

PHOTO: Mats Westerborn

20 years of inventories of underwater marine diversity in Finland: what has been achieved?

Markku Viitasalo  Syke

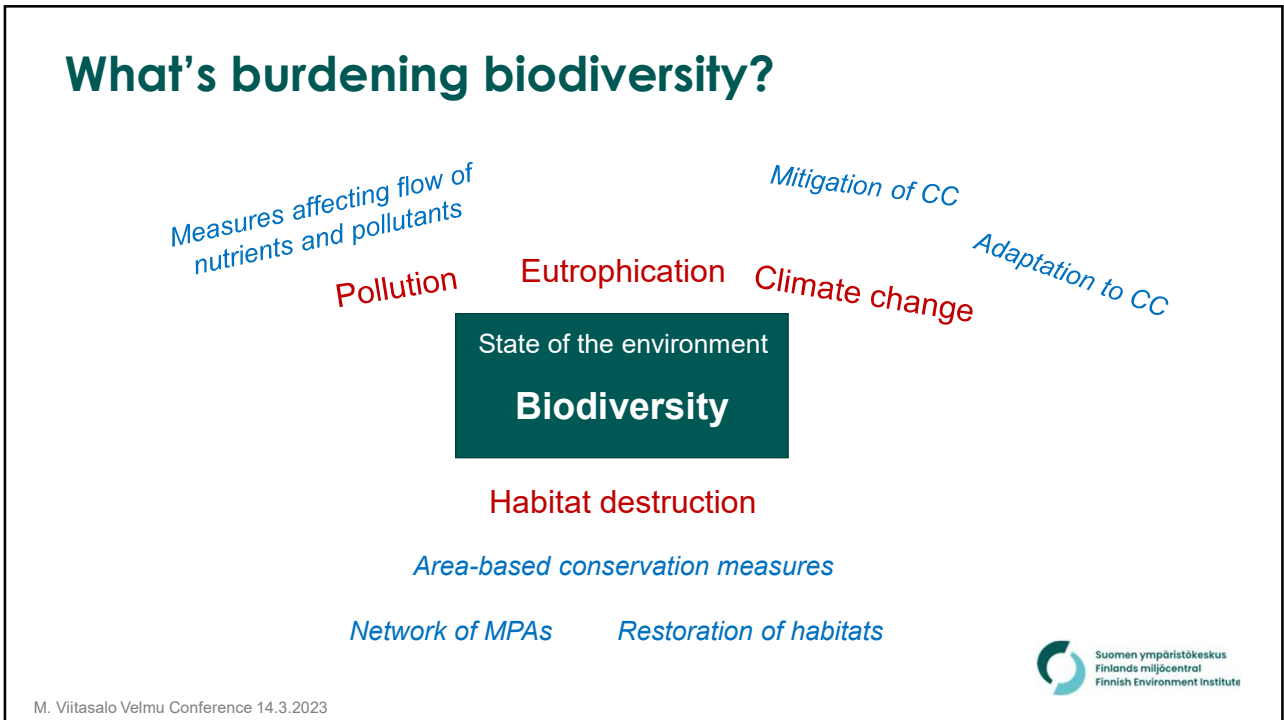
with contributions from the VELMU consortium members

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What's burdening biodiversity?



Measures affecting flow of nutrients and pollutants

Pollution **Eutrophication** **Climate change**

Mitigation of CC *Adaptation to CC*

State of the environment


Biodiversity

Habitat destruction


Area-based conservation measures

Network of MPAs *Restoration of habitats*

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Linda Jokinen

The main goal of VELMU

Perform spatial inventories of species and habitats, to support conservation and sustainable use of the Finnish marine areas

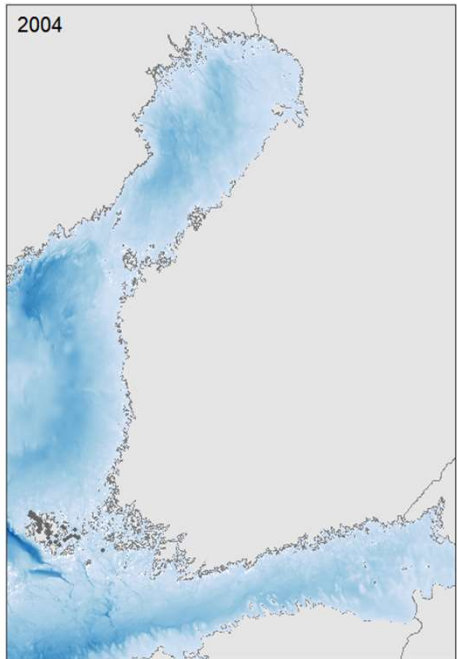


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Accumulation of VELMU observations since 2004

