JPI OCEANS

Concept paper

European Marinas Network

October 2024

European Marinas Network Joint Action Concept Paper

October 2024

Joint Action Title: European Marinas Network

SRIA strategic scope: Ocean Health and Ocean Stewardship & Governance

Lead countries: Greece and Italy

Responsible MB members: Pierpaolo Campostrini (IT), Aris Karageorgis (GR)

Contact leads for Joint Action: Francesca Coccon (IT), Alexandra Pavlidou, Eirini-Asimina Stamatopoulou (GR)

Supporting countries: DE, GR, IT

Table of Contents

Table of Content

1. BACKGROUND

Rationale

European waters count at least 6 million boats and over 6,000 inland and coastal marinas, which makes the recreational boating industry a significant contributor to the global blue economy and environmental dynamics (Alkhalidi and Alsulaili 2024; European Boating Industry). For example, in Italy alone, only 537 marinas operate (Bruccoleri et al., 2023). Marina companies operate in an increasingly competitive environment, where environmental impact becomes a unique point of sale criterion and can be considered as an indicator for the effectiveness of promotional strategies of the sector (Bruccoleri et al., 2023).

In addition, marinas act as positive catalysts for their environment providing space for local companies and being providers of access to seas and waters while activating citizens' ocean literacy and environmental awareness. This positive role can be strengthened by enhancing the role of marinas as stations for ocean science and community engagement. They provide infrastructure, often at key points where data is currently missing.

However, marinas and small ports with high boat traffic can also put pressure on their ambient aquatic systems, e.g. from direct release of contaminants from the boats or indirectly through their activities (Gaines, 2023; Amorim et al., 2024). To make the boating sector fit for the future, marinas and their stakeholders generally seek to improve their environmental performance. They have an intrinsic interest in protecting their surrounding waters and marine biodiversity as a basis for watersports and other activities. Other motivations to engage with research and innovation can include marina certifications, resilience to extreme events, adaptation to sea-level rise, synoptic data for better weather information, and community engagement to attract more customers.

Monitoring the marine environment inside and outside marinas is crucial for better management and sustainability, promoting sustainable use of the marine environment and data collection in the frame of the EU legislation (EU, 2000; 2018). However, the gaps in in-situ data availability and the limited access or dissemination of existing data in many countries worldwide increase the complexity of water quality monitoring. The scientific community is trying to overcome these gaps by introducing novel technologies for monitoring ocean water quality and integrative approaches to unravel the complex relationship between anthropogenic activities and the marine environment. Europe's marinas appear to offer an opportunity for efficient upscaling of monitoring capacities and knowledge gain about coastal areas.

Scientific background

A key scientific aspect of the proposed Joint Action on the European Marinas Network lies in recording crucial real-time data in coastal regions. Through the establishment of a marina-based monitoring network, a wide range of oceanographic and meteorological parameters could be recorded, crucially improving data coverage in coastal areas. Parameters to prioritise could include water temperature, sea state, dissolved gases, phytoplankton, microplastics, and others, potentially in combination with meteorological or air quality parameters.

Establishing such a marina-based measurement network would contribute significantly to closing data gaps in the coastal area. In addition, this data could help fill the lack of satellite data coverage in coastal regions and provide groundproofing in this area. The data obtained could be used, for example, to generate information on water levels or marine heat waves. This is especially relevant considering coastal regions often have high tourist and population densities. It would, therefore, provide key information for the regulating authorities to ensure the safety of the coastal population. In addition,

the data obtained could be used for the environmental management of marinas and coastal regions, e.g., to ventilate marinas in a timely manner if an oxygen minimum is threatening or, e.g. take timely warnings and measures in the event of toxic algal blooms.

The deployment of low-cost, low-maintenance sensor networks, including Ships of Opportunity (SOOP) systems, can enable continuous monitoring of water quality both inside and outside marinas, routinely measuring key oceanographic variables like salinity, temperature, turbidity, dissolved oxygen, and chlorophyll-a. By harnessing and further advancing the power of advanced sensor technology and community engagement, such infrastructure can create real-time data streams informing environmental management, improving marina operations, and promoting sustainable practices in coastal regions, thereby collecting scientific data with a direct benefit to society. Such a system can be designed to be accessible and scalable, offering citizen science involvement and business innovation potential.

