

Thematic Mapping and the Semiology of Graphics

Map Creation and Layout

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Video



Map Creation and Layout



Lesson Objectives

- Explain the role of a map layout
- Present the QGIS Print Composer

After this lesson you should be able to

- Format a map with the essential layout elements (scale, orientation, legend, zoomed inset, etc.)
- Export a map in an image, vector or PDF format.

Geographic Information Systems

Hello, and welcome to this lesson devoted to map dressing and the QGIS print dialer, the tool that enables to produce cartographic documents. The theoretical information concerning the dressing has been presented to you during the first lesson of this last module about the components of the map. Here we will mainly focus on its implementation, thanks to the functions of the dialer. The goals of this lesson are to remind you on one hand what the wrapping of a thematic map is and what its role is. On the other hand, we will present the main functions of the QGIS print dialer, which allows to lay out maps and to edit them to some extent for printing or with the aim of producing files in JPEG, PNG or PDF format for example for electronic publication. After this lesson, you will be able to use appropriately wrapping elements of map to lay it out, and to export cartographic documents from the QGIS print dialer in an image format or in a vectorial format.

Notes

Summary



0m 30s

Layout Elements

Systematic	Context-dependent	
Legend	Title	Projection
Scale	Author	Labels
Orientation	Date of creation	Inset maps
Data source	Information on the spatial units (e.g. date of state division)	Grid
Date of data collection	Explanation	Nomenclature
	Frame	Index
	Coordinate System	

Geographic Information Systems

We have already mentioned the fact that the signal constituted by a cartographic representation must be accompanied by a number of components. The components are part of what is known as the map wrapping. Amongst the wrapping elements, some must accompany the map and the use of others depends on the context. This is what we have attempted to summarize in this table. But we should note that certain components are presented as compulsory according to certain authors whilst they are not for others. And it is in fact a combination of the aims pursued and the context of the publication which will help determining the correct composition of the map. However, a majority of cartographers agrees that the following elements constitute the mandatory wrapping. First, a title and a subtitle second, the year of production of the statistic and spatial data, then a key containing the description of the indicators then a graphic scale an indication of the orientation, and by default the North is located at the top of the map, then the data source, the names of the authors and any indications related to copyright and finally, the year of creation of the map.

Notes

Summary



1m 44s

Role of Map Layout



- Completes the map to ensure the best possible understanding
- Information on the **geographic context**
- Importance of the **aesthetic aspects**

Geographic Information Systems

The role of wrapping is to complete the map in order to allow the best possible understanding. And with this in mind, a thematic map should not be presented to the reader without providing the information on the geographical context nor without taking into account the aesthetic aspects of the representation.

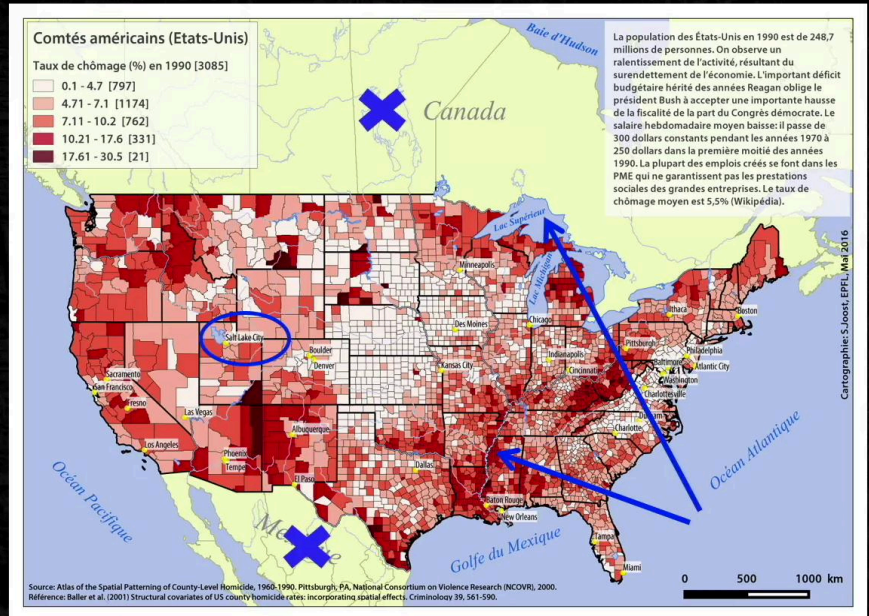
Notes

Summary



2m 58s

Geographic Context



Each represented territory has a geographical context. That means that it is contiguous to other regions or other countries, that it can be crossed by structuring geographical elements, such as rivers, lakes mountain chains, big cities, roads or major railway axes. These elements can be useful to the reader for the spatial location on one hand but also to better understand the reality of a socio-economic situation, for example. It is therefore important to include on the maps the few elements of geographical context which will promote the reading, and the comprehension of the phenomenon represented whilst taking care not to overload the document and to preserve the readability at the maximum.

