Floating Islands

(Synonyma: Floating rafts, floating treatment wetlands, floating vegetated islands, floating wetland systems, floating constructed wetland, buoyant mats with emergent aquatic plants, rafts of vegetation, prevegetated floating plant carriers, preplanted mats, les îles flottantes, islas flotantes, insulis natantibus)

We use floating islands in our engineered wetlands since 1995. Some examples from our realized projects:

- **Nesting and refuge area for waterfowl and wastewater treatment by submerged (microbiological active) biofilms:**

Stormwater treatment biotope Gadenstedt, Germany

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Floating islands on pontoons, Altmühlsee, Germany

Floating Homes with floating islands , Hamburg, Germany

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Coot, nesting on a floating island, Hamburg, Germany

Éndangered species black tern (Chlidonias niger), source Vossmeyer, Germany

- **Odour control and bacterial metabolism of high strength silage effluent:**

Sedimentation pond at Dittmannsdorf, Germany

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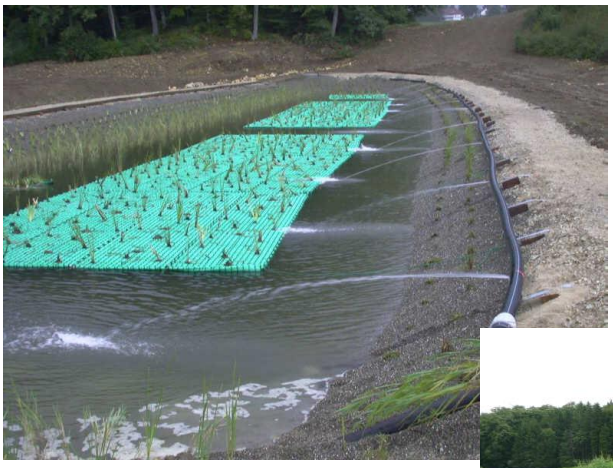
- **Filterponds covered with floating islands for sedimentation of secondary sewage sludge from a trickling filter (3.500 person equivalents):**

- **Filterponds covered with floating islands for sedimentation of secondary sewage sludge from a rotating biological contactor (5.000 person equivalents):**

- **Floating islands for tertiary treatment of activated sludge treatment systems:**



Renquishausen, Germany

Groß-Lafferde, Germany

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- **Floating islands as a barrier for oil and floating rubbish at a wastewater lagoon system:**

Berel, Germany

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- **Floating islands at different stormwater treatment wetlands:**

Oberg, Germany

Münstedt, Germany

- **Floating islands for high strength (COD > 10.000 mg/l) industrial wastewater treatment in a tropical country, as fish breeding habitat and for odour control:**

Tay Ninh, Vietnam

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- **Sedimentation ponds with floating islands for polluted effluent of the construction material recycling industry:**

Gunzgen, Schweiz

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Artificial and natural floating islands are characterized by buoyant dense mats of roots and rhizomes of marsh plants (helophytes). There are natural self-buoyant floating root mats and artificial ones growing on rafts.

Eichhornia crassipes

Natural floating islands gain their self-buoyancy either from the occurrence of air spaces within the aerenchyma tissue of the rhizomes or from gases (such as methane) released by decaying plant material. Natural floating islands occur, for example, in the Danube Delta, where they are called plaur. The plaur consists of a combination of reed rhizomes, other organic materials and soil which breaks away from river banks and lake bottoms to form floating islands of different size and shape. These floating marsh ecosystems provide valuable habitat for many, often very rare, species of birds.

Common genera of marsh plants (emergent aquatic macrophytes) forming floating islands are *Phragmites, Typha, Phalaris, Glyceria, Cyperus, Eichhornia* among others with air filled aerenchyma tissues.

Under moderate climatic conditions, e.g. in Germany and other European countries, we preferably use plant genera as *Lythrum, Carex, Juncus, Iris, Scirpus, Mimulus, Caltha, Glyceria* among others.

In tropical regions like South-Vietnam we tested different species like *Persicaria, Neptunia, Ipomoea, Limnocharis, Hydrocotyle, Cyperus, Colocasia* successfully, even under conditions of high strength starch production wastewater in a pretreatment pond.

Colocasia esculenta

Impomoea aquatica

In most applications we use a special textile plant carrier as a platform structure to support the buoyancy of the wetland plants (helophytes).

