WORLD HERITAGE

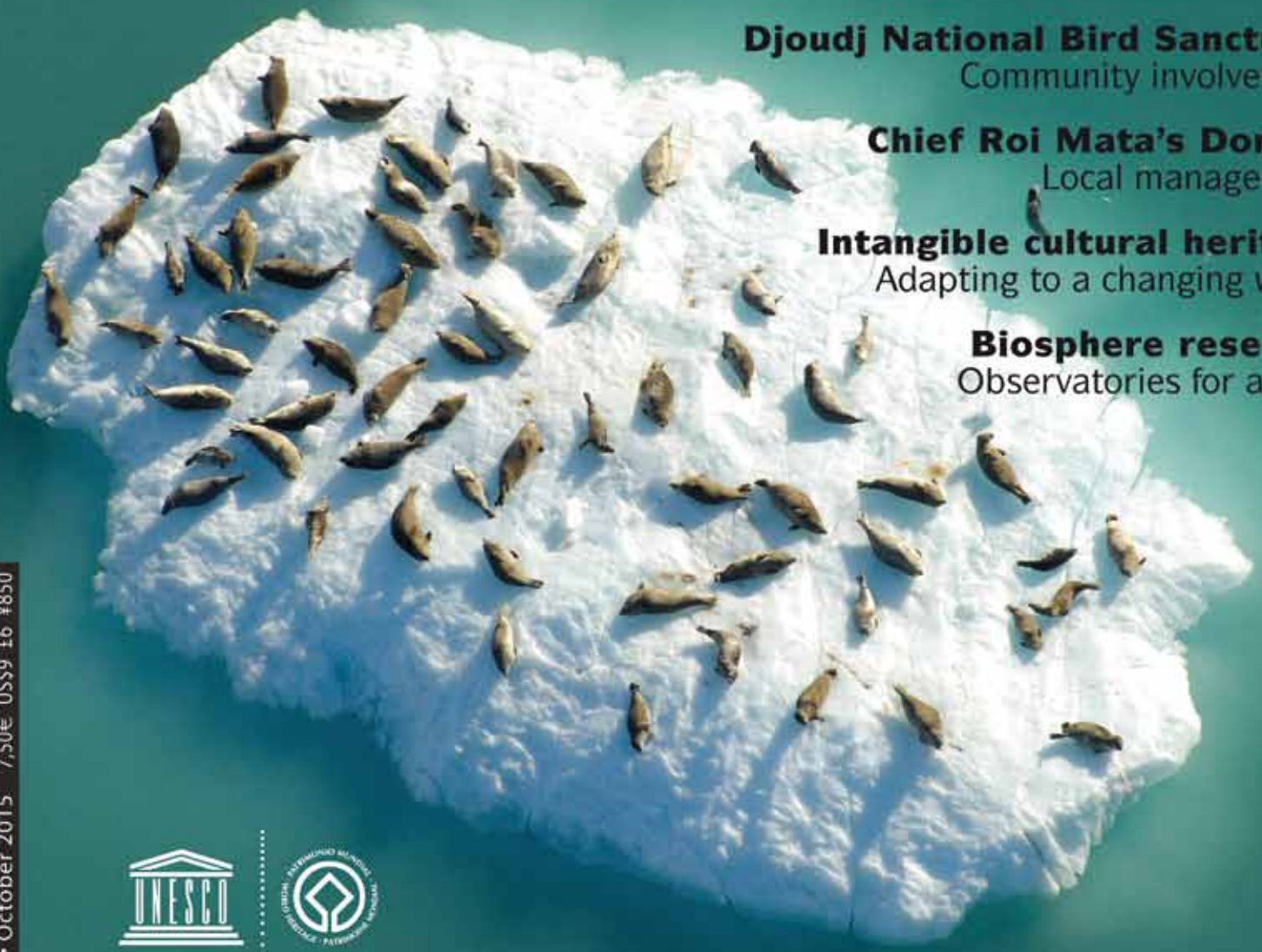
CLIMATE CHANGE

Djoudj National Bird Sanctuary
Community involvement

Chief Roi Mata's Domain
Local management

Intangible cultural heritage
Adapting to a changing world

Biosphere reserves
Observatories for action



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World Heritage Convention

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Parc national de La Réunion

Pitons, cirques and remparts of Reunion Island

The laboratory for the planet, the laboratory of living things

La Réunion, which first emerged from the Indian Ocean just 3 million years ago, is an island in continuous evolution, being fashioned by intense volcanic activity and vigorous erosion processes. Its magnificent, rugged landscapes form a remarkable mosaic of ecosystems that are unique in the world. The island is a crossroads of biodiversity with rates of endemism unsurpassed anywhere. Species native to the Mascareignes Archipelago, Madagascar, Africa, India, Australia and even Hawaii have adapted to highly diversified conditions on the island, and the evolutionary processes continue to this day. Faced with global changes, La Réunion National Park is setting up a network for monitoring the natural habitats of the island's heritage, using methods that are shared at both regional and international levels.

Faham
Jumellea fragrans

Réunion Island day gecko
Phelsuma borbonica

Bois de Laurent martin
Forgesia racemosa

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United Nations Educational, Scientific and Cultural Organization

Pitons, cirques and remparts of Reunion Island Inscribed on the World Heritage List in 2010

editorial

Cover: Harbour seals rest on an iceberg from a retreating tidewater glacier in Glacier Bay National Park (United States). The park, in collaboration with the University of Alaska Fairbanks-Geophysical Institute and the National Marine Mammal Laboratory-Polar Ecosystems Program, monitors changes in the availability and use of the ice habitat in the fjords.

The network of World Heritage properties was *inter alia* intended to ensure the proper preservation of the natural and cultural values of sites inscribed on the World Heritage List. Today, as the planet finds itself confronted with the impact of climate change, the existence of this network is proving to be of the highest importance in monitoring changing conditions and advancing solutions on the ground.

Climate change, in the words of the authors of the lead article of this issue, 'is arguably the greatest environmental and social issue of our time'. Yet such change does not affect all cultural and natural heritage sites in the same way, and understanding its impacts is relevant to the preservation of the sites concerned. Importantly, the World Heritage sites also harbour options to mitigate and adapt to climate change through the ecosystem benefits, such as water and climate regulation, that they provide and the carbon that is stored in World Heritage forest sites. Cultural heritage, on the other hand, can convey traditional knowledge that builds resilience for change to come and leads us to a more sustainable future.

The accumulated knowledge of local and traditional communities on plants, animals, seasons and natural phenomena is now referred to as intangible cultural heritage. As Rahul Goswami makes abundantly clear in his article, this heritage has proven to be a rich source of information, and recently also the climate change community has become aware of the important role of culture in tackling climate change. The exceptional monitoring network of World Heritage sites puts at the disposal of all nations the knowledge of these specialists whose competence touches upon natural and cultural features of our very existence in all regions.

UNESCO has been at the forefront of exploring the impacts of climate change on World Heritage. In 2007, under the guidance of the World Heritage Committee, it prepared a report on *Predicting and Managing the Effects of Climate Change on World Heritage*, followed by a compilation of *Case Studies on Climate Change and World Heritage*, and a *Policy Document on the Impacts of Climate Change on World Heritage Properties* in 2008. In May 2014, it published a practical guide to *Climate Change Adaptation for Natural World Heritage Sites* and continues to build the capacity of site managers to deal with climate change.

The World Heritage Convention has gradually evolved into a tool of expertise that is now in a position to monitor the progress of climate change and to suggest pertinent practical measures devised to mitigate and adapt to its impact, not only on plant and animal species but on human life itself. The case studies published in this issue offer remarkable insights into specific aspects of climate challenges to World Heritage sites in different parts of the world.

Mechtild Rössler
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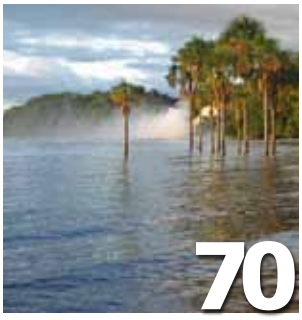
Contents



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The role of World Heritage sites in a changing climate

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A school of bigscale soldierfish (*Myripristis berndti*) on a deep reef at French Frigate Shoals in Papahānaumokuākea Marine National Monument (United States).

Climate change is arguably the greatest environmental and social issue of our time. Temperature change is often described in global averages but the additional heat trapped in the planet's atmosphere and oceans produces more than average conditions. Changes in precipitation patterns, seasonal timing of runoff and stream flow, droughts and windstorms are affecting ecological processes such as phenology, fire and pest outbreaks, which are already being detected in many parts of the world.[1] Climate change is a present and future reality that affects World Heritage sites, including both physical components and their capacity to continue to convey their Outstanding Universal Value.[2] While specific effects and the components of World Heritage at risk vary widely across different regions, evidence of climate change has been detected in virtually all ecosystems and at all locations.

On the global scale, temperate mixed forest, boreal conifer and tundra, and alpine biomes show the highest exposure to impacts that will probably change ecosystem dynamics, especially potential changes to wildfire regimes.[3] Rising temperatures are accelerating melting of snow and ice in the world's most pristine high elevation and high latitude sites, seen at the Great Himalayan National Park Conservation Area (India) and Waterton Glacier International Peace Park–Glacier National Park (Canada). Additionally, some areas are experiencing reduced snowpack because less precipitation falls as snow, and warmer winter temperatures can cause rain to fall on snow, further contributing to melting, as has happened at Olympic National Park (United States). There is growing evidence that hydrologic changes in mountain systems will significantly alter both stream flow and the ecology of rivers and wetlands. Mid latitudes are expected to become drier, bringing additional pressure to water-stressed arid and semi-arid systems. In Africa, even a 10 per cent decrease in precipitation could reduce drainage in some countries by up to 50 per cent, including sites such as Mosi-oa-Tunya / Victoria Falls (Zambia and Zimbabwe). The effects of warmer water and increased acidification in marine ecosystems are poorly understood but will surely interact with and compound existing human pressure on these systems. This is a concern for Australia's Great Barrier Reef.

Great Himalayan National Park Conservation Area (India) is characterized by high alpine peaks, alpine meadows and riverine forests.

© Henrik Johansson

Climate change is a present and future reality that affects World Heritage sites, including both physical components and their capacity to continue to convey their Outstanding Universal Value.

Some of the most visible consequences of climate change are occurring along coastal and fluvial systems with increased rates of erosion events that threaten preservation of archaeological and other cultural heritage resources, such as at Skara Brae, part of the Heart of Neolithic Orkney World Heritage site (United Kingdom). Impacts research such as recently compiled in the *Atlas of Climate Change Impact on European Cultural Heritage* illustrate, however, that the effects of climate change on cultural heritage will be wide-ranging: coasts and inland, extreme events and changing trends, subtle and dramatic, tangible and intangible. These include encroaching sand dunes combined with high intensity rainfalls at Timbuktu, which is one of many examples outlined in the 2007 UNESCO report *Case Studies on Climate Change and World Heritage*; and less visible loss of mangroves, now reversed, and their protection from rising seas at the Ruins of Kilwa Kisiwani and Ruins of Songo Mnara (United Republic of Tanzania). Loss of heritage also comes from changes or cessation of traditional practices and connections to place, illustrated by efforts to re-establish cultural use of natural resources at Papahānaumokuākea Marine National Monument (United States), and the loss of information from the past anchored in archaeological sites and buildings around the world.

Cultural heritage is distinct from natural heritage in that its Outstanding Universal Value is bound to place and the capacity of those monuments, buildings and sites to convey their historical, artistic, scientific, aesthetic, ethnological and anthropological significance. Cultural heritage is in part non-living and as such is non-renewable. Its balance is held in knowledge, practice, memory and identity, and as such its transmission can be broken. Once cultural heritage is lost, it is lost forever. Further, as the capacity of cultural heritage to move or change as environments around it change is limited, the focus for adaptation for cultural heritage must lie in research and management practices developed to preserve it.[4]

Managing risk and supporting adaptation and resilience

The emerging threat of climate change brings added emphasis to the role of World Heritage sites and other protected areas for conserving biodiversity, promoting ecosystem adaptation, enhancing scientific knowledge about climate change impacts, and engaging communities in learning and stewardship activities, such as outlined

Coastal erosion approaches the village of Skara Brae in the Heart of Neolithic Orkney World Heritage site. Sea walls were first built to protect the site in the 1920s. Historic Scotland continues to work to maintain the walls under pressure of storms and sea-level rise.

The Mosi-oa-Tunya/Victoria Falls (Zambia / Zimbabwe) is the largest curtain of falling water in the world.

in the IUCN *Natural Solutions* document released in 2010 and the works of the North American Intergovernmental Committee on Cooperation for Wilderness and Protected Area Conservation (NAWPA Committee). Current adaptation thinking is framed in terms of managing risks associated with future climate hazards for which climate change often acts as a catalyst accentuating the impacts of existing stressors.[5]

Well-managed protected areas are effective tools for climate change adaptation.[6] They can help to buffer species against climate change by providing well-managed natural habitats. Intact ecosystems are more resilient to external stressors and help to reduce the vulnerability of species to environmental change, including climate change impacts. Technical Series No. 43 under the Convention on Biological Diversity outlines elements that support resilience in protected areas and their ecosystems, which include:

- availability of climate 'refugia' (habitats that persist as climate changes);
- landscape connectivity that allows plants and animals to move to more suitable locations;
- viable populations with sufficient genetic diversity to adapt to local conditions through micro-evolution;
- blocks of natural habitat large enough to be resilient to impact of large-scale disturbances;
- sufficient species diversity for natural selection to operate on in response to long-term environmental changes; and
- fewer additional anthropogenic threats and stressors, such as habitat loss and degradation.[7]

Furthermore, protected areas help to avoid emissions from the impact of human land use on ecosystem carbon stocks, support ongoing sequestration by natural ecosystems, and therefore constitute an important mitigation response.[8]

In the manner that natural infrastructure provided by well-managed ecosystems is vital in helping natural systems to adapt, cultural heritage provides crucial information and approaches to human system responses and interactions with present and future climate change. The Intergovernmental Panel on Climate Change (IPCC) summary for policymakers in *Climate Change 2014: Impacts, Adaptation, and Vulnerability* noted that 'Throughout history, people and societies have adjusted to and coped with climate, climate variability, and extremes, with varying degrees of success'. Cultural heritage therefore is the unique source of examples alongside which modern concepts of social resiliency and adaptive change may be tested.

Jhochhen, Durbar square or urban centre of Kathmandu (Nepal) after the April 2015 earthquake.

© Katja Ulbert

Cultural heritage has many connections to place. In turn, however, examples of how human systems have interacted with changing environments can be widely relevant. In this sense, every place that has been a home to people – and is thus possessed with cultural heritage – has a part to play in understanding human roles in and responses to climate change. Management of cultural heritage with respect to climate change is rapidly being recognized as requiring a global effort. Such efforts include, but are not limited to, sessions at the July 2015 UNESCO Our Common Future Under Climate Change conference, incorporation of cultural heritage as a focus for disaster resilience planning at the 2015 Third UN Conference on Disaster Risk Reduction at Sendai (Japan), and the Pocantico Call to Action on Climate Impacts and Cultural Heritage, which outlines local-to-global-scale strategies and is gaining signatories from around the world.

UNESCO's 2010 publication *Managing Disaster Risks for World Heritage* notes that, by and large, cultural heritage sites are not prepared for present disaster regimes. Devastation from the Nepal earthquake and the ongoing destruction of the Mesopotamian World Heritage sites such as Palmyra, Nimrud and Hatra in the conflicts in the Middle East are also reminders that climate change is not the sole or, in a local perspective, the most immediate threat to cultural heritage around the world. Climate change however imposes increased or alternative disasters and trends of stress.

Many plant and animal species will adapt to change if they have the capacity and there is an opportunity to do so. Some species are already beginning to respond to climate change by dispersing to seek more suitable conditions. At a high level of ecological organization, 'biome' shifts have been detected in the boundaries of boreal, temperate and tropical ecosystems and some protected areas with long-term observations have measured upslope migration of small mammal ranges, as at Yosemite National Park (United States). The degree to which a species can move is one aspect of their 'adaptive capacity'.

Assessing the vulnerability of a species or ecosystem to climate change requires the evaluation of three basic components: the level of exposure to change (generally direct drivers such as temperature or precipitation or indirect drivers such as the impacts on vegetation-based habitat resources); the sensitivity of the organism or system to that change; and its ability to adapt by evolving in place, changing behaviours, or moving.[9] Most vulnerability studies to date have focused on exposure without considering the other two elements of sensitivity and adaptive capacity.[10] While this work is informative, the scale of many studies, coupled with a sole focus on exposure, has hindered application of results for conservation priorities or adaptation planning.[11]

Large landscapes with intact vegetation may have the greatest potential to allow species and populations to shift ranges and adapt to climate change. A recent study

has shown that, globally, 28 per cent of terrestrial vegetated area can be identified as refugia if all natural vegetated land cover is considered.[12] However, when considering only large landscapes (minimum size 48 km^2) that are at least 50 per cent wilderness, this value drops to 17 per cent. Results suggest that, in regions where relatively large, intact wilderness areas exist (e.g. Africa, Australia, boreal regions, South America), conservation of the remaining large-scale landscapes is a top priority. World Heritage sites are by definition relatively intact and, as such, should be considered a valuable global asset or natural infrastructure for adaptation to climate change. The rate of climate change is such, however, that some sites need additional protection and connectivity across landscapes to facilitate necessary migrations for some species and to provide refugia for others.

While the need for World Heritage and other protected areas as refuges for biodiversity and wildlife will increase in a changing climate, accomplishing conservation goals will be more challenging and complex than ever before. Species range shifts and alterations by disease, pests and disturbance may transform some sites to very different habitat and species assemblages than they were initially designed to protect. What will this mean for World Heritage designations? The World Heritage Convention states: '*Considering* that deterioration or disappearance of any item of the cultural or natural heritage constitutes a harmful impoverishment of the heritage of all the nations of the world.' As climate change raises the spectre of loss for both natural and cultural heritage, it raises questions about how we value these sites and what actions can or should be taken to protect or preserve them.

For biodiversity, conservationists may resolve this by accepting that ecosystems' structure, composition and functioning will probably change. Adaptation in this context requires enabling and allowing natural selection and other processes to play out across landscapes. However, at the level of a management unit, accepting or promoting (in the case of assisted migration) a transformational change in the state of an ecosystem is far from a 'no-brainer'. Future conservation efforts will require the re-evaluation of management goals and expectations to ensure that the intended conservation values and targets can be met.

A complementary perspective on the issue can be gained from considering World Heritage criterion (ix) that focuses on representation of significant ongoing processes in the evolution of biota and ecosystems, and criterion (x) that aims to identify the most important habitats for biodiversity conservation. Climate change impacts on some World Heritage sites could conceivably enhance their natural values, given the adaptation as a significant process and the crucial role that protected areas play in providing refugia for species.

Ruins of Kilwa Kisiwani and Ruins of Songo Mnara (United Republic of Tanzania).

Vulnerability for cultural heritage also assesses exposure and sensitivity, with recognition that these may vary for tangible and intangible components within a given heritage area. Correspondingly, prioritization for preservation action for cultural heritage seeks to integrate vulnerability and significance, as can be seen in studies conducted by the Scottish Coastal Archaeology and the Problem of Erosion (SCAPE Trust), a collaboration of Historic Scotland and the University of St Andrews. Diversity as a goal of cultural heritage preservation is not yet well established, although the value of diverse types of cultural heritage is inherent in the process of learning from cultural heritage for climate change adaptation.

Learning from and responding to change

It has now been almost a full decade since the issue of the impacts of climate change on natural and cultural heritage properties was formally brought to the attention of the World Heritage Committee by a group of concerned organizations and individuals. This resulted in an expert meeting which took place in March 2006 at UNESCO headquarters in Paris. Participants issued a joint report on *Predicting and Managing the Effects of Climate Change on World Heritage* as well as a *Strategy to Assist States Parties to Implement Appropriate Management Responses*. Building on the 2006 report, in 2008 climate change experts and practitioners of heritage conservation and management, international organizations and civil society, including the International Council on Monuments and Sites (ICOMOS), issued a *Policy Document on the Impacts of Climate Change on World Heritage Properties*.

This important early work brought critical attention to the need to protect the Outstanding Universal Values, integrity and authenticity of World Heritage properties from the adverse impacts of climate change. Among other things, the 2008 *Policy Document* identified three strands of future research needs for cultural heritage and climate change: (1) increased risk factors for planning; (2) socio-economic research; and (3) the nature and sources of other stress factors. Fresh efforts are required to continue to build this agenda. The capacity to learn from cultural heritage and utilize its elements as a source of resilience is a new addition to this list.

Wilderness and protected areas offer unique opportunities for research on climate change because these ecosystems represent some of the most pristine lands and the least modified by modern industrial human influence.[13] In many cases these areas provide the best basis for understanding the

Yosemite National Park (United States) vividly illustrates the effects of glacial erosion of granitic bedrock, creating geological features that are unique in the world.

complex interactions of the natural system, as revealed by such studies as the one devoted to seals at Kluane / Wrangell-St. Elias / Glacier Bay / Tatshenshini-Alsek (Canada and United States), the world's largest World Heritage site. These sites are slices of a much bigger puzzle and are landscapes for learning.

In the long term, the ability to conserve cultural integrity, biodiversity and ecosystem function in World Heritage sites and other protected areas, while allowing some components to change and adapt, will necessitate readily available, high-quality scientific information and an unprecedented level of collaboration. Beyond general trends, each site will be impacted differently and that requires planning and vulnerability assessments to be done at regional and local scales, taking into account all the available socio-ecological information.

Cultural heritage provides several solutions for climate change. With respect to extreme events, heritage illustrates disaster resilient or resistant architecture and settlement patterns. Indigenous science and traditional ecological knowledge is a wellspring of lessons for broader adaptation, while cultural heritage continuity provides social cohesion and a focus for recovery for affected communities. Solutions provided by cultural heritage for the longer environmental and social trends of climate change are less recognized, but numerous. In the realm of science, cultural heritage has been framed as 'distributed observing networks of the past' – sources of palaeogenetic and palaeoclimatic data and patterns of past land use.[14] Adaptation solutions come together at the landscape scale. For example, archaeological research across the American Southwest has developed comparative models of irrigation vulnerability and social rigidity between Mesa Verde National Park World Heritage site (United States) and other regional cultures.[15] Along the Yellow River in China, archaeological sites near The Grand Canal, Longmen Grottoes, and the Historic Monuments of Dengfeng sites show long-running interactions between agricultural intensification and responses to flooding during the Han dynasty. The combination of evidence worldwide of the greater time depth of human interaction with the environment has shaped definition of the Anthropocene and recognition that management of the environment towards desired conditions has a very long history.

Blue glacial pool in Wrangell-St. Elias National Park (United States).

© National Park Service, Alaska Region

Big problems/big solutions: giving hope to future generations

Climate change is challenging protected area managers and conservationists to rethink some of the basic tenets for how and why these areas are important and the role they play in helping natural and human systems to maintain resilience under stress and change. As climate changes, managers of World Heritage sites and other protected areas must raise awareness and communicate their relevance beyond the usual partners and supporters of conservation and stewardship. We are looking at the biggest threats we have ever faced but we also have the greatest capacity and the best level of knowledge. This is a time for exploring new tools for collaboration and learning.

At a time when more people will be vying for fewer resources, and where climate change is likely to cause a greater strain both on people's livelihoods and the availability of resources, expanding support for protected areas means that their relevance must become more visible to the human communities that live in or depend on them. This is something that is especially important to teach young people. They must be encouraged to be more aware of their surroundings and to be informed of what is happening to them. Many opportunities exist to encourage people to experience the wonders of these areas and to witness the changes that are taking place. Through direct experience in natural classrooms or via a wide range of interpretative and educational media, the public can come to understand how climate change is affecting the planet's resources and cultural heritage and how they may adapt their behaviour to promote resource stewardship.

Effective engagement also requires communication of meaningful messages of hope and action. One way to encourage participation is through place-based examples. Local and indigenous communities are crucial for adaptation, such as fire management in the Maya Biosphere Reserve (Guatemala). Cultural heritage can be a powerful means of communication and engagement with climate change. The SCAPE Trust has developed a mobile app that allows members of the public to monitor sites at risk of erosion, not only near Heart of Neolithic Orkney but also in the rest of coastal Scotland, and through the ShoreDigs programme, working with communities to decide together on the best means of capturing the heritage that will be lost. Archéologie Littorale et Réchauffement Terrestre (ALeRT) provides another model of such engagement along the north coast of France.

For successful conservation now and into the future, it is important to recognize that humans are not only the cause of global climate change but they are also essential to the solution of this problem. Ecological change is linked to social change. The stakes are now higher than ever before.

Longmen Grottoes (China) are located on both banks of the Yi River to the south of the ancient capital of Luoyang.

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Community responses to climate change in Vanuatu

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Boat across to Ifira island, Port Vila, Vanuatu.

Mouth of Fels cave, situated on the west coast of Lelepa Island.

Category Five Tropical Cyclone Pam struck the archipelago of Vanuatu in March 2015, leaving a long trail of destruction, with lives lost and homes and livelihoods destroyed. One item on the extensive bill of damage to this Pacific Island nation was the country's only World Heritage property, Chief Roi Mata's Domain, a cultural landscape located just 20 minutes by road from the capital of Port Vila. Storm surges, landslides, and trees and structures felled by winds gusting at over 300 km an hour had wreaked havoc at the site, rendering much of it inaccessible to the managers. Cyclone Pam has triggered a national conversation in Vanuatu about links between global climate change, cyclone intensity and disaster risk reduction, issues that pose profound challenges in turn for the site managers and community at Chief Roi Mata's Domain and other World Heritage sites throughout the Pacific. What are the strategies and options for site-level mitigation available to managers in the Pacific region, confronted by threats from climate change predictions that look increasingly real and immediate?

Vulnerability of Pacific Islands

Nowhere are the likely effects of global climate change viewed with more concern than in the Small Island Developing States (SIDS) of the Pacific Islands. Acutely vulnerable both to the rising cost of fossil fuels and to sea-level rise and other climate change-related phenomena, certain Pacific Islands states such as Tuvalu and Kiribati have already begun to experience severe flooding. Even at conservative estimates, the projected rise in sea-level of between 0.2 m and 0.7 m by 2100 will yield a significant increase in extreme sea level events. In addition, while the frequency of tropical cyclones may diminish slightly, their intensity looks set to increase; Cyclone Pam may have been the worst cyclone to hit Vanuatu in more than a century, but it may also come to represent the norm rather than the exception. All but one of the World Heritage listed properties in the independent Pacific Islands states, along with most of the sites currently on the region's Tentative Lists, stand at or very close to sea level. Global climate change thus presents a severe threat to the future of conservation, management and planning for World Heritage properties across the Pacific region. A closer look at management challenges and responses at Chief Roi Mata's Domain in Vanuatu may offer some insight and lessons for other properties in the region and beyond.

The Republic of Vanuatu signed the World Heritage Convention in 2003 and moved swiftly to establish a Tentative List and to nominate its first cultural heritage property for inscription by 2008. Chief Roi Mata's Domain is a largely marine and littoral cultural landscape that encompasses three sites associated with the life, death and spectacular burial of a 16th-century paramount chief, Roi Mata. The property has Outstanding Universal Value as an exceptional instance of a landscape representative of Pacific chiefly systems. Significantly, the authenticity of the property and its individual sites lies in the continuing association of the landscape with the oral traditions of Roi Mata, continuity of chiefly systems of authority and customary respect for the tangible remains of his life evident in the continuing *tabu* prohibitions on these places. Particular emphasis is placed on the

Lololima Waterfalls, on Efate island, Vanuatu.

The tamtam (or split drum) is used by the chiefs in each community.

Artok island.

central role of the community in maintaining, communicating and transmitting this knowledge to future generations.

In at least one other respect, Chief Roi Mata's Domain is possibly unique as a World Heritage site, as it is almost entirely owned and managed by the customary community, resident within the buffer zone in the villages of Lelepa and Mangaliliu (known jointly as the Lelema community). The Vanuatu National Museum and Cultural Centre, as the national institution responsible for engagement with the World Heritage Centre, plays a very important linking role and offers guidance and assistance where requested, but a community-level Lelema World Heritage Committee takes the lead in all management, tourism and decision-making processes relating to the property.

