Floating wetlands and mussel farms

Combining nutrient reduction measurements in coastal waters

Maria Posern

EUCC – Die Küsten Union Deutschland e.V.

Stakeholder meeting, 19.03.2019

LiveLagoons
Interreg South Baltic
EUROPEAN UNION
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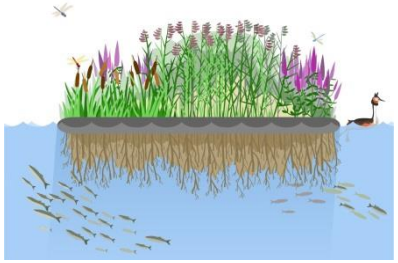
Introduction

Nutrient reduction via the removal of coastal biomass

- Collection & recycling of beach wrack
- Cultivation of micro – or macro algae
- Mussel farming
- Harvest of emergent macrophytes in natural coastal wetlands …
- … or on floating wetlands….
- ….



Introduction

Examples of floating wetlands with emergent macrophytes

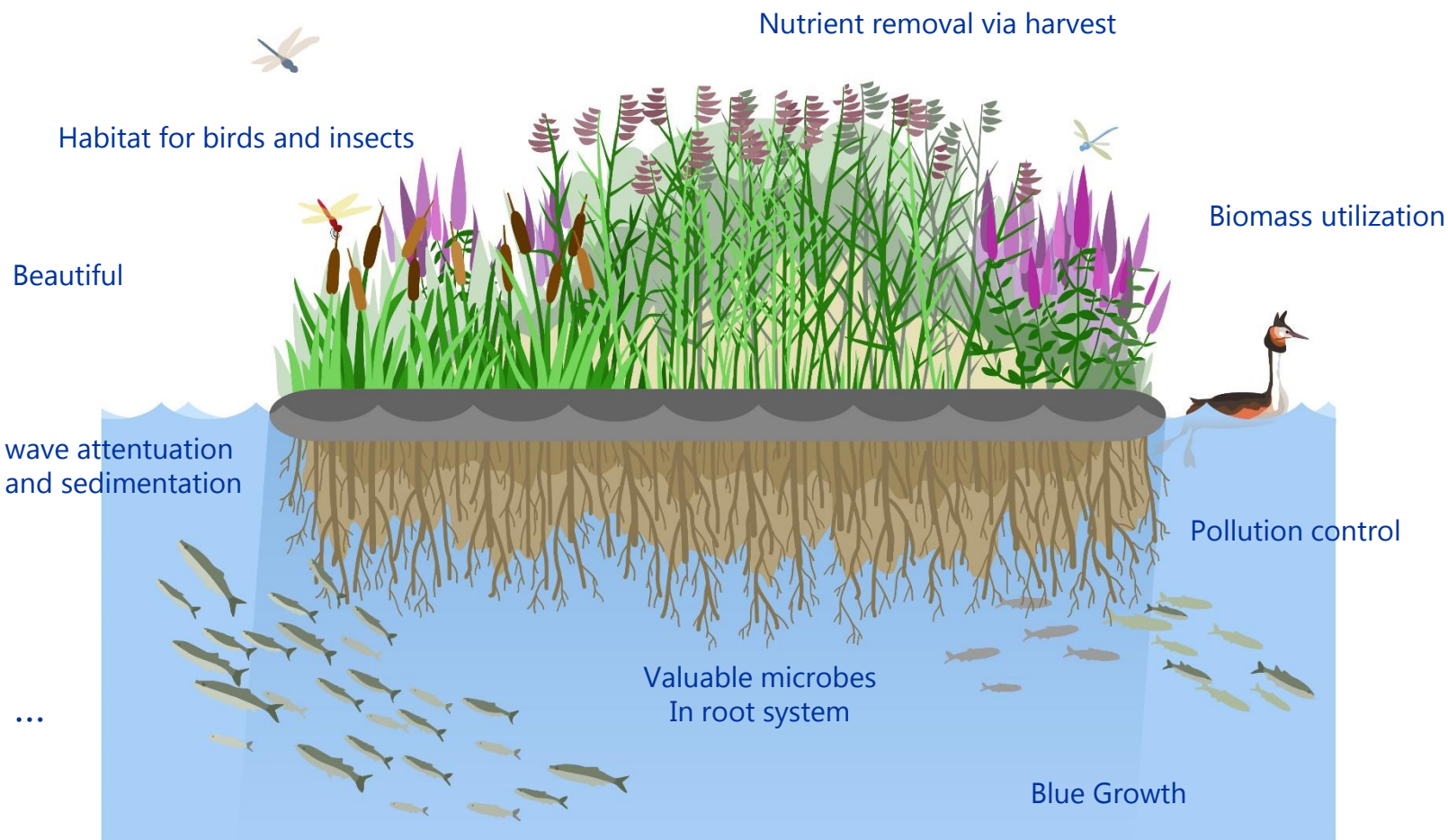
Images: https://frogenvironmental.co.uk/product/biohaven/, http://www.beemats.com/department-of-transportation.html, http://www.biomatrixwater.com/gallery/, http://www.schwimmenderoehrichtinsel.de/files/Landingpages/Landingpage-SRD/Foto%203.JPG

