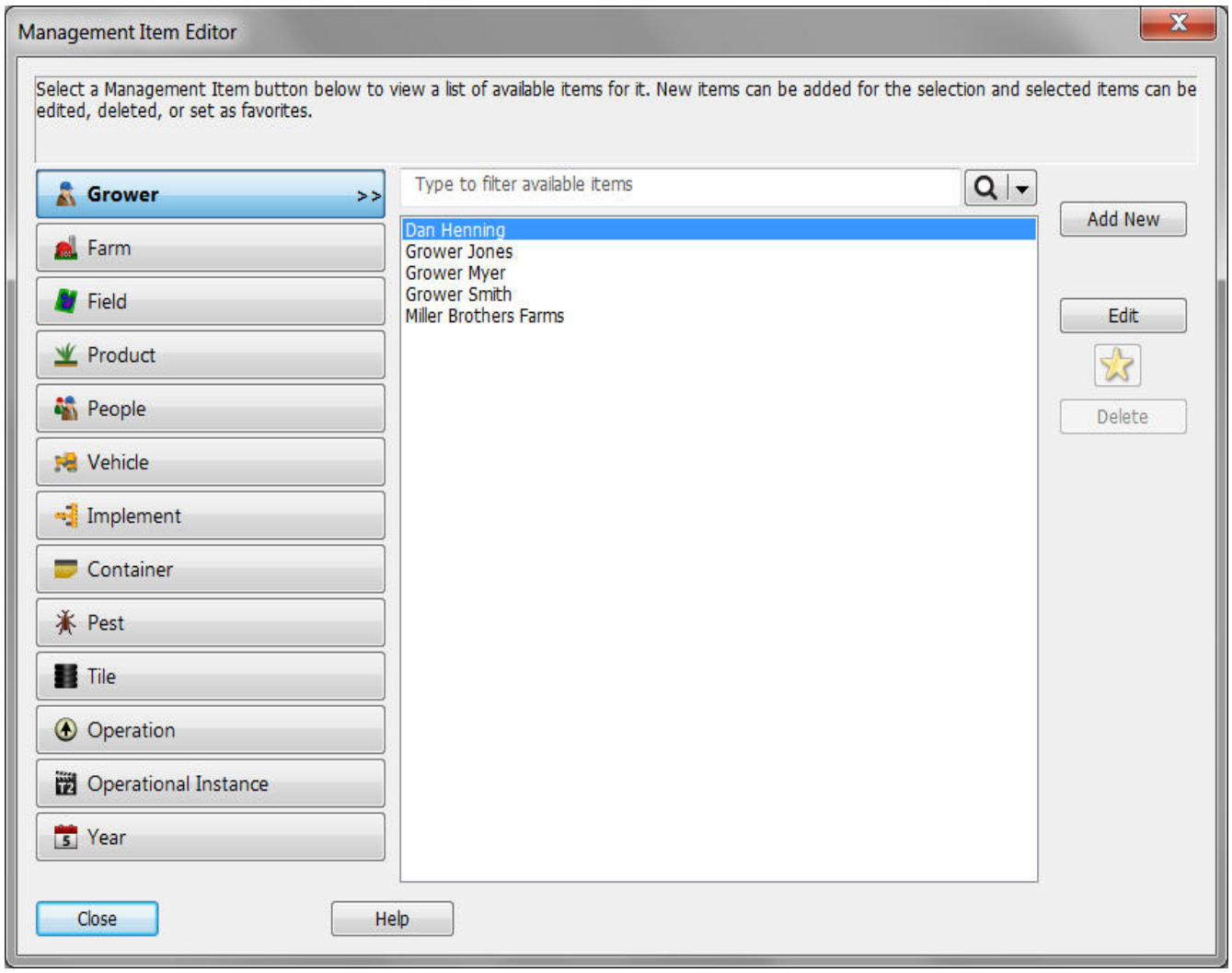
You will learn how to:

- Create new Growers, Farms, and Fields
- Manually move Fields between different Growers and Farms
- Merge Fields
- Spatial Sort
- Split Load/Region
- Edit Point Data
- Add Simple Analysis

Create New Grower, Farm, and Field Names

The following section describes how to create Grower, Farm, and Field Names which will be used in the Management Tree and can be exported for use in field displays and SMS Mobile.

1. Go to **Tools - Management Item Editor**
2. To add a Grower Name, select **Grower** and click **Add New**



If a Grower Name already exists in the Management Tree, this screen can also be accessed by right-clicking on the Grower Name and selecting Alter Grower List...

3. Type **Miller Brothers** for the Grower Name
4. Click **OK**
5. Select **Farm** and click **Add New**

If a Farm Name already exists in the Management Tree, this screen can also be accessed by right-clicking on the Farm Name and selecting Alter Farm List...

6. Type **Miller Brothers Farm** for the Farm Name
7. Select **Miller Brothers** for the Grower under Management Settings
8. Press **OK**
9. Select **Field** and click **Add New**

If a Field Name already exists in the Management Tree, this screen can also be accessed by right-clicking on the Field Name and selecting Alter Field List...

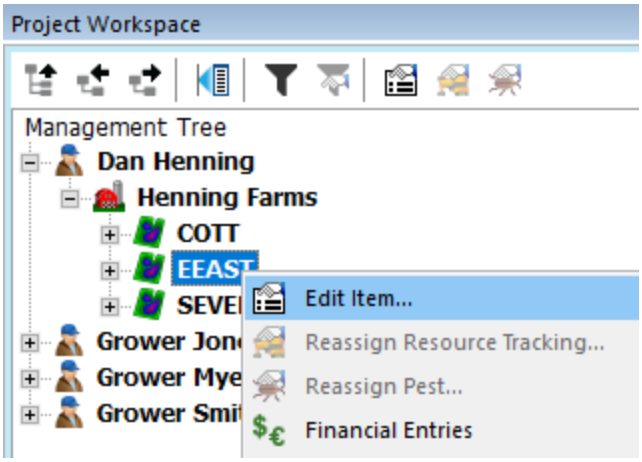
10. Type **North 80** for the Field Name
11. Select **Miller Brothers** for the Grower under Management Settings
12. Select **Miller Brothers Farm** for the Farm under Management Settings
13. Press **OK**
14. Press **Close** on the Management Item Editor dialog

The Field will not appear in the Management Tree until some data has been brought in and stored under the Field name and will shows as (Unused) in the Management Item Editor.

Field Management

This section discusses how to change the name of a Field and move it to different location in the tree.

1. **Right-click** on the Field name that you wish to modify (EEast) and select **Edit Item**

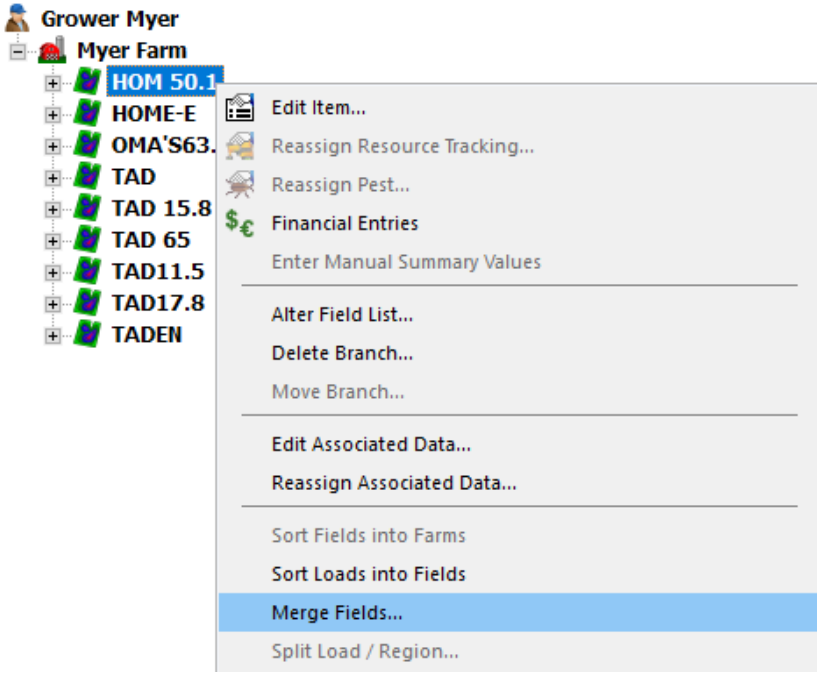


2. Change the Field Name to **East**
3. Change the Grower and Farm Name under Management Settings to the newly created **Miller Brothers/Miller Brothers Farm**
4. Press **OK**
5. Select **Apply to existing and future data**
6. Press **OK**
7. The Management Tree will refresh and now have the renamed Field under a different Grower and Farm name

Merge Fields

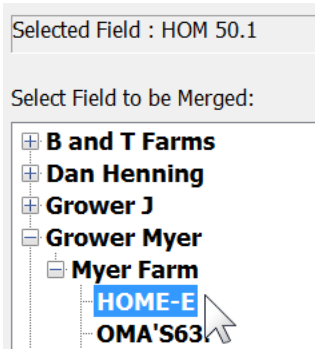
Merge Fields is a tool used to combine two separate fields and all operations into one field in the management tree. An example would be moving an incorrectly named field into a correctly named field.

1. **Right-click** on the field that is named incorrectly. For this example, use **Grower Myer - Myer Farm - HOM 50.1**
2. Click on **Merge Fields**

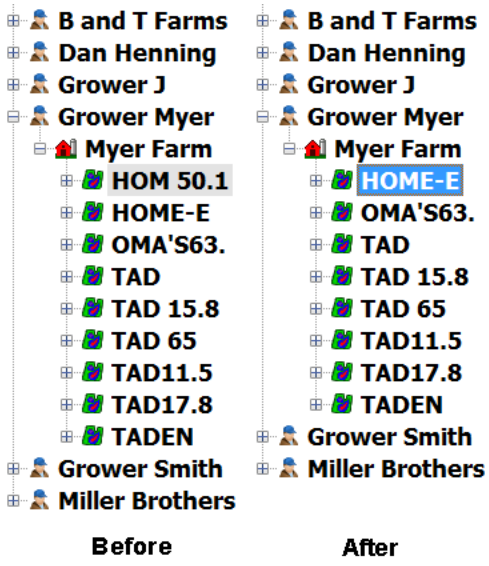


This is a permanent change and we suggest making a BACKUP before merging large amounts of data.

4. Navigate to the correct Field name by clicking on the **+** symbol next to Grower and Farm names



5. Select the Field for the data to be merged with. For this example, use **Grower Myer - Myer Farm - HOME-E**
6. Click **OK**
7. Expand the management tree and inspect that the fields merged correctly



Spatial Sorting

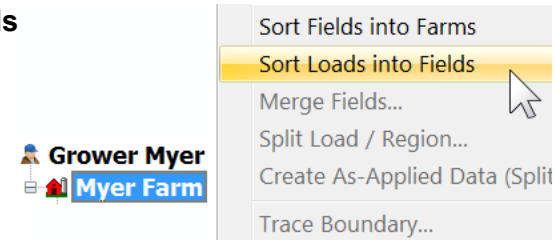
Spatial Sort is a tool that helps to organize data in the Management Tree by sorting Datasets/Loads into Fields based on field boundaries. Spatial Sorting should only be used if field boundaries are established in the software. See the Field Boundaries chapter if data that needs to be spatially sorted does not have frozen field boundaries.

This is a permanent change and we suggest making a Backup before sorting large amounts of data.

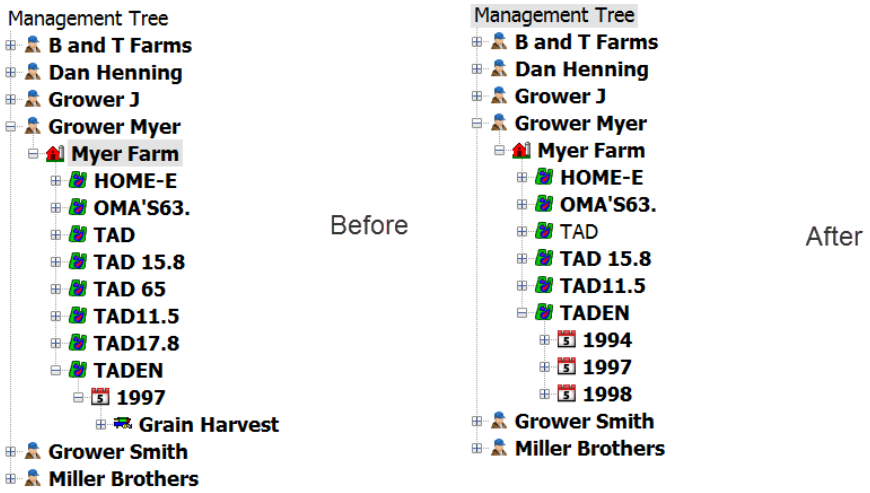
Spatial Sorting Data in the Management Tree

The following example will show how to spatial sort the fields under Myer Farm.

1. Right-click on the Farm level **(Myer Farm)**
2. Select **Spatial Sort - Sort Loads into Fields**



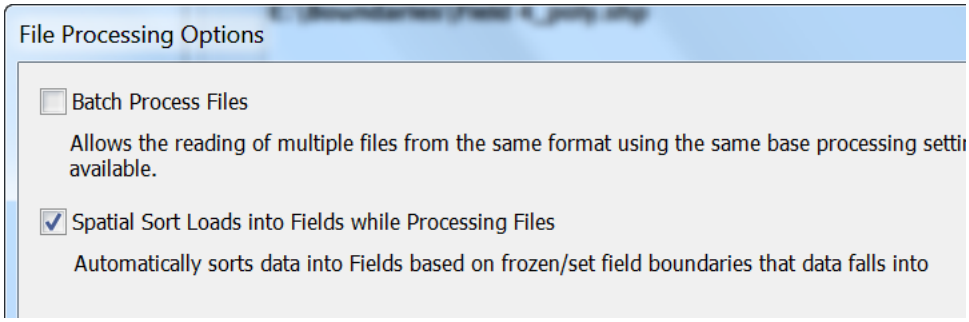
3. The **Spatial Sort - Sort Load Results** dialog box will appear informing of the number of loads looked at and the number of loads moved. Also, each load moved will be listed with the field it was moved from and into. There will be an option to save the results as a text file. Click **Close**



If a Grower has multiple Farms, right-click on the Grower name instead of the Farm. If multiple Growers exist and it is necessary to spatially sort between the different Growers, then go to Tools - Spatial Sorter - Sort Loads into Fields.

Spatial Sorting While Importing Data

The software can also sort new data, according to frozen field boundaries, when reading data into the software. This can be done by checking **Spatial Sort Loads into Fields while Processing Files**.



Split Load/Region

Split Load/Region is a tool that helps to organize data in the Management Tree by dividing Datasets/Loads into Fields based on field boundaries. Split Load/Region is only available AFTER frozen field boundaries have been created. See the Field Boundaries chapter if data that needs to be split does not have frozen field boundaries.

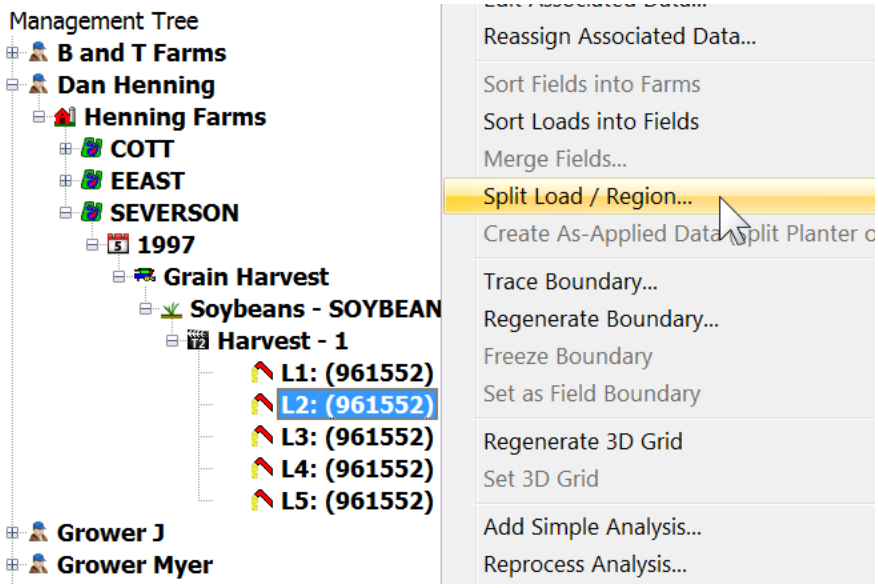
This is a permanent change and we suggest making a Backup before splitting large amounts of data.

1. Verify that the Fields have correct frozen boundaries **(Dan Henning - Henning Farms - COTT and SEVERSON)**
2. Verify that all the files from the operation have been read in (i.e. all Grain Harvest files for the year have been read into the software)
3. Verify that the portion of the Dataset to be moved is within the frozen boundary of the intended Field

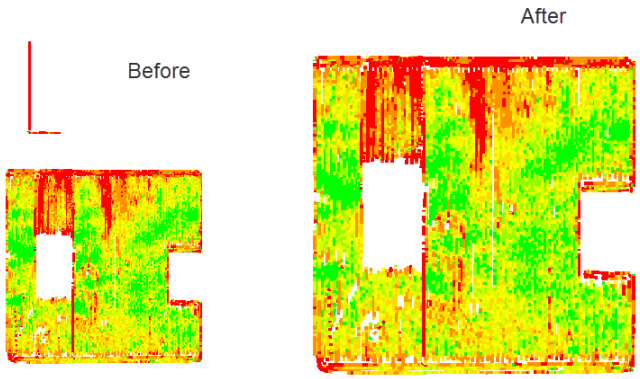
This can be done by creating a new map of one field boundary and then adding a map of the second field boundary and a map of the Dataset to be split.

4. Right-click on the load to be divided **(Dan Henning - Henning Farms - SEVERSON - 1997 - Grain Harvest - SOYBEANS - Harvest-1 - L2)**

5. Select **Split/Load Region**



6. Click **Close** when the process is done. The Split Load Results window appears. The previous field(s) will be listed along with the field(s) the loads were split into
7. Verify that the data moved to the correct Fields



The Monitor Summary goes to N/A since the Dataset has been altered.

There is also an option for Split Load/Region under Tools - Batch Command Utility.

Editing Point Data

To edit point data read into the software from a field display or imported as a generic file type, you will need to verify that the map type is set to **Base Map**.

1. Create a map of the data that needs modified. In this example use **Grower Jones - Home Farm - North 40 - 2012 - Grain Harvest.**
2. Click the **Base Map** button.
3. Right click over the map and choose **Edit Layer** or click on the **Edit Layer** icon in the mapping toolbar.
4. In the Point Map Editor that opens, use the **Select**, **Move**, **Merge** and **Delete** tools to modify or remove any unwanted data points.

To correct data recorded under the wrong **Product** or wrong **Year** use the **Move Branch** tool. This tool is accessible by right-clicking on the item in the management tree that needs corrected.

Add Simple Anlaysis

The software includes many simple analysis tools that allow for easy adjustment and correction of spatial information contained in the management tree. To access these tools, you can either select the dataset(s) in the management tree that you wish to apply the analysis tool and choose **Add Simple Analysis** or open the **Batch Command** dialog.

You can now choose from the following simple analyses:

- Adjust Yield - Allows you to modify the dry yield or wet weight attributes associated with a Grain Harvest spatial dataset for more accurate record keeping in the event of grain weight calibration errors in the yield monitor.
- Clip to Field Boundary - Will clip the selected dataset to the set field boundary to hide any data points that fall outside of the boundary. Commonly used when importing spatial data for a large land area where no clipping has been applied.
- Filter Data - Allows you to enter minimum and maximum values for a selected attribute and hide any data points that fall outside of that set range.
- Normalize Data - Create a new normalized attribute for each attribute you choose to normalized.
- Offset Data - Allows you to adjust a selected numeric attribute by a certain fixed number for more accurate record keeping.
- Optimize Swath Widths - Automatic adjustment tool that removes any overlap in recorded swath width to update the map view as well as all attributes linked to swath width.
- Reassign Attribute Values - Allows you to reassign an existing value to a different user determined value. This is particularly useful when working with user defined datasets, such as recommendations, where you could reassign the target rate values to a new value.
- Scale Data - Allows you to adjust any numeric attribute by a set scale factor(percentage) for more accurate record keeping.

To remove a previously applied Simple Analysis, right-click on the dataset(s) , select **Reprocess Analysis**, and remove any unwanted analyses from the individual datasets they were applied to. This will result in the data being returned to it's original state. Simple Analyses can also be removed using the Batch Command tools.

Importing

In this chapter you will learn how to:

- Import non geo-referenced images
- Import Images that have multiple bands
- Download Imagery From Internet
- Download Soil Survey Data from the Internet
- Import 3D Surface Files
- Import KML/KMZ File
- Import Spatial Files
- Import ASCII Text files
- Batch Import

Importing Data

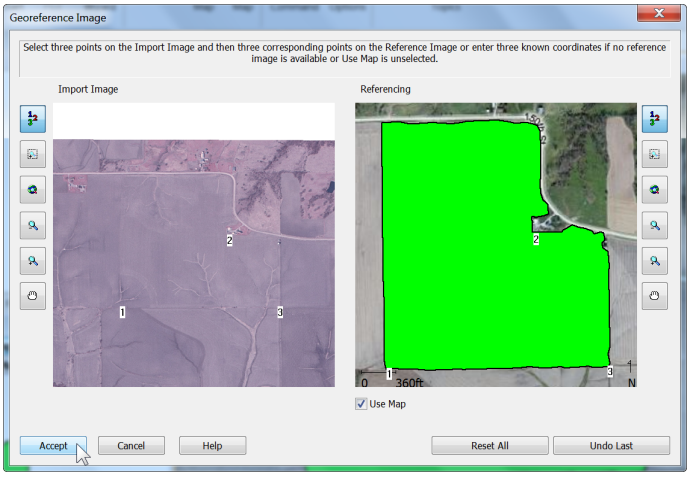
The software provides a number of import options. You can import image, ESRI Shape, ASCII text, and other file types into the management tree.

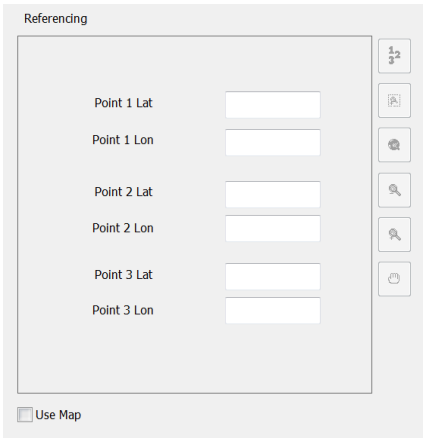
Image Files

Image files in a BMP, JPEG, JPEG2000, GIF, MrSID, PNG, WMF, TIFF, or GeoTIFF format can be imported into the system and be manually geo-referenced, if needed. Imported images can be saved in the Management Tree or stored as background images for maps. World files containing geo-referencing for the import image are also supported, if available, and will be automatically loaded if they are present in the same location as the image file you are importing.

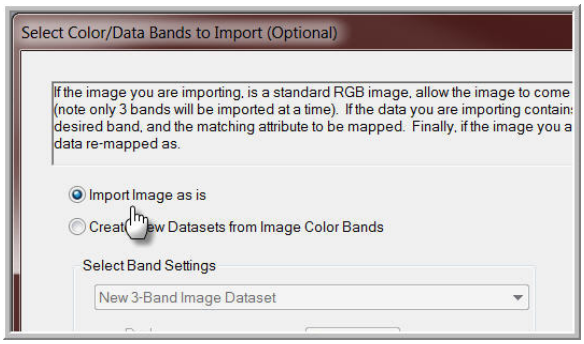
MrSid and JPEG2000 are image formats used in the GIS industry to compress, manage, and transfer very large image files, at very high resolutions. These files can be imported into the system, but by doing so they will not be compressed any longer, which means they can take up large amounts of storage space on your hard drive. Make sure that when importing these formats that you either use one of the available clipping options when importing or try to acquire images located around your fields specifically and not county wide images for example. Some files may not import, such as an image of an entire county, if they are to large because your computer may not have enough available memory or storage to open and save the file. Also, these formats can contain geo-referencing information like a GeoTIFF but it is not required. If it does not have the geo-referencing you will be required to geo-reference the image the same as you would when importing a regular image file.

1. To import an image file, go to **File - Read Files...**
2. In the File Reading Options window select **Import a File From a Generic Source** and then click on **Start Importing Generic Files...**
3. In the Select File Import Method window select Images and then click on **Select File(s) to Import...**
4. If the image is already geo-referenced, skip to step 6.
5. If the image is not geo-referenced the following window will appear. To geo-reference the image match three known lat/lon reference points (right side) to the same location on the file being imported (left side). On the left side, click a location that corresponds to the right side. Three known points are required to reference the map correctly. Each side of the screen has its own zooming/panning tools to assist in referencing the correct locations.
6. Click **Accept** when complete.

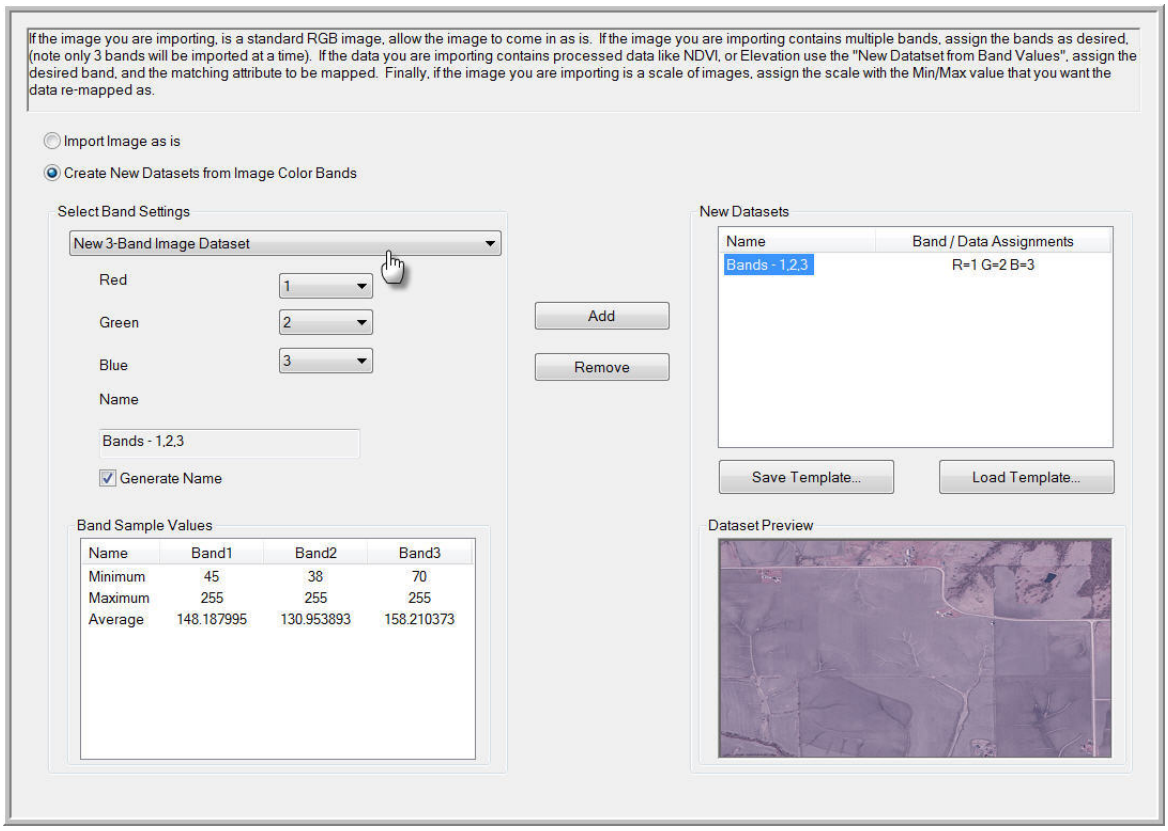




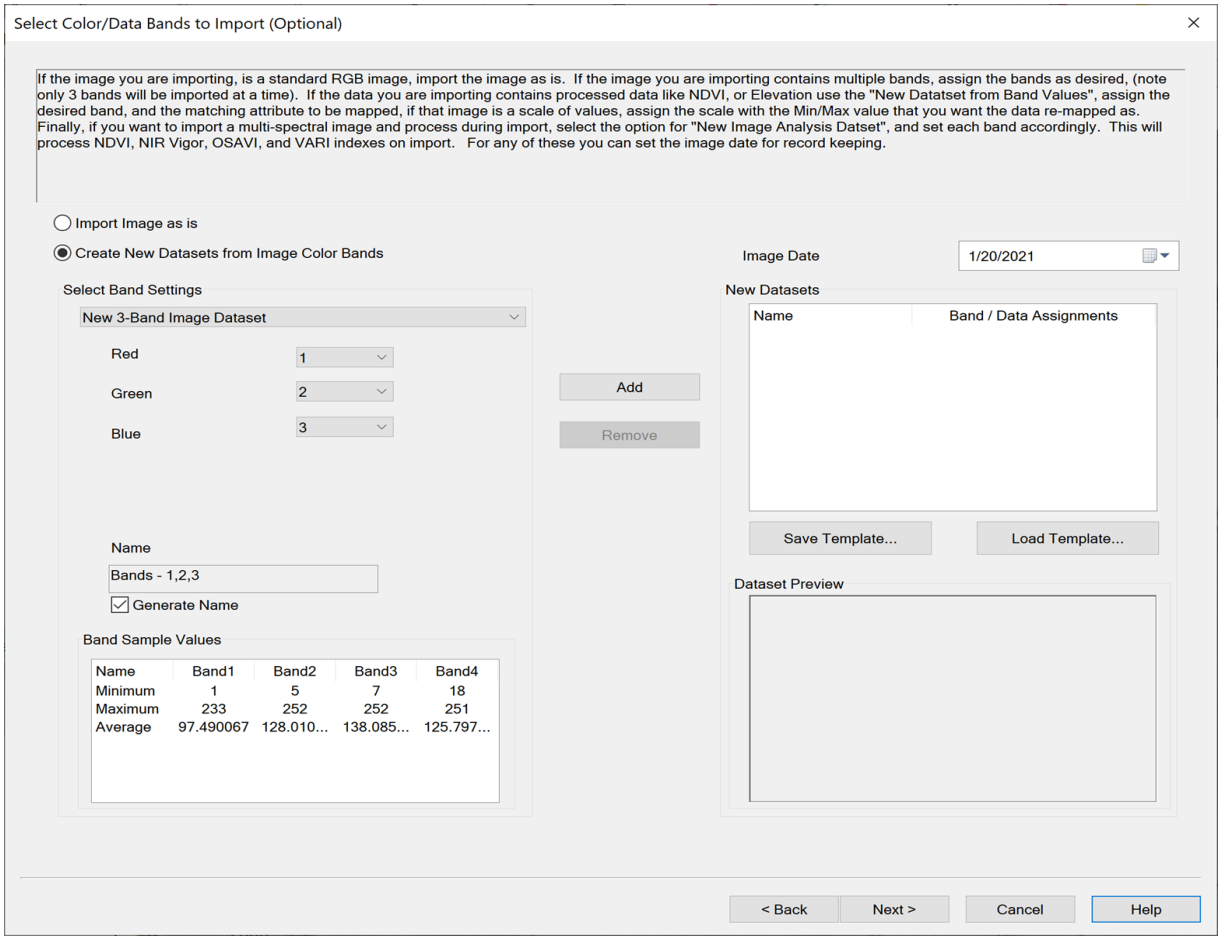
7. The Select Color/Data Bands to Import dialog will now open. If the image you are importing is a standard RGB image, choose to **Import Image as is**



8. If the image you are importing contains multiple color bands, assign the bands as desired (only 3 bands can be imported at once).
    - If the image that is being imported contains more than 3 bands (typically near infrared images will contain 4 or more), select the Red, Green and Blue bands as assigned by the image provider. As each is assigned to the Selected Bands Combination Box, a preview is available by clicking on the name of the bands.

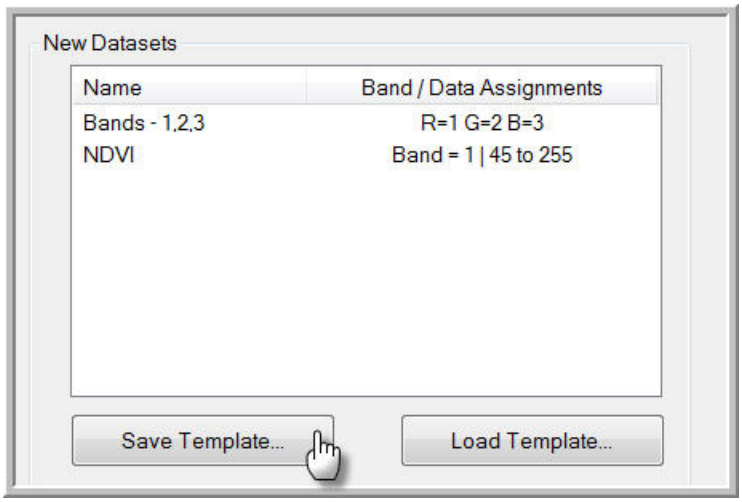


- If the image you are importing contains processed data, such as NDVI or Elevation values, use the **'New Dataset from Band Values**' option. When working with the New Dataset from Band Values options, assign the desired band and the matching attribute to be mapped.



- If the image you are importing is a scale of images, enter the Min/Max values that the data will be remapped as.
- If you enter an **Image Date**, that date will be included in the dataset name when saved to the Management Tree.
- If the image you are importing contains values, you can use the **New Image Analysis Dataset** option and SMS will process those image indices during the import process. This will allow you to assign Red, Green, Blue and Near-Infared bands, and during the import process SMS will create both an image layer and a Processed Image Analysis layer containing NDVI, NIR Vigor, OSAVI and VARI indices.

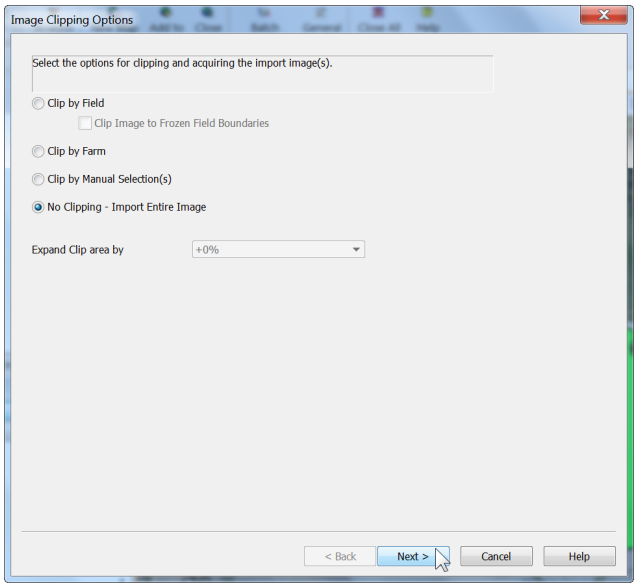
9. After defining all import settings, you can save a template for future use when importing images with the same properties. Each template can contain multiple band assignments, meaning multiple datasets can be created and saved during one import process.



10. Click **Finish**
11. The Image Clipping Options dialog will now open.

Image Clipping Options

This dialog gives options to select various clipping options to apply to images being imported into the software.



Clip to Field - Select this option to use the rectangular bounding area of your frozen field boundaries to clip an imported image to.

Clip Image to Frozen Boundaries - Select this option if you want to clip the imported image to the exact shape of the field boundaries.

Clip by Farm - Select this option to clip the imported image to each of the Farms you have defined in the software. This is based on the boundaries of all the Fields you have assigned to each Farm.

Clip by Manual Selection(s) - Select this option to manually select rectangular regions on the image being imported. This is useful when the image is very large and you only need to import small portions of the image into the software.

No Clipping - Import Entire Image - Select this option to import the image as is, without any clipping.

Expand Clip Area by - This option allows the user to select a percentage of either 0%, 10%, 25%, 50%, or 1 square mile to expand the clipping area that will be used to clip and import the image. An example is if

downloading imagery and using the Clip to Fields option, this can be used to capture additional area around the field.

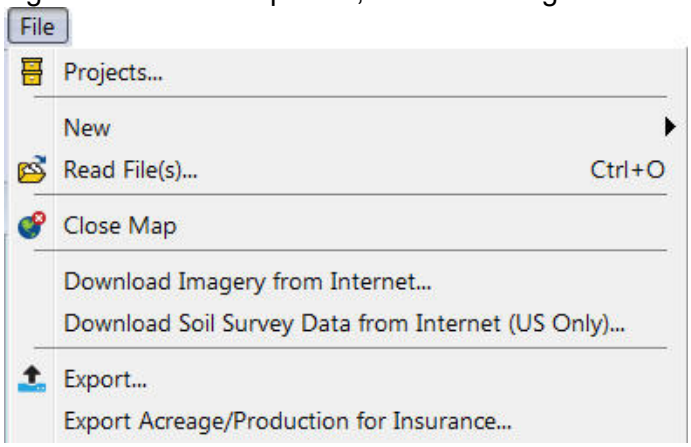
12. Select a clipping option and click **Next**
13. If saving to the Management tree, the management selection window will appear, select the appropriate settings, and click **Finish**
14. If images are saved to the background list, they will not be able to be used for NDVI analysis. If the intention is to have the image referenced in print layouts, or to appear as another reference image for a map, a background will offer more automatic linking options. **Choose Set As...** to automatically set the image as a background layer.
15. If the Temporary Reference option was selected then the Boundary Editor will automatically open and have the image displayed as a background layer while the editor is open.

Save Clipped Image as a Single Dataset

By default, this option will not be selected and all imported images will save as individual datasets in either the management tree or as backgrounds based on your selection above. If you select this option and multiple images are being imported, they will be saved as a single dataset in the system. This can be useful if you clipped by manual selection and had drawn multiple areas on the image to be imported and you want them saved into the system as one single dataset.

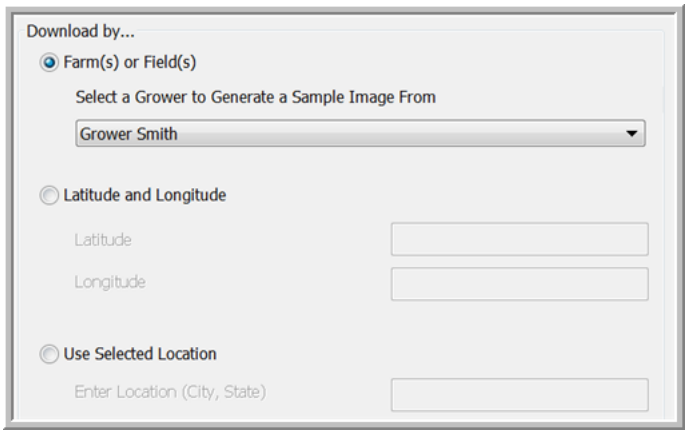
Download Imagery from Internet

Imagery is available free of charge for download. The images are color aerial photos, and allow the grower to select the desired resolution (some <1 meter). The images may vary, so there is no guarantee of their accuracy or quality.



An internet connection is required to use this feature

This dialog provides options for downloading free images from the internet via multiple image services.



Farm(s) or Field(s) - Select this option to download images based on existing fields in the management tree. The Farms part of the option creates a download area for each Farm level.

Latitude and Longitude - Select this option to enter in a manual latitude and longitude to use as a center position to download imagery for. The image that will be downloaded based on this entry, will cover 10 square miles centered around the position that you enter.

Use Selected Location - Select this option to enter a City, State name combination that you would like to download an image for. Enter either of the above and then click the Find button and the Select an Available Location list should fill with available download options that match your entry. Select one of the items in the list and then click OK to download an image that will be centered around the item you selected. This option is very useful if you don't have any previous data read into the software but you would like to create field boundaries from an aerial photo.

Download Soil Survey Data from Internet

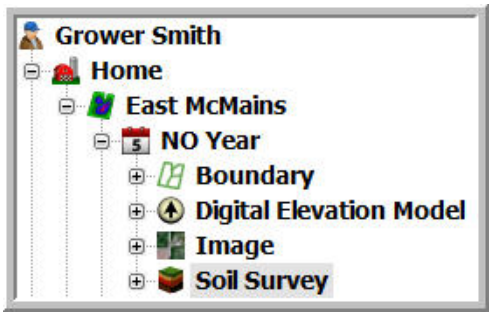
Soil Survey data is available at no charge to download for all customers based in the United States. Downloading soil survey data will result in a new dataset being saved to the management tree.

1. Select **File - Download Soil Survey Data from Internet**

An internet connection is required to use this feature.

2. This dialog will allow you to clip the downloaded datasets to your frozen field boundaries. Click **Next.**
3. Use the Select Data Filters dialog to select what growers, farms and fields you wish to download Soil Survey data for. Click **Finish**.

4. Choose what year you wish to save this data under and click **Accept**.
5. The soil survey datasets will now be downloaded into your management tree under the Soil Survey Operation.



3D Surface Files

Digital/NED/SDTS Elevation Models and LIDAR Files can be imported into the Advanced Software for mapping purposes and also can be used as the 3D grid the software uses when displaying maps in 3D and generating Terrain Analysis datasets. Before beginning the import trust, the files containing the elevation information you wish to import into the software will need to be saved to your computer.

1. Click on **Read Files**, **Import a File from a Generic Source**, **3D Surface Files** and then click **Select Files to Import**.
2. Select the type of file to import and choose the directory where it is stored. For this example, select LIDAR and navigate to the **SMS Training Data/Other Imports/Lidar** folder.
3. Select the proper projection, as provided by the image source. For this example select **NAD83/UTM Zone 15N**. Click **Finish**.
4. On the LIDAR Clipping Options dialog, choose if you wish to clip the file to Frozen Field Boundaries or to Expand the Clip area by. For this example check to **Clip the data to the frozen field boundaries**. Click **Next**.
5. Select Grower Smith, Home and East McMains in the Select Data Filters dialog and click **Finish**.
6. The LIDAR dataset will now be added to the Management Tree under the East McCMains Field, No Year and Elevation Model operation and can be included in maps and set as the 3D grid.

Spatial Files

ESRI Shape, MapInfo MID/MIF, DEM, BIL(NED), and TIGER (general data or county subdivisions) files can be imported into the system and displayed in the Management Tree as well as mapped, or stored as backgrounds for maps.

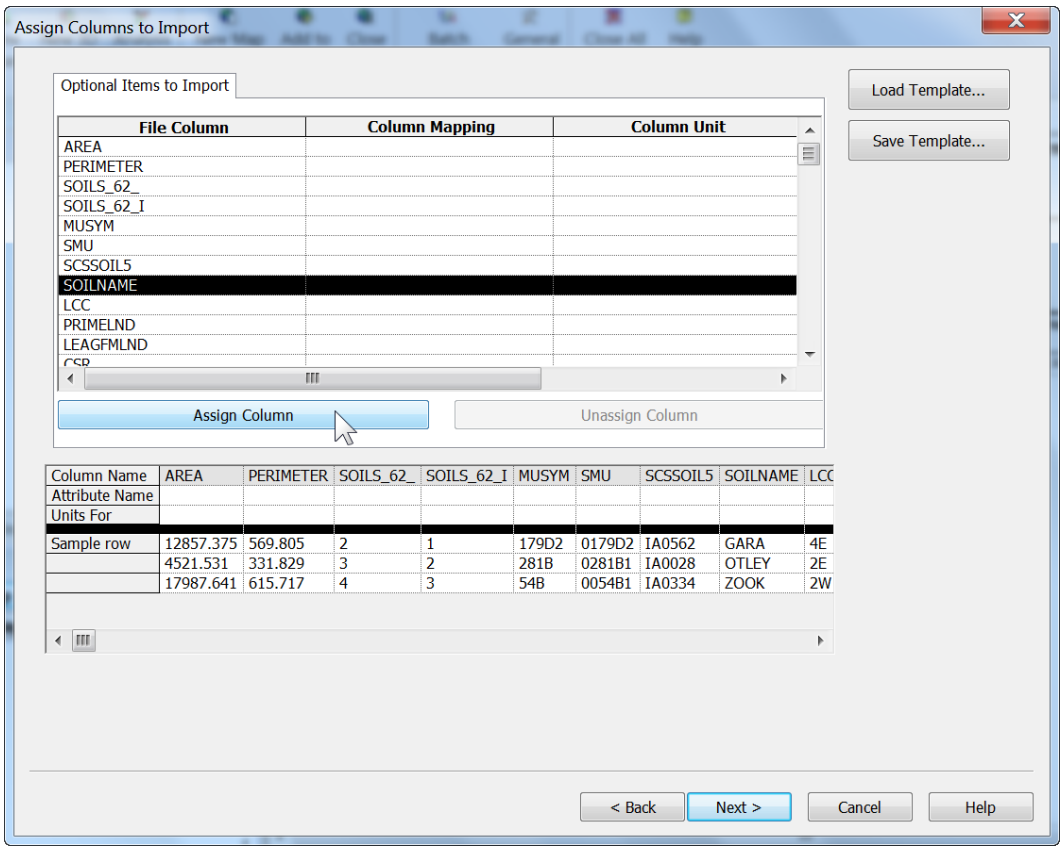
1. Click on **File - Read Files...**, **Import a File from a Generic Source, Shape Files**, and then click **Select File(s) to Import...** Select the type of file that needs to be imported, and select the directory where it is stored

For file formats that are comprised of more than 1 file (i.e. Shape files are comprised of .shp, .shx. and .dbf files) this window will only show the file extension listed on the right. Other files that make up that format, will need to be in the same directory to be processed correctly

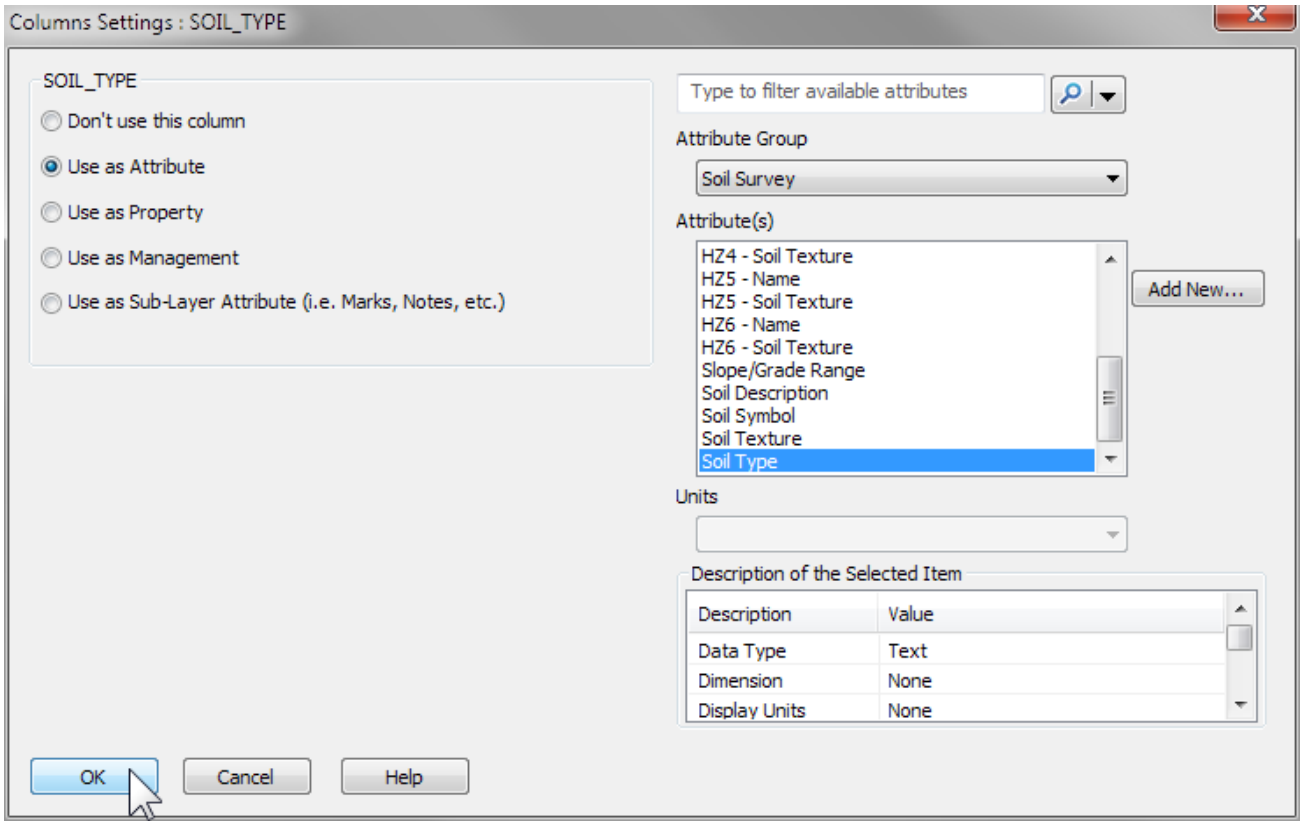
2. A progress bar will show briefly, depending on the file that is being imported, a dialog may come up that prompts for Projection and Datum information. Some spatial files will have this information tagged in the file itself, others will not, and requires the information to be filled in before proceeding. The source of the data should provide this information for you, if the wrong projection is supplied, the map will be skewed, and/or shifted and will not show in the correct location relative to where it should. When the proper projection has been set, click **Finish**
3. A preview of the map being imported will appear. If the wrong projection was selected in the previous step, the image may appear skewed or angled, if correct click **Next**
4. On the following dialog, options will be given to save to the management tree (these are similar to the image archiving options). One difference is that if being saved to the management tree, the Import Data Type should be set to the operation that is intended to be used as. Click **Next** when complete
5. Select Soil Sampling if the file being imported contains the points where the soil cores were pulled. For this example select **Boundary**, since the data being imported is a field boundary.

If a boundary is being imported, and it should also be used as an established "Frozen" field boundary Click the Set as Frozen Field Boundary option

6. On the following screen, a table will appear that contains all the data within the file being imported. Not all columns will need to be imported, just the items that are necessary for use. To activate an attribute to be imported, click on the attribute to be assigned under **File Column**, then click the **Assign Column** button, and then a new window will appear



7. In this menu, click on the appropriate to Use as ... option.



8. The top will list out several options to import the data into the software
   - **Attribute** - this will import data as a mappable item in a layer
   - **Property** - this will import data as a detail of the dataset
   - **Management** - if the shape file contains information such as product, farms, or fields, (management tree related information) this can be used to automatically segregate data into that level of the tree
   - **Sub layer** - Files can contain marks, or notes that can be saved as another level of the map

9. Select the appropriate Attribute Group, and Attribute for the selection. If the attribute doesn't exist there is an option to **Add New**. When done, click **OK**. Repeat these steps as needed until all Columns of data have been assigned.
10. When complete, the column settings from above can be saved so if another file with the same column data is imported, the option is there to load the template for each column. On the next file that is imported, click on Load Template and select the saved template that was used, and it will fill in the information automatically
11. The clipping options are similar to the image clipping options. For data that is larger that the field (i.e. Soil Survey Data) it is suggested to clip to Frozen Field Boundaries to get just the data that applies to that field instead of surrounding areas. Click **Next** when complete
12. In the following screen, select the fields that this should be applied to. For example, if importing a soil survey map for the second time, and more fields have been added to the growers operation, select just the new fields to prevent duplication within the tree. If this is all new data for the grower, select All Growers, All Farms, and All Fields. Click **Next** when complete
13. Next a filter will appear that will enable the selection of where the data will be stored at in the management tree. (if the data is being clipped to field boundaries, the Grower, Farm, Field areas will be darkened and not available to modify)

If the data being imported is not specific to any one year (i.e. boundary, soil survey data etc) saving to "NO YEAR" can be a good location to save information so it is easy to remember

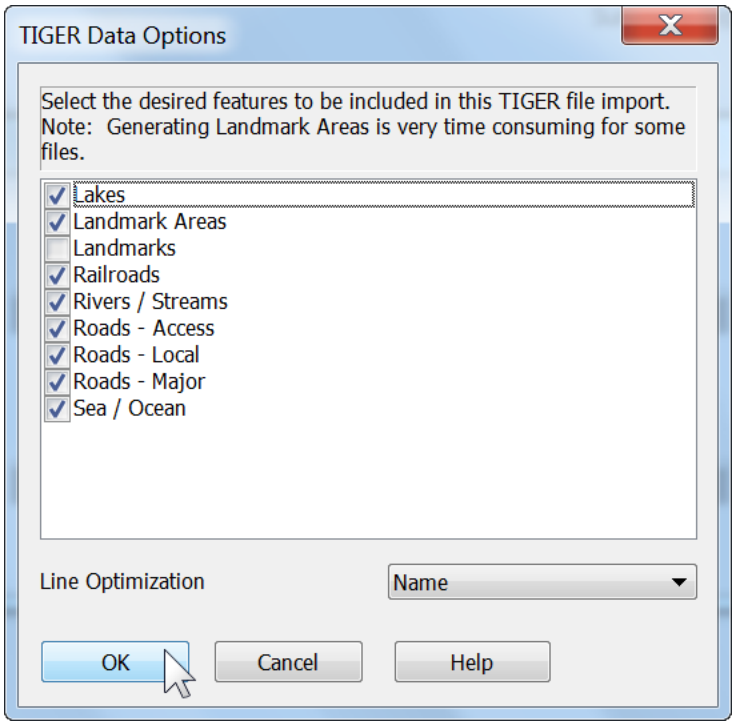
14. Finally, a preview will appear, and will display the attributes that have been selected to be imported. If the information looks correct, click **Finish**

Importing Tiger Data

Tiger data is one type of information that can display Roads, Streams, Lakes etc. This can then be used as a background to plot road names or streams or railroads that are near fields.

1. To import Tiger Data, go to **File - Read Files..., Import a File from a Generic Source**. Select **TIGER** Files

2. Select the desired file and click **Open**
3. In the following screen there will be options to import specific parts of the file. For example, just roads and streams may be desired, so activating those items would only be necessary. At the bottom there is an option to group names of common road segments. It is recommended to set to **Enhanced Name**. Click **OK**



4. A preview of the incoming data will follow, if this appears to be correct, click **Next**
5. In the following screen there will be options to set as a Background or as a Management tree item. For printing purposes, a background will offer more flexibility, and options. If saving to the tree is used, it is recommended to save as a **Generic** Operation. Click **Next** when complete
6. In this screen options to import more items are available, however no changes are necessary for this screen as they are already set correctly. Click **Next**
7. Finally, click **Finish** to complete the import process

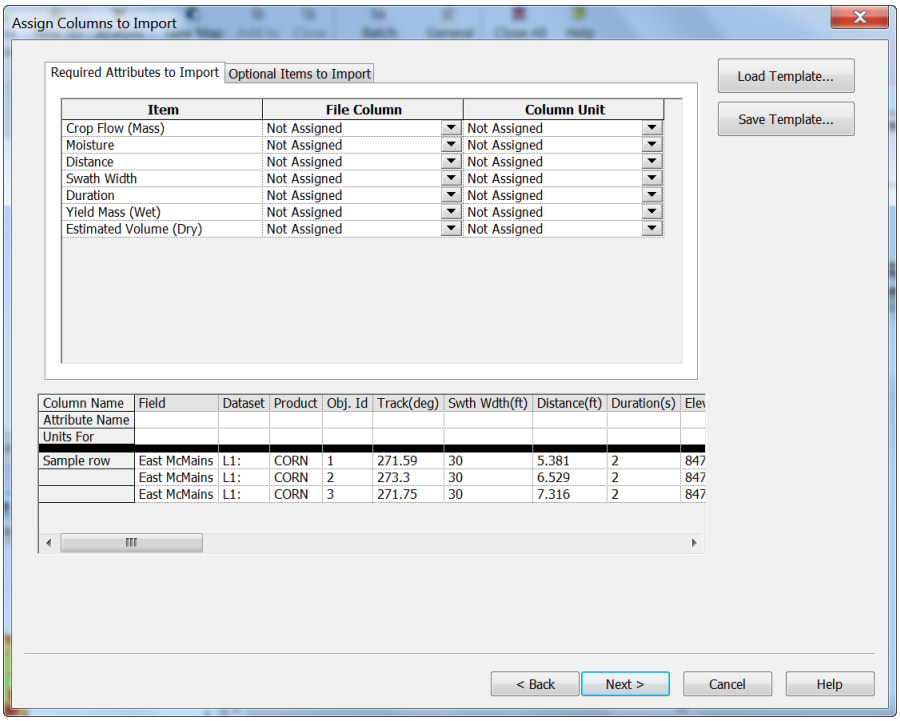
8. To link this to Farms or Fields the process is similar to linking images as Backgrounds. Refer to that section for linking settings, and recommendations
9. If the data was saved to the management tree, mapping the attributes to display different information is done via the attribute drop down menu

Importing Text Data

Some data that is collected by field displays, or transferred out from other GIS programs will be saved as text files. This is not to be confused with soil testing results data where information is being matched up to maps already in the management tree. This would traditionally be data such as yield maps, or application maps, and in some cases soil sampling point data (again, not the fertility results)

1. Go to **File - Read Files..., Import a File from a Generic Source**, and click **Text Files**. Click **Select File(s) to Import...**
2. In the following screen, select the appropriate file type to import, and navigate to where the file is saved at
3. Next assign the correct column for Lat/Long that is contained in the file. Click **Finish** when done
4. If the Lat / Long columns were selected correctly, the following screen will provide a preview of the field coming in. If this field looks distorted, or skewed significantly, it may be a good idea to reimport the file, to ensure proper alignment

5. Select the appropriate place to save the file within the software. Most likely this will be saved to the management tree. In this example set the Import Data Type being imported to **Grain Harvest**
6. In this screen assign the attributes that are necessary to the data coming in. This is similar to the attribute assignment in the Shape File import. When complete click **Next**
7. As in the Image Import, and the Spatial file import, there are clipping options that can be applied, select the appropriate settings, and click **Next**
8. Select the appropriate location to save the file in the management tree, and click **Next**
9. Click **Finish** to complete. Only the attributes that were linked in step 7 will be displayed when a map is created



Importing KML/KMZ Files

KML & KMZ files are spatial file types commonly used to display geographic information in an XML file that stores location, images and modelling information. To import these files into the software, follow the steps below.

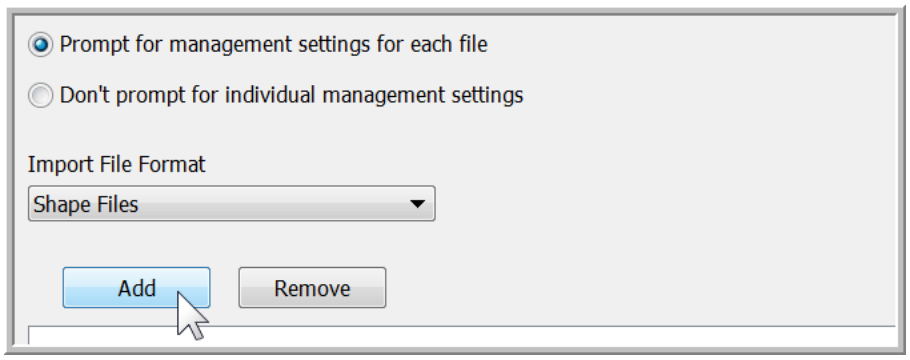
1. Go to **File - Read Files..., Import a File from a Generic Source**, and click **KML/KMZ File**. Click **Select File(s) to Import...**
2. In the following screen, select the appropriate file type to import, and navigate to where the file is saved at
3. Verify the selected file is correct in the Import Preview dialog and click **Next.**
4. Choose how you wish to store the information being imported and click **Next**

5. Based on the previous step, assign any columns that are required or that you wish to import and click **Next**.
6. After selecting the Import Clipping Options, click **Next**.
7. Assign the proper management selections, click Next and then **Finish**.

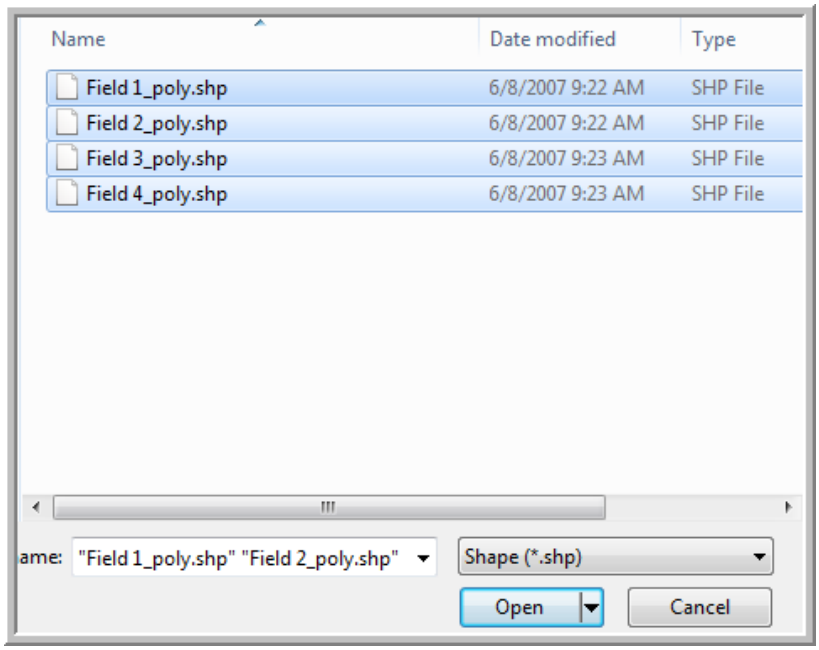
Batch Importing

Batch Import is extremely powerful when importing many files that are of similar type, such as boundaries saved as shape files.

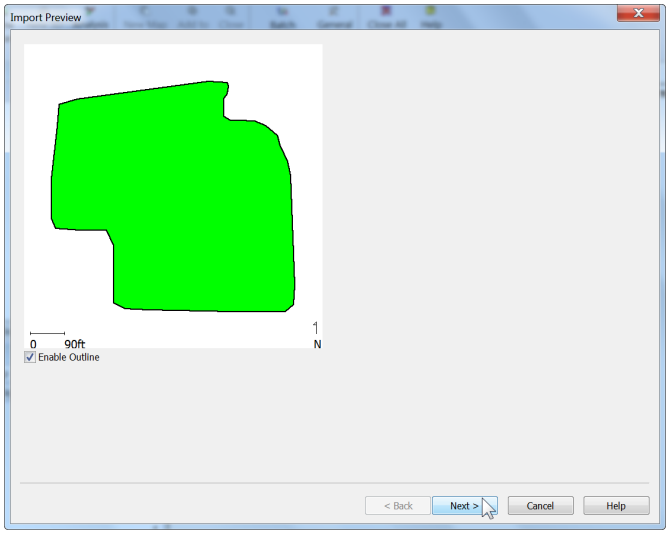
1. This tool is found under **Tools - Batch Command Utility - Import Files**
2. The Batch import tool will work for Shape files and Text files. For this example, we will use Shape, click the option to **Add files**. If it is desirable to assign specific management settings for each file that comes in, Choose the option to **Prompt for...** (this will prompt the user for Save Settings for each file) or if they are all going to be imported with these items defined, chose **Don't Prompt**. For this example click **Don't Prompt**



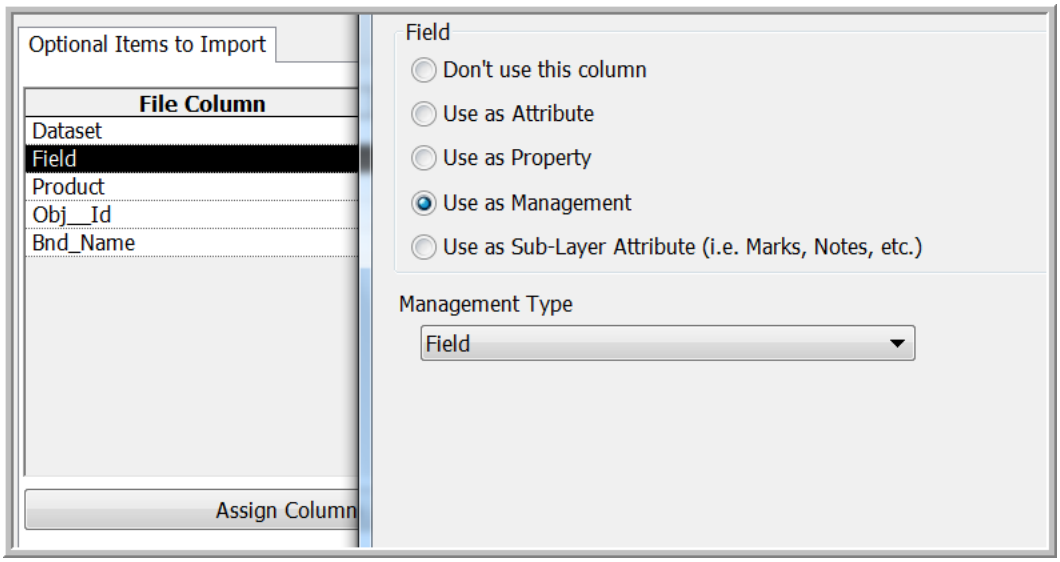
3. Navigate to the location where the files are stored on the computer, and select all the files, click **Open** when complete



4. All files will be displayed in the selection window, click **OK** to continue
5. A preview will appear of the first file that was found, if it appears correct, Click **Next**



6. Similar to importing one file, select where this information needs to be saved at in the software. In this case boundaries will be saved to the tree, so select the Boundary Operation as the Data type, and Set as Frozen Field Boundary. Click **Next** when complete
7. In the sample data, there is an option to assign column 2 as the Field Management item. Using this, each file that has a name in column 2 will automatically use that name when it is saved to the management tree after import



8. As in the Image Import, and the Spatial file import, there are clipping options that can be applied, select the appropriate settings, and click **Next**

9. Select the appropriate location to save the file in the management tree, and click Next. Fill in a temporary field name for the field area, the setting in step 7 will override the setting in this step for the field name
10. Click **Next** to advance to the next file that was selected to be brought in. After all have been assigned, the Management tree will be complete with Field names and Boundaries

Query

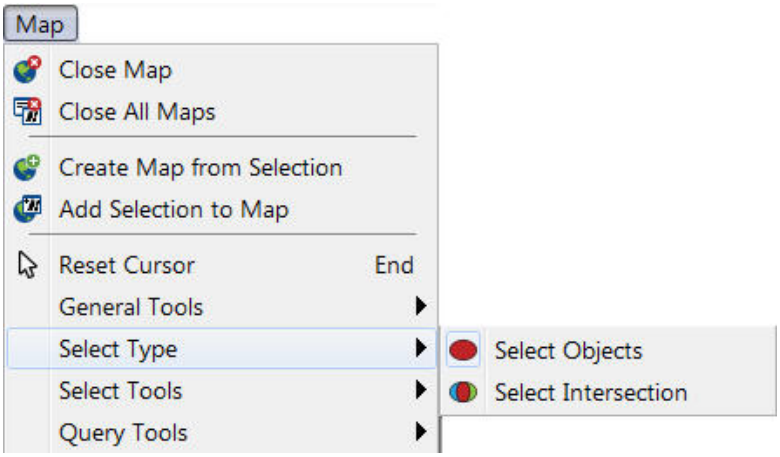
You will learn how to generate statistical results for various layers in your map. With the Query tool, you can:

- Find various statistical results of an attribute (such as minimum yield, maximum rate applied, total area, average plant population, average speed, etc.) for a particular area of your field
- Find various statistical results for multiple layers in a map (such as average yield for a soil type, or average yield for a hybrid)

In order to run a query, at least one object has to be selected in one of the currently mapped layers.

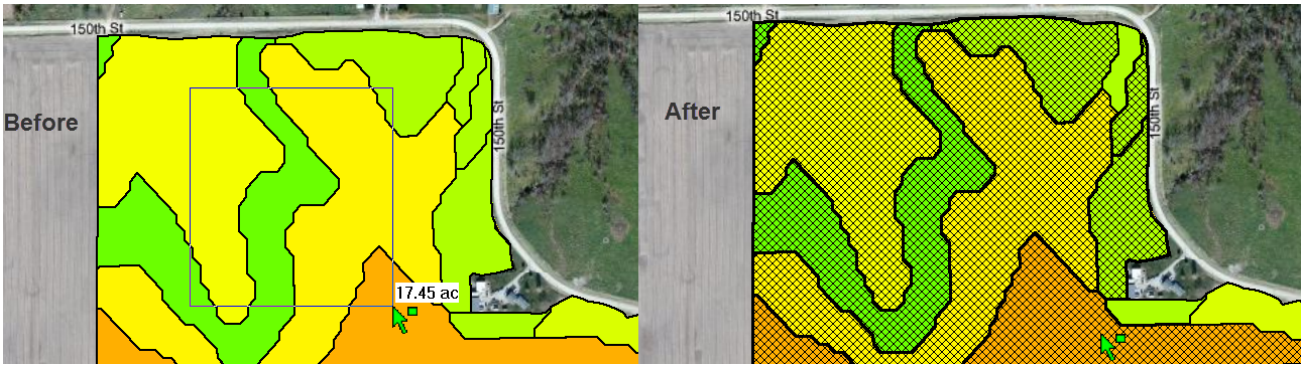
Select Type

The selection type determines how any shape (point, line, or polygon) in a layer is selected. The selection types can be found in the Map menu or on the Map screen in the mapping toolbar.



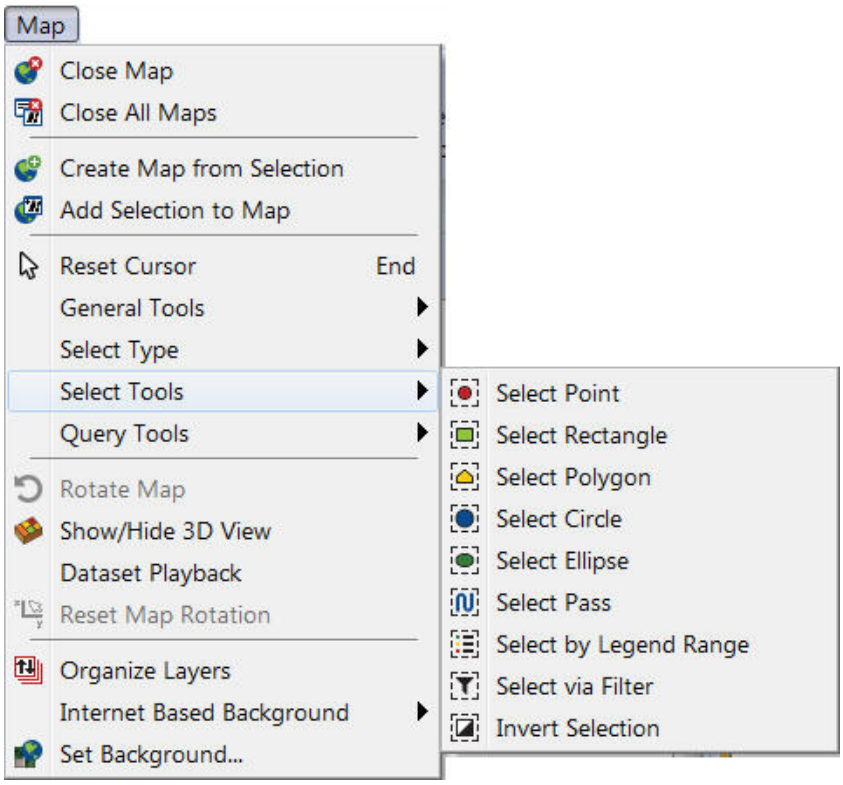
Select Objects

 When this option is used, entire objects will be selected by any of the Selection Tools. For example if the Select Rectangle tool is selected and a selection box that crosses the edge of a polygon in a layer is drawn, the whole polygon will be selected not just the intersected area.



Select Tools

The Select Tools are used to select objects from a layer. The selection tools can be found in the Map menu or on the Map screen in the mapping toolbar.



