TOWARDS LITTER-FREE COASTAL COMMUNITIES

TOOLKIT

Pillar IV Atlantic Action Plan & Free LitterAT

ATLANTIC STRATEGY
Supporting the Atlantic Action Plan

Interreg
Atlantic Area

Co-funded by
the European Union

free
litterAT

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Chapter I

Introduction

The incessant and growing delivery of litter to our oceans represents one of the most significant forms of marine pollution and has become critical to global sustainability as it affects marine ecosystems and human health. Litter enters the marine environment from land areas, rivers and from sea-based sources and the coastal and ocean circulation turns it into a transboundary issue that demands collaborative work and coordination that are at the core of the Marine Strategy Framework Directive (MSFD) implementation.

Tackling marine litter requires a transnational and multi-sectorial action involving policy makers and local authorities, researchers, the industry, NGOs, and civil society coupled with a multidisciplinary approach combining a wide range of knowledge and technologies addressing prevention, monitoring, cleaning, and circular economy, with awareness raising being a crucial component.

It demands concerted actions at international and EU level, but also at national and local level as country and local specificities should be considered.

Being aware of the challenges and complexities of marine litter, in the last 15 years, several EU research funding programmes have addressed marine litter under different perspectives but with complementary approaches, resulting in a relevant universe of projects and associated results. This important legacy has led to new knowledge and guidance in the form of scientific publications and technical reports, online information products, interfaces and apps for data management, monitoring and modelling tools, protocols and technologies, case studies and awareness materials.

Moreover, different initiatives have made meaningful efforts to facilitate the access to the knowledge and resources generated by these projects (see chapter II).

User-friendly access to project results is crucial to facilitate its uptake by targeted users and to foster Litter-Free Coastal Communities, where key public and private actors actively make use of existent knowledge and technology to set up solutions.

In this context, in the frame of the Pillar IV of the Atlantic Action Plan[1] , and linked to the Interreg Atlantic Area project Free LitterAT[2], a collaborative framework was launched to engage key EU projects addressing marine litter that had delivered or plan to deliver tangible and applicable outcomes to help coastal communities and actors to prevent and/or reduce marine litter and achieve the vision of litter-free coastal communities. This Toolkit is the first product of this collaborative initiative and is intended to make them visible and to facilitate the access to key projects and associated resources, while also fostering networking and result clustering activities.

[1]https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0329&rid=1

[2]https://freelitterat.eu/

The context: Pillar IV of the Atlantic Strategy & Free LitterAT project

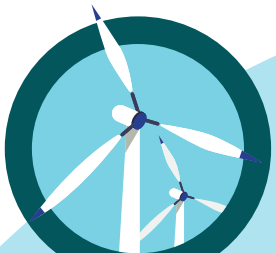
The Atlantic Maritime Strategy, adopted by the European Commission in 2011, was created in response to calls from stakeholders for a more ambitious, open and effective cooperation in the Atlantic Ocean Area. The first Atlantic Action Plan (AAP, 2013-2020) was updated by the Action Plan 2.0, released in 2020, and aims to unlock the potential of blue economy in the Atlantic Area while preserving marine ecosystems and contributing to climate change adaptation and mitigation.

Pillar I

Atlantic Ports as gateways and hubs for the Blue Economy

Pillar II

Blue Skills of the future and ocean literacy



Pillar III

Marine Renewable Energy

Pillar IV

Healthy Oceans and Resilient Coasts

The Action Plan has the ambition to achieve seven goals under the four thematic pillars through concrete actions mobilising all relevant Atlantic stakeholders.
These pillars are integrally interconnected and trans-regional by nature and represent a practical way to make the common vision a reality. They address key challenges and aim to foster sustainable blue growth and contribute to greater territorial cooperation and cohesion in the EU Atlantic area.

The Pillar IV addresses the context of vulnerability of the European Atlantic Ocean and its coastal areas, which are exposed to several human activities. The Pillar focuses on two specific goals: Goal 6 “Stronger coastal resilience” and Goal 7 “The fight against marine pollution”, the latter one including a set of concrete actions, most of them addressed to tackle marine litter.

Pillar Activities – Pillar IV

Challenges and Opportunities

The EU Atlantic coast is vulnerable, considering the high number of human activities in this area. Large storms, floods and erosion also have a detrimental effect on large parts of the coast and will likely be exacerbated through climate change. Risk prevention and adaptation measures are necessary to protect the coastal habitats and biodiversity, as well as infrastructure and economic activities at risk.

To address the needs identified, Pillar IV includes two specific goals and a set of concrete actions.

Goal 6: Stronger coastal resilience

- Demonstrate a comprehensive alert and observing system for incoming storms and floods in the EU Atlantic area;
- Develop synergies between existing EU infrastructures for coastal observation and protection;
- Develop test spaces, pilot areas to test methods of coastal protection and promote nature-based solutions;
- Promote sustainable practices in coastal and maritime tourism;
- Compile an inventory of regional adaptation strategies;
- Create information campaigns for Atlantic coastal communities;
- Educate young people and coastal communities about the natural evolution of the coastline;
- Share best practices on the application of maritime spatial planning to coastal adaptation and resilience;
- Map coastal wetlands for preservation and to monitor their role as carbon sinks.

Goal 7: The fight against marine pollution

- Develop a pilot project of litter-free coastal communities;
- Use available tools to identity major sources, pathways and hotspots of marine litter, as well as accidental or deliberate pollution;
- Promote circular economy-based business actions;
- Launch joint actions to promote a public perception of the problem;
- Promote fishing for litter actions;
- Engage under Oslo/Paris convention (OSPAR) to implement collective actions of the marine litter regional action plan;
- Promote coordinated and effective implementation of actions against marine litter and underwater noise;
- Support the work under the Union Civil Protection Mechanism and of Bonn and Lisbon Agreements towards effective prevention, preparedness and response to deliberate and accidental pollution;
- Promote cooperation among sectors for a coordinated at-sea and shoreline response.

Free LitterAT project

Strongly aligned with several of the actions above, especially with the first one, the Free LitterAT project, titled 'Advancing towards litter-free Atlantic coastal communities by preventing and reducing macro and micro litter', is a European project co-financed by the European Regional Development Fund (ERDF) through the Interreg Atlantic Area Programme 2021-2027. The broader goal of the project is to achieve litter-free coastal communities by combining knowledge, tools and technology development with implementation through pilot actions and multi-stakeholder engagement.

The project is coordinated by Centro Tecnológico del Mar (CETMAR) and will run from November 2023 to October 2026. The consortium is integrated by 14 partners and 9 associated partners (see figure below) with complementary capacities and experience that cover diverse areas of work necessary to tackle marine litter.

Partners

CETMAR Centro Tecnológico del Mar

Ifremer

Parditi agência regional para o desenvolvimento da investigação tecnologia e inovação

CSIC Consejo Superior de Investigaciones Científicas

MARE centro de ciências do mar e do ambiente

Intecmar Instituto Tecnoloxico para o Control do Medio Mariño de Galicia

Cedre

Marine Institute Foras na Mara

ciimar Centro Interdisciplinar de Investigação Marinha e Ambiental

USC Universidade de Santiago de Compostela

DGRM

Universidade Lusófona

Região Autónoma da Madeira Governo Regional — Secretaria Regional de Agricultura, Pescas e Ambiente, Direção Regional do Ambiente e Mar

Plateau technique compositic: Université Bretagne Sud

An Taisce The National Trust for Ireland

Associated Partners

AEBAM Asociación Española de Basuras Marinas

OSPAR Commission

APLM Associação Portuguesa do Lixo Marinho

Asociación vertidoscero

CPMR CRPM

KIMO

An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreachta Department of Housing, Local Government and Heritage

Ministère de la Transition écologique et de la Cohésion des territoires — Liberté Égalité Fraternité

Gobierno de España — Vicepresidencia Tercera del Gobierno — Ministerio para la Transición Ecológica y el Reto Demográfico

The main objectives of the project are:

- Preventing marine litter (based on circular economy principles) by improving waste management and recycling and facilitating the implementation of Single Use Plastic (SUP) and Port Reception Facilities (PRF) Directives;
- Understanding the origin and location of litter accumulation by identifying major sources, pathways and hotspots of marine litter (by monitoring and modelling);
- Reducing and removing marine litter and associated risks;
- Promoting litter-free coastal communities by developing pilot actions and awareness raising activities.

Linking Free LitterAT with Pillar IV:

Free LitterAT is giving especial attention and dedicating efforts to communication and capitalisation activities that are crucial to deliver and transfer applicable knowledge and resources to a wide community of end-users beyond the partnership and in other territories. Among these activities, the project directly contributes to Pillar IV of the Atlantic Action Plan, as most actions are aligned with this Pillar Goal 7 'The fight against marine pollution'. Combining objectives of Free LitterAT project and Pillar IV action 1 of Goal 7, a collaborative framework was launched to engage key EU projects addressing marine litter that had delivered or plan to deliver tangible and applicable outcomes to help coastal communities and actors prevent and/or reduce marine litter and achieve the vision of litter-free coastal communities.

Two key goals have been the drivers of this framework:

- To develop a Toolkit to facilitate the access and uptake of project results to promote litter-free coastal communities;
- To foster networking and project to project collaboration.

The final aim is to share approaches, promote complementarity and result clustering and to facilitate to local and regional authorities and maritime stakeholders the access and uptake of useful results generated by EU projects.

Although the action is promoted in the framework of the Atlantic Action Plan, the scope of the networking activities and associated outcomes and the potential beneficiaries are not limited to this geographical area and has the mission and vocation to be useful and applicable in other geographical areas.

Methodology

The Toolkit includes references and facilitates the access to selected projects and associated resources that may become, in the short– or middle-term, solutions to achieve litter-free coastal communities.

To produce this online resource, European project repositories, databases and related literature were consulted (see more details in chapter II) and a detailed and exhaustive selection of key European projects dealing with marine litter was performed. These projects were further investigated for the identification and extraction of their results and outputs.

For the selection of projects, the following criteria were applied:

- Projects with a result-oriented approach;
- Projects producing applicable knowledge and tangible outputs applicable to tackle marine litter;
- Ongoing and recently finalised projects;
- Results published in English;
- Information publicly available.

A factsheet for each project was produced including basic information of the project such as title, objectives, funding programme coordinator, project website, and the list of outputs and resources identified for each of them.

Following the collection of information for each project, project coordinators were contacted to ask for their engagement and collaboration to: 1) check whether the information in the project factsheet was correct, 2) send a brief summary of the results produced by the project and 3) select/highlight not more than five key resources or group of resources for being included in the Toolkit just as examples of project outcomes that could invite users to further explore the whole project and associated results.

The criteria for selecting resources were: 1) Tangible results published in English that can be implemented or put into exploitation by end-users: i.e. guidelines and methodologies, good practices, manuals, procedures, prototype technology, lifecycle studies, ready-to-work tools and technologies, software, apps, training and communication materials 2) scientific publications containing applicable knowledge and 3) relevance for the following thematic areas:

- Waste management and recycling;
- Prevention of litter entrance from sources (eg: rivers);
- Applicable detection, monitoring and modelling approaches;
- Marine litter removal and collection (ALDFG, Fishing for Litter, coast and beach clean-up);
- Awareness raising.

For finalised projects, a link is provided to facilitate direct access to the resources. For ongoing projects, the state of development of the resources and a link to the project website are included, allowing Toolkit users to follow their progress and access resources once they become available. The Toolkit does not pretend to be comprehensive in terms of capturing the huge universe of projects dealing with marine litter but to showcase a significant sample of key projects that can contribute with their outcomes to achieve litter-free coastal communities.

