iMERMAID

D7.2: Project Handbook
T7.1: Project Coordination
WP7: Project Coordination and Management

Author: Rodrigo Sedano, ITCL Technology Centre

Date: 31 May 2026

Funded by
the European Union

GRANT AGREEMENT NUMBER	101112824
ACRONYM/ FULL TITLE	iMERMAID/ Innovative solutions for Mediterranean Ecosystem Remediation via Monitoring and decontamination from Chemical Pollution
START DATE	01 June 2023
END DATE	31 May 2026
PROJECT URL	www.imermaid.eu
DELIVERABLE TITLE	'Project Handbook'
WORK PACKAGE	WP7
CONTRACTUAL DATE OF DELIVERY	31/05/2026
ACTUAL DATE OF DELIVERY	M36 (May 2026)
NATURE	Report
DISSEMINATION LEVEL	Public
LEAD BENEFICIARY	ITCL Technology Centre
RESPONSIBLE AUTHOR	Rodrigo Sedano, ITCL
CONTRIBUTORS	Esther Gómez, AQLARA
ABSTRACT	This deliverable constitutes the iMERMAID Project Handbook for the period M1-M36. It consolidates strategic, governance, scientific, technical, exploitation and dissemination information into a single coordination reference for the consortium. The document covers governance and quality assurance procedures, risk and KPI management, scientific evidence on contaminant behaviour, technology development progress across WP2, WP3, WP4 and WP5, scalability and uptake logic, the communication and dissemination strategy, and the open call replication pathway. It supports the transition from project implementation towards long-term exploitation

Funded by the European Union

	and contribution to the EU Mission 'Restore our Oceans and Waters by 2030'.

Disclaimer

Copyright message

Document Revision Log

Version	Description of changes	Author	Role in the project
0.1	Draft	Rodrigo Sedano (ITCL)	Project Coordinator
0.2	Final first draft	Rodrigo Sedano (ITCL)	Project Coordinator
0.3	First review	Esther Gómez (AQLARA)	Beneficiary
0.4	Addressed comments and suggestions from internal reviewer	Rodrigo Sedano (ITCL)	Project Coordinator
1.0	Final review and formatting	Rodrigo Sedano (ITCL)	Project Coordinator

Executive Summary

Deliverable D7.2 constitutes the Project Handbook for iMERMAID — Innovative solutions for Mediterranean Ecosystem Remediation via Monitoring and decontamination from Chemical Pollution — fulfilling the coordination and documentation requirements set out in the Description of the Action (DoA) for WP7, Task 7.1, under Grant Agreement 101112824. As a final-period deliverable due at M36, it serves a dual purpose: it functions both as a retrospective account of the project's governance, coordination and strategic progress over its 36-month lifetime, and as a forward-looking reference for exploitation, replication and policy engagement beyond the project's formal end date of 31 May 2026.

The handbook has been conceived as the principal coordination reference for the iMERMAID consortium and for any stakeholder — from EU policymakers to water utility operators, regional authorities and researchers — seeking to understand the coherence, strategic positioning and outputs of the action. It consolidates governance, strategic alignment, exploitation and dissemination information into a single document, ensuring that the full arc of the project is legible to readers who engage with it independently of other deliverables.

The document is structured around eleven substantive chapters. It opens with a project overview and handbook purpose, establishing the vision, mission and scope of iMERMAID and the role of this deliverable within the broader project documentation landscape. It then presents the project context, including the consortium of 26 partner organisations, the five project objectives, the five Mediterranean pilot sites and the full list of work packages, deliverables and milestones achieved over the project lifetime.

Chapter 3 covers the strategic benchmarking and alignment of the project with EU policy frameworks, including the Water Framework Directive (WFD), the Marine Strategy Framework Directive (MSFD), the Urban Wastewater Treatment Directive (UWWTD) and the EU Mission "Restore our Oceans and Waters by 2030", and presents the inter-project synergy matrix documenting iMERMAID's relationship with predecessor Horizon 2020 projects and current Horizon Europe Mission Ocean cluster members. It also describes iMERMAID's coordinating role within the Marine Shield Cluster, its participation in the BlueMissionMed Lighthouse, and the iWIRE Water Information and Remediation Platform as the project's primary digital exploitation asset and proposed reference model for EU-wide compliance monitoring.

Chapter 4 draw extensively from D7.1, documenting the governance, coordination and quality assurance framework applied throughout the project lifetime. These chapters capture the management spine of iMERMAID: the layered governance structure involving the Project Coordinator, Management Team, Technical Committee and Work Package leaders; the deliverable review procedure; the project repository; the living risk register; and the KPI monitoring system updated across both reporting periods.

Chapters 5, 6 and 7 address the upstream prevention logic and policy relevance of the project, integrating the three policy briefs produced under D1.2 targeting the European Water Resilience Strategy, the Urban Wastewater Treatment Directive and the Marine Strategy Framework Directive. These chapters also document the scalability and market uptake pathway, the communication and dissemination strategy, and the Open Call mechanism through which EUR 800,000 has been distributed to eight associated region projects across Bosnia and Herzegovina, Turkey, Moldova, Georgia, Slovenia, Montenegro, Israel and

Bulgaria, transforming iMERMAID from a five-site Mediterranean demonstration into a basin-wide replication initiative.

The narrative arc of the handbook is intentional and reflects the actual progression of the project: iMERMAID moved from governance and quality setup in its early months, through strategic alignment and stakeholder engagement in its middle period, towards pilot deployment, open call replication and policy influence as it approached M36. The project's source-to-sea approach has been consistently embedded across all dimensions of its work — from the governance procedures established at Kick-off to the policy briefs submitted to EU institutional consultations in 2025 and 2026.

This document is intended as a practical and enduring reference for the consortium, the European Commission and any stakeholder engaged with the future exploitation of iMERMAID results.

Table of Contents

List of Figures

List of Tables

Acronyms

4DS	4D Scavenger
AOP	Advanced Oxidation Processes
CA	Consortium Agreement
CoEC	Contaminant of Emerging Concern
CPE	Carbon Paste Electrode
D	Deliverable
DBD	Dielectric Barrier Discharge
DoA	Description of the Action
DWD	Drinking Water Directive
EC	European Commission
ECS	Electrochemical Sensor
EU	European Union
GA	Grant Agreement
GDPR	General Data Protection Regulation
GES	Good Environmental Status
HM	Heavy Metals
IBP	Ibuprofen
IoT	Internet of Things
Irg	Irgarol
KPI	Key Performance Indicator
LoD	Limit of Detection
MODBUS	Modular Digital Bus
MS	Milestone
MT	Management Team
MSFD	Marine Strategy Framework Directive
MQTT	Message Queuing Telemetry Transport
NF	Nanofiltration
NSAID	Non-Steroidal Anti-Inflammatory Drug
OP	Organophosphates
PC	Project Coordinator

PCT	Project Coordination Team
PDP	Pulse Discharge Plasma
PFAS	Per- and Polyfluoroalkyl Substances
PFOS	Perfluorooctane Sulfonate
PLC	Programmable Logic Controller
RO	Reverse Osmosis
RTD	Residence Time Distribution
SQL	Structured Query Language
TC	Technical Committee
TL	Task Leader
TRL	Technology Readiness Level
UF	Ultrafiltration
UWWTD	Urban Wastewater Treatment Directive
WFD	Water Framework Directive
WP	Work Package
WPL	Work Package Leader
WRS	Water Resilience Strategy

1. Introduction

1.1. Project Information

The iMERMAID vision is an advanced, innovative and reproducible series of technological solutions to prevent, monitor and remedy toxic and persistent chemical pollution in the Mediterranean Sea basin. The project is aligned with the goals and ambition of the European Zero Pollution Action Plan, the Barcelona Convention for the Protection of the Mediterranean Sea Against Pollution, the Chemical Strategy for Sustainability, the 2030 Climate Target Plan and the EU Mission "Restore our Oceans and Waters by 2030".