Project LiveLagoons

- Duration: 08/2017 to 07/2020
- Funded by: EU South Baltic Programme 2014-2020
- Homepage: **www.balticlagoons.net/livelagoons/**

Project LiveLagoons

Improving the water quality in eutrophicated lagoons by the use of innovative floating wetlands for nutrient removal

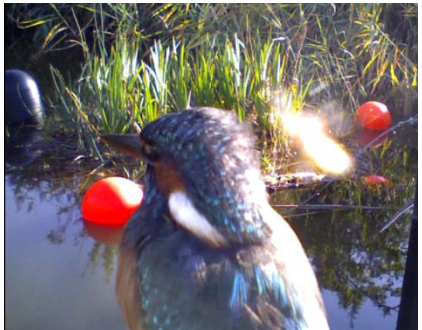


Chances

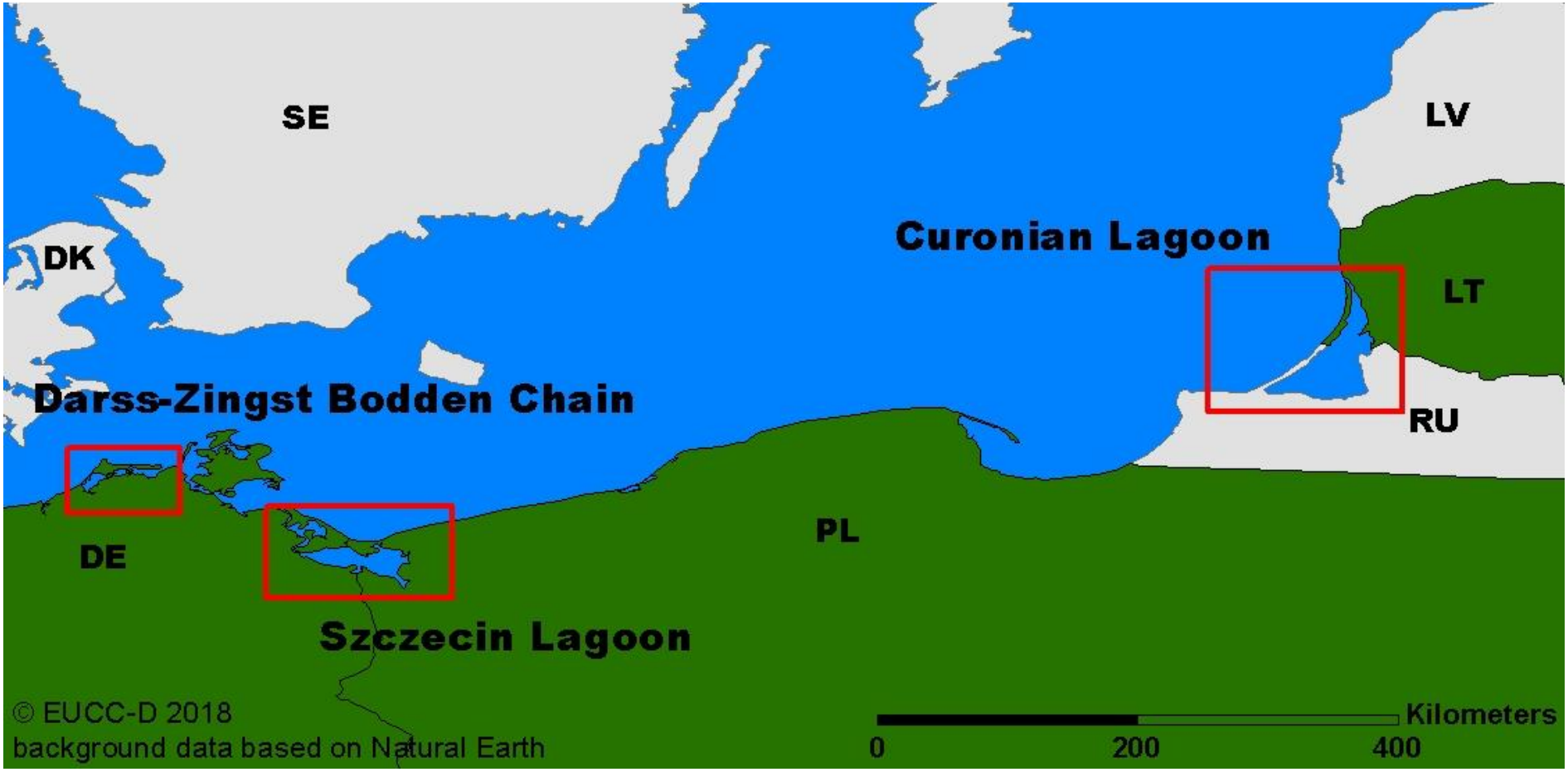
Floating wetlands offer more than nutrient removal, e.g. habitats, wave attentuation, tourist attraction, nature education…

