Leiden University, Faculty of Archaeology

# Preserving Heritage by Establishing a Maritime Archaeological Cultural Centre (MACC). *A Case Study of the Island of Euboea (Evia), Greece.*

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# Preserving Heritage by Establishing a Maritime Archaeological Cultural Centre (MACC).

*A Case Study of the Island of Euboea (Evia), Greece.*

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# Abstract

This research focuses on Establishing a Maritime Archaeological Cultural Centre (MACC) on the Greek island of Euboea (Evia). Greece has an incredible history underwater, but currently, this heritage is almost completely invisible to the general public. This was experienced by myself during archaeological fieldwork in the region. The main question of this thesis is how a center like the MACC can help make this hidden heritage visible to everyone while ensuring that the archaeology is properly protected. The study examines the entire "maritime landscape": the connection between shipwrecks on the seabed and the villages and ports on the land. Three international examples were analyzed to learn what works and what doesn't. In Baia (Italy), scuba-divers help with the research through "citizen science". In Abu Qir (Egypt), the water is often so murky and polluted that it is almost impossible to see anything underwater. In Alonissos (Greece), an underwater museum already exists, but its remote location makes it difficult for many people to visit. The results show that the current policy of leaving everything on the seabed (*in situ* preservation) has a major disadvantage: the history remains invisible and is sometimes slowly detoriated. Specifically around Euboea, strong tidal currents, winds and murky water make it very difficult and dangerous for recreational divers to visit archaeological sites safely. The conclusion is that the MACC should be established as a center on land. By using modern techniques, such as photogrammetry, people can experience the maritime heritage and cultures. This model stimulates the local economy in line with the 'Blue Economy' and the 2030 Sustainable Development Goals (SDGs) by redirecting tourism away from the overcrowded capital toward the underdeveloped region of Central Greece. In doing so, maritime archaeology is transformed into an active partner in societal development.

Αυτή η έρευνα επικεντρώνεται στην ίδρυση ενός Θαλάσσιου Αρχαιολογικού Πολιτιστικού Κέντρου (MACC) στο ελληνικό νησί της Εύβοιας. Η Ελλάδα διαθέτει μια απίστευτη υποθαλάσσια ιστορία, αλλά επί του παρόντος, αυτή η κληρονομιά είναι σχεδόν εντελώς αόρατη στο ευρύ κοινό. Το κύριο ερώτημα αυτής της διατριβής είναι πώς ένα κέντρο όπως το MACC μπορεί να βοηθήσει να γίνει αυτή η κρυμμένη κληρονομιά ορατή σε όλους, διασφαλίζοντας παράλληλα ότι η αρχαιολογία προστατεύεται σωστά. Η μελέτη εξετάζει ολόκληρο το «θαλάσσιο τοπίο»: τη σύνδεση μεταξύ των ναυαγίων στον βυθό και των χωριών και λιμανιών στην ξηρά. Αναλύθηκαν τρία διεθνή παραδείγματα για να δούμε τι λειτουργεί και τι όχι. Στις Μπαίες (Ιταλία), οι δύτες βοηθούν στην έρευνα μέσω της «επιστήμης των πολιτών» (citizen science). Στο Αμπουκίρ (Αίγυπτος), το νερό είναι συχνά τόσο θολό και μολυσμένο που είναι σχεδόν αδύνατο να δει κανείς οτιδήποτε υποβρυχίως. Στην Αλόννησο (Ελλάδα), υπάρχει ήδη ένα υποβρύχιο μουσείο, αλλά η απομακρυσμένη τοποθεσία του καθιστά δύσκολη την επίσκεψη για πολλούς ανθρώπους.
Τα αποτελέσματα δείχνουν ότι η τρέχουσα πολιτική του να αφήνονται τα πάντα στον βυθό (διατήρηση in situ) έχει ένα σημαντικό μειονέκτημα: η ιστορία παραμένει αόρατη και μερικές φορές φθείρεται αργά. Συγκεκριμένα γύρω από την Εύβοια, τα ισχυρά παλιρροιακά ρεύματα, οι άνεμοι και τα θολά νερά καθιστούν πολύ δύσκολη και επικίνδυνη την ασφαλή επίσκεψη ερασιτεχνών δυτών σε αρχαιολογικούς χώρους. Το συμπέρασμα είναι ότι το MACC θα πρέπει να ιδρυθεί ως ένα κέντρο στην ξηρά. Χρησιμοποιώντας σύγχρονες τεχνικές, όπως η φωτογραμμετρία, οι άνθρωποι μπορούν να βιώσουν τη θαλάσσια κληρονομιά και τους πολιτισμούς. Αυτό το μοντέλο τονώνει την τοπική οικονομία σύμφωνα με τη «Γαλάζια Οικονομία» και τους Στόχους Βιώσιμης Ανάπτυξης (SDGs) του 2030, ανακατευθύνοντας τον τουρισμό μακριά από την υπερπλήρη πρωτεύουσα προς την υποανάπτυκτη περιοχή της Στερεάς Ελλάδας. Με αυτόν τον τρόπο, η θαλάσσια αρχαιολογία μετατρέπεται σε ενεργό συνεργάτη στην κοινωνική ανάπτυξη.

# Preface

Born in the Netherlands with Dutch roots on one side and Greek-Pontic roots on the other, I have always had a deep interest in the sea. Both Dutch and Greek histories are largely shaped by overseas stories and domestic water management. At the Faculty of Archaeology, University of Leiden, I was able to develop these interests further through the maritime field schools led by Prof. Martijn Manders and research in Greece under the guidance of Prof. Joanita Vroom. Thanks to their influence, I decided to focus my thesis research on this topic.

The fieldwork conducted on Euboea as part of the HMC (Hinterland of Medieval Chalcis) project enabled me to integrate these maritime interests. Engaging with local communities and professionals enabled me to conduct preliminary research before starting this thesis. Local professionals such as Andrew Blackler, Konstantinos Politis, and Ioannis Zikos generously dedicated time getting to know us foreign students, answering questions, and making us feel welcome. The Greek local community frequently welcomed us with open arms, and as a result, several students, not only during the summer field school, but throughout the entire year, continued to research and organise events to reconnect with this robust, undiscovered and fascinating Island. A conversation with Prof. Koutsouflakis introduced a new perspective to my thesis, to examine the maritime environment of Euboea and the challenges of heritage management in Greece. Finally, my thesis supervisor, Gul Aktürk, has provided guidance, allowing me the space to grow throughout the process and steering me in the right direction.

# Acronyms and abbreviations

**MACC-** Maritime Archaeological Cultural Centre

**MPA** - Marine Protected Area

**UCH** – Underwater Cultural Heritage

**UAP** – Underwater Archaeological Park

**UNESCO** – United Nations Educational, Scientific and Cultural Organisation

**UNCLOS** - United Nations Convention on the Law of the Sea

**UVAAS** - Underwater Visitor-Accessible Archaeological Sites

**EUROSTAT** – European Statistical Office

***In situ*** - Situated in the original place and context

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# Chapter 1 - Introduction

## 1.1. Background and Scope

This thesis focuses on preserving heritage by establishing a Maritime Archaeological Cultural Centre (MACC) in the South Euboean Sea region of Greece. The island of Euboea lies in central Greece and is well known in the maritime history of the Mediterranean. Greece has a coastline of approximately 14,880 kilometres. This extensive coastline is among the longest in the world, resulting from Greece's thousands of islands, with Euboea being the second-largest. Greece is largely surrounded by the sea and heavily dependent on maritime activities, as its major economic hubs are coastal (European Commission, 2014, p. 6). This research analyzes global regulations and comparative international case studies before narrowing its focus to the historical development of the Euboea region. In doing so, this study seeks to reconcile heritage protection with the sustainable use of coastal areas.

One of the primary objectives of this thesis is to assess the region's potential through the lens of maritime heritage. Achieving this requires an archaeological overview of Euboea and its regional units to review the maritime remains. This study will analyse cognitive landscapes, trade networks, and stylistic typologies, such as ceramics and amphorae, identified across several archaeological sites. This analysis encompasses maritime archaeology in its entirety, integrating submerged sites, such as shipwrecks and submerged harbour cities, with their terrestrial counterparts, such as hinterland villages (Westerdahl 2013, p. 4). Furthermore, the research aims to uncover cultural parallels with overseas nations and establish historical connections with neighbouring regions. Such connections often reveal the deep-seated cultural diversity that remains evident in the island's contemporary heritage (Smith et al, 2012, p.7617). Beyond mere physical remains, this diversity reflects the complexity of human society as preserved within the hidden archive of Underwater Cultural Heritage (UCH).

However, accessing these underwater sites is very complicated. Site preservation and analysis are often slowed down by strict legal regulations and some of the most hostile environmental conditions on Earth, including strong currents, poor visibility, and extreme depth. These physical barriers often preclude direct public engagement; consequently, there is a significant lack of public awareness (Manders, 2022, p. 21). While advanced technologies, such as Remotely Operated Vehicles (ROVs) and specialised technical diving, are increasingly required to reach these sites, the environment remains inherently unstable. Biotic processes, including sediment shifting, biological decay, and erosion, continue to pose an immediate threat to the integrity of these submerged archaeological records.

There is often a terrestrial bias, as land-based features such as necropolises and fortifications remain the primary tourist attractions and frequently dominate the landscape. Land-based sites face threats from biotic erosion and from abiotic impacts, including modern construction and agricultural development (Manders, 2022, p. 128). Despite these challenges, terrestrial archaeology benefits from greater

accessibility, leading to more systematic studies, better funding, and more comprehensive heritage policies than its underwater counterpart. When combining both perspectives and considering the marine environment, we arrive at the concept of the "maritime cultural landscape", a term first introduced by Westerdahl in 1992. It not only provides data from several connected sites but also offers an innovative framework for understanding this complex maritime history. This theoretical approach emphasises that maritime sites should not be viewed in isolation but as interconnected parts of a broader network. Ports, shipwrecks, trade routes, and coastal settlements collectively constitute an integrated landscape in which terrestrial and maritime elements are interlinked. This perspective is essential for understanding not only the physical locations but also the historical contexts and functions of these sites. It helps to establish connections between local and regional heritage sites and their broader roles within cultural and economic networks. This framework is particularly relevant to the maritime heritage of Euboea, which is rich in cultural diversity, as evidenced by archaeological remains. Much of this history lies underwater, offering unique and objective insights into the cultures that have inhabited the island. Heritage management is increasingly practised at the local level while also reflecting broader national and global connections. In 2023, construction began on the National Museum of Underwater Antiquities in Piraeus, offering new opportunities to develop a cultural centre dedicated to maritime heritage and archaeology. The museum's mission is described as

*"A fully accessible museum, offering visitors a unique experience akin to diving into the past. Its exhibits will include submerged settlements, shipwrecks, vessel replicas, hulls, and cargo from merchant ships, as well as maps and diagrams, creating an immersive experience that traces the course of history beneath the waves. "*

This initiative in Euboea demonstrates the potential to establish an educational centre grounded in the concept of the effectifness of archaeology. This project aims not only to reduce overcrowding in the city of Athens but also to cultivate broader educational and cultural awareness, thereby valuing regional archaeology and cultural diversity. By looking beyond the simple question of 'why archaeology matters today,' it focuses on a more sustainable future. It utilises archaeological thinking and effectivness to address both historical and contemporary challenges, such as migration, identity, and cultural cohesion (Stahl, 2020, pp. 37-40). This research aligns with the current national agenda and the 2030 Sustainable Development Goals (SDG), positioning archaeology as an active partner in societal development.

## 1.2. Research Problem

Heritage can be understood as an expression of a particular group's or individual's identity, shaping how people position themselves within the social world. Preserving heritage is therefore essential for understanding others, oneself, and how individuals navigate social structures. Identity is not a fixed essence but a dynamic process shaped by history, culture, and representation. Thus, heritage does not simply safeguard an unchanging past; it participates in the continuous positioning of individuals and communities within broader narratives (Hall, 1990, p. 222). Therefore, it is crucial for people to know and experience their heritage. Unfortunately, factors such as coastal erosion, rising sea levels, shifting shorelines, modern development, earthquakes, and restricted physical accessibility mean that large parts of this landscape can no longer be directly experienced. Consequently, the maritime landscape is partly reconstructed cognitively through memory, textual sources, archaeological evidence, and local knowledge rather than direct observation (Hall, 1990, p. 225). For Euboea, this means that many residents know the sea's past primarily through family stories and local knowledge rather than through visible remains. To preserve and share this fragile heritage, establishing an educational centre in the region is a necessary intervention. However, this solution faces a harsh economic reality: the region is underdeveloped by European standards, and the financial investment required is currently beyond local means. This creates a difficult paradox where the region needs to look outward to save what is within. While the primary goal is for the local community to experience and identify with their history, funding this preservation often depends on attracting external tourism. Despite tourism being a major source of national income, both domestic and foreign travellers largely bypass the island of Euboea. In stark contrast, Athens has witnessed an exponential increase in tourism in recent years. To ensure long-term sustainability, the focus must shift from mass tourism in Athens to underrepresented areas like Euboea. Furthermore, it is essential to analyse legislative and policy frameworks at the European, national, and local levels, which frequently conflict. Yet, building a heritage tourism sector is not a simple task; it requires a complex strategy to transform local history into an experience that is both attractive to visitors and financially sustainable (Stoelhorst, 2010).