The iMERMAID mission is to create monitoring and remediation approaches that restore, protect and preserve the health of oceans, seas and waters by preventing and addressing contamination from Contaminants of Emerging Concern (CoEC). The project combines policy alignment, sensor development, remediation technologies and demonstration through use cases.

Monitoring solutions include the Electrochemical Sensor Box (ECS) for organic micropollutants, the Heavy Metal Box (METALSENS) for trace metal detection, the OilSense sensor for hydrocarbon monitoring and the PFAS Sensing EC Box. Remediation approaches encompass the AKVO microfluidic system, Pulse Discharge Plasma (PDP) and the 4D Scavenger. Five pilots implement and evaluate these technologies across agricultural wastewater (UC1, Spain), pharmaceutical contaminants (UC2, Tunisia), heavy metals (UC3, Italy), open-sea marine monitoring (UC4, Cyprus) and landfill leachate treatment (UC5, Greece). iMERMAID brings together a consortium of 26 organisations.

1.2 Document scope

This document provides the common rules, processes, and tools for the execution of the iMERMAID project. It covers quality and risk management and will be updated throughout the project lifecycle.

Its main objective is to establish a practical set of regulations and procedures for the project's development, aiming to ensure the delivery of high-quality work within iMERMAID. While some of these guidelines pertain to strategic aspects, others provide day-to-day project operational guidance.

This document is based on the terms and conditions outlined in:

- The Grant Agreement (GA), identified by number 101112824, which was signed by the European Commission, the project coordinator and all beneficiaries.
- The Consortium Agreement (CA), signed by the project coordinator and all beneficiaries.

The contents of this document may refer to these agreements but do not replicate nor contradict their content. However, in the unlikely case of doubt, the content of the GA and CA shall always overrule the contents of this derivable, due to their status as legally binding agreements.

1.3 Document Structure

This document is comprised of the following chapters:

Chapter 1 introduces the project and handbook purpose.

Chapter 2 provides project context.

Chapter 3 covers strategic benchmarking, alignment and cluster positioning.

Chapter 4 describes governance, coordination and quality assurance.

Chapter 5 describes the scientific evidence.

Chapter 6 and 7 presents prevent, upstream solutions and policy relevance, as well as scalability, uptake and exploitation.

Chapter 8 covers communication, dissemination and stakeholder engagement.

Chapter 9 concludes the handbook.

2. Project Context

Below is some key information about the iMERMAID project:

- Start-end: From 1 June 2023 to 31 May 2026 (36 months).
- Maximum grant amount: 7 893 477,38 €.
- Consortium: In Table *1*.
- Project objectives: The objectives are described in the Description of Action (DoA), Part B, Section 1.1. Also listed in Table *2*.
- Use Cases: The use cases are described in DoA, Part B, Section 1.1. Also listed in Table *3*.
- WPs: The list of WPs is available in DoA, Part A. Also listed in Table *4*.
- Deliverables: Available in DoA, Part A. Also listed in Table *5*.
- Milestones: Available in DoA, Part A. Also listed in Table *6*.
- Workplan:
    - The iMERMAID methodology:
    - The iMERMAID Ecosystem:

Table 1: The iMERMAID consortium.

Number	Name	Short name
1	FUNDACIÓN INSTITUTO TECNOLÓGICO DE CASTILLA Y LEÓN	ITCL
2	EDEN TECH	EDEN
3	WEEFINER OY	WF
4	IRIS SRL	IRIS
5	HELLENIC CENTRE FOR MARINE RESEARCH	HCMR
6	UNIVERSITE D'ANGERS	UA
7	TEKNOLOGIAN TUTKIMUSKESKUS VTT OY	VTT
8	CMMI CYPRUS MARINE AND MARITIME INSTITUTE	CMMI
9	WATER EUROPE	WE
10	ECOLE NATIONALE D'INGENIEURS DE GABES	ENIG
11	UNIVERSITA DEGLI STUDI DI FIRENZE	UNIFI
12	F6S NETWORK IRELAND LIMITED	F6S
13	PRIVANOVA SAS	PN
14	SOCAMEX SA	SOCAMEX
15	PRIVREDNO DUSTVO ZENTRIX LAB DRUSTVO SA OGRANICENOM ODGOVORNOSCU PACEVO	ZEN
16	APCL ADVERTISING PRODUCT COMPANTY LTD	APCL

17	SOCIETA METROPOLITANA ACQUE TORNIO S.P.A.	SMAT
18	H2O-PEOPLE B.V.	HP
18.1	MYGIJ B.V.	MyGij
19	ESDAK-ENIAIOS SYNDESMOS DIACHEIRISIS APORRIMATON KRITIS	ESDAK
20	ARMENGAUD INNOVATE GMBH	AIG
21	SOFTWATER SRL	SOTFTWATER
22	CUBEXLAB B.V.	CUB
23	VEREIN DER EUROPAEISCHEN BURGERWISSENSCHAFTEN – ECSA E.V.	ECSA
24	OPALIA PHARMA SA	OP
25	BIOSENSE INSTITUTE – RESEARCH AND DEVELOPMENT INSTITUTE FOR INFORMATION TECHNOLOGIES IN BIOSYSTEMS	BIOS
26	NATIONAL TECHNICAL UNIVERSITY OF UKRAINE IGOR SIKORSKY KYIV POLYTECHNIC INSTITUTE	NTUU KPI

Table 2: The iMERMAID objectives.

Main objective	The main objective of iMERMAID is to create innovative, and replicable approaches to prevent, monitor, and remediate chemical pollution to support the EU's mission to restore, protect, and preserve the health of our oceans, seas, and waters and to realise the goals of the Chemicals Strategy for Zero Chemical Pollution.
Objective 1	Pollution reduction via influencing public opinion and policy making
Objective 2	Mature and develop innovative, reproducible technologies to monitor pollution from chemicals.
Objective 3	Mature and develop innovative, reproducible technologies to reduce and remediate water from chemicals.
Objective 4	Integrate a set of compatible techniques and technology and carry out demonstration activities in 3 different areas of the Mediterranean Sea basin, comprising all relevant stakeholders to ensure wide take-up, sustainable development, expansion, and exploitation of the project t's results.
Objective 5	Maximise project outreach by attracting and engaging with a critical mass of target stakeholders, aiming for high participation in the open calls for associated regions, broad awareness of results and findings, market take-up in industrial sectors, and sustainable and collaborative community development.

Table 3: The iMERMAID Use Cases.

Use Case	Title	Site
UC1	Innovative solutions for the removal of contaminants from agricultural wastewater	San Esteban de Litera, Spain
UC2	Innovative solutions for the removal of pharmaceutical contaminants	Kalaat Al Andalouss, Tunisia
UC3	Innovative solutions for the removal of heavy metals	Turin, Italy
UC4	Monitoring platform on the Mediterranean Sea	Limassol, Cyprus
UC5	Innovative solutions for the removal of organic contaminants from landfill leachates	Crete, Greece

Table 4: List of WPs and Tasks.

