



Advancing Black Sea Research and Innovation to Co-Develop Blue Growth within Resilient Ecosystems

Reporting

Project Information

BRIDGE-BS

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[Project website](#)

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€ 8 999 877,50

Coordinated by

MIDDLE EAST TECHNICAL UNIVERSITY



Türkiye

Periodic Reporting for period 1 - BRIDGE-BS (Advancing Black Sea Research and Innovation to Co-Develop Blue Growth within Resilient Ecosystems)

Reporting period: 2021-06-01 to 2022-11-30

[Summary of the context and overall objectives of the project](#)



Black Sea and its unique ecosystem services are degrading and need to be better managed for the benefit of citizens dependent upon their sustainability. The project develops predictive tools and capabilities necessary to understand and predict the impacts of climate-driven and anthropogenic multi-stressors affecting the Black Sea. 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. It develops an ecosystem-based management framework to enable policy uptake and foster citizen engagement. Clustering around three main nodes including Service Dynamics, Blue Growth Incubators, and Empowered Citizens; BRIDGE-BS uses pilot sites at the regional level, with findings contributing to interconnected work packages addressing the four pillars of the Black Sea SRIA. BRIDGE-BS strives to achieve "a healthy, resilient and productive Black Sea by 2030" with awareness of the seriousness of the threat posed by the increasing human-induced pressures on the Black Sea. BRIDGE-BS puts to the forefront the overarching aim of assessing the current state of Black Sea ecosystems, their services, and resilience to the multistressors and creating the necessary means to manage these ecosystems sustainably.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far

NODE 1. SERVICE DYNAMICS - Multistressors defined in the Black Sea SRIA are addressed under BRIDGE-BS. Basin-wide, as well as Pilot Site-specific (PS) assembly of data on multistressors and boundary inputs, were the main targets in this process. Links exist with current and past initiatives/projects links are established. To facilitate open access and FAIR Data, the new BRIDGE-BS Database is activated. Model and machine-learning-based projections of a distributed set of PS-specific and basin-wide Blue Economy scenarios projections are developed for the first time based on existing data but also on the socio-economic co-design process in connection to NODE2. Ensemble of basin-scale models are available and results are being analyzed at the basin scale to identify safe operating conditions for the services generated by Black Sea ecosystems, via the implementation of accurate predictive modeling tools and the capabilities necessary to tackle the increasingly complex array of multistressors. Time series and maps of indicators of GES and key habitats are generated. Initial results are already utilized to establish the tools for resilience assessment and adaptive management. To examine the impacts of multiple stressors on individual and the suite of ecosystem services (ES), an initial hierarchical resilience assessment is carried out. At the basin level, pressure-state indicators for ES have been identified, relevant data collected, and preliminary multistressor impact analysis carried out. Decision Support Tools is being developed to estimate the risks of management decisions relative to multistressors are under development at different spatial scales.

NODE 2. BLUE ECONOMY INCUBATORS - Key data on the selected ES have started to be generated, innovative monitoring techniques are piloted basin-wide and extensive sampling for carbon sink for the first time in the basin are adopted. Despite the war, the entire Southern basin has been studied. New data were collected during the expeditions (Southern Shelf) and monitoring observation (North-western Shelf). Valuable data was generated filling gaps, especially towards a better understanding of the Black Sea-specific processes, and will be incorporated in updated models. An integrated approach for adopting new technologies for rapid biodiversity assessments are

developed and a detailed Black Sea basin-wide e-DNA sampling has been conducted. Stakeholder engagement, enabling the collaborative design of ideas and business models in the Living Labs (LL) has been set up at PS in the Black Sea. The LL analysis of how changing service dynamics in the short term will affect blue economy sectors, and how social, economic, and technological innovations could foster the Blue Economy in the Black Sea has been made. LL reached 120 local stakeholders. A detailed approach to establish socio-economic scenarios integrating qualitative and quantitative data at the country level based on the Climate Change IPCC scenarios. The first Blue Economy High Tech Summit for The Black Sea was organized engaging highly qualified speakers. The initial guidelines for the accelerator program identified research and business opportunities in the Black Sea, methods to translate research ideas into business, and a screening of the different accelerator approach. NODE3. EMPOWERED CITIZENS - Preparations have been made to resume the dialogue with the policy stakeholders, based on existing initiatives and regional frameworks to pave the way for knowledge-transfer activities. Additionally, a detailed assessment of regional and national frameworks for blue economy was conducted. Dialogue activities with key actors took place. The Virtual Blue Career Center was launched, and Summer School took place. Calls for the Ph.D. program were launched. The flagship program Black Sea Young Ambassadors continues. Local activities took place, reaching over 200 students.

Progress beyond the state of the art and expected potential impact (including the socio-economic impact and the wider societal implications of the project so far)

The project creates for the first time in the Black Sea a complete inventory of the data on stressors and ecosystem services with the BRIDGE-BS Database. Blue Economy Observatory is being developed as the first open-access database with aggregated economic data, models, and project results. Ensemble of basin-scale models are available and results are being analyzed at the basin scale to identify safe operating conditions for the services generated by Black Sea ecosystems, via the implementation of accurate predictive modelling tools and capabilities. New models that are capable of resolving Black Sea-specific processes given in the SRIA are developed. To project future resilience, holistic resilience assessment of the Black Sea ecosystems is conducted. The project advances machine learning techniques for extracting data from big data archives with Decision Support Tools to estimate the risks of management decisions relative to multistressors are under development at different spatial scales, employs artificial intelligence tools (e.g. ANN) to predict state-response dynamics at Pilot Sites and over the whole basin relative to indicators on multistressors together with modelling results. Additionally, the project develops a geospatial Cumulative Effects Assessment tool based on identification, quantification and representation of explicit driver-pressure-state-response relationships. The project's unique design couples process studies in the Pilot Sites to validate technology development, yielding several steps of increases in TRL in smart observations. The Living Labs already went beyond the state-of-the-art in the use of participative approaches such as co-creation of sustainable future scenarios with visioning and backcasting tools. The project also combines knowledge and technology for Industry 4.0 by harnessing Black Sea resources in support of high-potential Blue Economy sectors. The one and only

Black Sea Ocean Literacy Network is being developed. Novel capacity-building activities such as the VBCC platform and BSYA Program are also unique to the project.



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