Taking stock and planning ahead

In the days after the passage of Cyclone Pam, Lelema community managers took stock of the damage to the community and its houses and gardens, and then surveyed the impact on the sites of Chief Roi Mata's Domain, accompanied by Vanuatu's World Heritage Officer. Their preliminary report of widespread devastation, with landslides and fallen trees blocking access, and significant damage to vegetation within some of the sites, stimulated a request for Emergency Assistance from the World Heritage Centre, which was swiftly approved and implemented. A preliminary mission, which assisted the community in restoring access and cleaning up the sites, established that the property had escaped with surprisingly little direct damage either to the core components of each site or to its Outstanding Universal Value. However, an equally important finding was the need for managers to begin planning immediately for disasters of similar or greater magnitude. Management strategies for reconstruction of damaged or destroyed infrastructure, and revival of the community-owned cultural tourism enterprise, Chief Roi Mata Tours, will have to be undertaken within the context of an understanding of global climate change and its likely local consequences. While acknowledging the harshness of the lesson, site managers and other community leaders display customary resilience in speaking of Cyclone Pam in terms of an opportunity to take stock and reflect on future changes, to 'build back better'.

Chief Roi Mata's Domain has Outstanding Universal Value as an exceptional instance of a landscape representative of Pacific chiefly systems.

In several respects, tradition or *kastom* has served the property well. The locations of the principal sites are all based on a profound awareness of the history of cyclones, tsunamis and other natural disasters familiar to the community and its inherited knowledge. Roi Mata's burial ground on the tiny islet of Artok survived intact, as it has numerous previous cyclones and tsunamis; and his former residence at

Traditional dance on Tanna island, Vanuatu.

Fels Cave rock art.

Mangaas is strategically positioned behind a promontory, set back from the beach and protected by a shield of ancient trees. Traditional subsistence practices, such as the cultivation of cyclone-resistant wild yam species, have been maintained, but need to be further strengthened.

Initiatives for future threats

But local leaders are also aware that the nature and scale of changes to the local climate may exceed the experience of their ancestors. Sea-level rise and associated changes to the water table and soil chemistry pose a looming threat to Roi Mata's grave, currently only 5 m above sea level, and other climatic changes will hold implications for the natural values of the property, including transformations in the habitats and behaviour of endemic animal, bird and plant species, and a probable increase in the frequency and severity of coral bleaching events. The impacts of climate change will be registered not just in terms of the physical characteristics of the property, but also in the subsistence and residence practices, and thus the viability, of the local community, essential for the transmission of the values of Chief Roi Mata's Domain.

Local managers have already identified three key initiatives, each of them grounded in the interests and capacity of the Lelema community, which claims a central role in the monitoring and development of site-level strategies, and in the development of short- to medium-term mitigation measures over the next decade. The first addresses the part to be played by traditional subsistence practices and other forms of knowledge in responding to climate change and natural disasters, and will take the form of community-led training in the observation of weather, and the reinforcement of traditional strategies for food management in a disaster-prone environment, along with the selective adoption of new ideas and materials. The second initiative is to revisit traditional methods for the construction of cyclone-resistant houses and sea walls. A national survey is under way in Vanuatu to review the durability of traditional house forms; large communal meeting houses known as *farea* in Efate, which doubled as cyclone shelters. The Lelema community plans to draw on the results of this survey as well as local knowledge to build a major *farea* adjacent to Roi Mata's residence at Mangaas, as an opportunity to reinforce traditional building practices and to demonstrate the value of that knowledge to visitors. Similarly, massive sea walls of coral blocks were built in the past to protect coastal settlements from storm surges and tsunamis, but these have since been plundered and allowed to degrade; reconstruction may present a short- to medium-term option for protection of sites and settlements. The third and most ambitious initiative builds on traditional safety nets and support networks founded on ties of kinship and exchange, seeking both to strengthen existing networks and to extend their links to national and international partners, including donors, researchers and advocates. This rewiring of traditional connections may yet prove to be the most significant of the community's initiatives.

It will be vital that these local initiatives link up with and inform Vanuatu's National Climate Change Adaptation Strategy, which articulates with global responses critical for the mitigation of climate change and sea-level rise, and the development of longer-term strategies over the next twenty to thirty years. However, the local challenges of global climate change must also be situated within the context of other threats, and at Chief Roi Mata's Domain the most immediate and pressing concern continues to be the pressure on land. A boom in the long-term alienation to investors of the best arable land along the coast of Efate and other islands in Vanuatu will ultimately force Lelema community members to relocate to the interior to find space for gardens, or to Port Vila in search of employment. This move away from ancestral settlements along the coast may well weaken the link between the landscape and future generations, a link vital to the values of Chief Roi Mata's Domain. Responses to climate change will always be mediated and played out locally against the backdrop of a range of other challenges such as these.

SPONSORED STATEMENT

The Dordogne Basin Biosphere Reserve

Making the Dordogne Basin a place for demonstrating people's ability to reconcile economic development and social well-being with the preservation of nature

On 11 July 2012, UNESCO included the Dordogne River Basin in the World Network of Biosphere Reserves, thus recognizing its exceptional ecological, landscape, historical, cultural and social status. In it, important historic sites carry traces of truly ancient human occupation (with shelters at Laugerie Basse, La Madeleine and Lascaux, the painted cave with its many colours at Font de Gaume, and the fish shelter), and a rich and eventful past with numerous castles and other religious buildings.

The catchment area of the Dordogne, measuring 24,000 km², still boasts exceptional environmental conditions. With thirty-nine different species, the Dordogne is home to an impressive variety of fish. In particular, it is the last refuge of all the major diadromous migrating fish in Western Europe (European sturgeon, Allis shad, *Alosa* agone, European eel, brook lamprey, sea lamprey, Atlantic salmon and sea trout). It is also home to a number of rare mammals (such as otters and European bison), the presence of which is an accurate indicator of water quality.

Thanks to the quality and abundance of their waters, the Dordogne Basin rivers have become centres for several different activities: irrigation, swimming, sailing, paper and food industry, hunting, professional and amateur fishing, and hydraulic generation.

The management of the various water uses, which must be reconciled, requires an understanding of the river overall; territorial divisions must be crossed and action taken locally as part of a global process. By listing it as a biosphere reserve, UNESCO is recognizing the Dordogne Basin's strong commitment to sustainable development and integrated management of natural resources on a consistent scale, rendered possible by dialogue and shared action by everybody working in the area since the early 1990s. It was the epic story of the Dordogne Valley Summit and then of various general states led by EPIDOR (the Basin's territorial public organization that brings together the six departments crossed by the Dordogne) that have allowed all users and citizens to think about the future of the Dordogne Basin and design innovative solutions.

Of the many initiatives taken, some aim to reconcile water uses that on the surface are difficult to reconcile. The work centred on hydroelectricity is the best example of this.

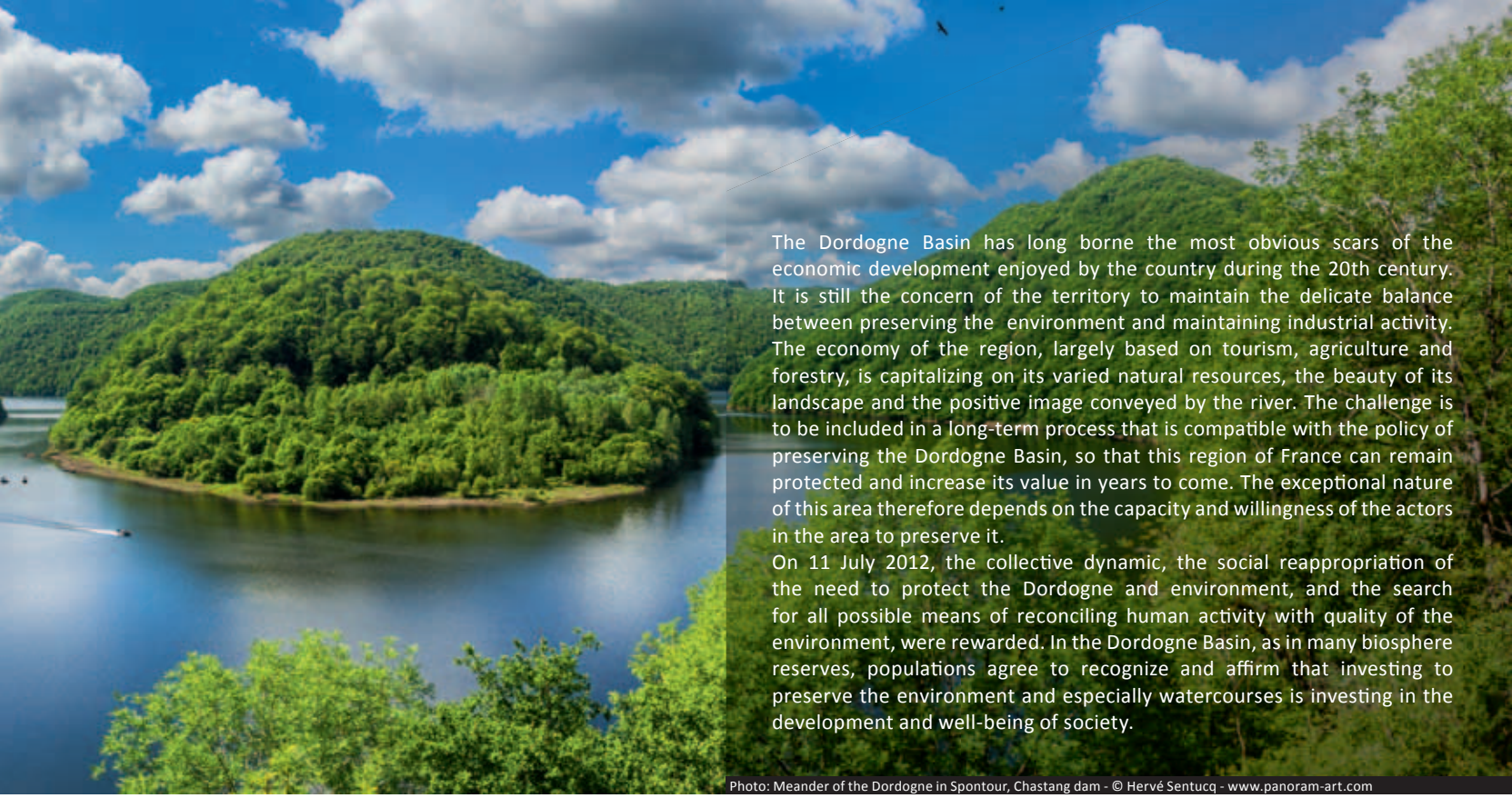
Bort-les-Orgues dam - © EDF

Since the last century, the Upper Dordogne Basin has been home to one of France's largest dam chains, which is now making a significant contribution to energy transition policies. Over the years, the perception and acceptance of these structures has evolved with the populations, the public authorities and the ebb and flow of opinion; although the primary function of a dam is still to produce electricity, it is becoming more and more legitimate to reduce the effects of this industrial activity on aquatic environments and other activities (such as fishing, swimming and navigation). EDF, the principal operator of the Dordogne Basin dams, has adjusted its activity to include environmental management as a completely separate activity from hydraulic power. Fifteen years of studies and experiments have led to areas of specific activity that can be considered as successful innovative experiences. The introduction of fish passes and the reduction in the effects of locks(1) are good illustrations of this. With their positive results, these actions constitute a source of potential inspiration for other countries also anxious to reconcile environmental protection with the development of an industry that provides the energy of the future.

EPIDOR and EDF have developed a partnership around ecological studies and surveys, actions on water regimes, aquatic environments and restoration of ecological continuity. All these initiatives are accompanied by a wide process of information-gathering and discussion with the users concerned (fishermen, environmental associations, local residents, etc.) and by support from numerous partners. The Adour Garonne Water Agency and the departmental and regional councils in particular are funding these efforts.

Experiments are continuing, enriched by joint work initiatives between universities.

(1) These hydroelectric locks correspond to the greater or lesser variations in upward or downward flow, caused by the stopping or starting of turbines.



The Dordogne Basin has long borne the most obvious scars of the economic development enjoyed by the country during the 20th century. It is still the concern of the territory to maintain the delicate balance between preserving the environment and maintaining industrial activity. The economy of the region, largely based on tourism, agriculture and forestry, is capitalizing on its varied natural resources, the beauty of its landscape and the positive image conveyed by the river. The challenge is to be included in a long-term process that is compatible with the policy of preserving the Dordogne Basin, so that this region of France can remain protected and increase its value in years to come. The exceptional nature of this area therefore depends on the capacity and willingness of the actors in the area to preserve it.

On 11 July 2012, the collective dynamic, the social reappropriation of the need to protect the Dordogne and environment, and the search for all possible means of reconciling human activity with quality of the environment, were rewarded. In the Dordogne Basin, as in many biosphere reserves, populations agree to recognize and affirm that investing to preserve the environment and especially watercourses is investing in the development and well-being of society.

Photo: Meander of the Dordogne in Spontour, Chastang dam - © Hervé Sentucq - www.panoram-art.com

The Dordogne Basin is the largest French biosphere reserve and the first on the scale of a watershed in its entirety

Dams equipped with fish passes

Since 1986, EDF has equipped the three dams on the Lower Dordogne (Bergerac, Tuillières and Mauzac) with fish passes that now allow migrating fish (shad, salmon and lampreys) to pass upstream to their spawning grounds. Progress has been made, although there is still room for improvement; continued work with scientists and technicians is making these initiatives more effective and turning the Dordogne into a valuable experimentation ground at both national and international levels.

Tuillières dam - ® EDF

A hydropeaking agreement aimed at experimenting with new methods of managing hydroelectric structures

Within the framework of the hydropeaking agreement signed between EDF, the State, EPIDOR and Agence de l'Eau, the methods used to operate dams have been adapted with the introduction of 'floor' flows between dams, 'peak' flows and flow variation gradients that are much more progressive. Specifically, since 2011 the experiments have succeeded in removing the effects of locks on the Dordogne during spring and summer, the most sensitive periods at an ecological level.

UN PARTENARIAT EDF EPIDOR
INITIATIVE BIOSPHERE DORDOGNE

Initiative Biosphère Dordogne un partenariat EDF - EPIDOR pour la Réserve de biosphère du bassin de la Dordogne

www.biosphere-bassin-dordogne.fr

The Dordogne Biosphere Initiative association

Under the effect of this name, conferred by UNESCO, it has been the wish of EPIDOR and EDF to strengthen their partnership and make it durable. They have therefore worked together to create the Dordogne Biosphere Initiative (IBD) association.

The IBD is working throughout the Dordogne Basin to support studies and actions centred on ecological restoration of the river area, ecological monitoring, research, experimentation and information, and interventions or acquisitions on water courses and areas alongside rivers, as well as actions to enhance the value of the biosphere reserve.

Through this association, EDF provides an annual financial contribution of €1 million to implement an action programme, lasting several years, aimed at reducing the impact of the hydroelectric industry on watercourses in the basin and improve the quality of aquatic environments. EPIDOR, as a territorial public establishment in the basin, is contributing its technical expertise and knowledge of the territory to ensure that the action taken is both interesting and effective.

The aim of this association, in accordance with UNESCO's Man and the Biosphere Programme (MAB), is therefore to make the Dordogne Basin an area in which humankind's capacity to reconcile economic development and social well-being with preservation of nature is demonstrated.

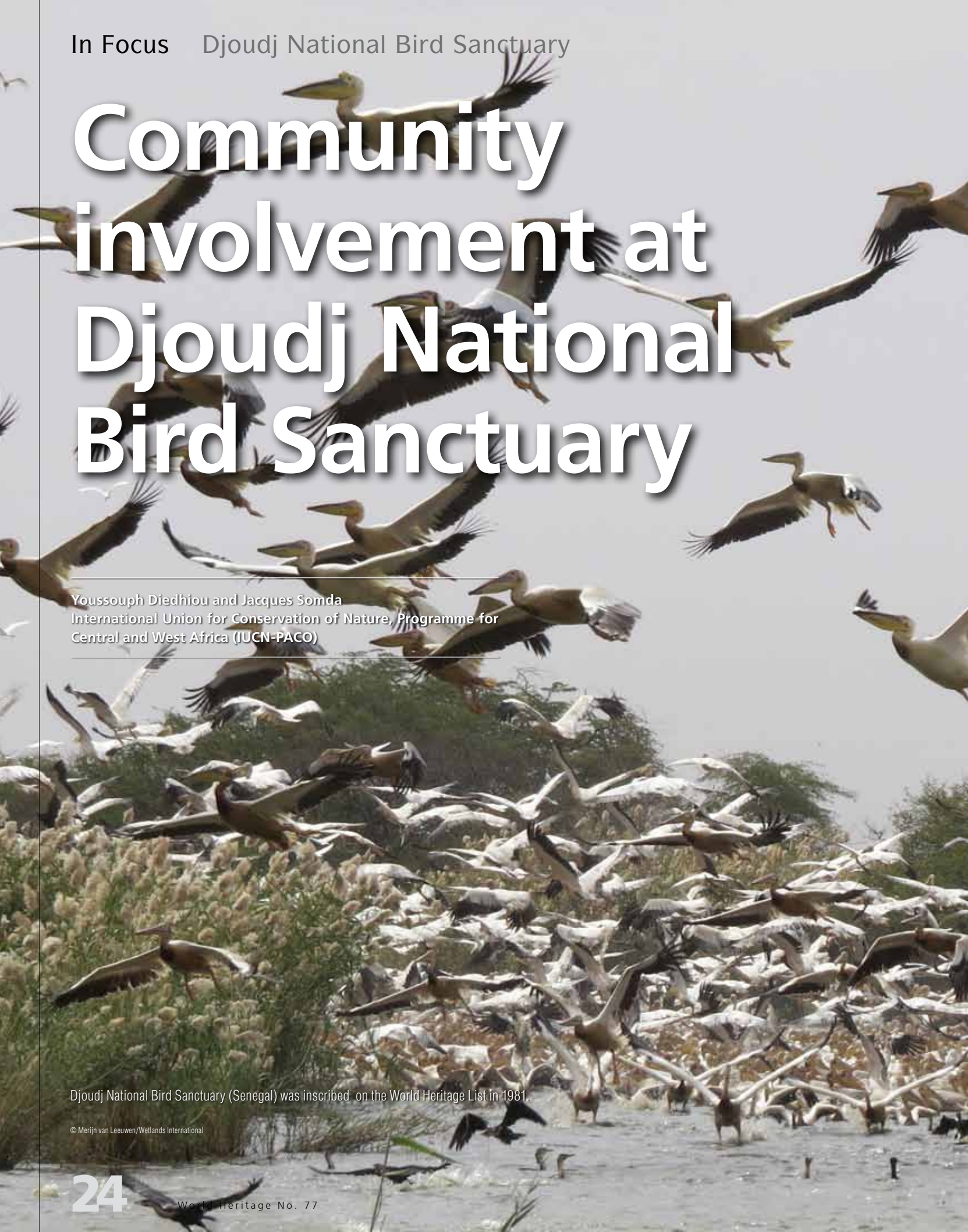
Dordogne dead arm - ® EPIDOR

Action to restore the river area

The ancient arms of the Dordogne have evolved more quickly than usual because of historical gravel-mining works in the riverbed and the loss of morphogenic flows brought about by dam activity. Because of this, they have become artificially 'perched' and are now often disconnected from the principal channel. To prevent fish from becoming trapped in these arms during periods of reduced flow, reconnection works have been carried out. Thanks to the IBD Association, about a dozen sites are being developed on the Dordogne.

Community involvement at Djoudj National Bird Sanctuary

Youssouph Diedhiou and Jacques Somda
International Union for Conservation of Nature, Programme for Central and West Africa (IUCN-PACO)



Djoudj National Bird Sanctuary (Senegal) was inscribed on the World Heritage List in 1981.

Great white pelicans (*Pelecanus onocrotalus*).

The Parc National des Oiseaux du Djoudj was created on 14 April 1971 to safeguard a representative sample of the Senegal River delta ecosystem. The 16,000 ha park is of international importance and as such it was included as a RAMSAR wetlands site in 1977 and inscribed on the UNESCO World Heritage List in 1981 as Djoudj National Bird Sanctuary.

World Heritage sites play an important part in improving the well-being of local communities through the goods and services that they secure for them. Today, however, the combined effect of numerous pressures and threats has unfortunately led to the inclusion of over 50 per cent of these exceptional sites in West and Central Africa on the List of World Heritage in Danger. Besides, in the perspective of the global and irreversible background of climate change, these protected areas are still in a position to offer adaptive solutions to the effects of climatic deterioration. However, any strategy of adaptation to climate change based on protected areas must take the socio-economic activities of the communities into account.

Climate change is a major challenge to communities living in or around protected areas and to their subsistence activities. It exacerbates poverty within these communities as a result of their heavy dependence on natural resources. Poverty, in turn, is a threat to the long-term conservation of protected areas in general and World Heritage sites in particular. It is therefore important to increase the knowledge of local communities and of site managers regarding the interrelations between communities, climate change and sites of international importance. This will help communities to involve themselves in any long-term strategy for the preservation of World Heritage assets, a step strongly recommended by the World Heritage Committee at its 26th session (Budapest, 2002) by adding a fifth Strategic Objective: 'Enhance the role of Communities in the implementation of the World Heritage Convention'.

The conclusion may therefore be drawn that the exceptional biodiversity of numerous World Heritage sites is doubly affected by climate change, first directly, through the disruption of the distribution and density of species at various sites because of rising temperatures and reduced rainfall, but also indirectly through the peripheral populations who see their outside resources reduced and are therefore tempted to exploit resources within the sites. This, in turn, increases pressure on the exceptional biodiversity of these sites. Although the direct effects of climate change are difficult to control and need to be handled at national and international levels through decisions to reduce greenhouse gases, the indirect effects caused by peripheral populations can also be reduced. This can be achieved by improving community understanding of the interrelations between their means of subsistence, climate change and resources within the World Heritage sites.

Djoudj National Bird Sanctuary consists of an inland delta in a shallow depression lying within the floodplain of the Senegal river, in north-western Senegal.

The IUCN-PACO study of the vulnerability of the communities living around Djoudj National Bird Sanctuary, and of their adaptation to climate change, identifies a way of enhancing the value of the part these communities play in implementing the World Heritage Convention.

The IUCN-PACO study of the vulnerability of the communities living around Djoudj National Bird Sanctuary, and of their adaptation to climate change, identifies a way of enhancing the value of the part these communities play in implementing the World Heritage Convention. It has in fact helped site managers in West Africa and generally increased knowledge of the ways in which local communities adapt to the effects of climate change and the implications for long-term conservation of the Outstanding Universal Value of these sites.

This study was conducted by IUCN-PACO's Protected Areas Programme within the framework of the Africa Nature 2011–2013 programme. It used the Community-based Risk Screening Tool – Adaptation and Livelihoods (CRiSTAL), with the overall aim of increasing knowledge of the relations between World Heritage sites, the communities living on these sites or at their periphery, and climate change. Specifically, it aims to analyse the perceptions of communities living on the fringe of Djoudj National Bird Sanctuary with regard to climate change; and the compatibility between adaptation strategies and conservation policies. The study unfolded in three stages:

1. Nine World Heritage site managers were equipped to analyse the vulnerability and adaptation capacities of the communities. A training workshop on the application of the set of tools for planning, monitoring and evaluating adaptive capacities was organized for the benefit of the managers of Comoé National Park and Taï National Park (Côte d'Ivoire), Mount Nimba Integrated Nature Reserve (Guinea and Côte d'Ivoire), W National Park of Niger, Niokolo Koba National Park and Djoudj National Bird Sanctuary (Senegal). This has provided insight into the interrelations between the management of World Heritage sites and their periphery against a background of climate change. The skills acquired will allow managers to ensure better harmony between the communities and their sites, through initiation of development plans compatible with biodiversity conservation objectives.

2. Thirty-eight members of Diadiem 3 village (the oldest of three of the same name) analysed their vulnerability and capacity for adaptation. The managers applied the tools within Diadiem 3 community in the form of

Djoudj forms a living but fragile sanctuary for some 1.5 million birds, such as the white pelican, the purple heron, the African spoonbill, the great egret and the cormorant.

discussion groups based on gender. A group of twenty-four women and another of fourteen men were assembled to collect and analyse data on vulnerability and adaptive capacities according to the viewpoints of either group. The aim was to ensure the inclusion of each gender in the development of the adaptation initiative on the periphery of Djoudj National Bird Sanctuary, which was accepted as the training site. The thirty-eight representatives of the community allowed the vulnerability and capacity for adaptation to be analysed for the benefit of the whole community.

3. Information was made available on possible relations between Djoudj National Bird Sanctuary, the Diadiem 3 community and climate hazards. The application of planning tools and tools for monitoring and evaluating community capacity for adapting to climate change produced valuable information on (i) the principal means of subsistence and their relation to the principal climate hazards in Diadiem 3 village, (ii) the impacts of these hazards on means and adaptation strategies, (iii) the scale of exposure and awareness within the community faced with these hazards, and (iv) the importance of resources in the implementation of strategies for adapting to these hazards.

The study highlighted the fact that the local resources most highly valued by the Diadiem 3 community (fish and water lilies) are suffering from climate hazards. These resources are also the preferred food of most birds in the park. There are therefore strong interrelations between the resources of Djoudj National Bird Sanctuary, climate change and the communities living in or near the site. It is therefore essential to introduce a coordinated management system for these threatened resources in order to ensure the well-being of the communities and the survival of birdlife, which is the principal tourist attraction of this world-renowned ornithological site.

In fact, Djoudj National Bird Sanctuary is directly or indirectly subject to the effects of climate change, and to variability and extreme weather events in particular. This study concentrated on the indirect effects, based on interrelations between the park resources and people living within a context of climate change. It analysed on a participative basis the climate hazards, the resources of Diadiem 3 village, and the community's relations and adaptation strategies. Three observations can be made.

First of all, long-term conservation and management of Djoudj National Bird Sanctuary cannot be achieved without taking proper account of the effects of climate change. The direct effects must be addressed within the park by increasing the resilience of associated ecosystems. Similarly, special attention must be paid to indirect effects, such as the fact that the peripheral populations affected by climate change could increase pressure on resources within the park to compensate for the impact of climate change on resources outside the park. This scenario, covered by our study, has still not been properly included in the park's management and conservation plans. The heightened vulnerability of peripheral populations will affect the park's vulnerability to climate

Situated in the Senegal River delta, the Djoudj Sanctuary is a wetland of 16,000 ha.

Djoudj National Bird Sanctuary is directly or indirectly subject to the effects of climate change, and to variability and extreme weather events in particular.

change. It is therefore essential to include climate change in the management plans for Djoudj National Bird Sanctuary.

Next, the local population has displayed its awareness of the interrelation between climate change and Djoudj National Bird Sanctuary. This sort of connection rests upon the resources present both inside and outside the park. Reduced quality and quantity of resources outside the park could induce local populations to infringe the park management rules to satisfy their needs which in turn would compromise the natural values of the site. This would mean introducing new measures to adapt the peripheral population and to ensure the site's biodiversity conservation aims. For example, fish are sought by waterfowl as well as by the local population. Climate hazards are however reducing the number of fish caught, thus intensifying competition between people and birds. A strategy to promote fish farming on the fringes of the park would help to reinforce people's ability to adapt while preserving the water resources for the benefit of the waterfowl within the park.

Finally, the Diadiem 3 community views the park as one of the most important resources for subsistence. In other words, the services provided to them by the park management are of great importance in implementing strategies of adaptation to climate change. Reinforcing the park management's capacities to supply services to the peripheral population should help to increase their contribution to conservation and long-term management of biodiversity within the park. However, the park alone cannot provide a solution to the problems raised by the vulnerability to climate change of the peripheral population, hence the need to strengthen the partnership between all those actively involved in conservation and development and allow each participant to contribute on a coordinated basis and within the framework of a common vision, as proposed by the populations in the course of this study. This requires an analysis of the vulnerability and adaptive capacity of the six other villages in and around the Djoudj National Bird Sanctuary to ensure that all those actively involved share a common vision. This goal can be achieved by applying the other CRiSTAL tools, which have only been partially used because the budget available for this study was insufficient.

This study was the first time that this type of analysis has been carried out at West African World Heritage sites. It could be repeated at other sites with a view to collecting a critical mass of information in the field touching upon the connection between climate change, heritage sites and communities living there.

How intangible cultural heritage adapts to a changing world

Rahul Goswami
Intangible cultural heritage expert and trainer in the Asia-Pacific region, and government consultant on agriculture, sustainability and development, India

A fisherman checks his nets in the man-made lake under Sigiriya rock, at the Ancient City of Sigiriya (Sri Lanka).

