Preserving the Heritage of the Depths: Facing the Challenges Underwater Cultural Heritage meets Today

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ABSTRACT

Underwater Cultural Heritage has great potential to promote the education, well-being, and economic development of local communities. However, community participation in its preservation and dissemination is limited and is tied to public awareness and responsible scientific research. Only a well-protected heritage has the potential to offer significant public benefits. Therefore, initiatives involving organizations, academic networks, and the local community, as well as collaboration with the global diving community, can strengthen the sense of shared responsibility for protecting these sites. This article addresses these key issues for the future of the world's Underwater Cultural Heritage.

Key words

Community Engagement | Conservation | International Cooperation | Underwater Cultural Heritage | Responsible Tourism | Unesco |

Underwater landscape at Beveridge Reef, Niue | photo UNDP (Vlad Sokhin)

Preservar el patrimonio de las profundidades: afrontar los retos actuales del patrimonio cultural subacuático

RESUMEN

El patrimonio cultural subacuático tiene un gran potencial para favorecer la educación, el bienestar y el desarrollo económico de las comunidades locales. Sin embargo, la participación comunitaria en su preservación y divulgación es limitada y está ligada a la sensibilización pública y a la investigación científica responsable. Sólo un patrimonio bien protegido posee el potencial de ofrecer importantes beneficios públicos. Por eso las iniciativas que involucren a organizaciones, redes académicas y la comunidad local, así como la colaboración con la comunidad global de buceo, pueden fortalecer el sentido de responsabilidad compartida para proteger estos sitios. En este artículo se abordan estas cuestiones determinantes para el futuro del patrimonio cultural subacuático mundial.

Palabras clave

Cooperación internacional | Conservación | Participación comunitaria | Patrimonio Cultural Subacuático | Turismo responsable | Unesco |

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INTRODUCTION

Underwater cultural heritage represents a vast and invaluable collection of historical and archaeological treasures lying beneath the world's oceans, rivers, and lakes. From ancient shipwrecks and submerged cities to forgotten trade routes, these underwater sites offer a unique window into human history and the evolution of civilizations. However, safeguarding and studying this heritage comes with numerous challenges that must be addressed to ensure its preservation and appreciation.

Today, some of the greatest challenges facing submerged heritage include raising public awareness and increasing recognition for its protection and research within the scientific community.

It is absent from major media as much as from ocean forums and scientific debates. Culture comes everywhere, it seems, last. Protecting these delicate sites while facilitating responsible research requires however building synergies and capacity across various sectors. Heritage professionals alone are too few and not able to save and investigate the hidden underwater treasures on their own. It is thus important to encourage responsible access to heritage sites and artifacts by the public to raise visibility and by scientists to promote the use of data gathered from research efforts.

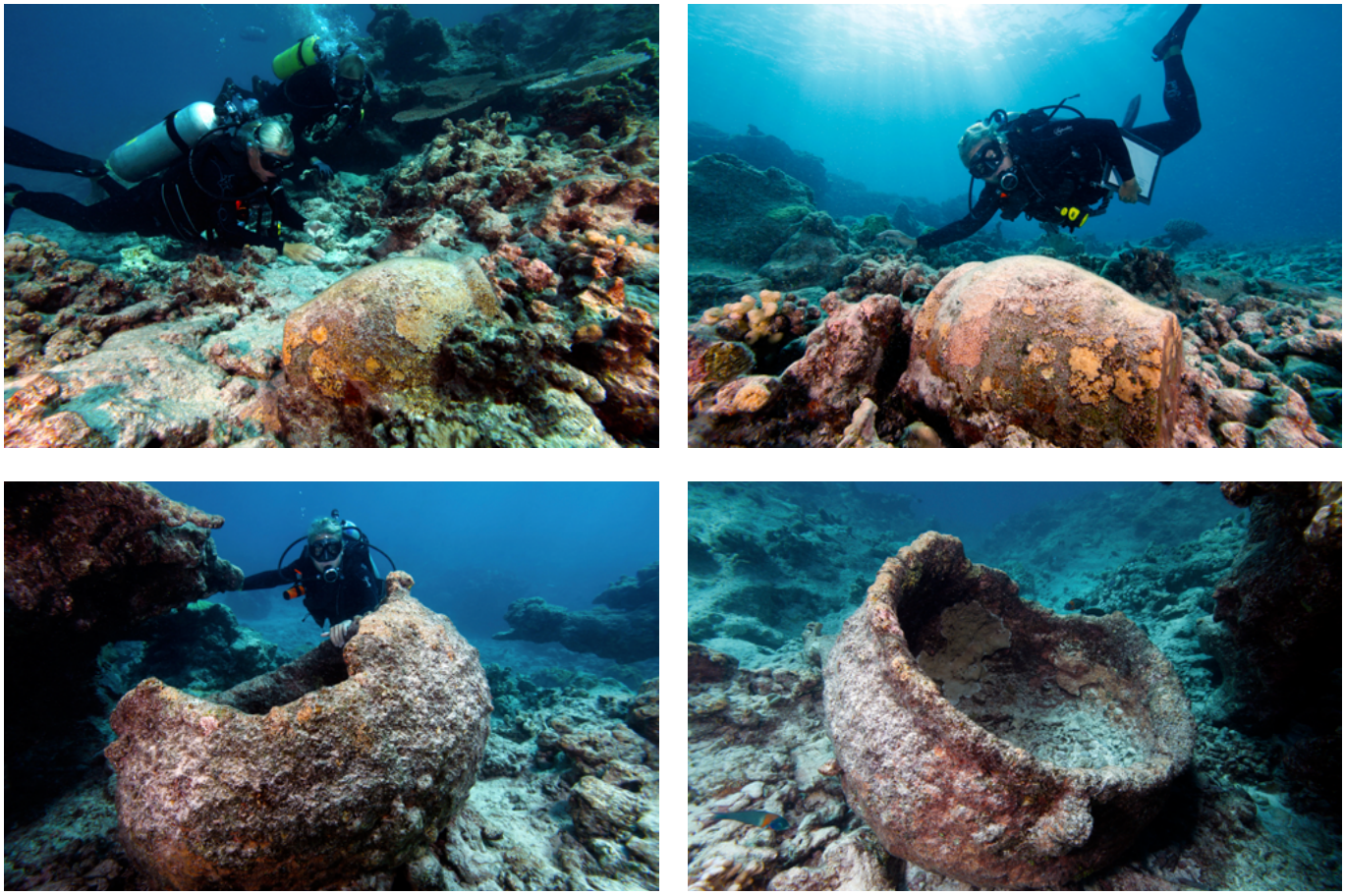
For this to happen, capacity and research need fostering as much as the protection of this heritage from looting and industrial activities. Only well-protected heritage has the potential to offer significant public benefits, and this requires a concerted effort to manage and communicate its value to broader audiences. Last but not least, the current changes in our climate and in sea levels do begin to impact underwater and coastal heritage in a faster and ever more devastating way. Here, awareness raising, and action are needed ever more urgently.

