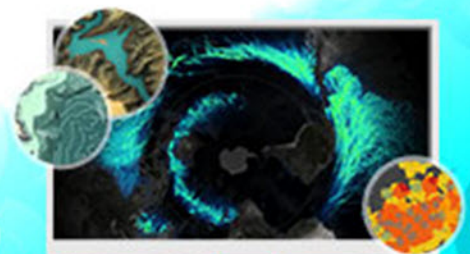


# Exercise

## Make a Map

### Section 1 Exercise 1

January 27, 2021



# Make a Map

### Instructions

Use this guide and ArcGIS Pro to reproduce the results of the exercise on your own.

*Note: The version of ArcGIS Pro that you are using for this course may produce slightly different results from the screen shots that you see in the course materials.*

### Time to complete

Approximately 15-30 minutes

### Software requirements

ArcGIS Pro 2.7

ArcGIS Pro Standard license (or higher)

*Note: The MOOC provides a separate ArcGIS account (user name and password) that you will need to use to license ArcGIS Pro and access other software applications used throughout the MOOC exercises. This account (user name ending with \_cart) provides the appropriate ArcGIS Online role, ArcGIS Pro license, ArcGIS Pro extensions, and credits. We strongly recommend that you use the provided course ArcGIS account to ensure that you have the appropriate licensing to complete the exercises. Exercises may require credits. Using the provided course ArcGIS account ensures that you do not consume your organization's credits. Esri is not responsible for any credits consumed if you use a different account. Moreover, Esri will not provide technical support to students who use a different account.*

## Introduction

A map is a graphic—either static or dynamic—that conveys a geographical story. In other words, a map is a *visual* thing that *communicates spatial* things. All three aspects—visual, spatial, and communication—are vital to the success of your map.

Sometimes, the story is about intangible or invisible phenomena. Sometimes, it is about how something changed over time. And sometimes, it is just a detailed accounting of the reality of a place.

The spatial component of your map is the data that you use to tell the story. Making sure that your data is relevant and authoritative is vital to ensuring that your map is credible.

"Authoritative data" generally refers to data that comes from an official and trusted source,

which has been checked and tested for accuracy, and that is intended for use and reuse by the public.

The visuals are the symbols, symbology methods, text, and layout elements that you choose to support your story. It is through these elements that you tell your story.

And the communication is *how* you tell that story. This is the most nebulous part of the process, but it is what can make the difference between an ordinary map and a compelling one. The design choices set the tone and clarity of your map and dictate how the map communicates.

### What will you learn?

This course will teach you the balance between the art and science aspects of mapmaking. To begin, this exercise teaches you the mechanics of making a map in ArcGIS Pro. You will get comfortable with ArcGIS Pro and learn how to create a project to store your work.

In this exercise, you will begin making a small-format reference map of the U.S. state of Massachusetts to print.

*Note: If this is your first time using ArcGIS Pro, you may find the [ArcGIS Pro Terminology Guide \(https://bit.ly/2tjqTmD\)](https://bit.ly/2tjqTmD) helpful.*

### Step 1: Download the exercise data files

In this step, you will download the exercise data files.

- a Open a new web browser tab or window.
- b Go to <https://bit.ly/3agWvNU> and download the exercise data ZIP file.

*Note: The complete URL for the exercise data ZIP file is <https://www.arcgis.com/home/item.html?id=f4b8eccbf7934c4fade38b80c5708817>. The file is 16 MB.*

- c Extract the files to a folder on your local computer, saving them to a location that you will remember.

### Step 2: Confirm that your computer can run ArcGIS Pro

In this step, you will run a test to confirm that your computer can support ArcGIS Pro. Even if you have ArcGIS Pro installed, you should confirm that it can support ArcGIS Pro 2.7.

- a Go to the [system check link](#).

- b Click the Can You Run It? button.
- c Follow the steps to open and run the test.

The site generates a report that lists the minimum requirements and identifies if your machine meets these requirements.

- d If your computer does not meet these requirements, use the provided links to complete the recommended updates, and then run the test again.
- e If your computer meets the requirements, save the report.

*Note: If your computer does not meet the requirements, you may need to use a different computer or update your graphics card. For more information about graphic card requirements, see ArcGIS Pro Help: [ArcGIS Pro 2.7 system requirements](#).*

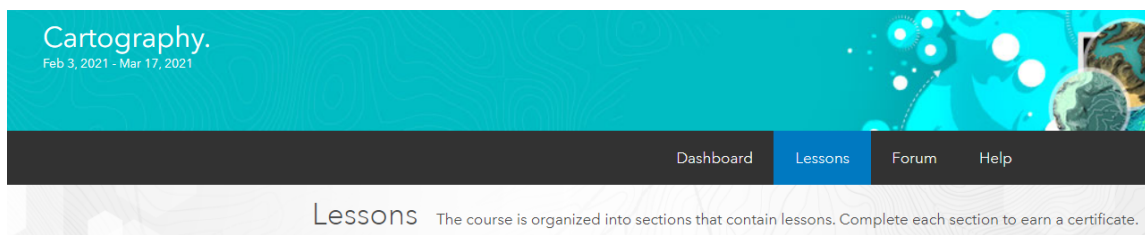
The MOOC team may ask you to share the report if you need help in later ArcGIS Pro exercises.

