
Contents

Foreword	9
Author's Introduction	11
1 What is QGIS?	13
1.1 The Origins of QGIS	13
1.2 Data Formats	13
1.3 OSGeo—The Open Source Geospatial Foundation	14
1.4 Translation into Other Languages	14
1.5 What you get when you Download QGIS	15
1.6 Download	15
1.7 Data for the Hands-on Exercises	15
2 The QGIS User Interface	17
2.1 Getting Started	17
2.2 The QGIS Documentation Website	17
2.3 An Introduction to the QGIS User Interface	18
2.4 The QGIS Browser Panel	20
2.5 QGIS Icons	21
2.6 Adding Data To QGIS	21
2.7 The Layers Panel	26
2.8 Adding Vector Data	30
2.9 The Layers Panel	31
2.10 Layers Properties	35
2.11 Map Interaction Using Icons	41
2.12 Setting File Transparency	43
2.13 Zoom and Pan	44
2.14 Saving your project	44
2.15 Coordinate Reference Systems (CRS)	45
2.16 Project Properties	49
2.17 More Map Interaction Tools	50
2.18 Vector Attributes and Attribute Tables	51
2.19 The Identify Tool	55
2.20 The Screen Measurement Icon	55
2.21 Select Features	56
2.22 Map Decorations	58
2.23 Spatial Bookmarks	59
2.24 Text Annotation	61
2.25 Actions	62
2.26 Labels	64
2.27 Diagrams	64
2.28 Statistical Summary	66
2.29 Query of vector features	67
2.30 Vector Query Builder	69
2.31 Complex Vector Representations	71
2.32 Vector Data Symbols	75
2.33 Vector Data Properties	76
2.34 Metadata	76
2.35 Raster data properties	77

2.36	Raster Data Pyramids	77
2.37	Histogram	78
2.38	Loading XYZ tiles into QGIS	79
2.39	Preview Mode	82
3	Creating and Editing New Vector Files in QGIS	85
3.1	Creating New Vector Data	85
3.2	Creating New Vector Data Attribute Fields	86
3.3	The QGIS Editing Mode and Icons	88
3.4	Creating a new GeoPackage Layer	92
3.5	Creating a New Point Layer in a GeoPackage	93
4	Finding GIS Data Online	97
4.1	The Geofabric OSM Daily Shapefile Update	97
4.2	Natural Earth Data Global GIS data website	98
4.3	USGS EarthExplorer	99
4.4	USGS National Map Portal	100
4.5	ESRI Open Data website	100
4.6	DIVA GIS website	101
4.7	The OpenTopography website	101
4.8	Other Online GIS Data Sources	102
5	Vector Data Import and Export	103
5.1	Vector data import and export	103
5.2	Open Geospatial Consortium (OGC) Data	108
6	Vector Data Processing and Analysis	113
6.1	The Vector Menu	113
6.2	Vector Geoprocessing Tools	113
6.3	Vector Buffers	114
6.4	Vector Intersections	117
6.5	Vector Polygon Counts	119
6.6	Calculating the Area	120
6.7	Vector Boolean Operators	123
6.8	Points in Polygons	123
6.9	Union	124
6.10	Vector Research Tools	125
6.11	Voronoi Polygons	128
6.12	Vector Delaunay Triangulations	129
6.13	Recategorizing Vector Data	130
6.14	Vector Data Analysis	131
7	QGIS Plugins	135
7.1	Core Plugins	135
7.2	Accessing the QGIS Plugin Repository	135
7.3	The QGIS Plugin Manager	135
7.4	Plugin Settings	137
7.5	Searching for Plugins	137
7.6	QuickMapServices	138
7.7	AutoSaver	142
7.8	Coordinate Capture	142
7.9	GPS tools	143
7.10	Live GPS Tracking	144
7.11	InaSAFE- The Disaster Planning and Response Tool	145
7.12	Semi Automatic Classification Satellite Remote Sensing Plugin	146
7.13	Offline Editing	147
7.14	More Plugins	147

8 Raster Data and Analysis	149
8.1 Why Use Raster Data?	149
8.2 Using the GDAL Library in QGIS	149
8.3 Importing and Exporting Raster Data	150
8.4 Raster Functions in QGIS	152
8.5 Raster Functions in the Processing Toolbox	153
8.6 Terrain Analysis	153
8.7 Working with Digital Elevation Model (DEM) Data	154
8.8 Interpolating Raster DEMs from Point Data	159
8.9 The Raster Calculator	167
9 The Processing Toolbox, Modeler, and Python Console	171
9.1 Using GRASS, GDAL, the Orfeo Toolbox, and SAGA tools within QGIS	175
9.2 The Graphical Processing Modeler	180
9.3 The Python Console	181
10 3D QGIS	183
10.1 The QGIS 3D Map Viewer	183
10.2 3D Viewer Icons	183
10.3 Creating and Saving 3D Movies	185
11 Georeferencing in QGIS	187
11.1 The Georeferencer Dialog	187
11.2 Georeferencer Icons	188
11.3 The Georeferencing Process	189
11.4 Point Picking	190
11.5 Residual Error and Root Mean Square (RMS) Error	190
11.6 Transformation Settings	192
12 Creating Maps and Reports	195
12.1 The Print Layout Screen	195
12.2 Print Layout Icons	196
12.3 Adding New Maps	196
12.4 Changing the Map Composition	197
12.5 Map Legends	197
12.6 Map Labels and Titles	198
12.7 Adding Images and Photos	200
12.8 Scale Bar	200
12.9 Coordinate Grids	201
12.10 Saving and Printing your Maps	203
12.11 Map Templates	203
12.12 Map Atlas	203
12.13 QGIS Reports	205
13 GIS and the Chef	207
14 Useful QGIS Websites	209
14.1 The QGIS Website and its Importance	209
14.2 QGIS Web Resources	210
14.3 QGIS Books, in English, in Print and e-books	210
14.4 QGIS Videos	211
14.5 Online QGIS Curriculum	212
14.6 Online GIS Data Archives	212
14.7 QGIS Blogs:	212
15 Conclusion	213
Index	215
Books from Locate Press	219