The crew of a ceremonial snake boat approaches the shore to participate in a commemorative temple feast that celebrates rice grown in the wetlands. This practice, on the River Pamba in Kerala (India), binds together village communities along the river.

Soils and humus, with grasses or cultivated, water whose form may be a hill tarn or a great tropical river, all these have been the expression and renewal of intangible cultural heritage. Whether in the Himalayan hill districts of northern India, the central province of Sri Lanka with its hydraulic wonders, the great basin of the Tonle Sap in Cambodia whose bidirectional water flow is the basis of both ritual and an aquacultural livelihood, or the highland *aldeias* (villages) of central Timor-Leste, in which an age-old institution that bans exploitation of the forest continues to be respected, the biophysical foundation on which so much intangible cultural heritage depends has remained plentiful and as reliable as the seasons.

But no longer, for new disturbances have shaken this relationship and they are all at once depleting these fundamental materials and altering their very nature. The new uncertainty is undermining communities' intimate knowledge of natural processes in their specific locations, such as inter-annual variations in weather or the cycles of certain plant and animal species. The protection of such knowledge is of critical importance – not only in consideration of its role as cultural heritage, and the wealth of accumulated and transmitted knowledge – but also because it provides keys to living with change, and especially with the effects and impacts of climate change.

Living with the effects of climate change

These questions touch upon ways and means to reduce the harmful effects of climate change, and the identification of forms of behaviour that allow us to live in relative harmony with these effects – effects that have moved to the centre of the scientific and technical debate about climate change. In these circles, however, this is known as 'mitigation' and 'adaptation', words and concepts that can scarcely be rendered in the languages and dialects spoken by the bearers of intangible cultural heritage and the holders of traditional knowledge.

What is known on the ground is the realization that the rate of change is reaching at times beyond the capacities of communities, the strength of their intangible cultural heritage and the depth of their local knowledge. Yet it is not 'climate change' alone that is the villain, for the effects that endanger communities are practically always the amplification by a changing climate of existing environmental degradation, over-exploitation of a natural resources base, urban and industrial encroachment into ecological commons that have long survived because of the cautious thriftiness of its human stewards.

IPCC report 2014

The fact that considerations of this kind found verbose mention in the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) in 2014 indicates that the formal earth sciences have learned to look with a new respect at their very much older, and very much more experienced, forebear – cultural heritage with all its expressions, knowledge systems and methods of safeguarding. The AR5 (as last year's voluminous report is called), has several times referred to sociocultural

Women members of a village institution in Himachal Pradesh (India), at a meeting. When cereal crop staples failed under new conditions brought about by climate change, they revitalized the cultivation of traditional varieties of upland millet, and kept alive the knowledge associated with its cultivation.

resilience and has linked this quality directly to 'vulnerability under conditions of environmental change'. Of much interest and concern to the IPCC scientists and authors has been what they call adaptation limits: environmental, political and sociocultural. When these adaptation limits are crossed, communities and settlements suffer. And so, in order to avoid crossing the line, they need to be recognized early enough. This is a role that intangible cultural heritage and local knowledge can easily assume, provided there is social willingness and political support.

When both are present, especially at the level of local administration, the benefits are apparent. In the district of Pathanamthitta, in the state of Kerala, south India, several sacred groves are revered by the residents of the villages along the River Pamba, whose source lies high up in the Western Ghats. 'Here we maintained sacred areas of forest and established rules and customs to ensure their protection,' explains Kummanam Rajasekhar, a social activist who has successfully led a public movement to protect the wetlands of the district.

The formal earth sciences have learned to look with a new respect at their very much older, and very much more experienced, forebear – cultural heritage with all its expressions, knowledge systems and methods of safeguarding.

'These rules prohibit the felling of trees, the collection of any material from the forest floor, and the killing of all animals. Because of these protective restrictions, faithfully followed over generations, our sacred groves are now havens of biodiversity.'

When this verdant and water-rich district of south India is hit by the effects of a changing climate (in which monsoonal variations become more volatile, rainy spells more intense and dry ones more frequent), its storehouses of communally-maintained biodiversity are invaluable. They harbour medicinal plants essential to village communities for their treatment of illnesses, they also contain wild relatives of crop species that can help to improve cultivated varieties, and many sacred groves include water resources such as ponds and streams upon whose flow cultivation (large tracts of paddy downstream in Kerala) depends.

Use of natural resources in listed heritage

To date, 364 elements have been inscribed on the Lists (and Register) of the 2003 Convention for the Safeguarding of the Intangible Cultural Heritage and my estimate is that no less than 80 per cent of these are dependent, directly or indirectly, on the use of natural resources by their practitioners. Where intangible cultural heritage is expressed through art and performance then musical instruments are made from these materials, rituals and customs require objects that are both common and sacred and fashioned from the produce of local biodiversity, culinary

A shore fisherman in the Southern Province of Sri Lanka, explains the spartan but complex craft. Experienced fishermen blended several streams of knowledge: on the habits of near-shore species, seasonal sea and monsoon conditions that determined choice of fishing technique, and how to maintain the sustainability of catches so that households could be fed without depleting fish stocks.

intangible cultural heritage relies entirely on crops, herbs and horticultural produce whose cultural significance can only be guaranteed when that produce has been cultivated organically, from seed that has been locally saved, 'process' intangible cultural heritage – a community's means of recognition of its relationships with the habitat, and the terms under which that community sustainably exploits that habitat – is entirely circumscribed by natural resources.

When the qualities and characteristics of those natural resources change, or when their typical habitat can no longer support them and they begin to wander (as plants have tended to do to escape climatic stress), or even when they face new predators or invasive species that were formerly foreign and unknown, then the natural resources that intangible cultural heritage is linked to and depends upon becomes unsuitable or scarce and in turn weakens that heritage, at times even terminally endangering it.

All too often, local potential for problem-solving, which rests upon the application of methods rooted in intangible cultural heritage or traditional knowledge, is overlooked by administrative mechanisms.

Local potential for problem-solving

This change in typical habitats and the threat to ways of living is often included (at times implicitly) when 'climate change impacts' on people and communities are described and debated. These impacts, states Abdhesh Gangwar, Programme Director of the Centre for Environment Education Himalaya (an institution supported by India's Ministry of Environment), 'are already visible in the lives of many people in South Asia, particularly the poor, vulnerable groups, and especially women'. He sees climate change currently being addressed mostly as a technical and political issue and advocates that 'all measures related to adaptation and mitigation should start from the local people's potential and needs, respecting their dignity and right to development'.

Yet all too often, local potential for problem-solving, which rests upon the application of methods rooted in intangible cultural heritage or traditional knowledge, is overlooked by administrative mechanisms. In coastal zones, especially in countries that are either experiencing or aspire to high economic growth rates, the competition for land involves communities that have used such land with care, urban and peri-urban settlements that are expanding and industry.

Preparing portions of fresh produce for sale in a local market in Covalima (Timor-Leste), an elderly cultivator keeps her goods in woven baskets, preferring these to commonly available containers made from plastic. Aesthetically pleasing and also requiring extensive knowledge of the properties of cane, such baskets continue to find household utility in rural Timor-Leste.

These communities have almost always included fisherfolk, whose knowledge of the ways of water is unparalleled. It is in the use of littoral land that their intangible cultural heritage lies, for theirs is an understanding of the means with which to live with an ocean's gifts but also with its ferocity. Hence they are coastal engineers too, for between their settlements and the sea always lay a variegated buffer of fields, bunds, protective vegetation on dunes, sandy dunes, mangroves where there is no sandy verge, mud flats and reed marshes. All these features were maintained by coastal villages, each in its own fashion, and together they formed a coastal defence that absorbed the cyclonic tidal surges and the powerful winds.

What happens when the very morphology of that coastal zone begins to mutate under the effects of climate change? Today, there is not a single Indonesian region or province whose ecosystems – coastal, forest, mountainous, wetland, agricultural – are not under pressure from rapid social and economic changes. Their histories all point to the extensive (usually total) use of traditional knowledge to find a balance between using the ecosystems and maintaining them well. Among those who have done so are the Buginese, whose intergenerationally transmitted knowledge of the marine ecosystem is extensive. Their complex arts of navigation and the piloting of fishing and trading vessels have developed synchronously with a detailed coastal terminology. The specific vocabulary used by the Buginese for features such as the vegetated border above the beach, the inner reef, a reef with sea grasses, a reef with corals, the reef crest, the outer reef, patches of corals less than about 10 m deep, patches of corals over about 10 m deep, and so on is an extension of the dense intangible cultural heritage and traditional knowledge concerning the use of these features, or their importance in daily and seasonal life. When the effects of climate change alter these features, even erasing some entirely, then that heritage becomes orphaned.

The traditional supporting the modern

In the South-East Asian region, among those who have reflected at length on these knowledge systems and the changes affecting them now – whether changes that occur naturally or through the offices of the state – is Demetrio do Amaral de Carvalho, of the Haburas Foundation in Timor-Leste. He emphasizes that traditional ecological knowledge can support modern marine and coastal resource management. 'However, the way in which natural resource managers indoctrinated with scientific knowledge incorporate local knowledge, to improve and strengthen management systems, must be based on an understanding of circumstances (why is local knowledge the way it is?) and also whether people (the community) choose to follow or submit to the guidance of local knowledge,' he says. 'If this is not done, the processes that they believe will strengthen natural resource management will actually become processes for the destruction of

The margin of a large sacred grove in central Kerala, south India. Usually associated with a temple, such groves also include an adjacent water body, such as a pond or flowing stream, reinforcing the connection between forest biodiversity, the need for unpolluted water sources and community observance of their protection.

the intangible cultural heritage and create conflict within communities.'

It is to forestall such conflict and to ensure against misunderstanding that intergovernmental agencies – such as the United Nations Environment Programme's World Conservation Monitoring Centre (UNEP-WCMC), the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), the United Nations Development Programme (UNDP), UNESCO, and the mechanisms of the Convention on Biological Diversity (CBD) – work to promote respect for local and traditional knowledge at national and provincial levels. In the commons of climate science, itself a subset of earth observation sciences, indigenous knowledge and cultural practices have long been recognized as sources of information and insight that are without parallel.

In-depth indigenous observations

In domains such as traditional medicine, forestry, the conservation of biodiversity and the protection of wetlands, it is intangible cultural heritage practitioners and the communities they belong to who observe and interpret phenomena at scales much finer than formal scientists are familiar with, besides possessing the ability to draw upon considerable temporal depth in their observations. For the scientific world, such observations are invaluable contributions that advance our knowledge about climate change. For the local world, indigenous knowledge and cultural practices are the means with which the effects of climate change are negotiated so that livelihoods are maintained, ritual and cultivation continue, and survival remains meaningful.

Yet it is just as important to recognize that in many regions, it is a combination of factors that weakens or threatens intangible cultural heritage. In the Indian Himalayan region, I was told by Vaneet Jishtu, taxonomist and conservationist, the profusion of medicinal herbs that are used in Ayurvedic traditional formulations was rich until the turn of the 19th century. He is growing a group of eight of these herbs, which together form the basis for a popular immunity-boosting elixir called *chyawanprash*, for not only has their occurrence in the hills dwindled precipitously, local communities have begun to lose the ability to recognize them in the wild. In this case, climate change is forcing the herbs to shift to more congenial altitudes in the hills, but at the same time they are facing hitherto unseen competition in forest undergrowth and meadows from new plant species, a shrinking of their habitat because of expanding settlements and infrastructure projects, and finally over-exploitation of these species by commercial manufacturers of Ayurvedic medicines.

A word for every nuance

Coping with the effects of climate change is a daunting challenge, just as much as confronting the effects of destructive change such as resource extraction, over-exploitation of biodiversity, and the conversion of commons into settlement. Societies that harbour intangible cultural heritage and traditional knowledge are also those in which knowledge is regarded in ways that differ fundamentally from the scientific norm: over the seasons each practitioner learns more about insects, animals, soil types, weather patterns and myriad natural aspects as a profound systems-based understanding of the world in which people appreciate their own place within the environment.

This learning relies upon an extraordinary linguistic diversity which UNESCO must be exercised to the utmost to help safeguard. The ability of intangible cultural heritage bearers to marshal the resilience needed to adapt on their own terms rests upon languages through which bodies of knowledge and streams of learning emerge – the very names of natural cycles, of medicinal or agricultural preparations, of the qualities of water or the sequence of spiritual observances. There were, not two generations ago, more words for 'forest' than there were dialects in South and South-East Asia. How many survive? When they do, so do the means to live sustainably, with a light footprint, alongside climate change.

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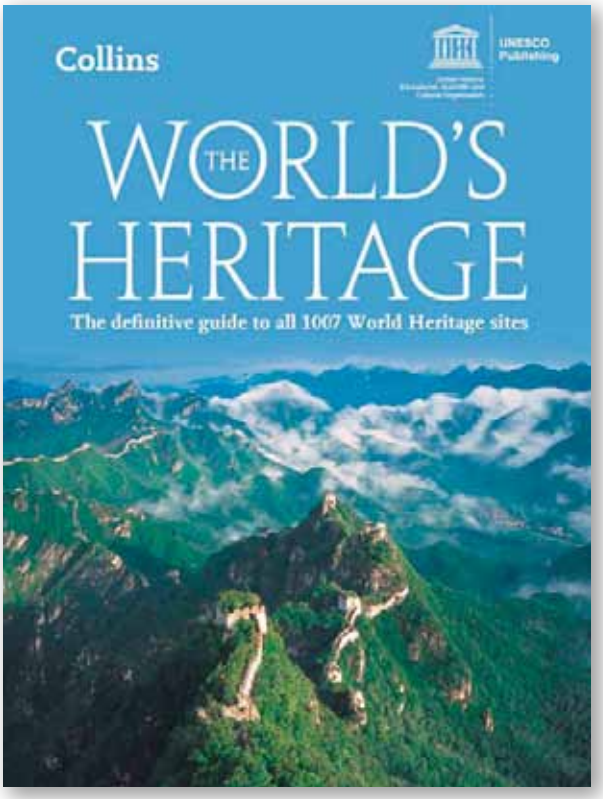
The World's Heritage



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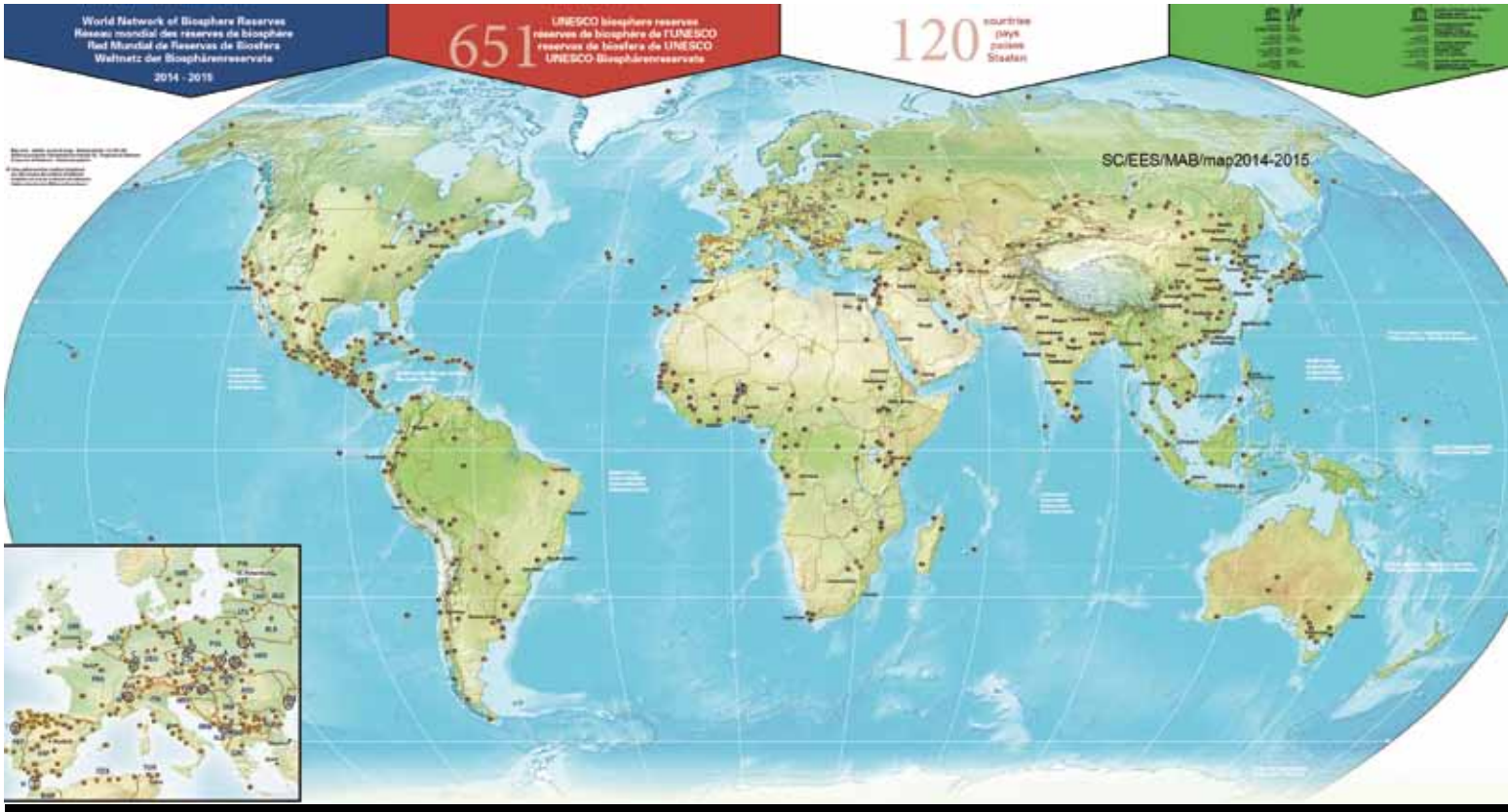
Biosphere reserves

Observatories for action

Peter Dogsé
Co-chair, UNESCO Task Force on COP21 and Climate Change
Programme Specialist, Man and the Biosphere (MAB) programme

The unique biodiversity of Galápagos Islands (Ecuador), a World Heritage site and biosphere reserve, is under stress from climate change.



The World Network of Biosphere Reserves includes 651 sites in 120 countries, including fifteen transboundary sites.

Climate change is already making itself felt at many UNESCO-designated World Heritage sites and biosphere reserves and in the UNESCO-supported Global Geoparks.[1] Around the world, researchers, site managers and national authorities are therefore working hard with local communities to try to identify the best ways to mitigate and adapt to climate change. Besides its impacts on biodiversity and natural heritage, climate change also variously affects the world's cultural heritage, both on land and in the marine environment.

World Heritage sites serve as global field observatories for climate change where information on the potential impacts can be gathered and disseminated and solutions to address them developed and tested.

Man and the Biosphere Programme

UNESCO's Man and the Biosphere (MAB) Programme, launched in 1971, is an intergovernmental scientific programme that aims to establish a scientific basis for the improvement of relationships between people and their environments. MAB promotes the United Nations Post-2015 Sustainable Development Agenda by addressing scientific, environmental, societal and developmental issues in a broad range of ecosystems, including mountains, marine, coastal and island areas, but also in forests, drylands and urban areas. Implemented in dedicated biosphere reserves, the MAB Programme provides a unique platform for cooperation on research, capacity-building, economic development, green job and income opportunities, and networking to share information, knowledge and good practices on key sustainable development challenges of biodiversity loss and climate change and on their interlinkages.

Biosphere reserves have pursued important climate change work related to monitoring and research, mitigation, adaptation, and public awareness.

Biosphere reserves

Biosphere reserves are sites nominated by national governments and designated under the MAB Programme. Unlike World Heritage sites, biosphere reserves are not covered by a convention but by a 'statutory framework' that outlines the criteria for a site to qualify.

Overall, biosphere reserves are special places for the development and testing of 'sustainability science' and interdisciplinary approaches to understanding and managing changes and interactions between social and ecological systems. Biosphere reserves can comprise terrestrial, marine and coastal ecosystems and although they are recognized by the UNESCO MAB Programme, they remain under the sovereign jurisdiction and management of the states where they are located.

World Network of Biosphere Reserves

Today, there are 651 biosphere reserves in 120 countries, including fifteen transboundary sites that together form the World Network of Biosphere Reserves (WNBR). As members of a network, biosphere reserves promote and benefit from regional and international cooperation through the exchange of experiences and know-how, capacity-building and the promotion of best practices. Around twenty new sites are added annually to the WNBR.

Biosphere reserves and climate change

MAB and biosphere reserves have been active on climate change for a good number of years. Guided by several official documents, notably the *Madrid Action Plan for Biosphere Reserves*[2] and the 2011 *Dresden Declaration on Biosphere Reserves and Climate Change*,[3] Biosphere reserves have pursued important climate change work related to monitoring and research, mitigation, adaptation, and public awareness. In line with the provisions contained in the *MAB Strategy 2015–2025*, and the associated *MAB Action Plan 2016–2025* to be adopted at the 28th MAB ICC organized in conjunction with the 4th World Congress of Biosphere Reserves: A New Vision for the Decade 2016–2025, in Lima (Peru), 14–19 March 2016, it is expected that climate action in biosphere reserves will be further stepped up in the coming years.

To give a flavour of some of the ongoing climate change actions in biosphere reserves, below are a few examples grouped under mitigation, monitoring and assessment, and adaptation, education and public awareness.

Biosphere reserves and climate change mitigation

Examples of climate change mitigation actions carried out in biosphere reserves include sustainable production and use of renewable energy, and carbon sequestration through enhanced forest and land use.

Isla de El Hierro Biosphere Reserve (Spain) – the first 100 per cent renewable energy island

The island of El Hierro was declared as a biosphere reserve in 2000. It is volcanic, and although the smallest of the Canary Islands, hosts rich terrestrial and marine biodiversity with several endemic species. El Hierro has recently gained fame for its ambitious policy to become the first 100 per cent renewable energy island. This has been achieved through a smart combination of wind and hydro power, consisting of a wind farm that produces electricity for the grid as well as a water pumping station, which pumps water up to a reservoir. The water can be released down into a hydro power plant to generate electricity on calm, windless days. Additional measures include domestic solar water-heating systems, use of biofuels, promotion of public transport and electric vehicles and energy-saving campaigns.

It is estimated that the wind/hydro project, promoted by the local corporation Gorona del Viento El Hierro, S.A., the shares

El Hierro (Spain) is a volcanic island, the youngest and smallest of the whole Canaries archipelago.

The argan tree is endemic of Arganeraie Biosphere Reserve (Morocco).

of which are held by Cabildo de El Hierro (local authority (60 per cent), Endesa (30 per cent) and the Canary Islands Institute of Technology – ITC (10 per cent) had an initial cost of €80 million and that it will help to save some 6,000 tonnes of diesel annually and associated CO_2 emissions, thereby mitigating climate change, improving the local environment, and enhancing the islands' capacity to produce desalinated water.

The energy experiences of El Hierro Biosphere Reserve are now being promoted under the UNESCO Renewable Energy Futures for UNESCO Sites (RENFORUS) initiative (see box), serving as a reference for small island territories and biosphere reserves around the world, such as Aruba, Easter Island and Minorca.

Arganeraie Biosphere Reserve (Morocco)

The Arganeraie, in south-west Morocco, was designated a biosphere reserve in 1998 in recognition of the extraordinarily high importance of the ecosystem services provided by the endemic argan tree (*Argania spinoza*) in cultural traditions, controlling desertification and providing sustainable income and job opportunities for local communities, notably women's cooperatives, based on the high nutritional, gastronomic, medicinal and cosmetic value of argan oil. The designation was also based on the fact that the argan forest is under threat from unsustainable land use and urbanization, felling trees for domestic energy consumption, as well as climate changes. By contributing to the protection and sustainable use of the argan trees, the biosphere reserve plays an important role in climate change mitigation. The Arganeraie is a high priority on the national agenda, as well as among international agencies. Increasingly so, too, within the private sector, keen to secure future access to argan oil, which is now found in an increasing number of successful products on global markets, and thereby ready to contribute to the conservation of the biosphere reserve. One such recent example is Procter & Gamble, which through UNESCO provides support to research activities, women's cooperatives, and the development of a renewable energy action plan for the Arganeraie Biosphere Reserve in cooperation with the UNESCO Centre on Renewable Energy based in Marrakech (Morocco).

Renewable Energy Futures for UNESCO Sites (RENFORUS) initiative

The objective of the RENFORUS Initiative is to provide the international community with global climate change field observatory sites involving the sustainable use of environmentally sound renewable energy sources in UNESCO biosphere reserves and World Heritage sites. While addressing climate change mitigation, RENFORUS seeks to demonstrate the benefit of harnessing the locally available renewable energy sources and their potential impacts on the environmental and ecological preservation of UNESCO sites. RENFORUS also contributes to strengthening capacities by facilitating access to information and the exchange of experiences and good practice case studies among local and regional renewable energy actors at UNESCO sites. RENFORUS is a partner of the Spanish media group Expansion in the organization of the '100% Renewables/The Future Now' – Global Forum (Madrid, Spain, 19 November 2015) sponsored by the Spanish infrastructure company ACCIONA, S.A., which will showcase success stories regarding 100% renewable energy solutions.[4]

Sierra Gorda Biosphere Reserve (Mexico)

Declared as a biosphere reserve in 2001, Sierra Gorda in northern Mexico is set in a rugged terrain with peaks up to 3,100 m and high rainfall, fluctuating between 350 mm and 1,800 mm per year. The region is very rich in biodiversity with several endemic, but also threatened, species. Covering almost 400,000 ha, the reserve is the primary protected area in the country regarding biodiversity, home to well over 2,000 plant species and some of the most environmentally significant forests of the entire country. Furthermore, the reserve has a rich cultural history with some 500 archaeological sites, including five 18th-century Franciscan missions designated as UNESCO World Heritage cultural sites.

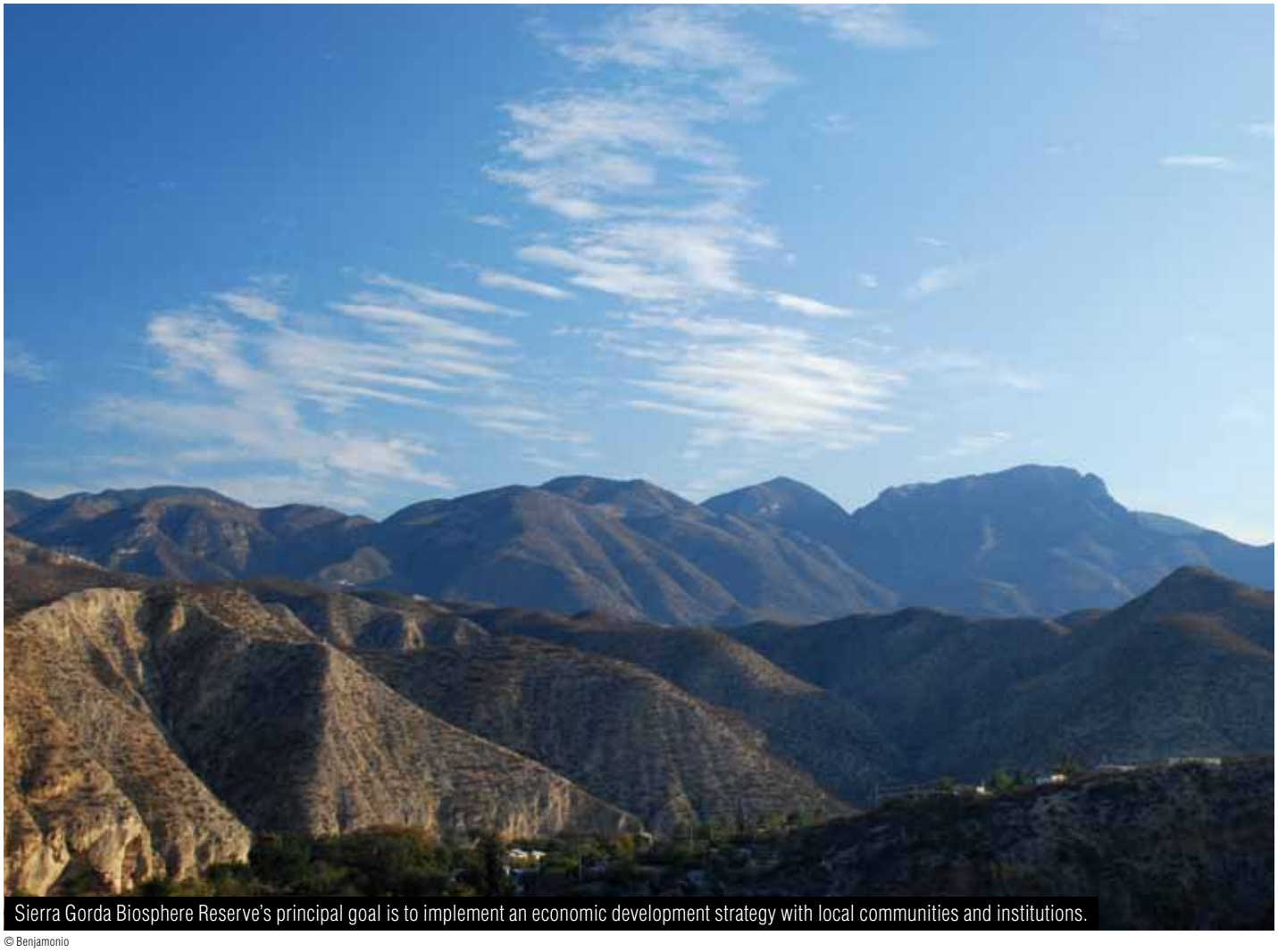
Some 50,000 people live in Sierra Gorda Biosphere Reserve, and while rich in natural and cultural assets, they are among the poorest in the country, resulting in non-sustainable forest and land-use practices. The reserve is therefore promoting communities to engage in new income opportunities, such as ecotourism, and forest protection generating revenue through the voluntary carbon markets that have emerged as an instrument to mitigate climate change. Organized and managed by Grupo Ecológico Sierra Gorda IAP, Bosque Sustenable A.C. and Viva Sierra Gorda, the Carbon Neutral Planet initiative offers enterprises and private individuals the opportunity to reduce their carbon footprint while also contributing to biodiversity conservation. Thus the biosphere reserve offers 'Biodiversity Carbon' that combines climate change, biodiversity and poverty reduction objectives. A truly win-win-win scenario![5]

Sierra Gorda is very rich in biodiversity with several endemic, but also threatened, species. Covering almost 400,000 ha, the reserve is the primary protected area in the country regarding biodiversity.

