Report on the Recommendations given by the World Heritage Committee:
Decision: 44 COM 7B.65

Precolumbian chiefdom settlements with stone spheres of the Diquís

November, 2022
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Ministry of Culture and Youth
Republic of Costa Rica
Summary

This report presents the progress made in complying with the recommendations provided by the World Heritage Committee through Decision 44 COM 7B.65, 44th extended session of the World Heritage Committee, in July 2021, at the serial site “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquís (1453), Costa Rica. “

On specific recommendations, the relationship with the communities surrounding the sites and with the Boruca indigenous communities, which have a historical relationship with those who inhabited the settlements with stone spheres, has continued.

Additionally, the project “Engaging youth from local communities in participatory management and conservation of the Pre-Columbian Chiefdom Settlements with stone spheres of the Diquís”, with an investment from the cooperation of the Government of Germany was completed with success and propitiating participatory management and conservation of the sites.

Concerning the educational activities, they are focused on Heritage Education. During 2019-2022 we can mention educational campaigns with different sectors of local population. The aim is to create inter-institutional links with the organized groups of the community and the region, with the purpose of creating spaces for the interpretation and appropriation of the archaeological, historical, social, cultural and natural heritage present in the World Heritage Site. Information is also provided about a web portal of the declared sites, and visitation data to the museum site of Finca 6 in the last 3 years.

In regard to the buffer zones, the progress in this issue continues to be difficult, since it depends in the development of the Regulatory Plan of the canton of Osa by the local municipality. Nevertheless, new efforts have been made to obtain a specific agreement with owners around the sites of the series.

For the Risk Preparedness and Management Disaster Plans, joint work between the Internal Audit of the National Museum of Costa Rica and the administration of the Visitor Center of the Finca 6 Site-Museum have served as basis to assess the risks associated with each of sites. Additionally, the “Local institutional plan for risk reduction” was prepared and approved by the Administrative Board of the National Museum of Costa Rica in 2020.

The process of consolidating the administrative unit as a program of the General Directorate continues, now with the help of a planning specialist. The contracting of maintenance and surveillance services has been renewed.

Finally, in relation to the execution of Heritage Impact Studies (HIA), there is no further development on the information presented for the HIA of the hydroelectric project. The project continues in an indefinite halt by the government. Concerning the HIA related to the Southern International Airport no decision has been taken by the Civil Aviation Council about the feasibility of the project, but the new government has required the information regarding the potential impact. A decision is expected in the following weeks.

Reports on conservation activities during 2020-2022 are included as annexes. Additional information includes the update of the Management Plan, and the elaboration of the Environmental Management Plan and the Environmental Management Educational Program.
Aerial view of the intervention of sphere B at Finca 6 site.
Decisions adopted at the 44th extended session of the World Heritage Committee

The World Heritage Committee,

1. Having examined Document WHC/21/44.COM/7B,

2. Recalling Decision 42 COM 7B.36, adopted at its 42nd session (Manama, 2018),

3. Welcomes the ongoing efforts by the State Party in developing participatory management mechanisms with local communities and indigenous groups, and encourages the continuation of these initiatives;

4. Commends the State Party on the numerous initiatives related to education and outreach, particularly those related to local and indigenous communities and youth, as an important aspect of the sustainable conservation of the property and awareness-raising on cultural heritage in Costa Rica more broadly;

5. Also commends the State Party on the important improvements to the property’s interpretation, including new signage installations and the expansion of the Visitor Centre, as important steps towards improving visitor experience and appreciation of the property’s Outstanding Universal Value (OUV);

6. Takes note that the approval of buffer zone regulations remains pending with the Osa Municipal Council, that the Risk and Disaster Management Plan is being finalized and that the increase of human and financial resources remains a significant challenge and, therefore, requests the State Party to finalize these pending issues in 2020 as indicated in its report and to notify the World Heritage Centre as soon as completed;

7. Takes note with appreciation of the efforts to formally establish a consolidated and multidisciplinary management unit for the property under the General Direction of the National Museum of Costa Rica, and of the establishment of a High-Level Commission to ensure its adequate protection;

8. Also takes note that there has been no decision taken for several years with regard to the feasibility of the Southern International Airport project, and that a Heritage Impact Assessment will be conducted if the project is to move forward;

9. Further takes note that the Diquis hydroelectric project has been indefinitely suspended by the responsible authorities and that all works related to the project have been halted;

10. Also requests the State Party to keep the World Heritage Centre informed about any changes in the status of these two projects, and to submit any relevant documentation and studies undertaken, in line with Paragraph 172 of the Operational Guidelines;

11. Further requests the State Party to provide further information on the nature and scale of the upgrades planned for the Palmar Sur regional airport located in close proximity to three of the property’s archaeological
sites, in order to determine any possible impacts on the OUV, in line with Paragraph 172 of the Operational Guidelines;

12. Requests furthermore the State Party to submit to the World Heritage Centre, by 1 December 2022, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its

Following the inscription of the serial nomination “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquís” (1453) on the List of World Heritage (Doha, Qatar, June 2014), the World Heritage Committee (WHC) has given several recommendations and requested progress reports on their implementation. The National Museum of Costa Rica, as an entity in charge of the follow-up of the declaration, has complied with these reports in 2015, 2017, 2018 and 2019.

At the extended 44th Meeting of the World Heritage Committee, in Fuzhou, China, Online meeting 16-31 July 2021, reference was made to the documents sent in November, 2018 and November 2019. Despite recognition of the progress accomplished, new recommendations were given since several of the updates provided were not entirely satisfactory. A new report was requested to be sent on December 1st, 2022 (Decision 44 COM 7B.65).

Next, there is a report of the activities that have been performed on each recommendation since 2019, a period affected by the world COVID-19 pandemic, with their different level of accomplishment according with the internal capabilities and external factors:

3. Welcomes the ongoing efforts by the State Party in developing participatory management mechanisms with local communities and indigenous groups, and encourages the continuation of these initiatives;

In November 2018, a cooperative project with the University of Costa Rica, for joint management activities with some of the communities near

Diquis Young Leaders participating in an archeological excavation near Finca 6 site.
the sites was approved. Directed by Dr. Daniela Arroyo Barrantes, it should have extended for two years (Pry01-1588-2019- Contribution to development of the participatory co-management system with local and indigenous communities of the site UNESCO World Heritage Site: “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquís”). However, the adjustments that had to be made due to the Covid 19 pandemic did not allow the execution of the project on the established schedule. For this reason, the project was suspended in May, 2021. The possibility of resuming it in the future remains open.

**Project: Engaging youth from local communities and indigenous peoples in participatory management and conservation of the Precolumbian Chiefdom Settlements with Stone Spheres of the Diquís 2019-2021.**

This project is on line with the objective to create inter-institutional links with the organized groups of the community and the region, with the purpose of creating spaces for the interpretation and appropriation of the archaeological, historical, social, cultural and natural heritage present in the World Heritage Site, and in the Osa region in general.

The project included training, through a series of educational and technical workshops, in the basic concepts of Word Heritage as a reference in the participation and leadership of young people from the communities of Osa and indigenous territories, in the conservation and management of the World Heritage site. The project responds to the concerns of the World Heritage Committee raised by Decisions 42 COM 7B.36 and 40 COM 7B.3, as well as the common goals set by the “Action Plan for World Heritage in Latin America and the Caribbean” (PARALC 2014-2024) adopted in Brasilia in 2014 and endorsed by Decision 38 COM 10B.4 of the World Heritage Committee.

With the support of the German Agency for International Cooperation (GIZ) and the coordination by UNESCO World Heritage Centre Latin America and the Caribbean Unit and the UNESCO-San José Office. Despite some adjustments, due to the impact of the Covid 19 pandemic, several workshops were developed through a non-formal education methodology based on learning techniques through educational dynamics, which allows young people to promote and participate in the management of the property declared World Heritage and to strengthen their soft skills.

This training process that strengthens soft skills will allow facilitators to recommend young people who show greater skills to be empowered as multiplying agents. Work was focused on legal and administrative processes linked to heritage properties’ management and youth leadership, teamwork, community organization, volunteering, self-esteem, communication, skills, projects and conflict resolution. Strengthening soft skills (leadership, teamwork, communication, community organization, group dynamics, projects) are the elements that will allow participants to become multiplying agents and promote knowledge to be replicated in benefit of the protection of the World Heritage property.

The project is geographically focused on the canton of Osa, where the four sites pertaining to the declared World Heritage property are located. The beneficiaries correspond to local districts and indigenous
Workshop with the Diquís Young Leaders.
territories, close to the World Heritage property and who have already participated in some activities related to its management.

A total of 240 young people participated and 90 reached the final activities. The creation of a World Heritage Youth Association was achieved as a product of this project. The project is empowering young people with knowledge and skills in the management of World Heritage properties.

Relation with indigenous communities

In 2019 Boruca authorities invited the conservation team to perform a diagnosis and intervention at the spheres that are in the Boruca town. An intervention was carried out in 2022 at the spheres located in the Community Museum (see Annex 2).

The indigenous communities of Curré and Boruca were included within the scope of the project “Engaging youth from local communities in participatory management and conservation of the Pre-Columbian Chiefdom Settlements with stone spheres of the Diquís” that has an objective the participation of young people in the management and conservation of the sites of stone spheres of the Diquís. Young people from both communities participated in the workshops.

Through the Regional and Community Museums program, we have been collaborating with the indigenous communities of Curré/Yímba and Boruca between 2020 and 2022.

In Curré/Yímba, a fair for the valorization of traditional knowledge was done in conjunction with the Community Museum. These knowledges included wood and gourd carving and uses of medicinal plants. We also collaborated in the construction of learning about archaeological resources, including tours of archaeological sites, and the strengthening of the museographic design of the permanent exhibition of the community museum, especially the inclusion of information on the pre-Columbian period.

In Boruca, strengthening activities were given in the learning and production of the museographic renewal of the Community Museum. This included a cooperative work for the redesign of the museum facilities, design of a new exhibition, scientific and museographic script and selection of objects.
4. Commends the State Party on the numerous initiatives related to education and outreach, particularly those related to local and indigenous communities and youth, as an important aspect of the sustainable conservation of the property and awareness-raising on cultural heritage in Costa Rica more broadly;

As in previous years several educational activities were performed as part of the inter-institutional coordination between the interested groups and the educational staff of the visitor center in Finca 6.

1) Educational activities carried out in the Osa canton

Cultural and educational management and community relations are three pillars or fundamental axes within the institutional work plans. Therefore, we work with a continuous Heritage Education program based on heritage values as support for the establishment of positive educational actions.

In this sense, several strategies have been developed that seek to value heritage in all its expressions by opening educational, creative, and participatory spaces that facilitate the incorporation of positive values and the reinforcement of identity.

For the 2020-2022 period, a total of 302 educational activities were attended, which included the awareness and participation of 6,471 people. As in the previous case, for the years 2020 and 2021 there was a significant decrease in the scope and participation of people in the educational programs and strategies of the center due to the situation generated by the pandemic. However, this worldwide and national situation allowed us to explore new resources, including virtual ones, as part of the strategic contingency measures and adaptation to the conditions derived from the pandemic.

<table>
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<th>PERIOD</th>
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<th>2020 Beneficiaries</th>
<th>2021 Activities</th>
<th>2021 Beneficiaries</th>
<th>2022 (october 7th) Activities</th>
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<td>656</td>
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Chart 1. Total educational activities and total beneficiaries per semester at the Finca 6 Museum Site during the 2020-2022 period.
Of the actions and strategies implemented as part of the Heritage Education program, it is worth mentioning the Annual Educational Sessions that seek to: 1) create meeting spaces, sensitive, affective and knowledge experiences for school, college, and university students, and for the general public, 2) favor the meaningful interpretation and positive valorization of heritage in all its dimensions and 3) strengthen the sense of citizenship, belonging and cultural identity through the enhancement of heritage in all its dimensions.

For these sessions we have had the contribution of young people from the Diquís Young Leaders Project, who have provided support with volunteering in these and other educational activities implemented as part of the center’s educational program.
General visitation data to the Finca 6 museum site. 2019-2022

During the 2019-2022 period, a total of 29,083 people visited and entered the Finca 6 archaeological site. It should be noted that, during the years 2020 and 2021, the COVID-19 emergency was faced, which affected the flow of visitation due to the contingency measures adopted to face the national (and global) emergency resulting from the pandemic. Therefore visitation during these two years showed a downward trend compared to years after the pandemic.

<table>
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<tr>
<td>2020</td>
<td>3270</td>
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</tr>
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<td>2019</td>
<td>5093</td>
<td>4746</td>
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<tr>
<td>TOTAL</td>
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Web Portal www.diquis.go.cr

At the beginning of 2107 the web portal www.diquis.go.cr was launched. The portal provides with ample information about the World Heritage Site and its different components, history of research, the timeline of occupation of the Diquís delta, animations, aerial views, natural environment, modern multicultural communities, agenda of activities, tourist attractions of the Osa canton, and other aspects.