This textile plant carrier consists of an extremely coarse warp knitted structure. It is manufactured of strip-like textile material or films using a modified warp-knitting machine with extremely coarse knitting tools. A three-dimensional structured material is achieved. This results in voluminous mats of high pore volume and a water storage capacity adjustable to the requirements given. This novel textile structure allows plants to spread their roots through it.

The plant roots growing in the water take up nutrients and provide large surfaces on their root and rhizome mats for active biofilms (microbes improving water quality). By shading the water surface floating root mats suppress the proliferation of algae. Floating rafts provide wildlife habitats for waterfowl above the water surface and breeding areas for young fishes in the root network below.

We use floating islands (floating rafts) in our treatment wetland projects for the removal of pollutants in water bodies[1] and for different other purposes alongside with constructed wetlands for nearly 25 years.

- **Our floating islands precultivation ponds at Habichtswald, Germany:**

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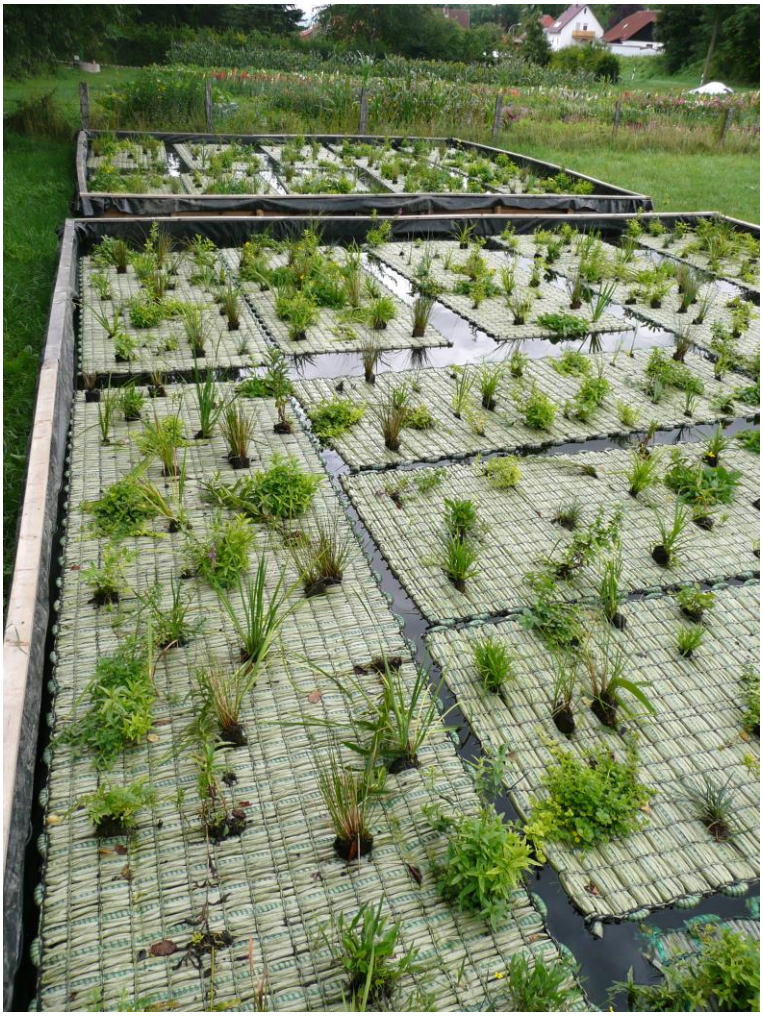
- **Our floating islands precultivation ponds at Rosdorf, Germany:**



For purchase of floating islands look at www.rhizotech.de.

[1] Removal of

-nutrients like phosphorus and nitrogen (direct plant uptake from the water through the plant roots and microbial metabolism)

-suspended solids (particulate organic matter) by filtration and sedimentation

-organic matter (BOD, COD) and volatile organic compounds like MTBE and benzene by biodegradation and direct plant uptake of contaminants and metabolism within the marsh plants (AFIFI, S., (1991): Biochemische Umwandlung von Halogenphenolen 2. Mitteilung: Das Verhalten von Halogenphenolen in bepflanzten Bodenkörpern. In: Berichte zur Ökotechnik, Arbeitsgruppe Ökotechnik (Hrsg.)).

-heavy metals by precipitation as insoluble salts and binding to particulate matter and uptake by plants and root mat biofilm microbes and following sedimentation processes.