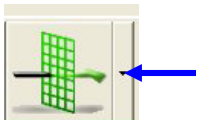
Exercise 4
Building a Single Pass Linear Model of Cattle Distribution in the California Foothills

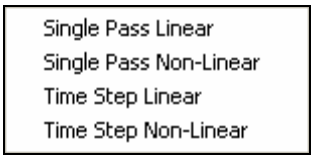
Step 1: Launching the Multi-Criteria Analyses

From the tool bar click onto the icon on the far right, select the “Multi-Criteria Analyses” option (shown here).

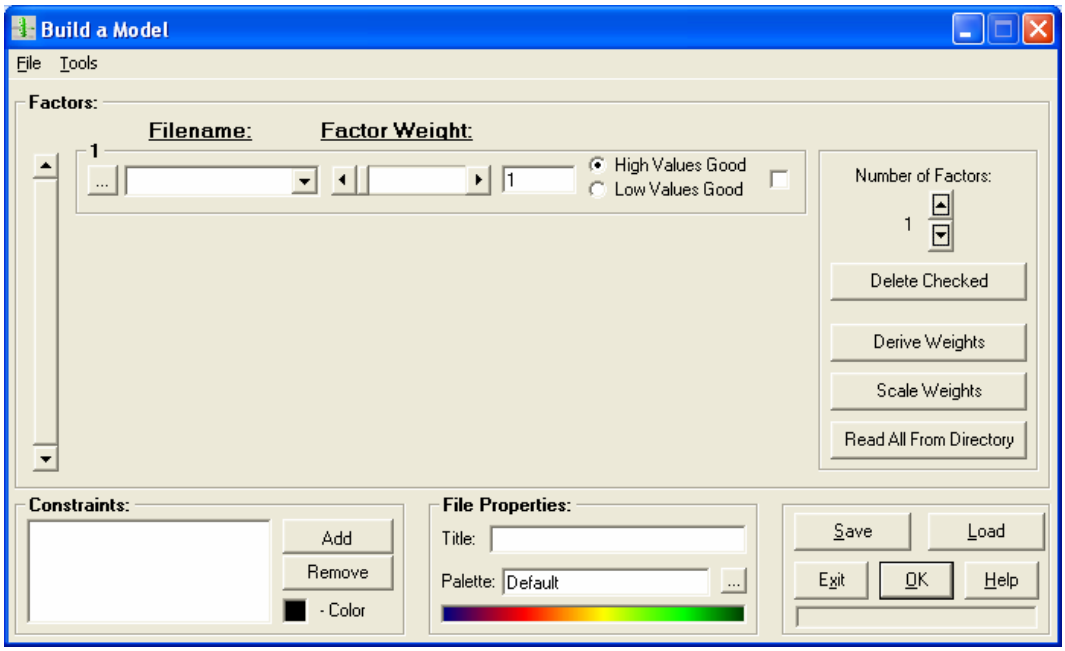


Click on the arrow for the drop down menu

This will initiate a dropdown menu with four choices of model types: Single Pass Linear, Single Pass Non-Linear, Time Step Linear, and Time Step Non-Linear.

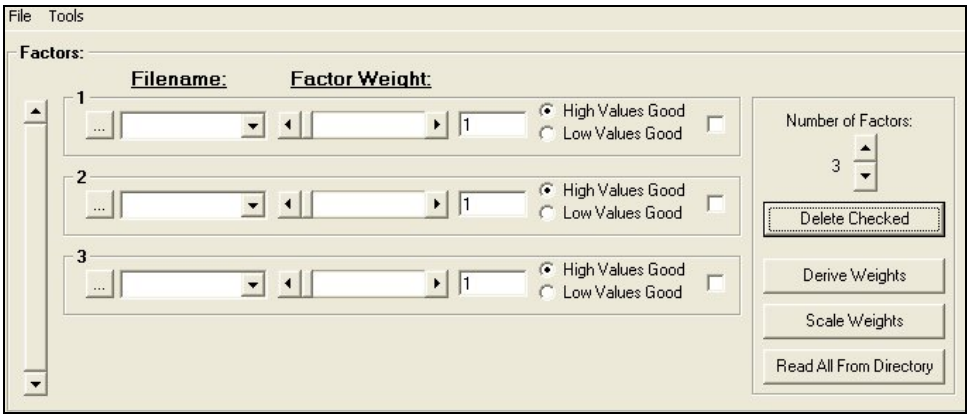


Click on the first choice, “Single Pass Linear”. This will open a new window with the heading “Build a Model”.