From October 1, 2019 to October 31, 2022, the Diquís portal www.diquis.go.cr was visited by 62,409 users, who have made 75,161 browsing sessions and have seen an average of 1.5 pages per session, for a total sum of 114,236-page views during the 37-month period. Most of the visitors are new (89%) and the rest (11%) are recurring.

User visits from 123 countries were received. The majority of sessions on the Diquís portal were made from Costa Rica (64.85%), in second place from Panama (20.32%) and in third place from the United States (4.51%). Other countries from which visits were received are: Colombia, Mexico, Guatemala, Spain, Ecuador, El Salvador and Nicaragua.
View of the web portal visitation records and web portal visitation records according to their origin, 2019-2022.

Web portal news about the Diquis Young Leaders project.
4) Temporary exhibitions at the Finca 6 Visitor Center

In the 2020-2022 period, three exhibitions have been opened in the new temporary exhibition hall in the Finca 6 Visitor Center. The purpose of this room is to provide the visitor with more information and motivate people who have visited the site to return again. One of them about “In Osa history travels by bicycle”, exalting the importance of this means of transport in the area since the banana plantations times.

Also, an exhibition called “Legacy in Stone” with a theme focused on the conservation and restoration of stone objects in their original site, particularly the research process and the actions carried out to restore and preserve the stone spheres found in the El Silencio and Finca 6 sites. And more recently the exhibit “Mangroves: Barrier and Freedom”, given the presence in the area of one of the largest mangroves in Central America.
Views of the exhibitions “Mangroves: Barrier and Freedom” (2022) and “Legacy in Stone” (2021)
5. Also commends the State Party on the important improvements to the property’s interpretation, including new signage installations and the expansion of the Visitor Centre, as important steps towards improving visitor experience and appreciation of the property’s Outstanding Universal Value (OUV);

After the 2019 signaling and interpretation, 10 new large signs with written and graphic information were placed along trails at the four sites. Also, 20 direction signs were placed, especially on Finca 6. The placement of 5 more large signs 75 orientation signs is planned for 2023.
6. Takes note that the approval of buffer zone regulations remains pending with the Osa Municipal Council, that the Risk and Disaster Management Plan is being finalized and that the increase of human and financial resources remains a significant challenge and, therefore, requests the State Party to finalize these pending issues in 2020 as indicated in its report and to notify the World Heritage Centre as soon as completed;

As in previous years, efforts have been made to solve the issue of buffer zones. We have mentioned, in previous reports, that in Costa Rica the Regulatory Plan is the main technical and legal instrument available through which the local government and the community plan land use and guide current and future economic activities, land uses, educational activity and health, according to Urban Planning Law No. 4240 of November 15, 1968 and its modifications.

However, the Osa Canton Regulatory Plan is still suspended. In addition, several previous attempts to develop a specific regulation for the issue of buffer zones have not been successful. During the period of this report, we have encountered the same difficulties at the level of the Municipal Council of the canton of Osa, since they express their concern about the limitation to the property of the owners of land included in the limits of the buffer zones.

In 2022, the director of the National Museum had a meeting with the mayor, to try to find a solution. He was very receptive as always, but no firm agreement has been made, even though a new City Council is in charge.

Faced with this situation, a new alternative is sought. A meeting was held with the representatives of Surcoop, owners of the land included in the buffer zone of the Finca 6 site, to directly explain the situation to them. In October 2022, a draft agreement was presented to them to adopt a decision that maintains the use of the land for agricultural purposes and establishes measures in future construction or projects. On November 11, 2022, the director met with them again to reach a consensus text. Even when there is a good disposition to keep the land under its current use, the cooperative council members cannot sign an official agreement because they must update their legal status.

We believe that this is a valid alternative to overcome the impasse that exists with buffer zones. Similar agreements will be sought with the owners of the land in the buffer zones around the archaeological sites included in the series.

Risk Preparedness and Disaster Management Plans

In 2018, a joint work was initiated between the Internal Audit of the National Museum of Costa Rica and the administration of the Visitor Center of the Finca-Site-Museum 6, to assess the risks associated with each of the archaeological sites declared World Heritage.

Once these risk factors were defined, a methodology provided by the internal audit was carried out to assess the level of risk and the impact of each of these factors applied to each of the archaeological sites. After the document was reviewed by the Heritage Protection,
Meeting about buffer zones with representatives of SURCOOP at Finca 6 Visitor Center.
and Anthropology and History Departments, it was sent to the National Museum Administrative Board for validation.

It was approved by the Board in 2019. Since then, annual evaluations have been made based on that document. In December 2022 an evaluation is scheduled to be carried out at Finca 6 by the Internal Audit of the National Museum.

Likewise, as the National Museum of Costa Rica is a public institution that provides visits to the general public, it must comply with Executive Decree No. 39502 - MP, which establishes the Emergency Preparedness and Response Plans for Work Centers or of Public Occupation.

With this standard and the bibliography of Managing Disaster Risks for World Heritage, published in 2010 by UNESCO, the “Local institutional plan for risk reduction” was prepared and approved by the Administrative Board of the National Museum of Costa Rica in 2020.

In June 2020, the Ministry of Health approved the “Local institutional plan for risk reduction” This plan’s main objective is to serve as a tool in managing situations that alter normality, that threaten the life and integrity of officials and visitors, as well as existing archaeological assets. Its approval allows the facilities to be operated.

7. Takes note with appreciation of the efforts to formally establish a consolidated and multidisciplinary management unit for the property under the General Direction of the National Museum of Costa Rica, and of the establishment of a High-Level Commission to ensure its adequate protection;

The commission has met several times over the past three years and stands as a fallback should pressing issues arise.

Financial and personnel resources

Regarding the personnel resources for the management of the sites, the situation remains the same as the last report, since the fiscal situation of the country was aggravated by the Covid 19 pandemic.

As mentioned in previous reports, an administrative unit for the administration of the Visitor Center and the archaeological sites is in the process of being created, as a dependency of the General Direction. The required documents were expected to be submitted to the Ministry of Planning for approval in the first half of 2020. However, this has not been met, as until 2020 there was no planner at the National Museum to help formalize the process. Now there is a planner and meetings have been held, the last one in September 2022, to evaluate the preliminary proposal for the organization of the administrative unit and its position in the institutional organization chart.
8. Also takes note that there has been no decision taken for several years with regard to the feasibility of the Southern International Airport project, and that a Heritage Impact Assessment will be conducted if the project is to move forward,

This issue was addressed in the 2018 and 2019 reports. The situation remains the same, pending the feasibility of the airport project.

9. Further takes note that the Diquis hydroelectric project has been indefinitely suspended by the responsible authorities and that all works related to the project have been halted;

This issue was addressed in the 2018 and 2019 reports. The situation remains the same, with all activities of the hydroelectrical project indefinitely suspended.

10. Also requests the State Party to keep the World Heritage Centre informed about any changes in the status of these two projects, and to submit any relevant documentation and studies undertaken, in line with Paragraph 172 of the Operational Guidelines;
11. Further requests the State Party to provide further information on the nature and scale of the upgrades planned for the Palmar Sur regional airport located in close proximity to three of the property’s archaeological sites, in order to determine any possible impacts on the OUV, in line with Paragraph 172 of the Operational Guidelines;

Regarding, recommendations 10 and 11, as previously mentioned, the project of a Southern International Airport, has not have any advance and continues in its feasibility stage. The Environmental Impact Assessment (EIA) has not been approved by the Environmental Technical Secretariat after the request of the National Museum of Costa Rica (Official letter DG-639-2015), no to do so until the Heritage Impact Assessment (HIA) is completed by this institution.

Likewise, the Technical Council of Civil Aviation sent a similar letter to the SETENA (Official letter CTAC-AC.2015-1244) requesting the temporary suspension of the environmental analysis until we have the
results of the Heritage Impact Assessment. Additionally, the government has invested in upgrading existing regional airports, including the Palmar Sur airport, which is in the Diquís delta. There were some initial contacts with the General Direction of Civil Aviation, to initiate the assessment of the Southern International Airport project, but since 2017, this has not been initiated.

The most recent exchange was the official letter DGAC-DA-IA-OF-0623-2021 (November 3, 2021) from the General Direction of Civil Aviation, requesting the Heritage Impact Study of the Diquís Hydroelectric Project and the response of the World Heritage Center. In addition, they requested a copy of the criteria issued to the National Environmental Technical Secretariat by the National Museum, specifically the Environmental Impact Study that is counted for file D1-11752-2013-SETENA.

The request was answered through Official Letter DAH-2021-O-263, attaching the requested documentation. New actions are awaited to continue coordination.

A new administration took power in May 2022, and in September 2022, there was a request from the Ministry of Culture and Youth attending a request from the presidential office of an updated summary of what has been done with respect to the airport project by the National Museum of Costa Rica. An executive summary was sent highlighting what had been done in recent years.

In official media, the Minister of Transport and Public Works mentioned in a public act that the current government considers that the airport project would be beneficial for the southern part of the country. But there is no official announcement yet. There is a consultation in process to the Ministry of Transportation and Public Works by the Ministry of Culture.

12. Requests furthermore the State Party to submit to the World Heritage Centre, by 1 December 2022, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its

In 2017 and 2018, the Project for the Conservation of Pre-Columbian assets in the Chiefdom Settlements in the Diquís Delta, declared World Heritage, under the direction of Dr. Isabel Medina-González, curator, archaeologist and researcher attached as an official of the National School of Conservation, Restoration and Museography (ENCRyM-INAH), Mexico, carried out joint technical work between the ENCRyM and the MNCR.

Conservation diagnoses were made of the stone spheres of the Finca 6 and El Silencio monuments. This involved a detailed process of searching and compiling the life history, valuation, conservation and research records of the sites. A photographic and graphic record of the alterations present on the surfaces of the stone spheres was carried out, as well as in situ studies on the properties of the rock matrices (i.e. color, hardness, moisture content, absorption capacity, impact resistance) and the analysis of mechanisms of material transformation.
The physical state diagnosis led to the establishment of an environmental monitoring program (temperature and humidity) in the immediate contexts of the spheres. The information generated in the conservation diagnoses and scientific studies carried out in parallel, were the basis for planning the intervention strategies of the stone spheres and some associated monuments, as well as establishing an order of priorities based on the state of conservation of these sculptures.

From the first year, a sustainable strategy based on the training of local cadres, national and international communication, and intercultural dialogue with local communities, including indigenous people, was articulated. These lines of work, coupled with the credibility sustained in a methodology and regulations, became the integrating node of the project.

After this stage, the technical phase of direct and indirect conservation interventions of the stone spheres was designed, to counteract the impact of certain alterations and contribute to the interpretation of these pre-Columbian sculptures. Likewise, the strategic lines of credibility, training, communication, and community were consolidated.

With the results obtained between 2017 and 2018, reference information was generated for decision-making, mainly defining the appropriate materials to intervene in the stone spheres and associated architectural monuments, whose aspects responded to compliance with international principles of archaeological conservation: respect for the authenticity and integrity of the values (historical, aesthetic, social), minimal intervention, compatible materials, reversibility/recoverability and respect for its historicity.

Dr. Isabel Medina intervenes sphere A at Finca 6 site.
Conservation team working with stone spheres at Finca 6 site.
In 2019, the largest sphere was restored, located in the El Silencio monument. In 2020 and 2022, four spheres were restored that are located in the only two alignments that are preserved to date, in the Finca 6 archaeological monument.

The results generated have been:

- Preventive and corrective intervention in the archaeological heritage of the Diquís Delta with special emphasis on five spheres exposed in the Finca 6 archaeological monument. After concluding these field works, technical reports were generated with the work carried out.

- Strengthening of theoretical, methodological and regulatory aspects in archaeological conservation in World Heritage Sites.

- Consolidation of actions for monitoring, maintenance and preventive conservation of the archaeological heritage.

- Preparation of a conservation strategy for the management of the spheres and architectural structures of the series of four pre-Columbian archaeological monuments declared World Heritage Site.

- Training of local cadres in theoretical, methodological, regulatory and management aspects in the relevance of the constituent elements of World Heritage Sites.

- Application of the acquired knowledge in the conservation and restoration of pre-Columbian spheres located in other archaeological monuments and public spaces, mainly those located in the south of the country.

- Public dissemination of the progress and results of the project to involve the population in the assessment, protection and conservation of the national archaeological heritage. It has been achieved through communication activities in national and international media, as well as informative work with the communities near the archaeological monuments declared World Heritage Site.

- Sociocultural sustainability through the establishment of a platform for local intercultural dialogue, through guided tours for children, adolescents and adults from the Osa community in the Visitor Center of Finca 6, and workshops with community leaders and members of the indigenous community of Boruca.