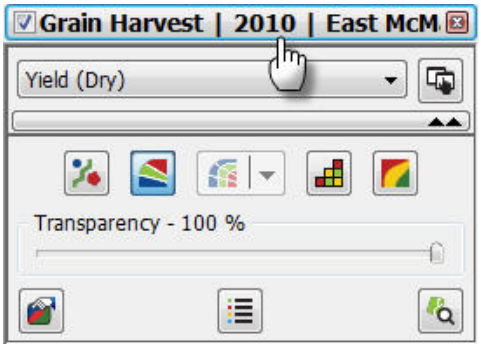
- **Select Point** - Click this button to use the cursor to select an individual object in a layer. By holding the Ctrl key, multiple objects can be selected within the displayed layer.
- **Select Rectangle** - Click this button to draw a rectangular region and select all of the objects that fall within the selection rectangle. By holding the Ctrl key, multiple objects can be selected within the displayed layer.
- **Select Polygon** - Click this button to draw a polygon region and select all of the objects that fall within the selection polygon. A left-click on the mouse will insert a vertex for the selection polygon, while a right-click will finalize the polygon. By holding the Ctrl key, multiple objects can be selected within the displayed layer.
- **Select Circle** - Click this button to draw a circular region and select all of the objects that fall within the selection circle. By holding the Ctrl key, multiple objects can be selected within the displayed layer.
- **Select Ellipse** - Click this button to draw an elliptical region and select all of the objects that fall within the selection ellipse. By holding the Ctrl key, multiple objects can be selected within the displayed layer.
- **Select Pass** - Click this button to select a pass. This tool will only work correctly for point or smart rectangle map types where a header sensor or implement switch was used while collecting the data. By holding the Ctrl key, multiple passes can be selected within the displayed layer

- **Select by Legend Range** - Click this button to select an area of the map based on the set legend ranges. For example, if viewing a hybrid map, click on an area of the map that contains the desired hybrid to select. After clicking, all areas of the map containing that hybrid will be selected. By holding the Ctrl key, multiple legend ranges can be selected within the displayed layer.
- **Select Via Filter** - Click this button to select objects through user defined data filters that utilize information from the current layer. Data filters can be based on spatial statistics, attributes, and properties. Any combination of these can be used to select objects.
- **Invert Selection** - Click this button to invert the current selection on the map. This will select all of the objects that are not currently selected, and at the same time unselect all of the objects that were initially selected.
- **Select via Filter** - This dialog appears when the Select via Filter tool is selected. This allows you to set filters that have been defined to query the current dataset layer and select the area/objects that match the filter criteria.

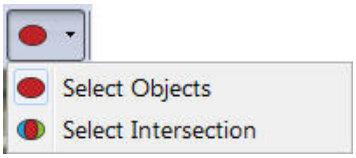
How to query a single layer

Follow these steps to query the data of a single map layer:

1. Select the layer to be queried in the Layer Window and make it active by clicking on its title bar



2. From the **Map** menu, choose **Select Type** and then either **Select Object** or **Select Intersection** or click on the **Select Type** icon in Map tool bar and choose one of the options



3. Now choose a selection tool from the **Map** menu by choosing the **Select Tool** and then choosing one of the tools or click on the **Select Tools** icon in the **Map** toolbar and choose one of the options
4. Based on the selected type and tool make a selection on the active layer/map
5. Once the selection is made go to the **Map** menu, select **Query Tools** and then **Query Current Layer** or click on the **Query Current Layer icon** on the Map Tool bar 
6. A numbered query result will now be displayed in a window that appears inside the Map window, labeled Query Results. Click the **Reset Cursor** icon  on the Map Tool bar or select a different tool to clear any selections and deactivate the selection tool. To clear the contents of the Query Results window go to

the **Map** menu and select **Query Tools** and then **Clear Query Results** or select the **Clear Query Results** icon from the Query Results window.

7. To hide the Query Results window click on the **Auto-Hide** button 

How to query multiple layers

Follow these steps to query data from multiple map layers:

1. From the **Map** menu, choose **Select Type** and then either **Select Object** or **Select Intersection** or click on the **Select Type** icon on the **Map** tool bar and choose one of the options
    - When working with Swath maps, you will first need to click on **Edit Layer Options**, choose the **Attribute/Property tab**, and on the **Display** tab, check the **Draw only individual, non-connected rectangle option**.
2. Now choose a selection tool from the **Map** menu by clicking **Select Tool** and then choosing one of the tools or click on the Select Tools icon in the Map toolbar and choose one of the options
3. Based on the selected tool make a selection on the active layer/map
4. If you wish to not include all layers in the query, go to the **Map** menu and select **Query Tools** and then select **Query Multiple Layers**. Check the layers to be queried and click **OK**.
5. A numbered query result will now be displayed in a window that appears inside the Map window, labeled Query Results. Click the **Reset Cursor** icon on the Map Toolbar or select a different tool to clear any selections and deactivate the selection tool. To clear the contents of the Query Results window click on the **Clear Query Results** button in the Query Results window.
6. To hide the Map Summary window click on the **Auto Hide** button in the Query Results window.

How to print the query results information

Follow these steps to print the generated query results:

1. Go to the **File** menu, select **Print** and then **Query Results**
2. Now select the printer, and make any needed printer setting changes and click **OK**
3. The query information will now print out just like it was displayed on the screen
    - Query results can also be included in custom print layouts. See the Printing chapter for more information.

Management Zone Layers

In this chapter you will learn how to:

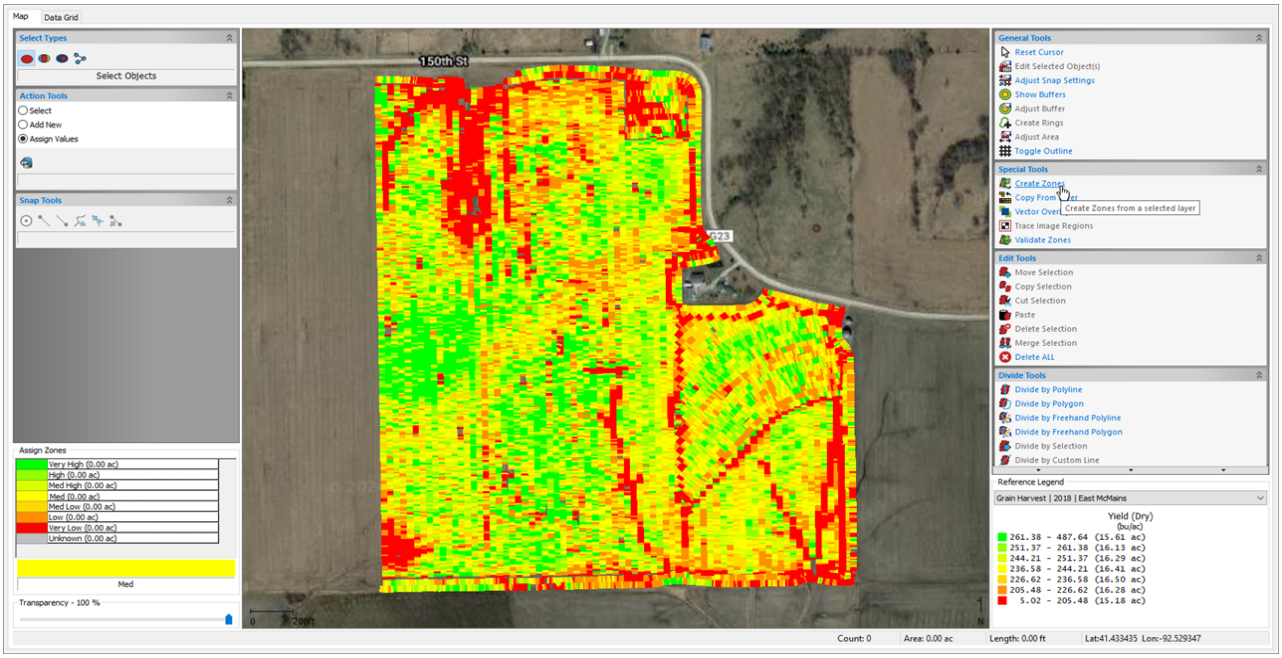
- Create a new management zone layer
- Assign productivity zones to regions
- Validate zones

Management zones can be generated based on any data contained in the management tree, and once created, can be referenced in queries, analyses and used to create other types of data, such as prescriptions.

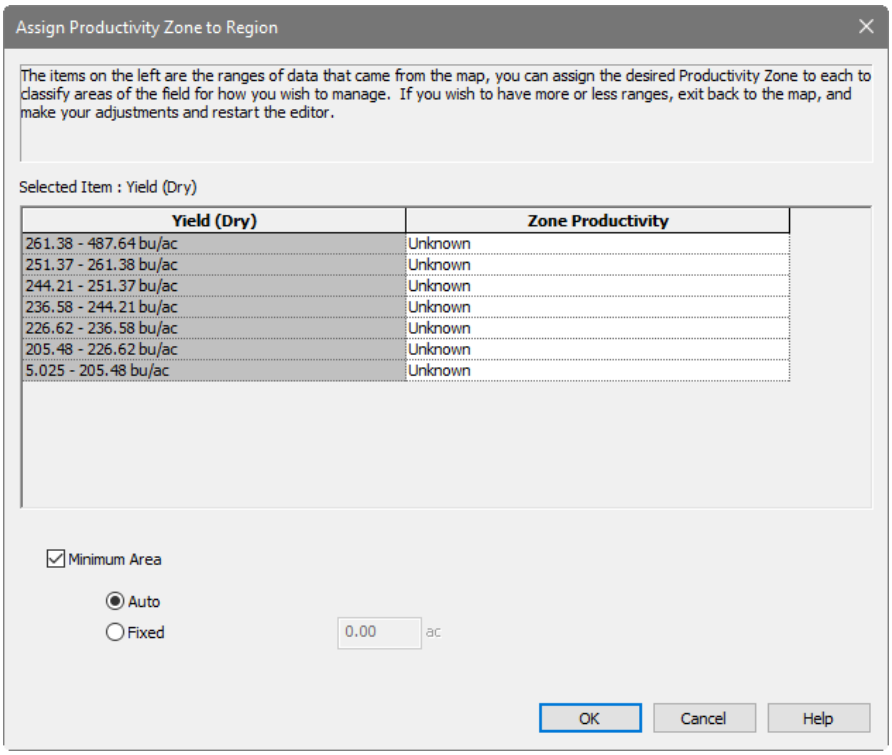
Creating Management Zones

To create a management zone layer, create a map of the data that will be used as the reference layer.

1. For this example, create a map of **Grower Smith - Home - East McMains - 2018 - Grain Harvest.**
2. To start a new management zone layer, go to **File - New - Management Zone Layer**
3. The Management Zone Editor will now open and display the reference map that was open when you started the new layer. The Assign Zones will display the seven productivity zones available for use.



4. To create zones, click **Create Zones** in the Special Tools menu.
5. Verify the layer you wish to reference is selected and click **OK**.
6. In the Assign Productivity Zone to Region dialog, use the drop-down menu to assign a **Zone Productivity** to the legend ranges displayed.



7. If working with spatial data, you will choose how to define the minimum zone area, using either Auto or Fixed.
    - When using **Auto**, the minimum area of the zones will be dependent on the size of the field you are working in.
        - For fields between 0-300 acres the minimum zone size allowed is 0.5 acres
        - For fields between 300-800 acres the minimum zone size allowed is 1 acre.
        - For fields over 800 acres the minimum zone size allowed is 1.5 acres.
    - When using **Fixed**, you defined the minimum number of acres your zones will be.
8. Click **OK**and your Management Zone Layer will be created.
9. To verify that there is a zone assigned to all areas of the field, click **Validate Zones** in the Special Tools menu.
10. SMS will analyze the management zone layer to detect any overlap or skips in the map and then prompt you to assign zones to any that are without a productivity rating.
11. To save this layer to the management tree, click **Save**, assign the appropriate management settings and then click **OK**.

Editing Management Zone Layers

Once a Management Zone layer has been created, you may wish to adjust the number of zones or zone assignments.

1. With the Management Zone Layer open, use the **Assign Values** tool in the Action Tools menu to select and reassign the Zone Productivity to any zone in the map.
    - You may also reassign zone productivity values using the **Data Grid** tab.

2. If you wish to combine any zones in the field, use the **Select** tools to select the zones you wish to combine and then using **Merge Selection** in the Edit Tools menu. To select multiple areas at once, hold the Ctrl key while using the selection tool.
3. If you wish to divide any existing zones into smaller zones, use **Divide Tools**.
4. Click **Save** once all desired changes have been made.

Prescriptions

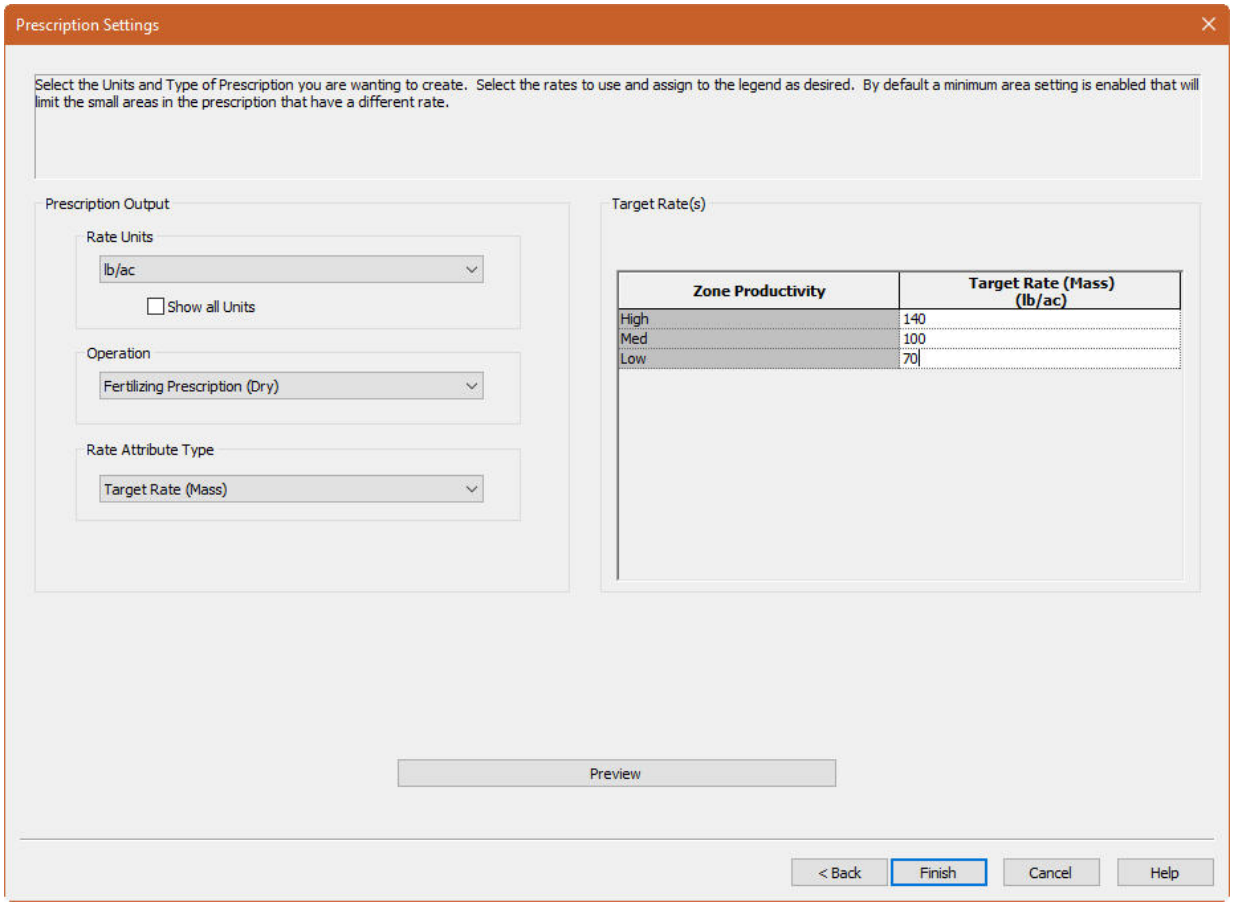
In this chapter you will learn how to:

- Create a prescription based on 1 reference layer (i.e. soil pH map)
- Adjust the map legend that the prescription will be based on
- Define the rates to be applied to the corresponding areas of the reference map
- Modify the prescription

New Prescription Layer

The following steps explain how to create a variable rate prescription. These prescriptions can be based off of any reference layer you have stored in the management tree. To start, the legend should reflect the ranges you want to apply the prescription in. Popular uses for this tool include dry/liquid fertilizing recommendations, planting prescriptions, seeding prescriptions and can be based off of yield data, soil testing data, or soil type maps.

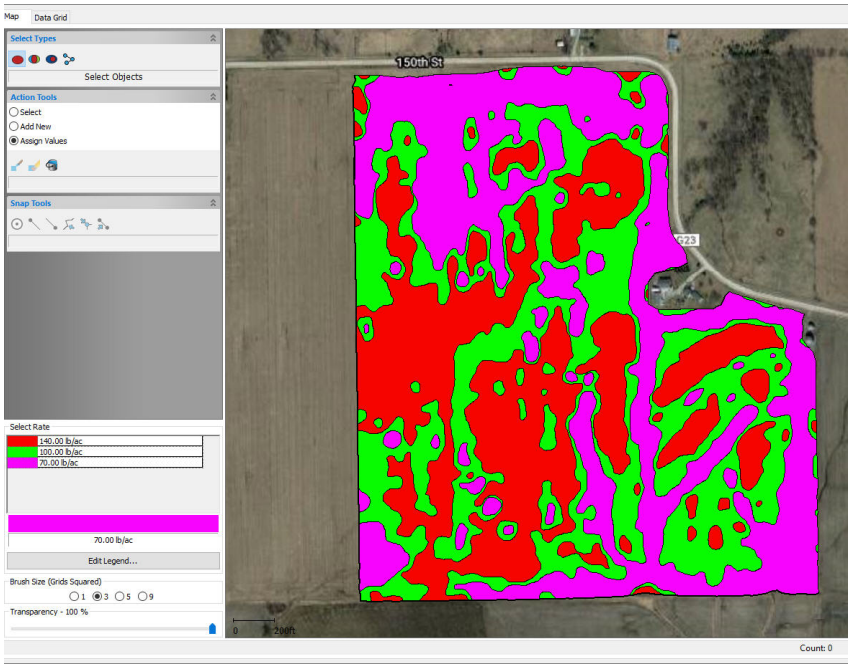
1. To start, create a map that contains data that will be used as a reference map. For this example, create a Management Zone map. In the Prescription Editor you will be able to use the **Manage Reference Layer** tool to reorder the mapped layers and attribute being displays.
2. After the legend and map settings are correct, the next step is to make the new prescription
3. Go to **File, New, Prescription Layer**, or click on the **New Prescription Layer** icon in the mapping window toolbar.
4. In the first screen, a preview of the reference map will appear, if this is correct, click **Next**
5. In the Prescription Settings dialog, select the **Rate Units**, **Operation**, **Rate Attribute Type** and enter in the **Target Rate(s)**.



The difference between "Planting" and "Seeding" operations is that the planting will be based on counting the number of seeds dispensed, seeding will use pounds of seed dispensed.

The label ksds/ac represents (seeds * 1000 / acre). 30 ksds would represent 30,000 sds/ac.

6. In this example, we will apply in lb/ac, select Fertilizing Prescription Dry and Target Rate Mass. Click **Finish**
7. The final screen now shows the Prescription that was generated. If the map is correct, save this layer to your management tree. It is recommended to save this layer as the Product that is being applied (DAP vs. P)

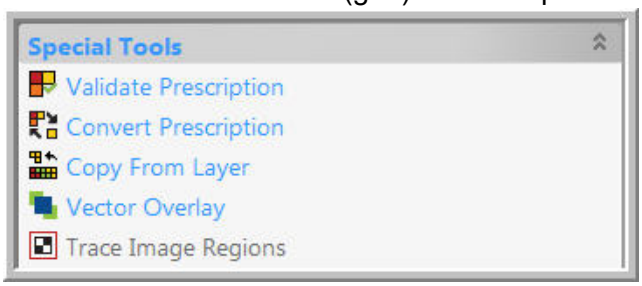


Editing a Prescription

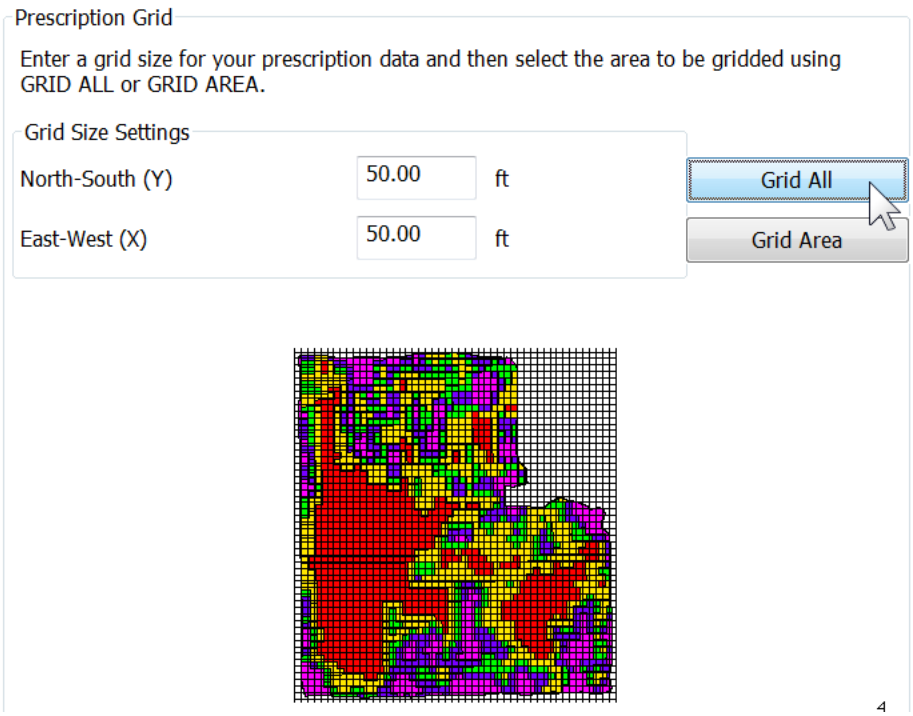
If the prescription needs to be edited with different rates there are 2 tools available to make changes.

1. Click on the **Assign Rate** tool  and select the rate in the legend screen of the preferred rate and then click in the map where that rate should be used.

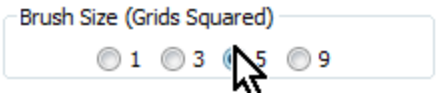
2. If there are gridded areas that need modified, the Paint Rate tool can be used.  The prescription map may need to be converted before this tool is available.
    - The map is currently in a "Vector" (polygon) based map, in order to use the Paint Rate tool, the map will need to be converted to a "Raster" (grid) based map. To do this click the **Convert Prescription Tool**



3. The prescription type and grid selection window will now open. In this window enter a value for the size of grid to make (Recommended to use the size of implement) Click **Grid All** and click **OK** when complete

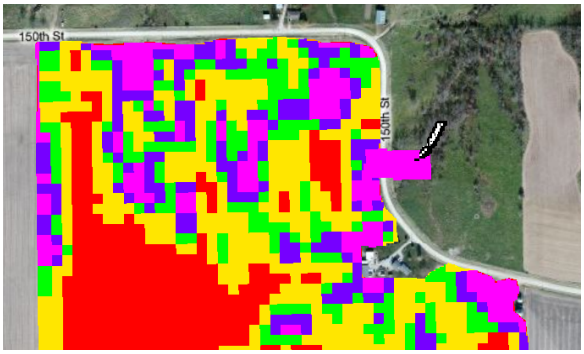


4. Now in the Prescription editor, the map will be gridded, and the Paint Rate tool will be available to select
5. With the brush activated, select the desired rate, and the brush size to use when changing the map



6. Click and drag to assign the new rates to the prescription
    - This is a useful tool to create check strips in the field, as well as making changes to the prescription to group like rates together

There is a "Grid" that extends beyond the field prescription area. The paint brush will apply a rate outside the field boundary if placed in that area. See below.



7. When finished, click **Save** and assign the correct product. Click **OK** to save this new prescription dataset to the management tree.

Exporting

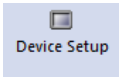
In this chapter you will learn how to:

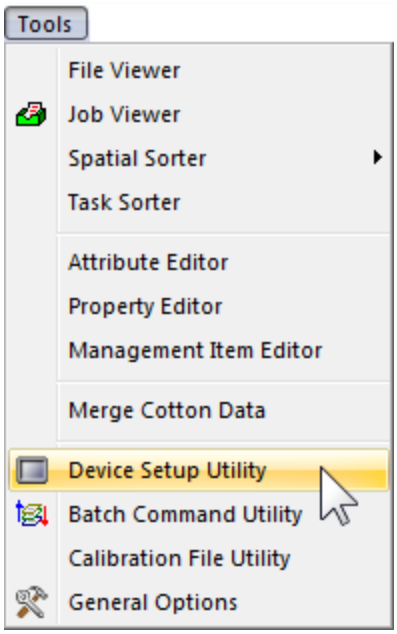
- Setup and export a configuration with Field Names, Products, Prescriptions, Variety Tracking files and Guidance Patterns to a display using Device Setup or AgFiniti Sync
- Load Field names into a display
- Export prescriptions out individually
- Export multi-product prescriptions out individually
- Export maps
- Export Acreage/Production Information for insurance

Device Setup Utility is a tool in the software which is used to export Field Names, Field Boundaries, Products, and Prescriptions to Ag Leader Technology, John Deere, Case IH, and New Holland monitors to name a few. Exporting field names from the software to the monitor is more time efficient than entering the fields in the monitor one at a time. In some cases, using Device Setup is required to get prescriptions out to a specific monitor (i.e. Case and New Holland's Pro 600/700 monitor).

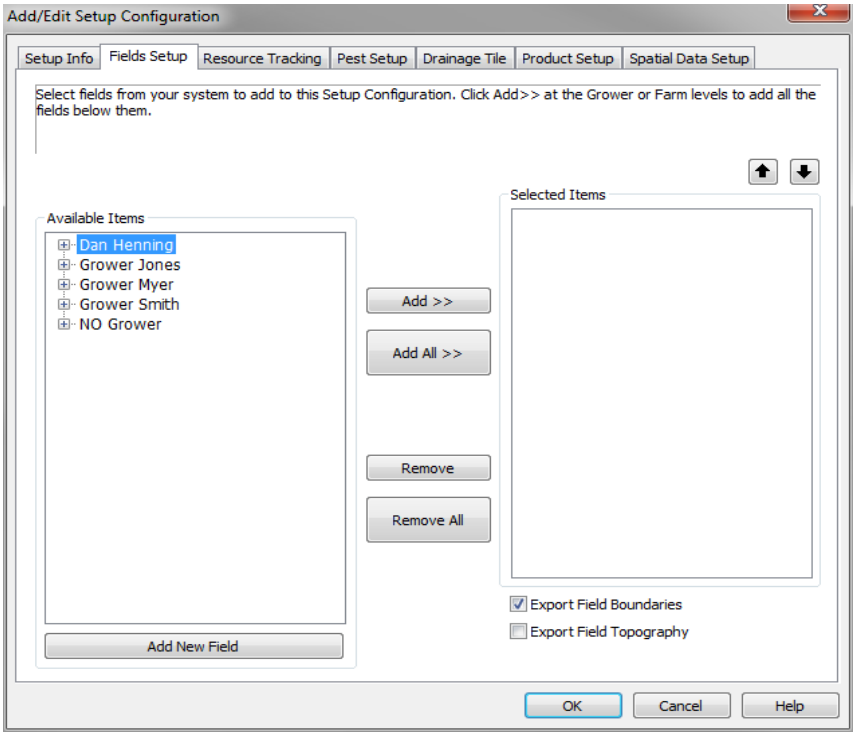
Exporting Items to a Monitor using Device Setup Utility

Creating a Configuration

1. Before exporting management setup information to a field display, it is recommended to remove all unused Growers, Farms and Fields from the Management Item Editor. Go to **Tools->Management Item Editor.** Grower/Farm/Field management items that have (unused) behind the name indicates that SMS currently has no information linked to that management item, and it should be removed if no longer needed. To remove, highlight the name of the unused management item and click **Delete** and then **Yes** to remove the unused item from the list.
2. Select **Tools - Device Setup Utility** 



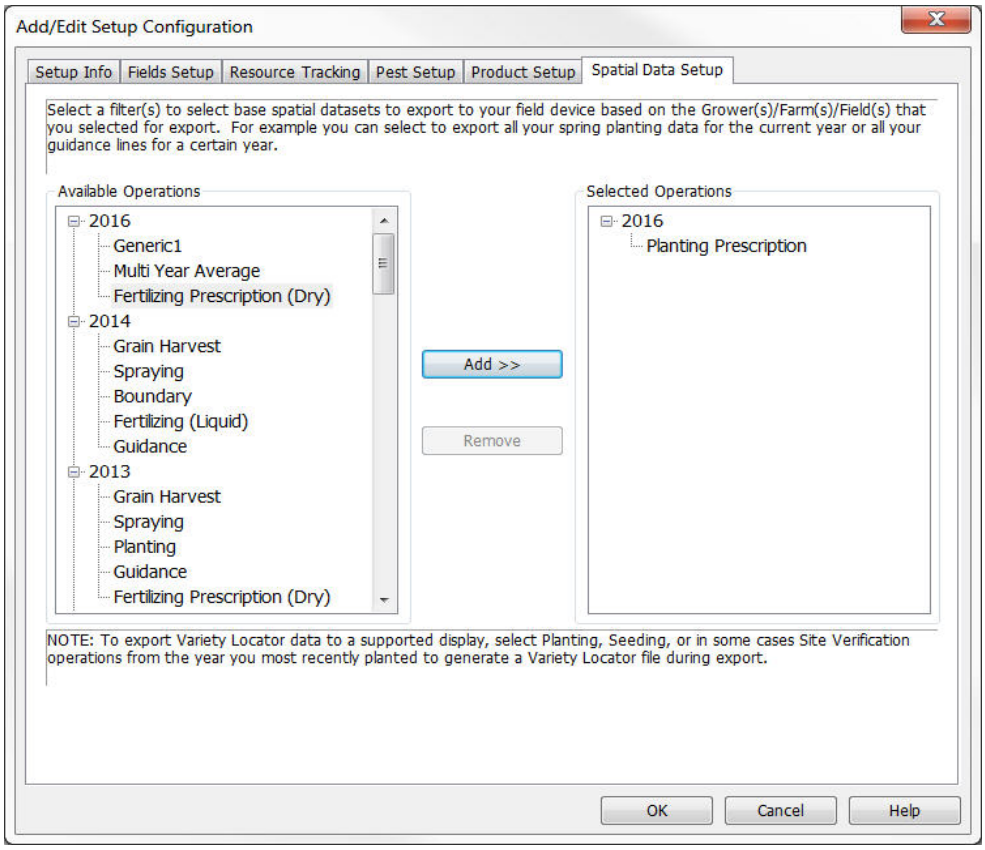
3. Enter a name for the setup file, or if one already exists, click **Add New**
4. Type a name for this list of field names (EX "Spring Planting") and click on the **Field Setup** tab across the top
5. Select the appropriate Grower and then select **Add**



6. The current list of field names will appear on the right side of the screen. If there are names that you do not want in the monitor, select the individual Field name and click **Remove**
7. By leaving Export Field Boundaries checked, frozen field boundaries for each of the specified fields will be exported along with the fields.
8. Click on the **Resource Tracking** tab
9. Select Resource Tracking items to be used in the current season and click **Add**
10. Click on the **Pest Setup** tab
11. Select Pests to be used in the current season and click **Add**

Pests are only supported in the SMS Mobile software.

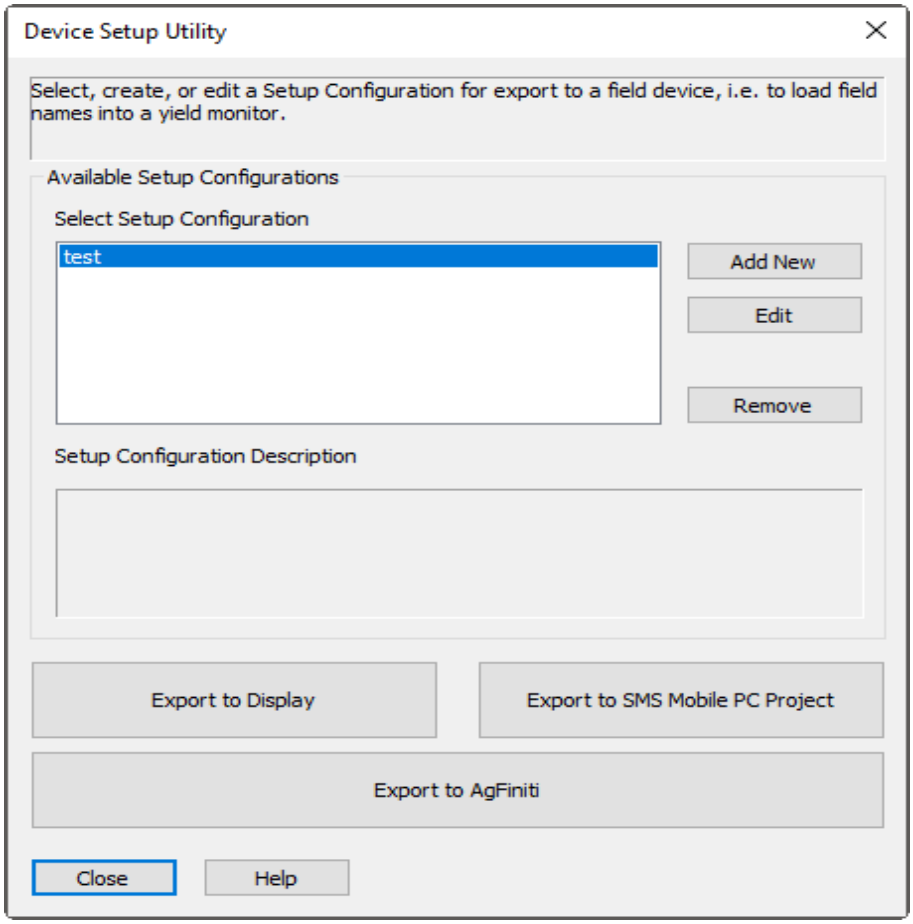
12. Click on the **Drainage Tile** tab
13. Select Drainage Tile Products to be used in the current season and click **Add**
14. Click on the **Product Setup** tab
15. Select Products to be used in the current season and click **Add**
16. Click on the **Spatial Data Setup** tab
17. Select the appropriate Year(s) and Operation(s) to be exported and click **Add**



18. Click **OK**to exit the Device Setup Utility Setup dialog

Exporting to a Display

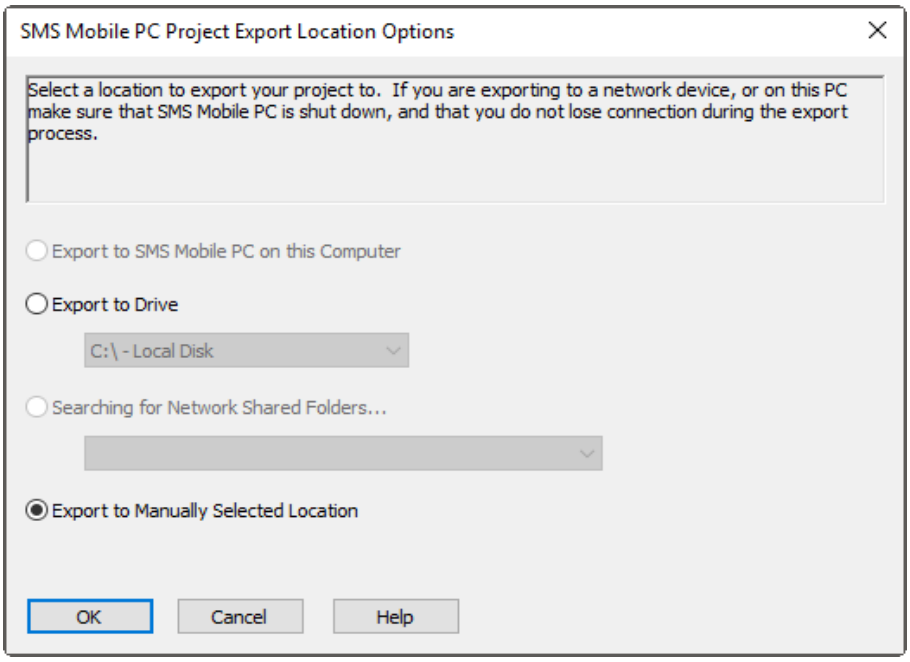
1. Select the appropriate configuration and click **Export to Display or Export to AgFiniti**



2. Select the appropriate Export Format

Exporting to SMS Mobile

1. Select the appropriate configuration and click **Export to SMS Mobile Project**
2. Select the appropriate export option and location to export your Mobile project to



Exporting Maps

Various amounts of information can be exported out of the software. Any map can be exported into generic file formats (I.E. Shape files, TXT files, KML/KMZ files) or as a geo-referenced image (I.E. GeoTIFF, JPEG). Prescription maps can be exported out as specific file types so that the desired monitor can control the rate of the product being applied.

Single Layer Export

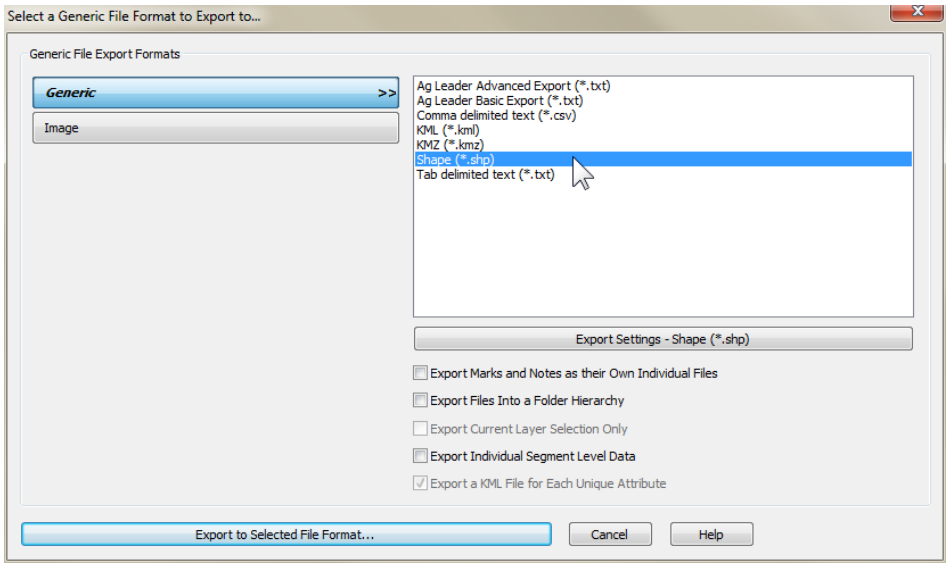
The following example will explain how to export a harvest map.

1. Create a new map of some harvest information. For this example, use G**rower Smith - Home - East McMains - Grain Harvest**

> In some cases, it may be desirable to combine information from two or more Fields in the file to be exported. To do this, click on the first Product in the Management Tree and while holding the **CTRL** key on the keyboard select the other Product(s) from either the same or different Fields.

2. Verify that the correct Map Type is selected. For this example, select Spatial Map
3. Right-click on the map and select **Export**
4. Select the type of export. For this example, select **Export to a Generic File Format**

5. Select the desired file format. For this example, select **Shape**

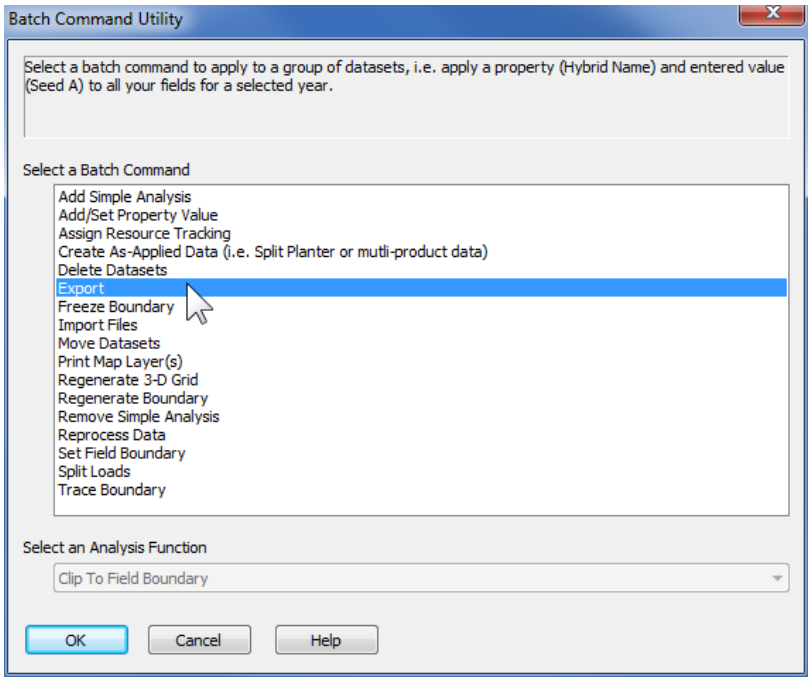


6. To add, delete, or change the units of the attributes and properties that are being exported in the Shape file, select **Export Settings - Shape**. For this example, there is no need to change any items
7. Click **OK**
8. Select a location to save the file, type a name for the file, and click **Save**

Batch Exporting

Data can be exported in batch using the Batch Command Utility. Data can be exported out as Shape,Text or KML/KMZ files. For example soil sample points could be exported out for an entire grower.

1. Click on the **Tools** menu and select **Batch Command Utility**



2. Select Export and click **OK**
3. Select the needed data filters for the data to be exported. Click **Next**
4. Click **Finish** and then select the format to save the files in. Click **OK**
5. Select the location to save the files at. Click **OK**

Exporting Prescriptions

Prescription maps can be exported one map at a time for some monitors, rather than using the Device Setup Utility tool. This is useful when only 1 or 2 prescription maps need to be exported. Some monitors are capable of controlling more than one product at a time, in these cases it may be required to export a multi-product prescription rather than multiple single product descriptions.

Single Product Prescriptions

Prescriptions for a single product can be exported out of the software. To export a single prescription file, follow these steps:

1. Create a map of the prescription. For this example, use a planting/fertilizing prescription from the Management Tree
2. Verify that **Spatial Map** is selected
3. **Right-click** on the map and select Export
4. In the Select an Export Method window click on Export Single File to a Field Display/Monitor and then click **Start Single File Export Process**
5. Select the display type from the left and then select the controller to export the prescription to and click **Export to Selected File Format**
6. Type in the desired Grid Size and Default Rate.

It's highly recommended that a Default Rate is typed in. The monitor will apply the default rate in the instance that the vehicle is either outside of the prescription area or GPS signal is lost.

7. Press **OK**
8. The Export Preview will show the preview of the map that is being exported. If everything looks as it should, click **OK**
9. Select the appropriate location to save the file and change the name of the file if desired
10. Click **Save**

Multi-Product Prescriptions

Multi-product prescriptions are needed when controlling more that one product on the monitor.

1. Create a new map of the first prescription to be controlled
2. In the management tree, select the second prescription and click **Add to Current Map**. The second map should now be on top of the first
3. Right-click on the map and select **Export**
4. Select **Export Single File to a Field Display/Monitor** and click **Start Single File Export Process....**
5. Pick the correct monitor type that will be used.
6. Click **Export to Selected File Format...**
7. Change the Layer Settings as needed
   - **Export Units** - Allows the selection of units to export the select layer in. The units available may be filtered to only those units supported by the format and/or device that were previously selected
   - **Default Rate** - Allows the selection of default units to be exported with the selected layer, if the format that will be exported to supports default units
   - **Units** - Allows the selection of units for the entered default rate. The entered value and units set here will be converted to the units that are selected above
8. Click **Add**
9. Select the next layer from the Select Layer drop down list and repeat the two previous steps
10. Verify that all layers in the Select Layer drop down list have been added over to the Selected Export Layers list
11. Click **OK**
12. Change the Grid Size if necessary. For this example, use the default grid size
13. Click **OK**
14. Verify that all layers have been added and look correct by selecting the Select Export Layer drop down menu
15. Click **OK**
16. Choose a location to save the file, type a name for the file, and click **Save**

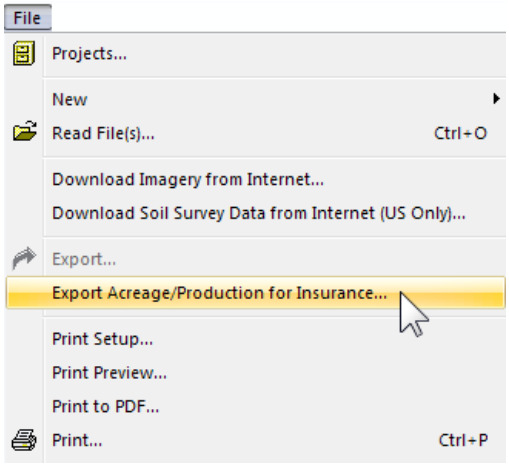
Exporting Acreage/Production Information for Insurance

There are two different export options for planting and harvest information to send to your insurance agency:

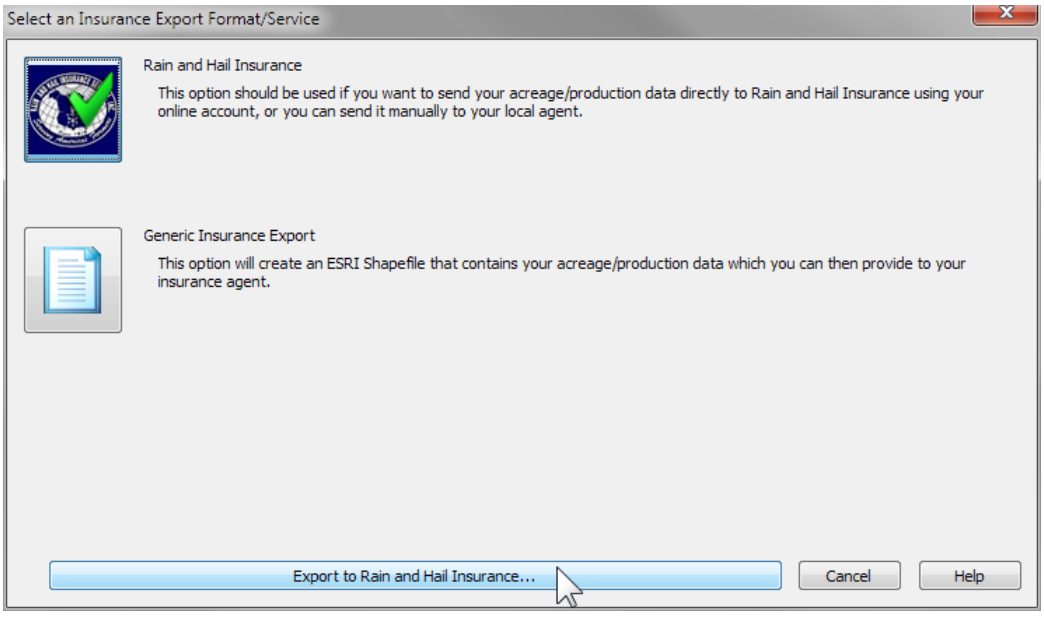
- Export to Rain and Hail Insurance
- Generic Insurance Export

The steps to export out information to either Rain and Hail or as a generic file type are very similar.

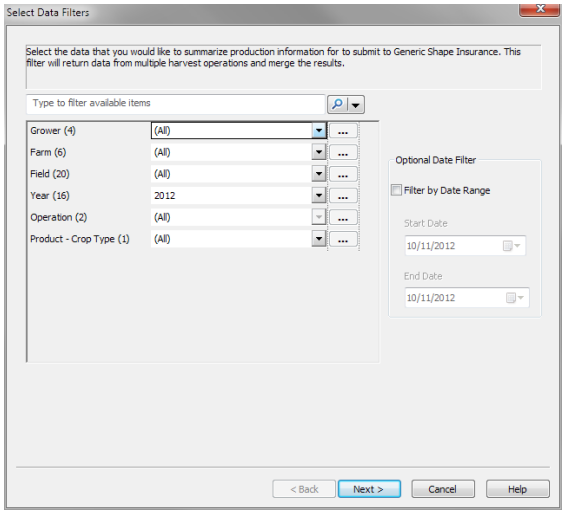
1. Go to the **File** menu and choose **Export Acreage/Production for Insurance**



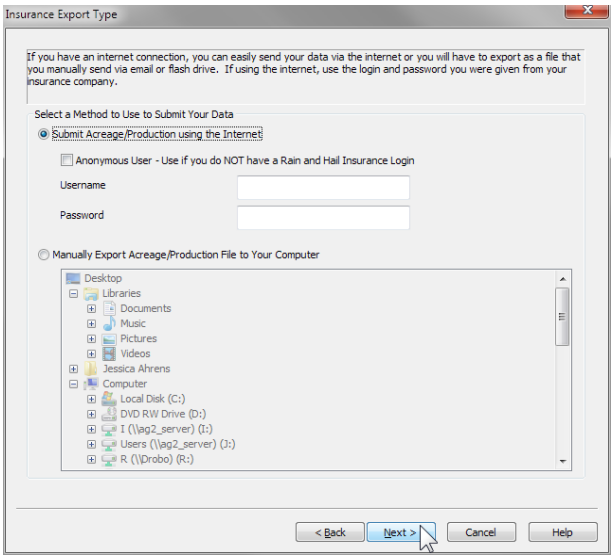
2. Choose to export to either **Rain and Hail Insurance** or as a **Generic Insurance Export** and click the **Export** button



3. On the Select Data Filters screen, use the drop-down menus to select what information you wish to include in the insurance export and click **Next**



4. Remove any unwanted datasets from the list of items being exported using the **Delete** button, and then click **Next**.
5. If exporting to Rain and Hail the following screen will allow you to choose your export method- either **Submit Acreage/Production** using the Internet or **Manually Exporting the Acreage/Production File to your Computer**. Click **Next** after making the appropriate selection



6. Click **Finish** and the acreage and production records will be exported using the selected method.

Backups

In this chapter you will learn how to:

- Create a backup
- Restore a backup
- Use backup scheduling

Backups are used to protect and save your data. Backups can be used to:

- Serve as a restoration point in the event of a hard drive failure or after performing an undo able event (i.e. delete branch, spatial sort)
- Transfer data from one computer to another

Creating a Backup

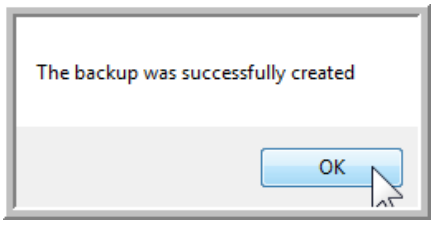
To create a backup within the software:

1. Click **Services - Backup/Restore Project(s)** or from the Projects Dialog click the **Backup/Restore Project(s)** button
2. Choose to Backup Project Data Now and click **OK**
3. Select the Project(s) that you wish to backup and click the **Add** button.
4. Enter an optional text description for you backup
5. Enter a Custom Name for folder the backup(s) will be placed in
6. Select the location to save the backup to by clicking the **Browse** button.
7. Click **OK**

Note: It's recommended to save the file to the local computer first and then copy the file to an external media storage device.

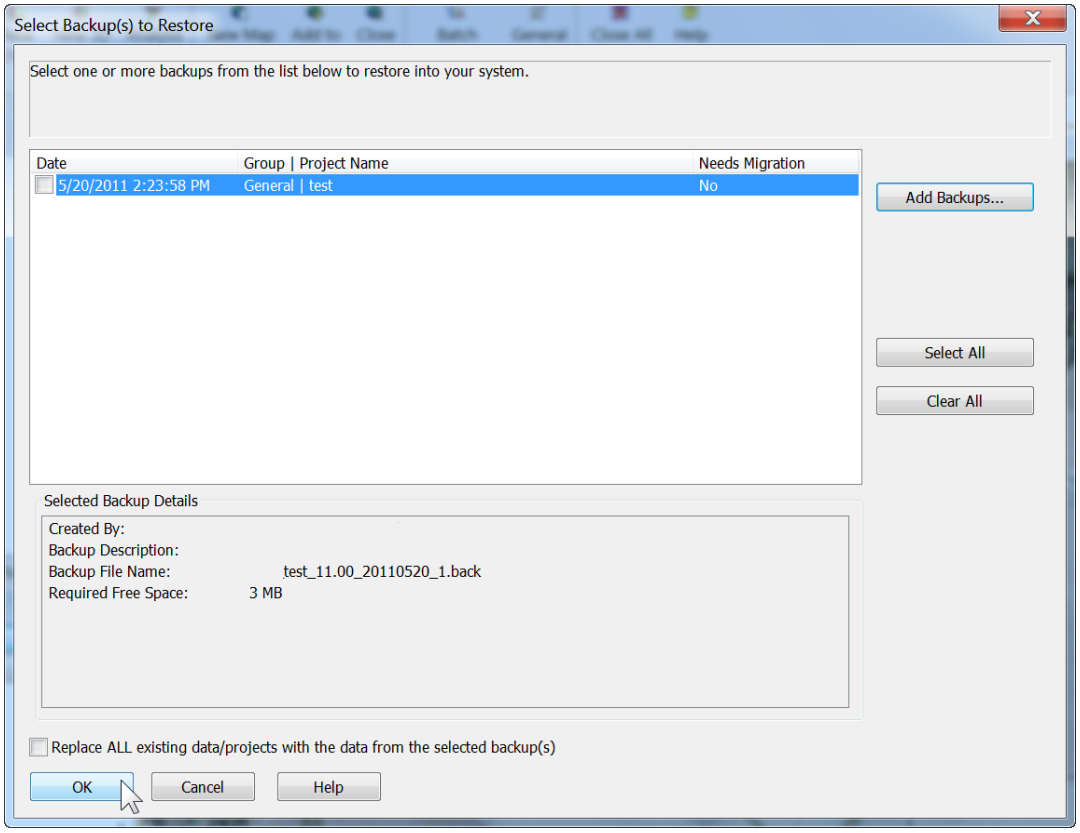
To change the default location of the Backup folder or split the size of a backup so that it can fit onto multiple drives, see the General Option section.

8. After the software has successfully created a backup, the following dialog box will appear. Press **OK**
    - Uses a *.back extension

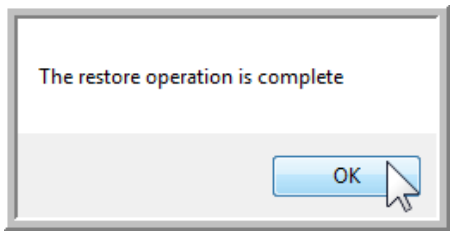


Restoring a Project

1. To restore a project, click **Services - Backup/Restore Project(s)** or from the Projects Dialog click the **Backup/Restore Project(s)** button.
2. Choose to Restore Project Data and click **OK**.
3. Select the folder that contains the backups and click **Load**.



4. Choose the desired backup and click **OK**
5. Once the restore operation si complete, click **OK**

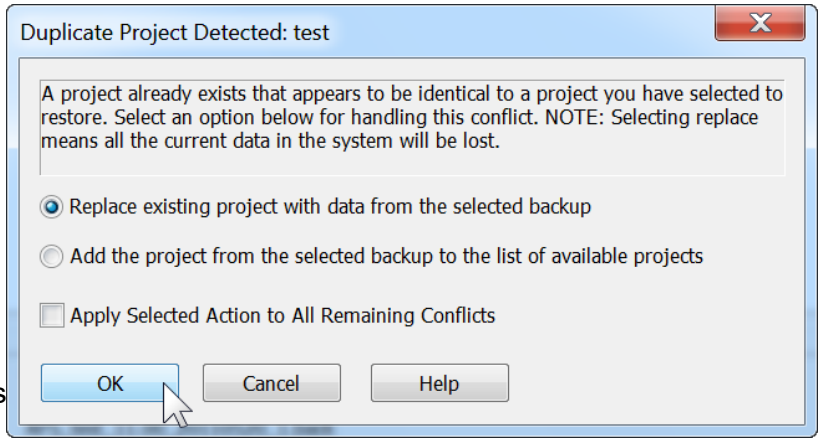


Working with Projects in the Software

Restoring a Backup of a Single Project

When restoring a backup of a single project , the following screen will appear with the following options:

- **Replacing the current project with the project in the backup** replaces the project that was originally used to create the backup.
- **Add the project in backup to the current data** adds the project to the existing list of projects in the project tree. If the name of the original project was changed after the backup was made, the software will automatically start restoring the project and renames the new project accordingly.



Selecting Replace current project with the project in the backup does NOT replace the project that is currently open unless that backup was actually a backup of that project. If there is any uncertainty as to what the project actually contains, It's recommended to select Add the project in backup to the current data and deleting the unneeded project at a later time.

Backup Scheduling

1. Backup Scheduling allows the software to create a timely backup on a daily, weekly, or monthly basis and can be accessed by clicking **Services - Backup/Restore Project(s).**
2. Click **Schedule a Backup for your Project Data** and click **OK**.
3. The following describes the different Schedule Types:

- **Disable scheduled backups** - Scheduled backups is turned off
- **Backup all projects** - A backup file for each project will be created
- **Backup individual projects** - This option is used to create backups of the total list of projects in increments. For example, if 3 is selected for Backup individual projects and Daily is selected for a Backup Frequency, then the first day the software will create a Backup containing projects 1, 2, and 3. On the second day, a Backup containing projects 4, 5, and 6. Once all of the projects have been backed up, the process will restart

4. Once the Schedule Type, Backup Frequency, and Backup Start Time have been selected and a Windows Account Name and Password have been entered, press **OK**
5. The following are required for the software to automatically create a backup using Backup Scheduling:

- A valid Windows Account Name and Password must be entered in the Scheduled Backup dialog box
- The software must be closed
- The computer must be turned on; however, the user does not need to be logged on

Projects

In this chapter you will learn how to:

- Create a new project
- Check a project in and out
- Check the history of a project
- Move a project to a different data location
- Edit data locations

Projects can be used as a way to split up multiple clients data. Think of projects as having a different file folder for each client, where each project would only contain a specific grower's information.

If a client later purchases a copy of the software (Basic or Advanced), is starting from scratch, and would like to have an exact copy of a project from another user of the software, then a backup could be created and restored. Both computers would then be able to display the same information.

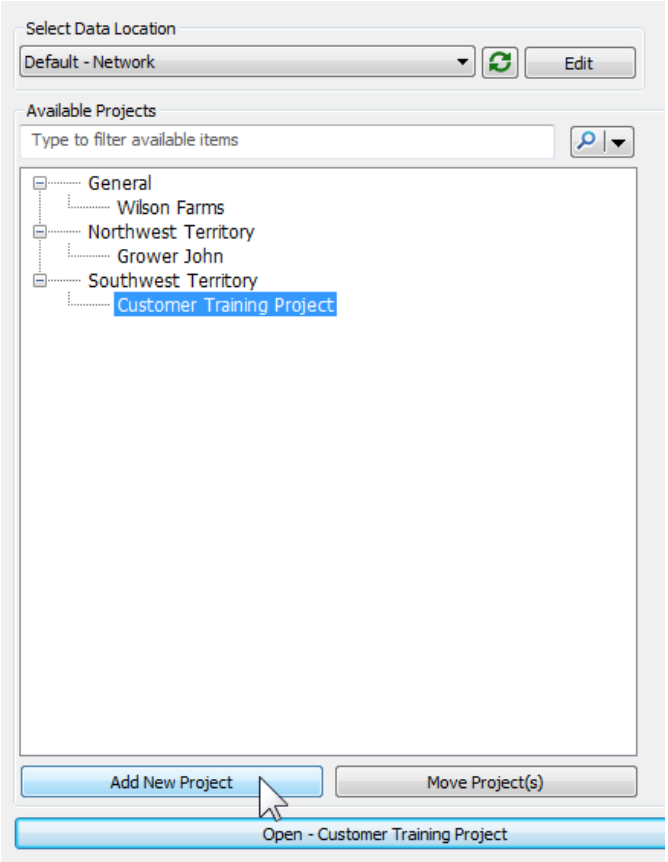
The Basic Software allows you to create and manage up to five different projects, while Advanced users can have an unlimited number of projects.

Creating a New Project

To create a new project:

1. Click **File - Projects...**or click on the **Projects** 

icon in the main toolbar
2. In the Projects dialog box, click **Add New Project**



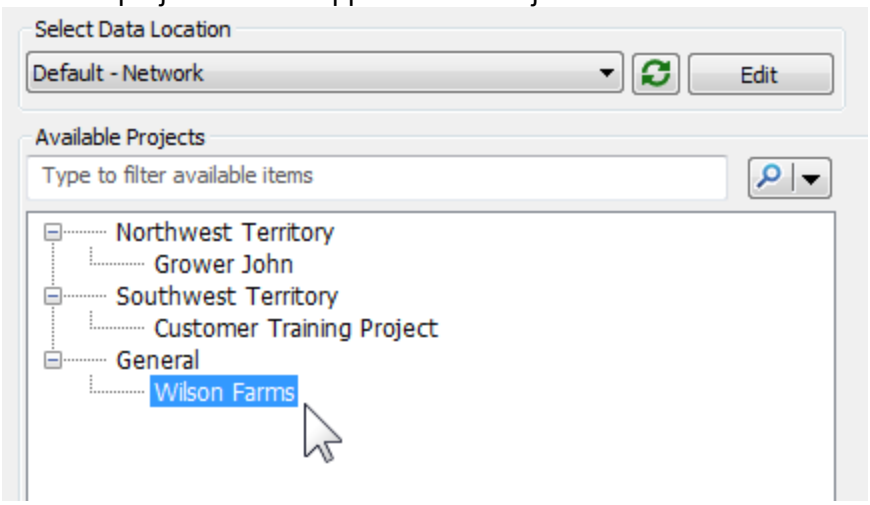
3. Select one of the two options and press **OK**. For this example, use **Create Empty Project**
   - **Create Empty Project** creates an empty project
   - **Create Copy of Existing Project** creates a exact duplicate of an existing project
4. Choose a project group name. For this example, choose **Northwest Territory**

Type a descriptive name for the project in the Project Name field. For this example, enter Wilson Farms

- Choose an existing group name by selecting the drop-down menu
- To create a new project group, click **Edit**

5. There is an option to type in a description and a password. These two fields are optional
6. Press **OK**

7. The new project will now appear in the Projects list



Project Check In/Check Out

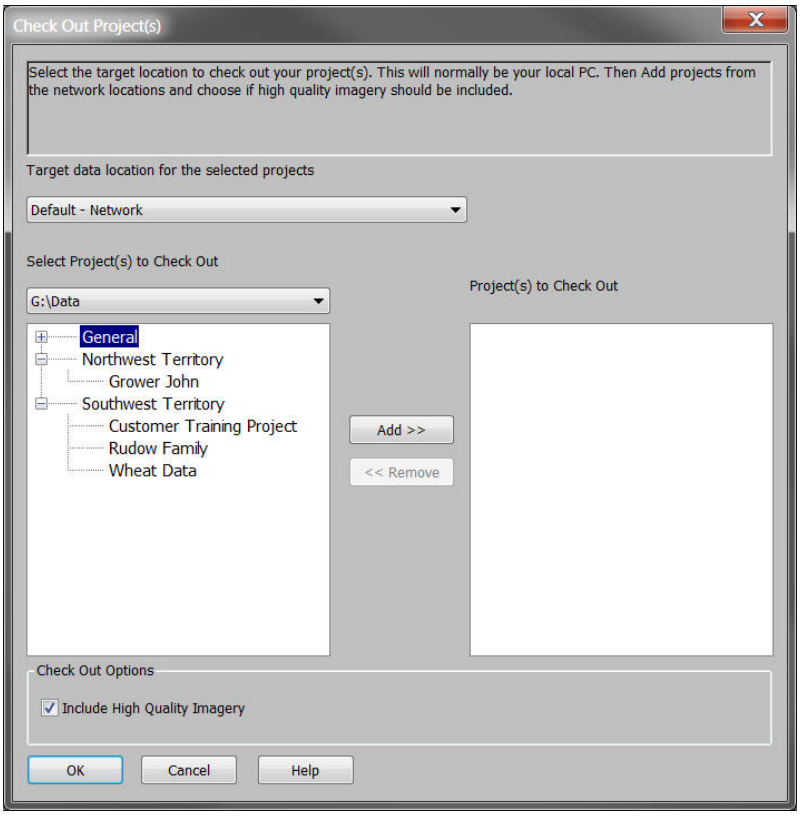
Overview

A user can "check out" a project from a shared Data folder location (such as a server) to a personal laptop (local machine), take the laptop to the customer's field, read the card into the software and make any necessary changes, then come back to the office and "check in" the project. Once the project is "checked in," the project will be removed from the laptop and placed back in the original Data folder with all of the changes and updates. Other users cannot access the same project until the project is checked back in.

Checking a Project Out

To check out a project, follow these steps:

1. Select the project to be checked out and click **Check Out Selected Project**
2. After the software has copied the project onto the local machine, "(the username)" will appear after the name of the project



Only the user that checked out the project will be able to access that project until it has been checked back in.

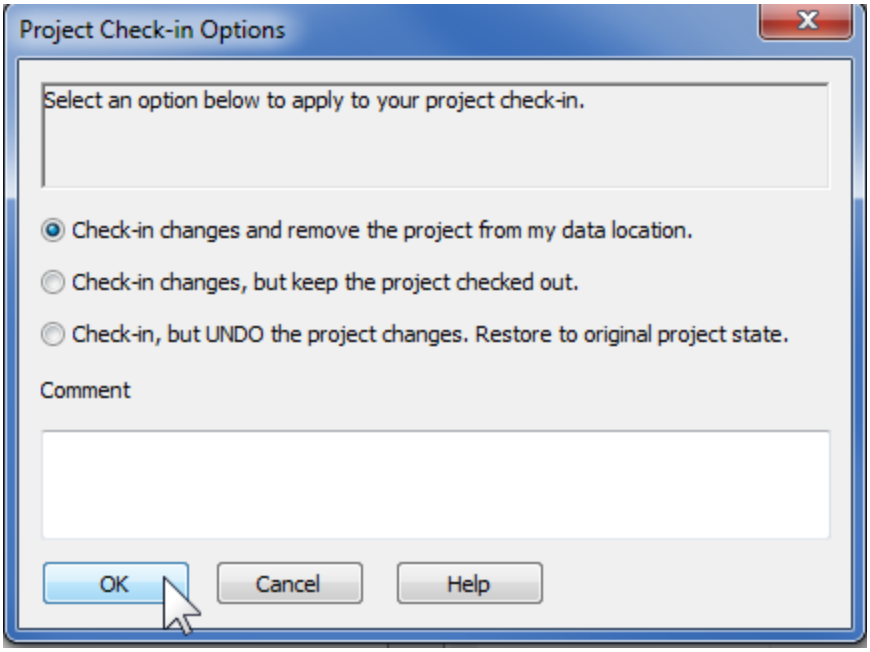
Working while disconnected from the shared data folder

Once the computer has been disconnected from the shared data folder and the software is started, the Projects Dialog will only contain the projects that are currently available.

Checking a Project In

To check a project back in:

1. Verify that the computer is connected to the drive that houses the shared data folder
2. Start the software
3. Click **File - Projects...**
4. Select the project and click **Check In Selected Project**
5. The following dialog box will appear asking what should be done with the project to be checked in. Choose one of the following options:



- **Check in and remove the local copy of the project** - This takes the updated project on the local machine and places it back on the server. This in turn allows others to work with the updated project
- **Check in and keep the project checked out** - This places an updated version project back on the server (for backup and multi-project analysis purposes) but leaves the project still checked out on the local machine
- **Undo check out and remove the local copy of the project** - All changes on the local machine will be discarded and the project will be restored to the original copy before the project was checked out

6. Press **OK**

Moving a project to a different Data location (Advanced only)

When the local machine is disconnected from the network, new projects can be created. However, these projects will not appear in the network data location until moved.

To move a project:

1. Select **Move Project(s)** on the Projects dialog
2. Select the Data location that contains the project you wish to move
3. Select a Project Grouping (i.e. General) or an individual project (i.e. Miller Brothers) and click **Add**
4. Once the desired projects have been selected and added, click **OK**
5. The Software will then copy the project over to the data location currently being used. These projects can now be accessed by any computer with rights to this data folder.

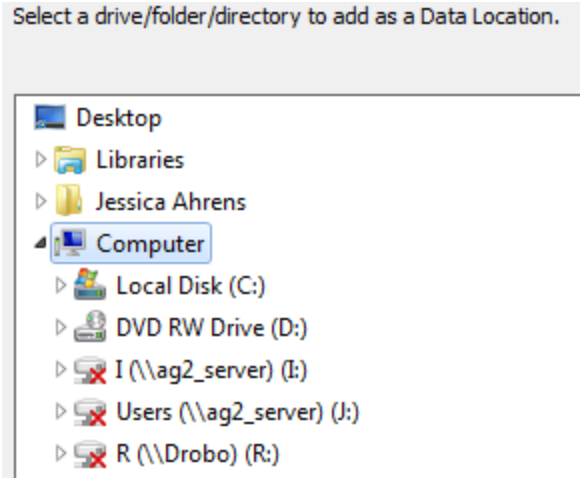
Viewing Project History

1. Highlight the project of interest and select the **History** tab.
2. The History will display the date, the event, the user, the computer ID and the Data folder that the project was stored in.

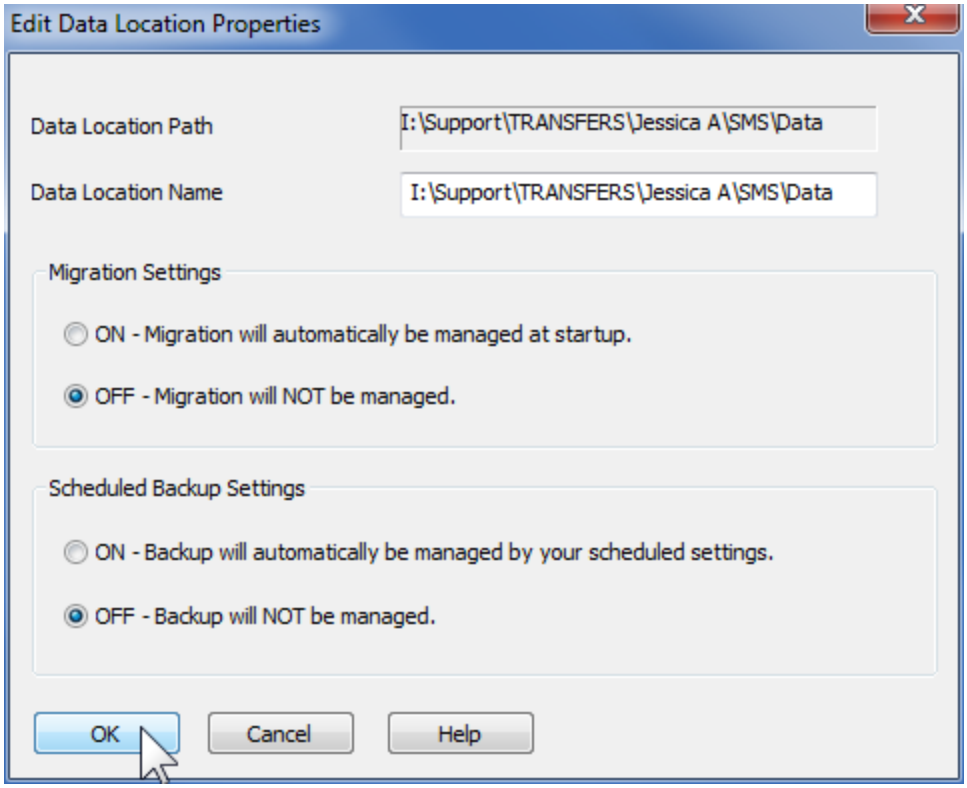
Editing Data Locations (Advanced Only)

Advanced allows users to easily search for, create new and edit existing data locations.

1. Select the **Edit** button at the top of the Projects Dialog
2. Click **Add New Data Location** to create a new data location on the local computer, network location or removable drives. Select the location where the new Data folder should be added and click **OK**



3. Click **Search for Data Locations** to search for previously created Data folders. On the Browse for Folder dialog select the directory or drive that contains the Data folder and click **OK**. This data location will now be added to the list of available data locations.
4. To edit a data location select the name of the project and click **Edit Properties**
5. On the Edit Data Location Properties screen you can modify the Data Location Name, migration settings and scheduled backup settings.



6. Click **OK** after making all necessary changes.
7. To remove a data location select the name of the data location you wish to remove and click **Remove Data Location**.

Note: Removing a Data Location does NOT delete the data folder from that location, it simply removes the location from the list of available locations.

