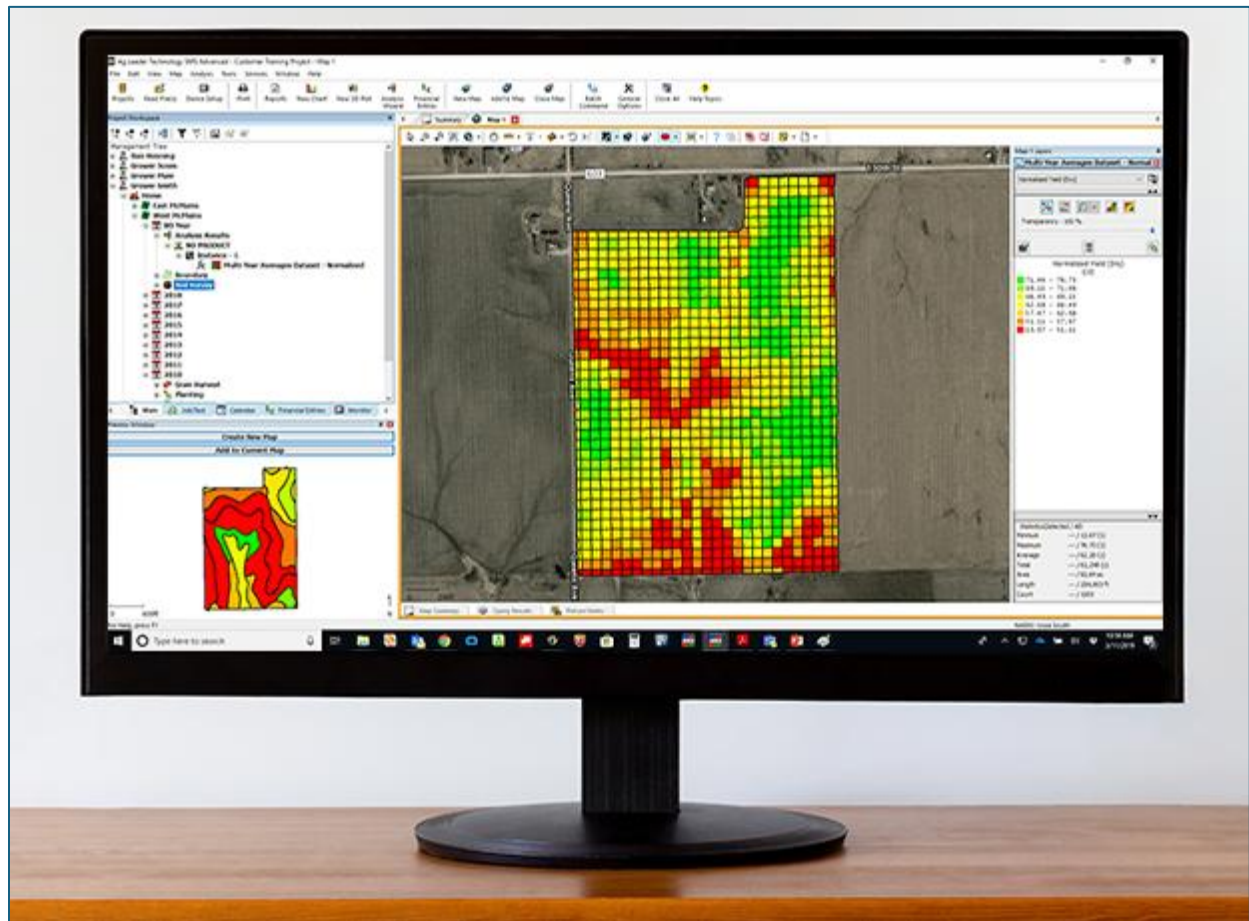


Importing Cornell Yield Stability Zone Maps into Ag Leader SMS Software

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Cornell University, Ithaca, NY 14853

Executive Summary

- Within a farm field, different areas tend to yield greater or lesser harvests over the years, with varying degrees of consistency. The ability to visualize how areas in a given field behave in this regard is valuable when planning crop planting and field treatments. Such visualizations are called yield stability zone maps.
- Cornell NMSP generates zone maps based on crop yield data sent to us by collaborating farms. These can be viewed in Ag Leader SMS, a tool which, among other uses, can import zone maps in several file formats.
- Before using this manual, users should have a yield stability zone map in .shp or .tif format. If a batch process is to be used, a .shp boundary file for the farm will allow field settings to be filled automatically, though this is not necessary.
- Minimum system requirements to run SMS according to the Ag Leader website:
 - 64 bit system
 - 1 GHz processor or higher
 - Windows 10/11 or Windows Server 2012 R2 and up
 - 1 GB RAM
 - 4 GB Application/Data Storage Space
- This manual contains instructions for how to download Ag Leader SMS and use it to import yield stability zone maps, individually or en masse with a batch process, view them alongside satellite imagery, and customize display settings.

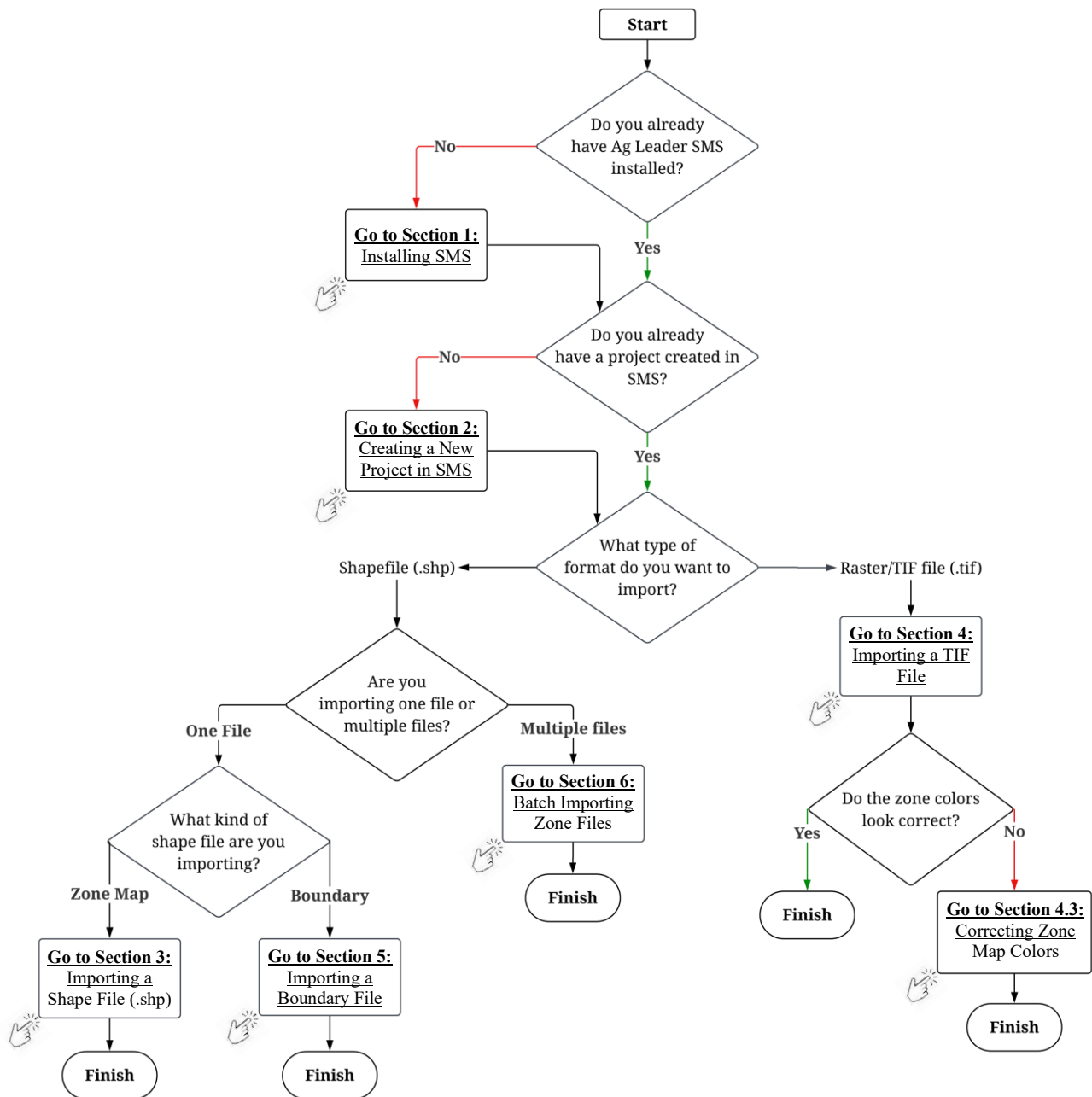
Acknowledgments

We thank former NMSP team members Tulsi Kharel, Dilip Kharel, Jason Cho, Angel Maresma, Sunoj Shajahan, and Isabella Marie Agurto for their contributions to our precision agriculture program and zone-mapping project. Funding for the research came from grants from the New York State Department of Agriculture, New York State Department of Environmental Conservation, and Northern New York Agricultural Development Program.

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Manual Quick Guide



Clicking the active links provided in specific steps will direct you to the relevant section of this manual.

1. Installing SMS

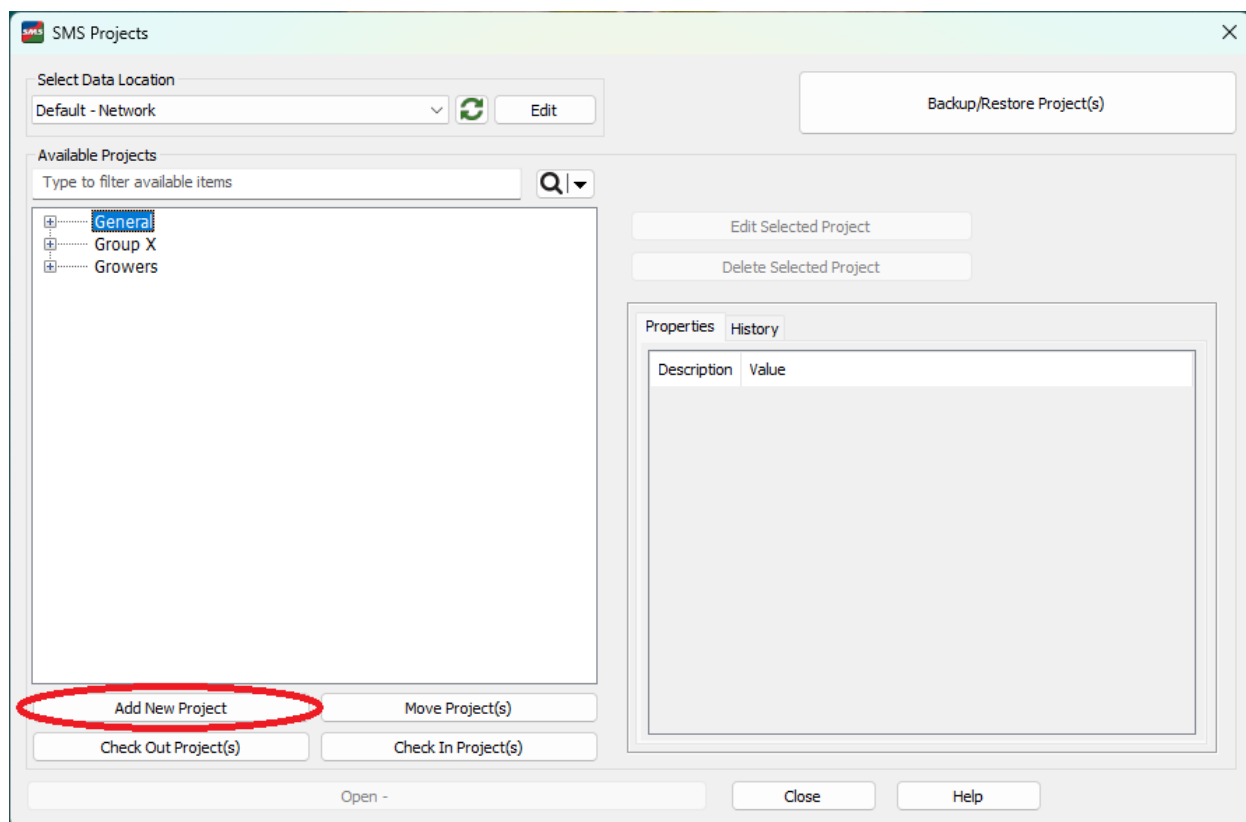
Access the Ag Leader SMS installer available in Basic and Advanced versions through this link: https://portal.agleader.com/community/s/article/3529?language=en_US. Ag Leader SMS Basic is a free version that provides essential tools for viewing and organizing data, while SMS Advanced is a paid version that adds advanced analysis and decision-support features.

After downloading and extracting the installation package, locate and run the "setup.exe" file. You will be prompted to install the required components. Follow the on-screen instructions to complete this step. You will then be asked to review and accept the license agreement before proceeding. When prompted to select installation options, choose **SMS Basic** if you are installing the free version, or **SMS Advanced** if you are installing the advanced fee-based version. Continue through the remaining prompts until the installation is complete.

Once you have SMS set up and open, follow the steps below to import a field shapefile (.shp) or raster file (.tif), and display the crop management zones.