Reports on the conservation activities carried out in 2020 and 2022 were prepared by the team of conservators and restorers who have been working on the issue. They provide detailed information on the different activities and interventions carried out. These reports are attached as Annexes 1 and 2.
Additional information

Management Plan for the “Pre-Columbian Chiefdom Settlements with Stone Spheres of the Diquís”

It was updated in 2021-2022, and is in process of validation by the General Direction and the Administration Board of the National Museum of Costa Rica. The plan will incorporate the needs and tasks identified in this report and in the Third Cycle Periodic Reporting Questionnaire in its final version.

Program of Institutional Environmental Management.

Its general objective is to “Strengthen the skills and abilities in environmental management based on the applicable requirements of chapter 6 and 8 of the standard ISO 14001:2015 corresponding to planning and operation, in the Pre-Columbian Chiefdom Settlements with Stone Spheres of the Diquís.

The Finca 6 Visitor Center recognizes and assumes its responsibility in protecting the environment and establishes a series of commitments which are mandatory for the institution and will be strengthened with the collaboration of interested parties relevant to Environmental Management. The program establishes an action plan with environmental measures that will be executed in the short, medium and long term and that give rise to the continuous improvement of the environmental management of archaeological sites.

Program of Environmental Education

It promotes the conservation and sustainable use of natural resources, aimed at the population of educational centers located in communities with direct interaction with archaeological sites.

Sunset at the Térraba river.
Credits

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PROGRESS REPORT

MANAGEMENT PLAN FOR
PRE-COLUMBIAN CHIEFDOM SETTLEMENTS WITH
STONE SPHERES FROM THE DIQUIS DELTA, COSTA RICA
CONSERVATION PROGRAM
MARCH 2019-MARCH 2020

Project 12 “Heritage Impact Assessment of World Heritage Sites:
Chief Settlements with Stone Spheres of the Diquís Delta, Costa Rica”.

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2020
This initiative originates from the efforts made in 2014 by the National Museum of Costa Rica (MNCR), the Cultural Institute of Mexico of the Embassy of Mexico in Costa Rica and the Ministry of Foreign Affairs (SRE), the Ministry of Culture (SC) and the National Institute Anthropology and History (INAH), all three in Mexico, within the framework of the Cultural and Educational Cooperation Program Mexico-Costa Rica 2015-2017, Project 12 “Evaluation of Heritage Impact of World Heritage Sites: Chiefdom Settlements with Stone Spheres of the Diquis Delta, Costa Rica”.

As a result of this, in 2014 Dr. Isabel Medina-González (ENCRyM INAH) was commissioned to advise the National Museum of Costa Rica (MNCR) in the preparation of the Nomination File of Pre-Columbian Chiefdom Settlements with Stone Spheres of the Diquis, nomination that was achieved in 2014. Two years later in 2016, she was invited to advise the elaboration of the Management Plan of the Chiefdom Settlements of the Diquis (PMADC, Corrales et. al 2017), which was defined based on the strategic orientations developed by the Action Plan for World Heritage in Latin America and the Caribbean 2014-2024 (WHC 2014). In this sense, the structure of the PMADC (Corrales et. to 2017) was oriented to the fulfillment of 5 strategic lines called: credibility, conservation, capabilities, communication and community. It was based on this, that together with the specialized personnel of the Department of Protection of Cultural Heritage (DPPC) of the MNCR, the Conservation Program was designed which, although by its own vocation is dedicated to the field of same name, also adds transversally to the other strategic lines.

In 2017, Dr. Isabel Medina-González (ENCRyM-INAH) assumed the objective of coordinating and permanently advising the PMADC Conservation Program, whose spheres of action are address in an integrated manner to research, preservation, intervention, management and dissemination of the Pre-Columbian Chiefdom settlements with stone spheres of the Diquis, declared as World Heritage, in a framework of interdisciplinary collaboration, community participation and International cooperation. In 2019, together with the DPPC team, a general report of advances that contemplated the first three years of work of the Program of Conservation at the Finca 6, El Silencio, Grijalba and Batambal sites was delivered (Medina-González, et. al 2019).
That same year, together with the DPPC, the *Project for the Conservation of Pre-Columbian Assets in the Chiefdom Settlements of the Diquis Delta, Instrument for the Formulation of International Cooperation Projects with Bilateral and Multilateral Sources* was developed, (V.V.A.A. 2019), whose general objective was defined as:

- Apply corrective and preventive measures for the conservation of pre-Columbian assets, movable and immovable property located in Pre-Columbian Chiefdom sites declared World Heritage.

The specific objectives of this Project were defined as:

- Monitor the state of conservation of intervened movable and immovable property, particularly in Finca 6, El Silencio, Batambal and Grijalba.
- Intervene directly and indirectly in 3 spheres in situ (Farm 6) and one in the Boruca community with the purpose of promoting the conservation and transmission to the future of its materiality and values.
- Diagnose the state of conservation of immovable cultural assets (El Silencio and Finca 6) to determine decision making.
- Carry out activities of information, dialogue, exchange and consultation with members of the local community, particularly the Boruca community.
- Follow up and strengthen the research project on materiality, technology and state of conservation of spheres and other associated archaeological collections in the custody of the MNCR.
- Document, evaluate and report the progress made in the field and office.
- Carry out academic dissemination actions on the work of diagnosis, research and intervention carried out in the Diquis chiefdom settlements.
- Evaluate the actions undertaken from 2016-2022 by the Conservation Program of the Management Plan of the Chiefdom Diquis Settlements, and in particular, of the Pre-Columbian stone spheres located underground and above ground to determine priorities of course decisions to follow for its protection, conservation and dissemination.
- Design and organize an International Workshop on Conservation and Management of Pre-Columbian Sites with Stone Heritage for the Exchange of Good Practices at the Regional Level (Subject to budget content).
Based on this orientation, an initial program was prepared for the 2020 season, from February 25 to April 4, the following activities would take place:
• Monitoring the state of conservation of Sphere A and exposed stone pavement of El Silencio.
• Progress of Intervention of Sphere A and Sphere E of Finca 6.
• Diagnosis (and if necessary intervention) of the Sphere at the Boruca Community Museum.
• Dialogue with local communities, including indigenous persons
• Progress Review for the Annual Report
• Scientific Research on Archaeological Materials

This planning was adjusted in a meeting with the MNCR authorities in Costa Rica: priority was given to the activities in the archaeological sites of Finca 6 and El Silencio, including in the first the monitoring of the exposed areas of Spheres A, B, C, D, E and F, as well as the diagnosis of the paved area still in deposit in the second.

Unfortunately, due to the health contingency derived from the global pandemic of COVID_19, the 2020 season ended on March 21, so the field period was limited from March 2 to 19. This meant that the activities carried out were concentrated solely on Finca 6, temporarily suspending the monitoring, diagnosis and maintenance actions in El Silencio. It was not possible to carry out diagnostic activities in the sphere of the Boruca Museum Community, the community dialogue with that population, nor the actions of direct communication in Palmar Norte. Fortunately, not the entire dissemination program was compromised, since it was still possible to carry out an interview on the radio station of the University of Costa Rica, the distribution of an informative affine in Palmar Norte and Finca 6, as well as several national press packages. The description of the activities carried out is presented in the following section.

It is worth giving credit to all the people and institutions that collaborated so that this season 2020 will take place. On behalf of the ENCRyM-INAH, Dr. Isabel Medina-González participated and the Rest. Jimena Portocarrero, while on behalf of the DPPC-MNCR, there was the collaboration of the Rest. Alfredo Duncan, Arql. Javier Fallas, Rest. Alonso Silva and technicians, José Alexis Matamoros and Miguel Rodríguez. There was also logistical support from Jeisson Bartels, and in particular the committed work of the administration and education workers team, of the Finca 6 Museum. The
archaeological work was headed by Dr. Francisco Corrales (DAH-MNCR). In the scopes of dissemination, the collaboration of the head from the DPM-MNCR, Lic. Mariela Bermúdez, as well as from Lic. Wendy Segura. In the planning, organization, execution and reporting phases, the support of the DPPC was essential, particularly the Head of the department Arql. Marlin Calvo, as well as Arql. Leidy Bonilla and secretary María de los Ángeles Parra.

Finally, we would like to extend some special thanks. We acknowledge the commitment work of the Administrative Board of the MNCR, whose members deserve credit for their generous and responsible action in the face of the pandemic scenario. Also, we would like to thank the always attentive management of the Mtra. Adriana Cruz, Secretary of Foreign Relations. An essential support element for the development of this project for five years has been the Mtro. Arthur Valencia, director of the Mexico Cultural Institute in Costa Rica: this season was a key piece is the health security resolution of the Mexican team. Our heartfelt gratitude to Mtra. Rocío Fernández, director of the National Museum of Costa Rica, to the director of the ENCRYM-INAH, Lic. Gerardo Ramos Olvera, to the Mtro. Luis Fernando García Álvarez and the Mtro. Cesar Arturo Lozano of the INAH Technical Secretariat, and its head, Dr. Aida Castilleja. The work of these officers was instrumental in the safe and timely repatriation of the Mexican counterpart for a time of unprecedented health challenges in both Mexico and Costa Rica.
II. SCOPE

The scopes achieved in the annual cycle (March 2019-March 2020) have been organized analytically in accordance with the programs, objectives and strategies established in the PMACD, to be followed:

**CONSERVATION**

**Specific Objective:** To know, register and document the archaeological assets that require preventive care or conservation actions

**Strategic Line:** To implement a program for registering and documenting aspects related to the cultural asset, either physically or electronically.

*Actions (2020): Follow-up to the Conservation Information File for Spheres and Monuments of the Diquis Chiefdom Settlements (AICEMACD).*

The compilation and digitization of information (reports, reports and records) continued. graphic and photographic) on the biography and conservation of the spheres, monuments and *Diquis Chiefdom Settlements*, which was compiled in a physical and digital collection. The documentation has been compiled from both the DPPC's own collections and other instances of the MNCR, including DAH and DPM\(^1\).

**Specific Objective:** Diagnose the state of conservation of the cultural asset with the different disciplinary techniques to establish requirements and priorities.

**Strategic Line.** Develop a diagnostic program of the main heritage elements from an interdisciplinary perspective.

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\(^1\) Steps have been initiated to establish the Diquis Stone Sphere Conservation Information System: a database that seeks to understand in a synthetic way the aspects of identification, life history, assessment, results of scientific studies, previous interventions, diagnosis, management, decision making, interventions and monitoring.
**Actions (2020): Spheres Integrated Diagnosis in 4 World Heritage Sites.**

The total of the written, graphic and photographic record derived from the diagnosis is in the possession of the MNCR for its systematization and protection. During 2020, the DPPC-MNCR has continued with the process the digitization of the graphic registry of alterations.

**Actions (2020): Diagnosis of Spheres of the Finca 4 site Collection in Finca 6.**

In 2016, a rapid diagnosis was made of the written, graphic and photographic record derived from the diagnosis is in the power of the MNCR for its systematization and protection. During the 2020, a monitoring of these spheres was carried out consisting of taking aerial photographs and of the sides oriented to cardinal points.

Specific objective. To develop a research program that supports decision-making decisions regarding the prevention and conservation of cultural property

Strategic Line. To carry out scientific research tasks on materials constituents and processes of alteration of Spheres located in situ in the Sites of Farm 6, the Silence, Batambal and Grijalba 2.

**Actions (2020). Development of the Research Project of constituent materials, processes of alteration and intervention alternatives for the conservation of archaeological assets from the Chief Settlements of Diquis, Costa Rica**

In 2017, the to the Research Project of constituent materials, alteration processes and intervention alternatives for the conservation of archaeological assets from the Diquis Chiefdoms Settlements, Costa Rica, collaborative initiative between Dr. Manuel Espinosa Pesqueira (LANCIC-ININ and LANCIC IIE) and Dr. Isabel Medina-González (ENCryM-INAH). During 2020, the efforts were concentrated on the samples of the Spheres A, B and E of Finca 6, as well as some of the spheres of Finca 4. The technical report in extensive is attached to this document.
Suffice it to mention here that among the most important findings of this research phase is the mineralogical characterization of each of the Spheres A and E, below:

As can be seen in figures 1 and 2, both spheres show a similar composition in terms of Quartz, Albite and Anorthite content, however, the Sphere E presents a greater recurrence of Sanidine, Calcite, Dolomite and Kaolinite, which explains its lower hardness, color lighter and more vulnerable to hygroscopic agents. An important aspect is the presence of ferro-magnesian minerals and montmorillonite; a high capacity hygroscopic clay. These latter minerals have been hypothetically identified as factors of intrinsic order of the rocks that form the spheres. In Sphere E the presence of derivatives of calcium explain the arenitization process by hygroscopic disintegration.
Correlative microscopy studies (optical, dark field and SEM-EDS) explain the intrinsic deterioration of the rocks that make up the spheres (Figure 3). As pointed out by Espinosa (2020: 25) “materials with type morphology clay were identified inside some micro-samples ... (which are associated) fractures and/or extensive cracks.

