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| **STUDENT NAME: Moses Bernard Velano**  **Geography Assignment Cover Sheet**  ***Your assignment/essay will not be marked unless this sheet is signed and attached to the assignment/essay.***   |  |  | | --- | --- | | **Course Code:** | GISC101-21S2 | | **Student ID Number:** | 83396373 | | **Lab Stream &**  **Tutor’s Name:** | GISC101-21S2 (C), ComA, 01  Earnest Rutherford 211 GIS Comp Lab &  Martin Nguyen | | **Assignment:** | Research Project: Part B - Visualisation | | **Due Date:** | 29th October, 2021 | | **Word Count:** |  |     **STATEMENT REGARDING DISHONEST PRACTICE**  ***(in connection with the work submitted for assessment)***  The University’s interpretation of what constitutes dishonest practice includes, but is not limited to, the following:   1. **Plagiarism**, being the deliberate presentation of any material (text, data or figures, on any medium including computer files) from any other source without clear and proper acknowledgement of the source of that material. 2. **Collusion**, being work performed in whole or in part in conjunction with another person or persons, but submitted as if it had been completed by the named author alone or joint authors if a group item of work. 3. **Copying**, being the use of material (in any medium, including computer files) produced by another person or persons, with or without their knowledge and approval. 4. **Ghost writing**, being the use of another party (with or without any form of payment) to prepare all or part of an item of work submitted for assessment.   Under the University Regulations, evidence of any of these or other forms of dishonest practice by any student(s) represents grounds for disciplinary action and may result in penalties ranging from denial of credit for the item of work in question to exclusion from the University. The University’s full policy on Academic Integrity can be found at the following link:  <http://www.canterbury.ac.nz/ucpolicy/GetPolicy.aspx?file=Academic>[-IntegrityGuidance-For-Staff-And-Students.pdf](http://www.canterbury.ac.nz/ucpolicy/GetPolicy.aspx?file=Academic-Integrity-Guidance-For-Staff-And-Students.pdf)    **DECLARATION:** I have read and fully understand the statement above regarding Dishonest Practice and hereby certify that this item of work submitted for assessment is entirely my own work.  Date: 24/10/2021 |

**GISC101 Research Project**

**Part A: Data analysis, code, and report**

**Introduction:**

The importance of considering at the health of the rivers in South Island, New Zealand rivers are vital to the communities and the environment that surrounds it. (The Nature Conservancy, 2018). That is why the aim of this research is to focus on how benthic macroinvertebrates enhances the water quality in these streams. As most of the information about this research project had already been justified in Part A, the focus of this part is to interpret the spatial visualization. Focusing on the results that were pre-made and using all the necessary steps and functions to produce an interactive map.

The proposal of this research is intended to examine the effect of median Macroinvertebrates Community Index (MCI) (Stats NZ, 2020) scores in the overall health condition of major rivers in South Island. Alongside with the effect of different climate condition to the mean MCI in the rivers.

**Data and Methods:**

In this part, the analysis that were relevant are gathered from the previous working from Part A. The analysis that was produced from previous part was done by using the function ‘st\_write’ from Simple Feature (SF) package. This enables the analysis results from Part A to be written in the disk and transfers it here (Pebesma, n.d.). Then using the function ‘st\_read’ to load the data that were pre-made from previous part into R. An interactive map was generated from the results gathered from Part A to visualize the mean SiteMedian of MCI under a certain climate condition using relevant functions of tm\_shape() from ‘tmap’ package. Giving information of the general health of the stream ecosystem in South Island by showcasing the highest mean MCI under different climate state. Another interactive map using the same functions to visualize the overall mean of MCI in major rivers of South Island TAs.

**Results and Discussion:**

The analysis that was accessed from Part A manifested a full visualisation of the wellness of major rivers in South Island. This part showcases the health quality of the streams by providing two interactive map that lets users navigate around to interact with the result of the analysis. These interactive maps that were created from the ‘tmap’ package produces a significant correlation. Where in the first interactive map (Figure 1) shows an insight of the correlation between the distribution of different climates in South Island TAs rivers and its individual mean SiteMedian of the major rivers in TAs. The second interactive map (Figure 2) showcases the distribution of the mean of MCI in major rivers of TAs.

The analysis of these interactive maps were sufficient for the visualisation, however there were few unusual features. This is displayed on both interactive maps showing missing values in the analysis, where insufficient measurements may have affected the visualisation of the mean MCI and SiteMedian. On the other hand, Grey District evidently showed a significant mean SiteMedian of MCI in their streams. Also manifesting a Cool-Extremely-Wet (CX) climate temperature in the river. This reveals that this district contains the most dense population of macroinvertebrates which indicates that its streams are remarkably healthy and clean.

This investigation were only limited for the major rivers in South Island TAs. Therefore, this may have likely affected the results of the visualisations where missing values occurred and few rivers of their MCI were unable to be measured. The negative impact of this, is the results in (Figure 1 & 2) may be deficient as the data that were gathered only accounted for the major rivers in South Island. If every rivers in South Island were considered to be studied then maybe a much more reliable results are produced.

Map

Description automatically generated

**Figure 1.** Distribution of the mean SiteMedian of MCI under certain climates state.

Map

Description automatically generated

**Figure 2.** Distribution of the overall mean of MCI in major rivers of South Island TAs.

**Conclusion:**

In conclusion, maintaining a high and healthy water quality in the rivers are designated by the inhabitants of the benthic macroinvertebrates. Containing a CX temperature in the water improves the mean SiteMedian of MCI in South Island major rivers. This is evidently shown in Grey District and Westland District manifesting a higher mean SiteMedian, pointing out that the quality of the rivers in those district are significantly clean and healthy. Furthermore, (Figure 2) laid out the variability of the mean of MCI by TAs showing the overall density of the benthic macroinvertebrate in South Island TAs major rivers.

**References**

The Nature Conservancy. (2018). *Healthy Rivers Lead to Healthy Communities*. <https://www.nature.org/en-us/what-we-do/our-insights/perspectives/healthy-rivers-lead-to-healthy-communities/>

Stats NZ. (2020). *River water quality: Macroinvertebrate Community Index*. <https://www.stats.govt.nz/indicators/river-water-quality-macroinvertebrate-community-index>

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