Eels (endangered & protected) on the floating wetlands

Refuge for fish, crustaceans, amphibians….



Project LiveLagoons



Pilot installation - Poland

- **Wicko Lake, Wolin National Park**
  - Installation of island in 2019
  - Shallow and sheltered area where island can remain over winter in the water

Pilot installation - Lithuania

- **Nida**
  - 200 m net installation
  - planted with indigenous plants from the Curonian spit
  - reed (*Phragmites*) and willow (*Salix*)

- **Juodkrantė**
  - Floating island from Biomatrix with native emergent macrophytes will be installed in 2019

Chances

Zebra mussels as in the Nida installation, Curonian lagoon

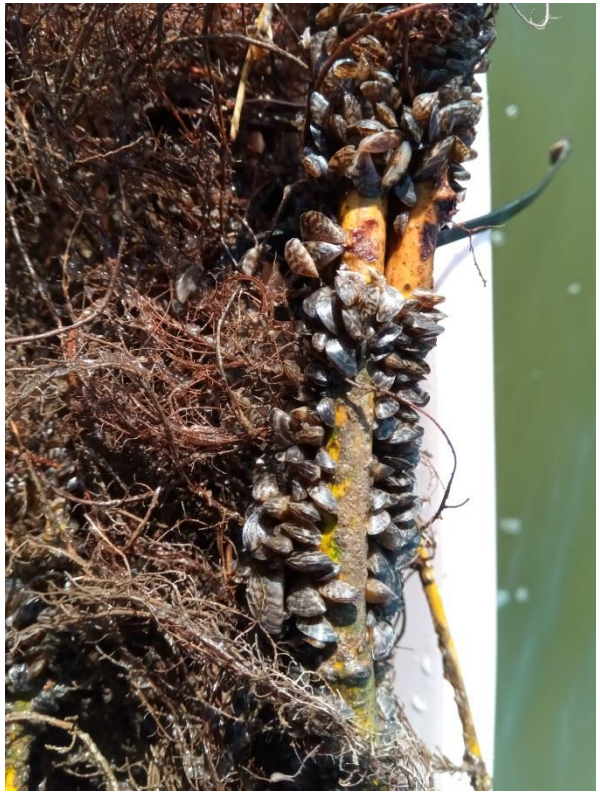
The nutrient content in soft tissues of zebra mussel is in average 100.9 ± 1.5 mg N g^{-1} DW and 9.3 ± 0.2 mg P g^{-1} DW;

the shell nutrient content is much lower with 0.45 mg g^{-1} P and 0.38 ± 0.05 % N.

