

Exercise 4: Create a Final Map Product



Introduction

Exercise goal: Following agency guidelines for map making, you will learn how to make a final map product in ArcMap.

- Upon completion of the exercise, the student will be able to...
- Prepare the ArcMap environment for map making
- Interact with the map layout through the placement and modification of map elements
- Apply agency-specific cartographic guidelines for creating a final map product

Contents

Introduction	1
Part 1: Preparing to Make a Map.....	2
Part 2: Layout View and Layout	4
Part 3: Map Elements—Data Frame	7
Part 4: Map Elements—North Arrow.....	12
Part 5: Map Elements—Graphics and Text	13
Part 6: Map Elements—Scale Bar	17
Part 7: Map Elements—Legend	19
Part 8: Extent Rectangles for the Reference Map	29

Part 9: Fine Tune the Map	31
Challenge: Export the Map	32

Part 1: Preparing to Make a Map

The goal for this exercise is to create a map whose purpose is to depict BLM land acquisitions and exchanges occurring around the Sandy River. The map's intended audience is for internal staff already familiar with the map's subject matter. This particular map document comes with a wealth of data that may look visually pleasing, but tends to distract the reader from the primary purpose of the map.

A. Start ArcMap.

1. **Start ArcMap** (either on a local computer by clicking the Start button and navigating to **All Programs | ArcGIS | ArcMap**; or in Citrix by double clicking **ArcMap** icon in the **Main>GIS>ArcGIS** folder). *The Getting Started dialog appears.*
2. For an Existing map, "Browse for more..."
3. Navigate to ...\\Cartographic_Tools\\Exercise4_Create_final_map\\Data, and open the Sandy_River_Map.mxd.

Drawn in the Data View are the symbolized features of BLM land acquisitions and exchanges occurring around the Sandy River. In the interest of time, the first task in making a map has been done for you. The datasets needed to make the map have been collected, organized, and symbolized in ArcMap. What remains is for you to create a final map product.

4. Turn off the following layers:
 - i. Hillshade
 - ii. Areas of Critical Environmental Concern


In the Data View, land acquisitions and exchanges are polygons symbolized by graduated colors—with older years in light orange; recent years (and "pending") in dark orange.

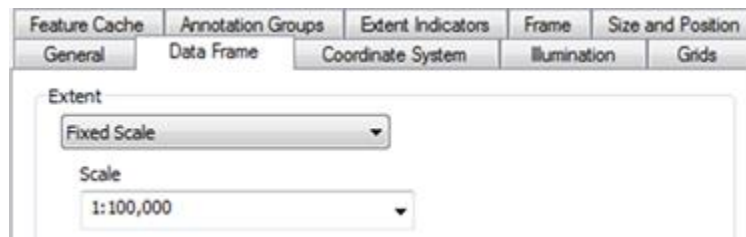


Cartographic Guideline: When making a map, determine the map's purpose, and design the map such that the final map product successfully conveys that purpose. Also, consider the intended audience of the map. Map design for a technical or well-versed audience familiar with the subject matter will differ with a map designed for the general public.

5. Turn off the labels for the Recreation Site layer.
 - i. Right-click on the layer → Remove checkmark for Label Features.

Both of these layers are unnecessary for our final map, and could potentially distract the user from understand the map's purpose.

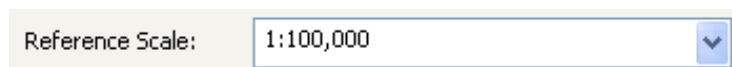
6. For the Sandy River Data Frame  **Sandy River** open the Data Frame Properties dialog window.
 - i. Right-click on the Sandy River Data Frame and select Properties.
7. Activate the Data Frame tab.



8. Enable Fixed Scale and set the scale to 1:100,000.
9. Click Apply.
 - i. Click 'Yes' if a warning on coordinate systems pops up.

Tip: Under the Data Frame tab, you can further limit data visibility by enabling "Clip to Shape" and specifying the "clipping" layer used to limit the map's drawing extent.

10. Activate the General tab.
11. Set the Reference Scale value to 1:100,000.



How is the Reference Scale used? If you need your map's symbols, graphics, and text to be a certain size at a specific scale, enter the scale value as the Data Frame's Reference Scale. For example, if you want 12-point text when the map's scale is 1:24,000, set the Reference Scale as 1:24,000.

What you should know about Reference Scale

- No Reference Scale Set: Symbol and text sizes remain the same regardless of the map's scale.
- Reference Scale Set: As you zoom in on the map, symbols and text appear larger; smaller as you zoom out.

For our map, the symbols and font sizes look best at a scale of 1:100,000. We will use this scale value for the Data Frame's Reference Scale.

12. Click OK. Click ‘Yes’ if a warning on coordinate systems pops up.

The Data View redraws to the new map scale. Because we have fixed the Data Frame’s spatial extent to 1:100,000, the tools for changing the map’s scale are disabled. We are ready to begin making a map.



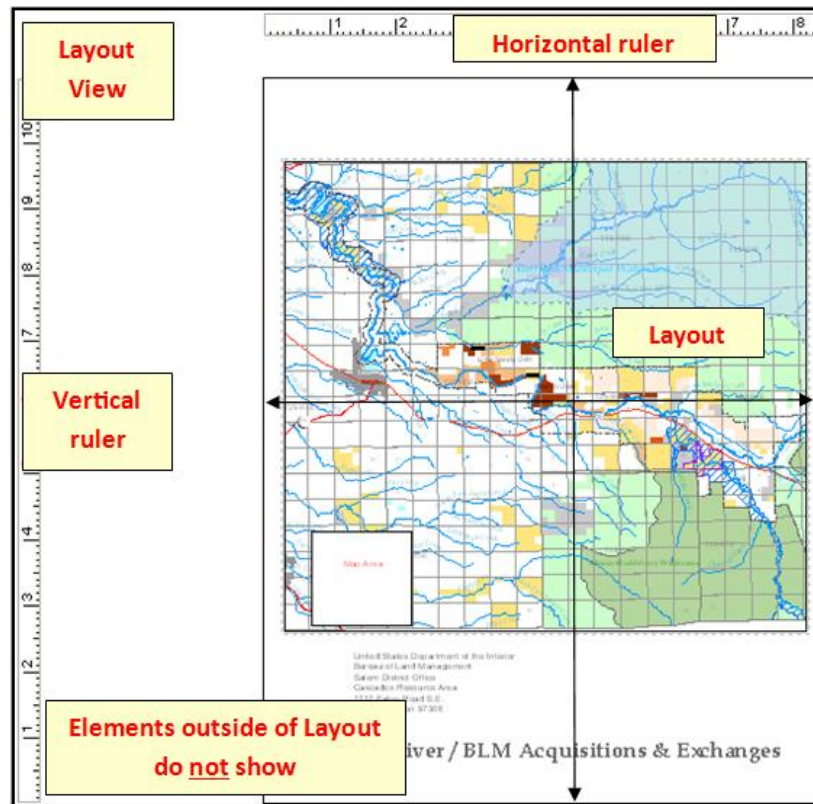
Part 2: Layout View and Layout

Once you have the data content loaded and symbolized, you can begin designing the map. Your first decision in the design process should be the map’s size. Referred to as Map Page Size, the map’s dimensions impacts the size and position of map elements. Let’s see how the map looks in the Layout View.

The Layout View provides the environment and tools for making a final map product. As illustrated in the screen capture the Layout View is the Layout, which is the canvas for designing your final map. The Layout is surrounded by a border that identifies the Layout’s maximum extent (the border of the page).

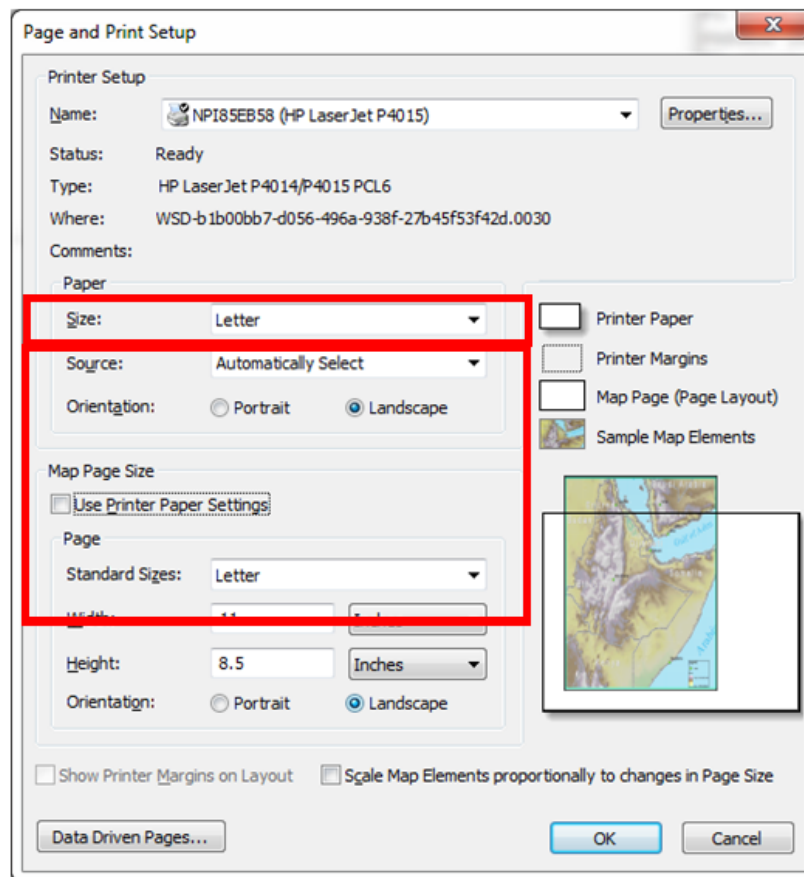
1. Click the Layout View button at the bottom left corner of the map display.
 - i. Do not confuse the icon with the New Map File button.

