

# Riparian Forest Buffer Restoration



Riparian buffer zones are habitats along surface water bodies such as rivers and lakes. They can be natural grassland, forests, shrubs, or in some cases also wetlands count as riparian buffers. Riparian forest buffers or riparian woody buffers are treed corridors along water bodies. Forests can store and retain water comparable to sponges.

Changes in land use, construction of dams and channels, felling of riparian forest, intensive grazing of domestic and wild animals, and other threats led to the reduction of this important buffer zones. The restoration of riparian buffers can support the 1) reduction of flooding by storing and infiltrating water, but also increasing evapotranspiration; 2) stabilization of riverbanks with their rooting system; and 3) filtration of nutrients and sediments before entering water bodies. Restoration activities can include management of existing buffer zones (e.g., removal of invasive species, managing grazing practices, removing construction and cleaning waste) or reforestation.

## Overview

|                        |  |
|------------------------|--|
| <b>Type</b>            | Green  |
| <b>Approach</b>        | Restoration  |
| <b>Hazard</b>          | They can be restored to reduce the risk on <b>Riverine Flooding</b> .  |
| <b>Multi-hazard</b>    | The riparian zone also functions as a buffer between land and water and can filter out pollutants. Therefore, riparian buffers can attenuate <b>Eutrophication</b> . Furthermore, the treed landscape provides protection and stabilisation for riverbanks and, therefore, prevents <b>Landslides</b> .  |
| <b>SDGs</b>            |     |
| <b>Direct Benefits</b> | <b>Runoff Storage</b><br>Treed riparian buffers have a greater capacity to store runoff water than other land cover types. Nonetheless, they do not reach capacities of other Nature-based Solutions such as ponds. Their retention and storage capacity depends on various factors, e.g., the soil, the climate region, and the forest density. |

**Slow Runoff**

In general, the riparian forests have the ability to slow surface runoff and, during flooding, also river runoff.

**Co-benefits****Water Quality**

Riparian buffers are transitional zones between land and water. They filter pollutants such as phosphor or nitrates and preventing them from entering surface water bodies and the groundwater.

**Soil Conservation**

Forest covers can retain eroded sediments but also stabilise riverbanks with their rooting system. These functions can prevent sediments from entering the water.

**Biodiversity**

Riparian buffers have several advantages for biodiversity of flora and fauna. Shade of the trees can regulate the water temperature which can be beneficial for fish populations. Furthermore, fish populations can increase due to natural woody shores which function as breeding places or organic food provision.

On land, riparian forests can increase the biodiversity by connecting forests or creating new habitats. Depending on the species, buffers need a minimum width to provide a habitat. A minimum of 30 m is often reported.

**Carbon Storage**

Additional forest biomass produced can enlarge carbon storages.

**Habitat Connectivity**

Restoring riparian forest buffers can be strategically targeted to reconnect existing buffer zones. Connecting habitats will invite different species to reside there.

**Costs**

According to calculations by the European Commission, minimum costs of trees per hectare are between 781-2555 Euro and maximum values are between 718 and 3514 Euros. Country specific prices are available in the Commission Staff Working Document 'The 3 Billion Tree Planting Pledge for 2030' (COM(2021) 572 final).

Other costs are reimbursement of landowners. This includes the land itself but also costs for lacking agricultural income. Maintenance costs are not reported.

**NBS Related Policies**

EU Biodiversity Strategy for 2030  
Habitats and Birds Directives  
Water Framework Directive  
Floods Directive  
Common Agriculture Policy  
European Green Deal  
EU Forest Strategy  
UN Convention on Biological Diversity  
Climate Change Adaptation Policy

**Funding Options** Rural Development Programme  
LIFE+ Climate Action  
EU Green Deal

## Design Implementation

**Scale** Microscale/single/scattered/local (1 m - 1 km)  
Watershed/Mesoscale (1 km - 100 km)

**Size** A minimum buffer width of 16 m is recommended. Generally, a buffer of at least 30 m width supports wildlife.

**Slope** Max. 3 %

**Soil** Organic and alluvial sediments

**Land Cover** Cropland  
Grassland  
Sparsely vegetated areas  
Urban

**Cautions** Riparian zones are planted best by connecting existing woody areas. Roads within the buffer may have a limiting factor on biodiversity.

## NBS Suitability Mapping

(Below are the layers and specifications listed that were used for analysing the suitability of this Nature-based Solution for your area)

**Land Cover** Built-up areas, landfill, construction, Cropland, Grassland, sparsely vegetated areas  
[LUISA Base Map 2018, Batista and Pigaiani, 2021]

**Canopy Cover** 0-30 %  
[Tree Cover Density 2018, Copernicus Land Monitoring Service]

**Soil Parent Material** Organic and alluvial sediments  
[Parent Material (European Soil Database v2.0), European Soil Data Centre (ESDAC)]

**Slope** Up to 3 %

**Infrastructure** Buildings (areas without buildings)  
[ESM, Corbane and Sabo, 2019]

## References

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