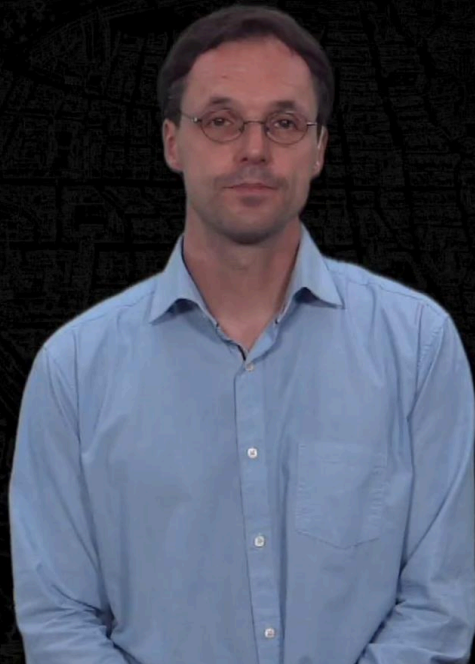
Notes

Summary



3m 17s

Map Aesthetics



- **Harmony**
 - Relationship between the map elements
 - Visual equilibrium
- **Composition**
 - Arrangement of elements
 - Quality of the formatting
 - Hierarchization
- **Clarity**
 - Coherence of color choice
 - Font choice: limit their number, style and color
 - Simplicity, parsimony: avoid unnecessary frills
- **Graphical Editing**

Geographic Information Systems

The aesthetic of cartographic documents produced rests on three pillars that are the harmony, the composition and the clarity. The harmony is the relation that has to be weaved between the elements of the map in order to produce a homogeneous signal. It is the visual balance between all the elements which will constitute a whole. The composition refers to the arrangement of the elements on the map. It is about laying out the components of the map by organizing and prioritizing them depending on their informative value and by using the space available at best around the map. The clarity depends on the coherence of the choice of colors, on the sobriety in the choice of fonts and on the optimization of the arrangement of the wrapping elements in the space available. The clarity is measured directly by the ease with which the reader will be able to decode the signal. We can also point out that the finalization of aesthetic aspects can be added during a retouching phase which is carried out in a graphic editing software like Inkscape. This phase requires the document to be exported beforehand in a vectorial format like PDF. We will not discuss it here and we will focus on the available functions in the print dialer.