## 1.3. Research questions

I formulated the following research questions to develop a structured approach for establishing a maritime archaeological cultural centre. These questions guide the research process and ensure a comprehensive analysis of the region's archaeological importance, policy frameworks, and potential for sustainable development, which I still did not fully understand after the research on the Island itself.

Main research question:

- *How can maritime archaeology be used as an educational tool within a maritime archaeological cultural centre, while supporting heritage preservation and sustainable local development?*

The primary purpose of these research questions is to map the regulations required to establish an archaeological cultural centre and to analyse whether this cultural hotspot can maintain high standards in archaeology, tourism, and local engagement. To allow for complete and sequenced research into the topic, 5 sub-questions have been formulated:

1. *What are the differences between Maritime archaeological policies in Greece and in the selected international contexts?*

2. *How do recently established marine parks in both Greece (Alonissos) and in comparable maritime regions, such as* Abu Qir Bay *(Egypt) and the Baia Underwater Archaeological Park (Italy), differ in terms of scientific research, public accessibility, and preservation strategies?*

3. *What is the historical importance of the area in terms of maritime cultural history and the landscape diversity of the region?*

4. *How can community engagement, educational initiatives, and stakeholder collaboration enhance heritage preservation of the region and promote sustainable development in the region?*

5. *What emerging digital and technological methods can support the documentation, preservation, and educational dissemination of maritime archaeological data??*

## 1.4. Methodology

In this thesis, I apply a multidisciplinary approach to develop a framework for establishing a Maritime Archaeological Cultural Centre in the Euboean region. The Bachelor's programme of World Archaeology at Leiden University primarily focuses on material analysis and cultural history, both crucial for data collection; nevertheless, this research will use a broader approach that combines archaeological analysis with interdisciplinary studies and a holistic interpretation. This study aims to contribute to a more comprehensive understanding of Euboea's maritime past and present by systematically collecting and contextualising archaeological heritage.

The study starts with the examination of both terrestrial and underwater archaeological data during a fieldschool on the island itself. These key concepts include the material and knowledge gained through the Hinterland of Medieval Chalkida (HMC) survey project conducted by Leiden University. From here, I was able to determine how the system and its rules are structured. This is where the research originated, which is why this study begins with questions and regulations concerning inter/national frameworks in maritime heritage management. In addition, the projects carried out by national organisations have served as a starting point for further literary research, and the second chapter will give more clarity on this. One of these national organisations is working in the area, the Ephorate of Underwater Antiquities (EUA). They conducted systematic research since 1976, as well as the contributions of the Hellenic Institute of Marine Archaeology (H.I.M.A.), active since 1973 and operating under the Greek Ministry of Culture. Several of their specialists have already examined the area and its maritime archaeological record; this data is used to emphasise the region's importance.

These combined archaeological sources form the foundation for identifying patterns of maritime interaction, trade, and cultural exchange around Euboea through excavated archaeological material (Chapter 3). Illustrating how Euboea's history was shaped by its maritime climate and the landscape. This lost maritime context is further explored through archaeological materials, specifically amphorae and other vessels, which reflect both the local maritime environment and the island's connectivity via overseas routes. These findings support a multidisciplinary objective, while the establishment of a Maritime Archaeological Cultural Centre (MACC) is not solely dependent on archaeological remains. Here, the MACC is proposed and justified as a means to achieve the region's SDGs. Above all, this thesis aims to protect cultural heritage for future generations. It does so by keeping in line with reports from development organisations such as the Honor Frost Foundation (2018), linking economic, scientific, communicative, and educational perspectives, while also emphasising social and international collaboration in the Euboean region (Alivizatou, 2012).The combining of methodologies brings an interdisciplinary framework for the promotion and protection of cultural heritage, if accessible to all stakeholders. Successful heritage management involves more than simply preserving artefacts; it requires making them meaningful and relevant to modern-day and future audiences.

### 1.4.1. Case Study Selection

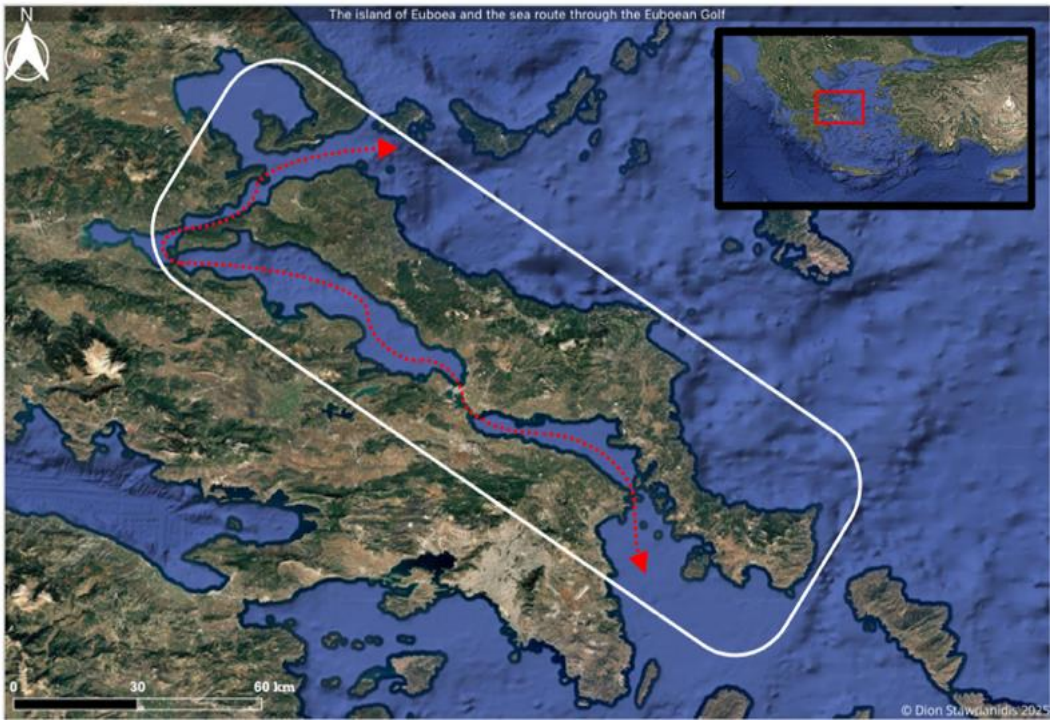
While the primary focus of this research is the island of Euboea, two comparative case studies have been selected to demonstrate the transferability of maritime landscape preservation challenges and their potential solutions. These cases were chosen based on their environmental similarities to Euboea, specifically regarding coastal geography and geological processes such as volcanic activity, currents, and pH levels. Furthermore, the selection accounted for historical connectivity, focusing on shared material culture and ancient trade routes. Consequently, the comparative analysis targets Mediterranean coastal regions, specifically those involving Underwater Archaeological Sites (UVAAS), Marine Protected Areas (MPAs), or Underwater Parks (UPA).

Therefore, the selected cases are Abu Qir Bay and Baie, which will function as indepth case studies for global preservation strategies and public engagement. The cases have been extensively documented in recent years and can provide guidiunce for future management strategies in Euboea.

## 1.4.2. Main Case Study Area: Euboea

Euboea is the second-largest island in Greece, located in the Aegean Sea off the east coast of Central Greece. Geographically, Euboea is part of Central Greece (Sterea Ellada/EL64) the region has approximately half a million inhabitants of which 200,000 are situated on the Island of Euboea (Eurostat, 2024). The capital, Chalcis, is an hour's drive from Athens and two hours by public transport.

**Figure 1** *Map displaying the Island of Euboea and the Historic Sea Routes.*




*Note.* The map is showing Greece (black rectangle), the island Euboea (white rectangle) and the historic sea route of the Euripus Strait with the North and South Gulfs (red dash/line).

The island is separated from the mainland by the Euripus Strait, consisting of the North and South Euboean Gulfs (See Figure 1). There are two bridges that connect the island to the mainland, but it is also accessible by ferry from several ports. The strait is approximately 40 meters wide at its narrowest point and has rare tidal currents that change direction several times a day. It is a mountainous island, with the central mountains being Dirfi in the centre (1,743 m, the highest peak), Kandili in the west (1,246 m), Pyxaria in the northeast (1,341 m), and Ochi in the southern tip (1,394 m). Furthermore, the island is climatologically sensitive; rainfall and strong winds primarily originate from the north, and in recent years, Euboea has become increasingly vulnerable to extreme environmental events (Lampropoulos et al., 2025). Including devastating wildfires and subsequent flash floods, most likely driven by local land-use changes. The seasonal river Lidias poses one of the greatest threats and, in addition to the tidal currents, contributes significantly to alluvial sedimentation, depositing both fine grains and large stones (Ghilardi et al., 2022).

### 1.4.3. Comparative Cases

The comparative cases consists of the sunken cities in Abu Qir Bay near Alexandria form one of the most important concentrations of UCH in the Mediterranean, and The Underwater Archaeological Park of Baia which was the first of its kind, functioning as both a Marine Protected Area (MPA) and an underwater museum with 14 different dive sites (UNESCO, 2023).

#### *Case 1: Abu Qir, Egypt*

#### *Location and environment*

Abu Qir Bay lies on Egypt's northeastern Mediterranean coast and forms a shallow, semi-circular bay on the northwestern edge of the Nile Delta, about 35 km northeast of Alexandria. The bay is commonly described as an arc-shaped embayment with an average depth of around 6 m and deeper areas reaching roughly 14–16 m in its northern parts, conditions that historically supported harbours, coastal settlements, and maritime connectivity.

**Figure 2** *Map of Abu Qir Bay Displaying Alexandria Port and Rosetta Branch Delta*


*Note.* This map displays the port of Alexandria (marked as A) and the Rosetta Branch Delta (marked as B).

The seabed is dominated by fine silts and muds, largely linked to Nile sediment input, especially from the Rosetta branch (see Figure 2, point B). This sediment regime created a soft, water-saturated substrate which was suitable for construction and harbour activity, yet structurally vulnerable over time. The bay shows variation in sediment types, ranging from muddier deposits to mixed sandy muds depending on local circulation and input patterns (Hamouda et al., 2015, pp. 1–3). The maritime landscape of Abu Qir Bay and its neighbouring harbour city, Alexandria, is strongly shaped by past and present human activity. Especially the industrial development, urban growth, and agricultural discharge have increased turbidity and pollution, including elevated concentrations of heavy metals in surface sediments, mainly from the port of Alexandria (see Figure 2, point A) (Abdel Ghani et al., 2013, pp. 2–7).

## *Case 2: Underwater Archaeological Park of Baia, Italy*

### *Location and Environment*

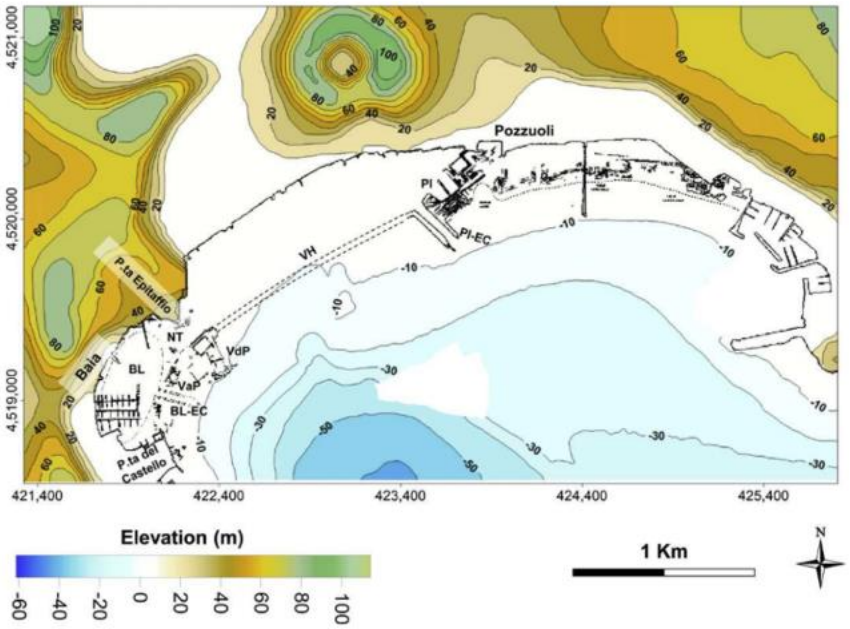
The Underwater Archaeological Park (UAP) of Baia is located in the Gulf of Pozzuoli, in the Tyrrhenian Sea, a part of the western Mediterranean, approximately 5 km west of Naples, and lies within the Campi Flegrei, an active volcanic complex north of Naples.

