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UNESCO White Paper
Underwater Cultural Heritage, Climate Change: Adaptation and Mitigation

This document contains the UNESCO White Paper on 'Underwater Cultural Heritage, Climate Change: Adaptation and Mitigation'.

UNESCO White Paper

Underwater Cultural Heritage, Climate Change: Adaptation and Mitigation

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Fig. 1. Sidon's sea castle, Lebanon © Crystal El Safadi

SUMMARY

Climate Change and anthropogenic activities are placing significant pressures on underwater cultural heritage (UCH). There is currently limited understanding and preparedness for how these pressures are managed. This White Paper proposes a detailed policy and capacity development response centred on adaptation and mitigation planning coupled with global programmes of communication and engagement. It proposes an ecosystems-based approach towards the future management of UCH and advocates for a Nature/Culture framework for future governance.

KEY MESSAGES

Climate Change and anthropogenic activity pose significant threats to underwater cultural heritage in marine, coastal and freshwater environments.

Cultural Heritage practitioners need to adopt an integrated approach towards understanding these impacts and planning for adaptation and mitigation measures.

Robust policy frameworks and protocols need to be developed to support future adaptation and mitigation aligned to capacity development and engagement programmes.

There are existing geographical imbalances between knowledge availability and capacity development and limited availability of climate finance for heritage adaptation.

Acknowledgements

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INTRODUCTION

This White Paper has been prepared in support of the Secretariat of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage. It is framed in support of UNESCO's initiatives around Culture and Climate Action in advance of MONDIACULT 2025 and COP30. The linkages between cultural heritage and climate change have become more systematically explored in recent years, notably with the updated Policy Document on Climate Action for World Heritage (2023) or the Guidance Note on climate action for living heritage (2024). However, the efforts to address the impacts of climate change on culture and heritage, and the climate response, focused mainly on world heritage, living heritage and museums. Similarly, Indigenous and local knowledge systems or cultural and creative industries (CCIs)[1] have been acknowledged regarding climate action. Yet, underwater cultural heritage remains insufficiently translated in public policies. The United Nations Decade of Ocean Science for Sustainable Development (2021-2030), the 'Ocean Decade', provides a convening framework for a wide range of policy analysis and policy frameworks to engage in the protection of oceans, but maritime and underwater archaeology have not been involved enough in this conversation. From a global policy perspective there is a clear need to promote the role of culture in climate action and to support greater advocacy efforts in this arena. There are a range of identifiable policy gaps and a need to enhance policy engagement and to strengthen the rationale for governance and investment. Many of the key principles of the existing policy frameworks can apply and be adapted to underwater cultural heritage, including the Sendai Framework for Disaster Risk Reduction 2015-2030, UNESCO Declaration of Ethical Principles in relation to Climate Change (2017), Policy Document on Climate Action for World Heritage (2023), UNESCO Policy on Engaging with Indigenous Peoples (2018), SAMOA Pathway, Guidance Note on climate action for living heritage (2024), Non-Economic Losses (2024).

Purpose: This paper aims to identify appropriate culturally-informed adaptation measures for the protection of underwater cultural heritage and the production of science-led mitigation strategies to document and protect heritage under threat from climate change and associated anthropogenic impacts. Underwater cultural heritage is an intrinsic component of coastal and waterfront environments and needs to be viewed through an inclusive nature/culture lens. The document also seeks to identify capacity-development opportunities and support sustainable community engagement and development initiatives that are participatory and inclusive. It addresses the need to communicate this messaging more effectively across all sectors of society and to include indigenous, as well as community voices on a more equitable level.

This framing is set against the recognition of the need for a Just Transition, where the wider UCH community has a clear role in promoting scientific information around the nature of climate change and hazards on UCH and to reduce the carbon footprint of its activities (see Underwood 2022). There are also clear opportunities to promote the role UCH plays in supporting biodiversity and sustainable community development within the broader remit of the Blue Economy and Green/Eco Opportunities.

CONTEXT

People have always lived on the coast and along inland rivers and lakes, depending on the sea and inland waterways for their livelihoods, communication and connections. Consequently, underwater cultural heritage represents both the tangible and intangible evidence of past and present human interactions with our marine, coastal and freshwater environments. Furthermore, it includes cultural activities and customary practices as well as the belief systems and cultural memory of these peoples.