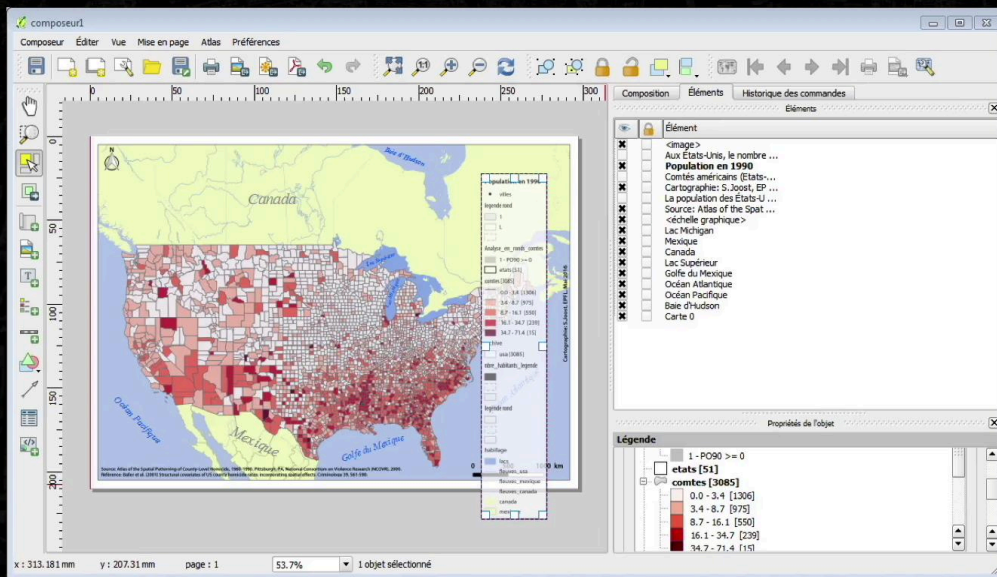
Notes

Summary



4m 02s

The QGIS Print Composer



Geographic Information Systems

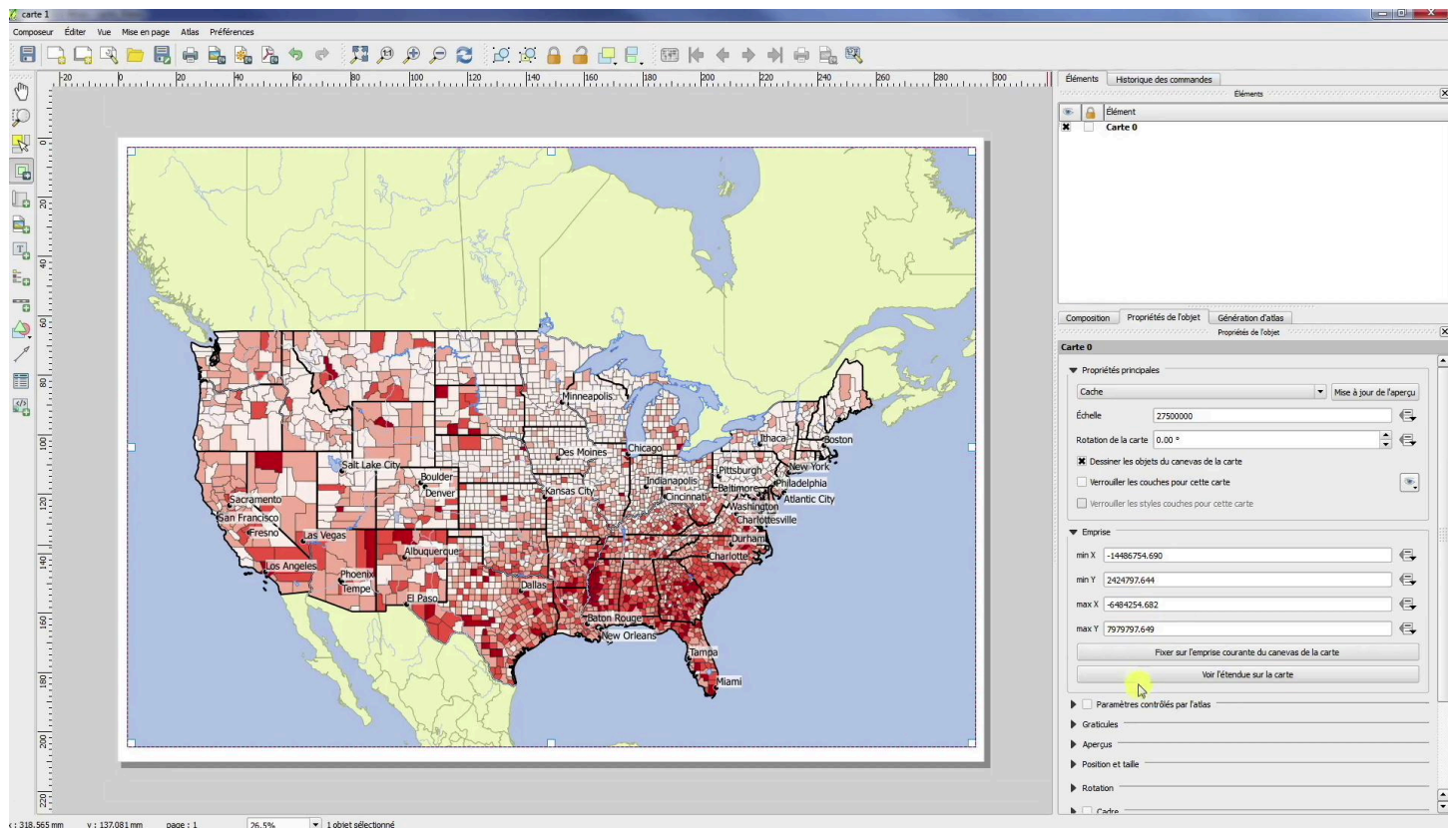
We will now apply these different notions related to the wrapping in the QGIS print dialer. The actions described in the following sequence allow to recreate, step by step the map of the spatial distribution of the homicide rate in american counties which we have presented in the lessons on the components and the functions of the map. The creation and implementation of a map in QGIS is done in the print dialer.

