

The SUBMARINER Network: A facilitator for sustainable & innovative blue growth cooperation

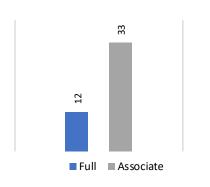


Angela Schultz-Zehden Managing Director

# SUBMARINER Network members



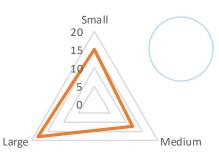




SUB/MARINER NETWORK







#### Members by country











Innovation, Bioeconomy, Spatial Planning, Nutri, Tourism, Culture, Energy, Ship

# Our ambitions

















Become climate-neutral by 2050



Protect human life, animals and plants, by cutting pollution



Help companies become world leaders in clean products and technologies



Help ensure a just and inclusive transition



**)** 



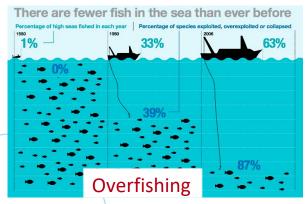






2 RESPONSIBLE CONSUMPTION AND PRODUCTION

#### **EU Green Deal**











# SUBMARINER topics

Macroalgae harvesting, cultivation & processing

Mussel Cultivation & Processing Reed Beach Cast Macro-Halophytes

Cultural Heritage / EcoTourism

Blue Biotechnology Microalgae

Marine Litter Side Streams New Species Aquaculture

Smart Combinations

















### Strategic Action Fields

Actors & Match-Making

Digitalisation Data & Tools

Sub-regional solutions

Access to Pilot sites & Large scale Demonstrations

Training & Capacity Raising

Technology Development & Transfer

Finance & Funding Regulation & Licensing

Awareness & Marketing



















#### Multi-Actor and Sector Approach

Companies, Research, Authorities, Civil Society

Natural and Social Science, Informatics, Creative Arts, Economics

Vision 2030



Contribute to decrease of GHG emissions



Ecosystem Restoration Increase Biodiversity



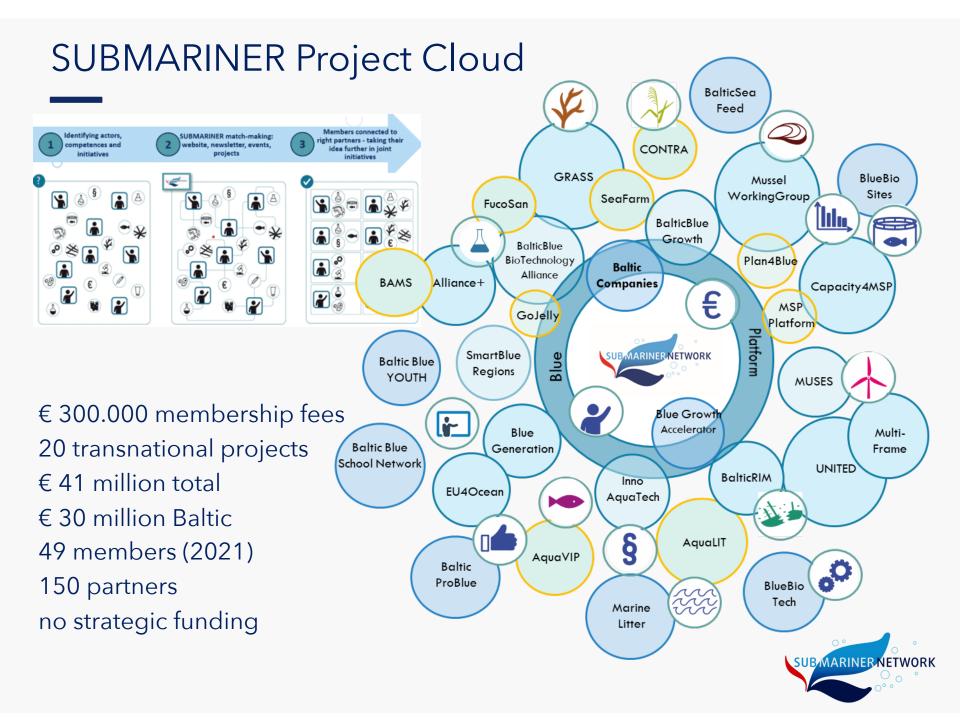
A smart, resilient Baltic Sea Regionlocal, circular economy



Improve human well-being



Promote bio-based innovations



# How far have we covered strategic actions of roadmap 2013?

Strategic Actions	Covered	Projects	Achieved ?
Actors Mapping & Matchmaking	yes	Blue Platform 个 Alliance 个	continue
Data / Environmental Monitoring	partially  BBG, GRASS ↑ Operational Pilots ↓  BlueBioSites →  yes  BBG+ ↑ SeaFarm ↑ InnoAquaTech ↑  Alliance ↑		a lot still to be done
Access to Pilot Sites			demonstrations transnational access
Technology Development & Transfer	yes	BBG+ ↑ SeaFarm ↑ InnoAquaTech ↑ Alliance ↑ SmartBlueRegions ↑	continue
Energy Solutions with Marine Resources	partially	CoastalBioGas →	integrate
Valorization and compensation of ecosystem services	yes	BBG+ 个 DE Marine Litter Studies 个	partial political success ↑ implementation ↓
Unlock financing for innovative uses of marine resources	yes	Alliance 个 others: BlueInvest	pre-acceleration service
Create better legal and regulatory conditions	yes	BBG+ 个 GRASS 个 SmartBlueRegions 个	no
Public Awareness	no	BalticProBlue ↓ ↓ BalticProBlue → Sea2Fork →	a lot still to be done
Ocean Literacy	partially	Eu4Ocean ↑ OceanBlues ↑ Erasmus ↓	a lot still to be done