The 2001 Convention on the Protection of Underwater Cultural Heritage defines UCH as: "*all traces of human existence of a cultural, historical or archaeological nature which, for at least 100 years, have been partially or totally immersed, periodically or permanently, under the oceans and*

[1] Artists for Climate Awareness, Creative Industries Pact for Sustainable Action, UN Alliance for Sustainable Fashion

in lakes and rivers". Additionally, Henderson *et al*. (2021), understand Marine Cultural Heritage (MCH) to represent 'all past human action on coasts as well as directly on the sea', encompassing 'tangible remains such as shipwrecks, submerged settlements, coastal settlements, ports and harbours, maritime ecologies and geology as well as equally vital intangible components such as cultural practices, artistic and linguistic expressions, local skills and traditional and historical knowledge.' Inland waters and lakes are also included within the broad remit of the Convention and constitute repositories of past human activity and landscape change but lack a robust definitory framework like MCH.

It is recognised that there are differing values and understandings placed on UCH and MCH across the globe, while there are also significant differences in terms of levels of investment and research undertaken. The Global South, for example, is under-represented in the science due to financial constraints and issues around capacity development and representation.

VALUES

Underwater cultural heritage is central to the identity of coastal, riverine and lacustrine peoples. It is a core element of place-making, community well-being and social cohesion as well as providing economic opportunity and supporting livelihoods. Cultural heritage greatly enhances the aesthetics of coastal environments and inland waterway environments and promotes accessibility and understanding of human histories and environmental change. Greater knowledge of underwater and marine cultural heritage supports marine and inland waterways protection as well as sustainable community development and represents an important shared legacy of our global past. It is also important to recognise that human values around cultural heritage are not a singular set of values across the globe. Different communities and regions can often assign different value-sets and differing understandings towards heritage. These differences can centre on the materiality and societal constructs around sites and landscapes while other communities might adopt a more spiritual or lived experiential approach to culture and heritage. Such a diversity of approaches needs to be considered in the context of future adaptation and mitigation planning.

The production of this White Paper is relevant in the context of the Sustainable Development Goals with UCH contributing in a number of ways to their realisation. In terms of SDG 14 *Life below Water* cultural heritage forms a core element in the conservation and sustainable use of our oceans, seas and marine resources for sustainable development. Underwater sites provide the basis for important habitats while many communities around the world depend on the seas for their livelihoods and associated belief systems. Our coasts and inland waterways are central to SDG 3 *Good Health and Wellbeing* providing leisure spaces and water-based activities that support healthy lives and promote wellbeing for all ages. The protection of underwater and coastal cultural heritage can also be key to SDG 2 *Zero Hunger*, as it can be a tool for food security. Finaly, this White Paper supports SDG 13 *Climate Action*.

THREATS/ IMPACTS

Underwater cultural heritage is facing unprecedented levels of threat from Climate Change and the nature of anthropogenic impacts in marine, coastal and freshwater zones across the globe. It is probable that every site and global cultural landscape is impacted in some way by our changing climate and associated environment change. There are different levels of understanding of the extent and impact of these threats in the various underwater environments that exist. While scientists have yet to fully understand the impact of climate change on cultural heritage sites on the seabed, there are more rounded understandings of these impacts in coastal area. Slow Onset Events (SOEs) like Sea Level Rise (SLR) as a consequence of global warming and temperature change is leading to inundation of our coasts and the destruction of historic landscapes and heritage sites. Global SLR averages over the past decades range from 1-3mm PA. This is most visible across many Small Island Developing States (SIDS) in the Indian and Pacific Oceans where communities and islands are being displaced by changing seas. The

associated processes of coastal erosion threaten large sections of global coastlines and actively damage historic coastal landscapes and marine sites. More frequent and intense storms further impact on the structural stability of our shores and inland waterways, leading to the erosion of riverbanks and lake-side settlements. Prolonged drought significantly lowers lake and river levels exposing archaeological material and leading to rapid decay. The damage from single weather events can be intensive and the associated impacts from flooding in places like Mozambique can lead to significant loss of life, displacement and widespread damage to cultural heritage sites. In the polar regions retreating glaciers and melting icecaps are fundamentally altering coastal landscapes with communities across the Artic losing cultural heritage sites and practices to rising seas and changing resource availability. Our seas and oceans play an important role in absorbing CO^2 but the unprecedented increase in levels has led to Ocean Acidification that can increase corrosion rates and lead to the rapid disintegration of materials like metal shipwrecks and structures on the seabed. Both temperature change and acidification can also impact on ecosystems and affect customary ecological practice.

