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Asessing the disturbance level in protected areas of India

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Introduction

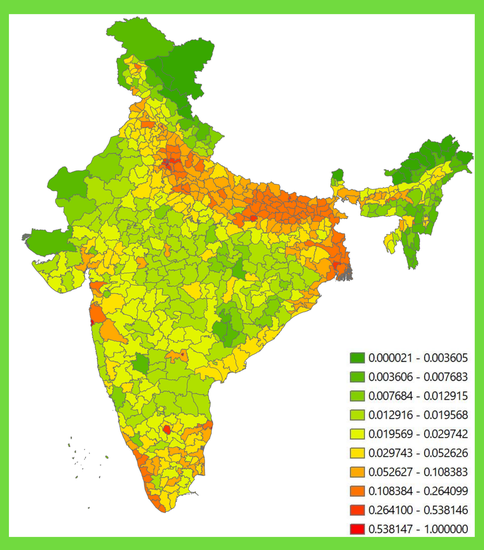
Protected areas are essential for the preservation of biodiversity and the maintenance of ecological balance. In India, these areas are increasingly threatened by anthropogenic activities and infrastructure development, such as population growth, road expansion, and railway construction. Understanding and assessing the levels of disturbance in these areas are critical for effective conservation and management. Geographic information system (GIS) analysis to integrate data on various parameters providing a comprehensive assessment of disturbance levels across India's protected areas.

Objective

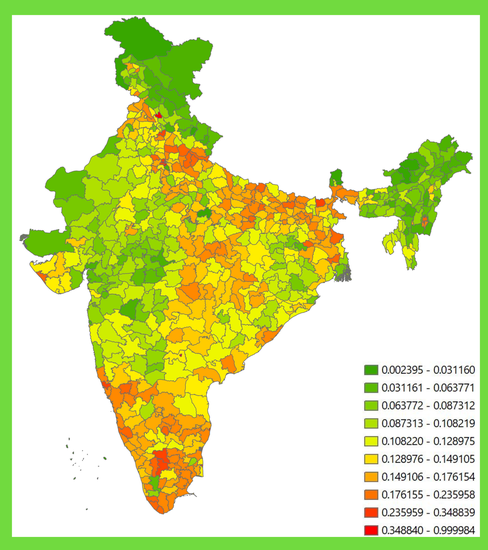
The primary objective of this project is

1. To assess the disturbance levels in protected areas of India, including integrating spatial data on population density, roadways, and railways using GIS analysis
2. Identifying the most and least disturbed protected areas across different regions
3. Providing insights and recommendations for conservation planning, habitat restoration, and sustainable management of protected areas based on the disturbance index findings.