Notes

Summary



5m 27s



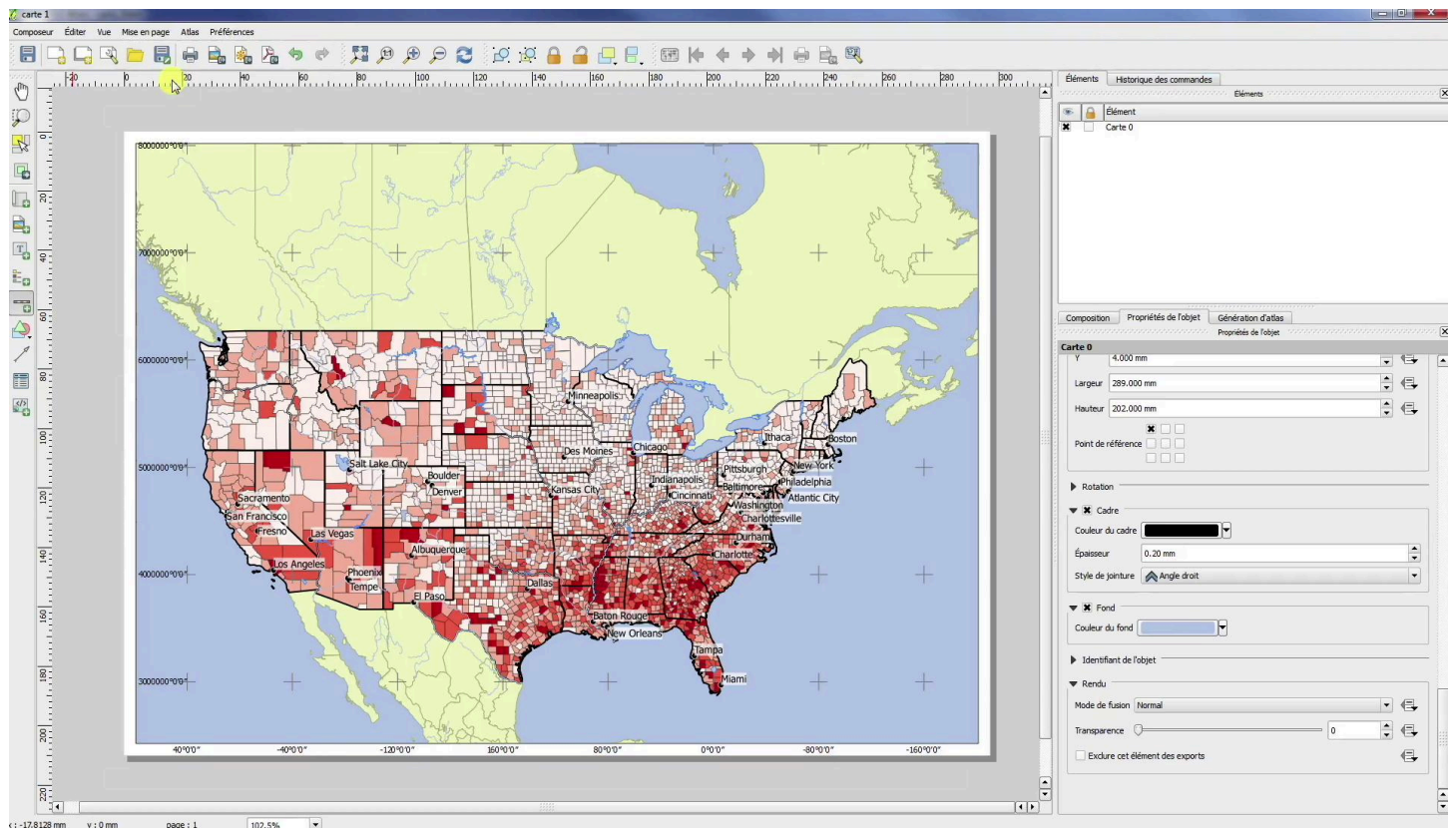
We can create a new print dialer from the "project" menu and then, "new print dialer" and "manage the existing dialers" always in the "projects" menu then "composition manager". For example, here we can delete the "map 1" dialer, which already exists. We will now create a new dialer called "map 1" to lay out the homicide rate map in the United States. To start with, in order for your dialer to present the same tool bars as what is shown on the screen, go to the "view" menu and tick "all the options" under "panels" and "toolbars". You should then have access to different toolbars on the left and on the top of the window and to panels with different options on the right. In the main toolbar, we first find the tools allowing to manage the print dialers, to create a new one or to save the project. We will see the other tools later. To start with, we will add the current map of our QGIS project thanks to the "add a new map" tool. The "object properties" panel allows us to lay out this map. First, by defining the scale of the map then under the "hold" tab it is possible to determine what geographical extent will be represented. It is also possible to modify this extent by moving the content of the map directly with the "move object content" tool.