**Figure 3** *Map of Pozzuoli Bay and the Underwater Archaeicial Park of Baia*


*Note.* The UAP of Baia sedimentary influences from volcanic activity (marked as A), the modern port of Naples (marked as B) and the island of Ischia (marked as C).

This region is characterised by a many volcanic calderas, which are large depression formed when a volcano erupts and collapses (see figure 3 markings A and B for location). The two major prehistoric eruptions that formed the area are called the Campanian Ignimbrite eruption (c. 37,000 years ago) and the Neapolitan Yellow Tuff eruption (c. 12,000 years ago) (Bergamin, 2009, p. 235; Passaro et al., 2012, p. 7).

**Figure 4** *Map of Baia with Elevation Measurements*




*Note.* The main archaeological remains are mostly underwater and depicted as black lines and letters. Adapted from( Passaro et al., 2012, p.3)

This is a process of slow vertical ground movements driven by underlying volcanic activity. Over the last two millennia, these movements have led to significant shifts in the coastline (See Figure 4). In Baia, this has led to the submersion of a substantial part of the ancient city. Recent research utilising morpho-bathymetric surveys (employing multibeam echosounders to map seafloor depth and morphology) estimates the current rate of subsidence at approximately 2.90 mm per year (Passaro et al., 2012, pp. 1-6). The underwater environment of Baia consists of a combination of sandy and silty sediments, influenced by both natural processes and long-term human activity. Studies of benthic foraminifera indicate that these sediments bear traces of historical pollution, including heavy metals and organic pollutants associated with harbour activities and subsequent industrial exploitation (Bergamin et al., 2009, p.237; Figure 3 point B).

## 1.5. Structure of the thesis

The structure of this thesis is designed to provide a comprehensive and logical analysis of the elements required to establish a Maritime Archaeological Cultural Centre (MACC) in the Euboean region. The progression from historical context and policies to contemporary challenges and recommendationswill provide a thorough understanding of the complexities involved in this process. The second chapter provides an international and national context by examining policy frameworks and comparative approaches to the preservation of maritime landscapes. The third chapter focuses on the historical background and significance of maritime heritage in Euboea. Chapter four will compare two global case studies and management in Euboea, and the final chapter will present a potential solution for preserving the maritime heritage of Euboea. Analysing its specific preservation challenges and exploring ways to promote the Sustainable Development Goals through the establishment of a MACC.

**Chapter 1** is the introduction chapter of this thesis and will address the contemporary and future problems of cultural heritage in the region, the aims of this thesis, and the methodology used to see where research can help and shape new initiatives. This section also introduces the main case study of Euboea and comparative cases in terms of geographical locations and features.

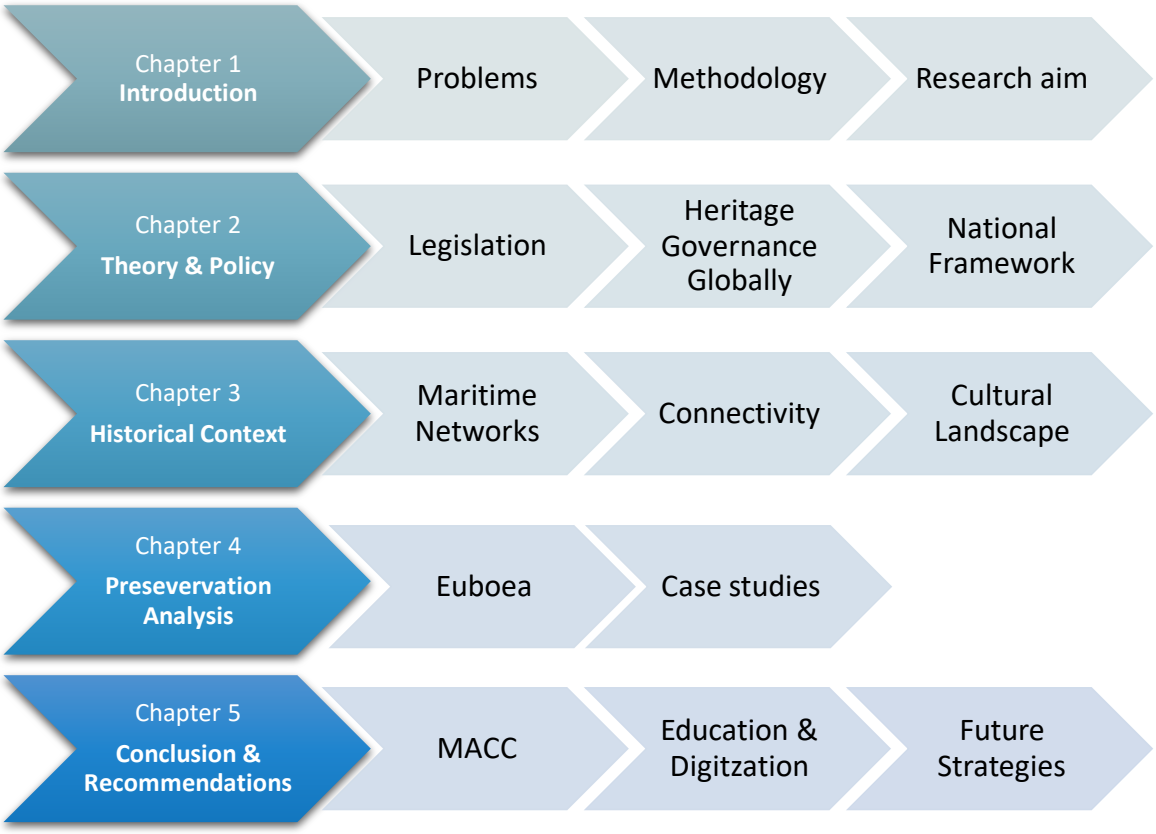
**Chapter 2** will address the evolution of maritime heritage policies and the contemporary challenges they face. The research explains how political and social factors have influenced heritage management over time, tracing the development of relevant laws and regulations. This chapter presents the first set of rules of heritage management by situating them within national and international law and policy. This part examines how these regulatory frameworks operate in practice and how international conventions can sometimes guide or even supersede national laws in shaping heritage policy.

**Chapter 3** provides an overview of Euboea's historical maritime importance, using archaeological data from several shipwrecks and other marine materials, such as amphorae, to emphasise the connectivity and identity of previous inhabitants. It will also provide a general overview of the archaeological remains of the case studies.

**Chapter 4** Will focus on to current experiences and challenges across different environments in the Mediterranean Sea, focusing on heritage preservation strategies and recent innovations/initiatives.

**Chapter 5** outlines a strategic framework for establishing a Maritime Archaeological Cultural Centre (MACC) in Euboea. It will examine the centre’s potential as a tool for sustainable tourism, local economic growth, and education. The chapter is divided into three core sections. First, it defines the MACC’s role as a multi-functional hub for cultural heritage. Second, it examines the integration of digital archaeology and educational programs, focusing on how technological innovations can overcome physical barriers to provide both virtual and physical access to submerged sites. Finally, the chapter concludes with targeted recommendations for following research, ensuring a long-term vision for the preservation and promotion of Euboea’s maritime cultural landscape.

**Figure 5** *Schematic Overview of the Thesis Structure*




*Note.* This diagram outlines the chapters and key topics of the thesisin chronological sequence

# Chapter 2 – Preserving Maritime Heritage: International and National Policies

Complex interactions between laws, regulations, and governance structures often shape who is responsible for protecting cultural and archaeological heritage. This is also the case in Euboea, where projects, such as the one I was part of (HMC), are often working within these structures. This chapter explains the foundation of the legal framework upon which heritage policies are built. The preservation of maritime cultural heritage is an interdisciplinary field that connects archaeology, law, policy, and environmental studies (McKinnon & Richards, 2010). Its protection is regulated at both the international and national levels, with each contributing distinct mechanisms and obligations. Understanding the origins of global laws and policies for UCH provides basic context for interpreting how regulations on the 'Maritime cultural landscape' (introduced in paragraph 1.4) have developed, allowing these policies to be translated into a legal framework suitable for this case study.

However, contemporary research shows that not all regulations function effectively in practice; it remains unclear who bears direct responsibility for local heritage management, and the multiplicity of jurisdictions, authorities, and interests makes it challenging to regulate remote environments such as the maritime landscape of Euboea. This chapter uses an integrated approach, considering the views of international bodies, state authorities, developers, and researchers. It analyses the legal frameworks governing UCH (2.1), covering international agreements (2.1.1) and the Greek national framework (2.1.2). This analysis helps define how ownership and management responsibilities are assigned within existing heritage systems.

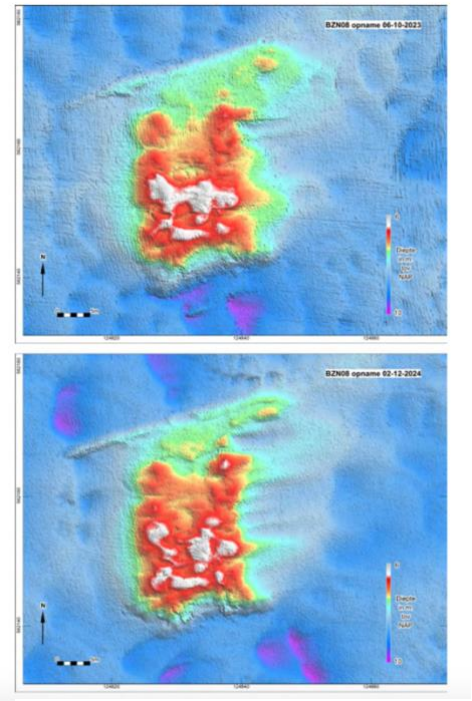
## 2.1. Global Frameworks of Preserving Underwater Cultural Heritage (UCH)

In response to these global catastrophes, the United Nations (UN) established the United Nations Educational, Scientific and Cultural Organisation (UNESCO), an intergovernmental organisation that, from 1946 onward, developed key frameworks for the protection of cultural heritage, laying the foundation for several major conventions in the decades that followed (UNESCO, 2025). UNESCO works mainly through conventions; in legal terms, this means that agreements made at a meeting or assembly must be carried out in accordance with the guidelines. Member states exercise their sovereignty by voluntarily becoming signatories to these conventions at United Nations assemblies. Often, it is preferred to monitor, and expertise and political/moral pressure are exercised between states. One of their first initiatives was the 1954 Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, which introduced the Blue Shield emblem to safeguard cultural heritage during times of war (UNESCO, 1954, Arts. 1–6).

In addition, the United Nations Convention on the Law of the Sea (UNCLOS) set out a general duty for States to "*protect objects of an archaeological and historical nature found at sea*" (United Nations, 1982, Art. 303, p. 138). UNCLOS is an international treaty that defines who has what obligations on and under the sea. States have the authority to carry out their work in certain zones and, above all, the responsibility to take action where necessary. This will be discussed later in this research, as Marine Protected Areas (MPAs) are established in accordance with UNESCO guidelines and UNCLOS treaties on the division of waters, ensuring that the UCH remains protected.

Building on this, the UNESCO (2001) Convention on the Protection of the UCH provides a clear definition of UCH and establishes an international framework for its management (Art. 1(1)(a), p. 52). According to Article 1(1)(a), UCH should take care of "*all traces of human existence having a cultural, historical or archaeological character that have been underwater for at least 100 years*" (UNESCO, 2001). The Convention provides guidance on how such heritage should be protected, with a preference for in situ preservation. Meaning, the protection of heritage at its original location on the seabed. This principle acknowledges that leaving archaeological remains in their original context usually offers the best protection for their scientific and cultural value and aligns with the idea of preserving sites as underwater museums for future generations. Although this is a positive step towards heritage protection, it also has disadvantages in maritime archaeology. The method is widely criticised for both its physical effectiveness and its impact on research. Managing UCH is becoming increasingly complex and diverse, due to technical, legal, and social factors (Bulut & Yüceer, 2023). Environmental conditions, such as tides and erosion, can destroy sites left in place. Additionally, there is often a lack of convincing quantitative data to demonstrate that these in situ techniques effectively preserve materials over the long term.

