

# **GEOM3007: Cartographic Theory and Design**

## **Laboratory 2: Map Generalization and Abstraction**

**Fall 2012**

**Due: October 3 at beginning of lecture (9:35am)**

### **LEARNING OBJECTIVES/TASKS:**

- Work with cartographic abstraction concepts and recognize when you are using them.
- Develop a map to meet specific narrative and layout requirements.
- Understand the properties of some common map projections and the implications of projection selection for map design.
- Experiment with ArcGIS layouts.

### **INTRODUCTION:**

This lab contains two parts, each of which will be the topic of a separate lab period:

- a) Cartographic generalization and abstraction: Darnley Basin newspaper map.
- b) Map projections: Mapping North America

The lab is due as a single submission. But I suggest that you do part a) during the first week it is discussed if possible to avoid having that work infringe on your time for part b).

**Total: 25 marks**

### **INSTRUCTIONS:**

The lab materials are posted in cuLearn. Download them and copy them to D:\Student\<student#> (or D:\Student\<student#>\lab2 is probably even better) where "<student#>" is replaced by a folder you create using your student number to keep your work separate from that of other students.

The two parts of this lab are unrelated and you should therefore create separate ArcGIS projects for each.

### **Part 1: Cartographic generalization and abstraction (15 marks)**

You have been provided with two news stories, one concerning a bridge replacement in Darnley, P.E.I. and the other discussing problems fishers are having navigating in and out of nearby Malpeque Harbour. Ignoring the fact that these stories ran in different newspapers 9 months apart, your editor has decided that you need to provide a single map that shows (and emphasizes, but subtly) the

significant locations in both stories. In addition, because column space is expensive, he insists that the map must be 9 cm x 6.5 cm. In the negotiations, he compromises a little and says you have 58.5 cm<sup>2</sup> to use however you wish but he will measure!

You have also been provided with some layers from the 11L12 Canvec 1:50000 data sets from Natural Resources Canada. These cover the area and will provide you with a starting point for designing your maps. Only use what you think you need and add additional layers as appropriate. Canvec metadata files have been provided along with a shorter summary spreadsheet listing the feature types in each layer with which you have been provided.

Remember, your objective is to create a map to support these stories and you should assume that the map and stories will be seen together. You are not trying to create a realistic image of the area. Use aggregation, amalgamation, selection and other techniques as appropriate, to make space for those story elements that need to be on the map. The required labels must be legible at the final printed size.

When you have refined your map design, create one letter size page containing:

- your 58.5 cm<sup>2</sup> *colour* map.
- One text box briefly detailing examples of cartographic generalization employed in creating the map.
- One small text box detailing the data sources and the projection you used (hint!) along with a statement of the approximate scale utilized by the map as a numeric scale designator (i.e., 1:nnnn).
- One text box containing a title, your name, and student number.

## **Part 2: Map projections (10 marks)**

In this part of the lab, you will create three (3) data frames, each using the same two data layers but displaying them using different projections.

You have been provided with a simplified world borders layer from thematicmapping.org, courtesy of Bjorn Sandvik, and a layer containing fixed geometric shapes (circles) distributed across the western hemisphere. Both the circles and the simplified world borders were generated in WGS 1984 geographic coordinates.

- **2.1** Create three data frames and label them "Lambert Conic", "Transverse Mercator", and "Web Mercator". Configure each to use a projection as described below:
  - "Lambert Conic" projection: WGS\_1984\_Canada\_Atlas\_LCC
  - "Transverse Mercator" projection: WGS\_1984\_UTM\_Zone\_14N
  - "Web Mercator" projection: WGS\_1984\_Web\_Mercator (a.k.a. the Google Maps projection).
- **2.2** In each of the frames load the simplified world borders, then load the circles on top. Give the world borders layer a fill (grayscale is fine to reduce printing cost) and show the circles as unfilled figures with solid borders.

- **2.3** Switch to layout mode and design a page to show North America in each of the three projections side by side. Allow some space for the creation of text boxes. Once you have designed the layout for the frames, ensure that North America is nicely framed in each.
- **2.4** Add a text box in which you briefly discuss the implications of each of these projections for preserving relative areas within the mapped space, for preserving angles, and for maintaining distance relations. What are the strengths of "web Mercator" and do they explain its seeming ubiquity since the advent of Google Maps? Do not use a font smaller than 10 points. If you need extra space to complete your answers, add an additional page to your submission.

**Please submit:**

- Your printed map layouts for the two parts of the lab, each on a single page as described above. Ensure that your name is on each.
- If necessary, an additional page to complete your answers for part b) and to double as your assignment cover page as described in the course outline.