LAB 12

Developing Cartographic Products in ArcGIS Pro To Tell the Story of the Capability/Suitability Model for *Lepus octopedis*

INTRODUCTION

In lab 11, you completed the capability/suitability model for *Lepus octopedis*. Your task in lab 12 is to create a presentation using graphic elements and cartographic products based on the models you created in labs 11A and 11B. In this lab you will finish up a couple of analytical tasks, make some tables, a bar chart, and some cartographic products. You will use these to create a PowerPoint presentation that describes the processes you followed to create the models and the results of the models. You will use ArcGIS Pro to create all maps, charts, tables, etc. necessary to tell the story of the *entire capability/suitability analysis* to a general audience using PowerPoint. Your final presentation will place the analysis and results in the context of the problem.

OBJECTIVE

The objective of the lab is to produce a *digital presentation* in PowerPoint that tells the complete story of the capability/suitability analyses that you conducted for the Sierra Vista Ranger District (SVRD). The story will include all relevant details from the site location and objectives through methods and conclusions. The digital presentation shall contain sufficient information to:

- convey the story of the *Lepus octopedis* capability/suitability model to a general audience with some project familiarity
- convey information about the *modeling process*, including assumptions and limitations of the model
- identify the work as your own
- be of outstanding quality

PROCEDURES

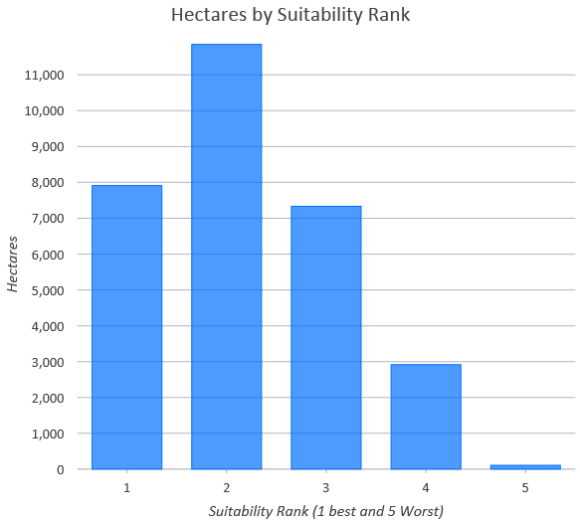
To help you with your PowerPoint document, and to help the lab staff grade them, the following discussion provides procedures for analytical products and rules for both content and presentation. Completion of this lab consists of the following steps: 1) creation of tables and graphs; 2) design and creation of cartographic products; 3) conceptual layout and graphic design of the PowerPoint presentation; 4) completing the PowerPoint document.

Creating Tables, Graphs, and Graphics

Although you completed most of the processing necessary for your PowerPoint in labs 11a and 11b, you still need a summary table, a bar chart, and a graphic of the ModelBuilder model. Instructions are below.

You will also need to create tables for the vegetation ranks, the predator density ranks, and the suitability matrix. The matrix will be created in a digital format that you can insert into a PowerPoint slide.

1. Related to the suitability matrix, you need to include a bar chart that details the total area in **hectares** for each of the five suitability classes. Open the Coronado project in the lab_11A folder in your workspace on the course file server; make sure you are working in the Suitability Model window. Open the table for the raster, *suitability*, and add a long integer field called "hectares" **[23]**.
2. Check the cell size **[106]** of the raster and mentally calculate the area of a cell in this raster. In the table, the count field represents the number of **cells** in each zone. There are 10,000 square meters in a hectare. Based on these factors, use the *field calculator* to calculate hectares for each zone in the raster **[78]**.
3. Summarize the table based on *suitability_rank* **[87]**. When setting parameters for the summary tool, use *suitability* as the input table, *suitability_summary* as the output table, *hectares* as the field, *SUM* as the statistic type, and *suitability_rank* as the case field. Make sure you place the output in the Coronado geodatabase. The new table should have five records, one for each suitability rank.
4. **Create a bar chart** from the "suitability_summary" table for use in your presentation **[75]**. For Data, select *suitability_rank* as the category and <none> for aggregation. Make sure *From one or more fields* is selected for the *Series.* Select *SUM_Hectares* as the field. Change the symbol color if you want to **[79]**.
5. Click on *General* (at the top of the dialog) type in names for the chart title, and X and Y axes titles. You may want to adjust the graphic and/or text properties **[75]**.
6. Once the chart looks the way you want it to, export it to a jpeg or png file in the lab 11A folder **[80]**. Your graph should look something like the one here. If you



become frustrated with the limitations of graphing in ArcMap, you can export the table, open it in Excel and create the graph there.