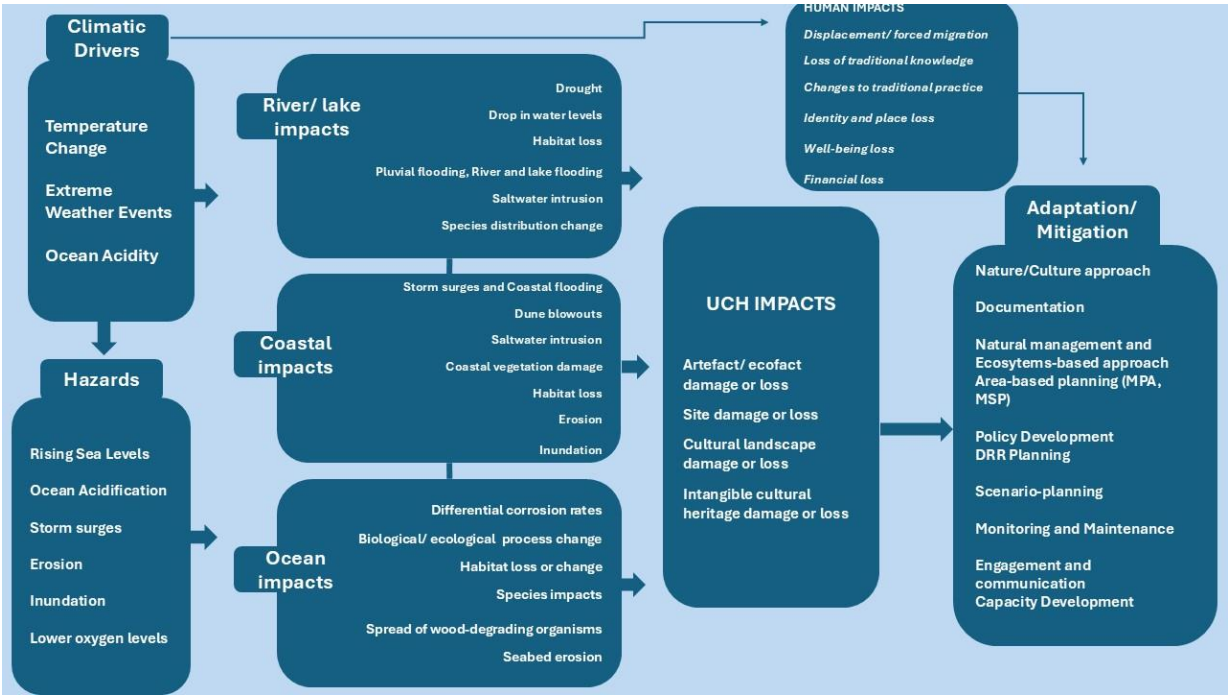

Fig 2. Outline diagram of the climate hazards and associated impacts upon UCH, linked to pathways for Adaptation and Mitigation.

Anthropogenic impacts

Anthropogenic influences on coasts and the seabed are placing further significant pressures on marine cultural heritage. Coastal infrastructural development involving port construction, settlement expansion, and industrial development is focused in areas of intensive past human activity and can destroy or significantly damage archaeological complexes. Coastal defence engineering to counter the impacts of Climate Change can often further damage historic sites and hard engineering structures can exacerbate erosion in adjacent sections on coastlines. Sand mining both on the shore and seabed can similarly greatly increase erosion rates while also destroying sites. Seabed disturbance associated with intensive fishing methods and dredging can release carbon and pollutants while damaging areas of submerged settlements or shipwreck sites. The intensification of near-shore and off-shore renewable facilities can further impact

cultural sites, objects and places of meaning in the marine zone. River dredging and realignment projects can cause irreparable damage to freshwater sites and objects while wider drainage schemes can fundamentally alter the character and integrity of historic landscapes.

Hazards

The International Panel on Climate Change (IPCC) is increasingly aware of the cultural dimensions of climate change and the associated vulnerability of cultural heritage. It has labelled processes that bring about change in heritage as hazards that can be natural or physical events that lead to damage or loss (IPCC 2022). There is an imperative to more fully understand the intersections between cultural heritage and climate change including the extent of loss and damage to UCH and the adaptation strategies associated with change, with a particular emphasis of the promotion of traditional knowledge systems. Additionally, the role of cultural heritage in the context of transformative change and sustainable community development needs to be considered alongside this.

Hazards that are commonly identified across the literature with UCH include the processes and change associated with long-term conditions including changing sea-levels that lead to coastal erosion and inundation, temperature change and ocean and sea acidification. Climate variability associated with the increased frequency and intensity of extreme events such as storms and flooding are also included. Any hazard assessment of these impacts needs to adopt a robust methodology, such as the Coastal Vulnerability Index (CVI), to both understand and quantify these events and long-term processes of change. Such assessments should be designed to assess the fragility and vulnerability of UCH to change and examine mechanisms that would consider adaptation and mitigation in terms of their future management.