IMPORTANT: Any part of a map element outside of the Layout’s extent will not appear on the output map. Initially, the Layout’s size and units are set by the default printer referenced by ArcMap. For example, the author’s default printer outputs to 8.5 by 11 inches with a Portrait (i.e., vertical) orientation. This exercise assumes that your defaults are 8.5” x 11” Portrait.



What if my Layout's size is not the same as the exercise format of 8.5" x 11"? On the next page, we will look at the "Page and Print Setup" properties (under the File menu) where you can set the Layout's dimensions as needed for this exercise. Along the margins of the Layout View are horizontal and vertical rulers. Notice each ruler measures the dimensions of the Layout. The rulers' size and units are defined by ArcMap's "Page and Print" settings, which we will view shortly. For this exercise, the units used by these rulers are inches. A measurement made on the Layout is determined by the mouse cursor's position relative to the rulers and reported in the rulers' units (e.g., inches).

2. From the File menu → Page and Print setup.



Cartographic Guideline: The map's orientation should match how the data is represented. In general, if the orientation of your data trends North-South, set the Layout orientation to Portrait if the data trends East-West, use Landscape orientation.

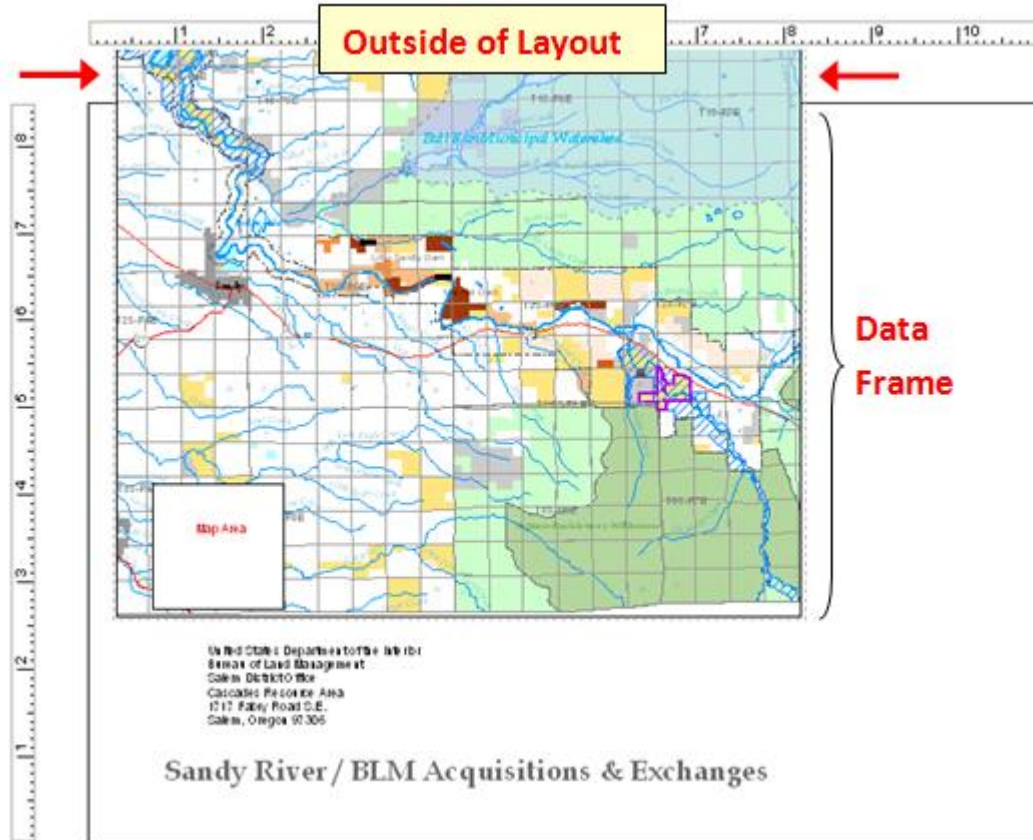
3. Under the Paper and under Map Page Size settings, set orientation to Landscape.

My printer name does not match the name in the next screen capture.

That's okay. Until you specify a different printer name, ArcMap uses the "default" printer's properties. For this exercise the instructions do not send your final map to a printer. Therefore, we will bypass most of the Printer settings.

4. Verify the following Map Page Size settings:
 - i. Standard sizes = Letter
 - ii. Width = 11 inches
 - iii. Height = 8.5 inches

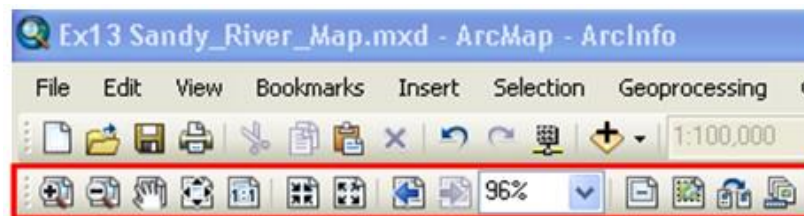
As in the screen capture, the Layout's orientation is now horizontal. The horizontal and vertical rulers have switched their dimensions. Notice a portion of the map data frame is outside the Layout. This part of the map will not output. In the next step, we will resize the map to the Layout's new dimensions.



5. Click OK.

Before we begin placing map elements on the Layout, take a moment to locate the Layout toolbar on ArcMap's User Interface. When you switch to the Layout View, the Layout toolbar become active.

6. Find the Layout toolbar.

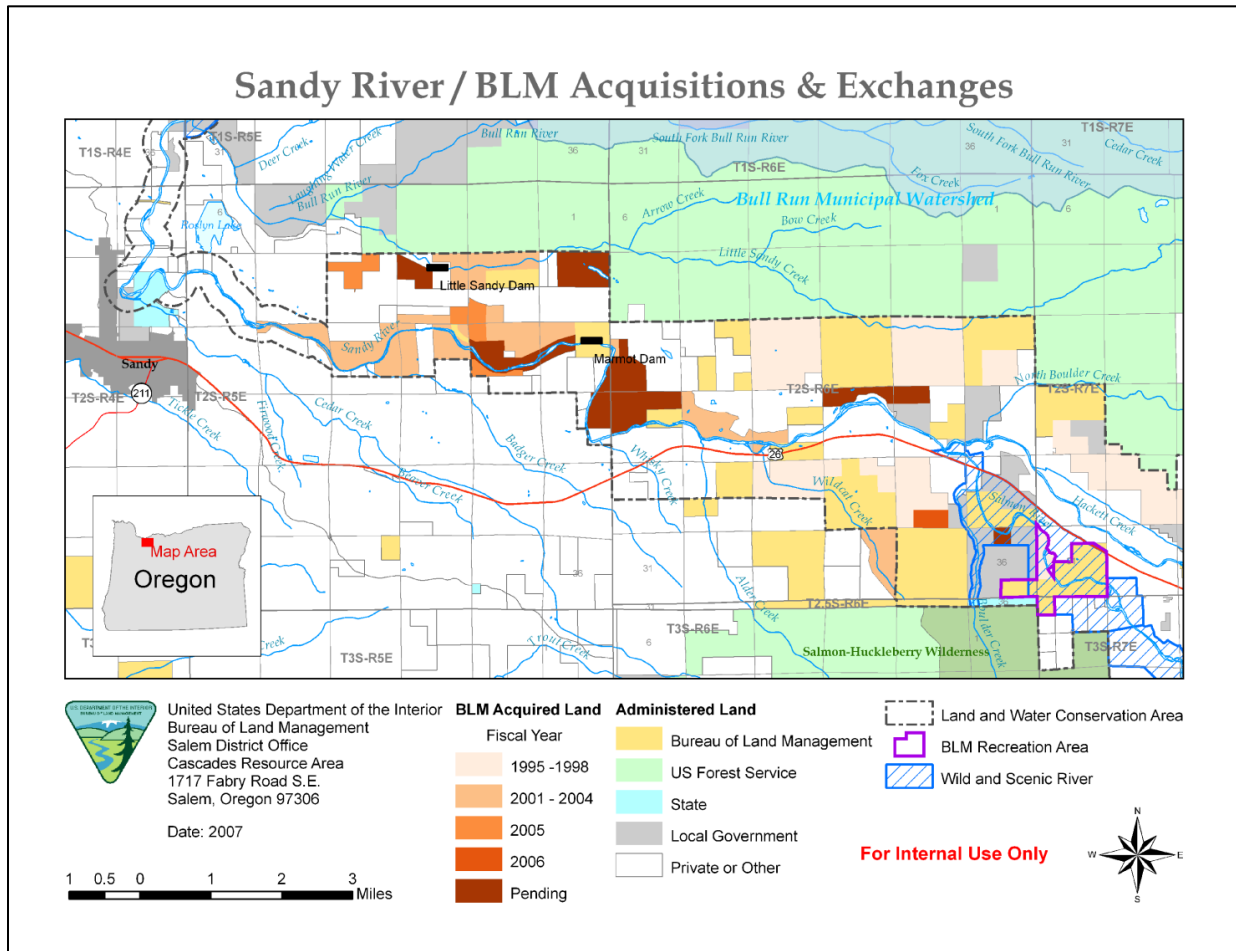


7. *Optional:* Dock the Layout toolbar.

Part 3: Map Elements—Data Frame

As it looks now, your map needs a bit of work before it looks like the final map above. To achieve our goal, we need to add and modify map elements. Map elements can either be objects such as Data Frames or be graphics such as the title, legend, and scale bar. A good place to start is with the size and

position of the Data Frame used to represent the main map. **TIP:** Use this as a guide throughout the rest of the exercise.