7. Next, you need a **graphic view of the capability model** from lab 11. Open the CapabilityModel tab. Arrange the model on the page so the entire model is visible, it is possible to follow the order of the processing steps, and it is large enough that the text is legible.
8. Use snip to capture this this model as a jpeg. Save it in your lab11A folder.

Cartographic Design and Production

For your presentation, you will want to include a number of maps that will help you tell the story of *Lepus octopedis.* The following cartographic specifications represent the required number, but you should feel free to include additional maps if it helps you tell your story.

You will need at least the following maps:

- A **base map** of the project area highlighting any of the data themes necessary for the construction of either the capability or the suitability model.
- A map of the **capability model**
- Map of the **vegetation ranks**
- A map of **predator density ranks**
- A map of the **suitability model**
- A **locator map** that shows the project area within the larger context of Arizona. (You can leave this as a standalone map or you can insert it into other maps.)

This may sound like a lot of maps, but the following instructions will help you make the maps quickly. Aside from the locator map, all the maps you make will share certain important elements such as size, and layout. An overall strategy is to create the first map from scratch, and then for each subsequent map replace the spatial content (a few clicks in the ArcMap table of contents), then change the title and make sure the legend still fits and you have a new map.

9. **Making maps to support your presentation.** Cartographic production takes place in a Layout window. Layout windows appear as tabs above the work canvas in ArcGIS Pro – just like map windows. In fact, you will apply the data and symbolizations from your map windows to the cartographic product in the Layout window. Consequently, before you begin the cartographic products for this lab it is important that you have visualized all the spatial data themes you want to include in the PowerPoint presentation.
10. **Establish a color scheme for your maps.** In general, it is good idea to remain consistent when it comes to color schemes for your maps. Pick a color family and stick with it. There are times when you should change families (for example, an NDVI map should probably use shades of green, but a map of forest service allotments should use a random color scheme), but even then you should stick as close to the family as possible.

11. **Establish standard layout, scale and elements for your maps**. Use map frames and save layout templates to enforce standardization of layout elements and the position they occupy in your map layout. This will help map-readers to understand the story you are trying to tell with the map. From the layout view resize the data frame using its 'handles' such that it occupies most, but not all, of the virtual page. As you resize the data frame on the page, the scale will change. Once you have the data frame sized and located on the page, leave it so that all themes display at the same scale.
12. **Add non-geographic elements to the map.** Each map needs a title, a legend, a scale bar, a north arrow, and appropriate sheet furniture. Add these to your map in a pleasing design. Remember, even though north arrows and scale bars are *cool*, they are not the most important feature of the map. They should be there to help the map-reader understand your map, not to overpower the geographic story you are trying to tell.
13. **Export your maps to a jpeg file.** Once you have your map symbolized and shown over an appropriate basemap, you can export it to a jpeg graphic file. For this lab, be sure that your jpeg files are at least 300 dpi.

Map Production: The following steps will take you through the creation of a basemap (the first on the list of required maps for this lab). .