2. Creating a New Project in SMS

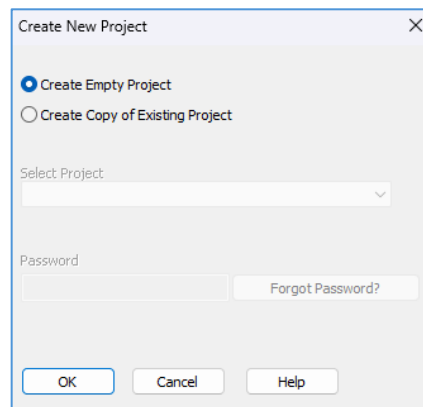
To create a new project, begin by opening the software and accessing the “SMS Projects” window. If no project has been previously created, select **Add New Project** to initiate the process.



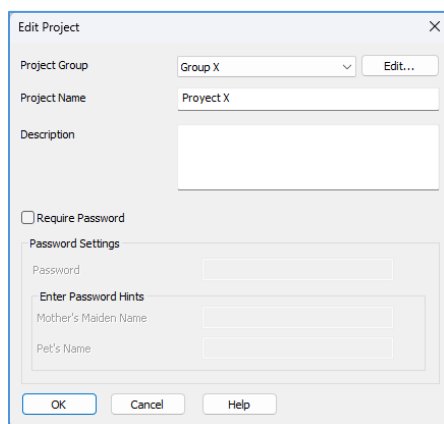
In the “Create New Project” window, choose the option **Create Empty Project** and click **OK** to proceed.

Next, in the “Edit Project window”, define the project settings. Select a Project Group from the available options, such as General, Growers, or create a new group by clicking **Edit...** and then **Add**, entering the desired group name, and confirming with **OK**.

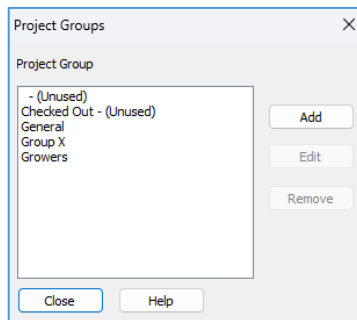
After defining the group, enter a Project Name and, if desired, include a brief description. Optionally, a password can be enabled to restrict access to the project.



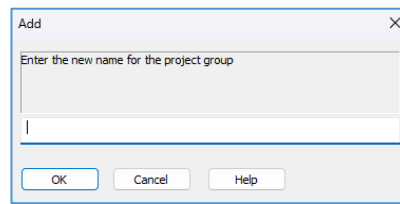
The "Create New Project" dialog box has a title bar with a close button. It contains two radio buttons: "Create Empty Project" (selected) and "Create Copy of Existing Project". Below these is a "Select Project:" dropdown menu. There is a "Password" text field and a "Forgot Password?" link. At the bottom are "OK", "Cancel", and "Help" buttons.



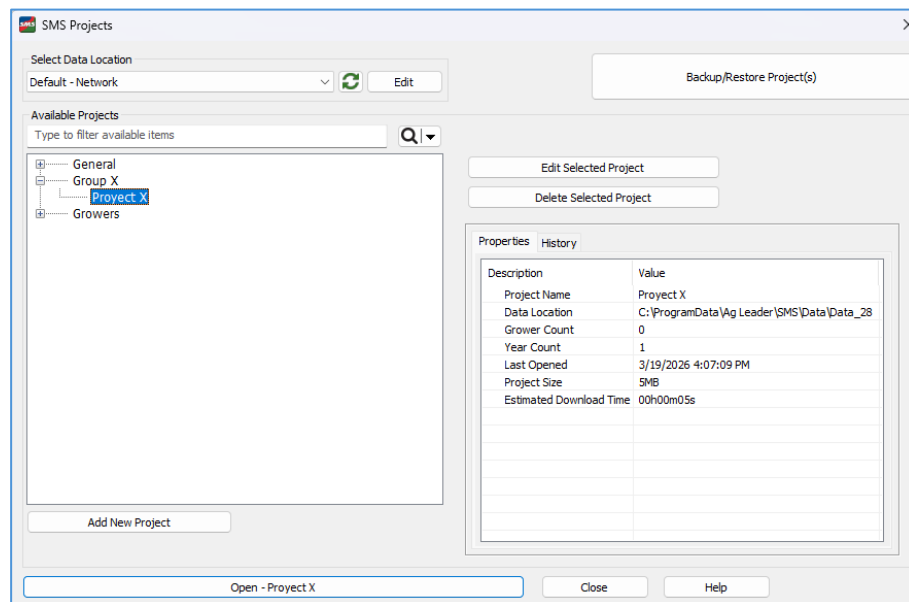
The "Edit Project" dialog box has a title bar with a close button. It contains a "Project Group" dropdown menu with "Group X" selected and an "Edit..." button. Below is a "Project Name" text field with "Project X" entered. There is a "Description" text area. A "Require Password" checkbox is unchecked. Below it is a "Password Settings" section with a "Password" text field, "Enter Password Hints" (with sub-fields for "Mother's Maiden Name" and "Pet's Name"), and "OK", "Cancel", and "Help" buttons.



The "Project Groups" dialog box has a title bar with a close button. It contains a list of project groups: "- (Unused)", "Checked Out - (Unused)", "General", "Group X", and "Growers". To the right of the list are "Add", "Edit", and "Remove" buttons. At the bottom are "Close" and "Help" buttons.



The "Add" dialog box has a title bar with a close button. It contains a text field with the placeholder "Enter the new name for the project group". At the bottom are "OK", "Cancel", and "Help" buttons.



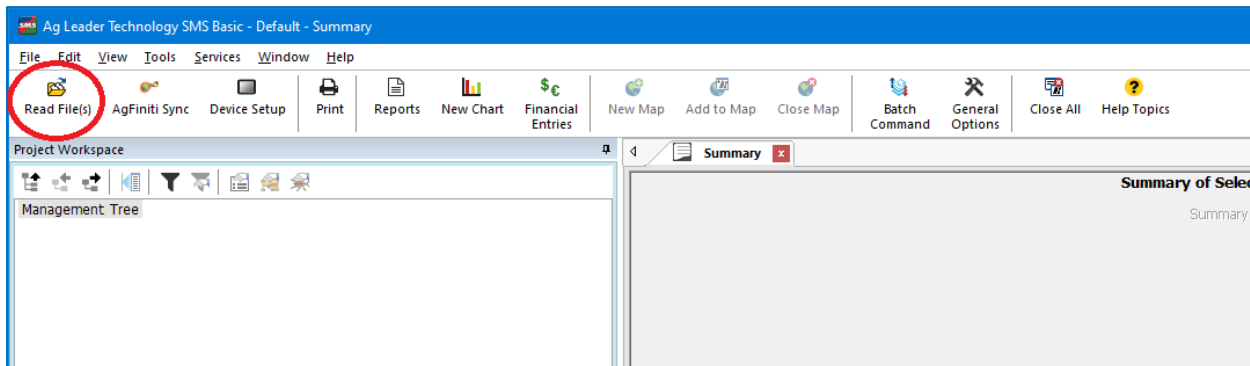
The "SMS Projects" main window has a title bar with a close button. It features a "Select Data Location" dropdown menu with "Default - Network" selected and an "Edit" button. A "Backup/Restore Project(s)" button is in the top right. Below is an "Available Projects" section with a search bar and a tree view showing a hierarchy: "General" (expanded) -> "Group X" (expanded) -> "Project X" (selected). There are "Edit Selected Project" and "Delete Selected Project" buttons. A "Properties" tab is active, showing a table of project details. At the bottom are "Add New Project", "Open - Project X", "Close", and "Help" buttons.

Description	Value
Project Name	Project X
Data Location	C:\ProgramData\Ag Leader\SMS\Data\Data_28
Grower Count	0
Year Count	1
Last Opened	3/19/2026 4:07:09 PM
Project Size	5MB
Estimated Download Time	00h00m05s

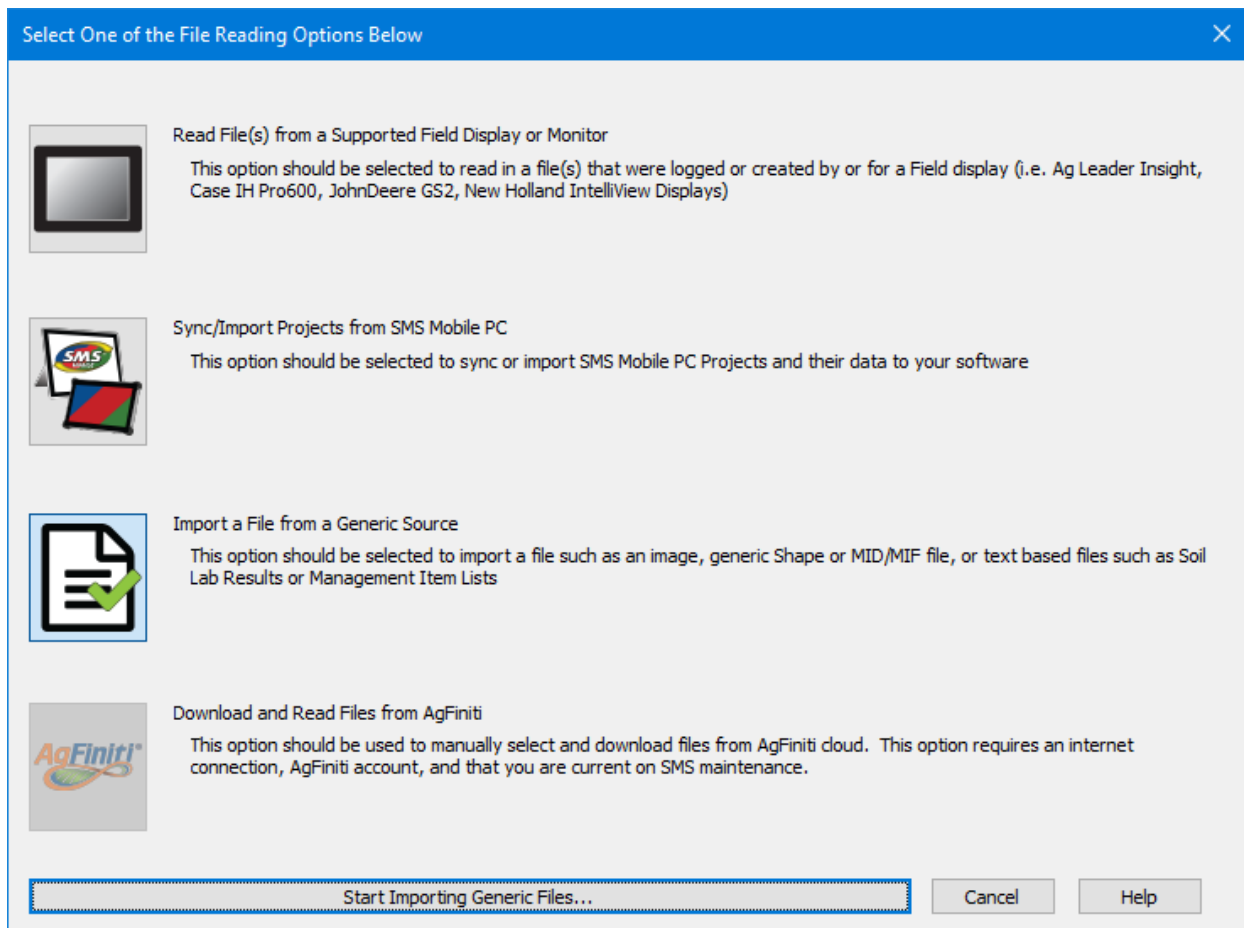
Once all fields have been completed, click **OK** to finalize the project creation. The new project will then appear on the list of available projects. Select it and click **Open – [Project Name]** to begin working.

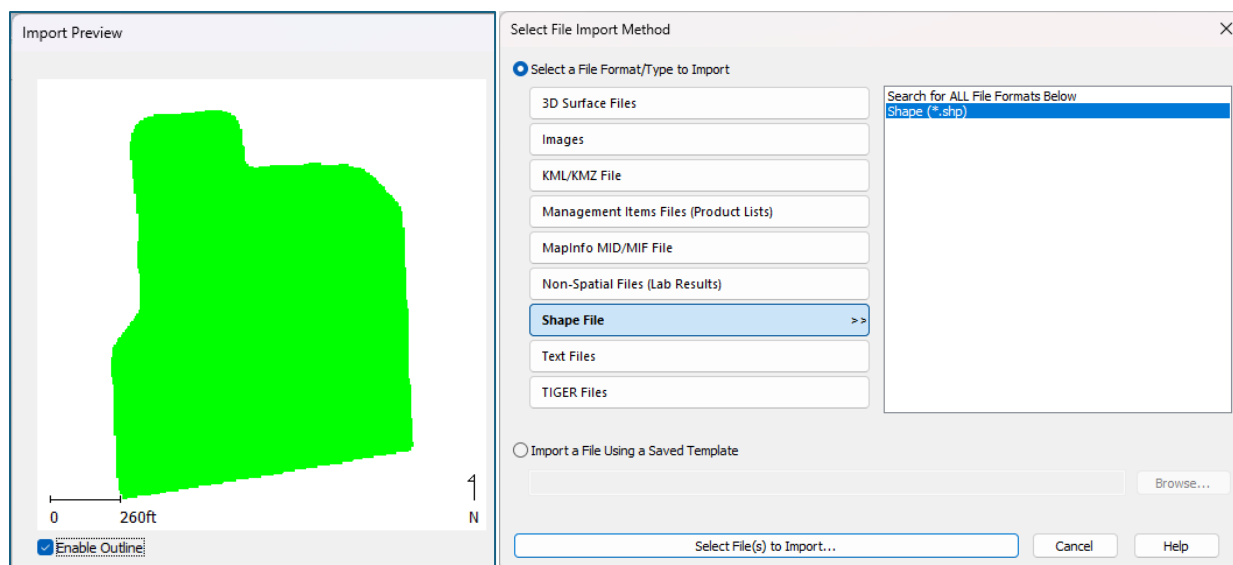
3. Importing a Shape File (.shp)

Begin by selecting **Read File** from the upper left of the SMS main window.



