

# BRIDGE BS Science-Policy Dialogue Forum

**Overview of the Project**  
Thessaloniki, 29.03.2023

**Dr. Mustafa Yücel**

[myucel@ims.metu.edu.tr](mailto:myucel@ims.metu.edu.tr)

**Co-Coordinator, BRIDGE-BS**



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# Oceans : Our Inner Space

## THE AIR WE BREATHE

We owe 6 of 7 breaths to seas



## BIO-GEO-DIVERSITY

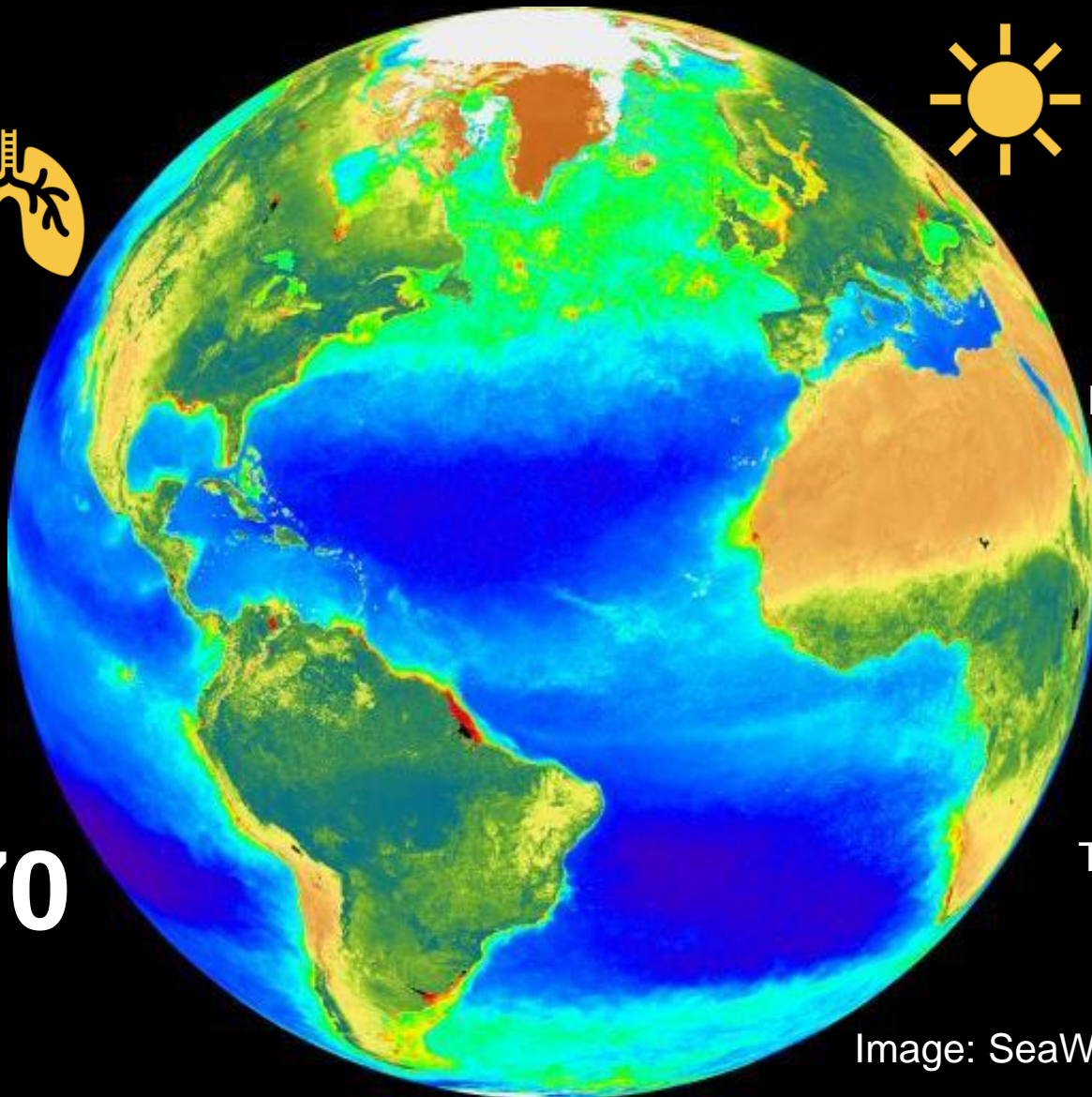
We discovered only 5% of the World's oceans. There is so much more to discover!

>%5

## AREA OF WORLD OCEAN

About 70% of the earth's surface is covered by oceans.

%70



%70



CLIMATE REGULATION  
Covering 70% of the Earth's surface, the ocean transports heat from the equator to the poles, regulating our climate and weather patterns



## BIOTECH

Many medicinal products come from the ocean, including ingredient that help fight cancer, hearth disease.