# How far have we covered topics of the roadmap 2013?

Topics	Covered	Projects	
Macroalgae	yes	SE SeaFarm, BBI MacroCascade, GRASS	
Mussels	yes	BalticBlueGrowth, Optimus, Ecopelag => Mussel Working Group	
Reed Beach Wrack	members	CONTRA	
Macro & Halophytes	members	LIFE: Floating Lagoons, HAFF	
Sustainable Fish and Shrimp Aquaculture	yes	InnoAquaTech, AquaVIP, but not Baltic Sea wide RAS FEED failed	
Blue BioTech	yes	Alliance, DK-DE Fucosan	
Microalgae for Energy	partially	Coastal Biogas, MACROalgae (applications failed)	
Wave Energy	no		
Multi-Use	yes	MUSES => UNITED, Multi-Frame	
Maritime Cultural Heritage	yes	BalticRIM (no extension)  DE Round Table, AquaLIT, FanPlesstic-Sea  => but not comprehensive	
Marine Litter	members		



## Conclusions

No longer only research

=> more and more companies

=> 650 companies earmarked

=> more and more products on the market

Proof of Concepts

=> mussels, algae can be cultivated

=> better knowledge on floating structures, beach wrack, biogas

=> cost-effective nutrient removal, where needed

=> negative environmental impacts limited

=> RAS, aquaponics, IMTA

Successful services

=> Baltic info and data hub

=> effective blue science-company interlinkage created



## Conclusions

Ongoing support needed

No longer only research => more and more companies

=> 650 companies earmarked

=> more and more products on the market

Proof of Concepts => mussels, algae can be cultivated

=> better knowledge on floating structures, beach wrack, biogas

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=> RAS, aquaponics, IMTA

Successful services => Baltic info and data hub

=> effective blue science-company interlinkage created

#### BUT

Little biomass production => Demonstrators slow moving

**Legal Barriers** => lagging behind actual positive developments

=> aquaculture behind agriculture

=> but little transnational innovation funding

=> Platform and project funding



# SUB **MARINER**

Since its founding in 2014, the SUBMARINER Network family has been continuously grow+ ing It currently has 24 network members. representing all Baltic Sea Region countries. The network includes both public and private sector organisations and reaches out to many more actors both within and beyond our project partnerships



MARINER

#### THE IDEA 2010

The project SUBMARINER (2010-2013) assessed, for the first. time, the potential for innovative and sustainable uses of Baltic marine resources. It developed the idea for the network

Macroalgas

Harvesting and Sultivation

Sustainable Fish

Aquaculture

Mussel Cultivation

# COMPENDIUM

Combination with

Offshore Wind Parks



Large-scale

Microalgae

Cultivation



Reed Harvesting

#### 2017 SUBNET CONFERENCE DECLARATION







Compendium

#### **NETWORK 2014**



The 2rd SUBMARINER Conference Better off Bue', hosted in Berlin on 27th 28th September 2017, marks another milestone



# **SUBMARINER** ROADMAP

FEBRUARY 2021

2016 ROADMAP STATUS REPORT































































# **Next Steps / Actions**

#### Action 1. Get pilots to the next level

- Identify & monitor sites based on common parameters
- Develop comprehensive regional plans
- Establish large scale demonstration farms / plants
- Encourage and coordinate new cooperative structures
- Change / facilitate legislation

#### Action 2. Increase company involvement

- Baltic Blue Bio-economy Product & Company Catalogue
- Address the need for a networking platform (cluster)
- Continue and expand company specific services:
  - Accelerator / match-making
  - Co-creation & ideation
  - Technology development & transfer

#### Action 3. Consolidate new focus areas

- Create Market Push and Pull: Product Development Consumer Awareness
- Education & Skills Development
- The 'Blue on Land': Waste Treatment, Marine Litter, Tourism, Food & Feed
- Cross-cutting assessments and plans: Biodiversity, Ecosystem, Climate Impact













# Action 1: Get pilots to the next level

- Foster cooperation to create critical mass of biomass for industry
- Continue to collect and assess common parameters
- Establish large scale demonstration farms / plants
- Change legislation / introduce ecosystem service payments
- Develop comprehensive regional plans

#### **Identification & monitoring of sites**

- Collect minimum set of joint parameters at operational farms in central platform (i.e. ODSS) to validate environmental benefits, alleviate risks, assess harvest results as well as socio-economic benefits
- Establish Baltic Sea wide system to identify optimal blue bio sites depending on purpose
- Agree on most effective monitoring technology
- Use existing offshore structures & activities (OWFs; Ships; Fishery) to provide also environmental data

#### Organise national / regional roundtables

- between industry, R&D and regulators to remove legal barriers; i.e. waste and zero pollution definitions; novel food regulation; single / multi-use sector licenses
- establish ecosystem payment pilots schemes
- agree on suitable demonstration sites; incl. specific multi-use areas
- Develop comprehensive regional development and marketing plans: Biodiversity; ZeroPollution, Carbon reduction, Circular and Regional Economy

#### **Encourage and coordinate new cooperative structures**

- Share costs for joint equipment & knowledge
- Secure joint larger contracts / foster direct interaction with relevant larger companies
- Develop regional business plans to show how many farms / biomass harvest are needed where to provide critical mass to industry

#### Merge topics

- Integrate cultural heritage, wave energy into multi-use
- Regional approach to various nutrient removal solutions



# Action 2: Increase company involvement

- Collect and maintain Baltic Blue Bio-economy Product & Company Catalogue
- Reach out and assess companies according to SUBMARINER criteria
- Address the need for a networking platform (cluster)
- Continue and expand company specific services







# mme 'bp'

#### **Continuous scouting for ideas & entrepreneurs**

- 365 days enrollment service
- Quick assessment / mentors match-making
- Bi-annual pitching and match-making events
- Link to business accelerators, fundings
- Increase collaboration with BIG companies

#### Lobby for continuous blue assistance programme

- Regular communication and dissemination hub
- Integrate outputs and results from research
- · Promote inter-regional funding pool
- Promote transnational innovation voucher system
- · Prepare blue economy funding guide

Sustainable product & service development

#### Foster co-creation / ideation

- Future Business Canvas scenarios
- Innovation Bootcamps, Hackathons,
   Creative & Disruptive Workshops
- Study Tours / inspiration from more advanced
- Foster regional circular economy value chains
- Forms of Multi-Use, e.g. with tourism

#### Foster technology development and transfer

- · Drying, harvesting, processing techniques and upscaling
- Combinations of renewable energy and aquaculture
- New technologies for site management
- Submerged or more offshore systems
- Blockchain technology, artificial intelligence, digitalization, big data ...