Biosphere reserves, climate change monitoring and assessment

Gorge of Samaria Biosphere Reserve, Crete (Greece)

Samaria National Park is located on the south-western coast of Crete. Its core zone, the Gorge of Samaria, was designated as a biosphere reserve in 1981. The national park is characterized by an intense terrain, with more than fifty summits



Sierra Gorda Biosphere Reserve's principal goal is to implement an economic development strategy with local communities and institutions.

Inlay Lake Biosphere Reserve (Myanmar) and its watershed provides several ecosystem services on which local people depend, including clean air, clean water, a cooler climate, fish stocks and other resources.

over 2,000 m and approximately twenty gorges. The Gorge of Samaria is the largest (around 13 km) and most famous. Caves, dolines, poljes and ravines form a unique landscape and an interesting mosaic of habitats. Approximately 200 bird species, 32 mammals, and 24 stenotype endemic flora species are found in the biosphere reserve. It also comprises examples of high-altitude Mediterranean forest (including virgin stands of the Italian cypress *Cupressus sempervirens*), maquis and phrygana scrubland. As in most parts of the Mediterranean, the area was formerly subject to grazing and timber extraction. The region around the gorge is interesting from a cultural perspective, as it hosts ancient ruins, churches and castles. Tourism is the main economic activity.

According to the Intergovernmental Panel on Climate Change (IPCC), the Mediterranean region will suffer multiple stresses and systemic failures due to climate change. Changes in species composition, increase of alien species, habitat losses, and degradation both inland and at sea, together with agricultural and forest production losses due to increasing heatwaves and droughts exacerbated by competition for water, will all increase vulnerability. Soil degradation is already intense in parts of the Mediterranean, together with prolonged droughts and fires, and it is contributing to an increased risk of desertification. Observed changes in plant communities in European mountainous regions show a shift of species ranges to higher altitudes, decreasing the species richness in Mediterranean mountain regions.

The importance of the Gorge of Samaria Biosphere Reserve's biodiversity has prompted several studies to examine possible changes in climatic factors. The establishment of a permanent biodiversity monitoring system of the national park, as well as the installation in 2013 of a network of local meteorological stations from the management body of Samaria National Park, provides primary data of high importance for the evaluation of climate change to the biosphere reserve and for the design of possible adaptation management strategies.

Biosphere reserves and climate change adaptation, education and public awareness

Inlay Lake Biosphere Reserve (Myanmar)

Designated as a biosphere reserve in 2015, Inlay Lake is located in the Southern Shan state of Myanmar. Reportedly the second largest inland lake in Myanmark, Inlay's wetland ecosystem is home to several hundred species of birds and more than forty species of freshwater fish, as well as otters and turtles. Fish from the lake constitute the major protein source for people living in the area, who have adapted their lifestyle and livelihoods to their biophysical environment. The majority earn their income from traditional methods of hydroponic farming, fishing and shifting cultivation. Farmers from one of the dominant ethnic groups in the Inlay Lake region, the Inthas, practise floating island agriculture, locally known as *yechan*. Many pagodas and stupas have been built on or near the lake. The Phaung-Taw-Oo and Ah-Lo-Taw-Pauk pagodas date back

The Gorge of Samaria (Greece) is a mountainous limestone area on the south-western coast of Crete.

The North Devon Biosphere Reserve (United Kingdom) extends from the catchments of the Rivers Taw and Torridge with its core at Braunton Burrows sand dune system.

800 years and are culturally and spiritually very significant.

Due to the impacts of climate change and climate variability and unsustainable use of natural resources, the lake is, up to a certain point, in a state of environmental emergency. The biosphere reserve has consequently been established to bring together and create synergies between the efforts of central and local government departments, UN agencies, local and international NGOs, and partner research institutions and donor countries, all aiming to ensure the adaptation and conservation of valuable ecosystems and the welfare of local communities dependent on the lake resources in view of climate change impacts. In view of this urgent situation, the Ministry of Environmental Conservation and Forestry (MOECAF) is implementing a five-year Action Plan for the Sustainability of Inle Lake and Environmental Conservation in Myanmar aimed at conserving the Inlay Lake ecosystem with the active participation of local communities and stakeholders, while maintaining the national cultural heritage and local livelihoods. This plan classifies the watershed area of Inlay Lake into three biosphere reserve zones (core area, buffer and transition zones). MOECAF will also establish an Environmental Education Centre that among other topics will provide education on meteorological and hydrological data as well as a museum for culture and environment.

North Devon Biosphere Reserve and Malindi-Watamu Biosphere Reserve – partners in adapting to climate change

Declared in 1976, North Devon Biosphere Reserve is situated in the estuary of the Taw and Torridge Rivers in North Devon (United Kingdom). The terrestrial part is comprised of an active coastal dune system, mud and sand flats, saltmarshes and lowland farmland, as well as woodlands. The reserve also has an important marine component representing almost half of the area (the total of which is 380,140 ha) and includes biodiversity of high conservation value. Much of the local economy is based on ecosystem services, such as tourism, agriculture, fishing, surfing, sailing, kayaking, golf, cycling, rock climbing and angling.

The Malindi-Watamu Biosphere Reserve is located on the coast of Kenya about 100 km north of Mombasa. Declared a biosphere reserve in 1979, notable physical features are rock platforms, cliffs, sandy beaches, tidal mud flats, mangrove swamps, coral reefs and seagrass beds. Malindi-Watamu is a major tourism and recreational destination offering boat trips, water sports, deep-sea fishing and coral viewing.

In view of the negative impacts of climate change facing both these biosphere reserves, North Devon and Malindi-Watamu have engaged in a twinning arrangement to learn from one another about how to possibly adapt to sea-level rise and coastal erosion that threatens local livelihoods and economies. This cooperation has strengthened the profile of biosphere reserves in Kenya in general and the management committee for the Malindi-Watamu Biosphere Reserve, which is seeking community participation in the decision-making process and better appreciation of the need for proactive climate change adaptation. This collaboration has been documented in the television programme 'Rising Tides', about adapting to climate change in North Devon and Malindi, showcasing recent research and local views on the problems and solutions to coastal issues. The community are witnessing and exploring the development of their solutions based on sound science and community participation.

Overall, this is an excellent example of how biosphere reserves around the world can work together in view of addressing climate change, a defining issue of our time, but also for future generations.

Notes

[1] For examples, see *Final Report of the Project on the Impact of Climate Change on Island and Coastal Biosphere Reserves*, Republic of Korea, Jeju Secretariat, World Network of Island and Coastal Biosphere Reserves, February 2015. http://wnicbr.jeju.go.kr/index.php/eng/resources/sourcebook?act=view&seq=116&bd_bcid=pds_en&page=1&sso=ok
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[4] http://www.renforus.net/
[5] http://planetacarbononeutral.org/en/home/

For more case studies and information:

BiosphereSmart initiative. An interactive mapping tool for biosphere reserves to share ideas, knowledge, good practices and experiences on issues related to climate change, green economies, and sustainable development. http://www.biospheresmart.org/
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MAB Strategy 2015–2025. http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/pdf/Final_Draft_MAB_Strategy_4-5-15_en.pdf

Northern Spain's Routes to Santiago de Compostela in Galicia

Route of Santiago in Arca, O Pino (A Coruña)

Northern Routes to Santiago in Galicia

The 39th session of the UNESCO World Heritage Committee, Bonn, Germany, approved an extension to the Route of Santiago in Spain, included in the World Heritage List since 1993, to the Routes of Northern Spain. This serves to recognize the origin and current nature of this unique World Heritage property, adding almost 1,500 km to a complex network that structures a territory that has developed in line with people that travelled along these routes, in a religious or spiritual quest that still applies today. This is evidenced not only by the millions of people that every year visit Santiago de Compostela Cathedral, but also the hundreds of thousands who, walking at least 100 km, follow one of the several routes that end at the resting place of the Apostle, met by the pinnacle of romantic architecture, the Portico of Glory by Maestro Mateo.

Original Route, Roman Wall and Lugo Cathedral

In order to achieve a better expression of the integrity of the Routes of Santiago, the Routes of Northern Spain are now recognized. Route one, whose origins are found at the time of the discovery of the tomb of James the Apostle in the 9th century BC, is the one followed by Asturian kings over old Roman roads that, passing through the city of Lugo, linked the capital of the kingdom in Oviedo to Compostela. It is the **Original Route** also known as the Oviedo Route, which in Galicia passes through Terras de Burón in A Fonsagrada (biosphere reserve with over 15,000 hectares specially protected due to its significant environmental value) to arrive in Lugo after crossing mountains with native forests and traditional population centres. In Lugo, the route passes through the **Roman Walls**, a property on the World Heritage List since 2000, built at the end of the second century to defend the Roman city of Lucus.

Roman Walls of Lugo

Lugo Cathedral

Camino de Santiago en A Fonsagrada (Lugo)

Its perimeter is completely intact and it is the most beautiful archetype of late Roman fortification in all of Western Europe. Inside the walled enclosure is **Lugo Cathedral**. Of Romanesque origin, it has Gothic, Baroque and Neoclassic features, and it is the only cathedral in Galicia whose baroque choir remains in its original location. Notable are the baroque Chapel of our Lady of the Big Eyes, the arcaded north door and the magnificent altarpieces and wall paintings inside. From Lugo, the route joins the French Route in Melide.

The Coastal Route, Mondoñedo Cathedral and Sobrado dos Monxes Monastery

Further north, and gathering pilgrims arriving at Spain's northern ports, the **Coastal Route** would come in through Ribadeo. On its way to Santiago it passes through the small town and **Cathedral in Mondoñedo.**

A cathedral, also of Romanesque origin, built far from the coast due to the pressure of Norman and Viking invasions, with robust Gothic structures. It is worth noting its magnificent rosette and the unique wall paintings, such as the ones that depict scenes of the 'Slaughter of the Innocents'.

Before reaching Santiago, the Coastal Route rests at the **Sobrado dos Monxes Monastery**, an impressive monastery that still maintains a Cistercian community devoted to agriculture and cattle farming, and still providing refuge to pilgrims, as it has a hostelry and shelter, whose cloisters and church are a magnificent preview of the final moments of pilgrimage towards Santiago.

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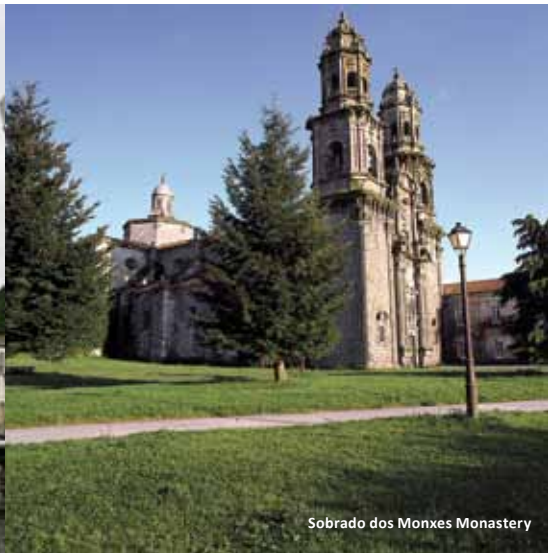
Mondoñedo Cathedral



Sobrado dos Monxes Monastery

United Nations Educational, Scientific and Cultural Organization

Routes of Santiago de Compostela: Camino Francés and Routes of Northern Spain Inscribed on the World Heritage List in 1993

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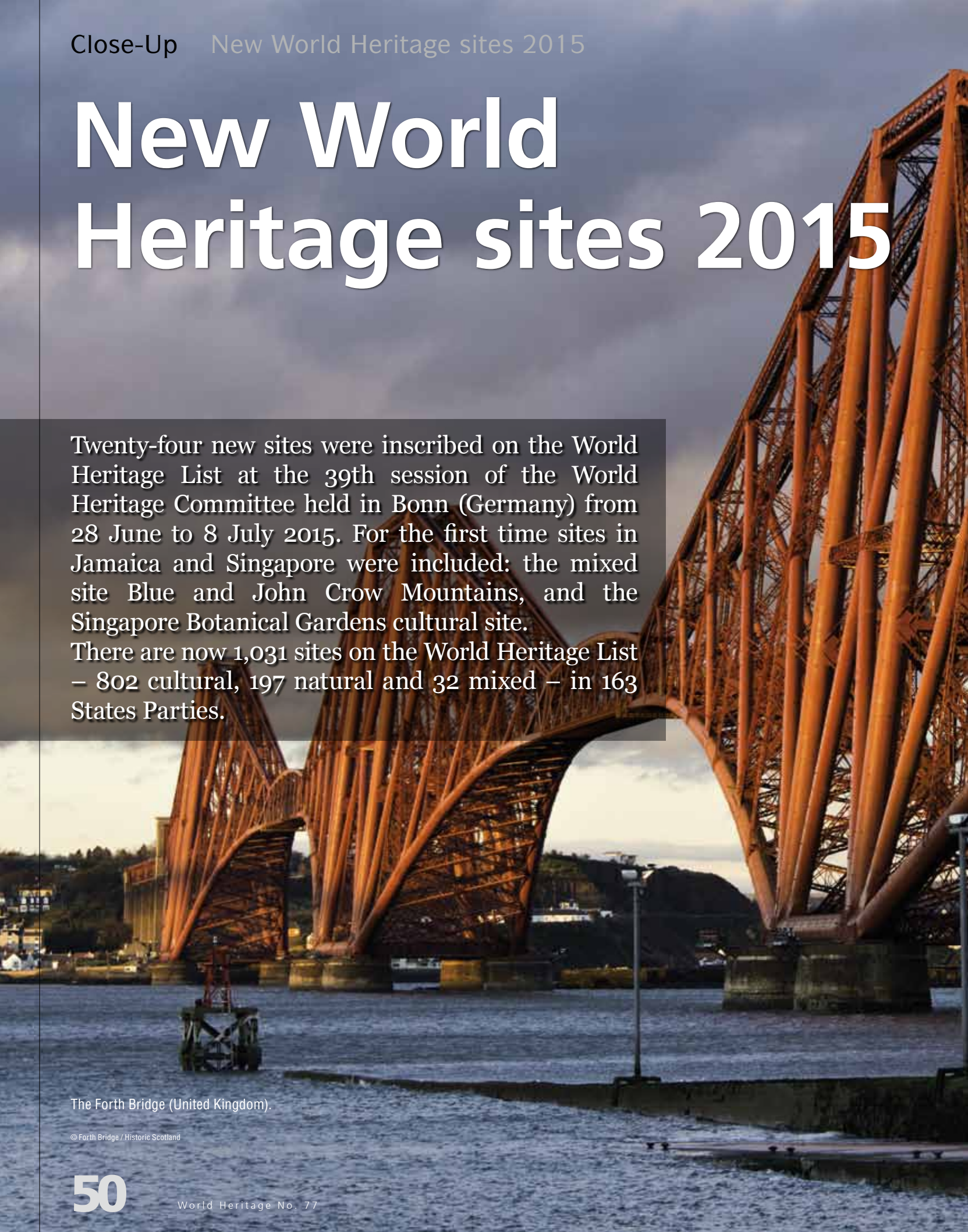
New World Heritage sites 2015

Twenty-four new sites were inscribed on the World Heritage List at the 39th session of the World Heritage Committee held in Bonn (Germany) from 28 June to 8 July 2015. For the first time sites in Jamaica and Singapore were included: the mixed site Blue and John Crow Mountains, and the Singapore Botanical Gardens cultural site.
There are now 1,031 sites on the World Heritage List – 802 cultural, 197 natural and 32 mixed – in 163 States Parties.



The Forth Bridge (United Kingdom).

CULTURAL SITES

Tusi Sites (China)

© Management Office of Laosicheng Tusi Domain

Located in the mountainous areas of south-west China, this property encompasses the remains of several tribal domains whose chiefs were appointed by the central government as 'Tusi', hereditary rulers from the 13th to the early 20th centuries. The Tusi system arose from the ethnic minorities' dynastic systems of government dating back to the 3rd century BC. Its purpose was to unify national administration, while allowing ethnic minorities to retain their customs and way of life. The sites of Laosicheng, Tangya and Hailongtun Fortress that make up the property bear exceptional testimony to this form of governance, which derived from the Chinese civilization of the Yuan and Ming periods.

Christiansfeld, a Moravian Church Settlement (Denmark)

Founded in 1773 in South Jutland, the site is an example of a planned settlement of the Moravian Church, a Lutheran free congregation centred in Herrnhut, Saxony. The town was planned to represent the Protestant urban ideal, constructed around a central church square. The architecture is homogeneous and unadorned, with one- and two-storey buildings in yellow brick with red tile roofs. The democratic organization of the Moravian Church, with its pioneering egalitarian philosophy, is expressed in its humanistic town planning. The settlement's plan opens onto agricultural land and includes important buildings for the common welfare, such as large communal houses for the congregation's widows and unmarried men and women. The buildings are still used by an influential community of the Moravian Church.

© Christiansfeld_Kolding Kommune

The *par force* hunting landscape in North Zealand (Denmark)

© Ib Welling

Located about 30 km north-east of Copenhagen, this cultural landscape encompasses the two hunting forests of Store Dyrehave and Gribskov, as well as the hunting park of Jægersborg Hegn/Jægersborg Dyrehave. This is a designed landscape where Danish kings and their court exercised *par force* hunting, or hunting with hounds, which reached its peak from the Middle Ages to the end of the 16th century. With hunting lanes laid out in an orthogonal grid pattern, numbered stone posts, enclosures and hunting lodges, the site demonstrates the application of Baroque landscaping principles to forested areas.

Champagne Hillsides, Houses and Cellars (France)

© Michel Jolyot Association Paysages du Champagne

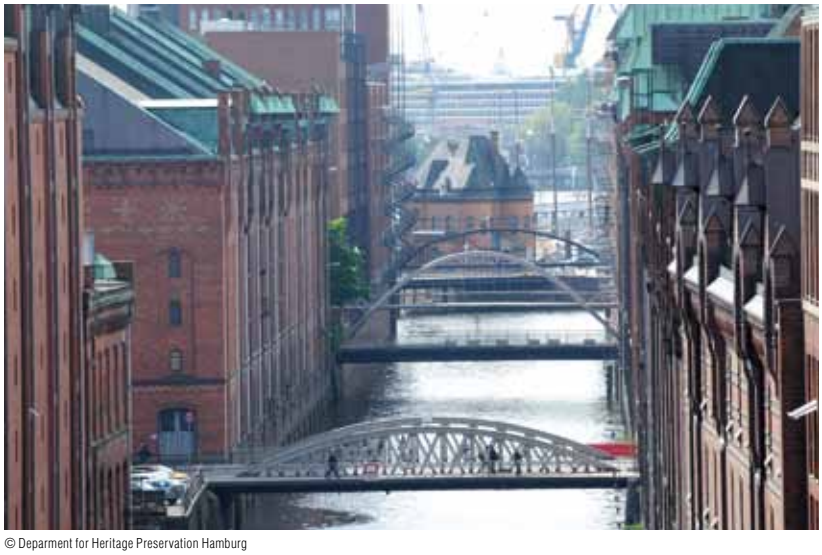
The property encompasses sites where the method of producing sparkling wines was developed on the principle of secondary fermentation in the bottle since the early 17th century until its early industrialization in the 19th century. It is made up of three distinct ensembles: the historic vineyards of Hautvilliers, Aÿ and Mareuil-sur-Aÿ; Saint-Nicaise Hill in Reims; and the Avenue de Champagne and Fort Chabrol in Epernay. These three components – the supply basin formed by the historic hillsides, the production sites (with their underground cellars) and the sales and distribution centres (the Champagne Houses) – illustrate the entire champagne production process. The property bears clear testimony to the development of a very specialized artisan activity that has become an agro-industrial enterprise.

Climats, terroirs of Burgundy (France)

The *climats* are precisely delimited vineyard plots on the slopes of the Côte de Nuits and the Côte de Beaune, south of the city of Dijon. They differ from one another due to specific natural conditions (geology and exposure) as well as vine types and have been shaped by human cultivation. Over time they came to be recognized by the wine they produce. This cultural landscape consists of two parts. Firstly, the vineyards and associated production units including villages and the town of Beaune, which together represent the commercial dimension of the production system. The second part includes the historic centre of Dijon, which embodies the political regulatory impetus that gave birth to the *climats* system. The site is an outstanding example of grape cultivation and wine production developed since the High Middle Ages.

© Jean-Louis Bernuy

Speicherstadt and Kontorhaus District with Chilehaus (Germany)



© Deparment for Heritage Preservation Hamburg

Speicherstadt and the adjacent Kontorhaus district are two densely built urban areas in the centre of the port city of Hamburg. Speicherstadt, originally developed on a group of narrow islands in the River Elbe between 1885 and 1927, was partly rebuilt from 1949 to 1967. It is one of the largest coherent historic ensembles of port warehouses in the world (300,000 m^2). It includes fifteen very large warehouse blocks as well as six ancillary buildings and a connecting network of short canals. Adjacent to the modernist Chilehaus office building, the Kontorhaus district is an area of over 5 ha featuring six very large office complexes built from the 1920s to the 1940s to house port-related businesses. The complex exemplifies the effects of the rapid growth in international trade in the late 19th and early 20th centuries.

Cultural Landscape of Maymand (Islamic Republic of Iran)

© Maymand Cultural Heritage Base

Maymand is a self-contained, semi-arid area at the end of a valley at the southern extremity of Iran's central mountains. The villagers are semi-nomadic agropastoralists. They raise their animals on mountain pastures, living in temporary settlements in spring and autumn. During the winter months they live lower down the valley in cave dwellings carved out of the soft rock (*kamar*), an unusual form of housing in a dry, desert environment. This cultural landscape is an example of a system that appears to have been more widespread in the past and involves the movement of people rather than animals.

Susa (Islamic Republic of Iran)

Located in the south-west of Iran, in the lower Zagros Mountains, the property encompasses a group of archaeological mounds rising on the eastern side of the Shavur River, as well as Ardeshir's palace on the opposite bank of the river. The excavated architectural monuments include administrative, residential and palatial structures. Susa contains several layers of superimposed urban settlements in a continuous succession from the late 5th millennium BC until the 13th century AD. The site bears exceptional testimony to the Elamite, Persian and Parthian cultural traditions, which have largely disappeared.

© ICCHTO

Necropolis of Bet She'arim: A Landmark of Jewish Renewal (Israel)

© Tsvika Tsuk

Consisting of a series of catacombs, the necropolis developed from the 2nd century BC as the primary Jewish burial place outside Jerusalem following the failure of the second Jewish revolt against Roman rule. Located south-east of the city of Haifa, these catacombs are a treasury of artworks and inscriptions in Greek, Aramaic and Hebrew. Bet She'arim bears unique testimony to ancient Judaism under the leadership of Rabbi Judah the Patriarch, who is credited with Jewish renewal after AD 135.

Arab-Norman Palermo and the Cathedral Churches of Cefalú and Monreale (Italy)

Located on the northern coast of Sicily, Arab-Norman Palermo includes a series of nine civil and religious structures dating from the era of the Norman kingdom of Sicily (1130–1194): two palaces, three churches, a cathedral and a bridge, as well as the cathedrals of Cefalú and Monreale. Collectively, they are an example of a sociocultural syncretism between Western, Islamic and Byzantine cultures on the island that gave rise to new concepts of space, structure and decoration. They also bear testimony to the fruitful coexistence of people of different origins and religions (Muslim, Byzantine, Latin, Jewish, Lombard and French).

© Cefalu_CRICD

Sites of Japan's Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining (Japan)

© Izunokuni City

The site encompasses a series of twenty-three components, mainly located in the south-west of Japan. It bears testimony to the rapid industrialization of the country from the mid 19th to the early 20th centuries, through the development of the steel industry, shipbuilding and coal mining. The process is illustrated by which feudal Japan sought technology transfer from Europe and America from the middle of the 19th century and how this technology was adapted to the country's needs and social traditions. The site testifies to what is considered to be the first successful transfer of Western industrialization to a non-Western nation.

Baptism Site 'Bethany Beyond the Jordan' (Al-Maghtas) (Jordan)

Situated on the eastern bank of the River Jordan, 9 km north of the Dead Sea, this archaeological site consists of two distinct areas: Tell Al-Kharrar, also known as Jabal Mar-Elias (Elijah's Hill) and the churches of Saint John the Baptist near the river. Situated in a pristine natural environment, this is believed to be the location where Jesus of Nazareth was baptized by John the Baptist. It features Roman and Byzantine remains including churches and chapels, a monastery, caves that have been used by hermits and pools in which baptisms were celebrated, testifying to the religious character of the place. The site is a Christian place of pilgrimage.

© Baptism Site Commission

Aqueduct of Padre Tembleque Hydraulic System (Mexico)

© Espacio de la Imagen

This 16th-century aqueduct is located between the states of Mexico and Hidalgo, on the Central Mexican Plateau. The heritage canal system encompasses a water catchment area, springs, canals, distribution tanks and arcaded aqueduct bridges. The site incorporates the highest single-level arcade ever built in an aqueduct. Initiated by the Franciscan friar, Padre Tembleque, and built with support from the local indigenous communities, this hydraulic system is an example of the exchange of influences between the European tradition of Roman hydraulics and traditional Mesoamerican construction techniques, including the use of adobe.

Great Burkhan Khaldun Mountain and its surrounding sacred landscape (Mongolia)

This site is situated in the north-east of the country in the central part of the Khentii mountain chain, where the vast Central Asian steppe meets the coniferous forests of the Siberian taiga. Burkhan Khaldun is associated with the worship of sacred mountains, rivers and *ovoo-s* (shamanic rock cairns), in which ceremonies have been shaped by a fusion of ancient shamanic and Buddhist practices. The site is also believed to be the place of Genghis Khan's birth and burial. It testifies to his efforts to establish mountain worship as an important part of the unification of the Mongol people.

© A.Duurenjargal

Rjukan–Notodden Industrial Heritage Site (Norway)

© Directorat for Cultural Heritage

Located in a dramatic landscape of mountains, waterfalls and river valleys, the site comprises hydroelectric power plants, transmission lines, factories, transport systems and towns. The complex was established by the Norsk-Hydro Company to manufacture artificial fertilizer from nitrogen in the air. It was built to meet the Western world's growing demand for agricultural production in the early 20th century. The company towns of Rjukan and Notodden show workers' accommodation and social institutions linked by rail and ferry to ports where the fertilizer was loaded. The Rjukan–Notodden site manifests an exceptional combination of industrial assets and themes associated with the natural landscape, an outstanding example of a new global industry in the early 20th century.

