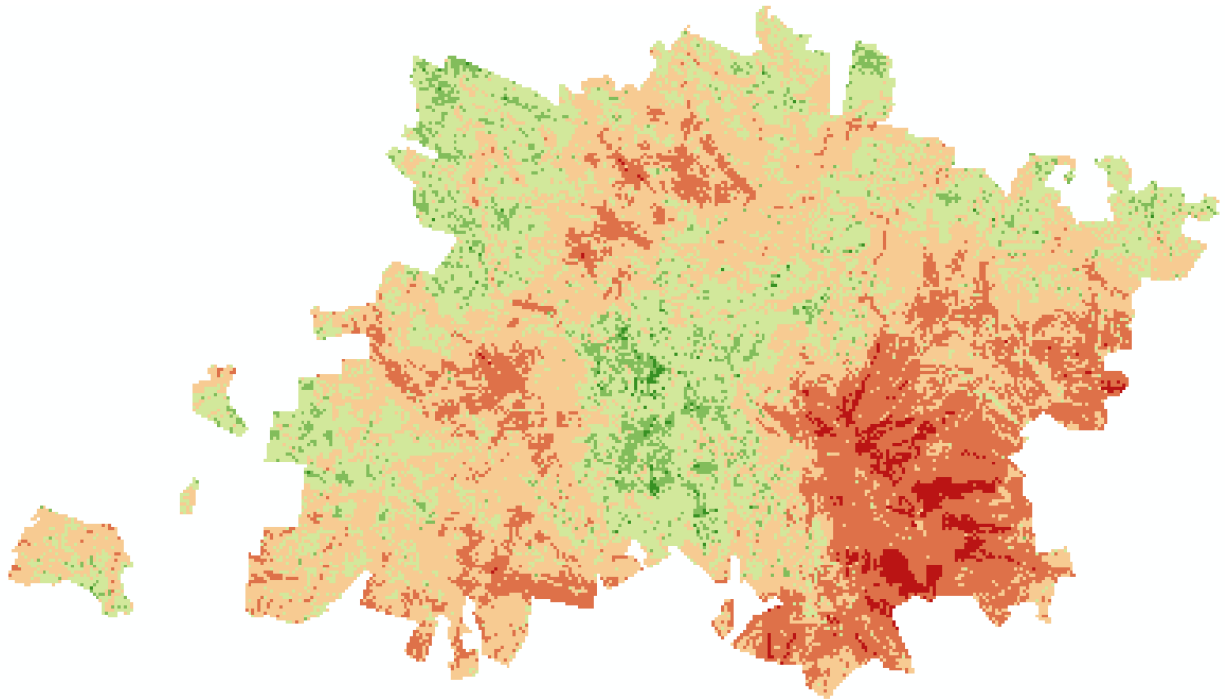


CIRMA Suitability Map User Manual



The recorded process for operation and handling of the suitability maps for the CIRMA region in El Yunque within ArcMAP.

Table of Contents

Downloading Files	2
Opening the Map Package	2
Adding Layers and Organizing Data	3
Suitability Modeling	4
Suitable Area Identification	5
Sharing Files	6

Downloading Files

The ArcMAP files will be shared through ArcGIS online. Using the group sharing option the files will exist within the WPI organization but will be shared with the specific US Forest Service group responsible for the data within El Yunque national forest.

