

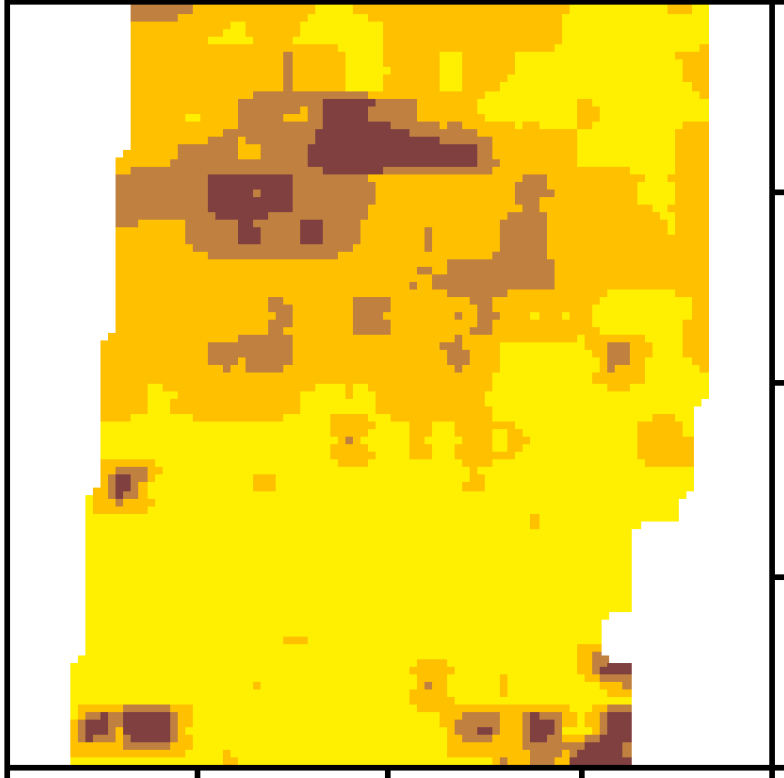
Soil Profile Average Ece of DA784 field

ECe(ave)
dS/m

- < 1
- 1 - 3
- 3 - 5
- > 5

Coord System
UTM (m)

X: Easting
Y: Northing



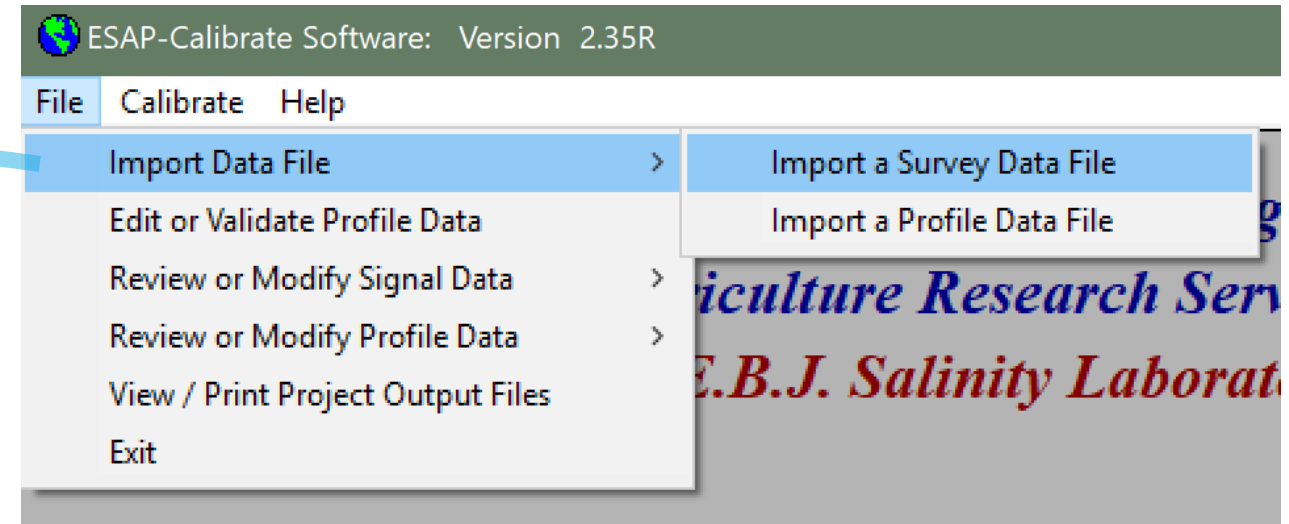
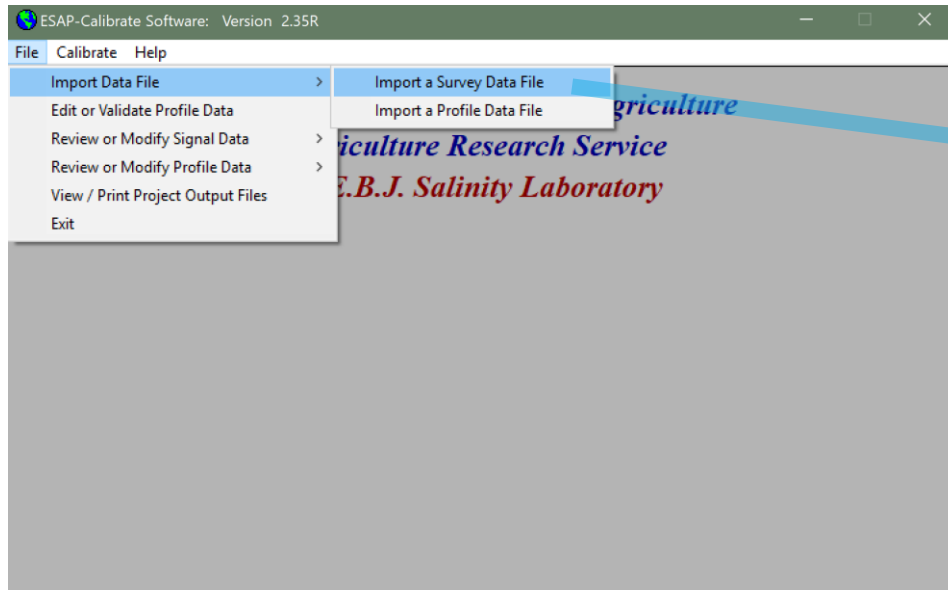
Using ESAP- Calibrate and ESAP-SaltMapper

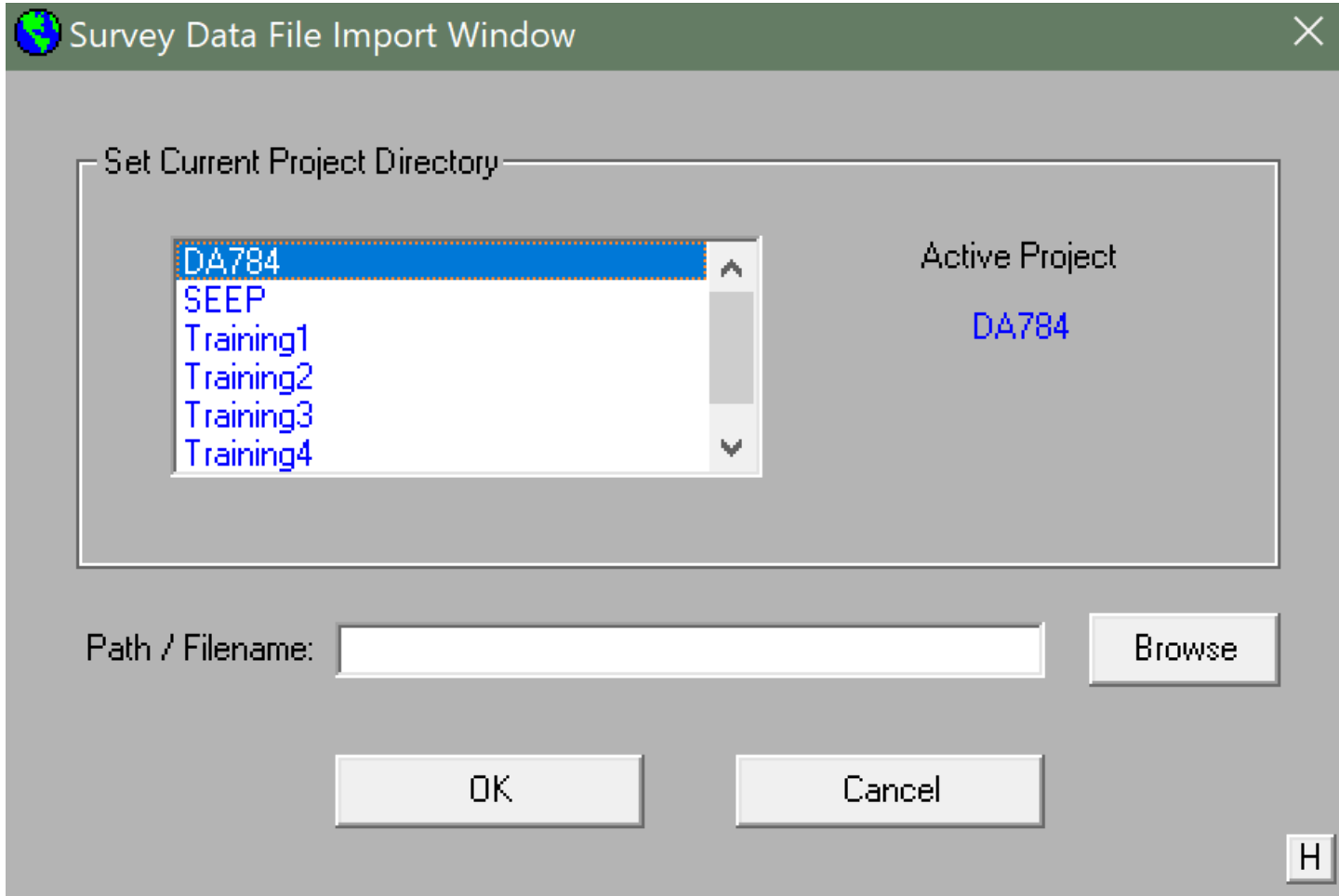
HOW TO CREATE EFFECTIVE
CALIBRATIONS OF EMI READINGS TO
OTHER SOIL CHARACTERISTICS



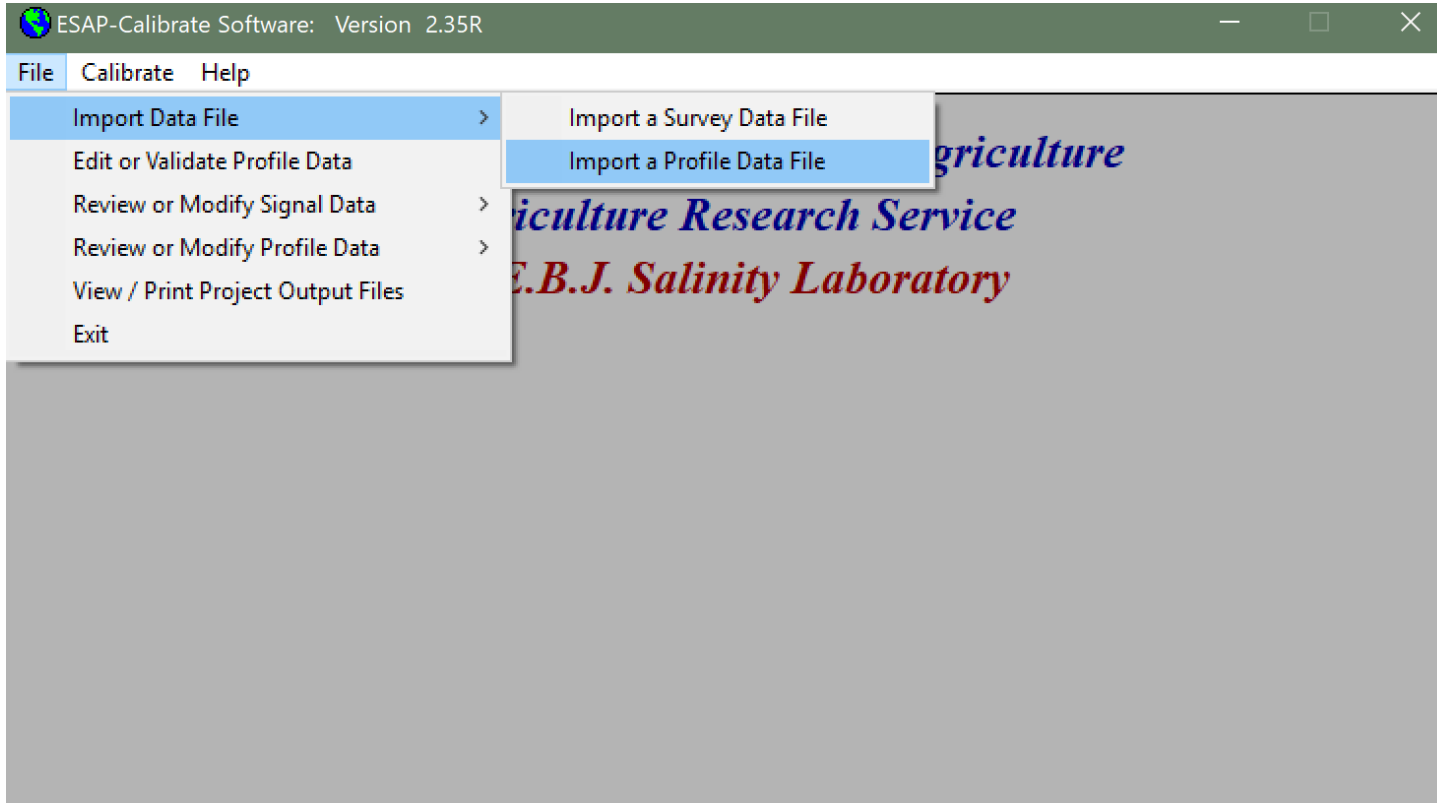
Open ESAP-Calibrate from the main ESAP menu