Table 1: This table illustrates the primary hazards associated with Climate Change and their associated impacts on Cultural Heritage.

Primary Hazard	Hazard	Impact	Cultural Heritage Impact	Intangible impact
Sea-level rise	Saltwater incursion Inundation	Foreshore lowering	Loss or damage to sites and landscapes	Undermining societal cohesion
Storm surge	Flooding, tidal surge, storm surge	Storm and flooding damage	Loss or damage to sites and landscapes	
Saltwater incursion	Saltwater incursion Inundation	Salt mobilisation	Damage to sites and artefacts	
Coastal Erosion	Landslide	Loss and/or exposure of cultural material Loss of shorelines	Loss or damage to sites and landscapes	Loss or damage to community
Water temperature change	Species change Water column property change	Introduction of invasive species or colonisation change	Species damage	Livelihood loss
Ocean Current change	Energy change	Sedimentation rate change or exposure	Loss or damage to sites and landscapes	Livelihood loss Loss or damage to traditional practice
Acidification	Biological growth	Change in corrosion rates	Potential increase in metal rates	Livelihood and tourism loss
Drought	Water level lowering	Site exposure	Loss or damage to sites and landscapes	Livelihood loss

Area Vulnerabilities

There is a significant shortage of data on the geographical impact on the processes of change on UCH globally. On the basis of the available scientific studies, a number of regions that pose particular concern can be identified and these include Low-Lying Islands and Coasts (LLIC), Small Island Developing States (SIDS), the Arctic, and Shallow seas (hosting coral reefs). Sea-Level Rise (SLR) will impact low-lying coastal areas and tropical and sub-tropical river deltas. Sections of the Asian, eastern US, and Gulf coasts as well as Pacific and Indian Ocean Islands are particularly vulnerable. The vulnerability of the low-lying coasts of Bangladesh, sections of northern India and Pakistan, and elsewhere across south-east Asia are currently subject to significant change. The increased amplification of storm surges will further exacerbate this issue.

Extreme weather events in certain regions can lead to further impacts. SIDS across the Pacific and Indian Oceans are exposed to the impacts from hazards such as cyclones and El Niño Southern Oscillation (ENSO) events. Cultural landscapes are under continuous threat. For instance, the Chief Roi Mata's Domain in Vanuatu, that includes three early 17th-century CE sites on the islands of Efate, Lelepa, and Artok, was hit by a category 5 cyclone in 2015 and associated storm surges. The rising sea level is further threatening this island complex. In the Artic regions, melting ice is impacting the Inuit communities around Baffin Bay. These communities utilise indigenous knowledge known as Qaujimajatuqangit as part of their livelihoods and subsistence

maritime economy. The loss of ice bridges and the associated landscape and sea changes are affecting their community levels of food security and disrupting travel and cultural traditions. Subsequent forced migration and the loss of archaeological sites undermine their collective identity, well-being, and sense of place.

Across Africa it has been estimated that at least 20% of coastal World Heritage Sites are considered at risk from extreme events and Sea-Level Rise (Vousdoukas *et al* 2022). Impacted sites include Tipasa, Algeria and the North Sinai Archaeological Sites Zone, Egypt. Currently, 56 sites (20%) are at risk from a 1-in-100-year coastal extreme event, including the iconic ruins of Tipasa (Algeria), and the North Sinai Archaeological Sites Zone (Egypt). By 2050, the number of exposed sites is projected to more than triple, reaching almost 200 sites under a continued high-emission scenario. The small island of Kunta Kinteh at the Ocean entrance to the Gambia River is subject to threats from both rising sea-levels and extreme events. It served as one of the first cultural exchange zones on the sea routes between Africa and Europe from the 15th century and later developed as an important site in the transatlantic slave trade. The loss of this coastal complex of monuments and associated memory and study of the history of enslavement to the consequences of climate change is unimaginable.

Many of these hazards and impacts of Climate Change are placing significant pressure on Indigenous peoples across the globe. This can include land and territory loss as well as limited access to fishing areas and associated issues around food security. These pressures can also impact cultural practice and community cohesion, while water-based ritual or leisure activities and associated belief systems can be disrupted. Travel by water can often become less safe as weather prediction becomes less reliable and storm events more frequent. Again, Climate Change is altering the frequency and intensity of El Niño Southern Oscillation (ENSO), across these regions and is associated with increased precipitation, flooding, ocean warming, and tropical cyclones. This is placing many coastal settlements and cultural heritage sites at risk. In the Amazonian River, Basin climate change is impacting the natural ecosystems of this area and as a consequence cultural and spiritual practices are being forced to change. A number of World Heritage Sites across South and Central America are under threat including the Chan Chan Archaeological Zone, Peru which is at risk of coastal change and flooding.