### Step 3: Install ArcGIS Pro

This MOOC uses ArcGIS Pro 2.7. If you already have ArcGIS Pro 2.7 installed, proceed to the next step. If you do not have ArcGIS Pro 2.7, complete this step.

- a Open a web browser in incognito mode and go to [www.arcgis.com](http://www.arcgis.com).
- b Sign in using your provided course ArcGIS credentials (user name ending with `_cart`).

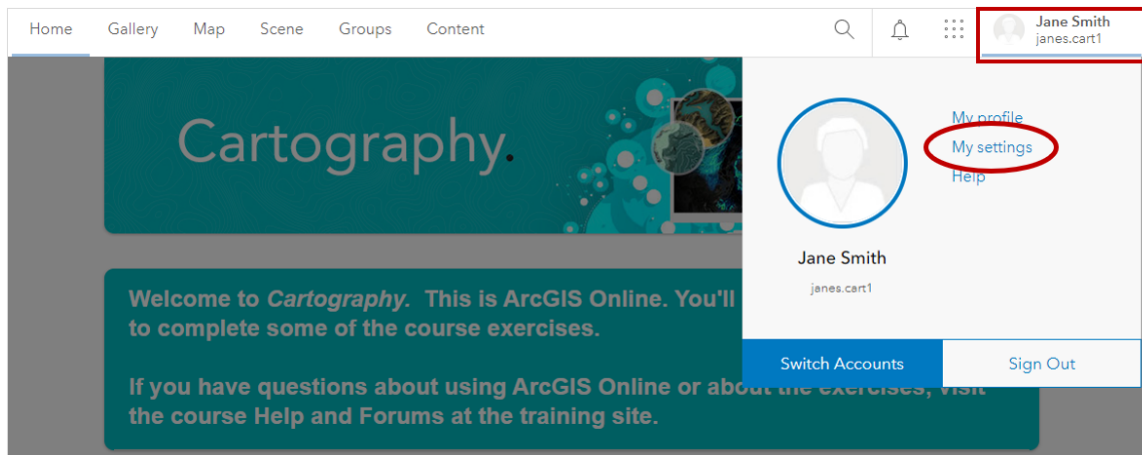
*Note: The course ArcGIS account user name and password are listed on the main Cartography. MOOC page under Lessons. The user name for this account ends with `_cart` (for example, `jsmith_cart`). You may want to write down the user name and password for quick reference.*



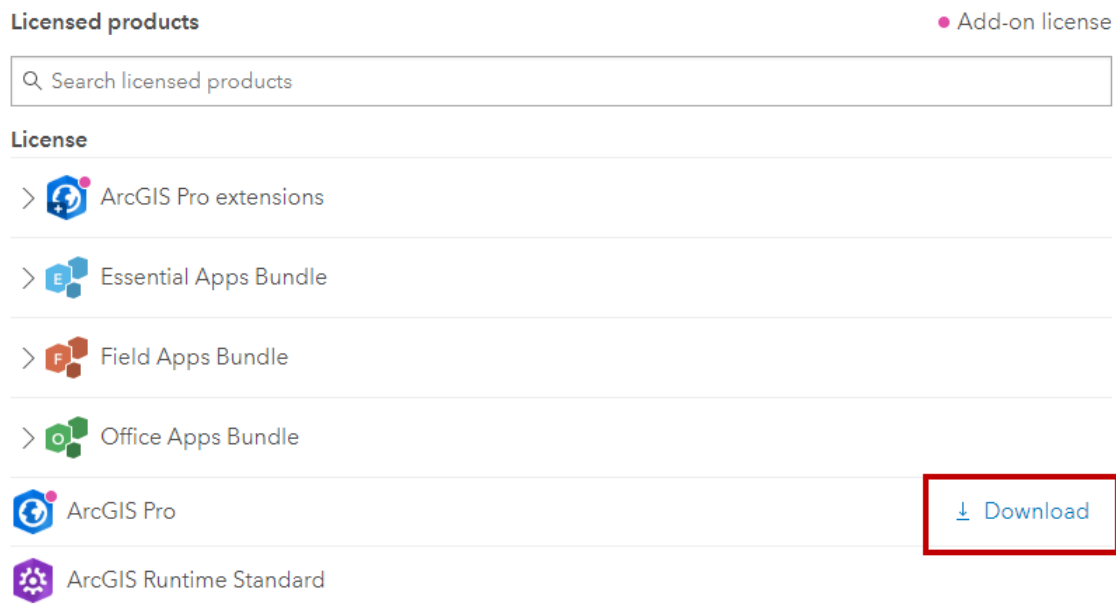
The MOOC provides a separate ArcGIS account (user name and password) that you will need to use to license ArcGIS Pro. This is not the same account that you used to access the MOOC.