# Action 3: Consolidate new focus areas



- Create Market Push and Pull: Citizen and Consumer Awareness
- **Education & Skills Development**
- The 'Blue on Land': Regional Development, Marine Litter
- Cross-cutting assessments and plans: Biodiversity, Ecosystem, Climate Impact





#### Ocean Literacy and Public Awareness

- Baltic Sea wide knowledge exchange & cooperation
- Ocean Literacy Library
- Network between knowledge providers / public spaces (i.e. aquaria & museums) and schools
- Consumer awareness actions: cook books; blue movement week; tastings; sea gardens
- Collaborate with: supermarkets; chefs; influencers...
- Use: youtube; Instagram; apps, etc.

#### **Education / Skills**

- Assess needs & create formal education and training programmes to address company needs
- Continue & expand Baltic Sea wide internship / job / career exchange service
- Create & foster closer collaboration between companies & formal educators

#### Blue on Land, e.g. Marine Litter Action Support

- cooperative actions at regional-national-Baltic Sea wide level: single use plastic round tables
- measures & efforts to reduce microplastics & plastic waste; substitute and modify plastic products
- establishment of 'fishing for litter' concept & funds;
- Standardization of fishing gear

#### **Blue Biodiversity & Climate Concepts**

- · Understand marine biodiversity decline
- Exchange and develop knowledge & tools to address ecosystem restoration
- Assess blue economy contribution to climate change reduction and mitigation
- Develop & support implementation of comprehensive regional blue climate measures & plans