Finally, it is important to note the intrinsic links between natural and cultural heritage across the globe and the interdependence of the human and natural world. Future management and adaptation frameworks need to adopt an integrated approach towards their governance and avoid considering them as separate entities. Both human and non-human systems play an interconnected and indivisible role in supporting future sustainable development and associated climate adaptation responses.

ISSUES

As a community of professionals, we can identify a series of structural issues that weaken our response to the climate crisis. While archaeologists and cultural heritage professions are framing responses to the crisis, they are often operating in isolation. A fully integrated, cross disciplinary approach that includes community as well as indigenous voices is required. Capacity-development and professional expertise remains a challenge in many parts of the world, especially in the Global South where the lack of funding presents serious barriers to the production of mitigation responses. Political support is often lacking and learning about the nature and extent of the threat needs to improve. Global society in general has limited preparedness for the impacts of Climate Change and there is an urgent need to develop a range of adaptation measures relating to cultural heritage. There is also a clear need to undertake a detailed examination of existing legislation and policy frameworks to ensure they meet the challenges of future change and can accommodate mitigation measures. This will involve an overview of international legislative and regulatory frameworks as well as looking at the regional and national context.

COMMUNICATION

A further consideration is how the issues highlighted in this White Paper can be communicated more effectively to all stakeholder groups. There is a series of disconnects that exist within the professional sphere. In terms of the management of coastal, marine, and freshwater environments, cultural heritage has not been fully integrated into established and developing management practices and frameworks. It is often regarded as being subsidiary to natural heritage and there are misunderstandings or a lack of knowledge about the nature and scope of cultural heritage and its associated importance from both a tangible and intangible perspective. Existing knowledge bases have sometimes been excluded, and a greater representation of knowledge holders needs to be included in future strategies. This will require a more people-centred approach and one that will engage in creative and inclusive pedagogies.

New strategies and innovative mechanisms need to be examined in terms of the dissemination of this information, including the use of new media technologies. Engagement with creative industries is also important in this regard to extend the reach of this messaging and engage with diverse audiences. An increased emphasis on inclusive co-creation should be encouraged with an emphasis on the identification and dissemination of cultural climate-based adaptation and mitigation solutions.

ADAPTATION

Adaptation is the process of reducing or avoiding the impacts of climate change and attempts to reduce exposure and vulnerability. In terms of cultural heritage, adaptation involves actions that support the informed protection and preservation of both tangible and intangible heritage as well as reducing vulnerability and climate-related risk. Adaptive release also recognises that heritage practice may accept processes of transformation and decline in the context of an ecosystems-based approach to coastal and marine management. Natural approaches towards the restoration of coastal cultural landscapes will implement traditional practices to reinstate ecosystems, reduce flood risk, and counter the impact of Sea-Level Rise. ‘Soft engineering’ solutions, including beach nourishment, reinstating mangroves, or native planting and encouraging salt marsh expansion, are a central element in this approach. Local and indigenous knowledge coupled with traditional management practices can be important elements in successful restoration programmes. An example of this approach can be seen at the medieval coastal port of Kilwa Kisiwani, Tanzania, where mangroves are planted to protect the World Heritage Site from coastal hazards, including storm surges and erosion. The mangroves further counter the impact of SLR through sediment entrapment and existing sediment protection. These trees, combined with the preservation of the near-shore fringing reef system, provide natural defences against extreme weather events. Furthermore, they play a crucial role in the maintenance of sustainable livelihoods amongst the local communities.

This interconnection between natural and cultural heritage with coastal communities is further illustrated at Banc d’Arguin National Park on the coast of Mauritania. Designated as a Natural World Heritage property, the Imraguen peoples living in the villages of Iwik and R’Gueiba in the park are subject to repeated flooding and coastal erosion linked to SLR. This has impacted the livelihoods and cultural values of these communities who have adapted to change through the use of managed retreat, settlement elevation, and costal defence with varying degrees of success. Future strategies will require planning around participatory adaptive pathways that seek to limit the loss of indigenous and coastal heritage attributes.

Principles

In terms of considering adaptation strategies, a number of provisional key principles should be considered. These include:

- All future adaptation frameworks should be informed, science-based strategies that are based on an inclusive, participatory approach.