Note: If you registered in the last few hours, your account may not be ready. Refresh the page in an hour or so to determine if your account is available.

- c In the upper-right corner, click your account, and then click My Settings.



- d Under My Settings, on the left side of the page, click the Licenses tab.
- e Under Licensed Products, find ArcGIS Pro, and then click Download.



The Download window opens.

*Note: You can run ArcGIS Pro in a different language by clicking the down arrow next to English (Version 2.7) and choosing a different supported language. Keep in mind that this course is taught in English, which means that all screen shots and exercises will use the English version of ArcGIS Pro.*

**f** Click Download.

If the default download location does not have enough space, you can change the location by following the steps in this [link](#).

**g** After the download completes, double-click the .exe file.

**h** Follow the installation instructions, accepting all defaults.

**i** When you are finished installing ArcGIS Pro, close the incognito web browser window.

### **Step 4: Open an ArcGIS Pro project and sign in**

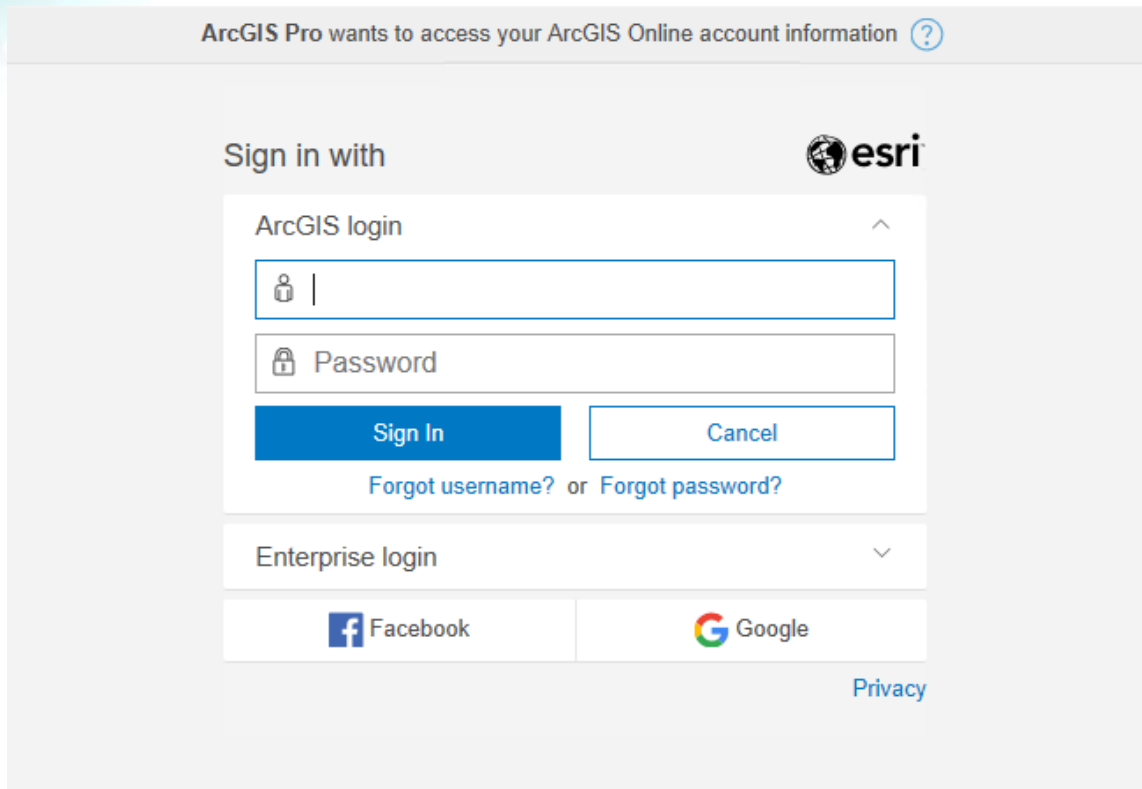
You will start by opening a project package from the data that you downloaded and sign in to ArcGIS Pro.

**a** In File Explorer, browse to the location where you saved your data, and then double-click the MakeAMap\_InitialState.ppkx file to open the exercise project in ArcGIS Pro.

You will use the contents of the exercise project to make your map.