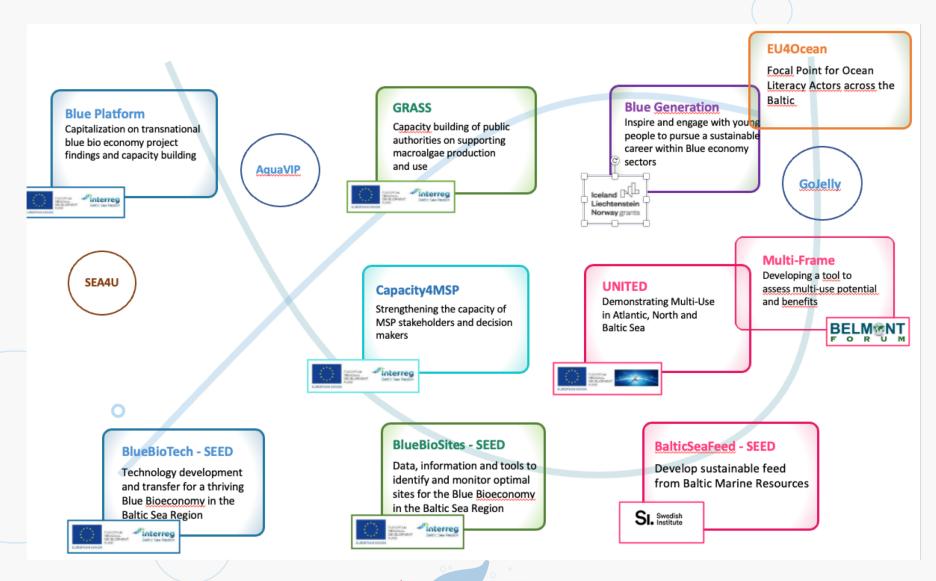


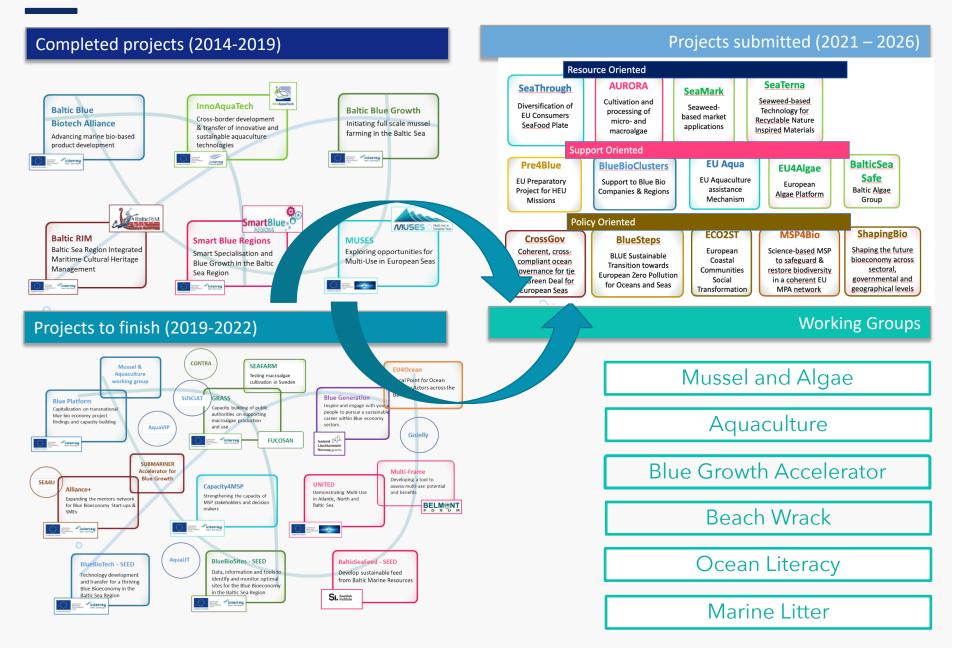


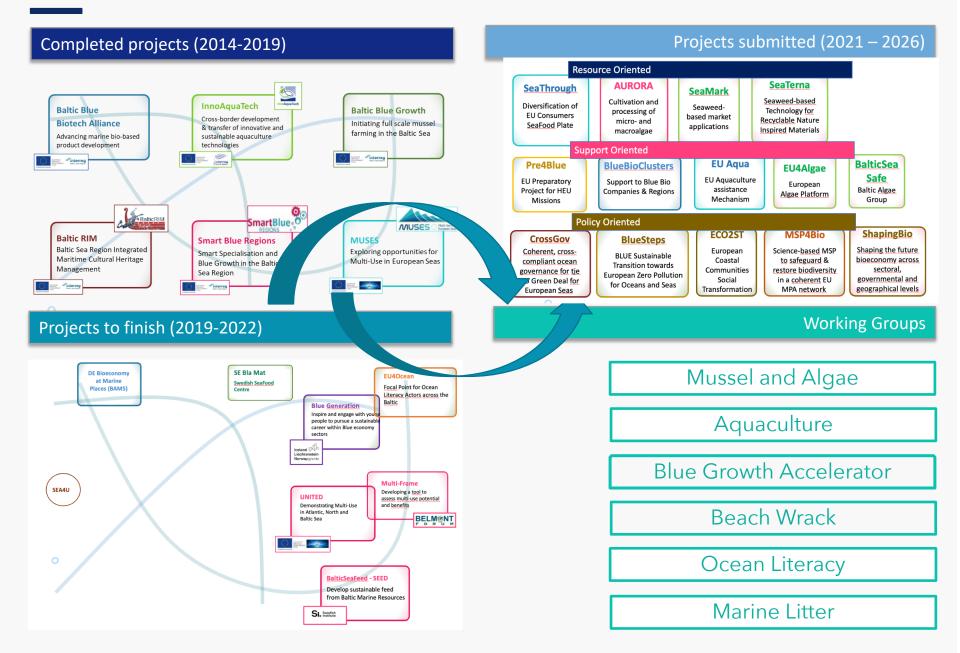
# But how to implement?

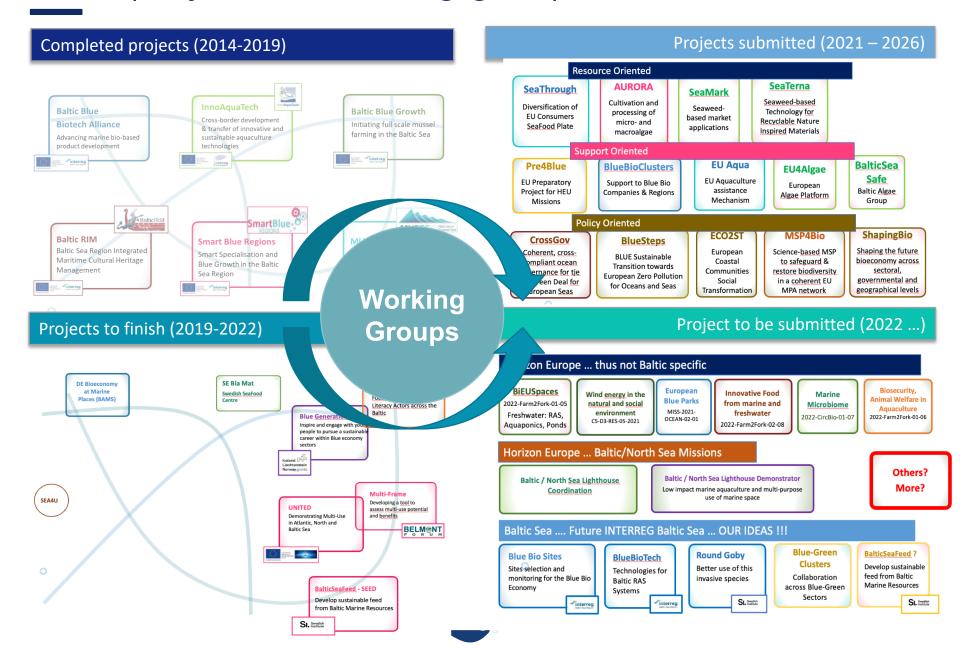


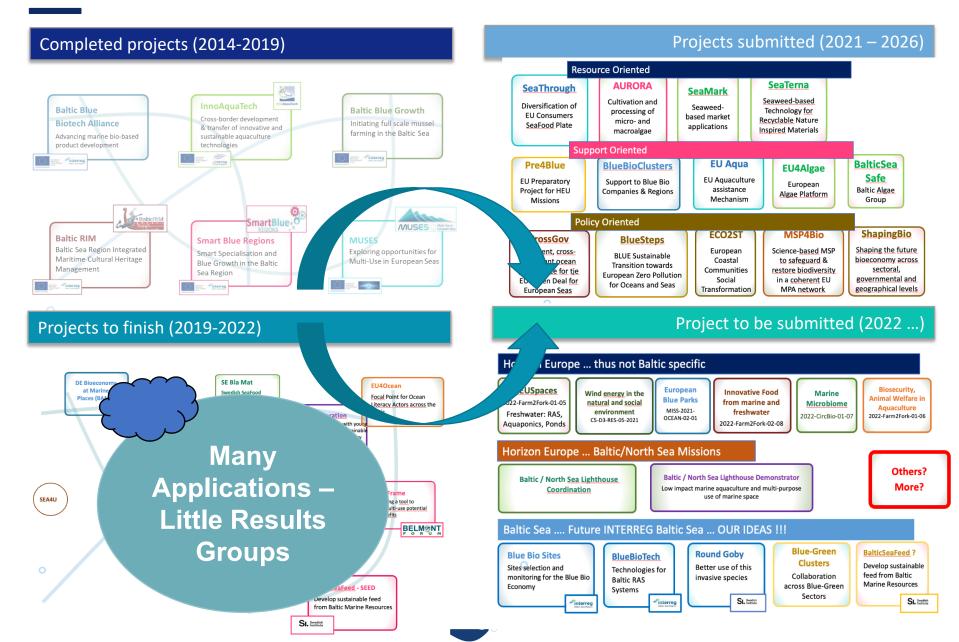
# Some projects still running ...