From the window “Select One of the File Reading Options Below”, click **Import a File from a Generic Source**, then **Start Importing Generic Files**.

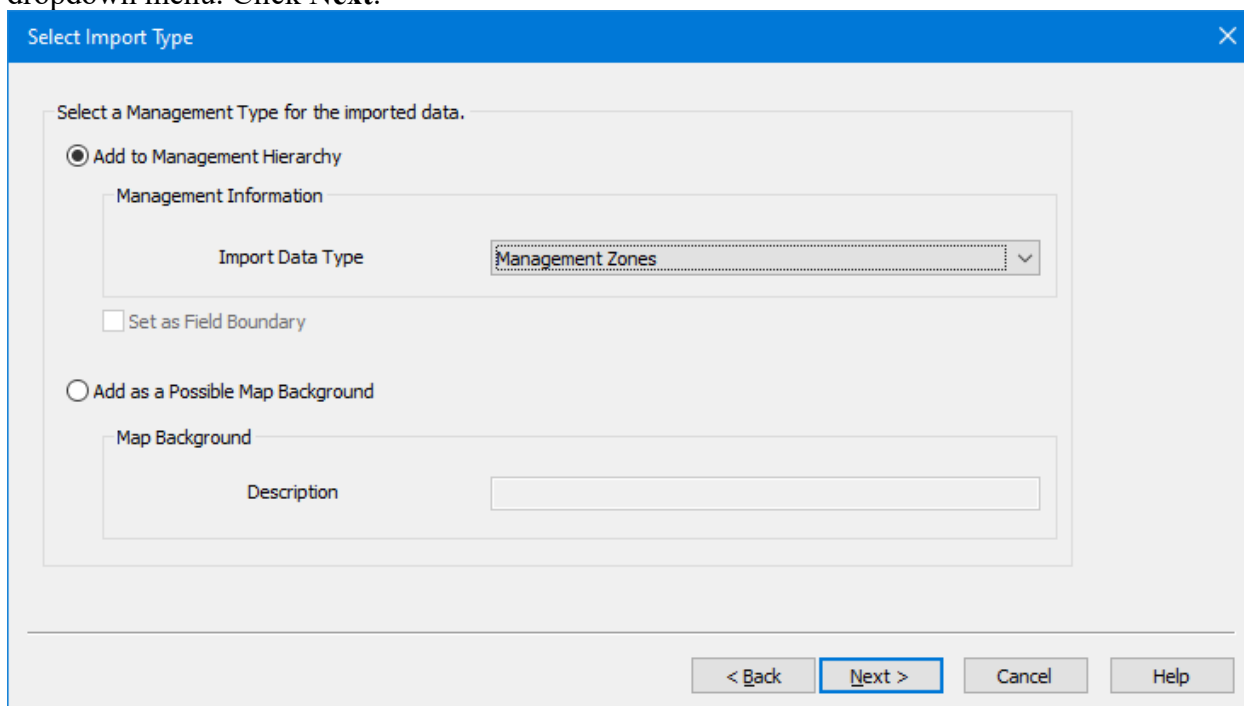




In the **Select File Import Method** window, choose **Select a File Format/Type to Import**, then **Shape file**. From the list on the right, select **Shape (*.shp)**. Then click **Select File(s) to Import**. Select the shapefile to be imported. You should see an **Import Preview** window showing the outline of your field. Click **Next**.

3.1. Shape File Settings

From the **Select Import Type** window, choose **Management Zones** from the “Import Data Type” dropdown menu. Click **Next**.



On the **Assign Columns to Import** window, you should see the file column "Zone" in the "Optional Items to Import" area. To use a zone map, begin by clicking **Assign Column**.

File Column	Column Mapping	Column Unit
Zone		

Column Name	Zone
Attribute Name	Zone ID
Units For	
Sample row	4
	4
	4

From the **Columns Settings: Zone** window, under the "Zone" menu on the left, select **Use as Attribute**. Then from the "Attribute(s)" list on the right, choose **Zone ID**. To find it, choose the Attribute Group (**All**) from the dropdown menu and scroll to the bottom under Attribute(s). Make sure the **Data Type** is set to **Text** under "Description of the Selected Item". Click **OK**.

Zone

☐ Don't use this column
☒ Use as Attribute
☐ Use as Property
☐ Use as Management
☐ Use as Sub-Layer Attribute (i.e. Marks, Notes, etc.)

Type to filter available attributes

Attribute Group: (All)

Attribute(s):

- Yield Growth (Mass)
- Yield Loss
- Yield Mass (Dry)
- Yield Mass (Wet)
- Yield Spread
- Yield Spread (Mass)
- Yield Variability
- Yield Variability (Norm)
- Z Offset
- Zone ID**

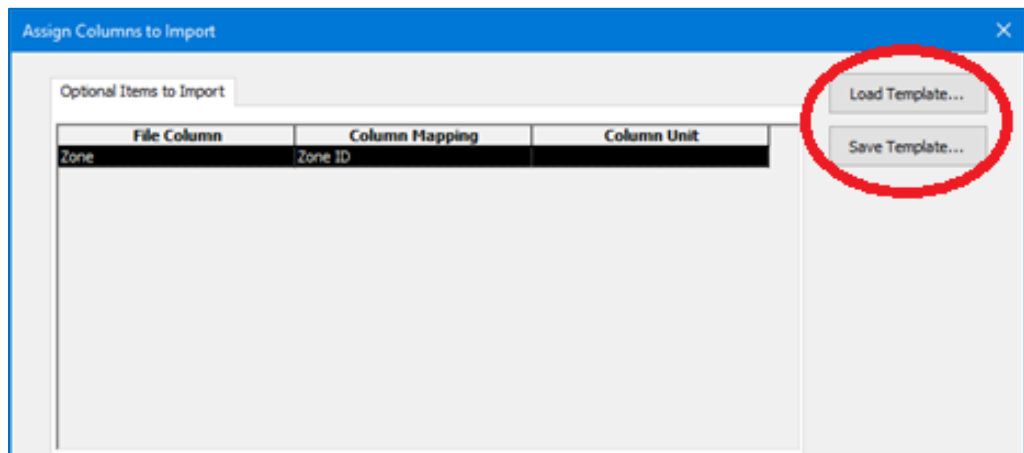
Units:

Description of the Selected Item

Description	Value
Data Type	Text
Dimension	None
Display Units	None

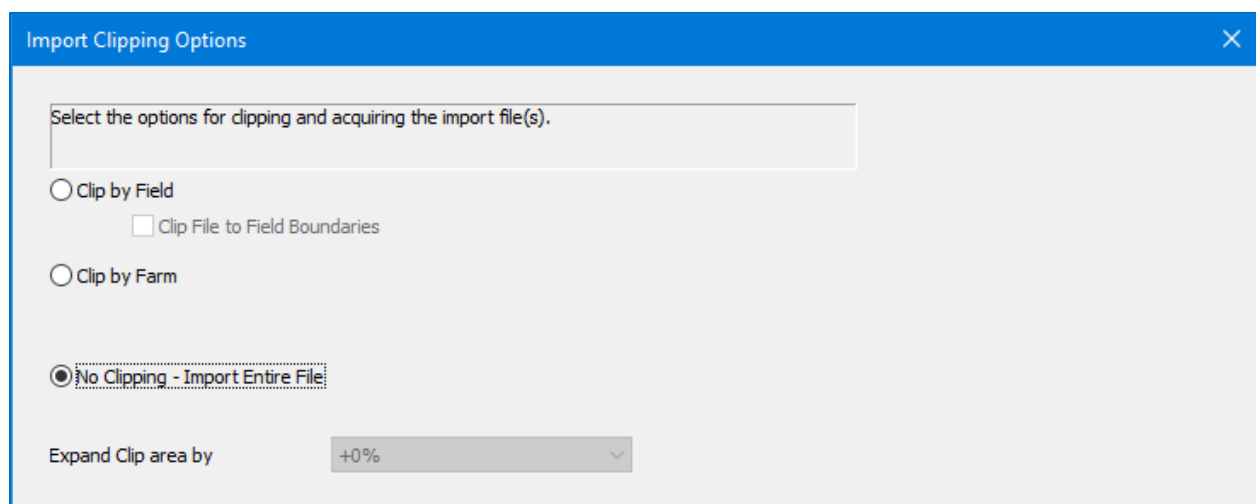
Optional: If you want to perform this step automatically in the future, you can use the **Save Template** button in the upper right of the **Assign Columns to Import** window. The default template folder for SMS, ImportTemplates, will work. Use the **Load Template** button to retrieve the template the next time you use SMS.

Alternatively, you can begin earlier in the file import process, on the **Select File Import Method** window. Select the option to **Import a File Using a Saved Template**, click **Browse**, and navigate to your template.



Once you have assigned your column mapping, click **Next**.

In the **Import Clipping Options** window, choose **No Clipping - Import Entire File**. This step assumes you are importing a single field file.



In the **Management Selection** window, select the appropriate grower, farm, field, and product from the corresponding dropdowns.

If one of these has not been added for the current project, click the adjacent **Add New** button. If you're importing the first field under a project, all of them may need to be added. Corn silage notably does not appear in the "Select Product" list.

When adding a new management setting, fill in any needed information, then click **OK**. For the Grower, Farm, and Field edit windows, the name alone should suffice.

In the Edit Product window, several other fields may need to be filled in. See below for an example involving corn silage.

The 'Edit Product' window has a title bar with a close button. It contains several tabs: 'Product Info', 'Product Mix', 'Product Description', 'Product Conversions', and 'Linked Items'. The 'Product Info' tab is active. It contains the following fields:

- Product Name: Text box with 'Corn Silage' entered.
- Common Name: Empty text box.
- Product Group: Dropdown menu with 'Generic' selected.
- Product Usage: Dropdown menu with 'Feed' selected.
- Product Form: Dropdown menu with 'Plant' selected.
- Crop Type: Dropdown menu with 'Corn Silage' selected.
- Product Mix: A checkbox that is currently unchecked.
- Buttons: 'Edit List...' button.

Once all management settings have been entered, click **Next**.

The 'Management Selection' window has a blue header. It contains several selection sections, each with a dropdown menu and 'Add New' and 'Edit' buttons:

- Auto-Select Grower/Farm/Field: A single button.
- Select Grower: Dropdown menu with 'Grower X' selected.
- Select Farm: Dropdown menu with 'Farm X' selected.
- Select Field: Dropdown menu with 'Field X' selected.
- Select Year: Dropdown menu with '2023' selected.
- Select Operation: Dropdown menu with 'Management Zones' selected.
- Select Operational Instance: Dropdown menu with 'Instance - 1' selected.
- Select Product: Dropdown menu with 'Corn Silage' selected.

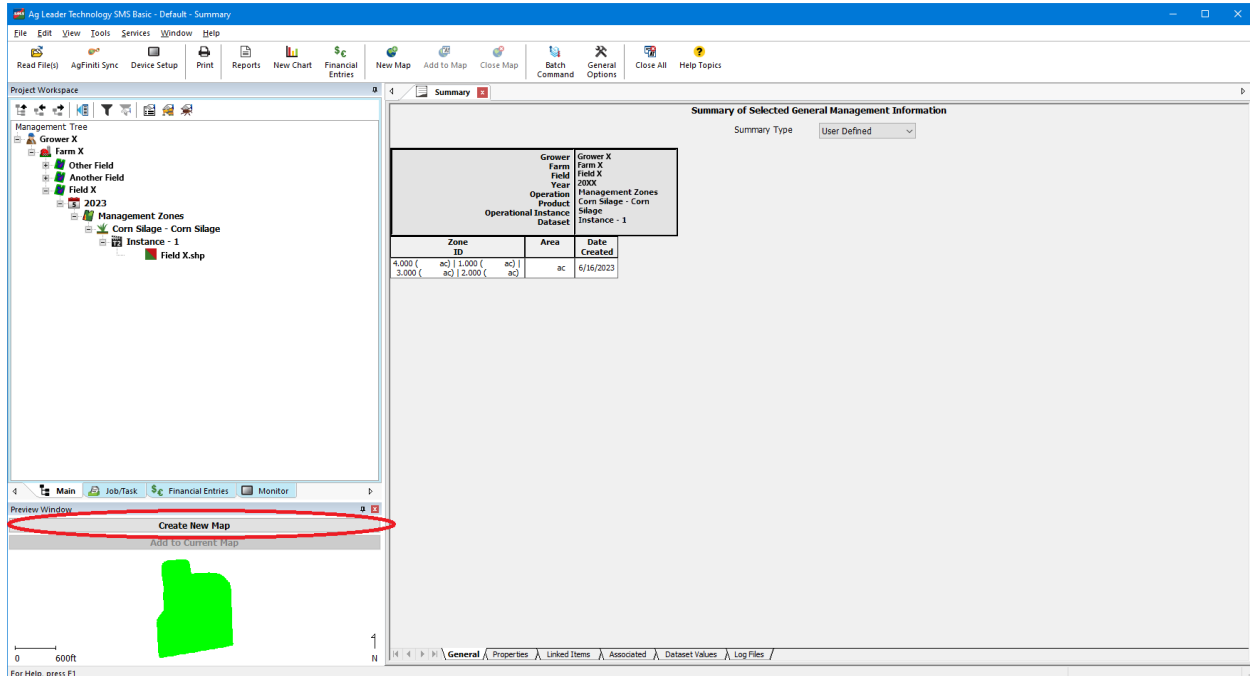
Finally, from the **Import Review** window, click **Finish**.