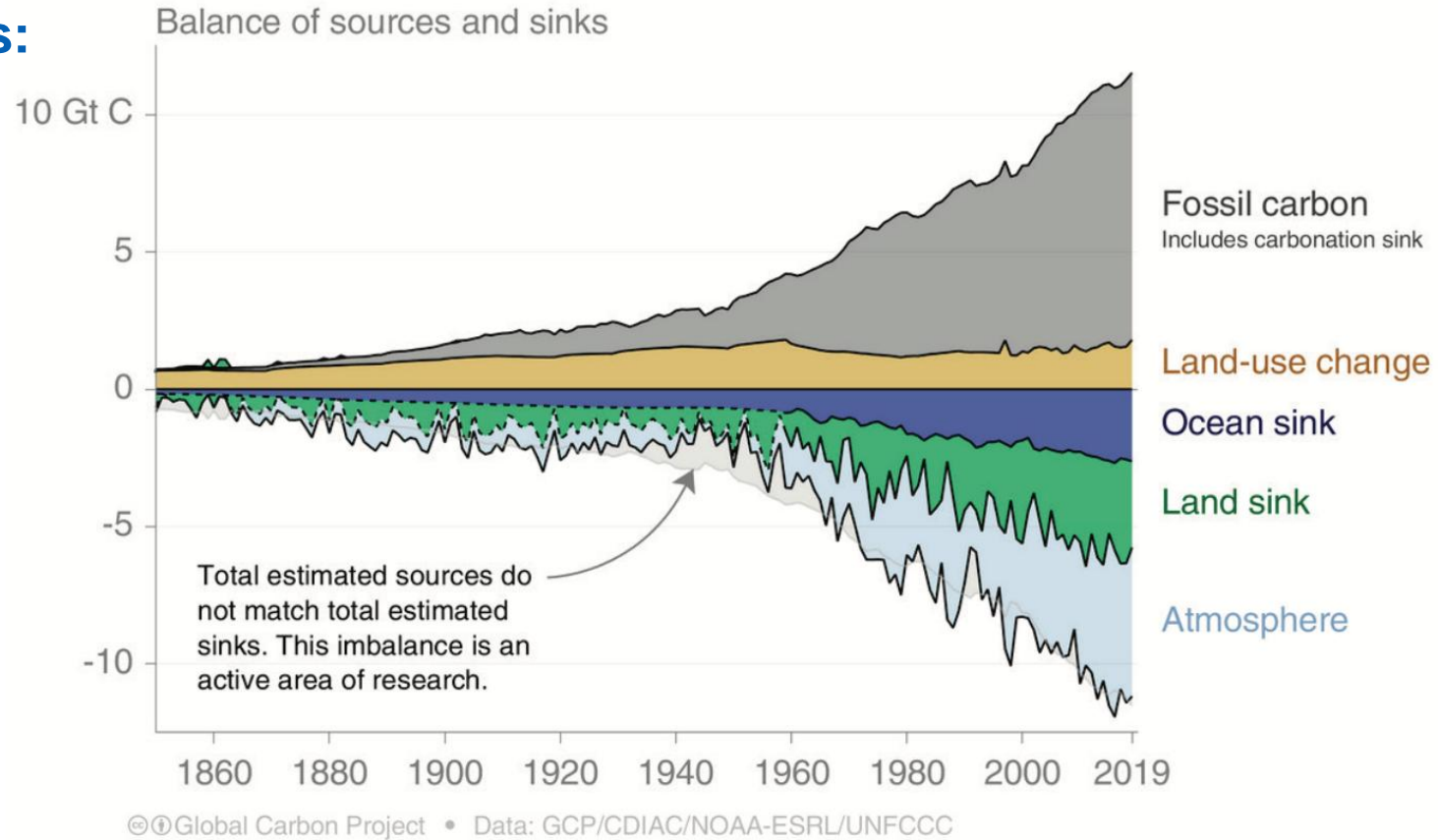
## FOOD

The ocean provides much more than just seafood.

Image: SeaWiFS



## Ecosystem Services: Storing Carbon



**FIGURE 1.2** Reconstruction over time of the industrial period of human carbon emissions to the atmosphere from fossil fuel use and land-use change (positive fluxes), ocean and land sinks (negative fluxes), and atmospheric accumulation. SOURCES: (a) Friedlingstein et al., 2020; (b) Global Carbon Project, 2020; (a) and (b) licensed under Creative Commons CC BY 4.0.

# THE UNIQUENESS OF BLACK SEA

A unique sea basin, rich in biodiversity and heritage, but also where an exceptional combination of natural and human induced stressors co-occur

**4869 km** coastline with  
**421 639 km<sup>2</sup>** total area and  
**18** major sea ports

**10** large rivers flowing to the sea,  
with a total river input exceeding  
**350 km<sup>3</sup> year<sup>-1</sup>**

**160 million**  
population of Black Sea  
Coasts and catchment

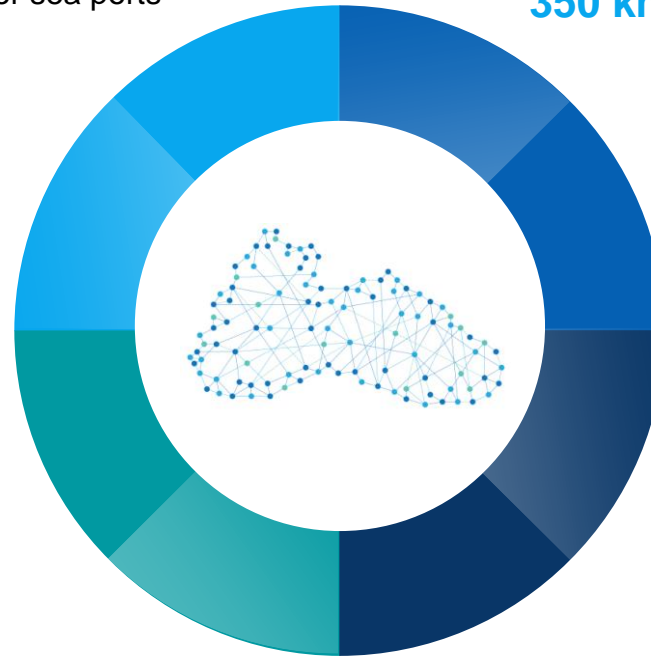
**5 ratio** of the Black Sea  
catchment area to the  
sea's area