Creating New Attributes and Operations

The Advanced Software allows you to create new attributes, properties and operations to fully customize your management tree and projects. Creating custom operations and attributes will allow you to create data such as management zones, field obstacles, pivot irrigation maps and manure management plans. These new operations can be based on data that already exists in the management tree. In this chapter you will learn to:

- Define attribute settings
- Learn what settings should be used for specific applications
- Create Custom Attributes

Creating Custom Attributes

1. To build a new attribute go to the **Tools** menu and select **Attribute Editor**
2. Click the **Add New** button
3. On the Attribute Editor fill in the following details:

Attribute Name

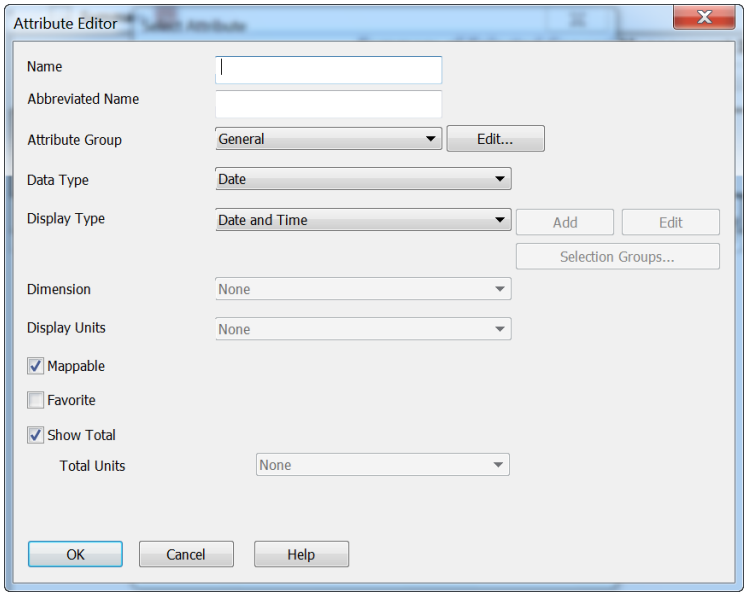
This is the name of the attribute that will be used in maps or analysis. Fewer words are recommended rather than a phrase, but be distinct.

Attribute Group

This is where the Attribute will be categorized. Placing the new attribute in the correct group where it relates will make it easier to find while working in the software.

Data Type

This allows selection of a data type for a new attribute. The following is a list of the available data types and a brief description of each:



- **Date** - This data type applies date and time formatting to values. Example = 1/1/2013
- **Logical Value** - A logical data type that always produces one of two possible value results, such as YES/NO or TRUE/FALSE
- **Unique Decimal Number** - This data type represents values that are non-continuous but do contain a decimal place of precision. This data type is often used for variable rate prescription values, where you have an exact decimal value that will be applied to a number of points or a large area
- **Selection List** - This data type allows the creation of lists of value selections that are available to chose from when setting a value, ensuring that consistent values can be set. An example would be a Weather Conditions attribute with available values of Sunny, Cloudy, Rainy, Windy, etc

- **Decimal Number** - This data type represents values that contain decimal place precision and are non-discrete in nature. This would include any data collected with a sensor such as yield data. Example = 145.23
- **Integer** - This data types represents whole numbers, such as 1,2,3. It is best used for ID's and similar values
- **Text** - This data type represents values that are character based and will not be treated like numeric information. An example would be a Field Name or an identification number such as a serial number

Display Type

This selection is only available when Date, Selection List, or Logical Value is selected as the Data Type for an attribute. The Display Type setting defines how the attribute will be displayed in summaries, reports, maps, etc. For example, Date can set the display type to Date and Time, Date Only, or Time Only.

Dimension

This selection allows you to pick a dimension for a new attribute, such as Flow Rate or Velocity.

Display Units

This selection assigns units for a new or existing attributes. The units that are selectable are based on those available for the Dimension.

Mappable

Check this box to make an attribute mappable. If this box is unchecked then an attribute will not be selectable from the attribute/property selection in the Layer Window when a map is made that contains the attribute.

Favorite

Check this box to set the attribute as a favorite. Favorites appear at the top of selection lists automatically and are separated from the normally available selections by a dashed line.

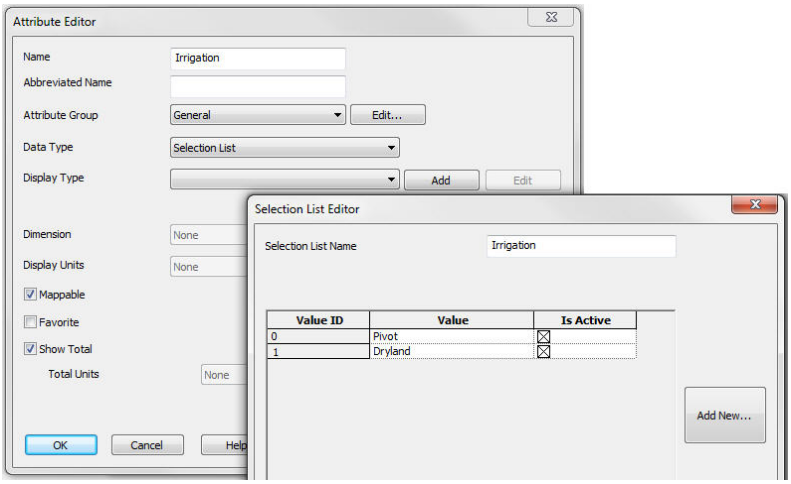
Show Total

Check this box to allow totaling of values in a dataset on summaries, reports, etc.

- **Total Units**-This selection allows you to choose a unit to display totals in, independent of what the normal display unit for an attribute is.

4. In this example we will create a new Attribute called **Irrigation**, which will be a selection list and will include **Pivot** and **Dryland** as the entries

- Attribute Name- **Irrigation**
- Attribute Group- **General**
- Data Type- **Selection List**
- Click **Add** to build a new Display type
- Selection List Name- **Irrigation**
- Click **Add New** and input the Value Names that should be displayed. For this example, enter **Pivot** and **Dryland**



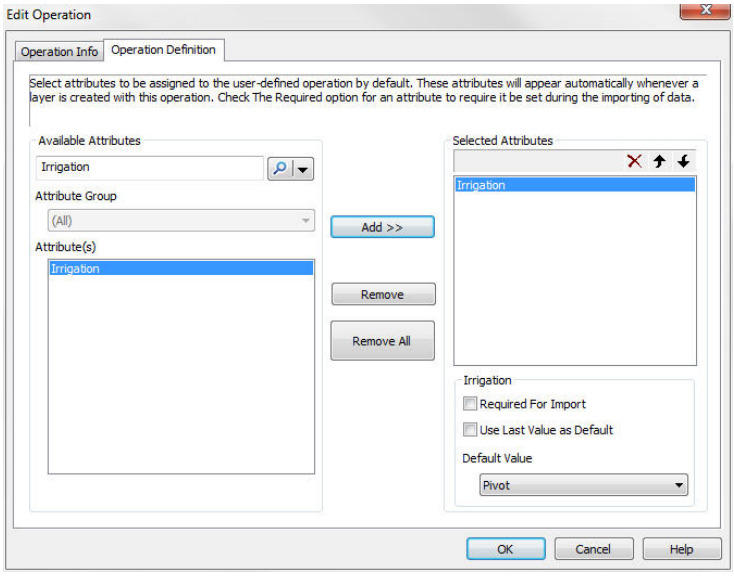
Add all values that will be used in the current layer and all future layers to ensure consistency

5. Click **OK** after setting all values for the new attribute

Building a Custom Operation

1. To build a new operation, go to the **Tools** menu and select **Management Item Editor**
2. Click the **Operation** button on the left and then **Add New**
3. Select the type of operation to create and click **OK**. In this example choose **Generic**
4. The Edit Operation dialog will now open. Input a name for the new operation on the Operation Info tab.
5. Use the Operation Definition tab to add over existing attributes to the new operation and click **OK**.

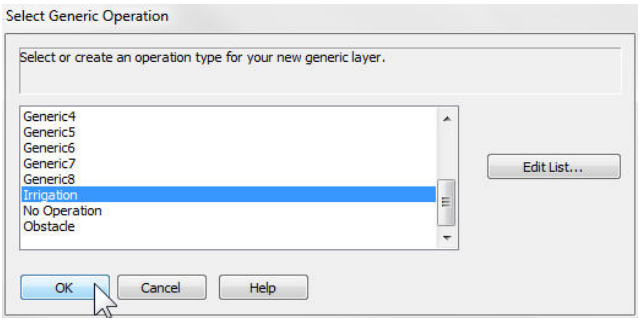
- To create a new attribute see the first section of this chapter
- To add an existing attribute to the operation definition tab select the attribute on the left hand side of the screen and use the **Add** button to move it to the Selected Attributes box. This list of attributes will appear in a future step.



Creating a new Dataset using the new Operation and Attribute

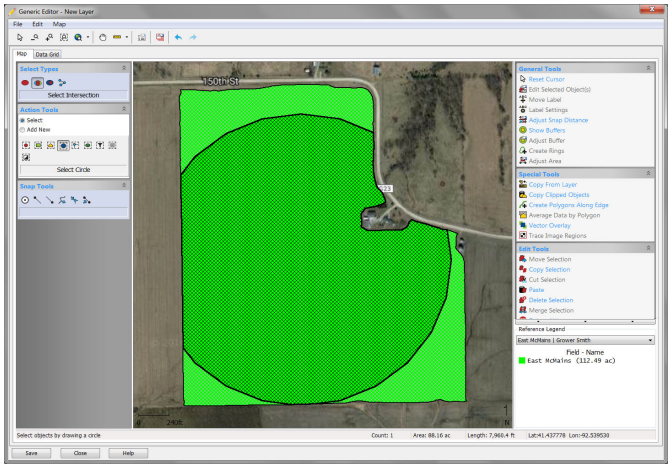
For this example we will use the Field Boundary layer to create a new Generic Layer that will be saved as the new Irrigation operation that was previously created.

1. Create a map of the **Grower Smith- Home Farm- East McMains** field boundary
2. From the **File** menu select **New- Generic Layer**
3. Select **Irrigation** on the Select Generic Operation dialog box. Click **OK**.

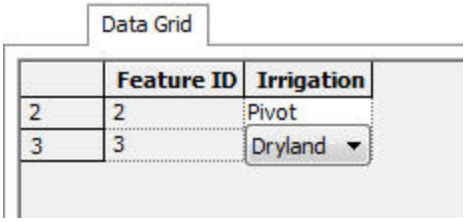


4. The Generic Editor will now open. The field boundary will be displayed as a background layer but is NOT currently part of the active map layer.
   - The **Add New** tools allow you to manually draw polygons, regions and zones in the field
   - The **Copy from Layer** tool will allow you to make a copy of any reference layer to use in the active map layer.
5. Click **Copy from Layer** 
   - Select the Layer that you would like to make a copy of. For this example, select the field boundary and click **Next.**
   - Use the **Select Layer Objects**to choose what data you wish to copy. By default the entire layer will be selected. Click **Next.**
   - Choose what data you want to copy from the layer and click **Finish**
     - **Copy Spatial Data**- only copies the spatial objects (polygons/polylines/points) from the layer
     - **Copy Spatial and Attribute Data**- copies the spatial objects and attributes assigned to them
6. The objects that were copied will now be displayed in the Generic Editor and will be selected by default
7. This layer can now be modified to match the new operation that is being created
   - To draw the pivot on the field boundary we will use a combination of **Select Intersection, Select Circle and Snap Center** tools. After drawing the center pivot, click the **Divide by Selection** tool

to cut the pivot into the field boundary.



8. With the pivot and dryland corners separated from each click on the **Data Grid** tab
9. By default the Feature ID and all attributes added to Management Item Editor under the Operation Definition tab will be displayed. If before entering the Generic Editor the operation was setup with all desired attributes you can being inputting attributes.



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To add a new attribute click the **Add Attribute** icon
- Select an existing attribute or use the Add New option to add a new attribute
- Click **OK**after highlighting the desired attribute
- The new attribute will be displayed in the Data Grid tab and values can be manually filled in, selected using the selection list, imported, or copied into the cells

10. Click **Save** after making all desired changes
11. This layer can now be used to make other management decisions for prescriptions or used in comparisons


Irrigation
Pivot
Dryland

Generic Editor

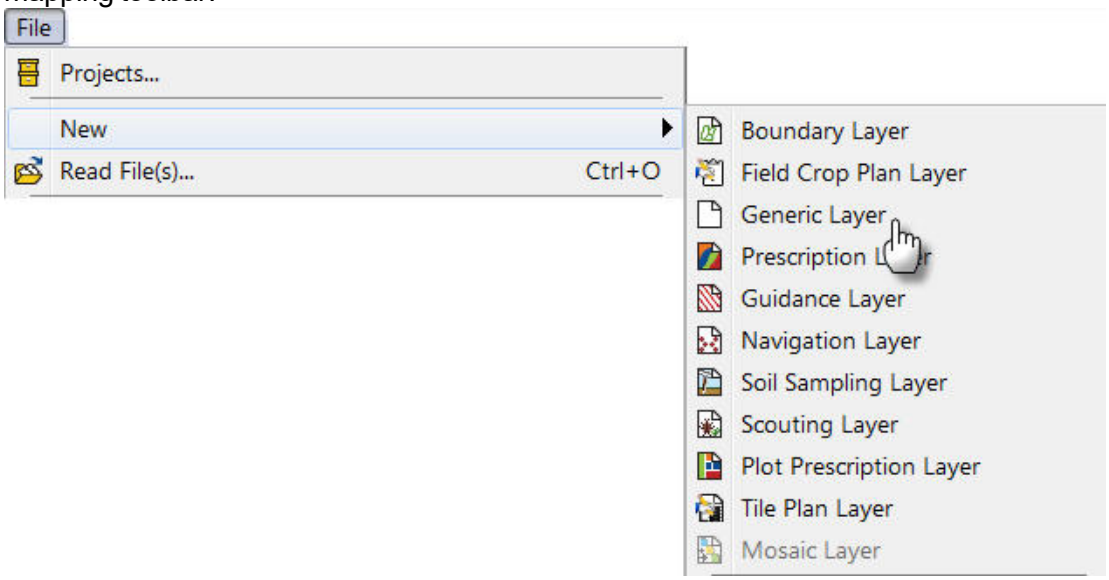
In this chapter you will learn to:

- Create a new generic layer
- Create new objects
- Modify existing datasets

The Generic Editor allows users to create new and edit existing datasets. Using the Generic Editor allows you to create tile lines, field obstacles and pivot irrigation zones for example.

Creating a new Generic Layer

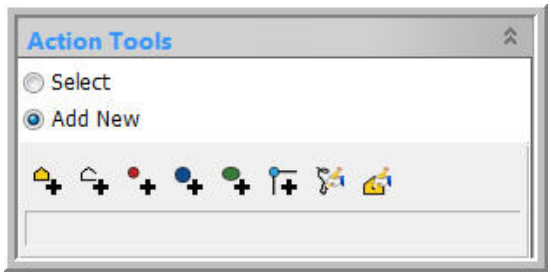
1. Create a map of what you would like to base your new generic layer on.
2. Go to the **File** menu and select **New** and **Generic Layer**, or click on the **New Generic Layer** icon in the mapping toolbar.



3. Select the type of Generic Operation to create and click **OK**.
4. The Generic Editor window will now open with your reference maps displayed in the background.

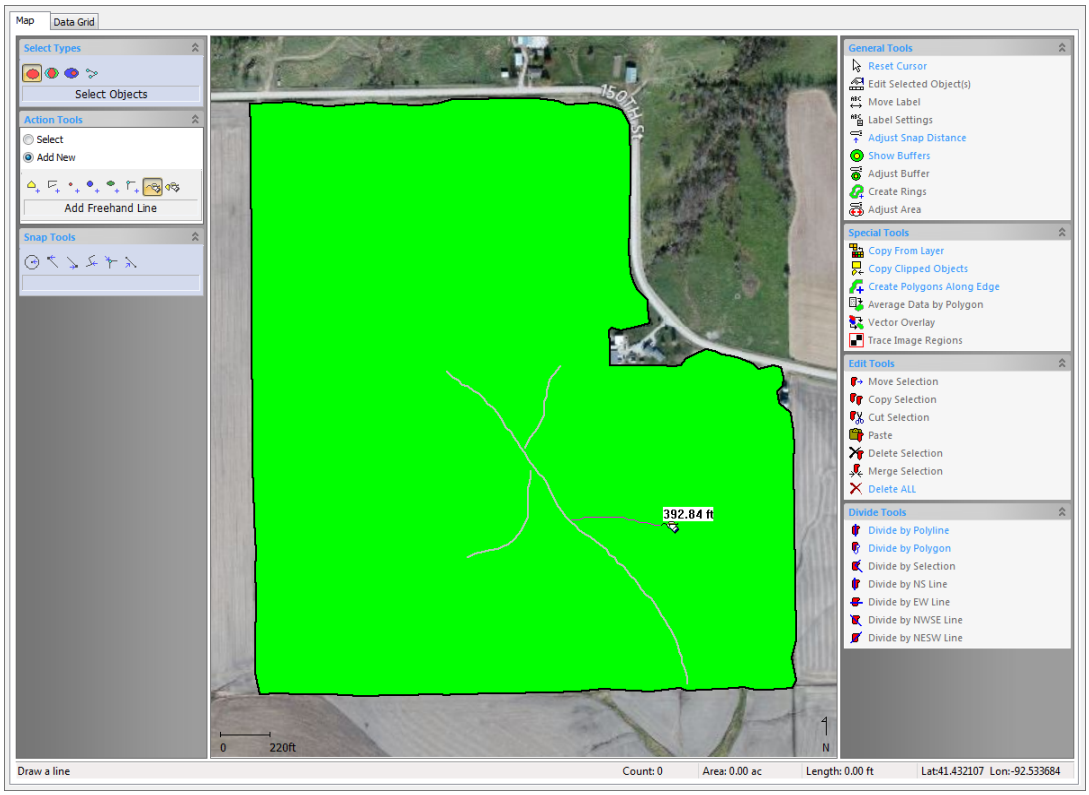
Adding new objects to a Generic Layer

1. To hand-draw new objects in the generic layer use the **Add New** tools available under the **Action Tools** on the left hand side of the screen



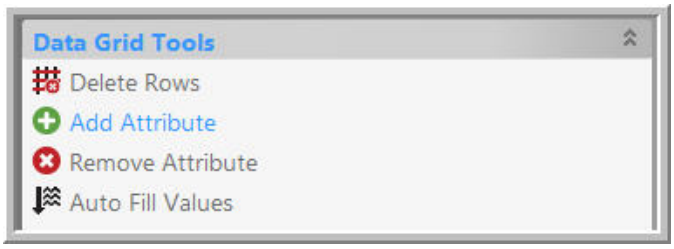
- **Add Polygon**- manually draw a polygon by left clicking to add vertices
- **Add Polyline**- manually draw a polyline by left clicking to add vertices
- **Add Point**- add individual points
- **Add Circle**- manually add a circle
- **Add Ellipse**- manually add an ellipse
- **Insert Vertex**- add additional vertices to the currently selected object

- **Add Freehand Line**- hand draw a freehand polyline
- **Add Freehand Polygon**- hand draw a freehand polygon

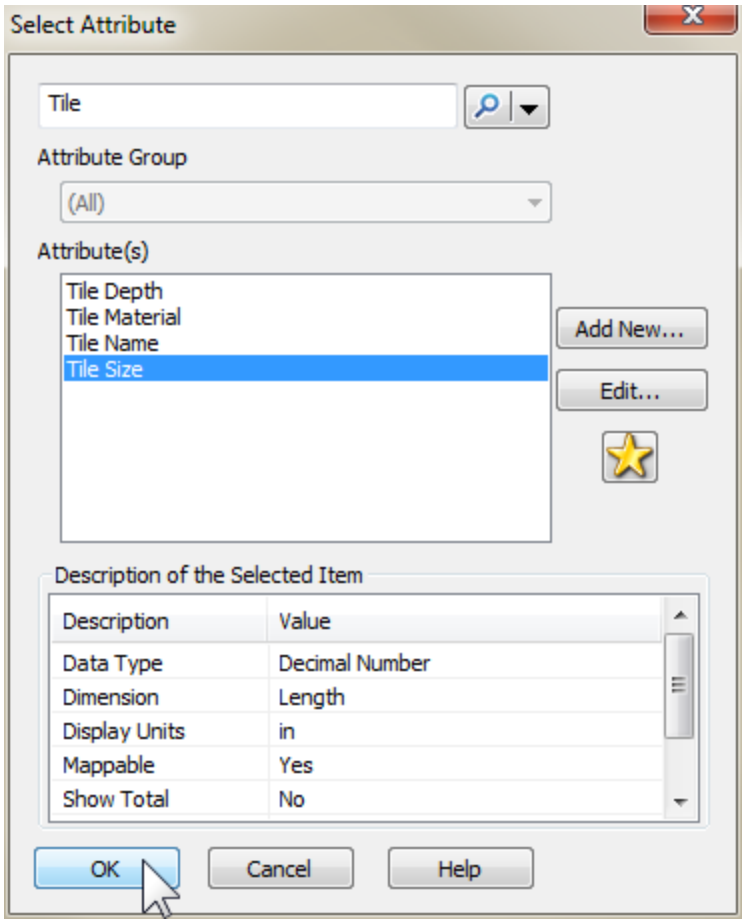


Many of the **Add**, **Select** and **Divide By** tools are also available by right-clicking over the map in the Editor window.

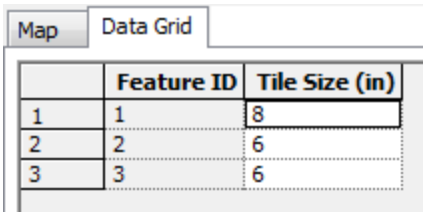
2. To assign values to the new objects click on the **Data Grid** tab and choose to **Add Attribute.** Adding additional attributes to the new Generic Layer will insure that all necessary details have been recorded for use in maps, reports and summaries.



3. In the **Select Attribute** dialog search for an existing attribute or **Add New**. Select the attribute to add and click **OK**



4. Input the values into the **Data Grid** for the newly added attribute(s)

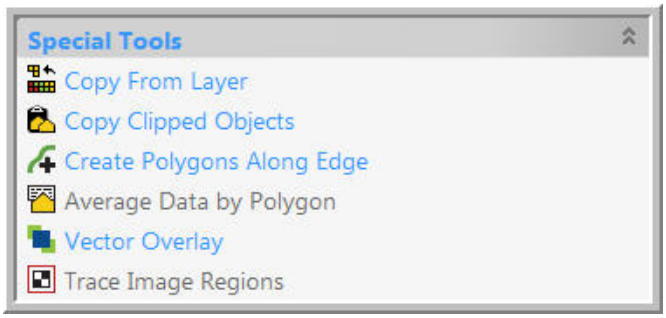


5. After adding all desired objects and attributes click the **Save** button.
6. Assign the appropriate Management information and click **OK**
7. Click **Close** to exit the Generic Editor window

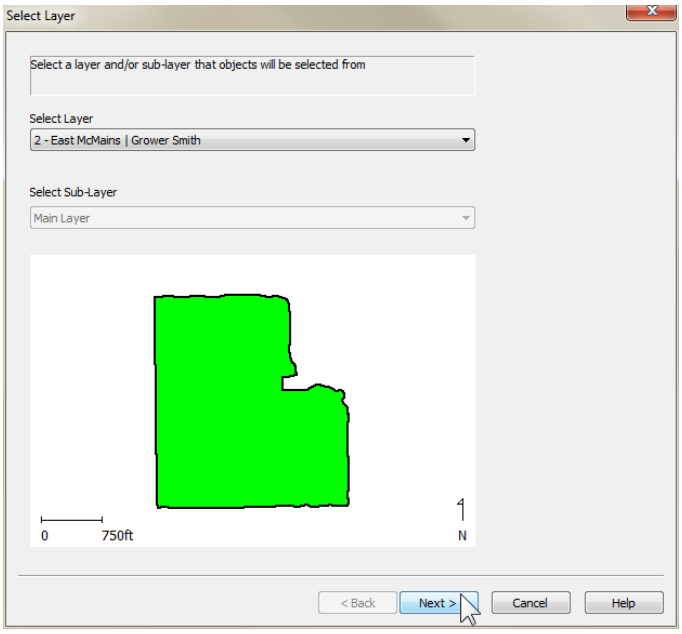
Editing existing objects in the Generic Editor

The Software allows you to copy the reference layer(s) into the new Generic Layer being created so that edits can be made.

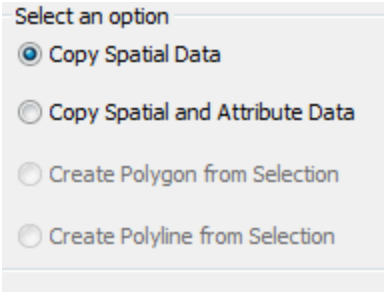
1. To copy a reference layer(s) into the new Generic Layer being created click on the **Copy From Layer** tool available under the **Special Tools** on the right hand side of the screen



2. Select the Layer or Sub-Layer to copy and click **Next**

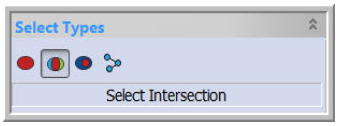


3. Use the **Selection Tools** to select what objects in the reference layer you wish to copy. By default all objects are automatically selected
4. Click **Next**
5. Choose what data you wish to copy from the reference layer into the new Generic Layer

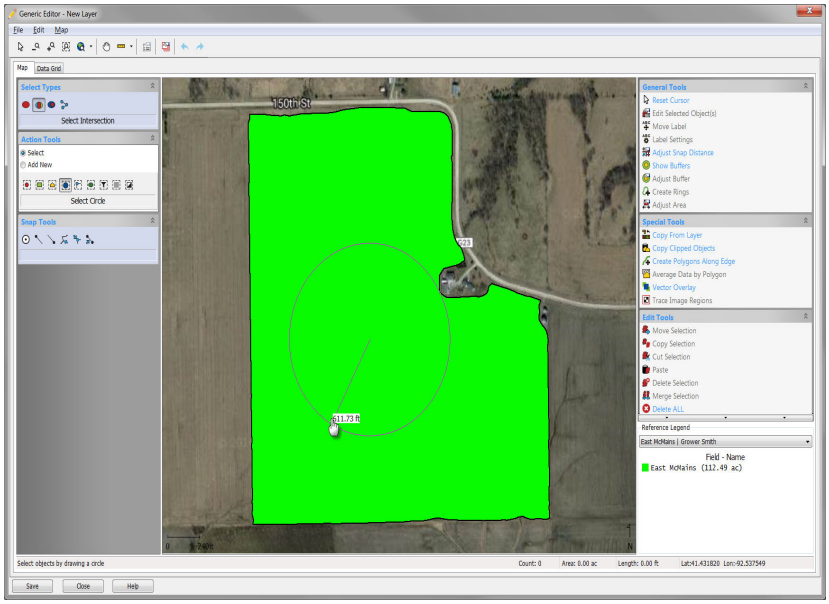


- **Copy Spatial Data**- this option will only copy the spatial location of the objects into the new Generic Layer
- **Copy Spatial and Attribute data**- this option will copy both the spatial location and all associated attributes from the reference layer into the new Generic Layer. For example, if you were creating a copy of a Soil Survey map and wanted to copy all soil attributes, such as Soil Type and Soil Description, into the new Generic Layer, you would want to choose this option

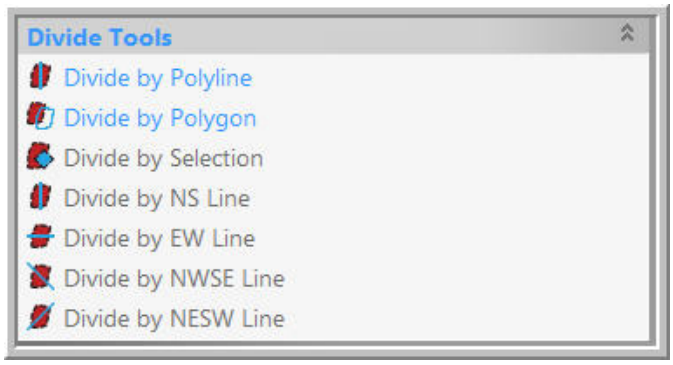
6. Click **Finish**
7. The reference layer will now be added to the new Generic Layer and will be displayed in the Generic Editor window. This layer is now an active map layer and can be modified using the **Selection Tools**, **Snap Tools**, **Edit Tools** and **Divide by Tools**
8. To insert or 'cut' new objects into the existing reference layer click on **Select Intersection**



9. Choose the Selection Tool that best represents the shape or object that you need to add
10. Draw the new object



11. With the object selected click the **Divide by Selection** tool available under the **Divide Tools** in the lower right hand corner. This will divide the original layer by the new object that was added to the map.



This tool allows users to modify existing layers without adding additional area to the map because it is dividing what already exists, not adding additional data to it.

12. Click **Save** after making all necessary changes
13. Assign the appropriate Management information and click **OK**
14. Click **Close** to exit the Generic Editor window

Soil Sampling

In this chapter you will learn how to:

- Create Soil Sampling Sites
- Import Soil Sampling Sites
- Import Electronic Soil Sampling Results

Soil Sampling Sites

Soil Sampling sites can be created and edited in the software or imported from a third party software.

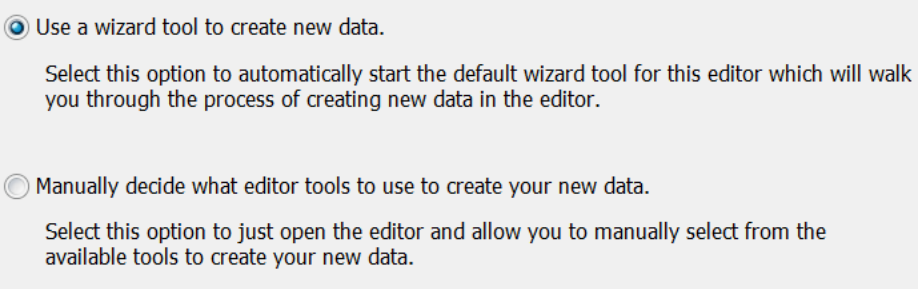
Creating Sampling Sites in the desktop software

In the software, sampling sites can be created in several ways. Two wizards are provided to equally space out each site to a predefined spacing or they can be added individually. Once the sites have been generated, they can then be moved, or deleted if necessary to fit all custom needs.

Sampling Wizard

The Sampling Wizard creates sites based off of an area that is already created. To create sampling sites based off of a Field Boundary, follow these steps:

1. Create a map of the Field Boundary. For this example, use **Grower Smith- Home Farm- East McMains**
2. To enter the Soil Sampling editor, go to **File - New - Soil Sampling Layer** or click on the **New Soil Sampling Layer** icon in the mapping window toolbar.
3. In the Select a Data Creation Method window, select **Use a Wizard tool to create new data** to enter the soil sampling wizard

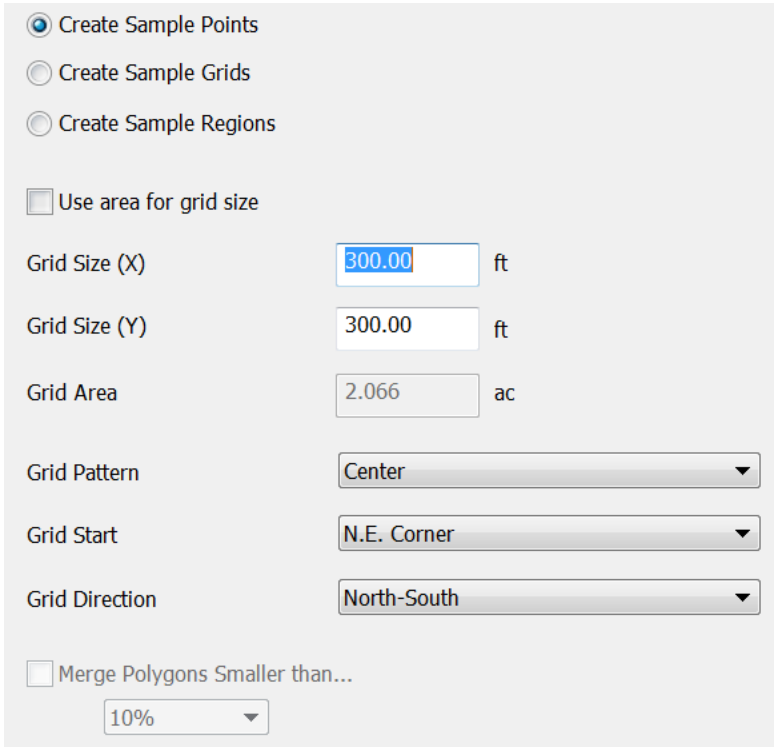


By checking the Do Not show this dialog when starting this editor the Select Data Creation Method window will not be displayed, instead the user will be taken directly into the Soil Sampling Editor window. The Select a Data Creation Method window can be re-enabled by going under **File, Enable Wizard Prompt at Startup.** The soil sampling wizard can be re-entered in the Soil Sampling Editor window by clicking the **Create Samples** tool.

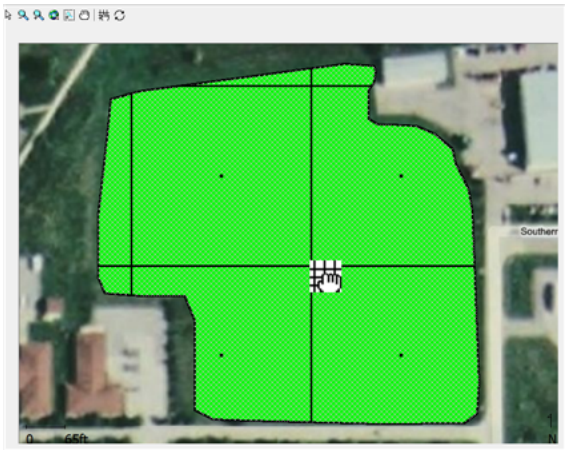
4. In the **Select Layer** drop down menu, verify that the layer the samples are to be generated from is selected. For this example, the Field Boundary should be displayed. Click **Next**

5. To generate samples for the entire field select the field, by default Select All is active, if necessary make any selection changes. The field should be shown in a black cross hatch when properly selected. Click **Next**
6. On the Sampling Parameters dialog box, there are several options to generate sites. For this example, select **Create Sample Points**

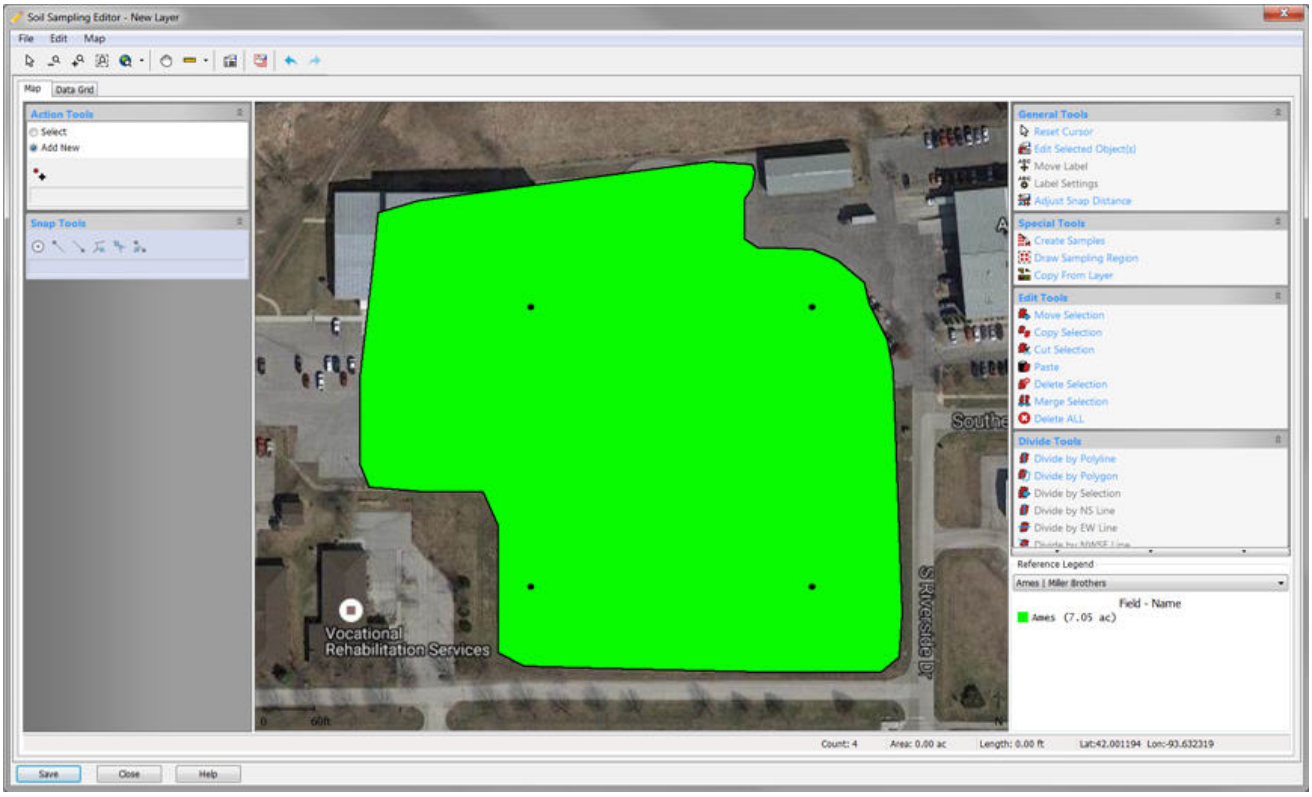
- **Create Sample Points** - Select this option to create sample points
- **Create Sample Grids** - Select this option to create sample grids
- **Create Sample Regions** - Select this option to create sample regions from a selected polygon (s), like a soil type layer or management zones
- **Grid Size** - Grid sizes can be entered for both X and Y, or an area can be entered if the Use area for grid size is checked. For this example, check **Use area for grid size** and type **2.5** for the Grid Area
- **Grid Pattern** - Determines the placement of the soil sampling points in the grid. For this example, choose Center
    - **Center** - Places the sample point in the center of each grid cell
    - **Offset Parallel** - Places the sample point in an alternating position to the left and then the right of the center of the cell
    - **Offset Perpendicular** - Places the sample point in an alternating position to the top and then the bottom of the center of the cell
- **Grid Start** - Determines the corner to start soil sampling
- **Grid Direction** - Determines the direction in which the samples are to be collected
- **Merge Polygons Smaller than...** - Merges smaller polygons (based on a user-defined percentage) to the closest full size polygon using the "nearest neighbor" technique



7. Click **Next**
8. Select the **Shift Grid** icon to adjust the location of the points.



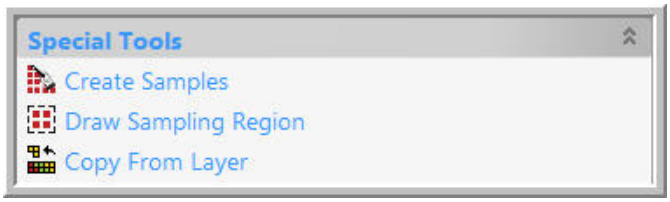
9. **Rotate Grid** will rotate the angle of the points, which can be useful for odd-shaped fields. For this example, it is not necessary to use this tool
10. **Reset Grid** can be used to reset the grid to the default position
11. Click **Finish**
12. Now that the points have been generated, it can be saved to the Management Tree. Click **Save**



13. Verify that the correct location is selected in the Management Tree. For this example, select **Grower Smith- Home - East McMains- Current Year- Soil Sampling - No Product - Sampling-1 - No Product**
14. Click **OK**
15. Click **Close**

Generate Sampling Region

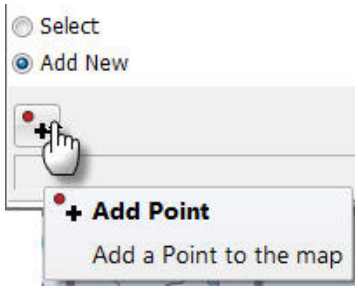
Generate Sampling Region is very similar to Generate Samples, but in this case the area to be sampled needs to be drawn rather than be selected as in Generate Samples.



1. Select the **Draw Sampling Region** button
2. Draw a polygon around the area to be sampled by left-clicking every time a corner needs to be made
3. Right-click when finished
4. Follow the same steps as mentioned above in the section about Generate Samples

Adding Individual Points

In the case of sampling management zones, it may be more useful to add points individually. For this, use the **Add Point** tool

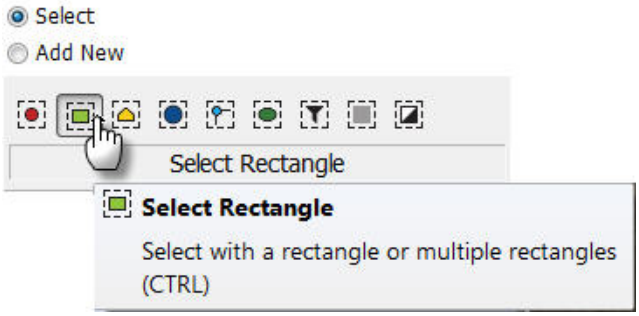


It is recommended that the points are created in the order that they are to be sampled. This way the navigation device will navigate the operator to the points in the most effective manner.

Moving and Deleting Points

After points have been generated from the sampling wizard, it may be necessary to move or to delete a few points to get the best results (i.e. avoiding gullies and waterways). To move or delete a point, the point must first be selected.

1. Choose the selection tool that best fits the need



2. If using the **Select Point** tool, select an individual point. If using one of the other selection tools, draw the shape around the points to be selected. Once the point(s) has been selected, it will be colored red

To select multiple points with the Select Point tool, hold the Ctrl key on the keyboard.

3. To move a point, click the **Move** tool, left click on the map, and drag the point(s) to the desired location
4. To delete a point, click the **Delete Selected** tool

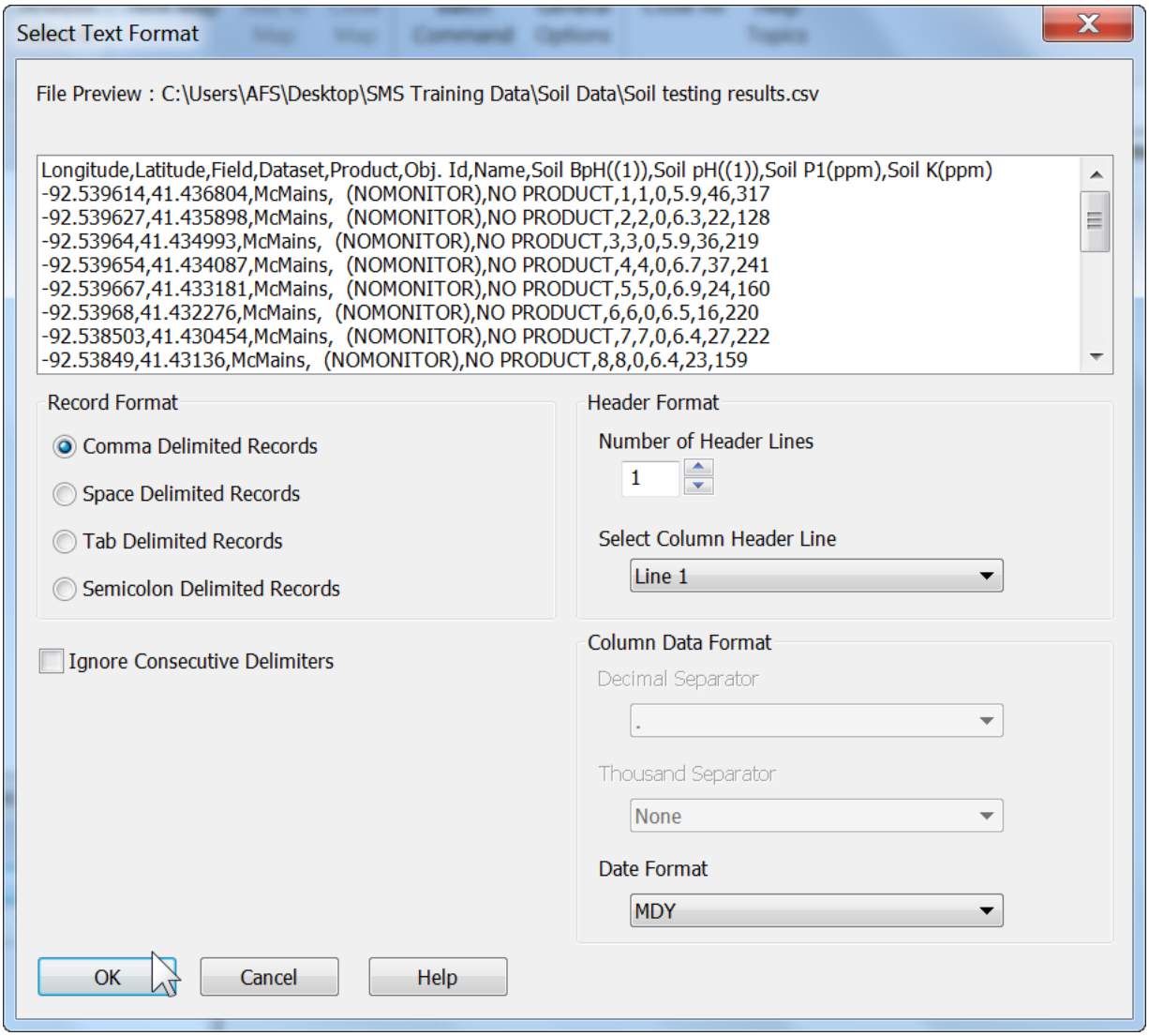
Importing Points

Soil Sampling points can be imported as shape files from a third party software. See the section on Importing Data for more information.

Importing Lab Results

After the samples have been tested, labs can send electronic results which can then be imported into the software.

1. Go to **File - Read Files - Import a File from a Generic Source - Non-Spatial Files (Lab Results)... Select File(s) to Import...**
2. Select the appropriate file. For this example, use **Soil Test Results.csv**
3. Click **Open**
4. **File Preview Window** - Displays the name of the file being imported and a sample of the contents in the file. This allows for an easy way to visually judge what the format settings for the file should be



5. **Record Format**
- **Comma Delimited Records** - Select this format if a comma separates the values in a row
- **Space Delimited Records** - Select this format if a one-character space separates the values in a row. This can also be used if there is an irregular number of spaces between values in a row
- **Tab Delimited Records** - Select this format if there is a consistent number of spaces between each value in a row
- **Semicolon Delimited Records** - Select this format if a semicolon separates the values in a row
6. **Number of Header Lines** - Select the number of header lines that the file contains. A header line is usually a text description of the contents of each column in the file. Setting this will allow the display of the header information on the attribute selection dialog so that the columns are named properly for easier assignment
7. **Select Column Header Line** - Select the specific header line, from the number of header lines set above, that contains the column header names to use as reference when assigning the columns of data in the import file to attributes in the system
8. **Ignore Consecutive Delimiters** - Select this item if the file contains multiple delimiters in-between values in a row. An example would be if a file contained two sets of commas between values in a row and there was not intended to be any value represented between the commas

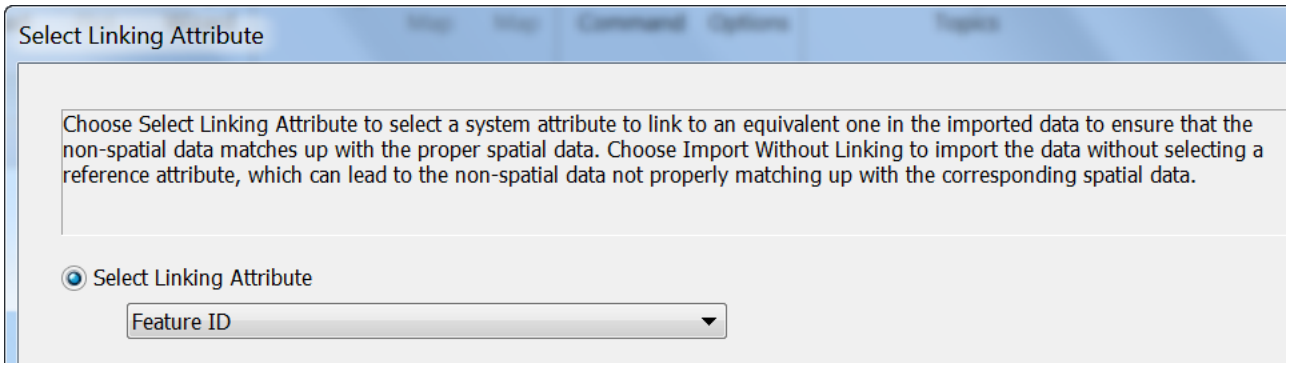
9. **Decimal Separator** - Select either a comma or period as your separator type that numeric values in your import file use to indicate a decimal place. This option is not available for comma delimited records
10. **Thousand Separator** - Select either a comma, period, hyphen, or none for the symbol used to indicate the thousand place separator in numeric values in your import file. This option is not available for comma delimited records
11. **Date Format** - Select the formatting of date information, if your import file contain date values. For data in your file to be considered a valid Date it is assumed that is either formatted using a dash, forward slash, or period symbol to separate the date values
12. For this example, leave all items on the **Select Text Format** dialog box at the default selections and click OK
13. Select **Soil Sampling - Grower Smith- 2013** and any other item necessary to match the fields that were grid sampled
14. The **Edit Data Filter Results** dialog box shows the Soil Sampling layers that were found from the filter on the previous screen. Click **Finish**

To delete an unwanted field from the selection, highlight the Field name and click Delete.

15. Select the Field Name Column option that best fits the need. For this example, choose **Select Field Name Column** and choose **Field ID** from the pick list
    - **Field Names Not Available** - Select this option if the lab results in the file belong to only one Field
    - **Select Field Name Column** - If a Field name column exists for the file and if the lab results for more than one Field are in the file, and then use this option
16. Click **Next**
17. Link the Fields by highlighting the appropriate names and clicking **Add**

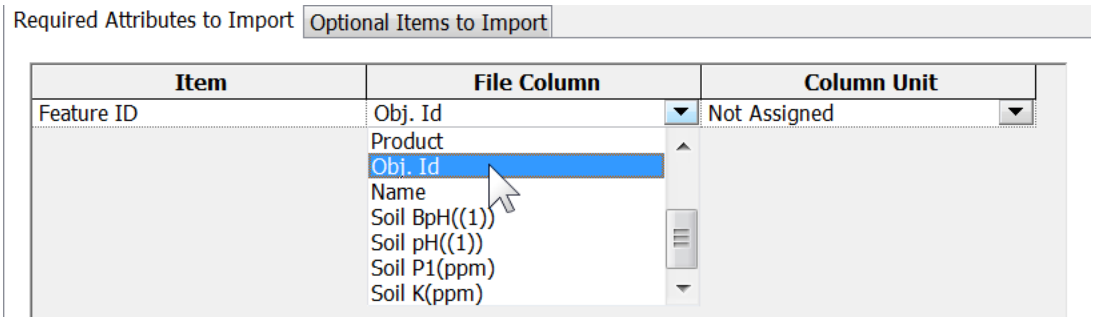
The Field(s) under Available Fields are the Fields that are in the Management Tree and were selected on the Select Data Filters dialog box. The Field(s) under Import Fields are the Field names that come from the lab results file. If Field Names Not Available was selected, then Entire File will appear under Import Fields.

18. Click **Finish**
19. Select the linking attribute. For this example, use **Feature ID**



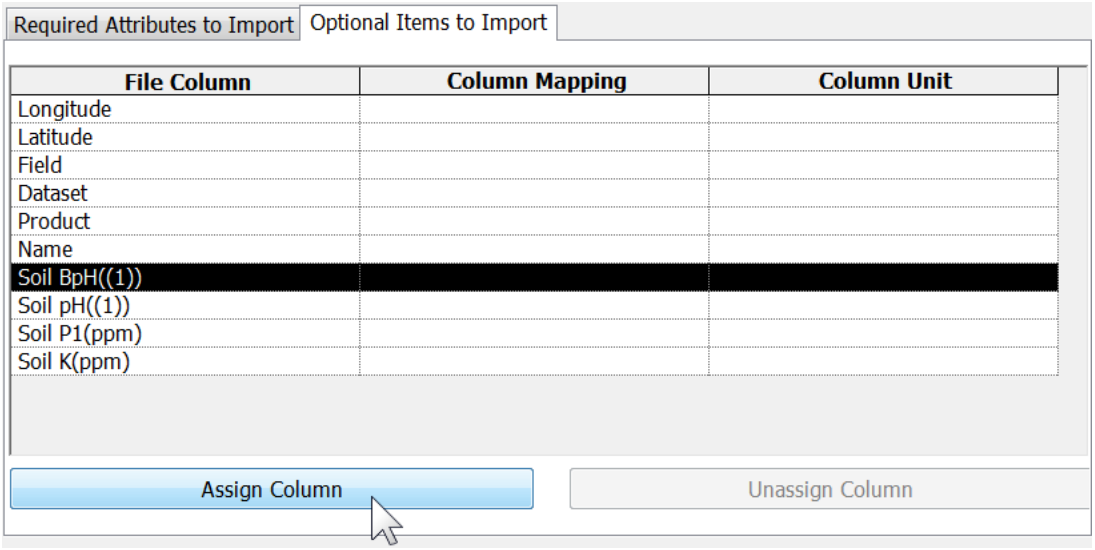
The linking attribute is what the software uses to link "Point 1" in the sampling layer with "Point 1" in the lab results

20. Click **Next**
21. On the **Select Column Attributes** dialog box, each column must be individually selected and linked with the appropriate attribute in the software. Start by looking under the Required Attributes to Import tab and assign the Item of **Feature ID** to **Obj ID** under File Column



The rest of the attributes can be found under the Attribute Group called Soil Sampling. Also, when selecting the Units, these are the units that the lab reported the numbers in the electronic file. For this example, all units will be in % or in PPM.

22. Next click on the **Optional Items to Import** tab and highlight another attribute to link. For this example select **Soil BpH** and then click **Assign Column** and link to **Soil BpH.** Assign the remaining attributes of **Soil pH**, **Soil P1**, and **Soil K**



23. Next, click on **Save Template** and type a descriptive name for the template and click **Save**

Templates can be loaded by clicking Load Template. This will automatically assign all of the columns when the template was created; assuming that all of the columns are in the same order as the original file.

24. Click **Finish**

All of the attributes have now been successfully brought into the software and linked to the set of soil sampling points created earlier.

Mapping Grid Soil Sampling Results

This section will show how to set the Grid Size, Interpolation, and Clipping Options for a soil sampling map. As a result, the map will default to a gridded Soil pH map. To learn more, see the section on Edit Options.

1. Create a new map of a soil sampling layer. For this example use **Grower Smith - Home - East McMains - 2013 - Soil Sampling**
2. Select **Soil pH** from the Attribute List. If a different attribute is desired to be the default attribute to appear when creating a new soil sampling map, choose that attribute at this time
3. Select the **Grid Map** icon
4. Click on the **Edit Options** icon
5. Click on the **Attribute Options** tab

6. Click on the **Grid/Contour/Clip** tab
7. Change the Grid Size as desired. For this example, use **50 x 50**
8. Change the Interpolation as needed. For this example, use **350** for the Maximum Distance and **0.1** for the Distance Ratio
9. For the Clipping Options, select **Clip to Field and Fill Values to Boundary Edges** (This is the default selection when working with a field that has a frozen field boundary established).
10. Once the map appears as desired these settings can be saved for all Soil Sampling maps by clicking **Save Spatial Attribute Settings...**
11. Select **Current Attribute and Layer** and **Current Operation Default**

Selecting Current Attribute and Layer saves the settings for all of the attributes in the layer (i.e. Soil pH, Soil OM, etc.) Selecting Current Operation Default saves the settings for all Soil Sampling layers.

12. Click **OK** twice

Crop Plans

In this chapter you will learn how to:

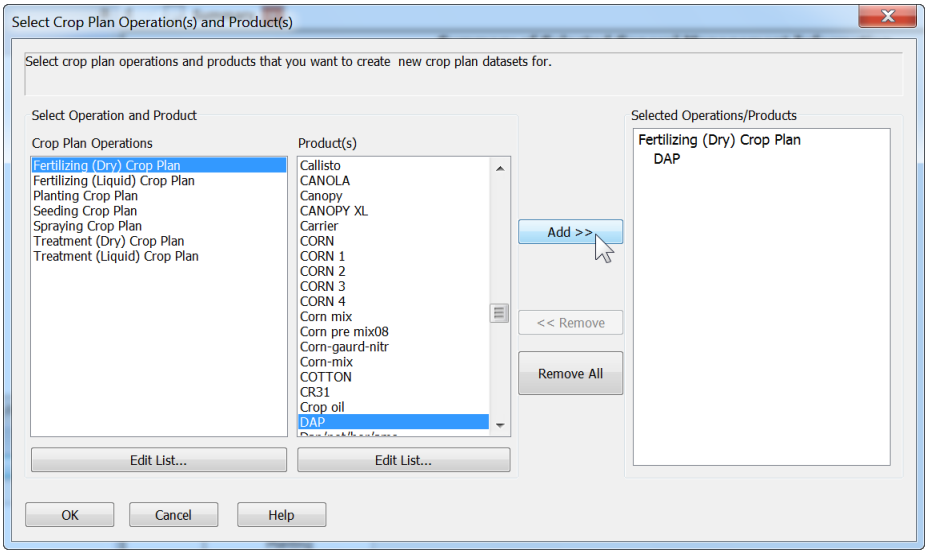
- Create a crop plan layer

Crop Plans can be used for several different things. They can be used as a form of record keeping as far as what products and rates were applied in each field. This is particularly useful when applying flat rates across an entire field. Once a crop plan has been created, it can in turn be exported out as a prescription and used in a variety of controllers. The values of attributes associated with a crop plan (i.e. Yield Goal, Build Goal (pH, N, P, K)) can be used in equations used to make variable rate prescriptions. This is particularly useful when each field has a specific Yield Goal or Build Goal for pH, N, P, and/or K. These can also be used in other functions such as Comparison and Correlation Analyses in the Advanced Software for further analysis.

Creating Crop Plans

Before starting, verify that all fields that Crop Plans are going to be generated for have frozen field boundaries by clicking on the Field name in the Management Tree. If this is not the case, read about boundaries in the Field Boundaries chapter.

1. Start by going to **File - New - Crop Plan(s)**
2. On the Select Crop Plan Operation(s) and Products(s) dialog box, start by selecting the operation that best meets the need. For this example, use **Fertilizing (Dry) Crop Plan**

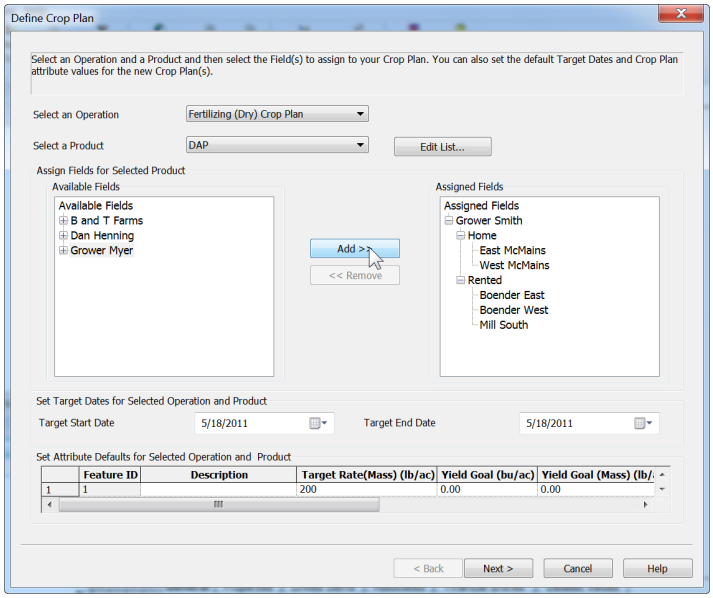


3. Select the appropriate product(s). For this example, select **DAP**.

> Use the CTRL key on the keyboard to select multiple products at one time.

4. Click **Add**. The Operation and Product should now appear under Selected Operations/Products
5. Repeat the previous three steps as necessary and click **OK**
6. On the Define Crop Plan dialog box, verify that the correct Operation and Product appear in the drop down menus at the top of the screen. For this example, verify that Fertilizing (Dry) Crop Plan and DAP are selected
7. Select the appropriate field(s) from the Available Fields list and click **Add**. For this example, select **Grower Smith** and add over all of the fields

8. Verify that the correct Fields appear under the Assigned Fields list. Fields that were accidentally selected can be removed by highlighting and clicking the **Remove** button
9. Under Set Target Date for Selected Operation and Product, enter the date range for when this product will be applied



The date range entered here will show up in the Calendar viewer (Advanced only).

10. Enter in the appropriate information for the attributes under Set Attribute Defaults for Selected Product. Information that can be entered here are Description, Target Rate, Yield Goal, and Build Goals (pH, N, P, K)

Target Rate, Yield Goal, and Build Goal values can be referenced when writing equations in the Equation Based Analysis tool(Advanced only).

11. Repeat the previous five steps for additional operations and products and click **Next**
12. Verify the appropriate Year is selected on the Management Selection dialog box. For this example, use the default value
13. Click **Finish**

Crop Plans can be created one field at a time by creating a map of the field by clicking on the Field name in the Management Tree and then going to File - New - Field Crop Plan Layer.

Guidance

In this chapter you will learn how to:

- Create guidance lines

The software can import guidance patterns from many different types of monitors as well as other GIS programs. You can also create new guidance lines, and edit existing lines using the Guidance Editor in the software. Refer to the Reading in Files chapter for details on reading in guidance lines from field displays.

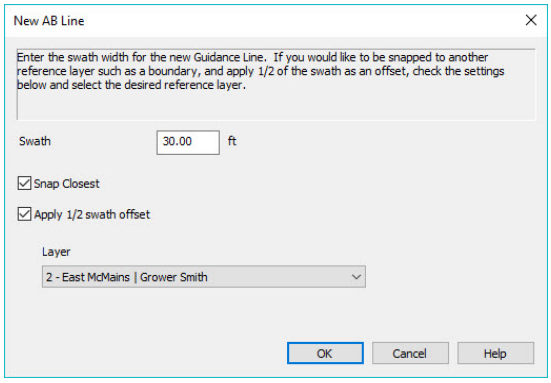
Creating guidance lines

The software has the ability to create guidance patterns based off of a region, an existing guidance pattern, logged passes or along a boundary edge. SMS Advanced users can create Terrain Based Guidance Lines for any field that has a regenerated 3D grid.

Manual Creation

To manually create a new AB line, follow these steps:

1. Create a map of the data you wish to base the new line on.
2. To enter the guidance editor, go to **File - New - Guidance Layer** or click on the **New Layer** icon and choose **New Guidance Layer**
3. In the Select a Data Creation method window select **Manually decide what editor tools to use to create your new data.**
4. Select **Add New** from the **Action Tools** dialog on the left, and click on the **New AB** icon.
5. In the New AB Line dialog that opens, enter the swath width, snap and 1/2 swath offset selections and choose the layer to base the new AB line off of.



6. Use your mouse cursor to click on the location of the A point, drag to the desired length and click again to set the B point. With Snap Closest enabled, as your mouse is moved towards the edge of the polygon, the cursor will snap to the edge of the polygon, allowing you to effortlessly create a new line at a set distance from the selected object. To adjust the snap distance, click on the Adjust Snap Settings icon under the General Tools dialog on the right.

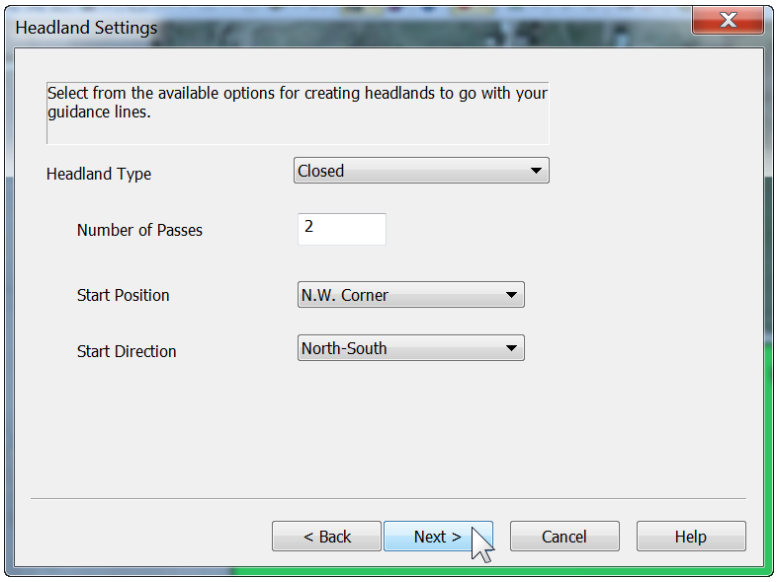
Guidance Wizard

To generate a guidance pattern, follow these steps:

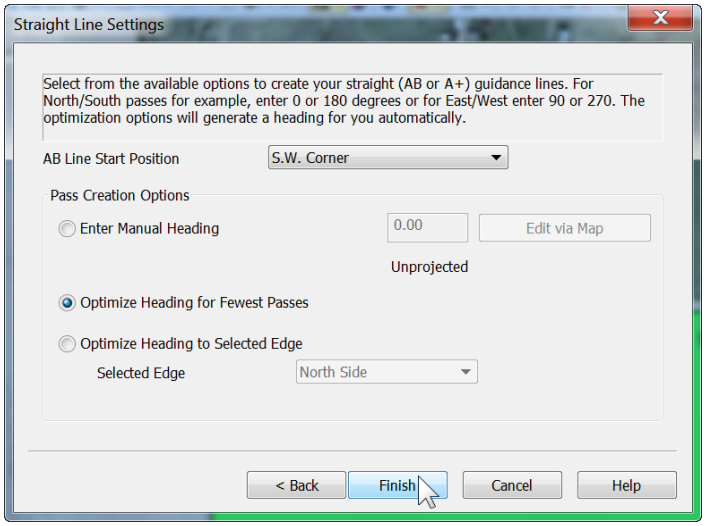
1. Create a map of the data you wish to base the new pattern on. For this example, use **Grower Smith - Home - East McMains Field Boundary**
2. To enter the guidance editor, go to **File - New - Guidance Layer** or click on the **New Layer** icon and choose **New Guidance Layer**
3. In the Select a Data Creation Method window select **Use a wizard tool to create new data** to begin generating guidance patterns
4. In the Select One of the Methods Below to Create a Guidance Line(s) dialog, select the option you wish to use. There are four possible options, although some may not be available depending on the reference layer you have open.

- Create Region Based Guidance - This method will step you through a wizard that will load a field boundary as the basis for the guidance. You will be prompted to select the desired boundary layer, and then giving options for Headland passes, as well as interior passes. These settings can be modified under the “More” button of the pattern settings area. Lines will only be as accurate as the boundary.
- Create Guidance from Existing Guidance Lines - If you have existing Guidance lines imported, and you want to move them to another field, or modify the points along the line (vertices). Caution should be used with moving points, as abrupt heading changes will translate to the vehicle in the field which may have undesirable effects
- Create Guidance from Logged Pass - This will allow you to select a previously logged pass, and copy that as a guidance line. This can be beneficial as if you had a line that was previously recorded it will allow you to make this into a Guidance line. The accuracy of the line will depend on how accurate the signal was used when you created the logged data. Further editing can be done with moving the points along the line. If it has less than 1 ft of deviation, they will be created as a straight AB, otherwise they will be created as a curve.
- Create Guidance Along Boundary Edge - This tool will allow you to select a side of a field, and create guidance lines based on the edge of a polygon. This will allow you to move the start/end points of the line to allow you to have a customized line. You can add lines on interior polygons as well such as waterways or terraces. This will be based on how accurate the boundary edge reflects the farmable portion of the field.

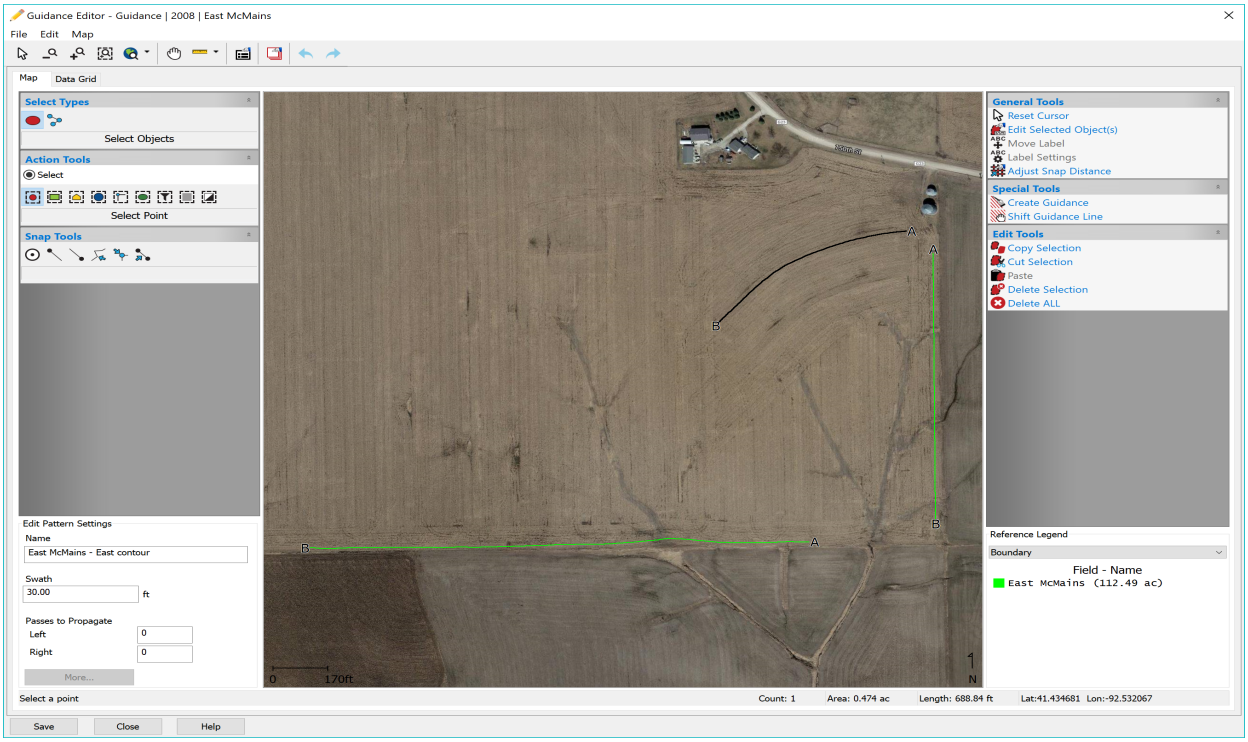
5. Click **Start Guidance Line Creation**
6. On the Guidance Settings screen, enter the swath width of the implement that will be used. For this example, enter **60**
7. Click **Next**
8. In the Headland Type drop down menu, select the type of headland pattern the field will have. For this example, choose **Closed**
9. Enter the number of passes in the headlands. For this example, enter **2**
10. Select the starting position and direction for the headlands pattern. For this example, choose the **N.W. Corner** and **North-South** direction



11. Click **Next**
12. In the Straight Line Settings screen, select the location for the AB Line Start Position. This would be where the first main pass will be made in the field. For this example, select **S.W. Corner**



13. To save the layer to the management tree, click **Save**

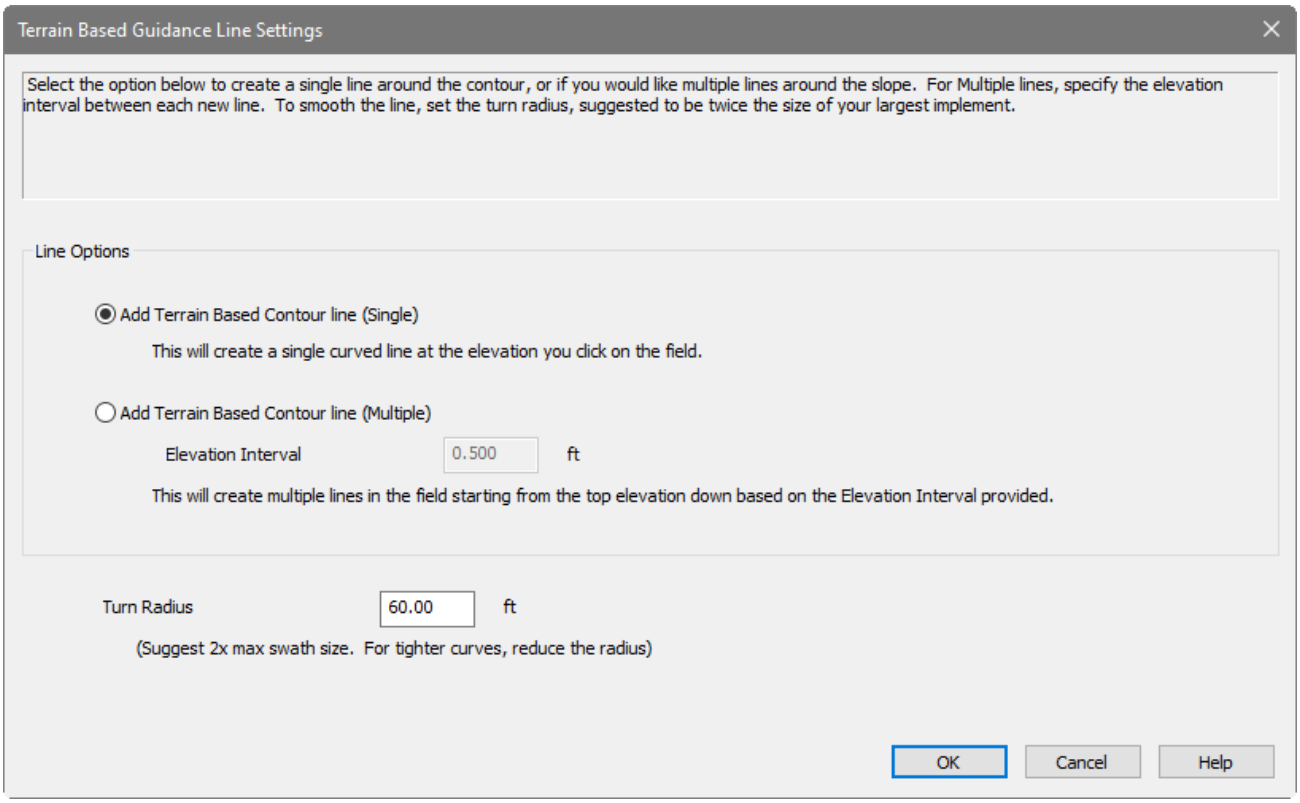


14. Verify that the correct location is selected in the Management Tree. For this example, select **Grower Smith - Home - East McMains - Current Year- Guidance - Guidance -1 - No Product**
15. Click **OK**
16. Click **Close** to exit the Guidance Editor

Creating Terrain Based Guidance Lines

SMS Advanced users can generate terrain based guidance lines for their fields, which is helpful in areas with rolling terrain, and for some particular crop types, such as rice where levees need to be created. Before using the terrain based guidance tools, the *field must have a 3D surface regenerated*.