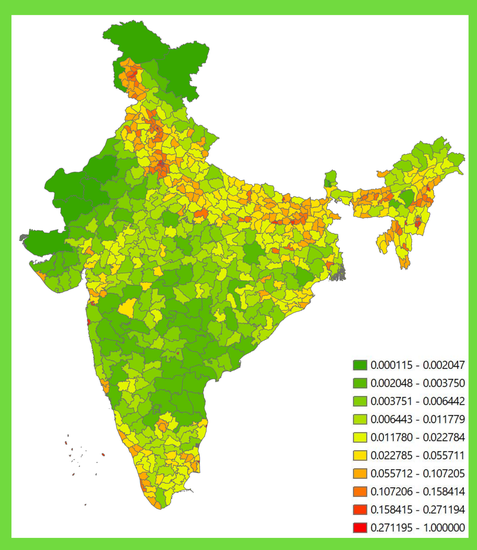
Database preparation and analysis



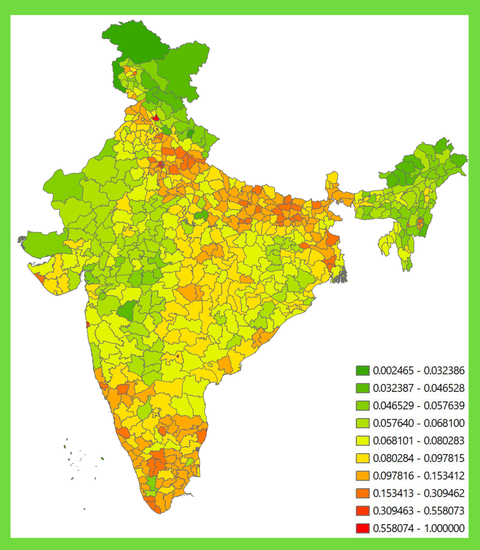
Population Density



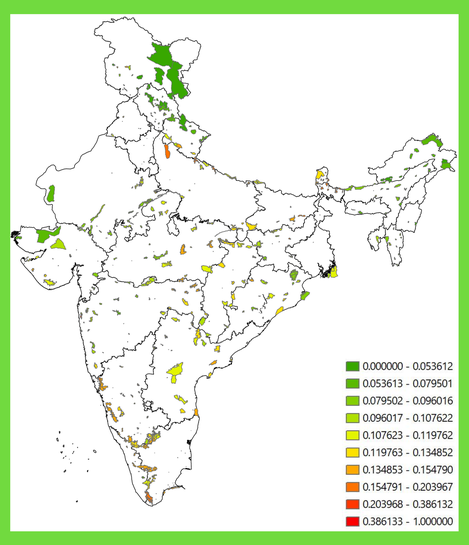
Road Density



Railways

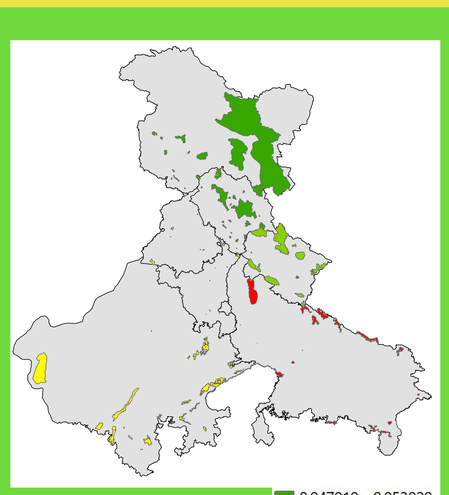


Normalized & Summed Densities



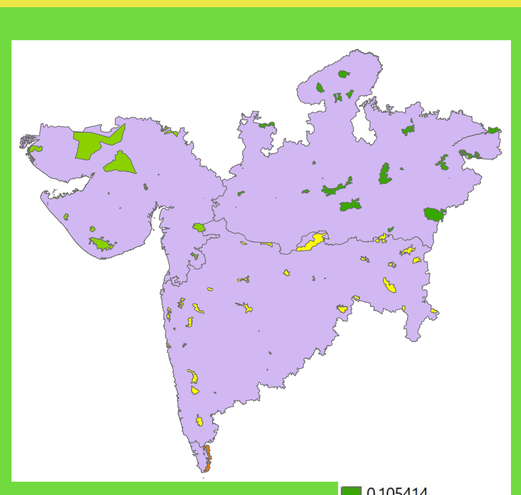
Protected Areas with Disturbance level

Results



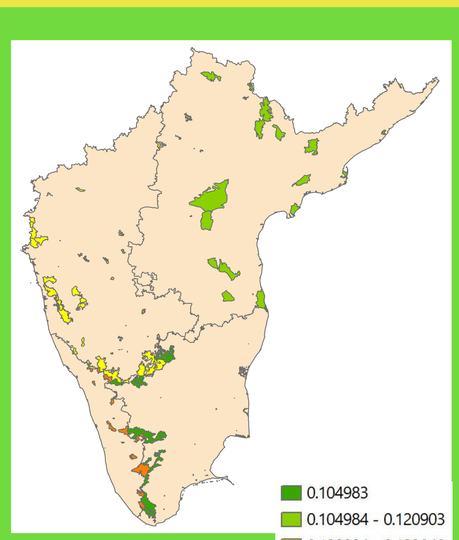
Northern Region

- Most Disturbed- Hastinapur WLS(UP)
- Least Disturbed- Limber WLS (J&K)