Import Survey Data File





Import .svy
file
generated
from ESAP-
RSSD



Create New Profile Data File

Profile Data File Import Window

Input File Status:

☐ previously saved Profile data file

☒ new Profile data file

Project Status:

☐ create a new Project Directory

☒ set the current Project Directory

Active Project
not yet specified

OK

Cancel

Set Current Project Directory:

DA784
SEEP
Training1
Training2
Training3
Training4

Define Input File Format:

DPPC

Generic

Input File Format Status:
not yet defined

Path / Filename:

Browse

H

Input Lab Data as .csv in correct format. Under “Data Input File Format” click “Generic”

Generic Profile Data File Format Sheet

File Info

12 Number of sample sites

3 Number of sampling depths per site (1-6)

4 Total number of input columns (3-10)

Site Info

Column 1: Site ID

Column 2: Sample Depth Unit: meters

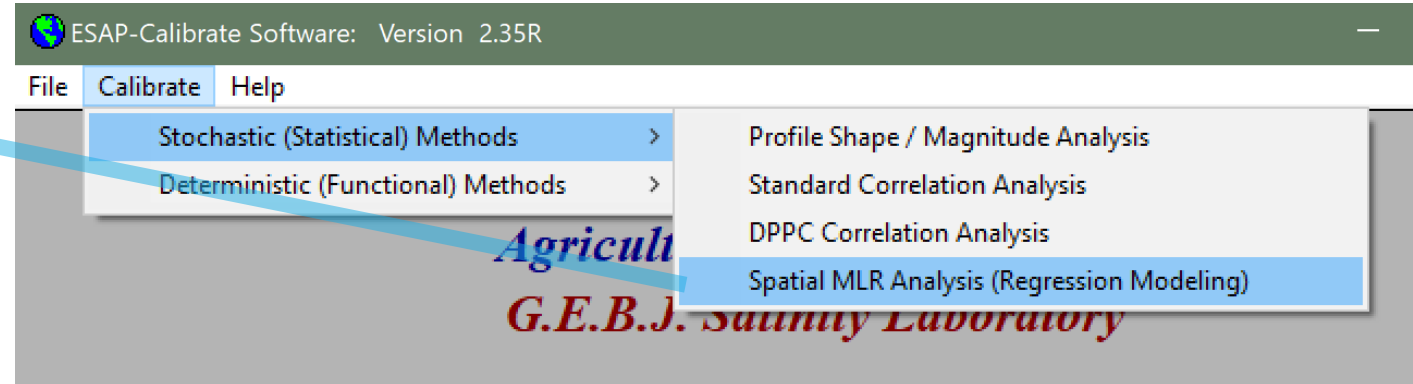
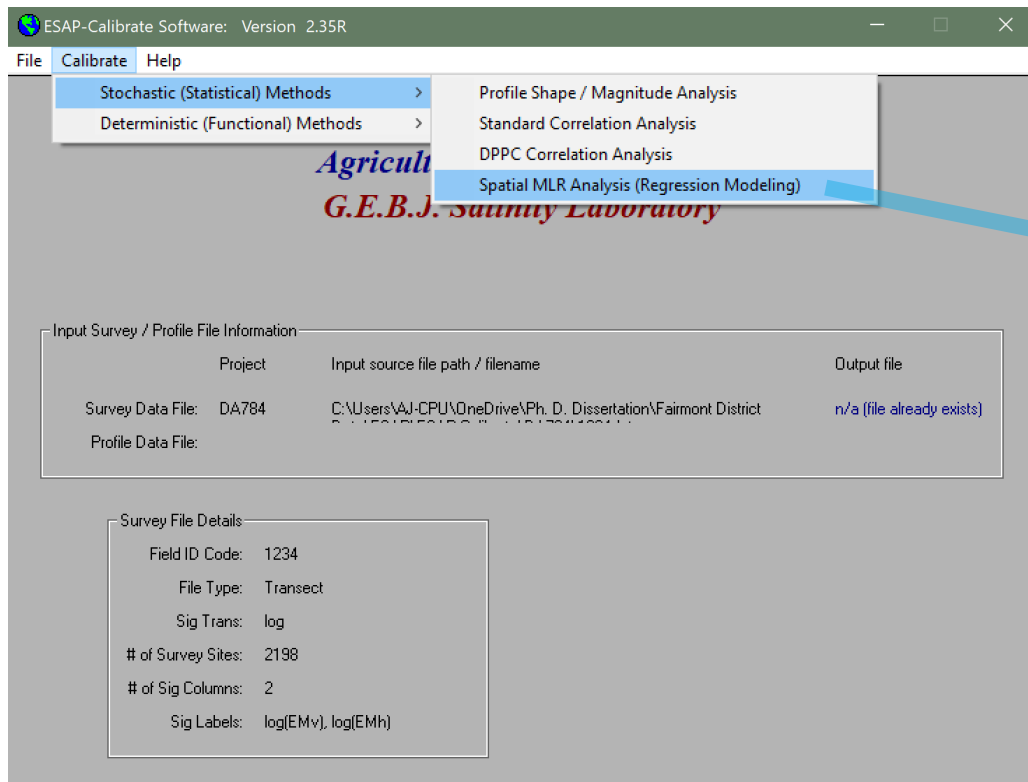
Soil Sample Data

	Labels	Units
Column 3:	pH	pH
Column 4:	ECe	dS/m

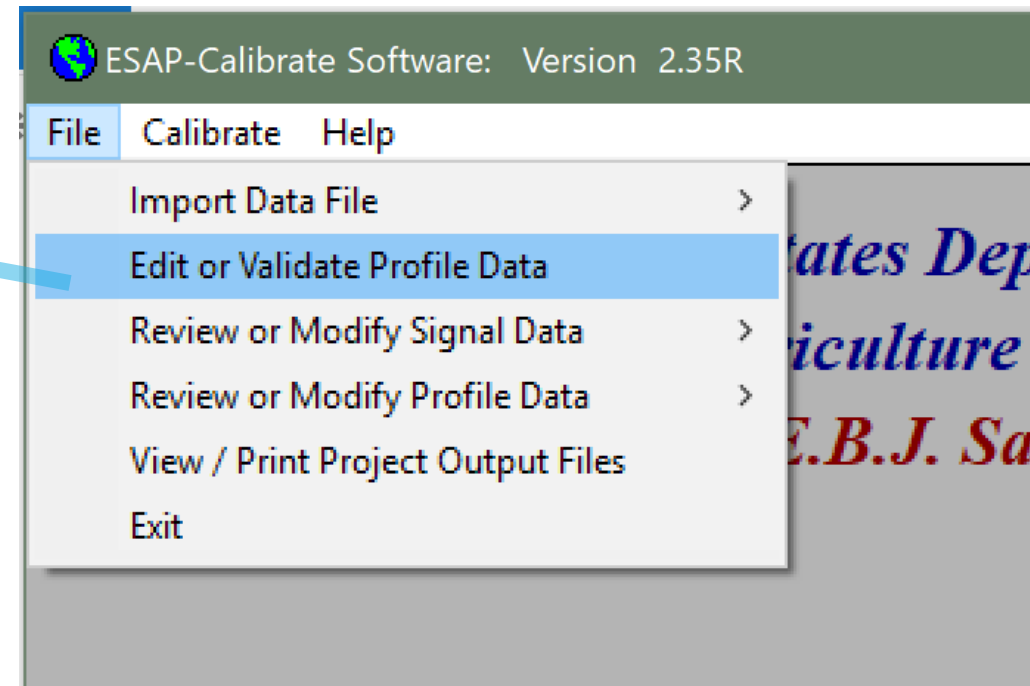
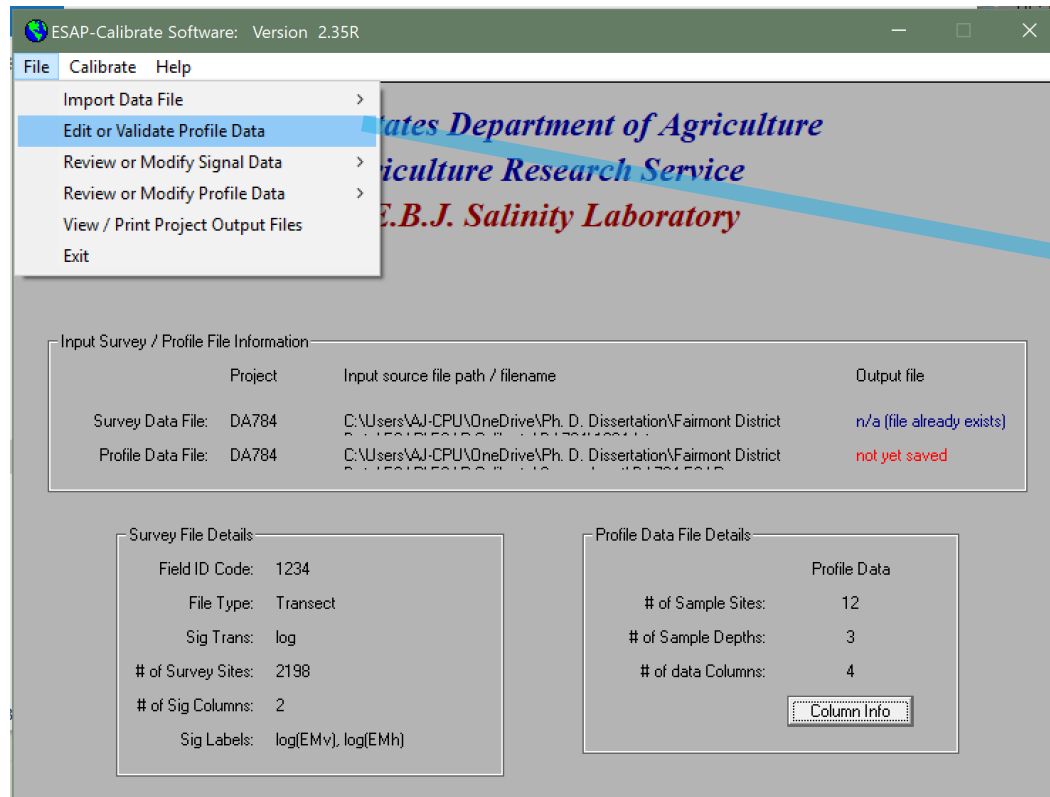
OK Review Format Cancel H

Fill in boxes with appropriate values and press “OK”

At the main menu, go to the Regression Modelling module



At the menu under “File” go to “Edit of Validate Profile Data”



Summarize / Edit / Save Profile Data

Data File Information

Active Project: DA784

File Type: Profile (Generic)

Edit Data

Compute Summary Statistics

View Summary Statistics

DPPC Profile Data Options

- ☐ convert % Clay to estimated SP
- ☐ convert gravimetric H₂O to estimated volumetric H₂O
- ☐ estimate % H₂O relative to FC (field capacity)
- ☐ calculate Tons of Salt per acre/ft

