



VEGETATED FLOOD PROTECTION DAMS, DIKES AND LEVEES

RW7

ADDRESSED
HAZARDSPROTECTED CRITICAL
INFRASTRUCTURE

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(1) Vegetated levee with recreational space at Sava River in Zagreb

Image Credit: [Tamara Kuzmanić, [2025]. Used with permission;

(2) Vegetated levee

Image Credit: [Tamara Kuzmanić, [2025]. Used with permission;

▶▶ What is it?

Vegetated flood protection dams, dikes and levees are **longitudinal structures** designed primarily to prevent flooding.

Levees and dikes are types of embankments that hold back water on one side, to protect land, often vegetated to enhance stability and ecological benefits. Longitudinal dams, a river training method, are built parallel to the flow of a river to manage water levels and flow (Bakker & Vrijling, 2013; Gebert & Groengroeft, 2020; Mazzoleni et al., 2017; Rimoldi et al., 2021).

▼ Primary functions and key services

- **Flood mitigation and flow regulation:** levees and dikes act as barriers along the waterline, preventing floodwater from overspilling. Longitudinal flood protection dams guide (channel) water-flow along river courses, preventing sudden surges (Mazzoleni et al., 2017).
- **Erosion control:** vegetation stabilises soil and reduces erosion from surface runoff and wave action. Longitudinal protection dams stabilise river beds and protect river banks from wave action and water surges (Gebert & Groengroeft, 2020; Rimoldi et al., 2021).

Infrastructure protected:

- Transportation networks: protects roads, highways, railways, and bridges from flood damage and erosion.
- Safeguards factories, warehouses, and business districts from water intrusion (Gebert & Groengroeft, 2020)
- Energy infrastructure: protects power stations, and renewable energy sites (e.g., hydroelectric plants, solar farms) from water-related damage
- Water infrastructure (supply and treatment): prevents contamination and operational disruptions (Mazzoleni et al., 2017)

In addition it protects:

- Cultural and heritage sites from flood risks
- Agricultural land: shields farmland from flooding, preventing crop loss and soil degradation.

Hydrological hazards:

- Moderate mitigation of pluvial flood (heavy rainfall), fluvial flood, coastal flood (e.g., storm surge), surface runoff, fluvial sediment transport, stream bank and bed erosion, sheet erosion and rill erosion, gully erosion, coastal and shoreline erosion (including freshwater environments), debris flood (volumetric sediment concentration 20-40%), and debris flow (volumetric sediment concentration >40%) (Gebert & Groengroeft, 2020).

Challenges this NbS addresses

- **Floods** – prevention/reduction;
- **Erosion** – prevention/reduction;

▼ Site suitability, scale and coverage

Regions dealing with hydrological hazards, depending on specific needs and local conditions.

- Alluvial valleys (Mazzoleni et al., 2017)
- Floodplains (Gebert & Groengroeft, 2020)
- Mountainous areas
- Urbanised areas

Ecosystem services

- ▶ **Biodiversity support and habitat provision** creation of habitat.
- ▶ **Water quality improvement:** by filtering of surface-runoff water (Rimoldi et al., 2021).
- ▶ **Aesthetic and cultural value**

