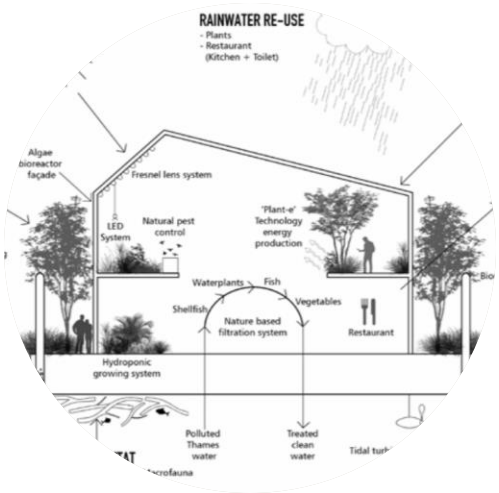
# Ecological design for floating islands

Exchange meeting on floating and resilient development - September 29, 2022

Robbert Jak Wageningen Marine Research

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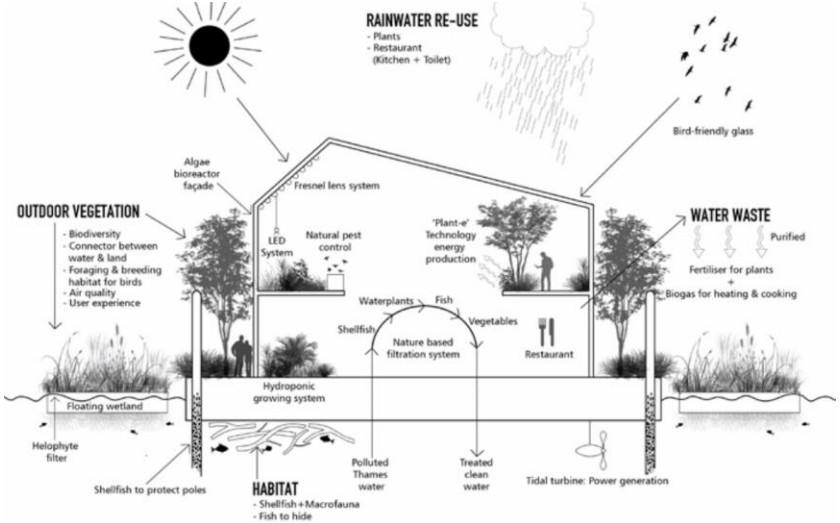
# Potential positive ecological impacts of floating islands for living

- New habitats that increase biodiversity
- Opportunities for water treatment
- Exclusion of other human activities (that have negative impacts)
- Benefits from self-supporting islands

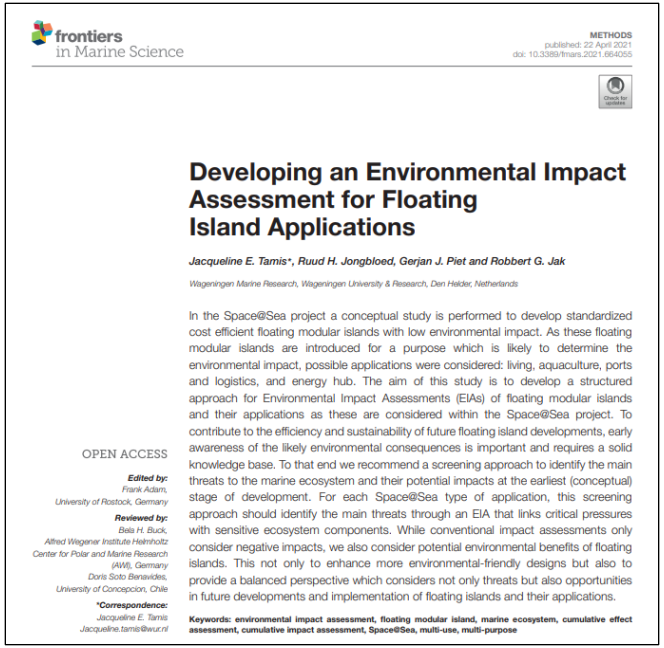



https://edepot.wur.nl/455410

https://research.wur.nl/en/publications/the-floating-greenhouse-on-the-thames-guidelines-for-nature-based

# Potential negative impacts

- Disturbance of nature by human presence
  - Visually
  - Noise
  - Artificial light
- Hazardous waste (pollution)
  - Discharges of waste
  - Litter released from structures or by humans
  - Emissions to air
- Construction
  - Shading effect, artificial substrates
- Transport vessels
- Introduction of non-indigenous species and reduction of native flora & fauna)



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METHODS
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**Developing an Environmental Impact Assessment for Floating Island Applications**

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In the Space@Sea project a conceptual study is performed to develop standardized cost efficient floating modular islands with low environmental impact. As these floating modular islands are introduced for a purpose which is likely to determine the environmental impact, possible applications were considered: living, aquaculture, ports and logistics, and energy hub. The aim of this study is to develop a structured approach for Environmental Impact Assessments (EIAs) of floating modular islands and their applications as these are considered within the Space@Sea project. To contribute to the efficiency and sustainability of future floating island developments, early awareness of the likely environmental consequences is important and requires a solid knowledge base. To that end we recommend a screening approach to identify the main threats to the marine ecosystem and their potential impacts at the earliest (conceptual) stage of development. For each Space@Sea type of application, this screening approach should identify the main threats through an EIA that links critical pressures with sensitive ecosystem components. While conventional impact assessments only consider negative impacts, we also consider potential environmental benefits of floating islands. This not only to enhance more environmental-friendly designs but also to provide a balanced perspective which considers not only threats but also opportunities in future developments and implementation of floating islands and their applications.

**Keywords: environmental impact assessment, floating modular island, marine ecosystem, cumulative effect assessment, cumulative impact assessment, Space@Sea, multi-use, multi-purpose**

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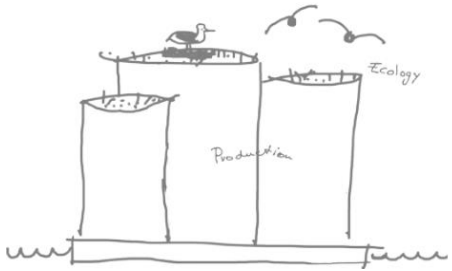
# New habitats

- Hard substrate: change of habitat
  - freshwater mussels, insect larvae, small crustaceans, algae
  - Optimize design: 3D structures, materials used, fish aggregating devices
  - Attraction of fish, water fowl (birds)
- Create conditions for water plants in surroundings




# Waste water treatment

- Use waste water treatment facilities also for river water
- Apply helophyte filters
    - Creation of swamp area, suitable for water fowl (birds) and other animals
    - “Floating wetland”
    - Farming of vegetables

# Other issues

- Exclusion of other activities causing negative impacts
    - Marine environment: fisheries

- Self-supporting living areas
    - Energy
    - Water
    - Waste
    - Food?

# Thank you for your attention!

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To explore the potential of nature to improve the quality of life