Deep Black Sea as the  
paleoclimate archive of  
**5 million years**

**Rich** in energy sources  
such as wave, currents,  
offshore wind, H<sub>2</sub>S,  
gas hydrates

**30 to 8 reduction**  
in the number of fish species  
with enocomical significance

**90%** of oxygen free,  
**H<sub>2</sub>S-rich** volume



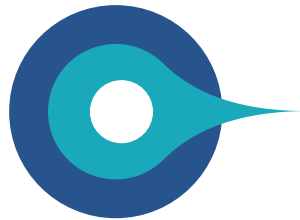


# THE STRATEGIC RESEARCH AND INNOVATION AGENDA

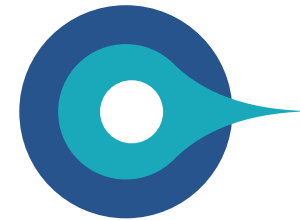
SRIA as an updated guide on how to tackle multi-stressors and co-develop the R&I needed for a sustainable blue economy



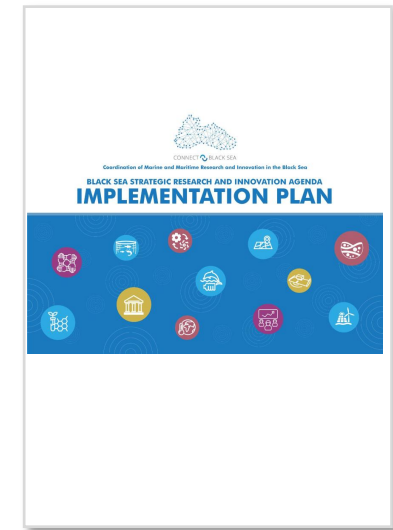
## 2018 Burgas Vision Paper



## 2019 Black Sea SRIA

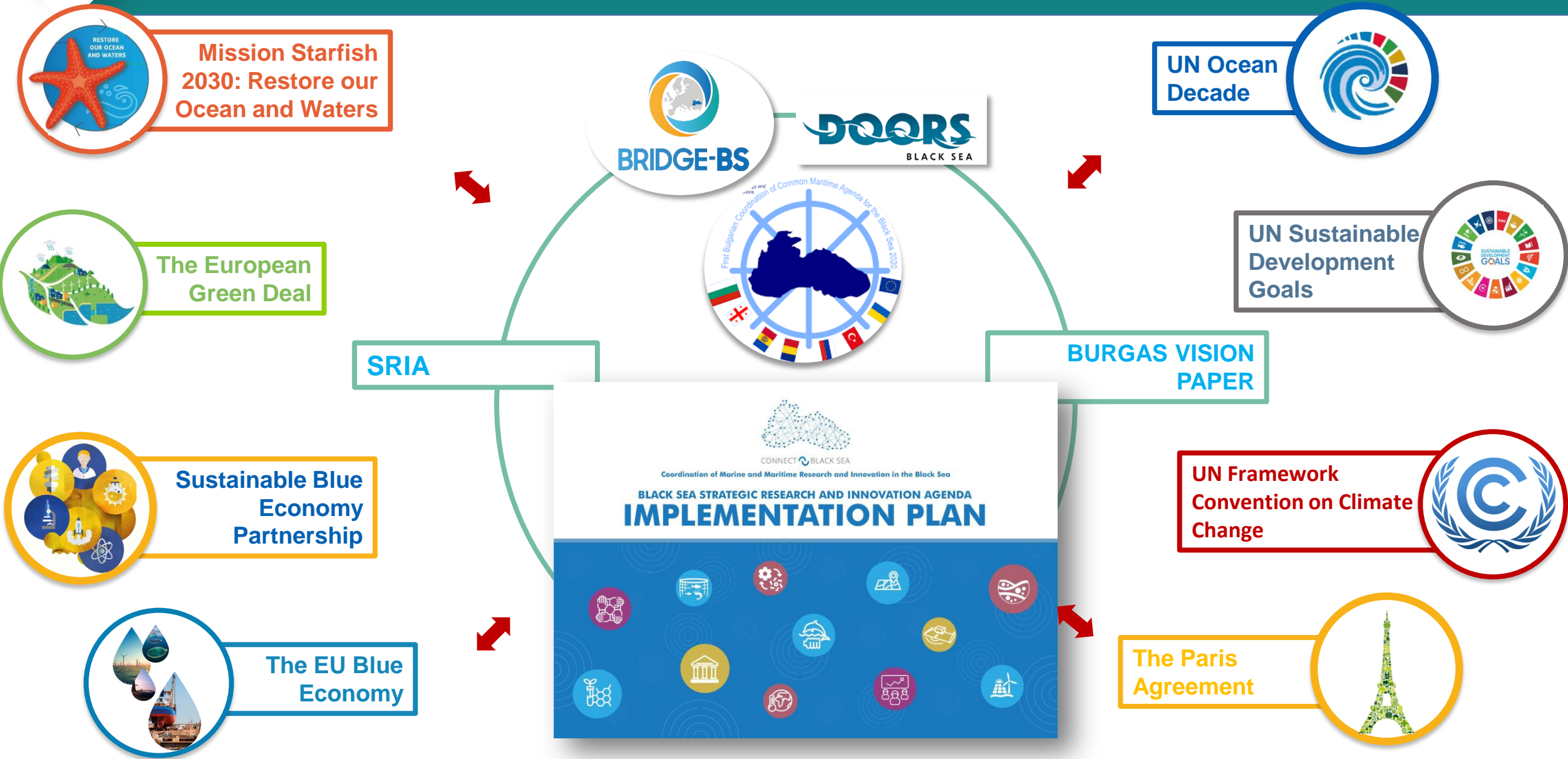


## 2023 Implementation Plan



# BLACK SEA SRIA IMPLEMENTATION

## SOCIAL CHALLENGES AND POLICY SYNERGY WITH OTHER INITIATIVES







# SRIA IMPLEMENTATION PLAN DEVELOPMENT



**4 May  
2023  
Brussels**



**2017**



**2020**



**2020-2022**



**2023**







**THEME 1: DIGITAL TWIN OF THE BLACK SEA**



**THEME 2: EFFECT OF MULTIPLE STRESSORS ON THE BLACK SEA ECOSYSTEM**



**THEME 3: CHANGING BLACK SEA BIODIVERSITY AND ECOSYSTEM RESILIENCE UNDER CLIMATE CHANGE AND MULTISTRESSORS**



**THEME 4: ECOSYSTEM BASED FISHERIES, HIGH-TECH AQUA- AND MARICULTURE**



**THEME 5: BLUE BIOTECHNOLOGY**



**THEME 6: ONE HEALTH APPROACH AND IMPROVED SAFETY FOR BLACK SEA COASTS**



**THEME 7: MARINE LITTER PILOT**



**THEME 8: MARINE RENEWABLE ENERGY**



**THEME 9: INNOVATIVE OBSERVING SYSTEMS**



**THEME 10: BLACK SEA UNDERWATER AND COASTAL HERITAGE**



**THEME 11: INNOVATIVE APPROACHES TO CONNECT SCIENTISTS, POLICYMAKERS, INDUSTRY AND SOCIETY**



**THEME 12: BLUE SKILLS AND CAPACITY BUILDING ON MARINE SCIENCES**

Corresponding Pillar:



**SRIA Pillar 1**  
Addressing Fundamental Black Sea Research Challenges



**SRIA Pillar 2**  
Developing Products, Solutions, and Clusters Underpinning a Sustainable Black Sea Blue Economy



