(262)

Assessing the Spatial Arrangement of Reach Morphology along a Headwater Stream: A Case Study in Yagirala Forest Reserve

Balasuriya, S.N.[*], Chandrathilake, G.G.T.

Department of Forestry and Environmental Science, Faculty of Applied Sciences,
University of Sri Jayewardenepura, Nugegoda, Sri Lanka
*sachibalasuriya.98@gmail.com

Abstract

Headwater streams are the initiation points of river networks. They are important areas for the investigation of geomorphological features of stream channels due to the proximity to sediment supply sources and fewer disturbance from anthropogenic activities. In this study, the spatial arrangement and characteristics of bed morphologies in a headwater stream in Yagirala Forest Reserve investigated at reach scale. The study was conducted by establishing 11 sites along the headwater stream. Montgomery and Buffington classification was used to identify different reach morphologies. Detailed observations of the classification criteria were recorded, along with measurements such as stream width, depth, and boulder sizes at each location. The study's findings show three major channel morphologies: alluvial, bedrock and mixed alluvial morphology along the headwater stream. Furthermore, various reach morphologies such as step pool, plane bed, pool riffle, regime (sand bed) under alluvial morphology were identified. Field investigations revealed that step-pool reaches were found in relatively high-gradient areas, while plane-bed and pool-riffle reaches were in mid-gradient areas, and regime reaches were found in lower-gradient areas. At the reach scale, the plane bed occupied the majority of the stream. Under the spatial arrangement of channel reaches, the expected general downstream pattern of Montgomery and Buffington classification was not observed in this study. Fluvial processes were dominated in all the reach types along the stream. Bed morphology characteristics at reach scale were closely related with the longitudinal profile of the headwater stream. The outcomes of the study have the potential to future restoration of the region's degraded headwater streams and similar environments while providing a better understanding of the major aspects of headwater streams.

Keywords: *Headwater streams, Reach, Morphology, Montgomery and Buffington classification*

Proceedings of the 29th International Forestry and Environment Symposium 2025 of the Department of Forestry and Environmental Science, University of Sri Jayewardenepura, Sri Lanka

5