Since 2004:
170.000+ spatially explicit observations on habitats and species

- diving
- videos
- benthic sampling
- fish larvae sampling
- echosounding
- remote sensing

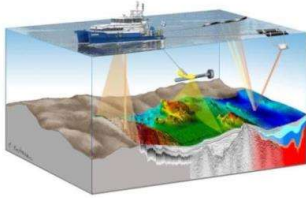


Louise Forsblom, SYKE

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Methods



Geol. Surv. Fin.
/ H. Kutvonen



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Knowledge on biodiversity hotspots and rare and functionally important species



Macroplea pubipennis
– a rare leaf beetle



Shallow coastal bays and lagoons: biodiversity hotspots



Fish larvae “nurseries”



Fourleaf mare's tail
Hippuris tetraphylla – a threatened species that in EU only occurs in Finland

Major areas of habitat forming species (e.g. bladderwrack)



Heidi Arponen, Parks & Wildlife Finland



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Information on spreading of non-indigenous species, and findings of entirely new ones



Harris mud crab, a N.I.S



© Metsähallitus / Katriina Könönen
Unknown Murchisonellidae snail



Unknown *Laonome*
sp. polychate

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Some scientific highlights of VELMU



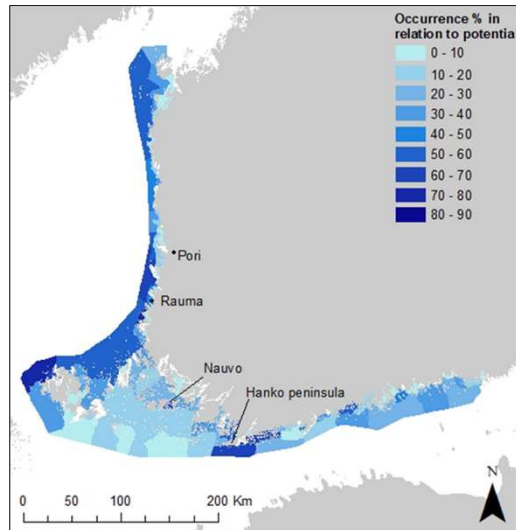
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Autecology of species

Occurrence of bladderwrack in relation to its potential

Rinne & Salovius-Laurén 2019, Ambio 49

“The current bad status of Fucus in the Archipelago Sea is alarming.”



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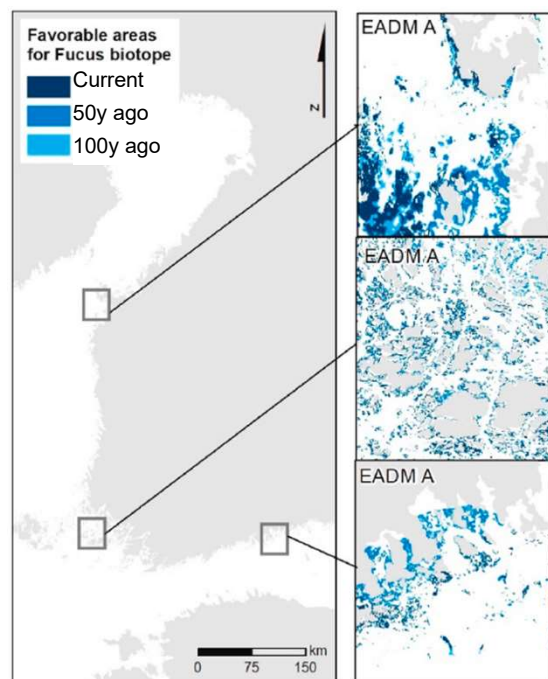
Projecting the past

Favourable areas for bladderwrack habitat, past and present

Sahla et al. 2020, Est. Coast Shelf Sci. 245



“Decrease in light availability has reduced favorable sea floor areas for the Fucus spp. dominated biotope by 45%.”



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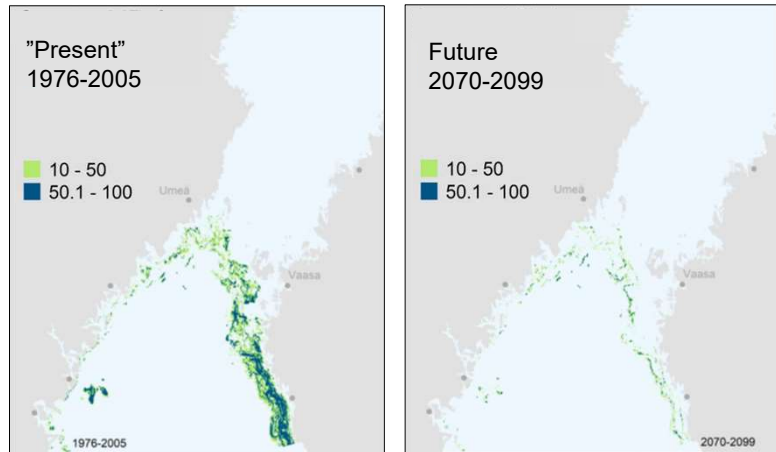
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Projecting the future

Distribution of blue mussel now and in the end of century

Turkia et al. 2022, ECONNECT Final Report

“Tackling eutrophication helps to simultaneously reduce the effects of climate change.”



