How much water should flow through a river to sustain terrestrial wildlife?

Using LiDAR and multispectral imagery to map herbivore habitats in Nepal

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Project description

Grasslands and forests alongside dynamic river systems at the Himalayan foothills form crucial habitats for endangered wildlife such as the endangered Greater one-horned rhinoceros, and the Bengal tiger and mesoherbivores that form its prey. The vegetation provides forage and shelter for land animals throughout the seasons and is predominantly influenced by floods, fires, and human activities. These ecosystems exist as 'conservation islands', surrounded by agriculture and settlements. The habitats can be affected by human-induced alterations in the water system that often happen outside these areas such as changes in river courses, hydropower dams or ground water extraction. It is expected that these alterations in hydrologic conditions can significantly affect the availability of food and shelter, yet their ecological responses remain insufficiently understood. Results will aid in making water-animal relationships explicit as empirical evidence for the required amount of water that should flow through a river to sustain wildlife on land. This can be seen as extension of the 'environmental flow need' concept.

As researcher you will use field data in combination with remotes sensing data to extrapolate vegetation traits to broader spatial scales to study how the shelter for wildlife is determined by hydrologic conditions. Canopy cover plays a crucial role during the dry period when temperatures exceed 40 degrees Celsius. The understory vegetation contributes to wildlife habitat structure by offering varying levels of protection from predators and serves as a food source.

You will integrate LiDAR, multispectral satellite remote sensing, and field data to develop detailed maps of vegetation structure (shelter). Seasonal vegetation changes derived from multispectral indices will be used to map canopy cover, understory type, and understory openness. You will then analyze how these variables are influenced by hydrological and other environmental drivers. We are planning to use the results for a scientific publication and you are invited to co-author and contribute to the scientific article. As a Bright Minds Assistant you will work in parallel to the NWA-funded initiative "Save the Tiger, Save the Grasslands, Save the Water" — https://savethetiger.nl/.

Job requirements

The researcher is expected to be proficient in GIS and remote sensing. This includes the analysis of plot data on vegetation, multispectral datasets and derived timeseries, as well as analysis of point cloud datasets. Affinity with hydrology, vegetation and wildlife is highly relevant.