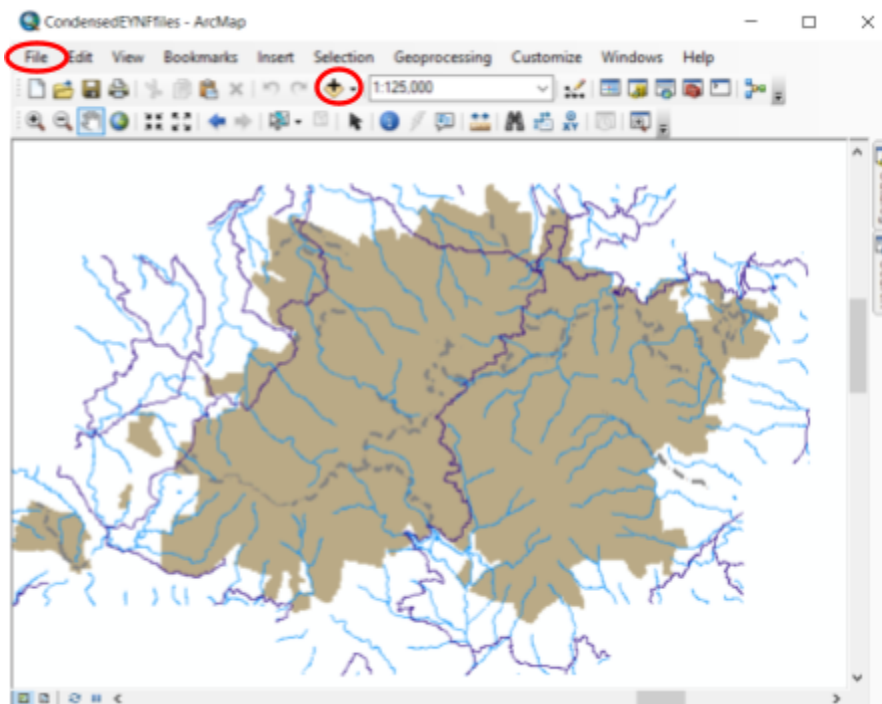
Within ArcGIS online navigate to the "My Maps and Data" tab. The map files should be shared with the group upon the conclusion of the project. You can download the map package to your stop through on Chase online and everything should be downloaded and impact on to your personal computer. When downloaded the packages will be stored in <path>\My Documents\ArcGIS\Packages.

When you find the CIRMA suitability map files on ArcGIS Online select "Add" which should download the map packages to your computer. All of the file types from ArcMAP are supported so there should be no issues transferring maps as long as ArcGIS Online is setup correctly.

Adding Layers and Organizing Data

Table Of Contents

- streams_EY
- state_roads_EYNF
- trails
- CIRMAMask
- ManagementAreas
- availablewatercapacity
- depthtowatertableinch
- yunque_BND_and_polygn
- organic_matter
- hydrologicsoilgroup
- compartments
 - Name
 - El Verde (8)
 - Gurabo (15)
 - Harvey (9)
- plasticityindex
- private_areas
- watersheds_EY
 - Name
 - Espiritu Santo River
 - Big River of Loiza
- Hiking Suitability
- Biking Suitability
- Water Infrastructure Suitability
- Water Activity Suitability
- Gardening Suitability
- Camping Suitability weight
- Hiking Suitability
- Final restriction
- CIRMA Buffer Raster
- HS_SM_EYNF
- parking_lots



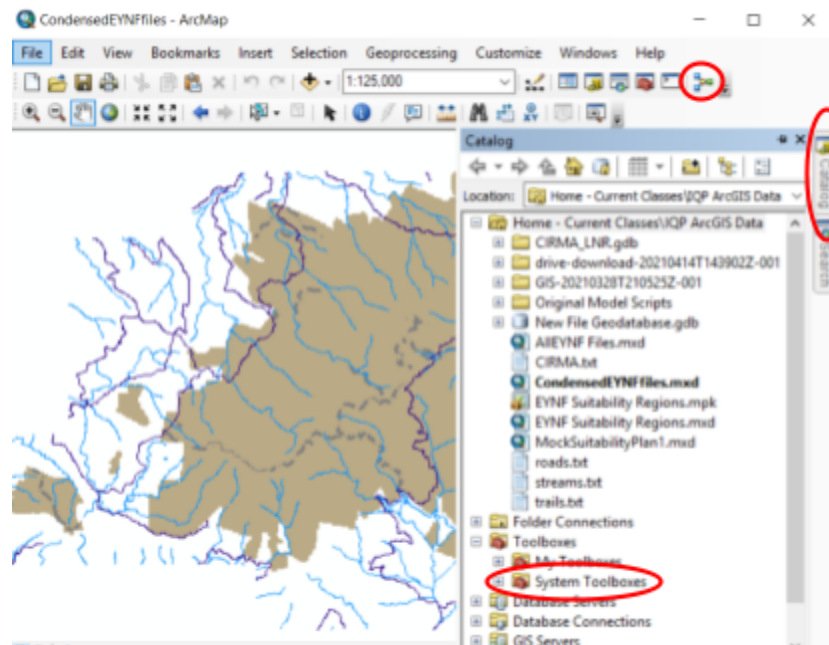
Once you have saved the files and opened the ArcMAP document the layout should become clear.

