

Preface

Spatial analysis involves the problem-solving aspect of GIS. From a cursory evaluation, the tools are basic—buffers, overlays, selections—but when combined in a particular sequence they can reveal things about the data that cannot be seen in a spreadsheet or chart. With this book, the reader will not create any new data, but will generate new files based on existing data. That is because analysis is not about creating new data but about making existing data say new things. The key is to know the tools well and to design the right sequences to bring the big picture in view. *GIS Tutorial 2: Spatial Analysis Workbook*, 10.3.x edition, focuses on data presentation and equips readers with the skills to build “big picture” maps.

This workbook is a compilation of tutorials and exercises based on the two-volume set *The Esri Guide to GIS Analysis* by Andy Mitchell. For best results, you should read the corresponding pages in *The Esri Guide to GIS Analysis* before each tutorial.

Chapters 1–6 correspond with chapters from *The Esri Guide to GIS Analysis*, volume 1. These correlations are easily identified because corresponding chapters have the same titles. Chapter 1 concentrates on symbology and categorization with the viewer in mind. The material in chapter 2 deals with mapping quantities and recognizing patterns through classification. In chapter 3, the lessons cover density mapping for value comparison. Chapter 4 focuses on creating boundaries using visual overlays for performing inside–outside analysis. Chapter 5 addresses the analysis of distance relationships between features. In chapter 6, readers learn how to represent data fluctuations over time.

Chapters 7–9 correspond to content from *The Esri Guide to GIS Analysis*, volume 2. The tutorials and exercises in chapter 7 deal with displaying geographic distribution to aid analysis. Chapters 8 and 9 address spatial statistics and introduce a higher level of mathematics for establishing a statistical confidence level for analysis.

Each tutorial contains several elements that build context and engage critical thought to reinforce the skills learned. Review sections appear after each exercise to recap the actions taken. Study questions are provided to encourage further analysis. “Your turn” tasks appear within certain tutorials to support independent demonstration of skills learned. The workbook also offers “Other real-world examples” throughout, which provide the reader with real-world scenarios that use the skills covered. Additionally, the “Independent projects” section outlines six different scenarios for independent projects that build on the skills readers acquire in the tutorials.

This workbook is geared toward a more advanced readership than the introductory *GIS Tutorial 1: Basic Workbook* and was written for those who want to learn more about analysis tools in ArcGIS and how to use them. It assumes an existing knowledge of ArcMap and ArcCatalog and requires the use of ArcGIS extensions, as well as third-party tools and scripts that are included in the student and instructor data.

Trial software and instructional data

For students: *GIS Tutorial 2* comes with exercise data and a trial of ArcGIS, which you can access in the Esri Press online resources at esri.com/esripress-resources. The trial comes with ArcGIS 10.3.1.x for Desktop. If you have an earlier version of ArcGIS for Desktop, you will need to uninstall it before loading the trial software.

For instructors: instructors can request instructor resources for this book at esri.com/esripress. This includes an instructor guide with outlines of each tutorial and the answers to the study questions, plus completed data and map documents for each tutorial and exercise.

Fixing broken path links in layer files

If you install the exercise maps and data to a folder structure other than the default, you must fix the broken path links for the layer (.lyr) files. To fix a broken data link, open ArcCatalog (or use the Catalog window in ArcMap), right-click the layer file, and click Properties. Click the Source tab, and the Data Source box displays the expected file location. Click the Set Data Source button, and navigate to the drive and locate where you installed the exercise data. For example, if you installed the data on drive E, your location might be something like the following (including the feature dataset name and feature class name): \\EsriPress\GIST2\Data\CityOfOleander.gdb\FireDepartment\FileName. You can move the dialog box to the side and see the correct feature data name and feature class name while you are setting it. Once you have reset the data source location, click OK to close the Properties dialog box.

The following files in the Data folder may need to be fixed:

- \Data\DFWRegionRoads.lyr
- \Data\Flood Areas.lyr
- \Data\LandUse.lyr
- \Data\LandUseCodes.lyr
- \Data\Lot Boundaries.lyr
- \Data\Site1_Time.lyr
- \Data\Site2_Time.lyr
- \Data\ZoningDistricts.lyr