Marina perspective

The European Marina Network Joint Action aims to establish an ecosystem consisting of many individual marinas and associated businesses running monitoring stations along the coastline, empowering marinas as hubs for ocean stewardship. The resulting information products could include forecasting and warning apps for marina users and the local population via marinas, local authorities, and social media platforms. Marinas that participate in developing the European Marina Network could be certified, earning a status such as “blue”, and thus become more attractive to their customers.

The European Marinas Network Joint Action would significantly improve the data situation in under-sampled coastal regions. Further, it can contribute to creating information products, enabling marina owners and local authorities to manage the coastal regions better, resulting in more efficient ocean and civil protection. Beyond actively preserving their natural capital and understanding the nature and dimension of local stressors, marinas are also increasingly called upon to promote environmental education. The popular Blue Flag (https://www.blueflag.global/criteria) award for marinas includes within its suggested criteria that “Information relating to local ecosystems and environmental elements must be available to marina users”. This implies indicating sensitive marine habitats and promoting “the participation of local stakeholders in local ecosystem management”.

The scoping process

The European Marinas Network Scoping Action has started exploring the potential of marinas to act as essential infrastructure for ocean observation, ocean science, and citizen involvement. The initial idea was followed by scientific meetings (online) and workshops (in person and online) with scientific experts and stakeholders to understand better and discuss the perspective to establish harmonised environmental data stations at marinas in participating countries, enabling them to play active roles in environmental stewardship and monitor their impact. The workshop highlighted the importance of the ecological characterisation of coastal ecosystems, including marinas, for better management and sustainability. The participants referred to the challenges in marinas and focused on the pathways to implementing solutions. The group of scientific experts and stakeholders discussed the perspective of using marinas as a resource for ocean science and sustainability and highlighted the potential benefits for marinas, including data-driven decision-making, certification programmes, and enhanced community engagement. The concept was to provide tools and guidance to marinas to become focal points for monitoring the marine environment and generating data.

Moreover, the group discussed the importance of involving citizen science and innovative sensor technologies to monitor marine environments, as well as the role of platforms like EMODnet in

harmonising and disseminating marine data. At the policy level, the discussion emphasised the alignment with EU directives such as the Marine Strategy Framework Directive and the Water Framework Directive. Experts noted the importance of ensuring that the Joint Action's activities and data collection efforts can support the implementation of these policy frameworks. From dredging requirements and the need to develop coastal resilience to marina certification, community engagement and brand awareness purposes, marinas have a vested interest in developing competencies around comprehending, measuring and reporting on ocean variables both within their marinas and in surrounding waters. These discussions have formed the basis for developing the focus and implementation of the Joint Action, which we outline in this concept paper.

2. OBJECTIVES OF THE PROPOSED JOINT ACTION

The proposed Joint Action is foreseen as a Knowledge Hub serving as a tool for developing the infrastructure for marine monitoring and data generation, with potential for a Joint Call for research and innovation projects at a later stage.

The proposed Joint Action will contribute to a better knowledge of marine ecosystems and decisions. It will be centred around the research objective to develop a data-based understanding of the socio-environmental conditions within and around marinas in Europe by:

- Establishing a network of selected marinas to participate in coordinated environmental monitoring and data collection efforts;
- Developing guidelines for the marinas on using procured and standardised, low-cost sensor packages in marinas to measure oceanographic and environmental key parameters;
- Enabling marinas to become focal points for harmonised data generation;
- Providing a centralised repository for data collection.

Complementary objectives of the Joint Action will include elements of education and science-policy impact:

Empowering marinas to become hubs for ocean stewardship and citizen science by:

- Engaging marina users, such as boaters and visitors, in hands-on environmental monitoring and data collection activities
- Providing educational resources and programmes to increase ocean literacy and promote sustainable behaviour among marina stakeholders
- Establishing a platform for marinas to share best practices and collaborate on sustainability initiatives

Informing policy and decision-making related to the management of coastal and marine environments to:

- Support the implementation of EU directives and policies, such as the Marine Strategy Framework Directive and the Water Framework Directive, and provide data to EMODnet
- Assist in maritime spatial planning and the development of sustainable coastal management strategies
- Identify and address emerging environmental issues in marine ecosystems.