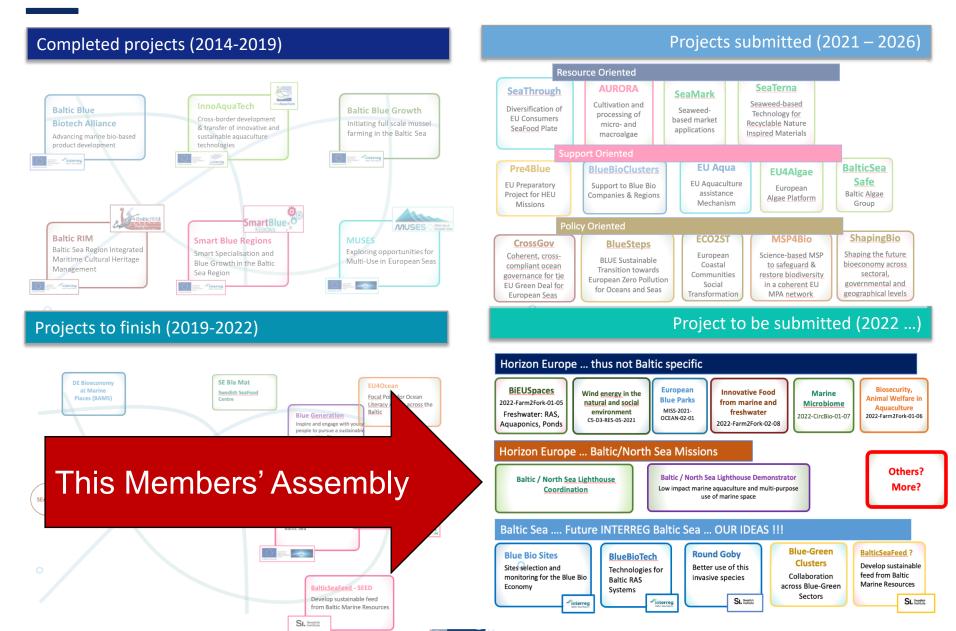








# Which projects shall drive our future?



# 3rd Generation Projects (2021 .... and beyond)

#### **Resource Oriented**

#### SeaThrough

Diversification of EU Consumers SeaFood Plate

#### **AURORA**

Cultivation and processing of micro- and macroalgae

#### **SeaMark**

Seaweed-based market applications

#### SeaTerna

Seaweed-based Technology for Recyclable Nature Inspired Materials

#### **Support Oriented**

#### **Pre4Blue**

EU Preparatory Project for HEU Missions

#### **BlueBioClusters**

Support to Blue Bio Companies & Regions

#### **EU** Aqua

EU Aquaculture assistance Mechanism

#### **EU4Algae**

European Algae Platform

#### BalticSea Safe

Baltic Algae Group

#### **Policy Oriented**

#### CrossGov

Coherent, crosscompliant ocean governance for tje EU Green Deal for European Seas

#### **BlueSteps**

BLUE Sustainable
Transition towards
European Zero Pollution for
Oceans and Seas

#### **ECO2ST**

European
Coastal
Communities
Social
Transformation

#### MSP4Bio

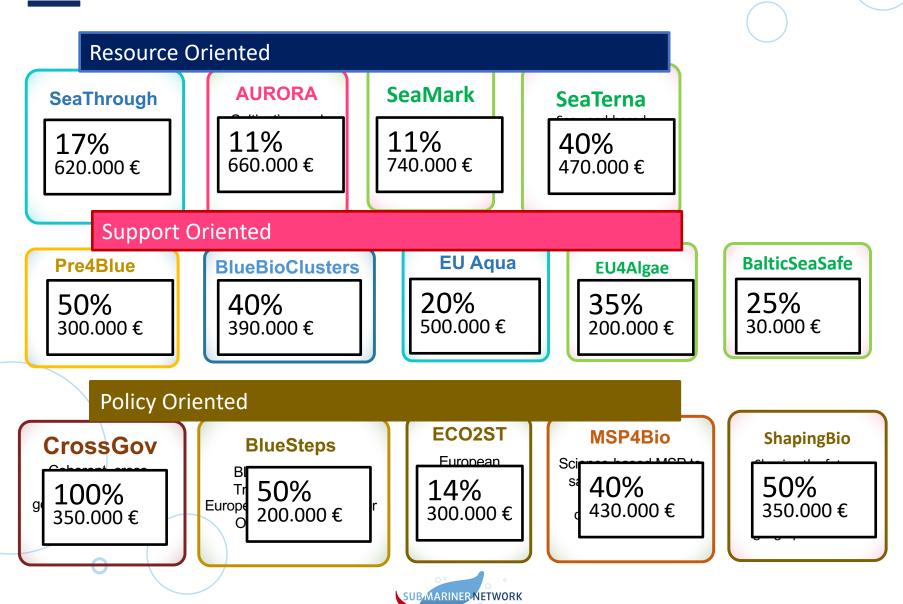
Science-based MSP to safeguard & restore biodiversity in a coherent EU MPA network