1. Create a map of the field that you wish to generate terrain based guidance lines for and then go to **File - New - Guidance Layer.**
2. Select the **Grower - Farm - Field** and then **OK**.
3. Choose **Manually decide what editor tools to use...** and then **OK**.
4. Select **Terrain Based Guidance Lines** from the Special Tools menu.
5. The Terrain Based Guidance Line Settings dialog will open where you can select the **Line Options** you wish to use.



- **Single** - Selecting this option will create one curved line at the elevation you select.
- **Multiple** - Selecting this option will create multiple lines, at the interval you define, starting from the highest elevation and working down.

6. Define the **Turn Radius**, which will be used to smooth the guidance line being generated. We suggest entering a value that is two times your largest swath/implement size, but for tighter turns, you can reduce the radius.
7. Click **OK**.
8. If you selected to generate a single guidance line, you will now place your line in the desired location by moving your mouse over the map, viewing the preview of the line and then left clicking to place the line.
9. If you selcted to generate multiple guidance lines, they will be displayed based on the interval you entered.
10. Terrain based guidance lines can be edited just as all other guidance lines are in the software, using the **Edit and Special Tools**.
11. Click **Save**, select the appropriate management settings, then **OK**, to save these guidance lines to your management tree.

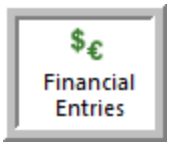
Financial Tracking

In this chapter you will learn to:

- Enter product purchases, commodity sales, operational expenses and income, field level expenses and income and tile expenses.
- View financial entries in reports and Profit/Loss Analysis datasets

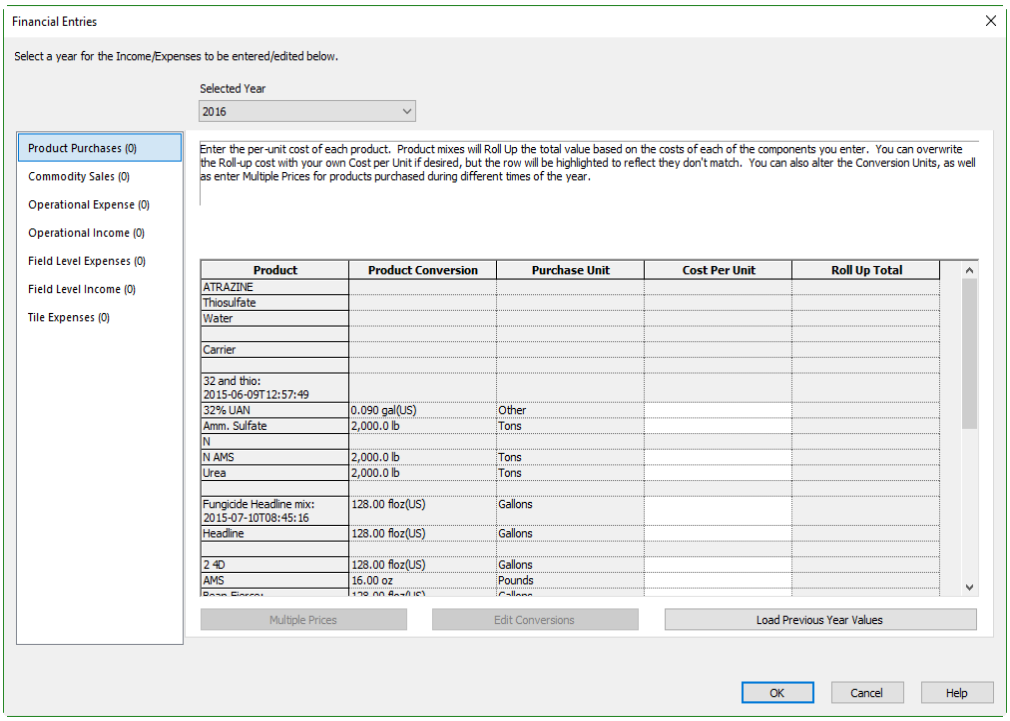
Creating Financial Entries

You can enter income and expense entries for your entire operation with ease using the Financial Tracking tools available in the software. After entering this information, you can view in Summaries, Reports, Maps and SMS Advanced users can include in Profit/Loss Analysis datasets.

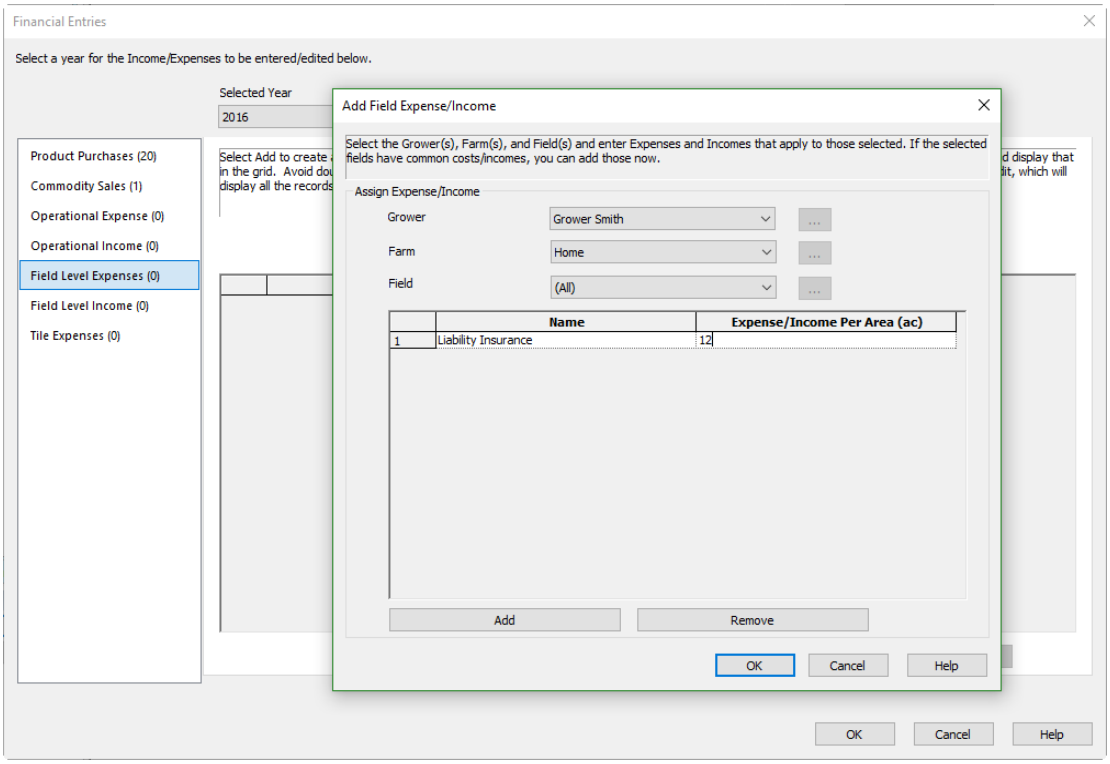
1. To begin, click the **Financial Entries** icon in the main toolbar 

or go to **File- New - Financial Entries**.
2. The **Financial Entries** dialog will open. The list of available items to enter are displayed on the left, and include:
   - Product Purchases
   - Commodity Sales
   - Operational Expenses
   - Operational Income
   - Field Level Expenses
   - Field Level Income
   - Tile Expenses

   The number displayed in parentheses indicates the number of existing financial entries previously entered for the year currently selected.
3. Use the **Selected Year** drop down menu to select which year to input financial details in. Every year that exists in the project you are currently working in will be displayed. Select the year to work in.
4. After selecting the year, the details displayed in the lower half the dialog will automatically update. The software automatically filters the information displayed in the dialog to only products applied or harvested during the selected year.



5. The information displayed is dependent on the type of entry you have selected on the left. Regardless of which type of entry you have selected, you will only need to enter information into the white cells. The gray cells will automatically populate/update based on the information you enter.
    - **Product purchases** - Allows you to enter the per unit cost of each product.
        - For products that were used in a Product Mix, simply enter the cost of each component, and the software will calculate total cost of the mix automatically. You can manually enter the cost of the total product mix, but if the total does not match the costs of each product mix, the cell will be highlighted in yellow.
        - If you purchased the same product multiple times and paid a different amount each time, use the **Multiple Prices** button to enter the start and end date for each price.
        - To adjust the product conversion being used, click **Edit Conversions**. This button will only be active when working with a product that does not have a Product Usage/Form entered.
        - If you routinely buy the same products each year, and wish to load the costs entered in the previous year, click on the **Load Previous Year Values** button.
    - **Commodity Sales** - Allows you to enter the average price per bushel for each Crop Type or Hybrid sold.
        - **Enter Sales By** - Use this drop down to change between entering prices on a crop type or product basis.
        - **Grain Sale Type** - Use this drop down to change the units between volume (bushels) or mass (pounds).
    - **Operational Expense** - Allows you to enter operational expenses on a per area, per count or per distance basis. The table is automatically populated with each operation that occurred in the selected year.
        - **Per Area** - Use this entry type to enter fees billed on a per acre basis, such as custom harvest or application where you paid a flat rate per acre covered.
        - **Per Count** - Use this entry type to enter fees billed on a per count basis, such as soil sampling where you paid based on the number of samples pulled.
        - **Per Distance** - Use this entry type to enter fees billed on distance covered, such as tile installation, where you pay per foot of tile installed.
    - **Operational Income** - Allows you to enter operational income on a per area, per count or per distance basis. The table is automatically populated with each operation that occurred in the selected year.
    - **Field Level Expenses** - Allows you to enter a field level expense for a single field or group of fields.
        - Click **Add** and the Add Field Expense/Income dialog will open.
        - Use the drop down menus at the top to select the **Grower**, **Farm(s)** and **Field(s)** you would like to enter expenses for.
        - Click **Add**. Enter a **Name** and **Expense per Area**. Multiple entries can be added by clicking the **Add** button again. Click **Remove** to clear one (if a row has been selected) or all (if no row is selected) of the lines of data that have been entered. Click **OK** once all entries have been made.



- **Field Level Income** - Allows you enter a field level income for a single field or group of fields. The steps to enter a field level income are the same as entering in a field level expense.
- **Tile Expenses** - Allows you to enter the cost per foot/meter for all tile sizes that were installed in the currently selected year. This table will be empty if no Tile Plans/Installed Tile exist in the year you are working in.
    - **Cost per Length** - Enter the amount paid per foot of tile installed for each of the Tile Products displayed.

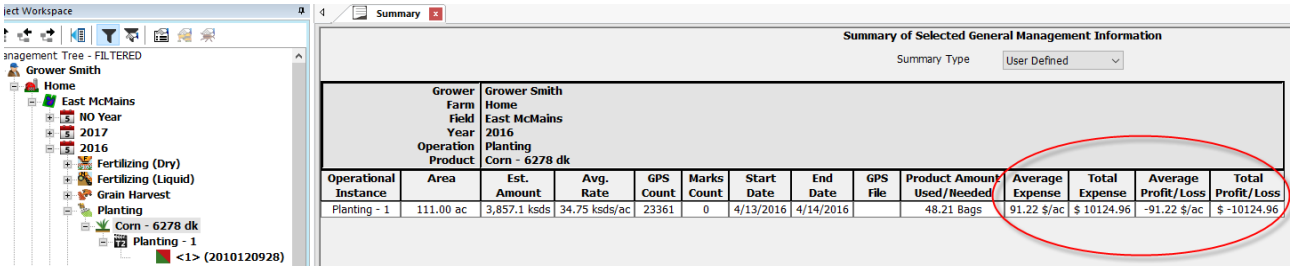
The Financial Entry screen can also be accessed through the Management Tree, by right-clicking on the level of the tree and you wish to add an entry too and selecting Financial Entries from the pop up menu.

Viewing Financial Entry Data

There are multiple ways you can view the financial information you have entered in the software, including as text only summary and report data, in maps, and SMS Advanced users can include the data in the Profit/Loss Analysis.

Summary Data

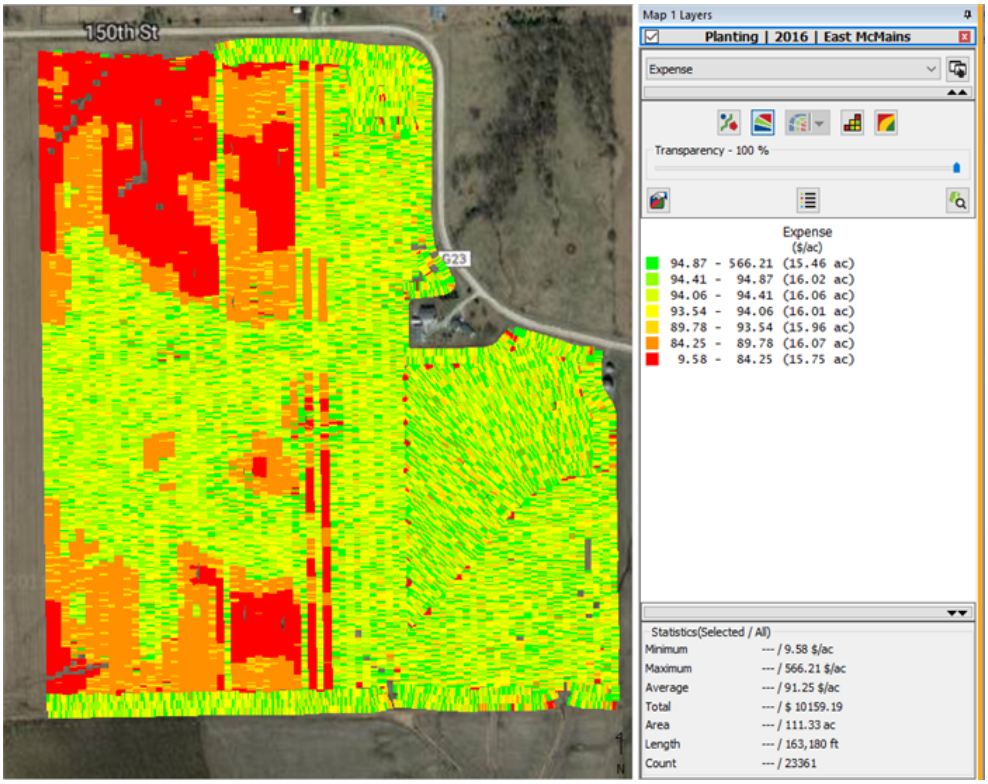
To view a financial tracking entry in the Summary window, select the Operation, Product, Instance or Dataset that contains the information you wish to view, and the Summary window will display the **Average Income/Expense, Total Income/Expense, Average Profit/Loss and Total Profit/Loss.**



Viewing financial entries in the Summary window will ONLY display the details of the currently selected dataset(s) and is not a comprehensive list of all income and expense entries you have generated.

Mapped Data

To view a financial tracking entry in the Mapping window, select the Operation, Product, Instance or Dataset that contains the information you wish to view and click **Create New Map**. Use the Attribute/Property drop down menu to view **Expense** or **Income** in the map & legend.



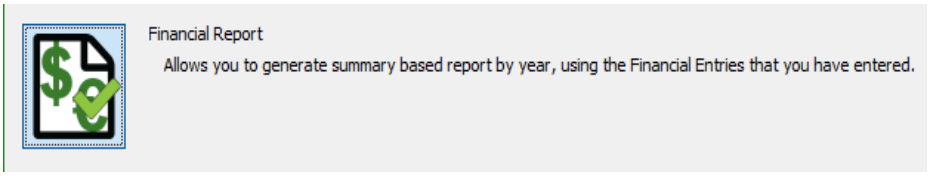
Viewing financial entries in the Mapping window will ONLY display the details of the currently selected dataset (s) and is not a comprehensive list of all income and expense entries you have generated.

Financial Tracking Report

To view all financial entries you have added to the software, you will want to create a Financial Tracking Report.

1. To begin, click the **Reports** 

icon in the main toolbar, or go to **File-New-Reports**
2. Click to select the Financial Report, and click **Create a Financial Report**



3. The **Profit/Loss Report Options** dialog will now open.
   - **Choose the Profit/Loss Filter Level**, which will determine how the report output will be grouped.
   - Use the **Income/Expense Projections** entry boxes if you wish to apply an anticipated increase or decrease to any financial entry you previously entered.
   - The **Data Source** drop down menu allows you to choose if your report will be based on Monitor Summary information, Manual Entries or Spatial Data Records.
   - If you wish to use shares to split income/expenses, check the **Apply Share %** box and then Add the **Share Name**(s) and **Share Percentages** in the following dialog.
   - Click **Next**.
4. In the **Select Data Filters** dialog, use the drop down menus to select the **Year**, **Grower**, **Farm** and **Field** you wish to include in your report and click **Next**.
5. Remove any datasets you don't wish to have included in the report and click **Finish**.
6. The **Financial Tracking Report** will open in the main mapping window. This report can be modified, printed or exported as HTML by right-clicking in the report window.

Financial Tracking Report

Analysis Description
Generates a Profit/Loss report for a selected field and year.

Year:	2005
Grower:	Grower Smit

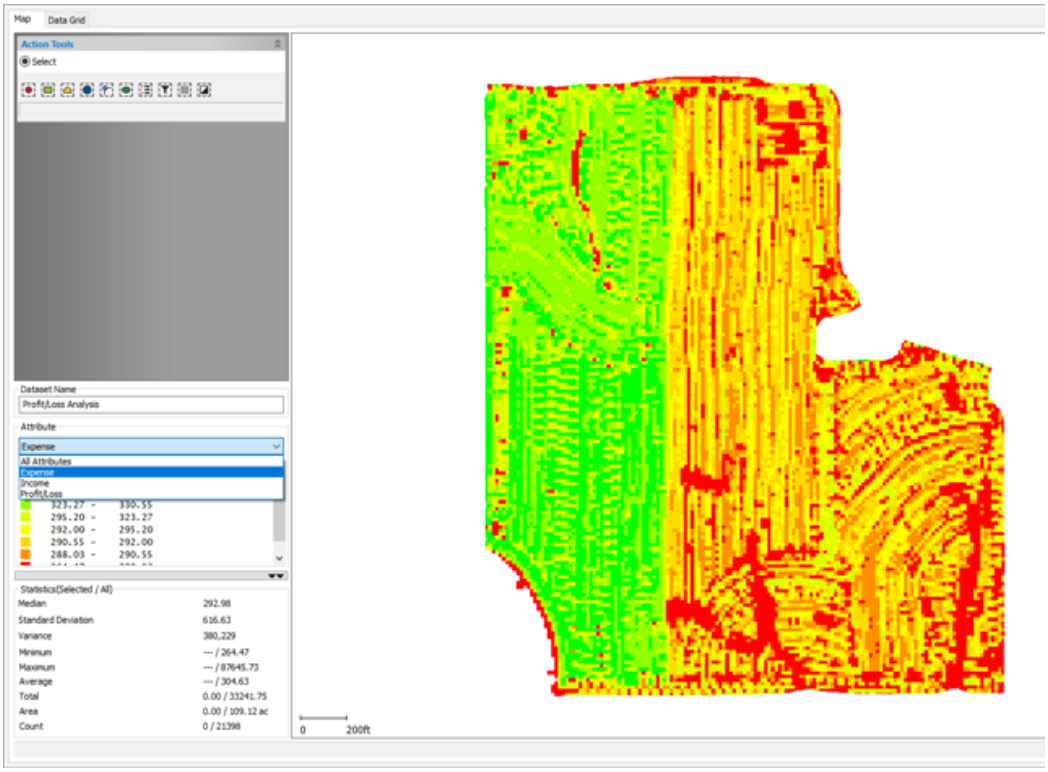
Farm	Expense/Income Type	Expense/Income Entries	Avg. Expense/Incom per Unit	Total Amount	Profit/Los $
Home	Commodity Sales	Corn Sales McMains	2.41 $/bu	18,616 b	44846.10
		(All)			**44846.10**
	Field Level Expense	Land Rent	-140.00 $/ac	112.25 a	-15714.50
		Misc Expenses	-50.00 $/ac	112.25 a	-5612.32
		NH3	-40.00 $/ac	112.25 a	-4489.86
		Spraying	-30.00 $/ac	112.25 a	-3367.39
		Tilllage	-5.00 $/ac	112.25 a	-561.23
		(All)			**-29745.30**
	Field Level Income	Gov't Payment	30.00 $/ac	112.25 a	3367.39
		(All)			**3367.39**
	Operational Expens	Harvest Operational Expen	-16.00 $/ac	117.56 a	-1880.96
		Planting Operational Costs	-10.00 $/ac	116.74 a	-1167.43
		(All)			**-3048.40**
	Product Purchases	Seed - M7	-100.00 $/1	17.77	-1777.26
		(All)			**-1777.26**
	(All)	**(All)**			**13642.53**
(All)	**(All)**	**(All)**			**13642.53**

Profit/Loss Analysis

To view all financial entries as spatial data, SMS Advanced users can generate a Profit/Loss Analysis

1. To begin, click on the **Analysis Wizard** icon in the main toolbar.
2. In the **Select Analysis Type to Run** dialog, select **Profit/Loss Analysis** on the left.
3. There is no setup required for this analysis. Select either **Single Field** or **Multiple Fields** at the bottom.
4. In the **Select Data Filters** dialog, use the drop down menus to select the **Year**, **Grower**, **Farm** and **Field** you wish to include in your report and click **Next**.
5. Remove any datasets you don't wish to have included in the report and click **Next**.
6. Verify the **Grid Size** is accurate and click **Finish**.

7. The Analysis Editor window will open displaying the new map that includes these attributes as well as Statistics for the field:
    - Expense
    - Income
    - Profit/Loss



8. Click **Save** and select where to save this new dataset at in the management tree.

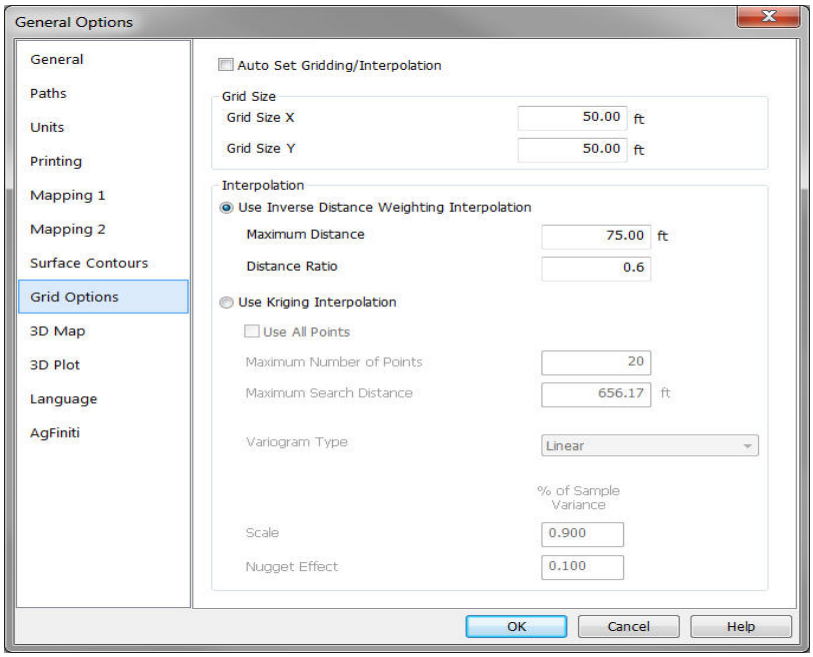
Interpolation

You will learn how to modify interpolation settings to accurately display and analyze data . In this chapter you will learn:

- Difference between interpolation types
- How to adjust interpolation settings
- Setting the default interpolation type

Interpolation

Interpolation is a way of averaging data between known and unknown geographic areas. There are two types of interpolation that are offered in the software: Inverse Distance Weighing (IDW) and Kriging. This section will discuss the differences between the two types.



Inverse Distance Weighting

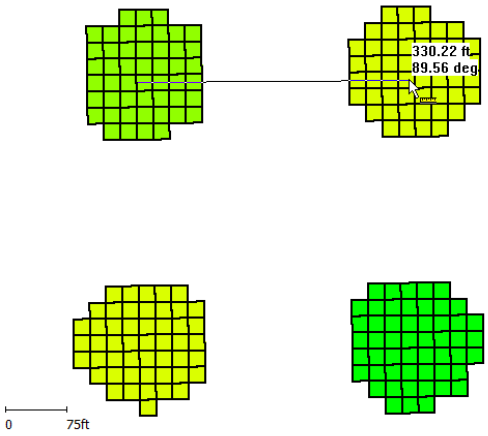
There are 4 settings for IDW that will change the appearance of the map:

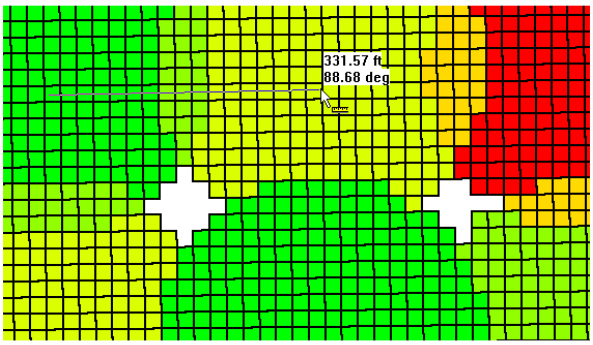
- **Grid X and Grid Y** - This is the size of the grid that will be displayed on the map
- **Maximum Distance** - This is the extent to which data will be averaged from a center point
- **Distance Ratio** - This represents the impact that information found at the max distance location will have in the areas near the center point

In some types of Data, such as Yield data, there is a dense amount of information that is present (i.e. data is logged continuously every 2 seconds and is solid across the field (no gaps or missing data unless un-harvested). In those types of situations, there is not going to be a great amount of variance by changing the above values. It is suggested that when performing analysis functions on yield data, to use smaller settings for the Maximum distance, and ratio values (Grids 50 x 50; Max distance 50-75 ft.; ratio .5 -.7).

For data that is sparse, the Distance and Ratio values may need to be adjusted. The distance should be as long as the longest distance in the dataset. So if a field has been grid soil tested on 2.5 acre grids, the Max distance should be at least 330 ft. If this is not long enough, blank areas may appear in the map when created, or not represented when analysis is performed. See below for example.

The 20 x 20 grid is used to demonstrate the areas blending together, larger grids like 50 x 50 are more practical for mapping, as the smaller the grid size- the longer processing will take.

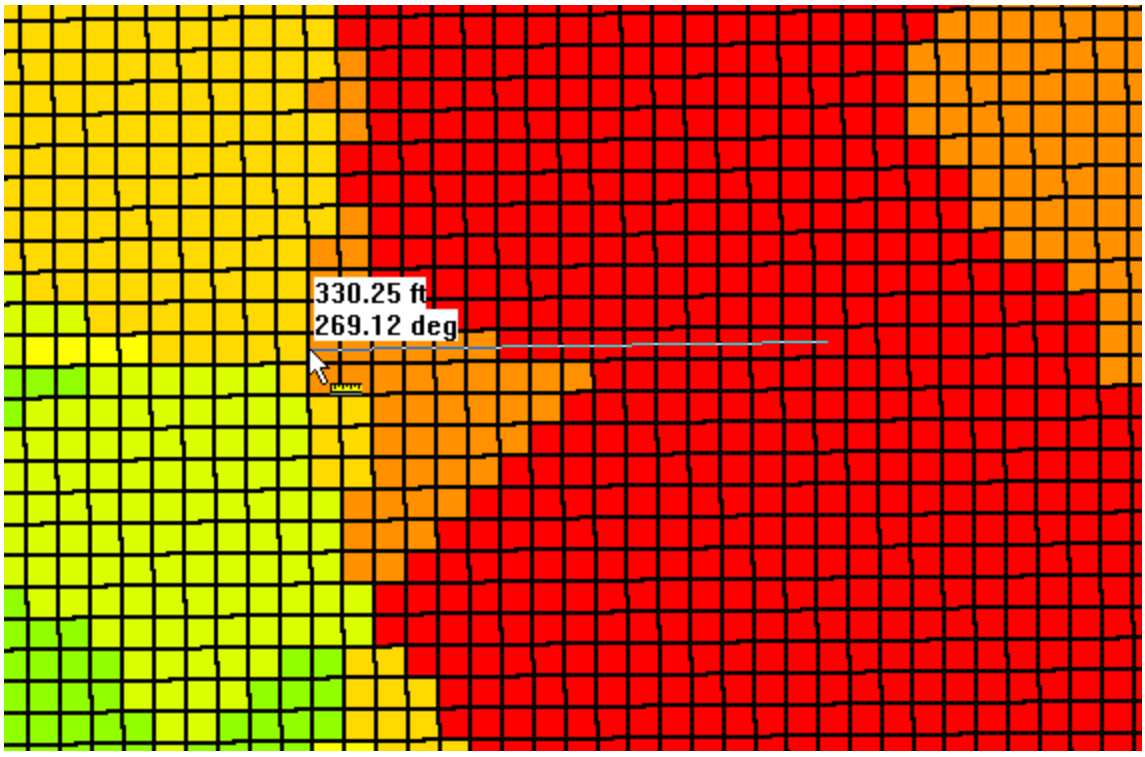




Above, Grid Soil Testing 2.5 ac centers

Max distance 80 ft. Max distance 200 ft.

In the above maps, notice how the distance at 200 ft. is not quite large enough to cover the entire map, the centers of each grid point are 330 ft. apart. Also notice that the areas are starting to blend together, and average their values where the 200 ft. diameters are intersecting.

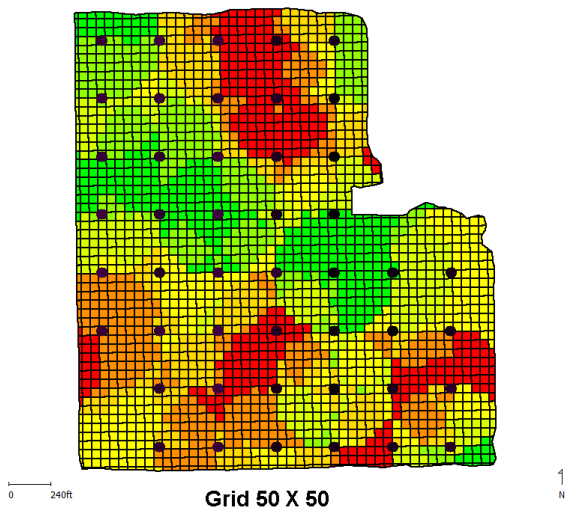


Max distance 350

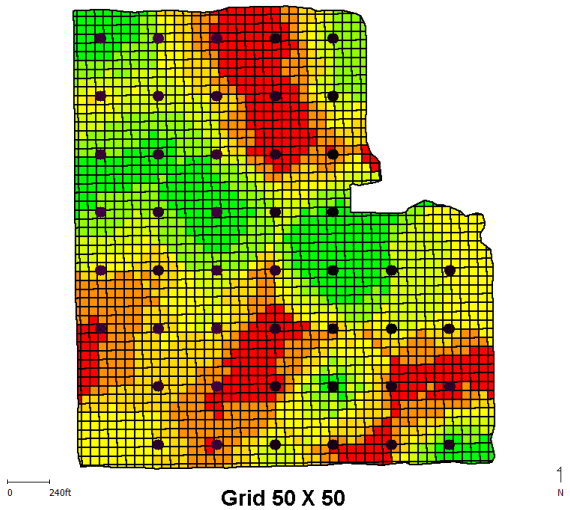
Ratio .1

With these settings, the map is completely covered, and the blending is a bit more pronounced between the sites.

The distance ratio will affect the blending, and determine how much influence is assigned from one point to another. See the full maps below to get a better view of how it works. The range for the distance ratio is .1 - 1. The black dots represent where the sampling points are.

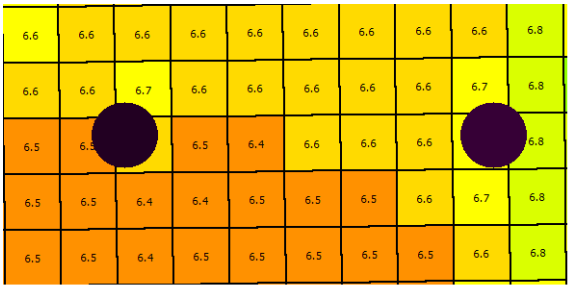


Grid 50 X 50
Max Distance 350
Distance Ratio .1



Grid 50 X 50
Max Distance 350
Distance Ratio .9

The larger the distance ratio, the more blending will be performed on the data, and the more influence from sites further away will be applied to a local soil testing site.



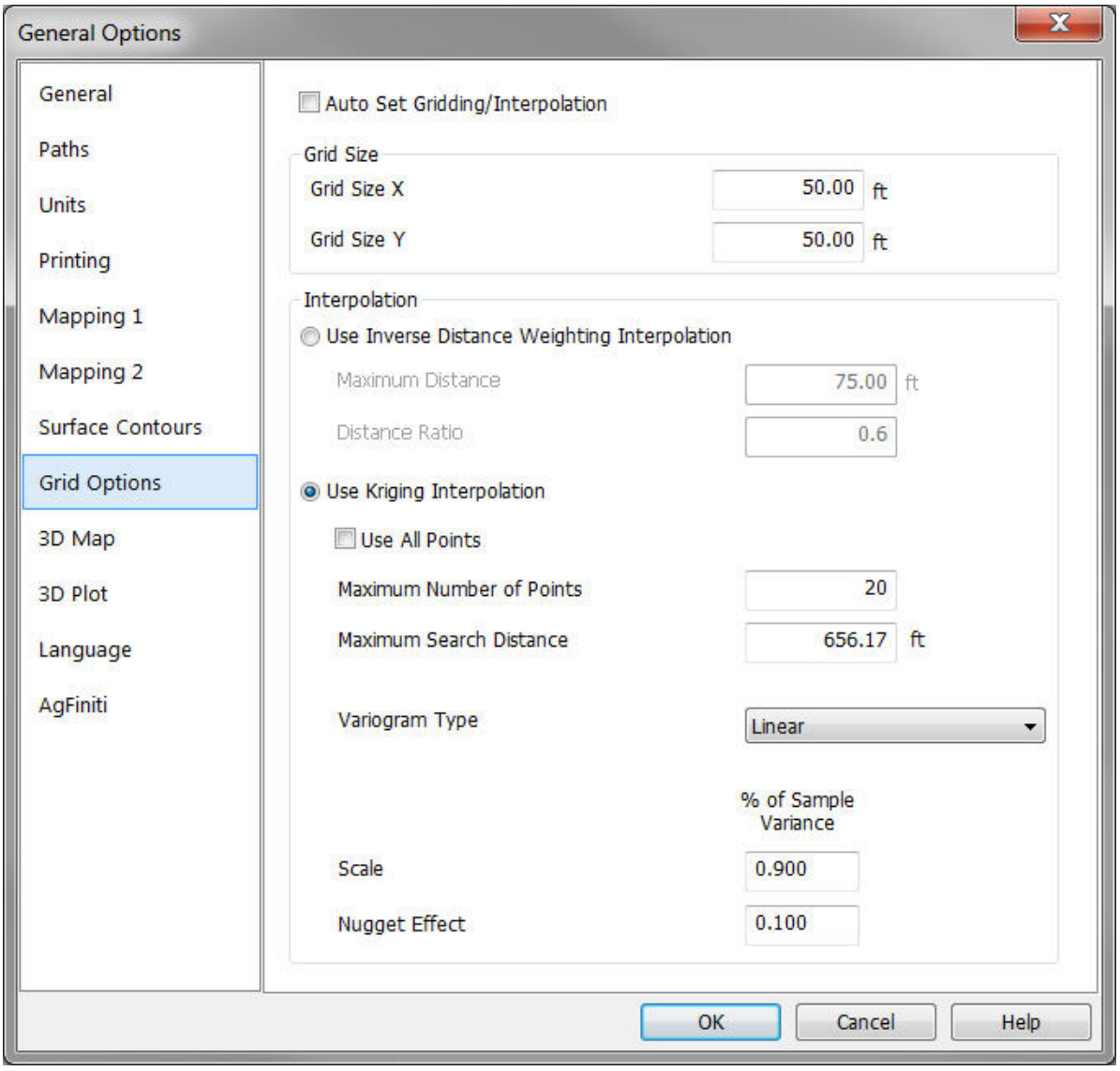
Grid Size 50 X 50

Grid Size 150 X 150

The larger the grid size used, the more abrupt the changes will be from one site to another. Smaller grids will offer smaller transitions, creating a smoother appearance to the map.

Kriging

Kriging is another statistical analysis method that takes data points, and gives several options for adjusting to each dataset. This will sometimes create maps that are more visually appealing, but each map will likely have specific settings to display the map accurately. Thus having default settings can be misleading, as each map may need to have its own settings. The logic that is used should be tested using several different maps, to decide what options work the best for your operation.



- **Max number of points** - This entry specifies the maximum number of points that will be used to interpolate a value for a given location
- **Maximum Search Distance** - This entry specifies the maximum distance that will be searched for points to be used in the interpolation for a given location

Model Variogram Settings

Range

This entry specifies the distance that the kriging process will use in the variogram and the point at which data beyond the entered range will no longer correlate with the dataset. Most often the Range is set at the same distance as the Maximum Search Distance.

Variogram Type

Automatic - Uses the sample variogram as the variogram model with a bin classing that is equal to the entered grid size (with linear interpolation within bins to make the results look relatively smooth). This method may provide results that look more appealing when mapped but it may not produce results that are as true to the input data. Please examine the results carefully and make sure you are comfortable with the results.

Scale

This entry specifies the height of the model variogram above the Y-intercept, which is specified by the Nugget Effect value. You should try to achieve a balance where by the sum of the Scale and Nugget Effect always equal 100%.

Nugget Effect

This entry specifies the Y-intercept for the model variogram. The nugget value if not set to zero acts as a smoothing factor. It is most often used when you know that your dataset contains values that could skew the results displayed on the variogram. A higher nugget effect value will smooth over anomalous data points that do not accurately represent the data that you are trying to interpolate.

Reset Scale and Nugget Button

Click this button to reset the Scale and Nugget Effect values back to their defaults - 100% of sample variance for the Scale and 0% for the Nugget Effect.

Variogram Chart

Displays a chart of Variance versus Length for a selected variogram model and the actual dataset being interpolated. From this chart, you can infer how well your dataset correlates to the variogram model. If your data correlates well with the model, then the interpolation should produce results that should accurately model your dataset. If your data is plotted in a horizontal position with very little to no vertical slope over the variogram length then your data does not correlate very well and will probably not produce reliable results to use in your analysis and decision making processes.

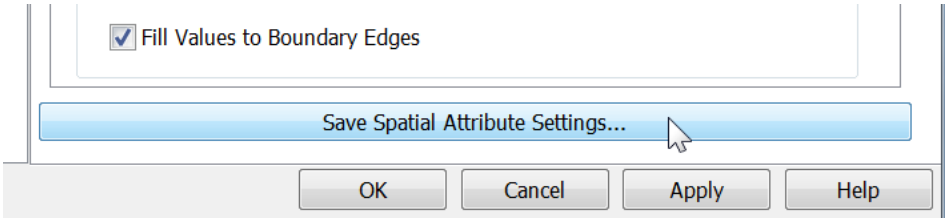
Automatically Set Gridding and Interpolation

Check this box to let the software determine the proper interpolation method based on the operation and function you are working with. Using this option will mean that sparse datasets (less than 1,000 GPS points) will default to Kriging, and dense datasets will use Inverse Distance Weighting. Even with this option selected, you can still default back to operational datasets when running analysis functions.

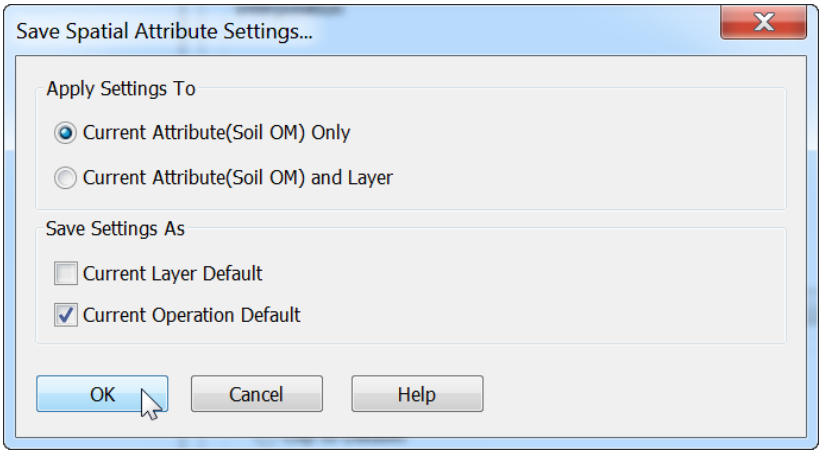
Saving Default Settings

Map Level

After all the settings have been adjusted, and a few maps have been compared, the settings that worked the best, can be established as defaults. There are two places this can be done- at the operation level for all related layers (i.e. all soil testing maps) and a global setting under General Options which will be applied to the entire project.

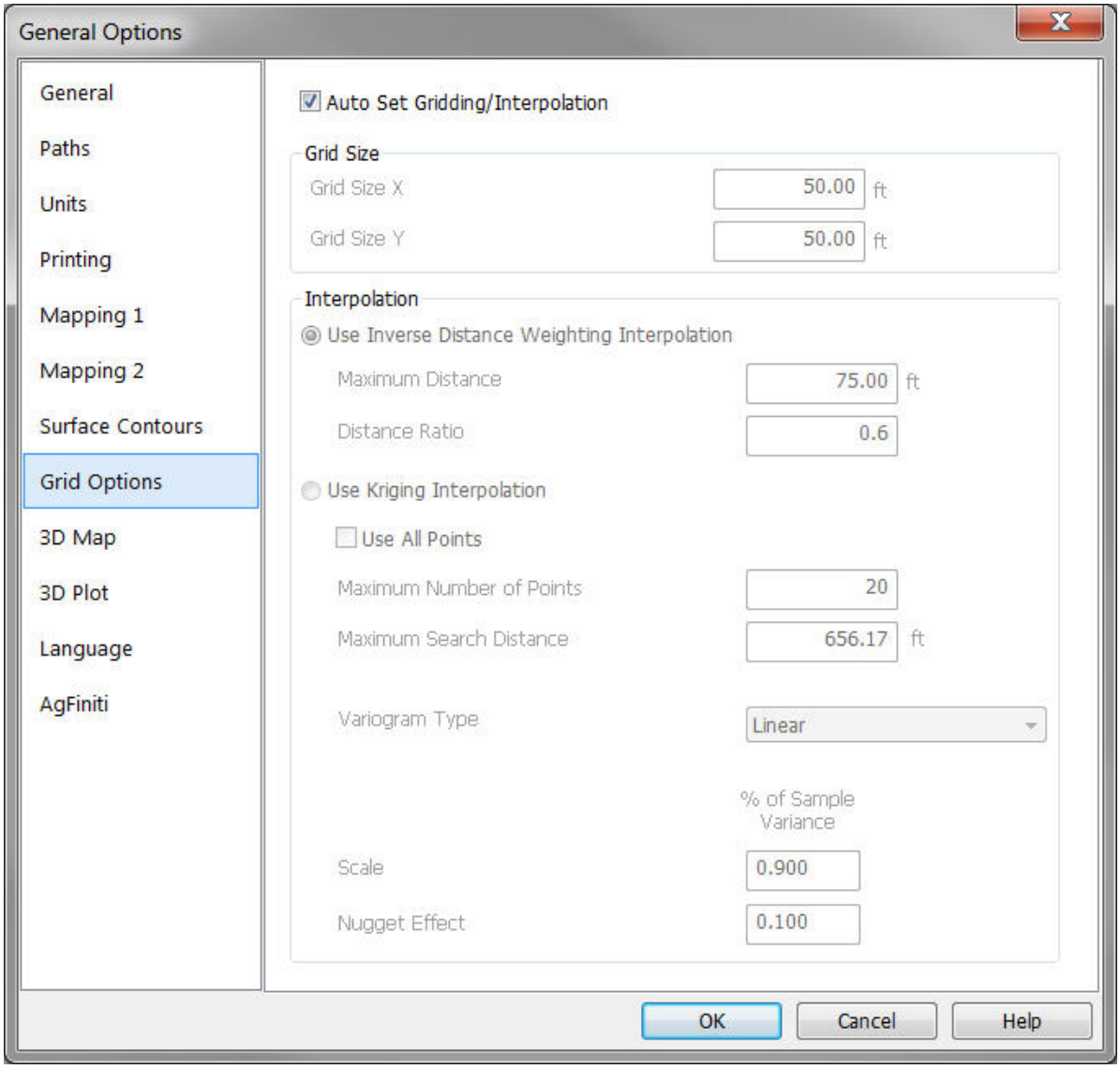


At the bottom of the Edit Options, Grid/Contour/Clipping tab is an option to save settings. Options of how settings are applied are as follows:



- **Current Attribute () Only** - Just the attribute showing will have these settings
- **Current Attribute () and Layer** - All attributes will have the same settings (recommended)
- **Current Layer Default** - Just this layer will have the above settings
- **Current Operation Default** - All layers of this type (i.e. Soil Sampling) will have the same settings (recommended)

Global Setting



Under the Tools, General Options, Grid Options contains the settings that will be applied if new analysis operations are created.

Multi-Year Averages Analysis

Multi-year averages analysis is used to average, or normalize, data from multiple years into one map layer. In this chapter you will learn:

- What data is typically used for multi-year averages
- When to use the data normalizing options
- How to evaluate the significance of the data that is generated

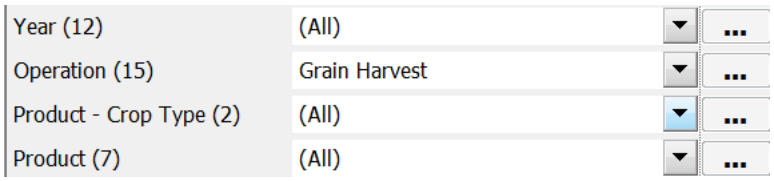
This tool is commonly used to take multiple years of similar data (usually yield data) and combine it into one map that can be used for establishing management zones, or expected yield of a crop raised in this field before, or to create a fertilizing prescription based on the crop removal rate from previous years.

Multi-Year Average Analysis

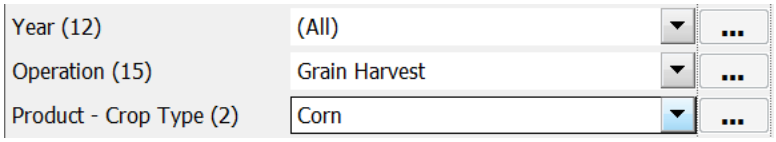
1. To begin this analysis, click on the **Analysis** menu, and select the **Analysis Wizard**
2. From the Select Analysis Type to Run window, click on the **Multi-Year Averages Analysis** button. Click **Add** to create a new analysis
3. In the Name/Description window name the multi-year analysis
4. The Select Data Filters screen will provide settings for the data that will be used for the multi-year average map. This will allow selecting multiple years, specific or all crops, or any year that had a particular crop grown

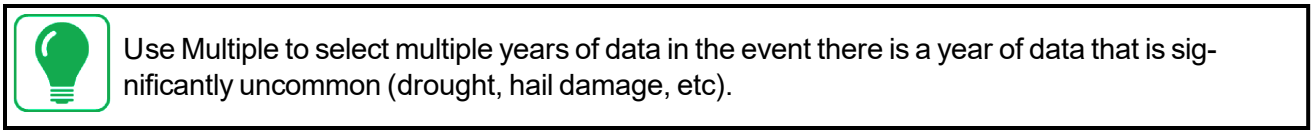
Examples of the filter options

This will select all years that have Grain Harvest information regardless of crop

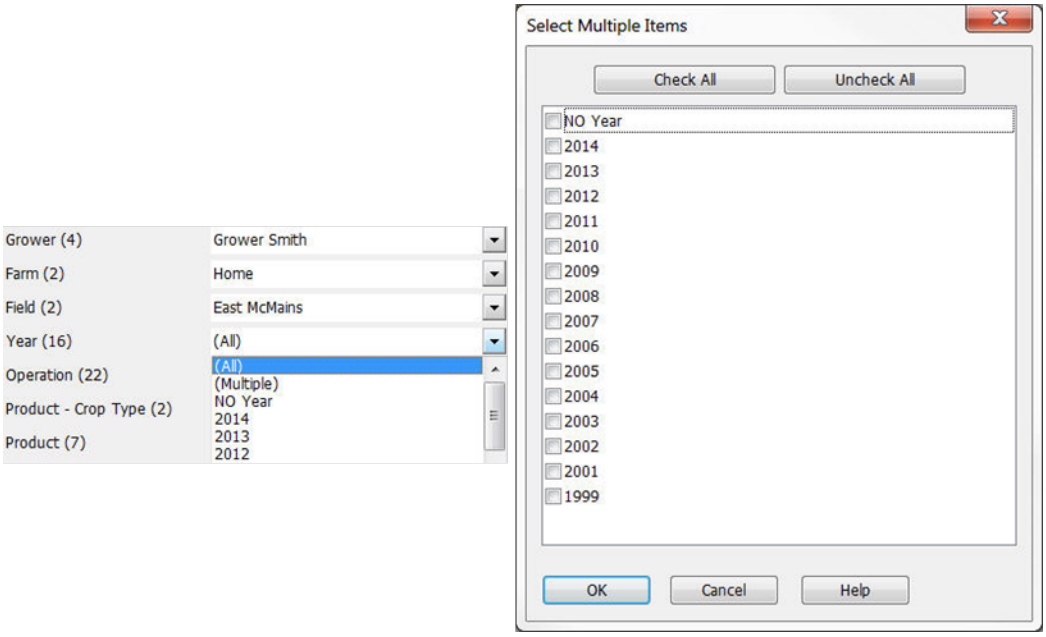


This will select all years that have corn data

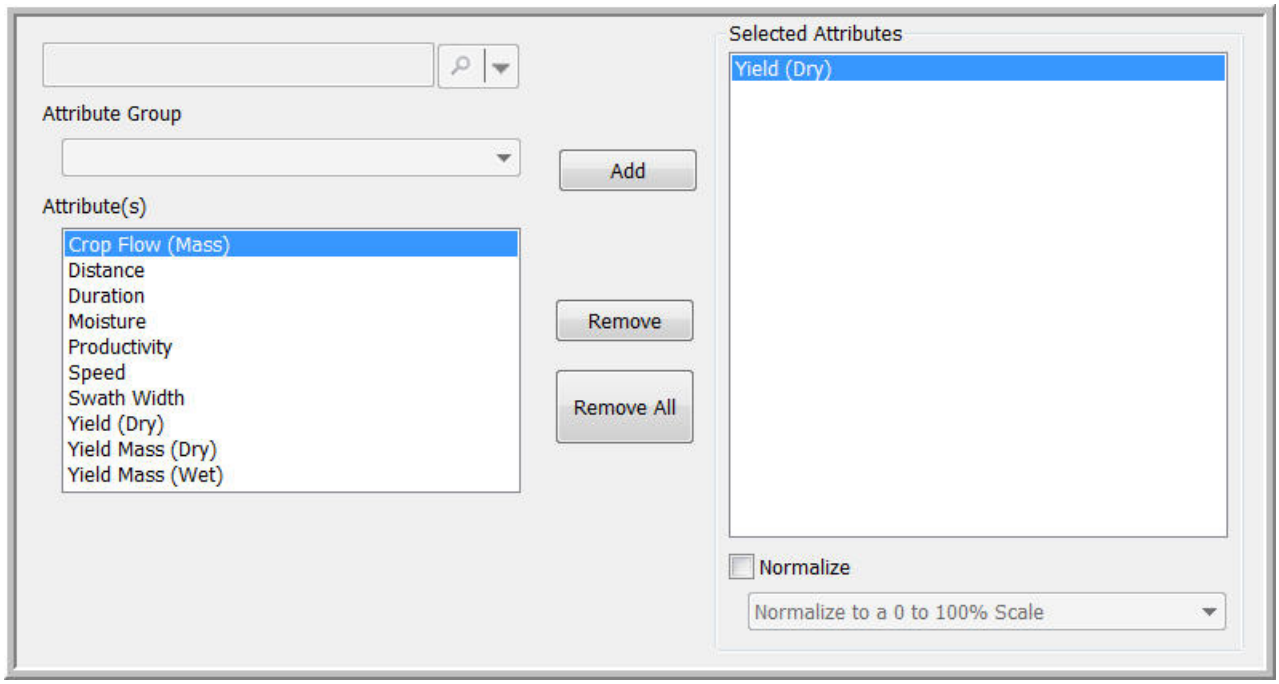




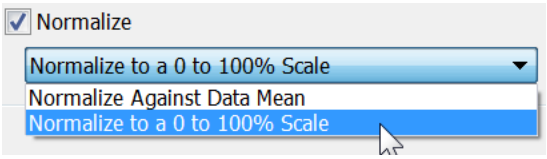
Use Multiple to select multiple years of data in the event there is a year of data that is significantly uncommon (drought, hail damage, etc).



5. After selecting the appropriate information, click **Next** to continue. The following screen will give a pre-view of the selected data, if all looks appropriate, click **Next** again
6. In the Aggregate Options dialog, select the attribute that needs to be averaged. Typically for yield data, **Yield(Dry)** is the attribute used



7. On the right-hand side of the screen there is an option to **Normalize** the data. This is typically used with selections that contain different crop types(rotation of corn and beans). If just one crop was selected to be included, this can be left unchecked, and the result will be average yield in bu/ac. If there are alternating crops, normalizing will place each map on a scale of its own, so that each crop type is represented equal, then average the years together
8. There are two methods to Normalize data, after one is selected, click **Next**



Normalize to a 0 to 100% Scale

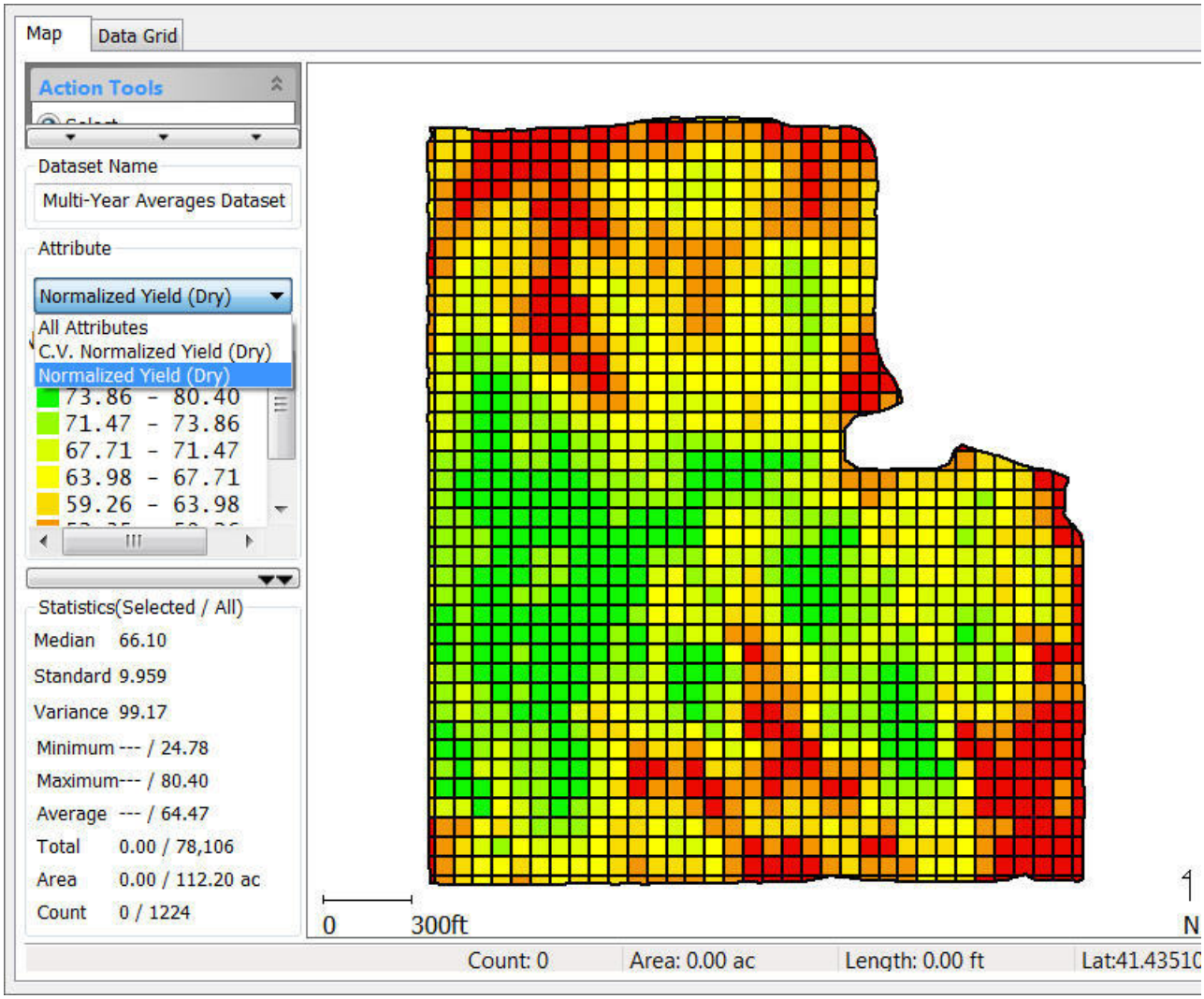
((Value - Min) / (Max - Min)) * 100 = Normalized Result

Normalize Against Data Mean

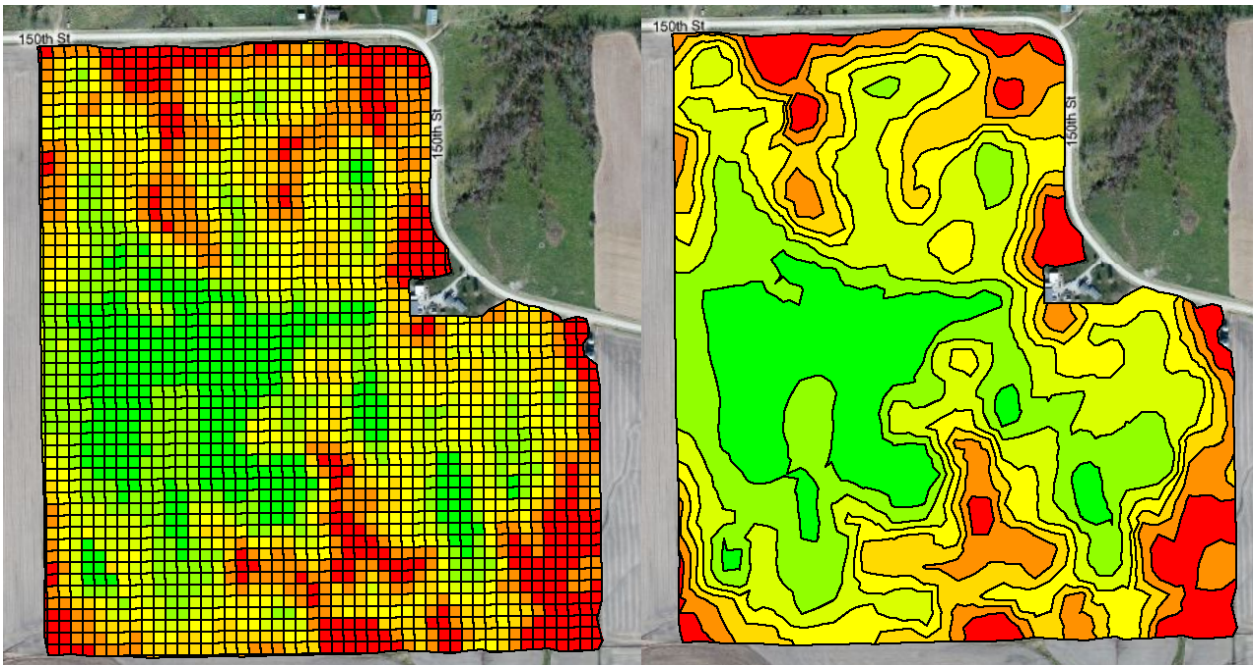
(Value / Mean) * 100 = Normalized Result

9. In the following screen select the desired interpolation settings for the data. Click **Finish** after settings are correct
10. In the Select Analysis Type to Run window, click **Single Field** to run the analysis for one field or click **Multiple Fields** to run across several fields
11. The resulting map will have multiple attributes created. One will be **Normalized Yield**, and the other will be **C.V. Yield**

- **Normalized Yield** - relative comparison for each yield map
- **Coefficient of Variation Yield** - amount of fluctuation between years of data. The lower the number, the more stable the yield from year to year



13. When saving this to the management tree, customizing an operation or a product name that describes this type of data will be more helpful if this is used for analysis in the future
14. Typically these types of maps will be displayed as a contour map, which show a zone type map, that can be used for generating soil sampling or prescription layers



Other uses for this tool can include the average crop moisture at harvest time, applied fertilizer on a field for each year and multiple soil testing events (Average P1 across a field, Average pH).

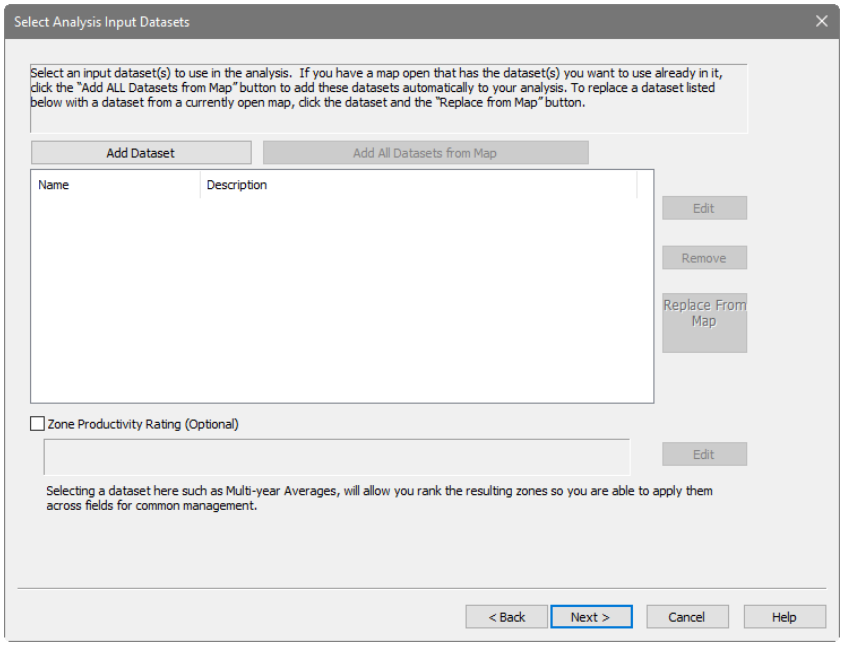
Zone Based Analysis

In this chapter you will learn how to :

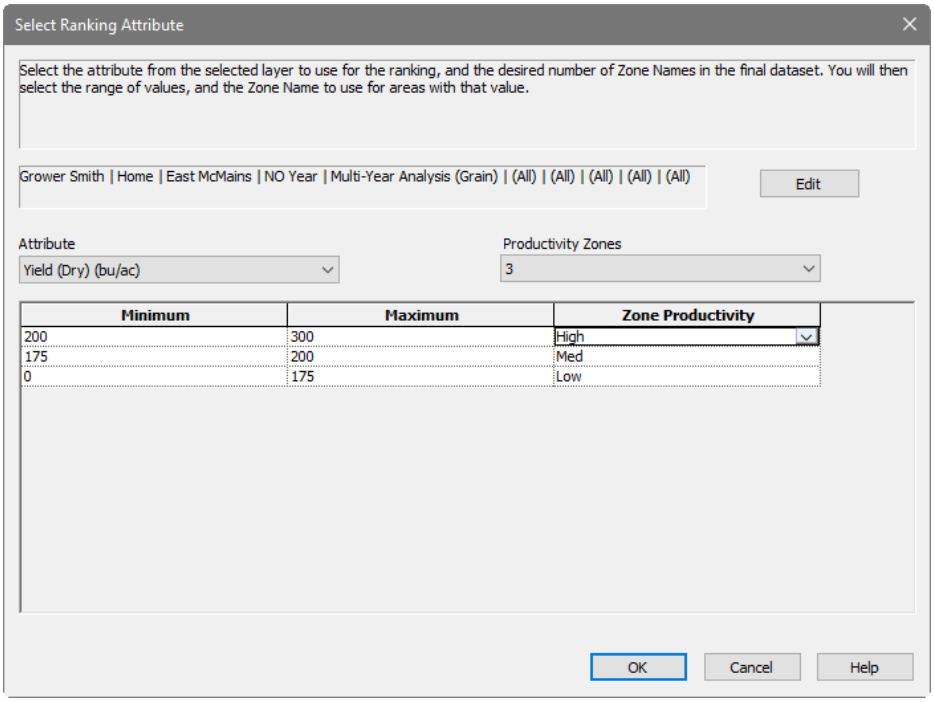
- Create, run and save a new Zone Based Analysis for generating productivity based management zones.

Creating a new Zone Based Analysis

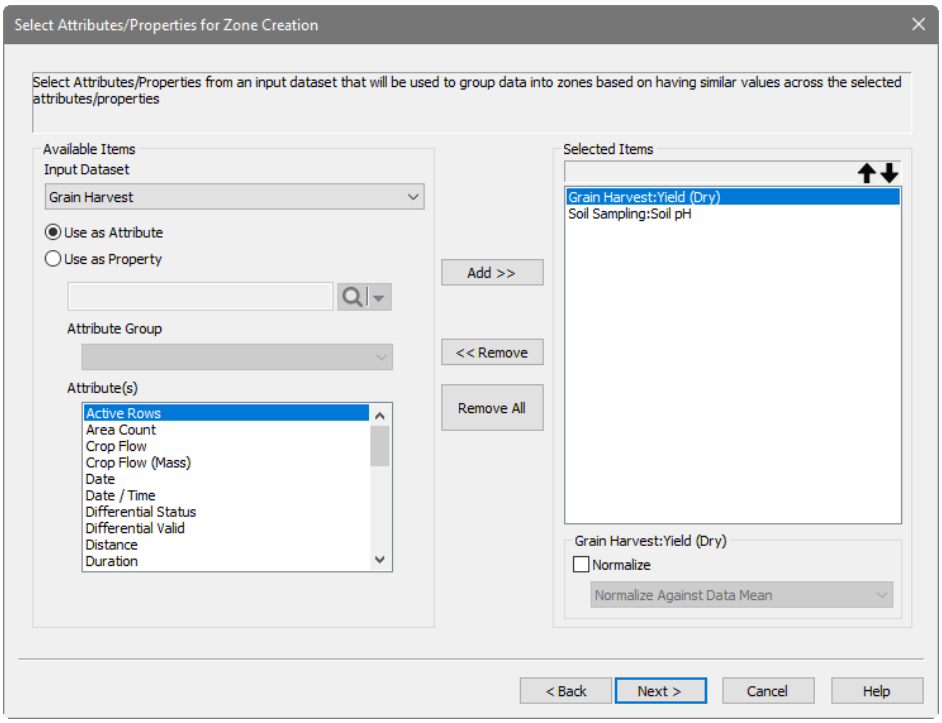
1. Click on the **Analysis Wizard** icon to begin.
2. Select **Zone Based Analysis** and then **Add**.
3. Enter a unique **Name** for this new analysis and then click **Next**.
4. In the Select Analysis Input Datasets dialog, use the **Add Dataset** and/or **Add All Datasets from Map** buttons to select all of the layers you wish to reference when creating your management zones.



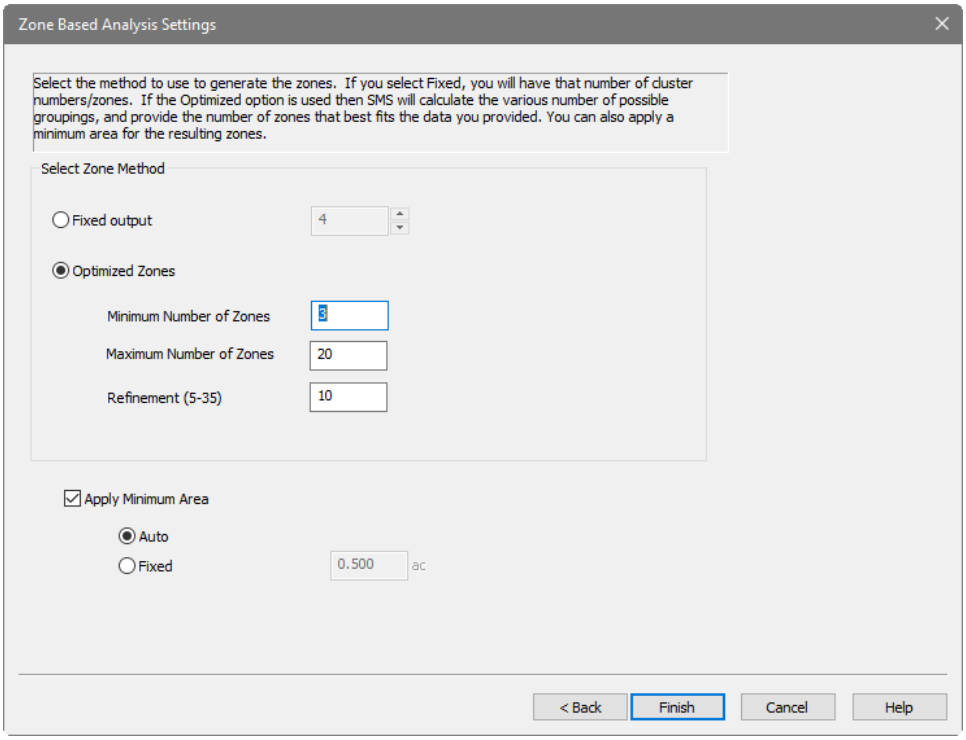
5. To assign a Zone Productivity Rating, which will allow you to rank the resulting zones for use across multiple fields, check the **Zone Productivity Rating** box. Choose which operation to base the productivity rating on, commonly a Multi-Year Analysis map, and then define the Ranking Attribute and corresponding zones. Click **OK** when finished.



6. Now select the attributes and/or properties you wish to use to build your zones by selecting the **Input Dataset**, **Attribute** or **Property**, and clicking **Add**. If you wish to normalize the selected items, click the Normalize check box.