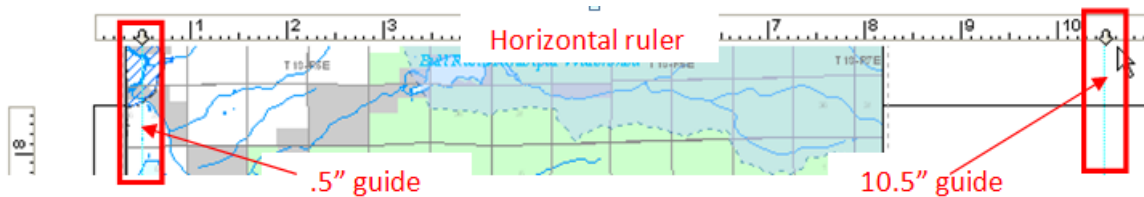
Cartographic Guideline: The data displayed in the main map represents the map's focus. Therefore, the Data Frame's size should cover two-thirds to three-quarters of the Layout.

We need to resize and reposition the Data Frame such that it 1) fits on the map and 2) dominates the Layout. The Layout View's rulers can help achieve this goal. Guides can be placed anywhere along a ruler, which allow for the snapping of map elements to specific locations on the Layout.

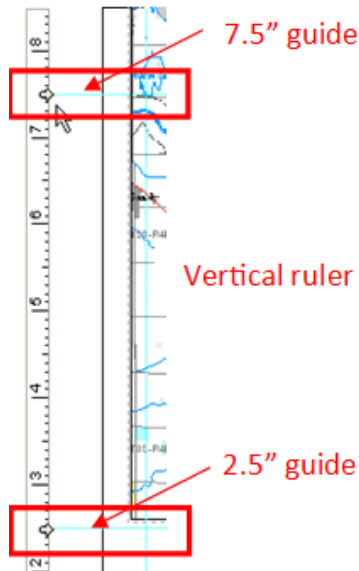
Cartographic Guideline: Leave a half-inch margin between the map elements relative to the Layout's edge. If you are binding the map, add an extra half inch to the binding side. On the horizontal ruler, we will place guides a half inch from the Layout's edges.

1. On the horizontal ruler, single-click at 0.5", then single click at 10.5".

As in the screen capture below, a down-pointing arrow is placed at the half-inch division of the horizontal ruler. Connected to the arrow's tip is a light blue, vertical guide. Note: The guides do not print.



2. On the vertical ruler, place guides at 2.5" and 7.5".



Tips on using guides: Guides can be moved in 0.1" increments. Simply, grab and drag the arrow connected to the guide. To remove a guide, right click on the arrow, then select Clear Guide.

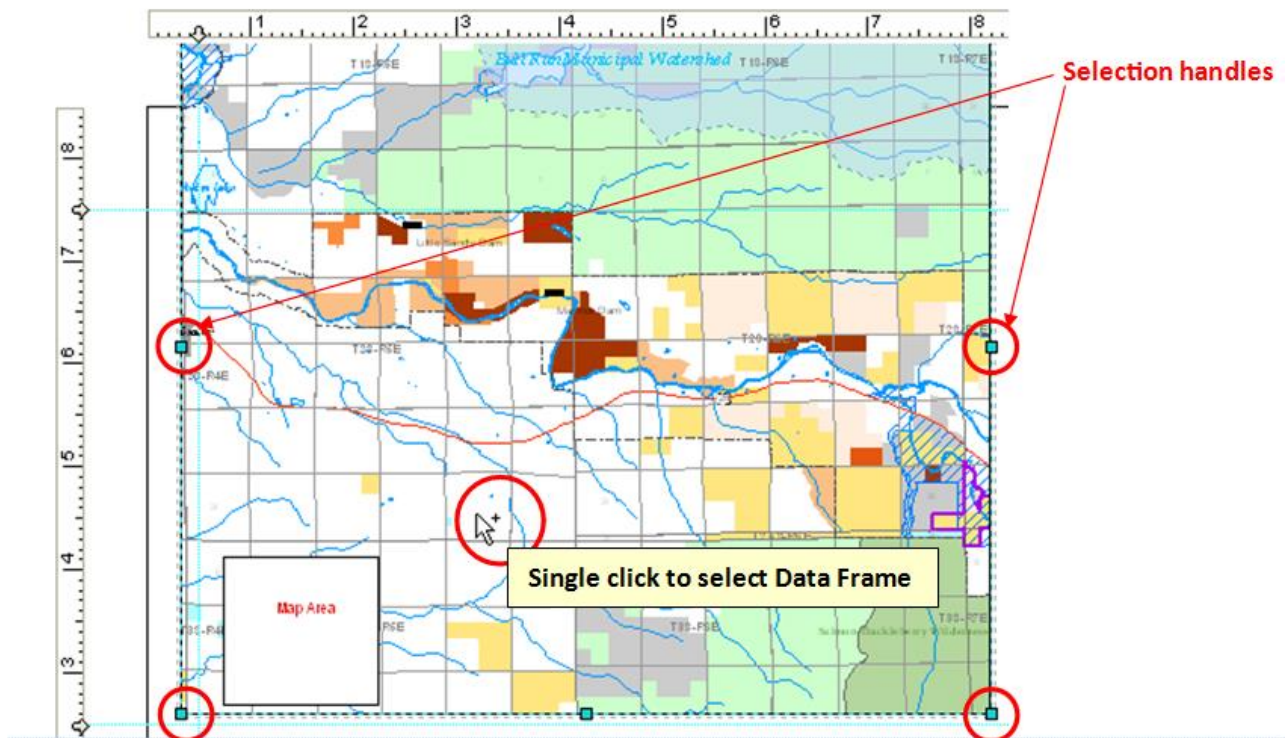
3. Verify the Select Elements tool is active. 

What we want to do next is resize/reposition the Data Frame to the limits of the four guides.

4. Single-click on the Data Frame.

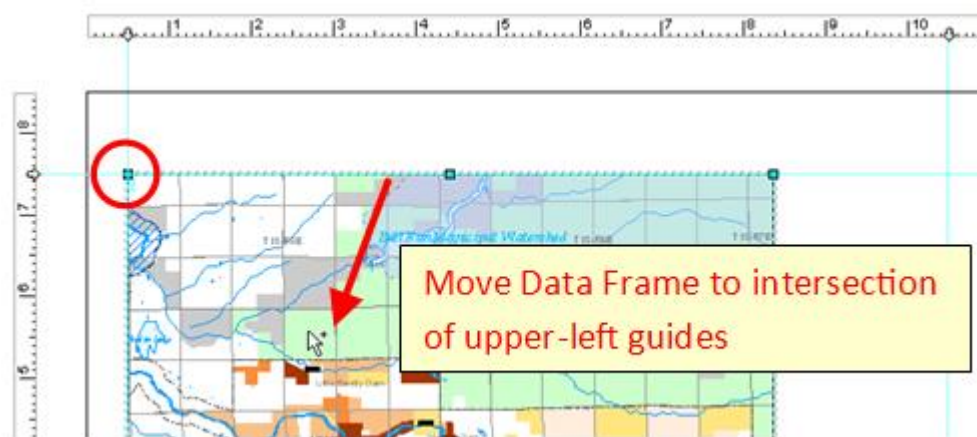
Selection handles appear along corners and edges of the selected element, and the mouse cursor becomes a plus sign of four arrows.

How do I resize a selected element? When the mouse cursor is over a selection handle, the cursor becomes a double-headed arrow. Grab and drag a selection handle to a new position. Moving a corner-selection handle or allows the selected element to resize proportionally. An example is given on the next page.



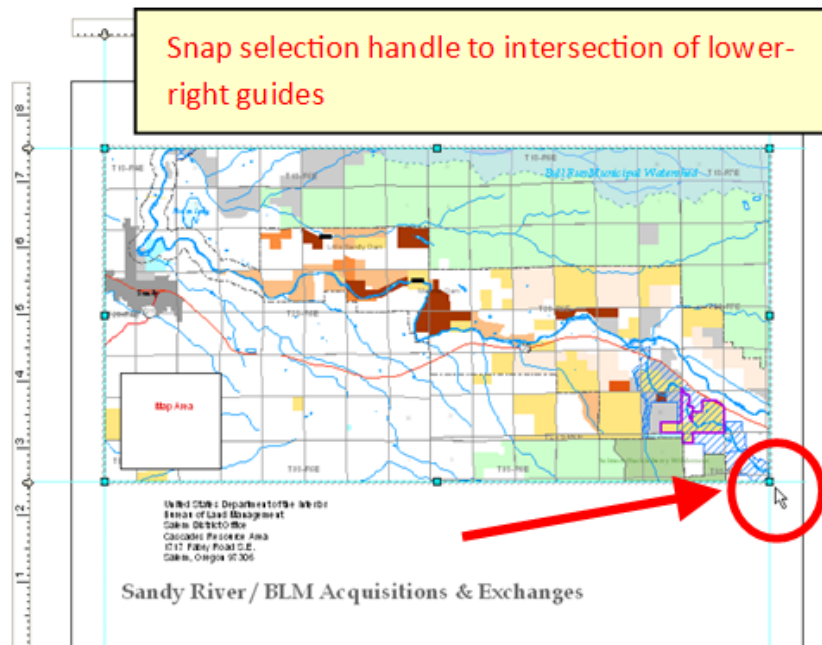
How do I move a selected element? You can reposition a selected element by placing the Select Elements tool over the selected element. The mouse cursor becomes a plus sign of four arrows. Grab and drag the selected element to a new position. For an example, see the next page.

- Grab and drag the Data Frame down and left until the Data Frame's top-left corner snaps to the intersection of the upper-left guides.