ID	Title	Lead	Start Month	End Month
WP1	**Societal actions for the reduction of the chemical pollution**	**HP**	**4**	**36**
T1.1	Formulate policy recommendations and regulatory proposals for policymakers and decision makers to encourage influence and support policy changes to tackle CoEC	WE	12	36
T1.2	Pollution mitigation via influencing social perception	HP	4	30
T1.3	Sustainability impact assessment	VTT	12	30
WP2	**Screening, mapping and monitoring of chemical pollution**	**HCMR**	**1**	**36**
T2.1	Optimise, demonstrate and deploy electrochemical based sensors for the effective monitoring of organic CoEC in demonstration sites with extrapolation to Mediterranean Sea	UA	2	33
T2.2	Optimise, demonstrate and deploy sensors for the effective monitoring of oil in 2 demonstration sites with extrapolation to Mediterranean Sea	BIOS	1	24
T2.3	Optimise, demonstrate and deploy sensors for the effecti8ve monitoring of heavy metals in demonstration sites with extrapolation to Mediterranean Sea	UNIFI	4	24
T2.4	Evaluate bioaccumulation and biomagnification potential of CoEC in Mediterranean food webs	HCMR	6	24
T2.5	Develop Framework for Sensing, Data Collection, Storage and Visualisation	CUB	1	32
T2.6	Develop recommendations for the applicability of the iMERMAID monitoring sensors in the monitoring programmes of the WFD and MSFD Directives with focus on the Mediterranean Sea	HCMR	12	36

WP3	**Removal and remediation of chemical pollutants via innovative technologies**	**EDEN**	**1**	**36**
T3.1	Microfluidic systems integrated with photocatalysts for upstream organic CoEC pollution remediation	EDEN	1	24
T3.2	Plasma enabled systems for the effective remediation of organic CoEC: Module design and optimization for each demonstration site	IRIS	1	24
T3.3	4D Scavenger systems for the effective removal and recovery of heavy metals	WF	1	24
T3.4	Reclaimed RO membrane conversion to NF and/or UF pre filtration membranes	ENIG	1	24
T3.5	Life cycle cost, cost-benefit analysis and anthropogenic noise pollution evaluation	VTT	24	36
WP4	**Demonstration of innovative technologies to achieve removal and remediation of chemical pollutants**	**CMMI**	**1**	**36**
T4.1	Framework requirements & Use case design	CMMI	1	12
T4.2	Technical Specifications	ITCL	1	8
T4.3	Coordinate work between technical and demonstration work packages and align findings from the demonstration sites	SOCAMEX	20	36
WP5	**Roadmaps for uptake and scalability of the innovative solutions**	**VTT**	**1**	**36**
T5.1	Assessment and recommendation of chemical and non-chemical alternatives	VTT	1	6
T5.2	Strategic foresight	VTT	2	7
T5.3	Scalability analysis with SD-modelling	VTT	1	6
T5.4	Creating roadmap/action plan	VTT	1	6
T5.5	Multi-stakeholder web interface with solutions' Showcase	Softwater	6	36
WP6	**Dissemination, communication, and exploitation of results via stakeholder involvement and linking to the missions and wider outreach**	**F6S**	**1**	**36**
T6.1	Communication, dissemination and outreach activities	WE	1	36
T6.2	Open Call and FSTP Management and Open Call promotion	F6S	10	36
T6.3	Innovation, Management, Exploitation and Sustainability	AIG	6	36
T6.4	Synergies and liaisons with other Mission Initiatives	APCL	1	36
T6.5	Capacity-building and Training programme and one-stop-shop solution Marketplace	HP	1	36
WP7	**Project Coordination and Management**	**ITCL**	**1**	**36**
T7.1	Project Coordination	ITCL	1	36
T7.2	Scientific & Technical Coordination	SOCAMEX	1	36

T7.3	Ethics Compliance Management and Ethics Advisory Board	PN	1	36
T7.4	Data Protection Compliance and Data Management Plan	PN	1	36

Table 5: List of Deliverables.

Del. No.	Deliverable name	Del. Leader	Type	Disse. Level	Due Date
D1.1	Report on societal actions	HP	Report	PU	30
D1.2	Final report on EU policy recommendations	WE	Report	PU	36
D1.3	Toolkit for social impact	HP	Demonstrator	PU	12
D1.4	Sustainability impact assessment	VTT	Report	PU	30
D2.1	EC sensor box dedicated to organic micropollutants	UA	Demonstrator	SEN	24
D2.2	EC sensor box for heavy metal monitoring	UNIFI	Demonstrator	SEN	24
D2.3	Bioaccumulation and potential for biomagnification of CoEC in Mediterranean Sea waters	HCMR	Report	PU	24
D2.4	Recommendations on the use of the iMERMAID monitoring sensors for the purposes of the WFD and MSFD Directives	HCMR	Report	PU	33
D3.1	Microfluidic remediation pilot module for remediation of organic CoEC	EDEN	Demonstrator	PU	24
D3.2	PDP pilot module for remediation of organic CoEC	IRIS	Demonstrator	PU	24
D3.3	4DS Pilot equipment for heavy metal removal from demonstration sites	WF	Demonstrator	PU	24
D3.4	RO membrane conversion to NF and UF pre filtration membranes	ENIG	Report	SEN	24
D3.5	Evaluation of the different techniques	VTT	Report	PU	36
D4.1	Requirements and design of the use cases	CMMI	Demonstrator	PU	13
D4.2	Benchmarking report on water remediation	ITCL	Report	PU	8
D4.3	Report on the demonstration activities	SOCAMEX	Report	SEN	36
D5.1	White paper on upstream solutions; strategic foresight	VTT	Report	PU	12
D5.2	Modelled Scalability of Solutions	VTT	Report	PU	18
D5.3	Roadmap	VTT	Report	PU	34
D5.4	Final release of multi-stakeholder web interface	SOFTWATER	Report	PU	32

D6.1	Communication, dissemination strategies – Initial plan; Midterm report; Final report	WE	Report	PU	6
D6.2	Exploitation Plan of the project's results and IPR protection; Initial versions and final reports	AIG	Report	SEN	24
D6.3	Initial Innovation Management Report	AIG	Report	SEN	24
D6.4	Material for the Open Call for Third Parties	F6S	Websites, patents, filings, videos, etc.	PU	13
D6.5	Results of the Open Call	F6S	Report	PU	36
D6.6	Exploitation Plan of the project's results and IPR protection report	AIG	Report	SEN	36
D6.7	Innovation management report	AIG	Report	SEN	36
D7.1	Quality assurance Risk contingency plan updated	ITCL	Report	PU	6
D7.2	Project Handbook	ITCL	Report	PU	36
D7.3	Ethics Compliance Report	PN	Report	SEN	6
D7.4	Data Management Plan	PN	DMP	SEN[1]	6

Table 6: List of Milestones.

ID	Name	WP	Lead	Due Date
MS1	Kick-off Meeting	WP7	ITCL	1
MS2	Benchmarking and analysis of current aspects, requirements, specifications & conceptual architecture	WP4	ITCL	8
MS3	Sampling cruise for the bioaccumulation-biomagnification study	WP2	HCMR	6
MS4	Kick off Social Media Campaign, social influencing	WP1, WP6	WE	10
MS5	Kick off Schooling project	WP1	ECSA	18
MS6	First policy brief	WP1	WE	18
MS7	Laboratory prototype of monitoring and remediation solutions	WP3	EDEN	20
MS8	Pilot installed in San Esteban de Litera (Huesca, Spain); Limassol (Cyprus); Turin (Italy); Crete (Greece), Kalaat Al Andalouss (Tunisia)	WP4	CMMI	24

[1] Both Deliverables D7.3 'Ethical Compliance Report' and D7.4 'Data Management Plan' have been approved to be changed from Public to Sensitive, due to their contents.