**SRIA Pillar 3**  
Building of Critical Support Systems and Infrastructures for the Benefit of Black Sea Communities



**SRIA Pillar 4**  
Education and Capacity Building



## SRIA Pillar 1 Addressing Fundamental Black Sea Research Challenges

### THEME 1: DIGITAL TWIN OF THE BLACK SEA

#### Strategic Joint Action 1.1

Developing the Digital Twin of the Black Sea, building on innovative models at regional and basin-scale that simulate climate change and multiple stressors and integrating them with socioeconomic trends, blue economy scenarios and system of systems approaches

#### Strategic Joint Action 1.2

Advancing AI-powered decision support tools (DSTs) for marine ecosystem management in the Black Sea

### THEME 2: EFFECT OF MULTIPLE STRESSORS ON THE BLACK SEA ECOSYSTEM

#### Strategic Joint Action 2.1

Organizing synoptic/joint oceanographic expeditions to identify synergistic and individual effects of each stressor (such as deoxygenation, acidification, sulfide build-up) on the entire ecosystem

#### Strategic Joint Action 2.2

Developing a source-to-sink pilot study to identify the fluxes, transformation and impact of emerging contaminants (such as pharmaceuticals, antibiotics, anthropogenic nanoparticles) and identify hazards arising from their multiple biotic impacts on the marine ecosystem

### THEME 3: CHANGING BLACK SEA BIODIVERSITY AND ECOSYSTEM RESILIENCE UNDER CLIMATE CHANGE AND MULTISTRESSORS

#### Strategic Joint Action 3.1

Cost-effective mapping of the Black sea biodiversity via emerging tools (such as the e-DNA) at genetic, species and ecosystem levels

#### Strategic Joint Action 3.2

Uncovering the extent of invasive species in the Black Sea and developing tools to forecast their impact in the context of Black Sea multiple stressors as a basis for mitigation and adaptation policies.