**Figure 6** *Multibeam Sonar Imagery*




*Note.* Multibeam sonar imagery from the Cultural Heritage Agency of the Netherlands depicting two stages of deterioration observed during the survey (RCE, 2025).

Although monitoring is possible using various methods, such as multibeam sonar surveys (See Figure 6) or annual dive checks, this strategy is sometimes used as a "do-nothing" approach to avoid costs, which effectively amounts to negligence (Broadwater & Nutley, 2009, pp. 70-73). Resulting in agencies serving merely as a fiscally convenient justification for inaction, which can, in reality, lead to the undetected deterioration of the site (Ortmann et al., 2010). The UNESCO Conventions establishes mechanisms for international cooperation and coordination overlooking states parties. The states should therefore share information, notify one another of discoveries, and collaborate, particularly in the open ocean (UNESCO, 2001, Articles 11–12, pp. 54–55). A "Coordinating State" may be designated to lead protection efforts "*for the benefit of humanity as a whole*" (UNESCO, 2001, Art. 12, p. 55). More broadly, the Convention obliges States Parties to cooperate in training, research, and enforcement, thereby encouraging the creation of a global network for the protection of maritime heritage (UNESCO, 2001, Art. 19, p. 56). The globally agreed basic rules mentioned above, established by organisations such as UNESCO, have provided guidance for decades and form the foundation of cultural heritage policy. However, new developments (e.g., archaeological research, urban management, and environmental discussions) call for new strategies to protect our world's cultural heritage as effectively as possible. Unfortunately, this globally respected UNESCO convention can also make the state responsible for all heritage within its territorial waters. This can lead to national or local mismanagement of heritage policy, particularly when viewed from an economic or interests perspective. In addition, the sea is increasingly being used by large private companies for various purposes. However, monitoring these activities from a state level is difficult to implement, especially in vast,

remote, and underwater areas (Petrakos, 2025). Even though numerous international agreements have been established to safeguard these vulnerable zones, the execution of these agreements varies significantly across the globe; their practical implementation is often adapted to fit specific regional contexts and capacities (Daly et al., 2022). To counter these negative trends, international cooperation and European-level agreements are essential to achieve sustainable blue growth. Within this framework, various archaeological organisations focus on specific maritime zones, dedicated to the integrated management of maritime landscapes, heritage, archaeology, and conservation. However, large private corporations often prioritise ocean-based economic development exclusively. This narrow focus contradicts the core meaning of the "blue economy," which is intended as a model of sustainable development for all, in which the sea and its resources are cherished rather than merely exploited (Bennett et al., 2020). Furthermore, this European Commission initiative aims to ensure that maritime activities generate jobs, economic value, and sustainability (European Commission, 2014).

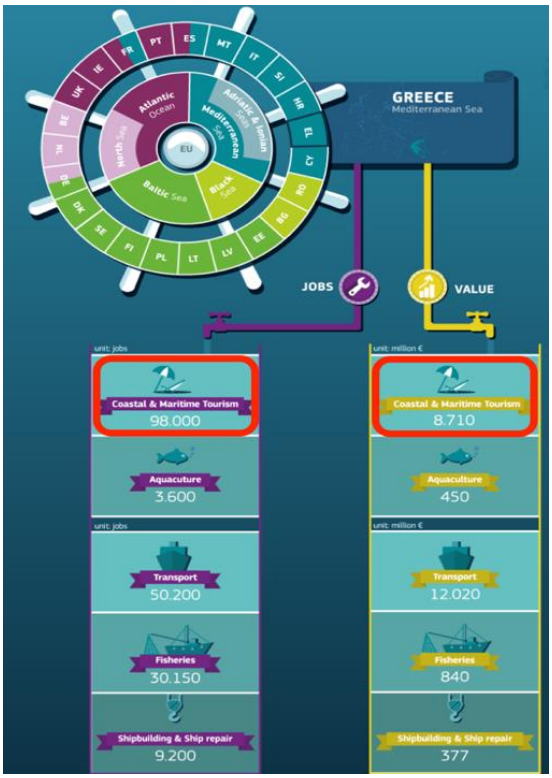
### 2.1.1. Global differences preservation methods

Within the context of heritage protection and policy, an international legal framework exists; however, its implementation varies significantly worldwide due to differing legislation and environmental conditions (Hafner et al., pp. 16–17). In cold-climate regions with brackish (low pH) or saline water, submerged archaeological sites containing organic materials (e.g., shipwrecks, wooden bridges) are well preserved (Gregory et al., 2012). Thus, these often intact materials can be monitored through surveys and sedimentation modelling. Additionally, physical covering is a viable method for stabilising shipwrecks in situ (MACHU Report, pp. 12–13). In contrast, around Euboea and the Mediterranean Sea, conditions are characterised by warm temperatures and high salinity/pH levels. These conditions cause organic materials, such as wooden shipwrecks and their cargoes, to undergo rapid biological deterioration (Öniz & Gültekin, 2025; see figure 6). On the other hand, technological advancements offer new possibilities for heritage preservation. Additionally, the United Nations Sustainable Development Goals will serve as a foundation for states to establish projects that require UCH management for a sustainable future for archaeological sites (Hafner et al., 2022, pp. 7–9).

## 2.1.2. National framework (Greece)

Following the Greek War of Independence (1821–1830), the absence of clear regulatory frameworks led to rapid urban transformation on the island of Euboea. During this period, drastic and irreversible decisions, such as the demolition of city walls and historic buildings, reshaped the city into its modern form and contributed to the loss of substantial cultural heritage (Mamaloukos, 2020, p.631). After the Second World War, the first global steps were taken toward protecting cultural heritage, including maritime archaeology. It became clear what catastrophic impact humanity can have on its environment, leading to the establishment of international agreements concerning, among other things, cultural heritage and the sea. A strong need arose for cooperation between states and governments to safeguard these two important yet fragile environments. In Greece, the strict state ownership and control of UCH, as established under former Law 3028/2002, now Law 4858/2021, and applied by the Ephorate of Underwater Antiquities, have at times created tensions between cultural protection and economic development, particularly in the tourism sector. Among the twelve Mediterranean countries, Greece ranks second in Gross Value Added (GVA). As illustrated in Figure 7, the largest share of this activity in Greek waters is attributed to Coastal and Maritime Tourism. Consequently, the Greek state must align its national policies with these international and European objectives. For decades, nearly all diving activities were prohibited in large areas of Greek territorial waters to prevent the looting of antiquities. While this policy should protect underwater sites, it also limits local economic opportunities for island communities that depend on tourism and marine activities. In addition, this legislation did not prevent divers from diving at underwater sites (Tzanakis, 2024).

**Figure 7** *The Gross Value Added*

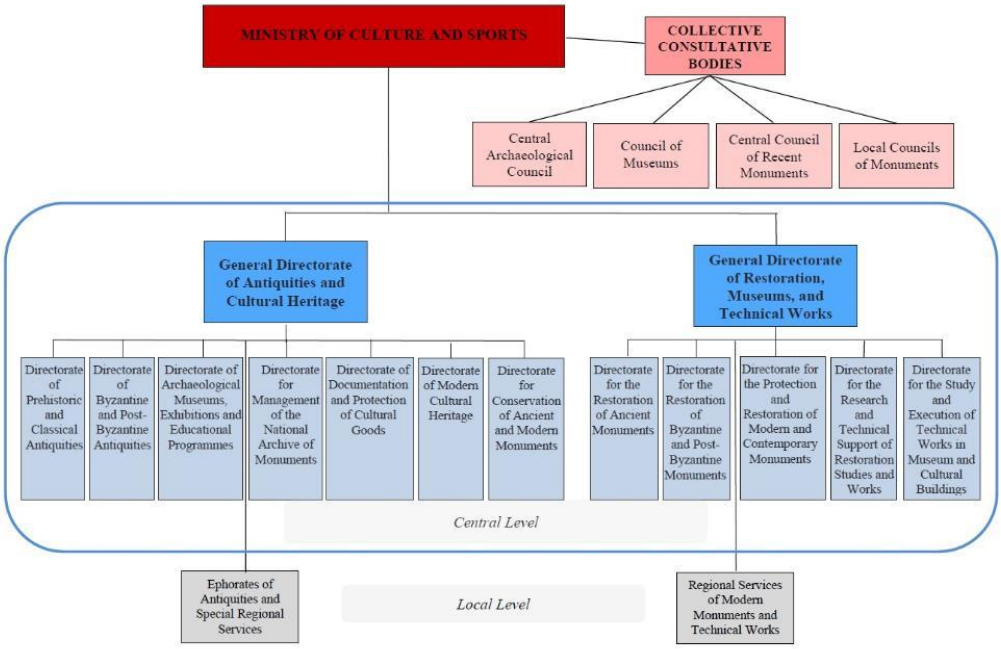



*Note.* This infographic displays Gross Value Added and employment rates by country, with a focus on Greece. From *The EU Blue Economy*. Adapted from European Commission, 16 April 2014. https://webgate.ec.europa.eu/maritimeforum/en/node/3551

Although a high level of protection is visible in the Constitution of Greece, as Article 24 states that "*the protection of the natural and cultural environment constitutes a duty of the State and a right of every person.*" (Council of Europe, 2018). This constitutional mandate establishes cultural heritage preservation, including underwater sites, as a fundamental state responsibility. Building on this principle, Greece has authorised comprehensive legislation to safeguard antiquities on land and underwater. The basis of this is Law 4858/2021, "*On the Protection of Antiquities and Cultural*

*Heritage in General*," which modernised and codified heritage protection. The law reaffirms state ownership of all antiquities predating 1453 (the end of the Byzantine Empire) and extends protection to newer cultural heritage as well (Council of Europe, 2018). Emphasising "predating 1453" indicates a difference in cultural heritage values from the state, which is not culturally appropriate in this context. While the later periods are part of Euboea's diversity and are often visible in the archaeological landscape today, they are thus valuable to share with the (inter)national public. Several core laws protect Greece's archaeological sites, but they also often make it difficult for recreational and international organisations to experience Greece's (maritime) archaeological diversity.

**Figure 8** *Political Order of Institutes of Greece (Council of Europe, 2018).*

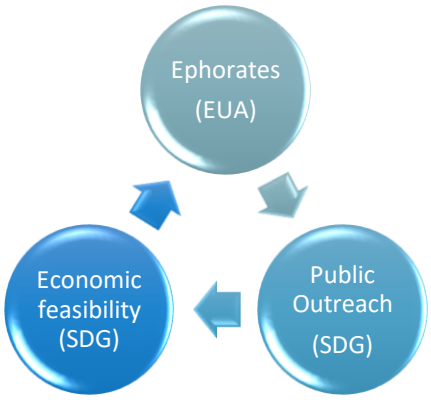



*Note:* This diagram is depiciting the hierarchical order of institutes involved within the framework of heritage management (Council of Europe, 2018).

First, there is Law 3028/2002 on the protection of antiquities and cultural heritage, followed by Greece's approach to maritime heritage, which is supported by several laws and international agreements. Law 2971/2001 on the Seashore and Coastal Zone establishes state ownership and control over the foreshore and seabed, securing that underwater antiquities within these areas fall under public jurisdiction. The UNIDROIT Convention of 1995 on stolen or illegally exported cultural objects was ratified through Law 3348/2005, strengthening Greece's ability to recover looted artefacts and prosecute traffickers. Environmental protection is regulated by Law 1634/1986, which ratified the Barcelona Convention for the Protection of the Marine Environment of the Mediterranean (Barcelona Convention), thereby safeguarding underwater heritage from ecological damage. Law 3521/2006 ratified the UNESCO 2003 Convention for the Safeguarding of Intangible Cultural Heritage, thereby acknowledging that seafaring traditions, shipbuilding techniques, and oral histories are vital components of Greece's maritime

identity. Despite this strong legal foundation, Greece has long faced the challenge of balancing protection with public access. For decades, strict restrictions on scuba diving were imposed to prevent looting, but they also limited opportunities for local economies and educational initiatives. A shift began with Law 3409/2005 on recreational diving, which opened certain areas for diving tourism under permit and introduced the concept of UCH. In 2019, new legislation further relaxed these rules, allowing certified divers to visit selected ancient wrecks under controlled conditions. The first of these initiatives, the Alonissos Underwater Museum in the Northern Sporades, opened in 2020 and has become a model for combining preservation with sustainable tourism (see paragraph 2.1.3.).