In this article, we will explore these pressing issues, highlighting the most important steps needed to secure the future of the world's underwater cultural heritage.

INCREASING PUBLIC, POLITICAL, AND SCIENTIFIC ENGAGEMENT BY STRENGTHENING AWARENESS

Let us begin with the starting point of it all: Awareness

One of the most pressing challenges in the preservation of underwater cultural heritage is the need for a substantial improvement in its visibility. Despite the growing importance of submerged heritage for science, much of its value remains hidden from the public eye, and its potential as a tool for science, education but also well-being is underutilized.



Maritime archaeologists document artifacts at the *Two Brothers* shipwreck site at French Frigate Shoals | photos NOAA (Greg McFall, Raymond Boland)

Reasons therefore exist many

Unlike heritage on land, underwater sites are physically submerged, locating it out of sight for most people. Exploring it often requires specialized diving equipment, technology like remotely operated vehicles (ROVs), and professional archaeological expertise. This restricts public engagement and awareness, as it is not as easy to visit as land-based heritage sites. Would the Titanic be located on land it would have millions of visitors a year. As it is, only a very few have been able to observe it from close.

Underwater cultural heritage is in consequence neglected in school curricula and textbooks, which emphasize terrestrial history and heritage. This leaves most people unaware of the rich cultural resources lying beneath the water. Popular media, including documentaries, films, and news stories, rarely focus on underwater heritage compared to land-based archaeology. Worse: When it is covered, this coverage often centers on treasure hunting, rather than the historical and cultural significance of the sites. This has created a skewed public perception that focuses on financial gain rather than cultural preservation.

Examples of this abound, yet, the Spanish audience will certainly be most familiar with cases as that of the Nuestra Senora de las Mercedes or the Columbian San José shipwreck.

Pirate narratives overshadow the scientific and historical relevance of underwater heritage, making it harder for the public and institutions to take it seriously as a field of study or a heritage to protect. Many cultural heritage organizations, governments, and international bodies prioritize terrestrial sites, leaving underwater heritage underfunded and underrepresented in protection laws and research initiatives. The complexities of underwater work can discourage authorities from allocating resources to it and most countries lack robust legal frameworks for protection to begin with.

While underwater heritage is increasingly threatened by climate change, pollution, and looting, many of these threats go unnoticed or are not understood by the public. Without a visible, immediate danger like the deterioration of a historical building, it can indeed be hard to convey the urgency of protecting underwater heritage.

FINDING A SOLUTION IN EDUCATION

To change this situation, educational programs that bring underwater cultural heritage to the forefront need to be developed and widely disseminated. One of Unesco's partners, the Unesco Chair for Ocean History at Lisbon's Nova University has started to teach underwater heritage values to all students in the university, no matter, what their subject of study is. Such kind of initiative is needed almost globally.