## SRIA Pillar 2 Developing Products, Solutions and Clusters Underpinning a Sustainable Black Sea Blue Economy

### THEME 4: ECOSYSTEM BASED FISHERIES, HIGH-TECH AQUA- AND MARICULTURE

#### Strategic Joint Action 4.1

Determination and validation of fish productivity zones and protected areas in the Black Sea using ecosystem-based approaches involving multi-actor platforms including artisanal (traditional) fisheries towards a basin wide network of complementary traditional fisheries and mariculture

#### Strategic Joint Action 4.2

Develop carbon-neutral sustainable mariculture in the Black Sea, including supporting related research in alternative carbon-neutral protein sources

### THEME 5: BLUE BIOTECHNOLOGY

#### Strategic Joint Action 5.1

Establishing a knowledge system of candidate species and habitats that support bioactive compounds such as novel pharmaceuticals, biofuels, enzymes, fishmeal, and biopolymer for sustainable development and food security in the region

#### Strategic Joint Action 5.2

Transforming hazards into resources: performing a feasibility study on the role of algae (from algal blooms) as biofuels, alternative protein sources and other natural products of the second generation

### THEME 6: ONE HEALTH APPROACH AND IMPROVED SAFETY FOR BLACK SEA COASTS

#### Strategic Joint Action 6.1

Investigate the long term and episodic (extreme weather event-related) changes related to sea level rise and coastal floods with associated impacts and adaptations including social aspects

#### Strategic Joint Action 6.2

Risk assessment of harmful algal bloom (HAB), jelly blooms and mucilage events at the regional level and their impact on ecosystem services, food safety and evaluation of their potential biotechnological applications

#### Strategic Joint Action 6.3

Identification of the ecosystem impact of civil and military disruptive activities (hazardous pollution, unexploded ordnance etc) affecting the resilience of coastal communities, integrating coastal scientific, socioeconomic and psychological angles

### THEME 7: MARINE LITTER PILOT

#### Strategic Joint Action 7.1

Raise awareness on the marine litter pollution and solutions in the Black Sea targeting the broader public by linking with already existing initiatives and creating novel activities (such as activities of Black Sea Young Ambassadors and other Early Career Ocean Professionals (ECOPs))

#### Strategic Joint Action 7.2

Enable the Black Sea CONNECT Marine Litter Action Forum as a recurring platform/forum to tackle the pollution crisis in close links to Mission Restore our Ocean and Waters

### THEME 8: MARINE RENEWABLE ENERGY

#### Strategic Joint Action 8.1

Development of an experimental renewable wind and wave energy demonstrator for identifying energy outputs, impact on the ecosystem and economic feasibility and social acceptability

#### Strategic Joint Action 8.2

Advance the concept and design and feasibility of a future multi-use offshore platforms or protected areas for piloting solutions integrating solar energy, green hydrogen production, and link to blue carbon (carbon capture underwater)

## SRIA Pillar 3 Building of Critical Support Systems and Infrastructures for the Benefit of Black Sea Communities

### THEME 9: INNOVATIVE OBSERVING SYSTEMS

#### Strategic Joint Action 9.1

Designing of an integrated joint observing system, including regular sea expeditions, standardized fixed observing systems supported by mobile platforms

#### Strategic Joint Action 9.2

Advance the mobile component of the Black Sea observatory by expanding the ARGO and glider deployment in a coordinated way

### THEME 10: BLACK SEA UNDERWATER AND COASTAL HERITAGE

#### Strategic Joint Action 10.1

Continue to map and select (for further promotion) the underwater heritage of the Black Sea and assess the sensitivity of heritage sites to climate change and multistressors

#### Strategic Joint Action 10.2

Opening the Common Cultural Heritage of the Black Sea coast to the wider public through the development of sustainable and innovative tourism models

## SRIA Pillar 4 Education and Capacity Building

### THEME 11: INNOVATIVE APPROACHES TO CONNECT SCIENTISTS, POLICYMAKERS, INDUSTRY AND SOCIETY

#### Strategic Joint Action 11.1

Develop mechanisms to continue the identification of new SRIA priorities and emerging topics of implementation

#### Strategic Joint Action 11.2

Engaging research and innovation stakeholders through sustainable stakeholder platforms such as Living Labs etc., World Cafes

### THEME 12: BLUE SKILLS AND CAPACITY BUILDING ON MARINE SCIENCES

#### Strategic Joint Action 12.1

Building on momentum of existing Black Sea Young Ambassadors Programme, new approaches for all ECOPs will be developed in order to engage general public such as the Citizen Science initiatives – actively involve citizens in science-related processes using innovative tools for learning by doing (water quality, biodiversity monitoring)