**b** If necessary, in the top-right corner of the ArcGIS Pro app, click Not Signed In, and then click Sign In.

**c** If you are already signed in to ArcGIS Pro with a different account, click Sign Out, and then click Sign In.

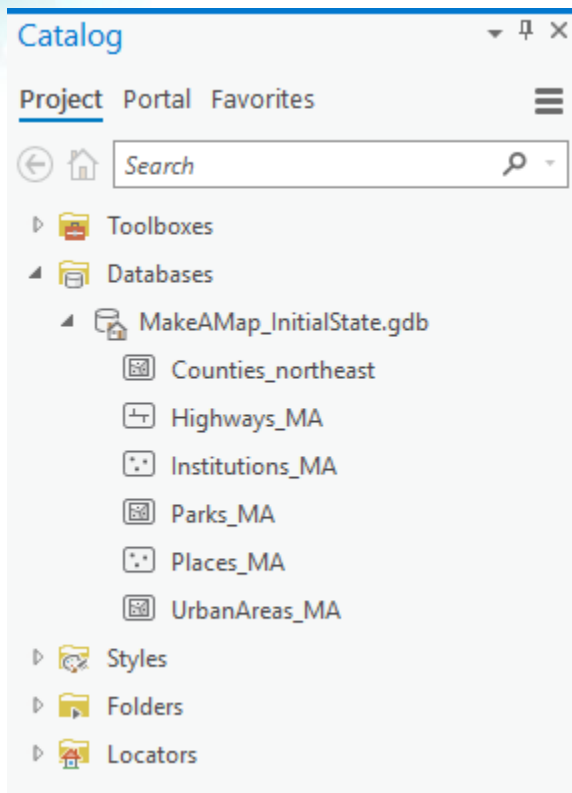


- d Sign in to ArcGIS Pro using your provided course ArcGIS credentials (user name ending with \_cart).

## Step 5: Add data to a new map

You will use the Catalog pane to access a database containing the data for the Make A Map project. The Catalog pane provides an inventory of items in your project and the commands to manage them.

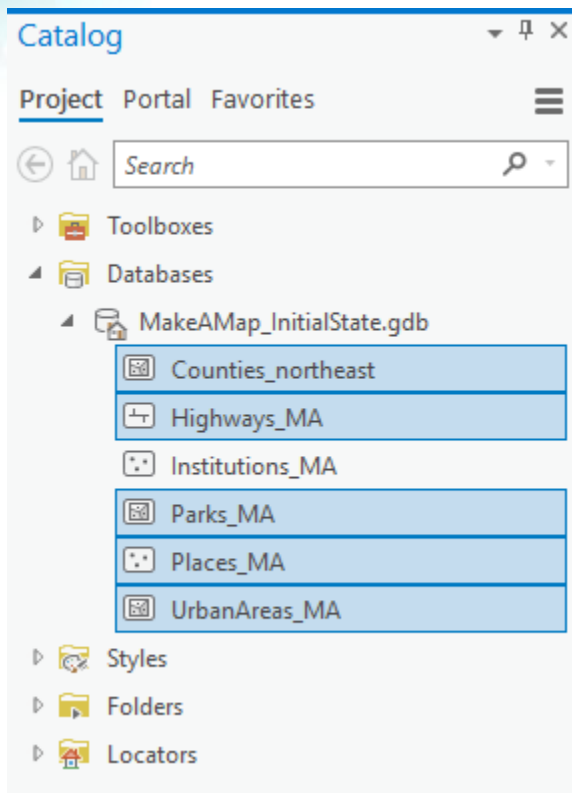
- a If necessary, open the Catalog pane:
  1. On the ribbon, click the View tab.
  2. In the Windows group, click Catalog Pane.
- b In the Catalog pane, expand Databases, and then expand the MakeAMap\_InitialState project geodatabase.