Baekje Historic Areas (Republic of Korea)

Located in the mountainous mid-western region of the Republic of Korea, this property comprises eight archaeological sites dating from AD 475 to AD 660, including the Gongsanseong fortress and royal tombs at Songsan-ri relating to the capital, Ungjin (present-day Gongju), the Busosanseong Fortress and Gwanbuk-ri administrative buildings, the Jeongnimsa Temple, the royal tombs in Neungsan-ri and the Naseong city wall relating to the capital, Sabi (now Buyeo), the royal palace at Wanggung-ri and the Mireuksa Temple in Iksan relating to the secondary Sabi capital. Together, these sites represent the later period of the Baekje Kingdom – one of the three earliest kingdoms on the Korean peninsula (18 BC to AD 660) – during which time they were at the crossroads of considerable technological, religious (Buddhist), cultural and artistic exchanges between the ancient East Asian kingdoms in Korea, China and Japan.

© Baekje Historic Sites Nomination Office

Rock Art in the Hail Region of Saudi Arabia (Saudi Arabia)

© Saudi Commission for Tourism and Antiquities

This site includes two components of a desert landscape: Jabel Umm Sinman at Jubbah and the Jabal al-Manjor and Raat at Shuwaymis. A lake once situated at the foot of the Umm Sinman hill range that has now disappeared used to be a source of fresh water for people and animals in the southern part of the Great Narfoud Desert. The ancestors of today's Arab populations have left traces of their passage in numerous petroglyphs and inscriptions on the rock face. Jabal al-Manjor and Raat form the rocky escarpment of a *wadi* now covered in sand. They show numerous representations of human and animal figures covering 10,000 years of history.

Singapore Botanic Gardens (Singapore)

This site at the heart of the city of Singapore demonstrates the evolution of a British tropical colonial botanic garden that has become a modern world-class scientific institution used for both conservation and education. The cultural landscape includes a rich variety of historic features, plantings and buildings that demonstrate the development of the garden since its creation in 1859. Since 1875 it has been an important centre in South-East Asia for science, research and plant conservation, notably in connection with the cultivation of rubber plantations.

© Singapore Botanic Gardens

Diyarbakır Fortress and Hevsel Gardens Cultural Landscape (Turkey)

© Diyabakir Metropolitan Municipality

Located on an escarpment of the Upper Tigris River basin that is part of the so-called Fertile Crescent, the fortified city of Diyarbakır and the surrounding landscape has been an important centre since the Hellenistic period, through Roman, Sassanid, Byzantine, Islamic and Ottoman times to the present. The site encompasses the Amida Mound, known as İçkale (inner castle), the 5.8 km city walls of Diyarbakır with their numerous towers, gates, buttresses, and sixty-three inscriptions from different periods, as well as Hevsel Gardens, a green link between the city and the Tigris that supplied the city with food and water.

Ephesus (Turkey)

Lying within what was once the estuary of the River Kaystros, Ephesus comprises successive Hellenistic and Roman settlements founded on new locations, which followed the coastline as it retreated westward. Excavations have revealed grand monuments of the Roman imperial period including the Library of Celsus and the Great Theatre. Little remains of the famous Temple of Artemis, one of the 'Seven Wonders of the World', which drew pilgrims from all around the Mediterranean. Since the 5th century AD, the House of the Virgin Mary, a domed cruciform chapel 7 km from Ephesus, became a major place of Christian pilgrimage. The Ancient City of Ephesus is an outstanding example of a Roman port city, with sea channel and harbour basin.

© Austrian Archological Institute

The Forth Bridge (United Kingdom)

© Historic Scotland

This railway bridge, spanning the estuary of the Forth River in Scotland, was the world's earliest great multispan cantilever bridge, and at 2,529 m remains one of the longest. It opened in 1890 and continues to carry passengers and freight. Its distinctive industrial aesthetic is the result of a forthright and unadorned display of its structural components. Innovative in style, materials and scale, the Forth Bridge is an important milestone in bridge design and construction during the period when railways came to dominate long-distance land travel.

San Antonio Missions (United States)

The site encompasses a group of five frontier mission complexes along a stretch of the San Antonio River basin in southern Texas, as well as a ranch located 37 km to the south. It includes architectural and archaeological structures, farmlands, residencies, churches and granaries, as well as water distribution systems. The complexes were built by Franciscan missionaries in the 18th century and illustrate the Spanish Crown's efforts to colonize, evangelize and defend the northern frontier of New Spain. The San Antonio Missions are also an example of the interweaving of Spanish and Coahuiltecan cultures, illustrated by a variety of features, including the decorative elements of churches, which combine Roman Catholic symbols with indigenous designs inspired by nature.

© National Park Service

Fray Bentos Industrial Landscape (Uruguay)

© Municipality of Rio Negro

Located on land projecting into the Uruguay River west of the town of Fray Bentos, the industrial complex was built following the development of a factory founded in 1859 to process meat from cattle raised on the vast prairies nearby. The site illustrates the whole process of meat sourcing, processing, packing and dispatching. It includes buildings and equipment of the Liebig Extract of Meat Company, which exported meat extract and corned beef to the European market from 1865 and the Anglo Meat Packing Plant, which exported frozen meat from 1924. Through its physical location, industrial and residential buildings, as well as social institutions, the site presents an illustration of the entire process of meat production on a global scale.

MIXED SITE

Blue and John Crow Mountains (Jamaica)

The site encompasses a rugged and extensively forested mountainous region in the south-east of Jamaica, which provided refuge first for the indigenous Tainos fleeing slavery and then for Maroons (escaped African slaves). They resisted the European colonial system in this isolated region by establishing a network of trails, hiding places and settlements, which form the Nanny Town Heritage Route. The forests offered the Maroons everything they needed for their survival. They developed strong spiritual connections with the mountains, still manifest through the intangible cultural legacy of, for example, religious rites, traditional medicine and dances. The site is also a biodiversity hotspot for the Caribbean Islands with a high proportion of endemic plant species, especially lichens, mosses and certain flowering plants.

© JNHT

EXTENSIONS

Cape Floral Region Protected Areas (South Africa)

Inscribed on the World Heritage List in 2004, the property is located at the south-western extremity of South Africa. It is one of the world's great centres of terrestrial biodiversity. The extended property includes national parks, nature reserves, wilderness areas, state forests and mountain catchment areas. These elements add a significant number of endemic species associated with fynbos vegetation, a fine-leaved sclerophyllic shrubland adapted to both a Mediterranean climate and periodic fires, which is unique to the Cape Floral Region.

© Western Cape Nature Conservation Board

Routes of Santiago de Compostela: *Camino Francés* and Routes of Northern Spain (Spain)

© Gouvernement du Pays Basque

A network of four Christian pilgrimage routes in northern Spain, this is an extension of the Route of Santiago de Compostela, a serial site inscribed on the World Heritage List in 1993. The extension represents a network of almost 1,500 km: coastal, interior of the Basque Country–La Rioja, Liébana and primitive routes. It includes a built heritage of historical importance created to meet the needs of pilgrims, including cathedrals, churches, hospitals, hostels and even bridges. The extension encompasses some of the earliest pilgrimage routes to Santiago de Compostela, following the discovery in the 9th century of a tomb believed to be that of St James the Greater.

Phong Nha – Ke Bang National Park (Viet Nam)

The Phong Nha – Ke Bang National Park, inscribed on the World Heritage List in 2003, covered 85,754 ha. With this extension, the site covers a total surface area of 126,326 ha (a 46 per cent increase) and shares a boundary with the Hin Namno Nature Reserve in the People's Democratic Republic of Laos. The park landscape is formed by limestone plateaux and tropical forests. It features great geological diversity and offers spectacular phenomena, including a large number of caves and underground rivers. The site harbours a high level of biodiversity and many endemic species. The extension ensures a more coherent ecosystem while providing additional protection to the catchment areas that are of vital importance for the integrity of limestone landscapes.

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PARKS OF CROATIA

"There are water, lakes, waterfalls and forest elsewhere, but Plitvice Lakes are unique."
- Academic Ivo Pevalek, 1937

United Nations Educational, Scientific and Cultural Organization

Plitvice Lakes National Park Inscribed on the World Heritage List in 1979

With a surface area of 294,82km², Plitvice Lakes National Park is the largest of Croatia's eight national parks.

Plitvice lakes was proclaimed National Park in 1949, also making it the oldest national parkin Croatia.

In 1979, Plitvice Lakes National Park was inscribed on the UNESCO World Heritage List as a natural site.

Pays de Saint-Omer

© C.Peterolff/P. Souny

At the heart of Pays de Saint-Omer is the fascinating Marais Audomarois marshland biosphere reserve. This is a world of land and water which has been changing continuously since the 7th century with the assistance of humankind. In this internationally significant wetland, humans have created a real maze of waterways with a multitude of land plots all cultivated to produce vegetables.

The existence of the Marais is closely linked to the town of Saint-Omer. In fact, 88% of the town consists of marshland. Saint-Omer is therefore inextricably linked with the marsh, especially with its *faubourgs maraîchers* (marsh suburbs), which have a very distinctive way of life.

The marsh proper consists of some 13,000 plots of land and water cut across by 700 km of canals in which the two traditional local boats, the *bacôve* and the *escute*, still navigate. About one hundred homes are located on islands, and the last water-postman in France still does his rounds here.

Mâle de charançons de la Mauve Lixus angustatus

© C. Peterolff

The marsh has also preserved its exceptional biodiversity, including one-third of all French aquatic plant species and about 100 species of nesting birds.

The current challenge facing the biosphere reserve is to succeed in preserving durably and harmoniously all of its principal characteristics and the natural, human and genetic heritage that has evolved. Far from seeking to put nature under glass, the territorial project aims to guarantee the future of this remarkable territory by involving the local populations in the decision-making process.

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Forum

The managers of World Heritage sites can benefit from the Global Framework for Climate Services. Information on and scenarios of sea-level rise for specific coastlines are being considered for planning adaptive, protective or rehabilitation measures for low-lying sites such as Sundarbans mangrove forests (Bangladesh and India).

See page **74**

A couple fishing in the mangroves for their livelihood in the Sundarbans (India).

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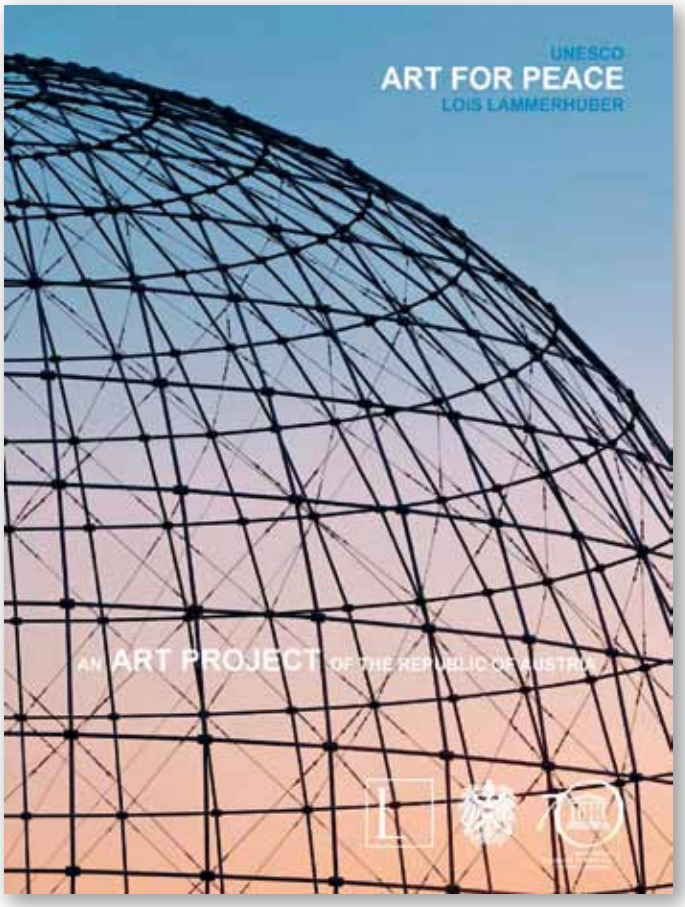

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The headquarters of UNESCO in Paris house the largest art collection of the United Nations. This UNESCO collection was neither planned nor curated by anyone. It came about through gifts from artists, representatives of the member states, visitors and personalities who wanted to support UNESCO's aims in this way. The collection is global and, unencumbered by any thematic constraints, includes all kinds of styles and forms of expression. This wide range reflects UNESCO's philosophy of "Building a Culture of Peace" perfectly.

The Republic of Austria appreciates the UNESCO collection as an extraordinary art treasure. By means of a very special art project, Austria lets all member states share in the UNESCO collection. The photographs unite the items of this art collection in a virtual exhibition. The accompanying book will be presented to each member state as a work of art showcasing an art collection that they co-founded. In this way, the UNESCO collection becomes the national property of each member state. Art will act as communicator in the name of and for the UNESCO.

The Republic of Austria dedicates ART FOR PEACE – a work by Lois Lammerhuber – to the UNESCO as a treasury of art.

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Interview with Christiana Figueres Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC)

© UNFCCC

Ms Figueres has served on many boards of non-governmental organizations involved in climate change issues. She is a widely published author on the design of climate solutions, has been a frequent adviser to the private sector, and lectures at many universities and colleges.

World Heritage:
The 21st session of the Conference of the Parties (COP 21) to the UNFCCC will be held in Paris from 30 November to 11 December 2015. It will aim to reach a universal, legally binding agreement that will enable climate change to be effectively combated and the rise in global temperature kept below 2 degrees Celsius. As Executive Secretary of the UNFCCC, what do you think are the major obstacles to this deal, or the key elements in ensuring that world leaders succeed in Paris?

Christiana Figueres (CF): Government representatives meeting in Paris will be working against a background of the most climate-friendly conditions the world has seen. For some years now, the stars have been aligning for success as policy-makers, business interests and citizens increasingly agree on the transformational notion that the solutions to climate change are at the same time the very ones that will lead to a safer, healthier, cleaner and more prosperous future for all. To my mind, these developments point to the key elements that will succeed in Paris. Let me briefly elaborate and provide three examples.

- While the climate change negotiations have been going on at international level, things have not remained static at national level. This is important because strong and coordinated domestic policies, laws and incentives ensure a firm foundation for the new international climate agreement, especially its effectiveness going forward over time.

There has been a distinct trend towards passing climate legislation both in developing and developed countries. Over 100 countries have emission reduction targets up to 2020, most of them formally anchored in laws or policies.

Equally encouraging are the figures associated with clean energy. The number of countries with renewable energy targets and policies increased again in 2014, and several jurisdictions made their existing targets more ambitious – including a rising number with 100 per cent renewable energy or electricity targets. As of early 2015, at least 164 countries had renewable energy targets, and an estimated 145 countries had renewable energy support policies in place.

More than ever before, these developments show that, at national level, countries are well prepared for an international climate agreement.

- The second key element that will lead to success in Paris is the fact that more and more non-state actors, such as businesses, cities or regions, are reacting to climate change. We must balance greenhouse gas emissions with the Earth's natural capacity to absorb them and we must protect the natural resources – forests, oceans, land and biodiversity in these habitats – that enable human development.

Creating this new model of growth is the mega-development challenge of our century and the best and brightest minds must be engaged to meet this challenge. Leading non-state actors such as cities and businesses are already tackling this challenge.

Urban areas account for nearly 75 per cent of humanity's emissions. Many of the world's largest cities have recognized the need to act and have made previously unthinkable strides towards an energy-efficient, low-carbon future. These cities are proving that a carbon-neutral future is not only possible, it will soon be a reality. Many cities are moving to reduce their emissions by at least 80 per cent by 2050 or sooner. Ten cities already want to be powered by 100 per cent renewable energy.

The largest 500 companies generate up to 15 per cent of global emissions. But many businesses are increasingly integrating climate change into their business and investment strategies. Companies typically reduce their emissions by improving energy efficiency and adopting lower-carbon technologies, processes and operating methods. Next to the obvious benefits for the climate, this also makes good business sense. Among the Fortune 500, fifty-three companies reported saving a combined US$1.1 billion in 2013 from energy efficiency, renewable energy and other emission-reduction initiatives – an average of over US$10 million per company. Many of these businesses are also calling for a strong agreement to be reached in Paris.

Initiatives by cities, businesses and industrial sectors to cut emissions can contribute and support national emission commitments, bringing significant savings of carbon dioxide (CO_2) equivalent.

- The third key element is the fact that the International Energy Agency has reported that, in 2014, global CO_2 emissions from fossil fuels stayed flat yet the world economy grew 3.3 per cent. One year does not guarantee a trend, but it does show that growth can be decoupled from emissions.

These are some examples, but there are many more. Yet they show that the world is ready to commit, ready to act and ready to achieve. The Paris agreement needs to provide the firm policy framework to guide these actions.

WH: The UNFCCC COP is the main arena for intergovernmental climate change negotiations. What do you think is the role of other multilateral environmental

agreements, including the World Heritage Convention, to act as a catalyst in the international debate or to advocate solutions to climate change?

CF: To really rise to the challenge posed by climate change, we need to make sustainable development the new norm. Sustainable development is the unifying thread across all environmental or environment-related agreements. To achieve this, we really need all hands on deck at all levels and that means exploiting as many catalytic aspects as possible.

One powerful example in this respect is the Post-2015 Development Agenda, and a suite of Sustainable Development Goals set to be agreed in September. The Agenda's catalytic role lies in the fact that the goals are part of the locomotive pulling the world and its people to a sustainable future – the Paris agreement and the SDGs are not two sides of the same coin, they are the coin.

Another example is the 'Rio Conventions'. The UNFCCC is one of these conventions, one of three adopted at the Rio Earth Summit in 1992. The others are the UN Convention on Biological Diversity (CBD) and the UN Convention to Combat Desertification (CCD). In terms of sustainable development, the three are intrinsically linked.

The Rio Conventions share a concern for many of the same environmental and sustainable development issues, and operate within the same ecosystems. If the Conventions can be implemented collaboratively and in a coordinated manner at country level, multiple benefits delivered at lower cost could result, leading to greater progress on all fronts. For example:

- Addressing climate change can affect rates of desertification and biodiversity loss, in which climate is a key factor.
- Introducing renewable energy technologies for the reduction of greenhouse gas emissions can also reduce pressure on land and forest biodiversity by providing an alternative to unsustainable biomass fuels.

This clarifies the role of the Rio Conventions, but of course there are other multilateral agreements that also have a role to play, as is the case with the World Heritage Convention. Its Article 2 on natural heritage is an important catalyst. Climate change impact is already evident in 35 of the 228 sites inscribed on the World Heritage List for their natural values, according to the IUCN World Heritage Outlook monitoring system. Climate change could also become the most widespread threat to World Heritage sites in the future.

But many World Heritage sites and protected areas are also key to economies and livelihoods, while improving the resilience of communities and countries to climate change. Take forested biosphere reserves as an example. Forests cover one-third of the Earth's land mass, performing vital functions – 1.6 billion people depend on forests for their livelihoods.

Forests feed rivers and are essential to supplying the water for nearly 50 per cent of the largest cities, including New York, Jakarta and Caracas. They also help to regulate the often devastating impact of storms and floods.

These examples underline the myriad links and catalytic aspects in many multilateral agreements. It is of utmost importance that these are identified and acted upon so that the many benefits of climate action can be maximized across a spectrum of international issues.

Manú National Park (Peru).

© Funkz

WH: Culture was only recently brought to climate change discussions, and it was mentioned in the 5th Assessment Report on Climate Change of the Intergovernmental Panel on Climate Change (IPCC). What does culture bring to climate change discussions, and what value does heritage, and World Heritage in particular, have in society's response to climate change?

CF: The IPCC clearly points out that, in the most vulnerable countries, cultures are already being negatively impacted by climate change. The report also states that future climate change impacts will increasingly have an effect on cultures.

There are many definitions of the term 'culture'. One refers to the cumulative deposit of knowledge, experience, beliefs, values, attitudes, meanings, hierarchies, religion, notions of time, roles, spatial relations, concepts of the universe, and material objects and possessions acquired by a group of people in the course of generations through individual and group striving.

In the context of climate change, this definition perhaps clarifies the extent that climate change impacts have in the sense that they are not primarily material. They cut much deeper.

This means that a large element of addressing climate change translates into protecting peoples' cultures, their way of life, their heritage. There are many compelling reasons – such as poverty or health – for policy-makers to act on climate change. But engaging with cultural heritage and things that people cherish, which could be lost due to climate change, is an equally compelling reason for communities to become involved in climate action.

The project that the UNESCO Office in Lima successfully implemented in Peru is a good example. It concerned Manú National Park, a World Heritage site, and focused on local adaptation capacity by developing an adaptation plan, while at the same time it helped neighbouring communities to improve their understanding of climate change, its implications on their livelihoods, and on the possible measures they could take to be prepared for it. The project involved all stakeholders and benefited local communities as much as it benefited the World Heritage site.

WH: UNFCCC facilitates and informs action on climate change, for example through the UN Climate Change Newsroom. How has the culture sector been presented in these activities, and how do you think culture and heritage could be more effectively integrated?

CF: As climate change, its impacts and responses to it all concern culture, culture features strongly in these activities even if there is no explicit reference. It is clear that no country, no culture, will be left unscathed by climate change. But beyond that, the word 'culture' derives from a French term, which in turn derives from the Latin *colere*, which means to tend to the Earth and grow, or cultivation and nurture. This is interesting because it means that from a cultural context, responding to climate change denotes tending and nurturing both the Earth and, by implication, the culture.

WH: World Heritage sites are some of the most cherished and unique places in the world. Many of them safeguard key ecosystem services and benefits. At the same time, their Outstanding Universal Value is threatened by the impact of climate change. How could the iconic value of these sites be better harnessed to bring the work of the UNFCCC to the grass roots, such as by raising awareness of climate change or of adaptation and mitigation practices?

CF: Although World Heritage sites are vulnerable to climate change, they also have the potential to fulfil a role in mitigation. These sites are often regarded with a sense of pride and deep valuation, not only by local populations, but often also internationally, which is readily reflected in tourism. This means that they are key tools in the context of further raising awareness of climate change and the response to it, both locally and internationally. Beyond awareness, adaptation and mitigation solutions need to be implemented. And here I loudly compliment UNESCO for already engaging with climate change issues and for moving increasingly towards implementation. For example, UNESCO's practical step-by-step guide *Climate Change Adaptation for Natural World Heritage Sites* is exemplary, especially because it has been tested in both Kenya and India. Together with UNESCO's inclusive approach where stakeholders and communities are concerned, this is exactly what is needed to advance adaptation on the ground.


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How natural World Heritage sites contribute to combating climate change

Sandeep Sengupta
Senior Policy Officer, Climate Change, Global Policy Unit, International Union for Conservation of Nature (IUCN)
Elena Osipova
Monitoring Officer, World Heritage Programme, IUCN

2015 is a crucial year for the international community in addressing the global challenge of climate change. Governments, on their part, are expected to deliver a new international agreement under the United Nations Framework Convention on Climate Change in Paris in December. But there is also growing recognition that if climate change is to be effectively countered, it will require the cumulative and sustained efforts of participants from across all levels and sectors of society. No one can be a bystander on this issue any more.

What contribution, if any, can World Heritage sites make in this respect? At the outset, it must be noted that the safeguarding of cultural and natural World Heritage sites is an intrinsically worthwhile goal in its own right. Sites are inscribed on the World Heritage List because they are of Outstanding Universal Value. They represent the 'best of the best' of our common natural and cultural heritage. These sites need to be preserved for posterity for the sake of all humanity – current and future generations alike – regardless of whatever other benefit they may bring.

However, it is equally clear, particularly in the case of natural sites, that high-quality conservation and management of these sites – and that of the wider ecosystems within which they are embedded – do bring significant and tangible additional benefits for both climate change mitigation and adaptation. These globally important benefits – which are among a range of other benefits that these sites provide at local and national levels – help to strengthen the case for their enhanced protection and recognition. They are an important component in the array of nature-based solutions available today that can help society to combat this global challenge.

A recent IUCN study on the benefits of natural World Heritage found that an estimated 5.7 billion tonnes of forest biomass carbon are stored within natural World Heritage sites in the pan-tropical regions of the world alone.[1] To offer a specific example, the Central Amazon Conservation Complex in Brazil – the largest World Heritage site in the Amazon basin – stores 676 million tonnes of carbon (MtC). This is the highest carbon stock of any tropical World Heritage

Canaima lagoon, Canaima National Park (Venezuela).

site. Other notable examples include Salonga National Park (Democratic Republic of the Congo; 633 MtC), Tropical Rainforest Heritage of Sumatra (Indonesia; 464 MtC) and Canaima National Park (Bolivarian Republic of Venezuela; 316 MtC). Moreover, sixteen natural World Heritage sites store more than 100 MtC each. The World Heritage network also contains higher forest biomass carbon density, on average, than the remaining protected area network in pan-tropical biomes, demonstrating its significant role in carbon storage and its important contribution towards climate change mitigation. And this is not even considering the other valuable economic, social, environmental and cultural benefits that these sites provide, including in terms of biodiversity conservation, water provisioning, support to local livelihoods and tourism.

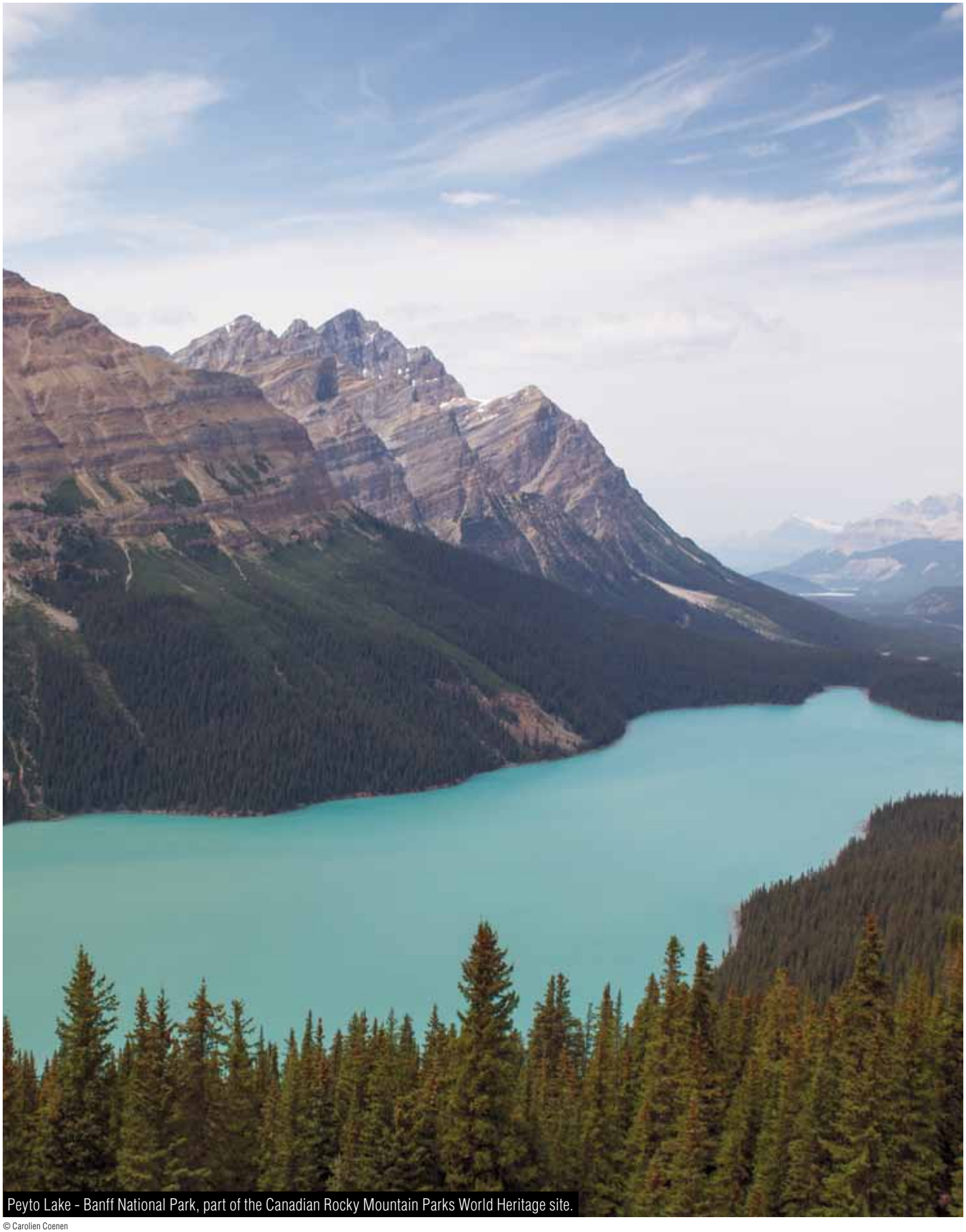
In addition to these terrestrial sites, marine World Heritage sites also contribute significantly to carbon sequestration and storage by capturing significant amounts of 'blue carbon'. For example, meadows of *Posidonia oceanica* seagrass in Ibiza – a mixed World Heritage site – act as a long-term carbon sink, storing five times as much carbon for each kilometre of coastline as the average recorded for the Mediterranean. The Posidonia meadows within the Ibiza site constitute more than 70 per cent of the meadows of Ibiza and Formentera islands, and in comparison to the whole Balearic Islands, they have the highest ratio between surface of seagrasses and length of coastline. This area also shows exceptionally high carbon fixation rates.[2]

At the local level, natural World Heritage sites play an important role in reducing the exposure and vulnerability of people and ecosystems alike to the risks and hazards associated with climate change, such as severe storms and floods, and in helping them to adapt better to its adverse effects. The Sundarbans, the largest expanse of contiguous mangrove forests in the world spanning 10,000 km^2 along the coasts of India and Bangladesh, clearly illustrate this role.[3,4,5] In this particularly vulnerable deltaic region, prone to a high incidence of extreme weather events exacerbated by climate change, millions of people directly benefit from the coastal protection provided by these unique World Heritage-listed mangrove forests.

