

ASSIGNMENT 03b – COMBINED CHOROPLETH MAPS

TASK:

Make a series of combined (bivariate) choropleth maps showing the unemployment rate and the proportion of the population with tertiary education using two types of visualization – a combination of two colors (Map 1) and a combination of hatched fill and color (Map 2).

In technical report answer following questions:

1. Compare all possible techniques of hatched fills (striped vs. dotted symbols, symbol spacing vs. symbol size). Which technique is more suitable and why?
2. Compare two types of visualizations (2 colors vs. hatched fill+color) used for combined choropleth map. Which type of visualization is more suitable and why?

DATA SOURCES:

- polygon layer *CensusDivision_Quebec_Statistics* (or similar) from previous lecture

SUBMISSION FORM:

- technical report
- 2 maps in PDF format
- ppkx

INSTRUCTIONS:

Part 1a – Combined Choropleth Map with 2 colors (Map 1)

- Add a layer *CensusDivision_Quebec_Statistics* to Map
- In *Symbolology* set following parameters:
 - Symbolization Method: Bivariate Colors
 - Field 1: set an expression (see Assignment 03a) or select “UnemploymentRate” field
 - Normalization: None
 - Field 2: set an expression (see below) or calculate new field
“PostSecondaryEducation” in attribute table* using following expression

$\$feature.HET_3_PostsecondaryDiploma/\$feature.pop_15_to_64_years*100$

- Normalization: None
- Classification Method: *optional*
- Grid Size: *optional*
- Color Scheme: *optional*
- in Histogram/Legend tabs set the break values and legend layout appropriately
- In *New Layout* (A4 Landscape) insert the Map Title, North Arrow, Legend, Scale and Credits
- Export *Layout* in PDF Format

You can find more on bivariate choropleth maps (combining 2 colors) [here](#).

Part 1b – Combined Choropleth Map with Hatched Fill and Color (Map 2)

- Add a layer *CensusDivision_Quebec_Statistics* to Map and rename it to *CensusDivision_Quebec_Statistics_Color* or similar to Map
- Copy the layer *CensusDivision_Quebec_Statistics* in Table of Contents
- Rename the duplicate layer to *CensusDivision_Quebec_Statistics_HatchedFill* or similar
- Symbolize the layer *CensusDivision_Quebec_Statistics_Color* as a simple choropleth map with sequential color scheme showing the unemployment rate (see Assignment 03a)

Now try out all techniques of hatched fill (striped vs. dotted symbols, symbol spacing vs. symbol size; see examples in Fig. 1a–1d).

HatchedFill01 (striped symbols, symbol spacing)

- For the layer *CensusDivision_Quebec_Statistics_HatchedFill* in *Symbology* set following parameters:
 - Symbolization Method: Graduated Colors
 - Field: set an expression →

$\$feature.HET_3_PostsecondaryDiploma/\$feature.pop_15_to_64_years*100$

- Normalization: None
 - Classification Method: Natural Breaks (recommended)
 - Classes: 5
 - Color Scheme: optional (we will change the symbology in the following steps)
- Click *More-Format all symbols* and choose *10% Simple Hatch* symbol from default ArcGIS style in *Gallery*
 - Go back to *Classes* tab, click on the symbol for Class 1 and in *Properties-Layers* turn off the Hatched fill layer
 - Go back to *Classes* tab, click on the symbol for Class 2 and in *Properties-Layers* set the *Separation* parameter for the Hatched fill layer (symbol spacing) to 12pt (recommended)
 - Go back to *Classes* tab, click on the symbol for Class 3 and in *Properties-Layers* set the *Separation* parameter for the Hatched fill layer (symbol spacing) to 8pt (recommended)
 - Go back to *Classes* tab, click on the symbol for Class 4 and in *Properties-Structure* copy the Hatched fill layer. For this copy keep the *Separation* parameter for the Hatched fill layer (symbol spacing) to 8pt (recommended) and set the *Angle* parameter to 135° (the *Angle* parameter for the original Hatched fill layer is 45°). Save this symbol to style.
 - Go back to *Classes* tab, click on the symbol for Class 5, from *Gallery* select your saved symbol. In *Properties-Layers* set the *Separation* parameter for both Hatched fill layers (symbol spacing) to 5pt (recommended)

HatchedFill02 (striped symbols, symbol size)