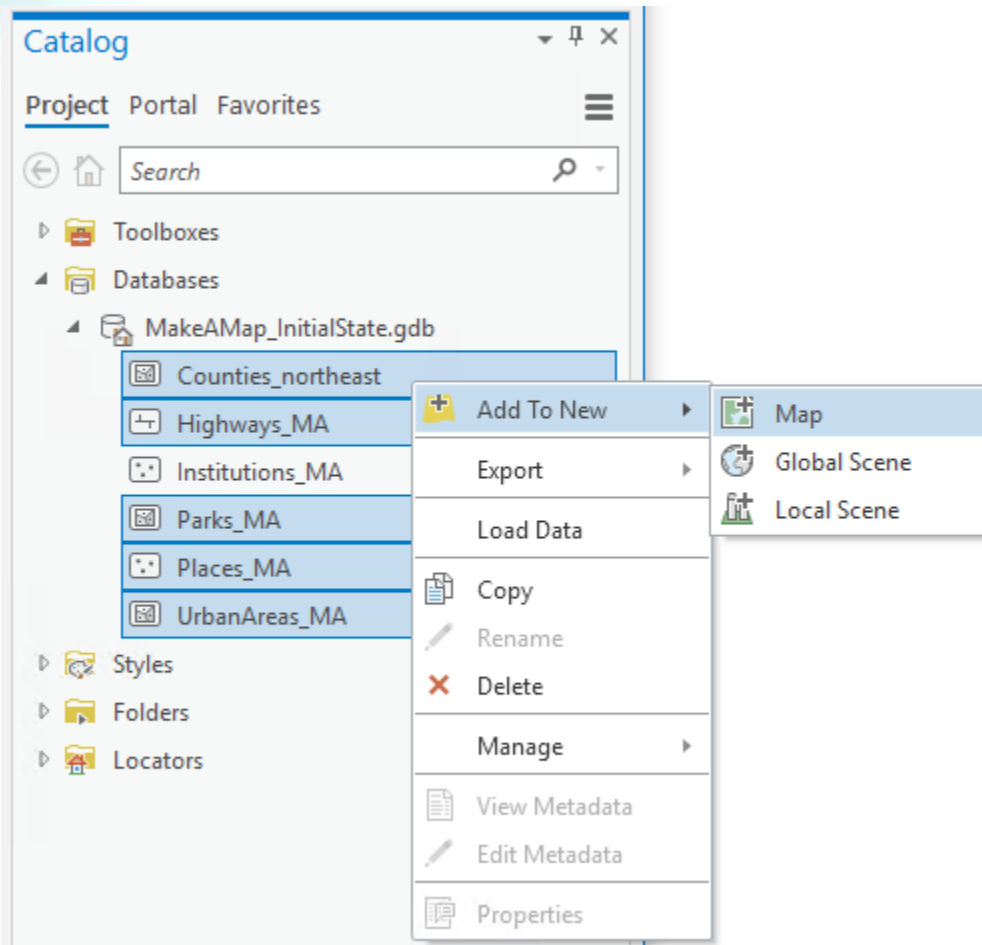
- c On your keyboard, press the Ctrl key, and then click each feature class in the project geodatabase except the `Institutions_MA` feature class to select them.

*Note: If you would like to complete one of the stretch goals at the end of this section, you can choose to select the `Institutions_MA` feature class, as well.*

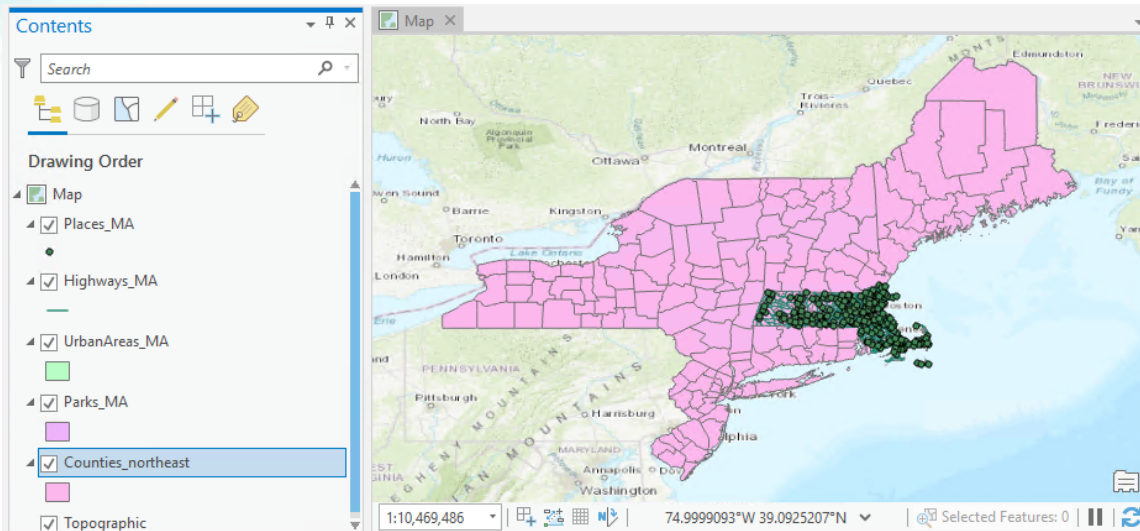




- d Right-click the selection, point to Add To New, and choose Map.



A new map is created with a basemap that provides a background of geographical context. The map is zoomed to the extent of the data layers in the northeastern part of the United States.



*Note: ArcGIS Pro randomly assigns colors, so the colors in your map may differ from the ones shown in the preceding graphic.*