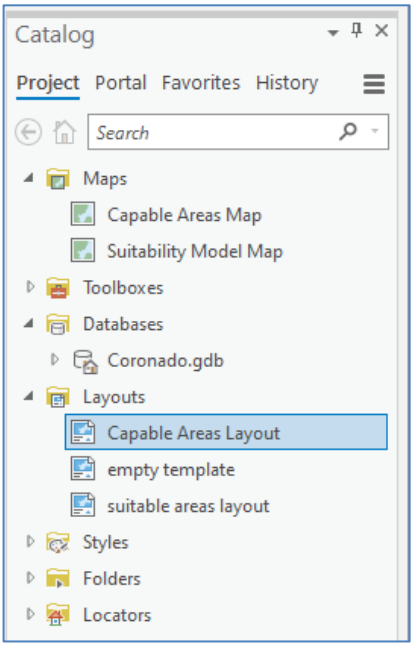
14. Before you begin the cartography, you need to find and create a map of Arizona that you can use as a locator map in your layouts. Add a new map to the project **[4]**, and call it Locator Map **[7]**.
15. There is a Shapefile of Arizona in the lab 12 folder. Add a folder connection to this folder **[8]**, turn off the basemap and add *azstate_polygon* to the map window **[19]**. Symbolize it with a neutral color and a black outline. Add the *admin* feature class from the Coronado geodatabase and symbolize it, using the same saturated color for both fill and outline.
16. Add a map layout window **[60]**; select *ANSI Landsape > Letter* for size and orientation of the page. Name the map layout *Base Map.*
17. Insert a Map Frame **[61]**. Select the *Capable Areas* map frame. Add an ESRI basemap theme **[105].** Select a theme or themes for the layout from the geodatabase that you used to create the capability or suitability models. (I used public allotments and streams in mine because I want to use this map in the presentation to talk about the need for public land and proximity to water, but there are other themes of equal importance that you can use.) Symbolize your theme/s appropriately **[40]**.
18. Increase the size of the Map Frame on the page **[62]**. Set both X and Y to 0.5", the Width to 10" and the Height to 7.5". If the data does not fit this frame properly, zoom to the extent of the layer or layers **[48 or 47]**.
19. Set the scale of the map to 1:200,000 **[126]**.

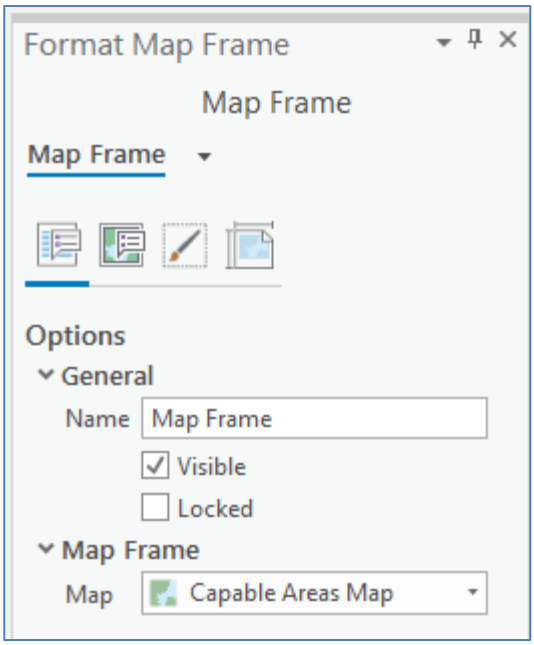
20. Insert and format a title **[77]**.
21. Insert a legend **[63]**. Remove items you do not need in the legend **[107]**. Format elements in the legend until it looks like you want it to look **[64]**. For example, you might want to add a border and a background color in order to bring the legend forward in the your map layout, and change the font size of the text to make sure it does not overwhelm the geographic elements with its size.
22. Insert a north arrow **[108]** and format it **[109]**.
23. Insert a scale bar **[111]** and format it **[112]**.
24. Insert and format map credits and metadata **[116, 117]**.
25. When your map is done to your satisfaction, export it to a graphic file for inclusion in your PowerPoint **[122]**. You are now ready to create a new map.

ArcGIS Pro is a professional cartographic application that provides the user with the means to create maps exactly as she has envisioned them. This mean that there are thousands of options to select from as you go through the process of making the simplest of maps. It's great for professionals, but for students it is often confusing and frustrating. If you feel the frustration building, be courageous, be ready to laugh at the crazy things that happen, and feel free to curse ArcGIS – so long as you don't lose your temper and destroy your computer. Remember, you are almost done with this course and this lab.

26. **There are a different strategies for making multiple maps in ArcGIS Pro.** Having a strategy is important because without one it is difficult to create a series of maps that are the same size and share the same design elements. The following are two methods you might use:

    - A logical approach is to use the architecture of the desktop application to make a sort of template for the project. Basically you will be adding *Layout Views* to your project for each map export you need to have. To do so start with an initial layout and include the map frame(s) you need, complete with legend, bar scale, north arrow and so on. Make a copy of this layout, change the name for the new map and replace the content of the map frame from the *Map Frame* properties.