Therefore, scientific evidence indicates that the penetration of moisture molecules in contact with ferro-magnesian and calcium minerals lead to the formation of clays, identified as montmorillonite and kaolin, respectively. Both clay horizons form zones that promote delamination. The expansion of the first generates greater physical-mechanical alterations in both spheres.

In conclusion, the *Research Project of constituent materials, alteration processes and alternatives of intervention for the conservation of archaeological assets from the Diquis Chiefdom Settlements, Costa Rica* has generated important advances regarding the materiality and state of alteration of the Spheres A and E of Farm 6, which were decisive for decision making.

*Actions (2020). Follow-up to the Bio-Deterioration Research Service.*
In January 2020, the M.Sc. Marielos Mora, researcher at the CIBCM of the University of Costa Rica made the delivery to the MNCR of the *Final Report of the Study of the biodeterioration of*
the archaeological heritage of Costa Rican natural stone (Annex 2). One of the purposes of the 2020 season was to carry out a meeting between the work team and the M.Sc. Marielos Mora, which was postponed until further notice due to the current health situation.

Strategic Line: Studies on environmental monitoring in terms of alterations in goods cultural.

Actions (2020): Micro-climatic Environmental Monitoring of the area of Spheres A, B, C, D and E.

During the 2020 field season, and for a period of 15 days, environmental microclimate monitoring was carried out in the areas close to spheres A, B, C, D, and E of Finca 6 site. This monitoring was carried out according to a protocol that consisted of:

- **Eventual recording of ambient temperature and relative humidity.** In the morning shifts (6:00 and 7:00 a.m.), noon (11:00 a.m.-12:00 p.m.) and afternoon (2:00 p.m.-3:00 p.m.) a thermohydrograph Radio-Shark brand was used, whose results were recorded in tables. The information obtained is being processed by the staff of the DPPC-MNCR.

- **Rain pH measurement:** Due to the fact that there were no rains during the 2020 season, this procedure was not carried out.


In 2019, a digital Data-Logger was acquired, an instrument that allows recording the temperature and ambient relative humidity continuously for 24 hours. The Data-logger has recovered every 3 months to process the environmental data by the DPPC-MNCR staff. The last data collection date was March 20, 2020.

Strategic Line: In situ studies on mechanisms of alteration of cultural property


During the 2020 season, the performance of the lime sand cores that were applied in the 2017 season in Spheres A and E of Farm 6 were revised. In both cases, it was observed that all witnesses were working properly, since they are forged and with adequate hardness.
(corresponding to number 2 on the Mohs Scale). None of them reported detachment or fracture, which indicates that the cracks and detachments remained stable. All witnesses were removed mechanically with a scalpel and toothbrush, likewise, residue cleaning was carried out with distilled water and acetic acid at the 2%, with distilled water washes. This treatment allowed us to observe that the application of witnesses is a completely reversible measure.

![Figure 4. Removal of lime sand cores applied in 2016 and elimination of residues by chemical cleaning.](image)

As of 2020, the date on which Spheres A and E were fully intervened, the fillings will work as a means to assess possible detachments and cracks.

**Strategic Line.** Develop, as a complement to the diagnosis, a monitoring program state of conservation of cultural property.

**Actions (2020):** Monitoring of the state of conservation of exposed crowns of spheres A, B, C, D, and E of Finca 6 Site. Following up on the diagnosis of the state of conservation of the spheres A, B, C, D and F elaborated in 2017, in the 2020 field season monitoring of the conservation status of their crowns was carried out. To do this, photographs of the surfaces were taken and the diagrams made in 2017 were compared. No greater changes were
reported in the alterations, except that in most spheres the presence of micro-flora has been reduced by almost 100%, effect attributable to the performance of the substrates of reburial.

Figure 4. Photographic record of the crown sphere B. Aerial shot

**Actions (2020): Performance monitoring of reburial substrate surfaces.** In follow-up to the reburial deposit optimization actions carried out in spheres A, B, C, D, and E of Finca 6 Site in 2017, the surface of re-entry deposits in 2020 was reviewed to assess their performance. As a result of monitoring, it has been concluded that the surface substrates of re-burial have had a satisfactory performance, since certainly they considerably impede the growth of microorganisms and higher plants, in addition to reducing moisture retention in the crown of the spheres.

The assessment also indicates that although a few shallow centimeters of the reburial deposits are lost due to the drag effect of runoff on the site, most of the deposit remains stable in situ. It was confirmed that the surface deposit suffers from hauling and coating by a layer of approximately 2-3 cm of fine clay, which does not generate any damage on the crowns of the spheres, but it is conducive to biological growth. Therefore, it decided in both
years to both remove this layer of clay and replace it with sand. This procedure it has been included as part of the maintenance protocol.

**Actions (2020): Internal performance monitoring of reburial deposits: Sphere A and E of Farm Site 6.**

Three years after the optimization of reburial substrates in spheres A and E, and with the opportunity of its re-excavation with a view to its intervention, a monitoring of its internal performance was made. In situ observations indicate that the performance of sand deposits is adequate since they help to control alteration agents, by considerably reducing the moisture retention in addition to reducing the growth of higher plants. It is to consider that the repository also functions as a container system that stabilizes the progress of cracks and fissures, as suggested by the core monitoring study. The performance of the geotextile is adequate since it is functioning as a root barrier.

**Specific objective. To establish risk management and conservation preventive strategies.**

**Strategic line. To develop preventive strategies based on interventions of optimization of reburial deposits.**

**Actions (2020) Optimize the reburial deposits of the spheres located in Finca 6.**

Once the intervention of spheres A and E of Finca 6 was completed, the reestablished reburial deposits were optimized, since its perimeter thickness was expanded to about 40-50 centimeters. The process was carried out in a conventional way by consecutive lifting of layers limited with the help of wooden sections. At a depth of approximately 20 centimeters from the surface, a layer of geotextile was placed to promote moisture stability, prevent erosion and control the root growth. On top was placed a sand layer to which a slope and suitable finish was given for the presentation of the sphere crowns.
Strategic line. To develop preventive strategies based on interventions of optimization of annexed surfaces to the support of exposed spheres.

**Actions (2020). Optimization of adjoining land surfaces of Sphere G of Finca 6 Site**

Following the logic of the interventions carried out in 2020 in Sphere A of El Silencio site, a decision to re-optimize the area of land surface attached to the Sphere F of Finca 6 Site, in order to create a control buffer to change humidity and temperature, as well as a barrier to plant growth.
The action consisted of carrying out an excavation of approximately 40 centimeters around the sphere, ten centimeters deep, the contour -understood as a natural container- was filled with gravel stone.

Figure 7. Support Surface Optimization of Sphere F of Finca 6.

It should be noted that, in order to contribute to the interpretation of the site, an excavation approximately 1 meter in diameter and 10 centimeters deep was done with the purpose of filling it with gravel stone, just above the location of the Sphere G, to provide a distinctive element about its location.

Figure 8. Surface treatment above the G sphere, in order to promote its interpretive location.
Specific goal. Establish and develop direct intervention strategies.

**Actions (2020) Control of microorganisms in crowns and exposed spheres in Finca 6.**

In 2016, it was found that all partially or completely exposed spheres at the site of Farm 6 (A, B, C, D, E, and F) were extensively populated by microorganisms and, in some points, even presented small proliferations of superior plants in the interstices where the accumulation of clayey substrate is concentrated. The action of these biologicals agents resulted in various alteration effects such as hydrolysis, loss of coherence, detachments. Biocolonization also made it difficult to appreciate the patrimonial elements, as well as their inspection for diagnosis purposes and monitoring of conservation. In that year, a deep cleaning of the aforementioned elements was carried out and established a permanent program of control and monitoring of microorganisms. This program is based on the current perspective of archaeological conservation, which recognizes biocolonization as a progressive, dynamic and changing system with respect to the conditions environmental. Since then, the strategy in terms of bio-colonization control has been aimed at carrying out photographic control shots, followed by annual cleanings aimed at the elimination of the early stages of microorganism growth, in order to prevent the proliferation of higher plants, as well as regular and aggressive cleaning.

![Figure 9. Surface cleaning of Sphere F, Finca 6.](image)
In the 2020 season, the program was continued. Photographic records were taken to monitor all exposed areas of spheres A, B, C, D, E and F, to document that the proliferation of microorganisms has been reduced and remains in a early stage growth, while the incidence of higher plants has practically disappeared, only punctual incidents were found in the big interstices of Sphere B.

![Figure 10. Surface cleaning of Sphere F, Finca 6.](image)

To control bio-colonization, the following treatments were carried out:

- Mixed cleaning with a toothbrush and a solution of water and ethyl alcohol (1:1).
- Consistent preventive treatment of an antiseptic bath of 5% hydrogen peroxide and a distilled water wash.
- Finally, in order to reduce the possible growth of microorganisms, and the inability to acquire Ecofox© or Citricidin© in the Costa Rican market, a spray with an alcohol solution 75% isopropyl in distilled water was applied, which has a remaining degree of biocide action.
In these treatments, high-capacity sprinklers were used that generate a spray by fan dispersion, which favors the aqueous sweep to remove accumulated substrates in holes and roughness.

**Actions (2020) Control of microorganisms in exposed spheres in shelter of Finca 6.**

In 2016, a rapid diagnosis of the Spheres from the Finca 4 Site was carried out, same that had been transferred to Farm 6 for their protection. In 2018, as part of the works expansion of the Finca 6 Site Museum, a shelter area was relocated to the rear of the new parking lot where a set of spheres from different sites were relocated from unprotected Diquis archaeological sites, including Finca 4, as well as a series of sculptures by burial mound from other pre-Hispanic settlements in the country. These collections, which have been transferred to the site by the MNCR as part of the rescue activities, were made open to exhibition at the end of 2019, as part of the tour for visitors to the site.

In order to integrate this collection to the actions of the Program of Conservation of the PMACD, during the 2020 season various activities to follow:

- Photographic monitoring of spheres from Finca 4: zenithal photographs and oriented towards the points cardinals.
- Monitoring of other sculptures through general photography.
- Mixed cleaning with a toothbrush and a solution of water and ethyl alcohol (1:1).
- Consistent preventative treatment of 5% hydrogen peroxide antiseptic bath and a distilled water wash.
Figure 12. Physical condition monitoring photographic record of Sphere 4, from Finca 4 site, sheltered in Finca 6. Figure 13. Cleaning of sculptures in the sheltered area of Finca 6.

**Action (2020) Integrated Intervention of Sphere A of Farm 6.**

The integrated intervention in terms of archaeological conservation of Sphere A of Finca 6 represents the most forceful intervention in its life story to date. The choice of treatments was based on assessment, diagnosis of physical condition and scientific studies of materiality, as well as the experience gained in the 2019 intervention of Sphere A of El Silencio site. The consideration of the last aspect, of course, considered that the conditions of Sphere A of Finca 6 are different from those corresponding to El Silencio, since the first is partially buried in a sand deposit, while its crown is exposed directly to environmental weathering conditions. The specific treatments carried out in the 2020 season are described below:

- **Unearthing:**
  With the participation of the MNCR archeology team, in particular Dr. Francisco Corrales, Sphere A was unearthed, using a 2.5 by 2.5 meters grid. Since the deposits corresponded to the substrates of reburial arranged in 2007, was fully excavated to the base of the monument.
• **Superficial cleaning.** It was carried out in a general way, with soft bristle brushes, to remove the sand substrate on the surface. Likewise, bamboo tips were used to eliminate concentrations of sand in cracks and fissures.

• **Chemical-mechanical cleaning.** The objective of this treatment was to generate a foreign surface of deposits and other materials on the surface, in preparation for its consolidation. The treatment consisted of the application of distilled water and alcohol in a 1:1 proportion by spray and the use of plastic soft bristle brushes. Subsequently, a peroxide solution was applied hydrogen (hydrogen peroxide) at 2% by spray, followed by a bath of distilled water.

Unfortunately, due to the lack of provision of the product on the market it was not possible to apply a layer of Ecotox at 5% to promote resilience in the face of proliferation of microorganisms in the medium term.
• **Preparation of Intervention Materials.** Before starting the stabilization processes—joining fragments, patching and edging—intervention materials were prepared. Quick lime was slaked, with a year of anticipation, in plastic containers to favor its decay. The paste inside the containers was sieved with plastic strainers. The sands were screened in two coarse and medium textures, as well as washed with drinking water and distilled water, to remove salts, and later, dry in the sun on surfaces plastic. With these charges, 1:1 lime-sand mortars were prepared, which were subjected to different coloring systems: pigmentation of pastes, application of fresh color and with acrylic paintings. These pastes were subjected to standardized drying tests to verify satisfactory hardness, compaction, and coloration. These procedures were essential to ensure the quality of the interventions carried out.
**Consolidation:** fillings and trims were applied to ensure the stability of gaps and edges exposed. The fillings, which were made with lime and sand pastes of different nature, served to promote a formal and volumetric reintegration, particularly of the sphere crown. To contribute more stability to exposed edges, piping with a 90º edge angled to the plane to prevent its visibility were applied.

