

The ENHANCE One Health Framework

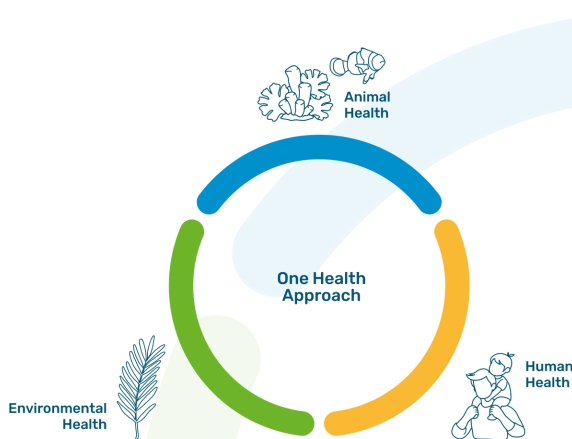
*A Holistic Approach to
Coastal Management*





What is One Health and Why It Matters for Coastal Areas?

The **One Health approach** recognises that **human**, **animal**, and **environmental** health are deeply **interconnected**. When coastal waters are polluted or ecosystems are damaged, it is not only marine life that suffers—**local communities**, their **economies**, and **public health** are also affected.



Traditionally, One Health focused mainly on **zoonotic diseases** (those transmitted between animals and humans). ENHANCE broadens this lens to include **marine and coastal environments**, showing how pollution, biodiversity loss, climate change, and emerging contaminants can impact **human well-being**, seafood safety, and animal health.

Coastal zones host some of the planet's **most valuable and fragile ecosystems**, but they face growing pressures from **human activity** and **climate change**. They are home to:



Densely populated cities and key economic activities (tourism, aquaculture, shipping)



Biodiverse marine ecosystems that provide **food, coastal protection, jobs, and recreation**



Increasing stresses from **nutrient run-off**, untreated wastewater, chemicals, plastics, habitat loss, sea-level rise, and **extreme events**.

These pressures are **cumulative** and **interacting**, not isolated. They can trigger **algal blooms**, degrade bathing waters, damage habitats, and increase flood risk. Managing them effectively requires a **cross-sectoral strategy** that connects environment, health, and socio-economic conditions. This is what the ENHANCE One Health Framework is designed to support.





The ENHANCE One Health Approach

The framework builds on the **DPSIR model** (Drivers, Pressures, State, Impact, Response), which structures how human activities affect coastal systems and guides responses. ENHANCE embeds One Health principles into this logic and introduces three composite indicators tailored to coastal areas:

- **Human Health Outcome Index (HHOI)**
- **Aquatic Animal Health Risk Index (AAHRI)**
- **Environmental Ecosystem Quality Index (EEQI)**

These indicators combine environmental, health and socio-economic data to provide a clear picture of risks and resilience in coastal zones.



Three Core Pillars of the ENHANCE One Health Framework



Human and Socio-Economic Well-Being (HHOI)

This pillar strengthens **public health**, safety, and **community resilience** in coastal areas by tracking environmental risks and assessing how changing conditions affect **tourism**, fisheries, and local livelihoods. All these aspects feed into the **Human Health Outcome Index (HHOI)**, which connects health outcomes with environmental and **socio-economic factors**.



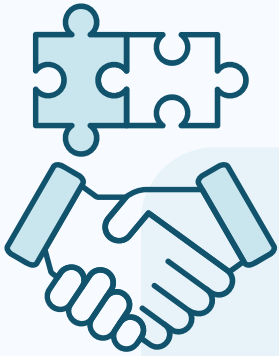
Aquatic Animal Health (AAHRI)

Aquatic animals are key to **food security**, local economies, and **ecosystem balance**. This pillar monitors the health of farmed and wild species, promotes **sustainable aquaculture** and biosecurity, and uses animals as sentinels of environmental risks. The **Aquatic Animal Health Risk Index (AAHRI)** identifies vulnerabilities in aquaculture and coastal ecosystems to support safer, risk-based management.



Environmental and Ecosystem Quality (EEQI)

This pillar monitors pollution, biodiversity loss, and climate pressures—including **eutrophication**, habitat degradation, invasive species, microplastics, and **marine heatwaves**—using citizen science, satellite data, monitoring programmes, and IoT sensors. The **Environmental Ecosystem Quality Index (EEQI)** integrates key indicators to assess coastal resilience and environmental performance.



How the One Health Framework was built?

The **ENHANCE One Health Framework** was co-created to reflect real needs in coastal areas through **stakeholder mapping** and **engagement** in two pilot regions—Barcelona & the Ebro Delta (Spain) and the Pagositikos Gulf (Greece). **Workshops** and **interviews** with scientists, local authorities, aquaculture producers, **health professionals**, NGOs, and educators helped identify key local challenges. This **participatory process** directly shaped the selection of indicators and the design of the digital tools that will form the ENHANCE platform, ensuring the framework is both scientifically robust and practical for day-to-day coastal management.

One Health In Practice

By applying **One Health principles**, the Framework:

- **Links environmental changes** (e.g., algal blooms or microplastic pollution) **to public health risks**.
- **Supports sustainable aquaculture** and food systems.
- **Encourages citizen science** in tracking biodiversity.
- **Strengthens preparedness against** emerging marine and **zoonotic diseases**.
- **Enhances cooperation** between local communities and policymakers.

From Knowledge to Action

The ENHANCE One Health Framework helps turn **information into action** by supporting:

- **Near real-time environmental monitoring**.
- **Early warnings about pollution or disease risks**.
- **Interactive dashboards** to support decision-makers plan and respond.
- **Cross-sector collaboration** among communities, policymakers, and businesses.



The **One Health Framework** supports major EU priorities such as the **European Green Deal**, the **EU Marine Strategy**, and **Zero Pollution** policies, helping Europe advance towards sustainable, resilient coastal areas.



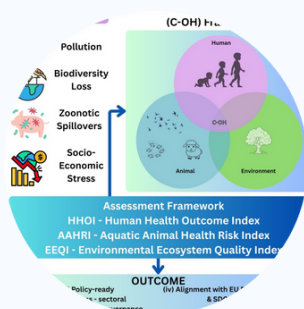
The Road Ahead

The One Health Framework developed under ENHANCE is the **foundation for a new generation of digital decision-support tools** for coastal management.

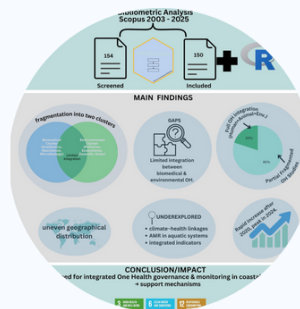
Next steps include:

- Developing and **validating the HHOI, AAHRI and EEQI indicators** in the pilot areas.
- Implementing the **ENHANCE Open Data Exchange platform**.
- Scaling the approach to other European coastal zones.

Read our scientific publications on the One Health Framework



[Coastal and Marine One Health: A Bibliometric Review \(2003–2025\)](#)



[A Holistic One Health Assessment Framework for Coastal Areas](#)

A project coordinated by
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