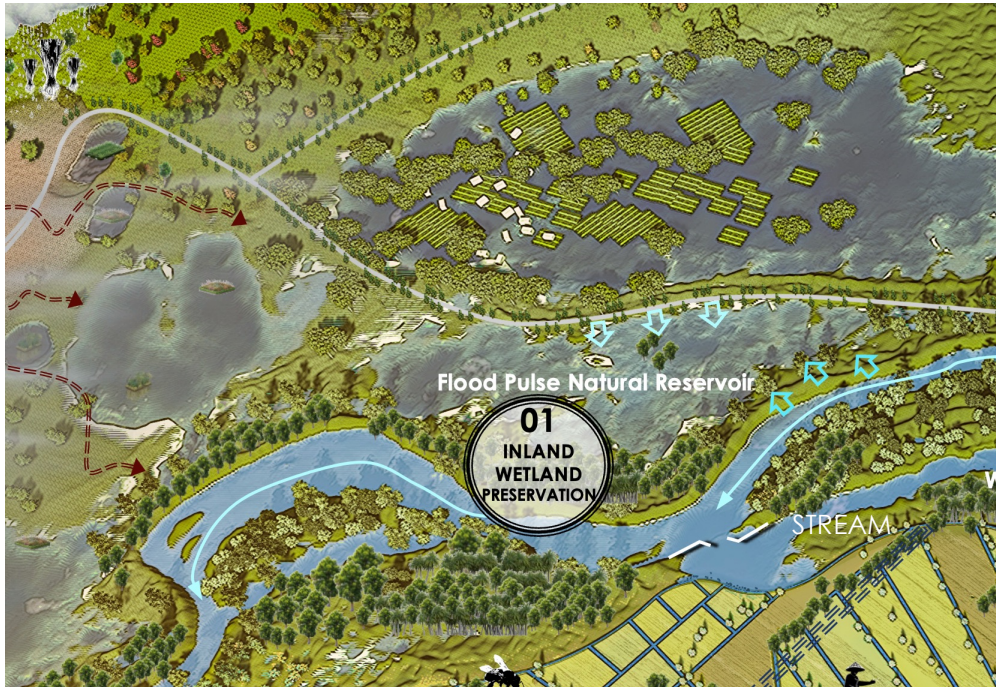
NbS-01: INLAND NATURAL WETLANDS



Riparian wetland restoration and preservation focuses on rejuvenating critical freshwater ecosystems by reinstating their natural hydrology and vegetation. Restoration efforts often involve reconnecting floodplains to their rivers by breaching levees, removing barriers, or regrading streambanks to allow seasonal flooding. This hydrological reconnection fosters sediment deposition and nutrient exchange, rebuilding the wetland platform and creating conditions for plant growth.

Techniques such as using biodegradable materials, like coir mats or straw bales, help stabilize banks and retain sediments, while channels, pools, and meanders are reintroduced to restore the natural features of the wetland. These modifications enhance water circulation and provide diverse habitats for fish, amphibians, and aquatic invertebrates.

Native flood-tolerant vegetation, is planted to anchor soils, filter water, and provide shade and habitat.

LANDSCAPES SUPPORTED

EbA (ECOSYSTEM-BASED APPROACHES)

- FOREST LANDSCAPE RESTORATION
- ECOSYSTEM-BASED DISASTER RISK REDUCTION
- ECOSYSTEM BASED ADAPTATION
- GREEN INFRASTRUCTURE
- INTEGRATED WATER RESOURCES MANAGEMENT

MAIN PROBLEMS ADDRESSED

- SOIL EROSION
- BIODIVERSITY LOSS
- FLOOD CONTROL
- DISASTER RISK REDUCTION
- CARBON SEQUESTRATION
- FOOD SECURITY

ECOSYSTEM SERVICES AND ACTIONS

SUPPORTING

- Provide habitats for plants, animals, migratory birds, fish.
- Recycle essential nutrients, maintain soil fertility.
- Trap sediments during floods, stabilizing riverbanks.

REGULATING

- Act as natural buffers by absorbing and slowing floodwaters, protecting downstream areas.
- Allow water to percolate into aquifers, maintaining base flows during dry periods.
- Regulate local temperatures and store carbon in wetland soils and vegetation.

PROVISIONING

- Store and regulate freshwater for domestic, agricultural, and industrial use.
- Support fisheries, rice cultivation, and wild edible plants.
- Provide resources like reeds, wood, and medicinal plants.

SOCIAL BENEFITS

- Offer opportunities for studying river dynamics, biodiversity, and wetland ecology.
- Recreation and ecotourism, cultural heritage around rivers.

