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Assessing the habitat suitability of the Ganga River under anthropogenic influence

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The Ganga River ecosystem in the Indo-gangetic plains is under severe anthropogenic stress. Flow regulation and habitat fragmentation caused due to structural barriers are responsible for the degradation of biodiversity in a river system. Determining the suitability of river habitats under contemporary modification is detrimental for river health management. Habitat suitability of several reaches of the Ganga River is impacted by the barriers through hydrological alteration leading to poor hydraulic condition and loss of lateral connectivity.

We study the hydrological, hydraulic, and geomorphic suitability of the Ganga River between Bijnor and Narora barrage for the Ganga river dolphin (*Platanista gangetica*), an indicator species of the Ganga, Brahmaputra- Meghna River system. The discharge data measured downstream of the Bijnor barrage shows that the minimum flow required for the biodiversity and the fluvial process is available only during the Indian summer monsoon period (June- September). While the river reaches upstream of the Narora barrage has maintained the required flow for biodiversity throughout the year. The channel hydraulics influences the habitat selectivity in a river system. The minimum preferred depth for navigation and foraging activity of the Ganga river dolphin is 1-2 m. We calculate the reach averaged hydraulic parameters of the Ganga River at the upstream of Narora barrage using the Geomorphic instream flow tool (GIFT) and altimeter derived water level for different flow conditions. The minimum required depth is available only when the water level is >178.95 m. This only suggests the reach averaged condition and does not reflect the cross-section level depth. The channel geometry analysis of several cross-sections shows that the mean depth of the reach upstream of Narora barrage is 2 m (range 1-2.8 m, SD= 0.8 m) in the low flow season (March) and the maximum depth ranged from 2.4 to 12 m (SD= 2.8 m). During the high flow season (September), the mean depth is 2.8 m (range 2.2-4 m, SD= 0.53) and the maximum depth ranges from 4.4 to 14.4 m (SD= 2.8 m). This suggests that the reach upstream of the Narora barrage has adequate depth during the low and high flow seasons.