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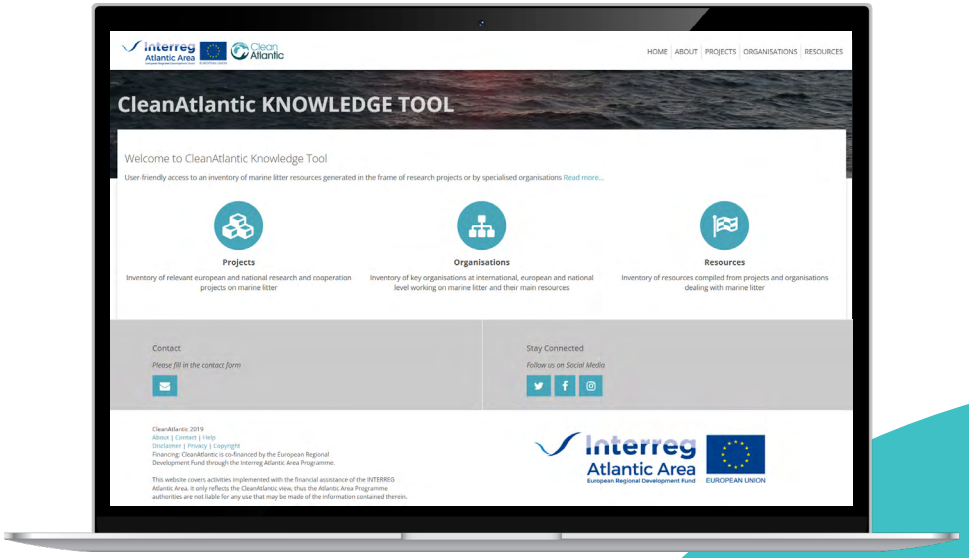
Chapter II

Sources of information

1 The CleanAtlantic Knowledge Tool

The CleanAtlantic Knowledge Tool (CKT) is an online repository launched in June 2021 and managed by CETMAR, that compiles marine research and technical resources specifically focused on marine litter sources, impacts, monitoring and on prevention and mitigation measures.

Visit website
knowledgetool.cleanatlantic.eu/



The CKT intends to address the problem of difficult access and dispersion of research outputs from European and national R&D projects by identifying existing knowledge and resources and providing user-friendly access to this information. It allows users to search by major themes related with marine litter (waste management and prevention, monitoring, modelling, awareness, Fishing for Litter, training, etc), by organisations, projects, type of resource, and by funding programme.

The CleanAtlantic Knowledge Tool focuses in the following sources of information:

- Key organisations working on the field of environmental protection, fully– or partially-dedicated to marine litter activities;
- European and international R&D projects related with marine litter;
- National R&D projects in the Atlantic Area countries (France, Ireland, Portugal, Spain and UK).

Projects and Organisations identified were/are included in the database and further investigated for the identification and extraction of resources that specifically tackled marine litter. Resources are described, classified and linked to their source (project or organisation) in the database.

This information was collected and included in the database of the CKT following a commonly agreed methodology. After the compilation of information, project coordinators and organisations were/are contacted to check and validate the data stored in the database.

Resources compiled were classified into 16 areas of knowledge and according to 15 types of resources. A detailed definition of each area of knowledge can be found it the CKT website.

knowledgetool.cleanatlantic.eu/about

The database currently stores information on 239 R&D projects at European, international, local and national level (Atlantic Area countries) and 120 organisations. Out of these projects and organisations, more than 1,250 resources were identified, analysed and included in the CKT. All the projects included in the Toolkit are also included in the CKT.

A leaflet summarising the CKT background, methodology, sources of information, criteria for the data collection, summary of data, etc. can be downloaded in this **link**.

2 European databases

For the elaboration of the Toolkit and the identification of key marine litter projects, the following European databases and inventories were consulted:

CORDIS: The Community Research and Development Information Service (CORDIS) is the European Commission's primary source of results from the projects funded by the EU's framework programmes for research and innovation, from FP1 to Horizon Europe. CORDIS has a rich and structured public repository with all project information held by the European Commission such as project factsheets, participants, reports, deliverables and links to open-access publications.
Access website

KEEP Database: Includes projects and beneficiaries of European Union cross-border, transnational and interregional cooperation programmes among the Member States (Interreg Program), and between Member States and neighbouring or pre-accession countries. The Interact Programme built this database and maintains it, as part of its mission, with the remaining Interreg programmes, and with the support of the European Commission. The database covers the 2000-2006, 2007-2013 and 2014-2020 periods, and is currently incorporating data on the 2021-2027 period.
Access website

LIFE Public Database: Contains all LIFE projects from 1992 and some results (projects and more than 20,000 documents). The general objective of LIFE is to contribute to the implementation, updating and development of EU environmental and climate policy and legislation by co-financing projects with European added value. LIFE began in 1992 and to date there have been five phases of the programme (LIFE I: 1992-1995, LIFE II: 1996-1999, LIFE III: 2000-2006, LIFE+: 2007-2013 and LIFE 2014-2020).
Access website

Marine Knowledge Gate: Innovative online repository of marine and maritime research projects and their tangible outputs (Knowledge Outputs, KOs) developed by Eurocean with funding from the EU and major national Research Funding and Performing Organisations (RFPOs) from 25 European coastal countries, as well as from Regional and International Agencies. It is a unique, innovative, open-access tool that directs to more than 5,000 records of the latest funded H2020 marine-related projects.
Access website

Water JPI (Joint Programming Initiative Water): Launched in 2010, the Water JPI tackles the ambitious challenge of achieving sustainable water systems for a sustainable economy in Europe and abroad. It includes The Thematic Annual Programming action (Water JPI TAP Action) which is a network of national projects focussed on specific research needs. It relies on the establishment of a network or cluster of excellence, creating a critical mass of research and technological excellence, the integration and sharing of knowledge, infrastructure, data and modelling tools, training and capacity building, as well as improved communication and networking with stakeholders and the scientific community.
Access website

CleanAtlantic inventory of initiatives: As part of the Interreg CleanAtlantic project activities, CEDRE (The Centre for Documentation, Research and Experimentation on Accidental Water Pollution) produced an inventory of initiatives, measures and actions (IMAs) designed to identify these activities in the Atlantic Area countries. The IMAs collected were characterised and classified by: (i) their identity (ii) the theme(s) or field(s) of action they address (iii) the target(s) they aim at (what type of litter? or what public?) and the supporting structures by (i) their identity (ii) the type of structure. A total of 481 initiatives were identified and registered in the interactive platform in the framework of the CleanAtlantic project.
Access website

3 Key documents reviewing projects dealing with Marine Litter

In recent years, there has been, and continues to be, a significant movement regarding marine pollution. European funding programmes have been focused on creating a more holistic approach to successfully reach the ambitious goals of the EU in terms on awareness, prevention and removal of marine litter, blue economy and to protect and restore marine and coastal ecosystems. Two key reports were consulted that summarise a wide number of European projects and provide an overview of how European funds are addressing these issues.

Portfolio Analysis EU Mission 'Restore our Ocean and Waters by 2030': presents the results of the analysis of a portfolio of 841 EU projects – completed or ongoing – that contribute to the objectives of the EU Mission 'Restore our Oceans and Waters by 2030'. These projects have been funded by the following sixteen EU programmes: CEF, CEF2027, COSME, DIGITAL, EMFAF, EMFF, EPLUS2020, ERASMUS2027, ESTAT, H2020, HORIZON, I3, Interreg, LIFE, LIFE2027 and SMP. The aim of the analysis has been two-fold: to help assessing the R&I's baseline underpinning the activities of the Mission Ocean & Waters to accomplish its ambitions goals, and to contribute to prospective analysis on content and future needs for the implementation of the Mission. The findings of the analysis include: (1) an structured overview of the project' portfolio in terms of their contribution to the objectives of the Mission, Green Deal targets, geographical areas, etc.; (2) an overview of tangible results delivered by the projects' portfolio and (3) policy recommendations, including gaps and approaches to scale-up and roll-out solutions that would require further support at European level, as well as synergies.

'Restore our Ocean and Waters': this Synergy Info Pack showcases 34 research projects funded through the complementary programmes of Horizon 2020 (including SME Instrument), LIFE and EMFF. This ground-breaking work is supporting the development of the technical, social, governance, innovation and business models needed to secure the restoration of aquatic ecosystems and the development of a sustainable, resilient and climate-neutral blue economy. Among these projects there are initiatives that foster a digital ocean and water knowledge system that builds on existing European infrastructures and services including Copernicus, EMODnet, Destination Earth, and European Research Infrastructure Consortia (ERICs).

03

Chapter III

Projects and Resources

Click on the projects for quick access

AQUA-LIT
'Preventing measures for averting the discarding of litter in the marine environment from the aquaculture industry'

CAPonLITTER
'Capitalising good coastal practices and improving policies to prevent marine litter'

CIRCNETS
'Blue Circular Nets'

CleanAtlantic
'Tackling Marine Litter in the Atlantic Area'

CRoCuS
'Cleaner Rivers - Cleaner Seas'

EUROqCHARM
'EUROpean quality Controlled Harmonization Assuring Reproducible Monitoring and assessment of plastic pollution'

Free LitterAT
'Advancing towards litter-free Atlantic coastal communities by preventing and reducing macro and micro litter'

GoJelly
'GoJelly - A gelatinous solution to plastic pollution'

INdIGO
'Innovative fishing Gear for Ocean'

INSPIRE
'Innovative Solutions for Plastic Free European Rivers'

INTEMARES Lost Fishing Gear
'INTEMARES - Lost Fishing Gear

INTEMARES Cleaning Fishing Grounds
'INTEMARES - Clean Fishing Grounds'

LIFE LEMA
'Intelligent marine litter removal and management for local authorities'

MAELSTROM
'Smart technology for Marine Litter Sustainable Removal and Management'

MARELITT Baltic
'Reducing the impact of marine litter in the form of Derelict Fishing Gear (DFG) on the Baltic Sea environment'

Mo.Ri.net
'Monitoring, census, removal and recycling of ghost nets: fishermen as key players in the safeguard of the sea'

NETTAG
'NetTag - Preventing marine litter from fisheries'

NETTAG+
'Preventing, avoiding and mitigating environmental impacts of fishing gears and associated marine litter'

Oceanwise
'Wise reduction of EPS marine litter in the North-East Atlantic Ocean'

Plastic Pirates
'Upscaling the Plastic Pirates citizen science initiative across Europe'

REMEDIES
'Co-creating strong uptake of REMEDIES for the future of our oceans through deploying plastic litter valorisation and prevention pathways'

SeaClear
'SEarch, identificAtion and Collection of marine Litter with Autonomous Robots'

SeaClear2.0
'Scalable full-cycle marine litter remediation in the Mediterranean: Robotic and Participatory solutions'

SEARCULAR
'Circular solutions for fishing gears'

TREASURE
'Targeting the reduction of plastic outflow into the Sorth sea'

Icon description

Best Practises

Best practises, guides

Educational

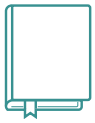
Educational training materials, education activities, workshops

Policy Recommendations

Policy recommendations, policy briefs

Reports

Reports, presentations



Books

Books, comics, handbooks

Equipment & Technologies

Equipment and technogies

Scientific Publications

Scentific publications, patents

Dissemination materials

Dissemination materials, clean up campaigns

Multimedia

Multimedia, videos, apps, digital games, data sets, platform online tools

Tools

Tools, toolboxes, software, toolkits

AQUA-LIT

Preventing measures for averting the discarding of litter in the marine environment from the aquaculture industry

AQUA-LIT

Summary
AQUA-LIT's main objective is to provide the aquaculture sector with a toolbox that includes already implemented, existing, and upcoming tools, case studies, best practices, a database and links between stakeholders for addressing the 3 main components of marine littering: prevention & reduction, monitoring & quantification, and removal & recycling.

Duration: 2019 – 2020

Funding programme: European Maritime and Fisheries Fund (EMFF)

Coordinator: Geonardo Environmental Technologies Ltd.

Visit website

AQUA-LIT

Project outputs

The two years project AQUA-LIT developed significant results for understanding better how aquaculture activities (separate from fishing activities) are littering the Ocean, how to tackle it and how policy can help in this regard. Its results have been integrated into Blue-Cloud 2026, a federated European FAIR and Open Research Ecosystem for oceans, seas, coastal and inland waters; into the Global Ghost Gear Initiative's Best Practice Framework for the Management of Aquaculture Gear; into the European Environment Agency's publication "Marine Litter in Europe – an integrated assessment from source to sea"; and into the Commission's "Restore our Ocean and Waters Info Pack". All publications and the Toolbox are available at the project's website.

Knowledge wave on marine litter from aquaculture sources

The aim of this report is to provide an overview of the available knowledge on marine litter originating from the aquaculture sector and reported in the marine environment of the North Sea region, the Mediterranean region, and the Baltic region. It includes a mapping of aquaculture facilities, and a description of all aquaculture-related items that can be observed as litter in the marine and coastal regions.

Knowledge wave on marine litter from aquaculture sources

The AQUA-LIT Toolbox

AQUA-LIT Toolbox aims at being considered the most important knowledge repository for aquaculture-marine litter related information across Europe. AQUA-LIT Toolbox is the result of the compilation of the information provided by the stakeholders in the frame of the project, the state of play regarding the aquaculture marine litter management in 2019 and 2020 and the input of the experts that have been part of or have worked closely together with the AQUA-LIT team.