**Figure 9** *Cycle to Justify Archaeological Research*




*Note.* Interpretation of the Poznań Cycle to justify archaeological research (Hafner et al., 2022, p.100).

Greece experiences highlight the ongoing tension between strict conservation methods and public engagement. People will value the region's historical significance only if they understand its heritage (Thurley, 2005). In the long run, this will lead to economic feasibility, which is key to the region's sustainability goals (see Figures 8 & 9). The overseeing organisation's 'political commitment' in this case is, on the local level, the Ephorate of Underwater Antiquities (EUA).

New policies increasingly involve local diving centres and municipalities in the responsible promotion of heritage. Although Greece has not yet ratified the 2001 UNESCO Convention on the Protection of the UCH, its national legislation already reflects many of the same principles, such as in situ preservation and the banning of commercial exploitation. Although the expansion of maritime activities presents inherent risks, most notably the potential deterioration of cultural heritage, Greece is proactively developing a framework that balances scientific protection, public education, and sustainable tourism. Rather than acting as a barrier to development, international conventions and the evolving national regulatory framework serve as the essential foundation for long-term preservation. Greece is currently in the foundational stages of navigating this delicate balance, assessing the economic potential of its coastal assets while keeping in mind the historical risks of exploitation. Ultimately, these

efforts aim to ensure that the nation's unique maritime heritage is both rigorously safeguarded and meaningfully accessible to future generations.

### 2.1.3. The Development of Marine Protected Areas in Greece

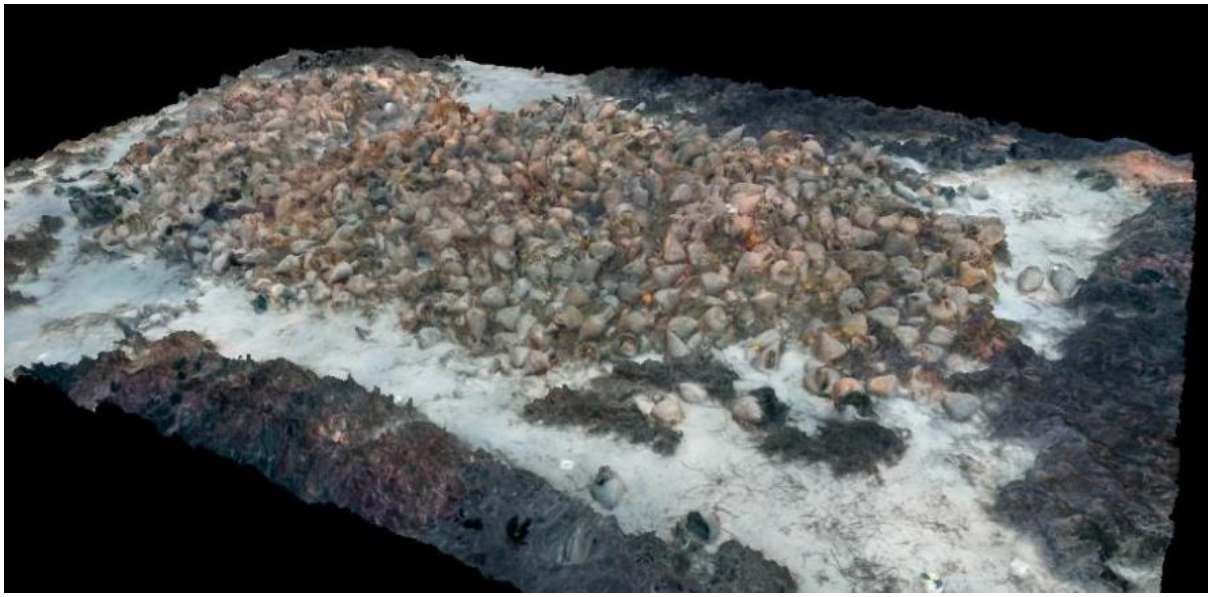
#### *Statistics and Laws*

Greece is currently heavily working on protecting its marine biodiversity and UCH. This effort includes expanding Marine Protected Areas (MPAs) and developing maritime archaeological parks (Oikonomou & Dikou, 2008, p. 847). In 2024, the Greek government announced plans for two new MPAs in the Ionian and Aegean Seas, spanning 14,000 km² and 8,000 km², respectively, constituting approximately 11% and 6.6% of Greek territorial waters (UNCLOS, 1982, art.3; Fraser, 2024). With these additions, the total protected marine territory would surpass 30%, as required by the new national legislation (Law 5037/2023), according to the United Nations. Moreover, a nationwide ban on bottom trawling in all national marine parks is expected by 2026, with the ban extended to all MPAs by 2030, supported by €780 million allocated across 21 marine conservation initiatives, such as Underwater Visitor-Accessible Archaeological Sites (UVAAS) (Reuters, 2024).

#### *Marine Parks and Underwater Museums*

Within these marine parks and UVAAS, a growing number of maritime archaeological sites are being designated as protected areas, allowing and controlling public access. In 2020, it inaugurated its first underwater museum at the Peristera shipwreck near Alonissos, allowing divers to explore a very well-preserved 5th-century BCE vessel within the National Marine Park of Alonissos, Northern Sporades (NMPANS), according to the Alonissos Underwater Museum. Ongoing research uses 21st-century digital technologies in promoting such underwater heritage (Droug & Sarantakou, 2024, p. 835).

**Figure 10** *Three-Dimensional Reconstruction of the Peristera Wreck Site Using Photogrammetry*



*Note. 3D reconstruction of the Peristera wreck site, created through the integration of optical and acoustic data. Adapted from "Opto-acoustic 3D Reconstruction and Virtual Diving on the Peristera Shipwreck," by F. Bruno et al., 2019, International Conference in Management of Accessible Underwater, Cultural and Natural Heritage Sites: "Dive in Blue Growth", p. 336 (https://atlantisresearch.gr/).*

One of these commonly used documentation methods is photogrammetry, see Figure 10. In 2024, the Ministry of Culture announced that four underwater archaeological sites in the Magnesia region, including late Roman and Byzantine shipwrecks at Telegrafos, Glaros, and Kikynthos, would be made accessible to divers. Research continues on the importance of involving local communities and stakeholders in these sites, addressing mismanagement in the region without a well-structured, decentralised governance (Arvanitis, 2024). The bottom line is that despite new technologies and European and national support, it is still not possible to bring maritime heritage to the people. Therefore, the new National Museum of Underwater Antiquities is set to open in Piraeus in 2026, with plans to exhibit thousands of marine archaeological artefacts. Despite these advancements, challenges remain regarding effective site management. A 2023 study of NMPANS found that over 80% of surveyed citizens reported no involvement in decision-making processes, while 43.7% felt poorly informed about the park's operations (Karantoni et al., 2023, p. 4). Inconsistent policies and competing interests further undermine trust in governance. Political pressure in 2022 led to the lifting of restrictions, resulting in significant ecological decline, only for the area to be re-designated a strict no-take zone months later (Brodersen et al., 2024). This tension between accessibility, economic benefits, and the realities of a fragile environment and inconsistently managed ecosystems underscores the need for integrated, science-based policymaking. Without robust regulatory enforcement, institutional coherence, and community engagement, maritime archaeological sites risk becoming legally protected but functionally vulnerable (Karantoni et al., 2023, p. 2). There is a growing imperative to align heritage preservation with ecological sustainability and public inclusion.

**Table 1** *Several Greek Underwater Visitor- Accessible Archaeological Sites (UVAAS)*

| Marine Parks / Underwater Museums | Description | Status / Problems |
|---|---|---|
| **Alonissos (Peristera)** | Classical shipwreck (c. 425 BCE) with ~3,000 amphorae. | Operational, but remote location limits accessibility. |
| **Fourni Archipel** | 58 shipwrecks from Archaic to Modern periods. | Diving park for managing high density of finds; difficult to minitore. |
| **Methoni Bay** | Shallow water sites (<8m) containing Roman sarcophagi and granite columns. | Ideal for park status due to heavy, immovable cargo; threatened by erosion. |
| **Pavlopetri** | Submerged prehistoric town (c. 2800–1180 BCE) with visible streets and tombs. | Requires strict protection; plans for a thematic park proposed. |
| **The National Marine Park of Alonissos Northern Sporades (NMPANS)** | Features one of the biggest Classical-era shipwrecks, several sites, large marine space | Combines nature conservation with archaeological sites like Peristera and the shipwreck of Vassilikos. Focus is mainly on marine nature conservation. |

*Note. This table presents various UVAAS in Greece, highlighting their archaeological descriptions and current management challenges.*

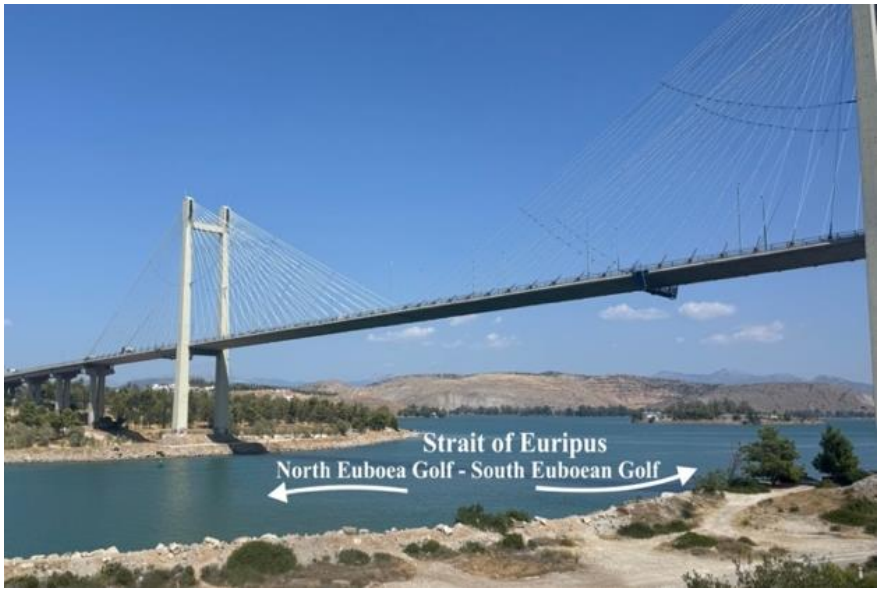
Achieving this balance is central to ensuring the long-term viability and societal relevance of Greece's rich maritime Furthermore, Law 3409/2005 nominally opened these UVAAS's to the public, in practice they remain largely inaccessible to the general public due to complex bureaucratic requirements and a lack of certified service providers (Stathis et al., 2019). As indicated in Table 1, many of these visitor-accessible sites (UVAAS) remain difficult to monitor or are threatened by erosion despite their significance. Therefore, this is attractive for small groups of tourists, but not feasible for relocating mass tourism from Athens to Euboea (Georgopoulos & Fragkopoulou, 2013). Nevertheless, several marine parks have been established in recent years and more are expected, even though these parks are often located in remote areas; difficult to access (e.g., Alonissos, Fourni).

# Chapter 3– Maritime Landscapes of Euboea and Comparative Cases: Historical importance through traces of maritime trade networks and material culture

## 3.1. Early Maritime Foundations: From the Bronze Age to Antiquity

Euboea has been an important part throughout the (pre)history of Greece due to its dominant geographical position, fertile plains, and rugged mountainous terrain. The island is separated from the mainland by the Northern and Southern Euboean Gulfs and connected by a bridge at its narrowest point near the city of Chalkis. Human habitation on the island dates back to the Middle Palaeolithic period (approximately 100,000 BCE) and continues to the present day (Sapouna-Sakellarakē, 1995, p.9). The northern and central parts of the island are primarily covered by forests and Mediterranean agriculture, while the south mostly consists of grassland and rough pasture due to the steep mountains and hills. Euboea and other parts of Greece, due to the low rainfall in the summer and the mountainous terrain, have historically needed to import food, even in ancient times (Levi, P et al. 1984, p. 12, 14).

**Figure 11** *Euripus Bridge and the Strait of Euripus*




*Note.* Euripus Bridge crosses the Strait of Euripus and connects Euboea with the mainland. North side depiciting the North Euboean Gulf and South side the South Euboean Golf.

