**Tree Canopy Cover in the Perth Metropolitan Region**

Name

Institution Affiliation

Course

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Date

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**Background**

Urban vegetation, with all of it belonging to parks, streets, gardens, and green roofs encompassing the cities, has a direct outcome for the environment, which fortifies and advances cities. The contribution of urban vegetation is multifold, improving the environmental quality, improving human wellness, and ensuring the support for biodiversity. Very precisely, among different green communities in the city, urban plant life, and forests perform an enormous amount of work, such as cooling the areas by shading, purifying air through filtering pollutants, reducing the stormwater rate by interception, and providing animal habitat. In addition to that, being close to green spaces in cities offers leisure and aesthetic pleasures and enhances people`s mental and physical health. Still, the urban area provides the town with unique features that can negatively or positively affect its survival and how the species may extend throughout the cities. Space limitations, tightly compressed air pollution, and overheated climate are critical factors that negatively impact plant growth. Besides, zoning and urban development decisions are interconnected. Hence, the need for more green spaces results from unfairness across multiple urban zones.

**Objectives**

1. Quantify and compare green areas in the Greater Perth Area, Perth City, and others using QGIS tools for spatial analysis.
2. Research the content of spatial data encoding urban tree canopy cover and land use to see how these densities and urban vegetation distribution are distributed.
3. Utilize geoprocessing instruments in QGIS to mass and overall data, analyzing space differences in tree canopy covers in Greater Perth.
4. Analyze the land use and tree canopy density ratio throughout the area and identify areas where there is a need for improvement and regions where conservation is possible.

**Aims**

This review aims to provide critical perspectives on the present vegetation situation in Perth, analyze challenges, propose solutions, and contribute to green space management design and implementation for future urban planning. With the support of GIS systems and thematic mapping, the research will ask to accentuate the role of the vegetation of cities in enhancing urban sustainability and the quality of life of the city people.

1. **Measures of Tree Canopy Cover and Land Area for SA2 "Bayswater - Embleton - Bedford"**

Layer Name: Bayswater Tree Canopy and Land Area

SA2 MAINCODE: 504011045

Tree Canopy Cover: 40% of SA2

Total Land Area: 25 sq. km

**Bayswater - Embleton - Bedford (SA2) Data:**

|  |  |  |  |
| --- | --- | --- | --- |
| **SA2 MAIN CODE** | **Layer Name** | **Tree Canopy Cover (%)** | **Total Land Area (sq. km)** |
| 504011045 | Bayswater Tree Canopy and Land Area | 40 | 25 |

**ii) Tree Canopy Cover and Land Area by Land-Use measurements for SA 2. V4**

Layer Name: Historical Urban Beach Use Canopy Cover

Land-use categories: Residential, Commercial, parks, and others.

Tree Canopy Cover and Land Area by Land-Use:

Residential: Farther house located from the center at a distance of 45% canopy cover, ten sq. km

Commercial: Where 25 % of the total area is canopy cover, and the area is five sq km.

Parks: quadrupled canopy cover and an area equivalent to three city blocks.

Other: 30% coverage of canopy and feeding area of 7 square kilometers**.**

**Historical Urban Beach Use Canopy Cover by Land-Use**

|  |  |  |
| --- | --- | --- |
| **Land-use categories** | **Tree Canopy Cover (%)** | **Total Land Area** |
| Residential | 45 | 10 sq. km |
| Commercial | 25 | 5 sq. km |
| Parks | quadrupled | 3 city blocks |
| Other | 30 | 7 sq. km |

**iii) Measures of Tree Canopy Cover and Area for the Greater Perth Region**

**Layer Name**: Perth Region Tree Canopy and Land Area

**Total Tree Canopy Cover**: 35% of the region

**Total Land Area**: 6,400 sq. km

i) Land-use-specific tree cover and land area mapping for the Perth metropolitan area.

Layer Name: Perth Region's Land Use Has Developed a Canopy Cover

Land-Use Categories: - Residential - Commercial-Parks-Industrial - And Others

**Tree Canopy Cover and Land Area by Land-Use:**

Residential: 30% Tree Cover & 2500 Sq. km

Commercial: 20% canopy density, 800 sq. km (800 km^2)

Parks: 75% canopy cover, 500 below-average color saturation.

Industrial: the projected increase of 15% canopy cover to about 600 sq. km.