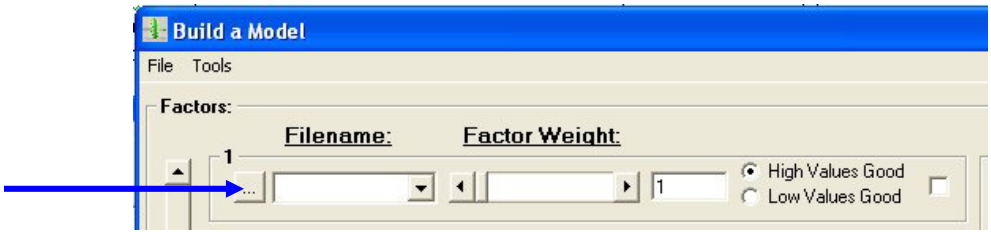


Step 2: Deciding on the Number of Factors

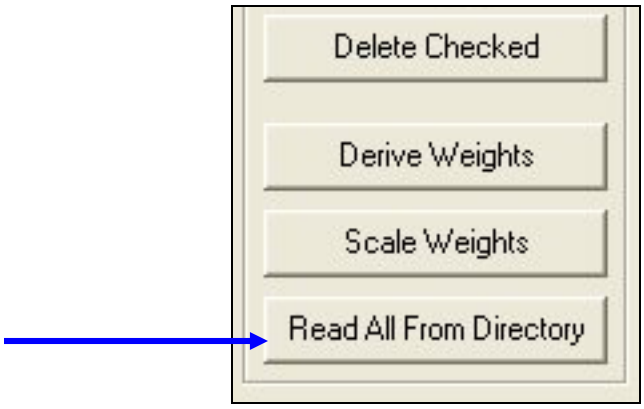
The first step to take when building a model is determining the number of factors to be included. This exercise will be kept simple with only three factors used. Since the default setting is for one factor, use the up arrows in the top right-hand corner of the screen to increase the number of factors to three. You will notice that two blank rows will be added to the left side of the screen, so there will be a total of three blank rows as demonstrated below.



The factors can be loaded either one at a time or all at once from the working directory. To load one factor at a time, click on the "…" button next to the file name, then search for and select the desired file. It is also possible to type in the file name; however, it must be spelled correctly for the program to recognize and add the desired factor.



To load all the factors in the working directory at one time, click on the "Read All From Directory" button in the lower right-hand corner of the window, as pictured here.



Step 3: Filling the Input Information (Factor Names and Weights, Constraints, and Output Title)

Since this example uses three factors (forage availability, distance to water, and distance from supplement), each needs to be loaded into the "Factors" section. These are ASCII raster layers, which means that their extension should read ".asc." Once these have been selected, a weighing value needs to be assigned, with each factor weighted according to importance.

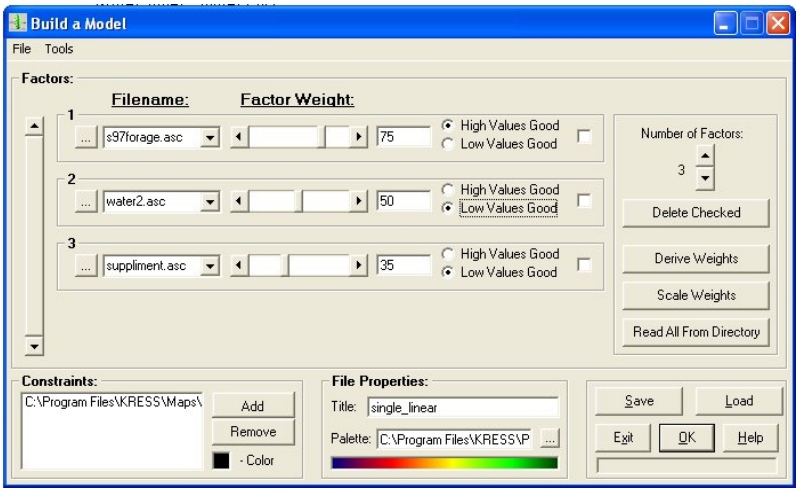
The factor weights range from 0 to 100.