The 'Import Review' window has a title bar with a close button. It contains a summary of the import process:

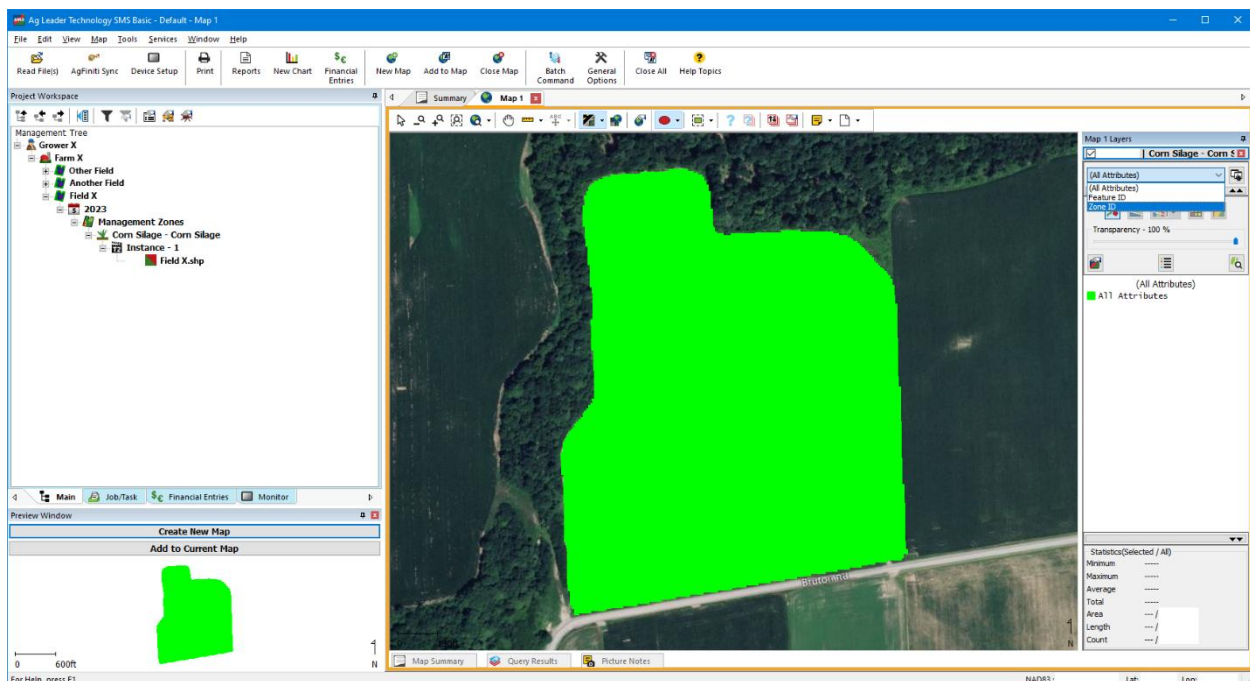
- Directory Path Here
- Number of Records : 29109
- Operation : Generic
- Imported Attributes:
 - Zone ID

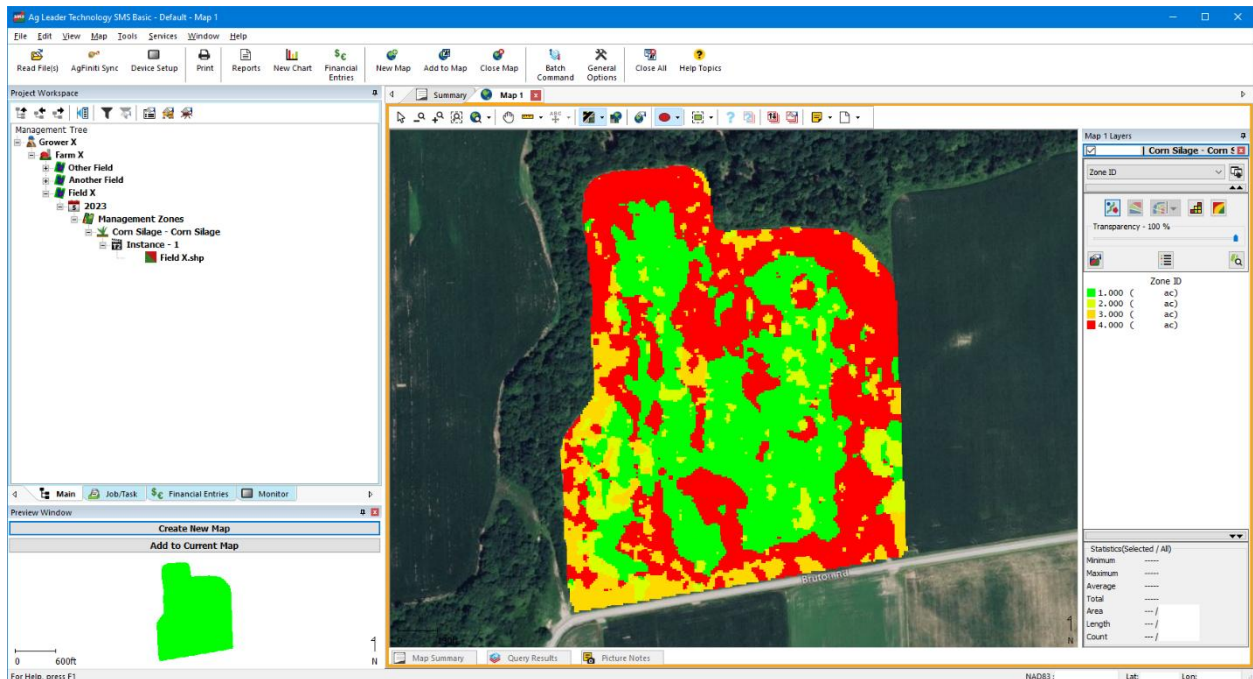
3.2. Viewing the Zone Map

To view the newly imported field file, select the field name and choose **Create New Map** from the Preview Window in the bottom left.



Once the map appears, you will see a Map Layer column on the right pane. From this column, choose **Zone** or **Zone ID** from the dropdown menu of attributes. The default selected attribute will be “(All Attributes)”.

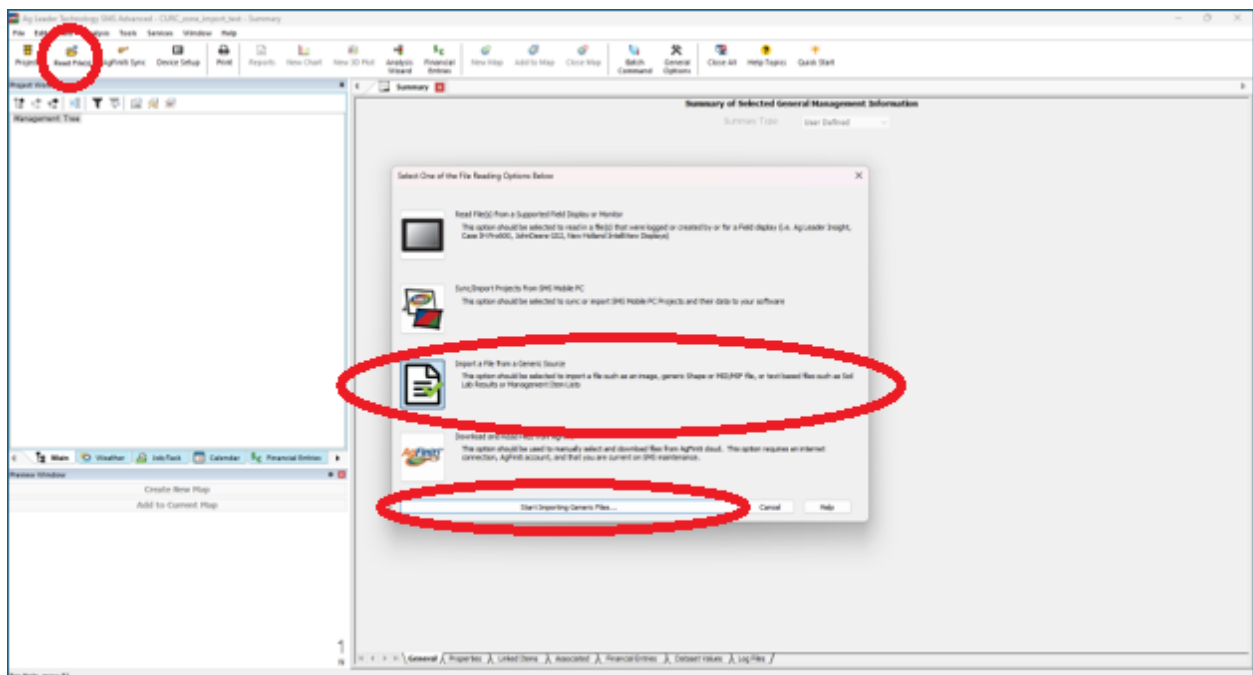




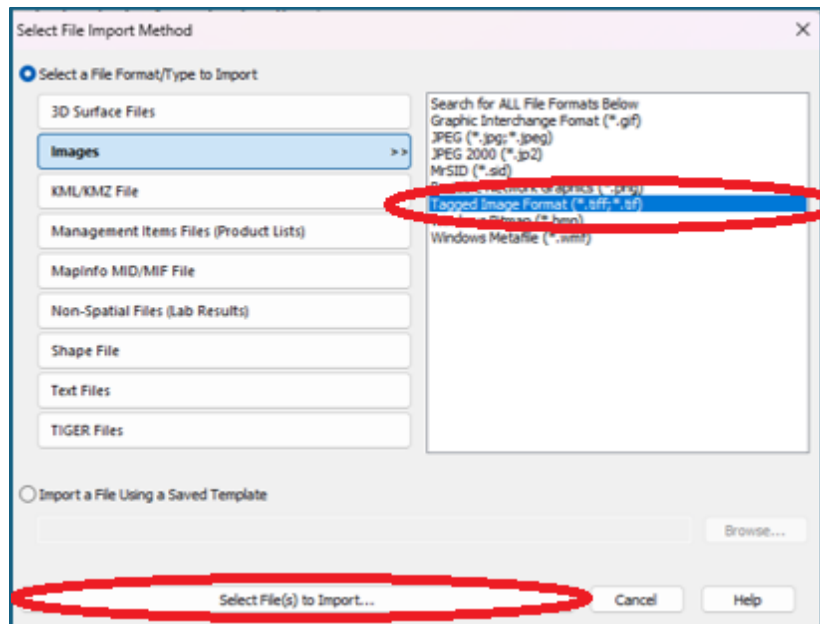
To finish the process, continue to [Section 4.3: Correcting Zone Map Colors](#).

4. Importing a TIF File

To import a TIF file in SMS, select **Read File(s)** from the upper left corner. Of the file options available, select **Import a File from a Generic Source** and **Start Importing Generic Files**.

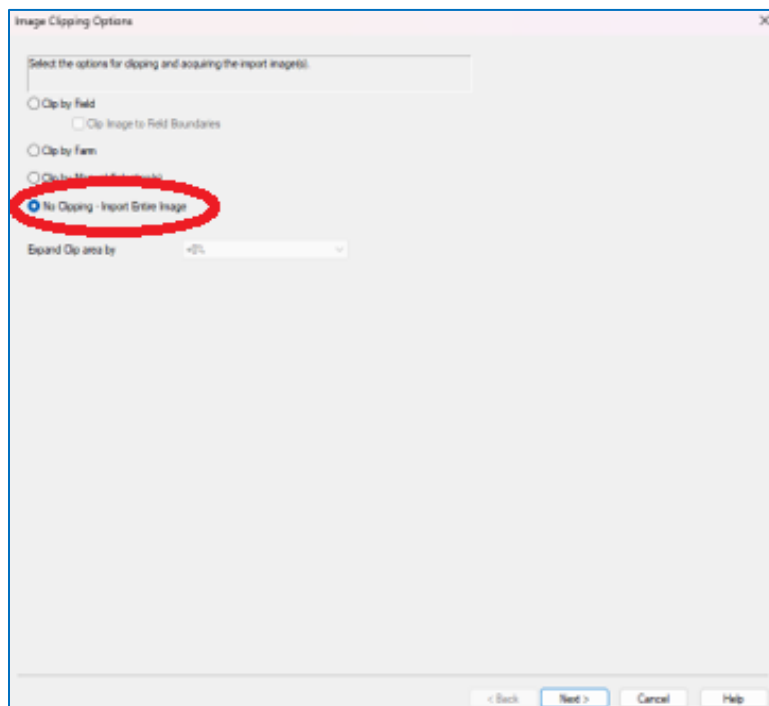


To filter SMS to read a TIF file, select the **Images** category and **Tagged Image Format (*.tiff, *.tif)**. Next, **Select File(s) to Import...** and choose your file.