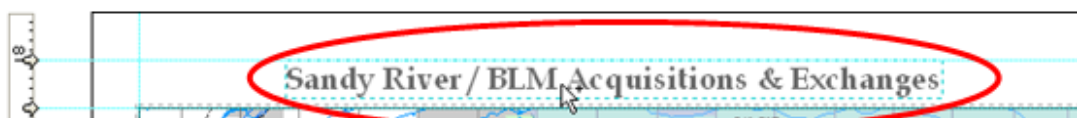
Tip: A resized or repositioned map element can be undone by clicking the Undo button (↶).

6. Resize the Data Frame by snapping the selection handle at the Data Frame's bottom-right corner to the intersection of the lower-right guides.



FYI: You can also snap map elements to grid points. To display the Layout's grid, click the Customize → ArcMap Options, then select the Layout View tab, and in the "Grid" section check "Show". To enable snapping to grid points, check "Grid" in the "Snap elements to:" settings also on the Layout View Tab. For further details on the Layout's rulers, guides, and grids, do an Index-help search for "guides, using with a layout."

7. On the vertical ruler, place a guide at 8.0".
8. Select, grab and drag the map's title "Sandy River/BLM Acquisitions..." to the horizontal guide at 8.0 inches and above the data frame. Center the title horizontally.



Cartographic Guideline: All distributed maps should include the following map elements:

- ✓ Title
- ✓ North arrow
- ✓ Scale bar
- ✓ Legend
- ✓ Supportive text and graphics (e.g., disclaimer, agency logo, date, etc.)

9. Deselect the title.

i. To deselect a map element, single-click on any white area outside of the Layout.)

*Before you continue, it is a good idea to periodically save the map. **You never know when ArcMap might crash.***

10. Save the map document.

i. From the File menu → Save As.

a. Navigate to the

...\\Cartographic_Tools\\Exercise4_Create_Final_Map\\Data\\Workspace folder.

b. Rename the Sandy_River_Map_results.mxd, click Save.

Part 4: Map Elements—North Arrow

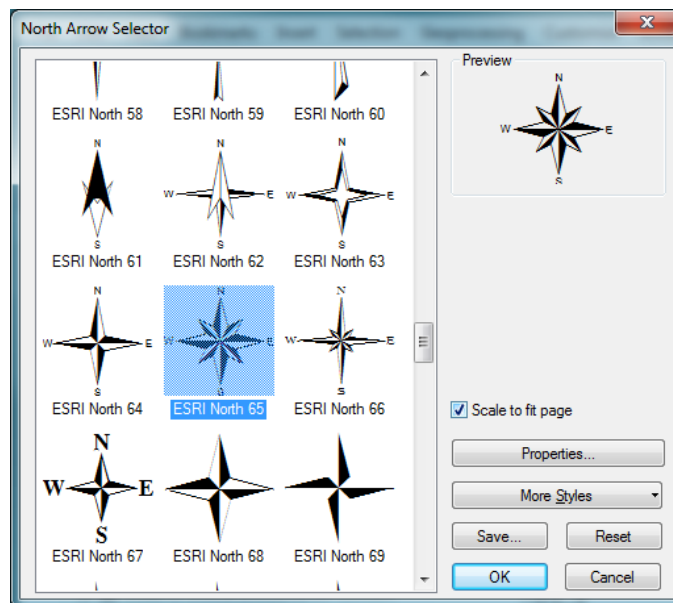
The North arrow orients the map for the reader. (The compass rose style north arrow is shown below.)

1. On the vertical ruler, place a guide at 0.5”.



2. From the Insert menu → North Arrow.

As in the screen capture, the North Arrow Selector dialog window opens. You can select from more than 100 different North-arrow styles.



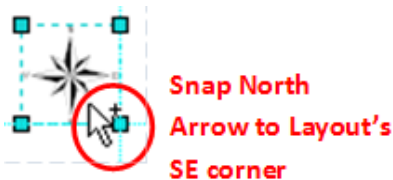
3. Choose ESRI North 65.

Good to know: Initially, map elements are inserted near the Layout's center.

4. Click OK.

If you refer to the final map on page eight, the North arrow belongs at the map's southeast corner. We will snap the map element to the intersection of guides at the Layout's lower right.

5. Snap the North arrow's bottom-right corner to the intersection of the lower-right guides.



6. Deselect the North arrow. (Hint: Single-click outside the Layout.)

Part 5: Map Elements—Graphics and Text

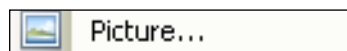
The term “graphic” covers a gamut of map representations from simple geometric shapes, to company logos, to more complex depictions of reality through digital photographs. Referencing the final map on page eight, you will insert a graphical representation of the BLM’s agency logo near the Layout’s lower-left corner.

1. On the vertical ruler, place a guide at 2.3”.



Tip on placing the guide. When you grab and drag a guide’s arrow, a yellow tip box appears (in the Layout View’s upper left corner) reporting the arrow’s position on the ruler.

2. From the Insert Menu → Picture.



The Open dialog window opens, waiting for you to navigate to the picture’s file location.

3. Navigate to the ...\\Cartographic_Tools\\Exercise4_Create_Final_Map\\Data\\Misc\\Logos folder.

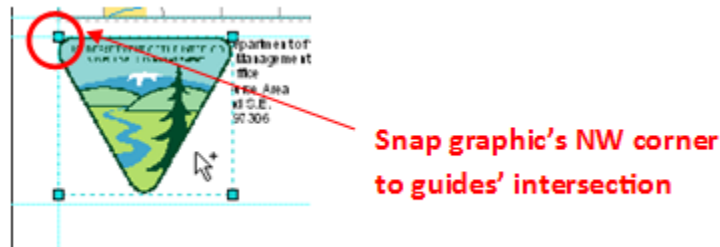
What graphic formats can I insert? You can insert TIFF, BMP, EMF, GIF, JPG, and PNG.

4. Select the blm_logo.tif file and click Open.



The inserted map element should already be selected. If not, select it.

5. Snap the logo's upper-left corner to the intersection of the 2.3" horizontal and 0.5' vertical guides.



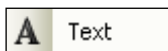
6. Grab the graphic's lower-right selection handle, and resize the logo until it no longer overlaps the agency's address information.

Tip: For the insertion of simple graphics (e.g., lines, circles, rectangles) or text and callout boxes, use the tools found on the Draw toolbar (normally docked at ArcMap's bottom).

7. Deselect the graphic.

Our map needs a date and disclaimer, which are both text-based map elements. Referencing the final map on page eight of this exercise, the date is placed below the agency's address; while the "For Internal Use Only" disclaimer is positioned left of the North arrow.

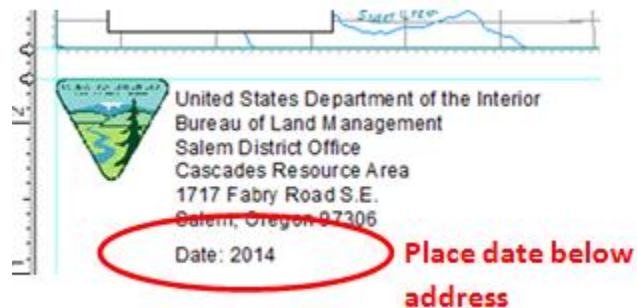
8. From the Insert menu → Text.





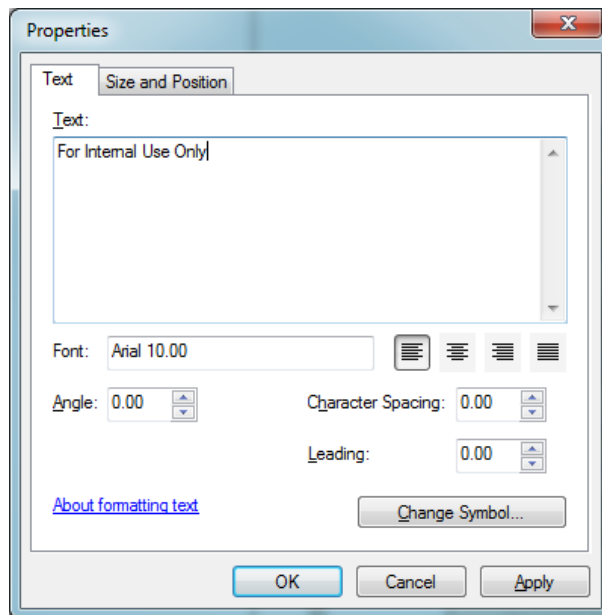
The map element is placed near the Layout's center. The text inside the map element is highlighted and awaiting your text entry.

9. Type in "Date: 2014" (without the quotes) and press <Enter>.
(The textbox's new value is "Date: 2014" and the map element should still be selected. If not, select it now.)
10. Leaving at least one line space, place the date below the agency's address.



11. From the Insert menu → Text.
12. Press the <Enter> key.
13. Place the textbox just left of the North arrow.
14. Open the properties of the text-map element. (Hint: Right click → Properties.)

The Properties window opens. In the window, we can enter the map element's new text.

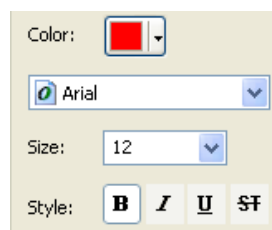


15. Enter the text: “For Internal Use Only” (Without the quotes).

Are there other disclaimers I can use? Use only agency-accepted disclaimers. For examples of agency disclaimers, talk to your GIS Coordinator or Cartographic Coordinator. We want the disclaimer to stand out with a bold font style and red color.

16. Click the Change Symbol button.

The Symbol Selector dialog window opens.



17. Set the following font options:

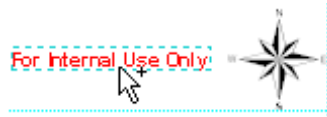
- Color = Mars Red
- Size = 12
- Style = Bold

FYI: You can also modify font/graphic properties using functions found on the Draw toolbar.

18. Click the OK button until the Properties window closes.


With the new properties, the disclaimer overlaps the North arrow. Let's fix that...