![Figure 17. Sphere A consolidation.](image)

**Chromatic reintegration.** Since the mortar pastes differ from the color of the rocky substrate, a process of chromatic reintegration was carried out which, in this case, because it is a monument
exposed to the weathering agents, was based on the mixed application of pigments and acrylic paints. The pattern was achieved by staining and details by pointillism to match the color and texture patterns.

Figure 19. Chromatic reintegration.

Figure 20. Detail and aspect of the chromatic reintegration during the process.

Figure 21. Side view of Sphere A at the end of the chromatic reintegration process
Reburial. As explained above, once the process of direct conservation-restoration was finished, Sphere A was reinterred in an inert substrate of siliceous sand in order to favor its long-term preservation.

Parallel to the treatment of Sphere A of Finca 6, an intervention was carried out in Sphere E, which was selected due to its severe state of alteration. The treatments carried out is described below:

- **Unearthing:** With the participation of the MNCR archeology team, in particular Dr. Francisco Corrales, the unearthing of Sphere E was carried out, using a 2.5 grid by 2.5 meters. Since the deposits corresponded to the substrates of reburial arranged in 2007, was fully excavated to the base of the monument.

- **Superficial cleaning.** The cleaning consisted, in general, in the removal of residues of the reburial deposit, applied in 2007, on the surface of the sphere, as well as of stationary clay remains in the interstices, cracks, fissures and gaps of the sphere. For this, brushes, soft bristle brushes (tooth and nail brushes), bamboo awls, fine dental spatulas and dissection needles were used, starting with the crown to descend towards the base of the sphere.
• **Chemical-mechanical cleaning.** The treatment consisted in the application of distilled water and ethyl alcohol in a 1:1 ratio by spraying, and using soft plastic bristle brushes. Subsequently, a 2% hydrogen peroxide solution (hydrogen peroxide) was applied by aspersion, as an antiseptic, followed by a distilled water bath.

Figure 25. Cleaning with 1:1 water-alcohol and rinsing with under pressure distilled water of Sphere E.

Figure 26. Chemical-mechanical cleaning of Sphere E of Finca 6.
• **Preparation of Consolidation Materials**

Before starting the fragment union and consolidation processes, the materials were prepared for intervention. The lime that was used for the treatments had already been slaked the previous year to its correct rot on the site. We worked with 3 mortars with loads of different thickness with the sand previously washed with water potable and distilled, as well as medium-dried ambient. The sands were screened in two coarse textures and half. Lime-sand mortars were prepared with these sands. 1:1.5 for coarse mortar, and 1:1 for medium.

![Figure 27. Screening of medium sand to obtain fine sand.](image)

For the fine mortar, the lime was strained through fine sieves (household plastic) and added marble dust in 1:1 ratio. These pastes were subjected to standardized drying tests to check its satisfactory hardness and compaction. These procedures are essential to ensure the quality of the interventions carried out.

![Figure 28. Preparation of fine mortar.](image)
• Bonding of fragments: preliminary location, before applying the adhesive. Prior to field season, the staff of the National Museum of Costa Rica undertook the task of cleaning and classify a number of fragments previously recovered from the site by their own inspections. A specific selection corresponding to Sphere E was carried out with the intention to be reintegrated to partially restore the shape and the volume of the sphere. Four fragments were achieved and located by coincidence in color, density and shape; they were attached exactly to the missing perimeters of the great lagoon at the zenith of the sculpture, which makes up almost a fourth part of its integrity. Since the four fragments were of large dimensions (20-35 cm in length) and weight, the reinforcement of the union was resorted to with the help of specialized posts based on 5mm CTS® fiberglass\(^2\). These reinforcements were strategically arranged according to the angle and depth required in each case. The fragments were drilled with a concrete drill bit and the posts were embedded with biphasic epoxy adhesive (DEVCON® 5 min epoxy\(^3\)), whose properties were ideal for guaranteeing long-term treatment efficacy. Adhesive-backed posts were driven into the rock matrix.

\(^2\) [file:///C:/Users/PC/Desktop/CR/Producto.html](file:///C:/Users/PC/Desktop/CR/Producto.html)

\(^3\) [https://itwperformancepolymers.com/media/13259/tds-5-minute-epoxy_es.pdf](https://itwperformancepolymers.com/media/13259/tds-5-minute-epoxy_es.pdf)
Given the qualities in the catalysis time of the resin in combination with the flexibility and resistance of the posts, it was possible to specify the placement of each fragment so that they coincided perfectly in the required position.

To promote total contact between surfaces and as a filler, flagstones were interspersed like wedges ensuring the union between pieces. The fragments were propped up to promote the adhesion during the setting time of the resin.
The process was successful since it was possible to recover a large percentage (5-10%) of the dimension of Sphere E. The contribution was noteworthy since the continuity in reading and material integrity of the monument was significantly recovered.

- **Consolidation.** After joining the fragments, fillings and trims were applied both to ensure structural stability of the sphere, protect exposed edges, provide greater homogeneity to the gaps, as well as promoting a formal and volumetric reintegration.

The fillings were made with lime and sand pastes of different nature. The fillings with structural function were applied in a proportion of 1:1.5 lime-coarse river sand, interspersed with gravel stone. It ensured a homogeneous distribution of the mortar in very open cracks (such as the one that crosses transversely to the sphere) or very deep recesses (between 5 and 20 cm deep).
Other fillings were made to contribute to the formal integration of the monument. Their composition consisted of medium-textured lime-sand in a 1:1 ratio. with this same mortar edging applied to add stability to exposed edges and associated profiles to the union of fragments. The borders were made at 90° with respect to the cloth and following the contours of the missing area to reduce its visibility. Missing and small cracks were consolidated with a fine paste made with a lime mortar and marble dust in ratio 1:1.

On the surface, colored mortars with mineral pigments were applied to reduce the contrast generated by the white color provided by the lime and achieve a background tone, a transition process to chromatic reintegration.
**Chromatic reintegration.** The colored mortar pastes provided a similar neutral tone similar to the rocky substratum. However, to achieve a total chromatic integration that combined a textural effect on smooth fillings, a process of staining and pointillism was carried out with lime and acrylic pigments.

Figure 36. Application of finishes with colored paste.  
Figure 37. Generation of texture by pointillism.

Figure 38. Chromatic reintegration process and advance results.

The system of reintegration by staining and pointillism made it possible to create a denotation of the intervention with respect to the constitutive rocky substratum.
Specific goal. Establish publication strategies, academic exchange and socialization of research and interventions in the field of property conservation cultural

Strategic Line. Carry out the delivery of conservation reports according to the logic of the Management Plan.
**Actions (2020). Preparation of the annual report: Graphic record of interventions**

In advance of the delivery of the 2020 Annual Report, the registration of the interventions of the spheres A and E of Finca 6 was made. For this, the views taken during the registration were used as a basis: photographic: top view and each of the cardinal points of the sphere (N, S, E and W, as well as from the NE, SE, SW and NW corners). The registration was carried out using the symbols that were developed in 2019 to mark the union of fragments, fillings and edges. These records remain deposited in folders for subsequent storage and processing by the National Museum of Costa Rica work team.

![Intervenciones](image)

**Figure 42. Symbology used for the graphic recording of the conservation-restoration interventions in Spheres A and E of Finca 6.**

**Actions (2020). academic exchange**

As part of the agreements with the MNCR, it was agreed to carry out academic exchange activities in order to inform the national and international community about the progress achieved by the conservation program. A paper was presented within the framework of the Latin American Congress of Archaeometry held at the Universidad de los Andes in Bogotá Colombia on June 6, 2019. The focus of this presentation was basically directed to the topic of scientific research and it was co-authored by Dr. Isabel Medina-González, Dr. Manuel Espinosa Pesqueira (LANCIC, IIE-UNAM) and the Archeologist. Javier Fallas. A theoretical reflection on the intervention criteria was presented at the LATAM Piedra Congress, organized by the ICCROM and the CNCPC-INAH, in Mexico, co-authored and with the presence of Javier Fallas and Isabel Medina-Gonzalez.
CAPABILITIES

Specific goal. Update local cadres in theoretical, methodological and technical archaeological conservation to optimize the permanence of the spheres and monuments OUV.

Strategic Line Update local curators in theoretical, methodological and technical archaeological conservation to optimize the permanence of the spheres and monuments OUV.

Actions (2020) Training in research, diagnosis and interventions in the field of spheres conservation

As part of the mission logic, all research tasks were planned and achieved and direct intervention in matters of conservation of spheres were translated into a theoretical teaching-learning, methodological and practical strategy for three of the local restorers, who have now acquired skills in these areas, as well as identified new areas of training opportunity. The link between counselling, intervention and training has become a action policy regarding conservation of monuments.

Figure 42. Training strategies in intervention
CREDIBILITY

Strategic Line Establish and monitor the application of a relevant regulatory framework for the intervention in the matter of conservation of the spheres and other monuments of the “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquis”

Specific goal. Establish, apply and disseminate regulations for the intervention of “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquis” monuments.

Actions (2020) Apply the intervention criteria of the monuments of the “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquis”

In 2020, the conservation principles and criteria focused on the intervention were applied to the monuments of the “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquis”, namely:

- Conservation will be carried out through a methodological process that will include a study, assessment, a diagnosis and a decision-making moment, all based on the work of an interdisciplinary team and whose purpose is to be able to contribute to the understanding, preservation and transmission of cultural heritage values.
- Conservation decisions will be based on experience, knowledge, judgments and expertise of professionals specialized in the matter.
- The conservation of cultural heritage will give preference to preventive actions over curative, corrective or direct actions
- All conservation actions must be documented, ensuring that their results are socialized, published and disseminated.
- All conservation actions must be carried out with the highest possible quality.
- All actions must be socially responsible and, preferably, proceed of community participation schemes.

Likewise, the interventions in Spheres A and E of Finca 6 were based on the following intervention criteria:
Respect the authenticity/integrity
• Proceed according to the minimum intrusion required
• Promote reading without creating false historical or aesthetic elements
• Use physically-chemically compatible materials with respect to those corresponding to the invoice.
• Favor reversible or retractable processes
• Allow the denotation of the intervention

COMMUNICATION

Specific goal. Promote greater awareness and knowledge about the OUV of the Diquis sites declared World Heritage both among the general population and, in particular, in the canton of Osa.

Strategic Line. Promote the inclusion of World heritage in formal programs of education through the generation of updated inputs for the programmatic contents of the educational curriculum.

Actions (2017, 2018 and 2019). Attention to visits from basic training schools in the canton of Osa.
These actions were canceled due to circumstances arising from the COVID-19 pandemic.

These actions were canceled due to circumstances arising from the COVID-19 pandemic.

Strategic Line. Promote a media information campaign for the general population about the “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquis”, their OUV and the efforts that the MNCR makes in regarding its conservation and management.

Actions (2017, 2018 and 2019) Dissemination of information in the mass media: journalistic notes in the press, the MNCR website and social networks on issues related to the “Pre-
Columbian Chiefdom Settlements with stone spheres of the Diquis”, its OUV and the advances regarding its conservation and management.

Since 2017, and as a joint development between the DPPC and the DPM of the MNCR, it was carried out a communication campaign in the mass media such as the written press, MNCR website and social networks with the aim of disseminating both the exceptional values of the “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquis”, and in particular of the spheres, as well as the efforts made for their conservation, this as part of a strategy to raise awareness and knowledge of Diquis sites declared World Heritage. This year due to the conditions of the COVID-19 Pandemic, the activities were limited to the preparation of posters, information packages for the national and international press, as well as videos that have been broadcast on the MNCR page.

**Actions (2020) Dissemination of information in the media coordinated by the México Cultural Institute, the Embassy of Mexico in Costa Rica and the Secretary of Foreign Relations.**

The Cultural Institute of Mexico, the Embassy of Mexico in Costa Rica and the Secretary of Foreign Relations Affairs have been fundamental in disseminating the activities of Project 12 “Assessment of Heritage Impact of World Heritage Sites: Chiefdom Settlements with Spheres of Piedra of Diquis Delta, Costa Rica. This year a Radio UCR conversation was organized; others activities had to be canceled in the context of the COVID-19 pandemic.

