

Contents

Preface ix

Acknowledgments xiii

Chapter 1: Introducing GIS for police work 1

Introduction 1

GIS for police work 1

Spatial coordinates 2

Spatial data 4

Police operations management systems and GIS 6

Overview of the book 9

Environmental criminology literature 11

References 12

Chapter 2: Exploring ArcGIS® Desktop 13

Map documents and ArcMap™ interface 13

Download and install ArcGIS Desktop software and tutorial data 14

Tutorial 2-1 Exploring the ArcMap user interface 15

Tutorial 2-2 Exploring the ArcCatalog™ user interface 26

Tutorial 2-3 Examining map layer properties 31

Tutorial 2-4 Examining Layout View 34

Instructions on how to save and submit assignment files for grading 36

Assignment 2-1 Critique an online crime mapping system 37

Assignment 2-2 Compare crime maps for serious violent crimes in Pittsburgh 38

Chapter 3: Using crime maps 41

- Crime maps for field officers 41
- Early warning system maps for investigators and command staff 43
- Crime maps for the public 44
- Tutorial 3-1 Using maps designed for the public 46
- Tutorial 3-2 Using an early warning system map 53
- Tutorial 3-3 Using a pin map for field officers 67
- Assignment 3-1 Analyze hot spots for larceny crimes 76
- Assignment 3-2 Create a map for the media 79
- References 80

Chapter 4: Building crime maps 81

- Periodic versus ad hoc crime maps 81
- Graphic design 82
- Tutorial 4-1 Building a pin map for field officers 84
- Tutorial 4-2 Building an early warning system for investigators 99
- Tutorial 4-3 Building a map for public use 114
- Assignment 4-1 Build an auto theft pin map 121
- Assignment 4-2 Build auto squad choropleth maps 125
- References 126

Chapter 5: Querying crime maps 127

- Attribute queries 127
- Spatial queries 129
- Building and using crime queries 129
- Tutorial 5-1 Creating attribute queries 130
- Tutorial 5-2 Creating spatial queries 141
- Assignment 5-1 Analyze leading-indicator crimes by day versus by night 148
- Assignment 5-2 Analyze robberies near check-cashing businesses 151
- References 153

Chapter 6: Assembling jurisdiction feature classes 155

- Geospatial data sources and jurisdiction maps 155
- Geospatial data for crime mapping 156
- Extraction of jurisdiction maps 157
- Joining aggregate tabular data to polygon map layers 157
- Assembling police jurisdiction feature classes 158

- Tutorial 6-1 Downloading and preprocessing geospatial data 159
- Tutorial 6-2 Extracting jurisdiction maps 166
- Tutorial 6-3 Joining census data to census polygon maps 174
- Tutorial 6-4 Creating new feature classes from geospatial data 177
- Tutorial 6-5 Digitizing features 188
- Assignment 6-1 Download and use a census block group basemap and data 200
- Assignment 6-2 Create maps for foot patrols and DUI target areas 204

Chapter 7: Geocoding crime incident data 209

- Master feature classes and update files 209
- Police reports and location data 210
- TIGER/Line® street centerline data 210
- Geocoding address data 211
- Address-matching errors and reporting 212
- Crime data aggregation 212
- Geocoding crime incident data 212
- Tutorial 7-1 Address-matching (or geocoding) data 213
- Tutorial 7-2 Improving address-matching results 221
- Tutorial 7-3 Processing update and master data files 236
- Tutorial 7-4 Aggregating data 244
- Tutorial 7-5 Protecting privacy in location data 249
- Assignment 7-1 Geocode Pittsburgh 911 calls for service data 256
- Assignment 7-2 Build space and time series data for 911 calls 258

Chapter 8: Automating crime mapping 261

- ModelBuilder models 261
- Model user interface 261
- Documentation 262
- Debugging 262
- Using ModelBuilder for automation 263
- Tutorial 8-1 Exploring a completed model 264
- Tutorial 8-2 Processing police reports into master files 273
- Tutorial 8-3 Producing a pin map for field officers 283
- Assignment 8-1 Build a model to produce choropleth maps 294
- Assignment 8-2 Build a model to produce size-graduated point marker maps 297

Chapter 9: Predictive policing for crime hot spots 301

- Spatial clustering of crime in urban areas 302
- Chronic and temporary hot spots 302
- Prediction models for temporary hot spots 303
- Predictive performance of hot spot models 303
- Prediction Accuracy Index effectiveness curves 304
- Crime prevention by police in hot spots 305
- Experimental field trials for crime hot spots 306
- Tutorial 9-1 Modeling and predicting chronic hot spots using grid cells 307
- Tutorial 9-2 Modeling and predicting chronic hot spots using Kernel Density Smoothing 317
- Tutorial 9-3 Emerging hot spot analysis 325
- Tutorial 9-4 Repeat and Near Repeat hot spots 330
- Project: Build and evaluate a crime hot spot program 342
- References 346

Data and image credits 347