BIOPOLUS MODULAR FLOATING PLATFORM

Floating forests that bring urban water *back to life*

A modular floating ecosystem where **coppiced riparian woodland**, a living **biotextile root matrix** — the **BIOPOLUS Metabolic Network Reactor (MNR)** — and **accessible public space** come together to turn degraded urban waterways into living infrastructure.

Water infrastructure that doubles as parkland — a living green corridor on the water.

≈ 40 M · 4 MODULES

THE PLATFORM Three proven systems, *one living structure*

Each platform layers three field-tested systems into a single structure — grounded in the **proprietary MNR biotextile**, refined through large-scale water and wastewater treatment and now reimagined as living public infrastructure.

1

Floating coppice woodland

A **multi-layered living habitat** — far beyond a grass-topped raft, approaching a natural riparian softwood forest that shelters wildlife above and below the waterline.

- **Coppiced grove** — woody species send deep roots below the surface for biofilm and submerged habitat; maintained by coppicing.
- **Floating perimeter mat** — low- to medium-growing herbaceous species, including macrophytes that oxygenate the water column.

2

MNR biotextile root matrix

Proven artificial-root carriers add a vast surface for biofilm. In combination with the living roots of trees, shrubs and other plants, they form a **hybrid rhizosphere** hosting 2,000–3,000 microbial species that break down pollutants.

3

Human-integrated space

Pontoon walkways open the platform for **access, operation, monitoring, education and community life**. It is designed as green infrastructure people can use and enjoy every day — not hidden machinery.

THE CHALLENGE Built for Europe's *water crisis*

Europe's rivers, lakes and urban waters face converging pressures — degraded habitats, nutrient pollution, intensifying floods and droughts, and growing strain on the communities and economies that depend on them. The platform is engineered to address these pressures directly, and to advance the EU's Horizon Europe mission — **Restore our Ocean and Waters by 2030**.

Freshwater degradation & biodiversity loss

River regulation and artificial channels erode ecological status and harm aquatic life.

→ **Multi-layered habitat** rebuilds aquatic and riparian biodiversity.

- PROTECT & RESTORE

Nutrient & organic pollution

Runoff, agriculture and under-treated wastewater drive eutrophication.

→ Floating units and **hybrid root matrices** cut nutrient loads.

- PREVENT POLLUTION

Floods & hydrological pressure

Narrowed floodplains and overloaded sewers bring floods and storm overflows.

→ **Water-sensitive design** buffers stormwater and builds resilience.

- PROTECT & RESTORE
- PREVENT POLLUTION

Lost river–floodplain connectivity

Disconnected, degraded wetlands break ecological continuity.

→ **Restored wetland function** reconnects habitats and rebuilds ecological continuity.

- PROTECT & RESTORE

Strain on water economies & recreation

Declining waters erode tourism, amenity and ecosystem services.

→ **Accessible blue-green space** revives services and recreation.

- SUSTAINABLE BLUE ECONOMY

The Carrione, Carrara — an urban river boxed in concrete and clouded by marble-quarry slurry.

ALIGNED WITH THE EU MISSION — RESTORE OUR OCEAN & WATERS BY 2030

A Horizon Europe mission. Each objective advances a named EU framework — the platform contributes to all three.

01

Protect & restore

Marine and freshwater ecosystems and the biodiversity they hold.

In line with the EU Biodiversity Strategy for 2030

02

Prevent pollution

Eliminate pollution of our ocean, seas and waters at source.

In line with the Zero Pollution Action Plan

03

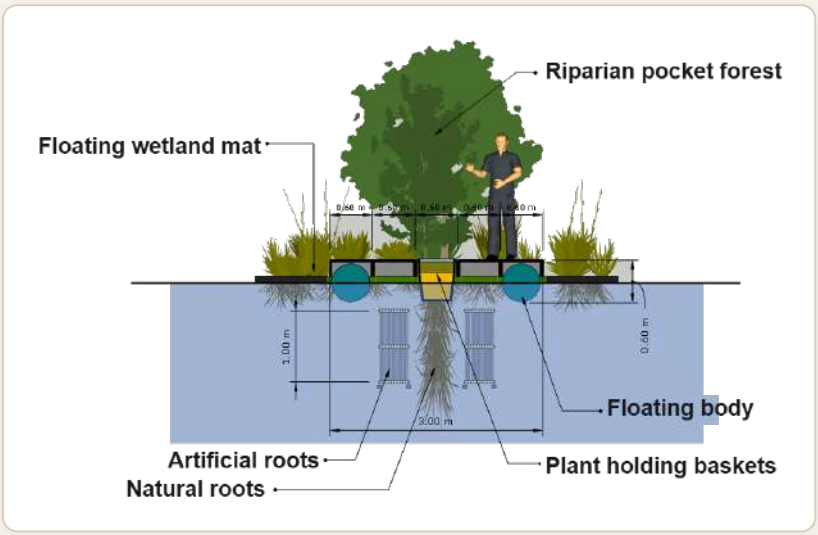
Sustainable blue economy

Make our use of water resources carbon-neutral and circular.

In line with the European Climate Law & Blue Economy Strategy

HOW IT WORKS *Modular* reactor systems

Every platform is built from one repeatable module — a pontoon roughly 3 × 7 m, ringed by a floating wetland mat and joined by pontoon walkways. How the modules connect depends on the site. In rivers and slow-flowing channels they form a linear cascade along the shore — four modules span roughly 40 m — drawing water through progressively differentiated root and microbial communities. In ponds, lakes and larger basins they lock into a matrix or network sized to the space, where a mechanical aeration system can optionally be added to drive water movement and circulation.



One module in cross-section — the repeatable building block. Planting above; a dense web of natural & artificial roots below the waterline.

Riparian pocket forest

Willow, alder & other trees — shade the water, extend the root zone, and shelter wildlife above and below.

Floating wetland mat

Perimeter macrophytes release oxygen into the water column, fuelling aerobic microbes.

Dense plant & artificial biotextile roots

Living root mass and biotextile carriers together form a vast, structurally complex surface for biofilm — and a rich habitat.

Biofilm on roots

A microbial biofilm breaks down nutrients and priority micropollutants such as pharmaceuticals.

Living root zone

Fish, invertebrates & microbes shelter and break down pollutants in the root web.

WHERE IT FITS One system, *many shorelines*

Strip
RIVERS · CANALS

Linear platforms running along shorelines, 3–5 m wide.

Isle
LAKES · RESERVOIRS

Module matrices or networks — one or more units, sized and anchored to the basin.

Pier
URBAN WATERFRONTS

Accessible walkways from shore — recreation plus treatment.

Belt
DEGRADED SHORES

Connected systems forming continuous habitat corridors.

WHAT IT DELIVERS

WATER QUALITY

- **40–60%** typical nitrogen removal
- **30–50%** typical phosphorus removal
- Heavy metals captured in harvestable biomass

BIODIVERSITY

- Multi-layer habitat for fish, birds & invertebrates
- Fish spawning & bird nesting structure
- Ecological corridors between habitats

PEOPLE

- Accessible green space on the water
- Education & citizen science
- Higher waterfront amenity value

CIRCULAR

- Coppiced biomass as a renewable output
- Modular & relocatable
- Low-energy, nature-based operation

BIOPOLUS Modular Floating Platform — modular nature-based water infrastructure, building on the field-proven MNR biotextile from large-scale water and wastewater treatment. Scalable to rivers, lakes, canals and retention basins.

Partner with us — *municipalities, private developers and research consortia — to bring urban waters back to life, from a single waterfront to a European programme. biopolus.net*

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