#### **ShapingBio**

Shaping the future bioeconomy across sectoral, governmental and geographical levels



# 3rd Generation Projects (2021 .... and beyond)



# 3rd Generation Projects (2021 .... and beyond)

#### **Resource Oriented**

#### SeaThrough

17% 620.000 €

#### **AURORA**

**11%** 660.000 €

#### SeaMark

**11%** 740.000 €

#### SeaTerna

**40%** 470.000 €

#### Overall

Probability: 41%

2.120.000 €

#### **Support Oriented**

#### Pre4Blue

**50%** 300.000 €

#### **BlueBioClusters**

**40%** 390.000 €

#### **EU Aqua**

**20%** 500.000 €

#### **EU4Algae**

35% 200.000 €

#### **BalticSeaSafe**

25% 30.000 €

#### **Policy Oriented**

#### CrossGov

100% 350.000 €

#### **BlueSteps**

50% 200.000 € for

#### **ECO2ST**

14% 300.000 €

#### MSP4Bio

Sci \$40% 430.000 €

#### **ShapingBio**

**50%** 350.000 €



# SeaThrough



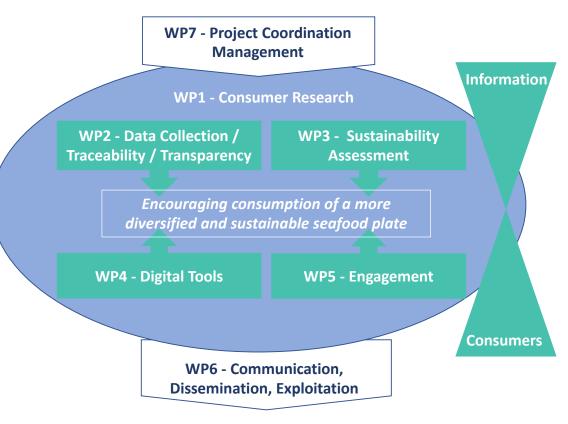


# Enhancing consumers' uptake of sustainable seafood from Europe through innovative and validated traceability and engagement tools

#### **SUBMARINERs:**

- UGOT (SE)
- SYKE (FI)
- LUKE (FI)
- NMFRI (PL)
- Many others ...
  incl. Miils, Blue
  Lobster, Havhoest

Overall Budget: 6 Mio €





### BlueBioClusters



# SUPPORTING EUROPEAN COASTAL REGIONS IN THEIR TRANSITION TO A SUSTAINABLE BLUE BIOECONOMY

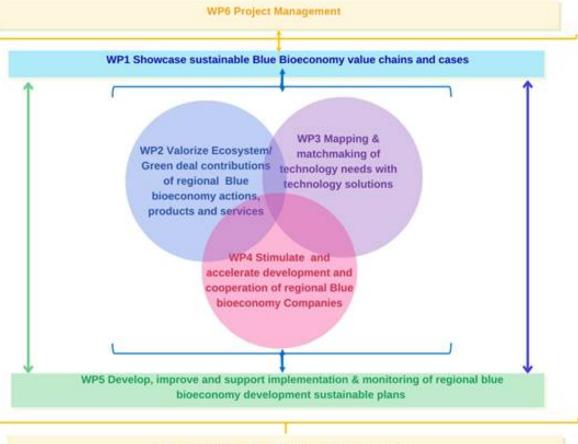
#### **SUBMARINERs:**

- Tartu BioPark (EE)
- Uni Tartu (EE)
- Klaipeda Uni (LT)
- Innovatum (SE)

#### With Blue Clusters from

Portugal, France, Belgium, Norway, Iceland, Scotland

**Overall Budget: 2.5 Mio** 



WP6 Communication, Dissemination & Exploitation



# SeaMark

Call: HORIZON-CL6-2021-CIRCBIO-01-09 — Unlocking the potential of algae for a thriving European blue bioeconomy

EU Grants: Application form (HE RIA/IA): V1.2 – 25.05.2021



Short title	SeaMark		
Coordinator	Ólavur Gregersen		
Organisation	Ocean Rainforest		
Duration	48 months		
Work programme	HEurope-CL6		
Topic	2021-CIRCBIO-01-09		



Seaweed-based market applications

SeaMark will go beyond state of the art with the installation of a pilot biorefinery for cultivated seaweed aiming at TRL7 producing multiple high value functional ingredients.

- Fermented pig feed ingredients (soy replacer)
- Nutra-/cosmeceuticals; meat replacer
- Biomaterials (packaging, medical dressing)





# SeaTernal



#### SEAWEED BASED TECHNOLOGY FOR RECYCLABLE NATURE INSPIRED MATERIALS

- SEATERNALs main objective is to develop three fully circular seaweed-based value chains at TRL 6.
- The project focuses on seaweed as sustainable feedstock utilising aqueous fractionation, conversion, and solventfree recycling technologies thus eliminating the need for distillation-based recycling of the solvents, a major energy and cost factor.
- The three value chains use a shared seaweed fractionation platform which yields processable seaweed fractions for the three value chains.
- Each of these products will be developed embracing a systems view of the value chains being designed for recycling

#### **BROWN**

- Laminarin
- Mannitol
- Alginate

#### **GREEN**

- Ulvan
- DMSP
- Cellulose

- PLA + lactic acid
- Acrylic acid
  - Alginate
  - Medical dressing

















# <u>Blu</u>eSteps

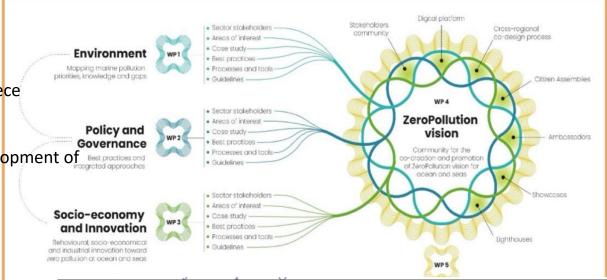
Blue Sustainable Transition towards European Zero Pollution for Oceans and Seas