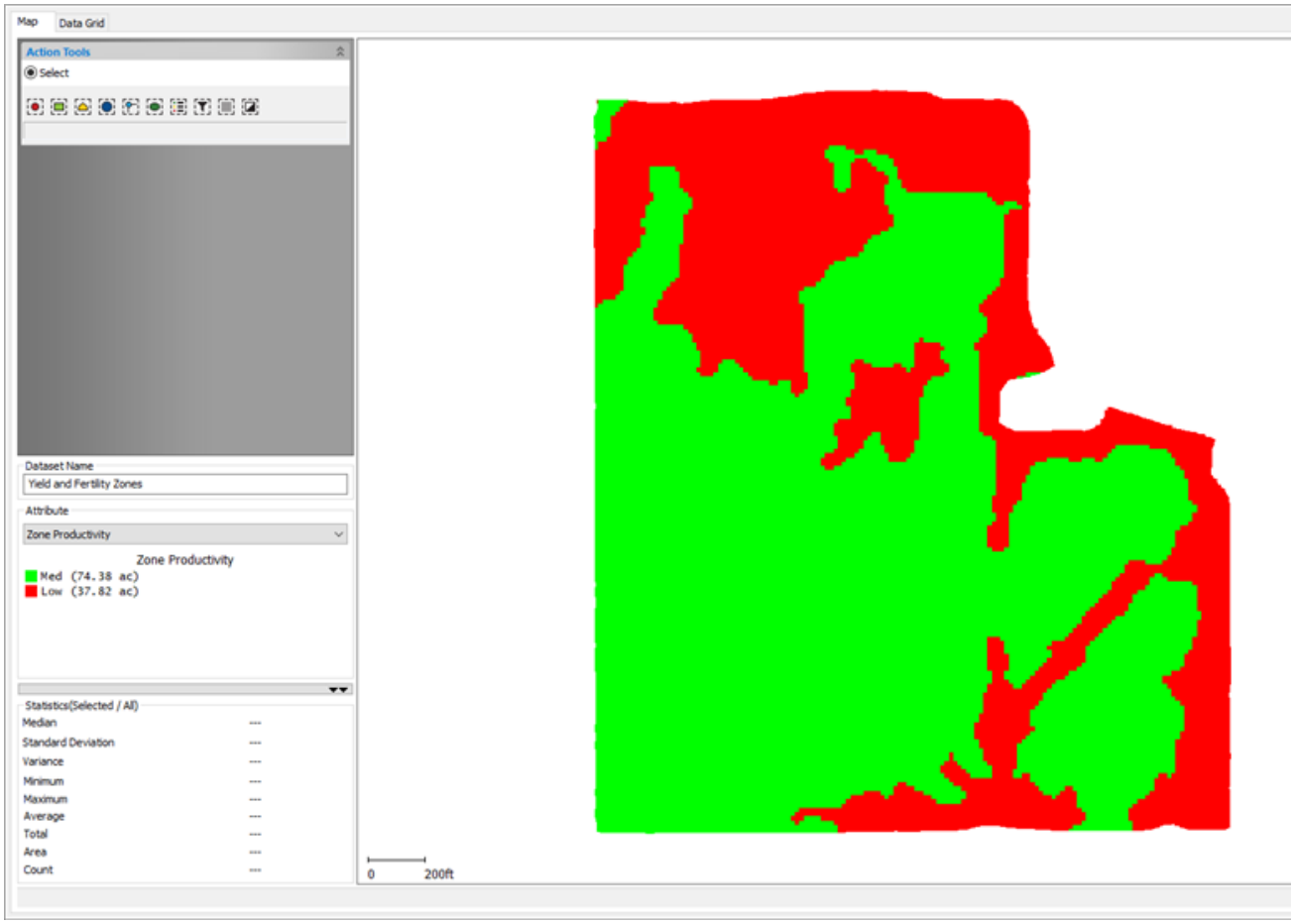


7. Click **Next** after adding over all desired items.
8. The **Zone Based Analysis Settings** dialog will now open.



- In this dialog you will first select how many zones you wish to create.
  - **Fixed** output allows you to define exactly how many zones will be in the resulting dataset.
  - Selecting **Optimized Zones** means that the software will analyze your datasets and determine the ideal number of zones based on the **Minimum and Maximum Number of Zones** you define. The Refinement value is how many times SMS will review the data when calculating the zones.

9. Now you can choose if you want to apply a **Minimum Area** to your zones.
   - **Auto** will base the minimum size of the zones on the field boundary.
     - 0-300 acre fields will not have zones smaller than 0.5 acres
     - 300-800 acre fields will not have zones smaller than 1 acre
     - 800+ acre fields will not have zones smaller than 1.5 acres
   - **Fixed** allows you to define the minimum size of zones.
10. Click **Finish**.
11. Select the appropriate Reference Dataset and click **Next**, verify all iterative filters and click **Finish**
12. The Zone Based Analysis will now be available to select and run for Single or Multiple Fields. Select which field(s) to generate this analysis for and the Analysis Editor will display the resulting zone map.



13. Click **Save** and select the appropriate management settings.

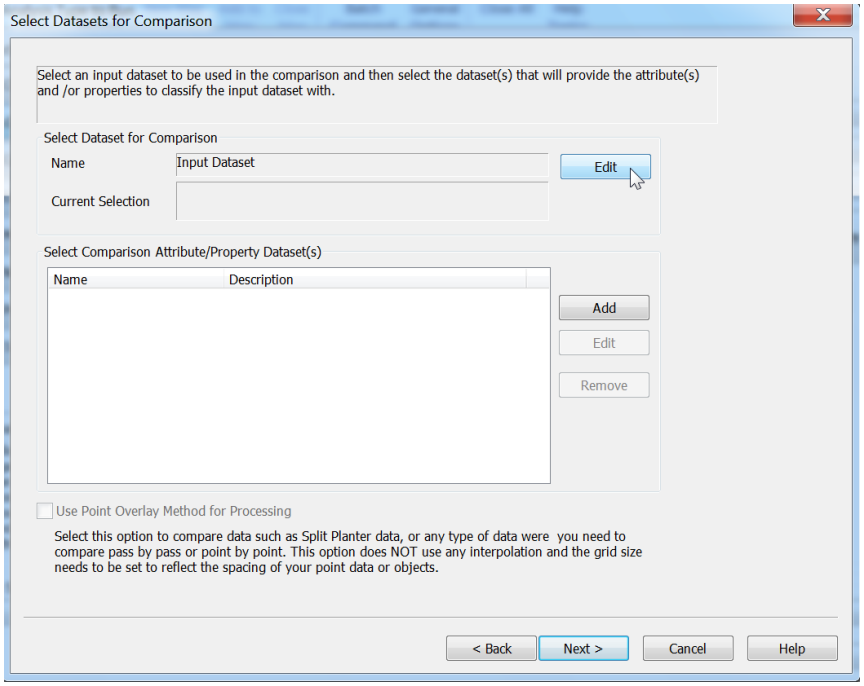
Comparison Analysis

In this chapter you will learn how to use the Analysis Wizard to compare attributes or properties from any mapped layer. With the Comparison Analysis, you can:

- Compare yield to varieties
- Compare yield and moisture to soil type
- Compare soil sample results to soil type
- Compare yield to soil type and hybrid

Comparison Analysis

1. Go to the **Analysis Menu** and select the **Analysis Wizard**
2. Click on the **Comparison Analysis** button and then click **Add** on the right-hand side of the Select Analysis Type to Run window
3. In the Name/Description window enter in a name and description for the comparison, such as **Yield by Hybrid**. Click **Next**.
4. Click **Edit** next to the Select Dataset for Comparison, to choose the dataset that will be used in the comparison to provide the actual results



5. Using the drop-down menus select the Grower, Farm, Field, Year, Operation, etc. for the layer that you want to compare. Click **Next** when completed. (This is typically a yield map)
6. On the Edit Data Filter Results screen remove any unwanted datasets and click **Finish**
7. On the Edit Input Dataset Settings screen you can:

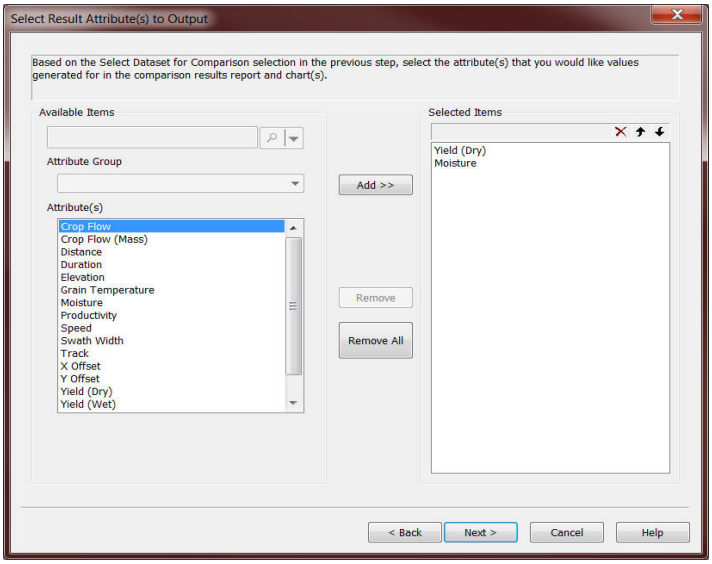
- Click on **Edit Selection** to edit the dataset that is being used for the comparison (takes you back to step 5)
- Click on **Edit** to modify the grid sizes and interpolation settings
- Click **OK** to accept the settings
    - If you previously selected to use **Automatic Grid and Interpolation Settings** the other settings will not be available to change. If you are using automatic settings, but wish to use a previously set operational default, uncheck automatic and click the **Restore Defaults** button and SMS will honor the operational defaults in this analysis.

8. Click **Add** under Select Comparison Attribute/Property Dataset(s) to select the layer(s) that will be used for comparison
9. Using the Drop-down menus select the Grower, Farm, Field, Year, Operation, etc. for the layer that you want to compare the Input Dataset to. Click **Next**

10. On the Edit Data Filter Results screen, click **Finish**, after removing any unwanted datasets
11. Click **OK** when finished
12. Once you have all of the layers to be used in the Comparison added, check the option to Use Point Overlay Method for Processing, and then click **Next**

> Use the Point Overlay Method for Processing option to compare data such as Split Planter data, or any type of data were you need to compare pass by pass or point by point. This option does not use any interpolation and the grid size needs to be set to reflect the spacing of your point data or objects.

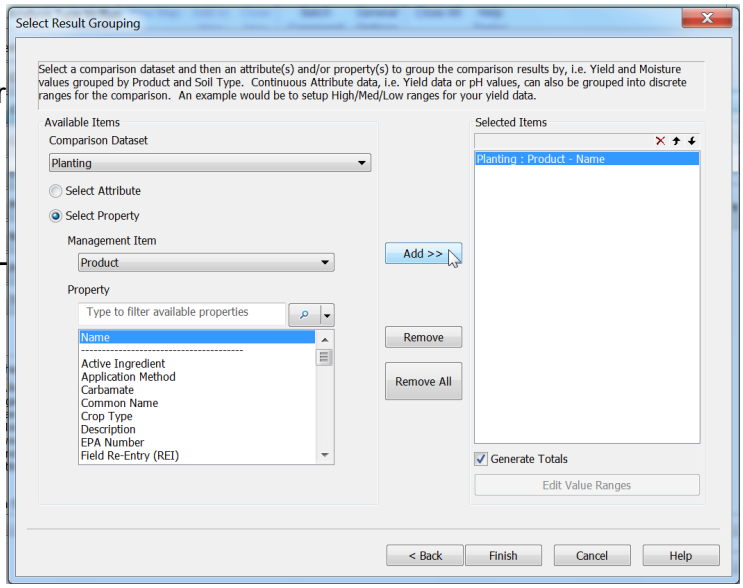
13. Select the attribute(s) that you would like values generated for in the comparison results, report and charts and click **Add**. Click **Next**



14. Use the Select Result Grouping window to:
    - Choose the dataset that will be used to group the results in the final report and charts
    - Choose whether the comparison grouping is an Attribute or Property
    - Select the Attribute Grouping and Attribute (for the Select Attribute option), or the Management Item and Property (for the Select Property option) that will be used to group the

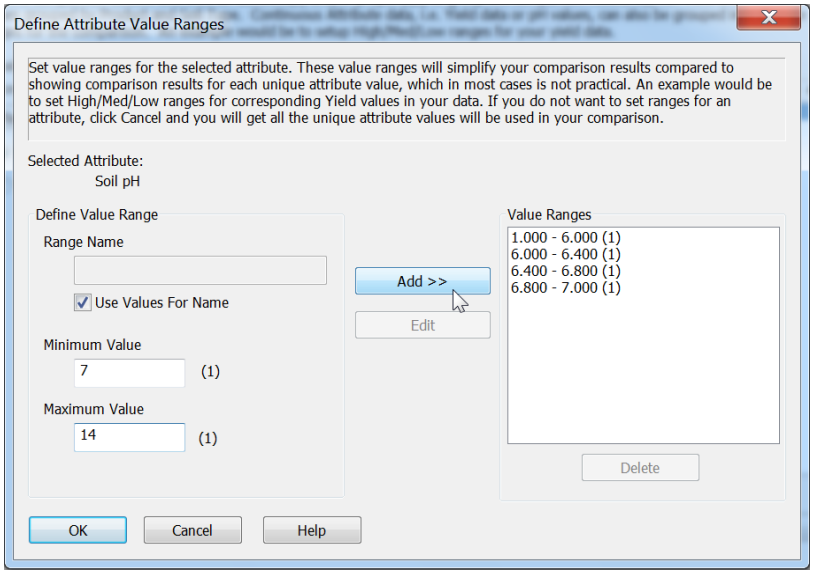
results in the final report and charts

- Click on **Add** to use the options selected under Available Items on the left side (this will copy your selection to the right side under Selected Items)
- Choose to Generate Totals for your sub-groupings
- Click **Finish** when you have all of your Selected Items added



If you add an attribute or property that contains numeric information, you will have to set the ranges for the sub-groupings. For example, if you want to compare Yield to Soil pH, you will have to set the various ranges of Soil pH that will be used to group your Yield information. See the next page for this example.

15. To set the ranges for a numeric attribute or property, enter the **Minimum** and **Maximum** values for each range, then click **Add**. When you have all of the ranges set up, click **OK**



16. Once you click **Finish** in the Select Result Grouping window, in the following screen, select the data that has the most information stored in it. (Input dataset selected will likely be the correct setting). Click **Next** when complete
17. Next is the iterative filter. In this dialog, the purpose is to get the correct relationship between the input dataset, and the comparison dataset. Below is the relationship that will work for most situations
18. For this example, this will reference the same grower, farm, field and year between the planting and harvest data. Operation is set to Fixed to limit to one operation to compare to at a time, for the layer that has the comparison items. Product, Operational Instance, and datasets will be set to All to ensure that all information from the planting layers are included. Click **Finish** when complete
19. Now that the comparison has been setup it can be run in the Select Analysis Type to Run window. Select the newly created comparison under Saved Comparison Analysis Functions and then click **Single Field** under Run Selected Analysis for... to perform the comparison on a single field.

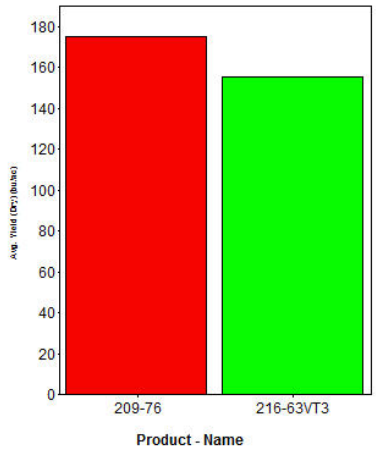
To run a comparison against multiple fields click the Multiple Fields radio button under Run Selected Analysis for.

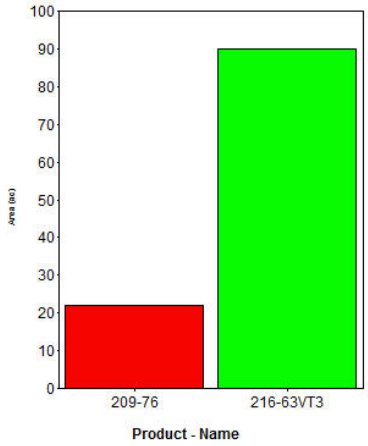
20. In the Select Data Filters dialog, select the grower, farm, field, etc.. to run the comparison for. Click **Next** and then **Finish**
21. When the analysis is complete, you will have multiple pages of results:

Yield by Hybrid

Analysis Description
Planter 30' Grid
Grower Smith | Home | East McMains | 2010 | Grain Harvest | (All) | CORN | (All) | Harvest - 1 | (All)
Analysis Results- Yield (Dry), Moisture Classified By- Planting : Product - Name

Product - Name	Avg. Yiel (Dry) bu/ac	Total Yield (Dr bu	Min. Yiel (Dry) bu/ac	Max. Yield (Dry) bu/ac	Avg. Moisture %	Total Moisture %	Min. Moisture %	Max. Moisture %	Area ac
209-76	175.34	3,868.4	57.93	196.91	14.04	16,120	13.34	15.84	22.06
216-63VT	155.35	13,988	36.07	206.43	16.02	71,490	4.326	27.57	90.05
(All)	**159.28**	**17,857**	**36.07**	**206.43**	**15.63**	**87,610**	**4.326**	**27.57**	**112.11**

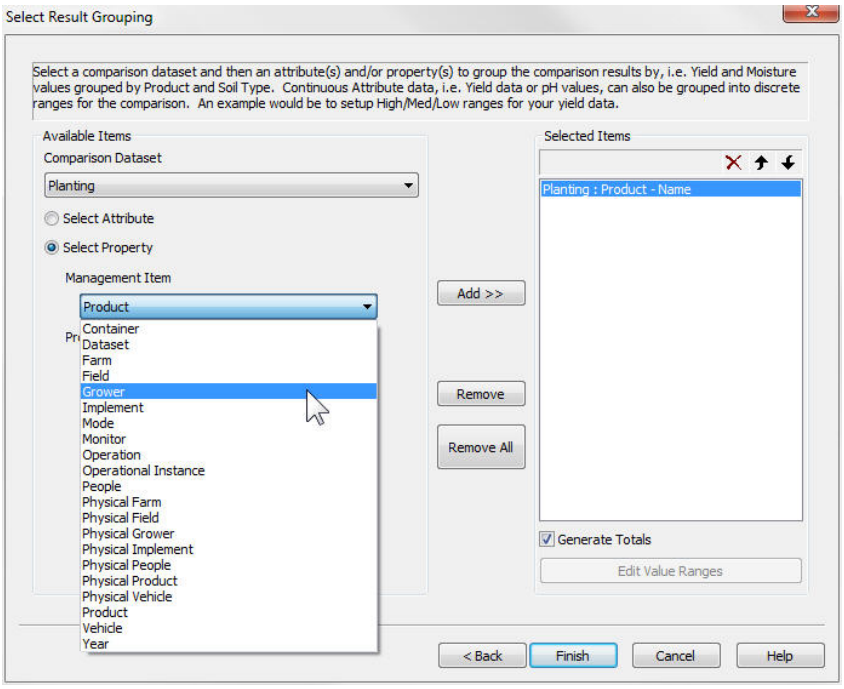




Comparison Analysis Results Grouping Options

In addition to displaying the results of a Comparison Analysis using the default settings, additional result groupings can be added to give you a more customized result when running the Comparison Analysis for multiple fields/projects at once.

1. To add additional result groupings, on step 14, change from Select Attribute to **Select Property**.
2. Use the **Management Item** drop down to select the new item to group the data by and then select the property name to include.
   - For example, to group results that include multiple growers, farms, fields and years add Grower-Name, Farm-Name, Field-Name, Year-Name to the Selected Items window.
   - Use the Up/Down arrows to arrange the data correctly. If you are going to group the results by Management Items it is recommended to list those in the results first before any attributes.



3. Click **Finish**.

The Comparison Results will now be grouped by the selected Management Items.

Yield by Product Name grouped by Grower:

Analysis Description
Planter 30' Grid
(All) | (All) | East McMains, West McMains | 2010 | Grain Harvest | (All) | (All) | (All) | (All)
Analysis Results- Estimated Volume (Dry), Moisture Classified By- Input Dataset : Grower - Name, Planting : Product - Name

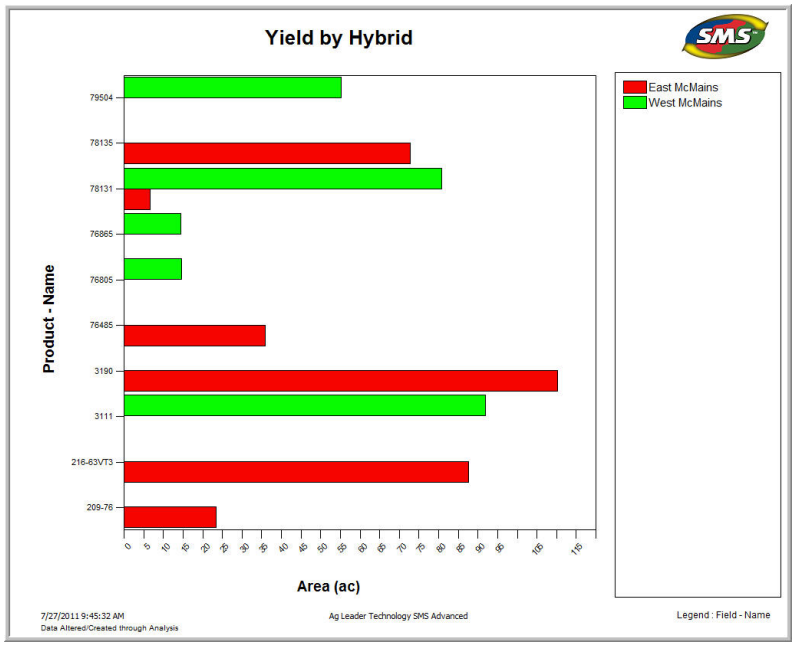
Grower - Name	Product - Name	Avg. Estimated Volume (Dry) bu/ac	Total Estimated Volume (Dry) bu	Min. Estimated Volume (Dry) bu/ac	Max. Estimated Volume (Dry) bu/ac	Avg. Moisture %	Total Moisture %	Min. Moisture %	Max. Moisture %	Area ac
Grower Smith	209-76	173.18	4,122.9	57.93	196.91	14.02	16,237	13.34	16.72	23.81
	216-63VT3	154.88	14,154	36.07	206.43	16.02	71,979	4.326	27.57	91.39
	3111	47.94	4,348.8	7.986	69.41	9.629	43,308	8.683	11.82	90.71
	(All)	109.89	22,626	7.986	206.43	12.97	131,524	4.326	27.57	205.90
(All)	(All)	109.89	22,626	7.986	206.43	12.97	131,524	4.326	27.57	205.90

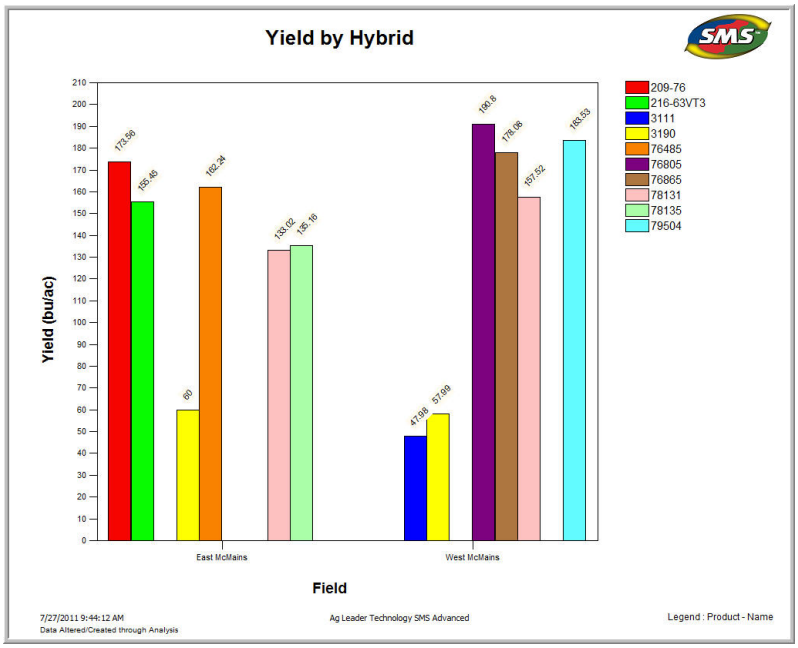
Customizing the Comparison Results Layout

In addition to modifying the result groupings you can also modify the layout and organization of the charts and tables contained in the Comparison Analysis Results after the analysis results have been generated.

1. After running the Comparison Analysis to modify any of the settings right click over the results page to modify and choose Edit Report/Chart Options.
2. The Report Options dialog will open where you can:
   - Modify the title, description, column width and logo on the General tab.
   - The Column Selection tab allows you to add or remove result groupings and items, sort the results by a user defined attribute and adjust the units used when displaying totals.
3. The Chart Axes dialog will open where you can:
   - Modify the Chart Type
   - Modify the X and Y axis values, units and labels
   - Adjust the colors and data labels to be displayed
   - Update the name and logo displayed on the chart

Customized Chart Examples:



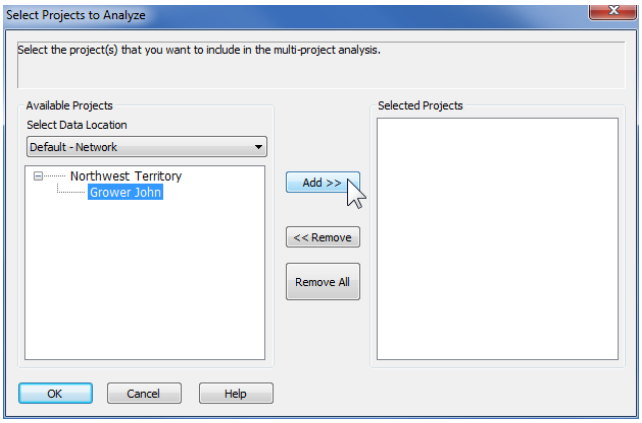


Multi-Project Comparisons

When growers are in different projects, it may be desirable to compare data from one grower to another. An example may be to compare a hybrid that many growers planted, to see what the combined grower average was. Then to present that to each grower with his own personal data. This will give the grower a relative

perspective of how other hybrids are performing. This does require that all planting or harvest data has been logged with the same product names. Some other examples may be how fertilizer treatments compared between growers, or rates of other treatments.

1. To begin, go to **Analysis - Analysis Wizard**
2. If there are existing Analysis functions setup for single projects, these can be used as a starting point. For this example, select the Saved Analysis function of Yield by Hybrid and click **Multiple Projects**
3. Select the other projects (or groupings) to compare with, the project that is currently being worked in will always be included. Click **Add** on all the desired projects, and then **OK** when complete



4. This menu will allow the selection of the year and products to be used in the comparison. Select the appropriate year, and the products to be used, click **Next**, then **Finish** if all data is appropriate
5. The comparison information can now be reviewed. Layout will be similar to a single project comparison, however the data will be for all the projects included in the comparison
6. Notice at the bottom there is an additional tab that will show the spatial areas where the information was pulled. The Coverage Map will be a square that will represent the outer extremes of the data for each grower

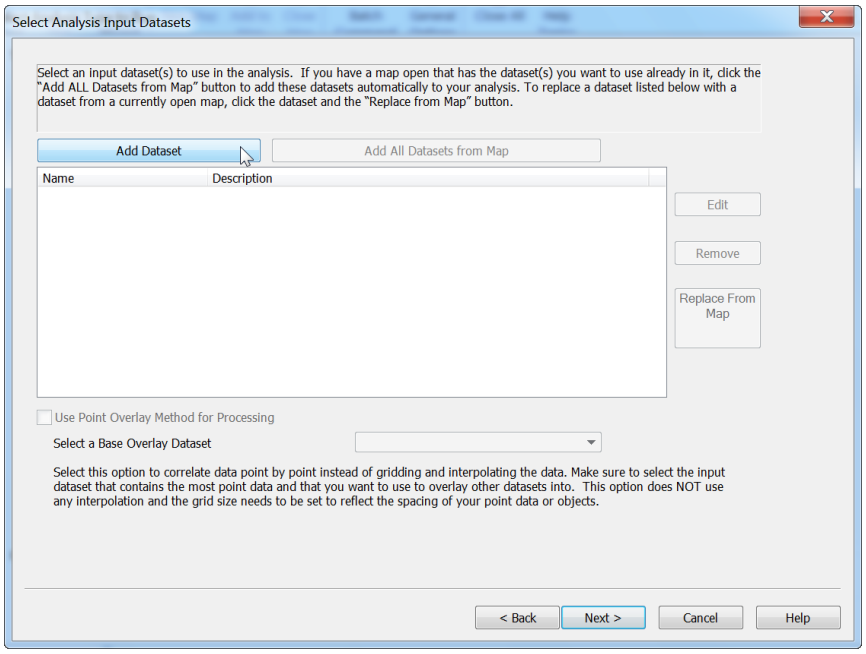
Correlation Analysis

The Correlation Analysis tool is used to determine positive or negative relationships between attributes, such as yield to soil sampling results. In this chapter you will learn to use this tool to:

- Identify relationships between datasets that are numeric

Correlation Analysis

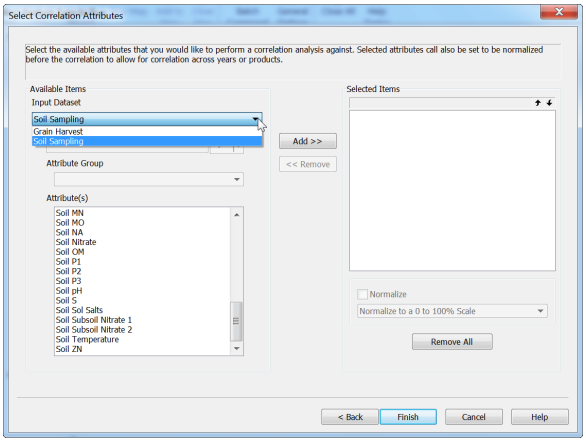
1. To start, click on the **Analysis Menu**, and select the **Analysis Wizard**
2. Now click the **Correlation Analysis** button and then click **Add** to create a new correlation analysis
3. In the Name/Description window enter a name for the correlation analysis, such as Yield and Soil Sample Results Correlation. Click **Next**
4. In the first screen, add the datasets that will be used for Correlation Relationships by clicking **Add Dataset**



5. Use the management filter to select the data to be used for correlation. Any numeric dataset can be used, i.e. yield, soil K, planting population. Click **Next**

6. The following screen will give a preview of the data that was shown in the filter, if everything is appropriate, click **Next**
7. In the following screen, there will be options to modify the name and edit the grid and interpolation settings.
    - If you previously selected to use **Automatic Grid and Interpolation Settings** the other settings will not be available to change. If you are using automatic settings, but wish to use a previously set operational default, uncheck automatic and click the **Restore Defaults** button and SMS will honor the operational defaults in this analysis.

8. Repeat steps 4-7 necessary. There is no limit to the number of datasets that can be added. Click **Next** when completed
9. In the following screen, select the pull-down menu to select the dataset with the information to correlate to other information



10. Select the Dataset at the top, then select the attribute in the lower left, and **Add** to the right-hand side
11. Repeat as necessary until all attributes are added to the right hand side. Click **Finish**
12. In the **Select Reference Dataset** dialog, select one of the inputs to be referenced for performing the analysis. Pick the input that contains the most data over all the years of data in your system, such as Grain Harvest. Select the appropriate iterative filters, click **Next**, and then **Finish** to complete the analysis.
13. In the Select Analysis Type to Run window click on **Single Field** under Run Selected Analysis for.. to perform the correlation on a field. Click **Multiple Fields** to run over several fields
14. The result is going to be a report as well as charts that will represent the Correlation data

Analysis Description
2010 Harvest and Soil Sampling Data
Grower Smith | Home | East McMains | 2010 | Grain Harvest | (All) | (All) | (All) | (All) | (All)
Analysis Results Yield (Dry) Moisture Soil OM Soil P1 Soil K Soil BpH Soil CEC

ATTRIBUTE	Yield (Dry)	Moisture	Soil OM	Soil P1	Soil K	Soil BpH	Soil CEC
Yield (Dry)	1.000	-0.286	-0.101	-0.135	-0.063	0.0078	0.204
Moisture	-0.286	1.000	0.089	0.174	0.133	0.165	-0.296
Soil OM	-0.101	0.089	1.000	0.264	0.326	-0.439	-0.039
Soil P1	-0.135	0.174	0.264	1.000	0.560	0.178	-0.400
Soil K	-0.063	0.133	0.326	0.560	1.000	-0.122	0.123
Soil BpH	0.0078	0.165	-0.439	0.178	-0.122	1.000	-0.301
Soil CEC	0.204	-0.296	-0.039	-0.400	0.123	-0.301	1.000

Correlation will be represented on a scale of -1 to 1. Essentially to have a positive relationship to yield, as one attribute has higher values, and in the same place yield has higher values the relationship will have a positive value. The frequency and proportional amount of occurrences will have a bearing on the higher or lower that number is. Values closer to zero will indicate weak relationships.

15. This report can be edited to display or remove items that are important for printing purposes. By **right-clicking** on the report, a menu will appear that will provide the ability to **Edit the Report Options**.
16. Options will change depending on the current Report/Chart that is displayed. If changes are made to reports or charts, right-click again to **Save All Document Settings**. The next time this Correlation Analysis is run, these settings will be used by default

3D Mapping

In this chapter you will learn how to use:

- 3D Grid Regeneration

  3D Terrain View

3D Grid Regeneration

As GPS receivers get upgraded and signal accuracy increases, it may be necessary to regenerate the 3D grid so that it using only certain years worth of information; as by default, the software averages all of the years of GPS information together to calculate the initial 3D View. Most users want to do this because initial data was collected with WAAS and then later upgraded to a subscription satellite or RTK network.

There are two ways to regenerate the 3D Grid for a field. Both are described below.

Regenerating one field at a time

1. **Right-click** on an **Operation** (or Product, Operational Instance, Dataset). For this example, pick any field and select an Operation, such as Planting, Field Survey or Elevation Model
2. Select **Regenerate 3D Grid**

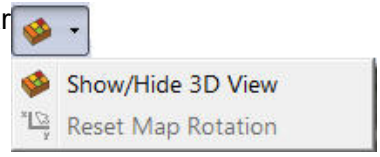
Regenerating using the Batch Tool

1. Go to **Tools - Batch Command Utility**
2. Select **Regenerate 3-D Grid**
3. Select the Growers, Farms, and Fields that need to have the 3D Grid regenerated. For this example, select **Grower Smith** for the Grower and All for the Farms and Fields
4. Choose to filter to **No Year** and **Elevation Model**
5. Click **Next**
6. Click **Finish** on the Edit Data Filter Results dialog box

3D Terrain View

3D Terrain View can be used to view maps in 3D, the terrain of the field, and to show the relationships between the terrain and attribute or property being mapped.

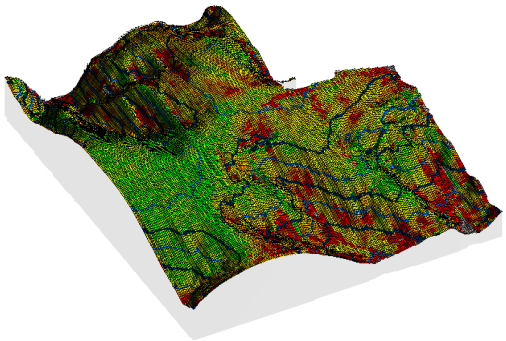
1. Make a map of a field. For this example, use **Grower Smith - Home - East McMains - Grain Harvest**
2. Select the **Hide/Show 3D View** icon from the Map Toolbar



This can also be selected by going to Map - Hide/Show 3D View.

3. Various tools are provided for the manipulation and analyzing of the 3D View including: Rotate, Reset Map Rotation, Zoom tools, Pan, and Measuring Tools

4. By going to **Edit Map Options** and clicking on the **3D Map** tab, you can adjust the grid sizes, scale and even select to show shaded relief. Shaded relief increases the ease at which you can view terrain changes in the field. Clicking on the **Surface Contours** tab allows you to turn primary and secondary contour lines on and off, adjust the line interval, size and colors, and even select to show labels.



The Measuring Tools can be used to show the slope and also change in elevation. The values displayed will depend on the accuracy of the GPS used to collect the data.

Tooltips are still functional, but depending on the tilt of the Terrain View, the information may be distorted.

Query tools will not work in the 3D Terrain View.

3D Settings

Some settings can be modified by going to **Tools - General Options**.

Terrain Analysis

In this chapter you will learn how to:

- Create a Terrain Analysis dataset.

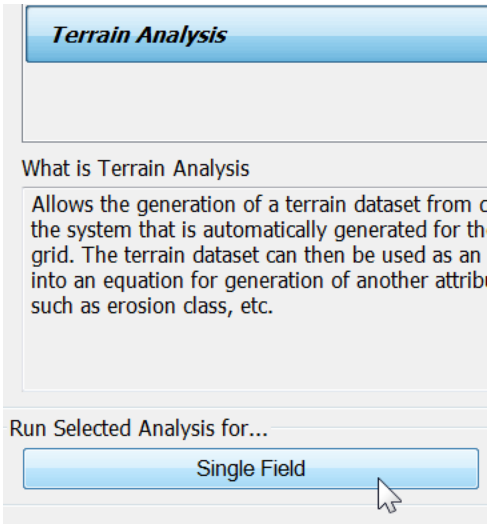
Terrain Analysis datasets are based on the set 3D Grid. This can be set with any spatial data containing elevation information in the Management Tree, which may include planting, grain harvest, spraying, or digital elevation model files. A Terrain Analysis dataset will create attributes for:

- Curvature
- Drainage Area
- Elevation
- Flow Direction
- Gradient Direction
- Slope /Grade
- Stream Power
- Watershed ID
- Wetness Potential

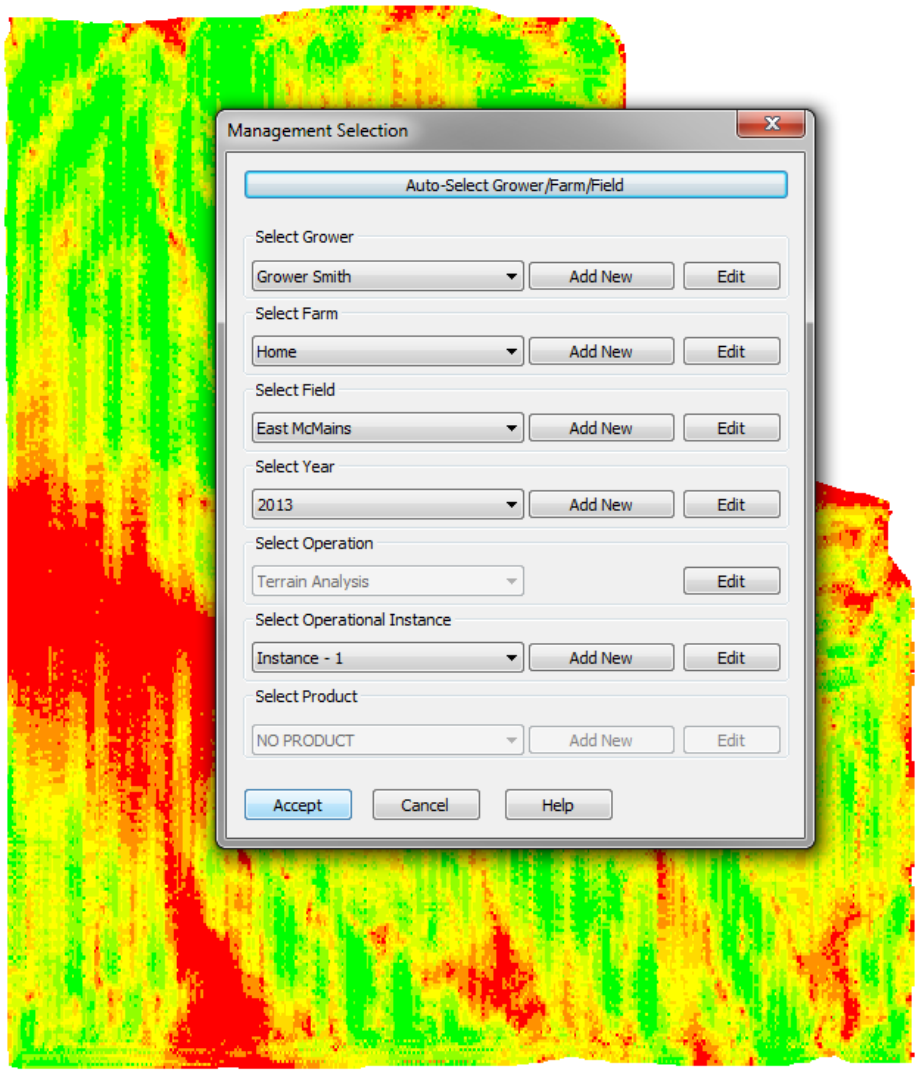
Generate Terrain Analysis Dataset

Before entering the analysis wizard, the 3D grid should be regenerated. To learn how to do this, see the 3D Grid Regeneration section in the 3D Mapping chapter. Doing so will determine the GPS information used in the analysis

1. To begin the analysis, click on the **Analysis Menu**, and select **Analysis Wizard**
2. Select **Terrain Analysis** and then click **Single Field** to run it for one field or click **Multiple Fields** to run it for several fields



3. Select the Grower, Farm, and Field to run this analysis for. For this example chose **Grower Smith - Home - East McMains**. Click **Finish**
4. Select **Save** in the Analysis Editor window. Select the appropriate management settings for archiving this dataset. For this example, select **Grower Smith - Home - East McMains - Current Year- Terrain Analysis- Instance-1 - No Product**. Click **Accept**


Management Selection
Auto-Select Grower/Farm/Field
Select Grower
Grower Smith
Add New
Edit
Select Farm
Home
Add New
Edit
Select Field
East McMains
Add New
Edit
Select Year
2013
Add New
Edit
Select Operation
Terrain Analysis
Edit
Select Operational Instance
Instance - 1
Add New
Edit
Select Product
NO PRODUCT
Add New
Edit
Accept
Cancel
Help

Equation Based Analysis

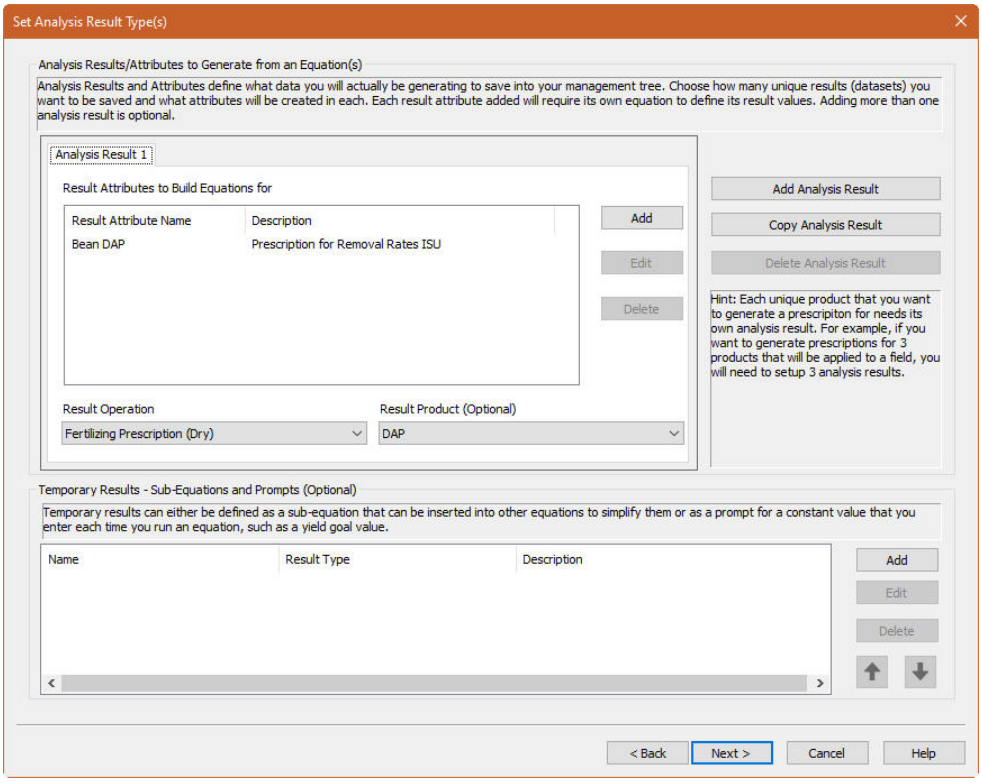
In this chapter you will learn to:

- Build an equation
- Use Temporary Results
- Run equations over multiple fields

Equation Based Analysis

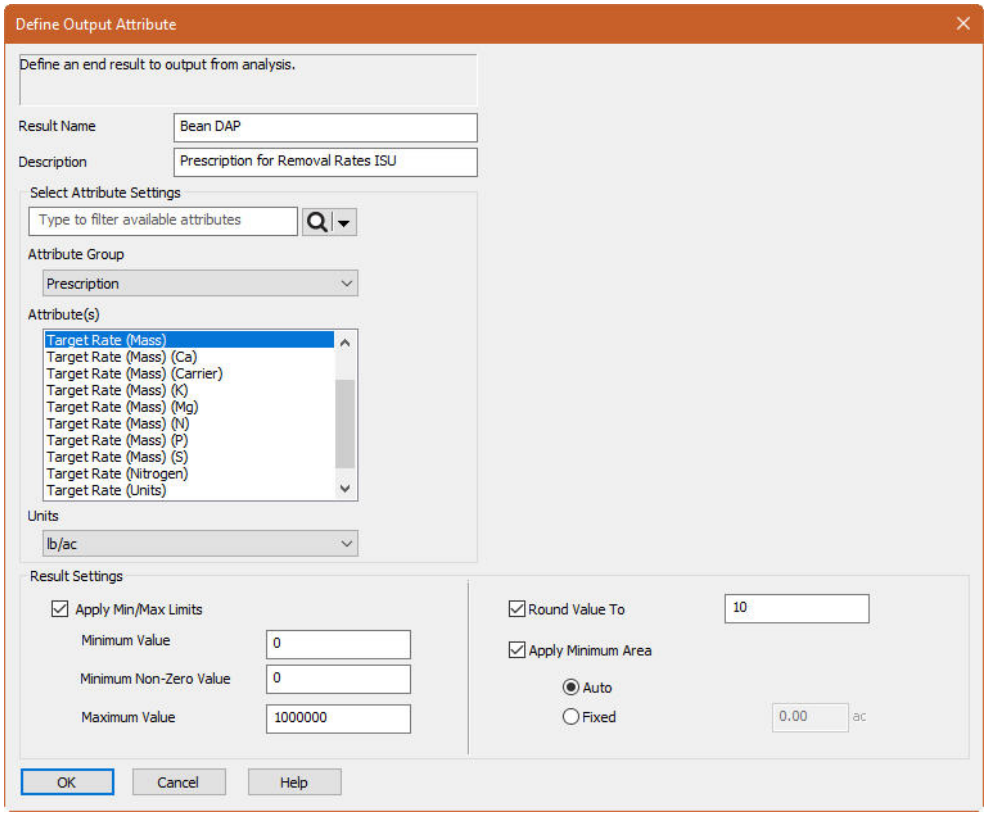
When running recommendations for nutrient application, they can be setup several different ways to accommodate different objectives. In this example we will build a fertilizing recommendation based on Soil K and Yield Values.

1. To create a new Equation dataset, click on **Analysis**, and **Analysis Wizard**
2. Click on the **Equation Based Analysis** button and then click **Add**
3. In the Name/Description window enter a name and a description for this equation. Click **Next**
4. This screen will define the output map. At the top right click **Add** under Analysis Result



On this screen you will be able to set up an equation in several ways. If you know that you always want to build the nutrient value to a specific level (170 ppm for Soil K) you will only need to fill in the top half of this screen in the Output of Analysis. If you would like to have the equation be a bit more flexible (a prompt for the desired nutrient value, or Yield goal) then you will need to fill in the Output of Analysis and the Temporary Results section.

5. Give the equation a result name and description



6. If this is for a Prescription, set the Attribute Group to **Prescription**
7. Set the Attribute to either , **Target Rate Mass, Liquid or Count**, depending on the type of prescription being generated.

The text search box under Select Attribute Settings can help save time when searching for attributes by filtering the attributes in the Attribute list.

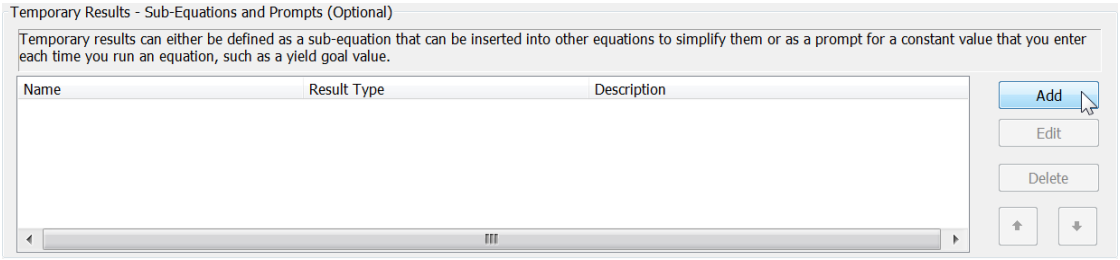
8. Select the proper units (for this example use **lb/ac**)
9. (Optional) Set the **Minimum** and **Maximum** amounts of fertilizer that is dispensed. The **Minimum** is usually set to 0, and the **Maximum** can be set to the most that you would apply based on the units in Step 9. If you wish to apply no product in certain areas of the prescription, but also wish to have a min-

imum amount of product dispensed in areas that are being applied to, enter a value in the **Minimum Non-Zero Value**.

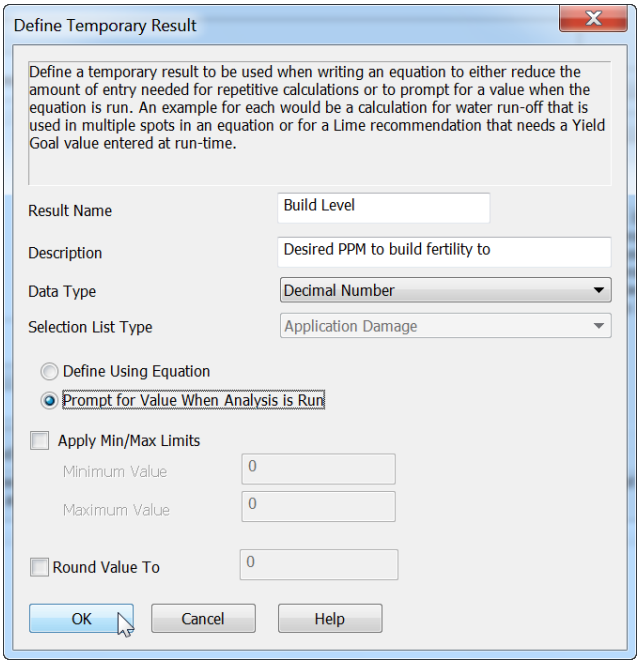
10. (Optional) Set the **Round value To** so that the rates that are calculated are rounded so that there are not a high number of individual rates. Minute fertilizer rates being sent through some application equipment controllers can be a problem when being applied. Recommend no less than a value of **10** for dry fertilizer, or **1** for liquid based products
11. (Optional) **Apply Minimum Area** allows you to control how small the application zones/regions will be .
    - **Auto** - This will adjust the minimum zone size dependent on the size of the field.
        - Boundary acres less than 300 acres will have a minimum area of 0.5 acres.
        - Boundary acres between 300-800 acres will have a minimum area of 1.0 acres.
        - Boundary acres over 800 acres will have a minimum area of 1.5 acres.
    - **Fixed** - You enter the smallest application zone.
12. Click **OK**
13. Now select the type of Operation you would like to create. For a fertilizer recommendation, select **Fertilizing Prescription (Dry)**
14. (Optional) You can specify the product you expect to be applied with this equation by selecting a product name from the **Result Product** drop down menu.
15. (Optional) If needed another Analysis Result can be added by either clicking on **Add Analysis Result** or **Copy Analysis Result** to duplicate the previous Analysis Result

Multiple Analysis Results can be added here by clicking on Add Analysis Result or Copy Analysis Result. This will allow a user to generate output results for multiple products at once. This can benefit users running several equations for unique products by grouping them all into a single equation that can be run once to generate all output at the same time. For example an Analysis Result could be added for a Potash fertilizing prescription and another added for a Phosphorus fertilizing prescription. Once the equation setup was completed it would output two prescriptions, one for Potash and one for Phosphorus.

16. To enter a Temporary result click **Add**, If no Temporary result is needed skip to step 19



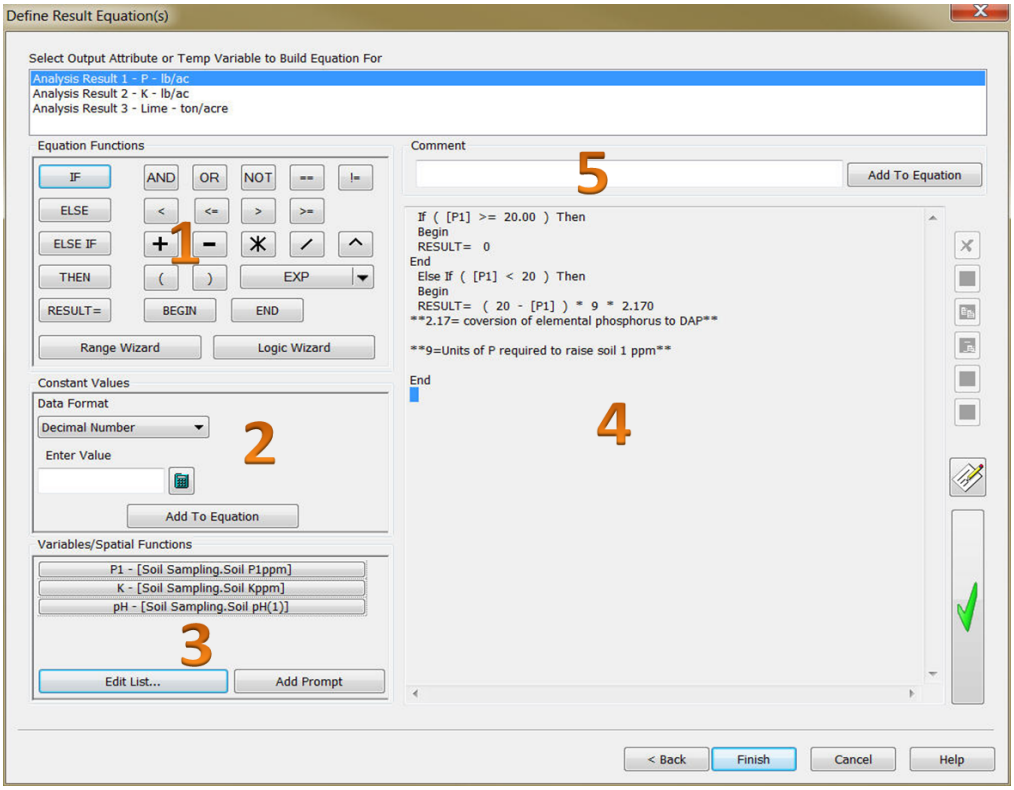
- Prompts can be used to increase the flexibility of equations by allowing the user to input the value each time the equation is run, instead of having multiple equations with different constants. Common uses of prompts include Build Goals, Number of Years to Build Level, Yield Goal, Product to be Applied
- Below is an example of a Fertility level that can be tailored to the field or producers' request



Add the prompts in the order in which they will be used when the equation is run. If Yield Goal is the first prompt to be entered, enter it first. You can reorder the prompt/temporary results list by selecting the item that needs moved and using the directional arrows.

16. Once the prompts have been added, click **Next** at the bottom of the screen
17. Click the **Add Dataset** button at the top of the screen
18. Use the management filter to navigate to a field that contains the base data for the equation, in this case **Soil Sampling**. Then click **Next**
19. On the following screen there will be an option to delete anything that is not needed. If everything is ok, click **Next**
20. On this screen changes can be made to the Display name, and also grid and interpolation settings. Click **Edit** to make these changes
    - If you previously selected to use **Automatic Grid and Interpolation Settings** the other settings will not be available to change. If you are using automatic settings, but wish to use a previously set operational default, uncheck automatic and click the **Restore Defaults** button and SMS will honor the operational defaults in this analysis.

21. Click **OK** twice to return to the Add Dataset screen. Click **Next** to continue
22. (Optional) The Management Item Selection screen can be used for pulling information from Product defaults. (i.e. with product settings for Roundup you can set 2 qt./A and pull those into part of the equation) Click **Next**
23. The formula screen contains all of the settings for creating the equation. There are five areas that are divided up to help organize functions



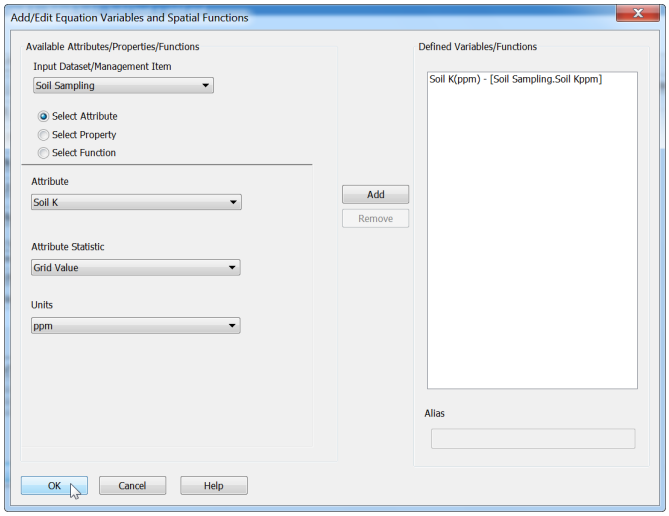
Equation Components

1. **Equation Functions -** This area contains all of the Math and Logic operators for use in the equation, to use, just click on the desired name and it will be added to the equation.
    - **Range and Logic Wizard Tools -** The Range and Logic wizards provide tools for creating an equation based on user entered range or logic that will automatically build the equation once complete.
        - The Range Wizard dialog allows the user to select one of the defined variables and define ranges and results. For example, if building a fertilizing recommendation based on yield in bushels/acre by selecting Estimated Volume Dry as the variable and adding three ranges you can input the greater than and less than values as well as the result that should be applied to all data that meets that criteria.
        - The Logic Wizard allows you to quickly build an equation based on logic conditions and the variables or temporary results defined in the equation. The Variable column will provide a drop down with all variables that have been selected to use in the equation. By selecting the variable and an operator, such as greater or less than, you can then input the results that should be applied when all conditions are met and check the Create a Complete Equation box to have the software build the equation for you

2. **Constant Values -** This area is used to enter any values to the equation. To enter a fixed value and place that in the equation, type it into the Enter Value space and click Add to Equation.
3. **Variables/Spatial Functions -** This area contains the attributes that have been pulled from the reference dataset(s). If any Temporary Results were added, they will also appear in this list.
4. **Formula** - This area will display the equation being generated. Once the equation is complete, use the Check Equation checkmark to verify that all mathematical syntax is accurate.
5. **Comments (Optional)** - This can be used if you would like to add notes to the equation to clarify conversion numbers or reminders for future use

These are best placed at the end of the equation as displayed on the sample equation shown later in this section.

25. Attributes can be added by clicking on the **Edit List** and prompts can be added by clicking **Add Prompt**
26. In the following screen select the attributes to be used in the equation and **Add** to the right and click **OK**



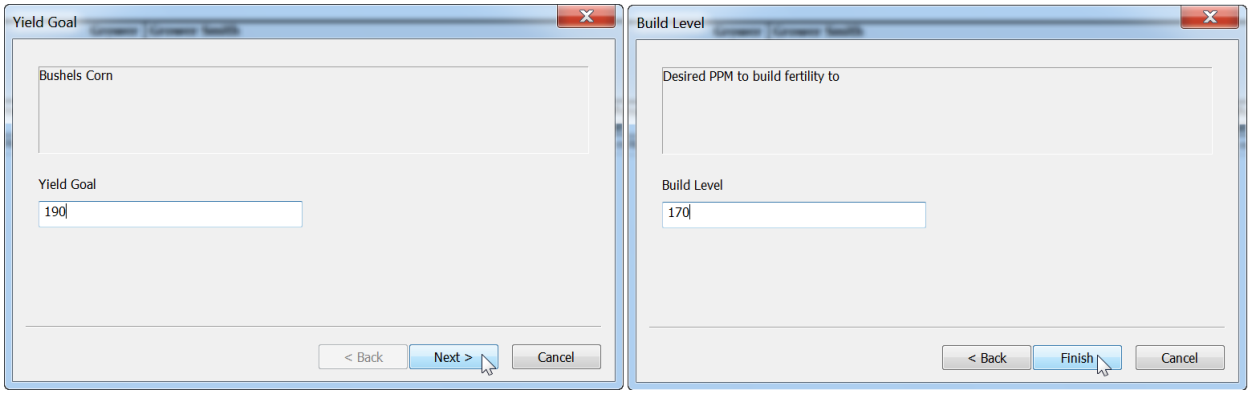
27. The following is the way that an equation might appear if using a prompt for the yield goal and a specific build level is desired. In this example, it will prompt for the PPM of desired build, and for the yield goal desired upon running the equation

```
 If ( [Soil K(ppm)] < [Build Level] ) Then
 Begin
 RESULT= ( ( ( ( [Build Level] - [Soil K(ppm)] ) * 5.000 ) - [Yield Goal] * 1.500 ) * 1.660 )
End
 Else If ( [Soil K(ppm)] >= [Build Level] ) Then
 Begin
 RESULT= [Yield Goal] * 1.500 * 1.660
End

**5 = Units of K required to raise soil 1 ppm**

**1.66 = conversion of elementium potassium to potash**

**1.5 = potash removed per bushel of soybeans**
```

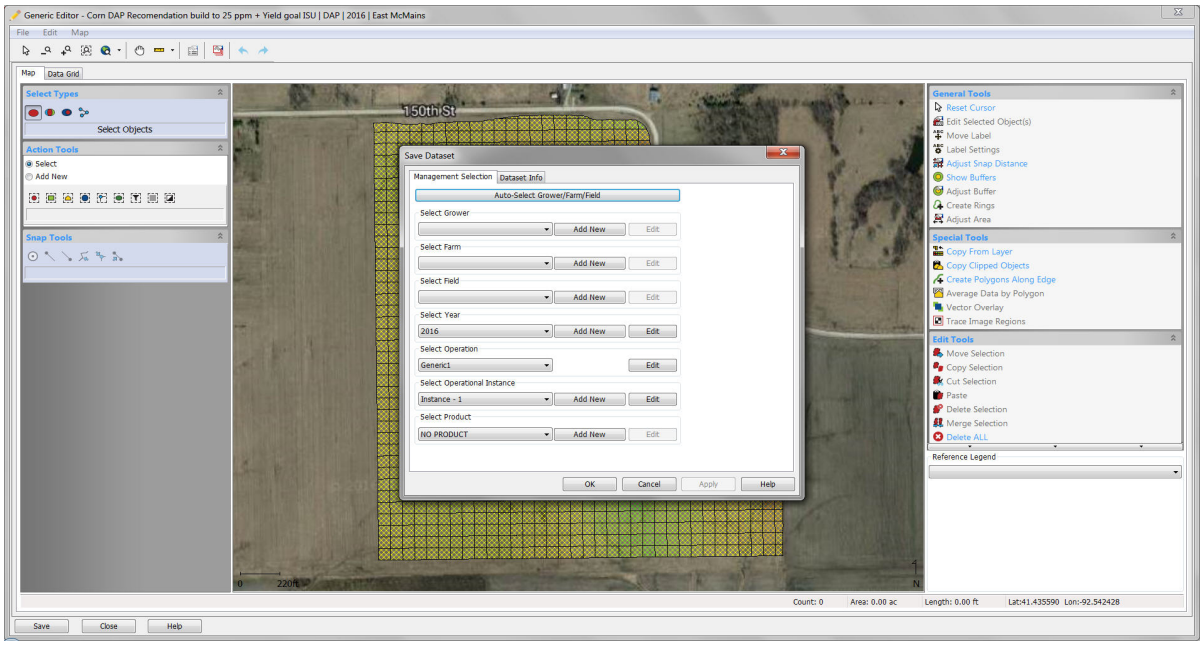
28. The following equation would be a simple build to 170 PPM for Potash application without a yield goal

```
 If [Soil K] > 170.00 Then
 Begin
 RESULT= 0.00
End
 Else If [Soil K] <= 170.00 Then
 Begin
 RESULT= ( ( 170.00 - [Soil K] ) * 5.000 * 1.660 )
End

**5 = Units of K required to raise soil 1 ppm**

**1.66 = conversion of elemental K to Potash application**
```

30. Click **Finish** to return to the Select Analysis Type to Run window
31. Select the Equation that was just setup to run under Saved Equation Based Analysis Functions. To run the equation for one field select **Single Field** under **Run Select Analysis for...**
32. Select the Grower/Farm/Field and other management information to run the equation against, in the Select Data Filters window. Click **Next** and then **Finish**
33. As the equation is processed it will ask for the values to use for the prompts that are in the equation if Temporary results were used



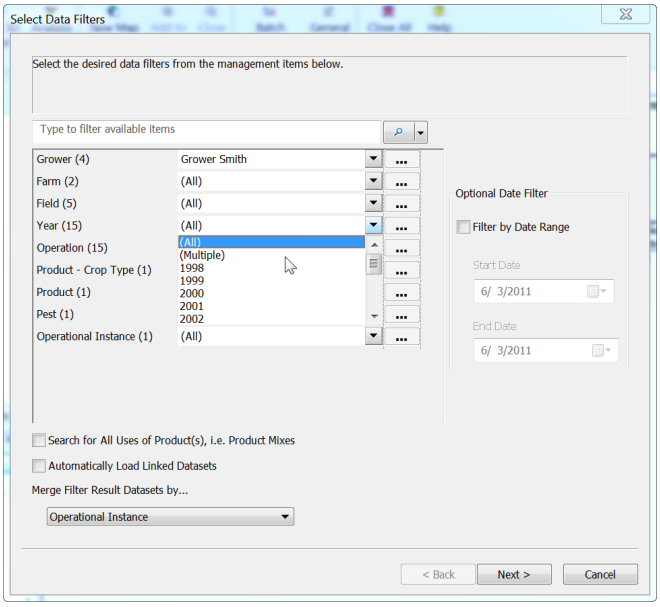
34. A new window will appear and show the resulting map. Clicking **Save** at the bottom will allow this map to be saved to the management tree. Select the **Product** for the type of fertilizer function created in the equation



35. This completes the creation of an equation. Verification should be done to compare the Output map, and the map that was used as a reference to make sure that the equation was calculated correctly

Running Equations Across Multiple Fields

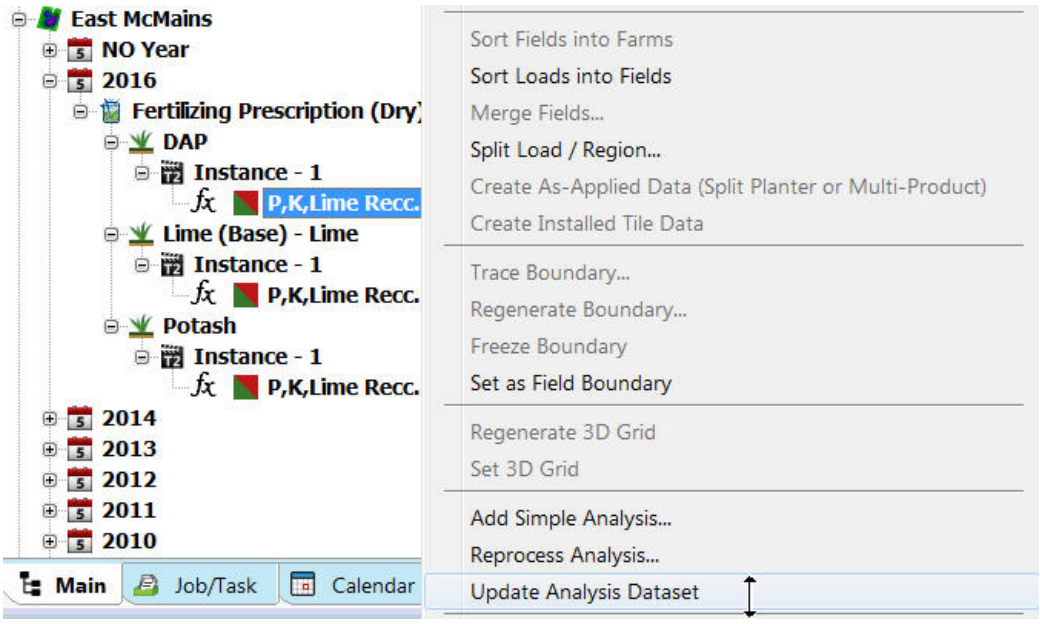
1. When in the Select Analysis Type to Run screen, select the saved equation under **Saved Equation Based Analysis Functions**. With the equation highlighted click on **Multiple Fields** under Run Selected Analysis for... at the bottom of the window
2. In the Select Data Filters window select the Grower/Farm/Fields and other management information to run the equation for. Click **Next** and then click **Finish**



Update Analysis Dataset

Datasets created from the Analysis Wizard can be updated through the management tree. These updates may include updating a multiple-year average to include newly archived harvest data or updating the yield goal prompts in a fertilizing prescription dataset.

1. **Right-Click** on the dataset to be updated and select **Update Analysis Dataset**



For all updates, except those with a prompt, this will be your only step.

2. If there's a prompt, enter in the appropriate value

The previously used value will display in the text box.

3. Click **Finish** and the analysis dataset will be updated

AgFiniti®

After exporting data from the SMS™ Desktop Software to your AgFiniti® account, you can view that information using Map View. To learn how to export data to AgFiniti, review the Exporting and Device Setup chapter.

In this chapter you will learn how to:

- Sync data between AgFiniti and SMS
- View information in AgFiniti Map View
- Modify the mapped values using the Stat Cards
- Customize legends
- Access your current location using GPS
- Remove data from your AgFiniti account

AgFiniti Sync

To sync data between SMS and AgFiniti, use the **AgFiniti Sync** tool.

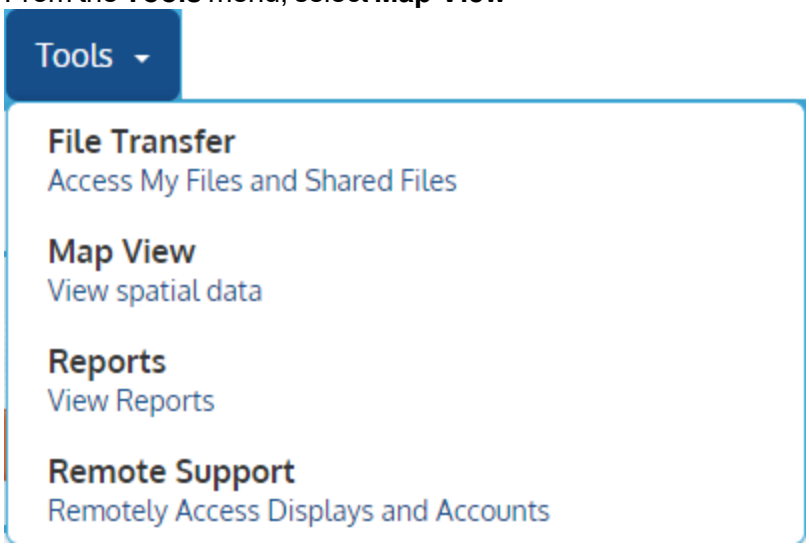
1. Open the project in SMS you wish to sync data to/from and click the AgFiniti Sync button.