Tide against marine litter – TOOLBOX

Policy Recommendations to tackle Aquaculture Debris

The 'AQUA-LIT Policy Recommendations' report examines how to avert the discarding of litter in the marine environment related to the aquaculture industry. This document provides a set of recommendations to improve decision-making and to overcome the existing gaps, being its main objective to provide information to support policy-making of the marine litter problem in the aquaculture sector. It was elaborated having in consideration key findings and results of each of the three sea basins AQUA-LIT focuses on (the Mediterranean Sea, the Baltic Sea and the North Sea), as well as the project's products and deliverables produced along the project.

Policy Recommendations to tackle Aquaculture Debris

AQUA-LIT

Best practice factsheets

Selection of many best practices collected from the collaboration with the aquaculture sector of the Baltic, the Mediterranean and the North Sea basins, as means to prevent, reduce, monitor, quantify, remove and recycle marine litter.

Access PDF

Marine Litter Identification Guide and Database

This litter inventory was generated through a genuine screening of available literature and litter databases (e.g. OSPAR, HELCOM, Marine Litter Watch) and was expanded over the course of the AQUA-LIT project based on discussions with stakeholders and aquaculture farmers. The database includes information on the main types of debris as well as the quantities in which they occur in the marine environment, identifying specific sources of marine littering coming from aquaculture activities.

Guide

Database

CAPonLITTER

Capitalising good coastal practices and improving policies to prevent marine litter

Duration: 2019 – 2023

Funding programme: Interreg V

Coordinator: NOVA University Lisbon - NOVA School of Science and Technology

Visit website

Summary
CAPonLITTER aims to improve policies and practices to prevent marine litter from coastal tourism and recreational activities. The project is focused on plastic food and drink containers resulting from improper consumer behaviour and insufficient waste management structures. The vision of the project was based on 3 objectives: working towards "Zero Waste Events", "Zero Waste Beaches" and "Zero Waste Communities", mainly aimed at beach litter and coastal tourism. It involved authorities and organizations from seven European countries where coastal tourism is a key economic activity, generating unmanaged waste. The project created communities committed to zero plastic waste and improve waste prevention, collection, and recycling at coastal sites.

CAPonlitter

Project outputs

Through interregional exchanges, partners developed regional Action Plans to implement best practices and align them with regional policy instruments and funding opportunities. Several actions are included in the partners Action Plans, such as:

- Eco-Centres of the Sea – zero waste fishing communities: aim of this action is to encourage the deposit in appropriate places, of fishing gear waste brought by fishermen, and also to promote their involvement and awareness on reducing impacts on ecosystems resulting by the fishing activities.
- Zero Waste Festivals: this action involves supporting local municipalities to develop a concrete plan and set out rules that guide event organizers and promoters on how to implement good practices.
- Zero Waste Beaches: the goal is to create Zero-Waste Beach plans aiming for the implementation of the EU Plastics Strategy.
- Winter Beach Cleaning: seeking a substantial reduction in the return of marine litter accumulated on the sands, brought by storms and washed away by spring tides.
- Blue Bag initiative transfer: an action for collection of marine litter from the sea, directed specifically to fishermen.
- To know more about all the actions developed by each country/partner, you can access the Greenbook CAPonLITTER.

Greenbook CAPonLITTER – Capitalizing good coastal practices and improving policies to prevent marine litter

This Greenbook has been designed to act as a supportive toolkit for local authorities who wish to take action against marine litter and want to better understand how. Prepared by partners of the CAPonLITTER project, the book is a showcase of best practices on how coastal authorities can take a diverse range of actions to help stem the flow of marine litter and prevent the costly effects this has on biodiversity and the entire marine ecosystem. In addition, a set of factsheets were developed with detailed information on some good practices selected by the project partners. These good practices focused on the three axis of the CAPonLITTER project: zero-waste beaches and beach facilities, zero-waste events, and zero-waste coastal communities. The Greenbook also includes the Action Plans developed by the partners – which includes the actions developed by each country in partnership with their stakeholders. These actions were inspired by the aforementioned good practices.

Access PDF

CIRCNETS

Blue Circular Nets

Duration: 2023 – 2025

Funding programme: Interreg VI

Coordinator: University of Oulu

Visit website

Summary
The CIRCNETS project builds on the work of previously implemented Northern Periphery and Arctic (NPA) projects Circular Ocean, Blue Circular Economy and Blue Circular Tech, which have demonstrated that the management of End-of-Life (EOL) fishing gear requires a transnational approach. While these projects have addressed certain aspects of the issue, they have lacked both the geographical scope and holistic view on the collection, recycling and re-use of discarding fishing nets, areas that CIRCNETS aims to comprehensively address.

CIRCNETS

Project outputs

Under CIRCNETS project, solutions from other regions are examined to determine how collection can be organised regionally in the most efficient and economical way, while respecting the principle of “do no significant harm”. The main outcome of the project is a Blueprint for the collection, treatment and reuse of EOL fishing gear for the NPA region. Through its delivery, CIRCNETS will prepare stakeholders from the fishing industry for the implementation of these legislative changes. This is achieved through the analysis of fishing gear volumes, collection responsibilities and collection practices in NPA ports, the development of an NPA marine plastic mitigation model (covering collection, treatment, and reuse), and the implementation of extended producer responsibility for EOL fishing gear in NPA countries.

Review of the current collection responsibilities and disposal practices in NPA fishing ports and aquaculture sector

The aim of this report is to provide an overview of the current collection and disposal practices for EOL fishing gear in the NPA ports and aquaculture sector. A short description of the fishing and aquaculture sector in the NPA countries, and the differences and similarities between them are presented in this work. In addition to this, the legislation regarding EOL fishing gear is reviewed, together with the requirements for collection activities, which must be adhered to, and existing EOL collection practices in individual countries.

Outputs and Results

Review of EOL fishing gear collection volumes and responsible parties in the NPA region

The report provides an overview of life cycles of fishing gear, information about the EOL fishing gear amounts in NPA countries and the current EOL fishing gear treatment methods and processing capacity in the NPA countries. (ongoing)

Outputs and Results

Development report for NPA EOL collection system

The report describes the improvement needs of the current EOL collection practices in the NPA region and how these could be improved using examples of best practice & best available technologies from outside of the NPA region. (ongoing)

Outputs and Results

CIRCNETS

Implementation of EPR in the EOL fishing gear sector

The report describes key considerations for the implementation of EPR for EOL fishing gear in the NPA countries. National requirements regarding the implementation, experiences from other EPR schemes and the peculiarities of the NPA countries are analysed and assessed, and recommendations are given on how to build/ modify collection and recycling systems in the different partner countries.
(ongoing)

Outputs and Results

CleanAtlantic

Tackling Marine Litter in the Atlantic Area

Duration: 2017 – 2023

Funding programme: Interreg V

Coordinator: Centro Tecnológico del Mar (CETMAR)

Visit website

Summary
CleanAtlantic aimed to protect biodiversity and ecosystem services in the Atlantic Area by improving capabilities to monitor, prevent and remove (macro) marine litter. The project also contributed to raise awareness and change attitudes among stakeholders and to improve marine litter managing systems. Through a holistic approach, CleanAtlantic addressed several facets of the marine litter problem, such as capturing and making existent data and knowledge available to establish the state of the art, as well as developing monitoring, modelling and mapping tools, reducing and removing of marine litter and carrying out training and awareness raising activities.

CleanAtlantic

Project outputs

CleanAtlantic has produced an important legacy in the form of technical reports, scientific publications, online resources and an interactive map making existent data and knowledge accessible. Data management, monitoring and modelling were improved by developing interfaces, apps, tools and protocols, and case studies and pilot actions of marine litter removal and ALDFG management and awareness raising materials were carried out. The environmental impact of specific items such as cotton buds and cigarette filters and the economic impacts of marine litter in different sectors (tourism, fisheries, and aquaculture) were also assessed. Moreover, partners tested new technologies like drones and satellites for monitoring and developed harmonized sampling and monitoring protocols. Awareness raising materials addressed to key stakeholders and adaptable to different context were delivered. More than 80 resources are available at the project website.

Overview of the work carried out in CleanAtlantic on improving marine litter monitoring

This report collates the main project results concerning marine litter monitoring. With this purpose, an overview of new and improved marine litter monitoring methods for seabed, water surface and coastal compartments is presented. Main findings, gaps on monitoring and research as well as potential improvements and recommendations are highlighted. For some of the compartments addressed, fully-dedicated reports are available and links are included in the reference section for further information.

Access PDF

Analysis of strategies for the monitoring and evaluation of accumulations of marine litter on the coast

This study aims to analyse different strategies for the location of areas of accumulation of marine litter that can be incorporated into monitoring, cleaning, and collection protocols.

Access PDF

MOHID Lagrangian Tool

This tool allows to predict the trajectory and fate of marine litter and the areas most likely to accumulate particles (hotspots). It holds the software necessary to include marine litter processes in an open-source Lagrangian transport model (The MOHID Lagrangian Tool).
An installation guide and a short user guide are also available for download.

Software

Installation guide

Short user guide

CleanAtlantic

Operational guide for the clean-up of marine litter on the coastline

This guide addresses routine beach litter collection operations, including manual pick-up and mechanised clean-up, particularly on sedimentary substrates which are more prone to stranding and more likely to suffer deleterious impacts caused directly by cleaning operations, whether manual or mechanical. The guide briefly presents the elements to understand how the shoreline functions, and how litter behaves in this dynamic environment.

Access PDF

CleanAtlantic Regional Policy Toolkit

This toolkit allows to discover the CleanAtlantic project's key achievements and how they can contribute to regional policies and initiatives against marine litter. It is intended to provide guidance and facilitate access to information and resources to regional policymakers to implement relevant and cost-efficient policies and measures.

Access PDF

CRoCuS

Cleaner Rivers – Cleaner Seas

Duration: 2020 – 2022

Funding programme: Black Sea Basin Programme 2014 – 2020

Coordinator: Earth Forever Foundation

Visit website

Summary
The CRoCuS project is a synergistic action of 4 NGOs and 1 townhall from different countries at the Black Sea basin, who came together to produce innovative tools for rapid assessment of river litter and waste recycling potential, promote sustainable waste management practices, share good practices and mistakes and spread the word across the borders for reduction of bio-degradable waste and plastics recycling and minimization. River and marine litter are one from the biggest threats to ecosystems, but also to human health and economic welfare.

CRoCuS

Project outputs

The project conducted a wide awareness raise campaign, capacity building for local actors and community mobilization on river litter reduction and prevention. Based on the partners experience, the project implemented new coordinated actions and shared knowledge, including: a trash alert mobile application, teacher trainings and experience sharing workshops, demonstration activities on how to produce compost and mulch, clean-up activities on the rivers, ways of reducing/recycling of plastics, press conferences/social media, TV/radio promotions, implementation of demonstration facilities on sustainable waste management, and the development of training packs and promotional/educational materials. Thus, the CRoCuS project contributed to reducing river littering and, consequently, marine litter, with actions that can be replicated elsewhere.

Training Pack on the main sources of pollution of rivers and the best available solutions for reducing river littering

This publication raises awareness and develop the successful implementation of best practices and partnerships among civil society activists, local governments, schools and small businesses situated in the rural areas of the Black Sea region. It contributes to the efforts to prevent, reduce, recycle and reuse wastewater and solid household waste; as well as to mitigate the negative impact of human activities on soil and water bodies, nature, protected areas, and both land and aquatic ecosystems.

Training Pack

Useful tips on milestones of EU waste management policy for decision-makers and business

This report provides a brief overview of the waste management policy that can be used as guidance and support for decision-makers and businesses. The goal of the summarized Directives is to improve EU waste management in order to protect, preserve, and improve the quality of the environment, as well as to encourage the prudent and rational use of natural resources.

Access PDF

Microplastics and their possible objects of future project work

This report presents a brief introduction to microplastics. The entire cycle and movement of microplastics in the environment is not yet known, but it is important to know where they come from and also in which environmental compartments could be found. This document also includes some of its main effects on humans as endocrine-disrupting chemicals (EDCs).

Access PDF

CRoCuS

Feasibility study: Evaluate waste recycling/reuse opportunities

The objective of this report is to evaluate the waste recycling opportunities and to purchase the equipment necessary for the disposal of plastic and organic waste. It presents an investment project which will contribute to improving the protection of the human health, reducing the risk of human disease and protecting all environmental factors. Additionally, promoting this type of investment will improve environmental quality and reduce pollution sources.