- Local, Traditional, and Indigenous Knowledge Systems must be fully considered and included in any decision-making process.
- Full consideration must be given to issues around the access and use of scientific information and to the destination of these data in terms of future storage and usability.
- More robust mechanisms for information access, associated early warning, disaster risk management, and monitoring systems need to be considered and implemented.
- There is a need to increase climate literacy for heritage managers, heritage-dependent communities, and wider heritage stakeholders.
- Access to climate finance for cultural heritage.
  There is currently limited information on the availability of finance for heritage adaptation, and this is a significant impediment to future planning. This is further complicated by the already challenging financial environment many countries are in where heritage adaptation is likely to be of a low priority. There is also limited data on the scale of future needs and few economic assessments on future capital requirements.

OPPORTUNITIES

Planning for Adaptation: In order to plan for future adaptation, a four-strand approach could be envisaged. This should not be viewed as being prescriptive but is instead presented as a potential roadmap towards better planning and future engagement with heritage adaptation. It recognises that there is a policy deficit in terms of incorporating UCH more fully into ocean governance and proposes an integrated approach towards future management.

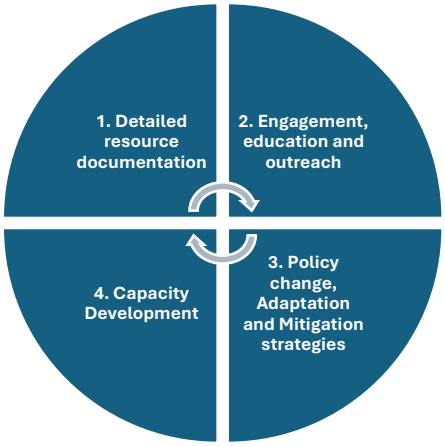

Fig 3. A four-staged approach for UCH and future adaptation planning.

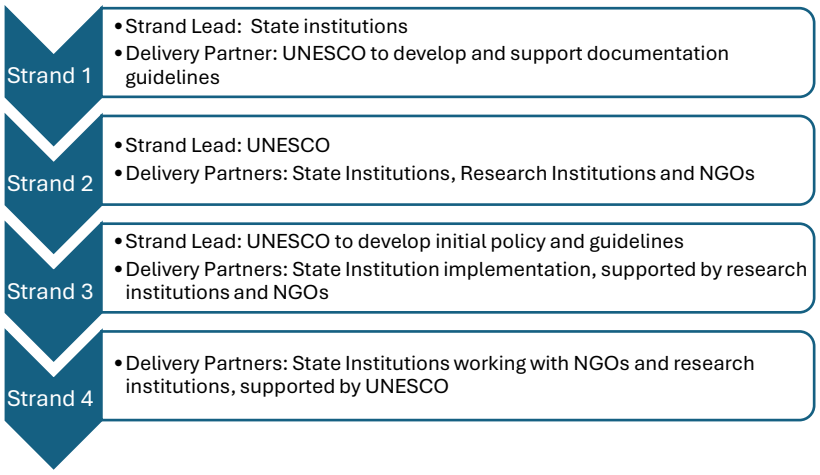

Fig. 4. Strand lead and delivery partners.

Table 2: The four strands and with details of associated actions.

	Strand	Actions
1	Detailed resource documentation	1.1 Develop national and regional programmes of documentation of underwater cultural heritage (UCH), supported by dedicated institutions. *Delivery Partners: State institutions* 1.2 Undertake scientifically-informed, area-based threat and vulnerability baseline assessments of the impacts of Climate Change on UCH. *Delivery Partners: State institutions*
2	Engagement, education and outreach	2.1 Development of an International Community of Practice (CoP) associated with UCH and Climate Change. *Delivery Partners: UNESCO Lead with State Institutions, Research Institutions and NGOs* 2.2 Establishment of an international Scientific working group for the provision of expert analysis and advice on Climate Change adaptation and mitigation for UCH and Marine Cultural Heritage (MCH). *Delivery Partners: UNESCO with State Institutions, Research Institutions and NGOs* 2.3 Establishment of a UNESCO-Commission on Climate Change Adaptation and UCH. *Delivery Partners: UNESCO Lead with State Institutions, Research Institutions and NGOs*