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Supporting measures combatting eutrophication

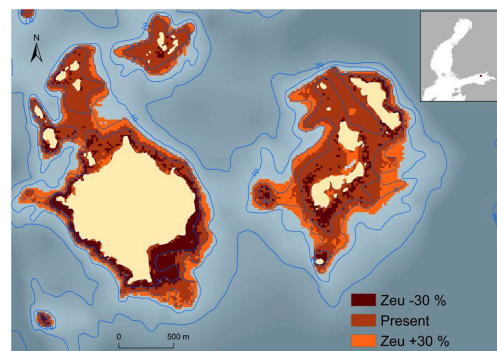


Mats Westerborn

Fucus distribution in -30 % and +30 % water clarity scenarios

Lappalainen et al. 2019, Est. Coast. Shelf Sci. 218

“To achieve good ecological status, the euphotic depth should increase by 7–59%, depending on the coastal type.”



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Conservation planning

First underwater nature value map

Virtanen et al. 2018, Front. Mar. Sci. 5

“Only 27% of the ecologically most valuable features were covered by the current MPA network.”

- Support of 30 by 30, and 10 % strict

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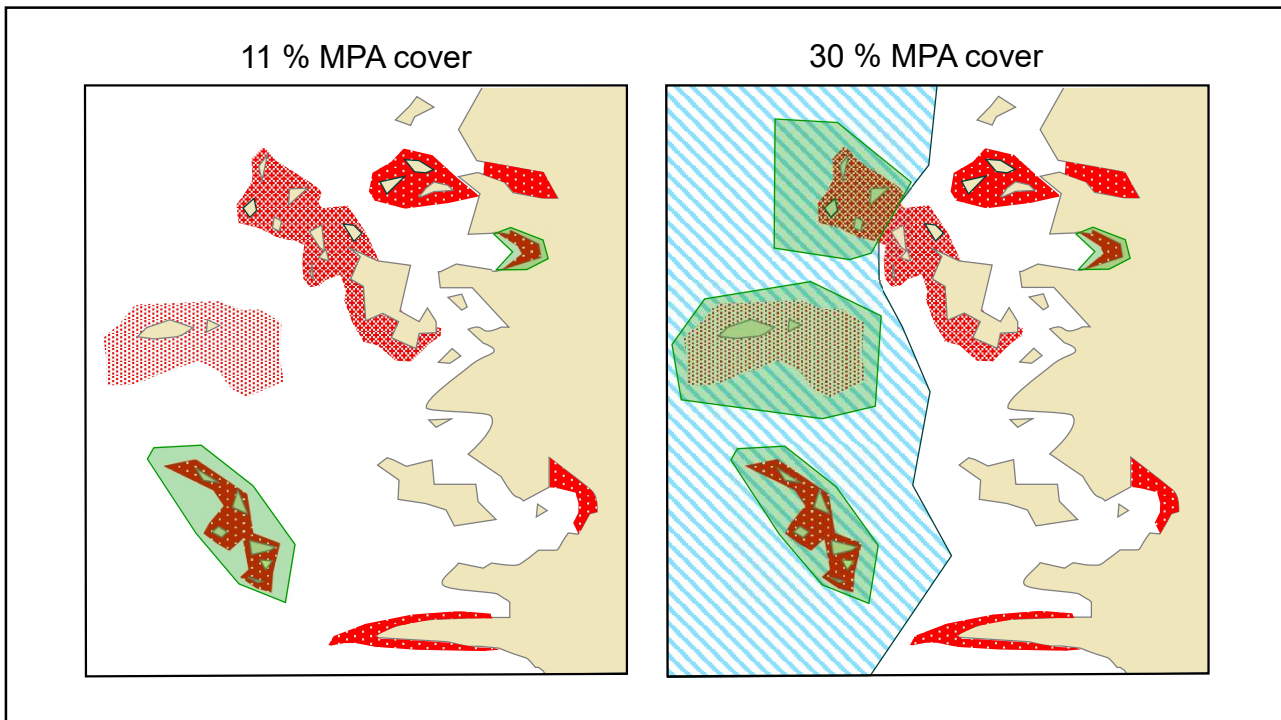
State owned sea areas

Where are the most valuable *unprotected* biodiversity hotspots?