Notes

Summary



5m 55s



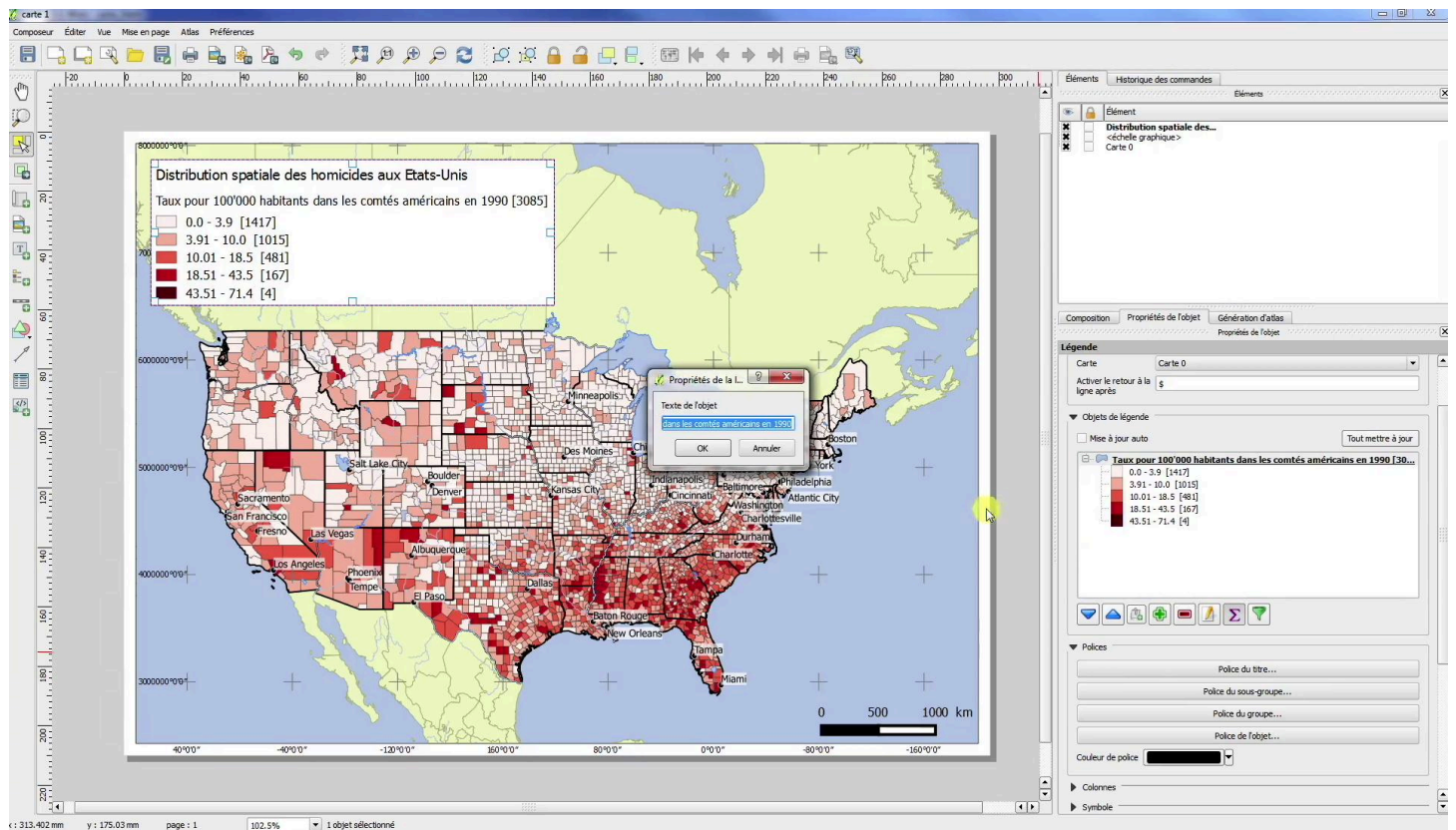
We will now add a graticule and display coordinates. Under the "graticule" tab, we choose the type of grid, the unit and the size of the intervals and finally, the type of line. It is also possible to add a frame and display the coordinates. Here we will display the coordinates in degrees, minutes and seconds. on the left and at the bottom of the map. We deactivate the display for the right and the top and we choose to display the coordinates either outside the map or inside the frame. Under the "position and size" tab, we will center the map in the middle of the page with a margin of 4 millimeters on all sides. We define the margins of 4 millimeters in x and y and we then define the width and height of the map, calculated here from the dimensions of the A4 format minus the margins of 4 millimeters. It is possible to display a frame around the map and to change its color and thickness. Finally, we can choose the color of the map background and possibly work with the transparency. Once the main map laid out, the different wrapping elements must be added. This means inserting a ladder, the orientation, a key, sources, etc. To begin with, we will display the scale.