An opportunity provides here the active participation in the current Europe-wide Ocean Literacy initiative, which aims to increase understanding of the ocean's critical role in human life and culture. Additionally, formal and non-formal learning materials targeting children and youth need however to be created to foster early interest and respect for our submerged treasures instead of promoting the pirate's hunt for gold that is quite ubiquitous in children's books and stories. It is urgent to provide young learners with interactive resources, encouraging curiosity and a deeper connection to underwater cultural heritage as well as an understanding for its true cultural values.

To do this, many ways are available. Heritage professionals can collaborate with educators and curriculum developers to integrate underwater cultural heritage into subjects like history, geography, and environmental science. They can also develop extracurricular programs such as after-school clubs, museum workshops, or summer camps, where students can engage with interactive content, such as virtual dive experiences or archaeology simu-

lations. Digital resources, educational videos or animated series can foster this.

Unesco has since several years encouraged an NGO as well as a university network to facilitate initiative. A professional network for the ongoing UN Ocean Decade has also been created. It can be hoped that these actions can change education for the better.

A special focus needs to be the work with museums, heritage organizations, and archaeologists to create programs where students can interact directly with experts through virtual talks, workshops, or internships. The museums and sites designated by Unesco as Best Practice for Access to submerged heritage are here the ideal partners to go forward.

There remains however the hippopotamus in the room: the question of underwater heritage being absent from the major Aquariums, with the exception of the Antalya Aquarium and some small contributions by the Naples and the Genova Aquariums. The introduction of the concept of culture in marine biodiversity and therewith in Aquariums is yet to be achieved. While archaeologists speak already from biocultural sites, in aquariums the focus is plainly on fish.

Integrating heritage into ocean education is thus essential to foster a more comprehensive understanding of the ocean as a cultural and historical resource, not just a biological and ecological one. To foster a generation that values and protects both the natural and cultural aspects of our oceans, integrating underwater cultural heritage into marine biology education is essential. By doing so, we need to broaden students' understanding of the sea, inspire interdisciplinary thinking, and promote the conservation of both

Aquarium of Antalya, Turkey | photo Onur Taner

Aquarium of Antalya, Turkey | photo aakaashá

marine life and the irreplaceable cultural stories hidden beneath the waves. Through collaborative efforts between educators, heritage organizations, and governments, we need to create an educational system that not only nurtures curiosity about marine ecosystems but also deepens respect for the ocean as a repository of human history.

There is still some convincing to be done, but a way might be the designation of Blue Schools for Heritage, in which interdisciplinary learning is fostered. Submerged heritage sits at the crossroads of disciplines such as archaeology, history, anthropology, and oceanography. Including it in marine biology education encourages broader thinking, blending science with humanities. This can make the curriculum more engaging and help students develop diverse analytical skills.

Many students may be inspired to protect the ocean through marine biology, but underwater heritage adds another layer –the preservation of historical artifacts that are often endangered by looting, pollution, and climate change. Understanding heritage vulnerability will inspire a new generation of custodians who care for both natural and cultural heritage under the sea.

Another way may be to actively and from official side to encourage schools to explore local heritage and nearby underwater heritage sites, even if they are located in lakes, rivers, or reservoirs, making it feel relevant and tangible to students' lives. Such heritage allows students to connect with both local history, such as submerged settlements near coastlines or inland lakes, and global maritime history, such as ancient trade routes. This will foster a greater appreciation for their own cultural identity while recognizing the interconnectedness of human histories worldwide.

A third option is the development of Citizen Science Projects. Students could participate in projects where they help map or monitor underwater sites, contributing to real scientific research while learning about both the history and biology of these environments.

Last but not least, an opportunity might also be the establishment of a special Underwater Cultural Heritage Day by Unesco, as currently underway. Schools can on such a day host themed events where students explore ocean ecosystems and heritage simultaneously. Partnering with museums, dive centers, and marine archaeologists for talks, exhibitions, or even field trips to sites can provide hands-on learning opportunities. Similar to Unesco's Dive for Peace initiative, schools could also organize local events where students can snorkel or dive at heritage sites, supported by educational materials that explain the significance of these submerged cultural landscapes.

Addressing the media

In addition to the above there remains the problem of the perception of underwater cultural heritage provided by the media.

The establishment of a media network dedicated to submerged heritage remains a crucial, and yet unfulfilled objective. A wider collaboration of heritage professionals with media partners and stakeholders would amplify the submerged heritage's presence, bringing greater visibility through documentaries, articles, and media campaigns. This would help translate the academic and archaeological value of these sites into narratives that resonate with the broader public. To this end, partnerships with NGOs, the Unesco Unitwin Networks, and the use of social media platforms –such as blogs, online campaigns, and collaborative projects– could play a pivotal role in boosting awareness and engagement. May be one could also dream one day of a heritage ambassador for submerged sites.