File Save Options

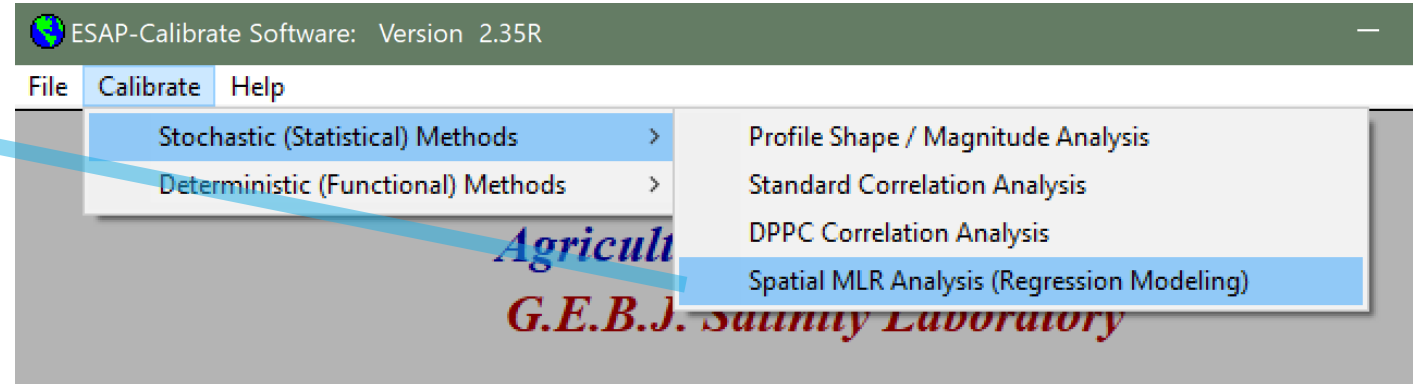
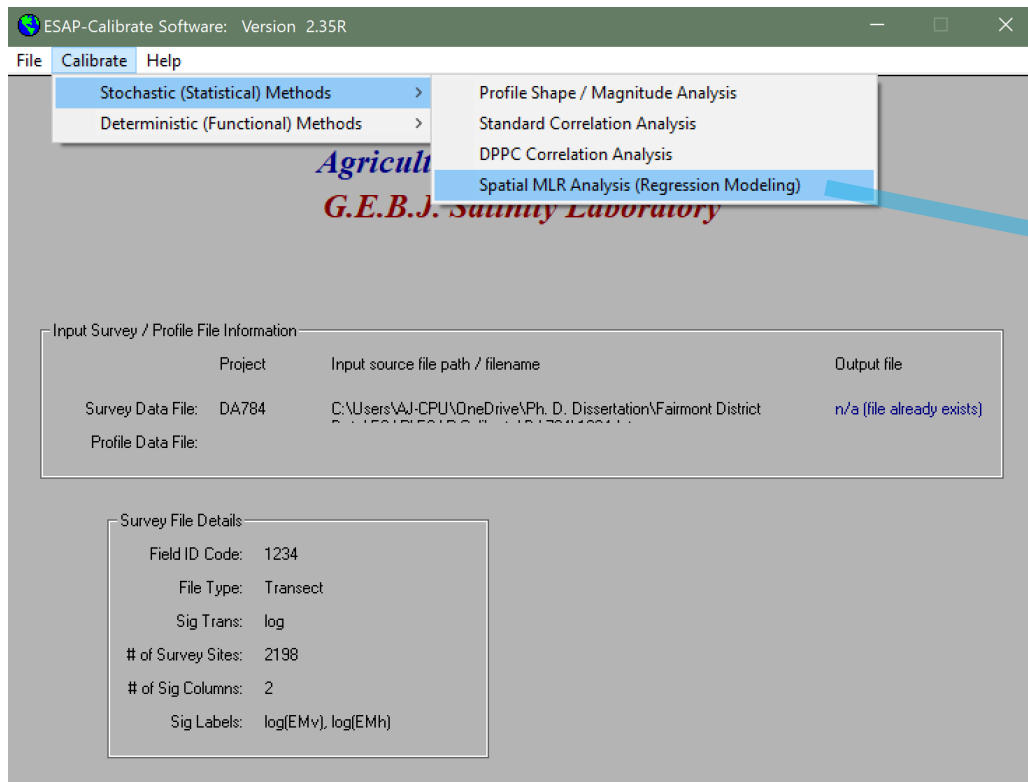
Specify Output Filename

Finished

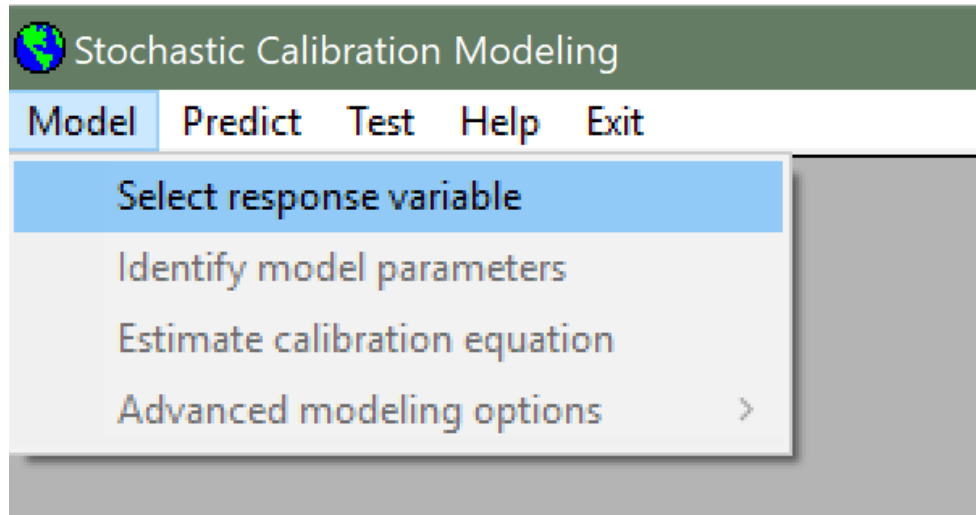
H

Compute
summary
statistics,
then save
your results

At the main menu, go to the Regression Modelling module



Select Response Variable and Merge Data. Accept Results.

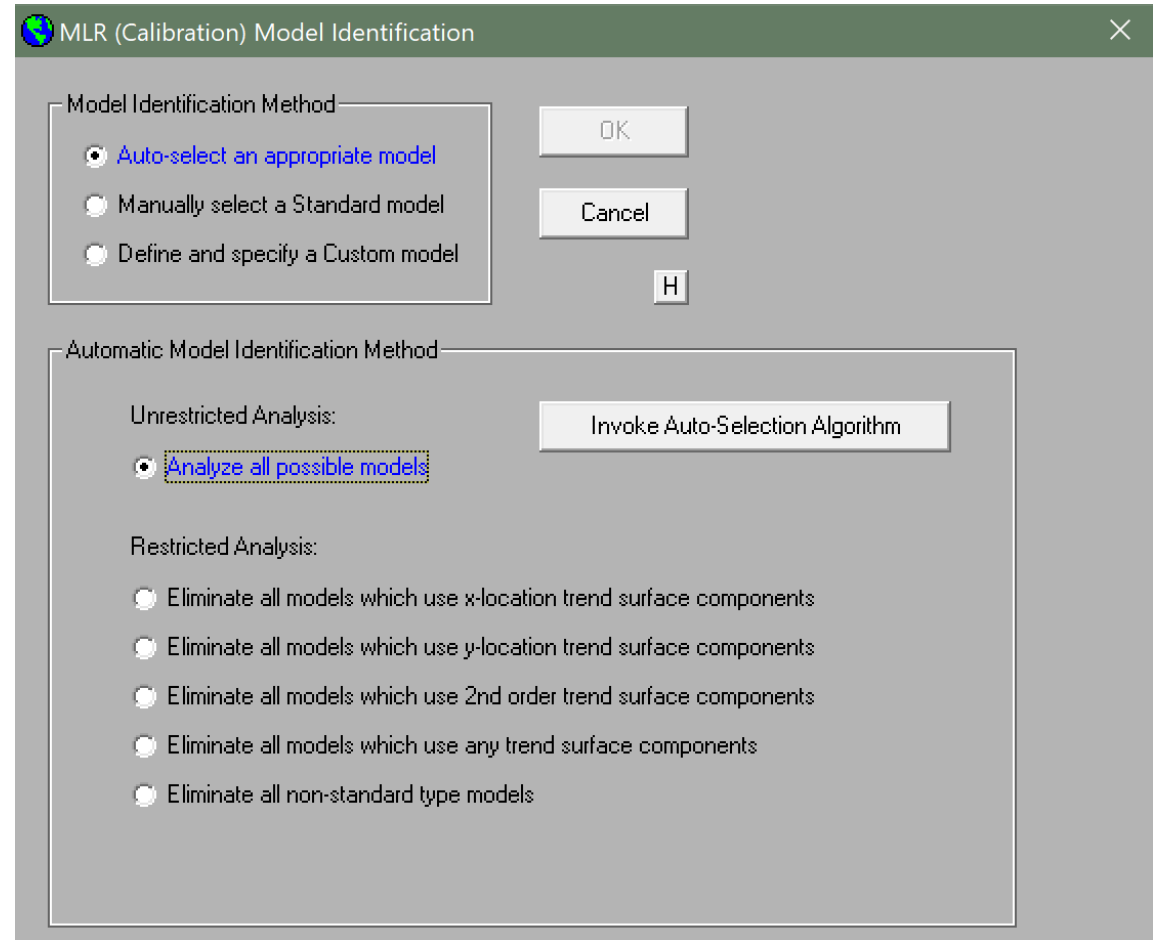
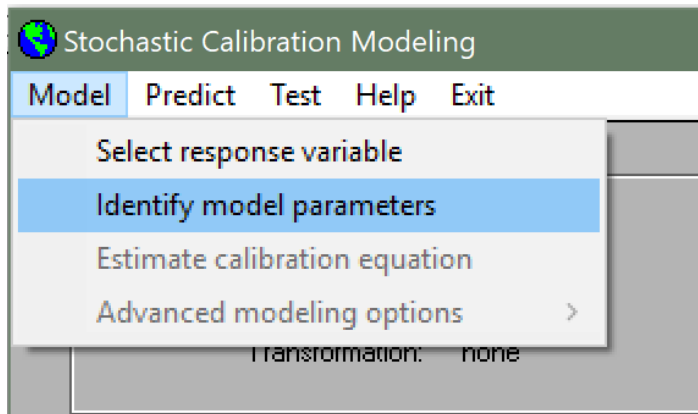


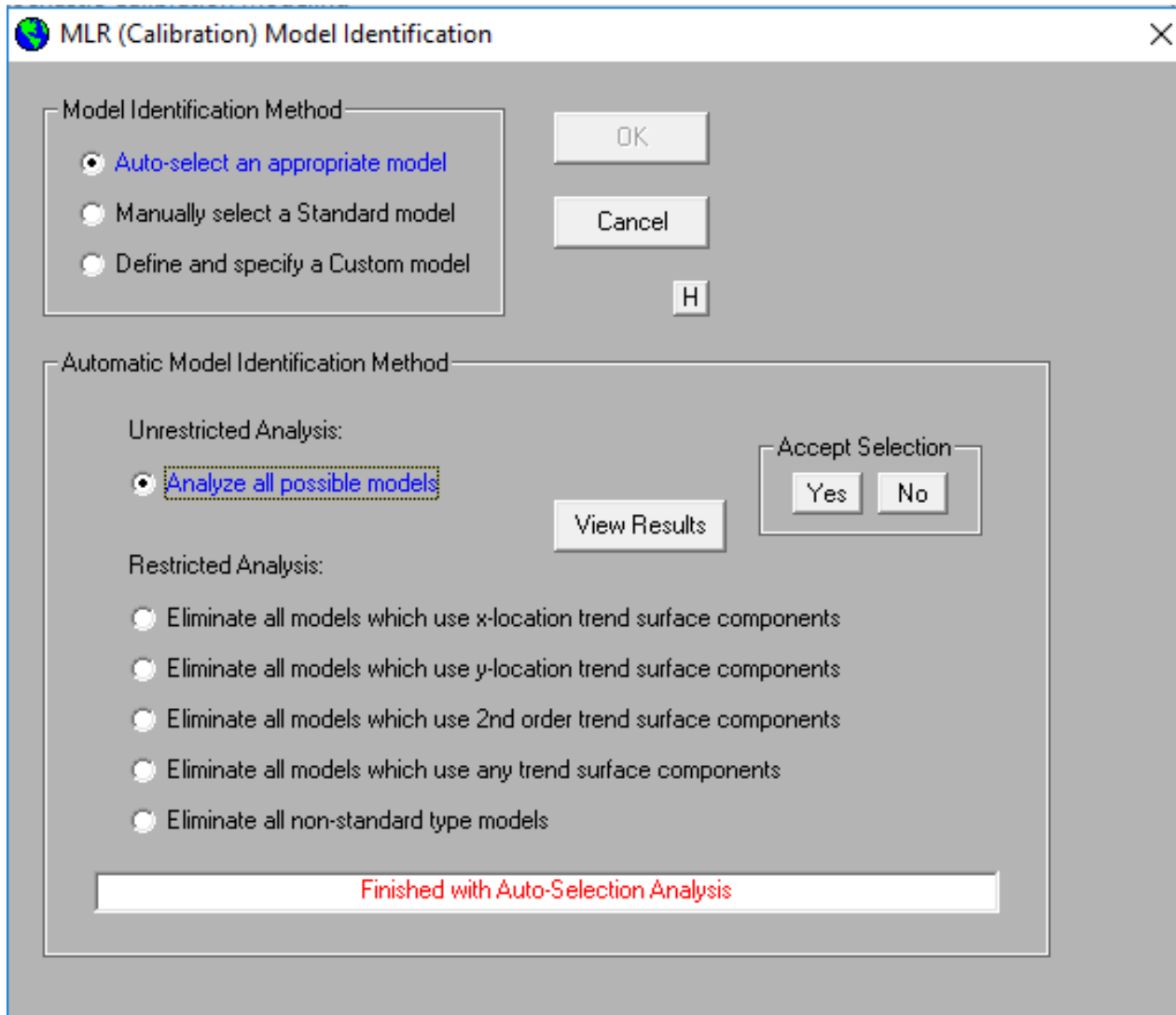
The 'Response Variable Specification' dialog box is shown. It contains the following sections and controls:

- Set Active Project Directory (for output prediction file):**
 - Active Survey Project: DA784 ☐ use Survey project
 - Active Profile Project: DA784 ☒ use Profile project
- Select Response Variable:** A dropdown menu showing 'ECe' and a checkbox for 'log transform' (unchecked).
- Merge Data Files:** A button labeled 'Merge Data'.
- File Merge Results:** A table showing the results of the merge process.
- Buttons:** 'Accept Results', 'View Log File', 'Plot Data', 'Delete a Site', and 'Reject Results'.