3. IMPLEMENTATION

In a first three-year phase, a Knowledge Hub is proposed to implement this Joint Action, aiming to:

- Develop a well-balanced network of experts from participating countries and relevant stakeholder organisations that provides all the expertise required to reach the defined goals using coordinated environmental monitoring and data collection efforts.

- Establish a pioneer network of a few marinas in participating member countries to work with the Knowledge Hub and scientific institutions on implementing monitoring capacities and exploring educational activities.
- Develop guidelines for the marinas on using standardised, low-cost sensor packages in marinas to measure agreed oceanographic and environmental key parameters.

At a later stage of the KHUB, when a network of marinas and operational guidelines are in place, a Joint Call could be launched to fill key knowledge gaps, e.g. on data flows and handling, on technological innovations on sensor packages, or on upscaled citizen science by the marinas network.

4. OUTCOMES AND IMPACTS

Immediate outcomes and impacts that the Joint Action may generate include:

a) The nucleus of a growing coordinated network of marinas across Europe actively that are engaged in environmental monitoring and data collection.
b) Established guidelines for using standardised, user-friendly sensor packages and data collection protocols for further marinas to adopt.
c) A centralised, open-access data repository for the environmental data collected by the marina network, including a system for external citizen scientists to upload their own images, observations, or measurements.
d) Improved capacity building and knowledge sharing among participating marina operators and users to understand and address environmental issues.
e) Demonstration of high-quality citizen science as a valuable contribution to efficient data generation and improved data coverage.

In the longer term, the European Marinas Network Joint Action will *impact* monitoring quality and data coverage in the European seas and ocean, in particular in coastal areas. This has the potential to also result in an improved understanding of environmental conditions, leading to more effective management and conservation efforts, in particular within and around marinas. The Joint Action will further provide a hands-on example for efficiently enhancing ocean literacy and stewardship among marina stakeholders, promoting sustainable behaviours and practices, and increasing the availability of high-quality, harmonised data to support policy decisions and maritime spatial planning. Additionally, the Joint Action has good potential to strengthen collaboration between the marina industry, scientific community, and policymakers to address environmental challenges, leverage a large number of marinas for ocean science and sustainability, empower marinas to engage in environmental monitoring and citizen science, establish a scalable model for coordinating environmental data collection, and foster synergies and cross-pollination of ideas between the marina industry, research institutions, and policymakers.

5. ADDING VALUE

- Leverage marinas as a unique and underutilised resource for ocean science and sustainability.
- Empower marinas to become hubs for citizen science and community engagement in environmental monitoring.
- Establish a scalable model for coordinating environmental data collection and knowledge-sharing across a diverse network of coastal sites.
- Foster synergies and cross-pollination of ideas between the marina industry, research institutions, and policymakers.
- Support marinas in understanding their impact and improving environmental performance

The proposed Joint Action responds directly to priorities set out within the 'Ocean Health' and 'Ocean Stewardship & Governance' components of the **JPI Oceans Strategy Framework**. The Framework especially states the relevance of the environmental aspects of the various multiple uses of the marine environment and the need to monitor the water quality. Better knowledge of the ocean and its ecosystems, together with free access to data, will enable industry, public authorities and civil society to make informed decisions for a sustainable transformation to the blue economy. In this context, the proposed Joint Action reveals marinas as a novel approach to ocean health and biodiversity conservation within the JPI Oceans framework. New applications for maritime technologies require new synergies and innovative infrastructure. Marinas can form an ocean observation network measuring essential ocean variables using the novel infrastructure. Hence, the European Marinas Network Scoping Action is addressed in the Ocean Health theme of the Strategy Framework but also clearly links to both Ocean Stewardship & Governance and Ocean Productivity.

6. LEADERSHIP, COLLABORATIONS AND RESOURCING

The leadership of the Joint Action is suggested to continue as per the scoping phase with Greece and Italy as co-lead countries via the Hellenic Centre for Marine Research (HCMR) and National Technical University of Athens, Greece; Italian Consortium for Managing Research Activities Venice Lagoon (CORILA), Italy. It will also continue to receive support from the JPI Oceans secretariat. The experts (policy and scientific) that carried out the scoping indicated their continued availability for the Joint Action.