Call: Horizon-CL6-2021-Zeropollution-01-04 (Achieving zero polluted seas and oceans)

#### Lead: CNR

- 1 CNR Italy
- 2 Bologna University Italy
- 3 Hellenic Centre for Marine Research Greece
- 4 Erinn Ireland
- 5 University of Vigo Spain
- 6 National Institute for Research and Development of
- Marine Geology and Geoecology Romania
- 7 Mondragon University Spain
- 8 Marche Polytechnic University Italy
- 9 Submariner Network For Blue Growth
- 10 Technical University of Denmark
- 11 Norwegian University of Science and Technolog
- 12 Sustainable Development Solutions Network
- France

Overall Budget: 3 Mio €



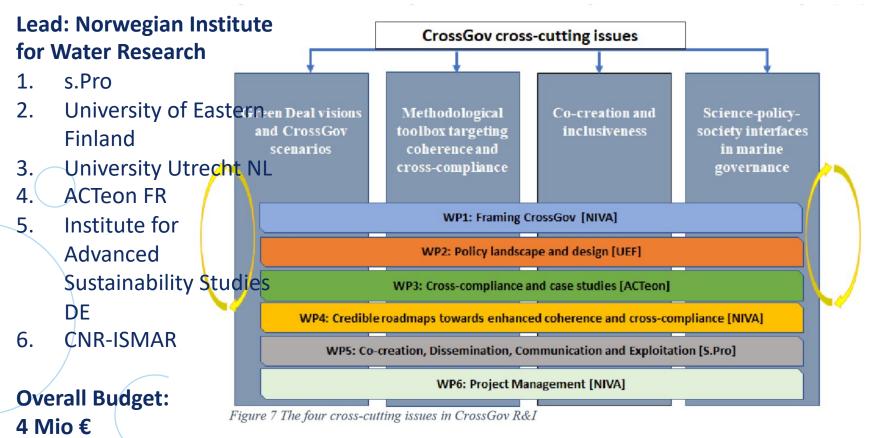
WP#	Work Package Title
1	Mapping marine pollution priorities, knowledge and gaps
2	Policy and Governance: best practices and integrated approaches
3	Behavioural, socio-economical and industrial innovation toward zero-pollution at ocean and seas
4	Designing a connected community for the co-creation and promotion of zero-pollution vision for ocean and seas
5	Communication, Dissemination and Exploitation

Coordination and Management

# CrossGov

# Coherent and cross-compliant ocean governance for delivering the EU Green Deal for European Seas

Call: Horizon-CL6-2021-Governance-01-06 (Cross-compliance of marine policies)





### ECo2sT

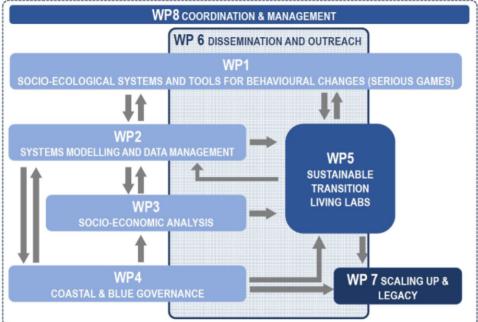
Call: Horizon-CL6-2021-Communities-01-04 (Socio-economic empowerment of the users of the sea )

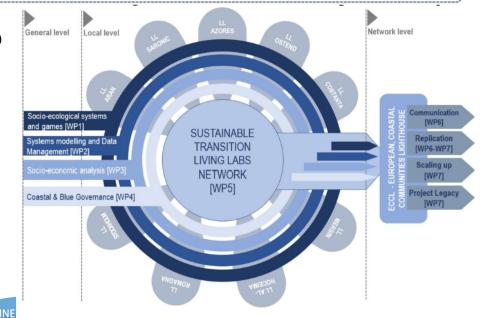
#### Lead: CNR

- 1 Consiglio Nazionale Delle Ricerche (Cnr) It
- 2 Alma Mater Studiorum Universita' Di Bologna (Unibo) It
- 3 Hellenic Centre For Marine Research (Hcmr) El
- 4 National Technical University Of Athens Ntua (Ntua) El
- 5 Stockholms Universitet (Su) Se
- 6 Danmarks Tekniske Universitet (Dtu) Dk
- 7 Sintef Ocean As (Sintef) No
- 8 Vlaamse Instelling Voor Technologisch Onderzoek N.V. (Vito) Be
- 9 Cardiff University (Cu) Uk
- 10 Univerza Na Primorskem Universita Del Litorale (Up) Si
- 11 Middle East Technical University (Metu) Tr
- 12 Institutul National De Cercetare-dezvoltare Pentru Geologie (Geoecomar)
- 13 Agir Association De Gestion Intégrée Des Ressources (Agir) Ma
- 14 Universidade Dos Acores (Uac) Pt
- 15 Submariner Network For Blue Growth Ewiv (Subm) De
- 16 Athina-erevnitiko Kentro Kainotomias Stis Technologies Tis (Athena)
- 17 WOC World Ocean Council Europe (Woc) Fr
- 18 MedIterranean Agronomic Institute Of Zaragoza / ES
- 19 Sdsn Association Paris (Sdsn) Fr
- 20 G.A.C. Group (Gac) Fr
- 21 International Marine And Dredging Consultants (Imdc)

#### Overall Budget: 6 Mio €

Fig. 3.1: Project architecture and major WP exchanges





# Projects ... in preparation ... to be submittedc



#### Horizon Europe ... thus not Baltic specific

#### **BiEUSpaces**

2022-Farm2Fork-01-05 Freshwater: RAS, Aquaponics, Ponds Wind energy in the natural and social environment C5-D3-RES-05-2021 **European Blue Parks** 

MISS-2021-OCEAN-02-01 Innovative Food from marine and freshwater

2022-Farm2Fork-02-08

Marine Microbiome

2022-CircBio-01-07

Biosecurity,
Animal Welfare in
Aquaculture
2022-Farm2Fork-01-06

#### Horizon Europe ... Baltic/North Sea Missions

Baltic / North Sea Lighthouse Coordination **Baltic / North Sea Lighthouse Demonstrator** 

Low impact marine aquaculture and multi-purpose use of marine space

Others?