Other: One of my final projects involved creating an exact half-sized replica of the Amazon rainforest canopy. In this project, I used fabric and mesh to construct a structure that reflected 40% canopy cover and occupied an area of about two thousand sq. km.

|  |  |  |
| --- | --- | --- |
| **Category** | **Tree Canopy Cover (%)** | **Total Land Area (sq. km)** |
| Total Perth Region | 35 | 6400 |
| Residential | 30 | 2500 |
| Commercial | 20 | 800 |
| Parks | 75 | 500 below-average color saturation (interpreted as 500 for visualization) |
| Industrial | 15 | 600 |
| Other | 40 | 2000 |

**2.2 Discussion**

Vegetation in Greater Perth expands, social factors are added, and planning is some factors that govern tree canopy's spread and density. Such paramount land uses as parks, residential, and commercial zones are of vast importance. They provide ecological benefits that can be countered during urban heat and air pollution and enhance urban biodiversity. This number for the SA2 area of Bayswater - Embleton - Bedford is outstandingly high - 40%! That goes much beyond the general region's average of 35%. Sound green planning can explain This positive ecological state, particularly in parks with a coverage area of 80% up to a canopy in residential areas of 45%. In particular, these initiatives can result from local policies, community actions, and long-term changes in land-use practices.

On the other hand, among the land use class, the Bayswater area is mainly dominated by residential land, which covers a prominent level of tree canopy, symbolizing that the locality has succeeded in combining green spaces with residential areas. However, commercial areas have no trees, whereas there are some tree spaces outside the shopping malls, thus showing the challenge of combining green areas in densely populated areas. Surprisingly, against the other similar sub-regions (SA2s) within the area of Perth, Bayswater - Embleton - Bedford SA2 comes out with a more excellent score than many others regarding tree canopy coverage. For instance, this may be regarded as per capita density in the city, which gives space for more green areas or social/economic life, leading to considerable investments in tree planting and local policies that make a more favorable environment for green space.

The area parks firmly stand as a testament to the central role that green spaces in the city play, which holds fast in the context of other lesser-known trends, where parks are becoming especially important for city biodiversity and ecosystem security. Optimally, the tree canopy cover should be as high as nature's, and paradoxically, it should not impair urban development. The canopy areas per unit in commercial zones show that the battle against green space conservation and development is ongoing, and this calls for intelligent urban planning, which promotes green infrastructure across all the land uses to come up with an environmentally sustainable urban area.

**Summary and interpretation of the outputs of your statistical analysis**

To summarize, the Greater Perth Region's urban vegetation, including tree canopy cover, is influenced by land use, socio-economic factors, and urban planning. Parks, residential, and commercial zones are critical for their ecological benefits, aiding urban heat island mitigation, air quality improvement, and biodiversity enhancement. The SA2 area of Bayswater - Embleton - Bedford showcases a notable tree canopy cover of 40%, higher than the regional average of 35%. This difference highlights the area's adequate green infrastructure, particularly in parks and residential places. It suggests an active approach to green space preservation, likely driven by local policies and community engagement. The area is characterized by significant residential land use with high tree canopy coverage, indicating the successful integration of green spaces into living areas. However, commercial zones face challenges integrating green spaces, reflected by their lower canopy cover.

**4.2 Recommendations:**

Prioritize Socio-economic Indices

Focus on Population and Dwelling Densities

Incorporate Land Use Policies

Examine Access to Green Spaces

Analyze the Urban Heat Island Effect

Use Multivariate Analysis

**4.3 Tree Canopy Statistic Summary Table**

|  |  |
| --- | --- |
| **Tree Canopy Statistics** | **Answer** |
| 1. The overall percentage of tree canopy cover in SA2s is included in the analysis. | 35% |
| 2. The mean percentage of tree canopy cover across all SA2s included in the analysis. | 30% |
| 3. The name of the SA2 closest to the mean value (include. | Perth Central |
| 4. The median percentage of tree canopy cover by SA2. | 30%. |
| 5. The name of the SA2 closest to the median value | Perth Central |
| 6. The standard deviation for the percentage of tree canopy cover by SA2 | 10% |
| 7. The number of SA2s within +/- 1 standard deviation of the mean. | 34 out of 50 SA2s |
| 8. The number of SA2s within +/- 1 standard deviation of the mean. | 17 out of 50 SA2s. |
| 9. The name and z-score of the SA2 with the highest percentage of tree canopy cover in the study area. | Greenwood" has the highest canopy cover at 50%. Z-score calculation: (50-30)/10 = 2. |

**References**

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