3	Policy change, Adaptation and Mitigation strategies	3.1 The full integration of UCH and MCH in national, regional and international policy with regards to Marine Spatial Planning (MSP). *Delivery Partners: UNESCO Lead on initial policy and guidelines with State Institution implementation* 3.2 Inclusive implementation approach within the frameworks of Integrated Coastal Zone Management (ICZM). *Delivery Partners: UNESCO Lead on initial policy and guidelines with State Institution implementation, supported by research institutions and NGOs* 3.3 Adaptive guidelines on how UCH can be integrated into Disaster Risk Reduction (DRR), Disaster Risk Management (DRM), and Post-Disaster Needs Assessment (PDNAs). *Delivery Partners: UNESCO Lead on initial policy and guidelines with State Institution implementation, supported by research institutions and NGOs* 3.4 Support mechanisms for the full integration of UCH and MCH into area-based marine protection frameworks including the MPA (Marine Protected Area) network. *Delivery Partners: UNESCO Lead on initial policy and guidelines with State Institution implementation, supported by research institutions and NGOs* 3.5 Undertake a detailed assessment of the existing legislative and regulatory frameworks that govern the protection of marine and environmental resources, including UCH in the context of Climate Change and Adaptation to include National Adaption Plans (NAPs). *Delivery Partners: UNESCO Lead on initial policy and guidelines with State Institution implementation, supported by research institutions and NGOs*
4	Capacity Development	4.1 Develop resource sets that support professional networks produce Climate Change impact, mitigation and adaptation strategies and applied methodologies. *Delivery partners: Research Institutions working with State Institutions.* 4.2 Programmes involving participatory decision making and governance combined with community stewardship need to be developed. *Delivery partners: State Institutions working with NGOs and research institutions* 4.3 The production, greater availability and accessibility of learning resources. *Delivery partners: all stakeholder groups.*

STRAND 1.

Detailed resource documentation

1.1. There is an urgent need to develop national and regional programmes of documentation of underwater cultural heritage.

It is recognised that many states currently support national inventories of UCH but these are often site specific records of particular sites or find spots. These inventories need to adopt an area-based approach that recognises cultural landscapes and the integrated nature of these places and aligns with Periodic Reporting (see 1.3). This documentation should also be aligned to the requirements of Post-Disaster Needs Assessment (PDNAs). It would be useful to develop guidelines on documentation to support countries with less-established capacity frameworks.

1.2. Such baseline surveys should also include scientifically-informed, area-based threats and vulnerability assessments of the impacts of Climate Change on UCH.

1.3. This detailed resource documentation should align with the Periodic Reporting and the Annex of the 2001 Convention "Rules concerning activities directed at underwater cultural heritage" and methodology detailed in the training manuals for the UNESCO course[2]. It could also be informed by Post-Disaster Needs Assessment (PDNAs) methodology and the *Practices for carrying out inventories of cultural property* drafted under the UNESCO Convention for the Protection of Cultural Property in the Event of Armed Conflict with Regulations for the Execution of the Convention and its two Protocols (1954 and 1999).

1.4. To support these efforts of documentation there should be dedicated institutions: competent authorities to oversee the protection of UCH and develop the standards for documentation, assessment, and protection, with a dedicated budget and financial arrangement to support such endeavor. States should be further encouraged to adopt five-year documentation cycles to include condition assessments and change monitoring programmes.

Few of the existing inventories contain comprehensive documentation of the impact of the Climate Change on sites and cultural landscapes. Informed documentation programmes are needed to create a baseline assessment of the current state of UCH and of its future needs. A number of examples of current good practice in this regard include SCAPE in Scotland (https://scapetrust.org/), MarEA/ EAMENA across the Middle East and North Africa (https://marea.soton.ac.uk/) and the Maritime Asia Heritage Survey (https://maritimeasiaheritage.cseas.kyoto-u.ac.jp/).

STRAND 2.

Engagement

In order to ensure a more informed approach is taken towards understanding the impacts of Climate Change and planning for future adaptation, the following initiatives could be established. This strand would be primarily led by UNESCO and focuses on immediate steps that could be taken to strengthen its work on UCH and Climate Change.

2.1. Development of an International Community of Practice (CoP) associated with UCH and Climate Change. This CoP could be initiated within the existing UNITWIN Network for

[2] Training manual for the UNESCO foundation course on the protection and management of underwater cultural heritage in Asia and the Pacific, The UNESCO training manual for the protection of the underwater cultural heritage in Latin America and the Caribbean

Underwater Archaeology and accredited NGOs and expanded to include a wide range of public and private stakeholders, with the support of the Scientific and Technical Advisory Body (STAB).

2.2. It is proposed that an international scientific working group linked to the 2001 Secretariat, including legal and policy experts and ocean and freshwater scientists, is established to create an expert interdisciplinary platform for the provision of analysis and advice on Climate Change adaptation and mitigation for UCH and Marine Cultural Heritage (MCH). Both have varying associated specialist levels of expertise and differing policy and regulatory frameworks.

2.3. Establishment of a UNESCO-Commission or working group on Climate Change Adaptation and Underwater Cultural Heritage.

This would include the detailed engagement with the relevant units within United Nations Environment Programme (UNEP) and with the International Union for Conservation of Nature (IUCN) to support a more integrated approach towards Coastal, Oceans and Seas marine resource management.

STRAND 3.