Feasibility study

EUROqCHARM

EUROpean quality Controlled Harmonization Assuring Reproducible Monitoring and assessment of plastic pollution

Duration: 2020 – 2023

Funding programme: Horizon 2020

Coordinator: Norsk institutt for vannforskning (NIVA)

Visit website

Summary
The goal of the EUROqCHARM project was to establish harmonised methodologies for the monitoring and assessment of macro–, micro– and nanoplastics in the environment, as well as blueprints for standards and recommendations for policy and legislation. It addressed the plastic pollution monitoring by critically reviewing state-of-the-art analytical methods and, taking harmonisation one step further, validating them through an interlaboratory comparison (ILC) study producing certified reference materials to marketed for at least three of the four target matrices (water, soil/sediment, biota, air), during and after project completion.

EUROqCHARM

Project outputs

The project developed a catalogue of Reproducible Analytical Pipelines (RAP) procedures for nano–, micro– and macro-plastics for four target matrices. To maximise impact, EUROqCHARM established and consolidated an operational network for plastic monitoring, fostering Transnational Joint Actions based on existing and future European and international initiatives. The project provided tools to support further development of standards, policy and legislative recommendations (including technological readiness levels and reference materials).

Reproducible pipelines and readiness levels in plastic monitoring

This review exposes the need to promote and accelerate the adoption of best monitoring practices, highlighting the importance of creating a flexible method validation framework based on reproducibility, replicability and repeatability. It proposes the application of RAPs (Reproducible Analytical Pipelines) and TRLs (Technological Readiness Levels) as a tool to support policy and technical decisions about plastic monitoring.

Access PDF

Validation of methods for plastics analysis in environmental samples

This presentation summarizes an interlaboratory study on the analysis of microplastics in environmental matrices (sand and sediments). On one hand, different plastic materials were selected to evaluate the different methodologies, such as PE, PET, PS, PP, PC and PVC. On the other hand, type of filter, density separation procedure and digestion of the sample were chosen as options for sample preparation; and µFTIR, uRaman or Pyr-GC-MS as possible detection system.

Access PDF

State-of-the-art monitoring methods and capacity for global scale marine debris indicators

This presentation highlights the importance of a harmonising system which will benefit the development of monitoring programmes. This determination is based on the differences obtained between different research teams, countries and regions, which has consequences for monitoring, risk assessment and legislation.

Access PDF

EUROqCHARM

Finding the Balance between Research and Monitoring: When Are Methods Good Enough to Understand Plastic Pollution?

This article addresses the issue of finding a balance between research and development, regulation, and monitoring within the field of plastic pollution. Considering that each of these elements comes with individual targets regarding data needs, the project focused on bringing research into monitoring by asking the following: (1) Why and what should we monitor? (2) Are there methods available to provide environmental baseline levels, and how should data be reported? (3) When should novel and developing techniques be implemented? (4) What frameworks are available to ensure a comparative approach is adopted between national and international organizations? (5) How do we balance and align scientific advancement with requirements from policymakers and regulators to obtain a rapid response? The project aim is to discuss complexities of answering calls from governing organizations to identify environmental contamination from plastic pollution.

Access PDF

Revisiting the strategy for marine litter monitoring within the European marine strategy framework directive (MSFD)

This article provides recommendations to support long-term, effective, and well-coordinated marine litter monitoring within the MSFD to achieve a comprehensive and accurate understanding of marine litter in EU waters. This will allow the development of measures to mitigate the impacts of marine pollution and eventually to evaluate the success of the respective measures.

Access PDF

Free LitterAT

Advancing towards litter-free Atlantic coastal communities by preventing and reducing macro and micro litter

Duration: 2023 – 2026

Funding programme: Interreg VI

Coordinator: Centro Tecnológico del Mar (CETMAR)

Visit website

Summary
Free LitterAT will achieve litter-free coastal communities by combining knowledge, tools and technology with pilot actions with multi-stakeholder engagement. It tackles marine litter, a transnational challenge demanding an integral approach involving prevention, monitoring, and removal when feasible of the already accumulated marine litter. The overall objective is to protect biodiversity by implementing innovative approaches to prevent and reduce marine litter, with special emphasis on ALDFG and microplastics. Free LitterAT will contribute to reducing inputs, locate sources and hotspots, enhance monitoring capabilities, and raise awareness. Main outputs include guidance, tools and joint solutions for waste management, marine litter monitoring, modelling, clean-up, and removal as well as action plans transferred to the competent authorities and maritime stakeholders. The project will build on previous results and alliances, developing new solutions to be implemented through pilot actions.

Free LitterAT

Project outputs

Free LitterAT will significantly contribute to reduce inputs, enhance monitoring and modelling capabilities, facilitate access to data, knowledge, and technology, promote alliances and increase stakeholder awareness. As main outputs, it will deliver good practices, improved protocols and systems for waste management and recycling, advanced monitoring and modelling guidelines and tools for macro and microlitter, protocols and methodology to identify sources, maps of sources and hotspots, collaborative platforms, training courses and good practices for the management of strandings of (micro)litter on the coastline and for the clean-up of coastal accumulation sites and actions plans for reducing ALDFG that will be transferred to key end-users.

Testing and recycling protocols for different types of fishing nets

Different protocols and systems for collection and recycling of End-of-Life fishing gears will be analysed and further developed. Recycling techniques will be improved by testing them with different types of polymers and different size, optimising the dismantling operations by proposing industrial techniques and improving the shredding process. This deliverable will highlight the technical solutions that could be adapted to promote good practices in the ports to facilitate recycling of end-of-life fishing gears. It will also provide a tool for communicating and supporting industry in the choice of solutions. (ongoing)

Waste management and recycling

Online Tool for litter image annotation

Embedded on an existing online platform (https://wave-labs.org) this deliverable will provide an online tool and a Graphic User Interface (GUI) for collaborative imagery annotation to tag and identify litter items and interactions with biota. The tool will enable annotation of multiple imagery data sources (e.g. drones, cell phones, ROVs, cameras) that can be leveraged for litter pollution assessments in several compartments. Interface will be used for annotating/segmenting objects of interest using bounding boxes or polygons, including the labelling (e.g. marine litter category), where stakeholders can include categories by their choice. (ongoing)

Assessing and monitoring marine litter

Guidelines for microplastics monitoring

Microplastic monitoring includes several steps that need to be fully optimised and validated so that valid reports on microplastics presence and their full characterization can be obtained. Set of harmonized guidelines and protocols to monitor microplastics in different matrices (water, sediments, and biota) and in different areas (offshore, coastal, and estuarine areas) will be delivered including sampling procedures, sample preparation strategies, characterization, and analysis of microplastics polymers indicating the different procedures and techniques with constraints, limitations and suitability considering structure, size, and origin. (ongoing)

Assessing and monitoring marine litter

Free LitterAT

Updated version of the MOHID-Lagrangian model

The model will include degradation rate equations, waves, and high-spatial resolution parameterizations and provide a more complete and accurate understanding of how marine debris moves and accumulates in the ocean. It will be useful for planning marine litter management and mitigation. The degradation rate equations allow for a more accurate prediction of its movement and long-term accumulation.
(ongoing)

Modelling approaches

Multilingual training courses and good practices for the management of important strandings of (micro) litter on the coastline and for the clean-up of coastal accumulation sites

Once in the ocean, litter disseminates making its recovery difficult and costly. However, meteorological and oceanic conditions can lead to important arrivals of litter and microlitter on the coastline and even accumulation in specific areas, including remote areas. These resources will show the specificities, constraints, appropriate techniques, equipment and associated costs for the management of litter strandings and for clean-up operations in the form of multilingual training courses and manuals dedicated to coastal municipalities.
(ongoing)

Reducing marine litter and risks

GoJelly

GoJelly – A gelatinous solution to plastic pollution

Summary
The project GoJelly developed, tested and promoted a gelatinous solution to microplastic pollution by developing a prototype microplastics filter for commercial and public use, where the main raw material is jellyfish mucus. The project aimed to simultaneously address two environmental issues with one approach by removing the commercially and ecologically destructive sea and coastal pollution of both jellyfish and microplastics. This innovative approach ultimately leads to less plastic in the ocean and raise jellyfish as a valued product for filters and other commercial exploitation.

Duration: 2018 – 2021

Funding programme: Horizon 2020

Coordinator: University of Southern Denmark

Visit website

GoJelly

Project outputs

The GoJelly project achieved several important outcomes, including the development of an innovative microplastic filter using jellyfish mucus, testing was limited to MED sea only, due to limited action during pandemic (EU Patent No. 21894188.8). It also produced jellyfish-based products, such as organic fertilizers, cosmetics, feed (with a pending patent), and food products (Patent No. IT201900011472A1), demonstrating the resource's versatility for a sustainable blue economy. Additionally, the project generated scientific publications and life-cycle studies that enhanced the understanding of jellyfish ecology and applications. GoJelly effectively disseminated its findings through traditional and social media, open lab ship cruises, and an engaging online game focused on jellyfish management and microplastic pollution scenarios.

System and method for removing microparticles and nanoparticles from water using gelatinous zooplankton mucus

Patented method for removing microparticles and nanoparticles from water using gelatinous zooplankton mucus. The method consists of supplying gelatinous zooplankton mucus to the water comprising particles, allowing the formation of particle aggregates; removing particle aggregates from water by passing water with the particle aggregates through a filter configured to receive water comprising particle aggregates.

Access PDF

Microplastic distributions in a domestic wastewater treatment plant: Removal efficiency, seasonal variation and influence of sampling technique

In this work, the efficiency of a municipal Wastewater Treatment Plant (WWTP) to remove microplastics (MPs) was assessed by collecting samples from raw to tertiary effluent during a 12-month sampling campaign (season-based) using different sampling methods (containers, 24-h composite and large grab samples). MPs retrieved from different treatment units within the WWTP were identified and quantified using plastic/non-plastic staining followed by optical microscopy, SEM and μ-Raman microscopy.

Access PDF

Single-Use Plastic Bans: Exploring Stakeholder Perspectives on Best Practices for Reducing Plastic Pollution

In this study, the authors conducted and documented workshops and interviews in Norway and Slovenia to identify stakeholder and future generation opinions and mitigation strategies for solving one of the most prominent environmental issues: plastic pollution. Stakeholders were brought together to explore their perceptions on considering jellyfish mucus as a new resource to contribute to reducing plastic pollution from entering the marine environment.

Access PDF

GoJelly

Between source and sea: The role of wastewater treatment in reducing marine microplastics

This paper describes the current state of knowledge regarding microplastics (MPs), wastewater and relevant policies that could influence the development and deployment of new technologies within Wastewater Treatment Plants (WWTPs). The authors review existing technologies for capturing very small MP particles and examine new developments that may have the potential to overcome the shortcomings of existing methods.

Access PDF

A digital game for scenario playing

This strategy game demonstrates the complexity of a marine system with jellyfish in it, under changing environmental conditions, giving solution approaches for a sustainable management to the interested public. It is focused on the human elements of the socio-ecological system as both impacted by and in turn causing changes in the marine environment. Plastics in the oceans is but one of the problems to solve in the GoJelly game. Others are eutrophication, sustainable food production and jellyfish aquaculture to manage jellyfish as a plague or a resource within trade-off analysis of different eco-system goods and services.

Digital Game

INdIGO

INnovative fIshing Gear for Ocean

Summary
The INdIGO project ran from 2020 to 2023 with the aim of reducing marine pollution from fishing and aquaculture. It involved 10 partners from industry and academia in the Channel area and was funded by the Interreg France (Channel) England programme. The project combined complementary approaches by working both on the preventive aspect, by improving the collection and recycling of used fishing gear, and on the search for alternative solutions, by developing biodegradable materials for fishing gear. Economic and social aspects were also assessed with special efforts to engage fishermen and the general public.

Duration: 2020 – 2023

Funding programme: Interreg V france (Channel) England Programme

Coordinator: UBS – Université Bretagne Sud

Visit website

INdiGo

Project outputs

By covering the production chain of the fishing gear from formulation, filament manufacturing to prototype net development, INdIGO project has:

- improved knowledge of end-of-life fishing gear and ALDFG.
- developed collection and recycling solutions in the Channel area.
- developed prototypes of biodegradable fishing and mussel farming gear.
- promoted the acceptability of biodegradable fishing gear.