The North and South Euboean Gulfs have historically functioned as essential maritime passways, facilitating communication and exchange between the northern and southern Aegean regions (see Figure 11). In the last 7000 years, there has been little change in the wind currents of the Aegean Sea and the eastern Mediterranean, with recent studies indicating only minor fluctuations in atmospheric circulation patterns. This is supported by research that suggests the ancient wind regime in these regions was almost identical to the current one, with only small variations (Gal, Saaroni, & Cvikel, 2021, p. 2). The temperature differences today throughout the year bring with them other winds. Therefore, the

route was preferred over the eastern coastline of Euboea, which is exposed to persistent northern winds throughout the year, making navigation hazardous and generally avoided (see Figures 1 & 11). Resulting in varying local seafaring patterns due to varying weather conditions, which therefore are a crucial aspect in sustaining intercommunity relationships (Jarriel, 2018, p. 54 & 65).

### 3.1.1. Constructing a maritime identity: evidence from pottery analysis

From the Late Bronze Age, or Late Helladic phase two A (LH IIA), we see a trend in pottery decoration. Marine Style pottery is distributed on a large scale across Central Greece and the Aegean, including Euboea (Johnston, 2016, pp. 154–158).

**Figure 12** *Mycenaean Krater depicting a Seabattle*

*Note.* Sherd from a Mycenaean krater, recovered from Pyrgos Livanaton (ancient Kynos near Euboea). The piece dates to the Late Helladic IIIC middle period. Cat. No. A91, Lamia Archaeological Museum. Adapted from *Ancient Mediterranean Ports Database*, n.d., https://ancmed.ulb.be/details.php?row=136.

However, this distribution marks more than just an economic exchange; it indicates the construction of an early maritime identity through processes of cultural hybridisation (Vavouranakis, 2020, p. 299; Knapp, 2020, p.146). In coastal regions such as Euboea, this exchange functioned as a mechanism for social reproduction, where communities derived their status partly from their connectivity with the sea (such as historic seabattle, as shown in Figure 12). As evidenced by the analysis of pottery at Lefkandi, local production did not remain isolated. Local forms merge with external influences, suggesting that inhabitants consciously chose a material culture that connected them to a broader, prestigious network (Dickinson, 2020, p.133) This process reflects the dynamics of globalization in antiquity, where material culture functions as a means of communication balancing between local identity and a shared, Mediterranean practice (Hodos, 2014, p.65). This early formation of a maritime identity laid the foundation for later Iron Age expansion. The first Greek settlers in Italy, with specific ceramic styles and drinking habits, were seamlessly transplanted from Euboea to Ischia, see Figure 3C for location (Müller, 2017, p.257). Here, material culture functioned as an essential anchor for group cohesion in a

foreign environment. When viewed through theoretical models of migration, it becomes clear that pottery was not merely a trade product, but an active means to define a cultural group amidst change (Burmeister, 2000, pp. 541–542). In conclusion, the marine-style pottery provides physical proof that maritime expansion was rooted in the earlier adoption of a shared visual language.

### 3.1.2. Reconstructing Euboean trade networks: shipwreck assemblages as material evidence

The archaeological analysis of shipwrecks in Fourni and the South Euboean Gulf highlights the region's pivotal role as a maritime highway (Figure 1 & Table 1). For centuries, this area acted as a navigational bottleneck, shaped by unsafe rock formations, currents, and strong wind patterns (Diamanti1 & Vlachaki, 2015, p. 93; Koutsouflakis, 2013, pp. 52-76). Consequently, the material culture recovered from these wrecks provides direct evidence of how trade networks evolved over time.

**Figure 13** *Location of Fourni in the Aegean Sea.*


*Note.* Location of Fourni (marked as red dot) relative to Euboea, in the Aegean Sea.

The number of shipwrecks from the South Euboean Gulf is promising, according to Koutsouflakis's 2013 data; see Table 2 for the comparison between Fourni and Euboea. A number of wrecks and their cargo can already tell a lot about the connectivity between the island and its people, see Figure 13 for the location. Wreck No. 22 (Daskaleio, 4th century BCE) illustrates the intensity of inter-Aegean commerce with its cargo of Solokha I amphorae. Even more telling is the Hellenistic Wreck No. 28 found in the Bay of Geraistos. Here, the discovery of Greco-Italic amphorae demonstrates that Euboean ports were not merely local stops; they were fully integrated into long-distance networks stretching as far as the Italian peninsula. By the Roman period, the nature of cargoes shifted toward bulk transport. Wreck No. 27 (Late Roman), located in the same bay as No. 28, reveals a dominance of Late Roman 1 and 2 amphorae, signalling large-scale imports of oil and wine. A striking contrast is found in the

Byzantine Wreck No. 23 (Thorikos). This vessel carried a cargo exclusively composed of glazed tableware, specifically Champlevé wares (Vroom, 2005, p.93). The distribution of such high-quality tableware points to specialised production centres (like Thebes or Corinth) and a trade dynamic that differs fundamentally from agricultural bulk shipping. Ultimately, these wrecks form a network of historical evidence on the seabed, confirming Euboea's status as a dynamic intersection where international bulk goods and regional specialised ceramics meet.

**Table 2** *The distribution of several shipwrecks in Greek waters*

| Historical Period | Date Range | Euboea (South Gulf) | Fourni (Archipel) |
|---|---|---|---|
| **Archaic** | *700 - 480 BCE* | 0 | 3 |
| **Classical** | *480 - 323 BCE* | 2 | 4 |
| **Hellenistic** | *323 - 31 BCE* | 5 | 7 |
| **Early Roman** | *31 BCE - 300 CE* | 3 | 5 |
| **Late Roman** | *300 CE - 600 CE* | 10 | 28 |
| **Byzantine / Medieval** | *600 - 1500 CE* | 4 | 6 |
| **Modern / Post-Medieval** | *1500 - Present* | 2 | 1 |
| **Undated / Other** | N/A | 0 | 4 |
| | Total per zone | 26 | 58 |

*Note.* The distrobution of shipwrecks in the Aegean and the South Euboean golf catogorised in historical periods (Sources: Koutsouflakis, 2013; Demesticha, 2021).

## 3.2. Landscapes and Material Culture: from the Late Antiquity to the Modern period

The strengthened cohesion between coastal areas was fueled by more intensive trade, which likely led to a more uniform material culture. This process relied heavily on the legacy of the Roman Empire, as the Romans had left behind roads and cultural structures that enabled large-scale trade. This possibly explains the enormous increase in shipwreck discoveries in the Late Roman era (see Table 2).

### 3.2.1. Amphorae as indicators of maritime connectivity

Roman authority in the western provinces declined during Late Antiquity, and the Eastern Roman (Byzantine) Empire gradually reoriented its economic and maritime networks towards (e.g. Constantinople, Egypt, and the Levant) (Laiou, 2001, p. 1148).

**Figure 14** *Günsenin Type Amphorae*


Note. These different Günsenin Type amphorae are from the Byzantine Period and used especially in the Eastern Mediterreanean (Adapted from the Nautical Archaeology Program). (n.d.). Biography of Prof. Dr. Nergis Günsenin. Retrieved July 8, 2025, from https://nautarch.org/biography-of-prof-dr-nergis-gunsenin/

The Günsenin Types, a type of Byzantine amphora, characterised by a pear-shaped body and specific handle placement (see Figure 14), show a strong, widely spread use of these same types of amphora, stretched over the whole length of the Mediterranean, showing a strong maritime trade Günsenin Types in the region (Vroom, 2005, pp.94 -103). This shift is also reflected in archaeological evidence from the South Euboean Gulf, where shipwrecks dated to the 4th–8th centuries CE (specifically Wrecks 18–23) contain large quantities of standardised Late Roman Amphorae (LRA) Types 1–5. Many of these amphorae are stamped with Christian symbols or marks from Constantinopolitan workshops, suggesting centralised production and distribution linked to imperial supply chains (Diamanti, 2010, p. 5; Pieri, 2012, p. 29). At the same time, local pottery workshops in Karystos and Marmari adopted similar production techniques. These included the use of new slips and Christian decorative motifs, such as crosses and fish, which reflected the broader spiritual transformation of Byzantine society and its material culture (Cinquantaquattro & D'Acunto, 2021, p. 76). These developments did not mark the end of Euboea's maritime role; rather, they represent a redirection of seaborne connectivity through new networks of imperial grain and wine transport as far as the black sea region, and religious pilgrimage towards the eastern Mediterranean Sea (Collins, 2012, p.50-56; Preiser-Kapeller, 2021, p. 12).

### 3.2.2. Seascapes as an indicator of a hidden Material Culture

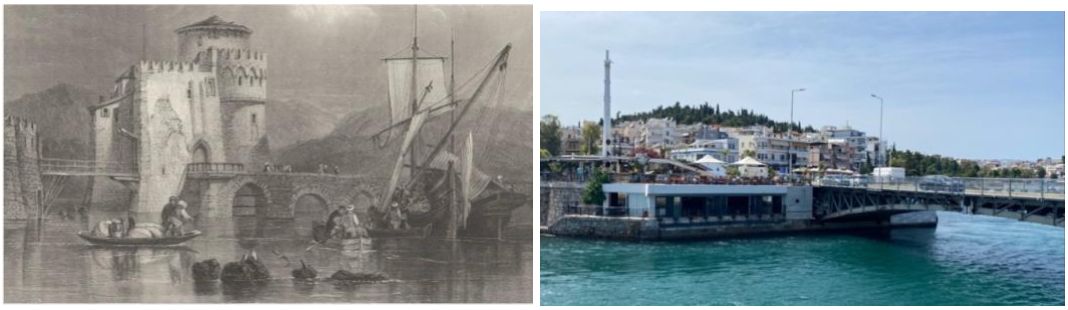
In the modern landscapes of the island of Euboea, the imprints of successive peoples and empires are often difficult to recognise today. The cultural diversity that has characterised the island throughout its history frequently lies hidden beneath the water's surface, deep within the soil, or wedged between the urban developments of the 20th and 21st centuries. What we observe today is a fragmented landscape, where the material culture of the past is often a forgotten and hidden landscape.

**Figure 15** *Engraving of the Medieval City Walls of Chalkida*


*Note.* Engraving by Giovanni Francesco Camocio (1574) depicting Negroponte (Chalcis) and its city walls.

One of the most drastic interventions in the island's historical appearance took place in Chalcis (Chalkida), its capital. At the end of the 19th century, a large-scale modernisation project was launched that permanently changed the city. It was necessary to create space for modern urban development and improved infrastructure, so the authorities ordered the widespread demolition of the old bridge, several Ottoman buildings, and the city walls that had defined the urban limits for centuries. This transformation culminated in 1963 with the commissioning of the new bridge, which remains one of the two bridges connecting the Greek mainland and the island (Zikos, 2021; Figures 16a & 16b). While functional, this development marked the loss of a layered cityscape where Byzantine, Venetian, and Ottoman influences were once directly visible (see Figures 15 & 16a).

**Figure 16** *The Old and New Bridges of Chalkida*



*Note.* 16a (left) is a 19th-century view of the Venetian bridge near Chalkida (Stanfield, 1833), and 16b (right) depicts the modern bridge used from 1963 onwards.

The fragmentation of the landscape began when the island was handed over to the Republic of Venice in 1390, with new governance in the Aegean (Skartsis et al., 2021, p. 17). During this era, the area was known as Negroponte for its black stone bridge (see Figure 16a). Highly specific tower structures from

the west were built in the countryside and the city. Some reused ancient building materials, known as spolia, in their foundations and corners. These towers were more than just fortified residences; they functioned as symbolic displays of power over the surrounding territory (Lock, 1990, p. 110). The connection between each other and the sea made it useful as a defensive network system (Blackler, 2022, p. 403). The Ottoman conquest in 1470 represented a shift in the region's history. Chalcis, renamed Eğriboz, became a crucial winter naval base for the Ottoman fleet. Ottoman archives record the export of Euboean wheat, cotton, and silk to Istanbul, directly linking inland production to maritime naval convoys (Vroom et al., 2024, pp. 191–192).

**Figure 17** *Tower Structures in the Euboean land and cityscape*

*Note*.17a (left) collapsed tower structure overlooking the hinterland of Chalkida, 17b (middle) the Two Towers of Mytikas currently investigated by Leiden University, and 17c (right) a Venetian tower in the city of Chalkida with modern reconstructions.