Sampling Design	Matches
RSD-1	0
RSD-2	12
RSD-3	0
RSD-4	0
RSD-5	0
User Specified SD	0
Unmarked Sites	0
Invalid Sites	0

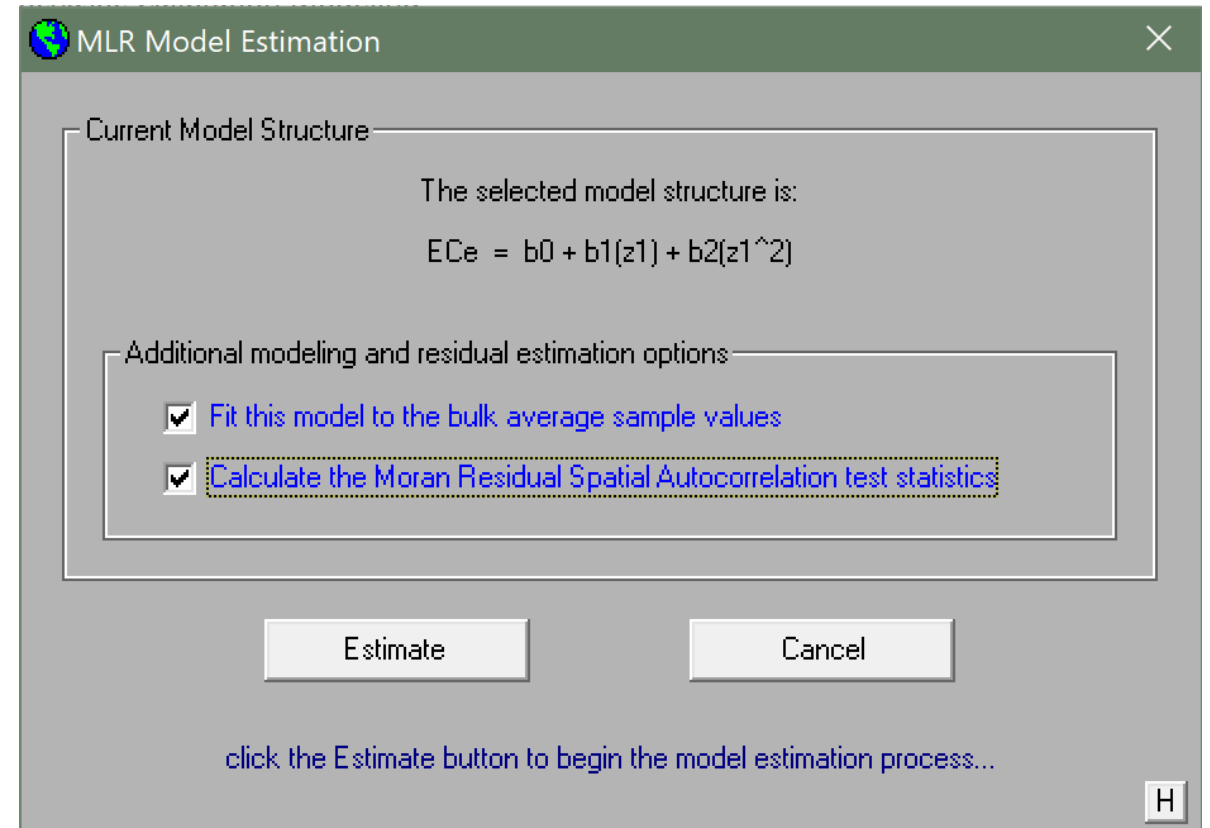
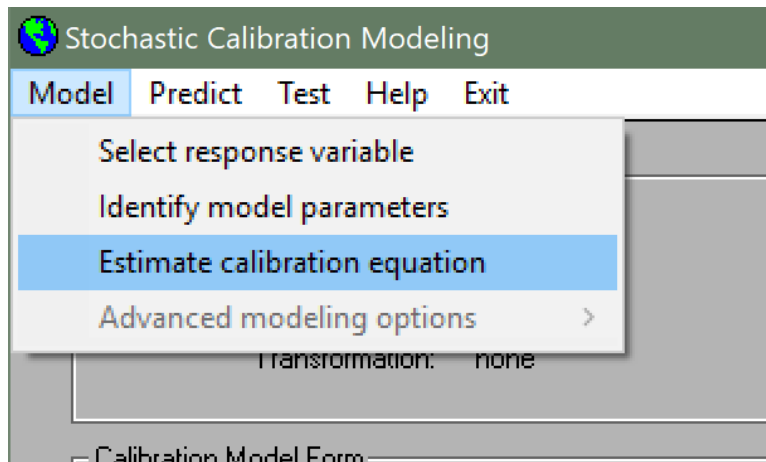
“Model” → “Identify model parameters” → “Auto-Select an appropriate model” → “Analyze all possible models” → Invoke





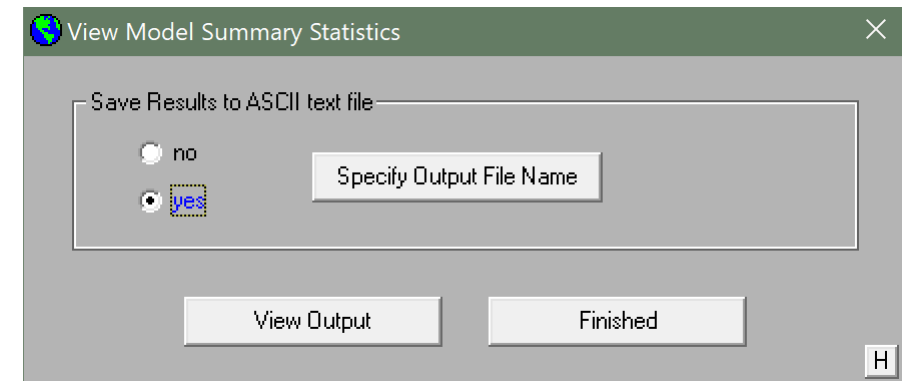
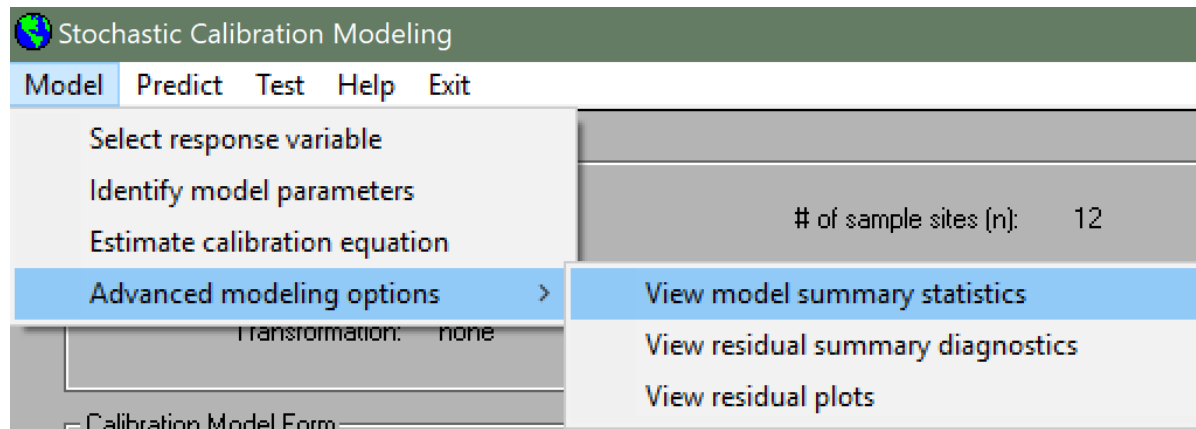
View Results
(optional) to
obtain PRESS
score rankings,
and then accept
selection

“Model” → “Estimate calibration equation”
→ Check both boxes → “Estimate”

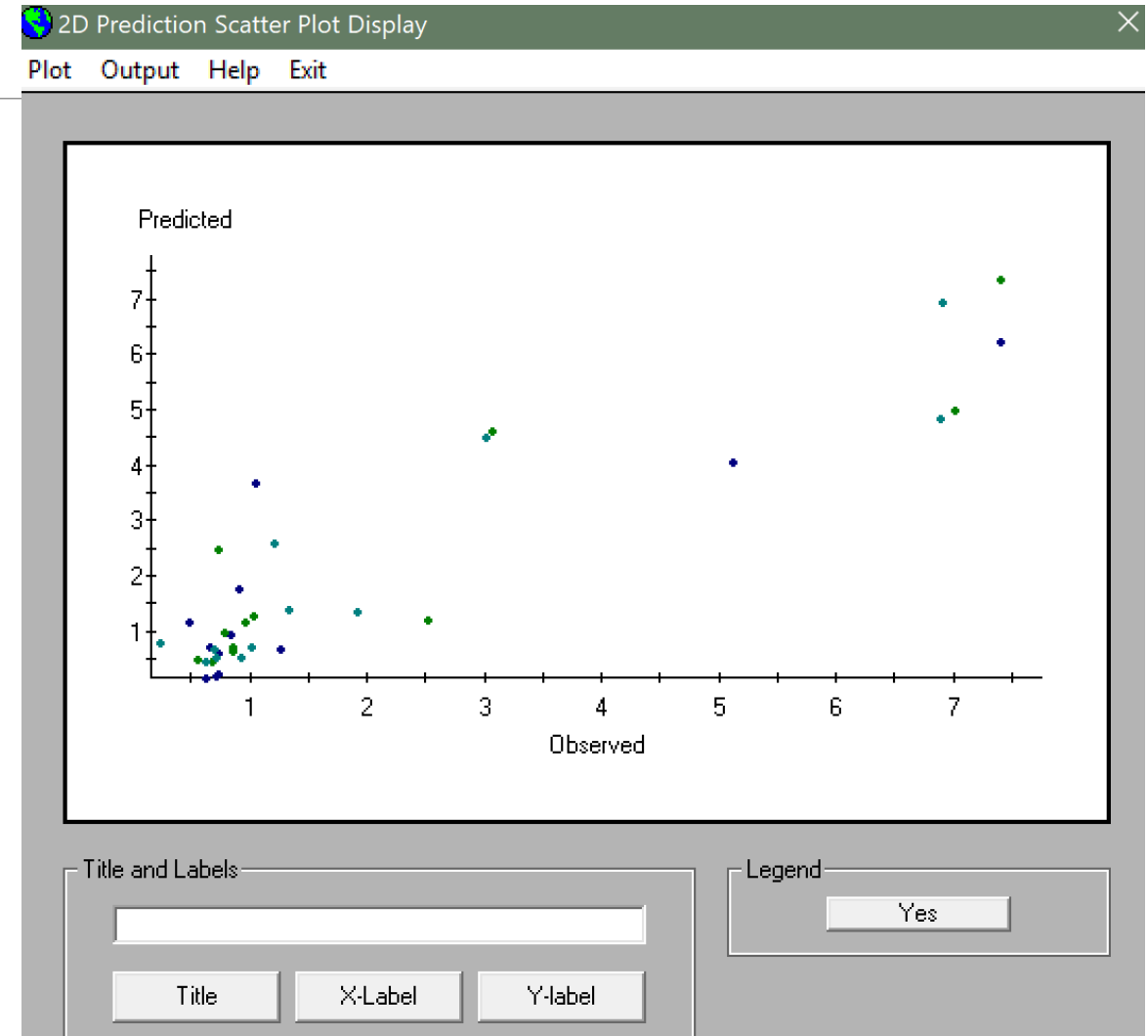
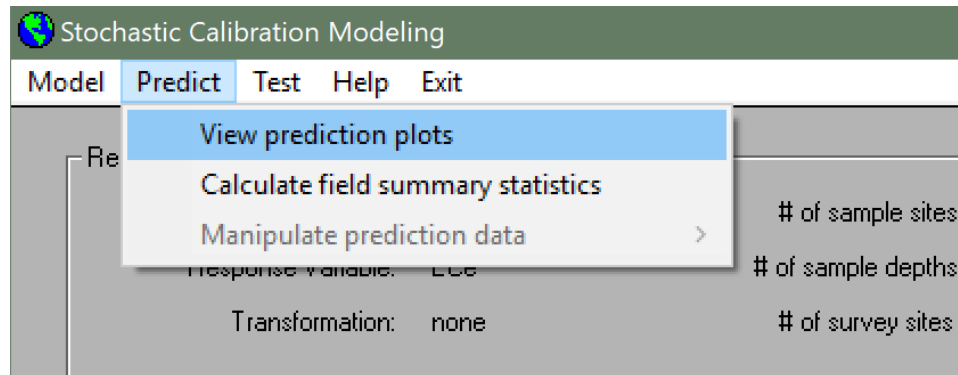