19. Reposition the disclaimer left of the North arrow.



Cool Tip: Without switching between tools, you can interactively zoom in, zoom out, and pan the Layout by holding down the z, x, or c keys, respectively. When you release the z key, the active tool returns to the Select Elements tool (☛). The Layout's magnification is approximately 450%.

20. Hold down the z key, and define a zoom-in box around the selected text and North arrow. When done, release the z key.


21. Click the "Zoom to Whole Page" button. 
(Hint: the button is found on the Layout toolbar.)

22. Click the Save button. 

Part 6: Map Elements—Scale Bar

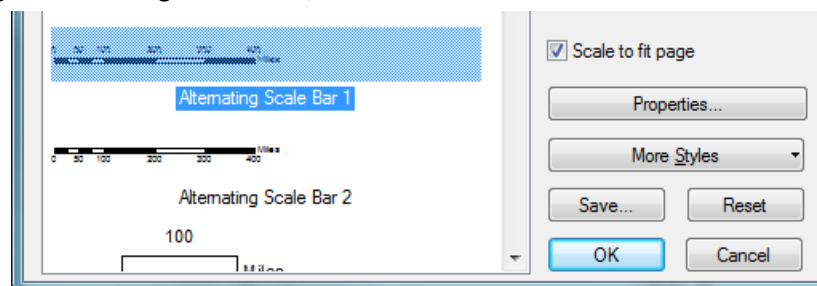
A map's scale provides a visual and spatial sense of feature size and distance relative to their real-world representations. In the Layout, a map's scale can be represented by a scale bar or by scale text.

Cartographic Guideline: In general, be wary in using scale text (e.g., 1:24,000). If your map is reproduced (e.g., photocopied), the copy will likely be slightly smaller. Unlike the scale bar, scale text does not reduce proportionally from copy to copy. Before publishing the final map, consider how scale text appears on a draft. Referencing the final map on page eight, the map's scale bar is located at the Layout's lower-left corner. Conveniently, two guides already intersect at the scale bar's location.

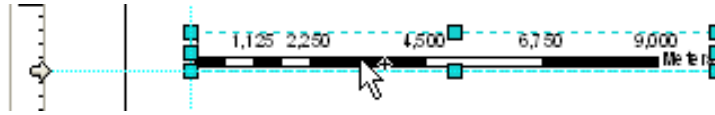
1. From the Insert menu → Scale Bar.  Scale Bar...

Be sure that the **Sandy River** data frame is activated before inserting the scalebar. If the Location Map is activated the scalebar will be for the state of Oregon.

2. Highlight Alternating Scale Bar 1, and then click OK.

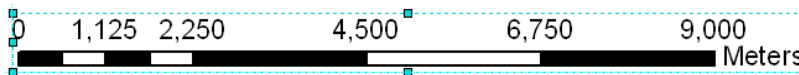


3. Snap the scale bar's lower left corner to the intersection of the 0.5" horizontal and 0.5" vertical guides.



Good to know: The scale bar you just added is linked to the active Data Frame. By default, the units of the scale bar match the Data Frame's map units—in this case, meters.

4. Hold down the z key, and define a zoom in box around the scale bar. When done, release the z key.



5. Open the scale bar's properties. Hint: Either double-click or right-click.

The Alternating Scale Bar Properties dialog window opens (see right). The "Scales and Units" tab should be active. As highlighted in the next screen capture, the window is divided vertically into settings for Scale and for Units.

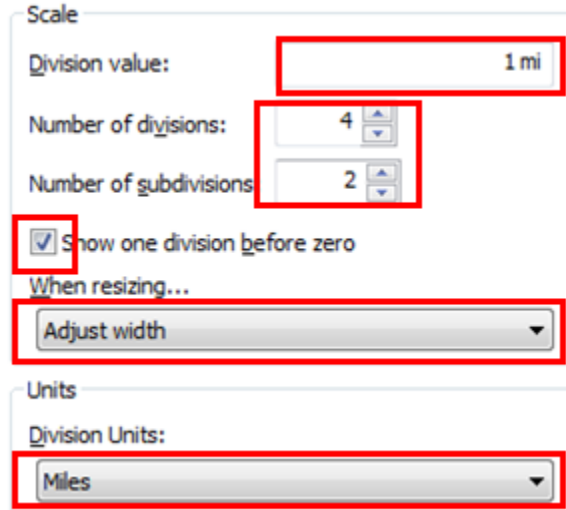
6. Set the following scale bar properties: (under the Scale and Units tab)

Cartographic Guideline - The following scale-bar properties are normally used:

- Units of Feet or Miles (Note: You cannot mix units on the same scale bar)
- Whole divisions right of zero with even intervals (e.g., 1 unit, 5 units, 10 units, etc.)
- One division left of zero; subdivide the division

7. Using the guidelines listed above, we will alter the scale bar's properties to display one-mile intervals.

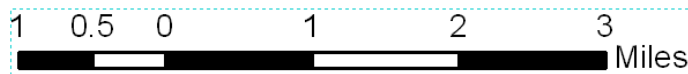
- When resizing... Adjust width
- Division Units—Miles
- Division value = 1 and press the <Tab> key
- Number of divisions = 4 and press the <Tab> key
- Number of subdivisions = 2 and press the <Tab> key
- Checkmark for Show one division before zero.



Good to know: When you resize the scale bar, the default setting is to change the division values. However, through the scale bar's properties, you can fix the division values such that resizing the scale bar changes either the scale bar's length or the number of divisions.

8. Click OK.

Your scale bar should match the graphic below.



9. Click the “Go back to extent” button.



10. Click the Save button.



Part 7: Map Elements—Legend

Our final map element to add is the legend. Referencing the final map on page eight, the legend we need to build spreads out horizontally below the main map. Before we insert the Legend to the map we need to make sure that the layers symbology (color) will be correctly represented in the Legend.

1. Right-click the Bull Run Watershed → Properties → Display. **(The layer has been set to display with 50% Transparency.)** Click OK.

When Transparency is applied to a layer, the color with which the layer is drawn becomes lighter. Next, you will make sure that this change is reflected in the Table of Content and on the legend.

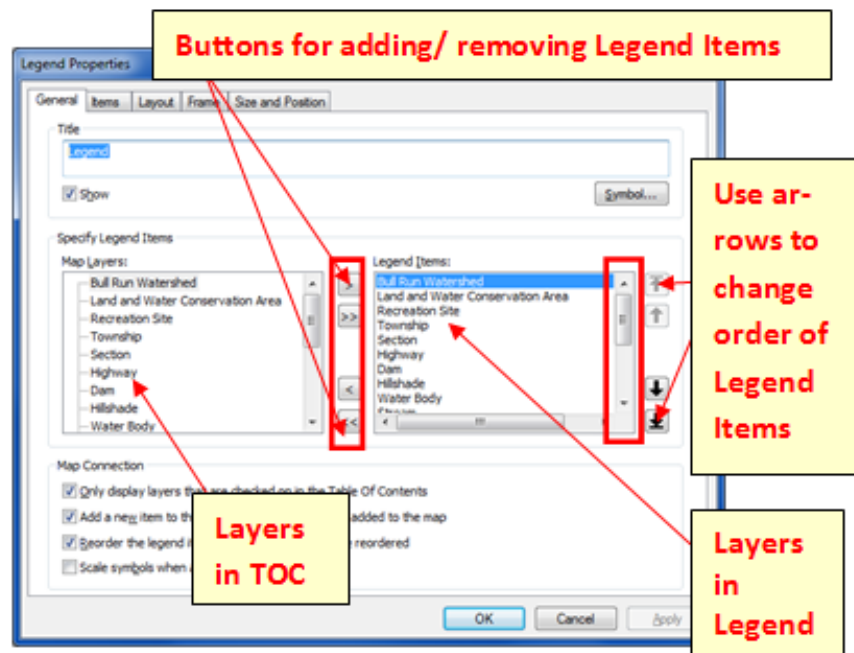
2. Right-click the Sandy River data frame → Properties → General, check the box in front of Simulate layer transparency in legends. Click OK.

Label Engine: Standard Label Engine

☒ Simulate layer transparency in legends

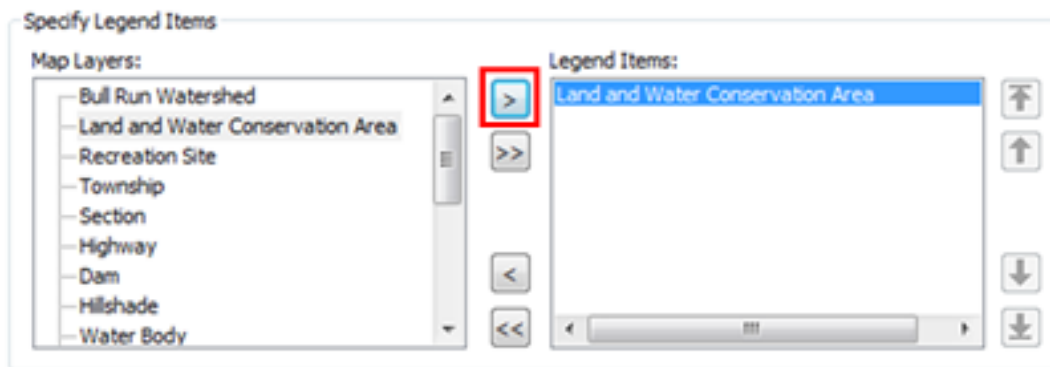
Check to be sure the Bull Run Watershed symbol in the TOC is the color the same as the one on the map. Now you are ready to insert a Legend.

- Click the Insert menu → Legend. When the Legend Wizard opens click Next four times then Finish to close the Wizard. **We will use the Legend Properties Window instead of the Legend Wizard.**
- Double click on the legend that appears on the map to open the Legend Properties window opens. Open the General Tab.