MS9	First SD model created, ready for recommendation by stakeholder group	WP5	VTT	12
MS10	First prototype of the multi-stakeholder web interface	WP5	SOFTWATER	24
MS11	Piloting completed	WP3	IRIS	36
MS12	Project website completed	WP6	WE	6
MS13	Open Calls: open call executed, and new projects integrated into iMERMAID	WP6	F6S	24
MS14	Launching of the Open Call	WP6	F6S	13

By M36, all fourteen milestones have been achieved, and thirty-one deliverables have been submitted. The Project Coordinator has validates the information in the EC Funding and Tenders Portal.

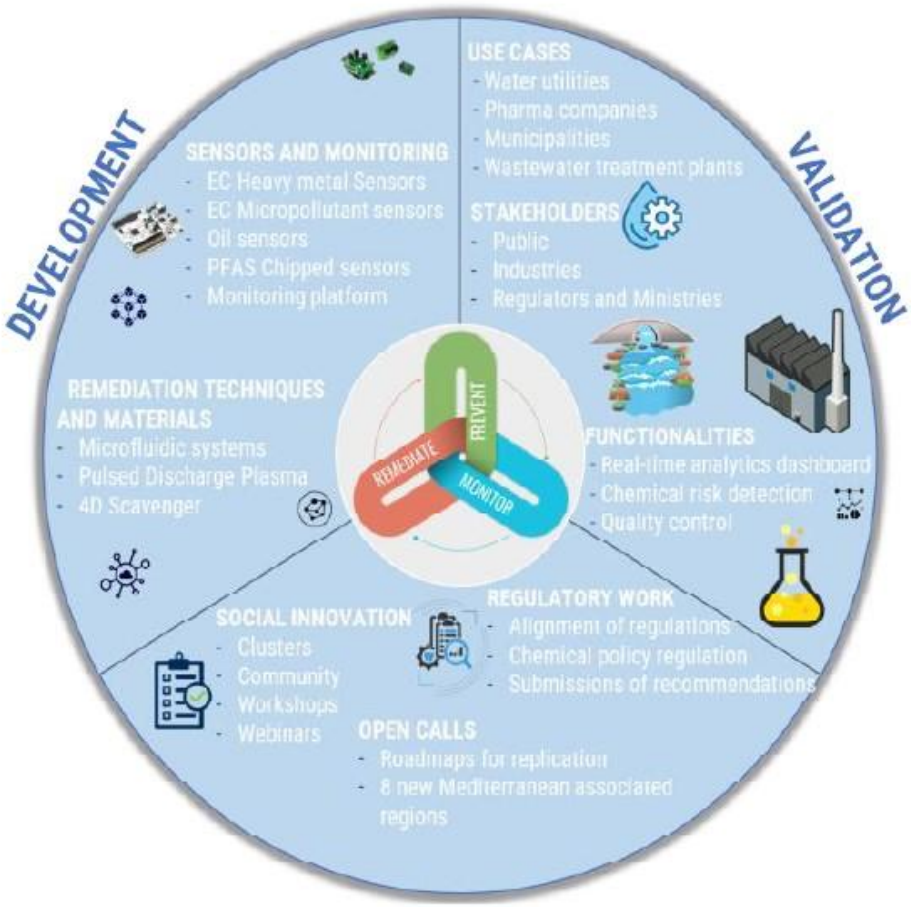

Figure 1: The iMERMAID methodology.

3. Strategic Project Benchmarking, Alignment and Cluster Positioning

3.1. Strategic Importance of EU Alignment

The iMERMAID project is strategically positioned to address Mediterranean chemical pollution through holistic alignment with EU water governance. By synchronising technological development with policy-driven objectives, the project ensures that monitoring and remediation solutions are regulatory-ready tools for deployment across the 22 countries of the Mediterranean basin. iMERMAID directly supports the EU Mission "Restore our Oceans and Waters by 2030" and has been guided throughout by the WFD, MSFD, UWWTD, DWD, European Water Resilience Strategy and the Zero Pollution Action Plan.

3.2. Evaluating the iMERMAID Approach

iMERMAID employs a dual-action strategy targeting the entire discharge network — urban, industrial and rural. By combining innovative sensors for real-time trace detection with high-efficiency remediation technologies, the project enables identification of pollution hotspots and immediate remedial intervention, moving beyond traditional periodic sampling towards autonomous, continuous and data-driven water management. The approach has been validated across five geographically and environmentally diverse pilot sites.

3.3. Inter-Project Synergy Matrix

The project leverages the technical legacy of preceding Horizon 2020 and Horizon Europe initiatives to baseline its Technology Readiness Level (TRL) and technical scope. The table below captures project-level synergies and their direct contribution to iMERMAID's development. All Marine Shield Cluster project URLs have been verified from www.marineshield.eu/projects.

Related Project	Programme	Contribution to iMERMAID	Technical Alignment & Evolution within iMERMAID
AQUAlity	H2020	Removal methods for CoEC in wastewater at industrial scale.	Maturation of CoEC remediation protocols; starting baseline for PDP and AKVO performance benchmarking.
Nanosenso	H2020	Portable pesticide monitoring kits at TRL4.	Evolved into the ECS targeting mixed organic micropollutant matrices including NSAIDs, pesticides and bisphenols.
WATERAGRI	H2020	Sustainable water retention and biochar use in agricultural contexts.	Integration of Eden Microfluidics' AKVO technology for agricultural runoff treatment in UC1 (Spain).
SEArcularMINE	H2020	Resource recovery from waste brines; circular economy in saline environments.	Circular economy principles applied to the 4D Scavenger design; maximising resource efficiency in saline and brackish pilot environments.

aqua3S	H2020	Standardised sensor detection and integration systems.	Implementation of integrated platform philosophy for basin-wide monitoring; informed the iWIRE three-layer data architecture.
NextGen	H2020	Circular economy solutions for the water sector.	Upscaling of recovery and reuse tools; informed the RROM reclaimed membrane approach under T3.4.
MULTISOURCE	H2020	Enhanced Natural Treatment Solutions (ENTS) for urban contaminants.	Refinement of natural procedure integration for mitigation of urban contaminants at mixed-use pilot sites.
SMURBS	H2020	Sentinel satellite data processing for coastal monitoring.	Adaptation of Sentinel-3 data for maritime pollution assessment in UC4; informed the satellite-based assessment module on iWIRE.
iMERMAID (coordinator)	HE Mission Ocean	Prevention, monitoring and remediation of CoECs across five Mediterranean pilot sites; coordinating project of the Marine Shield Cluster.	Central reference for all cluster activities. iWIRE (iwire.soft-water.it) serves as the shared digital infrastructure and Solutions Showcase for the cluster.
RHE-MEDiation	HE Mission Ocean	Governance hub for chemical pollution in the Mediterranean; micro-algae-based remediation of heavy metals, pesticides and PFAS; mobile and fixed sensing contributing to EMODnet.	Marine Shield Cluster co-member; alignment of remediation technology standards; shared participation in BlueMissionMed Lighthouse; joint MSFD policy brief contributions.
REMEDIES	HE Mission Ocean	Plastic litter valorisation and prevention across 8 Mediterranean sites with 33 replication locations; open calls for associated regions (EUR 500K).	Marine Shield Cluster co-member; shared open-call methodology for associated region replication; joint presence at EU Ocean Week 2026.
CONTRAST	HE Mission Ocean	Advanced monitoring and integrated assessment of CECs in European deep-sea and coastal sites; effect-based monitoring frameworks for EU policy support.	Marine Shield Cluster scientific exchange on CEC occurrence and fate in marine ecosystems; alignment of monitoring approaches with iMERMAID sensor outputs and iWIRE data standards.
DIGI4ECO	HE Mission Ocean	Digital Twin-sustained 4D ecological monitoring of restoration in fishery-depleted areas; integration of historical and real-time sensor data across 4 demonstration sites.	Marine Shield Cluster digital collaboration; alignment of data architecture principles with iWIRE platform design; shared approach to accessible and policy-relevant environmental monitoring data.
MOBILES	HE Mission Ocean	Advanced biosensors for organic chemicals, antimicrobial resistance and pathogens across soil, water	Marine Shield Cluster complementarity with iMERMAID sensor suite; organism-based biosensors extend coverage beyond

