

# Riparian areas could act as climatic refugia for plant diversity

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Riparian forest along Lancang River in Xishuangbanna. Credit: Huang Jian

The Lancang River is internationally known for its rich water resources and diverse aquatic ecology, but research on riparian plant biodiversity is sparse. As a tropical transition area in the Mekong Basin, Xishuangbanna

in southwestern China is an ideal place for in-depth studies into the role of rivers on biodiversity patterns and to predict the impact of climate change on regional plant biodiversity.

In a study published in *Science of the Total Environment*, researchers from the Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences have investigated the importance of [riparian areas](#) for biodiversity conservation management by identifying climatic refugia for threatened [woody plant species](#).

Using an ensemble of small models, the researchers predicted the current and future (2050s and 2070s) potential distribution of 50 threatened [woody species](#) in Xishuangbanna and then stacked the predictions for [individual species](#) to derive spatial biodiversity patterns within each 10×10 km grid cell. Afterwards, they identified the top 17% of the areas for spatial biodiversity patterns as [biodiversity hotspots](#) and defined climatic refugia as areas that remained as biodiversity hotspots over time.

The researchers then applied stepwise regression and linear correlation to analyze the environmental correlations with spatial biodiversity patterns and the relationships between climatic refugia and river distribution, respectively.

Results showed a transitional shift of threatened species from the tropics to upslope and boreal regions, confirming that climate warming drives species to higher elevations and/or latitudes. Spatially, biodiversity patterns shifted from southeast to northwest and were influenced by temperature, precipitation, and elevational heterogeneity.

They further confirmed that the Lancang River valleys act as refugia to maintain long-term species persistence by sustaining regional moisture availability and buffering climate change impacts on biodiversity. The

species richness of forests that border [water bodies](#) (i.e., riparian forests) is higher than that in other upslope forests.

"This study suggests that the establishment of a riparian buffer is an effective priority conservation strategy for the plant biodiversity in riparian areas. It's thus important to protect riparian areas from threats posed by the expansion of rubber plantations in Xishuangbanna," said Li Jie of XTBG.

**More information:** Xiaoyan Zhang et al, Riparian areas as a conservation priority under climate change, *Science of The Total Environment* (2022). [DOI: 10.1016/j.scitotenv.2022.159879](https://doi.org/10.1016/j.scitotenv.2022.159879)

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