“Model” → “Advanced modeling options” → “View model summary statistics” → “Specify Output File Name” → “Finished”

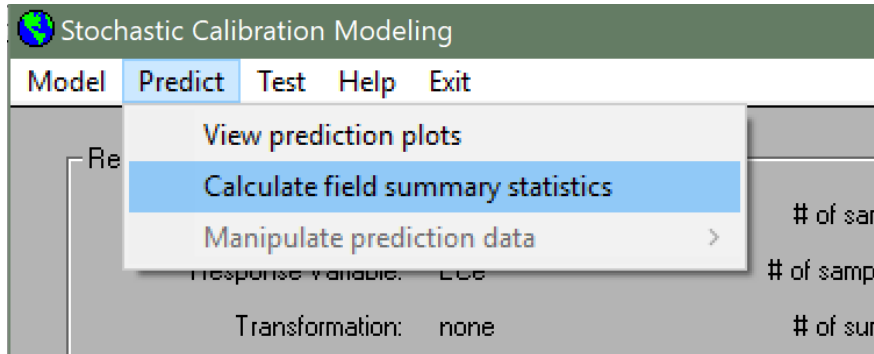
THIS FILE HAS THE REGRESSION EQUATION COEFFICIENTS FOR EACH DEPTH AND AVERAGE



Optional: View prediction plots for accuracy



“Predict” → “Calculate field summary statistics” →
Specify Soil Variable → Specify Cut-off values →
“Calculate Statistics”



Calculate Field Summary Statistics

Specify Soil Variable:

- ☒ Salinity (ECe)
- ☐ Tons_Salt (TS/acre-ft)
- ☐ Leaching Fraction (LF)
- ☐ Saturation % (SP)
- ☐ % Clay
- ☐ Other soil variable

Field Average Estimates:

☐ Back transform field log mean estimates (into geometric means)

Range Interval Cut-off Levels:

Please specify the # of cut-off levels: ☐ 1 ☐ 2 ☐ 3 ☒ 4

Cut-off level 1: Cut-off level 2: Cut-off level 3: Cut-off level 4:

☐ Log transform the above specified cut-off levels

Additional ECe or LF Info:

ECe units: ☒ dS/m, mS/cm ☐ mS/m

Calculate LF values using:

- ☐ EC(w):
- ☐ Cl(w):

Calculate Statistics Cancel

H

Specify Output File Name → Save File → Finished

The screenshot shows the 'Calculate Field Summary Statistics' window. The 'Specify Soil Variable' section has 'Salinity (ECe)' selected. The 'Field Average Estimates' section has the checkbox 'Back transform field log mean estimates (into geometric means)' unchecked. The 'Range Interval Cut-off Levels' section shows 'Please specify the # of cut-off levels:' with '4' selected, and four input boxes for cut-off levels containing the values 1, 3, 5, and 7. The 'Additional ECe or LF Info' section has 'ECe units:' set to 'dS/m, mS/cm' and 'Calculate LF values using:' set to 'EC(w)'. The 'Save Results to ASCII text file' section has 'yes' selected. A red status message at the bottom reads 'Finished processing all 2198 survey sites...'. The 'Finished' button is highlighted, and the 'Specify Output File Name' button is active.

Calculate Field Summary Statistics

Specify Soil Variable:

- ☒ Salinity (ECe)
- ☐ Tons_Salt (TS/acre-ft)
- ☐ Leaching Fraction (LF)
- ☐ Saturation % (SP)
- ☐ % Clay
- ☐ Other soil variable

Field Average Estimates:

☐ Back transform field log mean estimates (into geometric means)

Range Interval Cut-off Levels:

Please specify the # of cut-off levels: ☐ 1 ☐ 2 ☐ 3 ☒ 4

Cut-off level 1: Cut-off level 2: Cut-off level 3: Cut-off level 4:

☐ Log transform the above specified cut-off levels

Additional ECe or LF Info:

ECe units: ☒ dS/m, mS/cm ☐ mS/m

Calculate LF values using:

- ☐ EC(w):
- ☐ CI(w):

View Output Finished

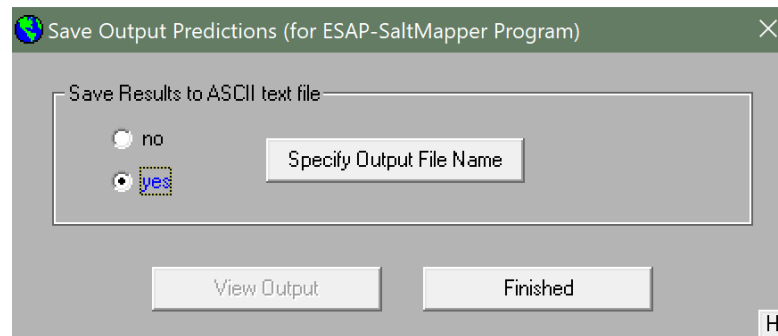
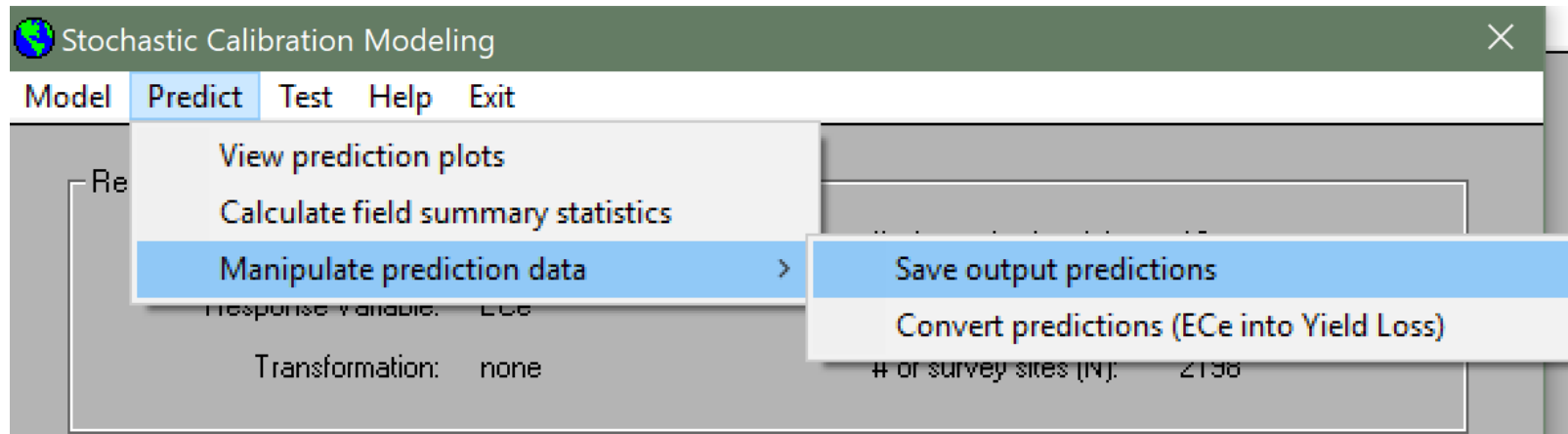
Finished processing all 2198 survey sites...

Save Results to ASCII text file:

- ☐ no
- ☒ yes

Specify Output File Name Save File

“Predict” → “Manipulate prediction data” →
“Save output Predictions” → “Specify output
file name” → “Finished”



Calibration is Now Complete!

Additional options from here:

- Yield loss predictions

- Mean-Shift Tests to see if salt content in a field has changed from one EM38 survey to another

- Net-Flux tests to see if salt content in a single sample site location has changed via additional soil samples

To view calibration equations directly:

- Find the project folder in the file explorer and open the file created in slide 16. An example of an equation is shown

$$\text{MLR Model Form:}$$
$$\text{ECe} = b_0 + b_1(z_1)$$

AOV Table and Parameter Estimates for depth: 0.15

Source	DF	SS	MS	F value	Prob >F
Model	2	41.0054	20.5027	15.74	0.0012
Error	9	11.7220	1.3024		
C-Total	11	52.7274			

model R-square = 0.7777
root MSE = 1.1412

press score = 25.380

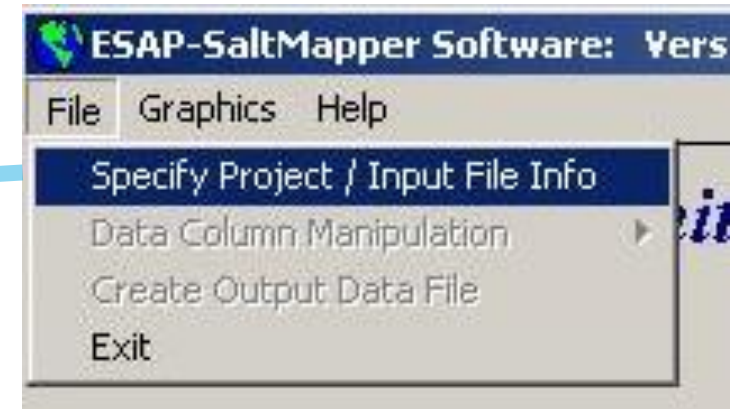
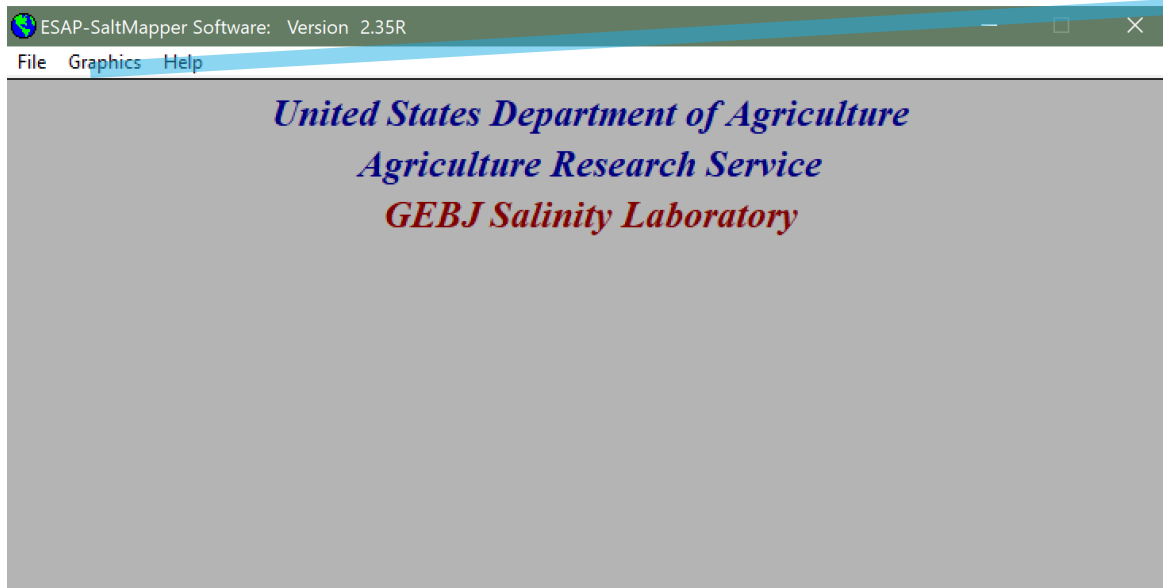
Parameter	Estimate	Standard Error	t value para=0	Prob > t
intercept	0.4374	0.5011	0.87	0.4054
z1	0.9874	0.2918	3.38	0.0081
z1^2	0.8948	0.2720	3.29	0.0094