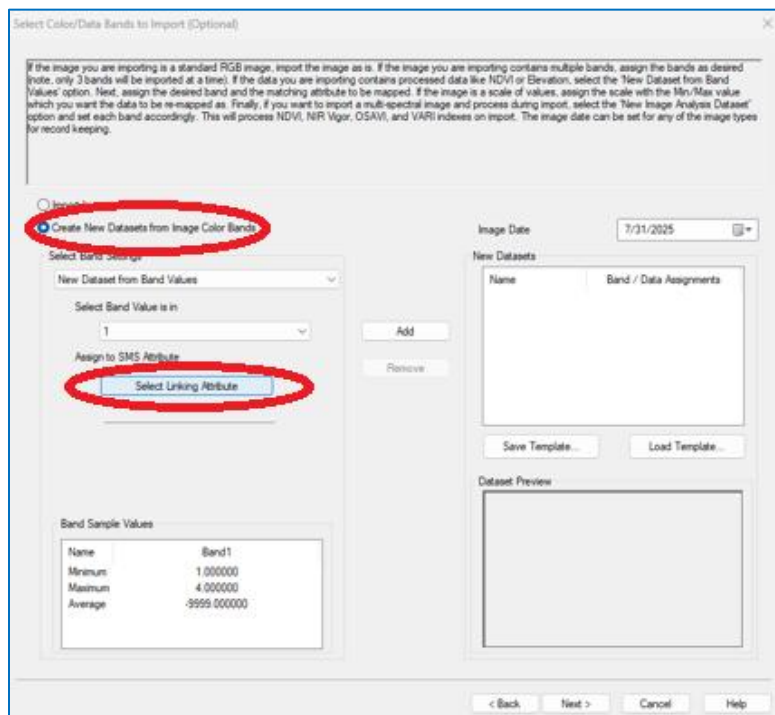


4.1. TIF File Settings

In the Image Clipping Options tab, select **No Clipping – Import Entire Image** and continue to the next tab.

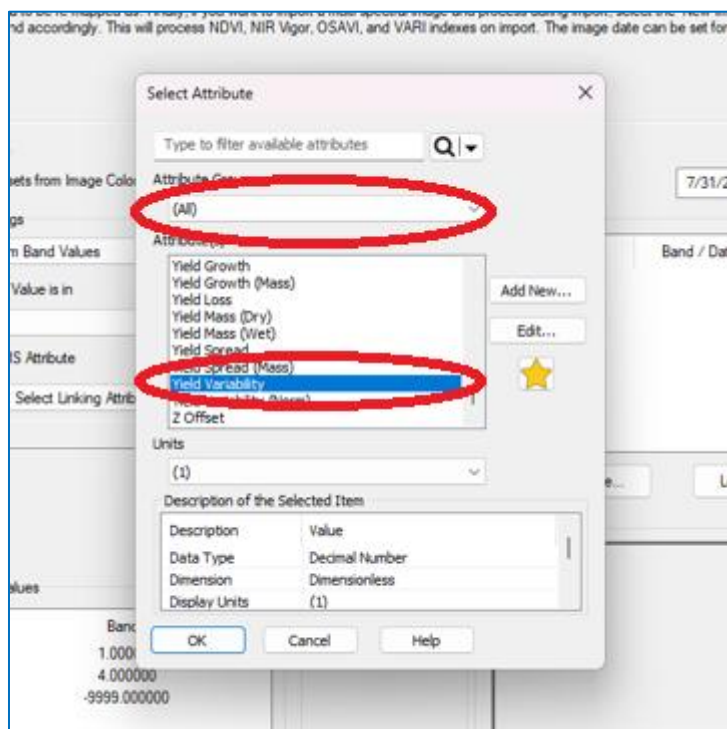


In the Select Color/Data Bands to Import (Optional) tab, select **Create New Datasets from Image Color Bands**. In the Band Settings, select **New Dataset from Band Values**, set “Select Band Value is in” to **1**, and click **Select Linking Attribute**.

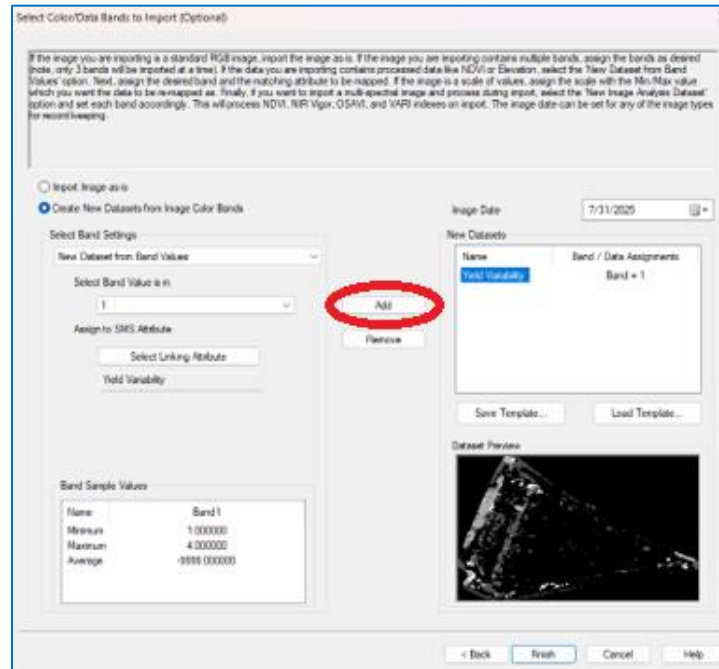


In the **Select Attribute** window, change the attribute group to **(All)**, scroll to the bottom of the “Attribute(s)” list, select **Yield Variability**, and set units to **(1)**. Click **OK**.

Note that the management zone ID is stored under the Yield Variability attribute for .tif files.



After the band settings are completed, click **Add** to add the band settings to “New Datasets”. To view the field, click on the name of the attribute in the “New Datasets” list and it should show in the bottom right corner. Click **Finish**.



In the **Management Selection** tab, fill in the information about the Grower, Farm, Field, Year, and Product. If the field's farm product is not available, click **Add New** and fill out the necessary information. When finished, click **Accept**.

Management Selection

Auto-Select Grower/Farm/Field

Select Grower

Grower X Add New Edit

Select Farm

Farm X Add New Edit

Select Field

Field X Add New Edit

Select Year

2025 Add New Edit

Select Operation

Image Edit

Select Operational Instance

Instance - 1 Add New Edit

Select Product

Corn Silage Add New Edit

Accept Cancel

Add Product

Product Info Product Mix Product Description Product Conversions

Product Name Corn Silage

Common Name

Product Group Generic

Product Usage Feed

Product Form Seed

Crop Type Corn Silage Edit List...

☐ Product Mix

Description

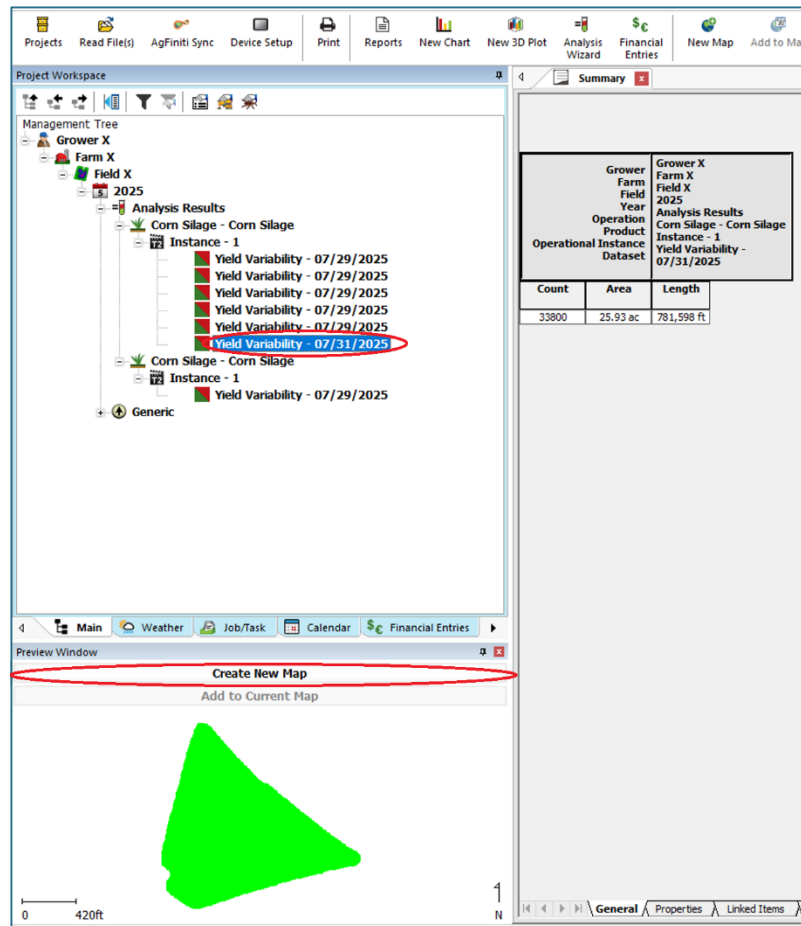
☒ Is Active

☐ Favorite

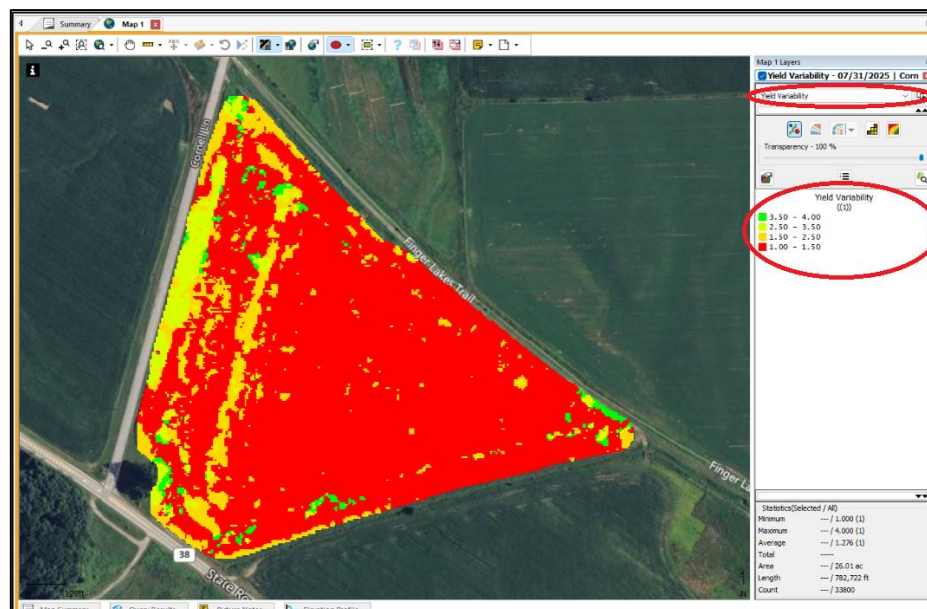
OK Cancel

4.2. Viewing the Zone Map

To view the map of a field, select the **Yield Variability** attribute of the field you just uploaded in the **Management Tree** and click **Create New Map** (in the lower left **Preview Window**).