		and air; portable real-time diagnostic tools and soil metagenomic database.	iMERMAID's electrochemical approach for broader contaminant detection.
AquaBioSens	HE Mission Ocean	Handheld devices for aquatic hazard measurement using immunoassays, eDNA quantification, acoustic biosensors and organ-on-chip devices; commercialisation pathway targeted.	Marine Shield Cluster technology exchange; commercialisation approach informs iMERMAID's exploitation pathway for ECS and METALSENS sensor systems.
SUNBIO	HE Mission Ocean	Offshore hybrid renewable energy combining marine floating photovoltaics, wave energy and thermal gradient systems; marine biodiversity support and carbon sequestration.	Marine Shield Cluster complementarity; solar-driven energy approach informs sustainable power supply options for autonomous iMERMAID sensor deployments in marine contexts (UC4).
SUNDANSE	HE Mission Ocean	Sustainable sediment management for the Danube-Black Sea system; complete river mapping with advanced research vessel; Sediment Management Handbook development.	Marine Shield Cluster cross-basin learning; sediment contamination monitoring methodology complements iMERMAID's sediment-bound pollutant analysis identified in MSFD Policy Brief 3.
ZeroPM	HE	Zero pollution of persistent and mobile substances; evidence-based multilevel framework guiding policy, technology and market incentives for PM substance elimination including PFAS.	Marine Shield Cluster policy alignment; ZeroPM's PFAS elimination and substitution strategy directly informs iMERMAID's PFAS monitoring approach and the regrettable substitution principle in Chapter 8.
Restore4Life	HE Mission Ocean	Socio-economic benefits of freshwater and coastal wetland restoration in the Danube basin; blue-green infrastructure for regional climate resilience.	Marine Shield Cluster cross-basin learning; restoration-based approaches complement iMERMAID's remediation-led Mediterranean strategy and inform long-term ecosystem recovery framing.

3.4. The Marine Shield Cluster: iMERMAID's Role as Coordinator

The Marine Shield Cluster (www.marineshield.eu) is a collaborative initiative uniting EU-funded Horizon Europe projects with the shared goal of addressing water pollution through three pillars: advanced monitoring, effective prevention and innovative remediation. The cluster is coordinated by iMERMAID, giving the project a central role in shaping the collaborative agenda for Mission Ocean projects. The cluster brings together eleven projects: iMERMAID, AquaBioSens, CONTRAST, DIGI4ECO, MOBILES, REMEDIES, Restore4Life, RHE-MEDiation, SUNBIO, SUNDANSE and ZeroPM.

iMERMAID's coordinating role has translated into concrete activities:

- 1st Marine Shield Cluster Meeting (February 2025): Established the cluster's collaborative framework, defined shared communication channels and identified areas of technical synergy.
- Progress Meeting (April 2025): Structured exchange of advances, challenges and opportunities for joint outputs, including shared policy contributions and cross-project data standards.
- Webinar "From Monitoring to Remediation" (April 2026): Public-facing event showcasing the continuum from sensor detection to active remediation across cluster projects.
- EU Ocean Week 2026: The cluster was present as a unified entity, with iMERMAID presenting its three policy briefs alongside other cluster members.
- MSFD Policy Brief co-development: The cluster was mobilised to provide inputs into iMERMAID's third policy brief on the MSFD, ensuring recommendations reflected a broader set of project perspectives.

3.5. The iWIRE Platform: Digital Infrastructure for Water Information and Remediation

The iWIRE platform (iwire.soft-water.it), the Water Information and Remediation Platform developed by SOFTWATER, is the project's primary digital exploitation asset and a key contribution to the broader Mission Ocean data infrastructure. It serves as the public-facing interface through which monitoring data, solution showcases and use case information from all five pilot sites are made accessible to water managers, policymakers, researchers and citizens.

The platform is structured around five functional areas:

- Case Studies: Dedicated pages for each of the five use cases providing site-specific environmental context, contaminant profiles, technology deployment descriptions and monitoring outcomes.
- Solutions Showcase: An interactive catalogue featuring the Electrochemical Sensor Box, Heavy Metal Box, Oil Sensor Box, PFAS Sensing EC Box, Microfluidic Remediation System, WEEEFINER 4D Scavenger, Immersive Digital Twin and Satellite-Based Assessment module.
- Associated Projects: A section linking iWIRE to the eight open-call associated region projects, ensuring geographic traceability of replication activities.
- EJWP Dataset: Access to the Environmental Joint Work Programme dataset, supporting scientific transparency and FAIR data principles in line with the EC open science mandate and D7.4.
- Interactive Map: A geospatial overview of all iMERMAID pilot sites and associated region projects across the Mediterranean basin.

The iWIRE platform has been proposed in iMERMAID's policy briefs as a reference model for data integrity and real-time compliance monitoring under the revised UWWTD (Art. 25) and the MSFD (Art. 11). Its blockchain-secured monitoring architecture, cloud data integration and visualisation dashboard provide a template for interoperable EU-wide water monitoring systems aligned with the Water Sector Digitalisation Action Plan.

3.6. Participation in the BlueMissionMed Lighthouse

iMERMAID is a core participant in the BlueMissionMed Lighthouse, a strategic hub designed to mobilise local actors and align regional resources with the EU Mission "Restore our Oceans and Waters by 2030". Participation has reinforced the project's policy relevance through the Mission Charter framework and strengthened connections with policymakers, coastal authorities and citizen engagement networks across the Mediterranean basin.

3.7. Transition to Technical Requirements

Strategic alignment with EU policy, reinforced through the Marine Shield Cluster, the BlueMissionMed Lighthouse and the three policy briefs developed under WP1 — dictates the engineering requirements that have shaped iMERMAID's technical development. The shift from reactive monitoring to proactive, autonomous remediation requires sensor sensitivity and remediation throughput governed by the stringent Environmental Quality Standards of EU directives.

4. Governance, Coordination and Quality Assurance

This chapter summarises the governance framework established at the outset of iMERMAID and applied throughout the project lifetime. Full procedural detail is provided in D7.1; this chapter captures the essential structures and principles for the Project Handbook.

4.1. Strategic Importance of EU Alignment

The iMERMAID consortium operates through a layered governance structure as described in the DoA (Part B, Section 3.1.1) and elaborated in D7.1. The key bodies are:

- Project Coordinator (PC) — ITCL: Holds overall administrative, legal and financial responsibility. Manages the project repository, coordinates deliverable submission and ensures compliance with the GA and CA. Acts as the primary point of contact with the European Commission.
- Management Team (MT): Comprises the PC and WP leaders. Responsible for strategic oversight, resource alignment and consortium-level decisions.
- Technical Committee (TC) — led by SOCAMEX: Covers WP2, WP3 and WP4. Ensures consistency of technical developments and coordinates regular technical meetings.
- Work Package Leaders (WPL): Accountable for delivery of work package outputs, milestone compliance and communication of risks or delays to the PC.
- Task Leaders (TL): Responsible for day-to-day execution of assigned tasks, preparation of inputs to deliverables and participation in WP meetings.

4.2. Project Schedule and Monitoring

The project schedule is stored in the project repository under WP7 and undergoes revision at minimum every six months at plenary consortium meetings. The two reporting periods are: Reporting Period 1 (Month 1 to Month 18) and Reporting Period 2 (Month 19 to Month 36). Progress is monitored through plenary consortium meetings, WP and task-specific meetings with minutes stored in the repository, day-to-day communication through Microsoft Teams, and periodic review of the KPI register by the Technical Coordinator.