- The forage layer, labeled "s97forage.asc," is set up so that the more forage available – a desirable trait – produces a higher value.
- The water layer is titled "water2.asc." Because proximity to water sources is advantageous, shorter distances (which translate to lower values), are seen as being good.
- The layer for the supplement, labeled "supplement.asc," can be compared to the water layer. The closer the herd to the supplement area (short distance equates to lower values), the better the situation.

Assign a factor weight of 75, 50, and 35 to each factor respectively.

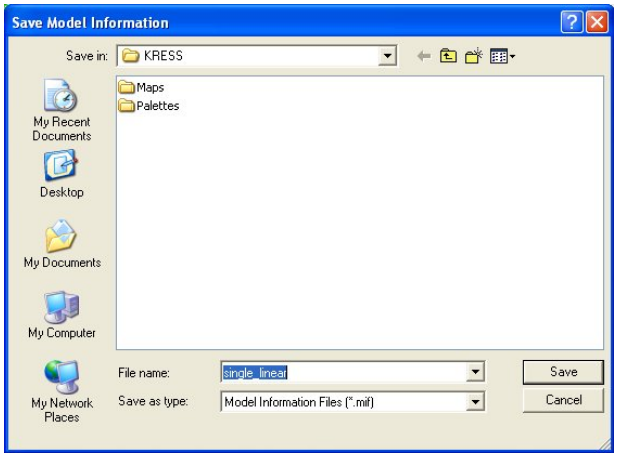
Then under the "Constraints" section on the lower-left hand corner of the window, click on "Add" and Select "mask layer".

Finally, under "File Properties," title the output file "single_linear," as demonstrated below.

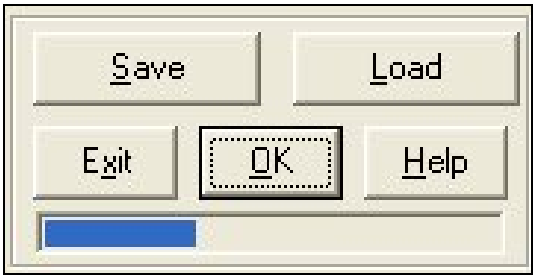


Step 4: Saving and Running the Model

After you have completed the above steps, you should save the model. Click on the "Save" icon. A new window titled "Save Model Information" will appear. The extension type will be a "Model Information File" ("*.mif"). Under the file name type "single_linear".

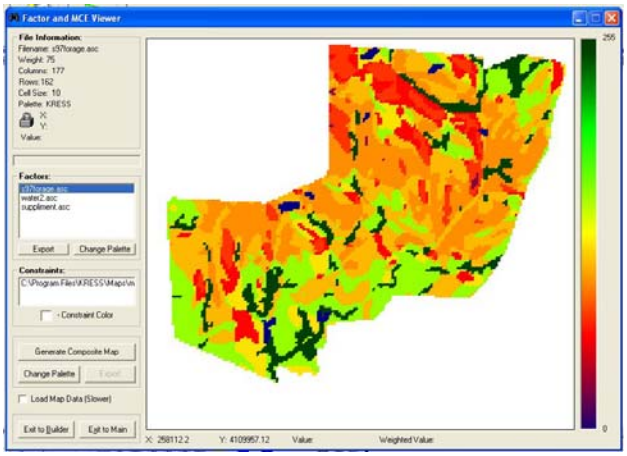


After saving the file, click on "OK" (in the "Build a Model" window) to run the model. You will notice a progress bar indicating how long the process is going to take; however, it should not take more than few seconds.