2. In the AgFiniti Sync dialog, you will choose what actions SMS should take:
    - **Download and Read Data/Files from AgFiniti**- Checking this box will open a new dialog where you will select which Growers you want to download data from AgFiniti into SMS. You will also be able to choose what seasons of data you wish to download:
        - Last Year, This Year and After
        - All Years
        - Selected Year and After
        - **File Format Options** - When importing John Deere Greenstar 3 data, you can specify if you want to use the EIC Importer.
    - **Upload Mappable Data to AgFiniti** - Checking this box will open a new dialog where you will select which Growers you want to upload mappable data from SMS into AgFiniti. Growers that are already in your AgFiniti account will be selected automatically. You will also be able to select what seasons and operations you want to upload.
        - Last Year, This Year and After
        - All Years
        - Selected Year and After
        - **Operation** - The default is all operations, but you can use the drop down to select an individual operation, or select Multiple to upload only the selected operations.
    - **Prompt to Sync to AgFiniti when this Project is...** - use this tool if you want SMS to automatically prompt you to sync data between AgFiniti and SMS each time you:
        - Open or Close this project
        - Close this project
        - Open this project
3. Click **Sync With AgFiniti** after making your desired selections.

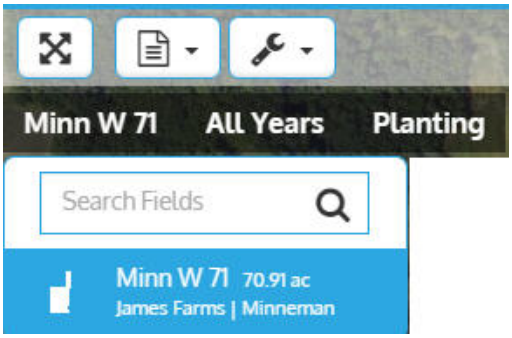
Map View

To view data in Map View, follow the steps below:

1. Log into your AgFiniti account by visiting www.agfiniti.com and enter your user name and password.
   - The credentials you enter into AgFiniti are the same as you use to register your SMS Desktop Software.
   - If this is the first time logging into your account, you will need to accept the Terms of Use.
2. From the **Tools** menu, select **Map View**



3. In the Map View window, the default display will be to show you either your field boundaries, or a place holder for those boundaries, depending on the physical distance between each of the fields available.
4. To view field information, use the **Fields** menu in the upper left.



5. After selecting the field, year and operations to view, use the **Stats** cardson the right to select what attributes to view.

> To increase the map viewing area, you can collapse the page header using the icon in the upper left hand corner as well as collapsing the Field and Stats panels at the bottom using the down arrow.

6. If you are viewing data on a device with GPS, you can turn on GPS Location to show your location in relation to the field(s) you have mapped.
   - When GPS is enabled, the stat cards will show you details about the full field as normal, but also the details about your current location.

7. To view details of a selected area, use the Query Tools in the upper left to draw a polygon around the region you are interested in, by left clicking to drop points and double clicking to finish the selection. The stat cards will update with details about your selected area.
8. To permanently remove data from AgFiniti Map View, go to the **Manage** menu and choose **Resources**, and select **Mappable Data**.
    - Select the information you wish to remove and click **Delete Selected Data**.
    - To remove a field(s) and all spatial data contained in that field, click the **Delete Fields** button.

SMS Basic users can store up to 10,000 acres of information in Map View and SMS Advanced users can store up to 30,000 acres.

Transfer Utilities

In this chapter you will learn how to:

- Transfer items between projects.
- Examples of items that can be transferred are:
  - Analysis Functions
  - Charts/Reports
  - Legends
  - Print Layouts

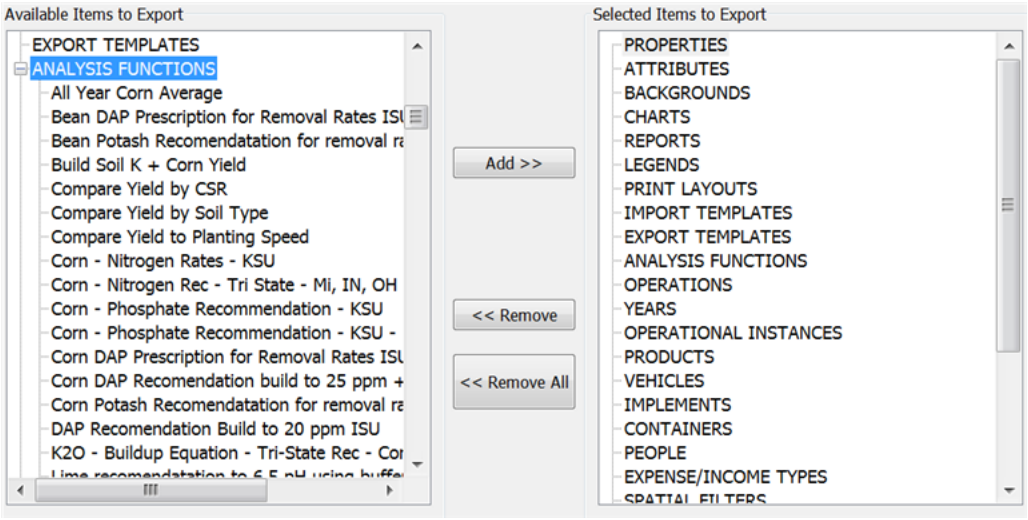
The transfer utilities provide a means of sharing various settings and setup files that you have created or modified, with other users of the software. The following items can be transferred: selection lists, properties, attributes, backgrounds, analysis functions, operations, years, operational instances, products, vehicles, implements, containers, operators, legends, print layouts, import templates, export templates, reports, and charts. If you transfer an item, such as a report or analysis function that uses an attribute or property that is user-defined the transfer will automatically add the attributes or properties that you defined and are unique to your system to the transfer list under the appropriate item group. This ensures that your transferred items will function properly on another users system or in another project, even though they may not have all the same items in their system that you have.

Transfers can also be used to "sync" items and settings between projects. This means that you can setup all your custom settings and items in one project, select all the items for transfer, click the Set As Transfer Project Default button, and now when you open any other project it will check to see if it has the latest transfer loaded and if not it will ask you if you would like to load the latest transfer. The result is that you can quickly and easily share your items with all the projects you use, which is extremely useful when you have items that you add would like to add to all your projects for general use.

Transfer Utilities

The Transfer Utilities allow you to create a transfer file that contains settings, setup files, management items, analysis functions, and backgrounds that can be transferred to another project in your system or to another users system.

Transfer Export Dialog



Available Items to Export

Select from the listed settings, files, etc that are available for transfer.

Show Default System Items

Check this option to show all items in the system, including factory defaults. The only time you should need to transfer factory defaults is if you have altered the defaults and you want to transfer them.

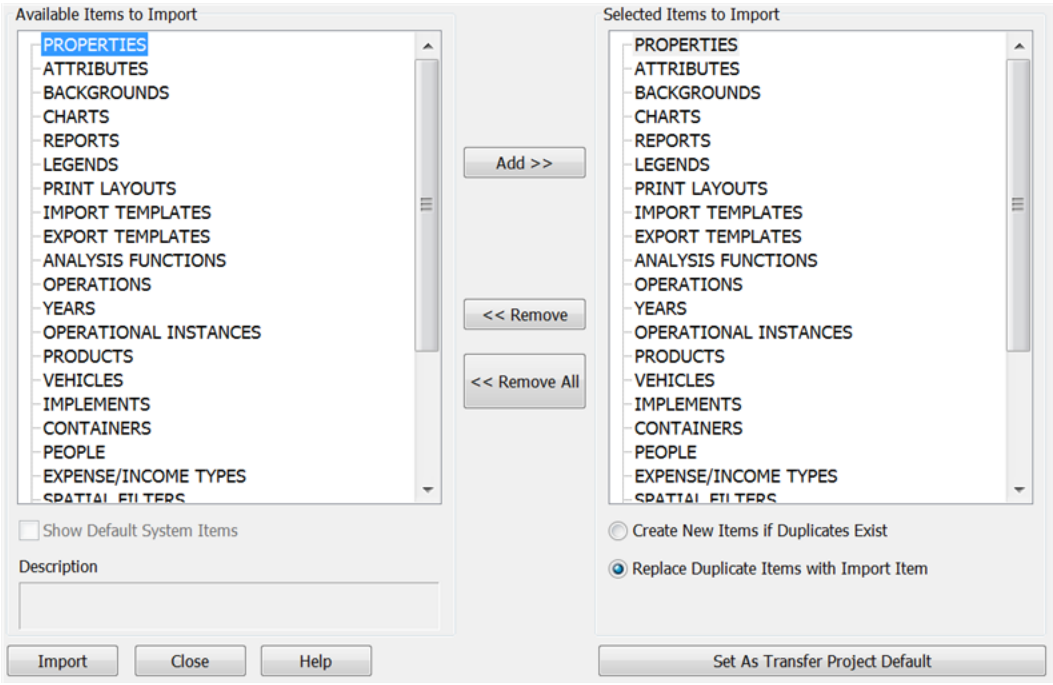
Selected Items to Export

Lists the settings, files, etc that have been selected for transfer.

Set As Transfer Project Default

Click this button to set the items that you have chosen for transfer as a global default for all projects in your system. Each time you open a project it checks to see if it has the latest global transfer that is available. If it does not, then you will be asked if you would like to load the transfer into the project you are opening or continue on without loading it. This is very useful for keeping items and settings that are often used or added over time to other projects so that you don't have to manually create them again or transfer and import them manually.

Transfer Import Dialog



Available Items to Import

Lists the items that are available for import, but should only list items that have been removed from the Selected Items tree.

Show Default System Items

Check this option to show all items in the system, including factory defaults. The only time you should need to transfer factory defaults is if you have altered the defaults and you want to transfer them.

Selected Items to Import

Lists the items that are contained in the selected transfer file for import. You can selectively remove items that you do not want to import from the transfer file.

Create New Items if Duplicates Exist

Select this option if you want to create new item entries in your system if duplicates are found between items in your system and those being imported from the transfer file. This option insures that you don't overwrite exist-

ing items that you may want to keep as is but can also lead to a number of additional items being created that could be duplicates of items you already have and really should have just replaced.

Replace Duplicate Items with Import Items

Select this option if you want to replace any duplicate settings, files, etc that are already in your system with the ones from the transfer file. Remember that this option will overwrite any existing items in your system that are the same, so be careful because you will lose the current version of these items in your system.

Set As Transfer Project Default

Click this button to set the items that you have chosen for import as a global default for all projects in your system. Each time you open a project it checks to see if it has the latest global transfer that is available. If it does not, then you will be asked if you would like to load the transfer into the project you are opening or continue on without loading it. This is very useful for keeping items and settings that you often add over time to other projects so that you don't have to manually create them again or transfer and import them manually.

Exporting Transfer Information

Follow these steps for using the export transfer utilities feature:

1. Go to **Services - Transfer Utilities - Export Settings and Files...**
2. You should now see the Select Information to Export dialog. This dialog allows you to export various items and settings for the listed groups. Select the desired settings and files that you want to transfer and then click **Add** to add them to the Selected Items to Export list
3. Once you have the list ready, click the **Export** button and name the export file and save it
4. The export file containing all the selected information has now been created and can now be taken to another install of the same version of the software and imported

Importing Transfer Information

Follow these steps for using the import transfer utilities feature:

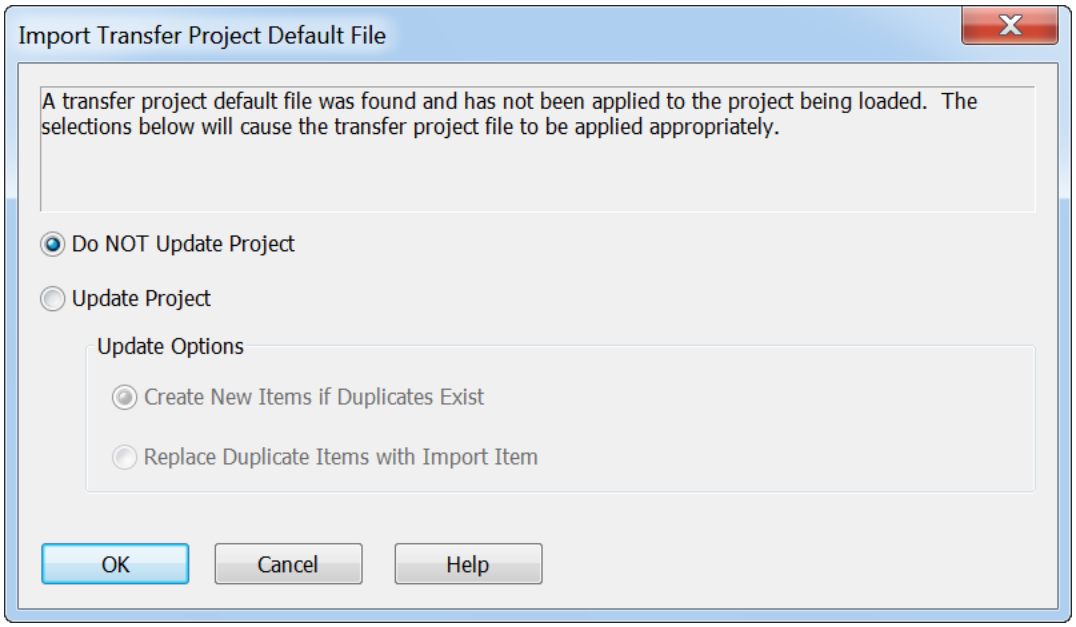
1. Go to **Services - Transfer Utilities - Import Settings and Files...**
2. Find the transfer file you would like to import, select it, and click **Open**
3. You should now see the Select Information to Import dialog. In this feature you have the ability to select items to import and use in your program. By default all settings and files in the exported file are selected, so if some settings or files are not desired to import you will have to remove them manually. The next setting you have to choose is if you want to "**Create New Items if Duplicates Exist**" or "**Replace Duplicate Items with Import Item**". These settings will allow you to create all new or replace system settings or files if conflicts exist between the files you are importing and what already exists in your system. In most cases you will create new but the option is available to replace if needed. Next you will need to click the **Import** button to complete the process

4. The import process should not take very long, but if backgrounds are being imported the process could be slower depending on the image sizes. After the import process is complete you should have the ability to use any of the settings or files that were imported

> On both the Transfer Import and Export dialogs there is a button provided called "Set As Transfer Project Default". Once you have made your selections for transfer import or export, click this button to create a global transfer file that all the projects in your system can use. When you open a project or create a new project the software will automatically check to see if it has the latest transfer file. If not it will ask you if you wish to load the transfer file. This option is a very easy way to keep all your projects updated with the settings and items that you want to commonly use.

Importing Project Defaults

Upon opening a different (or creating a new) project, the following dialog box will appear



The options are described below:

- **Do NOT Update Project** - The items in the Transfer File will not be imported into the current project
- **Update Project** - The items in the Transfer File will be imported into the current project
  - **Create New Items if Duplicates Exist** - New items will be created regardless of whether they already exist

> An example of this would be where an equation already exists in a project and changes have been made to it, but the user also desires to have the original equation in the project.

- **Replace Duplicate Items with Import Item** - If the item name already exists in the current project, it will be overwritten

> An example of this would be where an equation already exists in a project and changes have been made to it, but the user desires to only have the original equation in the transfer file loaded in the project.

1. Select the appropriate settings. For this example, select **Update Project and Replace Duplicate Items with Import Item**
2. Click **OK**
3. The items have now been successfully transferred to the current project and can now be used with the data in this project

Field Trial Module

In this chapter you will learn how to:

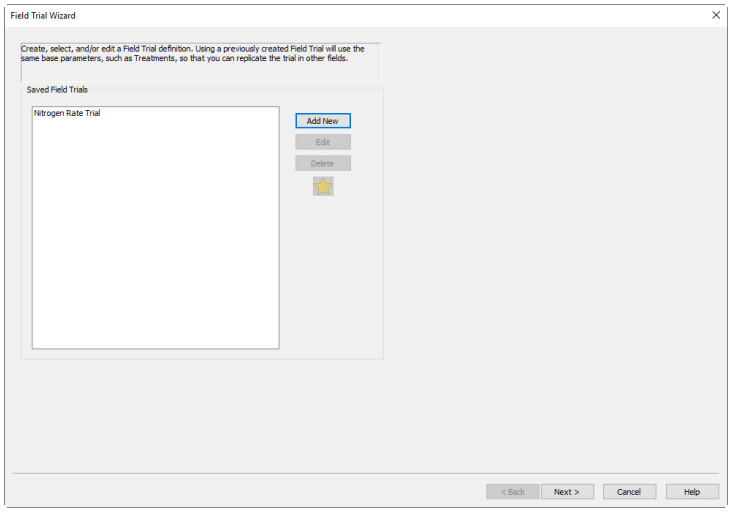
- Create and edit field trials
- Insert field trials into prescriptions
- Export to a field display

The Field Trial module assists you when designing, placing and analyzing field trials that can test seed, dry, liquid and generic applications. This allows you to generate agronomically sound trials for all types of inputs and then analyze the yield and financial impact these trials had in the fields.

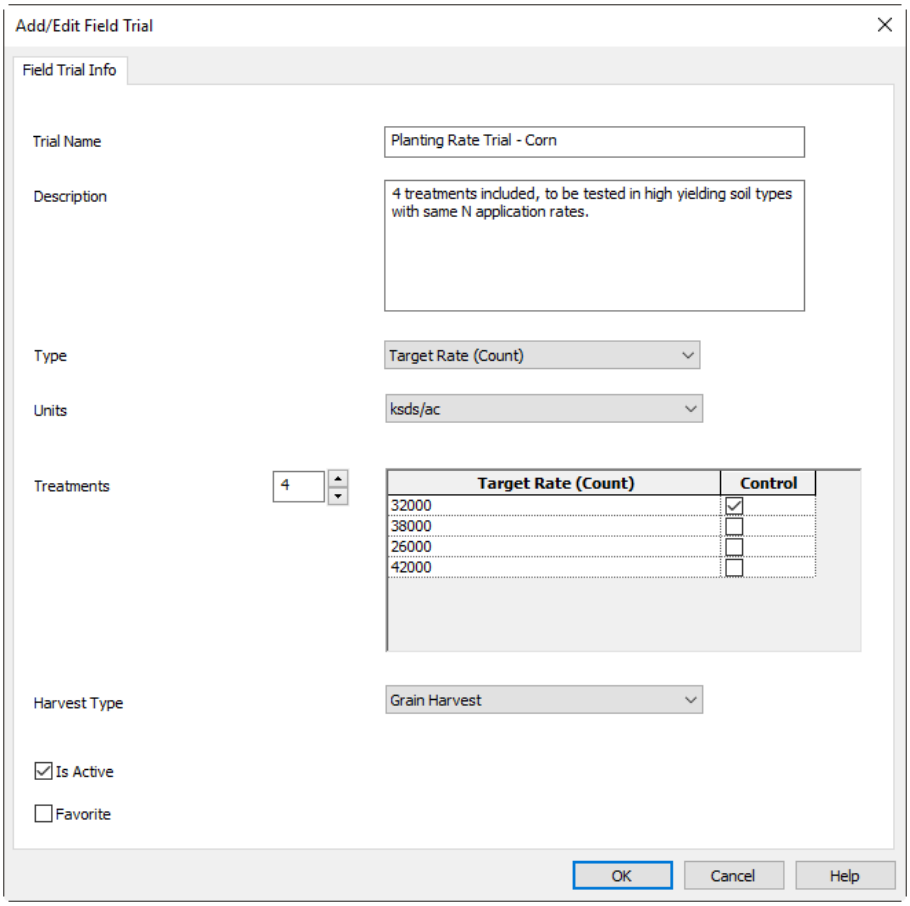
Building a Field Trial

Before building a field trial any data you wish to have available to reference, such as field boundaries, guidance patterns, as-applied data and soil survey information, will need to be saved to your management tree. The field prescription you plan to insert the trial into can be created before or after building the field trial.

1. Create a map of the data you wish to use as a reference layer when building the field trial.
2. Click **File – New – Field Trial** or click on the **New Field Trial Layer** icon in the mapping toolbar.
3. In the **Select Field to Load Reference Data From** dialog, verify the correct **Grower**, **Farm** and **Field** is selected, and click **OK**.
4. The **Field Trial Wizard** dialog will open. Existing Field Trials will be displayed, and you can **Edit**, **Delete** or **Mark as Favorites**. To build a new Field Trial, click the **Add New** button.



5. In the **Field Trial Info** tab, enter the following information:



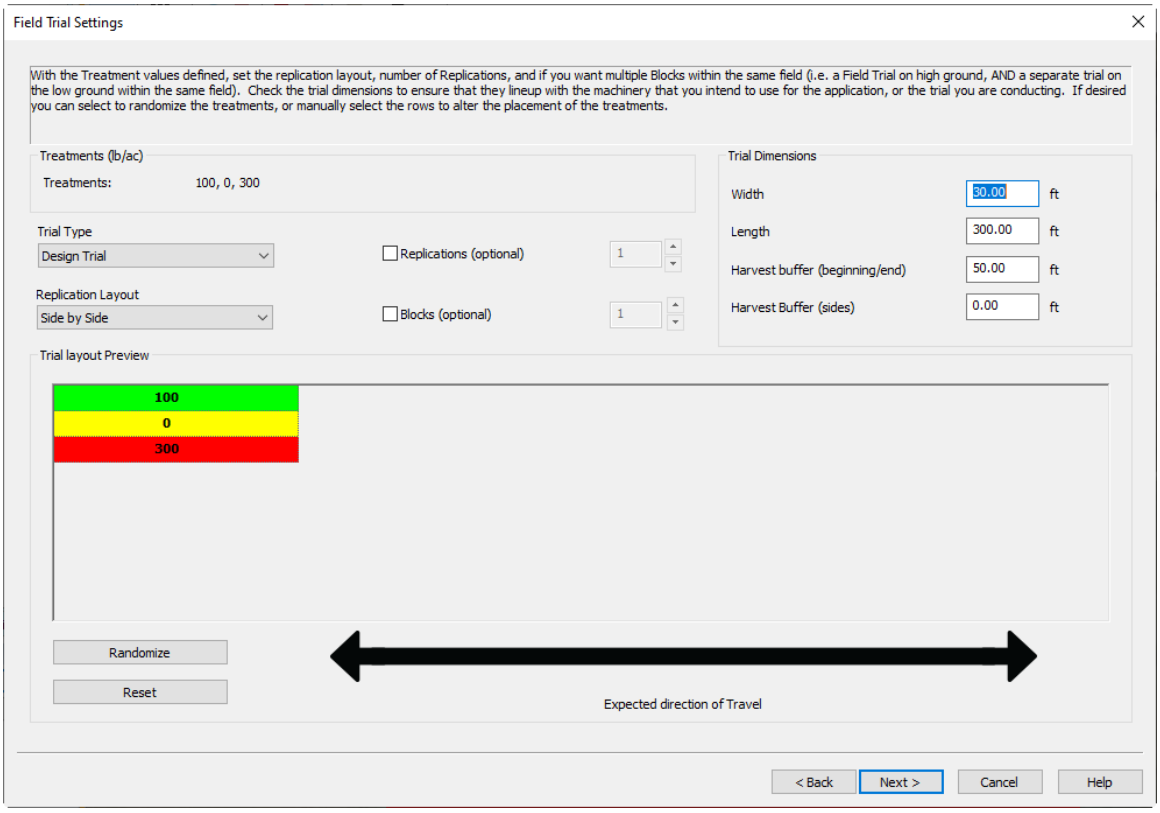
- **Trial Name** – This name will be displayed in the management tree, reports and analysis results so we suggest keeping the name brief but descriptive.
- **Description** – Use this text entry box to enter more detailed information about the trial.
- **Type** – Select the type of trial you are building:
  - **Target Rate (Mass)** – treatments controlled by weight
  - **Target Rate (Count)** – treatments controlled in seeds
  - **Target Rate (Liquid)** – treatments controlled by volume
  - **General (other)** – treatments not directly controlled by the field display, such as tillage type, planting speed or application date
- **Units** – Select the units the treatment will be controlled in. The Type selected above will determine what units of measure you can select from.
- **Treatments** – Select the number of treatments that will be in the trial. A minimum of two is required, but you can increase up to 20 if necessary. As you adjust the number of treatments, the text entry box to the right will be modified to match the number you enter.
  - Enter a rate or description for each different treatment in the field. These descriptions correspond to the different rates or variables being tested.

  - **Best Practice** – Include at least one typical rate in the list of treatments, that will be used as the control, so you can see how this control rate that has historically performed well, compares to the

other treatments being tested. If you anticipate a response curve being part of the post-harvest analysis you want to perform, consider having a minimum of 5 rate treatments, including a minimum and maximum treatment that are extreme enough when compared to the rest of the rates, that the yield curve will be impacted, allowing for economic and agronomic optimum values to be calculated.

- **Harvest Type** – Use the drop down menu to select the type of harvest information that will be collected for the trial.
- **Is Active** – Check this option so that the field trial is available to use in other fields and in future years.
- **Favorite** – Check this option to have this trial be displayed at the top of the Field Trial Wizard dialog, for easier selection in the future.

6. Click **OK** once all field trial information has been entered.
7. Select the Field Trial and click **Next**.
8. The **Field Trial Setup** dialog will open. Use this dialog to define the type of trial being created, trial dimensions, replication layout and how many blocks will be in the field. The treatments you defined on the previous screen will be displayed in the upper left hand corner.

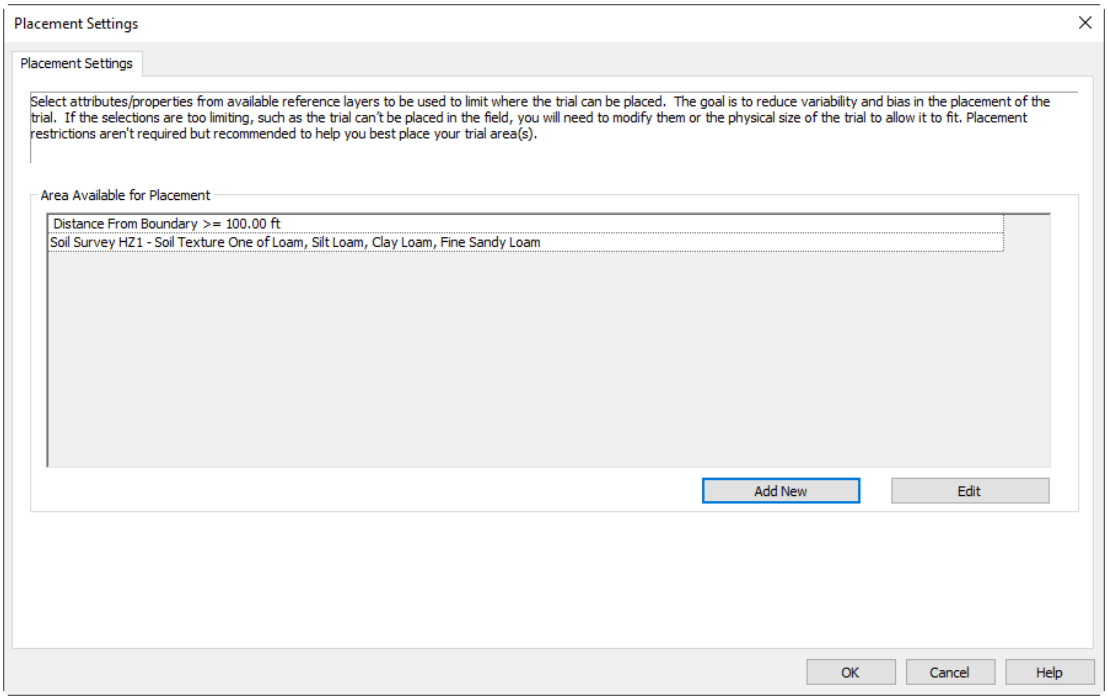


9. Select the **Trial Type** to create
   - **Design Trial** - This is a very structured trial where the user sets the number of rates, replications and strategically place the trial in the field in a way where the least amount of bias will occur. These designed trials can then be placed into a prescription that can be loaded into a field display for in-field control of the treatments.
   - **Manual Trial** - User can manually put in a trial into a specific location in a field. Typically these trials are designed after the operation has already been completed in the field, as are based on the as-applied data for variables that are usually not controlled by the field display , such as planting speed or downforce.
10. Enter the **Trial Dimensions** to use
    - **Width** defines the swath width of the treatment being applied. When working with trials where the passes are straight, the implement width of the machine is the suggested entry, whereas if you are working with curved passes or with trials placed at an angle, you may wish to widen this entry beyond the actual swath width. Increasing the width of these passes will ensure the trial will still be placed properly, in spite of any GPS variances or display settings.
    - **Length** determines what distance the treatment will be tested. Be sure to enter a large enough distance so that the results of the trial are meaningful.
    - The **Harvest Buffer (beginning/end)** entered will affect the analysis done on the field trial once yield data is available. The number entered here will tell the software how much data to exclude from analysis, by ignoring data points collected from the start and end of the trial to the distance you entered as the buffer.

- This buffer can lead to greater confidence in your trial results, as it removes the impact that less than instantaneous rate changes and machine fluctuations can create.
- **Harvest Buffer (sides)** should be used when the treatment application and harvest swath widths are not the same. This will allow some of the harvest data along the edges to be filtered out, for more accurate analysis results.

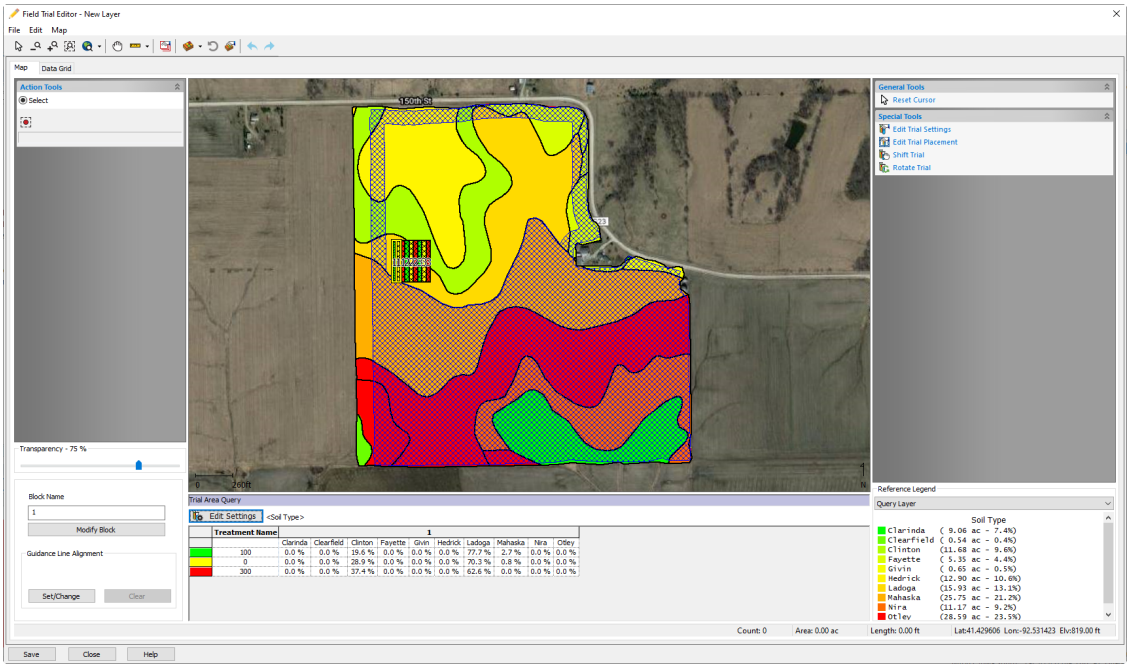
11. Select the **Replication Layout** (only available when creating Design Trials) you wish to use. As you make adjustments to the layout, the preview window will adjust.
    - **Side by Side** layout will place your treatments in different passes.
    - **End to End** layout will place your treatments all in the same pass.
12. To enter the number of **Replications**, place a check in the box and adjust the number to match the number you will use in the field trial.
    - Best practices suggest for each trial to garner the truest results, each trial should be replicated, or repeated in the field a minimum of 3 times, and preferably 4.
    - After harvest, the software will calculate the Least Significant Difference (LSD), only if there are at least 3 replications.

      - LSD helps you determine the least amount of change you need to see in order to attribute that change to the treatment being tested, instead of just variability due to other field conditions.
13. **Blocks** are optional (only available when creating Design Trials), but will allow you to duplicate the trial you are building in multiple areas of the field.
    - This is helpful if you want to test the treatments in multiple locations, such as the higher elevation areas of your field versus the lower elevations.
14. Clicking **Randomize** (only available when creating Design Trials) will rearrange your treatments so they are not always placed in the same order, or next to the same treatments.
    - This can help to remove bias from the trial and increase your confidence that the variable or treatment you are testing is most likely responsible for the yield response.
    - You can also manually reorder the treatments by clicking on the treatment name, and using the drop down menu to change where they are located.
    - To remove Randomization, click **Reset**.
15. Click **Next**.
16. The **Placement Settings** dialog will now open, where you can view the default filters, add new, edit existing or completely remove filters.



- If field boundaries are available, the default filter used by the software is to not place trials within 100 feet of the boundary edge.
- If soil survey information is available, the default filter used by the software will be to only place the trial in loam, silt loam, clay loam or fine sandy loam soil textures.
- To edit an existing filter, select the filter and click **Edit**.
- To remove an existing filter, select the filter, click Edit, and then select the Items to remove and click **Remove** or **Remove All**
- To add a new filter, click **Add New**, and use the Reference Layer Settings to define a new filter based on any of the reference layers you had mapped when starting to build your field trial.

17. Click **Finish** and the Field Trial Editor window will now open. The grid at the bottom will display the treatment name and soil survey properties.



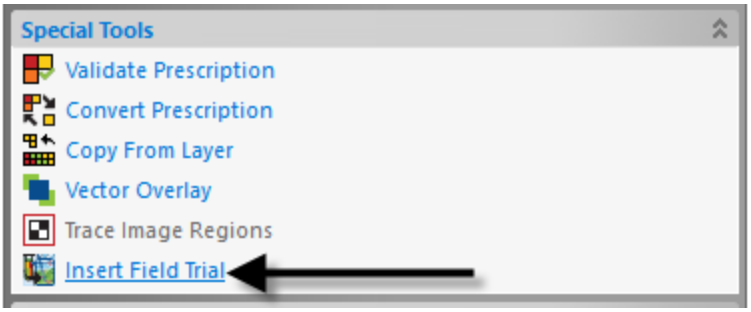
18. To adjust the background layers being displayed, click **Manage Reference Layers**. You can then adjust the Reference Legend being displayed using the drop down menu in the lower right hand corner.
19. Under **Special Tools**, you can adjust the location and settings of the field trial.
    - **Edit Trial Settings** will reopen the Field Trial Setup dialog.
    - **Edit Trial Placement** will reopen the Placement Settings dialog.
    - **Shift Trial** will allow you to left click and drag to move the treatment blocks.
    - **Rotate Trial** will allow you to left click and drag to change the alignment of the treatment block.
20. If you have multiple blocks in the trial, you can select them and enter a custom name, in the **Block Name** entry box.
21. **Modify Block** will allow you to remove individual replications from being included in the trial analysis, while still allowing the rest of the replications in the block.
22. If the field you are working in has Guidance operations saved in the management tree, and you would like to align the treatment block to one of those lines, select the treatment block and then click **Set/Change**.

- The **Select a Guidance Line** dialog will now open.
- Use the **Year** drop down menu to select which year contains the guidance line you wish to use, and then select the appropriate line from the left. You will see a preview of the guidance pattern selected to verify it is correct.
- Click **OK** and the treatment block you had selected will snap to the guidance line you selected.

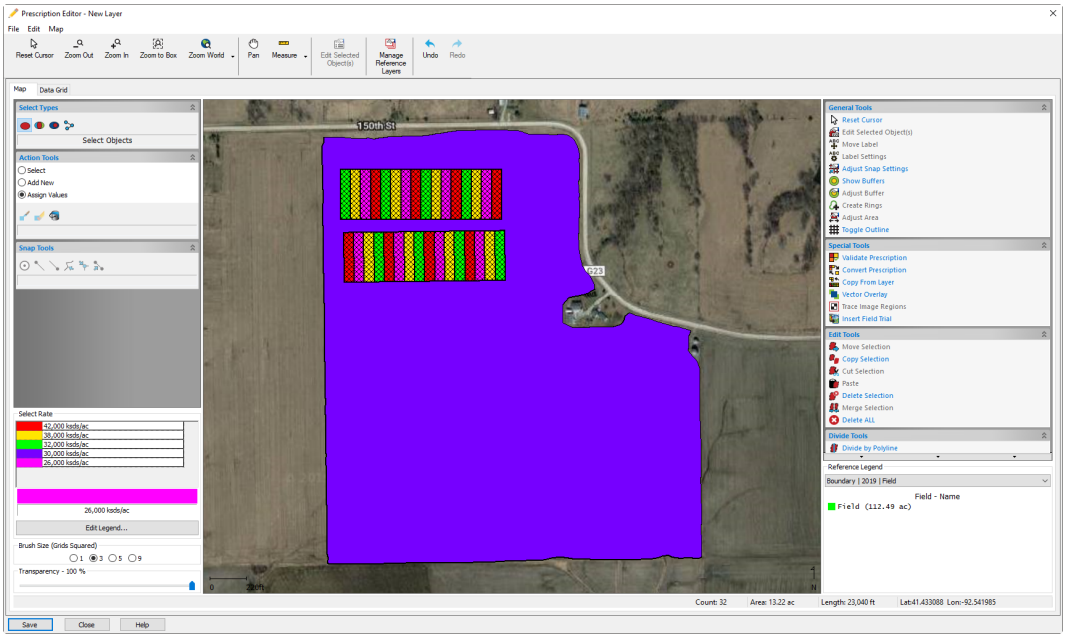
23. To adjust the attributes displayed in the Query table, click on **Edit Settings**. In the Query Area Settings dialog, select the layer, attribute and property to display and click **OK.**
24. Click **Save** and after verifying the proper management items are selected, click **OK**.
25. The Field Trial will now be saved in your management tree. You can make further edits as necessary by mapping the trial, and choosing **Edit Layer**.

Inserting Field Trials into Prescription Layers

1. To insert a Field Trial into the Prescription that will be used, create a map of the Prescription and choose **Edit Layer**. The Field Trial and Prescription have to contain the same unit type in order to be merged together. For example, a Field Trial created in seeds/ac can be merged with a Planting Prescription created in ksds/acre, but a trial created in seeds/ac could not be merged with a Seeding Prescription created in lbs/acre.
2. In the Prescription Editor window, click on **Insert Field Trial**.



3. In the Merge Field Trial window, select the **Year** and **Field Trial** you would like to merge with your Prescription. Verify the Treatments Preview window is correct, and click **OK**.
4. The Field Trial will now be merged with the Prescription Layer



5. Click **Save**.

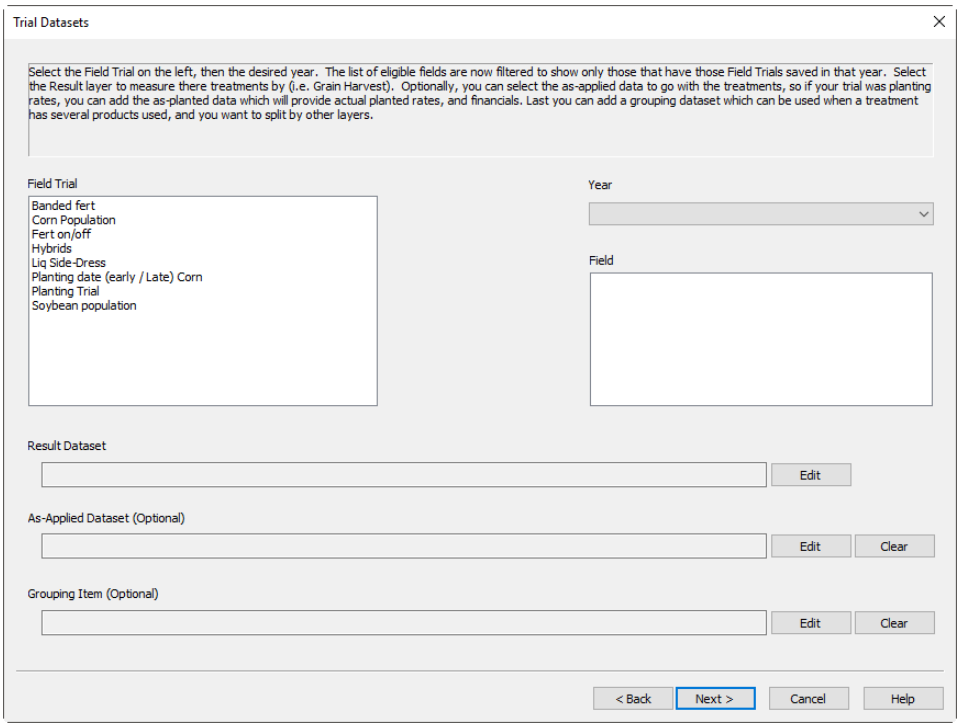
Exporting Prescriptions with Field Trials

Prescriptions containing field trials can be exported to field displays using **Device Setup Utility**. To export to generic file types, use the **Export** tool in the **File** menu.

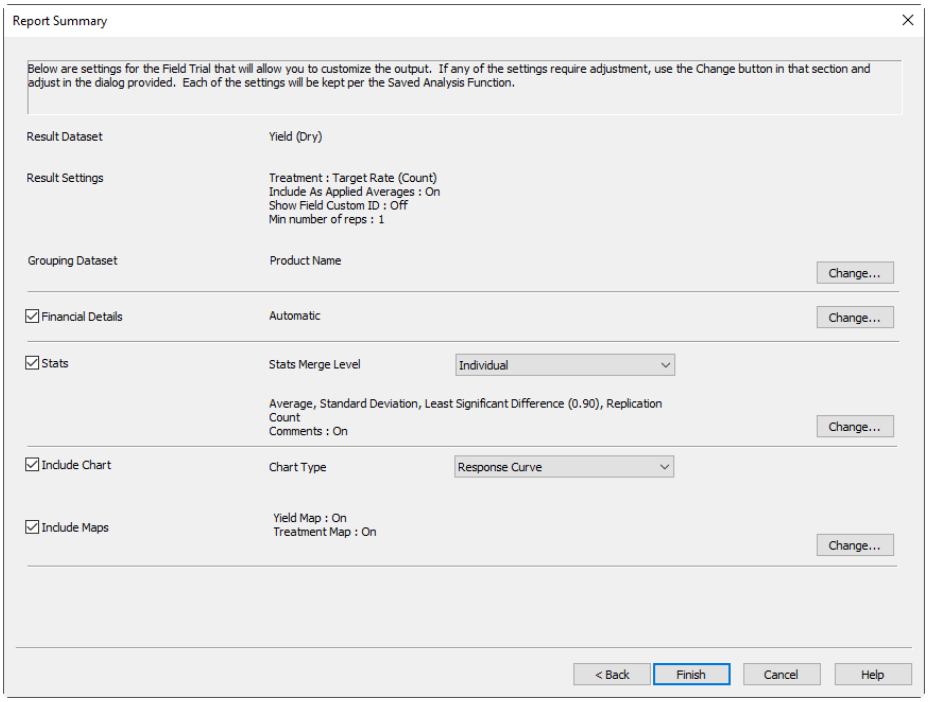
Creating a Field Trial Analysis

Before building a field trial analysis, you will need to verify that the information you wish to use as a result data-set, such as Grain Harvest, has been saved to your management tree.

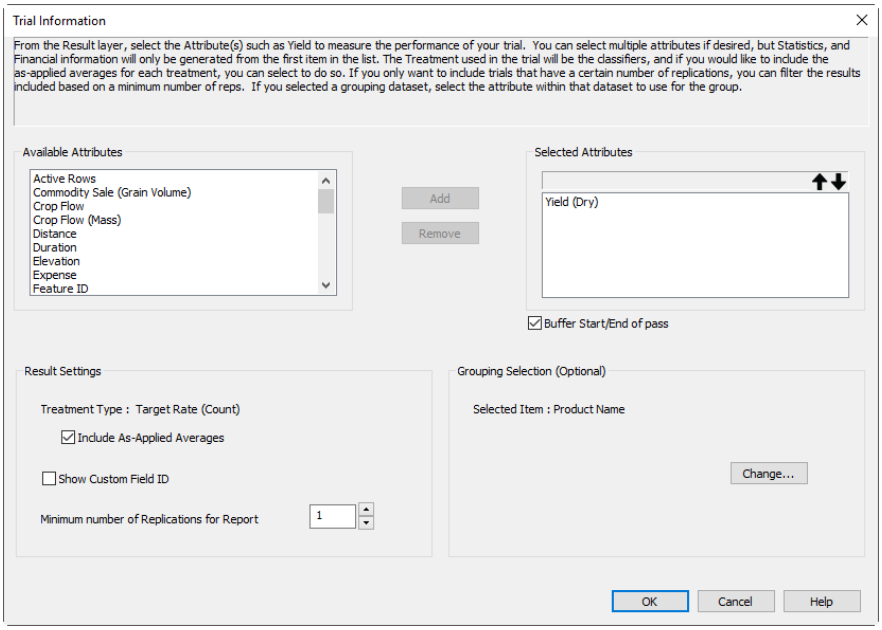
1. Click the **Analysis Wizard** icon and select **Field Trial** on the left.
2. You can choose to run any previously created Field Trial analyses or click **Add** to build a new report.
3. Enter a **Name** and optional **Description** for your new analysis and click **Next**.
4. The **Trial Datasets** dialog will open.



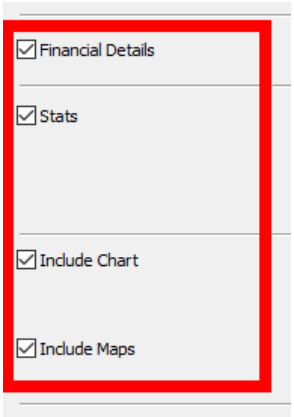
5. Select the **Field Trial** you wish to include in the report on the left. All Field Trials that exist in the project you are currently working in will be displayed.
6. Select the **Year** that you wish to have included in your analysis results from the drop down menu and the **Field** you wish to have included from the list.
7. Click **Edit** next to the Result Dataset and confirm that the auto-selected management items are accurate, and then click **Next**.
8. Remove any datasets you do not want included in the results and then click **Finish**.
9. There are two optional selections you can make: **As-Applied Dataset** and **Grouping Item**.
    - Selecting the As-Applied Dataset allows you to show that the rates being tested in the trial were accurately represented in the field, and also assists you in tracking product costs. Click Edit to select the As-Applied Dataset.
    - Choosing a Grouping Item allows you to segregate the analysis report by different variables, such as hybrids planted, soil types or management zones. Click Edit to select the Grouping Item.
10. Click **Next** after making all necessary selections.
11. The **Report Summary** dialog will open.



12. At the top of the dialog, verify the **Result Dataset**, **Result Settings** and **Grouping Dataset** that you previously selected are accurate.
13. Click **Change** to verify the Trial Information is accurate.



14. You can adjust what attributes will be included in the analysis results using the Add and Remove buttons. To alter the order of the attributes in the results, use the **Up** and **Down Arrows** in the Selected Attributes areas.
15. If you previously selected to reference As-Applied Datasets, you can select if you want those to appear in the results using the **Include As-Applied Averages** checkbox.
16. Check the **Show Custom ID** box if you have previously entered custom field IDs and wish to have those included in the report instead of the field names, to preserve data confidentiality.
17. **Minimum Number of Replications for Report** serves as a filter to exclude any field trials that do not contain the minimum number you select here.
18. Use the **Change** button if you previously selected to have your report results grouped, and you want to change the grouping value.
19. Click **OK** once all changes have been made.
20. There are 4 additional check boxes on this screen that are enabled by default.



- **Financial Details** - The financial details will automatically display product purchases or commodity sales that you entered through the financial tracking tools. If you wish to manually enter different costs, remove the check from Automatic and manually enter the income and expense values in the dialog.
- **Stats**- Modifying the stats merge level will alter how the results in the analysis report will be grouped. The highest detail form of this report is generated when individual is selected. Use the drop down to change to field level results. Clicking **Change** will allow you to choose between 4 different merge levels, as well as selecting what statistics to view. By default, average, standard deviation and least significant different are turned on. Customize the data that will be displayed in the analysis report using the check boxes, drop down menus and comments box.
- **Include Chart / Include Maps**- You can adjust what chart type will be displayed using the chart type drop down menu. Click **Change** to make additional modifications, including adjusting what is shown on the response curve chart, and if the analysis report will include both yield results and the field trial maps.

21. Click **Finish**.
22. Verify the Analysis you created is selected, and choose to run the analysis for a **Single Field**, **Multiple Fields** or **Multiple Projects.**
23. In the **Select Data Filters** dialog, verify the proper management items are selected and click **Next**.
24. Remove any unnecessary datasets and click **Next**.
25. Make any necessary modifications on the Report Summary dialog and click **Finish**.
26. The Field Trial analysis will now be generated, and once complete, will be displayed in the main mapping window of SMS.
27. To customize the report right-click and choose **Edit Report Options**.
    - On the **General** tab, you can adjust the name, description, colors and logo.
    - On the **Field Trial** tab, you can adjust if the chart starts at zero, type of chart and chart appearance settings.
28. To print, right-click and choose **Print**.
29. To save the file as HTML, which can be opened and edited in a spreadsheet, right-click and choose **Save as HTML**.

Banded Dry Fertilizer (field example)

Banded Fertilizer

Allows comparison to different management approaches, and compare the harvest results with financial and statistical data.

Sample Grower | Sample Farm | W60 | 2019 | Field Trial | (All) | (All) | (All) | (All) | Banded Dry Fertilizer

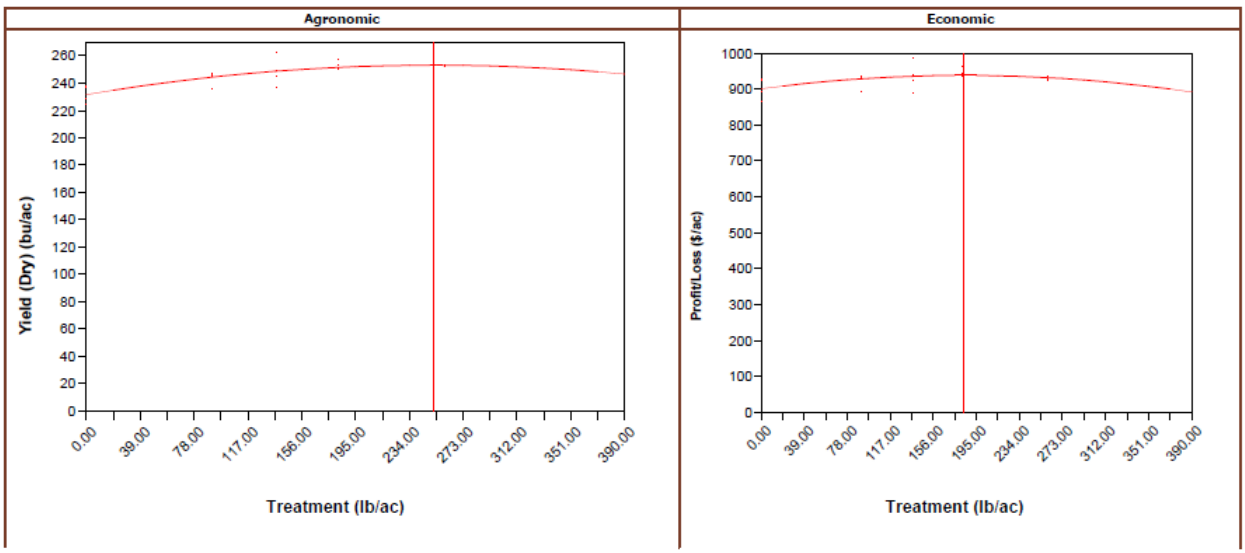
1					
Replication	Target Rate (Mass) (lb/ac)	Avg. Rate (Mass) lb/ac	Avg. Yield (Dry) bu/ac	Avg. Moisture %	Area ac
1	0	0.00	237.90	21.68	0.136
1	91	91.27	245.04	21.96	0.140
1	138	137.12	262.13	21.94	0.138
1	182	183.06	257.62	21.71	0.133
1	260	268.37	252.12	22.01	0.139
2	0	0.762	224.36	22.43	0.138
2	91	91.96	235.19	22.06	0.139
2	138	135.07	236.94	22.53	0.139
2	182	183.44	250.51	22.17	0.134
2	260	209.11	252.04	21.85	0.140
3	0	0.00	237.17	21.86	0.139
3	91	91.68	246.89	21.70	0.139
3	138	137.63	249.64	21.79	0.137
3	182	183.40	251.34	21.69	0.138
3	260	267.54	253.33	21.45	0.138
4	0	0.00	228.72	22.07	0.139
4	91	91.75	246.43	22.04	0.139
4	138	137.68	245.23	21.96	0.137
4	182	183.38	253.24	22.13	0.139
4	260	262.68	253.24	22.28	0.138
(All)	**(All)**	**132.80**	**245.95**	**21.97**	**2.760**

Trial Summary

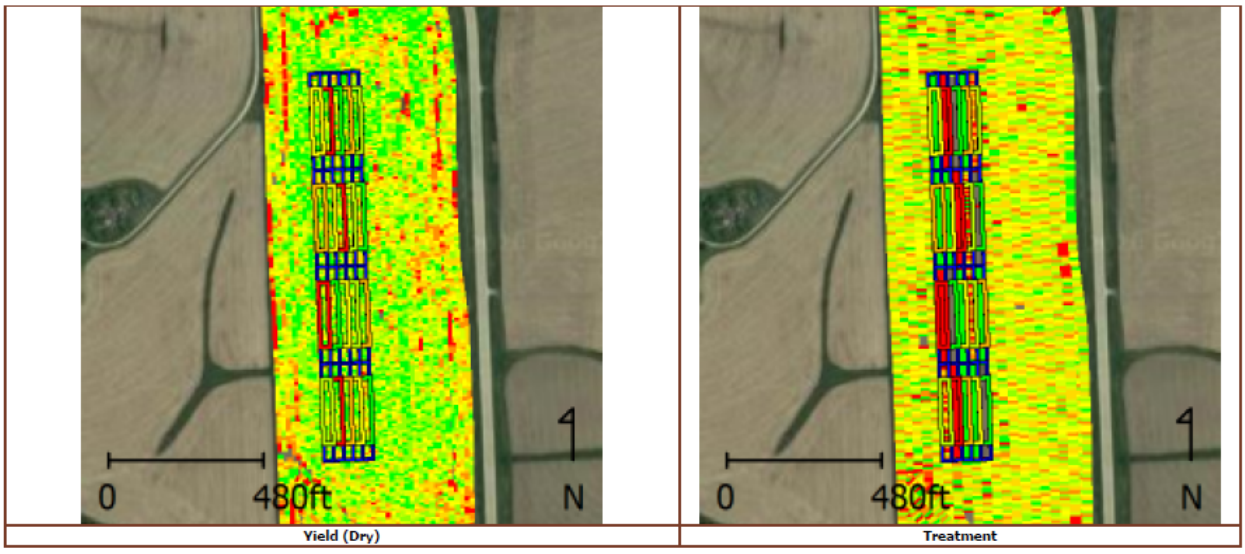
Treatment (lb/ac)	Average bu/ac	Standard Deviation bu/ac	Difference bu/ac	Revenue $/ac	Cost of Treatment $/ac	Profit/Loss $/ac
0	**232.04**	6.601	**-11.35**	904.95	2.04	902.92 (-20.93)
91*	243.39	5.521	0.00	949.22	25.37	923.85 (0.00)
138	248.49	10.51	5.096	969.10	33.94	935.16 (+11.31)
182	**253.18**	3.172	**9.787**	987.39	42.74	944.65 (+20.80)
260	**252.68**	0.697	**9.291**	985.46	55.74	929.72 (+5.87)

* = Control **Bold = Significant Difference**

Average	**245.95**
Standard Deviation	**9.737**
Least Significant Difference (0.90)	**7.743**
Replication Count	**4**



	Agronomic	Economic
	Maximum Yield (Dry) lb/ac	Optimum (lb/ac)
1	251.54	184.07



Plot Prescriptions

In this chapter you will learn how to:

- Create and edit plot prescriptions
- Adjust map settings for all plot prescriptions
- Export plot prescriptions

The Plot Prescription editor is used specifically for configuring small plots used to control the number of seeds dropped and trips for plot planters. This tool can be used to place the plot geographically in the field where there are fewer obstructions and have more consistent soils, thereby creating a more stable test environment.

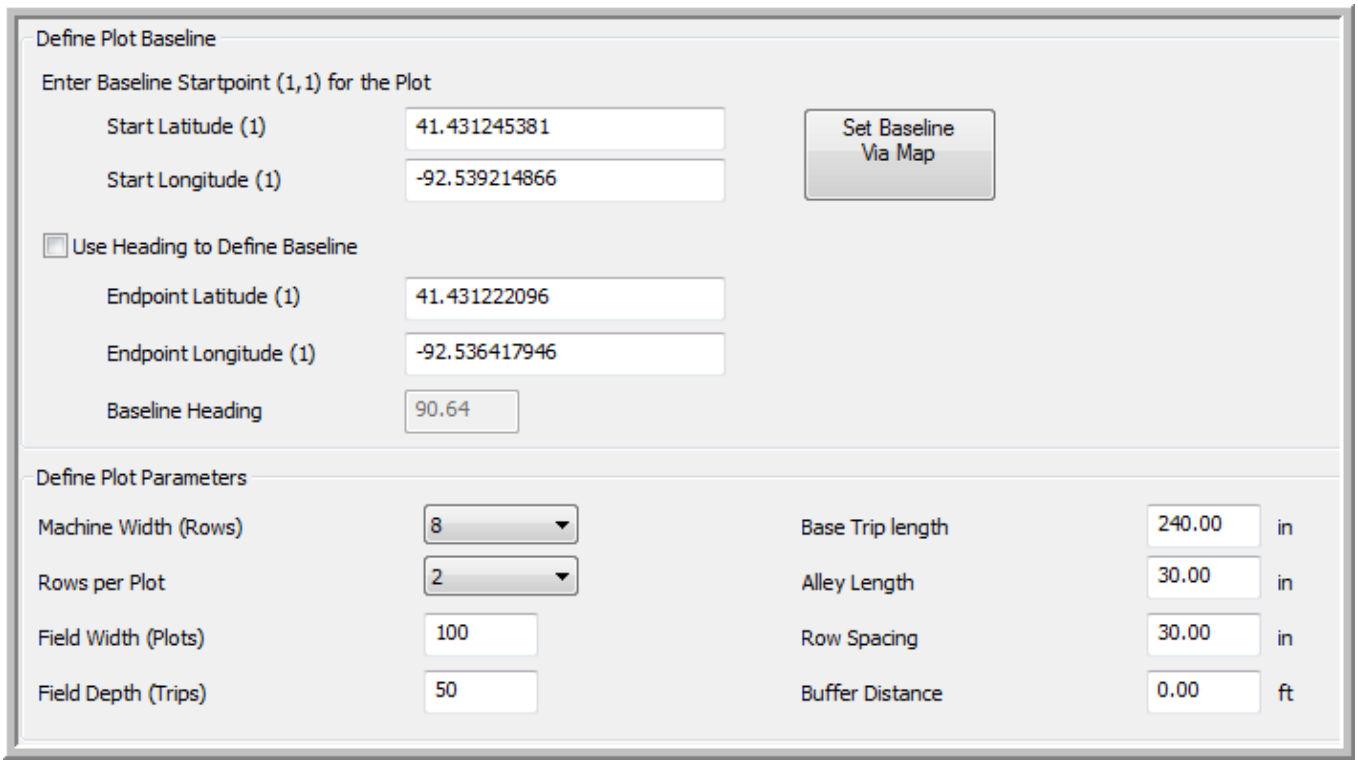
Building a Plot Prescription

Before building a plot prescription the data you wish to base the prescription on must be imported into the Software and saved to the Management Tree. For example, if you want to use yield maps or soil survey data as reference layers, be sure that data is available before beginning to build the prescription.

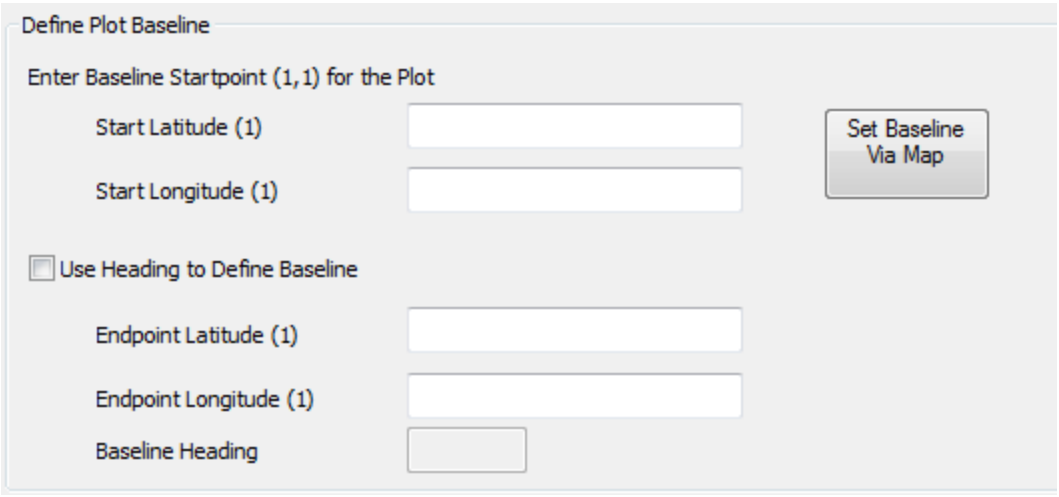
1. Create a map of the data you wish to use as the reference layer for your plot prescription.

> If multiple layers are being used as a reference map, the transparency bar can be used so that all map layers are visible

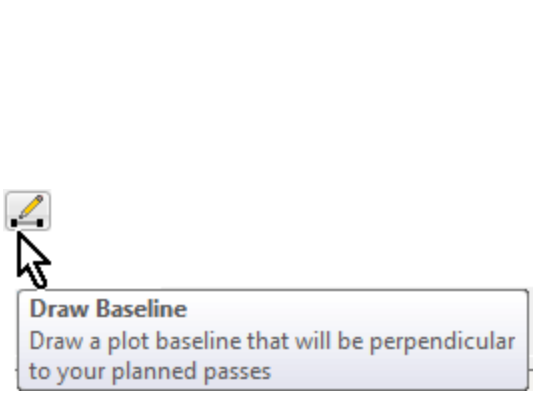
2. Click **File- New- Plot Prescription** or click on the **New Plot Prescription Layer** icon on the mapping toolbar
3. The **Enter Field Plot Settings** dialog will now open where you will establish the settings for the plot

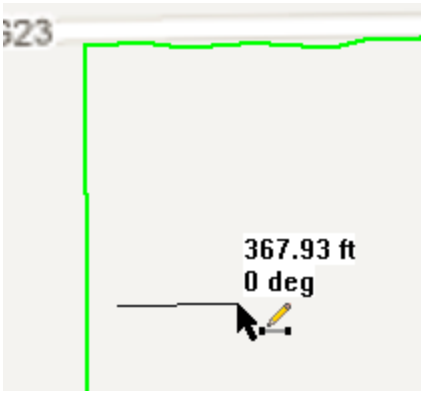


4. The plot baseline determines where the first range of cells in the plot will start. There are several ways to define the plot baseline: by entering in the A and B coordinates, Set Via the Map, or by typing in the coordinates for the A point and the heading to drive.

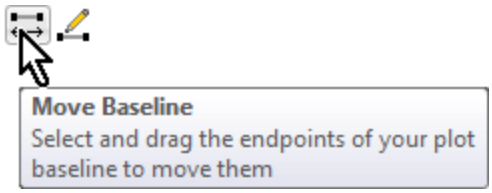


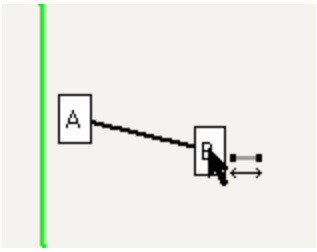
5. If you use the **Set Baseline Via Map** tool, the **Set Field Plot Baseline** dialog will open with all reference maps displayed. Left click once to add the A point and left click again to finish the baseline and add the B point. As the baseline is being drawn a tooltip displaying the length and heading will be displayed.



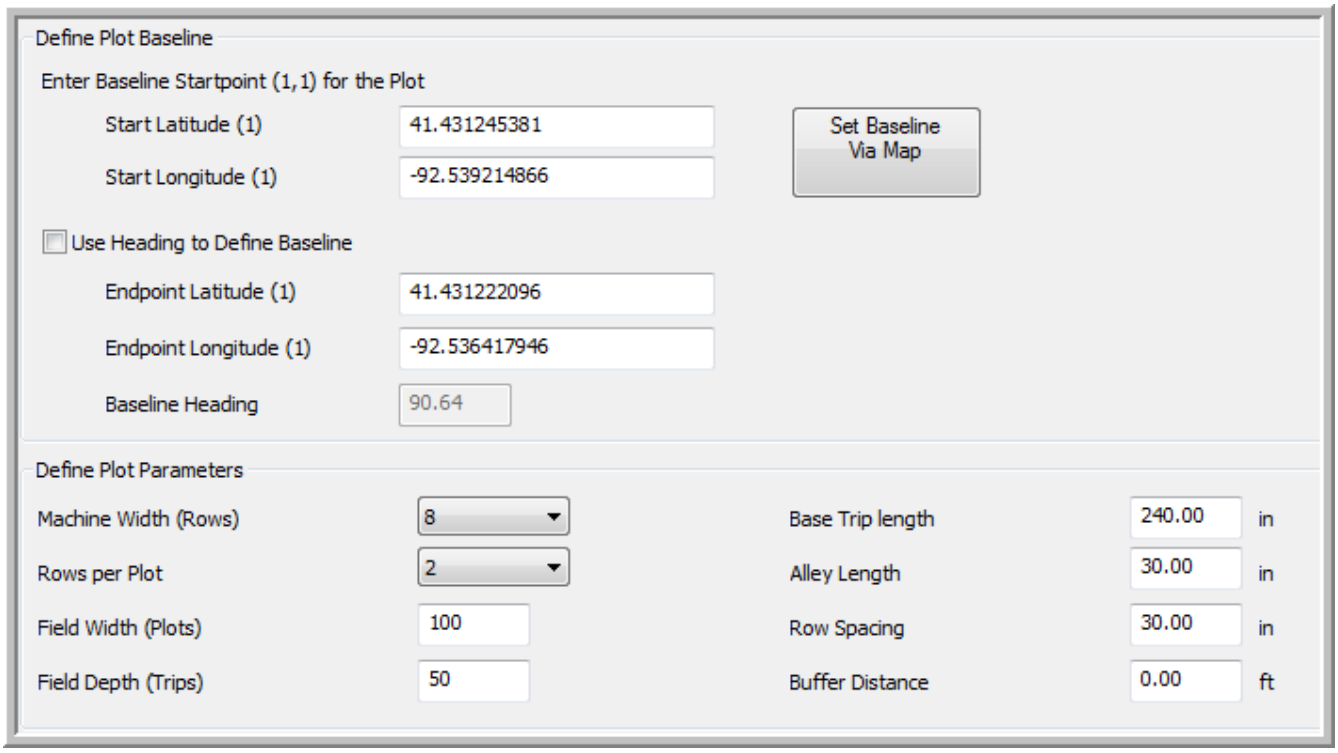


6. If the baseline needs adjusted use the **Move Baseline** tool to move the A and B points and fine-tune where the plot is located at in the field.

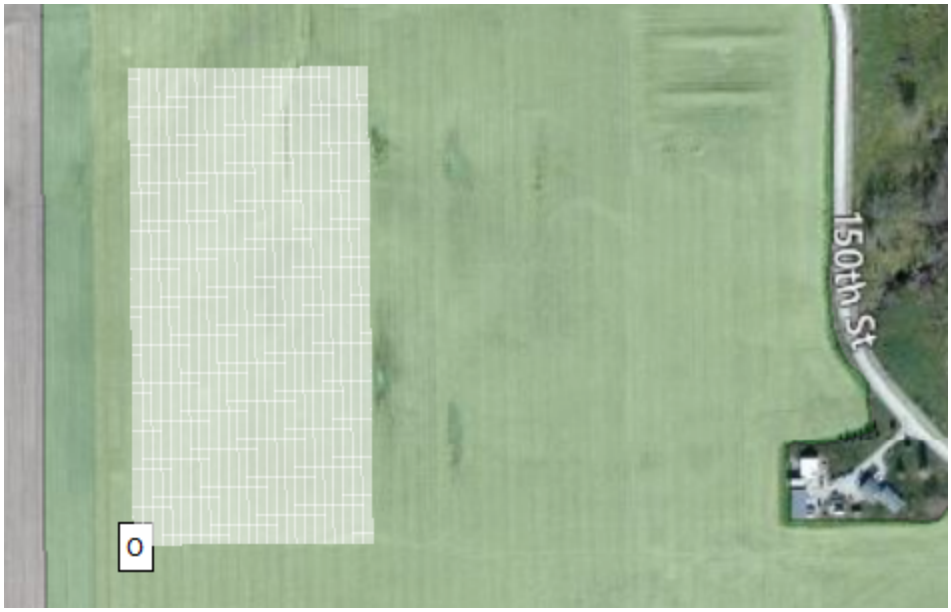




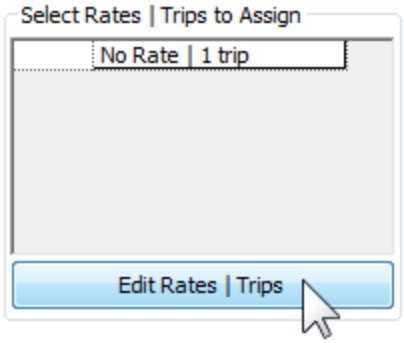
7. After the baseline has been created click **OK**
8. On the **Enter Field Plot Settings** dialog use the **Define Plot Parameters** to establish the machine width, number of rows per plot, field width, field depth, base trip length, alley length, row spacing and buffer distance.



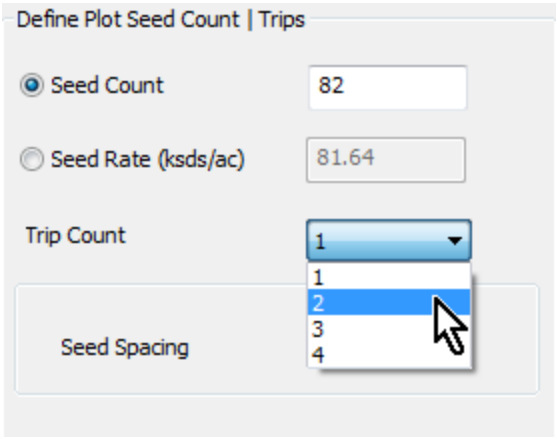
9. Click **OK** to complete the plot setup.
10. The field plot will now be displayed. The origin of the baseline will be displayed on the plot with a label of "**O**". The origin represents Plot 1-1 and each cell represents a planter pass and 1 trip.



11. Click the **Edit Seed Count | Trips** button to define the rates and trips for the plot.



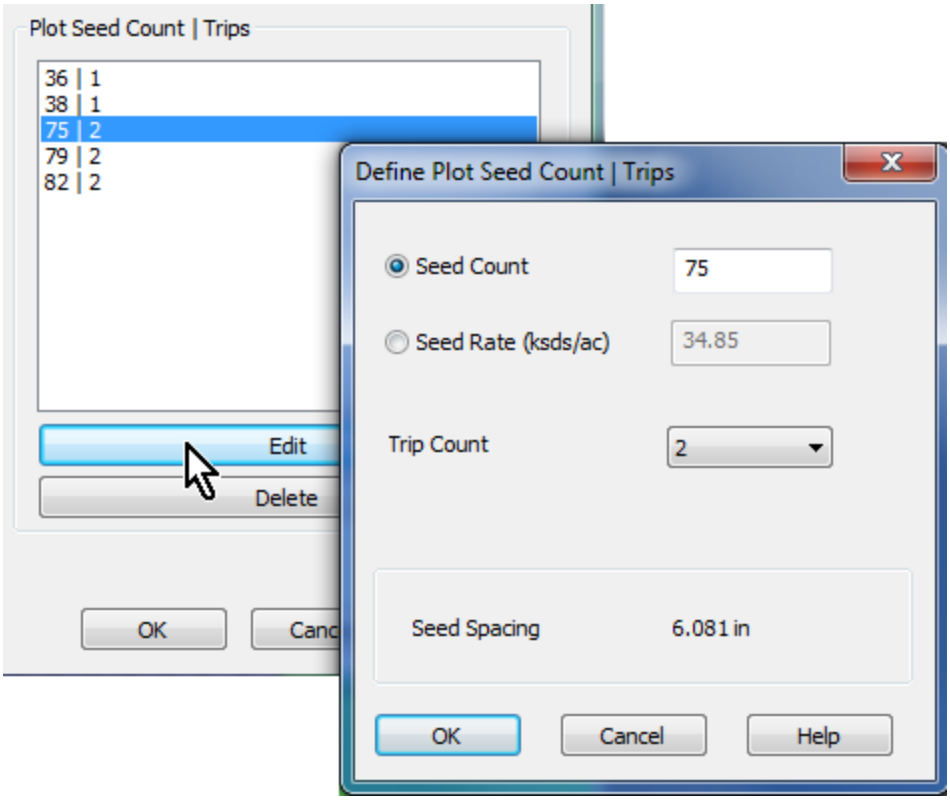
12. On the **Define Plot Rates | Trips** dialog enter **Seed Count** or **Seed Rate** and the **Trip Count**.Enter the **Seed Rate** and number of **Trips** and click **Add** to move the pair to the right. These values will automatically sort lowest to highest.
13.