4.3. Deliverable Development and Review Procedure

All iMERMAID deliverables follow the procedure defined in D7.1. Key requirements: use of the most recent version of the official template; language set to English U.K.; proper version numbering and Document Revision Log maintenance; and use of the Track Changes function by all reviewers. The review timeline is:

- 4 weeks before deadline: The deliverable lead partner provides a draft. The PC and TC assign up to two internal reviewers with relevant expertise and no direct authorship role.
- 2 weeks before deadline: Proposed changes have been incorporated, and the document is open for broader consortium review.
- 1 week before deadline: The author finalises changes and notifies the PC.
- Deadline: The PC conducts a final formatting and quality check before submission to the EC Funding and Tenders Portal.

4.4. Project Resository

The project repository is the common cloud infrastructure for saving, developing and sharing all project files. The platform used is Microsoft Teams, managed by ITCL Technology Centre. Access is granted only to consortium personnel, with GDPR-compliant file storage and automatic version control. The folder structure is organised by Work Package, with standardised subfolders for each deliverable.

4.5. Communication Tools and Mailing Lists

Effective internal communication is maintained through Microsoft Teams (primary platform for videoconferencing and collaborative file editing), Google Groups mailing lists, and email with "[iMERMAID]" in the subject line. The mailing lists are provided in Table 7: Mailing lists.Table 7.

Table 7: Mailing lists.

Group	Mailing address
ALL	imermaid.all@itcl.es
MTM	imermaid.management.team@itcl.es
WP1	imermaid.wp1@itcl.es
WP2	imermaid.wp2@itcl.es
WP3	imermaid.wp3@itcl.es
WP4	imermaid.wp4@itcl.es
WP5	imermaid.wp5@itcl.es
WP6	imermaid.wp6@itcl.es

5. Scientific Evidence, Monitoring and Remediation Solutions

The scientific and technical work of iMERMAID is grounded in a clear and consistent logic: effective remediation of chemical pollution in the Mediterranean Sea basin must be preceded and guided by rigorous, real-time monitoring, and both monitoring and remediation must be designed in response to the actual behaviour of contaminants in complex aquatic environments rather than on the basis of simplified assumptions about concentration thresholds alone. This logic connects the scientific evidence generated under WP2, the sensor technologies developed under WP2 and WP3, and the remediation solutions demonstrated across the five pilot sites.

5.1. Scientific Evidence Base

The principal scientific evidence underpinning iMERMAID's monitoring and remediation strategy was generated through D2.3 (Bioaccumulation and Potential for Biomagnification of CoEC in Mediterranean Sea Waters), which examined the behaviour of Contaminants of Emerging Concern as they move through Mediterranean marine food webs. The central finding of this work is that different contaminants behave fundamentally differently in marine ecosystems, and that risk assessment approaches must reflect this diversity.

Per- and polyfluoroalkyl substances (PFAS) were found to behave primarily through bioconcentration in demersal ecosystems — accumulating directly from water into bottom-dwelling organisms without necessarily increasing in concentration as they pass up the food chain. Trophic transfer assessments in the Saronikos Gulf confirmed that 75% of PFAS concentration levels in demersal species exceeded EFSA-proposed Environmental Quality Standard thresholds, despite remaining below seafood safety limits. This finding has direct implications for monitoring strategy: PFAS require continuous water column and sediment measurement at key demersal habitat areas, and source-level control is disproportionately effective at reducing ecological exposure.

Mercury, by contrast, clearly biomagnifies through trophic levels, accumulating progressively in predatory species such as large pelagic fish. This reinforces the regulatory priority given to mercury under both the WFD and the MSFD Descriptor 9 (safe seafood), and confirms that risk management for mercury must combine source-level control with food web monitoring. Organic micropollutants — including pharmaceuticals such as ibuprofen and other non-steroidal anti-inflammatory drugs — require monitoring at point sources and real-time detection capability given the transient and pulsed nature of their discharge patterns.

These findings directly shaped the design of iMERMAID's sensor suite and the selection of remediation technologies for each pilot site, ensuring that the project's technical solutions were responsive to evidence rather than generic.

5.2. Monitoring and Remediation Solutions

iMERMAID developed and deployed an integrated suite of monitoring sensors and remediation technologies across its five pilot sites, covering a range of contaminant classes and water body types representative of the diversity of the Mediterranean basin. The monitoring solutions provide real-time, continuous detection of target contaminants at trace concentrations, with sensor outputs directly triggering automated remediation activation — creating a closed-loop, autonomous and no-harm water management system.

The remediation technologies follow a shared development arc from laboratory design through prototype development to pilot readiness, each progressing through measurable TRL advancement over the project

lifetime. All three remediation technology tracks were designed and validated under a no-harm philosophy, ensuring that no secondary pollutants, hazardous residues or toxic by-products are generated during treatment — in compliance with the requirements of MSFD Descriptors 8 and 9.

The table below provides a consolidated overview of the monitoring sensors and remediation technologies developed within iMERMAID, their technical focus and their deployment across the five pilot sites.

5.3. Integration and Data Architecture

The monitoring and remediation solutions are unified through a three-layer data architecture linking field sensors to the iWIRE platform. At the hardware layer, sensors acquire real-time signals and pre-process data locally. At the transmission layer, data is securely transferred via MQTT protocols and IoT gateways with encryption aligned to GDPR requirements. At the exploitation layer, a SQL/NoSQL database backend connected to the iWIRE platform makes monitoring data accessible to site managers, regulators and researchers in real time, supporting both operational decision-making and longer-term environmental trend analysis.

This architecture has been proposed in iMERMAID's policy briefs as a reference model for data integrity and real-time compliance monitoring under the revised UWWTD and the MSFD, demonstrating that the technical outputs of the project carry direct regulatory relevance beyond the pilot sites in which they were developed and tested.

6. Prevention, Upstream Solutions and Policy Relevance

6.1. The Case for Source-Directed Approaches

Evidence gathered under WP5, specifically in D5.1 (White Paper on Upstream Solutions and Strategic Foresight), establishes a compelling case for source-directed prevention as the most cost-effective long-term strategy for CoEC management. The core argument: upstream prevention reduces the need and cost of end-of-pipe upgrades. Removing a contaminant at source is consistently less expensive than removing it from water once diluted, transported and chemically transformed.

The iMERMAID White Paper stresses the importance of a multi-stakeholder roadmap and identifies three potential leveraging tools for EU policies: fiscal incentives or financial support facilitating chemical substitution; networks and partnerships development to disseminate information to stakeholders and foster public-private collaborations; and demand stimulation to encourage environmentally benign product development through public procurement policies.

6.2. Regrettable Substitution and the Need for Caution

D5.1 introduces an important cautionary principle: regrettable substitution. This refers to replacing a regulated chemical with a structurally similar alternative that may carry equivalent or greater risks but has not yet been subject to the same regulatory scrutiny. The risk is particularly acute for plasticisers (phthalate substitutes whose long-term environmental profile remains poorly characterised) and bisphenol alternatives (BPS, BPF and other structural analogues with comparable endocrine-disrupting activity). iMERMAID's monitoring programmes have been designed to detect and address contaminant classes rather than individual chemical entities wherever possible.