#### Strategic Joint Action 12.2

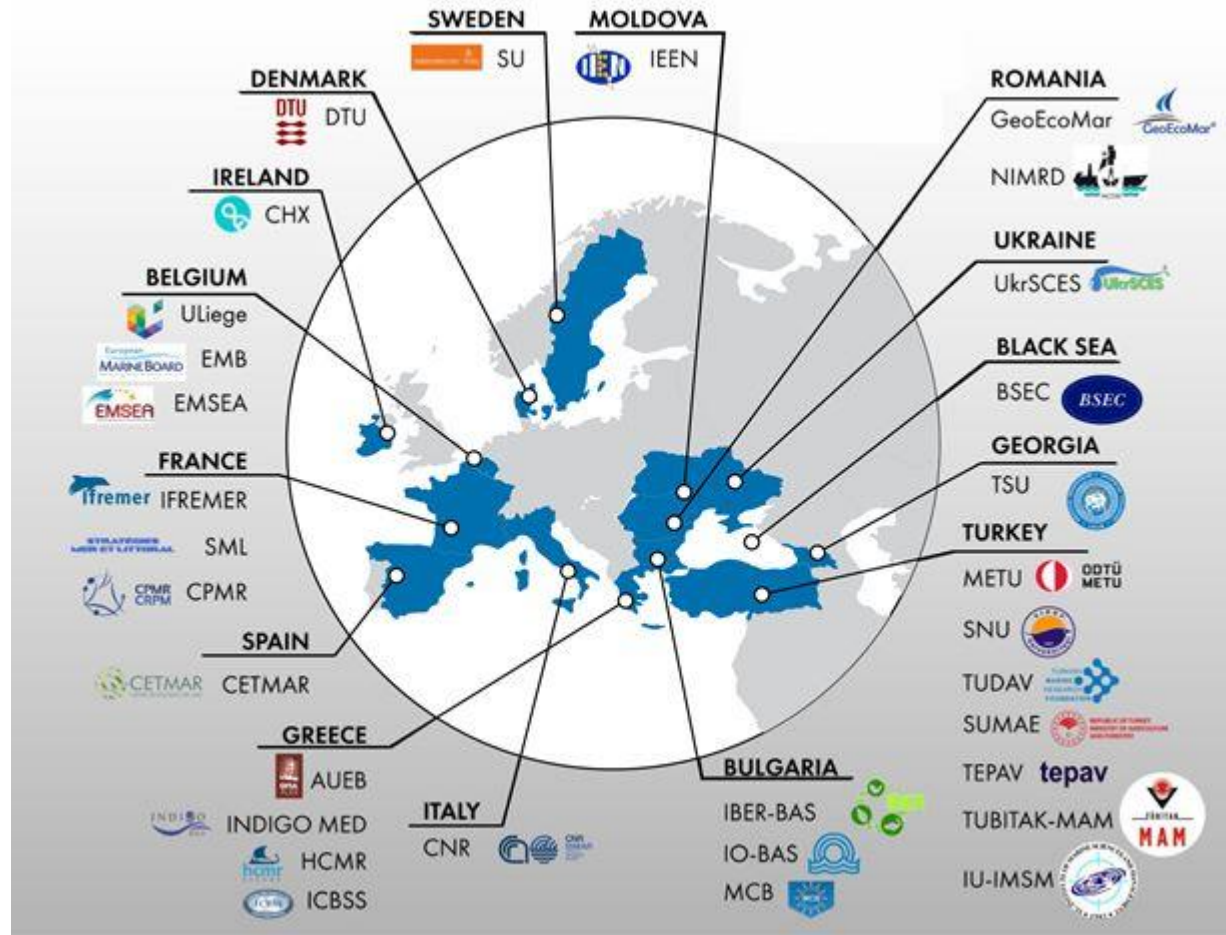
Develop a Training series (including summer school-type activities) for ECOPs and LATE COPS (peer training, involving late careers as mentors). Adopt a "Train the Trainer" Programme Approach (through staff exchanges, secondments, mobility programmes etc.) in order to increase the capacity of mentors/researchers who can act as mentors to younger researchers.





# BRIDGE-BS CONSORTIUM

## 31 partners from 14 countries



The overall objective of **BRIDGE-BS** is to advance the Black Sea's marine research and innovation to co-develop Blue Growth pathways under multi-stressors for the sustainable utilization of ecosystem services. To do so it will develop an ecosystem-based management framework to enable policy uptake and foster citizen engagement.





## NORTHWESTERN BLACK SEA (ODESSA BAY)

Habitat Maintenance (RMS)  
Food Provision (PS)