Fish & Click: Website and mobile application for mapping lost fishing gears

Fish & Click is a citizen science programme aimed at collecting data on abandoned, lost and discarded fishing gear equipment. Walkers, divers, yachtsmen and fishermen are invited to share their observations, whether at sea or on the shore. The more information is collected the better mapping of the distribution of lost fishing gear can be performed and suggest solutions for its managements.

Fish & Click App

Good practice guide for harbour authorities

In the form of self-assessment, this guide allows harbours to position themselves and to know the different steps to improve the recycling of end-of-life fishing gear.

Best practices for harbours

The economic impacts of introducing biodegradable fishing gear as a ghost fishing mitigation in the English Channel static gear fishery

The objective of this paper is to address the economic impacts of ghost fishing to the fishing industry and explore the role of Biodegradable Fishing Gear (BFG) as a mitigation measure, primarily to help fishermen in their decision to engage with the experimental phase of BFG development.

Access PDF

INdiGo

The two prototypes of net

This deliverable explains the manufacturing process of two prototypes of biodegradable nets meeting the specifications (MTT1), one for the fishing sector and the other for aquaculture.

Access PDF

Study of the acceptability of biodegradable fishing gear: results and recommendation

The objective of this study is to identify the barriers and levers to the acceptability of a new biodegradable fishing gear. The results should be used to make recommendations for the design of the biodegradable fishing gear and to implement an action plan to accompany the transition towards sustainable fishing practices.

Access PDF

INSPIRE

Innovative Solutions for Plastic Free European Rivers

INSPIRE
Innovative Solutions for
Plastic Free European Rivers

Duration: 2023 – 2027

Funding programme: Horizon Europe

Coordinator: Vlaams Instituut Voor de Zee (VLIZ)

Visit website

Summary
INSPIRE aims to drastically reduce litter and plastics in European rivers through a holistic approach, involving 20 technologies and actions. The project focuses on detecting, collecting, and preventing litter, such as macro– and microplastics, in rivers and riverbanks, including developing biodegradable alternatives to harmful products. Eight use cases, covering six European Rivers, will test these technologies, leading to seven defined solutions, supported by techno-economic analysis and business plans for scaling up. INSPIRE will also engage communities through a robust communication strategy, including activities at festivals promoting biodegradable products. A consortium of 26 partners will collaborate to ensure market-ready solutions.

More information access website.

INSPIRE

Project outputs

INSPIRE aims at creating a Master Plan which will be modular and serve as the guideline for the uptake of site-tailored combinations of litter solutions and detection approaches. Other outputs include set of models for the European rivers, a riverine litter database, cost-benefit sustainability analysis and a decision-making tool for plastic solutions, and sample processing and sampling protocols.

Scientific webinars and workshop, capacity building events and citizen science activities

Community engagement in INSPIRE aims to empower citizens to contribute to all specific objectives, including co-developing solutions to communities' needs as highlighted in the European Knowledge Valorisation Strategy. The project engagement blueprint will be implemented on four levels: a) for the project, b) for the demo/pilot sites, c) for specific stakeholders based on the project mapping activities, and 4) on EU level.

- INSPIRE will be offering a series of scientific webinars and a European workshop on river litter monitoring to inform, keep up-to-date and engage a broad INSPIRE community.
- The stakeholder needs and concerns are being evaluated, and capacity building events will be organized accordingly to build up local capacity.
- Citizen science activities are being carried out, including clean-up and anti-litter actions and challenges, where citizens are involved, engaged and can take over surveying.

Access website

Riverine litter database

Novel and integrative database on riverine litter across litter & plastic size ranges (micro <0.5cm, meso 0.5-2.5 cm, and macro >2.5 cm) considering several riverine compartments: water surface, water column, sediments and riverbanks. (Under development).

Access website

INSPIRE

Modelling framework and decision-making tool for riverine litter solutions

Mapping, assessment and modelling to have an overview of the needs of each river, its scale of urgency in tackling pollution and how that should be carried out. The resulting tools will provide a multi-scale and dynamic modelling framework for riverine litter allowing the upscale process at basin, country and European scales.

This links to a new decision-making tool to identify the most appropriate solution(s) (technologies and actions) for tackling litter pollution in the targeted river. This specific tool will enable to plan future interventions across the European rivers.
(Under development)

Access website

Monitoring and data reporting

Field (sampling or observation) protocols and laboratory protocols for riverine litter were developed under the best practices available and as good foundations for robust results. Furthermore, guidelines and templates were prepared to enable a uniform data reporting approach according to the FAIR principles, promoting the best practices for data management during and after the project.

Monotoring and analysis protocols

Data management plan INSPIRE

INSPIRE replication sites and project news

INSPIRE replication sites via a financial support to third parties' scheme.

Open Call

News

INTEMARES
Lost Fishing Gear

INTEMARES – Lost Fishing Gear

Duration: 2021 – 2023

Funding programme: General Directorate for the Coast and the Sea (Dirección General de la Costa y el Mar – DGCM, MITECO)

Coordinator: General Directorate for the Coast and the Sea (Dirección General de la Costa y el Mar – DGCM)

Visit website

Summary
The General Directorate for the Coast and the Sea (DGCM) of the Ministry for the Ecological Transition and the Demographic Challenge developed the 'INTEMARES – Lost Fishing Gear' project ('INTEMARES – Artes perdidos') with the aim of developing general criteria for action for the management of Abandoned, Lost or Discarded Fishing Gear (ADLFG) and developing pilot actions to verify their effectiveness in areas of the Natura 2000 Marine Network within the framework of the LIFE INTEMARES project. The initiative was technically driven by the Association Hombre y Territorio.

INTEMARES
Lost Fishing Gear

Project outputs

The work derived from this action aims to generate a tool for the better detection, characterisation and assessment of actions on lost or abandoned fishing gear. It has generated a series of tools to facilitate the management of ALDFG. These include the General Criteria Document, several audiovisual resources such as a video summary and 5 demonstrative actions to facilitate intervention and interpretation in different situations, and an instruction document for the use of the viewer and repository of encounters that it is available to different users: visitors, participants and managers.

General Criteria for the Management of Abandoned, Lost or Discarded Fishing Gear (ALDFG)

The main objective of this document (created under the INTEMARES - Artes Perdidos initiative) is to establish the basic criteria to facilitate the task of locating, evaluating, deciding and, where appropriate, removing lost or abandoned gear, ALDFG, from the marine environment through agreed procedures. In no case this is a normative or binding document, nor does it attribute obligations beyond those already included in current regulations, but rather it is created for guidance and information purposes. These activities are part of the Spanish Programme of Measures on Marine Litter.

Access PDF

INTEMARES
Cleaning Fishing Grounds

INTEMARES – Cleaning Fishing Grounds

Duration: 2021 – 2023

Funding programme: General Directorate for the Coast and the Sea (Dirección General de la Costa y el Mar – DGCM, MITECO)

Coordinator: General Directorate for the Coast and the Sea (Dirección General de la Costa y el Mar – DGCM)

Visit website

Summary
'INTEMARES – Clean Fishing Grounds' ('INTEMARES – Caladeros limpios') is an action launched by the DGCM of the Ministry for the Ecological Transition and the Demographic Challenge (MITERD) with the aim of establishing common guidelines for fishing for litter in Spain and the implementation of pilot projects to verify its effectiveness in the marine areas of the Natura 2000 Network. This initiative was promoted by the General Subdirectorate for the Protection of the Sea of MITERD, in collaboration with the association Vertidos Zero.

INTEMARES
Cleaning Fishing Grounds

Project outputs

The work establishes the basis for the development of a common fishing for litter scheme in marine waters where Spain exercises rights over the exploitation and use of marine resources (Exclusive Economic Zone, EEZ). The project outputs include the General criteria document for Fishing for Litter and a web application for reporting data on unintentionally fished waste (access restricted to port managing entities) in compliance of the Directive (EU) 2019/883 of the European Parliament and of the Council of 17 April 2019 on port reception facilities for the delivery of waste from ships, amending Directive 2010/65/EU and repealing Directive 2000/59/EC.

General criteria document for fishing for litter

The main objective of this document (created under the initiative INTEMARES - Caladeros limpios) is to define general guidelines for the development of fishing for litter activities in Spain, including the establishment and maintenance of a national database on items collected during these activities, and the definition of the involved actors, their organizational methods, and resource allocation, to ensure their effectiveness in the marine areas of the Natura 2000 Network. These activities are part of the Spanish Programme of Measures on Marine Litter (measures BM-17 and BM-26), as well as the I Circular Economy Action Plan 2021-2023 of the Spanish Circular Economy Strategy (action 3.7.1) and aim to lay the groundwork for the development of a National Litter Fishing Scheme.

Access PDF

LIFE LEMA

Intelligent marine litter removal and management for local authorities

Duration: 2016 – 2019

Funding programme: LIFE

Coordinator: Gipuzkoako foru aldunidia – Diputación foral de Gipuzkoa

Visit website

Summary
Life LEMA project aimed at providing local administrations with a methodological guide and prediction tools for the efficient management of floating marine litter through the pilot experiment in the southeast waters of the Bay of Biscay. This project location helped to boost the search for solutions to marine litter in trans-boundary waters, promoting collaboration and dialogue through meetings of groups of experts. Led by the Provincial Council of Gipuzkoa, the work team included research centres (AZTI, Rivage Pro Tech), public bodies (Syndicat mixte Kosta Garbia, the city of Biarritz) and the NGO Surfrider Foundation Europe.

LIFE LEMA

Project outputs

The project developed and tested technologies to predict, detect, analyse and collect floating marine litter. These included prediction models to predict the drift and accumulation spots of marine litter at sea, videometry systems for monitoring riverine litter, marine litter collection by fishing vessels and booms for riverine litter. Likewise, marine litter collection and characterisation campaigns were carried out with volunteers on different beaches, and awareness raising activities were conducted. Several meetings were held with experts to discuss marine litter and its management. More than 80 t of marine litter were collected, floating marine litter type and sources were determined, and microplastics' abundance and densities were estimated for the study area. The LIFE LEMA project contributed to preventing and mitigating marine litter with actions that can be replicated elsewhere.

Marine litter and microplastic abundance in coastal waters of the South-East East Bay of Biscay

This publication shows the abundance and densities of microplastics found in coastal waters of the south-east Bay of Biscay (2017-2020). It demonstrates that this region is a dead-end for plastic and it shows that plastic pollution levels in coastal waters of the SE BoB are similar to those in the Mediterranean Sea.

Access PDF

Fishing related litter transport and fate within the Bay of Biscay

This paper presents, through simulation, the distribution patterns and fate of floating marine litter (FML) generated by the fisheries sector within the Bay of Biscay. It shows that highly buoyant fishing gear beach after 30 days, only 1 % remain floating after 90 days, half of low buoyant items remain floating after 90 days and 20-35 % beach, and only 20 % escape the Bay of Biscay.

Access PDF

Marine litter windrows definition as marine litter accumulation structure

This contribution provides an observational description of floating litter windrows found in the coastal waters of the SE Bay of Biscay. It provides data on abundance, densities, typology of litter and potential sources. It also demonstrates the key role of these submesoscale processes in the distribution of FML at sea.

Access PDF

LIFE LEMA

Marine litter released by Basque rivers: modelling, accumulation zones and forecast using Lagrangian simulations

This paper provides an analysis of the seasonal behaviour of floating marine litter released by rivers within the south-eastern Bay of Biscay based on riverine litter characterizations, drifters, and high-frequency radar observations and Lagrangian simulations.

Access PDF

Economic perspective of mitigation solutions for marine litter

This paper presents the assessment of the effectiveness and the efficiency of four solutions designed to remove, monitor and/or manage floating marine litter. It demonstrates that the efficiency, effectiveness and willingness to pay are a baseline to design solutions for marine litter and fishing vessels can be an option for a sustainable marine litter collection.

Access PDF

MAELSTROM

Smart technology for MArinE Litter SusTainable RemOval and Management

MAELSTROM
Smart technology for MArinE Litter SusTainable RemOval and Management

Duration: 2021 – 2024

Funding programme: Horizon 2020

Coordinator: Marine Science Institute of the Italian National Research Council (CNR-ISMAR)

Visit website

Summary
MAELSTROM is a four-year Horizon 2020 project specifically addressing the critical issue of marine plastics and litter (ML) through a consortium of 14 partners from eight European countries, led by the Institute of Marine Sciences of the Italian National Research Council (CNR-ISMAR). The primary objective of MAELSTROM is to mitigate the impacts of marine litter in coastal ecosystems by identifying accumulation hotspots and implementing targeted removal strategies to extract debris from both the seabed and river water column before it can enter aquatic environments. Additionally, MAELSTROM actively promotes public awareness and education on marine litter issues through community engagement initiatives, including organized thematic events in Portugal, Spain, and Italy, which contributed to promoting sustainable practices and demonstrating the deployed technologies.