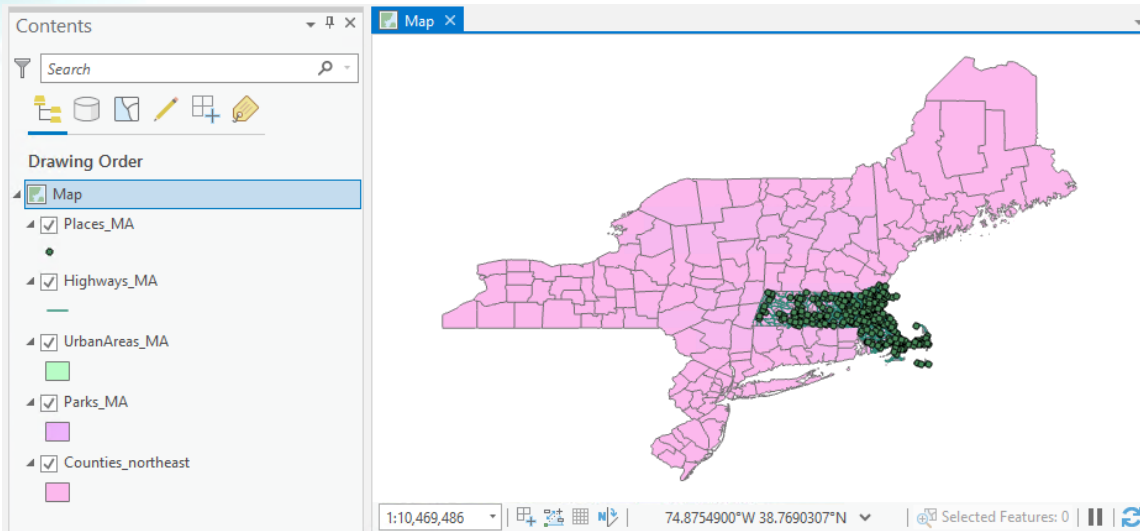
- e Close the Catalog pane.

The left side of the ArcGIS Pro window displays the Contents pane, which lists the layers contained in the current map. In the Contents pane, you can manage the display of layers, symbology, and other layer properties.

Using the check boxes next to the layer names in the Contents pane, you control which layers are drawn in the map or scene at any given time. You can remove the Topographic basemap because it is not needed in the general reference map that you will make.

*Hint: To open the Contents pane from the ribbon, click View, and then in the Windows group, click Contents.*

- f In the Contents pane, right-click the Topographic basemap layer and choose Remove.

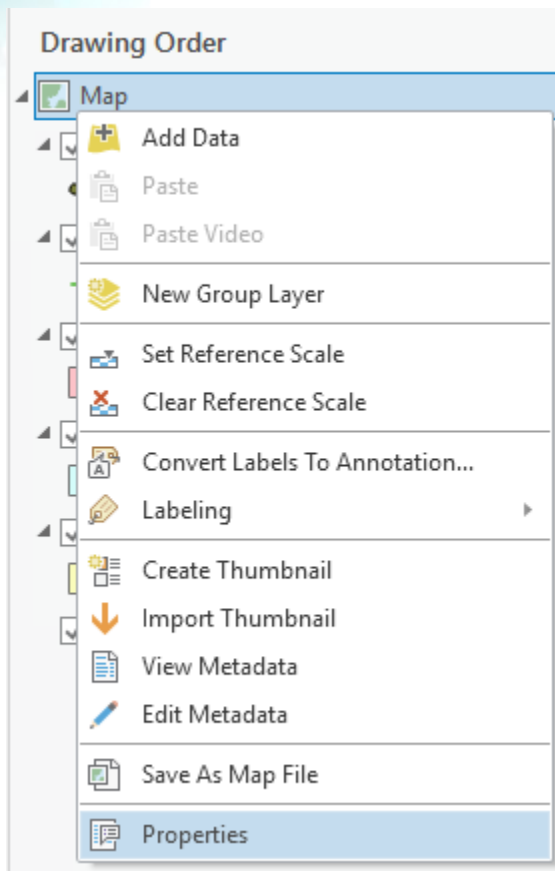


The basemap has been removed from the map.

## Step 6: Set the map properties

Next, you will set some properties to improve the display and organization of your map.

- a In the Contents pane, right-click Map and choose Properties to open the Map Properties dialog box.



*Note: You can also double-click Map to open its properties.*

On the General tab, in the Name field, you can see that the map is currently named Map.

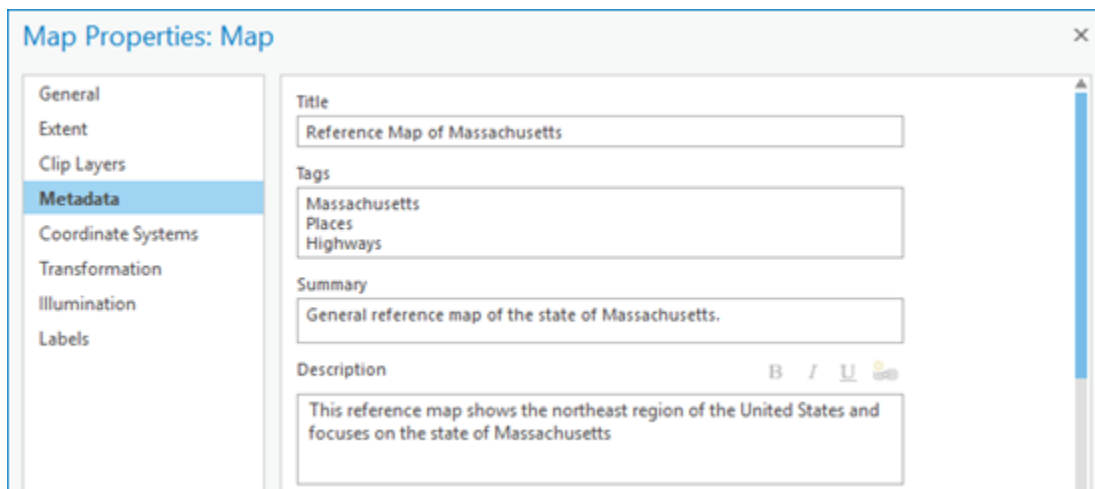
- b** In the Name field, type **Massachusetts** as the new name for the map.
- c** On the left side of the Map Properties dialog box, click the Metadata tab.