6.3. Policy Recommendations and Engagement: Three Policy Briefs

iMERMAID's engagement with policymakers was structured around a project-to-policy strategy implemented through WP1, producing three targeted policy briefs aligned to major EU legislative processes active during the project lifetime (D1.2):

- Policy Brief 1 — Contributing to the European Water Resilience Strategy (WRS): Highlighted chemical pollution through a source-to-sea perspective. iMERMAID was featured in a Euractiv article on digital tools and sensors for the water sector. The project's source-to-sea approach is reflected in the final WRS's emphasis on digital tools and the announced revision of the MSFD.
- Policy Brief 2 — Addressing Micropollutants through the UWWTD: Highlighted the importance of addressing micropollutants and CoECs under the revised UWWTD. iMERMAID is referenced in the Opinion of the Committee of the Regions (CoR) on the implementation of the EU WRS and the EU Water Acquis. Key recommendations: integration of electrochemical in-situ sensors into wastewater monitoring plans; promotion of modular remediation units; adoption of iMERMAID's digital architecture as a reference model for real-time compliance monitoring.
- Policy Brief 3 — Strengthening the MSFD to Address Chemical Pollution: Developed with a co-creation approach mobilising the Marine Shield Cluster. Used to contribute to the EC's call for evidence and public consultation on the MSFD review (launched March 2026). Presented at EU Ocean Week 2026 and disseminated to MEP Bajada and the CoR. Key recommendations: strengthen MSFD Descriptors D8 and D9 to include PFAS and CoECs; adopt ecosystem-based risk

indicators incorporating bioaccumulation metrics; mainstream real-time monitoring technologies; promote cross-border and regional innovation uptake.

The policy briefs were disseminated through iMERMAID and Water Europe communication channels, integrated into the EU WRS position paper and the OMNIBUS environment position paper of Water Europe, and presented at Water Innovation Europe and Water Knowledge Europe events.

6.4. Policy Linkage to EU Governance

iMERMAID's contributions to EU governance span five axes:

- Contributing to the revision of the WFD Watch List by providing field-validated monitoring data on CoEC concentrations across diverse Mediterranean contexts.
- Informing implementation of the UWWTD by demonstrating cost-effective advanced treatment options applicable at different scales.
- Strengthening the evidence base for MSFD Descriptor 8 (marine contaminants) and Descriptor 9 (seafood safety) reporting.
- Providing input to the EU Chemicals Strategy for Sustainability on monitoring and remediation of emerging substance classes.
- Engaging through the BlueMissionMed Lighthouse and Marine Shield Cluster to align outputs with the broader Mission Ocean policy agenda.

6.5. Citizen Engagement, Schooling Project and Social Innovation

The iMERMAID project recognised from the outset that long-term change in the way Mediterranean water bodies are protected cannot be achieved through technological innovation and policy engagement alone. Lasting impact requires a parallel shift in societal awareness, behavioural norms and the capacity of citizens to understand, engage with and advocate for cleaner water environments. This conviction shaped a dedicated strand of activity throughout the project lifetime, implemented primarily through WP1 and WP6 in close collaboration with ECSA (European Citizen Science Association) and the project's communication partners.

The centrepiece of iMERMAID's citizen engagement strategy is the iMERMAID Schooling Project, launched at M18 as Milestone 5 (MS5). Designed as an educational intervention targeted at secondary school students across the Mediterranean basin, the Schooling Project translates the complex scientific and environmental dimensions of chemical water pollution into accessible, age-appropriate learning materials. Its central output is the iMERMAID Schoolbook, a structured educational resource that guides students through the sources, pathways and consequences of Contaminants of Emerging Concern (CoEC) in Mediterranean water bodies, using the project's five pilot sites as real-world case studies. The Schoolbook is available in multiple languages to maximise reach across the diverse linguistic contexts of the Mediterranean region, and has been disseminated through the project's partner network and the iMERMAID website.

The Schooling Project was designed with a dual ambition: to raise awareness of water-related environmental challenges among the next generation of European citizens, and to demonstrate to policymakers and regulators that evidence-based environmental education can serve as a complementary instrument to regulation and technology in the pursuit of the EU Zero Pollution Action Plan goals. By engaging students at an age when environmental attitudes and behaviours are formed, the project aims

to contribute to a long-term cultural shift in the way Mediterranean communities relate to their water resources.

Complementing the Schooling Project, iMERMAID developed a broader citizen engagement programme coordinated by ECSA, embedding citizen science principles into the project's monitoring and awareness activities. This programme engaged coastal communities, local associations and civil society organisations at and around the five pilot sites, providing accessible communication of monitoring results, opportunities for public participation in environmental observation activities, and channels through which community-level concerns about local water quality could be captured and fed back into the project's stakeholder engagement process.

The citizen engagement activities were integrated into the project's communication strategy as a living plan, with dedicated communication KPIs tracking reach, participation and the diversity of audiences engaged. Key actions included the launch of the social media campaign at M10 (MS4), which built a growing follower base across LinkedIn and other platforms and served as the primary channel for sharing project news, pilot results and policy brief publications with a broad public audience. The project also maintained a regularly updated website (www.imermaid.eu) as the primary public-facing repository for all project outputs, including deliverables, policy briefs, the Schoolbook and the iWIRE platform access point.

iMERMAID's participation in EU Ocean Week 2026 provided a strategic high-visibility opportunity to bring together the project's citizen-facing and policy-facing dimensions, presenting iMERMAID results, including the three policy briefs and the Marine Shield Cluster activities — to a broad audience of marine governance stakeholders, civil society representatives and members of the public engaged with ocean protection.

The social innovation dimension of iMERMAID's outreach reflects a conviction articulated in D5.1 and carried throughout the project: that the transition to proactive, prevention-led water management in the Mediterranean requires not only regulatory pressure and technological readiness, but also informed, engaged and empowered citizens who understand the stakes and can advocate for change at local, national and European level. The Schooling Project, the citizen science activities, the social media presence and the public communication materials produced by iMERMAID collectively constitute a lasting contribution to this societal dimension of the EU Mission "Restore our Oceans and Waters by 2030".

7. Scalability, Uptake and Exploitation Pathway

7.1. Scaling Logic Across Three Application Areas

Deliverable D5.2 (Modelled Scalability of Solutions) uses a System Dynamics (SD) modelling approach to assess the conditions and pathways through which iMERMAID technologies can scale beyond the five pilot sites. Three primary application areas are identified:

- Heavy metal recovery from industrial and urban wastewater: The 4D Scavenger demonstrates the strongest near-term scaling potential, particularly in industrial contexts where heavy metal recovery carries measurable economic value. Scaling is most viable where regulatory compliance pressure is high and infrastructure for metal processing already exists.
- CoEC removal from municipal and pharmaceutical wastewater: The PDP and AKVO systems address a growing compliance gap as the UWWTD is strengthened. Municipalities with existing advanced treatment infrastructure represent the lowest-cost entry point for PDP adoption.
- Agricultural water reuse: The AKVO microfluidic system addresses the intersection of water scarcity and pollution risk in Mediterranean agriculture. Scaling is contingent on progressive implementation of the EU Water Reuse Regulation (2020/741). Currently only 2.4% of wastewater is reused in the EU; iMERMAID tested RO with recycled membranes in UC2 and validated safe reuse scenarios via monitoring in UC5.

7.2. Conditions for Successful Adoption

A central finding of D5.2 is that environmental benefit alone is rarely sufficient to drive adoption of new water treatment technologies. Successful uptake requires four conditions:

- Regulatory compliance: The technology must directly address an existing or anticipated legal obligation.
- Economic value: The technology must offer a credible financial case — through cost reduction or value creation (recovered resources, water reuse revenues). The circular economy dimension of the 4D Scavenger exemplifies this.
- Infrastructure fit: The technology must be compatible with existing site infrastructure, operational capacity and maintenance workflows.
- Stakeholder acceptance: End-users, regulators, communities and funders must be sufficiently informed and engaged to support adoption.

