

# Preface

Welcome to *Learning ArcGIS for Desktop*. ArcGIS for Desktop is one of the main components of Esri's ArcGIS platform, which is used to support decision making and solve various mapping problems. It contains a wide variety of tools to create, manage, analyze, map, and share spatial data.

*Learning ArcGIS for Desktop* starts with the computer hardware and software recommendations. Then, this book goes on to show you how to obtain and install a 60-day trial of ArcGIS for Desktop (Advanced) on Windows. The second chapter explores coordinate reference system concepts. In the next three chapters, you will learn how to create a file geodatabase and manage, create, edit, and symbolize spatial data. Then, this book focuses on planning and performing spatial analysis on vector data using geoprocessing tools and ModelBuilder. Next, you will analyze raster data using the Spatial Analyst and 3D Analyst extensions. Finally, basic principles of cartography design will be used to create a professional poster map.

The book is a tutorial-based guide that will lead you through the basic concepts and functions of Esri's ArcGIS for Desktop software.

## What this book covers

*Chapter 1, Getting Started with ArcGIS*, covers the hardware and software requirements and shows you how to obtain and install a 60-day trial of ArcGIS for Desktop Advanced, single-use version. This chapter introduces you to the main ArcGIS for Desktop applications: ArcCatalog and ArcMap.

*Chapter 2, Using Geographic Principles*, explains the basic concepts of geographic and projected coordinate systems. You will explore the major categories of map projections using the ArcMap application. Furthermore, you will learn how to use the ArcGIS datum transformations to correctly convert and transform different coordinate reference systems.

*Chapter 3, Creating a Geodatabase and Interpreting Metadata*, shows you how to organize the spatial datasets acquired from external resources in a file geodatabase. You will also learn how to document your file geodatabase using two metadata standards, ISO19139 and INSPIRE.

*Chapter 4, Creating Map Symbology*, shows you how to create and customize symbols and labels on a map. You will learn how to display geographic features based on their attributes using symbols to create qualitative and quantitative thematic maps.

*Chapter 5, Creating and Editing Data*, explains how to create and edit data. You will learn to work with editing tools to create and edit feature shapes and attributes. Also, you will learn how to create point geometry using tabular data.

*Chapter 6, Analyzing Geographic Data and Presenting the Results*, covers how to plan and perform data analysis. You will learn to prepare and combine the spatial datasets to obtain new information using specific analysis tools. Furthermore, you will learn how to generate a report to present the results of your spatial analysis.

*Chapter 7, Working with Geoprocessing Tools and ModelBuilder*, describes the advanced tools to automate an analysis workflow. You will gain a deeper understanding of GIS analysis by working with the geoprocessing tools and models.

*Chapter 8, Using Spatial Analyst and 3D Analyst*, covers how to visualize and analyze vector and raster data using the Spatial Analyst and 3D Analyst extensions. You will learn to perform site selection and a least-cost path analysis using raster data. You will also learn how to create 3D features from 2D features and how to calculate surface area and volume.

*Chapter 9, Working with Aerial and Satellite Imagery*, explains the image-processing functions. You will learn how to georeference an aerial photograph. You will also use the Image Analysis toolbar to display and extract information from the satellite imagery.

*Chapter 10, Designing Maps*, describes the main cartographic design principles that are applied in the ArcGIS Map Layout. You will learn to add, customize, and organize map elements in a map layout. Moreover, you will learn how to create a professional poster map using a standard template from the ArcGIS collection of templates.

## What you need for this book

To complete the exercises in this book, you will need ArcGIS for Desktop 10.3 or 10.4 (Standard or Advanced) installed on your system.

Depending on your software version, please download and install the latest patches (bug fixes) or service packs (compilation of bug fixes) from <http://support.esri.com/en/downloads/patches-servicepacks>.

You need a web browser and access to an Internet connection to add datasets from ArcGIS Online and other public sources.

Data used in this book is freely available on the Packt Publishing site.

## Who this book is for

*Learning ArcGIS for Desktop* is for users who are comfortable with the basic concepts of Geographic Information Systems and want to learn how to create and edit geospatial data, perform spatial analysis, and create effective maps with ArcGIS for Desktop.

## Conventions

In this book, you will find a number of text styles that distinguish between different kinds of information. Here are some examples of these styles and an explanation of their meaning.

Code words in text, database table names, folder names, filenames, file extensions, pathnames, dummy URLs, user input, and Twitter handles are shown as follows: "Start ArcMap application and open your map document named `AccessingImagery.mxd` from `<drive>:\LearningArcGIS\Chapter9\MosaicData`."

When we wish to draw your attention to a particular item, the words are shown as follows: "The result will be a *high resolution multiband image* or a *pan-sharpened multispectral image* with a spatial resolution of 15 meters."

**New terms and important words** are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in the text like this: "Use the **Select Features** tool that is located on the **Tools** toolbar to select the five visible city points."



Warnings or important notes appear in a box like this.



Tips and tricks appear like this.



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## Errata

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