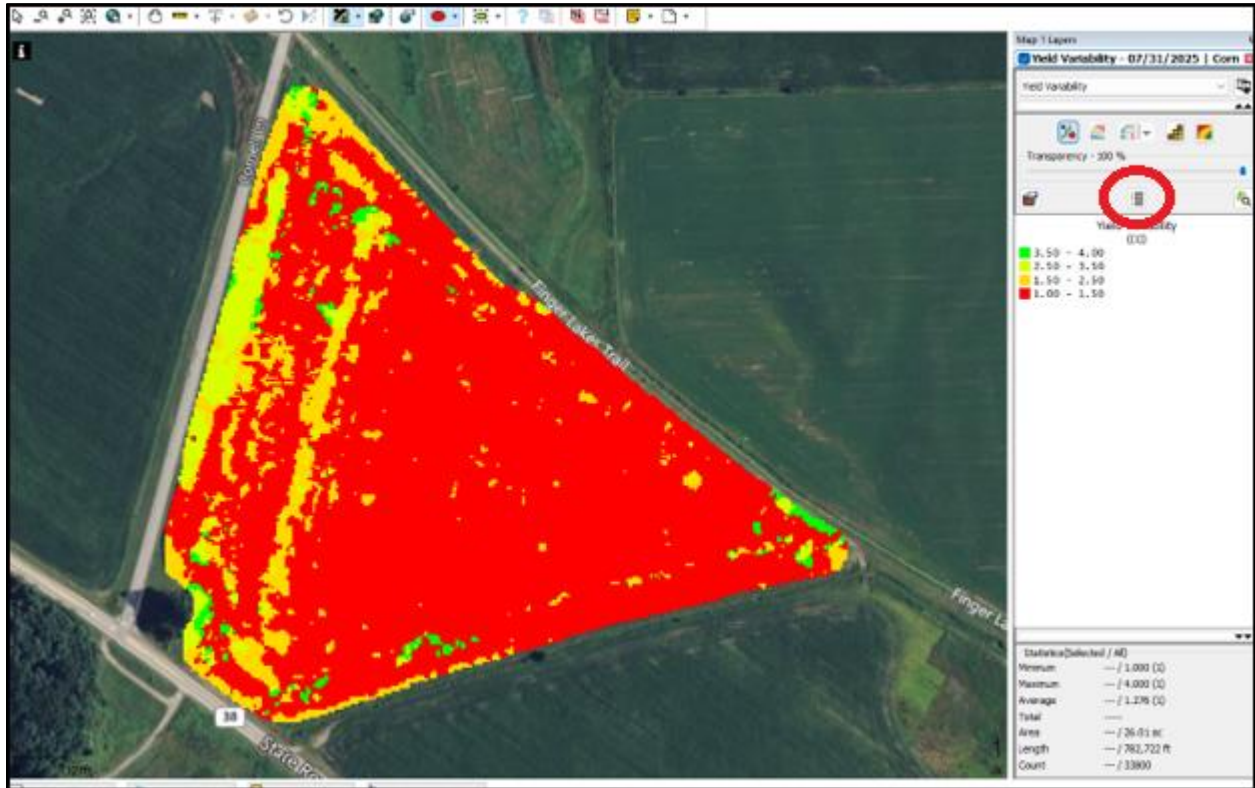


Once the map is generated, the upper right corner of the right panel will have a dropdown menu with **All Attributes** selected. To see the **Yield Variability**, click the dropdown and select it.

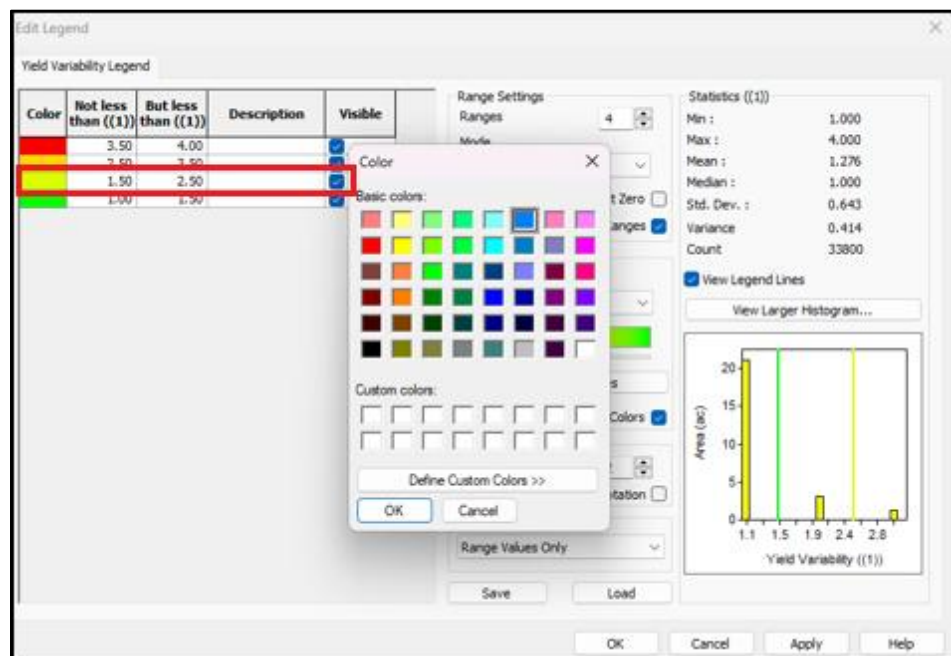


4.3. Correcting Zone Map Colors

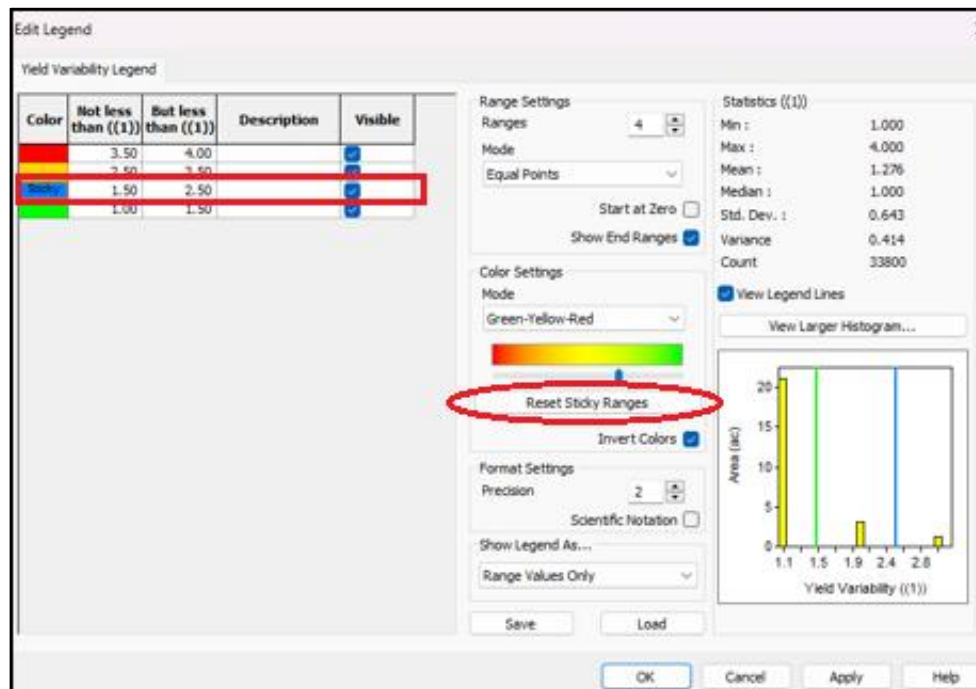
To correct the zone map scale or choose the appropriate colors for each zone, select the middle icon below the transparency scale, opening the **Edit Legend** menu.



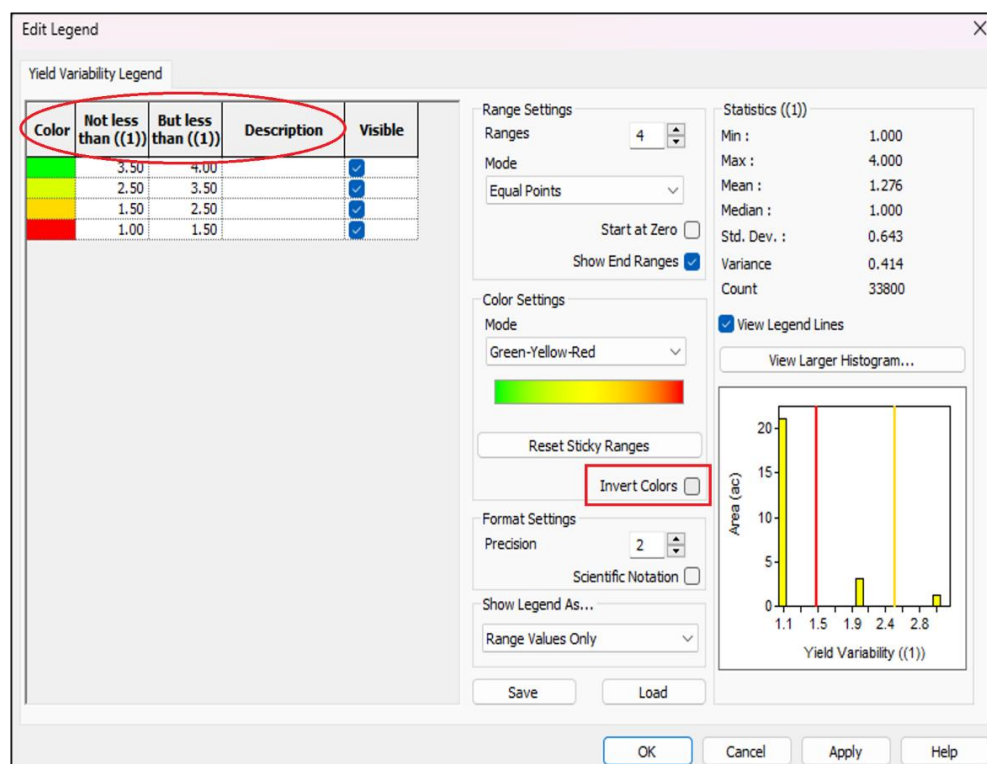
Zone 1 should be green, zone 2 should be blue, zone 3 should be yellow, and zone 4 should be red. To change the color of individual zones, double click the color and select from the options available. The default colors are suitable except for the yellow-green, which can be individually changed to blue. Of the basic SMS colors, row 1 column 6 is the most appropriate blue.



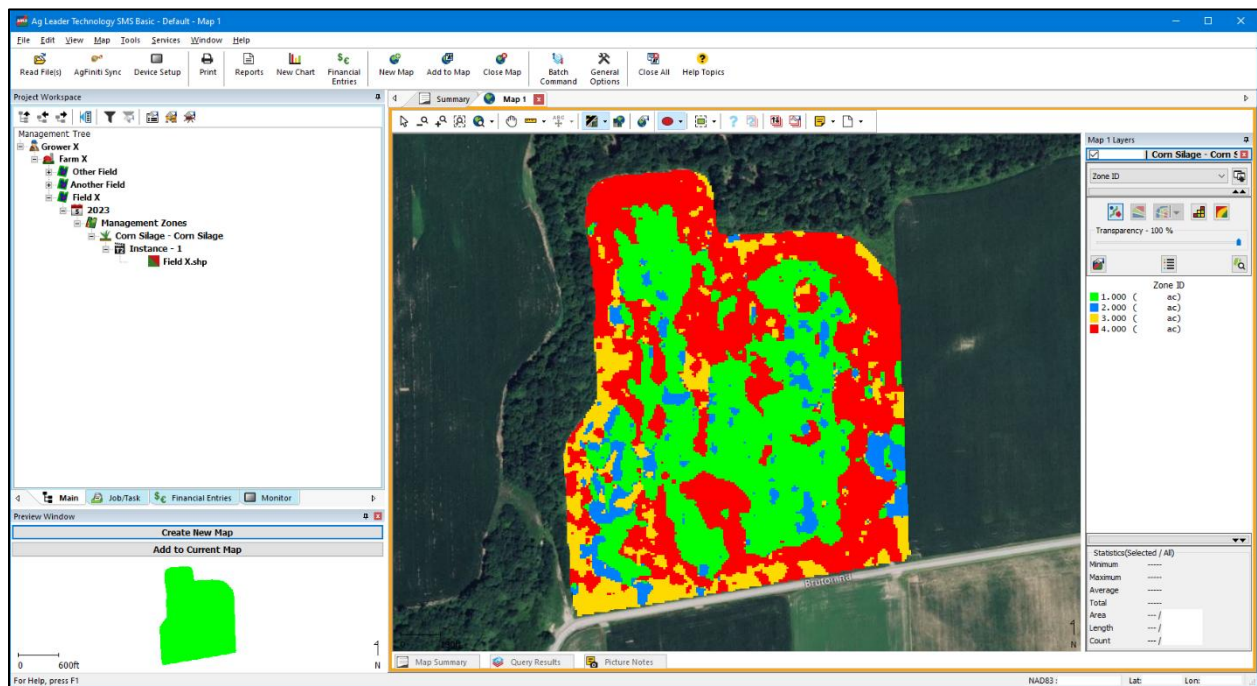
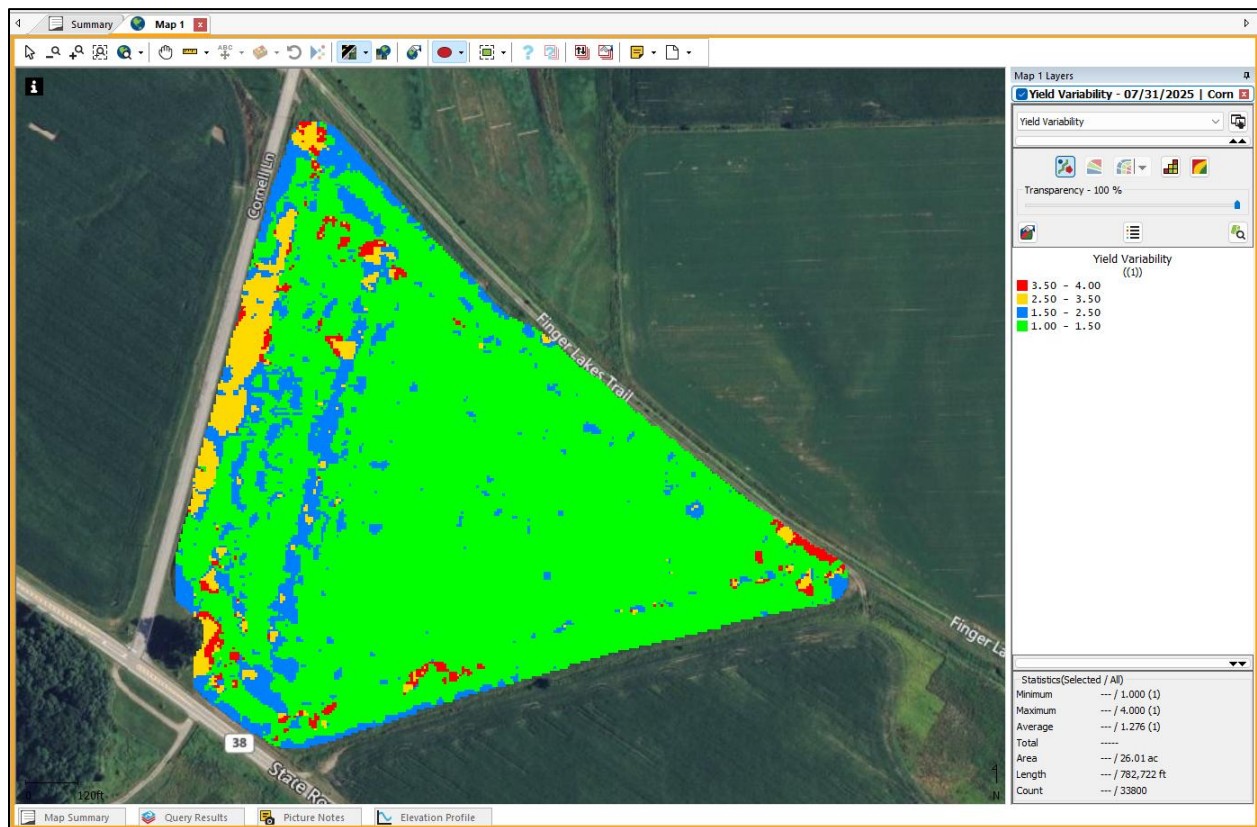
When one individual color is changed, it will be noted as “sticky”. The **Reset Sticky Ranges** button can be used to return to the original color settings.