- Copy the layer *CensusDivision_Quebec_Statistics_HatchedFill* in Table of Contents
- Rename the duplicate layer to *CensusDivision_Quebec_Statistics_HatchedFill02* or similar
- In *Symbology*, go to *Classes* tab, click on the symbol for Class 2, and save this symbol to style
- Click *More-Format all symbols* and choose the symbol saved in previous step in *Gallery*
- Go back to *Classes* tab, click on the symbol for Class 3 and in *Properties-Layers* set the *Line width* parameter for the Hatched fill layer (symbol spacing) to 1.5pt (recommended)

- Go back to *Classes* tab, click on the symbol for Class 4 and in *Properties-Layers* set the *Line width* parameter for the Hatched fill layer (symbol spacing) to 3pt (recommended)
- Go back to *Classes* tab, click on the symbol for Class 5 and in *Properties-Layers* set the *Line width* parameter for the Hatched fill layer (symbol spacing) to 4.5pt (recommended)

HatchedFill03 (dotted symbols, symbol spacing)

- Copy the layer *CensusDivision_Quebec_Statistics_HatchedFill* in Table of Contents
- Rename the duplicate layer to *CensusDivision_Quebec_Statistics_HatchedFill03* or similar
- In *Symbology*, go to *Classes* tab, click *More-Format all symbols* and choose *10% Ordered Stipple* symbol from default ArcGIS style in *Gallery*
- Go back to *Classes* tab, click on the symbol for Class 1 and in *Properties-Layers* turn off the Shape marker and Solid fill layer
- Go back to *Classes* tab, click on the symbol for Class 2, in *Properties-Layers* turn off the Solid fill layer* and for Shape marker layer set *Marker Placement-X Step/Y Step* parameter (symbol spacing) to 12pt (recommended)
- Go back to *Classes* tab, click on the symbol for Class 3, in *Properties-Layers* turn off the Solid fill layer* and for Shape marker layer set *Marker Placement-X Step/Y Step* parameter (symbol spacing) to 9pt (recommended)
- Go back to *Classes* tab, click on the symbol for Class 4, in *Properties-Layers* turn off the Solid fill layer* and for Shape marker layer set *Marker Placement-X Step/Y Step* parameter (symbol spacing) to 6pt (recommended)
- Go back to *Classes* tab, click on the symbol for Class 5, in *Properties-Layers* turn off the Solid fill layer* and for Shape marker layer set *Marker Placement-X Step/Y Step* parameter (symbol spacing) to 3pt (recommended)

HatchedFill04 (dotted symbols, symbol size)

- Copy the layer *CensusDivision_Quebec_Statistics_HatchedFill 03* in Table of Contents
- Rename the duplicate layer to *CensusDivision_Quebec_Statistics_HatchedFill04* or similar
- In *Symbology*, go to *Classes* tab, click on the symbol for Class 2, and save this symbol to style
- Click *More-Format all symbols* and choose the symbol saved in previous step in *Gallery*
- Go back to *Classes* tab, click on the symbol for Class 3, and for Shape marker layer set *Appearance-Size* parameter to 1.5pt (recommended)
- Go back to *Classes* tab, click on the symbol for Class 4, and for Shape marker layer set *Appearance-Size* parameter to 3pt (recommended)
- Go back to *Classes* tab, click on the symbol for Class 5, and for Shape marker layer set *Appearance-Size* parameter to 4.5pt (recommended)

For the final map choose one of them that suits best according to your opinion (explain your decision properly in the technical report). Finish the map layout.

- In *New Layout* (A4 Landscape) insert the Map Title, North Arrow, Legend, Scale and Credits
- Export *Layout* in PDF Format

** you can save the symbol with the Solid fill layer turned off (or with changed color to No Color) and apply it to Classes 2–5. Then you can set only Marker Placement-X Step/Y Step parameter for symbols in all following Classes.*

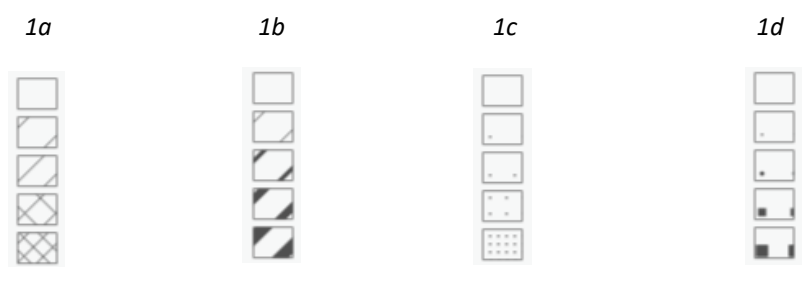


Fig. 1: Examples of various hatched fill techniques. 1a – striped symbols, symbol spacing; 1b – striped symbols, symbol size; 1c – dotted symbols, symbol spacing; 1d – dotted symbols, symbol size