Notes

Summary



7m 46s

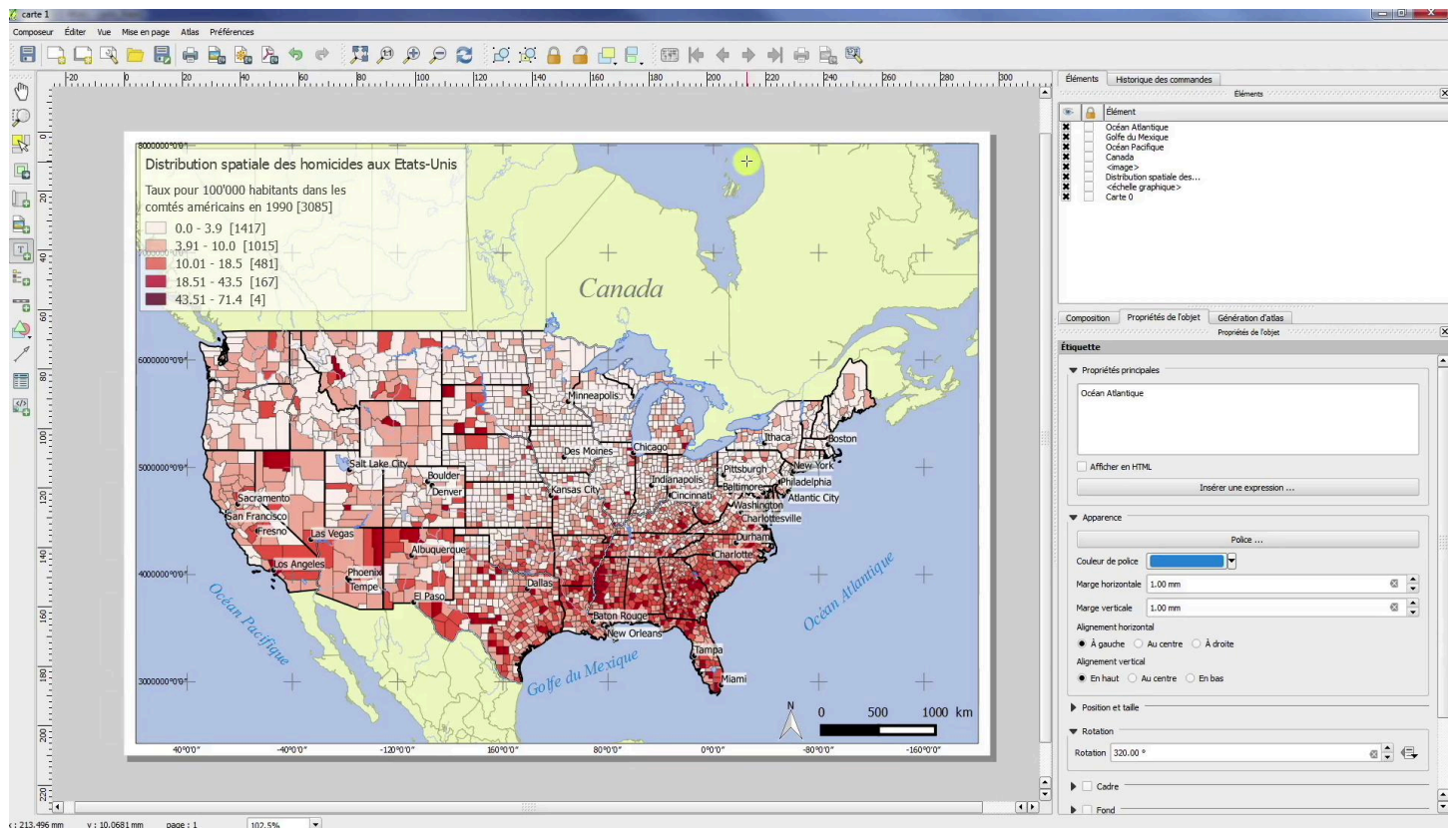


In the "layout" menu, we choose "add a graphic scale" or we click directly on the corresponding tool in the toolbar. When we click on the map, a scale is displayed with default settings. In the "object properties" we can modify the scale type, the units, the length displayed, the size of the object. It is also possible to modify other parameters related to the font in particular. We will now add a key. In "layout", we choose "add a key" and click on the map again. In the properties, it is possible to define the title, here the "spatial distribution of homicides in the United States". Under "key objects", by deselecting "auto update", It is possible to choose the layers for which the key will be displayed. We therefore delete the layers which we do not wish to see appearing. The name of the layer corresponds to the layer title in the key. To modify it, select the layer then click on the pencil icon. We can then insert the desired text for the subtitle. Text fonts can be customized. To insert a new line, it is necessary to define a particular character which will not be used in the text but which will indicate the position of the word-wraps. we choose the dollar sign here.