Cultural sensitivity

One element is important in all education efforts and thus needs to be mentioned here: cultural sensitivity, mutual respect and diversity. Underwater Cultural Heritage, by its very nature, holds an inherently intercultural significance. Maritime routes, submerged cities, shipwrecks, and artifacts often tell stories that transcend national boundaries, representing the shared history of humankind. This makes it a uniquely powerful tool for cross-cultural dialogue and understanding. Unesco has consistently emphasized the importance of using underwater heritage as a vehicle for promoting intercultural exchange and raising awareness about the need for its protection.

In commemoration of the centenary of World War I, Unesco organized for instance a series of initiatives including a major conference, publications, research projects etc., to highlight the submerged heritage associated with this

historical event. These actions not only shed light on the vast number of shipwrecks, submarines, and other underwater sites from the war but also aimed to create a more inclusive and balanced narrative around these artifacts.

By adopting an integrated approach in awareness-raising efforts, Unescoensured that the focus went beyond the mere historical events to address the social and cultural ramifications of World War I. This approach not only highlighted the diversity of experiences tied to the war but also contributed to reconciliation by fostering a shared understanding of this turbulent period and the preservation of its traces. This initiative demonstrated how underwater cultural heritage, when treated with cultural sensitivity, can help build more inclusive and representative narratives, acknowledging the contributions and experiences of all those affected –whether on land or under the sea. A similar effort is underway focusing on the colonial shipwrecks, i.e. from Spain, the UK and France, in the Americas.

All educational efforts related to Underwater Cultural Heritage must prioritize such cultural sensitivity and inclusivity, ensuring that heritage is made accessible and relevant to all communities, including local and also indigenous populations. This approach is essential for fostering a deeper understanding and respect for this heritage, as well as reflecting the diverse cultural contexts and perspectives that have shaped it.

Ultimately, these efforts reflect Unesco's broader mission to make heritage more inclusive and relevant to all, ensuring that educational programs and commemorations are culturally sensitive and recognize the diverse voices of history. By engaging local populations and respecting indigenous perspectives, these initiatives help create a more comprehensive understanding of the past, offering valuable lessons for the present and future.

Addressing decision makers and international forums

While the public awareness is crucial, there is no successful protection without the commitment of the cultural decision makers. Raising awareness among decision-makers and politicians requires bolstered legal and technical support for States. Assistance in harmonizing national laws and allowing for a common approach is a main reason of being for Unesco's 2001 Convention on the Protection of the Underwater Cultural Heritage.

On the next page, those ceramic vessels served as containers for transporting goods such as wine, oil, and grains across the Mediterranean. British Museum (top left) | photo Dale Cruse

Ship's Log Rotator (top right) | photo Wessex Archaeology

Greek anchors from the Classical and Hellenistic periods from the northern coast of Sicily. Exhibit Thalassa: meraviglie sommerse dal Mediterraneo (below) | photo Dan Diffendale

Strengthening decision makers awareness can be achieved through the promotion of existing legal frameworks, especially the 2001 Convention, but also including the already existing Unesco model law on underwater cultural heritage, and through direct assistance to governments.

Additionally, underwater cultural heritage needs to gain greater representation at key international forums. Active presentation of the cultural aspects of the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oceans in events such as the intergovernmental UN Ocean Conferences, discussions surrounding the Sustainable Development Goal 11, 13 and 14 and climate change summits need to integrate submerged heritage into broader environmental and policy dialogues. These platforms provide an opportunity to demonstrate how protecting this heritage is linked to wider global goals, such as ocean sustainability, biodiversity conservation, and climate action.

Particular attention must also be given to supporting Small Island Developing States (SIDS), Least Developed Countries (LDCs), and African nations in their efforts to safeguard their underwater cultural heritage. These regions, often at the frontline of climate change and oceanic challenges, require targeted assistance and strengthened collaboration to ensure their underwater cultural heritage is not lost. Most of them have no underwater archaeologists, but a variety of important submerged cultural sites.

Empower the scientific community

Speaking of awareness raising, it is finally essential to enable the scientific community to better disseminate its research on submerged heritage sites. Improved collaboration with key oceanic bodies like the Intergovernmental Oceanographic Commission and the agencies of the UN Oceans Network, as well as providing input to global platforms such as the UN Secretary-General's reports and the COP climate conferences, needs to ensure underwater cultural heritage research reaches the right audience. Creating pathways for scientists to present their findings in these high-level spaces is key to building a robust, science-based approach to heritage preservation.

To better disseminate research, the scientific community needs to be equipped with communication skills, technological tools, and platforms that allow them to share their work with a wider audience. Collaboration between marine biologists, oceanographers, and historians is already ongoing on many sites. For example, a project on ancient shipwrecks will today often also explore the impact of wreck sites on marine biodiversity, drawing in wider scientific interest. The Mexican Hoyo Negro project, focusing on human and animal remains in a cenote karst cave, involved elite divers, underwater archaeologists, marine biologists, anthropologists and many domains more.