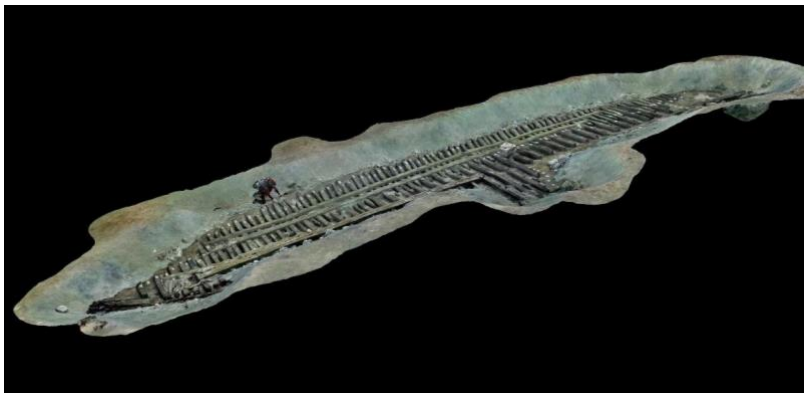
Today, the few remaining hidden tower structures are being researched and can be seen in the landscape or among modern buildings (see Figures 17b and 17c). While the concept of defensive tower structures dates back to antiquity, as seen in Figure 17a, their subsequent reuse during the Ottoman period remains a subject of debate. The specific functions these towers served under Frankish and Venetian administration are not yet fully understood and warrant further archaeological and archival research. The diversity of Euboea is defined by these intersecting peoples, from the early Bronze Age expansion to the Arvanite migrations, and the long-standing coexistence of Christian, Muslim, and Jewish communities, which have had a complex impact on the island's material culture, which remains part of its historical landscape.

## 3.3. Abu Qir's sunken cities

### *History and archaeological remains*

Although these events have not caused a decline in the current coastline. Thus, namely, an event which was not caused by a single but by a combined process involving relative sea-level rise, gradual subsidence, and disasters such as flooding of the Nile, earthquakes, and tsunami-related impacts (Hamouda et al., 2015, pp. 4–6). Consequently, archaeological remains have been discovered beneath layers of sediment and submerged in water, thereby facilitating their preservation in relatively good condition. Even organic materials have a high chance of survival because of a lack of oxygen, wherefore only microbial degradation is possible (Broda & Hill, 2021, p.9). Underwater research has documented a wide range of archaeological remains spanning a long time period. Some of the more prominent finds are monumental structures (such as temple-related architecture and harbour installations), sculptural material, inscribed stone elements, anchors, and other artefacts associated with religious and commercial life (Radwan, 2021, pp. 81–85). These remains are significant not only for their scale but also for their ability to illuminate long-term connectivity between Egyptian, Hellenistic, and Roman traditions. The archaeological remains from Abu Qir Bay are often closely linked to its role as a maritime hub, while several ancient coastal cities were located in this zone, including important sites such as Heracleion-Thonis and Canopus. The harbour played a key role in connecting the Mediterranean and the Nile Delta, as well as its hinterland (Shaikhon, 2019, pp. 3–5). Therefore, it is not only comparable regionwise with Euboea, but may also be linked to the hinterland activities currently being investigated on the Island. Underwater research has documented a wide range of materials, including monumental structures (such as temple-related architecture and harbour installations), sculptural material, inscribed stone elements and anchors (Radwan, 2021, pp. 81–85).

**Figure 18** *Photogrammetry Model of a Egyptian Pleasure Boat*



*Note.* This image shows a photogrammetry model of the wooden Egyptian pleasure boat with Greek inscriptions discovered in 2025. Reprinted from "Egyptian pleasure barge unearthed in Alexandria," by D. Radley, 2025, Archaeology Mag (https://archaeologymag.com/2025/12/egyptian-pleasure-barge-unearthed-in-alexandria/). Copyright 2025 by Archaeology Mag.

In 2025, a rare wooden shipwreck was discovered featuring Ancient Greek inscriptions, a language widely used for both written and spoken communication throughout this interconnected region (see Figure 18). As the European Institute for Underwater Archaeology (IEASM) operates in accordance with UNESCO guidelines, this find will be investigated on the seabed to ensure the vessel is preserved *in situ* (Radley, 2025).

## 3.4. Underwater Archaeological Park of Baia

### *History and archaeological remains*

The site of Baia has a remarkaly rich history and therefore some of the most luxurious Roman remains. The architctural remains vanished beneath the sea surface due to geological processes (Stefanile, 2016, p. 213). During the Roman Imperial period, Baia was an exclusive spa and residential centre for the Roman elite. The presence of thermal springs, combined with a favourable location near important ports such as Puteoli and Misenum, made Baia a prestigious location for villas, bathing complexes, and representative architecture. Zooming in on the submerged archaeological remains of Figure 4 reveals this Roman spa, including: the Villa dei Pisoni, a massive complex featuring a central courtyard and private thermal baths; the Nymphaeum of Claudius, a building originally decorated with elaborate statues (now replaced by replicas on-site) representing the Odyssean myth; and Villa a Protiro, famous for its remarkably preserved black-and-white geometric mosaics. (Stefanile, 2016). Morpho-bathymetric research has shown that some structures are now located at depths of several meters, while others are sunken to greater depths. This isn't because the buildings were constructed in different periods, but rather indicates varying rates of subsidence within the area (Passaro et al., 2012). This makes Baia a typical case of a sunken city, or rather, a forgotten or invisible maritime landscape.

# Chapter 4 - Marine Protected Areas (MPA): Global Differences in Preservation Challenges and Methods

Contemporary approaches to marine spatial planning are witnessing a paradigm shift in protecting global waters, including oceans, seas, and rivers. Internationally, the focus is shifting from strict preservationism to a model of sustainable accessibility. Important steps are currently being taken to protect these maritime zones by simultaneously enhancing public access and implementing various monitoring strategies. This chapter researches global paradigms and national-level analyses, specifically examining how two different states manage their respective MPAs. By evaluating the case study of Euboea (4.1) with international case studies from the wider Mediterranean region with comparable environmental contexts, namely Abu Qir, Egypt (Section 4.2) and Baia, Italy (Section 4.3). Each site demonstrates a distinct approach to balancing site-specific challenges with the need to maintain the integrity of submerged archaeological remains.

The preservation of maritime cultural heritage is vital not only for educational purposes, which deepen understanding of historical narratives, but also for its significant economic and social value. These sites support sustainable tourism and foster connections to cultural roots; therefore, this chapter will also aim to show how these global cases are working to keep the area open to the public. Consequently, the chapter concludes by assessing the current status of similar initiatives within the specific context of the case study. By discussing international preservation efforts and comparing them with regional Mediterranean counterparts, this chapter aims to identify the particular challenges and potential solutions for the sustainable development of Euboea's underwater heritage. Despite significant differences in national legislation across the region, international agreements remain in effect. Furthermore, Mediterranean nations face similar challenges in tourism, heritage management, and community engagement. This section analyses two maritime archaeological sites to see how countries in comparable environments make use of marine parks and UVAAS. The distinction between a marine park and an underwater museum lies in their focus: marine parks prioritise ecology and biodiversity, whereas underwater museums centre on archaeology. However, the fundamental objective remains the same: finding a sustainable approach to public accessibility, protection, and heritage management (Papageorgiou, 2018).

## 4.1. Preservation methods and current issues of Euboea

However, there are four primary reasons why this is not feasible at this location. Currently, diving and archaeological research are only conducted on shipwrecks through the EUA.

### 4.1.1. Problems of conservation in Greek waters

The first major threat to the Mediterranean involves overfishing, particularly through bottom trawling. This practice not only disrupts the marine ecosystem but also physically damages archaeological sites; recent legislation aims to curb these activities.

Second, the high pH of saltwater prevents many archaeological materials from being preserved, leaving mainly ballast, amphorae, and anchors. In recent years, these have been consistently covered (using zip ties) or excavated, resulting in even less being visible on the seabed (Tsompanidis et al., 2021, pp. 183-188). In addition, environmental factors pose further challenges while the warm, high-salinity waters of the Aegean Sea accelerate biotic processes, leading to the rapid deterioration of organic materials surrounding Euboea. This issue is exacerbated by climate change, which is driving global sea temperatures even higher (Daly, 2022).

Thirdly, the continuous tidal currents, which shift multiple times a day, along with strong tidal currents and wind patterns, make the water unpredictable and the seabed murky by continually displacing sediment. Additionally, the narrow strip of water is heavily trafficked, making diving conditions extremely hazardous for recreational diving. These dynamic conditions hinder accessibility and accelerate physical deterioration, often making standard survey and excavation practices unfeasible.

Finally, the region's maritime zones are designated for the 'Blue Growth' economy. This includes the development of offshore infrastructures, such as wind turbines and subsea cables, which require strict regulation to protect heritage assets. The tourism sector also falls within this framework. Scholars argue that mass tourism is increasingly unsustainable due to its high seasonality and limited economic value to local communities. However, halting tourism entirely would be economically disastrous for the region. Therefore, it is essential to identify sustainable solutions that balance economic needs with preservation. Scholars argue that, in recent years, mass tourism has become unsustainable. It is acknowledged that tourism suffers from high seasonality and limited economic value to local communities (Tsilimigkas & Rempis, 2021). Thus, across the Mediterranean region, there are various approaches to preserving maritime heritage, with each environment offering distinct advantages and disadvantages. While new technologies and methods offer fresh opportunities, local context remains decisive. Consequently, a Maritime Archaeological Cultural Centre (MACC) represents a viable initiative for Euboea. By focusing on a land-based museum and management structure, a MACC circumvents the local and regional challenges mentioned above, thereby effectively preserving the region's valuable archaeological heritage and overcoming the impact of mass tourism on an MPA. Moreover, it will contribute to the region's underdevelopment, especially on the island, as expected, in

line with the 2030 Sustainable Development Goals (SDGs), which Greece also aims to achieve. Thus, UCH could directly contribute to development, where performance in central Greece is below European levels (Koundouri et al., 2022), see Table 3 below.

**Table 3** *SDG status of 2022 and Influence of a MACC on the Future*

| *SDG* | Status | Direct impact of a MACC on current underdevelopt subjects |
|---|---|---|
| 4 QUALITY EDUCATION | Major Challanges | Provides direct access to specialized knowledge, narrowing the educational gap in Central Greece. Foccusing on cultural heritage and ocean literacy for both local schools and international students. |
| 8 DECENT WORK AND ECONOMIC GROWTH | Major Challanges | Creates high-quality local jobs and promotes sustainable, year-round cultural tourism on Euboea. This helps diversify the regional economy and reduces its dependence on seasonal mass tourism from Athens.. |
| 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE | Major Challanges | Introduces modern scientific infrastructure and digital innovation to a region currently lagging in technological development. It establishes Euboea as a strategic hub for advanced underwater research and international collaboration. Accessible by public transport from cities like Athens and Thessaloniki. |
| 10 REDUCED INEQUALITIES | Major Challanges | Promotes social and economic inclusion by providing the local Euboean population with direct access to high-level cultural and scientific resources. Additionally, it helps bridge the developmental gap |
| 11 SUSTAINABLE CITIES AND COMMUNITIES | Major Challanges | Secures and preserves the region's unique underwater heritage, fulfilling critical targets for cultural protection. The center also strengthens local identity and social cohesion by involving the community in heritage management. |
| 14 LIFE BELOW WATER | Significant Challanges | Raises vital awareness about the protection of marine environments. It teaches the importance of human-sea interactions to help preserve biodiversity. |

*Note.* The Sustainable Development Goals status of 2022, displaying what the direct influence of a Maritime Archaeological Cultural Centre could have on the region of central Greece / EL64.

## 4.2. Abu Qir

### 4.2.1. Preservation methods and current issues

Operating under UNESCO protocols, the IEASM aims to study the shipwreck on the seabed; however, achieving successful *in situ* conservation is particularly shaped by environmental and development pressures. Firstly, coastal waters around Alexandria are affected by intense abiotic impacts, including heavy pollution loads, increased turbidity, and waste inputs. Such conditions can drive chemical degradation that threatens stone and metal components of underwater sites (El-Rayis et al., 2003, pp. 145–148). Sediment chemistry is a key concern. The bay serves as a collection point for industrial wastewater from 22 factories (e.g. food, paper, fertiliser, and textiles) and agricultural discharges via the Rosetta estuary and the El-Tabia pumping station. This results in high concentrations of heavy metals, such as tin (Sn) and cadmium (Cd), in sediments. The presence of heavy metals can affect ecological systems and potentially intensify corrosion and other forms of deterioration in archaeological materials (Abdel Ghani et al., 2013, pp. 5–10).

Furthermore, the Mediterranean environment is generally unfavourable for the long-term preservation of organic materials, such as wood. Once a shipwreck or other organic artefacts become exposed above the protective sediment, they are immediately subjected to high salinity and alkaline pH levels. Additionally, the region's warm climate accelerates the activity of microorganisms and other biotic processes, which lead to the rapid degradation of timber (Öniz, 2025).