You can add files using the plus button or in the file tab. The files within the folder exist as different types of data. Vector data usually displays as lines like for roads and rivers, while raster data will have areas of values like the watershed, management areas, and plasticity index layers.

All existing graphic data from the file opened should be present in the column on the left seen on the left.

Once all the layers are present the models that generate the suitability maps can be edited or created if new land uses have been brought up. , models below should be created or edited to see that the paths still exist.

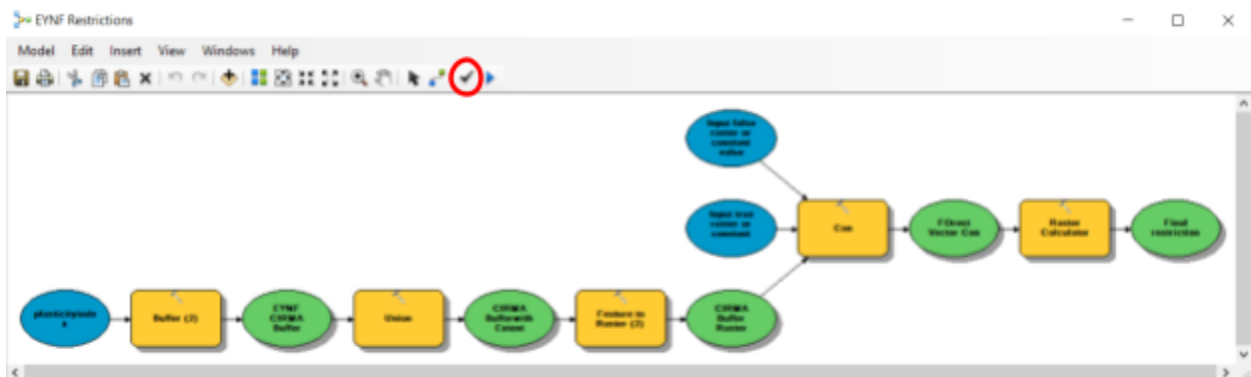
Suitability Modeling



The process for creating the suitability maps with these models takes three steps.

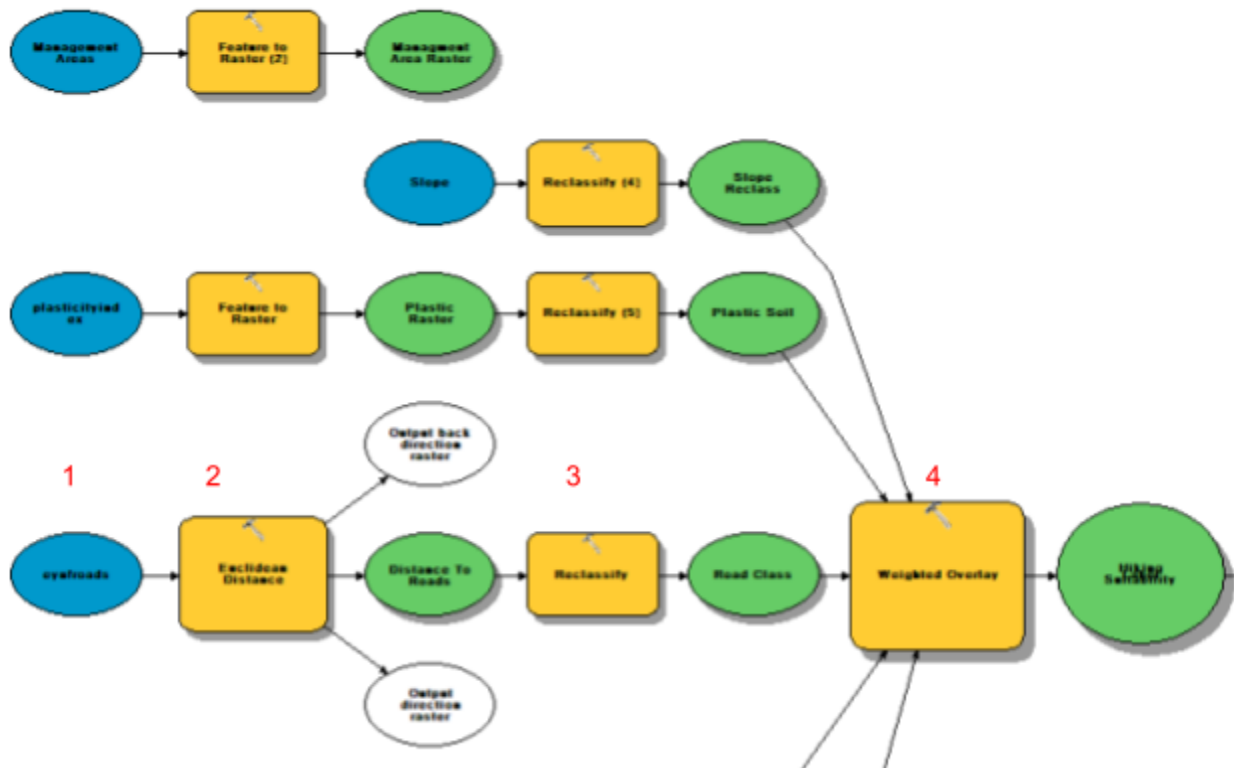
1. Creation of the base boundary layer
2. Identifying what data and tools to use
3. Utilizing Matrix to select weights