Interdisciplinary Conferences and Workshops remain however needed. Events that bring together archaeologists, historians, conservationists, and natural scientists can provide a platform for shared research, cross-pollination of ideas, and the co-development of public dissemination strategies that appeal to different audiences.

Important is also that universities, research institutions, and funding bodies require that a portion of funding or project plans be dedicated to dissemination.

ENHANCING PROTECTION AND RESEARCH: THE VALUE OF SCIENTIFIC INFORMATION AND INTERNATIONAL COOPERATION

After having spoken of awareness, protection needs also to be addressed. Without protection soon there will be nothing left of the precious submerged sites off our coasts.

Protection and research of underwater cultural heritage are essential not only for preserving historical and archaeological treasures but also for unlocking invaluable scientific information. The cultural, historical, and environmental data embedded in submerged sites offer unique insights into human history, past climate conditions, and ancient ecosystems.

However, these sites are under constant threat from natural degradation, looting, and increasing industrial activities. The need for a more structured and data-driven approach to protective actions has never been more urgent.

Improving data exchange

A critical step in enhancing underwater heritage protection and understanding involves improving data collection and analysis. This begins with robust reporting mechanisms from all stakeholders, including governmental bodies, scientific researchers, NGOs, and local communities. Modern technologies such as remote sensing, underwater drones, 3D mapping, and advanced data analytics can transform our understanding of submerged heritage. These tools offer the potential to detect and monitor heritage sites, assess threats, and measure the effectiveness of protective measures in real time. They are easy to share and better to analyze. The involvement of skilled partners and experts in data evaluation and interpretation is essential to ensure that the collected information is accurate and actionable.

Crucial is however also to make the collected data accessible. This needs to be a two-way street. Heritage professionals need to be able to easily access data on seabed formations, climate change and sea level rise, among others, while ocean research would benefit from underwater cultural heritage research results.

Such goals require enhanced cooperation between all actors engaged in protection and research. State Parties to the 2001 Convention, universities, NGOs, researchers, and the Unesco Scientific and Technical Advisory Body (STAB) must coordinate their efforts to ensure that data on underwater cultural heritage, its current status, threats, and conservation needs are shared and properly analyzed. The STAB, in particular, plays a pivotal role in evaluating research, providing technical assistance, and advising on Best Practices. However, to carry out these crucial functions, STAB's work conditions and financial support must be significantly strengthened.

Lagoons and Reefs of New Caledonia, 2001 | foto NASA/GSFC/Landsat

Furthermore, a concerted effort is needed to improve information flows. An example may be given. In Croatia submerged sites have been protected with metal cages. In a similar initiative the Mazaron shipwreck in Spain was safeguarded with a metal box cover. In both cases the way chosen brought problems. The metal decayed, changed the current, sank into the ocean floor. Making such experiences available to all is important to avoid making them another time instead of improving protective efforts based on the elements learned.

Engagement with intergovernmental organizations

Beyond improving research and protection mechanisms, increased engagement with intergovernmental organizations is crucial for underwater cultural heritage preservation and research. Strengthening cooperation with or through Unesco with the Intergovernmental Oceanographic Commission (IOC), the UN Department of Law of the Sea (DOALOS), and the International Seabed Authority (ISA) can here enhance efforts.

For instance, closer collaboration with the IOC needs in future to ensure that cultural aspects are included in broader marine management strategies such as Marine Spatial Planning, Marine Protected Areas, and efforts to combat climate change. Only this integration of cultural heritage into ocean protection frameworks will ensure that underwater cultural heritage is considered in policies addressing ocean sustainability and environmental conservation.

Intergovernmental Oceanographic Commission

Legal protection efforts

Another key area for improvement is the development of relevant laws, policies, and regulations in alignment with the 2001 Unesco Convention on the Protection of Underwater Cultural Heritage.

Many nations lack adequate legal frameworks to protect submerged heritage, making it vulnerable to exploitation and damage. Legal capacity-building initiatives, including training programs for authorities, are needed to empower governments to draft, implement, and enforce these laws effectively. A comprehensive legal commentary on the 2001 Convention, along with the development of specific training materials, could provide much-needed clarity and guidance to State Parties.

Also, by bolstering the current series of regional and national meetings, organized by Unesco not the last with the help of Spain, with targeted legal training, countries can improve their ability to protect underwater cultural sites.

In tandem with legal capacity-building, institutional capacities of states and organizations responsible for underwater cultural heritage need to be enhanced. Collaboration between governments, cultural institutions, and researchers can lead to the development of stronger management plans and effective responses to emergency situations, including the impacts of climate change and industrial activities such as deep-sea mining.

Especially, the creation of a project focusing on “Culture and Emergencies – Underwater and Coastal Heritage in the Face of Climate Change” would be a groundbreaking initiative. Such a project could establish emergency response mechanisms, ensuring that underwater cultural heritage is protected in times of crisis.

