



CHAPTER 1

Exploring the ArcGIS Pro interface

Before you get started, you'll need to install the software and download the exercise data, as described in the “How to Use This Book” section. If you haven't read that section, read it now—you'll need that information.

Let's start with downloading some shapefile data. So, what's a shapefile? It's a file that stores the location, shape, and tabular attributes of geographic features. The geographic features can be points, lines, or polygons. Although more sophisticated data storage types are available, shapefiles are a common building block for creating maps and performing analyses in a geographic information system (GIS).

In this chapter, you'll download shapefiles from the US Census Bureau and learn to use some of the key tools in ArcGIS® Pro, a GIS desktop program that uses a ribbon, similar to Microsoft Word. The ribbon contains tabs, groups, and tools that are organized to help you perform your work. This style of interface should already be familiar to you.

Download census files

Access the US Census Bureau archive

1. In a browser, browse to links.esri.com/Pro20_Census to visit the US Census Bureau data download location.
2. Click the tab for 2022.
3. At the bottom, under Download, click FTP Archive.

This link takes you to the bureau's FTP archive.

The screenshot shows the 'TIGER/Line Shapefiles' page for the year 2022. The page is titled 'TIGER/Line Shapefiles' and includes a navigation menu on the left with options like 'Mapping Files', 'Mapping Tools', 'Reference Files', and 'Reference Maps'. The main content area features a 'Format' section with a list of file formats: Shapefile - 2007 to Present, TIGER/Line ASCII format - 2006 and earlier, and Census 2000 available in both formats. Below this is a 'Download' section with two options: 'Web Interface' and 'FTP Archive', where 'FTP Archive' is highlighted with a red box. The year '2022' is also highlighted with a red box in the year selection menu.

Download county, state, and place shapefiles



1. In the FTP archive, click the County folder to open it.

The screenshot shows a directory listing from the US Census Bureau FTP archive. The table has two columns: 'Name' and 'Last modified'. The 'COUNTY' folder is highlighted with a red box.

Name	Last modified
Parent Directory	
2022_TL_Shapefiles_File_Name_Definitions.pdf	2022-09-01 12:11
ADDR/	2022-09-30 22:25
ADDFEAT/	2022-09-30 22:25
ADDRFN/	2022-09-30 22:25
ALANSH/	2022-09-30 22:25
ALTSN/	2022-09-30 22:25
ANRC/	2022-09-30 22:26
AREALM/	2022-09-30 22:39
AREAWATER/	2022-09-30 22:25
BG/	2022-09-30 22:39
CD/	2022-09-30 22:25
COASTLINE/	2022-09-30 22:25
CONGCITY/	2022-09-30 22:36
COUNTY/	2022-09-30 22:25
COUSUB/	2022-09-30 22:39

- Click `tl_2022_us_county.zip` to download the zip file to your Downloads folder.

Downloading the zip file may take several minutes.

United States [®] Census <small>Bureau</small>			
<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 Parent Directory			-
 tl_2022_us_county.zip	2022-10-31 19:41	79M	

You'll extract this zip file after you've finished downloading it.

- Let the file continue to download, and click the browser's back arrow to select additional files.
- Scroll down in the folder directory, and click the State folder.
- Click `tl_2022_us_state.zip` to download the zip file to your Downloads folder.

 Parent Directory			-
 tl_2022_us_state.zip	2022-10-31 19:41	9.5M	

- While the download progresses, click the browser's back arrow.
- Scroll down in the folder directory, and click the Place folder.

The US Census Bureau uses the name *Place* to refer to cities. This folder includes all US cities, as well as census designated places (CDPs), which are not cities per se but generally recognized areas. The important takeaway here is that the Place folder contains the city files.

The Place folder lists many zip files because the list includes files for all states and territories. This book concentrates on the authors' home state of California, which is state 06.

*If you use another state's place file, your project won't exactly match the examples or instructions used throughout the rest of the book. For example, instructions that say to open the `CaliforniaCounties` file won't match what you're seeing on your screen. If you're comfortable substituting the name and data for your state, feel free to do so. You can open a new tab in your browser and search **[YourState] FIPS code**. This code is the number you'll need instead of 06 when downloading the place shapefile.*

- Click `tl_2022_06_place.zip` to download the zip file to your Downloads folder.

FIPS codes

FIPS stands for Federal Information Processing Standard, which is a unique identifier (ID) for geographic areas. States have two-digit codes, and counties have three-digit codes. A state code plus a county code is a five-digit unique ID for every county in the United States.



You now have all the GIS census data you need.

- Open File Explorer, and browse to your Downloads folder.
- Right-click one of the zip files, click Extract All, and save the files to `C:\GIS20\Chapter01`. Repeat this step for the remaining shapefiles.

What files make up a shapefile?

After unzipping the US Census Bureau files, you'll have a file with the `.shp` file name extension. You'll also have a few other files with different file name extensions. A shapefile is made up of all these files, not just the `.shp` file. Some of them are mandatory and some are optional.

These are the mandatory files:

- `.shp` = the geometry of the features in the layer.
- `.dbf` = database file that stores the tabular data for the features.
- `.shx` = index file that ties the `.shp` and `.dbf` files together.

