HANDOUT – EXPLORING GEOSPATIAL DATA

INTRODUCTION

This handout details the steps associated with the import and exploration of shapefiles using the examples in the **N-CATT GIS Workshop > Day One > Module 2 > Data > Exploring Geospatial Data** folder.

OUTLINE

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1. EXPLORING SHAPEFILES

1.1. Open the File Manager

- Open the File Explorer (Windows) or Finder (macOS)
 - If you are using Windows: select the File Explorer icon in the Taskbar; alternatively, search for "File Explorer" in the search bar on the left side of your taskbar – if you do not see this, press the Windows key on your keyboard and begin typing
 - If you are using macOS: select the Finder icon in the dock; alternatively, press Command and Space on your keyboard and being typing "Finder"

1.2. Inspect Shapefiles

- Navigate to the folder containing routes.shp and stops.shp
 - You will see at least three files associated with each shapefile (Figure 1)
 - .shp contains feature geometry
 - .shx index file
 - .dbf database file that stores attribute data
 - Shapefiles optionally include:
 - .prj contains the coordinate and projection system
 - .xml stores metadata
 - .sbn index file (works in tandem with .sbx)
 - .sbx index file (works in tandem with .sbn)
 - .cpg specifies the encoding applied

Figure 1: Shapefile Viewed from a File Manager

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routes	\odot	12/17/2021 4:26 PM	PRJ File
routes.shp	\oslash	12/17/2021 4:26 PM	SHP File
routes.shx	\odot	12/17/2021 4:26 PM	SHX File



2. ADDING LAYERS TO A PROJECT AND INSPECTING THEIR CONTENTS

2.1. Add Layers From the Data Source Manager

- There are multiple options for how you can add new vector layers using the Data Source Manager:
 - Option 1: Select Layer > Add Layer > Add Vector Layer (Figure 2)
 - Option 2: Press Control, Shift, and V

Figure 2: Adding Layers

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- Select the Browse button (it looks like three dots) and navigate to the circulator folder within Module 2 > Data (*Figure 3*)
 - Holding **Control**, select routes.shp and stops.shp (*Figure 4*)
 - Select Open
 - Select Add

Figure 3: Browsing for Layers



Figure 4: Selecting Layers

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2.2. Add Layers from the Browser Panel

- There are also multiple ways to add layers from the Browser Panel:
 - Navigate to the Browser Panel (Figure 5)
 - Drag routes.shp and stops.shp onto onto the Map Canvas
 - Right click on routes.shp and stops.shp and select Add Layer to Project

Figure 5: Adding a Layer from the Browser Panel





2.3. View Layer Properties

- Right-click on the "routes" layer in the Layers Panel and select Properties (Figure 6)
- The Layer Properties dialog contains information on the layer and allows for the modification of its appearance, or symbology
 - Information: contains metadata and the layer filepath
 - Source: contains the coordinate and projection system
 - Symbology: allows for the manipulation of the color and appearance of features within the layer
 - Labels: allows for labeling of features within the layer
 - Fields: describes the name and type of fields in the Attribute Table

Figure 6: Viewing Layer Properties



Figure 7: Layer Properties Dialog





2.4. Open an Attribute Table

- Right-click on the "stops" layer in the Layers Panel and select **Open Attribute Table** (*Figure 8*)
- Metadata contains information about the data; for example, the metadata associated with this stops layer reveals that the wheelchair field documents the presence of an ADA-compliant surface for boarding/alighting



Figure 9: Attribute Table

📿 st	ops — Feature	s Total: 44, Filtered	d: 44, Selected: 0			
_	stop_id	stop_code	stop_name	stop_lat	stop_lon	wheelchair
1 330		330/401	Conway Street	39.28388500000	-76.61336900000 1	
2 331		331/402	Lee Street	39.28197800000	-76.61321400000 1	
3 411		411	Fort McHenry	39.26590100000	-76.58414500000 1	
4 412		412	Towson Street	39.26857600000	-76.59222900000 1	
5 413		413	Woodall St	39.27081300000	-76.59866600000 1	
6 414		414	Lawrence Street	39.27168300000	-76.60110700000 1	
7 415		415	Museum of Ind	39.27361000000	-76.60204000000 1	
8 416		416	Harborview	39.27533000000	-76.60519000000 1	
9 417		417	Pierside Drive	39.27740400000	-76.60616900000 1	
10 418		418	Rash Field	39.28079900000	-76.61016900000 1	
11 419		419	Otterbein	39.28396400000	-76.61457400000 1	
12 221		221/420	Pratt Street	39.28647100000	-76.61386600000 1	
13 403		403	Federal Hill Par	39.28053600000	-76.61238600000 1	
14 404		404	American Visio	39.28068700000	-76.60723900000 1	
15 405		405	Jackson Street	39.27526900000	-76.60562600000 1	
16 406		406	Boyle Street	39.27309000000	-76.60134000000 1	
17 407		407	Fort Avenue	39.27135000000	-76.60075000000 1	
18 408		408	Whetstone Way	39.27064000000	-76.59870000000 1	
19 409		409	Decatur Street	39.26926000000	-76.59478000000 1	
20 410		410	Andre Street	39.26804000000	-76.59128000000 1	
21 117		117/225	Little Italy	39.28536800000	-76.60324700000 1	
22 118		118/226	Fleet & Exeter	39.28418900000	-76.60055900000 1	
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3. NAVIGATING IN QGIS

3.1. The Map Navigation Toolbar

- The Map Navigation Toolbar (*Figure 10*) includes several tools for navigating layers within QGIS (*Figure 11*), including but not limited to:
 - 1. **Pan Map** click the map canvas to pan to the cursor position; click and hold to drag the map canvas
 - Zoom In click the map canvas to zoom in one level and center the map on the cursor position; drag a rectangle to zoom in to an area
 - Zoom Out click the map canvas to zoom out one level and center the map on the cursor position; drag a rectangle to zoom out on an area
 - 4. Zoom Full zooms to depict all layers

Figure 10: Map Navigation Toolbar



Figure 11: Map Navigation Toolbar Tools





3.2. Other Useful Navigation Commands

- Other navigation commands include:
 - Right-click on a layer in the Layers Panel and select **Zoom to Layer** to center the map on features within that layer
 - Scroll up/down to zoom in/out
 - Click the scroll wheel (if available) to drag the map canvas, regardless of what tool is selected



4. MANAGING GEOSPATIAL DATA

4.1. Moving Shapefiles

- Moving a shapefile:
 - Requires that you move all of the constituent files; failure to do so will likely result in a loss of data
 - Will not be possible if it is in use by a QGIS project
 - Will require that you re-link it to the QGIS project file, unless you move it using QGIS (see below)

4.2. Best Practices

- Do not move shapefiles once you have begun working with them, unless absolutely necessary; this is why it is critical that you establish a folder hierarchy early-on and stick to it!
 - If you do need to move a shapefile, the best way to do that is within the Browser Panel in QGIS; this will ensure that you do not lose any of its constituent parts