Pilot projects by Unesco are already ongoing in the Dominican Republic, in Senegal’s Delta Saloum and elsewhere. More action is however needed.

Industrial actors working in the oceans also need to be made more aware of submerged heritage and its importance. Special campaigns aimed at sensitizing industries, such as the fishing, shipping, and energy sectors, to the presence of Underwater Cultural Heritage could here help mitigate accidental damage to heritage sites. Encouraging these actors to collaborate in the protection of underwater heritage is essential to ensure its long-term survival.

Building capacity

Finally, there remains a continuous need for underwater archaeology training, particularly in regions like Africa, LDCs, and SIDS. These areas often lack the technical expertise and resources necessary to conduct

underwater research and conservation. The STAB plays a crucial role in providing technical assistance to these nations, but additional support is needed.

By addressing these key challenges –strengthening research, improving laws, building capacity, and fostering cooperation– the scientific value contained in underwater cultural heritage can be fully realized, ensuring these sites are protected for future generations.

The Unesco Scientific and Technical Advisory Body (STAB) plays a critical role in assisting states directly to preserve and protect their underwater cultural heritage, particularly through focused missions that provide technical expertise, assessments, and advice.

Two recent Unesco STAB missions, financed by Spain, have for instance focused in 2018 and 2021 on safeguarding the relics submerged beneath the waters of Lake Atitlán, a volcanic crater lake in Guatemala, which are vulnerable to environmental factors, tourism, and local development. This includes pre-Columbian structures that are integral to the heritage of indigenous Mayan communities. The mission responded to the lack of underwater archaeologists in the country and mediated in a conflict between the government authorities and the local indigenous community.

Similarly, Paraguay received in 2022 such assistance in the preservation of its wrecks from the War of the Triple Alliance (1864-1870), which represent a crucial but often overlooked aspect of South American history. Here a focus was on the conservation of the fragile wrecks and their protection from the impact of climate change, which dries periodically the Paraguay river.

A third series of missions goes currently, i.e., in 2024 and 2025, to the Dominican Republic. There, La Isabela holds a special place as the first European settlement in the New World. The nearby waters contain the remains of early Spanish ships and other submerged artifacts linked to the initial voyages of Christopher Columbus. They are identified and inventoried and a management plan is elaborated.

These missions highlight the strategic role Unesco STAB plays in supporting States Parties in preserving their underwater cultural heritage. By providing technical expertise, policy guidance, and local capacity-building, STAB ensures that these heritage sites are not only protected but also recognized for their universal value. Moreover, these missions demonstrate how submerged heritage can contribute to a country's identity, through sustainable tourism to economy, and even diplomatic relations by promoting shared histories.

ENCOURAGING RESPONSIBLE ACCESS AND EXPANDING THE USE OF SCIENTIFIC DATA

Having talked of awareness and protection, there remains the question of access. A key challenge in the preservation and promotion of underwater cultural heritage lies in ensuring that it becomes accessible—not only to scientists and researchers but also to the general public. For underwater heritage to truly be valued, it must be seen, experienced, and understood. The ability to physically or virtually engage with these submerged sites plays a crucial role in raising public awareness and fostering appreciation for their historical, cultural, and environmental significance.

Diving on the Roman villas in Baia, Italy; seeing through the windows of a submersible the wrecks around Cozumel; experiencing the fantastic museums on shipwrecks in Cartagena, Spain, remunerates the public for the taxpayer's investment in underwater archaeology.

A special initiative is here the Unesco Best Practice Designation. Unesco's designation of the best sites providing access to underwater cultural heritage as best practices serves as a model to foster global awareness, protection, and sustainable public engagement with submerged heritage. These designations highlight how countries can successfully balance conservation, education, and tourism, promoting access to underwater cultural treasures while protecting them from damage.

Notable examples, such as the Rhone 3 barge exhibition in Arles, France, the ARQUA museum in Cartagena and the Deltebre shipwreck site, the latter two in Spain, showcase the potential for these best practices to engage the public, enhance scientific knowledge, and create models for responsible heritage management.

Parco Archeologico Campi Flegrei (Italy) Web | source https://pafleg.cultura.gov.it/

These examples serve moreover as educational resources for other nations and organizations, demonstrating effective strategies for conservation and protection, while facilitating visitor access, often through controlled diving programs, virtual tours, or museum exhibitions, ensuring that the public can experience the site's cultural significance without harming it.

Best Practice museums, such as the Fuerte El Alto in Campeche, Mexico, create ideal opportunities for people to learn about the historical and cultural significance of submerged heritage, fostering a sense of global heritage and promoting the idea that submerged sites are valuable resources for all humanity, not just individual nations.

A special focus is here put by Unesco on contextual presentations.