Cartographic Guideline: All layers represented in the map should be clearly identified either on the map or in the legend; however, feature identification in both the map and legend is unnecessary. In our map, two-thirds of the layers are already labeled (e.g., Highway and Stream). For the remaining layers, they will appear in the legend.

- Click the “Move All Left” button. **The list of Legend Items is cleared.**
- Under the Map Layers list, click Land and Water Conservation Area.
- Click the “Move Right” button.

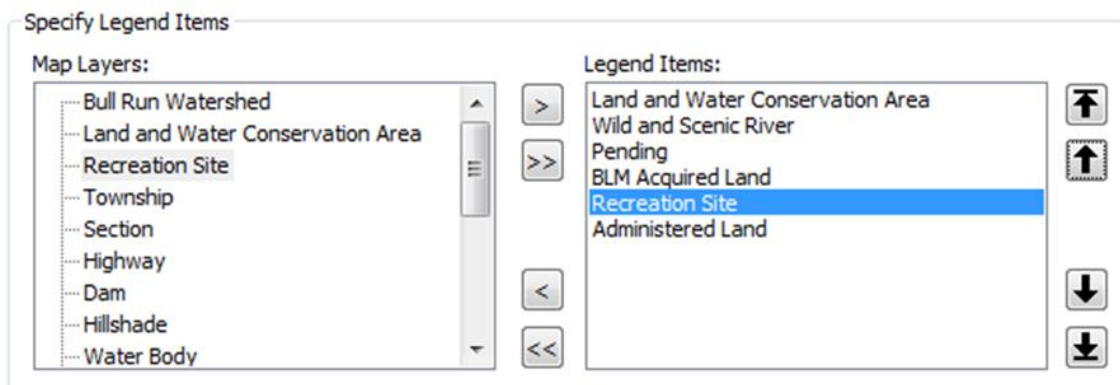


Under the Legend Items, “Land and Water Conservation Area” is listed.

8. Move the following Map Layers (left list) into the list of Legend Items:

- Land and Water Conservation Area
- Wild and Scenic River
- Pending
- BLM Acquired Land
- Administered Land
- Recreation Site

Tip: You can use the <Ctrl> or <Shift> keys to highlight multiple map layer names.




9. As needed, remove any duplicate Legend Items.



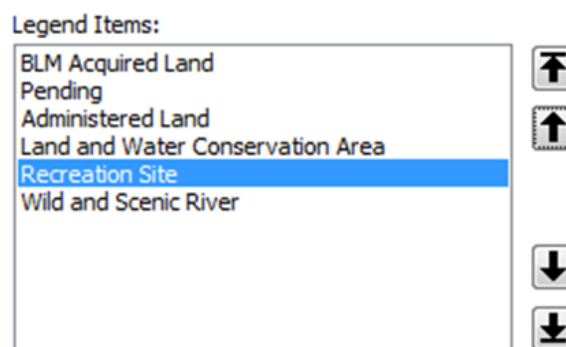
Next, we want to change the order of Legend Items. You will highlight the Legend Item and click the “up arrow” button (⬆) to change the Legend Item’s order.

10. Under the Legend Items list, highlight BLM Acquired Land.

11. Click the up arrow with the line above it  to move the BLM Acquired Land to the top of the Legend Items list. ***Under the Legend Items, "BLM Acquired Land" is at the list's top.***

12. Reorder the remaining Legend Items using the regular arrow  as follows:

- BLM Acquired Land
- Pending
- Administered Land
- Land and Water Conservation Area
- Recreation Site
- Wild and Scenic River



At the top of the Legend Properties Window General Tab, the legend's title is shown. Use of the legend's title is optional, and we will forego its use in this exercise.

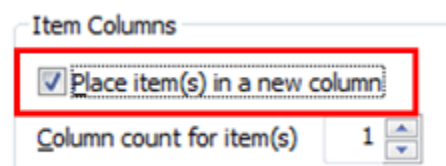
13. Delete any text in the legend's title box.

By default, the legend displays as a single column. This might be fine for a map using Portrait orientation. In our case, a legend spread out over three columns works better for the map's Landscape orientation (refer to the final map on pg. 8)

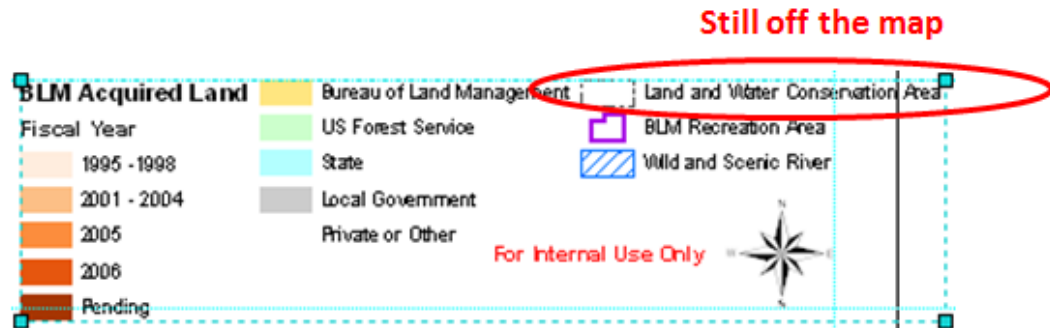
14. Activate the Items tab.

Our first fix is to correct how the layers are organized in the legend's columns. The layer order is correct, but the column break designations are wrong. In the list of Legend Items, the BLM Acquired Land layer should be highlighted. If not, highlight it now.

15. For the BLM Acquired Land Legend Item, enable the option to Place in a new column, and set the number of Columns to 1.



16. For the Administered Land Legend Item, enable the option to Place in new column, and set the number of Columns to 1.
17. For the Land and Water Conservation Area Legend Item, enable the option to Place in new column.
18. Click Apply.
19. Move the Legend Properties window off the legend to see the new property settings.



The new column designations have dramatically improved the legend's appearance. But part of the Legend Item called "Land and Water Conservation Area" is still off the Layout. Our next legend fix is to use consistent font properties for the Legend Items. For example, the Legend Item titled "BLM Acquired Land" uses a 15-point, bold font. However, there is no Legend Item title for the "agency-lands" column. We will standardize the way Legend Items are titled, and apply a smaller font in order to fit the "Land and Water Conversation Area" Legend Item.

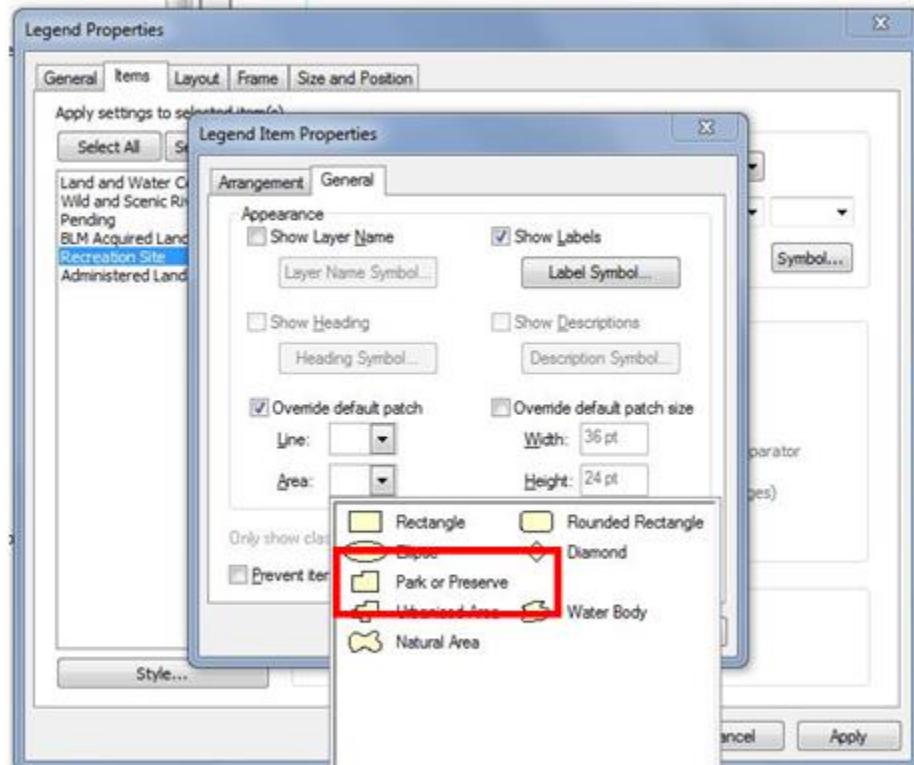
20. Click the Frame Tab.

In the Frame Tab of the Legend Properties window, you have the option of adding a frame (i.e., border) to the legend. The default setting is no frame, which we will also use.

21. Click the Layout Tab.

In the Layout Tab of Legend Properties window, you have the option of changing the patch (i.e., symbol) used for each Legend Item. With the exception of the Recreation Site Legend Item, we will use the default patches.

22. Under the Items Tab, right click on Recreation Site and go to Properties.



23. Under the General Tab, and click “override default patch”, click the dropdown arrow by Area and select the Park or Preserve patch.

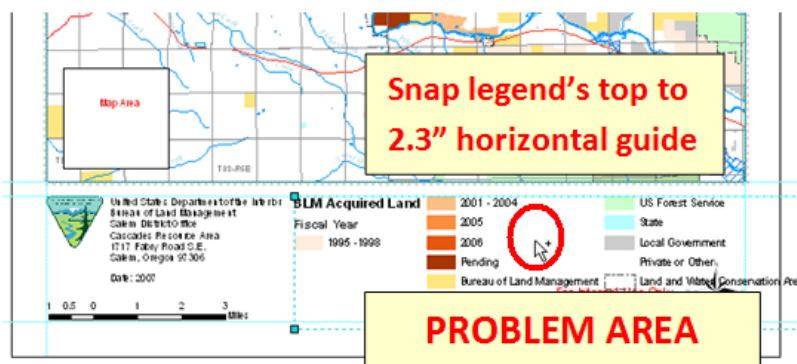
The rectangular symbol used for the Recreation Site Legend Item changes to the new patch.