To create the first boundary model you click the model builder button seen in the figure above in the top red circle. When editing you locate where the already created model is in the catalog on the left and right click on the toolbox and click “edit”. Once the empty model is open the tools, which are the yellow rectangles below, from the system toolbox can be dragged in or edited. When opening the EYNF Restrictions model make sure you validate the model before you run it so any changes are addressed. This will allow the model to recalculate all of the tools and will show errors if problems arise.



Below is the example model for the creation of the hiking suitability map. The first set of blue bubbles are the layers which have the data that was imported earlier. The yellow squares at number 2 is the euclidean distance tool from the spatial analysis toolbox. It sets values as you move closer or farther away from that specific entity. The tool under number 3 is called reclassify which is used on every feature in order to set them all to the same scale before they are weighed for priority. 0-9 was the scale used for this project with 9 being highly suitable and 0 being null/unsuitable. After every feature has been classified they can be weighed against each other. The data that we input in our matrix holds our ideal weights for every utilized feature based off of research, USFS opinion, and intuition.

Double clicking on the weighted overlay box labeled #4 will display all of the reclassified features based on their weights. If values don't match the exported table from the reclass tool then the suitability map output will be missing sections related to the features that don't exist. Run the entire model once the tools seem to be connected properly. Right click the final green box and click "Add to Display" to display the suitability gradient on the map.



Suitable Area Identification

Once the suitability gradient maps are thoroughly run and are displayed in the table of contents, the areas >7 on the scale of suitability can be exported and made as their own layer.

To start or edit this process in each land use model we converted the displayed suitability map into a polygon with the “From Raster - To Polygon” tool. This will not be color graded like the previous map, but it separates every calculated instance into their own polygons. Seen in the figure below click the “Open Attribute Table” button in order to select all of the areas rated >7.

The screenshot shows three main components of the ArcGIS interface:

- Table of Contents:** A list of layers including Infrastructure, Gardening, CIRMA, Camping, Biking, and Proper Hiking. The 'Proper Hiking' layer is selected.
- Attribute Table:** A table with columns 'id', 'Shape_Length', and 'Shape_Area'. It contains 10 rows of data. The 'Select All' button is highlighted.
- Select by Attributes Dialog:** A dialog box with a 'Method' dropdown set to 'Create a new selection'. The 'WHERE' clause is entered as 'gridcode >=8'. The 'Apply' button is highlighted.

In the table click “select all” then “select by attributes”. This will allow you to write a query to select everything above a decided threshold. We entered `gridcode >=8` which selects all values of 8 suitability or higher in the table. With these values selected go back to the polygon displayed, right click to open the dialog box, selections tab, and click “create layer from selected regions”. This layer is the suitability of that selected land use which excludes all values lower than 8, or the determined level, from the original dataset.

The screenshot shows the final step of the process:

- Table of Contents:** A new layer named 'CIRMAHikingSuitability sele' is added to the list.
- Context Menu:** A right-click context menu is open over the 'CIRMAHikingSuitability sele' layer. The 'Create Layer From Selected Features' option is highlighted.
- Dialog Box:** A dialog box titled 'Create Layer From Selected Features' is open, with the 'Create a new layer containing the selected features' option selected.