At the same time, biotic factors such as sediment movement from the Rosetta branch can alternately bury and expose cultural remains, creating cycles of protection and vulnerability. When archaeological structures become exposed, they may suffer from mechanical abrasion, stronger hydrodynamic forces, and accelerated decay. Additionally, large-scale coastal engineering interventions pose additional risks. Research on dredging and land reclamation emphasises that such activities can increase suspended sediments and create physical and ecological impacts that may also affect nearby UCH contexts (Mostafa, 2012, pp. 3–5). More recent research by Elfadaly and Lasaponara demonstrates that high-resolution satellite data enables precise diachronic analysis of land-use change. Their results indicate rapid, largely unplanned urban expansion around Alexandria, with growth accelerating after 2008 and increasingly encroaching on areas of archaeological significance (Elfadaly & Lasaponara, 2019, pp. 7–10). This fragmented pattern of coastal urbanisation intensifies pressure on both terrestrial and submerged cultural heritage, as archaeological sites are embedded within the same dynamic and interconnected coastal system (Elfadaly & Lasaponara, 2019, pp. 10–12). Although UCH should be protected through national heritage legislation and framed by international principles, including those associated with the UNESCO 2001 Convention and its emphasis on *in situ* preservation as the preferred approach, implementation remains challenging in highly urbanised coastal zones. In these areas, governance can be fragmented, and development pressures often outweigh archaeological priorities

(Shaikhon, 2019, pp. 8–10). A significant issue in this regard is that legal protection does not automatically translate into effective safeguarding in practice. When coastal development and infrastructure projects proceed without systematically integrating underwater archaeological risk assessments, the probability of accidental damage or the loss of context increases.

### *Public Engagement and Accessibility*

A paradox defines the accessibility of the UCH in Abu Qir Bay: while the sites' depths, ranging from 5 to 15 meters, are technically ideal for diving, the prevailing environmental conditions make public engagement nearly impossible. These factors are of critical importance to archaeological management; chemical and biotic processes in the bay's polluted waters accelerate material decay, while persistent turbidity creates a visual barrier that hinders both scientific documentation and public visitation. Currently, public access is severely constrained by a combination of low visibility and strict safety restrictions, making recreational diving for the general public, in practice, rarely feasible. Consequently, access is restricted to professional teams and specialists operating under highly controlled conditions, leaving this vast heritage largely invisible to non-experts (Radwan, 2021, pp. 90–92). This reality fundamentally shifts the focus of public archaeology in the region; engagement cannot be achieved through in-water visitation, but must instead be facilitated through alternative, innovative forms of interpretation and outreach.

The case of Abu Qir Bay illustrates the tension between international heritage management ideals and the harsh reality of an urbanised industrial coastal zone. Although the site hosts one of the densest concentrations of UCH in the Mediterranean, recently reaffirmed by the discovery of a rare wooden shipwreck in 2025, the environmental context necessitates a reassessment of traditional management models. The paradox of Abu Qir lies in the fact that the very factors that justify *in situ* preservation under UNESCO guidelines simultaneously constitute the primary barriers to public access. Extreme water turbidity and chemical degradation caused by industrial pollution render physical access for recreational divers virtually impossible and unsafe (Radwan, 2021). This creates a disconnect between the scientific significance of the findings and the public's engagement with them. The primary issue here is that in-water accessibility (such as a conventional underwater park) should not be the sole metric for successful heritage management. Instead, the situation in Alexandria calls for a hybrid model. To date, no tangible progress has been made due to regional instability and the pursuit of opportunistic, large-scale projects for a submerged museum. Although the initial concept was proposed as early as 2008, the transition from theory to actual implementation has faced prolonged delays (Anstey, 2015). Meanwhile, scientific research continues, but the general public remains significantly disconnected from their UCH.

## 4.3. Baia

### 4.3.1. Preservation methods and current issues

The conservation of underwater heritage in Baia is influenced by a complex interplay of physical, chemical, and biotic factors. Stone and mortar structures are exposed to salt crystallisation, light, temperature fluctuations, and mechanical erosion from wave action and sediment movement. Furthermore, biodeterioration plays a significant role in the site's decay. Recent research on mosaics within the archaeological park demonstrates that halophilic and halotolerant microorganisms, including cyanobacteria and algae, contribute to the deterioration of stone surfaces (De Rosa et al., 2025). Managing these biological threats requires constant monitoring and non-invasive cleaning techniques to prevent the loss of complicated and detailed Roman artwork.

The site also faces external pressure from the land. Urban expansion around heritage sites in Baia has been characterised by "wild urbanisation," which threatens the historical context of the landscape (Cova & Belvedere, 2019, p. 171). Satellite imagery and GIS tools are now being used to characterise and monitor these urban expansion patterns over time, particularly within the coastal buffer zones that border the archaeological park. The aforementioned research by Elfadaly and Lasaponara (2019) specifically examined the case of the Aragonese Castle in Baia; these GIS-based tools have revealed a steady increase in built-up areas over the past decades. This encroachment often occurs without integrated planning, threatening the visual integrity and the historical landscape that connects the terrestrial ruins with the submerged city. This kind of urbanisation is not merely an aesthetic concern; it also poses significant environmental risks to the submerged remains. The increase in impermeable surfaces due to urban growth leads to higher runoff rates and potential pollution, which can negatively impact water quality and sediment stability within the UAP. Management authorities can identify high-risk areas where urban pressure is most likely to cause the decay of heritage assets by integrating satellite imagery with spatial analysis. This approach has become a cornerstone of contemporary management strategies that balance modern urban needs with the preservation of the cultural landscape (Elfadaly & Lasaponara, 2019)

#### *Public Engagement and Accessibility*

The submerged remains are primarily made visible to the public through a network of authorised diving centres. These centres act as mediators between heritage and the visitor, providing guided tours that follow specific archaeological itineraries (Stefanile, 2016, pp. 219-220). This approach allows tourists to view replica or original mosaics, statues, and walls in their original context. For non-divers, accessibility is facilitated through glass-bottom boats and snorkelling excursions, ensuring that the heritage is not reserved solely for a niche audience (Kyvelou & Ierapetritis, 2024, p.8). Recent management models have moved toward more active visitor participation. Tourists are increasingly involved in data collection, a method known as "citizen science", where divers help monitor the state

of conservation by reporting changes or biological growth on the ruins (Canoro, 2024, p. 170). This involvement not only provides researchers with a larger dataset for monitoring but also fosters a sense of "shared ownership" and responsibility among the public. Innovative techniques, such as 3D reconstruction, are used for educational and scientific purposes, including monitoring conservation methods (Bruno et al., 2013) and interactive public engagement (Stefanile et al., 2012).

Furthermore, local organisations have expanded their scope beyond archaeology to include themes such as marine biodiversity and the region's unique volcanic activity, creating a more holistic educational experience (Canoro, 2024, p. 177).

# Chapter 5- Towards a Sustainable Future: Recommendations for Establishing a Maritime Archaeological Cultural Centre

This chapter summarises the research's conclusions regarding the establishment of a Maritime Archaeological Cultural Centre (MACC) on Euboea. The multidisciplinary approach of this thesis, combining material analysis with policy studies and environmental science (5.1.1 & 5.1.2), has been essential for understanding the region and the current issues of cultural heritage preservation. The findings from the previous chapters are synthesised to answer the main research question: *How can a MACC serve as an educational tool for heritage preservation and sustainable local development?* In the final section (5.1.3), I provide a recommendation concerning the location and feasibility.

## 5.1. Maritime & Cultural Heritage: Archaeology, Education, Tourism & Development

### 5.1.1. Synthesis of Research Findings: Preservation and Public Accessibility

This research has demonstrated that Underwater Cultural Heritage (UCH) meets strict requirements both in Greece and globally. Global frameworks, such as the UNESCO 2001 Convention, prioritise *in situ* preservation as the first option. It should serve to maintain heritage in its original context. In this thesis, I argue that these strict *in situ* methods are always beneficial but, in practice, often lead to public detachment or neglect. Broadwater and Nutley (2009) and Ortmann et al. (2010) note that without active monitoring, this can unintentionally serve as a justification for inaction or result in "invisible" heritage for the general public, consequently leading to neglect.

To address these challenges, this study evaluated two Mediterranean case studies and a comparable national Marine Protected Area (MPA). The archaeological data from Chapter 3 demonstrate that the case studies often share geophysical and archaeological characteristics with Euboea, particularly in terms of materials and historical periods. They form part of a broader “maritime cultural landscape,” a concept introduced by Christer Westerdahl (1992). Euboea’s strategic position along the Euripus Strait served as a key hub and maritime crossroads, shaped by its unique tidal and wind conditions throughout Mediterranean history and researched by Koutsouflakis (2003). Evidence for connectivity beyond Greece's territorial waters is found in the hinterland of Euboea and on the wreck sites; ceramics illustrate deep economic and cultural ties across the Mediterranean. As shown in Chapter 3, the sequence of wrecks in the South Euboean Gulf is also very much comparable with other sites, which is therefore important to the region. Although I would have liked to explore all the wrecks, I didn't have enough time, and ultimately, this wasn't the primary goal. One of the case study sites is Baia, Italy, where the Underwater Archaeological Park (UAP) demonstrates that active public participation through "citizen science" is essential for societal support. As noted by Canoro (2024), involving visitors in monitoring site conditions to get a sense of "shared ownership".

Furthermore, Stefanile (2016) highlights how accessibility for non-divers through different practices could help broaden understanding of heritage for a broader public and is not a niche privilege. In Abu Qir, Egypt, we see the limits of physical access, where extreme environmental factors, such as the industrial pollution and high turbidity discussed by El-Rayis et al. (2003) and Radwan (2021), often make recreational diving impossible. This call for digital model or land-based education, as described by Mostafa (2012), has become the primary means of engagement, a scenario often spoken of, but not always worked out. While other Greek MPA, such as Alonissos, serve as a national model for Underwater Visitor-Accessible Archaeological Sites (UVAAS), its remote location and the lack of community involvement in decision-making, documented by Karantoni et al. (2023), can influence long-term socio-economic impact.

### 5.1.2. The MACC as a visible public place for Sustainable Development

Therefore, another way must be found to make heritage accessible and visible to a wider public, including the local population and tourists. Additionally, it is important to address the socio-economic challenges of Central Greece, as documented by Eurostat (2024), as well as its potential. A public gathering place can not only actively help make heritage visible but also contribute to the 2030 Sustainable Development Goals (SDGs). This can be achieved by utilising the aforementioned models that encourage "citizen science", as well as through new educational innovations, such as using digital technologies like 3D photogrammetry to represent maritime heritage that is invisible or has already been lost. The reconstructions by, among others, Bruno et al. (2019) demonstrate what can be created and shown to a broader audience on land to overcome the physical barriers of the sea. This makes "invisible" history accessible to all citizens, fulfilling the educational idea of Alivizatou (2012) regarding intangible heritage. The MACC therefore offers an alternative to the mass tourism in Athens by establishing a new museum-like institution that redirects visitors from the overcrowded museums in Athens to underdeveloped regional units. Stoelhorst (2010) and Tsilimigkas & Rempis (2021) emphasise that a complex strategy is required to transform the local history into a financially sustainable experience. This aligns with the "Blue Economy" model for sustainable development, ensuring that maritime resources are used for the good rather than exploited.

### 5.1.3. Recommandations

Based on this research, two factors are particularly important. On the one hand, the proper preservation of archaeological material for (future) research, and on the other, making this heritage tangible for a broader audience. These objectives often conflict, leading to the following conclusion. First, stakeholders, including political bodies, municipalities, and the Ephorate of Underwater Antiquities (EUA), must do an analysis of how Euboea can play a more active socio-economic role through the establishment of a Maritime Archaeological Cultural Centre (MACC). This should involve consulting comparative case study sites, such as

Baia, Abu Qir, and the Alonissos (MPA), to evaluate their performance data and determine whether there is sufficient public support and whether tourism is feasible for such sensitive areas.

Furthermore, the optimal location for this centre must be investigated; the Mikro Vathi Factory is a potential site due to its accessibility from Athens, and this should be further researched. It is also essential to assess the financial feasibility, specifically whether costs can be covered by the state or subsidised by the EU, in alignment with the 2030 Sustainable Development Goal (SDG) targets. Ultimately, integrating legal frameworks and current challenges (5.1), innovative digital methods (5.2), and proposed future research (5.3) will contribute to the successful establishment of a MACC, enabling this region to reclaim its important historical and future role.

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## Figures

# Tables