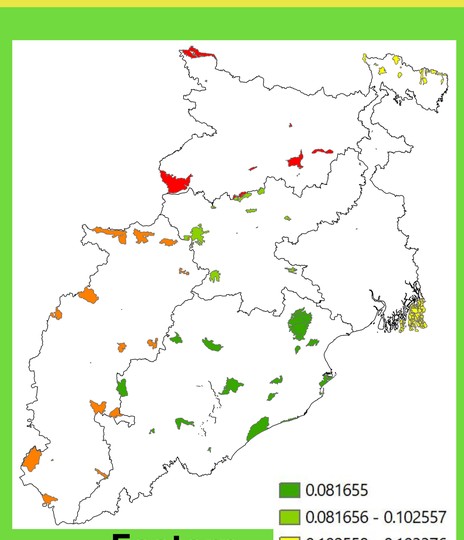
Western Region

- Most Disturbed- Nawegaon National Park(Maharashtra)
- Least Disturbed- Van Vihar National Park(MP)



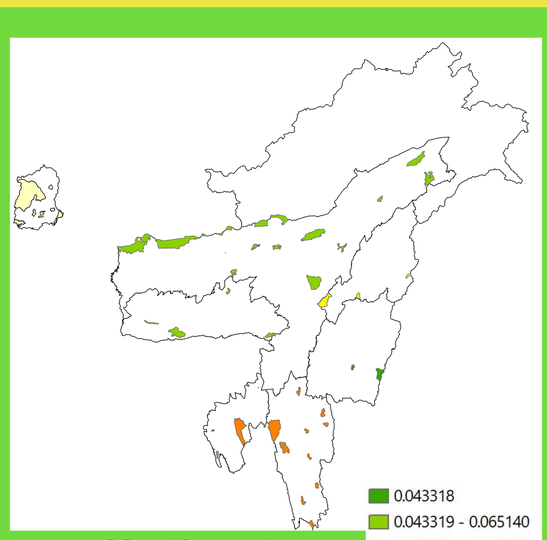
Southern Region

- Most Disturbed- Oussudu WLS(Puducherry)
- Least Disturbed- Indravati National Park(TN)



Eastern Region

- Most Disturbed- Pant WLS(Bihar)
- Least Disturbed-Bhitarkanika National Park(Odisha)



Northeastern Region

- Most Disturbed- Maenam WLS(Sikkim)
- Least Disturbed-Yangoupokpi Lokchao WLS(Manipur)

Future work and Objective

1. Expand Data Sources: Incorporate additional data sources such as satellite imagery for vegetation cover,etc. to refine the disturbance index.
2. Temporal Analysis: Conduct a temporal analysis to monitor changes in disturbance levels and identify emerging threats.
3. Biodiversity Impact Assessment: Integrate biodiversity data to assess the direct impact of disturbances on various species.
4. Community Involvement: Engage local communities in monitoring and conservation efforts to enhance the effectiveness of management strategies.

References, Appendix

Conclusions

From the above maps, it can be inferred that the the most disturbed protected areas is Hastinapur WLS(Uttar Pradesh), and Vikramshila WLS(Bihar) while the least disturbed is Limber WLS(Jammu & Kashmir) and Lachipora WLS(J&K). The population, roads and railways densities around Limber WLS are very low compared to urban areas.

The primary reasons for disturbances in the most affected areas include:

- **High Population Density:** Increased human settlements and activities within and around protected areas.
- **Infrastructure Development**: Extensive road and railway networks that lead to habitat fragmentation and easier access for poaching and illegal activities.
- **Economic Activities:** Agriculture, mining, and other economic activities that encroach upon protected land and degrade habitats.

These areas experience high levels of **human activity**, leading to habitat fragmentation, increased pollution, and greater human-wildlife conflicts