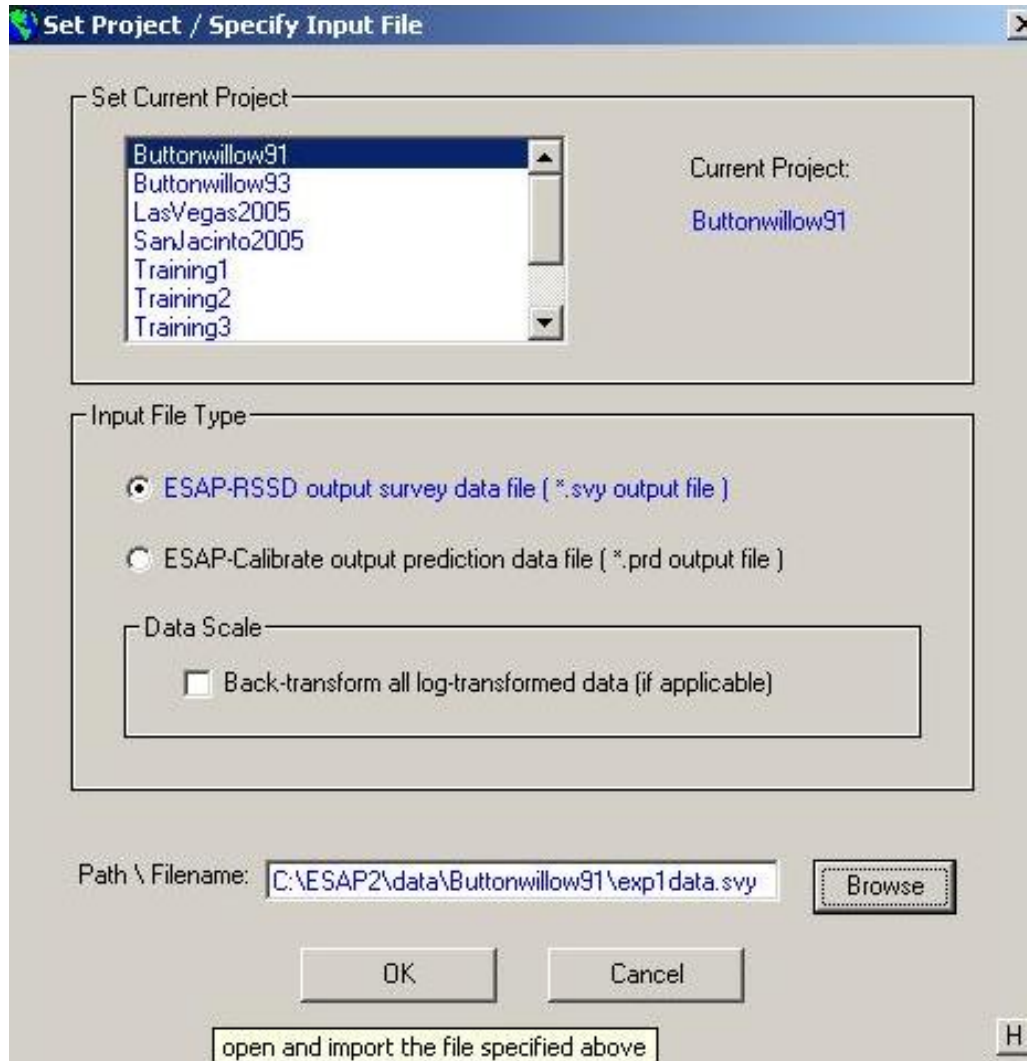
The ESAP-Calibrate Predictions are Now Ready for Use for ESAP-SaltMapper

Select ESAP-SaltMapper from the “Programs” and “Analysis Software” menus.



Select Specify/Input File Info from the “File” menu.

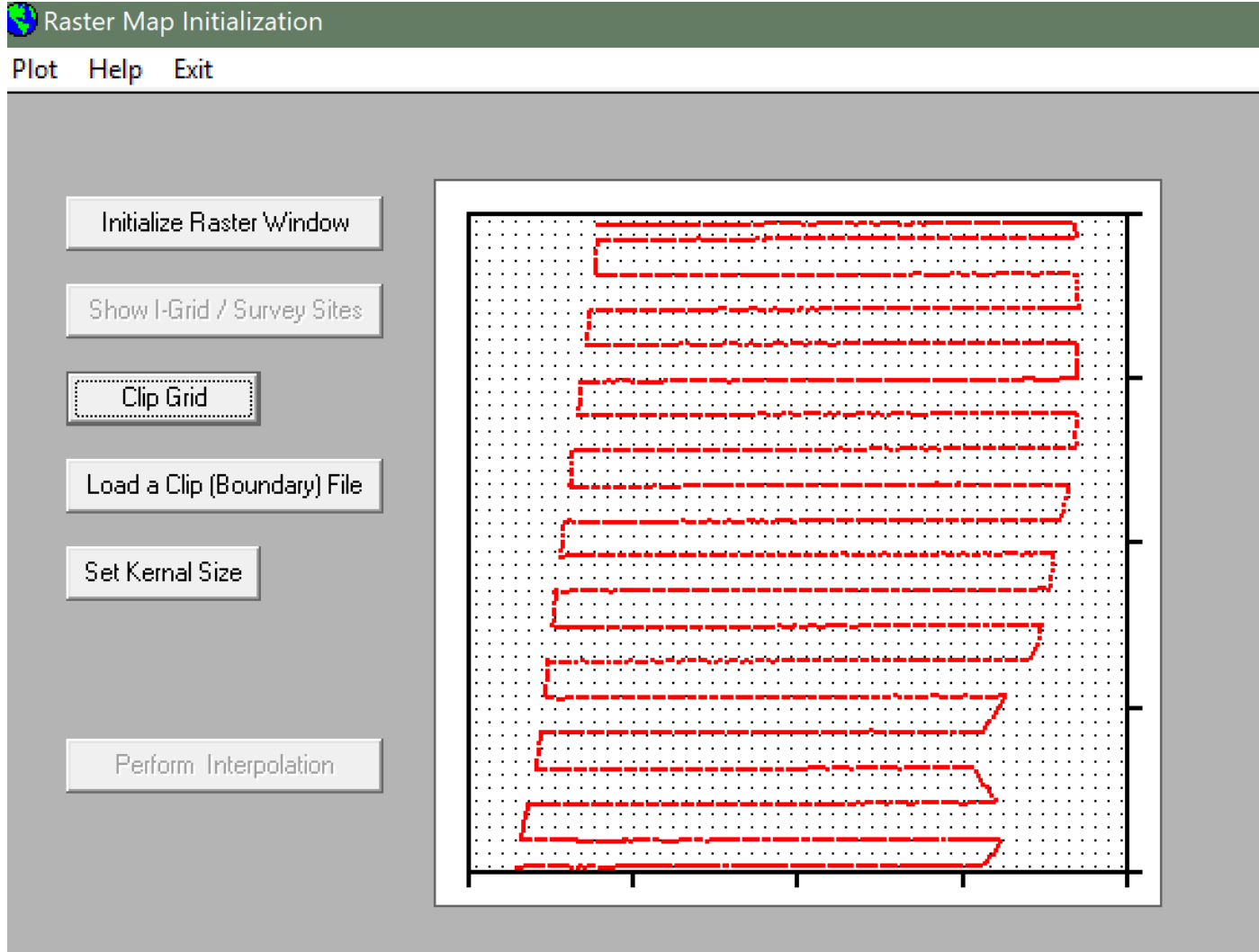




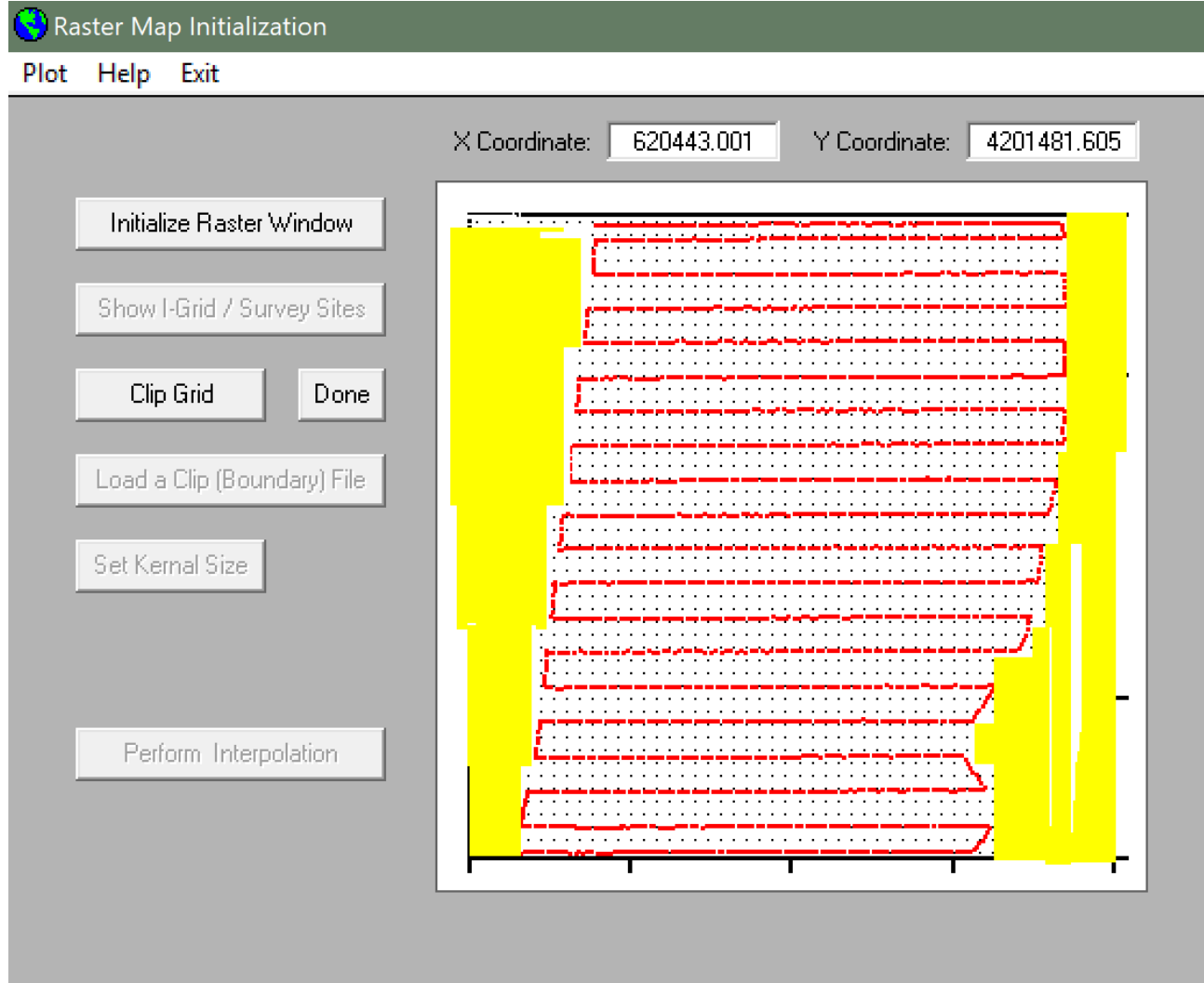
Specify the project and input file location

Select 2-D Raster Image Map from “Graphics” menu.