Policy change and mitigation strategies

It is clear that in order to bring about meaningful and transformative change there needs to be significant movement on the full inclusion of UCH and MCH into existing coastal and marine policy frameworks. Specifically, a nature/culture approach needs to be mainstreamed in order to realise more effective coastal and marine management internationally. In this context, it will be necessary to establish a coordination/cooperation mechanism for integrating UCH into maritime planning strategies and cross-sectoral/ministerial cooperation.

3.1. The full integration and consideration of UCH and MCH in national, regional and international policy with regards to Marine Spatial Planning (MSP) needs to be realised.

The Intergovernmental Oceanographic Commission (IOC) defines Marine Spatial Planning as ‘a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that have been specified through a political process’. Within UNESCO, the IOC has developed working programmes with the Man and Biosphere Programme and the World Heritage Marine Programme, in support of using MSP and marine conservation plans. There is a need to increase the level of engagement with UCH in these processes. In this context, the Ocean Decade Heritage Network (ODHN) established in 2019 represents an important step forward (https://www.oceandecadeheritage.org/).

3.2. Similarly, UCH and MCH requires a more inclusive implementation approach within the frameworks of Integrated Coastal Zone Management (ICZM).

The European Environment Agency defines ICZM as ‘a dynamic, multidisciplinary and iterative process to promote sustainable management of coastal zones. It covers the full cycle of information collection, planning, decision making, management and monitoring of implementation’.

There is so single similar policy framework for inland waterways such as MSP or ICZM. Countries do have a variety of Inland Waterway Strategies and Planning frameworks, as well as Catchment Management Plans and Area Spatial Plans. UCH will need to be considered more fully within these frameworks.

3.3. UCH rarely appears within the planning approaches to Disaster Risk Reduction (DRR) or Disaster Risk Management (DRM). Adaptive guidelines on how UCH and MCH can be fully integrated need to be developed.

3.4. Support mechanisms for the full integration of UCH and MCH into area-based marine protection frameworks including the MPA (Marine Protected Area) network. This will need to take account of the different regulatory and implementation frameworks that exist globally for MPAs.

The National Oceanic and Atmospheric Administration (NOAA) has defined MPAs as 'a defined region designated and managed for the long-term conservation of marine resources, ecosystems services, or cultural heritage'. Highly Protected Marine Areas (HPMAs) are areas that aim to prohibit all extractive, destructive, and depositional human activities within a site boundary, allowing for full ecological recovery of the site. MPAs strongly support climate change adaptation but currently only 6.35% of the world's oceans are protected. Additionally, the majority of these sites were implemented to protect natural heritage, and few only nominally address cultural heritage. Many of these existing areas have also limited financial and associated professional capacity as well as limited community engagement.

3.5. These policy changes need to be guided by an ecosystems- and culturally-informed approach that includes inclusive participatory decision-making.

3.6. Undertake a detailed assessment of the existing legislative and regulatory frameworks that govern the protection of marine and environmental resources, including UCH in the context of Climate Change and Adaptation. This should include an overview of National Adaptation Plans (NAPs) to assess their approach towards UCH.

STRAND 4.

Capacity development

This strand deals with the pressing need to enhance professional capacity on a global scale and develop more inclusive engagement programmes and participatory actions with coastal communities. Examples of good practice include CITiZAN, the Coastal and Intertidal Zone Archaeological Network (https://citizan.org.uk/), a community-led project tackling threats to England's fragile coastal archaeology, the recent UNESCO-led community exhibition on UCH in the Southern Caribbean of Costa Rica, and the Port Adelaide Community Archaeology (PACA) Project in partnership with the South Australian Maritime Museum with Flinders University. The Florida Keys Shipwreck Trail is a further example of community archaeology in marine environments, bringing together numerous coastal stakeholders to preserve marine cultural heritage and document maritime history.

4.1. Develop resource sets that support professional networks produce Climate Change impact, mitigation and adaptation strategies and applied methodologies.

These resource sets could include toolkits and/or protocols that are structured around the following:

- Climate vulnerability and mitigation for Underwater Cultural Heritage
- Coastal and Marine area-based protection strategies, including MSP and MPAs, for Marine Cultural Heritage
- Engagement and stewardship for MCH with coastal and marine communities
- Managing inland waterways and underwater cultural heritage

4.2. Programmes involving participatory decision making and governance combined with community stewardship need to be developed. Indigenous knowledge and customary practice need to be an integral part of this approach.

4.3. The production, greater availability, and accessibility of learning resources needs to be considered by all stakeholders to facilitate more inclusive and accessible information relating to UCH and Climate Change.

FURTHER READING

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FIGURES

TABLES