

## MODULE 6: BANK EROSION HAZARD INDEX (BEHI) after Rosgen (2006)

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### INTRODUCTION

Streams and rivers are formed by natural geological processes, fluvial dynamics, and human disturbance (Sulaiman et al., 2021). As a result, water resources must be carefully managed to ensure the long-term viability of river landscapes and a steady supply of clean water. We might notice that the river landscape keeps changing each year after a major flood event. River landscapes are altered due to erosion, sediment transport, and deposition (Julien, 2010). An interruption of natural river equilibrium through land-use change, in-stream sand mining or other causes will result in erosion or deposition downstream of the river networks.

We are interested in having a stable channel and river bank which can be defined as the least degraded channel caused by natural and anthropogenic alterations, with the most ecologically and morphologically dynamic states, self-sustaining and resilient to external perturbations (Palmer et al., 2005) and the best condition that the river can balance the human alterations given the catchment conditions (Brierley & Fryirs, 2013).

An unstable river bank will lead to excessive erosion, sediment transport and deposition processes. Although these three processes are natural phenomena that shape our river landscape (Julien, 2010), the excessive process will lead to river encroachment, the retreat of the river bank, damaging hydraulic structure and machines as well as shallowing the navigational passage (Vanoni, 2006; García, 2008). The problems associated with unstable river bank conditions are shown in Table 6.1 and Figure 6.1, respectively.

Table 6.1: Problems of excessive fluvial erosion, sediment transport and deposition

No.	Erosion	Sediment Transport	Deposition
1	The river bank will become unstable and susceptible to collapse which may introduce large amount of sediment loadings into the river system	The mud and debris flow will carry large amount of sediment which may wash away the properties and infrastructure along the flow path.	Flood plain deposits cause a variety of damage to crops and developments, as well as streets, highways, and railroads.