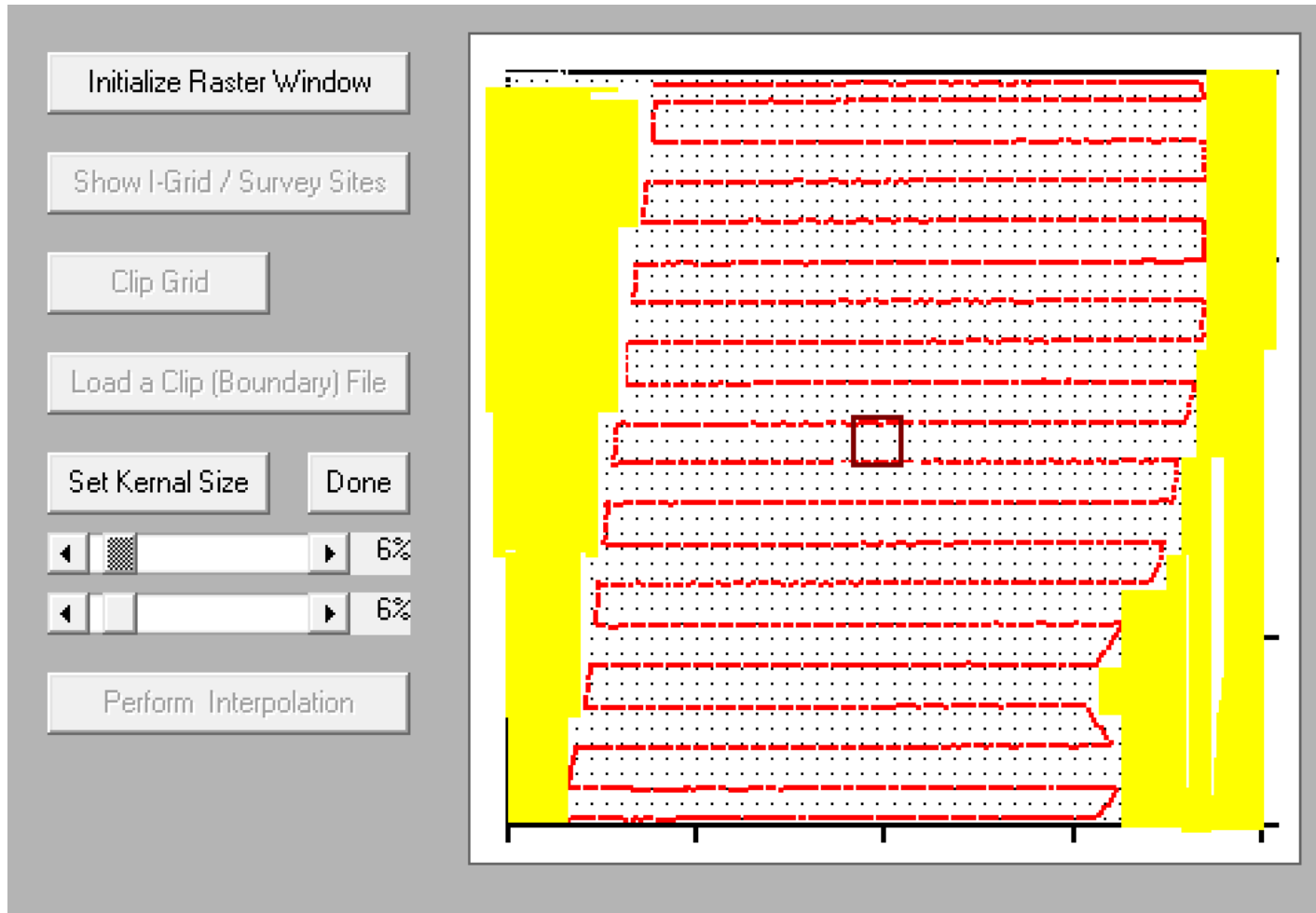


Initialize the
Raster
Window, then
Show the
Grid/Survey
Sites



Clip the grid to the appropriate field shape. Yellow indicates clipped area.

Press, "Done"



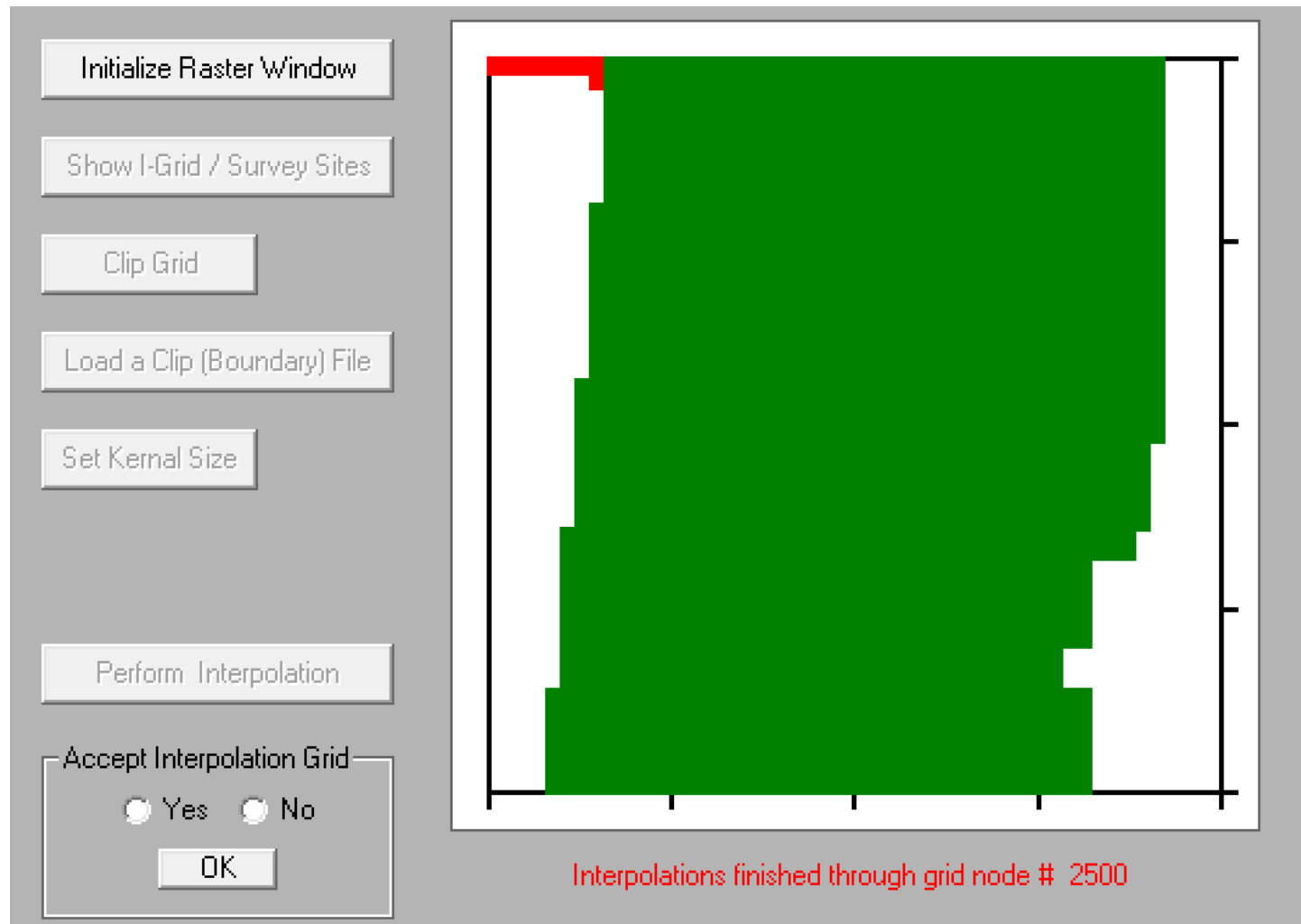
Set the Kernel
Size

Dense survey
grid (6%)

Sparse survey
grid (10%+)

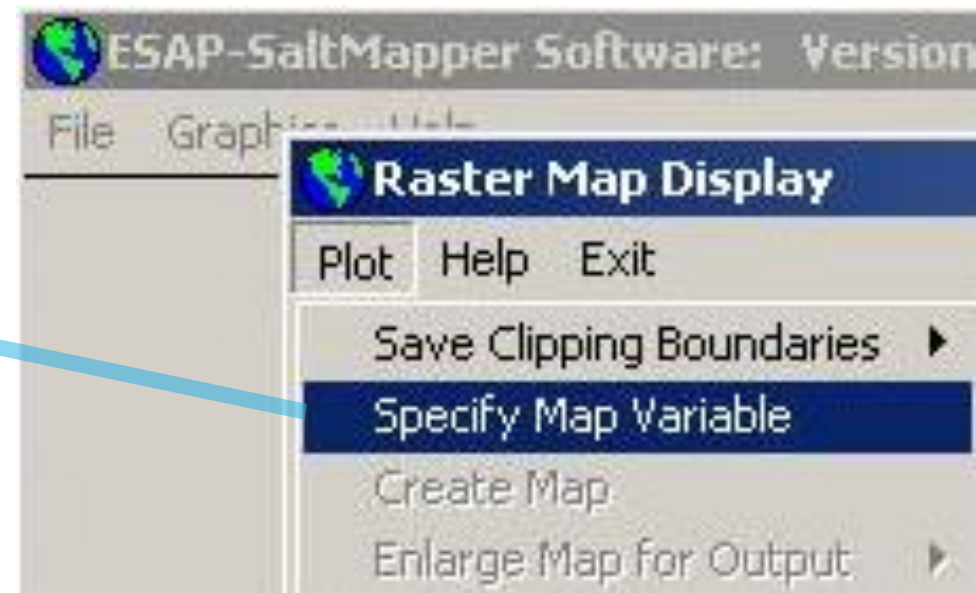
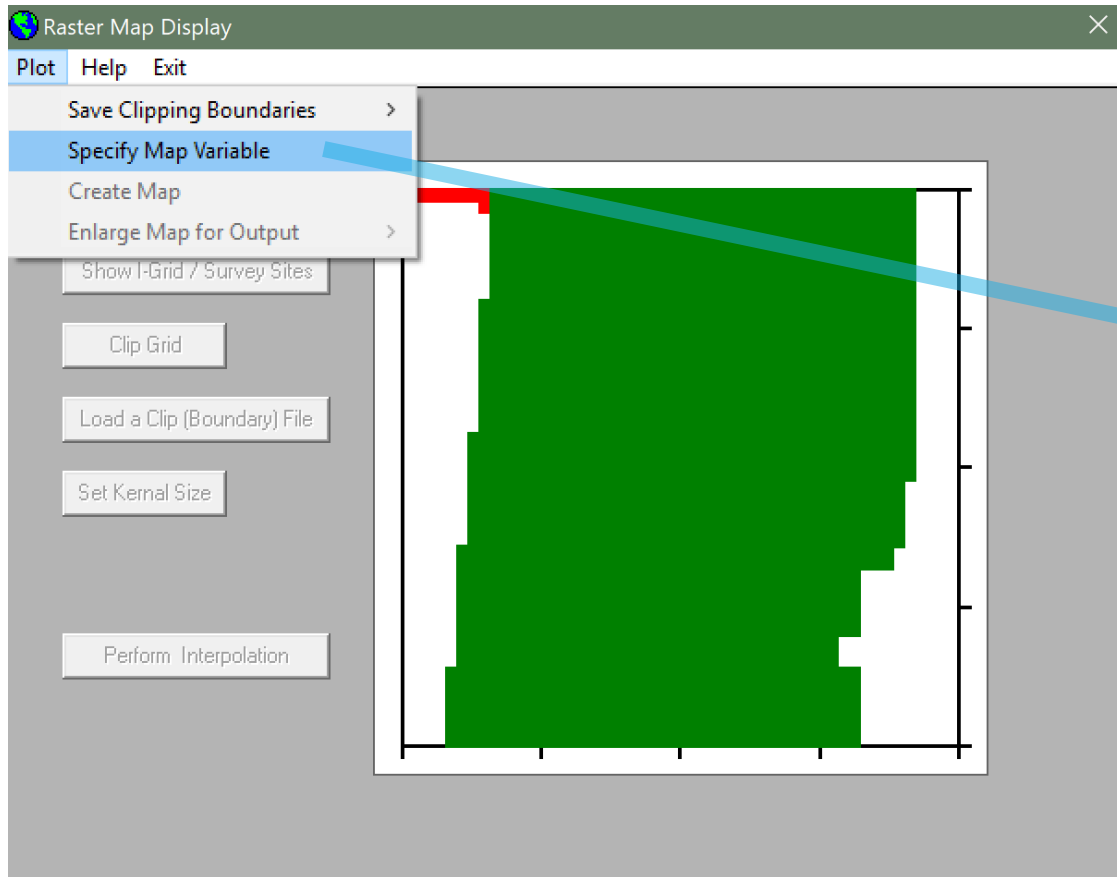
Press "Done"

Press "Perform Interpolation"



Accept
Interpolation
Grid After
Checking
Boundaries

Select Specify Map Variable from the “Plot” menu.