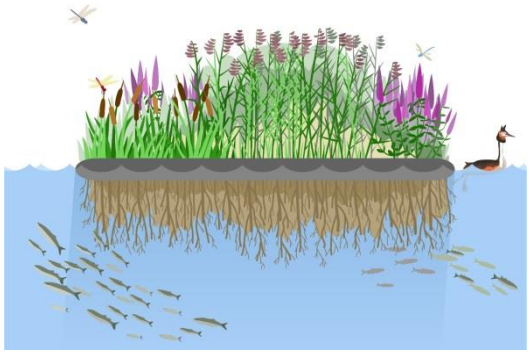
References: Goedkoop et al. (2011) ; Krolak and Zdanowski (2007); Jurkiewicz-Karnkowska (2005)

Chances

Combining floating wetlands with mussel cultivation to enlarge nutrient removal efficiency.



Chances



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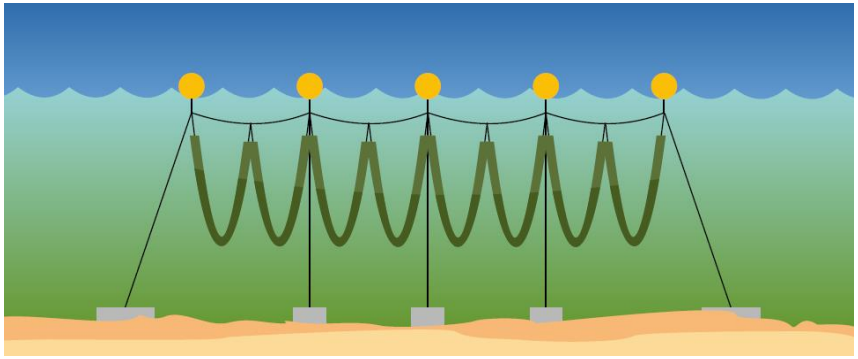

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Island design

A variety of floating wetland producers exists. What was important for us?

- Total buoyancy > 25 kg/m^2
- Island must withstand impact forces of > 350kg without loss of buoyancy or damage, in order to withstand pressures from boat waves and winter ice
- All materials used must be non toxic and fully recyclable
- Polystyrene, polyurethane foam and PVC should not be used in the system
- Pieces shall be connected using only corrosion resistant stainless steel hardware
- ...

2D matrix

3D & 4D Matrix

3D & 4D Matrix

Sources: Biomatrix Water, Biomater & Amorim Cork Composites, Beemats http://www.beemats.com/department-of-transportation.html

Pilot installation - Germany

Two stainless steel floating wetlands installed in 2018 at the brackish aquaculture research center at Born (Darss-Zingst Bodden Chain) for nutrient removal of fish inputs

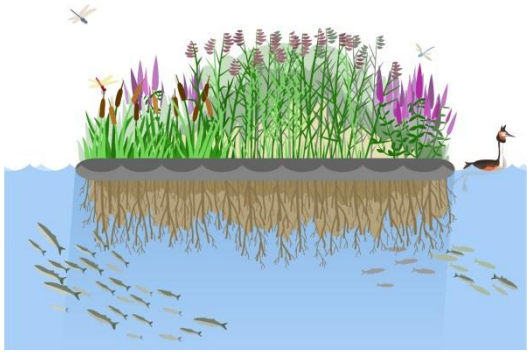
Pilot installation - Germany

Perennial macrophytes move their nutrients into the roots when senescence starts in autumn. To be most effective, harvest should be in (late) summer.

Pilot installation - Germany

Buoyancy was not sufficient

Chances



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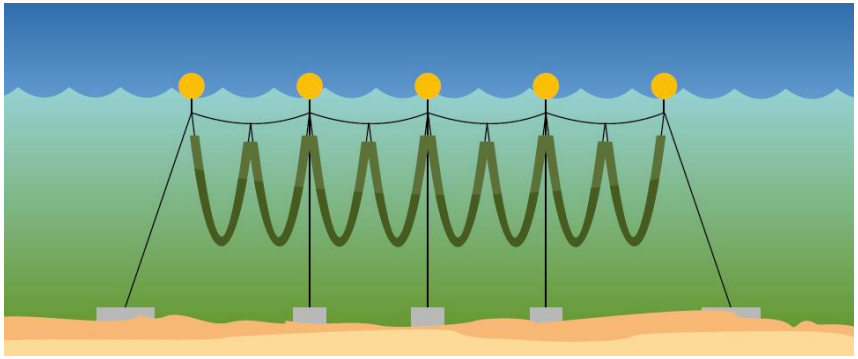