![Figure 43. Conversation on UCR Radio as part of the Communication strategy in conjunction with the Director of the Mexico Cultural Institute, Mtro. Arturo Valencia, and staff from the Mexican Embassy in Costa Rica.](image-url)
COMMUNITY

Specific goal. Inform the community about the progress made as a strategy information and consultancy within a participatory planning framework

Strategic Line. Communication strategy with the community for information and promotion of participatory planning

Actions (2020). Communication with the local community of Palmar Norte.
This year the activities were restricted to the elaboration of an informative pamphlet to distribution in the population of Palmar Norte; the rest of activities were canceled due to the circumstances arising from the COVID-19 pandemic.

Strategic Line. Intercultural dialogue with Boruca indigenous communities.

Actions (2020) Intercultural workshops with the Boruca indigenous communities.
This year the activities were restricted to the elaboration of an informative pamphlet to distribution in the population of Boruca; the rest of activities were canceled due to the circumstances arising from the COVID-19 pandemic.
During the last year, significant progress was made in relation to the Conservation Program for the “Pre-Columbian Chiefdom Settlements with stone spheres of the Diquis”, in general and their spheres in particular. In general, it is worth emphasizing the ratification of diplomatic frameworks that, based on international cooperation led by the SER, have allowed the extension of Project 12 “Evaluation of the Heritage Impact of Sites of World Heritage: Chiefdom Settlements with Stone Spheres from the Diquis Delta, Costa Rica”, for three years. This extension will allow consolidating conservation strategies, credibility, training, communication and community that support the registration of ACDs in the List of World Heritage. In particular, the advances in the conservation of the stone spheres of Finca 6 have been achieved thanks to a methodological and professional approach that has addressed regulatory and technical issues as a constituent part of the decision-making process. Undoubtedly, one of the greatest achievements of the program has been the intervention of two of the sculptures of the alignments of Finca 6, as well as the establishment of preventive conservation, maintenance and monitoring.

Lastly, it is worth emphasizing that the Conservation Program itself is an innovative initiative of the International Collaboration where the efforts, support and wills have been united of the Secretary of Foreign Relations of Mexico, AMEXCID, through the Cultural Institute Mexico, from the Embassy of Mexico in Costa Rica, the National School of Conservation, Restoration and Museography of the INAH in Mexico, and the National Museum of Costa Rica, within the framework of the Program for Cultural and Educational Cooperation Mexico-Costa Rica 2015-2017: Project 12 “Assessment of Heritage Impact of World Heritage Sites: Chiefdom Settlements with Stone Spheres from the Diquis Delta, Costa Rica. In these efforts it is worth making visible the efforts and support unconditional of Mtro. Arturo Valencia, director of the Mexico Cultural Institute in Costa Rica, of the Prof. Rocio Fernández, director of the National Museum of Costa Rica, and the directors of the ENCRYMINAH, in particular its current director, Mr. Gerardo Ramos Olvera.

Churubusco, June 12, 2020
Report on conservation work in the in-situ spheres of the archaeological monument Finca 6 (P-254 F6), Osa, Puntarenas

Project: Conservation of pre-Columbian assets in Chief Settlements with Stone Spheres in the Diquís Delta, declared World Heritage

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May, 26th, 2022

San José, Costa Rica
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I. Introduction

This document specifies the preventive and corrective conservation work carried out from March 14th to 31th, 2022. Activities were concentrated on two stone spheres located in the alignments sector in the archaeological monument Finca 6 (P-254 F6), which is located in the Osa canton, southeastern Costa Rica. Monitoring work was also carried out at the El Silencio, Batambal and Grijalba-2 monuments; as well as in the sphere placed at the Boruca Community Museum.

The archaeological conservation field season was an activity scheduled in the Bilateral Cooperation Project between Costa Rica and Mexico called "Conservation of pre-Columbian assets in the Chiefdom Settlements in the Diquís Delta declared World Heritage" for the period 2020-2022. It was made official in 2019 before the Ministry of National Planning and Economic Policy (MIDEPLAN) and the Ministry of Foreign Affairs.

From the Department of Cultural Heritage Protection of the National Museum of Costa Rica (MNCR) the participants were: Alonso Silva, restorer, and Javier Fallas, archaeologist-conservator. The counterpart from Mexico was Dr. Isabel Medina González and Adriana Castillo, officials from the National School of Conservation, Restoration and Museography (ENCRyM) of the National Institute of Anthropology and History (INAH).

Other MNCR participants were: archaeologist Dr. Francisco Corrales, from the Department of Anthropology and History (DAH), Freddy Alonso Bonilla, driver of General Services section, and Finca 6 Visitor Center manager Jeisson Bartels and his staff in charge of the field work (Mainor Delgado, Johnny Fernandez, Jordan Ulate, Elias Morales, Juan Navas, and Rodrigo Diaz).

The collaboration of the educator Carlos Morales, from the Finca 6 Site Visitor Center and communicator Wendy Segura from the Museological Projection Department, MNCR was also very valuable.
II. Objectives

- Carry out interventions in spheres B and D of Finca 6 to optimize the state of conservation.
- Carry out maintenance interventions in spheres A and E of Finca 6.
- Execute preventive conservation tasks in the spheres of Finca 6.
- Monitor the 2019 intervention carried out in the sphere of the El Silencio site.
- Carry out interventions in the sphere of the Community Museum of Boruca.
- Continue the dialogue with indigenous communities on issues of archaeological conservation.
- Disseminate the archaeological conservation work in the Diquís sites declared World heritage at the local, national and international level.

III. Work carried out in spheres B and D of Farm 6

The work carried out in this archaeological conservation season was concentrated in spheres B and D of the Finca 6 monument. The work consisted of a documentation of surface alterations, re-excavations, surface cleaning of microorganisms, interventions, preventive actions, among others actions, which are detailed below:

3.1. Documentation of surface alterations in the spheres

The diagnoses of alteration records made in 2017 and 2018 were key to understand the state of conservation of the Finca 6 spheres (Fallas, 2017, 2018; Silva, 2018). Through monitoring tours, its condition has been periodically assessed, paying attention to the behavior of the alterations in the dry and rainy seasons, as well as the growth of the surrounding vegetation (Fallas, 2020b, 2021a, 2021b). These monitoring contribute to decision making and work planning in the field seasons.

This season, initial documentation continued with photographic records of the zenithal plane and the four corners of the re-excavation (before and after cleaning). The surveying staff, a plastic arrow pointing north, an acrylic board with the name of the site, sphere number, date of capture, and the plane of the sphere being photographed were placed on each photograph.
3.2. Re-excavation
To remove the fill that covered spheres B and D of Finca 6, excavations of 3 x 3 m were carried out, reaching between 80 and 120 cm deep. The base of the spheres was not reached because in those sectors they do not present physical impairments. This work was coordinated by Dr. Francisco Corrales.

Arbitrary levels were not established in these re-excavations, and the only distinction in this process was firstly the removal of the earth and then the sand (Figure 1), both materials were placed in 2017, and it was the last re-excavation carried out in these spheres (Fallas, 2017).

The re-excavations carried out in this field season determined that the reburials carried out in 2017 were successful, because the perimeter of sand placed around the spheres was maintained and prevented the growth of thick roots in the buried sector, although thin root growth did occur. In addition, the geotextile placed on the sand layers was kept in a good state of conservation.

*Figure 1. Progress in the excavation process in sphere B of Finca 6*
3.3. Interventions
The restoration in the spheres involved different processes that will be detailed below:

3.3.1. Surface cleaning of microorganisms
In order to have sterilized rock matrices in the interventions of spheres B and D of Farm 6, cleaning was carried out in two moments; in the zenith planes before the re-excavations and in the rest of the surface of the spheres after the re-excavations.

The soil and biofilms adhered to the surfaces of the spheres were removed with dry cleaning using thick brushes, brushes (with fine and medium bristles), wooden spatulas, and dental tools. This was made with greater care in areas such as cracks and loss of material. rocky material. In the exposed sectors of sphere B, the growth of rhizomes was noted, which were removed manually or with the use of said tools (Figure 2a and 2b).

Wet cleaning was then carried out by applying liquid products in different proportions with pump atomizers, such as 50% distilled water with 50% ethyl alcohol, and 95% distilled water with 3% hydrogen peroxide. These products were sprayed and supplemented with brushes (soft and medium bristles) to progressively remove soil and biofilm. The wet cleaning was carried out from the zenith to the base of the spheres, to prevent dirt from entering the cracks and missing spaces of the constituent material of these objects (Figure 2c and 2d).

Sphere B generated more work during its cleaning process, because in the exposed sectors of the zenithal plane it presented physical deterioration such as cracks, missing material and loss of material in granular form, which implied more care not to erode the rock of this sphere.

This cleaning process was documented through photographic records that showed the changes that the surfaces of the spheres acquired. This documentation also provides information to provide annual monitoring of the state of conservation of these spherical objects.
3.3.2. Withdrawal of previous interventions

The process of cleaning the rock matrix of spheres B and D of Finca 6 also involved the removal of lime and sand, cores made in a quadrangular shape (1.5 cm on each side) placed in 2017 on cracks distributed in the upper and middle sectors (buried) of both spheres.

In the first instance, an accounting of the evidence located 5 years ago was made. It was verified that the 11 witnesses in sphere B and the 8 in sphere D were in a good state of conservation, they did not present cracks or detachments, which indicates that the spheres do not show movement. With the passage of time, these tests were pigmented with light brown tones, due to the contact of the cores with the sand and the earth used during the reburial (Figure 3a), but it was easily removed with a brush and the original light gray tone was recovered (Figure 3b).

After this assessment, hardness measurements and detailed photographic documentation were made. Subsequently, these witnesses were removed with stainless steel tools and
the percussion of the hammer on a chisel (Figure 3c and 3d). The residues of these tests adhered to the surfaces of the spheres were removed with fine bristle brushes and the application of distilled water, ethyl alcohol and acetic acid.

**Figure 3.** Lime and sand cores placed in 2017 in sphere B of Finca 6: a) sand-covered crack test, b) crack core after sand cleaning, c and d) before and after mechanical removal.

3.3.3. Interventions of the spheres

The intervention process of spheres B and D of Finca 6 involved 4 work stages: selection of materials, preparation of materials, integration, and chromatic integration, which are expanded below:

- Selection of materials: Scientific studies previously carried out by Dr. Manuel Espinosa of the Institute of Aesthetic Research (IIE) of the National Autonomous University of Mexico (UNAM), determined the compatibility of sand and lime with the constituent material of the stone spheres from the Diquís sites.
- Preparation of materials: Prior to the field season at Farm 6, the materials for the intervention of the spheres were acquired, mainly lime, sand and pastern stone.

Quicklime was obtained at the Fossil Land lime kiln, located in Patarrá de Desamparados, San José. Two weeks prior to field work (March 1 to 11, 2022), a 25-kg bag was hydrated with distilled water and placed in two plastic containers (5-gallon buckets). The procedure consisted of placing the quicklime and progressively adding water until it exceeded the volume of quicklime, and little by little the lime lost caloric energy and produced calcium hydroxide, also called slaked lime. In the following days, the lime was removed, and this process was continued on site (Figure 4a), because the hydration and periodic movement of the lime allows it to function as a cement or mortar, with higher quality lime settled at the bottom of the container.

The sand was washed with distilled water to remove particles such as ferromagnesians and prevent the formation of future deterioration on the surfaces of the spheres. The selected sand was sieved in different sieves (by the strainer and the sieve), to have various thicknesses of sand. Sands of gray and yellow tones were available; whose proportions were transferred to the site in plastic bags (Figure 4b). The pastern stone was also left to rest on distilled water to remove adhering particles, although this process was done on site (Figure 4c).

For the intervention of the spheres, lime and sand pastes were prepared in a 1:1 ratio, which were stored in labeled plastic containers (Figure 4d). The mortars were prepared with some differences in the selection of sand thicknesses, because coarse sand was used, since it provides greater consistency in the pastes. It should be noted that in some of these mortars, pumice stone powder was used in a 1:1 ratio, with the intention of adding hardness and prolonging the resistance of the interventions, because they are exposed to the environment.

The mortars used in the intervention of the spheres comply with two principles: 1) the hardness of the paste does not exceed the hardness of the rock, and 2) the mixture is more permeable than the rock of the sphere.
Figure 4. Preparation of materials used in the intervention of spheres B and D of Finca 6: a) removal of hydrated lime, b) sand processed and transferred in plastic bags, c) pastern stone resting in water and d) progress in the preparation of the paste.

- Integrations. In spheres B and D of Finca 6, three types of integrations were made: patches, patched cracks and edging. The procedure in these cases began by wetting the intervention area with distilled water. The lime/sand mortar was placed progressively in a 1:1 ratio, and pressed with metal spatulas to compact the paste and extract the stored water.

The patches were made with coarse sand mortar and covered spaces with loss of rocky material from the spheres such as multilevel losses, missing, loss of rounded shape, and were located in the zenith and upper planes, which correspond to the most exposed areas of these spheres in Finca 6.