Map Variable Specification

Map Variable Attributes

Mapping Variable: ECe(ave) Raster Cut-off Levels: 1st Level: 1 2nd Level: 3 3rd Level: 5 Units: dS/m

Map Features:

Title: Soil Profile Average Ece of DA784 field

Coord System: UTM (m) X-Label: Easting Y-Label: Northing 0 ddp 5 ddp

Map Appearance (Color Palette Choices)

low values -- high values

1 2 3 4

Custom colors: low med-low med-high high

(click on the text boxes to set each range color)

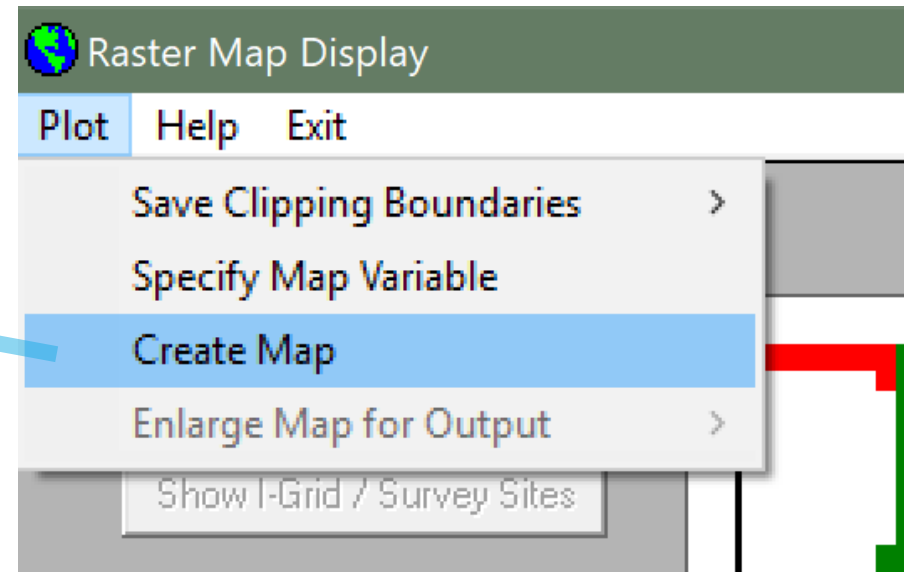
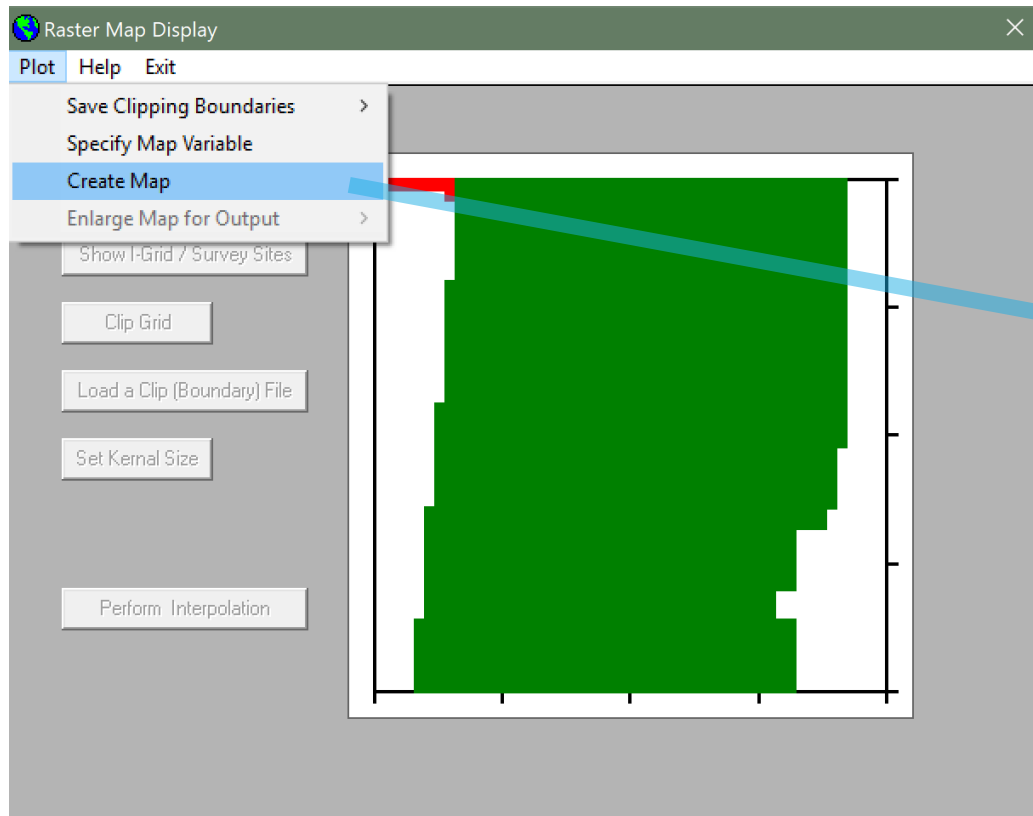
☐ Overlay sample sites (t.tvy data files only)

OK Cancel H

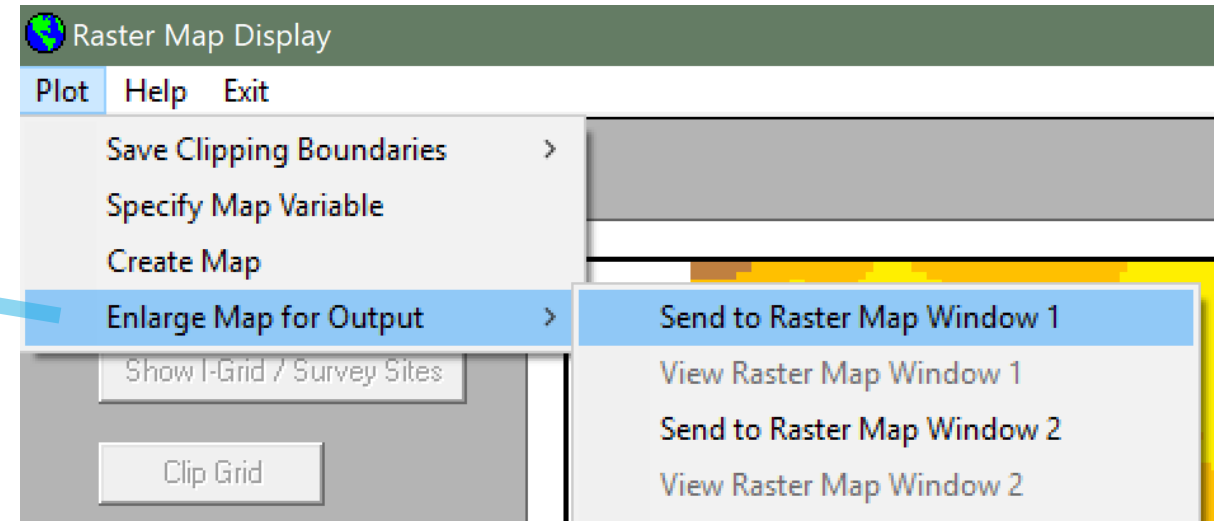
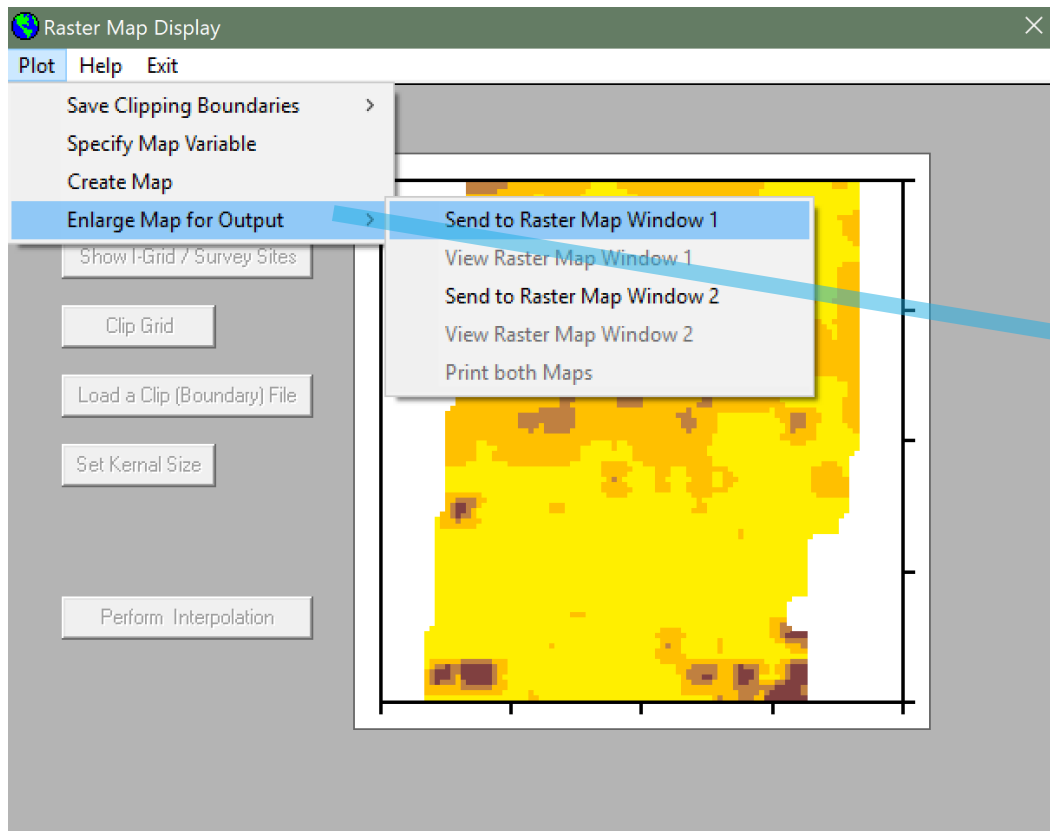
Customize Variable, Map Features, and Map Appearance. Sample sites may also be overlaid.

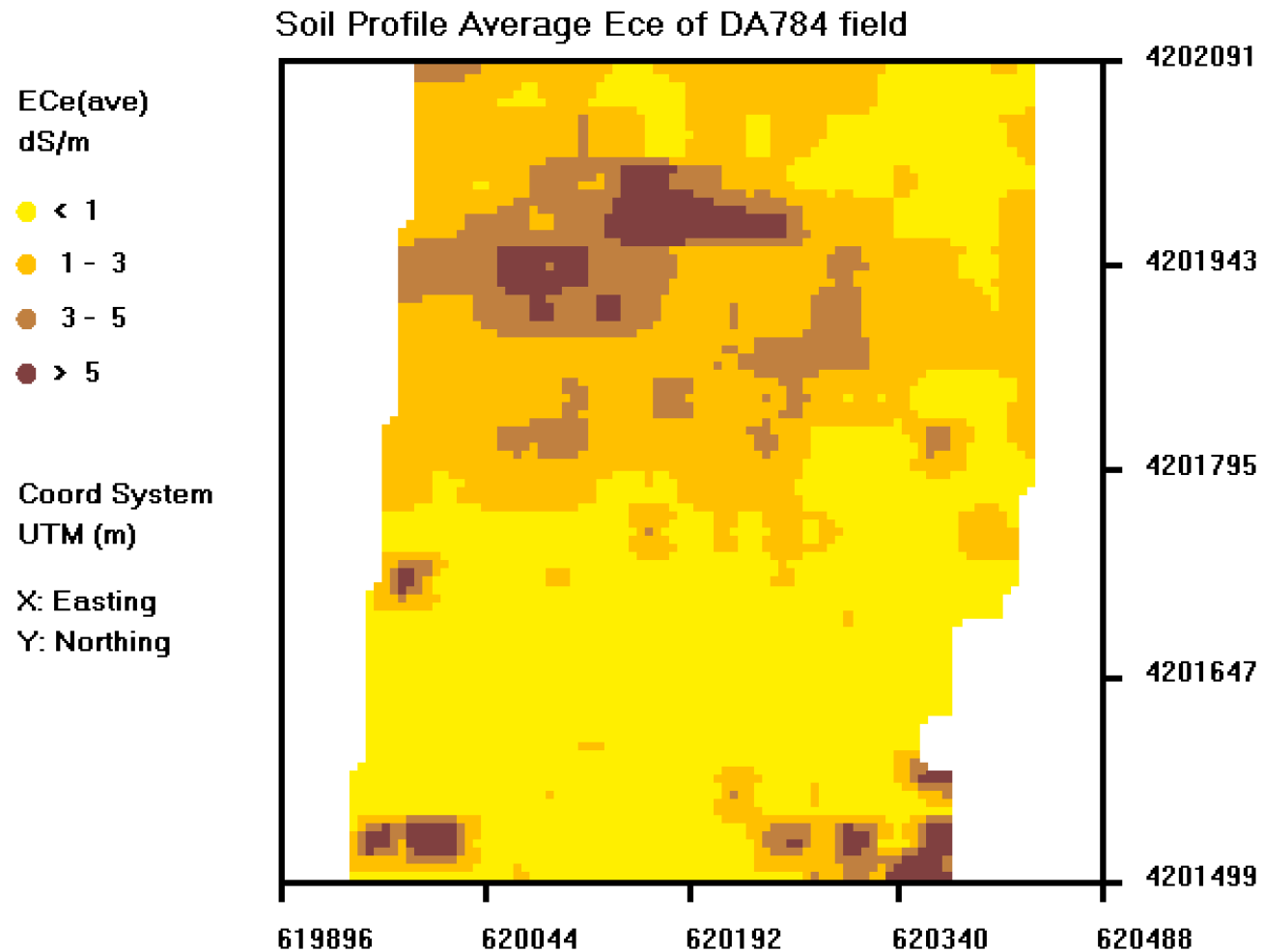
Press "OK"

Select Create Map from the “Plot” menu



You can now view your salinity map. Select Enlarge Map for Output from the “Plot” menu to view or print your map.





Final Product!



Questions