- Alternatively, you can make the first map, and then save your project. Then use *as* to create a new APRX with a new name. When you save this new APRX you will also save the map layout from the earlier map document. Use this to create the second map, use "Save As…" to create a new APRX – and so-on.

Layout and Design of the PowerPoint Presentation

27. There are many different PowerPoint presentation **design templates** available in the application or downloaded from the WWW. What you want to do is select one that fits your story. So take a few minutes and decide what kind of story you want to tell and then look for a design template that fits the story. For example, the template you select for a story about cute bunnies would be different from one about aggressive rabbits.
28. **Think about your PowerPoint** document as an aid to the story you are telling. Stories begin with an introduction and end with a conclusion. In between these is the main body of the story. Your PowerPoint should do the same thing. The introduction is where you set the stage for your story, and the conclusion is where you tell us what it all means. The body of the story will follow the steps you took to go from a raw data to a completed suitability model. As you are preparing to create your PowerPoint, you should do a quick **outline of the PowerPoint slides** necessary to tell your story. Because spatial models are ordered, this story is best told in the same order in which you created the model. For example:

Title Slide

- Introduction to the story of *Lepus octopedis* and your plan for a Lepus ranch in the Sierra Vista Ranger District. – This is a good place to include the locator map.
- Discussion and graphics of capability/suitability modeling with an emphasis on *Lepus octopedis.*
- An annotated graphic of the capability modeling tool you created in lab 11a.
- A map of your capability model and discussion of what it means.
- A map of NDVI with discussion of how you created it.
- A map of predator density with discussion of how you created it.
- The combination of ordinal values for vegetation and predators. This slide could contain both vegetation and predator tables along with the combination matrix and minimal discussion about how and why you arrived at the values in the combination matrix.
- A map of the suitability model with discussion of how it came to be
- A concluding slide/s that explains what this model means. Be sure to include any reservations you may have about the model and modeling process.

Completing the PowerPoint

You should now begin creating/collecting the maps, tables, and other graphics you need to use in your PowerPoint document as well as making choices about their placement within the slides and in combination with the text.

29. **Some general comments about the use of PowerPoint.** PowerPoint is not a great way to convey information so you have to work hard to get your point across. Generally, less text and more graphics are better. You should have a graphic of some sort on every page.
30. **Your maps** will be better if there is uniformity to their design, colors, and size. Some of this you take care of in ArcMap, but there are things you can do in PowerPoint to help as well.
    - To ensure **standard placement and size** of maps and graphics, use slide layouts with containing boxes. When you insert graphics into the container they will scale to fit the box.
    - Your choice of **design template**, particularly the colors and graphic elements it uses should not conflict with your maps and other graphics.

DELIVERABLES

Since new data is not being introduced this week there is no need to create a lab 12 folder. Simply continue working in the ArcGIS Pro project, Coronado, in the lab11 folder. Put the PowerPoint in the lab 11 folder as well.

Your final submittal shall be one (1) *PowerPoint* presentation containing no less than 10 slides and no more than 14 slides containing the elements listed above.

Any slides in your presentation that contain cartographic compositions (maps) shall be complete and fully legible. This means that each one shall have, **at the minimum:**

- geography
- bar scale
- title
- legend
- your name

EVALUATION

Your presentation product will be evaluated based on the extent to which the presentation can stand on its own to tell the story of the suitability project and on design criteria. Design criteria include an assessment of the communication effectiveness of the presentation and the use of design elements that demonstrate an understanding of map design principles.

Remember that PowerPoint presentations work best in a graphic heavy and text light environment. There should be graphic elements on each page of the presentation, and enough text to move the story along, but not so much that your audience falls asleep.

FREQUENTLY ASKED QUESTIONS

Q. What is the map projection information for our SVRD study area?
A. The projection is UTM, zone 12, meters, the reference ellipsoid is Clarke 1866, and the datum is NAD 1927.

Q. Where can I find other spatial data to use in my presentation?
A. Look for other potential themes in the "~/lab12/data" location on the server.

Q. I don't understand, how are we supposed to do all this?
A. You have done nearly every one of these operations in various labs this semester. Use old labs, use the software documentation, ask your TA or lab instructor.

Q. Why are the instructors in this class so mean?
A. Because we enjoy torturing students with meaningless lectures, labs, and readings.