It is good practice to include metadata for your map. When someone else goes to use your map in the future, the metadata provides context and understanding of what the map is for and where the data came from. Refer to ArcGIS Pro Help for more information about metadata (<https://bit.ly/2HtXwFC>).

- d** On the Metadata tab, type a title for your map, such as **Reference Map of Massachusetts**.
- e** Add some descriptive tags, such as **Massachusetts, Places, Highways**, and any others that you would like.

- f Type a summary for the map, such as **General reference map of the state of Massachusetts.**
- g Finally, type a description for your map, such as **This reference map shows the northeast region of the United States and focuses on the state of Massachusetts.**

*Note: You can use the Summary and Description shown in the following graphic, or you can write your own.*



- h After providing the metadata, click the Coordinate Systems tab.

Maps and scenes use coordinate systems (<https://bit.ly/2qih20s>) to locate and display data correctly on the earth's surface and relative to one another. A coordinate system is a reference framework that defines the position of features in either two- or three-dimensional space.

In a GIS map, you work with geographic data through layers. Layers are collections of geographic data, such as features or imagery.

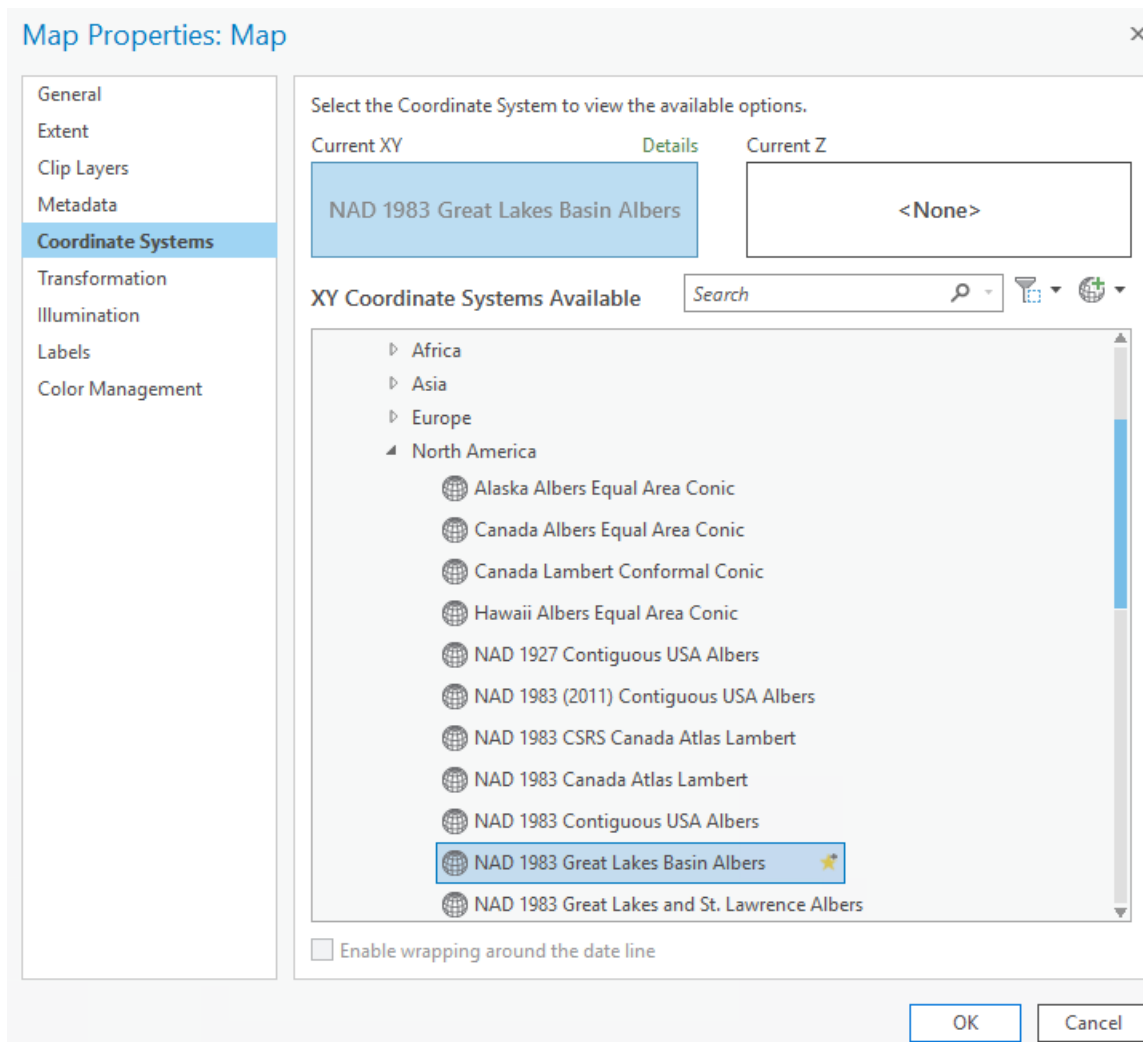
Currently, all layers in your map are unprojected in the WGS 1984 geographic coordinate system. Unprojected coordinate systems apply the geographic coordinates of the (nearly) spherical globe to the page or screen on a rectangle. This is why the states look a bit stretched. A projected coordinate system applies a mathematical adjustment to the coordinates to project their image onto the page or screen.