24. Click on the Size and Position tab.

In the Size and Position Tab of Legend Properties window, you can control the spacing between Legend Items as well as the spacing of a Legend Item’s components (e.g., distance between Legend Item’s patch symbol and its text). We will use the default spacing settings.

25. Click OK.

26. Move the legend to snap the legend’s top margin to the 2.3” horizontal guide.



In order for the legend to fit on the map, we need to further modify the legend's properties.

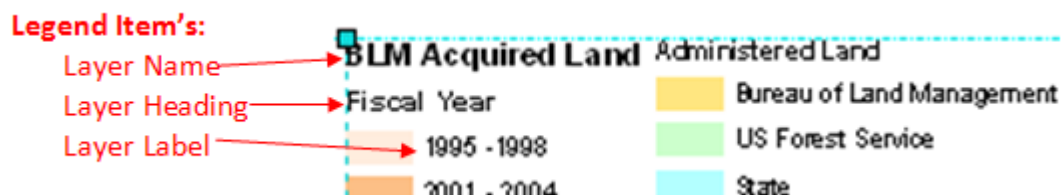
27. Open the legend's properties. (Hint: Double-click or right-click.)
28. Right click on the Administered Land Legend Item within the list on the left and choose Properties. (Hint: You should be in the Legend Properties under the Items Tab.)
29. Activate the General tab.



The various settings in the window control how a Legend Item is symbolized and labeled. We want to show the Layer Name for the BLM Administered Land Legend Item.

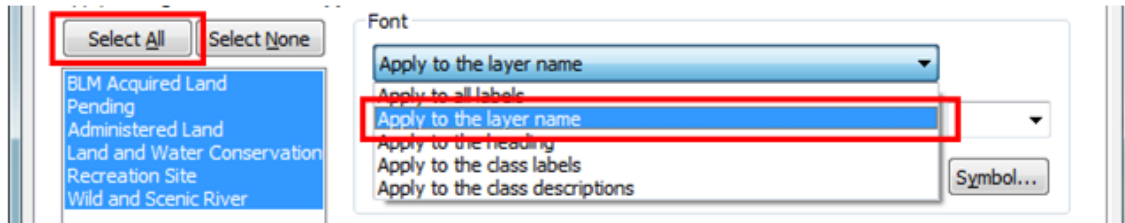
30. Enable the option to Show Layer Name. ☒ Show Layer Name
31. Click OK.
32. Click Apply.

As highlighted in the next screen capture, the "agency-lands" column is labeled with "Administered Land." However, the name's appearance is mismatched with the font used for "BLM Acquired Land."



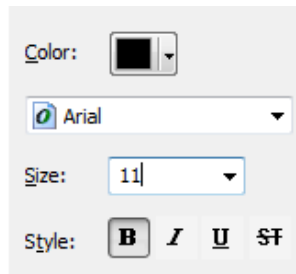
Rather than tediously modify font properties for each Legend Item, we can apply property settings simultaneously to all Legend Items. We will start by making all Legend Item Layer Names use the same font type, color, style, and size.

33. Still on the Items tab, click “Select All” to highlight all layers, select “Apply to the layer name” from the dropdown list.



34. Click the Symbol button. Confirm the following font properties will be applied:

- Color = Black
- Font Type = Arial
- Font Style = Bold
- Font Size = 11

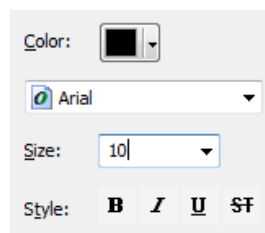


35. Click OK, and then Apply.

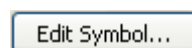
36. On the Items tab, click “Select All” to highlight all layers, select “Apply to the heading” from the dropdown list.

37. Click the Symbol Button and confirm the following properties:

- Color = Black
- Font Type = Arial
- Font Style = Regular (*ie., no bold*)
- Font Size = 10

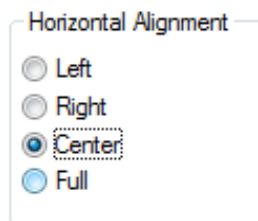


38. Click the Edit Symbol button.

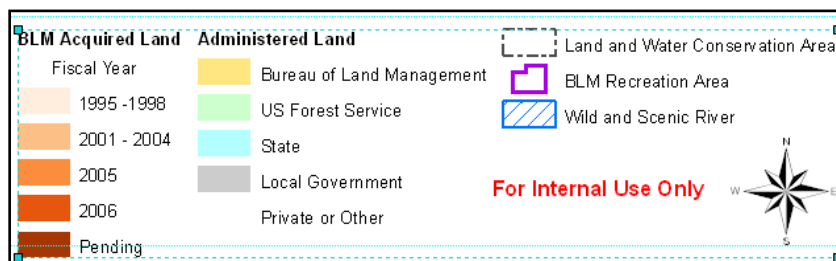


The Editor dialog window opens.

39. Enable Center Horizontal Alignment, then click the OK button until you are back at the Legend Properties window.



40. Click Apply.
- i. The Legend Item Layer Heading called "Fiscal Year" shifts to a centered alignment.
41. On the Items tab, click "Select All" to highlight all layers, select "Apply to the class labels" from the dropdown list.
42. Click the Symbol button.
43. Confirm the following font properties will be applied:
- Color = Black
 - Font Type = Arial
 - Font Style = Regular (*i.e., no bold*)
 - Font Size = 10
44. Click OK and Apply.



Our final legend property to adjust is the spacing between the columns.

45. Activate the Layout tab.

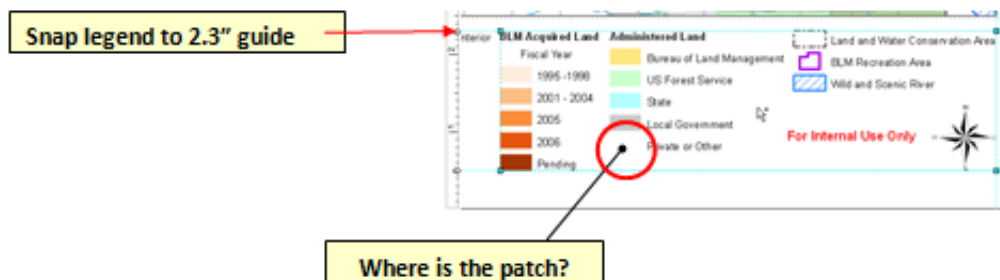
Under this tab are various spacing settings you can manipulate to fine-tune the legend's look.

46. Increase the columns spacing to nine, and press the <Tab> key.

title gap	8.57 pt
item gap	5.36 pt
column gap	9.00 pt
layer name gap	5.36 pt
group gap	5.36 pt
heading gap	5.36 pt
text gap	5.36 pt
vertical patch gap	5.36 pt
patch gap	5.36 pt

47. Click OK to close the Legend Items Properties window.

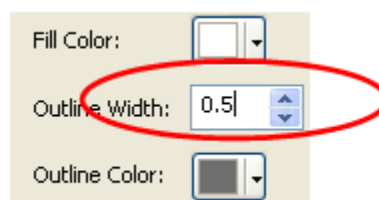
48. Snap the legend's top margin to the 2.3" horizontal guide.



Good to know: The legend you just added is linked to the active Data Frame and to the layers listed in the TOC. When you change a layer's properties (e.g., alter the symbol color), the corresponding legend item updates as well.

Notice the Legend Item Layer Label called "Private or Other" has a missing patch symbol. Actually, the patch is being displayed. However, the patch's white fill color is the same as the Layout's background color. Agency policy discourages altering the standard color scheme used to symbolize land ownership. However, we can put a thin outline around the symbol, which will also appear in the legend.

49. In the TOC, click the "Private or Other" symbol (under the Administered Land layer), then enter an Outline Width of 0.5.



After you click OK to close the Symbol Selector window, both the TOC and the legend update to new symbol change.



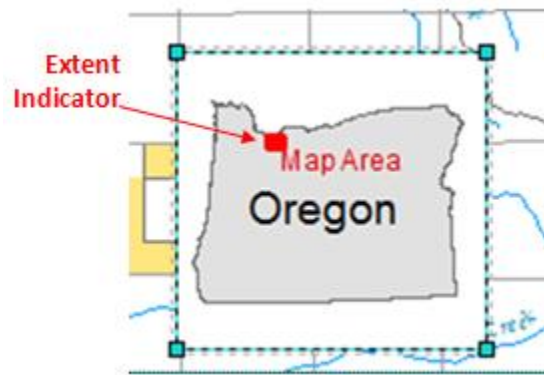
50. Deselect the legend.

51. Click the Save button.



Part 8: Extent Rectangles for the Reference Map

When two Data Frames are present on the Layout, you can orient the reader by specifying one Data Frame to represent the main map and the other Data Frame to represent a Reference map showing the size and location of the main map. For example, you may be unfamiliar as to where in Oregon the Sandy River flows. Through the use of ArcMap's Extent Rectangles, a rectangle is drawn on a map of Oregon showing the spatial extent of the main data frame. The Reference map is also known as the Inset, Locator, Overview, or Vicinity map.



1. What are the names of the two Data Frames?
 - 1)
 - 2)
2. Which Data Frame is active?
 - (a) Location Map / Sandy River (circle one)
 - (b) (Hint: the Data Frame's name is Bold in the TOC)
3. Make the Location Map Data Frame active.