Private protection is needed for reaching ecologically meaningful 30 by 30!

Syke

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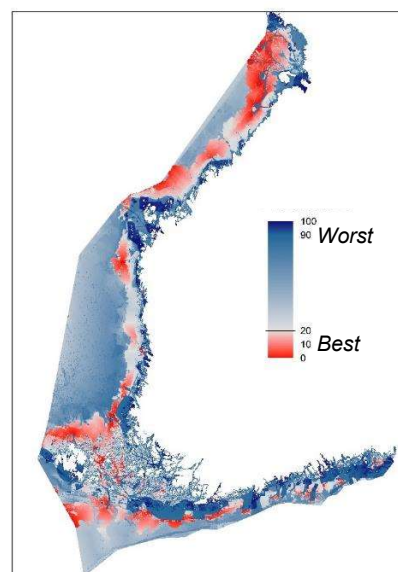
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Ecosystem-based placement of offshore wind power

Balancing profitability of energy production, societal impacts and biodiversity

Virtanen et al. 2022,
Renew. Sust. Energy Rev. 158

“New areas for wind power were recognized, where construction costs would be moderate and disturbance to biodiversity, marine industries and people limited.”

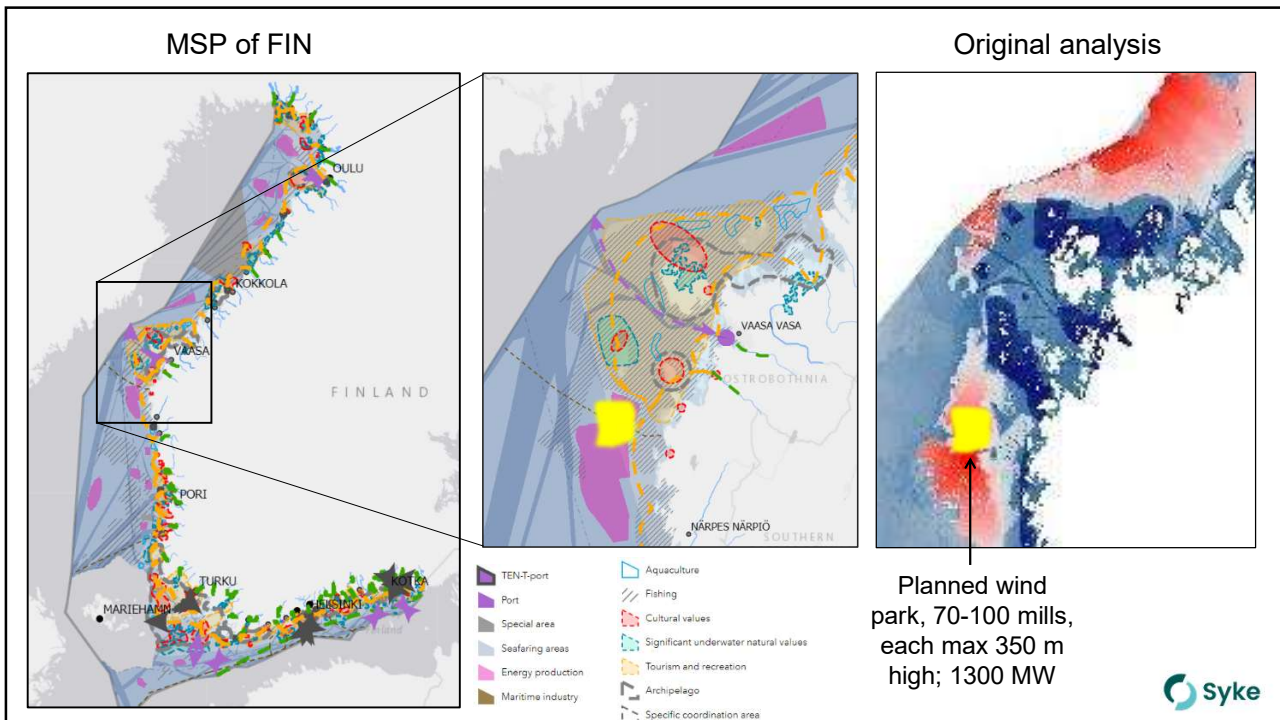


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VELMU data have been used in top quality research and – what is most important – in applications with great societal impact

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Other VELMU highlights today and tomorrow

- Lauri:** EMMA & PEMMA areas
- Sonja:** Conservation planning in Åland
- Wiljam:** *Fucus* associated invertebrates
- Fiia:** Restoring state of habitats
- Elina:** Impacts of dredging on biodiversity
- Louise:** Mapping of ecosystem services
- Meri:** The fish perspective



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