MAELSTROM

Project outputs

MAELSTROM has achieved numerous significant results, including mapping areas heavily impacted by marine litter (ML), developing new hydrodynamic models, and creating innovative sustainable technologies to collect, remove, sort, and transform ML from coastal and estuarine ecosystems into new products that contribute to the circular economy. Two key technologies were implemented for marine litter removal: a Bubble Barrier in Vila do Conde, Portugal, and a Robotic Seabed Cleaning Platform (RSPC) in Venice, Italy. These initiatives involved local stakeholder engagement, co-design, and multidisciplinary research. The project has facilitated extensive outreach, communication, and network building with a diverse, globally spread audience, resulting in over 40 deliverables and reports. Project outputs also include one Working Group on Marine Litter Management (WG-MLM), ten theses and dissertations, two scientific articles in peer-reviewed journals, five conference proceedings, one interactive forum, two booklets, two policy briefs, four technology workshops, seven thematic webinars, five international side events, twelve newsletters, five interviews on television, the organization of sixteen MAELSTROM events, and fifteen clean-up initiatives, in addition to more than forty-five talks.

MAELSTROM Media Kit

The MAELSTROM media kit includes downloadable logos in various formats, banners tailored for social media, presentation templates, and thematic newsletters (MAELDROPS). It aims to enrich stakeholders with information and reflections to raise awareness about marine pollution while highlighting MAELSTROM's mission. The media kit also links to a YouTube Channel, focusing on addressing marine pollution through innovative solutions. Content includes insights into new technologies, pilot project progress, and community engagement initiatives.

- Media Kit
- Youtube Channel
- Maeldrops

Creation and Operationalization of a thematic Working Group on Marine Litter and Plastic Strategy

In this document, focus is placed on the in-person and digital events, workshops, and webinars organised or involving the MAELSTROM project which were designed to elicit expert opinions and feedback pertinent to the Marine Litter science and policy landscape. These strategic networking and engagement activities served as a means to build the repository of information including EU-funded projects, individual experts, and key stakeholders, which was used to establish a Working Group on Marine Litter Management (WG-MLM).

- Download PDF

MAELSTROM

8 Regulatory Changes that can Make Marine Litter Removal and Reintroduction in the Economy Viable at a Large Scale

This Policy Brief derives from the joint work of two main EU H2020 – funded projects under the pilot action for the removal of marine plastics and litter, namely MAELSTROM and INNOPLASTIC. The team's experience in projects, aimed at tackling marine litter, supporting a circular economy and producing renewable energy, has provided some valuable insights for policy and decision-makers.

Police brief

Ecosystem state and ML pollution assessment in the two demo sites (Lagoon of Venice and the Porto region)

The purpose of this report is to provide a first survey of the ecological status of the selected demo sites (Venice Lagoon, Venice, Italy; Ave River Estuary, Vila do Conde, Portugal) before the implementation of the marine removal technologies. For the two demo sites, the report describes the methodologies for the mapping of marine litter and microplastics and the procedures for the evaluation of the state of the biological communities.

Download PDF

Preliminary report on the Cable robot autonomous control using Machine learning for litter identification

Report on the RSCP based on cable robotics, and its shared autonomy control system utilising smart cameras, integrated sensors, teleoperation features, and underwater imagery. This system was trialled and tested successfully in the Venice lagoon coastal area, Italy and has proven effective at identifying, collecting, and removing large “difficult-to-remove” items from the seabed including tyres, ropes, chains, ghost fishing gear and other large items of waste. Also included is a link to the launch event video of Bubble Barrier Vila do Conde.

Launch Event of Bubble Barrier Video

Deliverable

Conference Papper

MARELITT Baltic

Reducing the impact of marine litter in the form of Derelict Fishing Gear (DFG) on the Baltic Sea environment

MARELITT Baltic

Duration: 2016 – 2019

Funding programme: Interreg IV

Coordinator: Municipality of Simrishamn, Sweden

Visit website

Summary
The focus of MARELITT Baltic project was to reduce the impact of marine litter in the form of derelict fishing gear (cleaning, prevention and recycling) in the Baltic Sea by developing cost-efficient, safe and environmentally friendly DFG cleaning methods identified through demonstration actions for sampled targets (soft seabed/wrecks/rocky bottoms) including an environmental impact assessment analysis for sensitive areas.

MARELITT
Baltic

Project outputs

The project developed a handbook on DFG retrieval methodologies, presented a map with the overview obtained of the host areas in the Baltic Sea and published a code of conduct for the fishing industry to increase responsible fishery. The project also provided an overview about harbour reception facilities for old fishing gear and DFG looking for an improvement of reception facilities in harbours including environmentally sound waste management for DFG. Along with all this, a recommendation paper on national and EU level was also published with compiled recommendations for regulation on prevention.

MARELITT Baltic developed a sustainable strategy for national authorities around the Baltic Sea to manage DFG, which is marine litter with extensive hazardous effects on the marine ecosystem.

MARELITT Baltic is the first transnational initiative in the Baltic Sea region bringing together local and national government agencies, the fishing industry, environmental NGOs, the diving community, and scientific institutions to develop a step-by-step roadmap on how to tackle derelict fishing gear. These recommendations are presented in the Baltic Sea Blueprint methodology, which offers practical guidelines on mapping, retrieving, recycling, and preventing abandoned fishing gear. This methodology is currently being implemented in Sweden by Marint Centrum.

Baltic Sea Blueprint

The Baltic Sea Blueprint is a comprehensive handbook covering four pillars of action to reduce derelict fishing gear in the Baltic Sea. These four pillars are: mapping, retrieval, recycling, and prevention. The handbook is an action plan with recommendations, best practices and lessons learned for policy makers, namely, national authorities. Their feedback was included in the drafting of the document. The handbook also helps those developing projects for cleaning operations, fishing organisations, fishery management authorities, fishery control authorities, and NGOs. The Baltic Sea Blueprint was created in such a way that, within one hour, the reader should be aware of the most important issues and solutions for derelict fishing gear.

In the ongoing project "Knowledge Transfer of the Marelitt Blueprint Methodology to Achieve Cost-Effective and Sustainable Retrieval Efforts" Marint Centrum has worked on the national implementation in Sweden of the Marelitt Blueprint method. The goal of the project has been to achieve sustainable and cost-effective retrieval efforts. In the project's results (still in process), Marint Centrum presents several identified shortcomings in the process of locating and retrieving lost fishing gear as well as proposed solutions and improvements for future efforts related to lost fishing gear.

Marint Centrum also emphasizes that the work of locating and collecting lost fishing gear must continue in parallel with preventive efforts and underscores the need for a comprehensive, collaborative, and systematic approach between responsible authorities to ensure that future efforts are both sustainable and cost-effective.

Even though the Marelitt Blueprint method is built on knowledge and experiences merely coming from the Southern Baltic Sea, it may be used as a methodological concept in different aquatic environments for development of DFG mitigation policies. Both dimensions of the problem, gear loss itself and its environmental impacts are explained using numbers of various factors such as geographic location, seabed morphology, topography, water depth, water currents, fishing pattern, fishing intensity and involved fishing gears. By understanding separately, the role of these underlying factors on the problem, the Blueprint can be adapted to a wide range of different cases including other seas with different combinations of the underlying factors.

Access PDF

Mo.Ri.net

Monitoring, census, removal and recycling of ghost nets: fishermen as key players in the safeguard of the sea

Duration: 2021 – 2023

Funding programme: EAMP 2014/2020 – 1.40 A

Coordinator: Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)

Visit website

Summary
The Mo.Ri.net project aims to give a concrete contribution to addressing the problem of marine litter, which causes direct and severe environmental impacts on marine species, habitats and ecosystems. The main objective is to restore compromised marine habitats through concrete actions of litter removal (plastics, ghost nets, lost or abandoned fishing gear), both actively involving fishermen and by raising awareness on this issue through specific activities. The project was carried out in Sardinia (Italy), inside and outside the marine protected areas of Asinara Island and Capo Carbonara.

Mo.Ri.net

Project outputs

In a first phase of the project, surveys were conducted to characterise the biodiversity of the study areas and the presence of litter items, and to evaluate the toxicological effects related to floating litter and ingested litter by collecting fishing species and marine mammal biopsies. In the second phase, geolocated marine litter and lost fishing gear were removed with the involvement of fishermen and SCUBA divers, contributing to the conservation of marine habitats in two pilot areas. In the final phase, the collected polyethylene waste, if deemed suitable, was sent to the recycling and valorisation process. An operational guide was also developed on how to store the litter collected from fishing boats and how to deliver it to equipped areas. Besides, several awareness and dissemination activities were realised.

Healthy assemblages of *Isidella elongata* unintentionally protected from trawling offshore of Asinara Island (northwestern Sardinia, NW Mediterranean Sea)

This paper provides an overview of the monitoring activities that are carried out to detect marine litter in deep water and to assess its impact on benthic organisms. The paper reports the litter characterisation in terms of occurrence, typologies, density and impact on benthic species, in one of the pilot areas of the project, assessed through the use of multibeam echosounder and remotely operated vehicle (ROV) technologies.

Download PDF

“This boat takes care of the sea” sticker

“This boat takes care of the sea" it is the sentence reported on large stickers (30x30cm), that ISPRA has been giving to all fishing boats for fishermen's cooperation in fishing for litter and marine litter recovery projects. In addition to the delivery of the sticker to be affixed on the fishing vessel, this recognition also envisages the inclusion of the name of the fishing vessel and its captain on ISPRA website. Although it is not a certified quality mark, this sticker represents tangible recognition, even at the dockside, of the fishermen's commitment to protect and preserve the marine environment.

Access website

DocuFilm

The documentary is intended for a wide audience: it describes the project activities, with reference to the extensive damage caused by the presence of litter in the marine environment, the mitigation measures taken, and the results achieved. The aim of the documentary is to motivate action by making fishermen feel part of something beautiful and useful, giving their profession social prestige.

“Hunt for ghosts nets”

Mo.Ri.net

Comics

The comic "Twenty thousand nets under the sea" addresses the issue of marine litter, focusing attention on the impact that litter has on marine organisms and ecosystems, and illustrating some positive actions achieved thanks to the collaboration between multiple subjects, in particular researchers and fishermen, aimed at mitigating the problem. It also contains some 3D illustrations to attract youngsters and make them feel like diving at the bottom of the sea.

Twenty Thousand Nets Under The Sea

NETTAG

NetTag - Preventing marine litter from fisheries

Duration: 2019 – 2021

Funding programme: European Maritime and Fisheries Fund (EMFF)

Coordinator: CIIMAR – Interdisciplinar de Investigação Marinha e Ambiental

Visit website

Summary
The NetTag project aims to reduce and prevent marine litter derived from fisheries by working directly with fishermen through an integrative preventive approach: i) reducing lost gear by using new technologies (acoustic system), which will help fishermen to localize and recover their lost gears; and ii) promoting better practices on-board regarding management of fishing waste, through awareness actions organized by fishermen associations for fishermen. The project is based on synergistic activities between fishers and scientists to pilot innovative solutions to tackle the urgent need of reduction and prevention of marine litter.

NETTAG

Project outputs

NetTag activities began with participatory workshops to identify the most commonly lost fishing gears and the environmental impacts caused by marine litter – in particular by Abandoned, Lost and Discarded Fishing Gear (ALDFG). This information was used to develop new technologies to track and reduce lost fishing gears. The technology includes low-cost, miniature and environmental-friendly acoustic tags and acoustic transceivers for uniquely localisation of lost gear and an automated-short-range robotic recovery system. NetTag also produced a collaborative on-board best practices handbook, and released a cost-efficiency evaluation of the proposed solutions to reduce and prevent marine litter, which will help to measure the efficacy of the new technology to recover lost gears.

How to manage onboard marine litter. Best practice guide.

A booklet co-produced with fishers from partner fishing associations in the NetTag project, providing essential guidelines for managing litter produced on board and debris collected by fishing nets. Specially designed for daily use, the booklet is intended to be kept on board, offering practical, easy-to-follow instructions to support responsible waste management practices during regular fishing operations.