Yet it is important to keep in mind, notwithstanding these benefits, that World Heritage sites are themselves at considerable risk from climate change today – among the various other threats that they face. At the most recent meeting of the World Heritage Committee in Bonn (Germany, June 2015), IUCN drew particular attention to the threat that climate change poses for World Heritage sites. In fact, the IUCN World Heritage Outlook 2014 identified climate change as the most serious *potential* threat to natural World Heritage. It also found that in 35 out of 228 natural sites studied the impacts of climate change are already visible and represent a high threat to the integrity and values of these sites, which include Kilimanjaro National Park (United Republic of Tanzania), Great Barrier Reef (Australia), Monarch Butterfly Biosphere Reserve (Mexico) and Canadian Rocky Mountain Parks.

Ultimately, the larger fact remains that only healthy ecosystems can continue to provide the services and benefits that humanity depends on. In the case of natural World Heritage sites, with the ever-growing pressure from climate change they are facing, we need to ensure that the other threats confronting them are reduced to a minimum, so that they can continue to provide a full range of benefits, including

The dense meadows of oceanic Posidonia (seagrass) in Ibiza (Spain) contain and support a diversity of marine life.



Peyto Lake - Banff National Park, part of the Canadian Rocky Mountain Parks World Heritage site.

Mount Kilimanjaro, here covered with snow and ice (United Republic of Tanzania).

natural solutions for climate change mitigation and adaptation.

Even so, natural sites are only part of the answer to the global challenge of climate change. Given the scale of the problem, the need for a coordinated and effective global response that addresses the underlying drivers of anthropogenic climate change has never been clearer. This is why IUCN, like many others in the international community, is calling for an ambitious, fair and balanced agreement to be adopted in Paris that is comprehensive in its coverage of greenhouse gas sources and sinks, includes all major sectors, maintains the highest levels of environmental integrity, and facilitates global efforts to reduce our dependence on fossil fuels. And one that clearly recognizes and supports the vital role that natural ecosystems – including World Heritage sites – and their better conservation, restoration and sustainable management can play in both climate change mitigation and adaptation.

IUCN, like many others in the international community, is calling for an ambitious, fair and balanced agreement to be adopted in Paris.

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How climate services can help to protect World Heritage sites

Michel Jarraud
Secretary-General, World Meteorological Organization

UNESCO World Heritage sites include some of the world's best-known and admired parks, natural formations, cities, archaeological remains and other special locations. Many of these sites are vulnerable to climate change and its impacts. Today, as the ocean and atmosphere warm and new weather and climate patterns emerge, World Heritage sites face greater threats than ever before.

Many of the risks posed by climate change have been well documented. Reports produced by UNESCO and World Heritage practitioners describe how erosion exacerbated by rising sea levels threatens coastal sites, how warming and acidifying seawater bleaches coral reefs and harms ocean biodiversity, how melting ice and permafrost leads to glacial lake outbursts and destabilizes archaeological sites, and how storms and higher temperatures can harm ancient cities, parks and wildlife.

To protect World Heritage sites from today's weather hazards and tomorrow's climate change impacts, we need to rigorously monitor the weather and climate variables that affect them, disseminate accurate and timely forecasts and alerts for extreme events, increase the resolution and usefulness of climate change scenarios, and provide site managers with actionable information for developing their adaptation plans.

Gathering data

The weather and climate observations coordinated by the World Meteorological Organization (WMO) and others are produced by a vast array of specialized instruments. Weather stations distribute data from thermometers, rain gauges, barometers and many other instruments. An international fleet of 3,800-plus buoys roams the seas gathering data on temperature, salinity and currents. Planes, ships and balloons gather observations, as do increasingly sophisticated constellations of weather and Earth observation satellites. This massive effort is vital to understanding weather and climate risks and must be sustained by continued funding and political commitment.

These observations make possible constantly improving weather forecasts and alerts that enable people to prepare for storms, floods and other extreme events. Forecasting continues to become more and more accurate due to supercomputer-based modelling, observations from satellites and other instruments, and a greater understanding of large-scale climate patterns such as the El Niño-Southern Oscillation. As a result, today's five-day weather forecast is as reliable as the two-day forecast of twenty-five years ago. Similarly, while three-day forecasts of tropical cyclone storm tracks were of limited skill for some storm basins

A colony of the soft coral stands bleached on a reef off Islamorada, Florida (United States).

Cape sugarbird feeding at Cape Floral Region Protected Areas (South Africa).

as recently as the early 1990s, five-day forecasts are now the global standard. Continued improvements in forecasts and alerting systems will save ever more lives and property – and help management authorities to protect World Heritage sites from the extreme weather events that will become more frequent and intense with climate change

Effective assessment

Meanwhile, our understanding of climate change also continues to improve. For example, advances in climate observations and modelling make it increasingly possible to 'downscale' the results of global models to explore likely impacts at the regional or even subregional level. A growing understanding of the regional drivers of climate change (such as deforestation and other land-use change) versus global drivers (such as CO_2 concentrations) will also improve assessments of local vulnerabilities and risks. These increasingly high-resolution and place-specific scenarios can be incorporated into long-term climate change adaptation plans for cities, agricultural zones, economic sectors – and World Heritage sites.

Climate services can offer science-based information and forecasts that empower decision-makers to manage the risks and opportunities of climate variability and climate change.

The best way to reduce the risks of climate change, of course, is to make rapid and dramatic cuts in global greenhouse gas emissions. But because further impacts are inevitable even with effective mitigation, adaptation measures are also critical. To support adaptation to climate variability and climate change, in 2013 WMO and its partners launched the Global Framework for Climate Services, a mechanism to promote the development of information based on climate predictions and facilitate and coordinate its application as products and services.

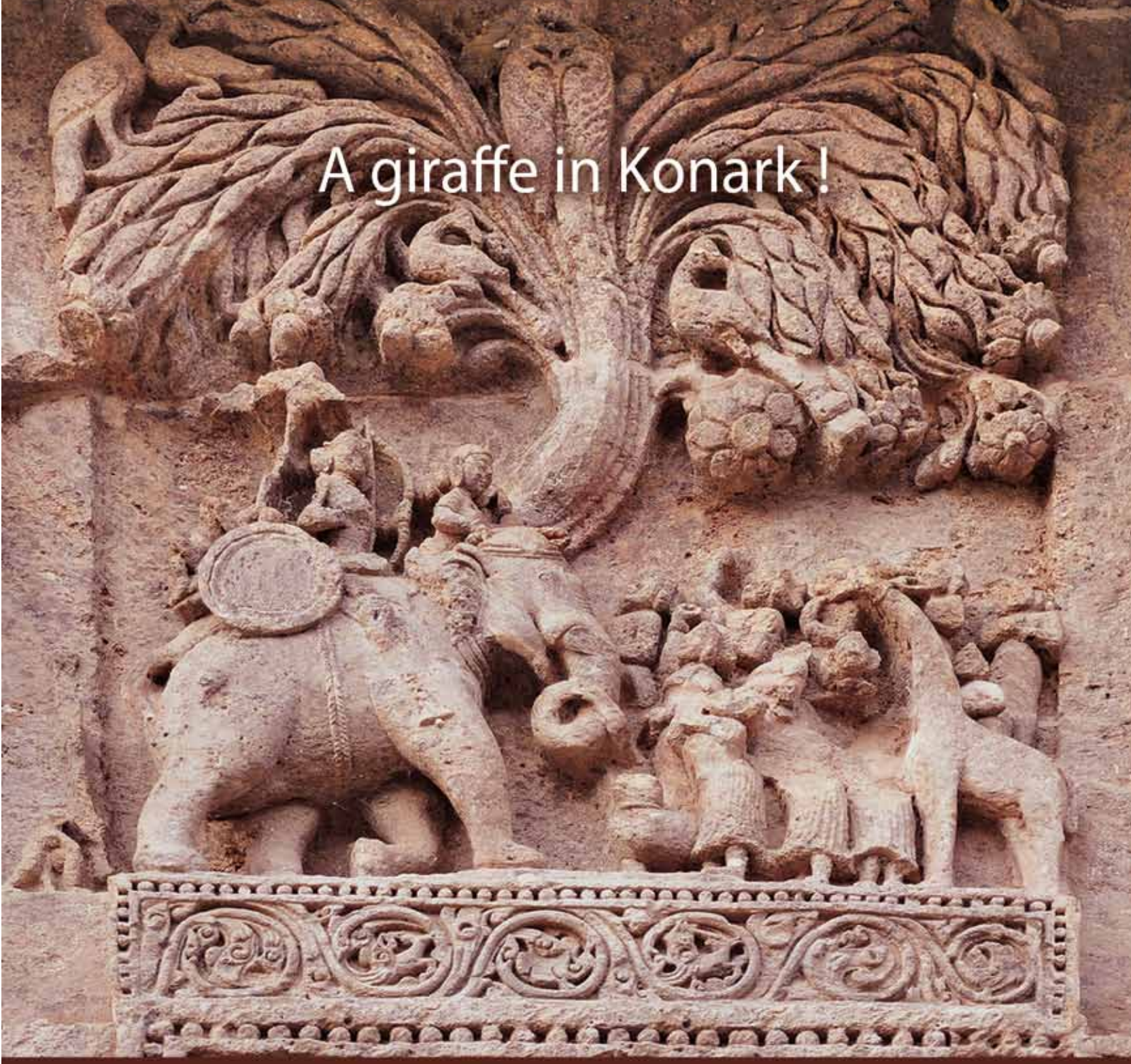
The delivery of climate services has become possible because seasonal and multiyear climate information and forecasts have advanced to the point where they can now provide actionable information on these timescales. Similarly, scenarios of future climate change based on increasingly reliable models are now robust enough to guide investments and strategies for addressing the impacts that will appear over the coming decades. Climate services can therefore offer science-based information and forecasts that empower decision-makers to manage the risks and opportunities of climate variability and climate change. The providers of climate services consult with users to determine what kind of information they need, when and how often, and in what format. They then deliver the information and assist their users to interpret and apply it.

Sophisticated climate services combine climate forecasts with information from other sectors to inform decisions on key priorities such as public health, agriculture, water management and disaster risk. For example, forecasts of drier-than-average periods in the Sahel can be integrated with information about a population's health and maps of available health facilities to support the timely roll-out of vaccines ahead of a meningitis outbreak. A monsoon forecast plus information on past cropping decisions and market trends can support decisions on food security. Scenarios of future sea-level rise combined with population trends can shape long-term investments in coastal housing and infrastructure.

Uses for World Heritage

The managers of World Heritage sites can also benefit from these kinds of services. Information on and scenarios of sea-level rise for specific coastlines are being considered for planning adaptive, protective or rehabilitation measures for low-lying sites such as Sundarbans mangrove forests (Bangladesh and India) or Komodo National Park (Indonesia), on whose beaches important turtle populations nest. National and regional temperature and precipitation trends can be used to adapt management plans for natural parks so that they continue to protect biodiversity and sensitive historic remains under new conditions, as in the case of Cape Floral Region Protected Areas (South Africa) or the frozen Scythian tombs of the Golden Mountains of Altai (Russian Federation). Knowledge about emerging weather and storm patterns can inform protection plans and defences for archaeological sites. This is the case of heritage sites of invaluable historic significance such as Venice and its Lagoon (Italy) or parts of London (United Kingdom). Ocean temperature and acidification levels and trends – which are not globally uniform but vary from place to place – can be incorporated into management plans for ocean-based sites such as the coral reefs of the Great Barrier Reef (Australia) or the Belize Barrier Reef Reserve System.

WMO is committed to collaborating with UNESCO on raising awareness about the vulnerability of sites that represent the world's cultural and natural diversity of Outstanding Universal Value. By working together, and learning more about each other's needs and working culture, the weather and climate community and the World Heritage site management authorities can develop improved information, predictions, services and products that can help to protect humanity's cultural and natural heritage from the growing risks of climate change. World Heritage sites can act as laboratories for climate observation, forecasting, modelling, weather alerts and climate services. As part of its ongoing collaboration with UNESCO, WMO and the world's National Meteorological and Hydrological Services (NMHS) are committed to sustaining and strengthening the weather and climate services that underlie these efforts.



13th Century Sun Temple, at Konark, Odisha

The magnificent animal giraffe, found only in Africa, finds a place in one of the carved panels on the southern upper portion of pista or raised plinth of the grandest architectural marvel, Sun Temple, Konark – the 13th Century World Heritage Monument. Historians opine that, either a giraffe was brought alive by sea from Africa to Odisha or a few giraffes were brought to India, bred in a royal park somewhere and the king acquired one.

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Rising sea-level over time: historical traces provided by underwater cultural heritage

Underwater cultural heritage is an essential source of information when it comes to understanding the history of climate change and its consequences.

For about thirty years now, scientists have been warning that rising temperatures are leading to a rise in sea level. Yet this phenomenon, although we are seeing it again today, is nothing new.

Civilizations have always tended to develop close to rivers and coasts in order to find the resources essential to survival. This being so, ever since humanity first appeared we have been exposed to climate change leading to variations in sea level caused by the formation or melting of glaciers or the movement of tectonic plates. In fact, for 90 per cent of human existence, the sea level has been between 40 m and 130 m lower than it is today. For this reason, a considerable portion of the historic and prehistoric traces of our ancestors' existence is now under water. These remains, which form part of our underwater heritage, are a very important resource in the study of the first human civilizations and their origins. At a time when sea levels could once again be changing significantly, this heritage could moreover help to increase understanding of this phenomenon.

Changes in sea level, and their impact on human societies and models of territorial occupation, have only been studied and understood for a century or so. This field of research is based on two key discoveries. The first, made by British geologist Clement Reid, was that of submerged forests. The second, made by palaeoethnologist Alberto Blanc, was that of caves once inhabited but now under water off the west coast of Italy. In 1930, a 14,000-year-old harpoon was discovered in the North Sea during a fishing expedition, providing the first proof that land now submerged was once habitable.

Since then, research has continued and 2,650 underwater sites have now been listed. The number of prehistoric sites in Europe dating back 6,000 to 300,000 years is currently estimated at several thousand. Although these sites are less easily accessible, they have a major advantage over those that remain above water because cultural heritage is generally better preserved under water, especially with such organic matter as wood or fibre. Study of these sites has opened up a huge field of research and understanding of our past.

One of the most important sites is the Dogger Bank region of the North Sea, a sandbank that forms a 17,600 km^2 submarine plateau off the east coast of England. The North Sea south of Dogger Bank has been the subject of several studies and has yielded much information on the life of prehistoric peoples. Skeletons of animals such as mammoths, rhinoceroses and even hyenas, stone tools, human bones and numerous other items have been discovered by scientific expeditions and fishing crews. Several studies have been

The Dhofar archaeological site (Oman).

conducted since these finds, with the aim of unlocking the mystery of the prehistoric past.

Several other underwater sites dating from prehistoric times are also well known to researchers: Danish sites, Neolithic sites in Bulgaria and Bronze Age villages in the Black Sea, the Neolithic village of Atlit Yam just off the coast of Israel, and similar sites abounding in ancient Indian structures in the Americas, the Gulf of Mexico and along the Coast of Florida.

For future research, however, the seabed of the Persian Gulf in the vicinity of Qatar is one of the most promising locations. Recent research has shown that thousands of years ago the Gulf was a plain watered by rivers and dotted with lakes. A new theory that challenges existing ideas of when the first humans left the African continent suggests that the Gulf region was home to early humans about 100,000 years ago before they dispersed around the world, prompted by the rise in sea level resulting from climate change.

In 1930, archaeologists discovered large numbers of stone tools in areas of the Arabian Peninsula that are now uninhabitable desert. Only a significant degree of climate change could account for this phenomenon. The Gulf has in fact experienced several sea-level changes over time. It was partly submerged as recently as about 12,000 years ago at the beginning of the Holocene, the latest interval of geological time. So rather than sea it was a fertile landscape, irrigated by the many watercourses flowing through it.

This implies that if underwater research is conducted in this area there is every likelihood of finding the remains of a city or signs of habitation even older than Ur, which flourished between 2025 and 1738 BC and is known as the most ancient Sumerian city. Such an exceptional discovery would greatly improve our knowledge of how the first humans lived. It would also provide vital insights into the way that societies evolve in relation to their environment.

Many questions remain unanswered, however. Underwater archaeological research is still a very new science, and the potential of such studies is only beginning to be understood. Underwater prehistoric sites promise to be a vast source of information about the lives of the earliest humans and the dawn of civilization, improving our understanding of the current period of our history.

The UNESCO Convention on the Protection of the Underwater Cultural Heritage, adopted in 2001, plays an important role in facing this challenge. It is intended to increase awareness of the importance of underwater cultural heritage, to participate in the protection of this heritage through an international legal framework, and to promote underwater archaeology and the work of scientists and experts. This heritage is confronted with many dangers and much work remains to be done, not only to save it, but also to recognize its importance in climate change research.

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BIOSPHERE RESERVE POĽANA

Good practice in the sustainable management of natural resources

The Biosphere Reserve Poľana in Slovakia joined UNESCO's Man and the Biosphere (MAB) programme in 1990. Biosphere reserves (BR) are an example of sustainable living, balance and a mutual relationship between human beings and nature.

Biosphere Reserve Poľana is made up of three zones: core zone – six nature reserves, which are set aside for long-term protection in harmony with nature conservation; buffer zone, where activities that are compatible with nature conservation aims should be realized; and transition zone where processes of sustainable management of natural sources are carried out and developed. Biosphere Reserve Poľana should fulfil certain functions – protection, logistics (research, education) and development.

Protection functions are fulfilled by tasks related to PLA Poľana, which was established in 1981 with the aim to protect organic, plant and animal communities as well as a unique landscape character.

Biosphere Reserve Poľana covers an area of 20,360 hectares and research is being carried out in scientific institutions. One of the priorities of BR Poľana is educating the younger generation and their relationship to nature. Development activities includes support for the inhabitants and keeping them close to nature, and maintaining traditional management at Poľana.

In 2014 the International Coordinating Council of MAB put forward a set of recommendations for BR Poľana aimed at increasing cooperation with the local population and business communites and improving the managment through an integrated approach to increase cooperation with entities in the tourism industry. The measures look to enhance the capacity for better coordination, particularly socio-economic research. A Coordination Committee has also been established, which will manage the activities of BR Poľana. Representatives of the self-governing region, land users, landowners, entrepreneurs, foresters, farmers, culture, education and research institutions can be members of the Committee.

Only correct communication, hard work and respect can help those that live in Biosphere Reserve Pol'ana. Wisdom, appreciation, simplicity (without unnecessary legislative obstacles) and finances can really contribute to the development of the Biosphere Reserve Pol'ana.

Currently, it can be concluded that the joint efforts succeeded in creating a working relationship on a unique level in Slovakia. Mutual respect, professionalism, humanity and above all selfless willingness to help others create a platform for quality cooperation, which has already managed to produce tangible positive results in BR Pol'ana.

Nature

Poľana is the highest volcano mountain in Slovakia. It was designated a Protected Landscape Area in 1981. The whole range is part of the Carpathian arch. There are thermophiles as well as mountain plants and animal species in a relatively small area due to its protrusion to the south and altitude range of almost 1,000 metres. The unique geological and geomorphological character of this area is a result of volcanic activity around 13–15 million years ago. The range was formed during four periods of volcanic activity. Its geology and geomorphology formations were reasons for the establishment of some small scale protected areas. These are rich in rare plant and animal species, ecosystems as well as interesting landscape structures.

There are around 1,220 higher plant species in BR Poľana, 80 of which are protected, as well as 390 mushroom species, 160 lichens and 130 mosses. The animal kingdom is rich as well, with 278 chordates, 222 of which are protected species. Birds and mammals dominate. Non-chordata are represented by many Carpathian endemics. Forests cover 85 per cent of the area. Large beech, fir-beech and hillside forest communities are typical for Poľana and have a primeval forest character. Oak-beech forests can be found in lower areas, on the south-west side, where many tree species are present. Beech and fir-beech forests are the largest. They grow to huge sizes due to favourable conditions of rich soils. Apart from the main tree species - beech and fir - there can also be found species like spruce, acer, and ash can also beech trees reach up to the ridge at the south slopes, although yew trees are rare.

Areas that were deforested a long time ago are represented today by communities of meadows and pastures, which also encompass peatlands and meadows rich in groundwater. Mountainous and sub-alpine species of grass are typical. Rock communities increase the overall biodiversity of the area. Thanks to high habitat biodiversity, the representation of non-chordata is very rich as well. Many of them are endemic, rare and threatened. There are 11 species of amphibians. Open areas are ideal for reptile species. Birds also are richly represented here, with 180 species seen in the area. The richness of bird species, as well as the presence of many species of European importance, has made Poľana a Special Protected Area within the Natura 2000 network. Poľana is home to large carnivores as well, including wolves, lynxes and bears, while most of the river coursers are enjoyed by otters.



Humans

The area of BR Poľana belonged to the least urbanised protected areas in Slovakia up until 2014. There were only three parishes (Iviny, Snohy and Vrchslatina) with typical low-key settlement (overall only 400 permanent inhabitants). Hriňovské lazy will become part of the transition zone in 2015. It is a mosaic of small strips of land, interlaced by meadows and pastures at former arable land, lanes, sometimes overgrown by hip-roses, sloes and wild cherries. Horses and traditional farming tools are used in this area. The character of this landscape is highlighted by traditional wooden houses, barns, potato cellars, painted wooden crosses and other folk art. Scattered settlements were created in Hriňová due to difficult accessibility of arable land. Individual farming units were created, which were far apart from each other. Arable farming was a main income. Animal breeding, especially cattle and sheep farming, forestry, and charcoal burning were important as well. Hriňová cadastre was not influenced by collectivization during the communist era, unlike many others. Thanks to this fact it could keep a unique landscape character as well as various forms of management. Podpoľanie is a picturesque little-known region in central Slovakia, known by its untouched nature, original folk art, live traditions and poetic Detva. Anyone who has visited it once, wants to return again. The region of Podpoľanie has no precisely marked geographic and administrative legal borders. It is an area dominated by the massif of Poľana with little villages and towns at its foothill, as if laid down in the arms of Poľana. They belong together and create a sense of unity.

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News

The 39th session of the World Heritage Committee, meeting in Bonn (Germany) from 28 June to 8 July 2015, inscribed Hatra (Iraq), Old City of Sana'a (Yemen) and Old Walled City of Shibam (Yemen) on the List of World Heritage in Danger. The Committee removed one site, Los Katíos National Park (Colombia), from the List, which currently includes forty-eight properties (thirty cultural, eighteen natural).

See page 90

Old Walled City of Shibam (Yemen).

39th session of the World Heritage Committee: decision-making in Bonn

The 39th session of the World Heritage Committee, meeting in Bonn (Germany) from 28 June to 8 July 2015, chaired by Prof. Dr. Maria Böhmer, Minister of State at the German Federal Foreign Office and member of the Bundestag, inscribed twenty-three cultural properties and one mixed property on the World Heritage List and approved the extension of three sites already on the List. It added three sites and removed one site from the List of World Heritage in Danger. The World Heritage List now includes 1,031 properties (802 cultural, 197 natural and 32 mixed) in 163 countries.

The 39th session of the Committee, which brought together over 1,900 participants from 127 States Parties, appealed on its very first day to the international community to counter the new threat of violent extremism and cultural cleansing.

In a move to sensitize the world to the dangers facing World Heritage today, the Committee adopted the groundbreaking Bonn Declaration on World Heritage. This Declaration condemns 'the barbaric assaults, violence and crimes committed in recent times by the so-called Islamic State of Iraq and the Levant (ISIL) also known as Daesh … against the cultural heritage of Iraq, including the World Heritage site at Hatra'. The Committee also expressed deep concern for other sites such as Palmyra (Syrian Arab Republic), the Old City of Sana'a (Yemen) and the Old Walled City of Shibam (Yemen).

The Committee called on all parties associated with conflicts to refrain from any action that would cause further damage to cultural heritage and to adopt measures for the evacuation of World Heritage properties being used for military purposes. It launched an appeal to all States Parties to cooperate in combating the illicit trafficking of cultural heritage, and recommended that the World Heritage Centre and Advisory Bodies develop a post-conflict strategy.

In a video message, German Chancellor Angela Merkel spoke of the importance of heritage for our understanding of cultures.

Director-General of UNESCO, Irina Bokova, in her opening address to the Committee, said: 'Heritage is under attack today. … In Syria, Iraq, Libya and Yemen, we see the brutal and deliberate destruction of heritage on an unprecedented scale. This is a call for action'; while Maria Böhmer invoked the role of culture in peace-building and pointed to 'the fury of terrorist organizations like ISIS in Iraq [which] surpasses our imagination'.

The Director-General subsequently launched the Global Coalition, Unite for Heritage (#Unite4Heritage), a campaign designed to strengthen the mobilization of governments and all heritage stakeholders in the face of deliberate damage to cultural heritage, particularly in the Middle East.

The Committee noted with satisfaction the continuing progress being made in restoring and reconstructing the mosques and mausoleums at the World Heritage property of Timbuktu (Mali), damaged and destroyed by extremists three years ago. Maria Böhmer announced to the Committee that the restoration of the mausoleums is nearing completion through the extraordinary work carried out by local craftspeople and with international support. She presented a UNESCO medal on behalf of Irina Bokova to Allassane Hasseye, head of the guild of Timbuktu masons, the custodians of unique traditional skills in the maintenance of earthen architecture. On

Opening Ceremony of the 39th session of the World Heritage Committee held in Bonn (Germany).

Participants in the International Young Experts Forum with World Heritage Committee Chair Prof. Dr. Maria Böhmer and UNESCO Director-General Irina Bokova (centre).

18 July 2015 the Director-General visited Timbuktu to pay tribute to the inhabitants and masons of the city whose mobilization and skills played a crucial part in the reconstruction of the buildings.

At the opening of this year's Committee session, participants in the International Young Experts Forum presented the outcomes of their meeting and called upon the States Parties to the Convention to include the teaching of World Heritage in national school curricula.

The 39th session was the occasion for the chairs of the six UNESCO culture conventions to meet for the first time to discuss ways of working together more effectively. In a joint statement, the chairs emphasized the need for a renewed political will to support UNESCO's culture conventions and called for the United Nations to ensure that World Heritage values be recognized in the implementation of the Post-2015 Development Agenda.

The Committee also drew attention to the growing danger of poaching and its impact on the Outstanding Universal Value of many natural World Heritage properties. In addition, it urged States Parties to participate in the Conference on Climate Change scheduled to take place in Paris in December 2015.