If the default colors are in the inverse order relative to how they were listed above, select **Invert Colors** to correct.

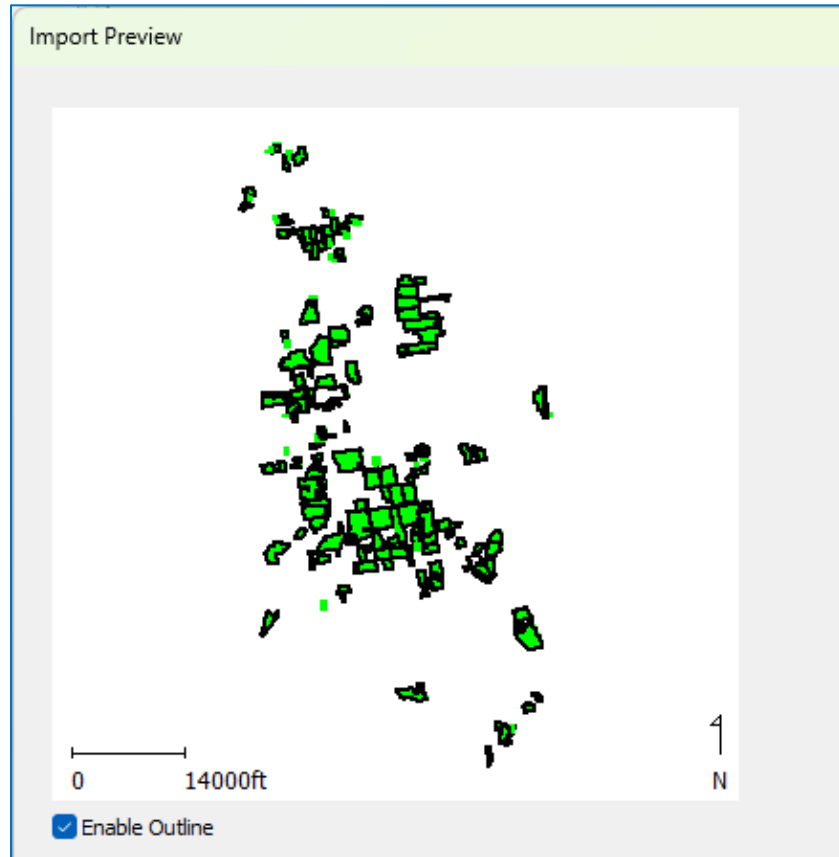


The final map should appear similar to those below after changing the legend.

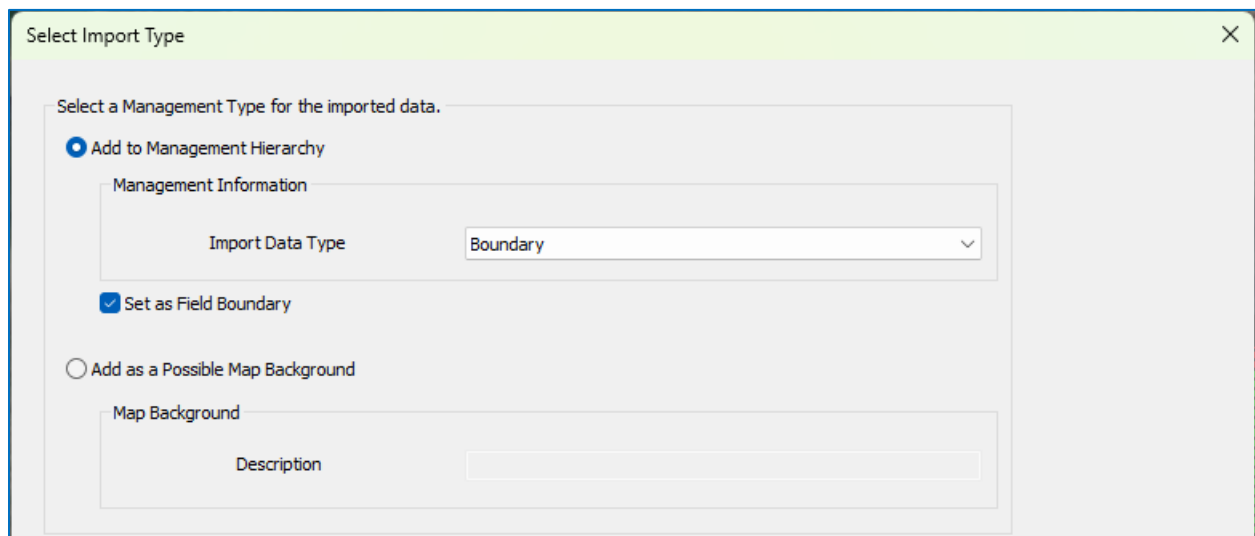


5. Importing a Boundary File

Select the boundary file you want to import according to the initial steps of Section [3. Importing a Shape File \(.shp\)](#). You will get an import preview of all the fields in the boundary.



In the **Select Import Type** window, check the **Set as Field Boundary** box.



No changes are needed in the **Assign Columns to Import** window. Click **OK**.

In the **Import Clipping Options** window, select **No Clipping – Import Entire File**. Click **Next**.

Import Clipping Options

Select the options for clipping and acquiring the import file(s).

Clip by Field

Clip File to Field Boundaries

Clip by Farm

No Clipping - Import Entire File

Expand Clip area by

+0%

If you want to import a specific part of the boundary file, select appropriate filters from the dropdowns in the **Select Data Filters** window. Once finished, click **Next**.

Management Selection

Auto-Select Grower/Farm/Field

Select Grower

Grower X

Add New

Edit

Select Farm

Farm X

Add New

Edit

Select Field

Field X

Add New

Edit

Select Year

2026

Add New

Edit

Select Operation

Boundary

Edit

Select Operational Instance

Instance - 1

Add New

Edit

Select Product

NO Product

Add New

Edit

Select Data Filters

Select the desired data filters from the management items below.

Type to filter available items

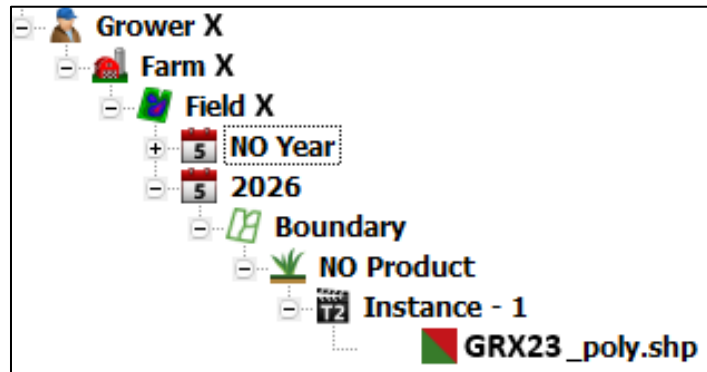
Q

Grower (1)	(All)		...
Farm (13)	(All)		...
Field (92)	(All)		...

Optional Date Filter

None

On the **Management Selection** window, choose the grower's name from the dropdown under "Select Grower", using **Add New** to add it if not already present. The farm and field can be set to dummy values (e.g. Farm X, Field X). Set the "Select Operation" dropdown to **Boundary**, then click **Next**. Click **Finish** on the Import Review window. After SMS finishes processing the boundary file, you should see a file tree that looks similar to the example to the right.



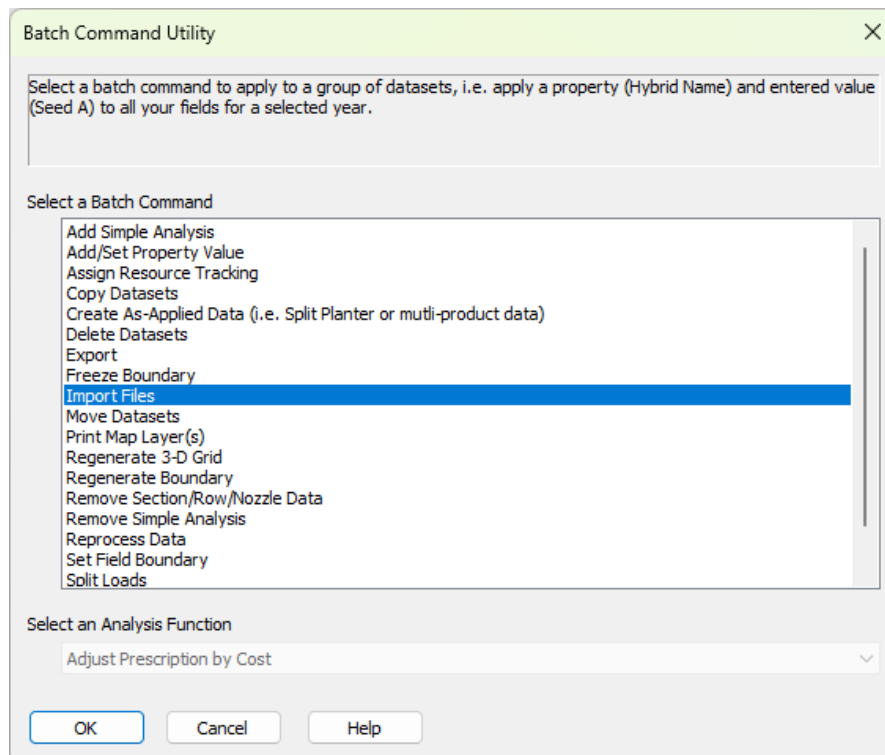
6. Batch Importing Zone Files

As of version 25.50, SMS is unable to batch import .tif files. The following instructions show how to batch import .shp files only.

Begin by selecting the **Batch Command** icon from the menu.