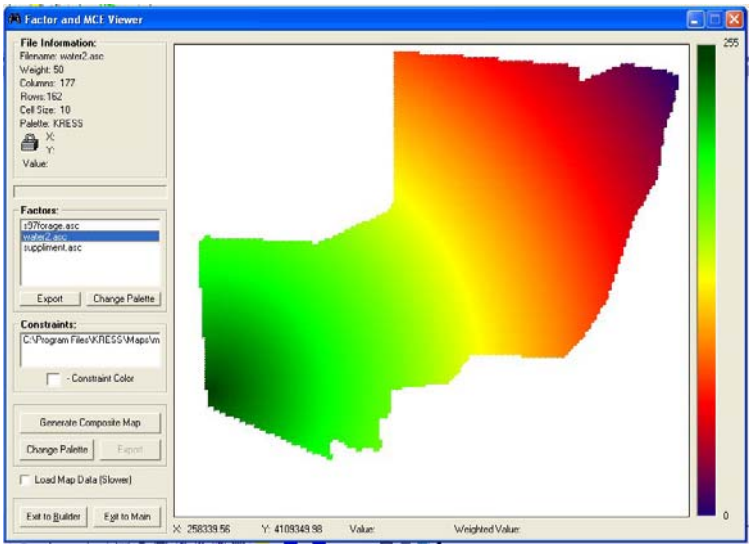


Step 5: Displaying Factors

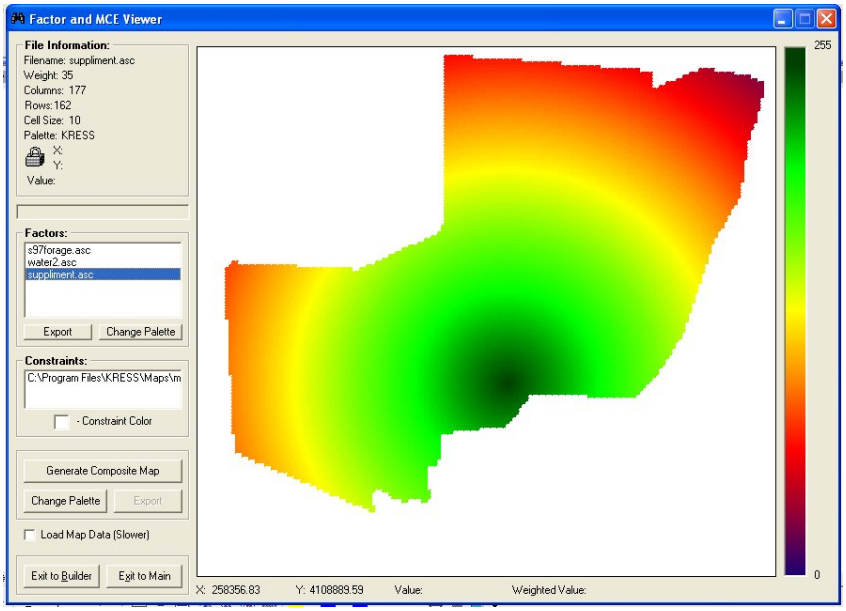
The newly created map is divided into separate layers for each factor. The forage factor is displayed automatically; however, you can move between views by clicking on the file name. The upper left corner, labeled "File Information," displays the layer's attributes as well as other facts: the file name, the factor weight, the number of columns and rows, the number of pixels, and XY reading showing the position of the cursor on the map. The color key on the far right shows high values of green and low values of purple. The darker green indicates high amounts of material available for forage.



The second factor, the water layer, can be displayed by highlighting the file name. Remember that the water levels are read as distances from water, so the lower values (evidenced by the red and purple hues) are actually more desirable traits.



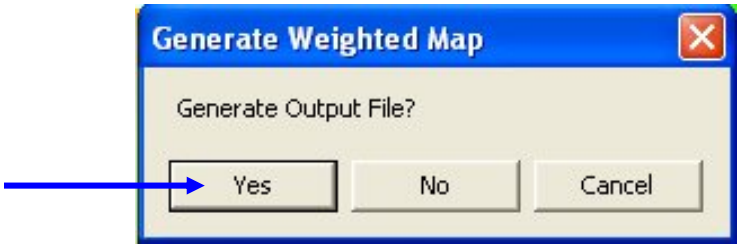
The third factor, distance from supplement, can be displayed by highlighting its file name. This layer is read in the same way as the water layer, with lower values signifying more advantageous positions.