Among the properties added to the World Heritage List were Blue and John Crow Mountains, Jamaica's first site. Singapore, with the inscription of Singapore Botanical Gardens also saw its first property enter the List. While Los Katíos National Park (Colombia) was the only property removed from the Danger List, three new sites were added: Hatra (Iraq), Old City of Sana'a (Yemen) and Old Walled City of Shibam (Yemen) (see p. 90).

During its deliberations, the Committee decided to suspend the third cycle of Periodic Reporting and to launch a two-year Periodic Reflection Period, from 2015 to 2017, with a view to revising the Periodic Reporting format before the Third Cycle in order to improve follow-up on progress made by States Parties in implementing the Convention.

The Committee also approved several changes to the *Operational Guidelines* and extended the mandate of the Ad Hoc Working Group, which was established in 2014, to be convened in 2015 by Turkey, to further discuss and make recommendations on limiting the number of nominations per State Party and the overall number of nominations per year, as well as on the sustainability of the World Heritage Fund.

Before approving the budget for the World Heritage Fund, the Committee noted with concern the impact of the reduction of UNESCO's regular budget on programme activities. It also noted that the current financial situation of the Fund has hampered its ability to provide for activities relating to the Convention. It therefore called upon all States Parties to allocate voluntary contributions to the Fund. The Committee decided to continue to explore ways of ensuring the sustainability of the Fund through extrabudgetary opportunities and additional fundraising possibilities in collaboration with the World Heritage Centre, UNESCO services, the Advisory Bodies and the States Parties.

On the sidelines of the Committee session, a World Heritage partners' event and panel discussion, hosted by the German international broadcaster Deutsche Welle, provided a platform for discussing the contributions of private sector partners to World Heritage conservation and promotion activities. It allowed partners to share experience and best practices with other partners, as well as meet Committee members and representatives of heritage authorities from States Parties attending the session.

The Committee accepted Turkey's offer to host the 40th session of the World Heritage Committee in Istanbul from 10 to 20 July 2016, and also elected H.E. Ambassador Gürcan Türkoğlu, Vice-President of the Turkish National Commission for UNESCO, as chair of the 40th session.

The following vice-chairs were elected: Philippines, Poland, Peru, Lebanon and Senegal (until the end of the 20th General Assembly in November 2015 when new members from Africa would be elected). Ms Eugen Jo (Republic of Korea) was elected Rapporteur of the 40th session.

Marine Programme supports exchange of experience

The Marine World Heritage Programme is supporting a series of encounters between site managers with the aim of exchanging experience. Recently the site manager of Tubbataha Reefs Natural Park (Philippines) met with Jon Day, previously of the Great Barrier Reef Marine Park Authority (GBRMPA), in order to strengthen the site's planning and evaluation tools.

The Great Barrier Reef has a strong focus on the site's Outstanding Universal Value. The Tubbataha exchange of experience with this ex-GBRMPA expert has helped to insure that the site's management plan reflects its Outstanding Universal Value as well. A new framework for assessing management effectiveness was also developed.

The challenges facing Tubbataha are the same as those confronted by many other marine World Heritage sites: the need for vigilance to deter illegal fishing, a growing problem with marine debris, increased shipping activity and difficult choices on how to allocate limited resources.

For Tubbataha the short-term outcomes included a greater focus on tourism management in the site's annual plans, and a greater emphasis on collecting socio-economic data to identify conservation projects that maximize community benefits.

This exchange of information received support from the Pacific Fund (the French Ministry of Foreign Affairs and International Development), as part of a larger project to increase the capacity of Marine World Heritage site managers in the Pacific Ocean.

The Marine World Heritage Programme is currently also supporting an exchange of experience from the Great Barrier Reef to Galápagos Islands (Ecuador) and a twinning arrangement between Glacier Bay (United States) and the Norwegian Fjords.

PIPA sets powerful precedent

In a precedent-setting move, Kiribati has banned commercial fishing inside the Phoenix Islands Protected Area (PIPA).

PIPA, the largest World Heritage site, has been officially closed to all fishing, except small scale fishing for local communities, since 1 January 2015. At the World Ocean Summit, held in Cascais (Portugal) from 3 to 6 June 2015, satellite-tracking data showed that the site, which is about the size of California, is successfully barring fishing vessels from the protected area.

The Kiribati decision is a huge step forward and a powerful precedent for World Heritage sites. Today over 30 per cent of World Heritage marine sites struggle with illegal, unreported or unregulated fishing which pose serious threats to the OUV of these sites.

Phoenix Islands Protected Area (Kiribati).

© Cat Holloway

Jaeger-LeCoultre honours World Heritage marine sites

On the 45th anniversary of Earth Day (22 April 2015), the watch manufacturer Jaeger-LeCoultre and the World Heritage Marine Programme hosted a special event at Jaeger-LeCoultre's New York boutique to highlight Glacier Bay National Park (United States), a World Heritage marine site.

The Guardians, a short video on Glacier Bay, was unveiled at the event, presenting the work of scientists and project managers who preserve the site. A unique exhibition by award-winning photographer Mark Kelley was also showcased in the boutique.

The partnership between Jaeger-LeCoultre and UNESCO has enabled the doubling of the marine area globally protected under the World Heritage Convention, as well as the establishment of an international network of forty-seven managers who share best practices and solutions.

Since 2008 Jaeger-LeCoultre has brought critical resources and public awareness to the forty-seven marine sites. In addition to financial support for the World Heritage Marine Programme, Jaeger-LeCoultre pays tribute to one of the sites every year.

Discover the new video online: *The Guardians*.

Glacier Bay National Park (United States).

© Jasperdo

Better protection for marine World Heritage sites

The World Heritage Marine Programme attended a meeting in London from 11 to 15 May 2015 at the International Maritime Organization (IMO) to support the governments of the Philippines and Mauritania in obtaining better protection against maritime pollution for their World Heritage sites.

In order to reduce vulnerability to damage from international maritime activities, the IMO can designate places recognized for their globally significant marine ecology as Particularly Sensitive Sea Areas (PSSA). The World Heritage Marine Programme worked closely both with Mauritania and the Philippines over the past few years in the lead-up to this meeting and is helping to prepare the full application of both countries to PSSA special status.

Today World Heritage sites comprise, or protect waters adjacent to, six of the fourteen PSSAs worldwide, including: Papahānaumokuākea (United States), Malpelo Fauna and Flora Sanctuary (Colombia), Galápagos Islands (Ecuador), Everglades National Park (United States), Wadden Sea (Denmark/Germany/Netherlands) and Great Barrier Reef (Australia).

Banc d'Arguin National Park (Mauritania).

© Christine Vaufrey

If successful, Banc d'Arguin National Park (Mauritania), with its unique but fragile marine ecosystem and migratory bird population would be the first PSSA on the African continent. Mauritania has officially launched its intention to apply for PSSA designation for the waters adjacent to the park.

Following several groundings in Tubbataha Reefs Natural Park last year, the Philippines Government officially launched its application for PSSA status of its World Heritage site during a special event at the IMO meeting in May 2015.

As part of the World Heritage Marine Programme's work toward strengthening the sharing of best practices among managers of World Heritage sites, peer-to-peer learning was organized at the May IMO meeting in London between the managers of Banc d'Arguin, Tubbataha Reefs and the Australian Government. Australia presented its full application to extend the Great Barrier Reef PSSA to cover key parts of the Coral Sea during the IMO meeting and shared its invaluable expertise on how to approach the application and ensure a successful outcome.

Everglades National Park (United States).

© Eric Baker

Cultural heritage and disaster risk reduction

A series of International Expert Meetings on Cultural Heritage and Disaster Resilient Communities took place from 11 to 17 March 2015 in Tokyo (Japan), before and during the Third United Nations World Conference on Disaster Risk Reduction (WCDRR) in Sendai (14–18 March 2015), in order to explore the role of culture and cultural heritage in building resilient communities and the contributions that local knowledge can provide to issues concerning DRR, climate change and sustainable development.

Organized by UNESCO in partnership with the Japanese Agency for Cultural Affairs, the National Institutes for Cultural Heritage in Japan, ICCROM and ICOM, the meetings outlined how culturally sensitive approaches contribute greatly to the mitigation of impacts caused by natural disaster.

At the same time, the sessions pointed out that traditional knowledge, practices and land-management uses, which are inherently risk-informed, owing to centuries of adaptation and trial and error, can make a significant contribution to strengthening resilience, especially if combined with modern science.

Participants also noted that the preservation of heritage landmarks plays an important role in times of crisis and during the recovery stages, as they support identities, strengthen social cohesion and provide a sense of continuity and hope for the future.

Despite the substantial role heritage can play in disaster prevention and recovery strategies, implementing policies that take this potential into account remains a significant challenge and requires appropriate institutional mechanisms and considerable capacity-building. In this sense, the new international policy for DRR, adopted at Sendai, provides a solid foundation for UNESCO to advocate for the integration of culture and heritage within DRR and to work with the appropriate partners at regional and national levels.

Using the priority areas identified in the Sendai Framework for Disaster Risk Reduction 2015–2030, participants at the sessions made a series of recommendations, emphasizing the importance of integrating cultural heritage and disaster risk management organizations at all levels of governance, and the importance of developing culturally aware approaches to DRR.

The meeting called for a strengthening of disaster risk governance in order to manage DRR at local, national and international levels, in particular stressing the importance of preventive as opposed to purely response-oriented approaches. Participants also asked national governments to encourage investment through financial assistance, tax incentives and loans to promote the protection of cultural heritage within a disaster risk management framework, and pointed out the need to encourage a multidisciplinary approach to the study and further understanding of DRR.

Cathedral of the Blessed Sacrament, Christchurch (New Zealand) after the 2011 earthquake.

International Expert Workshop includes specialists from North and South Korea

Within the framework of the UNESCO/ Republic of Korea Funds-In-Trust Project for the Preservation of the Koguryo Tombs and Mural Paintings in the DPRK, a UNESCO Expert Workshop: Conservation of Mural Paintings – Research, Access, Conservation was organized at Museum für Asiatische Kunst, Staatliche Museen zu Berlin (Germany) from 2 to 4 June 2015. The workshop, which brought together specialists from the Republic of Korea and the Democratic People's Republic of Korea, served as a venue not only to reinforce the DPRK's national capacity in conservation, but also to foster insights into the conservation and management of Koguryo Heritage in keeping with international standards. It was the first occasion in which both South and North Korean experts met to share experiences and exchange views on the topic of cultural heritage conservation.

Complex of Koguryo Tombs (Democratic People's Republic of Korea).

Three DPRK experts, trained under the UNESCO Koguryo Project since its Phase II in 2004, contributed to the workshop by presenting their work together with fellow UNESCO international specialists. This was also the occasion to promote the visibility of the UNESCO/RoK Funds-In-Trust Koguryo project in the international community.

The UNESCO Expert Workshop also brought together international mural painting conservators and specialists from thirteen countries and successfully released new general guidelines on the conservation of mural paintings, particularly in damp environments, developed on the basis of the Principles for the Preservation and Conservation/Restoration of Wall Paintings established by ICOMOS in 2003. These general guidelines are available on the World Heritage Centre website (http://www.international.icomos.org/victoriafalls2003/wall_eng.htm). In addition, participants discussed important examples of mural painting conservation, particularly with regard to World Heritage properties.

The workshop was jointly organized by the World Heritage Centre and Rathgen-Forschungslabor, Staatliche Museen zu Berlin, in close cooperation with Museum für Asiatische Kunst, Staatliche Museen zu Berlin and ICOMOS Germany.

Gastronomy joins forces with sustainable seafood

In an innovative approach to safeguarding the world's fresh seafood, Relais & Châteaux high-quality hotels and gourmet restaurants and SeaWeb Europe declared their support on World Oceans Day (8 June 2015) for UNESCO's mission to preserve the marine sites on the World Heritage List.

Relais & Châteaux properties are located in some of the world's most unique and spectacular places, including those with World Heritage status. From 7 to 14 June, guests at these properties around the world were offered a special Sustainable Seafood Menu that its gourmet chefs conceived entirely from seafood selected with the advice of SeaWeb Europe, an environmental organization that strives for the conservation of the world's oceans and its resources through the promotion of sustainable seafood and other produce. A percentage of each menu was donated to UNESCO in support of its work to improve protection of the marine sites on the World Heritage List.

Today many of the world's marine protected areas, including 30 per cent of listed marine sites, still suffer from illegal, unreported or unregulated fishing. Overfishing does not only affect the fish and shellfish being caught, but also upsets the whole ecosystem and associated food chains.

Marine World Heritage sites can provide a buffer against pressure for the rising demand for fresh seafood, the depletion of stock and the impact of climate change to allow fish to grow and multiply safe from major disturbance and boost the resilience of the oceans' unique ecosystem.

'The Relais & Châteaux restaurants are both guardians of the most precious resources our earth has to offer and innovators leading the way for tomorrow's gastronomy in a creative, responsible and committed way,' said Philippe Gombert, International Chairman of Relais & Châteaux.

Cocos Island National Park (Costa Rica).

Kathmandu Valley damage

Following the devastating earthquakes on 25 April and 12 May 2015 in central Nepal, the World Heritage Committee at its 39th session requested the State Party of Nepal to invite a joint World Heritage Centre/ ICOMOS/ICCROM Reactive Monitoring mission to consider the state of conservation of the Kathmandu Valley site and further development of the Emergency Action Plan. The Committee also called upon the international community to provide financial and technical support to Nepal in protecting, conserving and restoring the property.

Kathmandu Valley was inscribed on the World Heritage List in 1979. The cultural heritage of the property is illustrated by seven groups of monuments and buildings that display the full range of historic and artistic achievements for which the valley is world famous. The seven sites include the Durbar Squares of Hanuman Dhoka (Kathmandu), Patan and Bhaktapur, the Buddhist stupas of Swayambhu and Bauddhanath and the Hindu temples of Pashupati and Changu Narayan.

At the initiative of the Government of Nepal, an International Donor Conference on reconstruction, Towards a Resilient Nepal, was held on 25 June 2015 in Kathmandu.

According to information provided by Nepal's Department of Archaeology (DoA) on 7 June, Kathmandu Valley and other districts within and outside the valley had 813 damaged monuments including temples, chaityas, stupas, sattal, shrines, durbar complexes, etc., of which 184 have completely collapsed and 629 are partially damaged. In particular, extensive damage was done to the monuments, historic buildings and heritage assets within the seven monument zones. The DoA has developed an Emergency Action Plan for cultural heritage, which is integrated in the Post Disaster Needs Assessment (PDNA) prepared by Nepal's National Planning Commission.

With the assistance of the World Heritage Centre, an Emergency Assistance project was approved on 21 May by Maria Bohmer, chair of the World Heritage Committee, to address urgent conservation issues, the implementation of which is under way.

At the invitation of Nepal, a UNESCO/ ICCROM/ICOMOS/ICORP/ICOM and Smithsonian Institution assessment mission was carried out at the property on 19 May. They assessed the needs for stabilization and security of cultural heritage. The multidisciplinary team worked towards the establishment of a national team of cultural heritage professionals capable of leading the critical early phase of stabilization. They also helped with on-the-ground implementation of first aid.

The team found that all the sites visited had structural instability resulting in damage or danger to collections. The wall paintings in the Shantipur shrine, for example, had to be transported to a safe temporary location. Strategizing, segregation and storage of architectural fragments needs to be undertaken and structural solutions for temporary stabilization developed.

As many monuments at the sites are in a precarious state, in June the UNESCO Office in Kathmandu expressed the hope that any decision to reopen certain monuments be re-examined.

Given the enormous importance of cultural heritage to the tourism economy of Nepal, UNESCO considers that the future rebuilding programme should incorporate ways for visitors to see and understand work in progress. It has recommended that the rebuilding and conservation work be part of a wider sustainable development strategy that aims to revitalize the economy of the nation.

Damage to Patan and Basantapur towers, Kathmandu Valley (Nepal).

Action on Great Barrier Reef

The unanimous decision by the World Heritage Committee at its 39th session to support efforts to preserve the Great Barrier Reef (Australia), demonstrated how civil society and government can work together to protect one of the world's most iconic places.

The Great Barrier Reef is a site of remarkable variety and beauty on the north-east coast of Australia. It contains the world's largest collection of coral reefs, with 400 types of coral, 1,500 species of fish and 4,000 types of mollusc. It also holds great scientific interest as the habitat of species such as the dugong ('sea cow') and the large green turtle, which are threatened with extinction.

The decision is the culmination of over three years of intensive dialogue, which was triggered by negative effects relating to the development of the port of Gladstone, brought to the attention of the World Heritage Committee in 2011.

The Committee welcomed the State Party's efforts, in consultation and partnership with stakeholders, to establish the Reef 2050 Long-Term Sustainability Plan (2050 LTSP) that outlines an overarching vision for the future conservation of the property over the next thirty-five years. This plan sets five-year targets and includes a very ambitious goal of reducing nutrient runoff by 80 per cent by 2025. The Committee has called on the Government of Australia to rigorously implement all its commitments under the 2050 LTSP, including through legislation, to halt the current documented decline in the property.

The Committee decision means that a permanent ban on dumping of dredged material on the World Heritage site will be put into effect. The decision also enhances efforts to substantially reduce port development along the Queensland coast.

An additional AUS$200 million is to be invested in halting and reversing the bad water quality from coastal runoff, which has proved detrimental to the growth and health of coral systems in the reef.

While the Committee welcomed the steps taken by the Government of Australia to put in place this ambitious plan, it called for focus on implementation. The Committee decision requires the government to provide an update on progress by December 2016, in particular to ensure that the plan has sufficient funding.

An overall state of conservation report is required in 2019 when the first positive signs of recovery are expected, in particular concerning the inshore reef systems in the southern two-thirds of the property.

Great Barrier Reef (Australia).

Yemeni sites of Sana'a and Shibam under threat

On 16 July 2015, following a two-day expert meeting held at UNESCO, Director-General Irina Bokova announced an Emergency Action Plan for the Safeguarding of Yemen's Cultural Heritage. The plan responds to the continuing threat the ongoing conflict in the country poses to its tangible and intangible cultural heritage.

In February 2015 a violent conflict erupted in Yemen, causing terrible human suffering and loss of life. Cultural heritage sites were heavily affected, mostly through collateral damage. However, the intentional destruction of ancient tombs was reported to have occurred, for the first time, in Hadramout, in July 2014.

The Director-General called on the international community to support the Action Plan. 'To succeed, this plan must be funded, and it is clear that local government does not have the resources to undertake these efforts alone,' Ms Bokova said. 'I ask you to mobilize your institutions and your contacts to support UNESCO and the Yemeni authorities to implement this action plan,' she added.

All three cultural World Heritage properties in Yemen (Old Walled City of Shibam, Old City of Sana'a, Historic Town of Zabid) are now on the Danger List. The Old City of Sana'a and the historic centre of Saa'da were hit by shelling and gravely damaged.

In deciding to inscribe the Old City of Sana'a, the Committee noted that the property continues to be vulnerable owing to the deteriorating security situation, in combination with ongoing social change, threats of inappropriate development and continuing lack of organizational support and resources for both heritage management initiatives and physical conservation projects.

The neighbourhood of al Qasimi near the famous urban garden of Miqshamat al Qasimi has been seriously damaged. The 12th-century al-Mahdi Mosque and surrounding houses have also been affected and the majority of the colourful, decorated doors and windowpanes characteristic of the city's domestic architecture have been shattered or damaged.

The World Heritage Committee voiced concern over the damage inflicted on this Islamic city of great historic and heritage importance. Situated in a mountain valley at an altitude of 2,200 m, Sana'a has been inhabited for over 2,500 years. In the 7th and 8th centuries the city became a major centre for the propagation of Islam. Its religious and political heritage can be seen in 103 mosques, 14 hammams and over 6,000 houses, all built before the 11th century. Sana'a's many-storeyed tower-

Old City of Sana'a (Yemen).

houses built of rammed earth add to the beauty of the site, inscribed on the World Heritage List in 1986.

The Committee decided that the Old Walled City of Shibam was under potential threat from the ongoing armed conflict, which compounds safeguarding and management problems already observed at the site, such as significant threats from natural elements, physical changes and a lack of organizational support and material resources for physical conservation projects.

The Committee therefore decided that placing the property on the Danger List could help to reinforce international mobilization for the safeguarding of the site.

Surrounded by a fortified wall, the 16th-century city of Shibam is one of the oldest and best examples of urban planning based on the principle of vertical construction. Its impressive tower-like structures rise up from a cliff and have given the city the nickname of 'Manhattan of the desert'. It was inscribed on the World Heritage List in 1982.

Hatra (Iraq) threatened by armed groups

Hatra (Iraq).

The World Heritage property of Hatra has been inscribed on the Danger List because of damage inflicted to the site by armed groups. The Committee considered that the optimal conditions are no longer present to ensure the conservation and protection of the Outstanding Universal Value of the property and that it is threatened by both current and potential danger. It also expressed great concern about the absence of information on the state of conservation of the property.

Hatra, a large fortified city under the influence of the Parthian Empire and capital of the first Arab Kingdom, withstood invasions by the Romans in AD 116 and AD 198 thanks to its high, thick walls reinforced by towers. The remains of the city, especially the temples where Hellenistic and Roman architecture blend with Eastern decorative features, attest to the greatness of its civilization.

Los Katíos National Park (Colombia) removed from Danger List

The Committee decided to remove Los Katíos National Park from the Danger List due to significant improvements in the management of the property and in recognition of steps taken by the national authorities to reduce illegal extraction of timber and overfishing.

The site had been placed on the List in 2009 at the request of the Colombian Government to handle threats to its protection, notably deforestation, unauthorized settlements, illegal fishing and hunting.

Extending over 72,000 ha in north-western Colombia, Los Katíos National Park was inscribed on the World Heritage List in 1994. It comprises low hills, forests and humid plains. It has an exceptional level of biodiversity with several threatened animal species and numerous endemic plants.

The Committee praised the Colombian Government's efforts and said the site was a best practice example of how the Danger List can serve to mobilize international cooperation to safeguard a World Heritage property.

Los Katíos National Park (Colombia).

Corps established to strengthen security in DRC national parks

The World Heritage Centre congratulates the Democratic Republic of the Congo (DRC) for the establishment of a Corps with the aim of securing national parks. On 15 June 2015 the DRC published decree No.15/012 on the establishment of a Corps in charge of securing national parks (Corps en charge de la sécurisation des Parcs Nationaux, or CorPPN) and related nature reserves.

The CorPPN will ensure the protection of national parks and nature reserves, and support anti-poaching efforts and the fight against wildlife crimes throughout the country. The new institution will be placed under the authority of the Ministry of National Defense, Tourism and the Environment, and coordinated by the Congolese Institute for Nature Conservation (Institut Congolais pour la Conservation de la Nature – ICCN). CorPPn staff members will come from the national army, police, specialized security services, conservators and ICCN guards. Brigades will be deployed in the five World Heritage sites of the DRC: Kahuzi-Biega National Park, Garamba National Park, Salonga National Park, Virunga National Park and Okapi Wildlife Reserve; as well as national parks of Maiko, Upemba, Lomami and Kundelungu.

This decision falls within the framework of the implementation of the Kinshasa Declaration, signed by the Director-General of UNESCO and the Prime Minister at a high-level meeting in 2011. In the Declaration, Congolese authorities committed to, among other actions, implement corrective measures, concerning security at the sites, the fight against commercial poaching and the illicit exploitation of natural resources.

'We hope that the adoption of the decree will allow for improved management of World Heritage properties and national parks of the Democratic Republic of the Congo,' stated Edmond Moukala, Chief of the Africa Unit at the World Heritage Centre. 'The establishment of the Corps will enable security to be restored at the sites. Insecurity is one of the main factors affecting World Heritage properties and their Outstanding Universal Value, also putting in danger populations and ICCN staff,' he added.

CorPPn will help to combat the steady rise of poaching, which mostly affects African elephants and rhinos and continues due to growing illegal trade in wildlife fauna and flora-species. Intensive cooperation is needed to ensure effective action against these threats to the integrity of World Heritage sites, and to fight this scourge affecting several Member States in Africa.

Virunga National Park (Democratic Republic of the Congo).

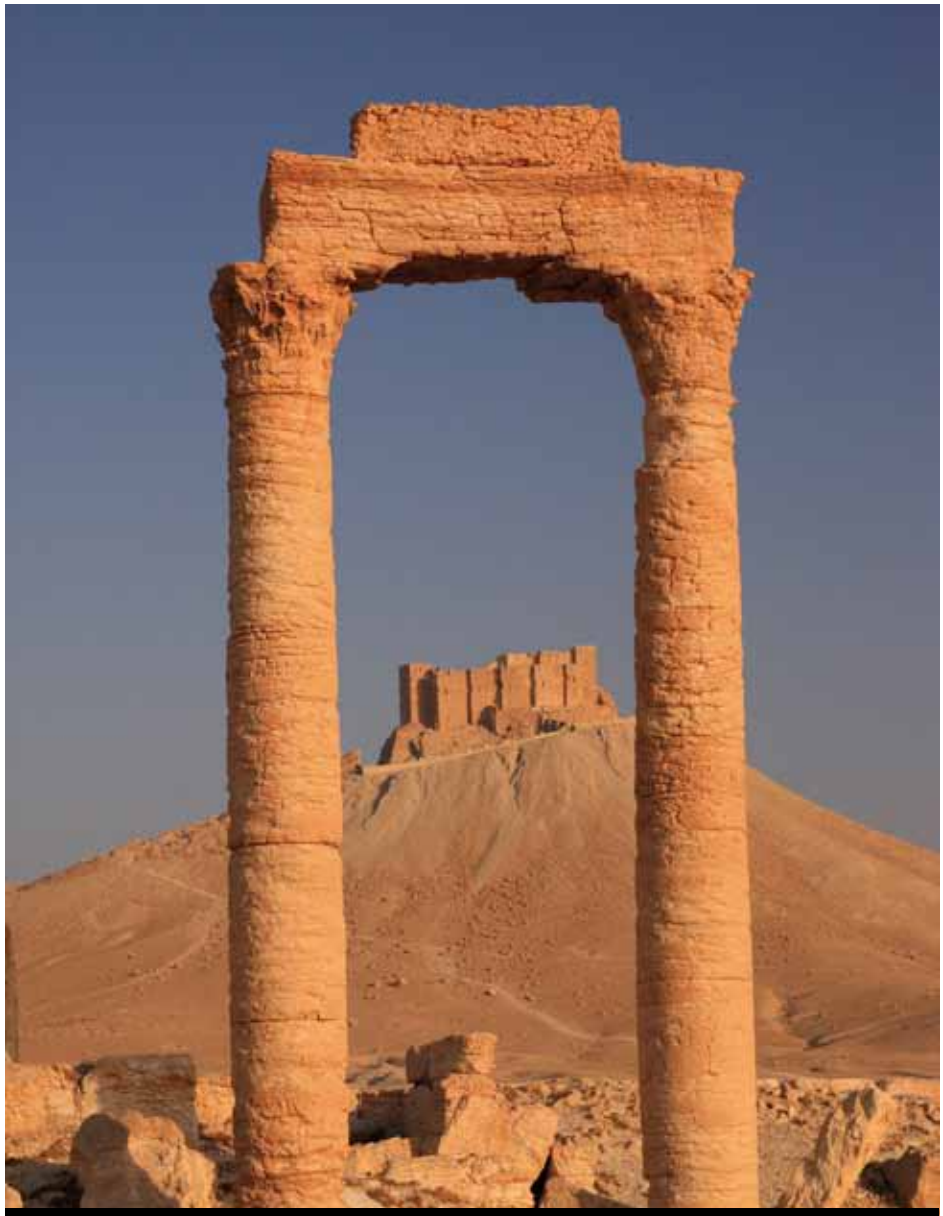
Recent attacks and destruction of Syrian cultural heritage

On 11 October, UNESCO received reports of major destruction of several historic buildings in the ancient village of Shinshara in the Jebel Zawiye. The site consists of baths and houses, and includes a fourth-century church and a convent dating from the sixth century. It is part of the Ancient villages of Northern Syria heritage site, inscribed on the World Heritage List in 2011.

The destruction adds to the long list of damage to heritage sites in Syria.