These are the optional files:

- `.prj` = projection file that lists the map projection being used.
- `.shp.xml` contains metadata about the shapefile.
- `.sbn` and `.sbx` = spatial index files.
- `.cpg` describes the encoding applied to create the shapefile.

Other file types may also be associated with a shapefile, but they are beyond the scope of this book.

Add data to ArcGIS Pro

Start ArcGIS Pro

1. Click the Windows button on the taskbar to open the Start menu. In the alphabetized list of programs, click ArcGIS to expand it. In the folder, click ArcGIS Pro. Ignore all the other programs—ArcGIS Pro is the mapping program.

When ArcGIS Pro starts, you have several choices for the type of project you want to start. An ArcGIS Pro project is a collection of related maps, layouts, and resources (such as system folders and databases). Project files have the .aprx file name extension. Projects are stored in their own folders with their own databases (known as geodatabases). You're going to start with a map this time.

2. Under New Project, click Map.



3. For Name, type **MyState**.
4. For Location, browse to your C:\GIS20\Chapter01 folder.

You are telling ArcGIS Pro which folder to save your ArcGIS Pro project in. You want *Chapter01* to show in the Name box.

5. Click OK to create the new project.

At the top of the project window, your project name is shown.

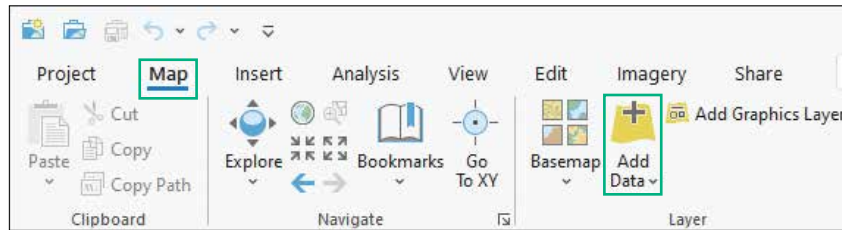
Add shapefiles to an ArcGIS Pro project

ArcGIS Pro uses a ribbon interface that groups commands into categories. It can take a bit of getting used to, but it's handy to have.

1. On the Map tab, in the Layer group, click Add Data to begin adding the shapefiles to your project.

If you click the top part of the Add Data button, the Add Data dialog box will open. If you click the down arrow, you'll see a list of data types from which to choose. Most of the time, you can click the button and not the down arrow, because you'll generally be adding data from your computer.

You will use this tool constantly, so it's a good idea to get to know it.



The challenge is to browse to the folder where you unzipped the three shapefiles.

- In the left pane, scroll down and click This PC. In the right pane, double-click Local Disk (C:), double-click the GIS20 folder, and double-click the Chapter01 folder to locate your shapefiles.

If you don't see the shapefiles (they have the .shp file name extension), you haven't properly unzipped the files, or they aren't in that folder. If you've unzipped them into individual folders, that's OK—you'll need to look in each folder and add the files individually. If you still don't see them, redo the earlier instructions, unzipping and adding them again. If you think the problem is something else, we assure you it isn't.

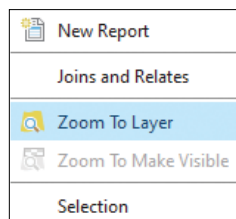


- Click tl_2022_06_place.shp, and then press and hold the Ctrl key while clicking both the county file and the state file. Click OK to add all three shapefiles.

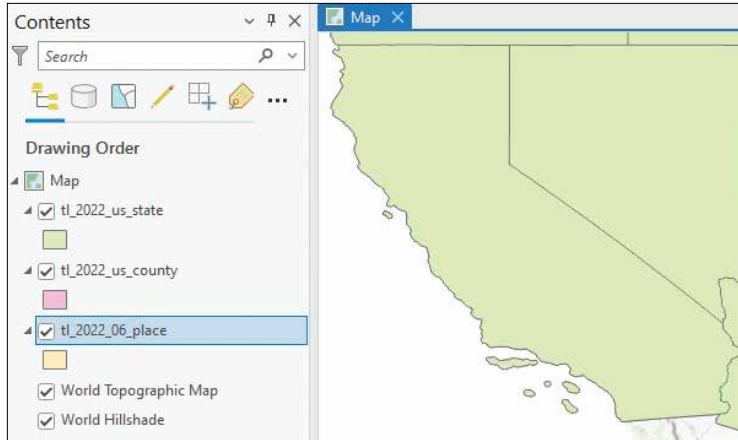
ArcGIS Pro randomly assigns the colors. You can change them later.

The map expands to show the whole world. Not so helpful, but we can fix that.

- In the Contents pane, right-click tl_2022_06_place.shp, and choose Zoom to Layer.



This layer has data for only one state, so the map zooms to that state's extent.



Reorder layers

The shapefiles will be added to the map with the state layer at the top of the Contents pane. The layers in the Contents pane draw in a specific order: from the bottom up. Because the state layer draws last, it covers the county and place layers.

1. At the top of the Contents pane, ensure that the List by Drawing Order tool is selected.



2. In the Contents pane, click `tl_2022_us_state` and drag it down so it's directly above the World Topographic Map. Drag `tl_2022_06_place` to the top of the list.

Now your map looks better!