7.3. Exploitation Pathway Conditions for Successful Adoption

The iMERMAID exploitation pathway is structured across three-time horizons:

- Short-term (to M36 and immediately beyond): Results documented and disseminated through D6.6 (Exploitation Plan), D6.7 (Innovation Management Report) and D5.3 (Roadmap). Technology partners [EDEN, IRIS and Weefiner] have initiated or are advancing commercialisation plans.
- Medium-term (1-3 years post-project): The iWIRE platform provides durable digital infrastructure for Mediterranean water monitoring. Associated region projects activated through the open calls provide replication cases in new geographies.

- Long-term (beyond 3 years): iMERMAID contributes to the evidence base for the next generation of EU water policy instruments and Mission Ocean programming. Project outputs are archived on Zenodo and accessible through www.imermaid.eu.

8. Communication, Dissemination and Stakeholder Engagement

8.1. Communication Strategy as a Living Plan

Deliverable D5.2 (Modelled Scalability of Solutions) uses a System Dynamics (SD) modelling approach to assess the conditions and pathways through which iMERMAID

The communication strategy was monitored through dedicated KPIs tracking reach, engagement and the diversity of audiences addressed, and was updated at regular intervals in coordination with the project's internal review cycle. Rather than treating communication as a downstream activity — something done after results are produced — iMERMAID embedded communication planning into the project's operational rhythm from Month 1, ensuring that dissemination activities were aligned with the maturity of technical and scientific outputs and with the evolving opportunities presented by the EU policy agenda.

Key communication milestones achieved over the project lifetime reflect the progressive build-up of iMERMAID's public presence and policy visibility. The project website (www.imermaid.eu) was launched at M6, establishing the primary public-facing repository for all project outputs, including deliverables, policy briefs, the iMERMAID Schoolbook and access to the iWIRE platform. The social media campaign was launched at M10, building a growing follower base across LinkedIn and other platforms and serving as the primary channel for sharing project news, pilot updates and policy brief publications with a broad public audience. The iMERMAID Schooling Project and Schoolbook were launched at M18, extending the project's reach into educational communities across the Mediterranean basin. The first policy brief was published at M18, initiating the project's formal contribution to EU legislative debates.

As the project progressed, the communication approach evolved from general awareness-raising towards more targeted policy exploitation. The three policy briefs produced under WP1, addressing the European Water Resilience Strategy, the Urban Wastewater Treatment Directive and the Marine Strategy Framework Directive, were each timed to coincide with key moments in the relevant EU legislative processes, ensuring that iMERMAID's evidence and recommendations entered policy debates when they were most likely to be heard. The citation of iMERMAID in the Opinion of the Committee of the Regions on the EU Water Acquis, the feature in Euractiv, and the integration of project results into Water Europe's EU WRS and OMNIBUS environment position papers are tangible indicators of the strategy's effectiveness.

The project also maintained a regular newsletter disseminated to a growing subscriber base throughout its lifetime, and participated in major European events — including Water Innovation Europe, Water Knowledge Europe and EU Ocean Week 2026 — to ensure continuous visibility within the EU water policy and innovation community.

8.2. Open Calls and Replication in Associated Regions

Deliverable D5.2 (Modelled Scalability of Solutions) uses a System Dynamics (SD) modelling approach to assess the conditions and pathways

One of the most distinctive features of iMERMAID's dissemination strategy was the structured Open Call mechanism, which transformed the project from a five-site Mediterranean demonstration into a basin-wide replication initiative. Through two open calls managed by F6S, a total of EUR 800,000 was distributed to third parties in associated regions, supporting local and regional authorities to demonstrate the

feasibility, replicability and scalability of iMERMAID solutions in new geographic and environmental contexts.

The Open Call programme operated through a structured three-stage process: a use-case definition stage in which associated regions identified their local water challenge and selected relevant iMERMAID technologies; an implementation stage in which regional actors deployed and tested selected solutions with support from iMERMAID consortium partners; and an evaluation and feedback stage in which results were assessed against defined KPIs and findings were fed back into the iMERMAID knowledge base and future exploitation planning.

Eight associated region projects were activated through this mechanism, covering Bosnia and Herzegovina (BRIDGEWAT), Turkey (IMRHMCSR), Moldova (PPRRRCM), Georgia (ISHMPGR), Slovenia (HEMRIS), Montenegro (REACT), Israel (MARINER) and Bulgaria (MP3Lake). Together, these projects extended iMERMAID's geographic footprint across a diverse range of national, environmental and institutional contexts, providing compelling evidence that the project's approaches are not site-specific but genuinely transferable across the broader Mediterranean region and its neighbouring basins.

The Open Call mechanism also served a strategic communication function, embedding iMERMAID's identity and results within a growing network of regional water governance actors who will continue to apply, adapt and advocate for the project's approaches beyond M36. In this sense, the open calls represent not only a replication mechanism but a long-term investment in the living legacy of the project.

9. Conclusions

The iMERMAID project closes at M36 having fulfilled its core ambition: to demonstrate that innovative, integrated and replicable approaches to the prevention, monitoring and remediation of chemical pollution in the Mediterranean Sea basin are not only scientifically feasible but operationally deployable and policy-relevant. Over 36 months, a consortium of 26 organisations from 14 countries worked together to translate a shared environmental vision into concrete results that collectively contribute to the EU Mission "Restore our Oceans and Waters by 2030" and to the broader goals of the European Zero Pollution Action Plan.

The project addressed one of the most pressing environmental challenges facing the Mediterranean region: the accumulation of Contaminants of Emerging Concern in a semi-enclosed sea basin that supports the livelihoods, health and cultural identity of hundreds of millions of people. iMERMAID approached this challenge holistically, recognising that lasting environmental improvement requires action at every level, from the governance frameworks that guide a consortium, to the sensors that detect pollutants in real time, to the schoolbooks that teach the next generation of Mediterranean citizens why clean water matters.

What the project has demonstrated, above all, is the value of integration. The combination of scientific rigour, technological innovation, policy engagement and citizen produced results that none of these dimensions could have achieved independently. iMERMAID is stronger as a whole than the sum of its parts, and it is this integrated character that makes its results transferable and its legacy durable.

The project leaves behind a body of work: scientific evidence, validated technologies, policy contributions, a digital platform, an educational resource and a network of replication projects across the Mediterranean and its neighbouring regions, that is designed to remain useful, accessible and actionable long after the formal project period has ended. iMERMAID does not close; it transitions.

The Mediterranean Sea and its surrounding regions support a diverse variety of essential socioeconomic activities. It is one of the highly exploited water ways and the influence of anthropogenic activities on its marine habitats and ecosystems has grown significantly since the industrial revolution. Because of this, the Mediterranean Sea basin is very vulnerable to chemical contamination and build-up. To safeguard the Mediterranean Sea basin from contaminants for emerging concerns (CoEC), iMERMAID will integrate, coordinate, and synergize innovative preventive, monitoring, and remediation solutions. iMERMAID will build an evidence-based multidimensional framework that will guide policymaking and transform societal perceptions to reduce CoEC usage, emissions, and pollution. Furthermore, next generation sensor and remediation solutions will be developed within iMERMAID to monitor and remove prioritized chemicals from its source while reducing upstream pollution. iMERMAID builds an ideal interdisciplinary team by bringing together prominent SMEs, researchers, regulators, and innovation professionals who have been essential in improving the knowledge and awareness of CoEC. Beyond state-of-the-art techniques, iMERMAID will strive to strengthen regulations against CoEC, expand economic possibilities and competitiveness, improve the standard of living for EU residents, while preventing the accumulation of chemical pollution in the Mediterranean Sea basin. iMERMAID will empower the efforts to create a zero

reality.

iMERMAID

Funded by
the European Union