The Rhone 3 barge, a Roman river vessel discovered in the Rhone River, was for instance carefully excavated and conserved, and is now displayed in the Musée Départemental Arles Antique. Specifically laudable is the exhibition of the artifacts in their historical context and in explaining this heritage's significance as a part of Roman trade and transportation. The museum provides a range of educational activities, workshops, and tours that teach visitors about the barge's history, the process of underwater archaeology, and the broader significance of Roman-era river transport. Interactive displays and digital reconstructions allow visitors to engage with the barge's story, offering insights into both the site's historical value and the methods used to excavate and preserve it. This makes the exhibition accessible even to those who cannot visit the site in person.

The same is true for the Deltebre I shipwreck site, located near the mouth of the Ebro River in Spain. It represents another excellent example of how heritage can be made accessible while being preserved and protected. The wreck, a British transport ship that sank during the Peninsular War in 1813, has been developed into a best practice model for controlled Dive Tourism. The site is accessible to divers under strict guidelines, allowing them to explore the shipwreck while minimizing any potential damage to the site. Artifacts recovered from the wreck, such as cannons, personal items, and ship equipment, are displayed in local museums, complemented by digital resources and detailed historical reconstructions that enhance public understanding of the site's historical significance. The Deltebre project involves also educational initiatives aimed at schools, universities, and the local community, explaining the archaeological work conducted on-site and highlighting the importance of conserving underwater heritage.

This approach demonstrates how sustainable public access can be provided while maintaining site integrity and fostering a deeper connection between the public and submerged heritage. It is a model for how shipwrecks can

become not just tourist attractions, but educational platforms for understanding maritime history and heritage.

Unesco's emphasis on such best practices serves to inspire other countries to adopt similar models, thus fostering hopefully greater access and awareness on a global scale. The designation of best practice sites can not only enhance public appreciation but shall also stimulate sustainable tourism, providing economic benefits while ensuring the long-term preservation of submerged sites. The successful integration of tourism and conservation seen in sites like Deltebre encourages countries to invest in the preservation of their underwater heritage as a valuable cultural and economic resource.

Scientific access and data provision

Beside public access, scientific access is equally important. Underwater cultural heritage holds vast amounts of data essential for studying past civilizations, climate change, and oceanography. Improving cooperation between relevant intergovernmental mechanisms and Unesco programs –such as the Man and the Biosphere (MAB) Programme, the Intergovernmental Oceanographic Commission (IOC), and the World Heritage Centre (WHC)– is necessary to facilitate access to this data and advance interdisciplinary research.

To give an example: The study of submerged landscapes, shipwrecks, and coastal settlements can show, how these have been affected by past environmental changes. Especially submerged prehistoric landscapes are areas that were once dry land but are now underwater due to past sea-level rises. These landscapes, which include ancient human settlements, forests, and coastal features, offer critical evidence of how sea levels have changed over millennia and how ancient populations responded to these changes.

Dogger Bank, often dubbed also Doggerland, a submerged landscape in the North Sea, is a prime example. During the last Ice Age, it was a vast landmass connecting Britain to mainland Europe, inhabited by prehistoric communities. As the ice caps melted and sea levels rose, this Doggerland gradually disappeared beneath the waves. By studying the archaeological remains found on the seabed, such as tools, bones, and traces of human settlement, scientists can reconstruct past sea-level changes and the rate at which they occurred.

This study of submerged landscapes can give scientists a longer-term perspective on how sea levels have fluctuated in response to global climate changes, such as the end of the Ice Age. By analyzing how ancient communities adapted to rising sea levels –whether by relocating, building protective structures, or changing their subsistence strategies– researchers can gain insights into

human resilience and adaptability to environmental stressors. This can inform current strategies for coastal communities facing similar challenges today.

These ancient records can also help validate and refine climate models used to predict future sea-level rise. For example, understanding how long it took for past sea-level rises to reach certain thresholds can inform projections for future changes. Coastal heritage sites, such as shipwrecks and coastal ruins, can also offer data on historical shoreline positions and coastal erosion patterns. The preservation state of these sites can show how environmental factors like ocean currents, temperature, and acidity have changed over time, which helps predict how modern coastlines may evolve under current climate change scenarios.

Biocultural approach

An important aspect of access involves strengthening the link between natural and cultural heritage governance. The current separation between these two domains limits the potential for comprehensive ocean management. A more integrated, biocultural approach is needed –one that acknowledges the interconnectedness of natural and cultural heritage in marine environments. Underwater cultural heritage must be incorporated into marine spatial planning processes to support more holistic ocean management solutions. This would involve fostering partnerships between archaeologists, cultural heritage managers, and marine scientists to develop adaptation strategies, predictive models, and approaches for reducing pollution and mitigating climate change in ways that are both environmentally and culturally sensitive.

Intertidal wreck at the head of Loch Fyne (Scotland) | photo Wessex Archaeology

In terms of direct public access, creating or enhancing Marine Protected Areas (MPAs) that focus on underwater cultural heritage is one of the most effective ways to ensure both protection and public enjoyment. MPAs provide a framework for managing access while safeguarding delicate sites from damage. A valuable tool is here the wider dissemination of the Unesco Code of Ethics on Diving, which promotes responsible underwater exploration and ensures that divers, one of the key publics that interact directly with underwater heritage, are aware of their impact and responsibilities.