Notes

Summary



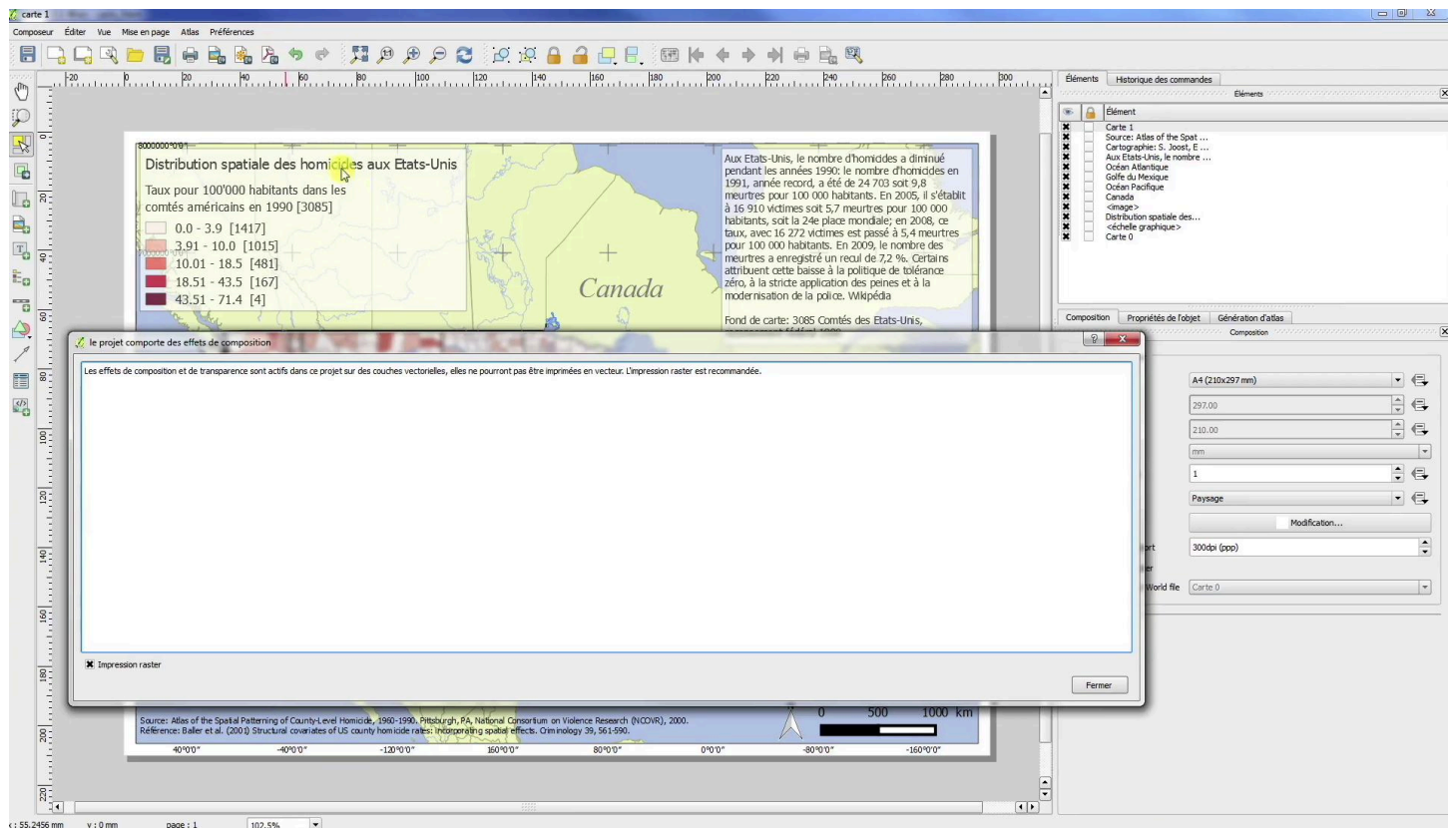


The character must then be inserted in the text at the desired location, for the word-wrap. Finally, we will display a fine frame around the key and put a white background with a little transparency. Then, to display the orientation we have to get an image. In the "layout" menu, we choose "display an image" then draw a rectangle on the map to determine its location. We can then either load images from a personal file, or use predefined QGIS directories in which pictograms are already available. Here we will choose an arrow that indicates the direction of the North. The image can easily be resized and moved. One of the last display options which we have not yet used in the "layout" menu is the label display. This tool allows to insert text boxes. We will use it first to add country names on the map like Canada first... then the Pacific Ocean... The color and the text fonts can be changed in the "object properties". In the "rotation" tab we can easily tilt the text as desired. For each of these elements, we could also display a frame, a background, or use transparency as we have seen previously for other objects. An element can also be copied and pasted with the usual commands, control C, control V.