Guide

NETTAG+

Preventing, avoiding and mitigating environmental impacts of fishing gear and associated marine litter

Duration: 2023 – 2026

Funding programme: Horizon Europe

Coordinator: CIIMAR

Visit website

Summary
NETTAG+ aims to develop three innovative and sustainable solutions to reduce the negative environmental impacts of fishing gear. Through collaboration with the fisheries industry, scientists, and NGOs, NETTAG+ will prevent marine litter derived from fisheries activities, avoid loss of fishing gear, and mitigate harmful impacts by removing existing abandoned, lost, or discarded fishing gear (ALDFG). These solutions aim to reduce hazardous chemicals, microplastics, ghost fishing, and bycatch while improving gear tracking and recovery technologies. NETTAG+ solutions will be tested, validated and demonstrated in the Atlantic and Mediterranean countries, namely Portugal, United Kingdom, Spain, Italy, Croatia and Malta. NETTAG+ seeks to shift the fisheries industry toward sustainable practices, empowering fishers as key actors in tackling marine pollution.

NETTAG+

Project outputs

NETTAG+ will deliver a portfolio of three solutions to prevent, avoid and mitigate the environmental impacts of fishing gear and associated litter, which includes: (1) awareness actions, participatory workshops and demonstration events with fishers on marine litter prevention and retrieval; (2) an acoustic tagging system to avoid fishing gear loss; and (3) a robotic system to detect, map, track and recover ALDFG.

MyGearTag

The system consists of one or more miniature, low cost/power acoustic tags (transponders), attached to a fishing gear, and a Surface Locator Unit (SLU) which is deployed and operated from any available vessel. It tracks and locates lost fishing gear with high precision, preventing the loss of fishing gear.
(ongoing)

Resources

IRIS Autonomous Underwater Vehicle / Remotely Operated Vehicle

IRIS is a small-size fully actuated Autonomous Underwater Vehicle (AUV). IRIS can operate in AUV or ROV modes, the latter operating with an optical fibre umbilical cable. It has several acoustic systems such as a scanning sonar, a multibeam sonar, two full HD cameras and illumination (front and back). IRIS also has the MyGearTag acoustic tracker to detect lost fishing gear.
(ongoing)

Resources

Handbook on good practices for waste management

The Handbook specifically designed for professional fishers, focuses on raising awareness about marine litter, including ALDFG, and provides practical guidance for waste management, both on-board and at fishing ports, with best practices for handling litter produced during fishing operations and marine debris passively collected in fishing nets.
(ongoing)

Resources

NETTAG+

Video Game and Virtual Reality Scenarios

Virtual reality resources will provide immersive experiences, designed to communicate, address, and raise awareness about marine litter and ALDFG in the oceans. The virtual reality immersion includes a video game targeting young people to increase ocean literacy and encourage conservation-attitudes towards ocean protection; and three virtual reality scenarios targeting local, national and EU/Mediterranean authorities and policy-makers, that depict (i) the current reality of the litter trapped in fishing gear; (ii) a future scenario of the litter problematic based on a 'business as usual approach'; and (iii) a future scenario of the litter problematic based on solutions provided by the NETTAG+ project. (ongoing)

Resources

Fishers' Reward Program

NETTAG+ will co-produce, in conjunction with key representatives from fishing communities in Croatia, Italy, Malta, Portugal and Spain, culturally relevant sets of proposed fishers' reward programs to incentivize collection and management of marine litter passively collected by fishing gear. (ongoing)

Resources

OceanWise

Wise reduction of EPS marine litter in the North-East Atlantic Ocean

Duration: 2018 – 2023

Funding programme: Interreg Atlantic Area

Coordinator: Direção-Geral dos Recursos Naturais, Segurança e Serviços Marítimos (DGRM)

Visit website

Summary
OceanWise aimed at jointly developing a set of long-term measures to reduce the impact of Expanded Polystyrene (EPS) products in the North-East Atlantic Ocean. 13 partners including national governmental agencies responsible for marine environment, waste management and recycling took up this challenge within circular economy principles. Tangible solutions were set by addressing the entire life-cycle of EPS products to achieve transnational sound management of EPS marine litter in the Atlantic.

OceanWise

Project outputs

Based on resource-efficiency participatory methods and circular economy principles, OceanWise has collected and disseminated best practices within sectors considering the use, manufacturing, recycling and uptake of foamed polystyrene, working together with people who produce and/or design products with these materials or manage foamed polystyrene waste. OceanWise has also created a catalogue of priority EPS and Extruded Polystyrene (XPS) products and applications with guidelines for producers and designers, as well as public authorities, identifying which EPS products are more likely to reach the marine environment and impact on its ecosystems and what are the main barriers, the policy options and the opportunities. All the collected information is accessible at the project Knowledge Hub, where project reports have also been uploaded.

OSPAR Recommendation 2024/04 on the management of expanded polystyrene (EPS) and extruded polystyrene (XPS) fish boxes in ports, to prevent release of EPS/XPS into the marine environment

The purpose of this Recommendation is to, in complement to the transposition of the EU Ports Reception Facilities Directive (PRF Directive), encourage all ports that handle EPS/XPS fish boxes to apply measures to guarantee appropriate disposal of EPS/XPS (specifically through the installation of cages (or containers) and if the volume is sufficient, through installation of an EPS / XPS compaction equipment). This Recommendation intends to further involve port authorities and port management entities in the reduction of marine litter, encouraging those authorities and entities to keep their areas clean of marine litter.

Access PDF

OceanWise

OSPAR Agreement 2024-10: Best Practice for the life cycle management of expanded polystyrene (EPS) and extruded polystyrene (XPS), as a means to reduce EPS and XPS becoming marine litter

The aim of this agreement it the development of a detailed best practice guideline for dealing with EPS and XPS, pulling together this wealth of information from the OceanWise project. The best practice guidelines includes best practice such as: limiting the use of EPS for the construction industry places at construction sites near waterways, avoiding the use of EPS/ XPS in single use/low durability products for leisure activities near coasts and rivers, reducing the use of EPS / XPS in packaging and other products and promoting re-suable alternatives, or promoting reusable plastic fish boxes in high density polyethylene, among others.

Access PDF

OSPAR draft Decision on the restriction of use of non-coated EPS and non-coated XPS pontoons and buoys

This document will restrict the use of exposed EPS / XPS in pontoons and buoys, pointing towards alternatives (such as air-filled plastic) or hard coating options that limit loss of EPS / XPS to the marine environment. With a preference for materials with better environmental properties, there are plenty commercial alternatives to EPS material in the market for both floating pontoons and for buoys used in maritime activities. By choosing materials other than foamed plastic, a significant source of marine pollution is avoided.

OSPAR Decision (ongoing, still in the process of final approval in the current OSPAR 2024-2025 cycle).

PlasticPiratesEU

Upscaling the Plastic Pirates citizen science initiative across Europe

Duration: 2022 – 2025

Funding programme: Horizon Europe

Coordinator: Deutsches Zentrum für Luft – und Raumfahrt (DLR)

Visit website

Summary
'Plastic Pirates – Go Europe!' is a citizen science initiative on plastic waste pollution. Using a large-scale citizen science approach in rivers, waterways, and at coastlines, children and young people gather valuable data for European researchers. The main objectives of the initiative are to gain scientific knowledge on the origins and pathways of plastic pollution, raise environmental awareness, proactively engage with different young Europeans and increase scientific literacy of the participants.

The EU-funded PlasticPiratesEU project upscales 'Plastic Pirates – Go Europe!' in countries across Europe while gathers vast amounts of data on plastic pollution in European rivers, oceans, and seas. The project also tests, replicate and refine best practice models to connect citizen engagement with excellent science to help reach the objectives of the Mission Restore our Oceans and Rivers by 2030.

PlasticPiratesEU

Project outputs

The Plastic Pirates - Go Europe! initiative has expanded from 3 to 13 European countries, with additional pilot samplings in Barbados, Chile, and Egypt. Over 16,000 students have sampled 350+ rivers and coastlines. The action booklets and teaching materials have been translated into 14 languages, including Arabic and a network of 26 research institutions has been established across Europe. The network processes the samples, making open-access Plastic Pirates data on plastic pollution available on platforms like Zenodo (forthcoming). The initiative has generated three research publications, with two more underway, and reached millions via EuroNews and other media. It has established links to the European Solidarity Corps and Erasmus+ to foster youth and volunteer engagement. Partnerships with EU projects like EU4Ocean and European Blue Schools further amplify its impact.

Open-access action booklet and teaching material available in 14 languages

The project provides accessible action booklets and teaching guides in 14 languages, enabling seamless participation across diverse linguistic regions. These materials offer clear, step-by-step instructions for students and teachers on conducting standardized plastic sampling along rivers and coastlines. The booklets are designed to empower young participants, providing practical knowledge on environmental science while fostering hands-on learning. Teachers receive additional resources that integrate the sampling activities with broader environmental and scientific literacy lessons. Supporting videos and worksheets help prepare students for field activities, ensuring accurate, reliable data collection across regions.

Materials

PlasticPiratesEU

Multiple scientific publications on citizen science, plastic pollution data and reaching EU policy objectives

Research stemming from the project has advanced knowledge on plastic pollution across Europe's rivers. Studies, such as Uogintė et al. (2024), explored litter sources in Lithuanian rivers, while Kiessling et al. (2019, 2021) identified primary pollutants in German rivers and documented microplastic hotspots. Frameworks for riverbank plastic monitoring (Vriend et al.) and quality measures for citizen science data (Dittmann et al., 2022) enhance data reliability and comparability. Other publications assess policy impacts, like the EU's Single-Use Plastics Directive (Kiessling et al., 2023) and share best practices in youth engagement and communication (Dittmann et al., 2023).

Resources for researches

Open-access data-set on plastic pollution in European rivers, waterways and coastlines

The Plastic-Pirates data-set compiles detailed information from all litter samplings across European rivers and coastlines from September 2022 to July 2024. It includes data on participant groups, sampling location (GPS coordinates), waste types (e.g., plastics, glass, metal), specific items (like single-use plastics), floating waste, and environmental conditions (e.g., river flow, microplastics). Photos and metadata enhance data quality.
(expected Dec 2024)

Access website

Lessons-learned from upscaling a citizen science initiative across Europe

The document serves as a guide for organizations interested in scaling citizen science projects across Europe. It shares insights from the successful expansion of the Plastic Pirates initiative, which engages young citizens in monitoring plastic pollution in rivers. Key lessons highlight the importance of combining scientific rigor with accessible methods, leveraging political support, fostering a transnational spirit, and securing sustained funding. It also discusses challenges in ensuring data reliability and continuous national funding, underscoring the need for early, structured commitments. The document ultimately illustrates how citizen science can drive environmental awareness, produce valuable data, and align with EU environmental objectives.

Access website

REMEDIES

Co-creating strong uptake of REMEDIES for the future of our oceans through deploying plastic litter valorisation and prevention pathways

Duration: 2022 – 2026

Funding programme: Horizon Europe

Coordinator: National Institute of Chemistry, Slovenia

Visit website

Summary

The EU-funded REMEDIES project aims to restore our seas and rivers through deploying (micro)plastic litter valorisation and prevention pathways.

Project activities will revolve around monitoring and detection, collection and valorisation, and prevention and reuse of plastic waste.

The REMEDIES movement is striving to co-create a plastic-conscious society by applying cutting-edge technology and circularity approaches, underpinned by a holistic citizen engagement framework.

After validating the technologies in eight demonstration sites, they will be scaled up in 33 more locations across the Mediterranean, while 400 tonnes of plastic litter will be collected in the marine and riverine environment. Moreover, during this EU mission, EUR 500,000 of cascade funding will be granted to foster real zero-waste solutions with two open calls targeting five associated regions.

REMEDIES

Project outputs

REMEDIES is developing 12 innovations at 8 Mediterranean sites under 3 pillars: monitoring plastic litter, collection & valorisation, prevention & zero waste. By 2024 2 Open Calls with up to 100k€ support for public institutions and a Hackathon with 200+ participants were launched. By 2027, 170 km² will be mapped, 3,700t will be prevented and 400t will be collected, and 115 clean-ups (#20tonneschallenge) will be co-organized. Over 1 million people have already been reached, inspiring a movement for a healthy Ocean and Waters.

REMEDIES monitoring App

The REMEDIES Shoreline ML platform and app serve as a comprehensive marine litter survey tool and data repository. The app enables users to monitor and log beach, seafloor, and riverine litter using devices such as air and underwater drones. The platform consolidates and organizes extensive data gathered from marine litter monitoring missions across multiple demo sites, including data from clean-up activities and GPS-equipped unmanned devices. The platform can also import and integrate external datasets from EMODnet related to beach litter monitoring. With dedicated tools, data collected can be seamlessly exported and uploaded to EMODnet.