Due to the fact that these deteriorations exceeded 3 cm in length and 0.5 cm in depth approximately, pastern stone was placed after having made a first layer of paste, this with the intention of giving greater consistency to the mortars (Figure 5a). On this layer of pastern stone, the lime paste with sand was placed again (Figure 5b). The depth of the
gaps involved the placement of different layers of paste. In the intermediate phases, the mortar was “scratched” to provide better adhesion for the next layer to be placed. It is estimated that more than 30 repairs were made.

The repaired cracks were lime and sand mortars in a 1:1 ratio placed on cracks from 0.1 to 1.5 cm wide and up to 9 cm deep (concentrated in the zenithal planes and the upper and lower sectors) and in a phase shift on the south face of sphere B (Figure 5c and 5d). In the deepest spaces of the cracks, pastern stone was placed and then the mortar with coarse sand. In the thinnest cracks (mainly in the middle sectors) paste with fine sand was used to make it easier to enter the narrowest and deepest spaces. Approximately 40 fissures were repaired.

The edging consisted of placing 1:1 paste (fine sand) on angular sectors of delaminations and joints located in the upper part, mainly in sphere B. It is estimated that at least 6 edgings were made.

The intervention methodology carried out in both spheres implied certain differences in the procedure due to the deterioration and distribution of these, because the intervention in sphere B was carried out from the zenithal plane towards the lower sector, while sphere D was made from the lower sectors to the upper ones.

In the intermediate drying process of the interventions, textures were created to homogenize the finishes of the spheres and avoid concentrations of water that would trigger instability in the interventions. The textures were made in two ways: through the impression left with a wooden stick (Figure 5e), or with the placement of mortar balls; this last case was only carried out to resemble the loss of multilevel of the zenithal plane of the sphere B of Finca 6.

It should be noted that during the interventions in Finca 6, the area presented an environmental temperature that exceeded 30 ° C, what is characteristic of the dry season in the southeastern Pacific area of Costa Rica. As a result of this situation, damp cloths were placed in the interventions to facilitate a slow drying process of the mortar, because an accelerated drying may burst the interventions.
Figure 5. Processes of the interventions carried out in sphere B of Farm 6: a) placement of pastern stone on a paste of lime with sand, b) advancement of patching, c-d) process of placing mortars on patched cracks, e) preparation of textures in the interventions, f) reintegration of color with gray and yellowish tones.

It should be noted that spheres B and D of Finca 6 presented various common biological and physical deteriorations, but without a doubt, sphere B had a greater deterioration in the exposed plane, and this is due to differences in the state of conservation of the constitutive material.
Figure 6. Process of the interventions carried out in sphere D of Finca 6: a) front view of a missing sector, b) front view of the missing sector covered with pastern stone placed on an initial layer of lime paste with sand, c) front view of mortar with “scratched” segments, d) patch drying, e and f) chromatic integration process.

- Chromatic reintegration. After the patches, patch cracks and trims dried, the mortar went from a dark gray tone to a light gray. To resemble the texture and color of the surface of the spheres, the color reintegration of the exposed zenithal plane was carried out, and a general pigmentation was made in the buried sectors of the spheres.
In the reintegration of color, lime water was used for the white color and to dilute the yellow, green, red, brown and black tones of low-viscosity Pébeo acrylic paints. Brushes of different thicknesses and tips, #1, 2 and 3 were used to make the “dotting” technique (Figure 5f), while #20 brushes were used to create general textures (Figure 6f), and #15 for finer textures.

The interventions carried out in spheres B and D of Finca 6 were documented through constant photographic records of detailed and general plans, and which allows demonstrating the changes given in these spheres (Figure 7).

**Figure 7.** Views of the intervention process carried out in the spheres of Finca 6: a, b and c) before, during and after the intervention of the southwest sector of sphere B, d, e and f) before, during and after the intervention of the sector northeast of sphere D.
The interventions were also recorded graphically, and consisted of placing transparent sheets on top of the photographs taken from the zenithal planes and from the four corners of the excavation. On this surface, the interventions were captured with symbols established since 2019 and that have been implemented in the restorations of the spheres of the El Silencio, Finca 6, Batambal, and Grijalba-2 monuments (Figure 8).

**Figure 8.** Diagram of the record of interventions made in the zenithal plane of sphere B of Finca 6

Interventions in spheres B and D provide mechanical stability, and are visually perceptible. To exemplify this process, the photographic records of before and after the interventions in the zenith planes of spheres B and D of Farm 6 are taken as reference (Figure 9).
3.4. Preventive conservation
The intervention processes in spheres B and D were complemented with preventive conservation work, some of the tasks were carried out in parallel with the interventions (such as the placement of temporary roofs and environmental monitoring), and other actions were carried out later to interventions (reburials), whose particularities are detailed:

3.4.1. Reburial
In the semi-exposed spheres of the Finca 6 monument, a reburial methodology has been implemented since 2017, based on replacing the land surrounding the sphere with river sand, which was previously sifted in a sieve. This measure makes it possible to reduce the growth of vegetation near the sphere, facilitates and accelerates water filtration and controls humidity concentration.
In 2022, the procedure was carried out in spheres B and D of Finca 6. At a depth of between 80 and 120 cm, 5 wooden boards were placed vertically (approximate sizes of 200 cm long, 35 cm wide and 2 cm thick), creating a diamond in the 3 x 3 m excavations (Figure 10a and 10b).

Through the use of tools such as wheelbarrows and shovels, this provisional structure was progressively filled, the interior with sand and the exterior with the earth removed from the re-excavation (Figure 10c), creating a space around the sphere of 30 to 50 cm in diameter. wide covered with sand. To give consistency to the fillings, they were imprisoned with the wooden boards and the weight of several people.

**Figure 10.** Reburial carried out in sphere B of Finca 6: a) process of placing and imprisoning the earth, b and c), view of placing and imprisoning the sand, d) arrangement of the geotextile, e) prefinal view of the stone placement fourth, and f) final view.
When the height of the boards was completed (30 cm), they were removed and placed again on top to repeat the procedure described above. Rope handles were made at the ends of the wooden boards to facilitate the removal of the pieces on the fills (mainly because the moist soil adheres).

At 40 cm from the surface level (approximately), strips of geotextile (6 m long and 40 cm wide) were placed vertically on the outside of the boards. This measure seeks to avoid root contact with the buried sectors of the sphere. Subsequently, the reburial process continued until ground level was reached (Figure 10d).

To facilitate the filtration of the standing water on the surface of spheres B and D, gravel stone was placed on the last layer of sand located in the reburial (Figure 10e). This will function as an absorption well and seeks to reduce ponding, mainly in the rainy season. This gravel stone layer was then covered with sand (Figure 10f), leaving a 50 cm wide ring of sand from the exposed portion on the sphere. The entire process of the reburials carried out in both spheres was documented through photographic records.

In the surrounding space of sphere D, the pooling of water during the rainy season has been noted. To evacuate the water, a ditch (7 m long, 45 cm wide and 70 cm maximum depth) was made to the west of the sphere, so that it connects with an internal channel of the site.

3.4.2. Temporary roofing
In order to reduce the impact of solar radiation and rain on the interventions that were being carried out in spheres B and D of Farm 6, temporary awnings of two sizes were placed, one rectangular (6 m wide and 12 m long) (Figure 11) and another quadrangular (3 per m long). Under these conditions, temperature and humidity measurements were taken (both environmental and surface) which will be detailed in the following section.

During the field days, a general measurement was made on the minimum sizes that a roof should have. A 6 m wide by 18 m long range was established to cover spheres A and B, as well as a 6 m wide by 15 m long range to cover spheres D and E, respectively.
The data generated from these temperature and humidity measurements and the estimation of the required dimensions of these structures will provide important inputs to analyze the possibility of placing (or not) temporary or permanent roofs on the spheres that are located in the alignment sector of Farm 6. These conditions will contribute to the state of conservation of the spheres and prolong the durability of the interventions, mainly during the rainy season.

3.4.3. Environmental monitoring
During the intervention of the stone spheres of Finca 6, the deteriorations formed on their surfaces were monitored, based on microclimatic measurements.

Environmental measurements were made on 8 days (from March 15 to 25, 2022) three times a day (between 7:00 and 8:00 a.m., from 12:00 to 12:30 p.m., and between 3:00 and 3:00 p.m.). 3:30 pm), whose data was recorded physically and then digitized in Microsoft Excel for processing. It should be noted that when these measurements were made, the spheres were under a temporary roof.
3.4.3.1. Environmental temperature and humidity measurement

The readings were carried out using an electronic instrument called an environmental thermo-hygrometer, which measures air temperature and relative humidity in real time, and was placed in the zenith planes of spheres B and D of Finca 6. A total of 26 measurements were recorded. (13 per sphere); temperatures ranged from 28.1 °C to 41.1 °C, and relative humidity from 36 to 85%.

The environmental temperature and humidity data were recorded during three times of the day, and for this reason, they were processed separately. Of the 26 measurements made, a total of 14 measurements were made in the morning (7 in each sphere), 8 at noon (4 per sphere) and 4 in the afternoon (2 in each sphere).

The averages of measurements recorded during the three times of the day in spheres B and D showed that morning temperature (7:00 to 8:00 am) ranged between 31.4 and 31.3 °C, respectively, from 38, 7 to 40.1 °C at noon (12:00 to 12:30 pm) and from 35.4 to 37.05 °C in the afternoon (3:00 to 3:30 pm) (Graph 1).

**Graph 1.** Finca 6: Distribution of environmental temperature averages recorded by the thermo-hygrometer on the zenithal plane of spheres B and D, according to hours of measurement in the month of March 2022.
This indicates that measurements recorded in the morning showed the lowest and similar temperatures between both spheres, while at noon and in the afternoon, they showed higher temperatures and, on average, 1.4 to 1.65 °C higher in sphere D than in B (Graph 1).

The environmental humidity averages in both spheres show that readings of 46.9 to 58.2% were recorded in the morning, respectively, between 42.2 and 37.5% at noon and 48.5 to 43% in the afternoon (Graph 2). An opposite behavior was recorded compared to the measurements of environmental temperature shown above, because the concentration of higher humidity occurred in the morning and with higher values in sphere D, while at noon and in the afternoon the data were lower, and in average 4.7 to 5.5% higher in sphere B than in sphere D (Graph 2).

Graph 2. Finca 6: Distribution of environmental humidity averages documented by the thermo-hygrometer on the zenithal plane of spheres B and D, according to hours of measurement in the month of March 2022.

The ambient temperature and humidity readings of spheres B and D of Farm 6 provide data on the behavior of the immediate environment during the month of March 2022, but it is recommended to contrast them with the measurements recorded in the month of March 2020.
3.4.3.2. Rock surface temperature and moisture measurement

The surfaces of spheres B and D of Farm 6 were measured differently, because a digital infrared thermograph was used to determine the temperature, which was placed half an inch from the sphere (Figure 12); and for humidity, a protimeter was used that was located directly in the rock of the sphere.

**Figure 12.** Surface temperature and humidity measurement process in sphere A of Finca 6.

In the three moments of the day, 24 measurements were made in the zenithal plane of the spheres (12 for each one), distributed in 14 readings in the morning, 6 at noon and 4 in the afternoon. The processing of this information showed that surface temperatures in the morning ranged on average between 28.9 and 29.5 °C respectively, at noon from 40.9 to 37.4 °C, and in the afternoon between 32.2 and 32.2 °C. 37.2 °C (Graph 3).
Graph 3. Farm 6: Distribution of surface temperature averages recorded by the infrared thermograph on the zenith plane of spheres B and D, according to approximate hours of measurement in the month of March 2022.

It also shows that the morning temperature measurements were lower, with sphere D reflecting on average 0.6°C more than sphere B; while at noon and in the afternoon higher temperatures were recorded, and similar averages between both spheres (Graph 3).

The surface humidity averages between both spheres showed that in the morning they ranged between 11.7 and 9.4% respectively, at noon from 10.6 to 5.3% and in the afternoon from 12.5 to 6% (Graph 4). The surface humidity readings also showed opposite data to the surface temperature measurements, and sphere B presented higher values during the three times of the day compared to sphere D (Graph 4).
**Graph 4.** Finca 6: Distribution of average surface humidity readings documented with the protimeter on the zenithal plane of spheres B and D, according to approximate hours of measurement made in the month of March 2022.

The information generated in these environmental monitoring is essential to understand the environment in which the stone spheres are exposed, particularly those located in alignment sectors in the Finca 6 monument. The possibility of carrying out these monitoring at other times of the year should be considered, as well as to compare with the measurements recorded in the weather station of the National Meteorological Institute, also located in the Finca 6 monument.

**IV. Work in other areas of Finca 6**

In spheres A, C, E and F, preventive and corrective conservation work was carried out, such as superficial cleaning, maintenance of interventions, interventions and maintenance of its surrounding space.