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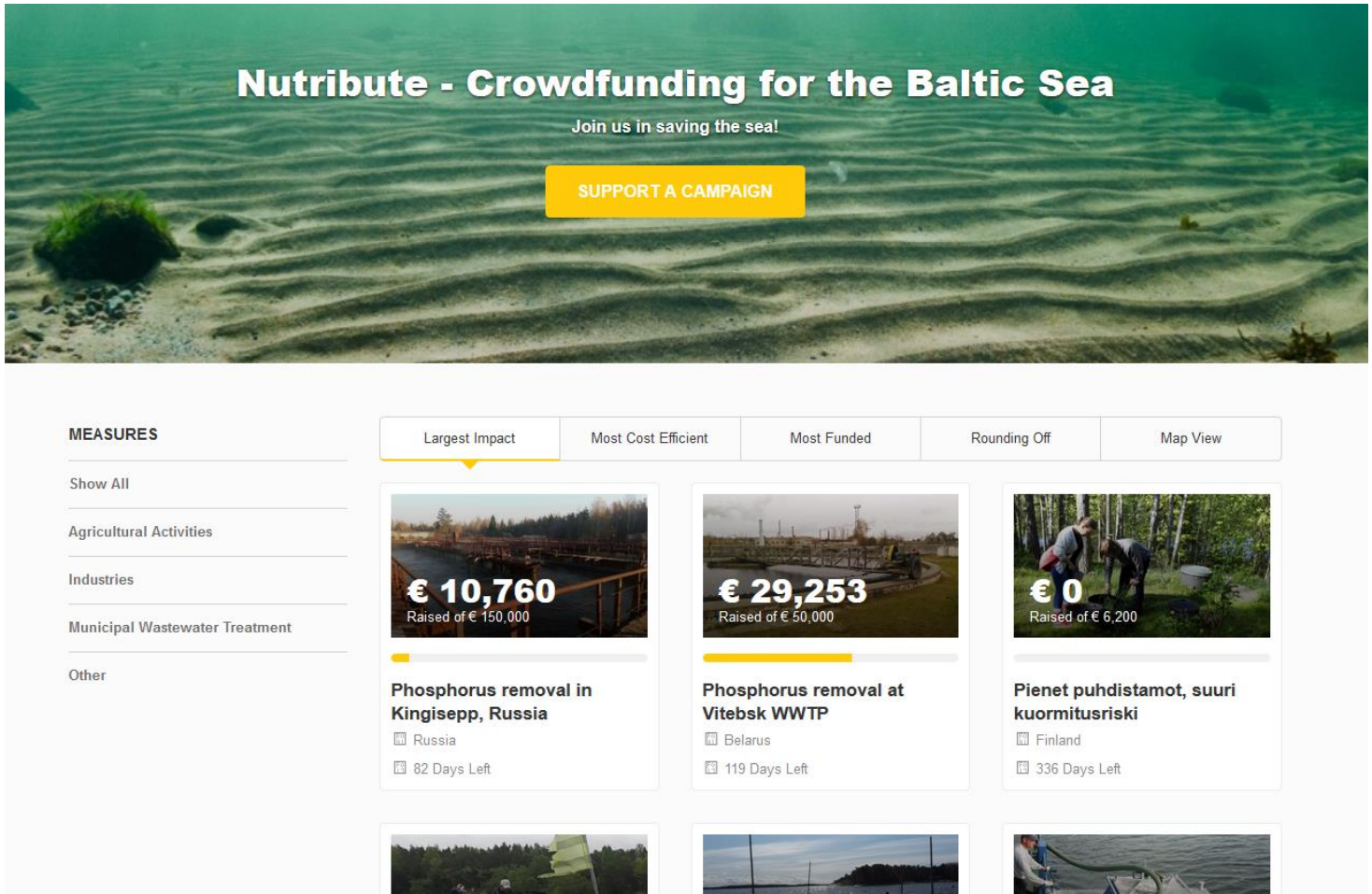
Funding opportunities

Crowdfunding plattform for financing nutrient quota trading: **www.nutribute.org**



Contact:

Lead partner: Arturas Razinkovas-Baziukas, Arturas.Razinkovas-Baziukas@ku.lt

Communication and dissemination: Maria Posern, posern@eucc-d.de

www.balticlagoons.net/livelagoons

Thank you very much for your attention!

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