Download App - Play Store

Download App - App Store

River Cleaning Barries

Plastic litter collection in rivers will be carried out using barrier systems. The barriers will prevent 85-90% of riverine litter from reaching the Adriatic Sea, allowing for the collection of plastic material that can be recycled. The expected output includes collecting over 100 tonnes of floating plastic through river cleaning. Collected riverine litter in good condition will be stocked to be recycled. Local partners will manage waste collection in collaboration with other project tasks. The trapped plastics will be monitored in coordination with other project components. (ongoing, expected, 2025)

Access REMEDIES Demo Sites

Access River Cleaning website

AI model for marine plastic recognition from aerial drone videos

This study focuses on optimizing the utilisation of drones and object detection algorithms through deep learning for effective detection and supervision of plastic litter. The performance of two major families of object detection models, namely single-pass and double-pass, using drone images captured at varying heights will be explored. The overarching objective is to identify the optimal performance-to-resource conditions, maximizing efficiency in the detection and supervision endeavours.

Access PDF

REMEDIES

REMEDIES Anti-litter campaigns

The Anti-litter Campaign focuses on increasing environmental awareness and promoting sustainable practices to protect the coastlines and oceans. The primary goal is to realise 8 anti-litter campaigns to showcase the technologies and the innovations of the demo sites, promote sustainable behaviour change through the organisation of beach clean-ups, and educate volunteers and active citizens about sustainable practices and beach preservation.

2nd REMEDIES Anti-Litter Campaign Results

Uniting for Cleaner Coasts

Plastic Valorisation Education Lab

A Plastic Valorisation Education Lab will be established and prototyped by Impact Hub Athens in Santorini Island at the Cyclades Demo-Site. Small-scale plastic transformation machines will be used for community workshops aimed for the general public or directed to specific audiences including schools. With the scientific and technical guidance of AIITIP, Impact Hub Athens, will co-develop specific guidelines for using the machines and analyse ways to valorise plastic and create awareness through community acts and small-scale production.
(expected 2024, 2025)

SeaClear

SEarch, identificAtion and Collection of marine Litter with Autonomous Robots

Duration: 2022 – 2023

Funding programme: Horizon 2020

Coordinator: Technische Universiteit Delft

Visit website

Summary
The mission of the EU-funded SeaClear project was to tackle the problem of underwater litter using innovative autonomous robotic technology, with the goal of cleaning the oceans and protecting their biodiversity. The system developed in the project consists of several interconnected components. The “mothership” SeaCAT launches and manages two remotely operated underwater vehicles (ROVs): the MiniTortuga for litter search and identification using AI-based algorithms, and the larger Tortuga equipped with a gripper for litter collection. The litter is stored in a specially designed basket. Additionally, an aerial drone monitors the system and maps litter at the sea surface, helping to identify areas with high litter density. All these elements work together to create a map of the seabed, detect the litter, and then collect and remove it.

SeaClear

Project outputs

The SeaClear system has been successfully demonstrated in October 2023 near Dubrovnik, Croatia: the project first demonstrated the capabilities of the SeaClear system in Bistrina bay, while the second demonstration took place on the shores of Lokrum island. First the SeaCAT performed a bathymetry scan, which revealed the initial positions of the litter. Next, the observation ROV (MiniTortuga) did an automated, detailed scan of the hotspot area to further detect smaller litter. Finally, the collection ROV (Tortuga) picked up the litter items and deposited them in the litter basket. In this way the full pipeline of the SeaClear system has been demonstrated successfully site, which is a huge step towards cleaning up the sea floor!

Use-case definition document

The main objective of the SeaClear project is to develop an autonomous robotic platform for underwater garbage collection. To this end, this report provides a description of the chosen pilot locations, as well as a comprehensive analysis of their characteristics and presents a comparison of the different test areas. Finally, it documents a general context of different robotic-assisted services use cases that can be developed to demonstrate the functionalities of the SeaClear infrastructure.

Access PDF

Specification and design document

This work analyses the impact of chosen test sites' environmental preconditions, litter occurrence and available infrastructure on the envisioned robotic solution. The set of requirements resulting from this analysis and from the end-user expectations form the basis of the SeaClear system's design objectives. The challenges for deploying the SeaClear system in the proposed test areas differ from one another and the solutions for overcoming them are presented through individual analysis.

Access PDF

Concept cost-effectiveness report

This deliverable describes the full integration of all individual development entities - (robotics) hardware, (robotics) software and overall system software architecture and overall communication scheme - and justifies their complexity and costs in terms of effectiveness and impact. This deliverable also evaluates the technical layout of the overall SeaClear concept.

Access PDF

SeaClear

Sensors/platforms hardware integration technical guide

This report details the hardware (mechanical and electrical) installation of the sensors, ROV and UAV cameras, imaging and bathymetry sonars. Then the physical interfaces between the four components (two ROV, the UAV and the basket) and the USV serving as their deployment base is detailed.

Access PDF

Technical end User Guide

The main objective of this document is to give a general overview on the SeaClear system by introducing the components, interfaces, and overall functionality. It identifies the appropriate settings to mount or dispatch the SeaClear system including on site requirements and limits and a Technical end User Guide-regarding operation. Trouble shooting, risk assessment and mitigations strategies are outlined.

Access PDF

SeaClear2.0

Scalable full-cycle marine litter remediation in the Mediterranean: Robotic and Participatory solutions

Duration: 2023 – 2026

Funding programme: Horizon Europe

Coordinator: Technische Universiteit Delft

Visit website

Summary
The EU-funded SeaClear2.0 project is a lighthouse project for the Mediterranean under the Mission Ocean and Waters. It will develop an integrated approach to address the entire cycle of marine litter. The project will focus on reducing marine litter pollution, specifically from plastics. This will be achieved by using teams of autonomous, intelligent robots to monitor and collect marine seafloor and surface litter up to 250 kg, and through horizontal and participatory practices to identify site-specific measures for marine litter prevention and reduction.

SeaClear2.0

Project outputs

By the date of the publication of this Toolkit, the project completed the design and full specification of various components of the integrated SeaClear2.0 system, including the “mother ship” SeaCat2, the smart grapple to lift large pieces of litter from the seabed, the surface litter collection robots, and the SeaDragon shuttle tender for transportation of collected litter to the shore. Production of these systems will be completed by the end of 2024, after which the first trials will take place. Moreover, the project has also further developed and improved the algorithms for navigation and planning, and for mapping, detecting and classification of marine litter using both camera and sonar data.

A BlueROV2-based platform for underwater mapping experiments

A low-cost laboratory platform for development and validation of underwater mapping techniques is proposed, using the BlueROV2 Remotely Operated Vehicle (ROV). Both the ROV and the objects to be mapped are placed in a pool that is imaged via an overhead camera. In the prototype mapping application, the ROV's pose is found using extended Kalman filtering on measurements from the overhead camera, inertial, and pressure sensors, while objects are detected with a deep neural network in the ROV camera stream. Validation experiments are performed for pose estimation, detection, and mapping. The litter detection dataset and code are made publicly available.

Access PDF

Marine litter occurrence domains report

This report defines the problem that the SeaClear2.0 system tackles. A marine litter occurrence analysis is conducted for each demonstration or pilot site within the project and marine litter hotspots and typology at each site are discussed.

Access PDF

SeaClear2.0

Public Demonstrations, Pilot Sites and Showcases Plan

This report describes the specific areas of use of the SeaClear2.0 system and defines the technical, environmental and infrastructural preconditions to deploy the system, and proves its functionality and efficiency.

Access PDF

Product and Service Data Sheet

This document presents the Product and Service data sheet which describes the SeaClear2.0 system preliminary specifications on which the system has been designed, and its expected operational performances.

Access PDF

SEARCULAR

Circular solutions for fishing gears

SEARCULAR
Circular Solutions for Fishing Gears

Duration: 2023 – 2026

Funding programme: European Union under the EU Mission 'Restore our Ocean and Waters'

Coordinator: AZTI

Visit website

Summary
SEARCULAR's core objective is the reduction of marine litter and microplastic generated by European fisheries (demersal trawlers, demersal seiners, tropical tuna purse seiners) at source and, in support of this, the introduction of circular economy practices within the fishing sector value chain, including at ports. It seeks to do this by building acceptance of the tried and tested solutions offered by the project, and fostering behavioural change. Coordinated by AZTI, SEARCULAR brings together 13 organisations from across 6 countries, each working in close collaboration with the fishing industry to implement circular solutions for fishing gear.

SEACLEAR

Project outputs

SEARCULAR will develop / test / validate 4 close-to-market sustainable and circular solutions. Three of the solutions are related to the use of more sustainable materials as alternatives to the traditional non-circular plastic used in fishing gears: (1) a dolly rope made of recycled polyamide from discarded fishing nets (thus it is focused on circularity and more durable materials); (2) a certified marine-biodegradable materials for demersal seine ropes (the focus is on less impact gears); (3) an eco-designed biodegradable drifting Fish Aggregating Devices (dFADs) used by tropical tuna purse seine fishery. The forth is an End-of-Life (EOL) fishing gears solution for ports by promoting a replicable management system that enables the pyrolysis of EOL fishing gears for a plastic2plastic application. SEARCULAR will, therefore, provide solutions to help the fishing industry and their value chain to reduce their contribution to marine litter and microplastics by fostering the implementation of circular approach in fishing gear making and providing replicable EOL management practices. SEARCULAR will also help the fishing industry to have valid alternatives and conscious professionals to act by choosing technologies and practices that protect our seas and oceans; and informing policy-makers of the difficulties and good practices to consider for future and wider implementation across Europe.

Circular dolly rope design

A circular dolly rope based on recycled polyamide from end-of-life purse seine nets will be designed and further tested and validated by commercial trawlers.
(ongoing)

Access website

Marine-biodegradable demersal seine ropes

A marine-biodegradable demersal seine rope that generate less microplastic due to abrasion and use biodegradable materials will be developed. It will be validated by 2 fishing vessels that operate in the North Sea and Barents Sea.
(ongoing)

Access website

Eco-designed biodegradable Fish Aggregating Device (FAD)

An eco-designed biodegradable Fish Aggregating Device (FAD) will be developed, and further tested and validated by key stakeholders (most representative fishing associations in the world).
(ongoing)

Access website

SEACLEAR

Port-based solution to facilitate the recycling of EOL fishing gears

A port-based solution to facilitate the recycling of EOL fishing gears will be delivered. It will be based on a Blue Point site, reverse logistics and pyrolysis procedure.
(ongoing)

Access website

TREASURE

Targeting the REduction of plAStic oUtflow into the noRth sEa

Duration: 2023 – 2026

Funding programme: 2021 – 2027
Interreg VI-B North Sea

Coordinator: Carl von Ossietzky
University of Oldenburg

Visit website

Summary
The TREASURE project aims to reduce marine pollution by preventing plastic waste from inland waters flowing into the North Sea through improved governance, data collection, prevention, and removal methods. It adopts an integrated, cross-sectoral approach, addressing governance to enhance cooperation and policy, data collection using citizen science and drone technology, behaviour change through education, and plastic waste removal using various techniques. The project operates through Living Labs in regions like the Frisian Peninsula and Dutch deltas, implementing and testing solutions that can be applied across the North Sea region to reduce riverine waste.

TREASURE

Project outputs

Through the project's developed resources, such as the TREASURE Box and the Living Lab blueprint, the expected results of TREASURE include enhanced capacities of local stakeholders - such as port authorities, water managers, and relevant local or regional authorities - to implement effective and feasible solutions for plastic litter prevention and reduction within the North Sea region.

TREASURE Box

Guidebook for the developed joint methodology to set up living labs for plastic-free waters, comprised of four main pillars: governance & policy, data collection & analysis, prevention & behaviour change, and waste removal techniques. This blueprint will then be transferable to other estuaries and waterways. (expected 2024)

Media and Publications

TREASURE Living Lab Blueprint

The TREASURE Box is based on the Living Labs results and acts as a governance support platform, which includes a multi-criteria decision-support tool and open data knowledge platform that provides practical information on the most suitable data collection, removal tools, and prevention measures, in order to assist practitioners, such as water managers, decision makers, and other stakeholders, based on practice-based insights from the TREASURE living labs.
(expected 2025)

Media and Publications

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