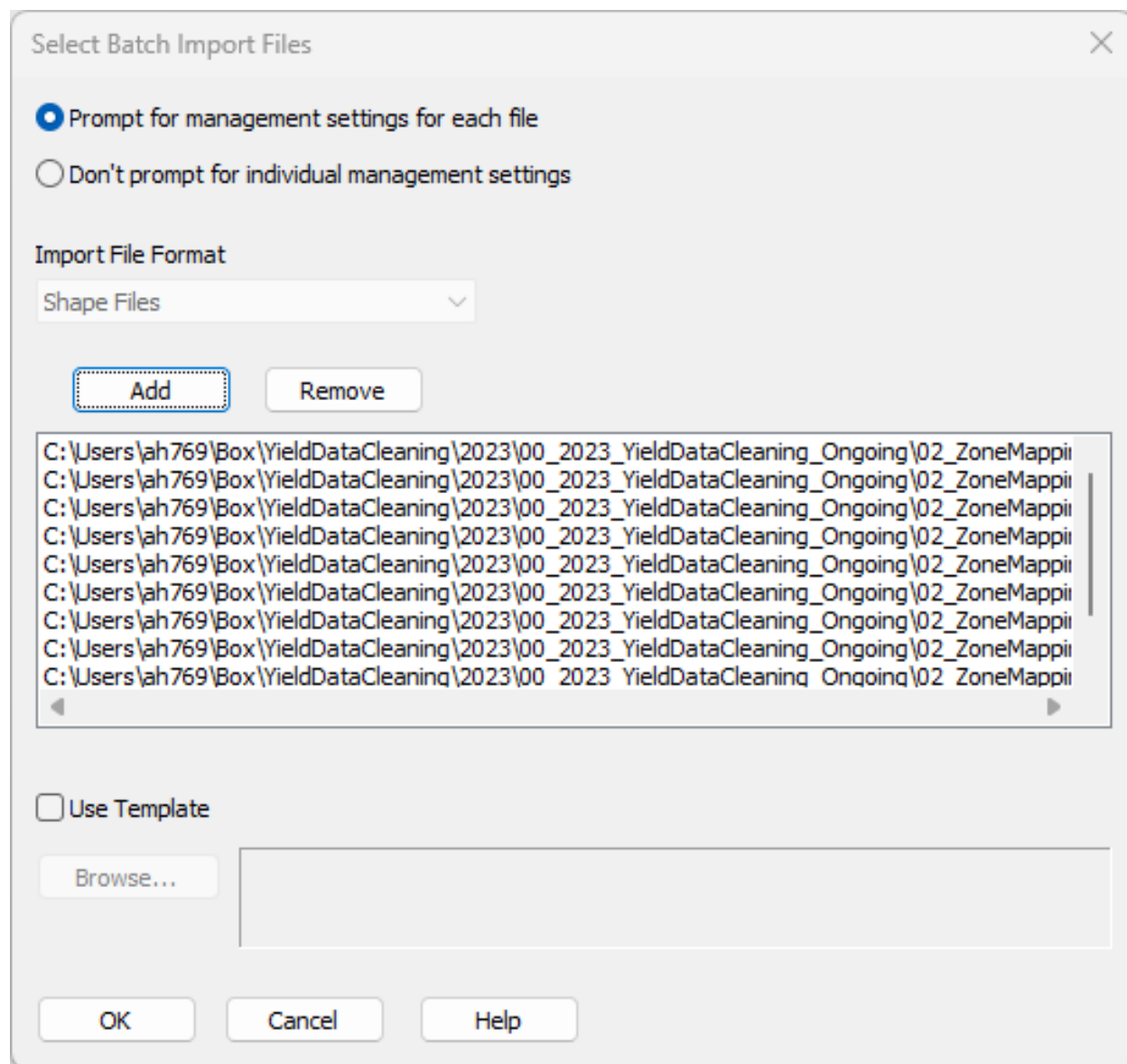
Select **Import Files** from the menu. Click **OK**.



In the **Select Batch Import Files** window, select **Shape Files** from the “Import File Format” dropdown. Click **Add**, select the files you want to import, and click **Open**.

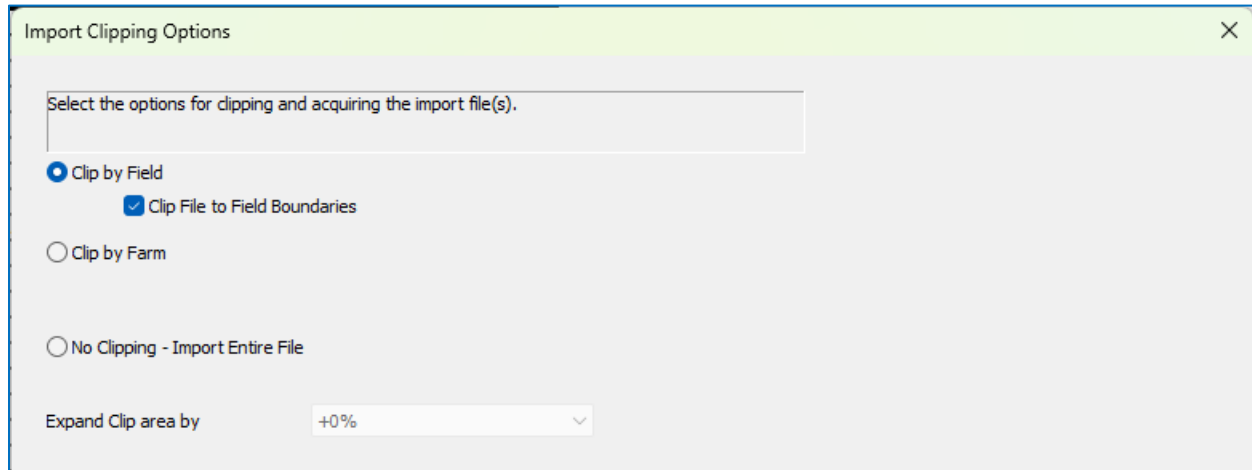
If you just want to view your zone maps in SMS, the fastest route is to select **Don’t prompt for individual management settings**.

Alternatively, you may want your zone maps located correctly in the project workspace (each under its own field and farm). If you already have a boundary file for the farm, select **Don’t prompt for individual management settings**. If you don’t have a boundary, or you want to enter settings field-by-field, select **Prompt for management settings for each file**. (If you’re importing many files this way, be ready for a long repetitive process.) Click **OK**.



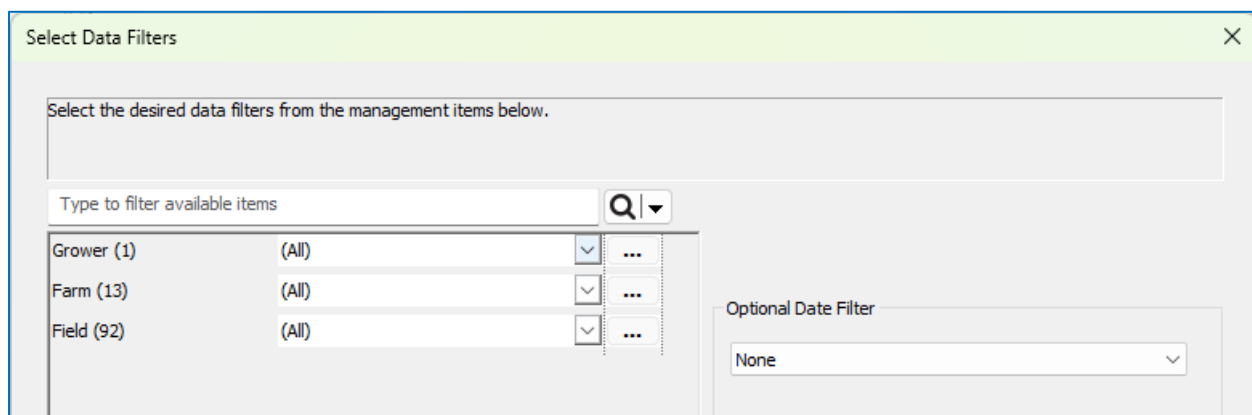
Subsequently, follow the normal steps for importing a shape file from the Import Preview window onward. If you’re using a boundary file, there will be a few differences:

Under Import Clipping Options, select **Clip by Field** and check **Clip File to Field Boundaries**.



The 'Import Clipping Options' dialog box has a title bar with a close button. Below the title bar is a text box with the instruction 'Select the options for clipping and acquiring the import file(s)'. There are three radio button options: 'Clip by Field' (selected), 'Clip by Farm', and 'No Clipping - Import Entire File'. Under 'Clip by Field', there is a checked checkbox for 'Clip File to Field Boundaries'. At the bottom, there is a label 'Expand Clip area by' followed by a dropdown menu showing '+0%'.

If needed, you may choose filters from the dropdowns in the **Select Data Filters** window. Once finished, click **Next**.



The 'Select Data Filters' dialog box has a title bar with a close button. Below the title bar is a text box with the instruction 'Select the desired data filters from the management items below.'. There is a search bar with the placeholder text 'Type to filter available items' and a magnifying glass icon. Below the search bar is a table with three rows: 'Grower (1)', 'Farm (13)', and 'Field (92)'. Each row has a dropdown menu showing '(All)' and a button with three dots. To the right of the table is a section titled 'Optional Date Filter' with a dropdown menu showing 'None'.

In the **Management Selection** window, if you are using a boundary file, Grower, Farm, and Field will be grayed out since the fields will be clipped automatically according to the boundary file. You still need to select a product.

Management Selection

Auto-Select Grower/Farm/Field

Select Grower
 Add New Edit

Select Farm
 Add New Edit

Select Field
 Add New Edit

Select Year
 2026 Add New Edit

Select Operation
 Management Zones Edit

Select Operational Instance
 Instance - 1 Add New Edit

Select Product
 CORN Add New Edit

When that is done, click **Next**, then click **Finish** on the Import Review window. As the fields are processed according to the boundary, you will see this window for each of them:

Importing Attribute Data

Cancel

If you selected the option to customize files individually, you will get a **Management Selection** window for each field. Make any needed changes, then click **Accept** to proceed to the next field. Repeat until all files have been imported.

Management Selection - ARE226.shp

Auto-Select Grower/Farm/Field

Select Grower
 Grower X Add New Edit

Select Farm
 Ziefle Add New Edit

Select Field
 ZFL9B Add New Edit

Select Year
 2026 Add New Edit

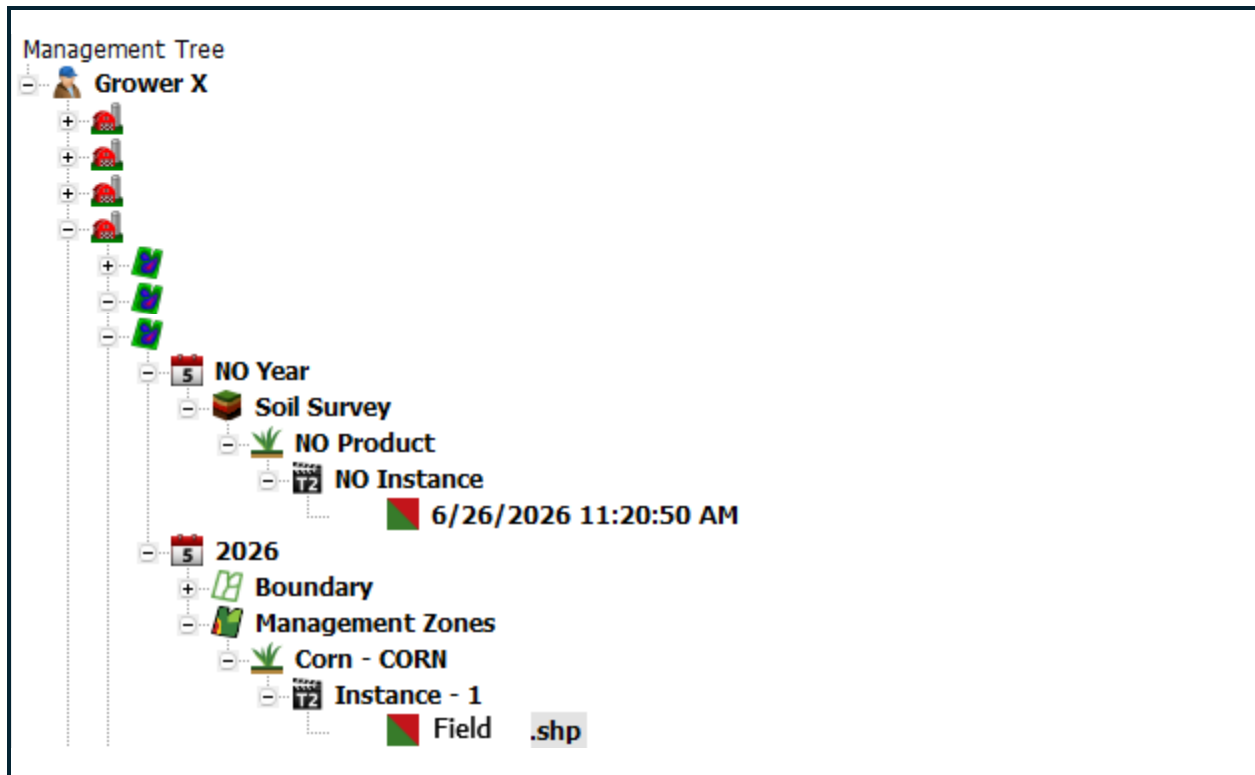
Select Operation
 Management Zones Edit

Select Operational Instance
 Instance - 1 Add New Edit

Select Product
 CORN Add New Edit

Accept Cancel Help

If you processed the fields into your management tree, whether via the boundary file or manual customization, you can find the zone map by opening the appropriate farm and field file and checking under Management Zones.



Additional Resources

- NMSP Fact Sheets:
 - Agronomy Factsheet 107: How and Why to Clean Corn Yield Monitor Data:
<http://nmsp.cals.cornell.edu/publications/factsheets/factsheet107.pdf>
 - Agronomy Factsheet 123: Yield Stability Zones:
<http://nmsp.cals.cornell.edu/publications/factsheets/factsheet123.pdf>
- Processing/Cleaning Corn Silage and Grain Yield Monitor Data for Standardized Yield Maps across Farms, Fields, and Years. Cornell University, Ithaca NY,
http://nmsp.cals.cornell.edu/publications/extension/ProtocolYieldMonitorDataProcessing1_15_2020.pdf
- Ag Leader SMS:
 - Download instructions and link (also found under Section 1):
https://portal.agleader.com/community/s/article/3529?language=en_US
 - SMS Basic and Advanced Manual:
https://portal.agleader.com/community/s/article/4225?language=en_US