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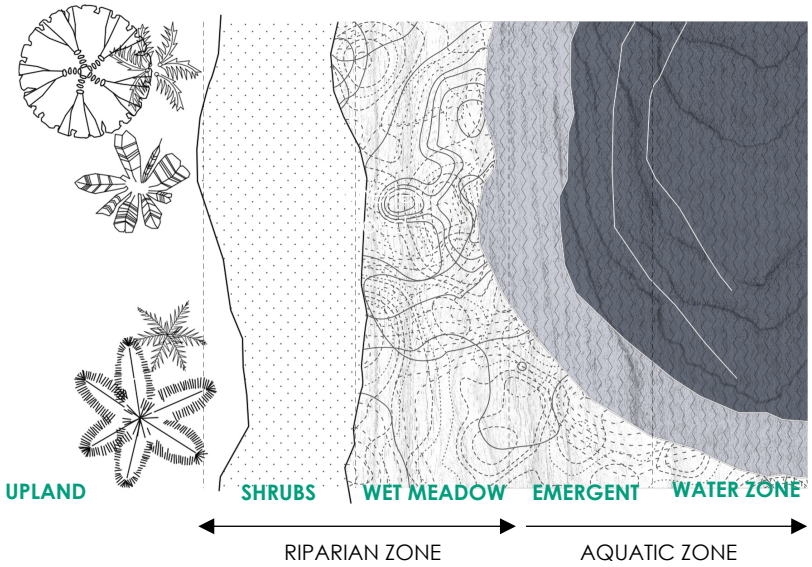
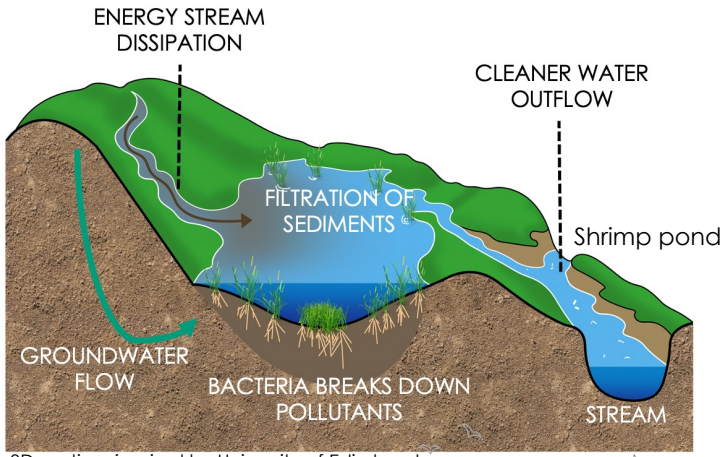


INLAND NATURAL WETLAND ALONG RIVER



3D section, inspired by University of Edimburgh

NATURAL WETLAND SECTION.

PROJECT'S CHALLENGES & RISKS

- **Pollution:** Agricultural runoff, industrial waste, and untreated sewage contaminate wetlands, harming biodiversity and reducing water quality.
- **Sea level rise:** Coastal wetlands, including mangroves, are at risk of submersion due to rising sea levels.
- **Governance challenges:** Competing demands for agriculture, urban development, and water resources lead to wetland degradation.
- **Natural Subsidence**: Wetland areas can naturally subside over time, compounded by human activities like groundwater extraction.

NbS co-BENEFITS AND THEIR INDICATORS

- **Enhanced Biodiversity Conservation**
  Population trends of key indicator species.
  Presence of migratory bird species during critical seasons.
- **Improved Water Quality**
  Levels of pollutants (e.g., nitrogen, phosphorus) in wetland and downstream water, sediment load reduction in river systems.
- **Flood Risk Reduction**
  Reduction in flood peak levels during heavy rains.
  Number of downstream communities protected from flooding.
- **Increased Food Security:**
  Area of agricultural land supported by wetland irrigation.
  Annual fish catch or wild food harvest.
- **Reduced Disaster Recovery Costs:**
  Estimated savings from reduced flood damages.

COST ANALYSIS

- **Direct Costs**
  Restoration, monitoring, infrastructure.
  $5,000–$30,000 per hectare restoration cost
- **Indirect Costs**
  Loss of income from alternative land uses (e.g., agriculture or development).
- **Time Horizon**
  Initial establishment and functional optimization (3–10 years).
  Full operational lifespan (10–50 years or more)
- **Direct Benefits**
  Flood risk reduction, water quality improvement, resource harvesting.
- **Indirect Benefits**
  Policy and Regulatory Costs (Enforcement of wetland protection laws), capacity building and education.
- **Risk Assessment**
  Sea level rise, urbanization, funding gaps for long-term management and the reliability of revenue.

REFERENCES:

Cambodia, Tonle Sap Lake and Floodplain Wetlands.
Australia, Barmah-Millewa Forest (riverine wetlands).
UK, Tophill Low Nature Reserve, small wetlands fed by the River Hull in East Yorkshire.

IMPLEMENTATION OPPORTUNITIES:

Vietnam, Mekong Delta Wetlands, particularly in the Plain of Reeds and U Minh wetlands.
Indonesia, preserve and restore wetlands in the Mahakam River Basin in Kalimantan.