Assignment 4: Disaster Management GIS

- **Due date:** Sunday, June 7th 2020, 11:59PM, via LMS
- **Submission**: upload a single PDF report per person, with a filename as STUDENTNUMBER_A1.PDF, in A4 format. Maximum report length of 4000 words (excluding cover page, references, appendices, and any diagrams or images). The report should be submitted by a single person from the group, including a cover sheet clearly identifying the group members (names and student Ids).
- **Assessment:** This group assignment is worth **30 marks** in total. Assessment points are:
    - **Presentation**: Formally well-presented report of adequate length, with argument/results appropriately supported with well-presented maps, graphs and/or tables, referenced in text. (3 marks)
    - **Approach**: Adequacy and technical soundness of the documented approach (choice of tools, parameters etc). (3 marks)
    - **Risk analysis**: Risk analysis supported by appropriate data visualizations (maps, graphs). In particular, the choice of symbology and colours used in your maps should follow the guidelines for good maps design and legibility (8 marks)
    - **Interpretation and reflection**: quality of critical analysis, further discussion and recommendations evident in discussion section. Reflection on the theoretical learning objective. (8 marks)
    - **Referencing**: non-trivial motivations, methodological choices and interpretations should be supported by literature that is well and correctly referenced. Beware of plagiarism! (3 marks)
    - **Individual reflection**: Understanding of the individual contribution (individually marked), elaborated below. (5 marks)
- **Prepare your report neatly.** Grading is based on completeness, accuracy and the professional quality of your submission.

Learning objectives

This exercise builds on previous exercises. Groups will be required to research on disaster risk management and response planning. The learning objectives are:

- You are able to use your previous knowledge to source, compile, load, and manipulate raw data to perform a risk analysis.
- Understand risk analysis and its application to projects or any action to analyse risks on a quantitative and qualitative basis.
- You are able to produce effective map visualizations supporting your analytical results.
- **Theoretical learning objective**: You will reflect on the influence of scale of representation, data accuracy, and data categorisation on the results you have produced.

Individual Reflection

This project report includes individual reflection. In no more than one page, each member of the group describes their own contribution to the project, to be included in the Appendix section at the end of the assignment report. This will be followed by a critical reflection of the value of this contribution for the validity or success of this project. It should include:

1. What did you contribute to the project, and how you did this (workflow of your project).
2. A critical review and assessment of your individual contribution to the project.
3. A critical reflection on the project learning and outcomes.

Outcomes of this assessment

Your submission will consist of a written report. An ideal report would contain the following components:

- **Cover page:** with report title, subject title, assignment number, completion date, author names and student numbers, total number of pages and word count.
- **Abstract:** A short summary in a paragraph of around 300 words or less providing and overview of the paper and its main contributions.
- **Introduction:** Where you set the motivation, problem statement, and approach, and you define any necessary terms and establish the specific focus of the report.
- **Literature Review:** A summary of your literature review from A2 with key principles and focus mentioned.
- **Methodology**: Concise outline of the steps taken to address the problem and derive the results, with clear argument about the choice of methods and parameters (possibly organised into tables).
- **Results**: A series of maps, including Hazard map and various Risk maps.
- **Discussion:** Highlighting the key messages from the presented facts and any limitations.
- **Conclusion**: Summary of report, limitations of the study and possible extensions.
- **References:** With a consistent citation style, referencing the main literature that supported your approach, tool choice and/or parameter choices. (and **Appendices** where applicable).
- **Appendices**: Any subsidiary information and your Individual Reflections to be included here.

Task Overview

In light of the recommendations on Emergency Planning and Response, the State Government has contracted your consultancy to perform a risk analysis across the state. Your consultancy will be required to gather state-wide data related to the disaster scenario and its effect on the population, environment, industry, and infrastructure. Based on this data, the state government wants your consultancy to produce a response plan for emergency response teams and the general public. This response plan will prepare the target audiences for future disaster events.

It will include information, statements, and recommendations related to:

1. Population movement management
2. Environmental impact statements
3. Industry response plans, and
4. Infrastructure management and protection

Risk analysis is part of risk management – an essential component in managing any project. It can be analysed spatially with the following equation.

Risk = Hazard x Elements at Risk x Vulnerability

The things at risk can include:

- Population
- Environment
- Industry
- Infrastructure

Limit your research area to a state of your choice. Eg. Cyclones in QLD, bushfires in VIC or NSW etc. Once decided, choose the elements that can impact your disaster hazard, which can include a combination of the following examples:

- Accessibility to roads
- Distance to emergency services
- Tree density
- Land use
- Topography
- Electricity wires
- Previous burnt areas
- Previous fires

Obtain your data from various data sources and begin compiling, loading, and manipulating the data in ArcGIS. Some useful tools will be suggested in the workflow document.

You need to discuss what the government should do with this information, how the public should be informed and to recommend any improvements or response plans to reduce risks, eg. Where drainage should be increased, suggested areas to undergo preliminary burn-offs, which neighbourhoods should be informed of heightened disaster risk, what infrastructure should be updated etc.

On top of your discussion you will also need to produce a series of map, including the Hazard map showing just the hazard values, and various Risk maps showing:

- Vulnerability and hazard values applied to an element at risk
- End risk with all elements at risk, vulnerabilities and hazard values combined according to the formula

It is highly suggested you focus your research on either **Flooding** or **Bushfires**

The following websites can be used to obtain useful datasets. Feel free to obtain datasets from other reliable source of your choice. You can also pay a visit to the map curator of ERC library for any specific data once you have decided on your scenario.

www.data.vic.gov.au, www.data.qld.gov.au, www.data.nsw.gov.au, www.aurin.org.au,
www.services.land.vic.gov.au/SpatialDatamart/
www.openstreetmap.org/