Notes

Summary





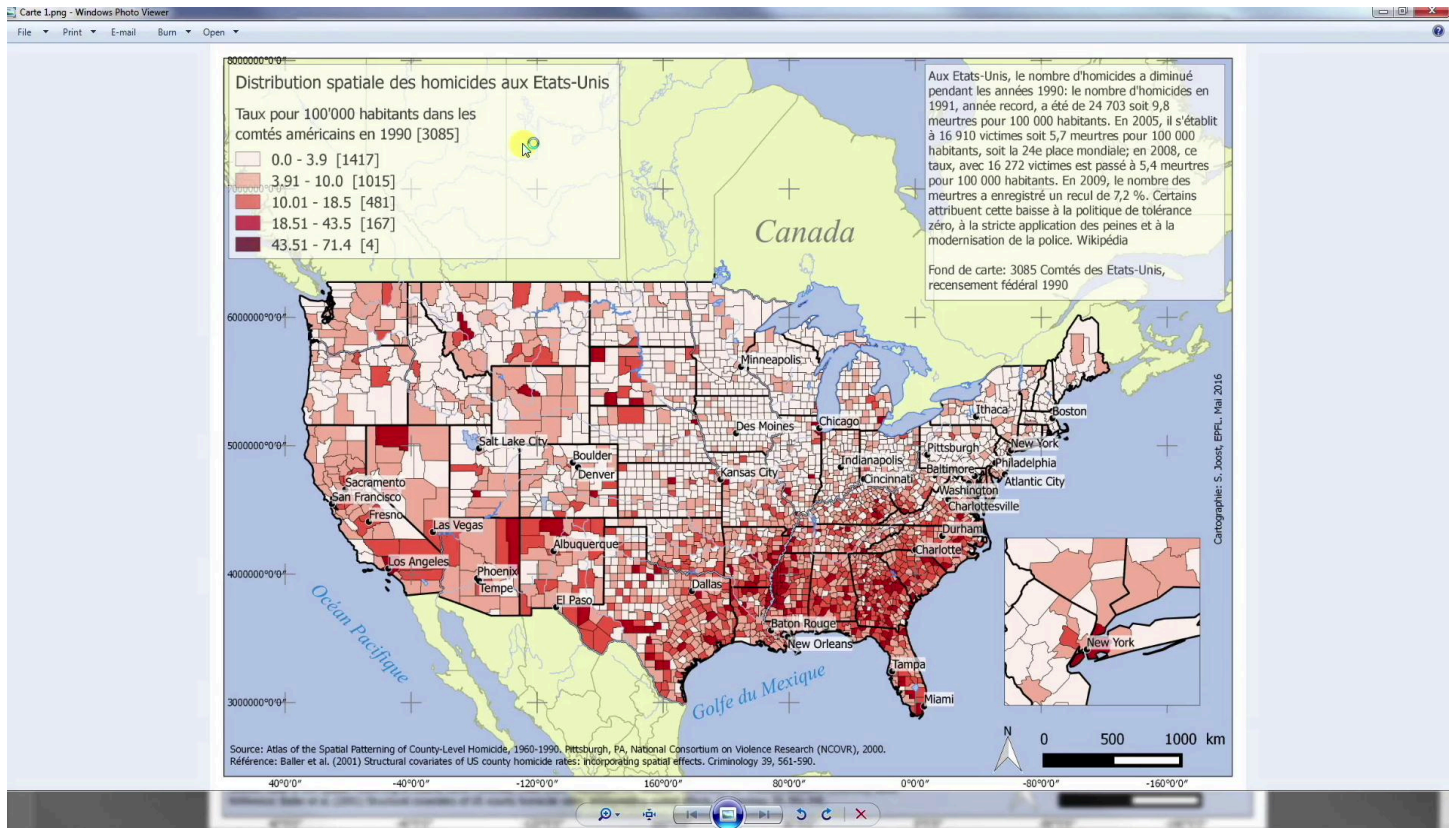
We will also use the labels to display a comment that describes the map. The text can be copied and pasted into the designated space. We will add two more text boxes. The name of the author of the map as well as the sources, and references. These elements can be displayed more discreetly on the map. To finish our map, we will display a box showing a zoom on the New York area. To do this, we will first lock the main map so that the changes made in the QGIS project do not reverberate on the main map. Then, in the QGIS project, we zoom in on the area of interest. Coming back to the print dialer, we can add a new map which will represent the enlarged area. To put this map in the foreground, we just have to change the order of superposition in the "elements" panel. This map is now ready and we will proceed to the printing and exporting. Different options are available including the choice between the JPEG or PNG image format or the vectorial format, in SVG or PDF. In the "composition" panel, it is possible to set the paper size and orientation as well as the resolution of the export. It is important to clearly define this resolution in order to obtain a good quality impression.

Notes

Summary



12m 59s



Here we will export a PDF and a PNG image. For the PDF, a message suggests us to use an image format to retain the transparency effect. This does not matter because, often, an exported PDF file is then edited in a graphic editing software like Inkscape. A glance at the two files created allows us to verify that the exporting operations have been successfully completed.

Notes

Summary

14m 48s