Tip: From the Layout View, you can make a Data Frame active by selecting it with the Select Elements tool. After selecting the Data Frame, a dashed gray box appears around the active Data Frame. Note: The dashed gray box does not print.



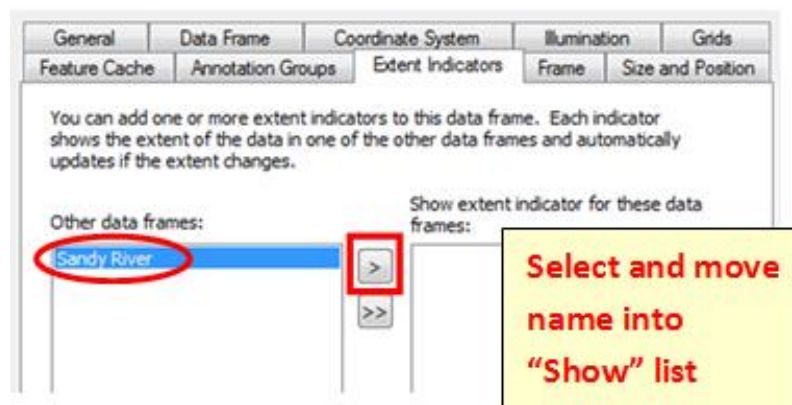
Notice that activating the Location Map Data Frame changes the Map Scale value and enables the Zoom tools. This is because the Location Map Data Frame has different Data Frame property settings compared with the Sandy River Data Frame.

- In the TOC, turn on the Oregon layer. (This is in the Location Map Data Frame, underneath the Sandy River Data Frame).

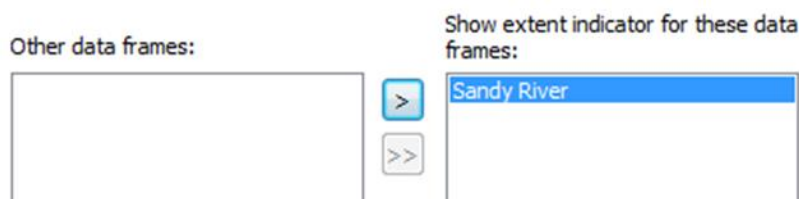
The Location Map Data Frame contains only one layer called Oregon. The state of Oregon draws in the Reference map when checked. Through the properties of the Location Map Data Frame, you can display an Extent Rectangle referencing the main map.

- Open the Location Map Data Frame Properties. (Hint: Right click on the Reference map. The Data Frame Properties dialog window opens).
- Activate the Extent Indicators tab.

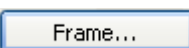
As illustrated in the screen capture, you define an Extent Rectangle by selecting from the list of Data Frames and moving its name to the list of "Show extent rectangles..."



- Select the Sandy River Data Frame, and click the "Move Right" button.



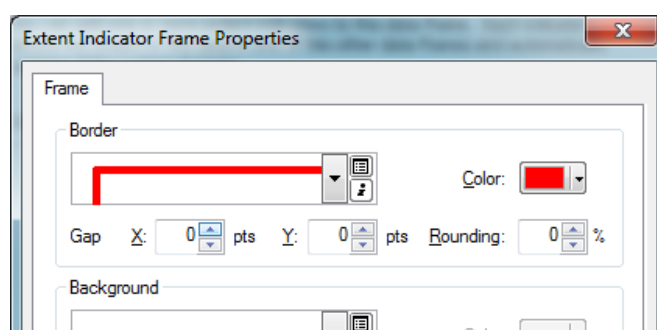
8. Click the Frame button.



9. Click the Style Properties button for Border.



10. Verify that the border's width will be 4.0 Point using the Mars Red color. (Or any bright red color).



11. Click the OK button until the Data Frame Properties dialog window closes.

In the Reference map, a small red rectangle marks the size and location of the main map.

12. Select the main map.



Your action not only selects the main map in the Layout but also makes the Sandy River Data Frame the active Data Frame. Notice the Sandy River data frame is in Bold in the TOC, and the Map Scale and Zoom tools are disabled.

13. Deselect the main map.

14. Click the Save button.



Part 9: Fine Tune the Map

Your map is nearly complete. You have added all the necessary map elements. What remains is a little polishing. The Layout View comes with tools for nudging, distributing, and aligning the map elements. For example, the date text you added may need a little nudging so that it is justified with the left margin of the agency's address information.


1. Zoom in to the date and agency-address map elements using the Zoom In tool on the layout

toolbar.



2. Select and nudge the date until left justified with the agency's address. Use the arrow keys on your keyboard.

Tip: Use of the keyboard's arrow keys nudges a selected element a tenth of an inch.

3. Click the "Go back to extent" button on the Layout toolbar. 

4. Deselect the date.

i. Hint: Use the Select Elements tool on the Tools toolbar to select off the date textbox.

Advice: Map element placement is subject to the cartographers' interpretation and preference. A goal of any map design is to make the map simple and readable.

5. As needed, select and nudge the disclaimer to a central location between the legend, North arrow, and Layout's bottom margin.

i. Use the final map on page eight as a reference.

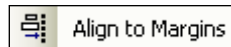
6. Deselect all map elements. Select the title.

In Step 3, you manually snapped the title to within a half inch of the Layout's top margin. Now we want ArcMap to horizontally center the title to the Layout's left and right margins.

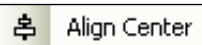
7. Open the "Graphics" toolbar.



8. Right-click on the title → Align → Align to Margins.



9. Right-click on the title → Align → Align Center.



Unless you already had the title perfectly centered, you should notice a slight shift in its horizontal position.

10. Deselect the title.

11. Anywhere along the horizontal ruler, right-click → Clear All Guides.

12. Anywhere along the vertical ruler, right-click → Clear All Guides. *Optional:* If available, print the map.

Tip: If you plan to print the map, click the File > Print Preview to verify if any part of the map will be clipped based on the printer's Page Size settings.

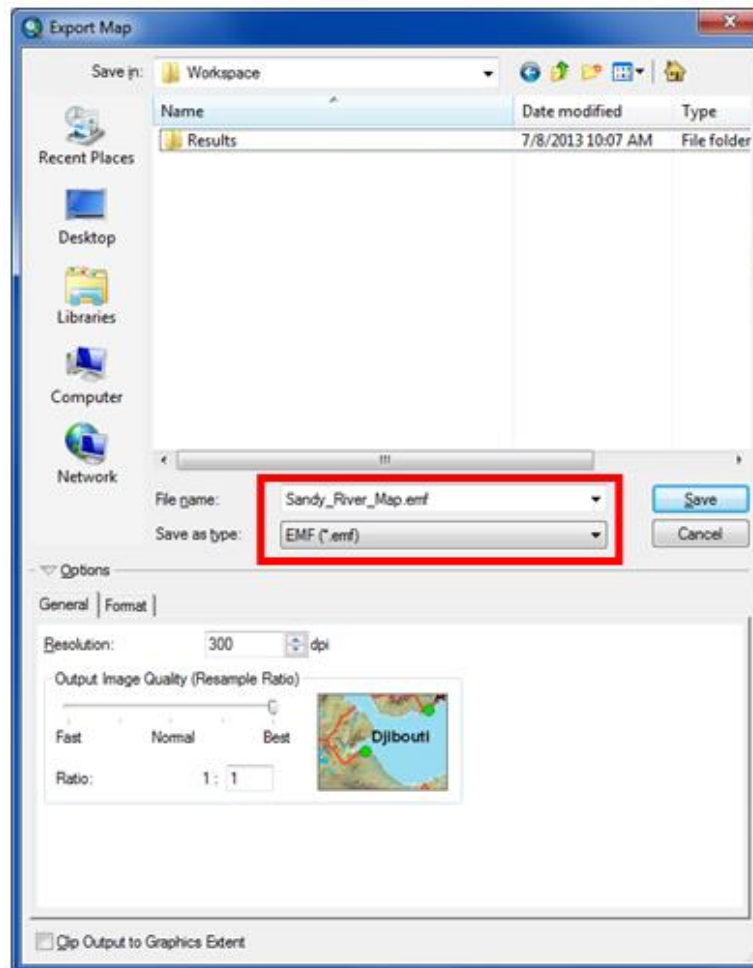
13. Unless you plan to continue with the challenge step, exit ArcMap, and answer "Yes" to saving any changes.

Challenge: Export the Map

Besides printing the map, the Layout's contents can be exported to various file formats that can be inserted into other applications or sent as e-mail attachments. As a challenge, you will export your final

map to an EMF image format. EMF is a Windows based vector graphics format that saves image data in a RGB format and does not support CMYK data.

14. From the File menu → Export Map.
 - i. The Export Map window opens. ArcMap can export to ten different image-file types.



How do I know which image-file type to use? For publishing, PDF is the most commonly used format. For a digital image, a TIFF usually has the best image quality (a.k.a., resolution), but they have a larger file size. A JPEG or GIF are common formats used for e-mail and the Internet. A BMP typically has the lowest resolution. The EMF, BMP, GIF, JPEG, and TIFF formats can be inserted into any MS application (e.g., MS Word). In the end, you may have to experiment with the different formats, and see which file type works best for you.

15. Under “Save in,” navigate to the
 ...\\Cartographic_Tools\\Exercise4_Creare_Final_Map\\Data\\Workspace folder.
16. From the Save as type drop-down list, choose EMF.
17. Use the file name of Sandy_River_Map.emf.



The output resolution value is measured in dots per inch (dpi)—the higher the resolution, the sharper the image quality. However, a higher dpi translates into increased file size. We will use the default resolution of 300 dpi.

18. Click Save.

In less than a minute, the exportation process completes (you will see “Export complete” in ArcMap’s Status bar).

19. Exit ArcMap.
 - i. Click the **File** menu and choose **Exit**.

END OF EXERCISE