REALIZING THE POTENTIAL OF UNDERWATER CULTURAL HERITAGE: CULTURAL, EDUCATIONAL, AND ECONOMIC BENEFITS

Given all the above one conclusion can be drawn: The immense potential of underwater cultural heritage to benefit society remains yet largely untapped.

Beyond its historical and scientific value, it can play a key role in shaping cultural identity, fostering education, promoting well-being, and supporting sustainable livelihoods. To fully realize this potential, a more focused and clear approach is necessary to ensure that it can contribute meaningfully to these areas.

Submerged heritage, as all heritage, has the ability to reinforce cultural identity and pride. As a shared legacy, it transcends national borders and highlights humanity's common history. This makes it an important vehicle for promoting peace and intercultural dialogue. Previous initiatives, such as the focus on World War I underwater heritage, have demonstrated the potential of submerged sites to connect people through a shared past. Building on this, cooperation with programs like the "Routes of Enslaved Peoples" could illuminate the historical narratives of marginalized communities, fostering mutual understanding and reconciliation. Developing projects on cultural routes, such as ancient trade paths or migration patterns, and initiatives that highlight women's contributions to marine heritage, could strengthen the role of submerged heritage in building cultural pride and bridging diverse communities.

In terms of education and well-being, underwater heritage can have a profound impact on local communities. However, initiatives that encourage community involvement in preservation and outreach remain underdeveloped. Working with NGOs and academic networks like the Unitwin Network for Underwater Archaeology, creating programs that engage local populations –particularly youth– would foster a deeper connection to their underwater heritage. Community involvement could also be expanded to include outreach to the global diving community, whose members often serve as informal stewards of underwater heritage. Engaging these groups in conservation

efforts would create a broader sense of shared responsibility for preserving submerged sites and their stories.

The promotion of responsible tourism offers another avenue to unlock the potential of submerged heritage for societal benefit. By working with national authorities, NGOs, institutions, and the tourism industry –such as cruise ship operators, hotels, and dive clubs– it can become a pillar of sustainable tourism. Properly managed, underwater-heritage –related tourism can provide significant economic benefits to local communities while ensuring the protection of these sites. Training programs focused on sustainable tourism practices and the creation of heritage-related jobs, such as heritage guides, archaeological diver training, and initiatives like “Adopt a Wreck,” can create new livelihoods centered around the preservation of cultural heritage.

These efforts are especially critical for Small Island Developing States (SIDS), African countries, and Least Developed Countries (LDCs), where underwater cultural heritage offers a unique opportunity to combine cultural preservation with economic growth. Developing responsible tourism in these regions would not only help protect underwater sites but also contribute to poverty alleviation and community resilience, offering sustainable alternatives to industries that might otherwise pose a threat to these fragile environments.

THE VITAL ROLE OF THE 2001 UNESCO CONVENTION IN SAFEGUARDING UNDERWATER CULTURAL HERITAGE

The challenges and opportunities facing underwater cultural heritage today demand, as shown, urgent and coordinated action. As a unique and irreplaceable repository of human history, underwater cultural heritage holds vast potential to contribute to our cultural identity, scientific understan-

Vasa Museum, in Stockholm. Below, warship sunk in 1628. It is the best-preserved 17th-century ship in the world. On the right, diving suit displayed at the facility | photo Karlheinz Klingbeil

ding, education, and sustainable development. However, without significant improvements in public awareness, protection mechanisms, access, and the realization of its societal benefits, much of this heritage risks being lost forever.

The 2001 Unesco Convention on the Protection of Underwater Cultural Heritage is crucial to overcoming these challenges. As the first international framework dedicated to safeguarding this legacy, the Convention provides a platform for countries to join forces in preserving these submerged treasures. By promoting international cooperation, the Convention ensures that efforts to protect, research, and share this heritage are not limited by national boundaries but are part of a global commitment to heritage preservation.

However, the success of the 2001 Convention relies heavily on collaboration and investment. Strengthening partnerships between governments, scientific bodies, NGOs, intergovernmental organizations, and the private sector is essential for advancing heritage research and protection. Involving a wide range of stakeholders ensures that it is integrated into broader ocean governance efforts, climate change mitigation, and sustainable development goals. Increased investment –both financial and in terms of capacity-building– is also critical. Supporting the work of the Scientific and Technical Advisory Body (STAB), improving legal frameworks, and investing in modern technologies will enhance the ability to safeguard underwater heritage for future generations.

The future of underwater cultural heritage depends on our collective efforts. The 2001 UnescoConvention offers the framework, but it is up to States Parties, experts, communities, and the public to turn its principles into action. By working together and committing to sustainable investment, we can ensure that underwater cultural heritage continues to be a source of knowledge, identity, and inspiration for generations to come.