Projected coordinate systems all have limitations, but you can choose and manage the specific limitations to meet the needs of your map.

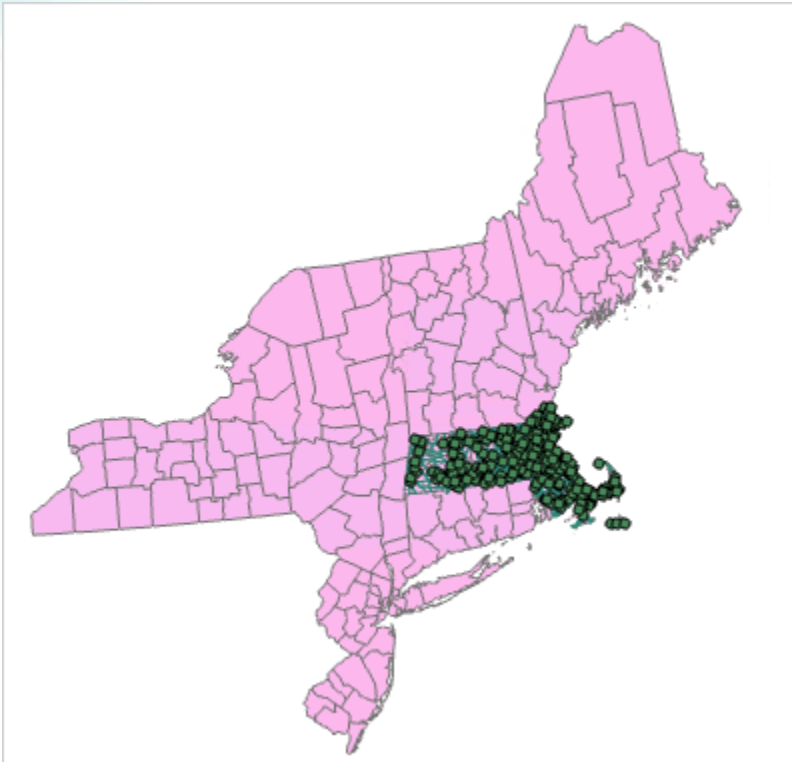
You will change the coordinate system for your map to an Albers projection (<https://bit.ly/2IlbeWz>). Albers is an equal-area projection, which keeps the size of areas on the map true to their size relative to the globe. This comes at the price of minor scale and shape distortions. The Great Lakes Basin Albers projection is designed to minimize distortions specifically in the

Great Lakes Basin area of North America. You will learn more about coordinate systems in Section 2 Exercise 1: *Working with Map Projections*.

- i On the Coordinate Systems tab, scroll down the list of coordinate systems to find and expand the Projected Coordinate System section.
- j Expand the Continental section, and then expand the North America section.
- k Click the NAD 1983 Great Lakes Basin Albers projection to select it.



- l Click OK to apply the coordinate system and close the Map Properties dialog box.



Because the Albers equal-area projection minimizes distortion, it is well-suited for areas of interest that trend east-west, like Massachusetts. You will notice that Massachusetts no longer looks "stretched."

As you work, it is a good idea to periodically save your map.

- m** On the ribbon, click the Project tab, and then click Save As.
- n** Browse to the MakeAMap folder on your computer and save your map as **MyMassachusettsMap\_<your first and last name>.aprx**.

*Note: Throughout the course exercises, you will be prompted to save your work with a unique identifier, such as your first and last name, at the end of the filename, so you do not overwrite the original project.*

- o** If you are continuing to the next exercise now, leave ArcGIS Pro open.
- p** If you will continue to the next exercise at a later time, exit ArcGIS Pro.