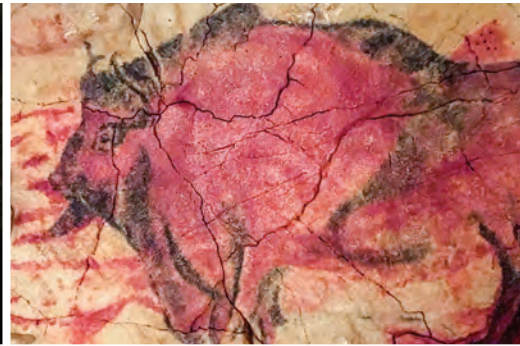
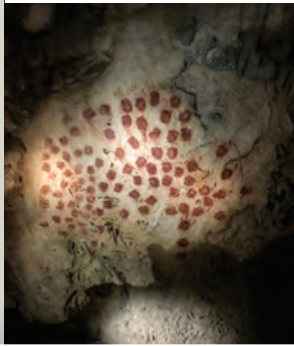


**NETWORKING  
FOR ROCK ART**  
Global Challenges,  
Local Solutions



Edited by  
Neville Agnew  
Janette Deacon  
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THE GETTY CONSERVATION INSTITUTE

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LOS ANGELES

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The Getty Conservation Institute (GCI) works internationally to advance conservation practice in the visual arts—broadly interpreted to include objects, collections, architecture, and sites. It serves the conservation community through scientific research, education and training, field projects, and the dissemination of information. In all its endeavors, the GCI creates and delivers knowledge that contributes to the conservation of the world’s cultural heritage.

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Cover images:

Top: Painted Rock, a horseshoe-shaped sandstone feature in central California’s Carrizo Plain, features numerous paintings on the walls of its interior. Its paintings have suffered greatly from disrespectful visitors, primarily in the first half of the twentieth century. Painted Rock was the focus of an on-site training course for rock art conservation, organized by Getty Conservation Institute, in 1991. See Chapter 3.1 for more information. Image: Tom McClintock.

Middle Right: The Cave of Altamira outside Santillana del Mar, Spain, was discovered in 1868. After decades of heavy visitation, authorities recognized the cave’s delicate climate was being impacted to the detriment of the paintings’ preservation. It was closed to the public in 1977 and a replica (pictured) was built for visitors, which opened in 2001. See Chapter 4.2 for more information. Image: Tom McClintock.

Bottom: The White Shaman Mural is one of the best preserved and most narratively elaborate paintings in North America. Located in the Lower Pecos River Region of southwest Texas, the site is currently managed by the Witte Museum in San Antonio. See Chapter 3.3 for more information on the rock art of the Lower Pecos. Image: Tom McClintock.

Middle Left: The Chauvet-Pont d’Arc Cave was closed immediately following its discovery in 1994, a decision that was based on the impacts observed at other sites like Altamira and Lascaux. At the time of discovery, the paintings yielded some of the earliest known radiocarbon dates for rock art, roughly 32,000 years old. A facsimile of the cave and its paintings was opened to the public in 2015. Pictured here is the replica of the “grand panneau des Points-Paumes,” nearly one hundred ochre palm prints evoking the shape of a bison. See Chapters 2.4, 4.1, and 4.7 for more information. Image: Tom McClintock.

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## 4.2 Preventive Conservation at the Cave of Altamira, Spain

*Pilar Fatás Monforte*

Altamira's rock art is extremely fragile heritage. While this is an intrinsic feature of all rock art expressions, it is further aggravated in the cave of Altamira because of both natural and anthropic conditions. Altamira has a geologically unstable formation where rocks that have been sinking and falling rocks since Prehistory; it is a cave that is in the process of collapsing and gradually disappearing through natural evolution. For this reason, after it was discovered, several interventions were performed which did improve its stability but also irreparably changed the cave's natural dynamic, prompting serious conservation problems with its rock art. These changes in its "architecture" were joined by the interventions to prepare it to welcome tourist visits in the first half of the twentieth century. These visits, more than 170,000 visitors per year in the 1970s, led to a chronically ill cave where all we can do today is apply preventive conservation measures that slow down the deterioration processes.

When the tourist overexploitation was brought to an end in 1978, the greatest priority for the cave of Altamira has been to protect it and, to that end, a series of multidisciplinary research projects has been undertaken. Over the course of the following forty years, the cave has been characterized physically, chemically, biologically, and geologically in an effort to gain a detailed understanding of the deterioration processes. In parallel, preventive conservation strategies have been put into place to improve its preservation: delimiting the protected area on its surface (allowing for measures like eliminating the presence of pollutants in the water that seeps in and vibrations caused by productive activities and traffic), removing artificial elements inside such as handrails and lights, and restricting access for visitors and for researchers.

In 2014, a new comprehensive diagnosis of its state of conservation was undertaken with the goal of equipping the cave with its own Preventive Conservation Plan (PCP) while also identifying the impact of the human presence on the cave's conservation conditions (fig. 4.9). The PCP defines and implements systematic working methods (measures and

**FIGURE 4.9.** Works in the Polychrome hall of the Cave of Altamira within the framework of the Preventive Conservation Plan. Image: Ministry of Culture and Sports of Spain / IPCE.





actions) to better conserve the cave and its art and describes response mechanisms to situations that endanger this conservation. All of this is based on preventive conservation strategies that act at the source of the risk with the goal of slowing down the deterioration and avoiding or minimizing the loss. The overarching goal is to study the losses in order to apply the most appropriate conservation strategies.

The tracking and control actions stipulated in the PCP are defined in a series of protocols applied by different research teams from either the museum or its partner institutions: environmental and microbiological control, geological-structural stability, and the monitoring of the surface activities in the cave's sphere of influence, among others. The PCP also limits the cave's accessibility and carrying capacity, meaning the amount of time people can stay inside the cave without exceeding the thresholds established by the natural environmental dynamic of the cave, while also bearing in mind the cumulative effect.

The research based on tracking and describing the environmental factors and the anthropic influences on them have enabled us to identify the main active risks in the cave. We can, therefore, identify and address deterioration early by applying the most appropriate solutions. The main risks identified are associated with processes related to water infiltration and condensation, microbiology, and geology. In order to understand and apply conservation measures for these deterioration processes, paint dissolution and other processes have been recorded and quantified, the karst in the cavity has been described in greater detail (at a macro and micro level through geophysics), and the water dynamic on the cave's ceiling has been examined via a study of the micro-basins generated on a photogrammetric model.

Altamira's extremely fragile microbial ecology has also led to two major studies on the behavior and genomics of the bacterial colonies living on the walls and ceiling of the cave. Determining their main source of food has enabled us to implement corrective measures in an effort to lower the arrival of nutrients inside it. Likewise, the stability of the rocky massif at the site is constantly monitored, enabling us to identify and correctly associate any potential rock displacements or the opening of fractures which could pose structural risks to the cave. Preventive conservation criteria are applied which enable us perhaps not to avoid but at least to slow down or minimize the deterioration factors that affect the cave of Altamira. Furthermore, they are applied with sustainability criteria to optimize limited, but necessary, resources and ensure that any interventions remain stable over time.