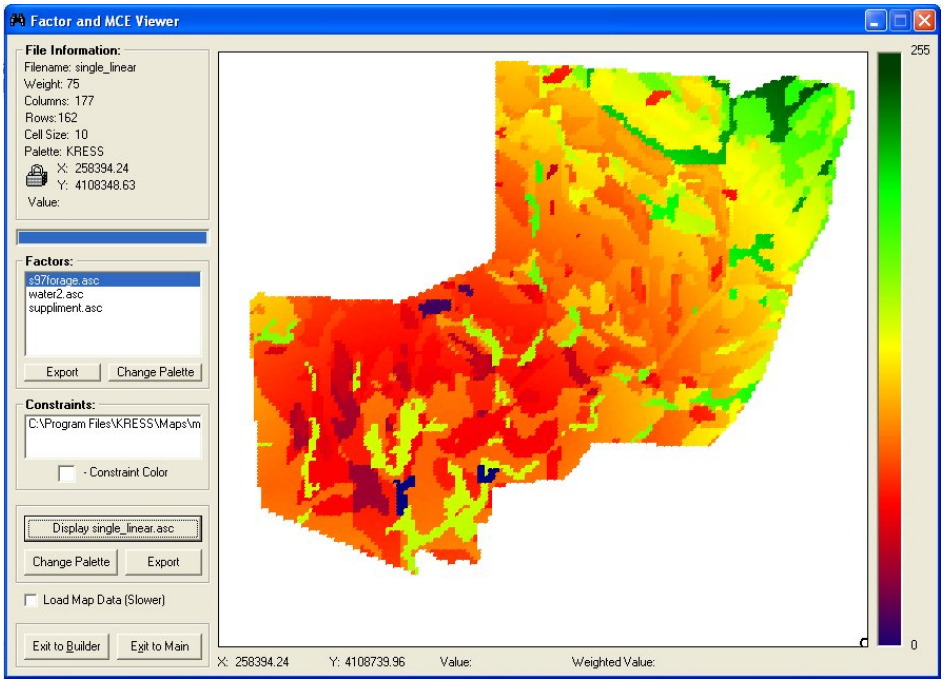
Step 6: Generating a Suitability Map

To show all three layers in an interactive setting, a composite map needs to be created. Click on the "Generate Suitability Map" icon.

The next window will ask if you would like to generate an output file. Click on "Yes".

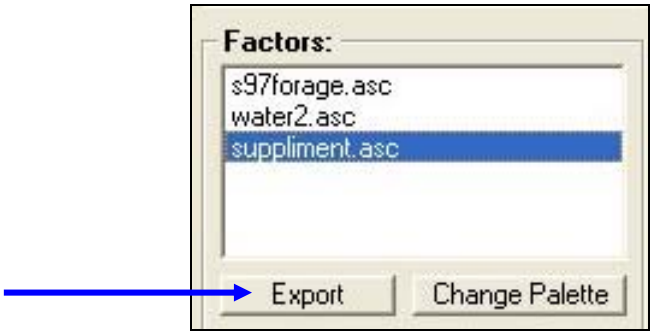


The resulting map will look like the one pictured below, with all the layers interacting together on the same map.

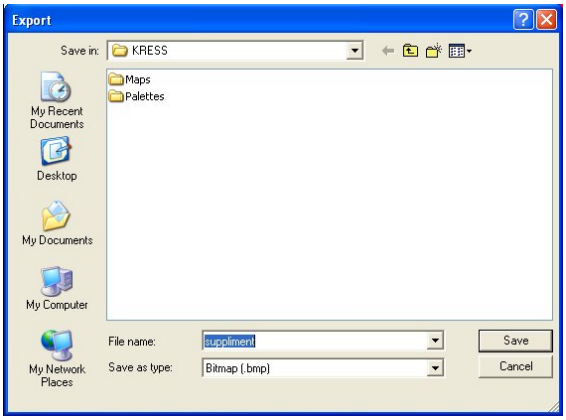


Step 7: Export

In order to use your created maps in other computer programs, written reports or power point presentations, they should be exported as bitmap files. Select a factor, such as the "suppliment.asc" file shown below, and click on the "Export" button.



When saving the file, make sure that the type is "Bitmap" ("*.bmp"). This way, the images are compatible with most other programs.



Finally, you can either “Exit to Builder” to run another model or “Exit to Main,” taking you back to the starting page of the KRESS Model.