The proposed Knowledge Hub would rely on national resourcing of the travel of experts to workshops. Further resource requirements would need to be defined in Terms of Reference for the Knowledge Hub and would be acquired according to JPI Oceans' resourcing model for Knowledge Hubs, to be decided soon. The Joint Call foreseen would operate as in other JPI Oceans Joint Actions through a virtual common pot via institutional and/or structural funds from individual countries. This is subject to sufficient interest from participating countries.

Moreover, the Joint Action could be suitable for being connected with specific missions of the Horizon Europe programme focused on ocean health and water quality or seek resourcing through EU Research and Action calls of the Horizon Work Programme.

Additionally, the industry-led efforts could provide valuable insights and opportunities for collaboration, whereas existing networks, such as the TransEurope Marinas Network and the European Boating Industry (EBI), can be closely engaged. Both were instrumental in the development of the Joint Action idea and stand ready to continue supporting the Joint Action.TransEurope Marinas is a non-profit association of nearly 80 marinas across 12 countries in Europe, well-placed to support a pilot programme in specific sites, efficiently collate feedback and findings and explore options for future applications. The European Boating Industry (EBI) association, representing the entire recreational boating and nautical tourism industry, is well-placed to drive awareness, provide network access and support exploitation by industry and policy-makers throughout the Joint Action.

References

1. Bruccoleri, M., Cannova, P., Cruz-Pérez, N., Rodríguez-Martín, J., Loras, F., Santamarta, J.C., 2023. Leisure Boating Environmental Footprint: A Study of Leisure Marinas in Palermo, Italy. Sustainability, 15, 182. https://doi.org/10.3390/su15010182
2. Amorim, V.E., Silva Ferreira, A.C., Cruuzeiro, C., Cardoso, P.G., 2024. Enhancement of per- and Polyfluoroalkyl Substances (PFAS) quantification on surface waters from marinas in the Douro River, Portugal. Environmental Research 262, 119805. https://doi.org/10.1016/j.envres.2024.119805
3. Alkhalidi, M. and Alsulaili, A., 2024. Enhancing Marina Sustainability: Water Quality and Flushing Efficiency in Marinas. J. Mar. Sci. Eng., 12, 649. https://doi.org/10.3390/jmse12040649
4. Gaines, L.G., 2023. Historical and current usage of per-and polyfluoroalkyl substances (PFAS): a literature review. Am. J. Ind. Med. 66 (5), 353–378. https://doi.org/10.1002/ajim.23362
5. European Commission, 2000. Directive2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Off. J. Eur. Union L327, 1–72
6. European Commission, 2018. Commission Decision (EU) 2018/229 of 12 February 2018 Establishing, Pursuant to Directive 2000/60/EC of the European Parliament and of the Council, the Values of the Member State Monitoring System Classifications as a Result of the Intercalibration Exercise and Repealing Commission Decision 2013/480/EU.
7. European Boating Industry – https://www.europeanboatingindustry.eu/about-the-industry/facts-and-figures

SUPPLEMENTARY INFORMATION

Contributors

Scientific Workshop
4-5 July 2024, Venezia Certosa Marina, Italy

Alberto Carpanese (Sea The Change, IT)
Alberto Sonino (Venezia Certosa Marina, IT)
Alessandro Pititto (EMODnet)
Alex Nicolini (Sea The Change, IT)
Alexandra Pavlidou (Hellenic Centre for Marine Research – HCMR, GR)
Aris Karageorgis (HCMR, GR)
Caterina Dabalà (Italian Consortium for Managing Research Activities Venice Lagoon – CORILA, IT)
Eirini-Asimina Stamatopoulou (National Technical University of Athens, GR)
Giacomo Montereale Gavazzi (CORILA, IT)
Johann Durand (Blue Flag)
Kostas Panagos (FOKEA)
Melanie Symes (TransEurope Marinas)
Paolo Diviacco (Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), IT)
Parinos Constantine (HCMR, GR)
Philip Easthill (European Boating Industry (EBI)
Pierpaolo Campostrini (CORILA, IT)
Roberto Perocchio (Assomarinas, IT)
Thorsten Kiefer (JPI Oceans)
Toste Tanhua (GEOMAR, DE)
Virginia Jacquemod (Venezia Certosa Marina, IT)