## WESTERN BLACK SEA (DANUBE DELTA REGION)

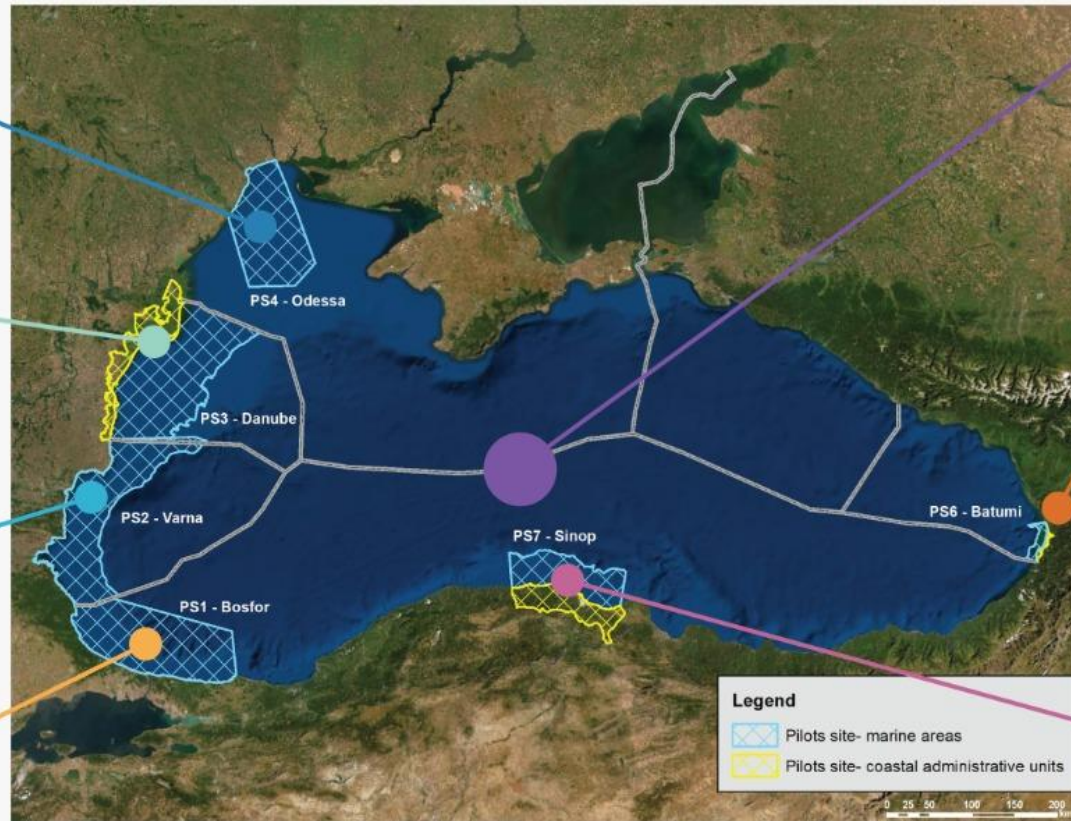
Carbon Sequestration (RMS)  
Water Quality (CS)

## WESTERN SHELF (VARNA & BURGAS)

Habitat Maintenance (RMS)  
Food Provision (PS)

## BOSPORUS SITE

Fish Migration Route (PS)  
Buffering Against Anoxia (RMS)



## BASIN-WIDE

Climate Regulations (RMS)  
Food Provisioning (PS)

## EASTERN BLACK SEA (BATUMI SITE)

Recreation and Tourism (CS)  
Food Provision (PS)

## SOUTHERN BLACK SEA (SINOP SITE)

Recreation and Tourism (CS)  
Food Provision (PS)

### NODE 2. BLUE GROWTH INCUBATORS:

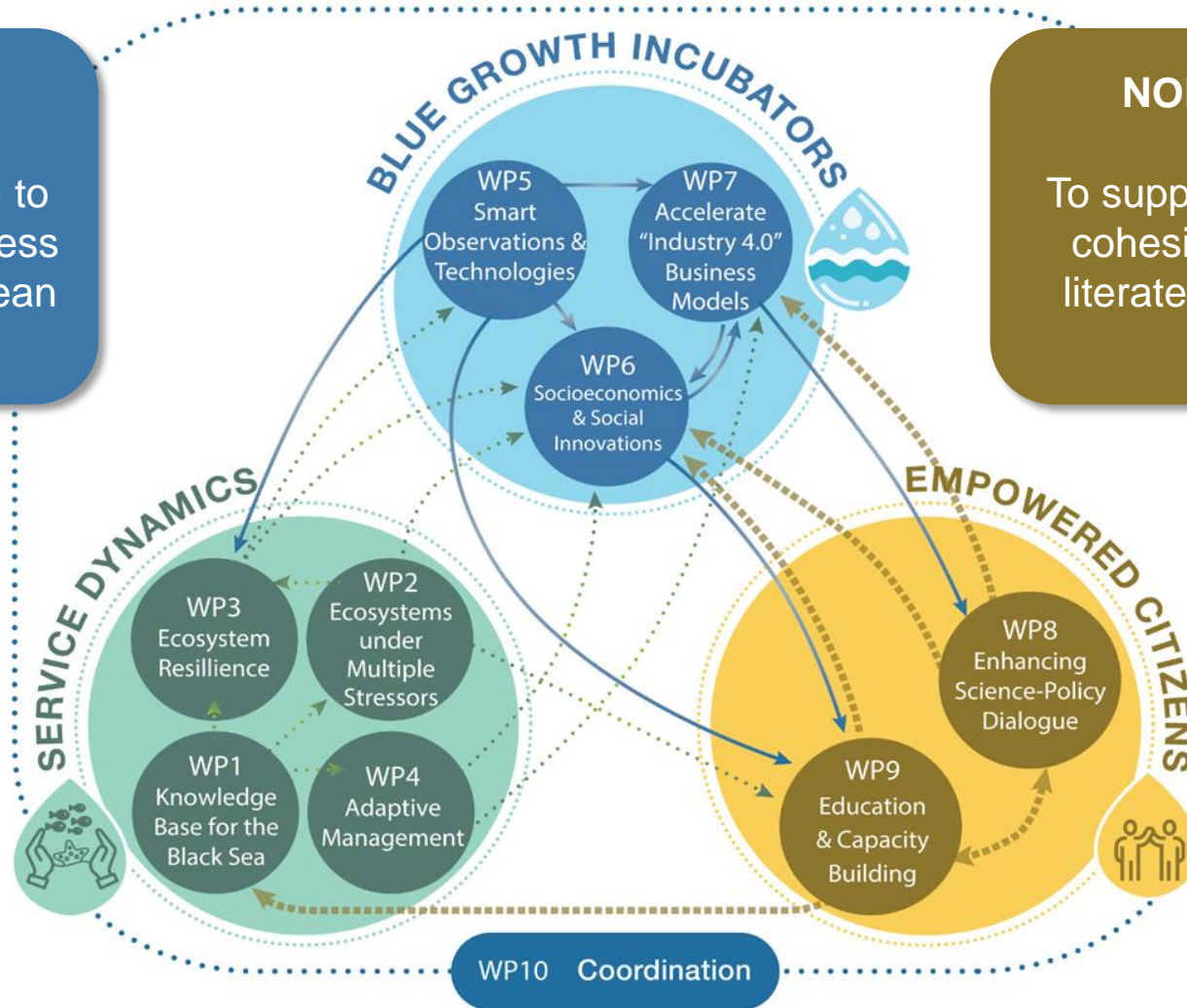
To provide an operational platform to translate scientific ideas into business opportunities and stimulate the ocean economy in the Black Sea