The damage includes a devastating series of attacks on heritage sites such as the Arch of Triumph in Palmyra, a civil monument two thousand years old and symbol of the city also inscribed on the World Heritage List, which was destroyed on 5 October. Built by Septimius Severus between 193 and 211 AD, the Arch of Triumph was a symbol of the city, whose image has traveled around the world. A masterpiece of civil architecture and urban planning, it was topped with geometric and floral ornaments, and marked the junction between the immense colonnade more than one kilometer in length and the Temple of Bel, itself destroyed on 30 August 2015. The Temple of Bel was one of the most important 1st century CE religious monuments in the Middle East and a construction unique in its design.

The ancient temple of Baalshamin, an iconic part of the World Heritage site of Palmyra, was blown up on 23 August. Its cella, or inner area, was severely damaged, and followed by the collapse of the surrounding columns. Baalshamin temple was built nearly 2,000 years ago, and bears witness to the depth of the pre-Islamic history of the country. In June 2015, there was damage to funeral towers in addition to previous damage to the famous Lion Statue of Athena, located at the entrance of the museum of Palmyra. The Lion Statue of Athena, a unique piece of more than three meters high, represents a feline protecting an antelope between its legs. It represents a protective figure of the ancient city and its people, and a symbol of the protection that the strong owes to the weak.



Site of Palmyra (Syrian Arab Republic), before its partial destruction in September 2015.

Following the latest destruction of Palmyra, UNESCO Director-General Irina Bokova stated, 'This new destruction shows how extremists are terrified by history and culture – because understanding the past undermines and delegitimizes their claims – and embodies an expression of pure hatred and ignorance. Palmyra symbolizes everything that extremists abhor --cultural diversity, dialogue between cultures, the encounter of peoples of all origins in this caravan city between Europe and Asia.

Despite criminal relentlessness, violent extremists will never be able to erase history, nor silence the memory of this site that embodies the unity and identity of the Syrian people. Each new destruction should encourage us to share further knowledge of the significance of this heritage in museums, in schools, in the media. This is part of saving the city, and the global fight against the cultural cleansing that has plagued the Middle East. I commend the professors, journalists, associations, cultural professionals and all citizens who participate in this effort to help transmit the history of Palmyra to future generations.'

Mechtild Rössler appointed Director Division for Heritage and World Heritage Centre

Mechtild Rössler has been appointed Director of the Division for Heritage UNESCO Culture Sector and the UNESCO World Heritage Centre.

An expert in both cultural and natural heritage and the history of planning, Ms Rössler was appointed in 2013 to the post of Deputy Director of the World Heritage Centre. Since 2014, as Deputy Director of the Division for Heritage, her tasks included overseeing teams of the Cultural Heritage Treaty Section in charge of three international Conventions: The 1954 Convention for the Protection of Cultural Property in the Event of Armed Conflict, the 1970 Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property and the 2001 Convention on the Protection of the Underwater Cultural Heritage as well as Museums. She also managed the team of the History, Memory and Dialogue Section (HMD) dealing with the Slave Route, Silk Road Platform and the UNESCO Sharjah Prize for Arab Culture.

Dr Mechtild Rössler has a degree in cultural geography from Freiburg University (Germany) and a Ph.D. from the Faculty for Earth Sciences, University of Hamburg (Germany) in 1988. She joined the CNRS at the Research Centre of the "Cité des Sciences et de L'Industrie" (Paris, France) in 1989 and worked in 1990/91 as a visiting scholar on geography, area research and spatial planning at the University of California at Berkeley, USA, in the Department of Geography. In 1991 she started working at UNESCO Headquarters in Paris in the Division for Ecological Sciences and transferred in 1992 to the newly created UNESCO World Heritage Centre. She held different positions including as Programme Specialist for Natural Heritage (1993-2001), Chief of Europe and North America (2001-2010), Chief of the Policy and Statutory Meeting Section (2010-2013) and Deputy Director. She has published and co-authored 13 books and more than 100 articles, including *Many voices, one vision: the early history of the World Heritage Convention* (together with Christina Cameron, 2013). She follows Kishore Rao who retired as Director in August 2015.

Mechtild Rössler, Director of the Division for Heritage and UNESCO World Heritage Centre.

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Young people face sustainable challenges

The World Heritage Young Experts Forum 2015, Towards a Sustainable Management of World Heritage Sites, held from 18 to 29 June 2015 in Koblenz and Bonn (Germany), brought to light the important role that young people can play in supporting sustainable management as a key strategy to ensure continuing recognition and appreciation of World Heritage. The event brought together youth representatives from thirty-two States Parties.

In order to develop a deeper understanding of the World Heritage Convention and the workings of the Committee, the youths analysed the implementation of the Convention at two different German World Heritage sites. The participants had the opportunity of hands-on experience at the sites in terms of conservation and maintenance, and learned to face the challenges and potential impacts of sustainable management of the sites during a series of workshops. They held discussions with international heritage experts and were able to attend and assist their delegations for one to four days.

A highlight of the Forum was the creation of a youth model of a plenary debate of the World Heritage Committee, and a recommendation to States Parties

A new feature activity for recent forums is the Youth Model of the World Heritage Committee, an educational simulation drawing the young people's attention to heritage preservation and promotion and how the World Heritage Committee works.

© German Commission for UNESCO / Kolja Matzke

to promote this type of simulation among young people in their respective countries.

The young delegates drafted and presented a declaration, Towards a Sustainable Management of World Heritage Sites, during the official opening ceremony of the 39th session of the Committee. This declaration confirmed their commitment to youth participation in heritage management and support for the creation of measures towards promoting their initiatives at national level. It also called for new structures among young experts to share valuable knowledge and experiences gained from youth-led initiatives, linking them to the community of heritage professionals.

The Young Experts Forum also insisted on the vital importance of linking local communities to young people for sustainable management, and called on States Parties to further integrate World Heritage educational programmes in national curricula.

The declaration emphasized the importance of establishing means and mechanisms to promote youth representation within the National Commissions for UNESCO and asked the World Heritage Committee to encourage States Parties to promote local community engagement, including that of youth, as an integral part of the management plans to be monitored in Periodic Reporting. It noted that the Committee's support would contribute to increasing the pool of resources and experiences in a youth networking platform.

World Heritage meets its private partners

During the 39th session of the World Heritage Committee, a World Heritage partners' event and panel discussion, hosted by the German television Deutsche Welle, provided a platform for discussing the contributions of private sector partners to World Heritage conservation and promotion activities.

Following a successful first edition in Doha (Qatar) in 2015, the event allowed partners to share experience and best practices as well as meet Committee members and representatives of heritage authorities from States Parties attending the session.

Recognizing the increasing importance of involving the private sector in preservation of World Heritage sites, the panel session was an opportunity to present models for successful partnerships in support of World Heritage, reach out to companies and explore new opportunities of cooperation.

During the presentations, Takayuki Aikawa, General Manager, Corporate Advertising and Sponsorship Group at Panasonic, gave an overview of the numerous activities carried out since the beginning of the partnership between UNESCO and Panasonic over the last four years to raise awareness and educate young people.

Anouk von Hochmeister, press contact for the family-owned company Kaercher Germany, the world's leading provider of cleaning technology, gave a presentation on how its cultural sponsorship programme, has been providing free heritage-sensitive cleaning to over 100 monuments worldwide in the last thirty-five years, including a number of World Heritage sites.

Michael Firnhaber, who is in charge of Strategic Partner Development at Google Germany, presented the latest opportunities in the digital world offered by the Google Cultural Institute which brings together millions of artefacts, heritage sites and their stories in a 'virtual museum'.

Vera Weber, President of Fondation Franz Weber, presented the work of the Swiss environmental organization. With four decades of experience in the protection of endangered fauna, the organization is now partner in the preservation of natural World Heritage sites, particularly in Africa.

John Delaney, Senior Vice President of Seabourn, the world's leading small ship cruise line, and a partner supporting the World Heritage and Sustainable Tourism Programme, presented a new initiative with OurPlace, a long-standing UNESCO partner in the field of World Heritage photography. Seabourn and OurPlace, represented by its executive director Geoff Steven, have joined efforts to develop deeper appreciation and understanding of the many World Heritage sites among Seabourn's destinations.

An animated debate followed the panel presentations, with discussions centred on how the private sector could be more involved in the support and awareness-raising of African World Heritage sites. There was also considerable interest in the importance of new communication technologies, which allow people to develop deeper insight and understanding of outstanding sites, otherwise difficult to access.

Former World Heritage Centre Director Kishore Rao and the panel of partners, at the partners' event in Bonn.

#Unite4Heritage: celebrating cultural heritage and countering extremism

#Unite4Heritage, the UNESCO-led campaign to celebrate cultural heritage and counter extremism, has been running for six months and is a testament to the passion of people all over the world to stand up against extremist rhetoric and celebrate our shared heritage.

Since its launch in March 2015, the campaign has become a 'conversation of record' among organizations and the general public alike. UNESCO has published more than 400 messages and posts on social media that have been viewed millions of times. Thousands of people have so far celebrated the places, objects and cultural traditions that matter to them.

The initiative has also been supported strongly by UNESCO's Field Offices in the Arab Region, holding events and training sessions, and working with schools and youth groups to ensure young people are included in the conversation. Public concerts were held in Erbil (Iraq) and Amman (Jordan), for example, featuring performances from local celebrities. A photo and story contest was launched in June, encouraging people to post examples of their cultural heritage. The top twenty of these will be published in an upcoming issue of World Heritage.

The #Unite4Heritage campaign was launched in Baghdad by the Director-General of UNESCO in response to the unprecedented attacks on cultural heritage by extremist groups. It aims to build an alternative narrative based on cultural diversity and intercultural dialogue, to counter extremist propaganda that calls for the extinguishing of anything that does not fit within their narrow vision of society.

Join the conversation online by searching for #Unite4Heritage on Twitter, Facebook or Instagram.

Visit the campaign website at http://www.unite4heritage.org/

#Unite4Heritage campaign in Jordan.

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Sustainable tourism: a goal in Africa

The second phase of practical training in Sustainable Tourism Capacity Building in Four African Heritage Destinations is under way within the framework of the World Heritage and Sustainable Tourism Programme.

The project, run by the World Heritage Centre and the African World Heritage Fund and funded by the Government of Flanders, uses a capacity-building toolkit developed by the World Heritage Centre to help site managers to manage tourism more sustainably (http://unescost.cc.demo.faelix.net/).

The project aims to help each site to develop a sustainable tourism strategy using the guidance tools in order to enhance broad stakeholder engagement in developing and managing tourism. It is structured in three phases: initiation workshops, follow-up workshops and specialized workshops. Phase two took place at three of four African Heritage Destinations in June 2015.

Participants from Mosi-oa-Tunya / Victoria Falls, a transboundary World Heritage site in Zambia and Zimbabwe, met in Livingstone (Zambia) from 11 to 12 June 2015. A second workshop with participants from Lake Malawi National Park was held in Cape Maclear (Malawi) from 15 to 16 June. Participants from Maloti-Drakensburg Park, a mixed transboundary site in South Africa

Mosi-oa-Tunya / Victoria Falls (Zambia / Zimbabwe).

© Tee La Rosa

and Lesotho, met at Cathedral Peak (South Africa) from 19 to 20 June. The fourth destination site, Ngorongoro Conservation Area (United Republic of Tanzania) has completed the first stage of the programme.

Each workshop was attended by site managers, tourism managers, World Heritage programme specialists from Paris headquarters, representatives of regional offices and the African World Heritage Fund, as well as by James Rebanks, a UNESCO sustainable tourism expert.

In all three meetings the results of the initiation workshops were reviewed, while each country presented a progress report. Consultations were held with stakeholders and revealed additional objectives and strategy actions. The case study of Denmark's Wadden Sea tourism strategy was presented at all three workshops as a template to guide the creation of a strategy for the different destinations.

Each group also reviewed the Statement of Outstanding Universal Value of their sites with a view to creating a more 'tourist friendly' version that could easily be transformed into marketing statements about the destination, creating a vision and overarching goals for their strategy. Actions and action planning for each objective were also identified and developed.

The workshops were able to bring together stakeholders in order to think strategically about tourism in an entire destination, while testing out the capacity-building 'How To' guides.

The third phase of the workshops will be held in September/October 2015.

In Memoriam: Dr Ronald Van Oers

The World Heritage Centre announces with profound sadness the passing on 28 April 2015, at the age of 50, of Dr Ronald Van Oers, Vice Director of the World Heritage Institute of Training and Research for Asia and the Pacific Region, a UNESCO Category 2 Centre based in Shanghai (China), and a colleague of the World Heritage Centre since 2000.

Ron was a brilliant professional in the field of heritage. He had a wealth of academic experience in teaching and research, including as a Research Fellow at Delft University of Technology (Netherlands).

His passion and rich experience contributed to the successful development and coordination of several World Heritage related thematic programmes, among which the Programme on Modern Heritage, the World Heritage Programme for Small Island Developing States (SIDS), and the World Heritage Cities Programme. He also spearheaded the international effort to develop new guidelines for urban conservation. The UNESCO Recommendation on the Historic Urban Landscape (2011) was developed and adopted thanks to his initiative, commitment and persistence. He advocated with conviction and enthusiasm its application worldwide.

His numerous publications in the field of urban heritage will continue to serve for many heritage professionals as a valuable reference.

Ron loved working in the field with projects and people, and travelling from the most urbanized cities to the most remote islands.

Ron was a dear friend and will be greatly missed by all colleagues at the World Heritage Centre and UNESCO, as well as by the World Heritage community, which has looked to him for guidance and inspiration over the years.

The World Heritage Centre expresses its deepest condolences to Ron's wife, family, friends and colleagues.

Dr Ronald Von Oers.

The Case of the Lost World Heritage, 15th episode

A series of World Heritage comic strips featuring Rattus Holmes and Dr Felis Watson, the famous pet detectives of Sherlock Holmes and Dr Watson, will soon be published. The sleuths save the World Heritage sites from evil Moriarty, who plans to steal them for an interplanetary theme park. They are part of a series co-published by UNESCO and Edge Group, UK, which includes other adventures of Holmes and Watson in *Rattus Holmes in the Case of the Spoilsports* (about doping in sports) and *Rattus Holmes and the Case of the World Water Crisis*. It will also be available on the World Heritage Centre website http://whc.unesco.org. For more information about Edge Group and their work, write to edgesword@yahoo.com.

The story continues in the next issue of *World Heritage*...

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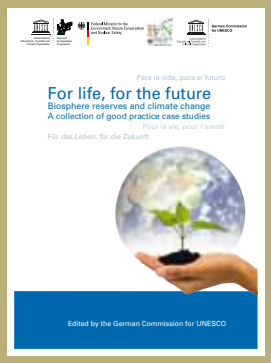

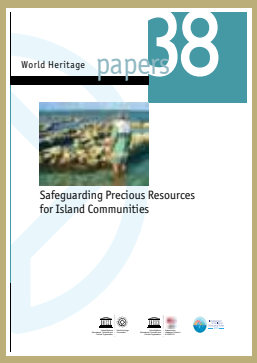

Poverty Point: Revealing the Forgotten City

Jenny Ellerbe and Diana M. Greenlee
Louisiana State University Press
English only
http://lsupress.org/books/detail/poverty-point/

The settlement of Poverty Point, occupied from about 1700 to 1100 BC and once the largest city in North America, stretches across 345 acres in northeastern Louisiana. The structural remains of this ancient site – its monumental earthworks, semicircular ridges, and vacant plaza – were inscribed on the World Heritage List in 2014. This imaginative and informative book explores in full Poverty Point's Late Archaic society and its monumental achievements. Jenny Ellerbe's stunning black and white photography reflect the mystery of the site, and archaeologist Diana M. Greenlee discusses the most recent archaeological findings, explaining what past excavations have revealed about the work involved in creating the mounds and the lives of the people who built them.

For life, for the future: Biosphere reserves and climate change A collection of good practice case studies

Edited by the German Commission for UNESCO
English only
https://www.unesco.de/file-admin/medien/Dokumente/Wissenschaft/Biosphere_reserves_climate_change_web_9MB.pdf

This report addresses biosphere reserves and their ability to take up important challenges, such as loss of biodiversity, climate change, tourism and natural disaster prevention. It contains twenty-eight case studies drawn from an international survey and good practices from UNESCO biosphere reserves in Australia, Austria, China, Colombia, Costa Rica, Cuba, Czech Republic, Ethiopia, Germany, Kenya, Mexico, Peru, Republic of Korea, Russian Federation, Senegal, Slovenia, South Africa, Spain, Sweden and the United States, which demonstrate what biosphere reserves are already doing in this policy field.

International Training Course (ITC) on Disaster Risk Management of Cultural Heritage

Ritsumeikan University
English only
http://www.rits-dmuch.jp/en/project/itc.html
http://www.sngraphix.biz/aadi/training.html (online version)

Over the past nine years, the World Heritage Centre has cooperated with the Ritsumeikan University (R-DMUCH) in Kyoto (Japan) on its annual International Training Course on Disaster Risk Management of Cultural Heritage. The main contents are a guide to conducting courses in disaster risk management for cultural heritage in urban areas. The training will assist other institutions that might wish to develop a similar initiative in their own context (e.g. Category 2 centres, regional heritage institutions or UNESCO chairs).

World Heritage Paper Series No. 38 Sauvegarder les précieuses ressources des communautés insulaires (Safeguarding Precious Resources for Island Communities)

UNESCO World Heritage Centre
French version
http://whc.unesco.org/fr/series/38/

Small Island Developing States (SIDS) are islands of the Caribbean Sea, the Atlantic, Indian and Pacific Oceans. They are some of the most beautiful places on Earth, with atolls of white sand beaches, mountain ranges, historic ports and towns, and agricultural landscapes. This publication is unique within the World Heritage Paper Series in its focus on the Small Island Developing States in all subregions, and the links between SIDS. It also offers various thematic papers addressing these concerns and challenges to World Heritage in SIDS, aiming to inform and guide decision-makers, professionals and local communities in their endeavours to create synergies between improving living conditions and caring for the environment, both natural and manmade. Originally published in English, this French version is now available.

World Heritage Paper Series No. 41 Human Origin Sites and the World Heritage Convention in Eurasia, Volumes I and II

UNESCO World Heritage Centre
English only
http://whc.unesco.org/en/series/41/

The purpose of these two volumes is to present the reader with a panorama of human origins in Eurasia, by bringing together key papers written by leading scientists in the domain of research into human origins. The first volume covers the topic of human origins in Eurasia, while the second focuses entirely on the case of the Swabian Jura Aurignacian, particularly important in relation to some of the major research issues surrounding the dispersal of modern humans on the continent. The perspective of this publication is on Eurasia as a whole, transcending modern, political, cultural and regional frontiers, and thus allows a greater and more profound study of prehistoric archaeological sites.

Climate Change 2014 – Impacts, Adaptation and Vulnerability: Part A: Global and Sectoral Aspects

Working Group II Contribution to the IPCC Fifth Assessment Report
Cambridge University Press
English only
http://www.cambridge.org/

This latest report of the Intergovernmental Panel on Climate Change (IPCC) again forms the standard scientific reference for all those concerned with the environmental and social consequences of climate change, including students and researchers across the natural and social sciences, professionals in medicine and law, and practitioners in environmental planning, resource management, development, disaster risk reduction, and adaptation. It provides relevant material for decision makers and stakeholders at all levels of government, NGOs, and the private sector worldwide. This assessment provides information on: current and future impacts of climate change; risks of climate change impacts for the health and security of people and ecosystems; prospects for adaptation, including opportunities, barriers, and financing; and more.

Sourcebook of Opportunities for Enhancing Cooperation among the Biodiversity-related Conventions at National and Regional Levels

United Nations Environment Programme (UNEP)
English only
Available for download at wcmc.io/Sourcebook

The aim of the UNEP Sourcebook is to provide national focal points of biodiversity-related conventions and other stakeholders with options to achieve enhanced implementation of the conventions, including the World Heritage Convention, through strengthening cooperation. The UNESCO World Heritage Centre, World Heritage focal points and other national and international experts have contributed to the sourcebook by presenting case studies. These include conservation of Madagascar rosewood and African elephants; best practices of integrated management of protected areas with overlapping international designations; capacity-building and regional support to World Heritage Periodic Reporting; development of national strategic agendas through working groups and coordination bodies among the focal points, as well as joint national efforts to identify and collect data for reporting.

Calendar

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3 to 18 November

38th session of the General Conference of UNESCO Member States.
UNESCO Headquarters, Paris.
Information: www.unesco.org

18 to 20 November

20th session of the General Assembly of States Parties to the World Heritage Convention.
UNESCO Headquarters, Paris.
Information: r.veillon@unesco.org

30 November to 4 December

10th session of the Intergovernmental Committee for the Safeguarding of the Intangible Cultural Heritage.
Windhoek, Namibia.
Information: e.constantinou@unesco.org

1 to 3 December

International Conference on Urban Conservation: Role of the Recommendation on the Historic Urban Landscape in safeguarding modern heritage in the Arab States.
Kuwait City, Kuwait.
Information: m.ziane-bouziane@unesco.org

8 to 9 December

6th Meeting of the Parties to the Second Protocol of 1999 to the Hague Convention.
UNESCO Headquarters, Paris.
Information: j.hladik@unesco.org

10 to 11 December

10th meeting of the Committee for the Protection of Cultural Property in the Event of Armed Conflict.
UNESCO Headquarters, Paris.
Information: j.hladik@unesco.org

14 to 16 December

9th session of the Intergovernmental Committee for the Protection and Promotion of the Diversity of Cultural Expressions.
UNESCO Headquarters, Paris.
Information: r.roca-hachem@unesco.org

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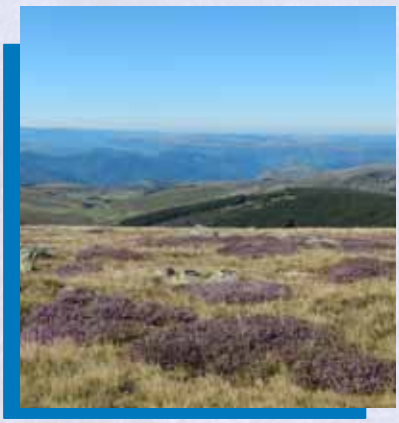
The Causses and Cévennes, a cultural landscape that is a living picture of Mediterranean

www.causses-et-cevennes.fr

The Causses and Cévennes have been included on the UNESCO World Heritage list since 2011 as an example of a cultural landscape that is a living picture of Mediterranean agropastoralism. This territory in the South of France extends over four departments (Aveyron, Gard, Hérault and Lozère), covering an area of 3,000 km2. Its magnificent scenery includes mountains, valleys, limestone plateaux (the Causses) and gorges, which testify to a successful relationship, which has existed for thousands of years and continues to this day because of its culture of agropastoralism. The exceptional universal value of the Causses and Cévennes is illustrated in how agropastoral activity, which combines the breeding of herds and flocks and the production of foodstuffs and cereals to complement their feeding.



The Causses and Cévennes territory presents almost all of the types of pastoral organisation encountered around the Mediterranean. Because of their discreet and modest human engineering achievements, the inhabitants of the Causses and Cévennes have adapted to the climatic and geographical restrictions of the area, producing vast open spaces, a remarkable biodiversity and an ingenious agricultural heritage. This has led to the discovery of much evidence of how this landscape was built over thousands of years, including the lavognes (washing places), drailles (cattle tracks), cazelles (drystone huts), sheepfolds, caves and hydraulic systems found all over le territory.

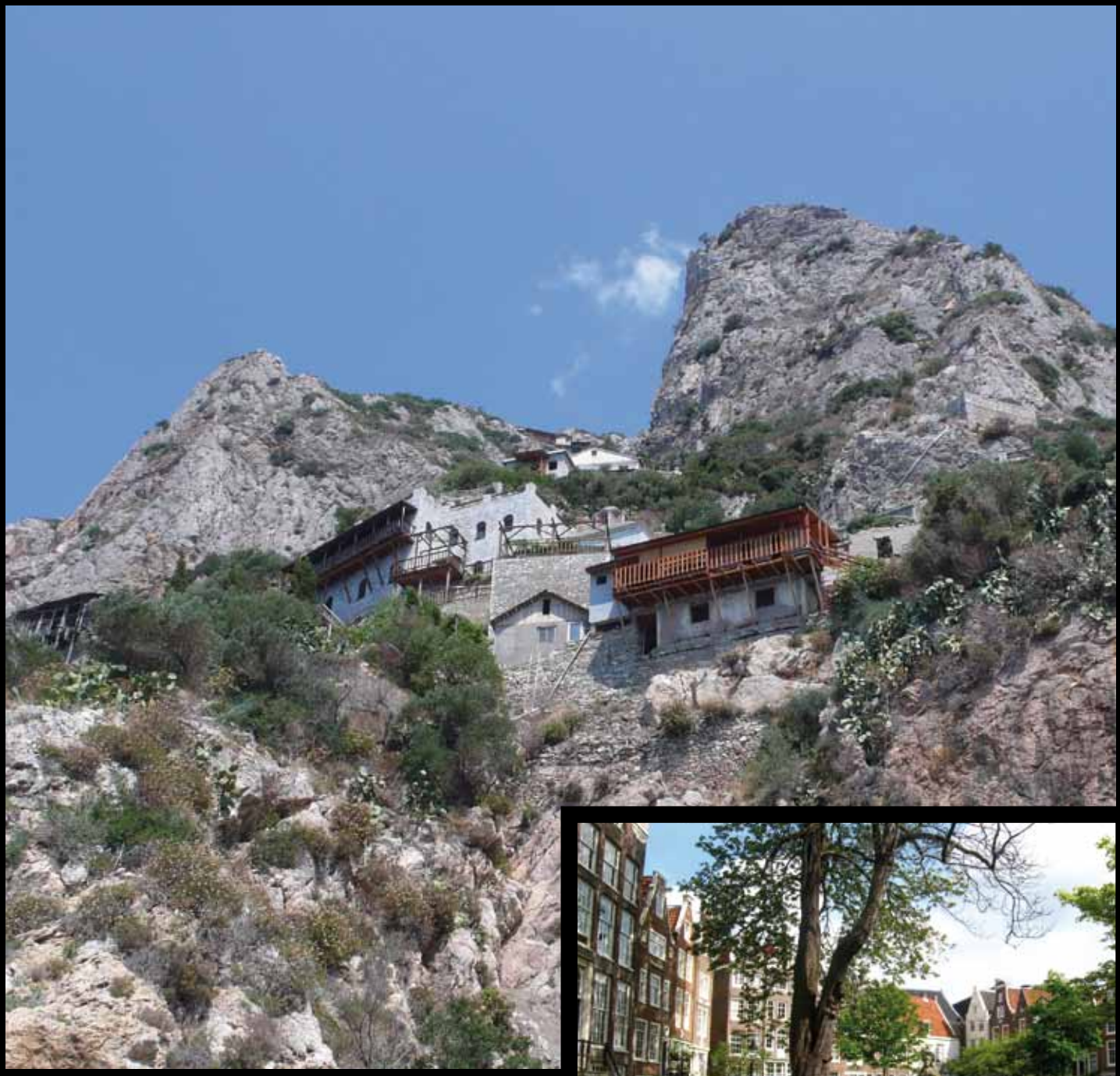
Being entered in the list of world human heritage carries recognition of the hard work of the inhabitants who have built this cultural landscape. It reveals their culture and their knowhow in making products (meat, cheese, leather &c) and indeed landscapes of excellent quality.

Entente interdépartementale des Causses et des Cévennes
9 rue Célestin Freinet
48400 FLORAC
FRANCE(+33) 466 483 123

Organisation des Nations Unies pour l'éducation, la science et la culture

Les Causses et les Cévennes, paysage culturel de l'agro-pastoralisme méditerranéen inscrit sur la Liste du patrimoine mondial en 2011

C&C Les Causses & les Cévennes paysage culturel de l'agro pastoralisme inscrit sur la Liste du patrimoine mondial



Mount Athos (Greece).

In Focus: World Heritage and gender

This issue will explore how gender plays a role in the management and conservation of World Heritage. Case studies include Mount Athos (Greece) – forbidden to women and children; Sacred Sites and Pilgrimage Routes in the Kii Mountain Range (Japan); Flemish Béguinages (Belgium) – *béguines* were women who dedicated their lives to God without retiring from the world; and Tombs of Buganda Kings at Kasubi (Uganda).

Flemish Béguinages (Belgium).

An interview with Farida Shaheed, Special Rapporteur in the field of cultural rights at the UN Office of the High Commissioner for Human Rights, throws light on gender equality and human rights in cultural heritage conservation.

Next Issue

Built Before

TEXAS was TEXAS

OR THE UNITED STATES WAS UNITED

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