More?

#### Baltic Sea .... Future INTERREG Baltic Sea ... OUR IDEAS !!!

#### **Blue Bio Sites**

Sites selection and monitoring for the Blue Bio Economy



#### **BlueBioTech**

Technologies for Baltic RAS Systems



#### **Round Goby**

Better use of this invasive species

SI. Swedish

#### Blue-Green Clusters

Collaboration across Blue-Green Sectors

#### BalticSeaFeed?

Develop sustainable feed from Baltic Marine Resources

> SI. Swedish Institute



## SUBMARINER Catalogue

#### Key facts

- ONLINE
- Currently 150 ,top' companies..
- Potentially more
- SUBMARINER Network members support selection process and outreach strategy
- Funded by the Nordic Council with 42.500 Euro / potentially additional sources by Blue Platform
- Company ,self-registration' continuous updates possible
- Inter-active ,automatic messaging'





### Selection



Companies using aquatic resources (ideally from Baltic) for their products / services



Companies whose activity is "sustainable" (ideally certified)



Companies that offer at least a verified prototype and at best a commercially viable product or service



Companies whose activity is showcased online (website / social media channels)







# Selection



Companies using aquatic resources (ideally from Baltic) for their products / services



Companies (ideally cer



Companies	
prototype	
product or	



s whose activity is "sustainable"				
r	Company	Product/service	Product family	Aquatic resource
,	Furcella (EE)	Face creams based on red algae	Cosmetics	Red algae Furcellaria
r	Kingfisher AB (SE)	Eco-certified macroalgae cultivated as biomass	Biomass	Mainly kelp
k	Everts sjöbod (SE)	Lobster safaris and oyster tastings with quality stamp Naturens Bästa	Sustainable tourism	Lobster, oyster
	EstAlg Group Oü (EE)	SAPROPEL, a natural organic underwater soil fertilizer	Fertilizer	Bottom sediments of freshwater reservoirs
\	Blå Biomasse A/S (DK)	Nitrogen reduction with mussels farming	Environmental services	Mussels



# Our target groups



Companies

The catalogue offers them a tool to connect with other companies in the region and a platform to promote their own products through our network.



#### Additional

Researchers, funders, certification bodies, producers, retailers, end consumer, general public.





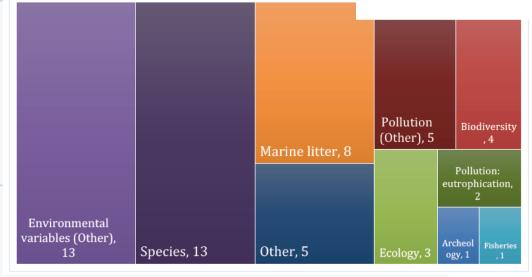
## FIRST-EVER MAPPING OF

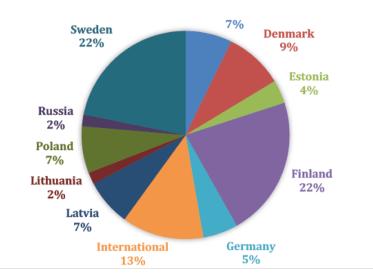
# MARINE CITIZEN SCIENCE PROJECTS IN THE BALTIC SEA REGION



- ❖ From May Sept 2021
- Targeted stakeholder outreach + desk research & online questionnaire
- ❖ 55 projects identified:
  - No older than five years prior to 2021
  - focusing on BSR marine or coastal environment
  - data collected actually used by researchers for scientific research or for exerting influence on policy-makers





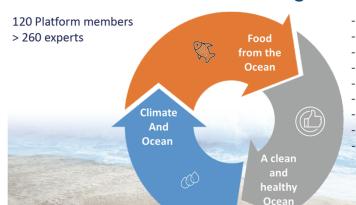


# EU4Ocean Coalition for Ocean Literacy

- ❖ Running until 2022
- ❖ SUBM involved as Baltic Focal Point
- EU4Ocean consists of:
  - ➤ EU4Ocean Coalition
  - > Network of EU Blue Schools
  - > Youth4Ocean Forum
- connecting diverse organisations, projects and people that contribute to ocean literacy and the sustainable management of the ocean
- ❖ 12 partners across Europe, led by ACTeon
  - · Seascape Belgium
  - European Marine Board
  - Nausicaá
  - World Ocean Network
  - Ciência Viva
  - European Marine Science Educators Association
  - Ecologic Institute
  - European Centre for Information on Marine Science and Technology
  - s.Pro (SUBM)
  - MARE Nostrum (Romania),
  - European Schoolnet
  - Women4Oceans

#### The EU4Ocean Coalition event 26 & 27 AUGUST 2021





- Academia
- NGOs
- Networks
- Aquariums & museums
- Industry (SMEs)
- Inter-governmental
- Public Authorities
- Projects

133
Youth4Ocean
members
81 Young Ocean
Advocates
26 projects

36 Blue Schools 13 countries 6041 students



# % Welcome to SUBMARINER family