### NODE 1. SERVICE DYNAMICS:

To assess the status, and develop the multidisciplinary understanding and predictive tools on ecosystem functioning necessary to implement adaptive management

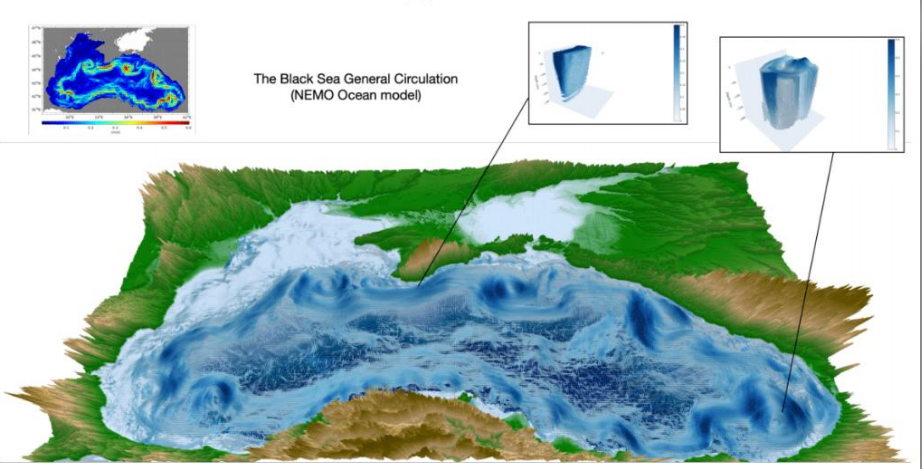
### NODE3. EMPOWERED CITIZENS:

To support the development of a cohesive, knowledgeable and literate Black Sea international community





# Summer School 2022



A dark blue poster for the "HIGH-TECH SUMMIT FOR THE BLACK SEA". It features the BRIDGE-BS logo, a central graphic of blue cubes and gears, and text: "27-28 SEPTEMBER 2022 VARNNA, BULGARIA" and "#HTS4BS". A small text at the bottom mentions funding from the European Union's Horizon 2020 program.

- ### Menu
- ▶ Biodiversity - water column
  - ▶ Biodiversity - seabed
  - Biodiversity - marine mammals
  - Biodiversity - fish
  - Biodiversity - birds
  - ▶ Eutrophication
  - ▶ Contaminants
  - ▶ Hydrography
  - ▶ Litter
  - Energy (noise)
  - ▶ Statistics

Search database   Results   Graphic results

Please choose one option and select item from the main menu

Emblas

[blackseadb.org](https://blackseadb.org)

A blue banner with the BRIDGE-BS logo at the top. The text reads "BLACK SEA OCEAN LITERACY NETWORK" in large blue letters. Below it, in white text on a blue background, it says "We want every Black Sea citizen to become Ocean Literate!".



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 101019717



# LIVING LABS

## FIRST ROUND 2022

Organizers:  
IU - DBIE  
TUBITAK MAM  
TEPAV  
TUDAV



**Istanbul, TURKEY**  
16 February 2022

Within the scope of Living Lab, risks, pressures and main drivers identified by prioritizing fundamental marine ecosystem services, a sustainable blue economy in the Black Sea. In addition, innovative 4.0 industry approaches for sustainable blue economy and enhanced ecosystem services in the Black Sea were discussed.




Winter Cruise 2022



# BLACK SEA

The Black Sea  
Ecosystem Management  
Blue Growth

# VIRTUAL BLUE CAREER CENTER

- Increase Awareness of the Workforce and Employability
- Professional Development and Education
- Promote Blue Economy Sectors



## SECOND COHORT 2023-2025

# BLACK SEA YOUNG AMBASSADORS

We come together to re-connect missing links for #BlackSea and raise awareness of this unique sea basin



#BlackSeaYouth



General Assembly



## READ THE RESEARCH ARTICLE PUBLISHED WITH THE CONTRIBUTION OF BRIDGE BLACK SEA!




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## READ THE RESEARCH ARTICLE PUBLISHED WITH THE CONTRIBUTION OF BRIDGE BLACK SEA!







# THANK YOU!



**BRIDGE-BS**

**STAY TUNED!**

[bridgeblacksea.org](http://bridgeblacksea.org)

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