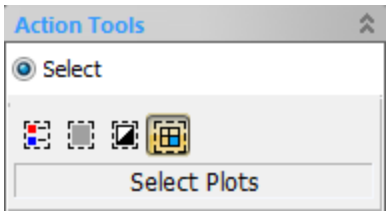
If using the Seed Rate (ksds/ac) enter “32” to plant 32,000 seeds per acre. This value will be rounded up to the nearest whole seed for the Seed Count | Trip setting

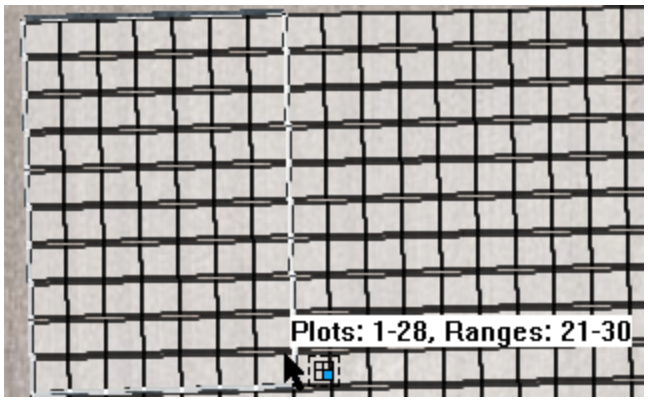
14. The **Seed Spacing** will be calculated and displayed based on the user-entered Seed Count.

15. To Edit or Delete a rate that has been added, select it and click the **Edit** or **Delete** button.

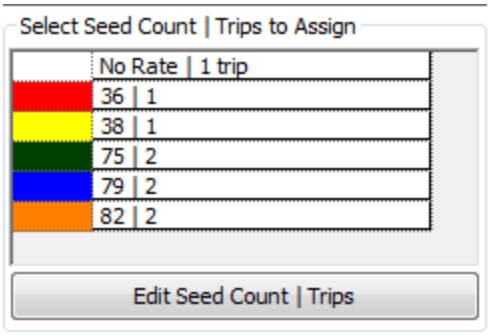


16. Click **OK** after entering all desired Seed Count and Trip combinations.
17. To begin assigning seed counts to the plot, select the area to assign the first rate to by choosing the **Select Plot** tool and left click and drag to select all desired cells.





18. To assign a seed rate to the selected plots click on the appropriate **Seed Count | Trips** in the legend window. The selected plots will now display the color and rate.



You can save and edit the Plot Prescription as often as needed. Before the prescription can be exported to the SeedPro 360 display all plots must have a rate assigned.

If you have plots that have two or more trips the plots will be merged together automatically.

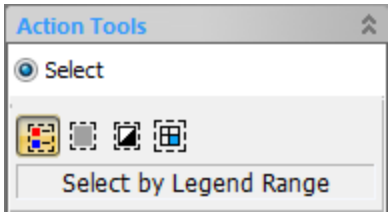
19. Once all rates have been assigned and the plot appears as desired, click the **Save** button to store the prescription in the management three.

Editing a Plot Prescription

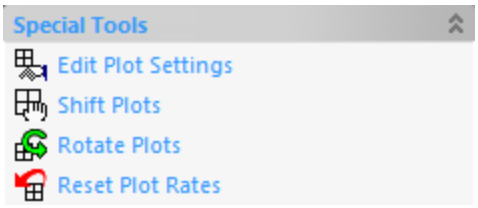
1. To edit a plot prescription create a map of the prescription that needs modified and click **Edit Layer**

2. Using the selection tools, highlight the area in the plot that needs updated and make the appropriate changes. In addition to the **Select Plot** tool there are other selection tools available:

- **Select by Legend Range** allows users to highlight one plot in the layer and all other plots with the same seed rate will be automatically selected. This tool is very useful if an entire rate needs modified or removed from the prescription.
- **Select All** will select all plots in the prescription layer
- **Invert Selection** will automatically select all plots that were not previously selected.



3. If the placement of the plot needs adjusted there are several tools available to accomplish this.

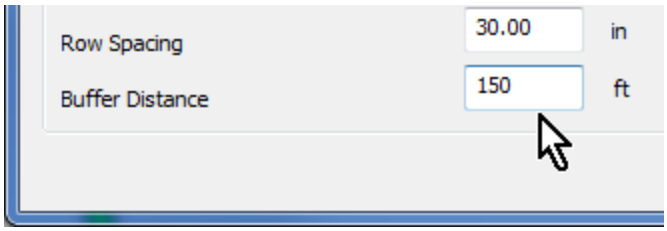


- **Edit Plot Settings** will open the Plot Settings dialog where the baseline can be adjusted as well as all plot parameters.
- **Shift Plots** allows the user to move the plot to other locations in the field.
- **Rotate Plot** allows the user to rotate the plot using the origin location as a pivot point.
- **Reset Plot Rates** removes all seed rates that have been assigned

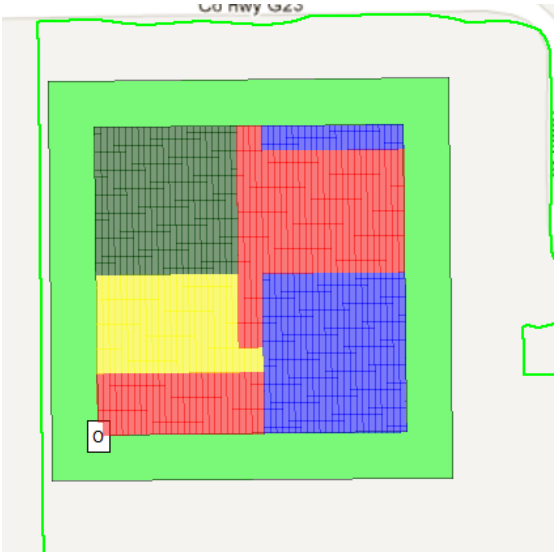
Adding a Buffer to a Plot Prescription

The buffer tool allows you to add a buffer around the plot prescription. This will allow you to enter the distance in feet that is needed around the plot for a buffer. This allows for a reference point for pollination setbacks or obstacles in the field.

1. To add a buffer enter the **Buffer Distance** on the **Plot Settings** dialog.



2. Click **Show Buffer** in the editor window 

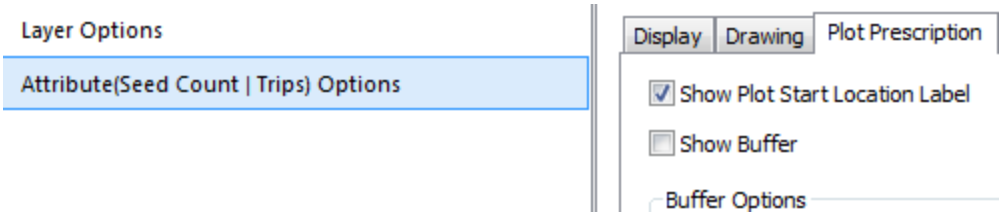
3. The buffer will now be displayed around the plot. 

4. After making any necessary adjustments to the buffer, click **Save**.

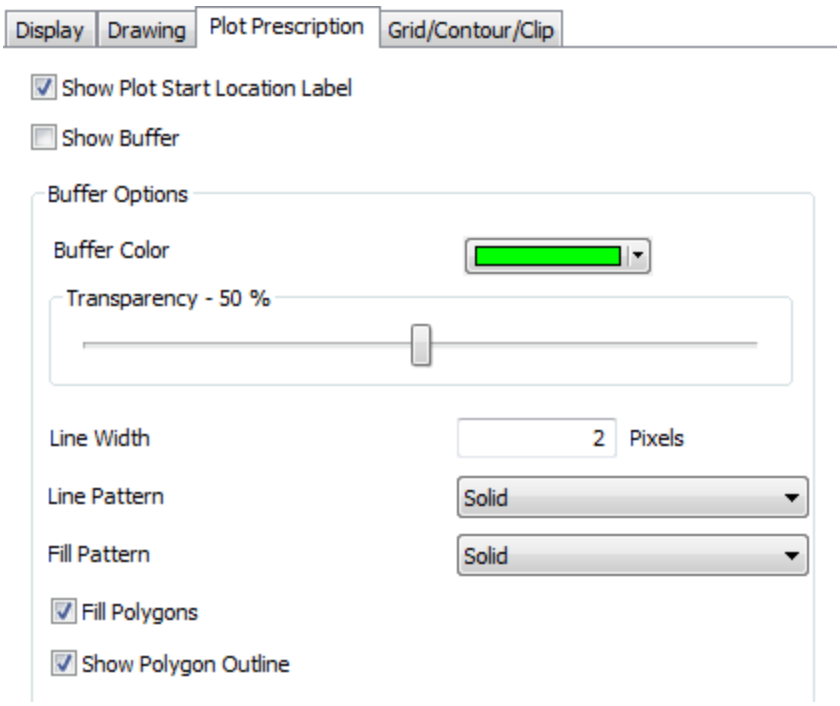
Modifying Plot Display Settings

1. To modify the map display settings, create a map of a plot prescription, and click **Edit Layer Options** 

2. Go to the **Attribute Options** tab on the left hand side of the dialog and click on the **Plot Prescription** tab



3. On the **Plot Prescription** tab the display options can be customized including labels, buffer display settings and line width options.



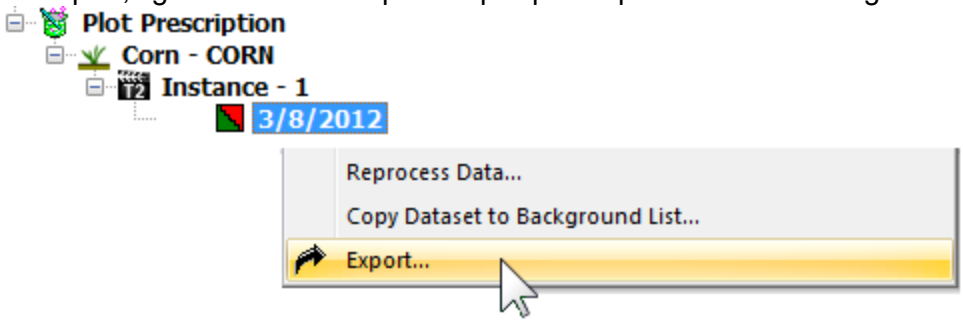
4. To save these custom settings click on the **Save Spatial Attribute Settings** button and check the **Operation Default** box. Saving these settings as the operational default will apply these settings to all plot prescriptions that are currently saved in the management tree, as well as all new prescriptions that get created.

Exporting Plot Prescriptions

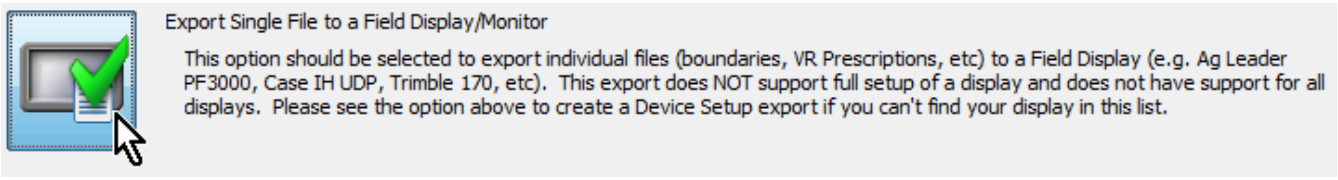
Once the plot has been defined it can be exported to the SeedPro 360 display for use in the field and also as a .KML/.KMZ file that can be shared with others and opened in applications such as Google Earth©.

Before exporting, the plot prescription must have a seed count assigned to all plots.

1. To export, right click on the map of the plot prescription or in the management tree and choose **Export.**



2. Select to **Export Single File to a Field Display/Monitor** and click on **Start Single File Export Process**



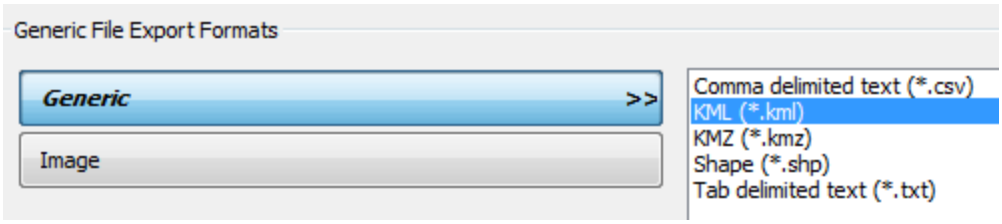
3. Choose **ALMACO** on the left and the **SeedPro 360** on the right and choose to **Export to Selected Format**

4. Choose the location to save the file to and the name for the file and click **Export to Selected File Format**

Give the file a distinct name so that it can be easily identified in the field

Plot Prescriptions can also be exported using the **Batch Command Utility**

5. To export a plot prescription as a .KML/.KMZ file right click over the map or the prescription in the management tree and choose **Export**.
6. Select to **Export to a Generic File Format** and choose **Start Generic File Export Process**
7. Choose **Generic** on the left hand side of the screen and **KML** or **KMZ**as the desired format.
8. Check to **Export a KML File for Each Unique Attribute**so that when the file is loaded into Google Earth there will be a legend displayed for each layer that is imported.



9. Click on **Export to Selected File Format**
10. Select where to save the files and what name to assign to them and click **Save** to complete the export process.

Water Management

In this chapter you will learn how to:

- Create a tile plan layer
- Edit tile plans
- Edit installed tile datasets
- Include tile layers in maps and reports
- Create Installed Tile Data

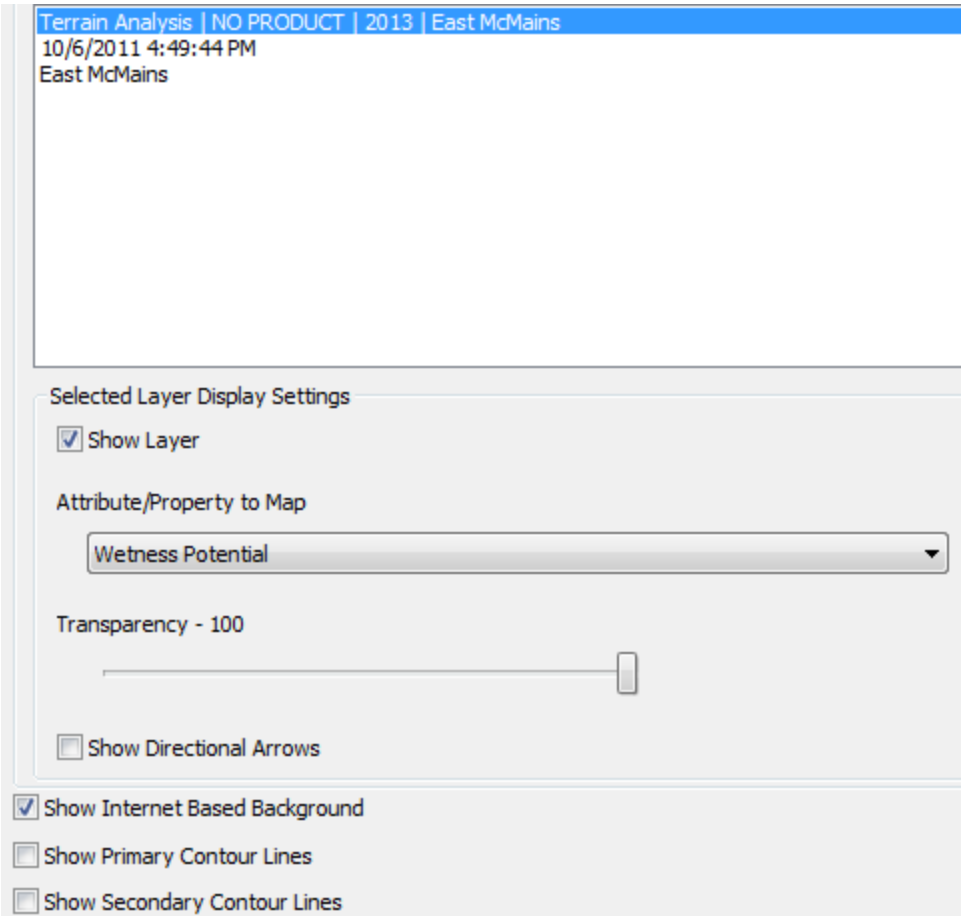
Creating a Tile Plan Layer

The software can be used to generate tile plan datasets that can be exported to displays for use in the field. Any data currently stored in the management tree can be used as a reference layer in the Tile Plan Editor.

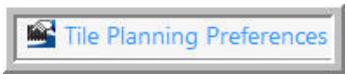
Before beginning a new tile plan, use the Regenerate 3D grid tool, to ensure that the surface profile is based on high accuracy GPS information (i.e. RTK)

1. Make a map of the field that you wish to create a new tile plan layer for. For this example, use **Grower Smith - Home - East McMains - Frozen Field Boundary**
2. Go to the **File** menu and select **New - Tile Plan Layer**
3. Select the **Grower**, **Farm** and **Field** to create the layer for and click **OK**
4. The **Tile Plan Editor** will open and display the reference layer you started with, in addition to any **Soil Survey** datasets that are saved in the management tree for the selected field.
5. To modify the map display click on the **Manage Reference Layers** tool

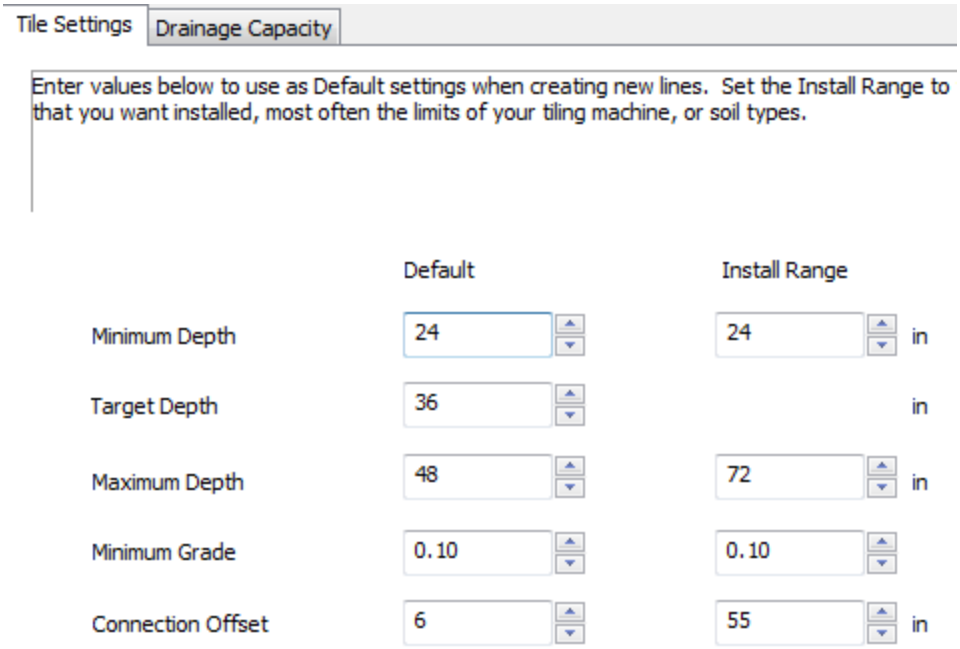
6. The **Manage Reference Layers** dialog will open where you can adjust the order of the layers, adjust the mapped attribute/property, change the transparency,turn directional arrows on/off, decide if internet based images should be displayed and choose if you wish to show Primary and Secondary Contour Lines. Click **OK** after making all necessary changes.



7. Use the **Reference Legend** tool, located on the right hand side of the editor, to modify what is being displayed in the legend.
8. To view and design the tile plan in 3D click, the **Hide/Show 3D View** button. You can customize the 3D map using the 3D Map Settings tool.
9. Click on the **Tile Planning Preferences** button to input tile and drainage capacity settings.

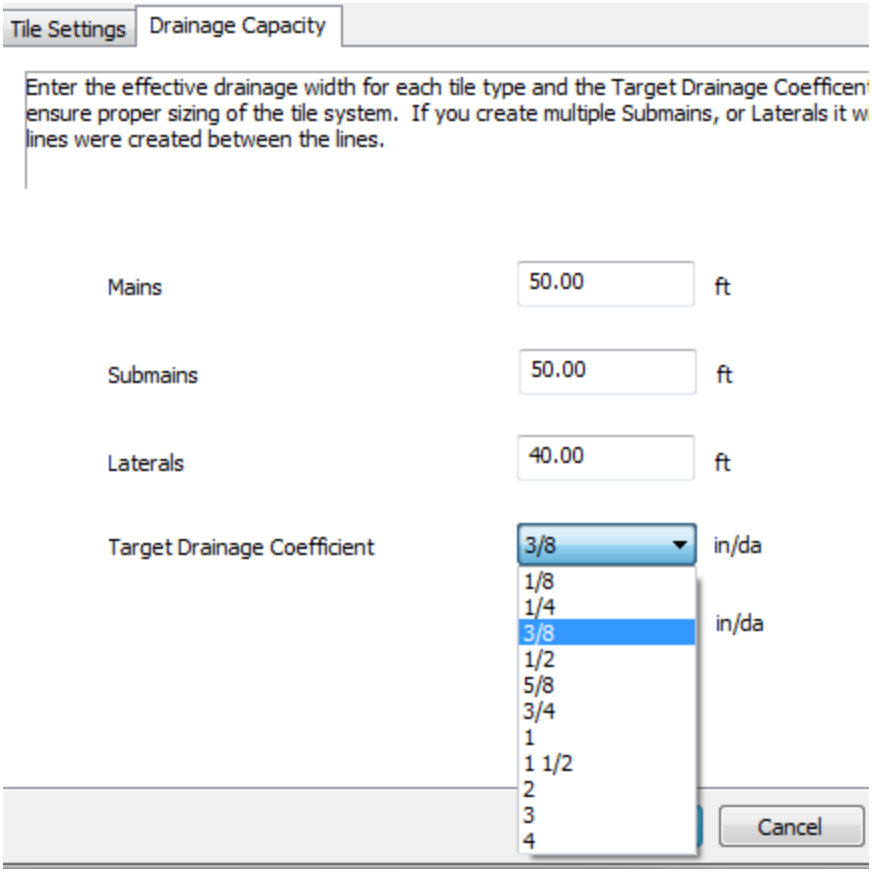


10. On the **Tile Settings** tab, the **Default** settings are the values that will be assigned to each new tile run that is created. The **Install Range** represents the maximum values that you wish to install at and will be referenced in the Optimize/Trim Run tool.



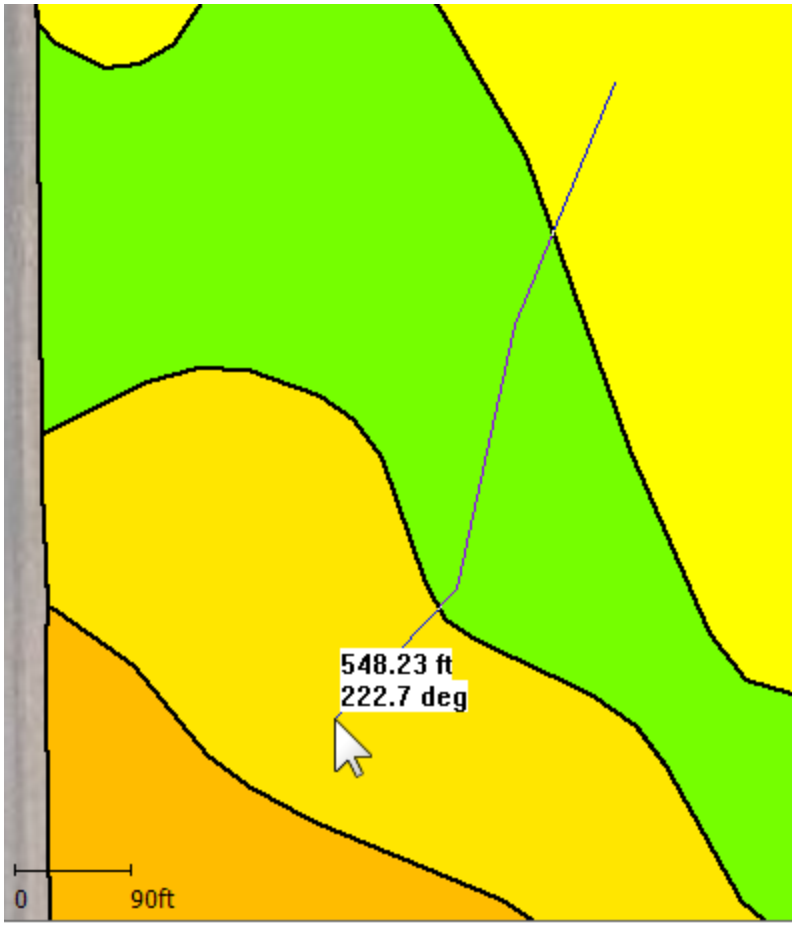
The **Connection Offset** represents the number of inches above the bottom of the run that a new run is connecting to. For example, if you input a connection offset of 6 inches for a new lateral, that means that lateral will be 6 inches above the bottom of the main that it is connecting to.

11. The **Drainage Capacity** tab is where you will input the effective drainage width for all mains, submains and laterals. Use the **Target Drainage Coefficient** drop down menu to select how much water you wish to move from your field on a daily basis with the tile system being designed.



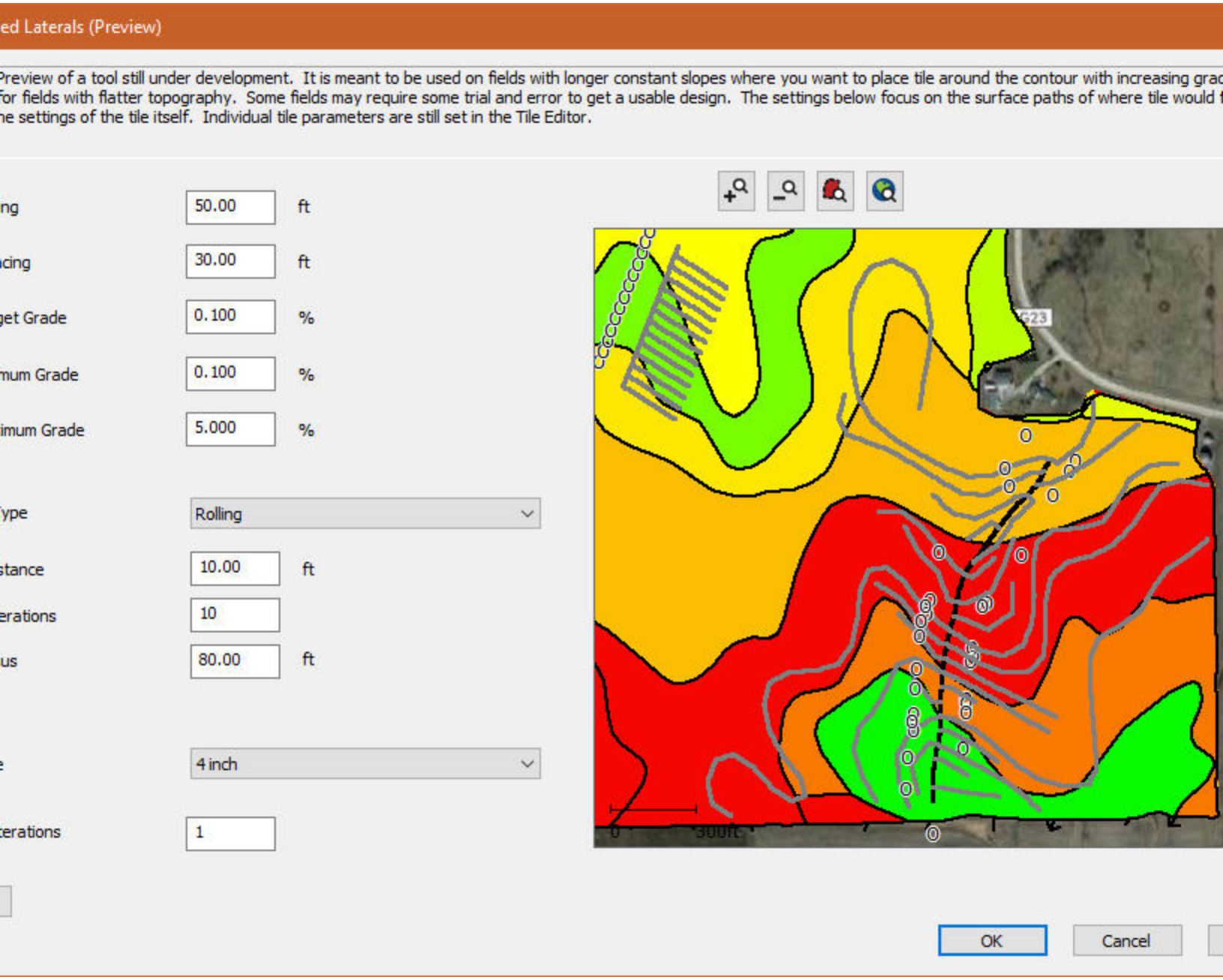
12. There are two ways that users can add tile runs:
    - Manually drawing runs using the **Add New** tools
    - Using the **Create Terrain Based Main / Laterals** tools
13. To begin manually drawing runs click **Add New** tools on the left hand side of the screen. There are three tile types that can be added as well as adding **Run Extensions** to existing tile lines:
    - **Tile Main**
    - **Tile Submain**
    - **Tile Lateral**
14. To add a new tile run select the appropriate run type and left click over the map on the starting location and left click each time there is a change in heading or direction needed, and finally right click to end the tile run. As you add the run the distance traveled and heading in degrees will be displayed as tooltips.

When adding any new main, submain or lateral, if you hold the **Shift** key while adding new lines, the new tile run will be snapped to 5 degree increments, for more precise drawing.



15. To have the software automatically create tile mains, click **Create Terrain Based Main** (only available if the field you are building a tile plan for has a saved Terrain Analysis dataset).
16. Select which method to use:
    - **Create Main Based on Selected Watershed** - Using this tool will find the lowest point in the watershed as well as the lowest point around the edge of that same watershed, and insert a main using the shortest distance between the two, while still maintaining grade.
    - **Create Main Based on Selected Outlet** - Using this tool creates a new main based on the user selected outlet, and follows the terrain of the field as long as grade allows.
    - **Create Main Based on Drawn Path** - The most customizable of the tool, you can draw the tile main as you would when using the manual add tools, but the software will automatically smooth the line to best fit the surface and how the water will move through the field.
    - Create Offset Tile Runs along Created Main - this can be used in conjunction with any of the 3 tools described above and will build a double main based on the run generated above, which allows you to easily create parallel runs around field obstacles, such as grass waterways.

17. To have the software automatically create contoured laterals after creating a Terrain Based Main, click **Create Contoured Laterals** under Special Tools. This tool is intended to be used in fields that have longer constant slopes where you want to place tile around the contour with increasing grade.
18. In the **Create Contoured Laterals** dialog you will be able to adjust the settings of the surface paths of the tile to follow the contours - not the tile itself.


ed Laterals (Preview)
Preview of a tool still under development. It is meant to be used on fields with longer constant slopes where you want to place tile around the contour with increasing grad
for fields with flatter topography. Some fields may require some trial and error to get a usable design. The settings below focus on the surface paths of where tile would
he settings of the tile itself. Individual tile parameters are still set in the Tile Editor.
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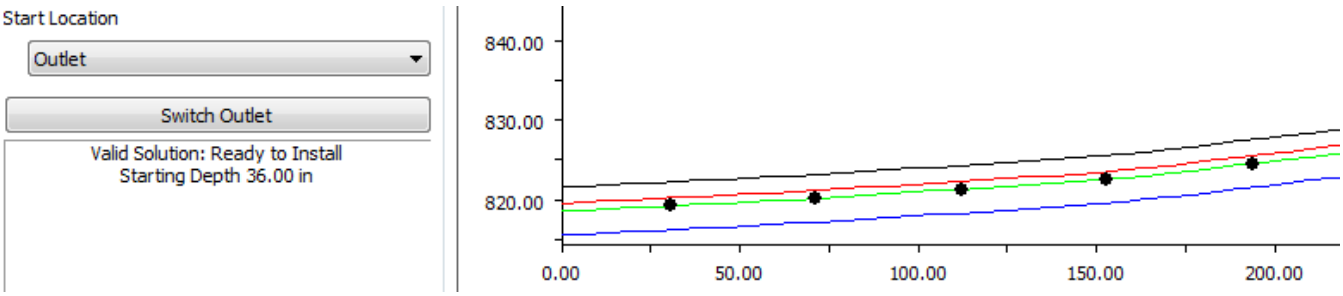
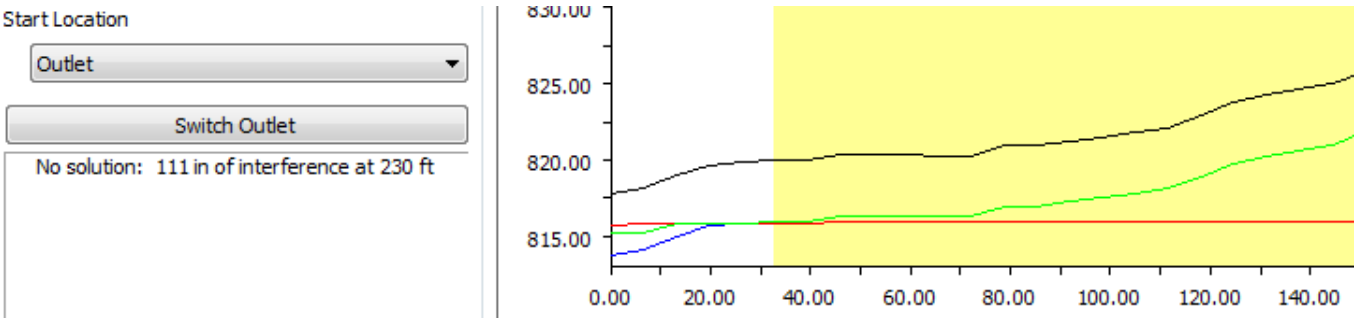
- **Target Spacing** - Where the connection attaches to the main between lateral. Spacing between the laterals throughout the contour will attempt to keep this spacing, but as the contours change, the spacing will fluctuate.
- **Minimum Spacing**- Minimum distance where a lateral will end itself if it gets within the entered distance to another latera.
- **Surface Target Grade** - Grade that the software attempts to use to find the preferred path.
- **Surface Minimum Grade** - Minimum grade considered for each path.
- **Surface Maximum Grade** - Maximum grade considered for each path.
- **Landscape Type** - Auto selected based on the average slope of the field.
  - Flat
  - Rolling
  - Hilly
- **Search distance** - Distance to search from the last vertex placed to space the next legs of the lateral.
- **Search Iterations** - The number of times the search distance extends to find the exact right match of target grade and radius (as defined by the turn radius). For example, if the search distance was set to 5 ft. and the iterations was set to 3, SMS would take a value at 5', 10' and 15'. The one that is closest to an exact match to the target is the point that will be used, assuming it doesn't violate the turn radius settings or the target/min/max grade settings.
- **Turn Radius** - Tightest turn radius allowed for laterals to curve around a change in slope direction.
- **Assigned Tile** - The tile size assigned to all laterals being created.
- **Smoothing Iterations** - The number of times each line is smoothed to prevent abrupt changes in direction.

19. After adding runs using either available option, the **Profile Settings**, **Elevation Profile** and **Assigned Tile Options** will become available to edit.
20. The **Message Area** will show if the line is a valid solution or if there is interference. If it is not positive flowing, a message will be displayed that there is No Solution and display how many inches of interference there are and also the distance from the outlet to the site of interference.

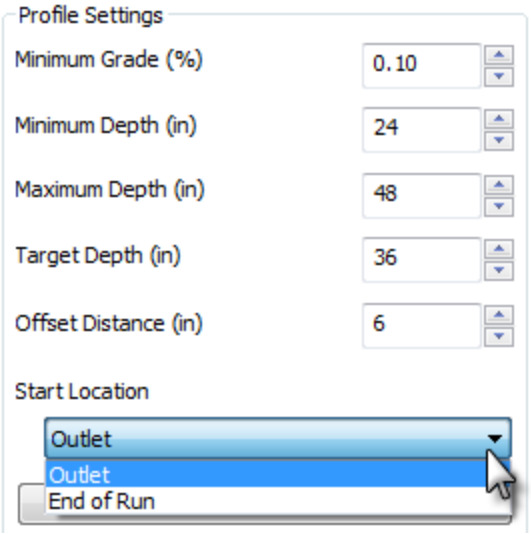
Valid Solution:



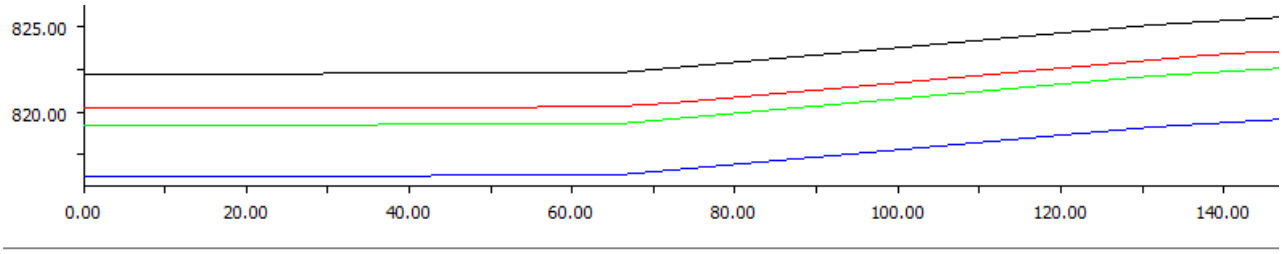
No Solution:



21. Use the **Profile Settings** to adjust the **Minimum Grade (%)**, **Maximum Depth**, **Minimum Depth**, **Target Depth** and **Start Location**.
    - Start location can be either the Outlet or the End of Run. The start location is important as this will determine what will be loaded as the starting location in the display during installation.
    - As you make changes to the Profile Settings, the elevation profile window will update.

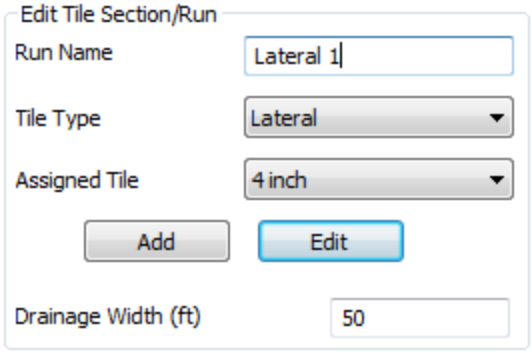


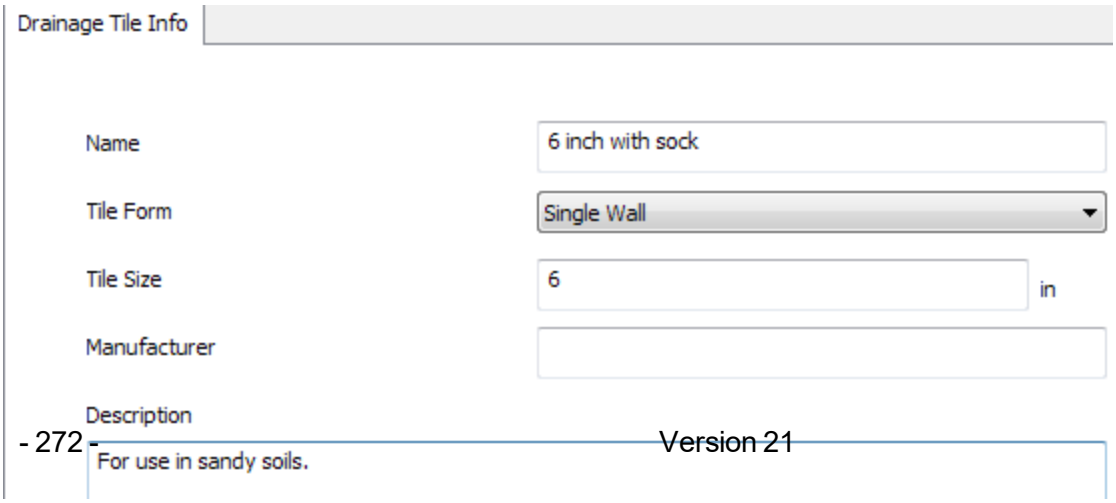
22. The Elevation Profile contains 4 different lines that represent your tile plan:
    - **Black line-** soil surface
    - **Red line-** minimum depth
    - **Green line-** target depth
    - **Blue line-** maximum depth



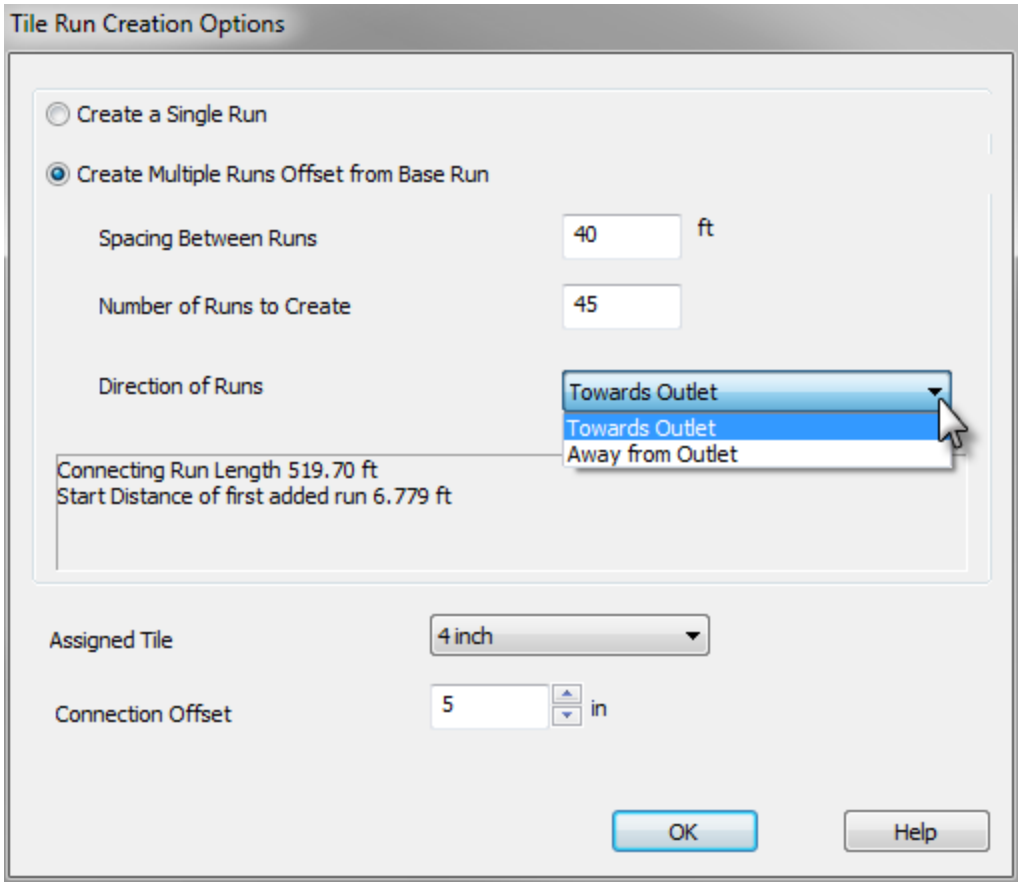
23. To the right of the Elevation Profile there is a **Statistics Box** that will display the average details about the selected run and also show you the details about the specific location you have selected. To see the details about a specific location, mouse over the elevation profile.

24. Use the tools available in the **Edit Tile Section/Run** window to input a custom **Run Name**, modify the **Tile Type** and select or add new **Assigned Tile**. To add new tile sizes click the **Add** button and input a **Name**, **Tile Form** and **Tile Size**. If no Run Name is entered, the software will automatically generate one for you.

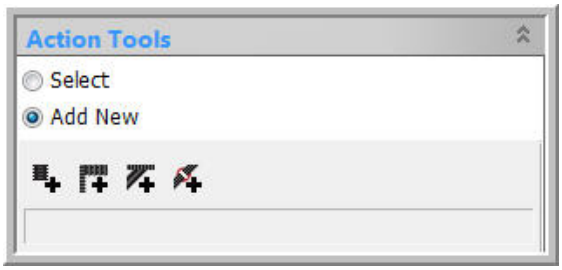




25. When adding Submains and Laterals, you can manually draw the runs or use the Create Contoured Laterals tool. To manually draw the runs, left click at the proper start location on the main or submain, and right click to end the run. The **Tile Run Creation Options** dialog will open where you can choose to create a **Single Run** or **Multiple Runs**.
26. When creating Multiple Runs, you will input the **Spacing Between Runs**, **Number of Runs to Create** and if they should fill towards or away from the outlet. Creating multiple runs this way ensures that all runs are equally spaced. You can also select the tile size to be assigned to the runs and the connection offset.

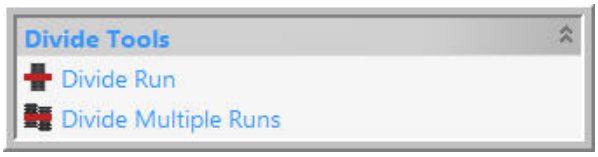


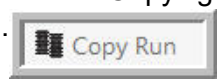
27. To extend the length of a run, click on **Add Extension**, left click to choose what existing run to extend and right click to end the extension.



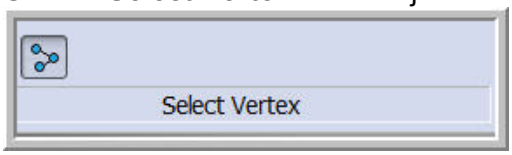
When adding extensions to existing runs, if you hold the **CTRL** key while left clicking to add the extension the added length will automatically snap to the same degrees as the last two vertices of the original line.

28. To divide a run into multiple smaller runs select the **Divide Run** tool and left click over the area of the existing tile run where you wish to divide it.



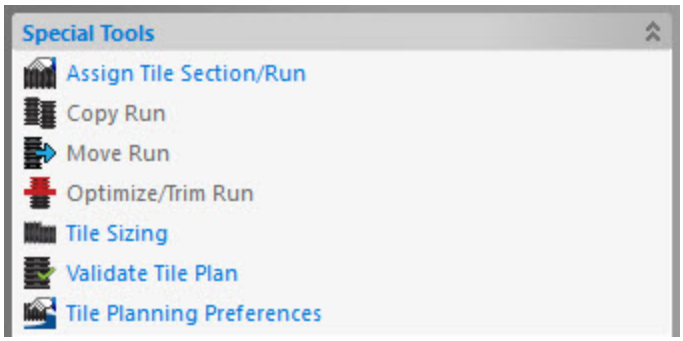
29. An existing run can be copied by selecting a run and clicking the **Copy Run** button. Copying a run ensures that the new run is the same length and spacing as the original run. 

30. Use the **Select Vertex** tool to adjust the location of vertices in tile runs



31. The Move Selection will allow you to move the entire tile run at once, without modifying the length or attachment angle. It is recommended to set the main first, then adjust laterals/submains, so as not to modify the tile settings.

32. Before saving the new tile plan, you can either select each tile run and verify that it has a valid solution, make any necessary adjustments to the profile settings and assign the tile to be used OR you can click on the **Tile Sizing** or **Validate Tile Plan** tool.

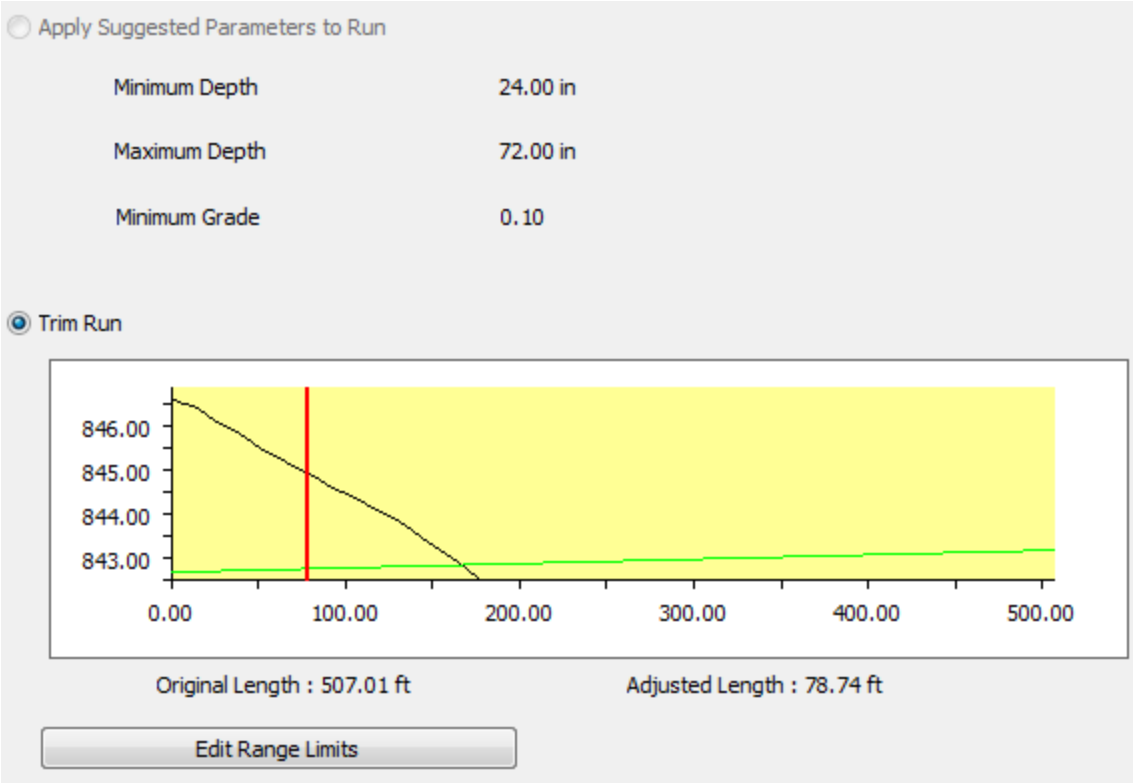


33. The software will now check all lines in the Tile Plan editor to verify if they have valid solutions. If all runs have valid solutions a message will open indicating this.

    The Tile Plan is valid per your parameters. All runs have a flowable solution, are properly sized, and have valid connections based on the parameters you have entered.

34. If all runs are not valid the runs that do not have a positive solution will be highlighted in yellow so that they can be easily identified and a dialog will open informing you how many lines do not have a valid solution.

35. Now that all invalid runs have been identified, select the first run highlighted in yellow and review the message box to see what about the run is invalid.
    - If run is invalid due to improperly sized tile or connection offsets, make the necessary adjustments in the profile settings window.
        - Click Tile Sizing and the software will display the recommended tile settings to match your previously defined parameters that can be applied.
    - If the run is invalid due to interference click the **Optimize/Trim Run** tool under Special Tools.
        - The Optimize/Trim Run dialog will display any scenario that will correct the run
        - **Apply Suggested Parameters to Run** will show you what settings can be applied to this run to make it a valid solution, based on the Install Range settings entered in the Tile Preferences menu.
        - **Trim Run** will show you where the interference occurs along the selected run and if no valid solution can be found using your install range settings will divide the run into two sections and delete the portion that occurs after the interference



36. Click the **OK** button to close the Optimize/Trim Run dialog
37. Once all necessary changes have been made, click **Save**
38. Verify all Management Settings are correct and click **OK**
39. Click **Close** to exit the Tile Plan Editor
40. The new Tile Plan will be saved in the management tree, and each Tile Product will be saved as a unique dataset. The Elevation Profile tab across the bottom of the main mapping window will display the surface layer and selected tile run when mapped.

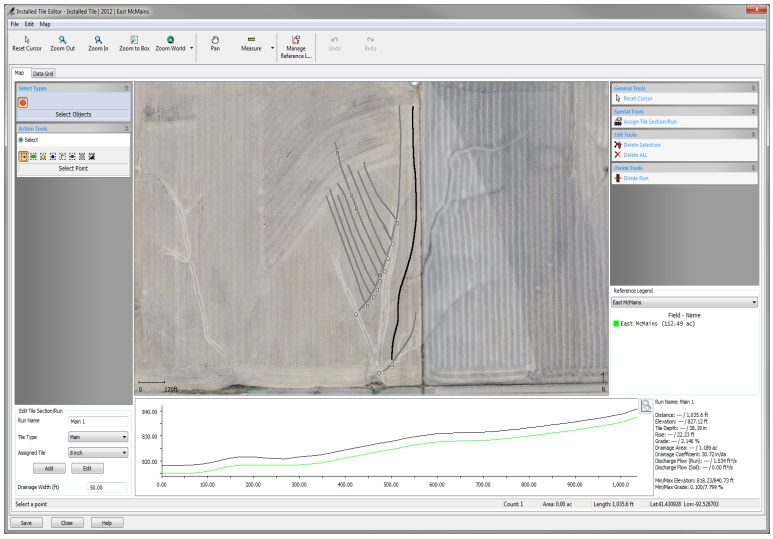
Editing Tile Layers

After creating a tile plan layer, or importing an installed tile dataset, you can edit the settings in the software.

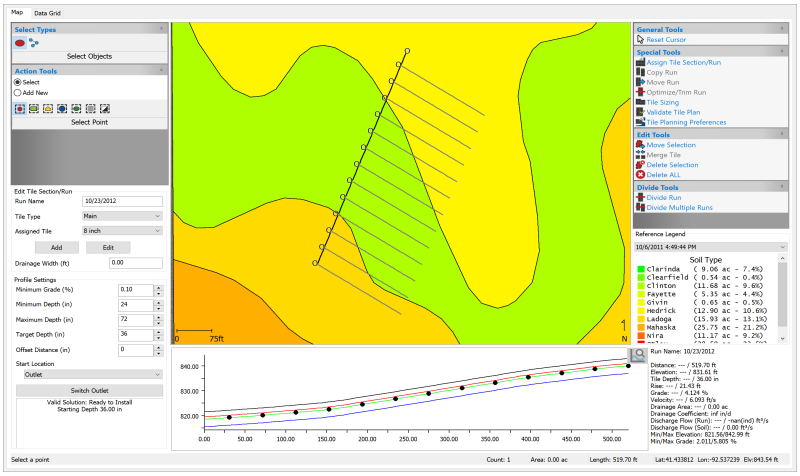
After importing an installed tile dataset, you can edit the settings in the software.

1. Create a map of the **Tile Plan** or **Installed Tile** dataset(s) that needs modified.
2. Click the **Edit Layer** icon in the mapping toolbar.
3. When editing Tile Plan layers you will have access to all of the same tools as you did when creating the Tile Plan.
4. When modifying Installed Tile layers you will be able to **Divide Runs** and input custom **Run Names**, assign **Tile Type** and **Drainage Width**, and select and add new **Tile Sizes**.

Installed Tile Editor:



Tile Plan Editor:



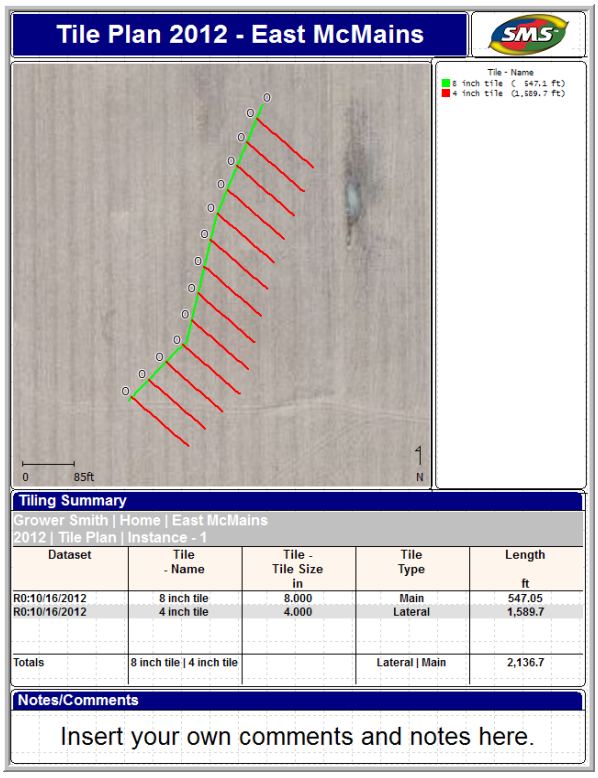
Including Tile Layers in Maps and Reports

Printing Tile Maps

Tile Plan and Installed Tile datasets can be included in maps just like all other datasets saved in the management tree. There is a custom print layout designed specifically for tile layers.

1. Create a map of the tile plan or installed tile you wish to print. To turn on labels click on **Edit Layer Options -> Property Options -> Tiling tab**.

2. Click on the **Print** icon in the main toolbar
3. Choose to **Print the Current Layer**
4. Select the **Tiling_Report.lyt** from the Existing Print Layouts box on the right hand side of the dialog
5. Click on the **Print Current Layer** button



Printing Tile Reports

Tile Plan and Installed Tile datasets can be included in reports and summaries just like all other datasets saved in the management tree. There is a custom report designed specifically for tile layers.

1. Click on the **New General Report** icon in the main mapping toolbar
2. Select **Tiling Summary Report** and click **Next**
3. Select the proper management items and click **Next**
4. Remove any unwanted datasets and click **Next**
5. Modify any items to be included in the report and click **Next**
6. Click **Finish** after making any necessary changes on the **Report Options** dialog

Tiling Summary Report

Grower :	**Grower Smith**
Farm :	**Home**

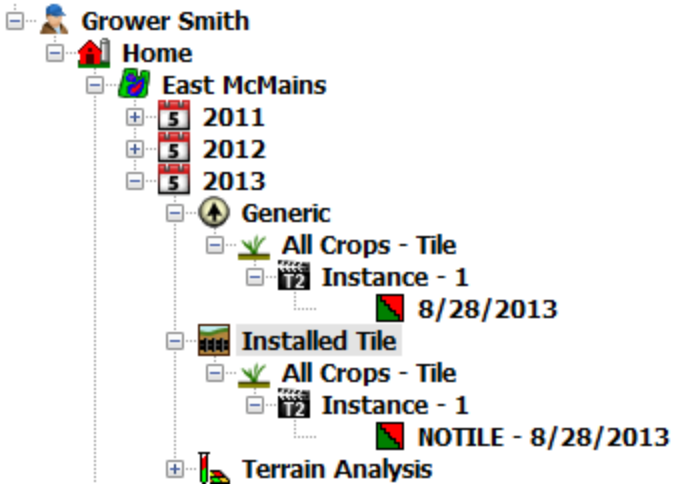
Field:	East McMains
Year:	2012
Operation:	Tile Plan
Operational Instance:	Instance - 1

Tile	Tile Type	Tile Size in	Length ft	Minimum Elevation ft	Maximum Elevation ft
4 inch tile	Lateral (1,589.7 ft)	4.000	1,589.7	818.91	846.62
8 inch tile	Main (547.05 ft)	8.000	547.05	818.17	846.54
Totals	**Lateral (1,589.7 ft) | Main (547.05 ft)**		**2,136.7**	**818.17**	**846.62**
				Minimum	Maximum

Create Installed Tile Data

The software allows users to convert any generic polyline dataset into an Installed Tile dataset so that it may be exported out to field displays to load as a reference layer when installing new tile.

1. Right click on the polyline dataset and choose **Create Installed Tile Data**
2. A new Installed Tile dataset will now be added to the Management Tree



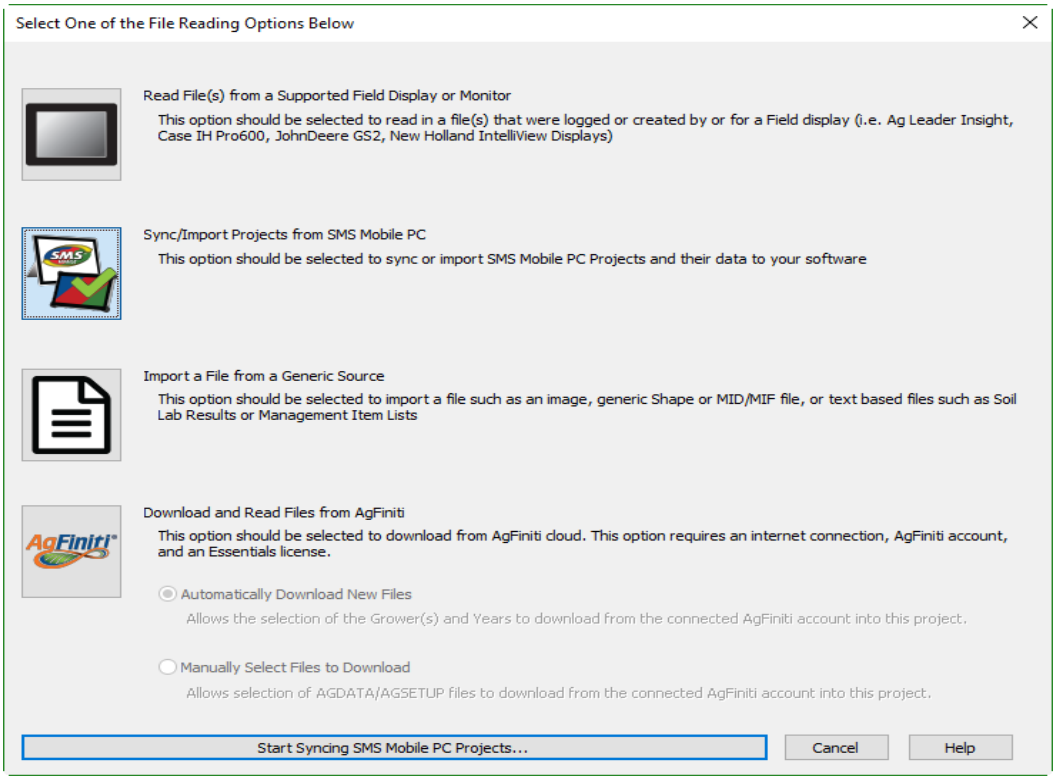
Syncing With SMS Mobile

You will learn how to sync SMS Mobile with the desktop software. By syncing with the desktop software, you can:

- Import logged data created in SMS Mobile into the software
- Update SMS Mobile projects from the desktop project, including field level boundaries, backgrounds, and management items
- Delete Mobile Projects after Syncing
- Delete all data except management items, field level boundaries, and boundaries after syncing

Sync with Mobile

1. Select **File - Read File(s)...**
2. In the File Read Options window select **Sync/Import Projects from SMS Mobile**



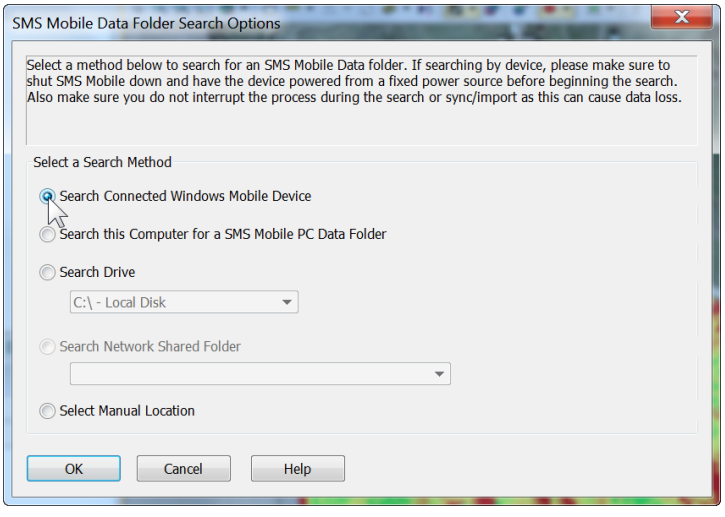
3. Select the appropriate search method in the SMS Mobile Data Folder Search Options window. For this example, select **Search Mobile Device**. Click **OK**

Search Connected Windows Mobile Device- will search the PDA directory looking for all SMSMobileData folders. This includes application data directory, flash cards, and any other storage locations on the device

Search this Computer for a SMS Mobile PC Data Folder - will search your computers hard drive for a Mobile PC SMSMobileData folder

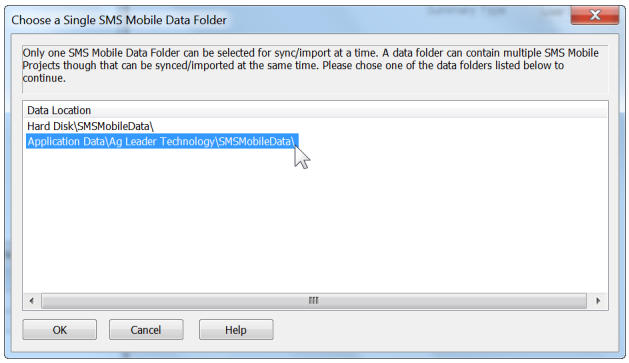
Search Drive- select a drive on your computer to search for an SMSMobileData folder. This could include any flash cards being read by card reader (internal or external)

Searching for Network Shared Folders..- will search a networked drive for an SMSMobileData folder

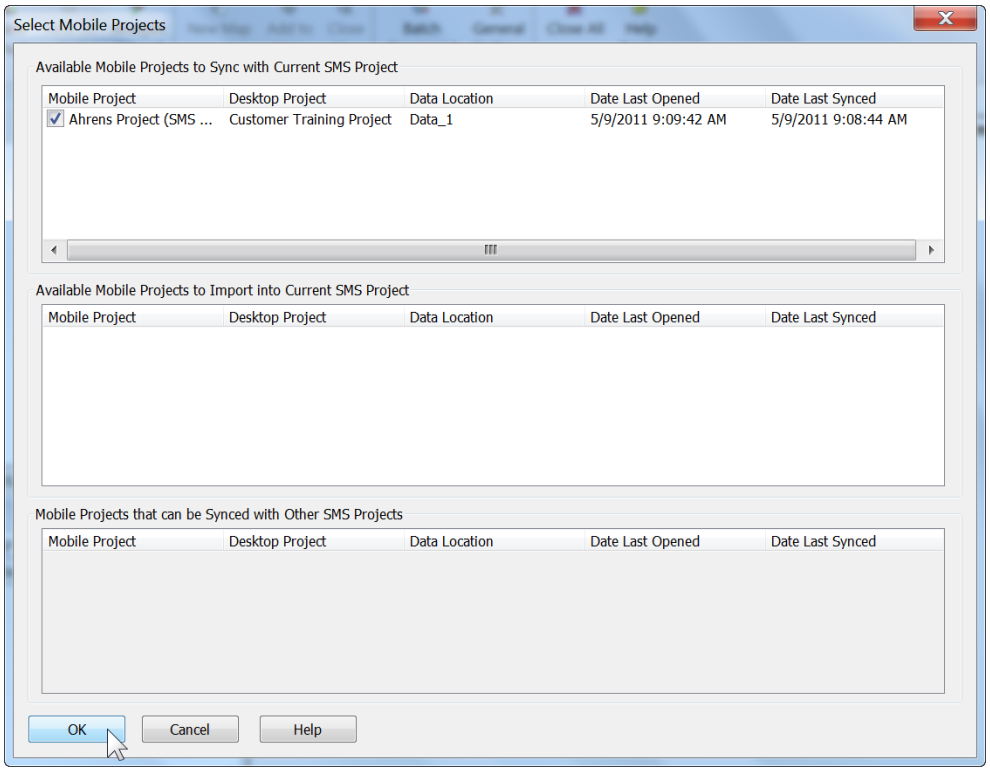


Select Manual Location- browse to any location on your computer to search for an SMSMobileData folder. Select the folder called SMSMobileData

4. Choose the appropriate Data Location to be synced. For this example, select **Application Data\Ag Leader Technology\SMSMobileData**. Click **OK**

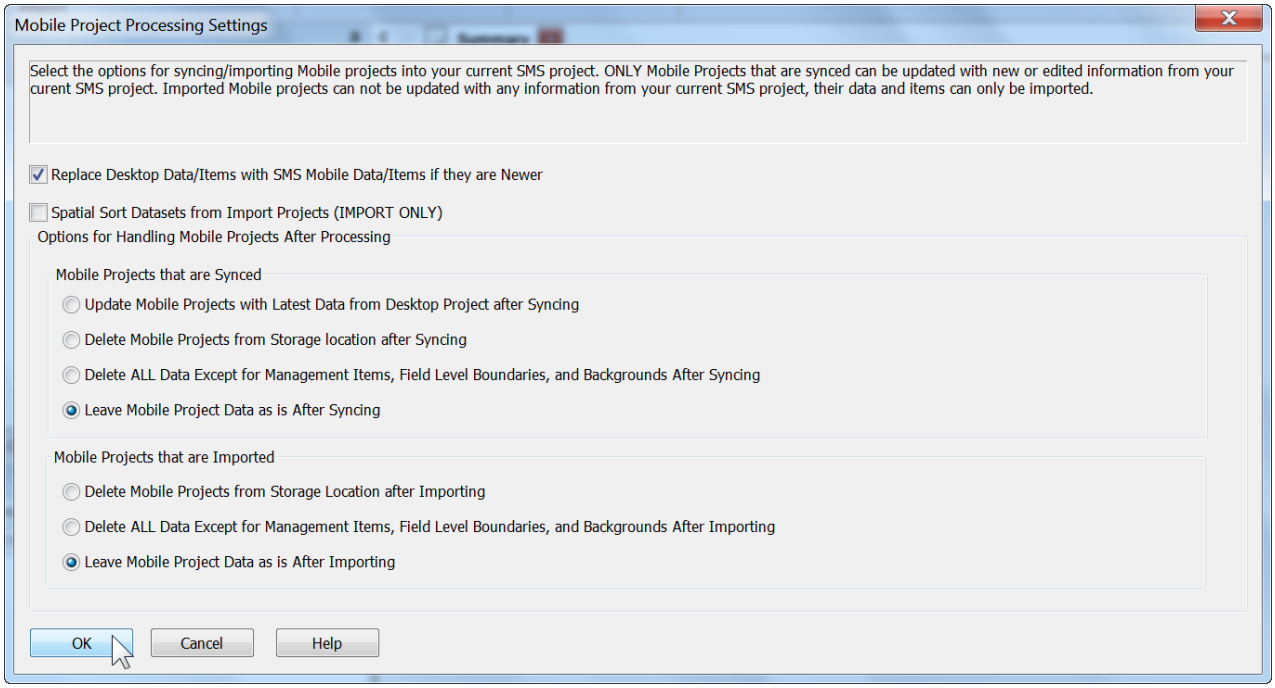


5. Select the Mobile Projects to be Synced or Imported. For this example, select the Customer Training Project (SMS Mobile). Click **OK**



- **Available Mobile Projects to Sync with Current Software Project**- list of SMS Mobile projects that can be synced with the desktop software project currently open. These projects were either created with this desktop project or synced with previously
- **Available Mobile Projects to Import into Current Project**- list of SMS Mobile projects that can be imported in the current project. May include new projects created in SMS Mobile or projects exported from a different desktop program
- **Mobile Projects that can be Synced with Other Software Projects**- list of SMS Mobile projects created or previously synced with other projects in the desktop software, that can only be synced with that same project

6. Select the appropriate Mobile Project Processing Settings. For this example, leave the default options selected. Click **OK**



Above are the default settings and recommended settings for syncing.

General Processing Settings

- **Replace Desktop Data/Items with SMS Mobile Data/Items if they are Newer**- will replace any desktop data with data logged from SMS Mobile if they are newer, including boundaries and datasets
- **Spatial Sort Datasets from Import Projects (IMPORT ONLY)**- will spatial sort datasets based off the first point created in the dataset and the set field boundaries in the desktop software

Mobile Projects that are Synced/Imported

- **Update Mobile Projects with Latest Data from Desktop Project after Syncing (Sync only)** - will update the selected Mobile project with the latest data from the desktop project, including field boundaries, backgrounds, and management settings
- **Delete Mobile Projects from Storage location after Syncing/Importing**- will remove the selected Mobile project after the sync process. Warning all contents of the SMS Mobile project will be deleted

- **Delete ALL Data Except for Management Items, Field Level Boundaries, and Backgrounds After Syncing/Importing**- will remove the selected Mobile projects logged data after syncing, except management items, boundaries, and backgrounds
- **Leave Mobile Project Data as is After Syncing/Importing**- will not alter anything in the Mobile project after syncing

7. The processing time will vary depending on the amount of data being imported and the computer

Allow the Syncing process to complete, some syncing instances may display "Not Responding" warning, but generally does not indicate a computer lockup.

Syncing data directly from an SD card versus through Microsoft Active Sync/Windows Mobile Device Center may expedite the syncing process.

Crop Scouting

In this chapter you will learn how to:

- Generate scouting regions
- Add and edit observations
- Generate scouting reports
- Add Pests

Crop scouting can be used to show observations made in a field, such as pest count, population, plant health, recommendations, etc. This information can be created in the desktop software, or in SMS Mobile, and then synced back into the desktop.

Creating Observation Regions

Methods

There are three main ways to create a crop-scouting layer:

- Select a new crop scouting layer and start manually adding observation zones
- Generate observation zone grids using a scouting wizard
- Generate observation zones from a previously created layer using the scouting wizard or the copy from layer tool.

Start Adding Observations

To create a scouting layer there needs to be a map created of a layer that will be used as the reference layer - a boundary map is recommended.

1. Create a map of a boundary. For this example use **Grower Smith - Home - East McMains**

2. To start a new scouting layer go to **File - New - Scouting Layer**
3. In the Select a Data Creation Method window select **Manually decide what editor tools to use to create your new data**
4. Select the **Add** tool to start adding observation regions to the layer. Add polygon, circle, ellipse, and free-hand polygon are the choices for adding regions. For this example choose **Add Freehand Polygon** and click and hold down the left mouse button to draw out an observation region

Create Observations Using the Generate Observations Wizard

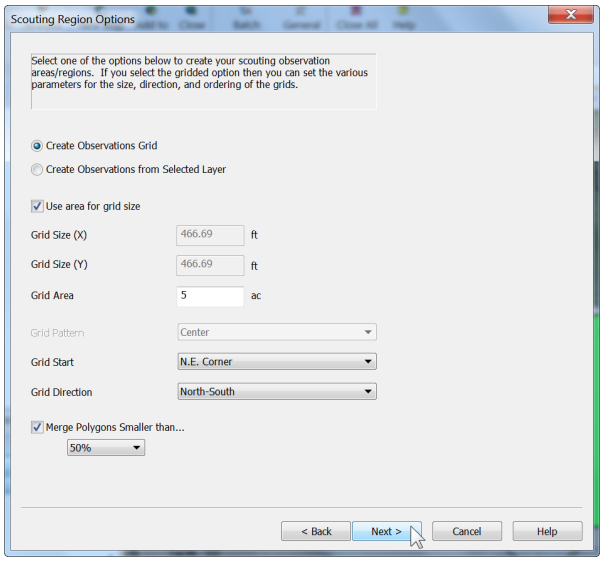
Scouting observation regions can be automatically created using the Generate Observations wizard. They can be grid generated or based off a reference layer such as a generic zone map that had been previously created.

Creating grid regions

1. Start by creating a map of the boundary. For this example use **Grower-Smith - Home - East McMains**
2. Create a new scouting layer. Go to **File - New - Scouting Layer**
3. In the Select a Data Creation Method window select **Use a wizard to create new data**
4. In the **Selected Layer** drop down menu, verify that the layer the observations are to be generated for is selected. For this example the field boundary should be selected
5. Click **Next**
6. By default, the entire field will be selected, as indicated by the black crosshatch displayed on it. To generate observations for only a portion of the field use the selection tools.

To select only a portion of the field, use the selection tools at the top of this screen rather than selecting all.

7. Click **Next**
8. On the Scouting Region Options screen select **Create Observations Grid**
9. Grid sizes can be determined by either entering values for X and Y, or selecting the **Use Area for grid size** box and entering in an acre amount. For this example use area and enter **5** acres for grid size
10. The grid start location and direction can be selected as well. For this example use **N.E. Corner** and **East-West** direction
11. Select **Merge Polygons Smaller than...** and select **50%**. This will ensure all grids smaller than 50% of the designated size will be merged with the next closest full sized grid
12. Click **Next**
13. Use the **Shift Grid** icon to adjust the observation regions created. The **Rotate Grid** icon can be used to turn the grid to match the field better if needed. For this example shift the grid to the left to remove the partial boxes on the left side



The Reset Grid button can be used to set the grid back to its original layout.

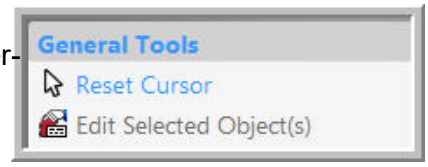
14. Click **Finish**
15. Click **Save** to save the layer to the Management Tree
16. Verify that the correct location is selected in the Management Tree. For example, select **Grower Smith - Home - East McMains -Current Year- Scouting All Observations - Scouting -1 - NO PRODUCT**
17. Click **OK**
18. The layer can now be closed and then edited later either from within the desktop software, or exported out to SMS Mobile, and edited out in the field. For this example leave the scouting editor open and move onto the next section

Adding / Editing Observations for a Region

- Scouting Observation Regions can be edited three different ways. Two will open up a similar editing screen.
- Selecting a region(s) and choosing the Edit Selected Objects icon
- Clicking the Data Grid tab at the top left of the map
- Observations can be edited while using SMS Mobile out in the field, and then imported back into Desktop software when scouting is finished

Adding / Editing Observations using Edit Selected Object (s) button

1. First, an observation region needs to be selected. To do this click the **Select Point** icon

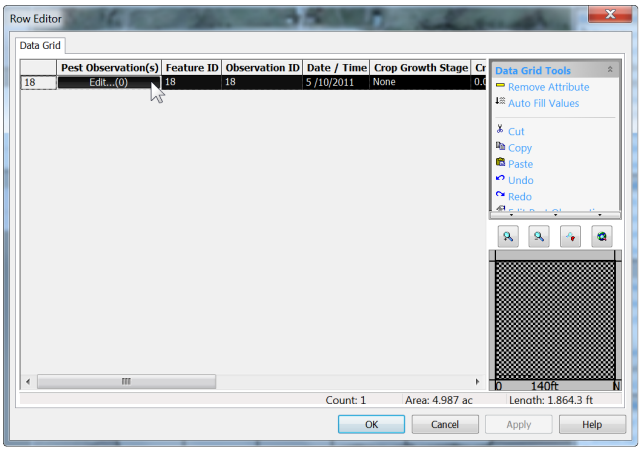


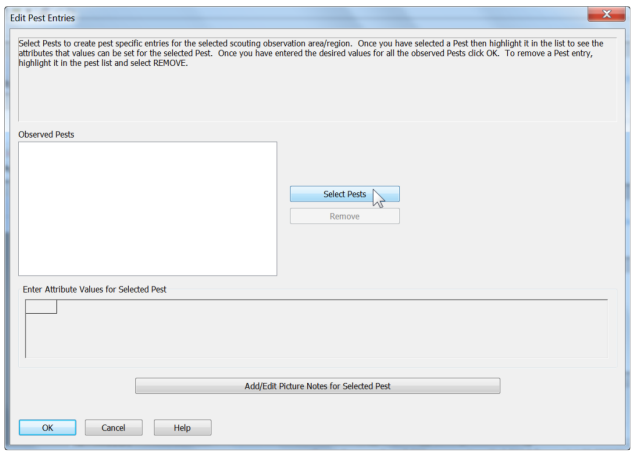
2. Now click inside any of the observation regions created using the observation wizard. This will leave that region cross-hatched and the others will turn gray
3. Click the **Edit Selected Object(s)** icon

Using the Row Editor

The Row Editor screen allows any additions and/or changes to be made to all attributes for this region.

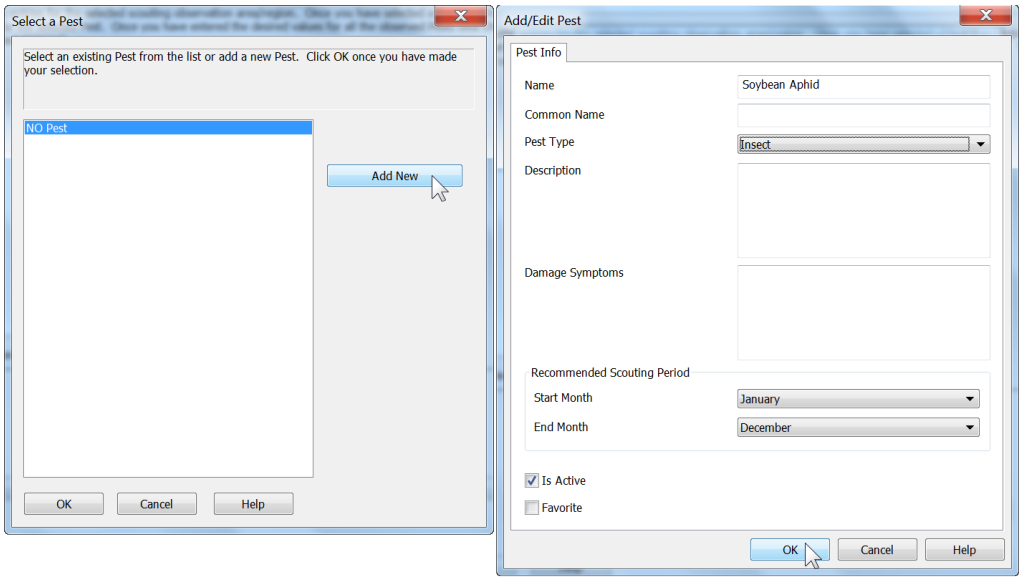
4. Pest Observations - Choose **Edit** and the Edit Pest Entries box will appear





5. Click **Select Pests** to open the Select Pest box and highlight a pest
6. Click **OK**

7. If there are no pests added to the list yet, click the **Add New** button



8. The Add/Edit Pest screen allows a Name, Common Name, and Pest Type to be chosen along with other optional information. For this example create a pest called Soybean Aphid and choose Insect from the Pest Type drop down list
9. Click **OK**

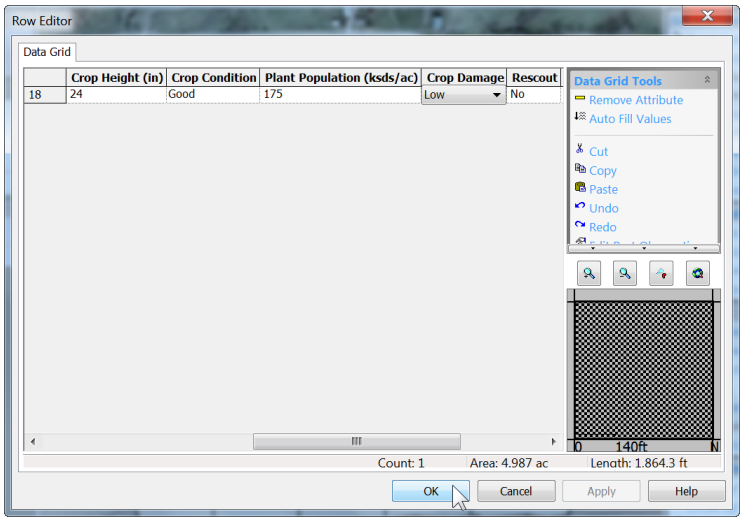
Pest definitions cannot be edited after being created from the scouting editor. This can be done using the Management Item Editor from the Tools menu and selecting Pests.

10. Click **OK**
11. Now a pest has been added to this Observation Region and various statistics can be entered for it. If more than one pest has been added then each pest must be highlighted one at a time to enter the information for the pest
12. Click inside the **Pest Count** box

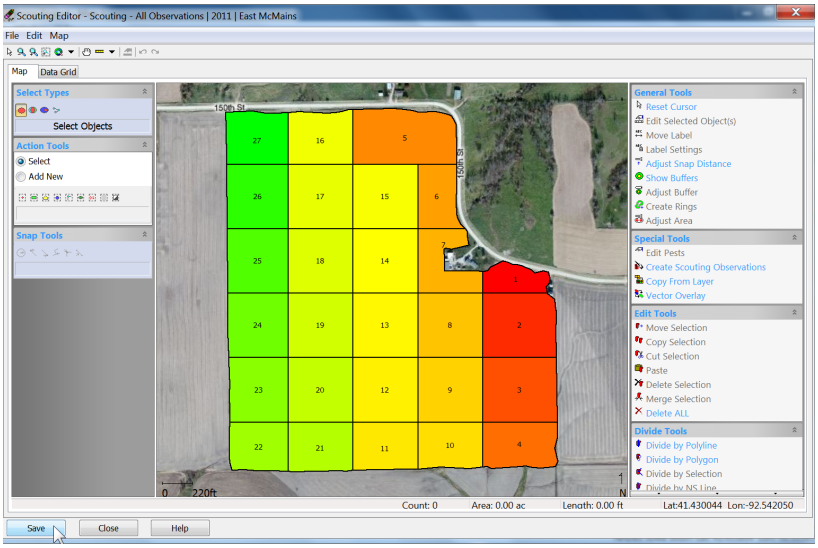
Enter Attribute Values for Selected Pest

	Pest Count	Scouting Count	Scouting Unit	Insect Growth Stage	Insect Size(in)	Percent Infestation(%)	Recommendation
1	350	1.000	Plant(s)	Other	0.00	0.00	

13. The first 3 attributes work together. They are **Pest Count**, **Scouting Count**, and **Scouting Unit**. Think of entering information for the Pest here as "so many pests per so many of a certain unit. For this example (Soybean Aphids), enter 350 for Pest Count, 1 for Scouting Count, and Plant(s) from the Scouting Unit drop down menu. This means that at this scouting observation, 350 Soybean Aphids were counted on one plant
14. The rest of the attributes can now be filled out as well. For this example fill out the Insect Size and Percent Infestation (%) boxes
15. Click **OK**
16. Other Attribute Information - these attributes can be filled out as needed for the observation region such as Crop Growth Stage, Height, Population, Rescout Dates, etc



17. Click **OK**
18. Select another observation region and click the Edit Features icon again to add attribute data to that region. For this example select one or more region(s) and then add in any amount of observation data

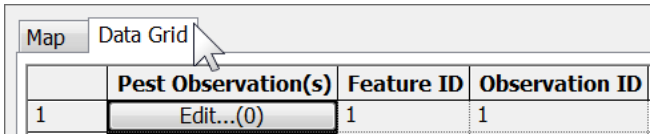


Multiple observation regions can be selected at once by selecting the first region, then holding down the Ctrl key and selecting any other regions. Then Edit Features can be selected to edit more than one region at once using the Auto-fill icon. This may be helpful for items such as Crop Condition or Crop Growth Stage that may be the same value for multiple regions.

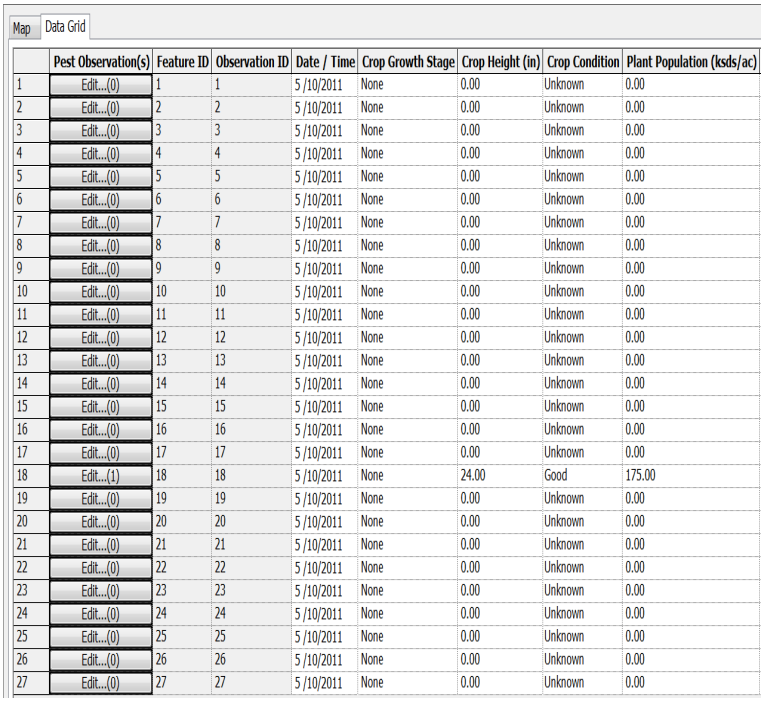
19. When done editing click **Save** and move on to the next section

Adding / Editing Observations using the Data Grid

1. Click on the **Data Grid** tab at the top of the map in the scouting editor



2. Edit any observation information for any regions


Map | Data Grid

	Pest Observation(s)	Feature ID	Observation ID	Date / Time	Crop Growth Stage	Crop Height (in)	Crop Condition	Plant Population (ksds/ac)
1	Edit...(0)	1	1	5 /10/2011	None	0.00	Unknown	0.00
2	Edit...(0)	2	2	5 /10/2011	None	0.00	Unknown	0.00
3	Edit...(0)	3	3	5 /10/2011	None	0.00	Unknown	0.00
4	Edit...(0)	4	4	5 /10/2011	None	0.00	Unknown	0.00
5	Edit...(0)	5	5	5 /10/2011	None	0.00	Unknown	0.00
6	Edit...(0)	6	6	5 /10/2011	None	0.00	Unknown	0.00
7	Edit...(0)	7	7	5 /10/2011	None	0.00	Unknown	0.00
8	Edit...(0)	8	8	5 /10/2011	None	0.00	Unknown	0.00
9	Edit...(0)	9	9	5 /10/2011	None	0.00	Unknown	0.00
10	Edit...(0)	10	10	5 /10/2011	None	0.00	Unknown	0.00
11	Edit...(0)	11	11	5 /10/2011	None	0.00	Unknown	0.00
12	Edit...(0)	12	12	5 /10/2011	None	0.00	Unknown	0.00
13	Edit...(0)	13	13	5 /10/2011	None	0.00	Unknown	0.00
14	Edit...(0)	14	14	5 /10/2011	None	0.00	Unknown	0.00
15	Edit...(0)	15	15	5 /10/2011	None	0.00	Unknown	0.00
16	Edit...(0)	16	16	5 /10/2011	None	0.00	Unknown	0.00
17	Edit...(0)	17	17	5 /10/2011	None	0.00	Unknown	0.00
18	Edit...(1)	18	18	5 /10/2011	None	24.00	Good	175.00
19	Edit...(0)	19	19	5 /10/2011	None	0.00	Unknown	0.00
20	Edit...(0)	20	20	5 /10/2011	None	0.00	Unknown	0.00
21	Edit...(0)	21	21	5 /10/2011	None	0.00	Unknown	0.00
22	Edit...(0)	22	22	5 /10/2011	None	0.00	Unknown	0.00
23	Edit...(0)	23	23	5 /10/2011	None	0.00	Unknown	0.00
24	Edit...(0)	24	24	5 /10/2011	None	0.00	Unknown	0.00
25	Edit...(0)	25	25	5 /10/2011	None	0.00	Unknown	0.00
26	Edit...(0)	26	26	5 /10/2011	None	0.00	Unknown	0.00
27	Edit...(0)	27	27	5 /10/2011	None	0.00	Unknown	0.00

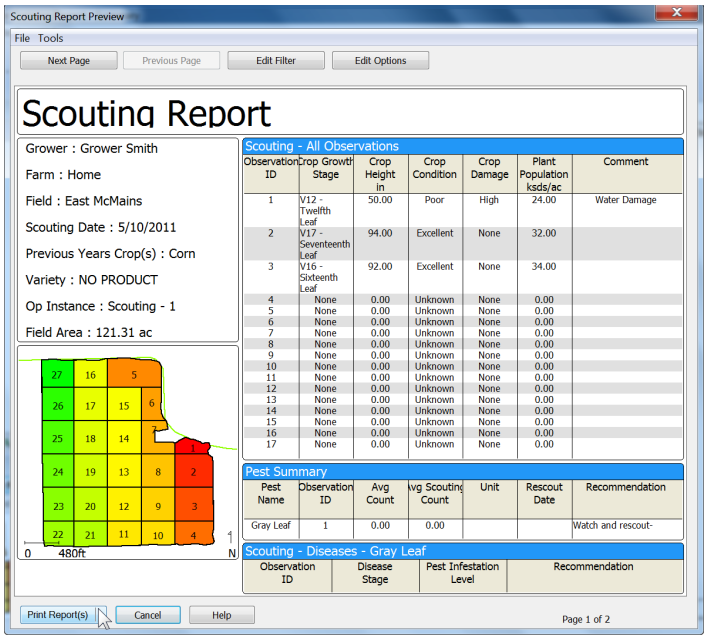
Notice the attribute information is available for all the observation regions on the map. This data can be edited the same way as in the previous section only the regions do not have to be selected first. However, it may be hard to tell which region is being edited

3. For this example edit any information and then click **Save** and then **Close**

Creating a Scouting Report

The scouting report feature allows users to created detailed scouting reports quickly and easily. These reports contain valuable scouting information organized in an easy to read format. Follow the instructions below to create a crop scouting report.

1. Click on **File - New - Scouting Report**
2. In the Select Data Filters window select the appropriate Grower, Farm, Field(s), etc.. to run the report for. Click **Next** and then click **Next** again in the Edit Data Filter Results window.
3. In the Select a Scouting Report Type window select the type of scouting report to be generated. **Condensed** will give you a report containing a summary of the scouting observations with a map to go along. **Detailed** will give you the same as condensed, plus individual pest details and linked images. Select the desired report and click **Next**
4. In the Select Report Content Settings window select the information to be generated in the report. This window allows the user to edit the contents of the report, add a comment, and display backgrounds and/or farm/field boundaries. Make any necessary selections or changes and the click **Next**
5. In the last window, Select Report Formatting Options, make any necessary formatting settings (Image logos and Report colors). Click **Finish**
6. In the Scouting Report Preview window review the report, if necessary make changes, and then print. Click **Print Report(s)** to send the report to your default printer



The Scouting Report Preview will differ from the printed results. The text boxes will resize to fit the entire text and entries into each summary box.

Additional Information

How the Layer is saved to the Management Tree

When a new scouting layer is saved to the Management Tree, it may be saved under multiple operations. There will always be a Scouting - All Observations layer, but if pests have been added there will be a layer saved under each type of pest. For example, if insects, weeds, and diseases had all been added to at least one observation region, then there would be a separate layer for each of those pests in the Management Tree along with the All Observations layer. This allows for better management of pests from scouting period to period.

A suggested way for keeping track of scouting observations if a field is scouted periodically would be to save each layer as a separate instance of scouting and the instance could be saved as the date of the scouting. This will keep the Management Tree organized as well as make it easier to run queries or analyses on the saved maps.

Creating and Adding Pests Using Management Item Editor

Pests can be added before creating scouting layers so they are there to choose from ahead of time.

1. Go to **Tools - Management Item Editor**
2. Click on **Pests**
3. Click **Add New** and the same screen appears that did when pests were added from within the scouting editor. Click **OK** and repeat until all pests have been added
4. Click **Close**

Linked Items

In this chapter you will learn how to Link Items. With the Linked Items feature, you can:

- Attach text files, PDF documents, web sites and images to items in the management tree
- Include linked images in custom print layouts

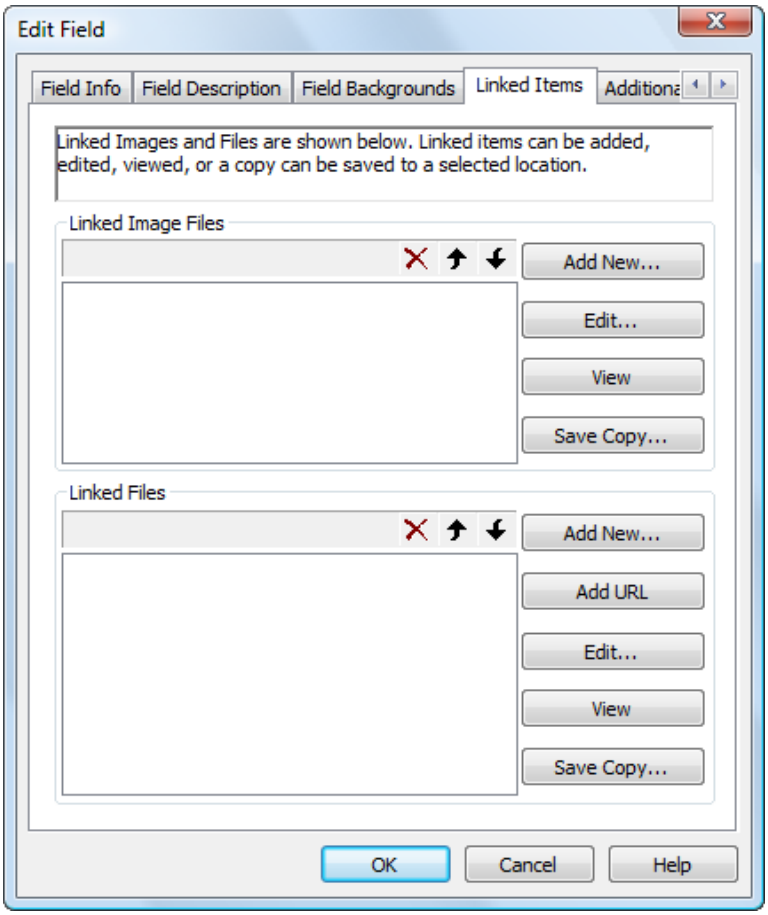
Linking Items

In the software, items such as text and PDF documents, web sites and images can be linked to items in the management tree; these linked items do not contain spatial data but serve as a way to incorporate more operational records for the year. Examples of how linked items are used would be including images of pests that were recorded during crop scouting or displaying the label of a chemical used for spraying.

Linked images can be viewed in the software, included in print layouts and saved to other storage locations. Linked files can be viewed in the software and saved to other data locations. Linked URLs (internet web addresses) can be opened using the software as the web browser.

Linking Items from the Management Tree

1. **Right-click** on the item to link to in the Management Tree (can be any level) and go to **Edit Item**. Select the **Linked Items** tab where new images/files/URLs can be added by clicking on the **Add New** button



2. In the Open window select the format of the image/file to link and navigate to where the image/file is stored. Select the image/file to add and click **Open**. In the Edit Linked Item dialog box name the new image/file by typing in the desired name in the Name field and clicking **OK**

Linked items can be edited, deleted and viewed on the Linked Items tab.

Linking Items Using the Management Item Editor

1. Go to **Tools - Management Item Editor**
2. Select the **Management Item** icon and the Management Item to link items to and choose **Edit**
3. Select the **Linked Items** tab to add new, edit existing, view, save copies or delete linked items

Management Item Editor is the only location where items can be linked to Pests

Viewing & Saving Linked Items

In addition to viewing/saving linked images through the Management Tree and the Management Item Editor they are also available under the 'Summary' window in the 'Linked Items' tab.

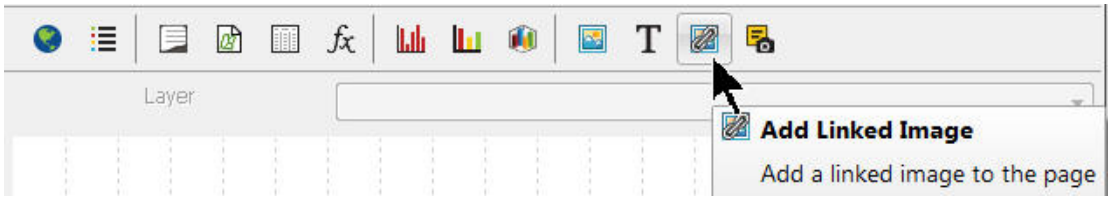
1. Select the item in the Management Tree that has linked items.
2. In the Summary window click on the **Linked Items** tab
3. A list of all images/files/URLs will be displayed and can **Save Copy...** of images and files and **View** all images, files and URLs

Using Linked Images in Custom Print Layouts

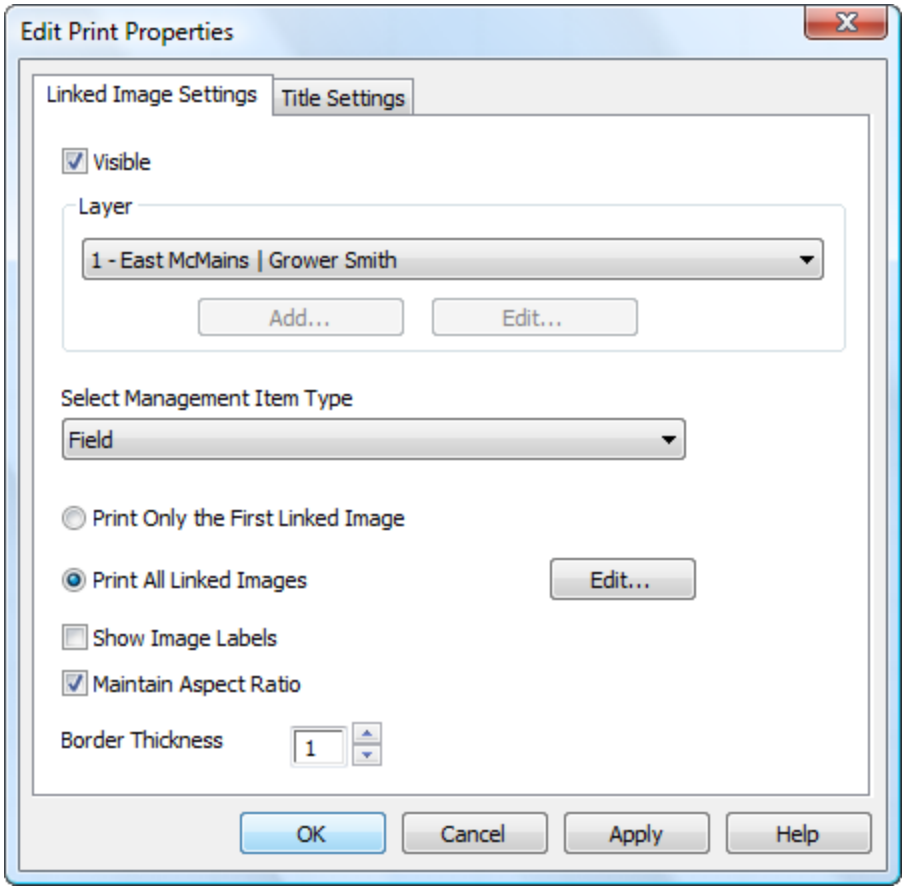
When creating or modifying a custom print layout linked images can be incorporated.

Any Image to be used in Print Layouts must be linked as an image, not a file.

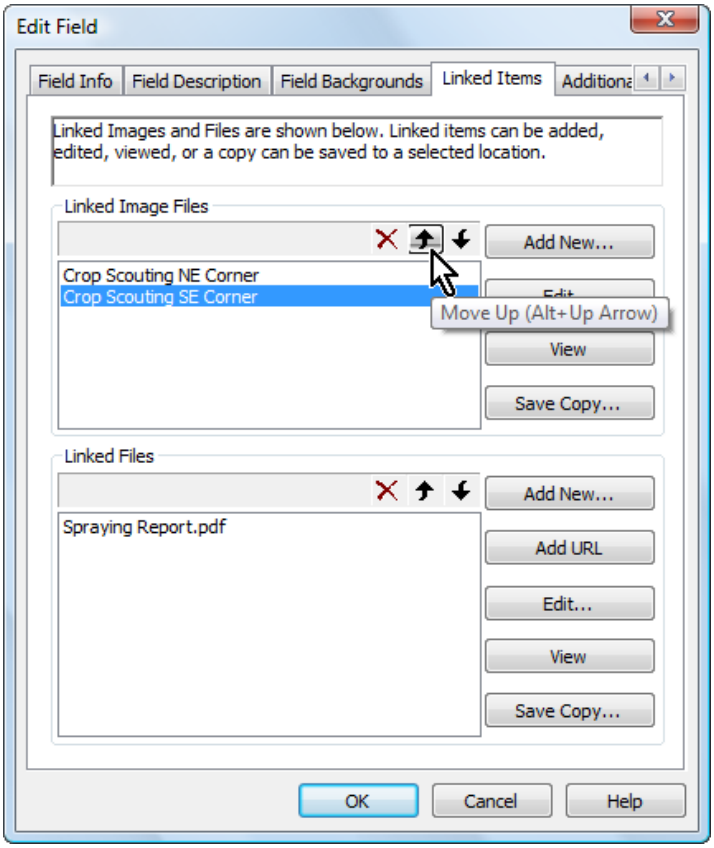
1. Open the custom layout window and go to the **Edit** menu, select **Add** and choose **Linked Image**, this is also accessible under the Linked Image icon located in the tool bar



2. If the desired image to have incorporated is not displayed in the linked image box **Right-click** and go to **Edit Properties** or select **Properties** from the **Edit menu**



3. In the Edit Print Properties dialog box make sure that the image is marked as Visible and that the correct Management Type is selected. In order to select a linked image the management type where the image was first linked will need to be selected
4. If there are multiple images linked to the selected management type the option to Print only the First Linked Image or to Print All Linked Images is available
5. If only one printed image is the desired result but the first image is not the correct to include in the print layout the Linked Items tab can be used to modify the order in which the images are displayed by using the up/down arrows


Edit Field
Field Info
Field Description
Field Backgrounds
Linked Items
Additiona
Linked Images and Files are shown below. Linked items can be added, edited, viewed, or a copy can be saved to a selected location.
Linked Image Files
Add New...
Crop Scouting NE Corner
Crop Scouting SE Corner
Move Up (Alt+Up Arrow)
View
Save Copy...
Linked Files
Add New...
Spraying Report.pdf
Add URL
Edit...
View
Save Copy...
OK
Cancel
Help

Creating As-Applied Data

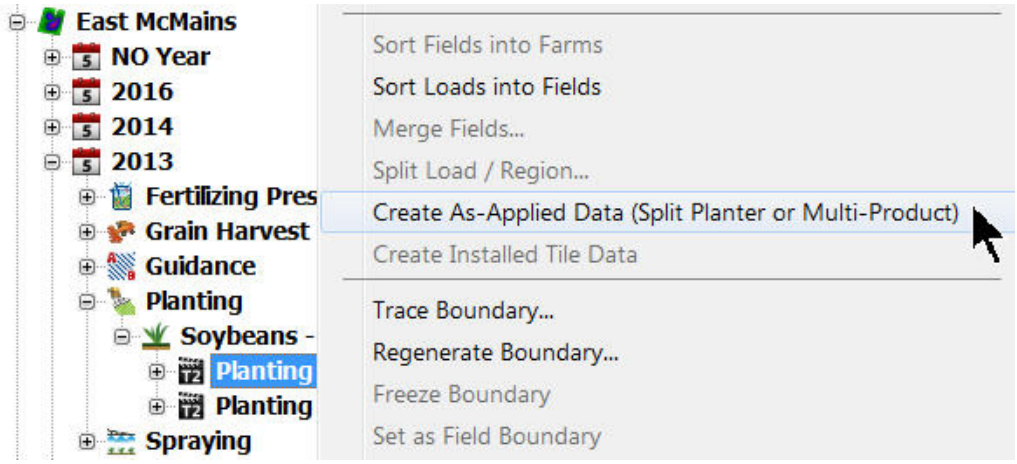
In this chapter you will learn how to Create As-Applied Data (Split Planter or Multi-Product). With the Create As-Applied Data feature, you can:

- Set a product for your data
- Set an application rate for your data
- Split your data into separate swath widths to match what was applied in the field
- Split your data into multiple operations for other simultaneously logged products

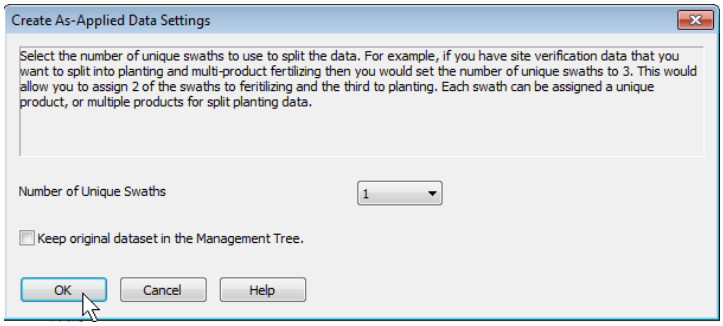
The Create As-Applied Data tool allows datasets to be separated into multiple products and operations in the management tree. It should be used on data that was logged as a single Load/Region, but where the implement actually contained more than one product or applied multiple operations (I.E. planting while applying fertilizer or each half of the planter had a different hybrid/variety).

Create As-Applied Data Settings

1. To create split planter data, right-click on the Dataset, Operational Instance, Crop/Product, or Operation in the Management Tree that you want to create split planter data for and then select Create As-Applied Data. The Create As-Applied Data Settings should appear.



2. In the Create As Applied Data Settings window select **Number of Unique Swaths -1** and uncheck **Keep original dataset in the Management Tree**



The maximum number of sections that a single swath can be split into is four (I.E.. 4 varieties per operation).

Number of Unique Swaths

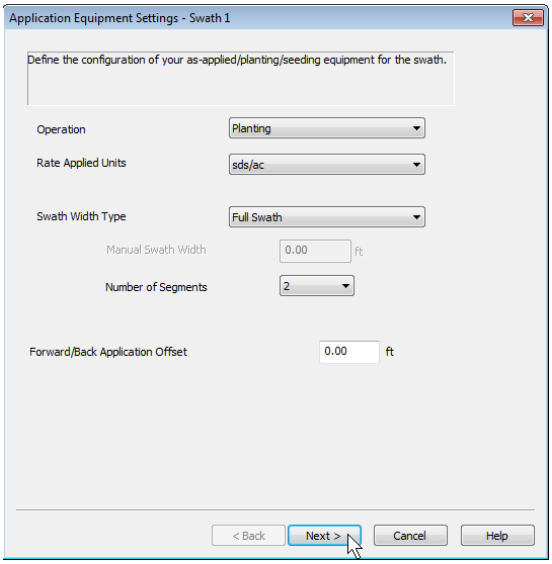
Select the number of unique swaths to use to split the data. Each unique swath can become an additional operation. Each unique swath can be assigned a unique product, or multiple products, for split planting data.

Keep Original Data in the Management Tree

Select to keep the original dataset in the management tree after creating additional unique swaths (I.E. Creating As-Applied Data for a planting operation, with one unique swath for applied fertilizer while planting, by creating only one unique swath for the fertilizing you'd want to keep the original dataset for the planting data). It is recommended to leave this option checked.

Application Equipment Settings

3. In the Application Equipment Settings window select the following settings: **Operation - Planting, Rate Applied Units - sds/ac, Swath Width Type - Full Swath, Number of Segments - 2, and Offset - 0**



Operation

Select which operation the new unique swath dataset will be stored under in the management tree. This may vary for each additional unique swath created.

Rate Applied Units

Select the units to be used to create the as-applied data. The available units will vary depending on the operation selected.

Swath Width Type

Select the type of swath you want to use to create the split planter data. Three options are provided.

- **Full Swath**

This option will use the original swath that was logged in the monitor. The full swath width will be divided by the number of split sections to give each section the same width. In most cases, this option will be the recommended choice.

- **Manual Swath**

This option should be selected to override the logged swath with a manually entered one. This option is especially useful when you need to define sections of varying widths such as a 12 row planter where the splits are at 8 rows and 4 rows. This option can also be used if the swath was not logged properly in the file.

- **Partial Swath**

This option should be used if the logged data was actually set and logged for only a partial swath. This setting will double the values and make the data appear as if it was logged as full swath.

- **Manual Swath Width**

Enter a manual swath width that will be used to create the split sections. This option is only available if the Swath Width Type of Manual Swath is selected.

Number of Segments

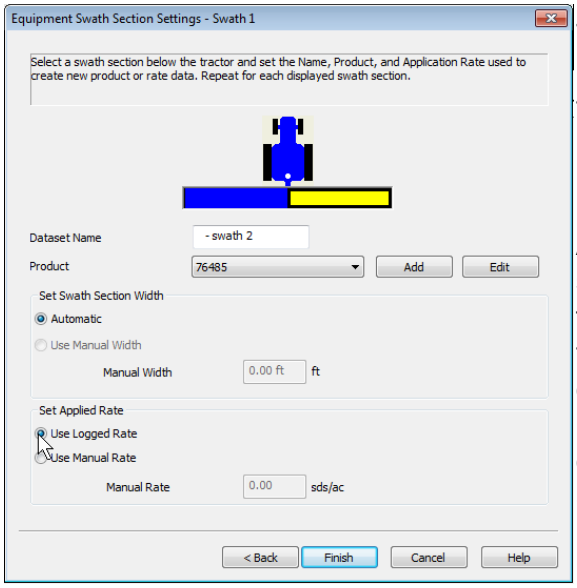
Enter the number of swath sections that will be created from the total swath width (this should be the same number of varieties that are in the planter). The maximum number of sections that can be created is four.

Forward/Back Application Offset

Enter the distance, if different, of the newly created swath from the original logged swath (I.E. Creating a new swath for fertilizing that was applied while planting from the original planting dataset. The fertilizer was applied three feet in front of the seed, so the forward offset would need to be three feet.).

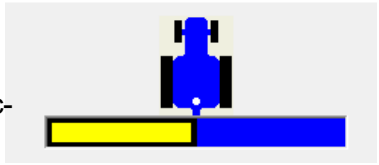
Equipment Swath Section Settings

4. In the Equipment Swath Settings window select the right side of the planter and set the product to **76485**. Set the Swath Section Width to **Automatic** and change the Set Applied Rate to **Use Logged Rate** (make sure to change this for both products)



This dialog allows you to define the swath sections and set the products, widths, and rates to apply to the equipment swath sections that will be created.

Equipment Graphic



Allows the selection of the swath sections to set and adjust settings for. Move your mouse over the section you wish to edit and left click on it. The selected section will highlight with a black border and change from blue to yellow. The options below the Equipment Graphic (Dataset Name, Product, Set Applied Rate, etc.) need to be set for each swath section.

Dataset Name

Enter a dataset name for the selected section. By default the name will be displayed as " - swath 1", " - swath 2", etc. to help signify the sections the datasets represent once split.

Product

Select the product that should be used when the as-applied swath dataset is created. The same product can be selected for situations where all the sections of the equipment contain the same product, but just the rates were varied on the different swath sections. For cases where different hybrids or varieties were used, you would set the product for each section to the actual name of the hybrid or variety that was used. If you logged your data as CORN for example, but you were really planting two different hybrids, you can now set the sections to the actual products, Hybrid A and B for example, and not even use the original name, which will be replaced by the new ones. The goal is to track and maintain the actual product names that you plant, maintain, and harvest throughout the crop cycle instead of using inaccurate or varying names.

- **Add Button**

Click this button to add a new product.

- **Edit Button**

Click this button to edit an existing product.

Set Swath Section Width

Select Automatic to divide each split section into equal swath widths, or Use Manual Width to manually enter swath widths for the each section. The Use Manual Width option is only available if the Swath Width Type of

Manual Swath is selected on the Application Equipment Settings screen.

Set Applied Rate

If an actual rate was recorded during application, the Use Logged Rate option will keep the recorded rate for each split section. If no rate was recorded or the logged rate was incorrect, the Use Manual Rate option can be used to set a rate for each split section.

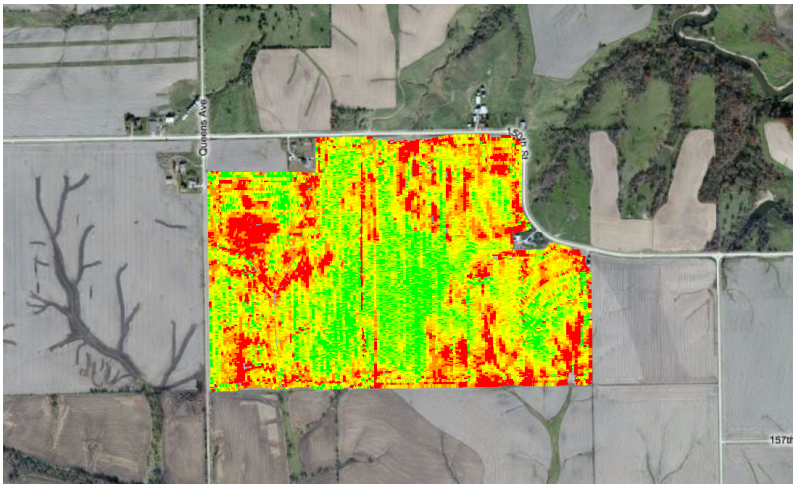
After processing is complete you will now have one or more new datasets using the settings that were defined when the Application Equipment Settings were defined.

5. Create a map of the Planting data by clicking on Planting and clicking **Create New Map**. Change the attribute/property being displayed to **Product - Name** from the drop down to view the split planter data

Backgrounds

In this chapter you will learn to:

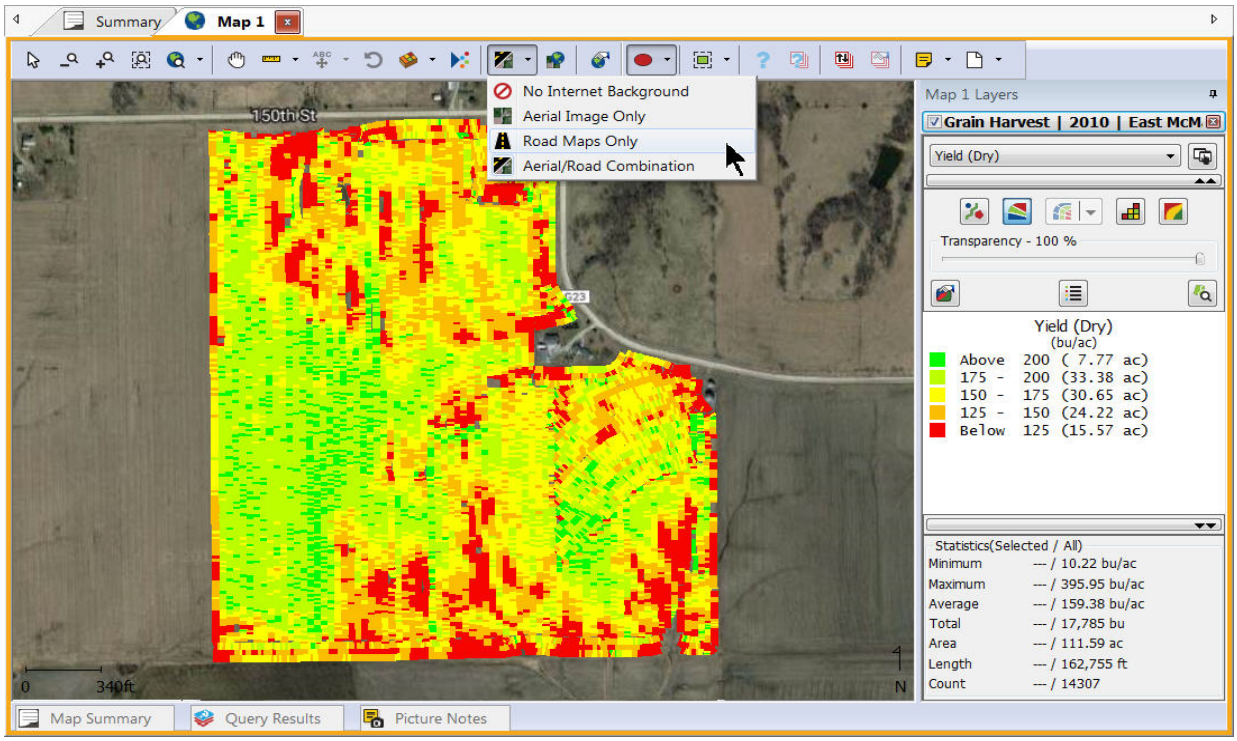
- Turn Aerial and/or Road Internet Backgrounds on and off
- Copy data from the management tree and set as background
- Import data and set as a background
- Customize backgrounds to display labels
- Link Backgrounds to Farms



The background tool is a way to display a reference layer (image or spatial map) with another map layer (such as a yield map, or planting map). Imagery, roads, and soil type maps are all examples of things than can be linked to appear automatically when a new map is created.

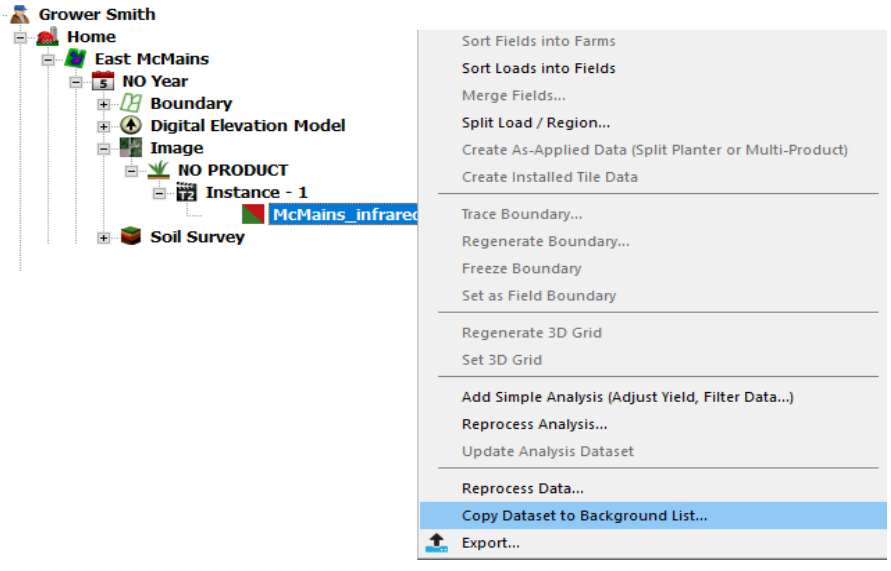
Turning Internet Aerial/Road Backgrounds on and off

The Software has the ability to automatically display aerial and road backgrounds individually or as a combination each time a map is created. This feature requires an internet connection and can be controlled using the Internet Background tool in the mapping toolbar.



Adding files to your Background list

Any data can be copied to the background list for reference in map layers or print layouts.

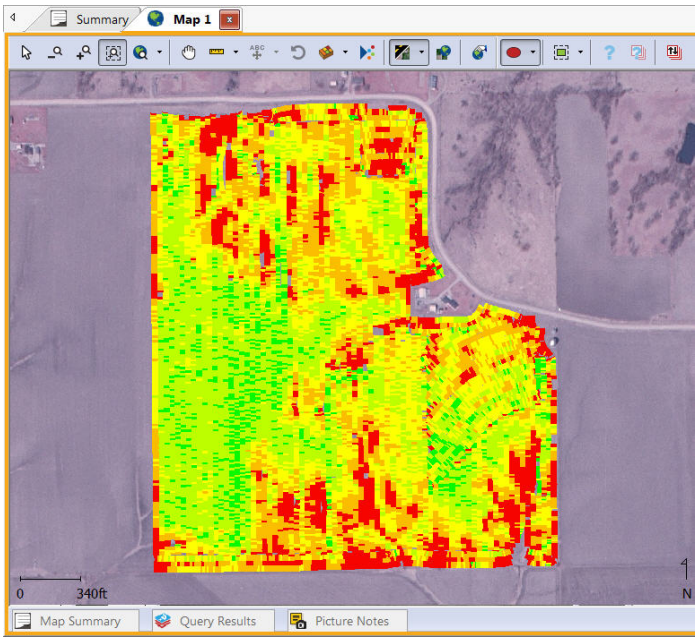


This will copy the layer that is in the management tree into the background list.

Give this layer a name that can be easily identified for future use

Now this image can be added/linked to any map layer for reference.

1. Create a new map to add an image to (i.e. yield Map)
2. Right-Click on the map and select **Set Background**
3. Now select the desired background and click **Add**
    - Two tabs are available at the top: Spatial and Image
4. On the following screen click **OK**

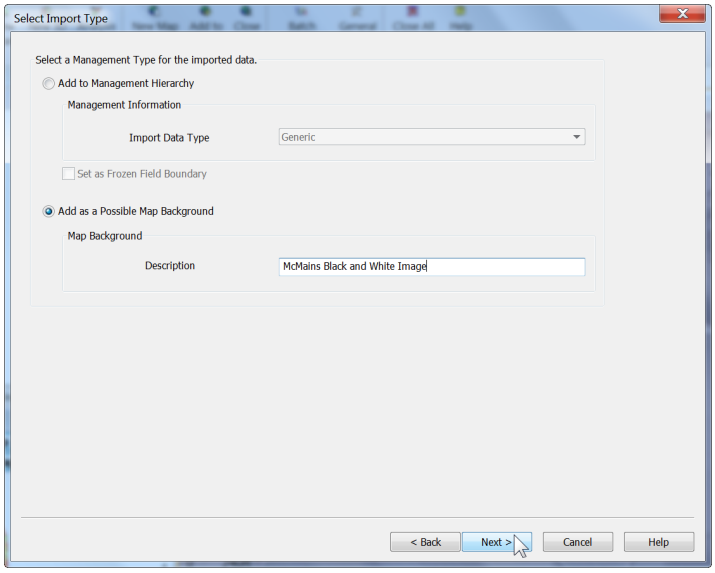


5. Finished map

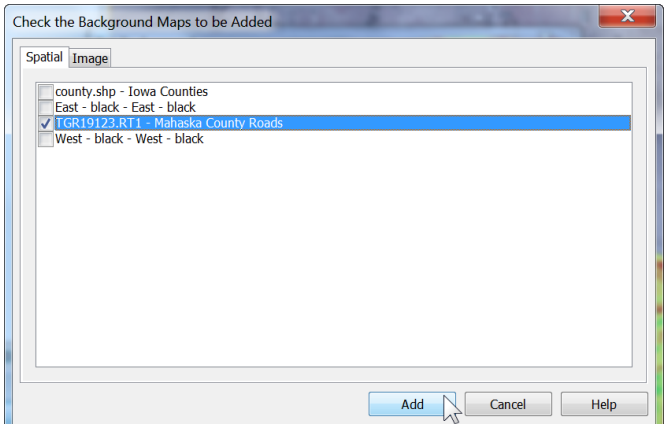
This image is not a "layer" of the map, it is only in the background to provide a reference for the field. You can Add multiple backgrounds and chose the order in which they appear in step 4.

Importing data and setting as a Background

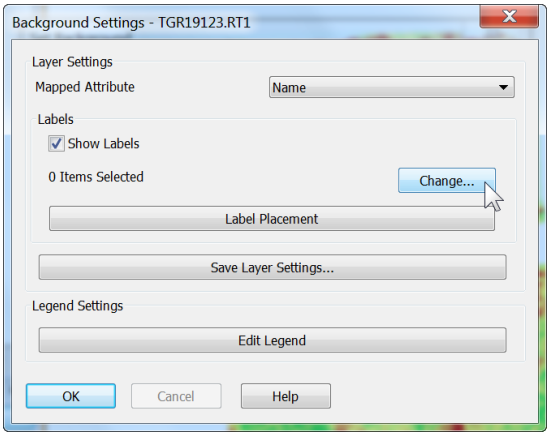
As you are importing images or spatial data you can also set them to be saved to the Background List



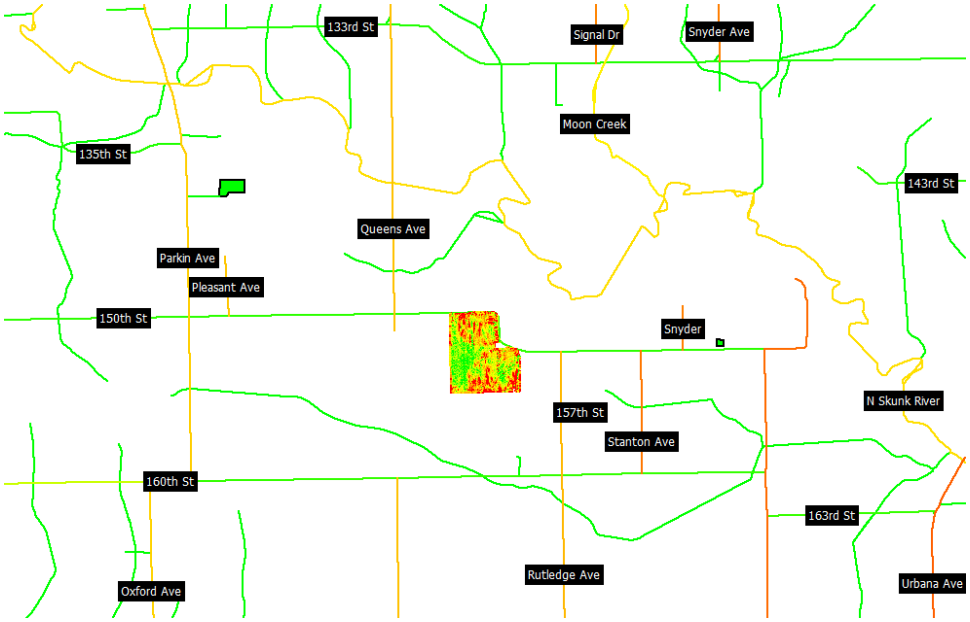
1. To activate a background that contains data, click on the **Spatial** tab (this is similar to step 3), Check the box next to the desired layer, and click **Add**



2. If the map appears as desired, click **OK** at the bottom, if editing is needed to spatial maps to show labels, or change color click the edit button at the bottom of the following screen. This example will be using Tiger Data, that will then show the road names on a map
3. Change the mapped attribute to **Name**, then check the box next to **Show Labels**. For more editing, go to **Label Placement** button. The next screen contains the same options as the Edit Options section. After all settings have been modified, press **OK** until you return to the map



4. Finished map



Note: This image is not a "layer" of the map, it is only in the background to provide a reference for the field. You can add multiple backgrounds and choose the order using the screen in Step 3.

NDVI Analysis

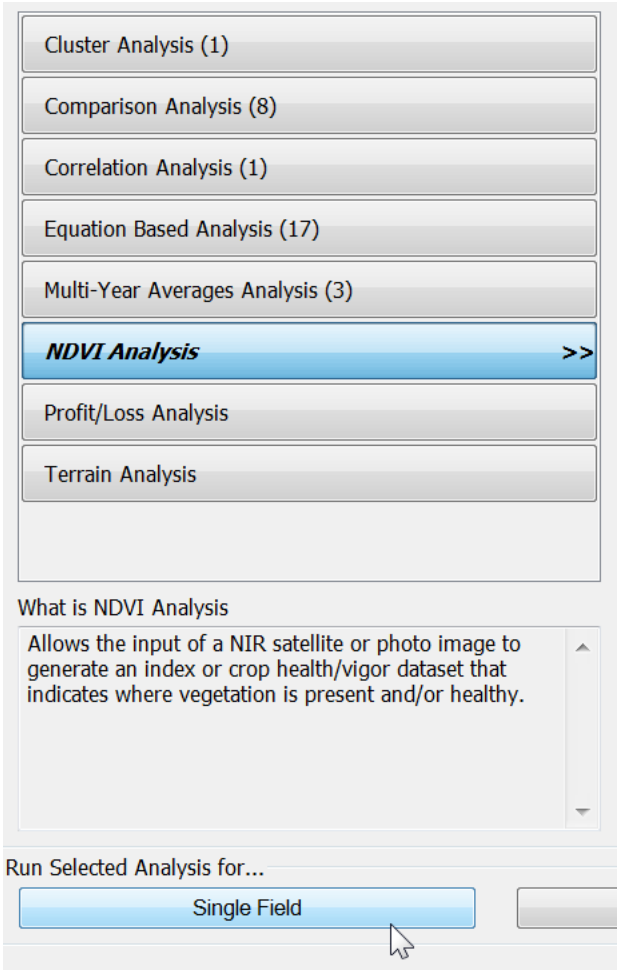
In this chapter you will learn how to:

- Generate an NDVI dataset

This example will demonstrate the ability of the software to generate an NDVI dataset based on an image (most commonly using an infra-red image). These images can be imported into the software as demonstrated in the Importing chapter.

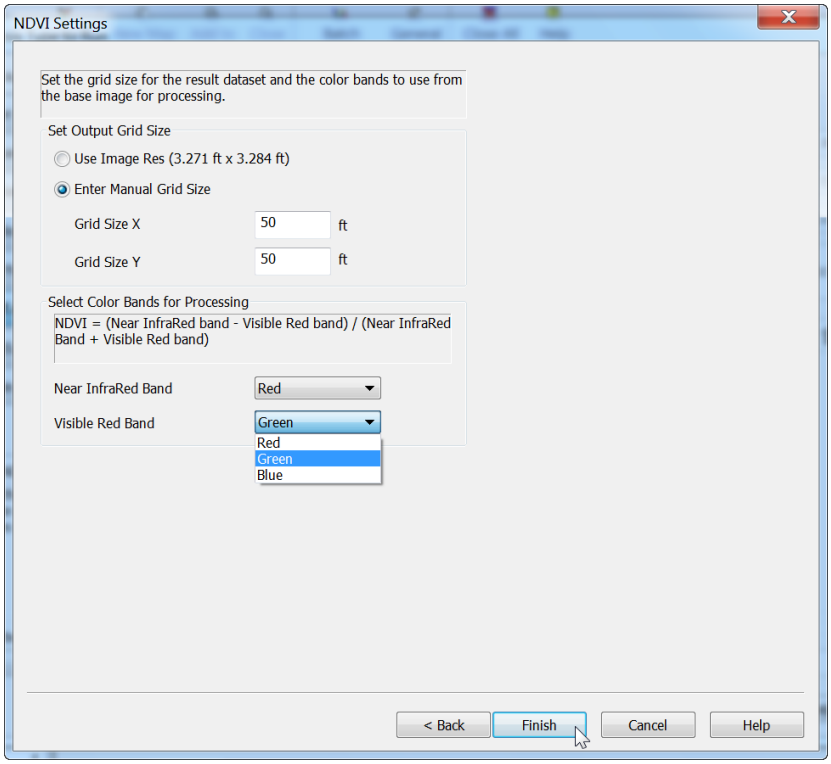
Generating an NDVI Dataset

1. If not already archived, import the image(s) being used to generate the NDVI dataset
2. To begin this analysis, click on the **Analysis** menu, and select the **Analysis Wizard**
3. From the Select Analysis Type to Run window click on the **NDVI Analysis** and then click **Single Field** under Run Select Analysis for..to run this analysis for one field. Select **Multiple Fields** to run this ana-



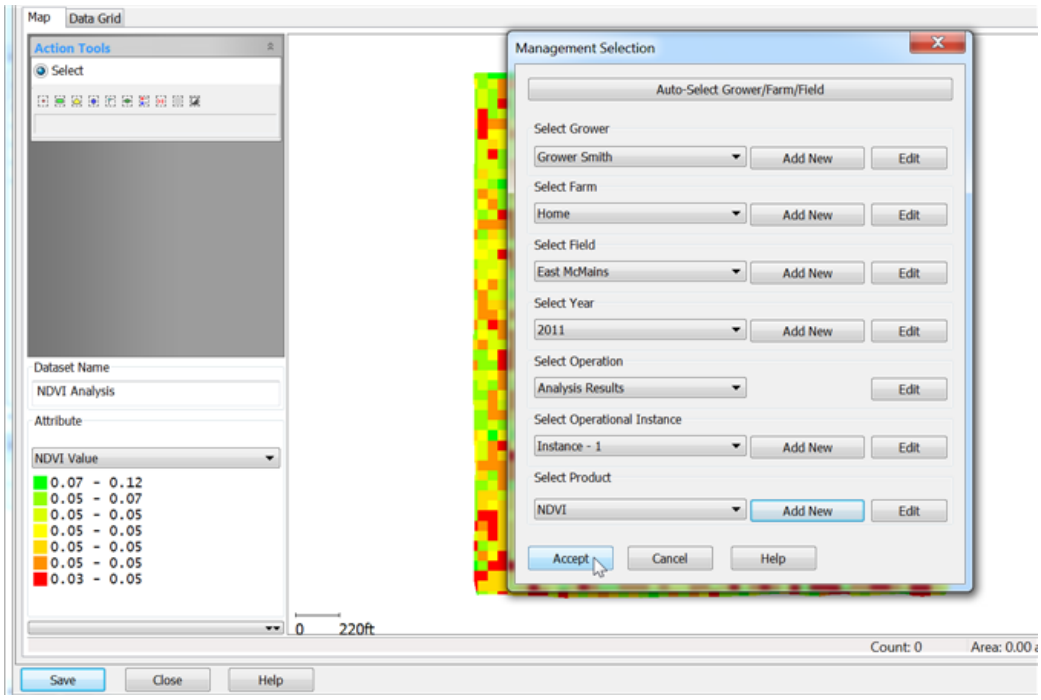
lysis for several fields at once

4. Select the appropriate data filters to generate the NDVI dataset from. For this example, select **Grower Smith - Home - East McMains - NO Year - Image - NO PRODUCT - Instance-1 - McMains_ infrared**. Click **Next**
5. Click **Next** in the Edit Data Filter Results window
6. Set the Output Grid Size to the appropriate settings. For this example, select Enter Manual Grid Size of **50ft x 50ft**. Set the Color Bands for Processing to **Red** for Near Infrared Band and **Green** for the Visible Red Bad. Click **Finish**



Depending on the source of images, Near Infrared Band and Visible Red Band may differ. See image provider for details.

7. Click **Save** in the Analysis Editor screen. Select the appropriate filters in the Management Selection window. For this example use, **Grower Smith - Home - East McMains - Analysis Results - Instance-1 - NDVI**. Click **Accept**



- **NDVI Value** (Normalized Difference Vegetation Index)- an index of crop health in relation to the rest of the field. The higher the value, the healthier the crop.
- **NIR Vigor**- Infrared image that has been converted to numerical values.

Glossary

Attribute Group

A category under which related Attributes can be consolidated.

Attribute

Data within a map that contains information for an operation. Tends to be data that fluctuates from object to object (i.e. Yield, Moisture, Soil pH, Target Rate (Mass)).

C.V. (Coefficient Variation)

A number representing comparison of values with standard deviation significantly different from the sample datasets. The lower the value the more "uniform" results from sample maps used.

Cluster Center

The averaged value for polygons generated from attributes included in a Cluster Analysis.

Cluster Number

The number assigned to each zone (or cluster) created from a Cluster Analysis.

Curvature

Calculation that uses the slope at 2 points divided by the distance between the two points.

Drainage Area

Length of tile run x Drainage Width + any connection runs that is displayed in Installed/Tile Plan datasets

Drainage Coefficient

Actual drainage coefficient for tile system that is used to see how effective the drainage of the plan is to the targets set in the preferences. Uses tile size, grade, area and connections in calculation.

Discharge Flow (Run)

Actual discharge flow assuming that the tile is at full capacity. Full capacity established from total Area and the Target Drainage Coefficient.

Discharge Flow (Soil)

Actual discharge flow amount of water for the total Area and the Target Drainage Coefficient defined in preferences.

EC

Soil EC (Electromagnetic Conductivity) is a measurement that correlates to soil properties affecting crop productivity, including soil texture, cation exchange capacity (CEC), drainage conditions, organic matter (O.M.) level, salinity, and subsoil characteristics.

Feature ID

Numerical listing (ID) of points, polygons, or lines in a dataset.

Flow Direction

Similar to Gradient Direction, it is the direction of flow (think of water) measured in degrees 0-360.

Gradient Direction

Similar to Flow Direction, it is the direction of flow (think of water) measured in degrees -180 to +180 (East = 0 degrees). Generated through the Analysis Wizard with the Terrain Analysis function.

Interpolation

Process of calculating data across unknown areas from data with known information.

- **Inverse weighted distance -** An interpolation method that averages local cell values but also takes into account distance of neighboring cells. The further away the sample data is from a location the less influence that data has on the calculation of a value at that location.
- **Max Distance -** Parameter that specifies the maximum distance for which points will be included.
- **Distance Ratio -** Parameter that applies a ratio that weights the influence of data of smoothing will be adjusted over a dataset.
- **Kriging** - An interpolation method for generating unknown values from known ones by developing and applying a weighted moving average. Weighting factors are arrived at through a semi-variogram.

NDVI Value (Normalize Difference Vegetation Index)

An indicator of crop health in relation to the rest of the field. The higher the value, the healthier the crop.

NIR Vigor

Infrared image that has been converted to values.

Plant Population

Population of emerged seed.

Property

A characteristic that is associated to a management item (i.e.: Dataset name, Product name, Field, Is GMO, Maturity, etc.).

Seed Population

Population of seed that was planted during a span of time.

Shortcut Keys

1. Measure - CTRL + M
2. Multi-Line Measure - CTRL + L
3. Copy Selection - CTRL + C
4. Paste - CTRL + V
5. Cut Selection CTRL + X
6. Undo CTRL + Z
7. Redo CTRL + Y
8. Reset Cursor END
9. Delete Selection DELETE
10. Move Selection CTRL + E
11. Merge Selections CTRL + R
12. Snap to Start Point F2

13. Snap to Center F3
14. Snap to Midpoint F4
15. Snap to Endpoint F5
16. Snap to Closest F6
17. Snap to Vertex F7
18. Snap Off F8
19. Pan Up - up arrow
20. Pan down - down arrow
21. Pan Left - left arrow
22. Pan Right - right arrow
23. Zoom in - +
24. Zoom out - -
25. Zoom prev - Backspace
26. Zoom world - Home
27. If a spatial object or vertex is selected, and the arrow keys + Ctrl key is used, allow this to move the object around the map in increments of 5 pixels per keystroke.

Slope / Grade

Measure of Slope in a field calculated by the elevation data and lat/long data.

Stream Power

Amount of water force coming from upland drainage area. Generated through the Analysis Wizard with the Terrain Analysis function.

Summary Type

- **Spatial Data Records -** Type of summary reflects the data that appears on the map. The results may differ from Monitor data (on yield maps). This is due to the raw data being filtered (see processing settings) to make the map more reflective to adjust for equipment / product flow tendencies.
- **Monitor Summary -** Summary directly from a monitor. This information will reflect the data that is currently in the monitor. For yield data this will be more reflective of what was harvested, and a total production for the year.
- **User Defined -** By default shows the same information as Monitor, but can be edited to display spatial records instead.
- **Manual Entries -**Information that is supplied by user, in the event of inaccuracies from the Monitor or Spatial Data.

Track

The degree of heading during a data collection event (0 - 360 degrees).

Watershed ID

Numeric ID assigned in terrain analysis to help determine common draining areas in the field.

Wetness Potential

Areas of field that will tend to pond - will identify the low-lying areas of a field. Generated through the Analysis Wizard with the Terrain Analysis function.

Soil survey data:

- **CSR2** – Corn Suitably Rating – Index of soil productivity to growing corn (Iowa only)
- **Depth to Restrictive Layer** – depth to the upper layer of the profile that won't allow water or root penetration
- **Drainage Class** – the natural drainage condition of the predominate soil type
- **Erodability Class** – The overall Erodability classification based on the wind and water
- **Hz(n) – Hydraulic Conductivity** – the amount of water that moves vertically in time with a saturated soil
- **Hz(n)- K Factor** -Factor which quantifies the susceptibility of soil
- **Hz(n)- Max Depth** – maximum depth of the Horizon Layer
- **Hz(n)- Name** – Name of the Horizon layer
- **Hz(n)- Soil % Clay** – Percentage of soil composition held by Clay particles
- **Hz(n)-Soil % Sand** - Percentage of soil composition held by Sand particles
- **Hz(n)- Soil % Silt** - Percentage of soil composition held by Silt particles
- **Hz(n)- Soil Texture** – Textural class for the horizon layer
- **NCCPI (Corn/Cotton/Small Grains/Soybeans)**- National Commodity Crop Productivity Index is a model for nonirrigated crops that uses natural relationships of soil, landscape and climate factors to model the response of commodity crops in soil map units. Represented as a numeric range of 0-100 with 100 being the best.
- **Slope/Grade (%)** – Representative slope of that soil type expressed in %
- **Slope/Grade (raw)** - Representative slope of that soil type expressed in grade units
- **Slope/Grade Range** – the range of slope for that soil type
- **Soil Description** – Correlated name of the map unit
- **Soil Symbol** – Symbol used to uniquely identify the soil map unit survey
- **Soil Type** – Name given to soil type based on its range of properties
- **T-Factor** - Soil Loss tolerance factor for the maximum loss per year, to maintain quality soil for plant growth.
- **Water Storage 0-39 In** – amount of water storage available in the top 39 inches of soil profile
- **Water Storage 0-59 In**- amount of water storage available in the top 59 inches of soil profile