**4.1. Surface cleaning of microorganisms**

In spheres A, C and E of the Finca 6 monument, a superficial cleaning of the soil and microorganisms adhered to the zenithal planes was carried out, and in sphere F it was carried out on its entire exposed surface. The cleaning process was carried out in the
same way as described for spheres B and D, and documentation was made of before, during and after this process (Figure 13).

**Figure 13.** Cleaning of surface microorganisms in sphere C of Finca 6 site.

4.2. Maintenance of interventions

Spheres A and E of Finca 6, intervened in 2020, underwent a maintenance process. The process consisted of re-placing trims and patches in the parts that had become detached from the exposed sectors in both spheres.

The characteristics of deterioration in each sphere determined the type of intervention carried out, in sphere A welts and patches were made, while in sphere E welts and patched fissures were made (Figure 14a and 14b). In both cases, the 1:1 mortar (lime and sand) was used, with a difference in the thickness of the sand. The color reintegration process carried out in the other spheres was also replicated (Figure 14c and 14d).

All the maintenance processes of the interventions of spheres A and E of Farm 6 were documented through photographic and graphic records in a general and detailed manner (Figure 14e and 14f).
**Figure 14.** Maintenance process of the interventions in sphere E of Finca 6: a-b) process of placing trims and repaired fissures, c-d) before and after the color reintegration process, e-f) photographic and graphic record of the interventions made.

4.3. Interventions

In sphere F of Finca 6, interventions were made with lime and sand mortars in a 1:1 ratio to stop physical damage, and consisted of patches placed on sectors with loss of material, as well as edging made on the edges of delaminations (Figure 15a and 15b), located mainly between the upper and middle sectors of the sphere.
The same procedure was used in the other spheres, as well as photographic and graphic documentation (Figure 15d).

**Figure 15.** Intervention process in sphere F of Finca 6: a-b) placement of patches on delaminations, c) color reintegration process and d) north plane intervention diagram.

4.4. Maintenance of the space surrounding the spheres

In the spaces surrounding the exposed crowns of spheres A, C and E of Finca 6, the vegetation was cleaned to isolate these stone monuments from contact with the surface. This activity involved an induction to the staff of the Visitor Center of Finca 6 Site.

The proper procedure is to remove by hand the vegetation that grows on the layer of sand from the reburial made in 2018 and 2020, while the grass that thrives on the ground is left low by cutting with a knife in an outward direction. (Figure 16a), so that the grass does not deposit towards the surface of the sphere. It should be noted that the sphere must be covered with a canvas to avoid any blow with a stone or a knife.
In spheres A, C and E, absorption wells were made to improve the filtration of the surface ponded water. This process consisted of digging (approximately 30 cm wide and 10 cm deep) around the crown of the spheres (Figure 16b). Subsequently, gravel stone was placed and finally the sand was placed (Figure 16c and 16d).

**Figure 16.** Maintenance of the space surrounding sphere C of Finca 6: a) removal of the surrounding grass, b) excavation of the surrounding space, c) placement of a fourth stone, d) placement of sand.
V. Works in the other WH sites

5.1. The Silence

In the El Silencio monument, a general tour and monitoring of the state of conservation of the intervened heritage was made. In the case of the stone sphere the following was done:

- Photographic record from the four reference corners.

- Detailed photographic documentation of the status of the interventions carried out in 2019 (Figure 17a, 17c and 17e).

- Maintenance of interventions. The in-situ evaluation allowed detecting the adherence of biofilms to the interventions and for this reason a cleaning was carried out. Micro-detachments of the mortar were also noted in some interventions, so it was decided to place the lime paste with sand again in a 1:1 ratio, mainly edging on the edges of sectors with delamination.

The loss of color integration of the interventions was also detected, because they presented the base gray color. Faced with this situation, the chromatic reintegration was made based on brown and green tones with acrylic paints. This made it possible to match the color and texture of the sphere. This process was documented through general and detailed photographic records to assess the before and after color reintegration maintenance (Figure 17).

- Photographic record of the lime/sand mortar tests (in proportions 1:2 and 1:3) located in 2018 on a river boulder and which was placed 2.5 m to the northwest of the sphere. It was confirmed that these tests resisted almost 4 years exposed to the same environmental conditions as the sphere.
Figure 17. Documentation and maintenance of color reintegartion in the interventions of the El Silencio sphere: a-b) northeast view before and after chromatic reintegartion, c-d) reintegrated fragment before and after chromatic reintegartion, e-f) repair before and after chromatic reintegartion.

In the paving of the El Silencio monument located near the sphere, only a photographic record was made from 5 m from the east face of the sphere (Figure 18). The assessment made it possible to follow up on the interventions carried out in this structure in 2019; and on this occasion it was appreciated that the growth of the manisillo grass has patinated the mortar placed 3 years ago.
5.2. Batambal

In the Batambal monument, a general monitoring of the state of conservation of the exposed heritage and the state of the interventions carried out in 2021 in spheres 2, 3 and 4 (Figure 19) was carried out.

An evaluation of the resistance of the hardness of the mortar was carried out. Loss of color reintegration was observed, but in many cases, it was patinated with the formation of biological deterioration such as moss, like the rest of the surface of the sphere.

Figure 19. Monitoring of the state of conservation in the intervention of sphere 4 of Batambal
5.3. Grijalba-2
In the Grijalba-2 monument, a general tour was carried out to document the state of conservation of the archaeological structures, as well as the condition of the stone sphere (Figure 20). It was noted that the surface of said spherical object has few biofilms, a product of the cleaning carried out in November 2021. While the interventions (healed fissures) made in the zenithal plane of the sphere are in good condition, although it has lost a great deal of part of color reintegration.

Figure 20. Monitoring of the sphere of the Grijalba-2 monument

The technical works of archaeological conservation in the world heritage sites were complemented with outreach actions with the communities, which are described below:

VI. Boruca Indigenous Community Museum
We visited the Boruca Community Museum which is in the process of being remodeled, Mileny González Lázaro and Margarita Lázaro attended us. During the internal tour, different rooms were observed, such as the exhibition room, the handicraft sales area, and progress is being made towards the opening of a restaurant for traditional meals. Without a doubt, the incorporation and renovation of these spaces will bring benefits to this museum.
In the case of the exhibition spaces, attention was paid to the state of conservation of the stone sphere, which has been in the form of a temporary loan agreement since 2013. It was noted that, as part of the changes made to the infrastructure, the sphere is not outside, but rather inside the museum.

The technical conservation works carried out in the stone sphere were:

- Photographic record from the four cardinal points of reference (Figure 21a). It was compared with previous photographs, and it was noted that the sphere appears to have been slightly moved to the north, possibly during the refurbishment.

- Dry cleaning with a brush to remove accumulated dust (Figure 21b).

- Conservation diagnosis. A review of the rocky matrix of the sphere is made, and deterioration of physical origin such as differential alteration, delaminations and impacts, as well as cracks and delaminations on the east and north face, are recorded through detailed photographs. In addition, in the lower part it has traces of red paint and cement splashes as a result of the maintenance work done on the floor.

- Interventions. Two edgings were made with lime paste and sand in a 1: 1 ratio at two points of a delamination that was about 10 cm long (Figure 21c and 21d). The borders were made to stop the delamination process. While on a thin fissure that goes from the upper sector to the middle part of the north face, two lime and sand witnesses were placed in a quadrangular shape (1 x 1 cm).

In both intervention processes, the reintegration of color was done with acrylic paints (Figure 21e and 21f). Likewise, a general and detailed photographic record of these interventions was carried out.
Figure 21. Preventive and corrective conservation processes carried out in the sphere of the Boruca Community Museum: a) photographic record of the west plane, b) dry cleaning with a brush, c-e) intervention process with borders placed on the edges of the delamination and f) final view of the lime and sand witness placed on the fissure.
VII. Divulgation of information

This field season, outreach activities were resumed with the local population (Osa canton), specifically on the conservation and restoration work carried out at the Finca 6, El Silencio, Batambal and Grijalba-2 sites. It should be noted that due to the situation that the country is still going through due to the pandemic, activities with little crowding were contemplated.

In the Community Museum of Boruca, a dialogue activity was carried out with the community on several topics, such as the perceptions about the conservation of the cultural heritage that they protect in their museum space, the modality of temporary loans of archaeological objects, as well as informing about the restoration work in world heritage sites, and the conservation work in the sphere that they exhibit in their Museum (Figure 22).

This activity was carried out with the participation of other colleagues from the National Museum, such as Ronald Martínez from the Regional Museums Program, Francisco Corrales from the Department of Anthropology and History, and Carlos Morales from the Site Museum Finca 6.

Figure 22. Dialogue activity in the Boruca Community Museum.
In the Finca 6 monument, outreach actions were also carried out with different actors, such as dialogues with national and foreign tourists, the delegation of the National Archaeological Commission and the local government of Osa. The COVIRENAS group from ACOSA was given a guided tour of the “Legacy in Stone” exhibition, located in the temporary room of the Farm 6 Visitor Center, and was complemented with a tour of the site (Figure 23), to explain the process of interventions implemented in areas B and D.

Figure 23. Dissemination activity on the archaeological heritage of Diquís carried out at the Finca 6 Visitor Center

We also collaborated with the communication area of the Museographic Projection Department, specifically in the preparation of the press release published on April 2, 2022 in the digital bulletin of the National Museum of Costa Rica, entitled “Two pre-Columbian spheres were subjected to the process of conservation and restoration in situ”, whose material was sent to other national communication media such as La Nación.

It should be noted that the Finca 6 monument also attended to local media, specifically Ballena Tales from Uvita and the newspaper Enlace from Pérez Zeledón. While in a virtual way, the communication area of the National Institute of Anthropology and History (INAH) of Mexico was attended, whose information was replicated in other Mexican newspapers.
VIII. Final considerations

The archaeological conservation season carried out in March 2022 in the Finca 6 monument is a continuity of activities scheduled in the Conservation Program of the Chiefdoms Settlements with stone spheres of the Diquís, declared by UNESCO as a World Heritage Site.

The intervention actions carried out in the Finca 6 monument (mainly in spheres B and D) complied with a series of international archaeological conservation principles such as compatibility, reversibility, recognition by the restored sectors of these stone monuments, as well as respect for his story. Restoration materials (specifically lime and sand) were selected and used that are compatible with the constituent material of the stone spheres, and at the same time comply with the principle of reversibility because the restorations can be undone if necessary. These materials were used to make repairs, edges and repaired fissures that were placed on spaces with rock material losses (deterioration such as delaminations, missing parts, cracks, among others), whose interventions contribute to the stabilization of the external surfaces of the spheres and their time, to mitigate the interior because it protects from water seepage or the entry of insects.

The recognition of the intervened sectors is facilitated by the use of the same materials of lime and sand, in addition to the color reintegration process made with acrylic paints. While the principle of respect for the history of these stone spheres was executed during the process of analyzing which places were going to be intervened, because some "marks" of their surfaces were preserved, possibly generated by the agricultural activities carried out years ago, due to because these sectors showed stability in their rocky matrix.

The intervention is a learning process about the object of study. In the restorations of the spheres, decisions have been made based on their raw material, type of deterioration, degree of exposure, among other aspects. The monitoring of the on-site interventions carried out in 2020 in spheres A and E of Farm 6 (Duncan, 2020; Fallas, 2020a; Silva, 2020), allowed in 2022 to adjust technical aspects in the elaboration of the fillings, because in this case they were raised to monitor if they have a greater resistance over time in their exposure to the elements. For this reason, the importance of periodic
monitoring should be highlighted to record the state of conservation of the spheres and the behavior of the restorations to plan specific actions.

These corrective conservation works contribute to preserving the integrity and authenticity values of this Diquís cultural heritage, but preventive conservation actions are also essential, such as regular cleaning of microorganisms, optimization of landfills through reburial, as well as the importance of temporary roofs.

Precisely during the intervention of spheres B and D of Finca 6, provisional awnings 6 m wide by 12 m long were placed, which made it possible to demonstrate the benefits that the spheres (and the restorations) would have when these structures were placed, because they mitigate the direct impact of solar radiation and rain.

However, it is relevant through the involvement of different professionals to have the discussion of assessing the possibility (or not) of building these temporary roofs. This management represents a challenge for the management of these monuments, because the design and budget projection of these infrastructures must contemplate the least impact on the landscape, as well as contemplate the risk of damage to them, because in the El Silencio monument given the theft of the zinc sheets of the temporary roof.

The conservation works contribute to the preservation of their heritage and also contribute to the interpretation of the archaeological components of these Cultural Sites declared World Heritage Sites, because it is key to guide them towards their understanding; for this reason the involvement of the local community to transmit the values of this ancient culture, as well as to disseminate the conservation and restoration work carried out in the cultural assets of the Pre-Columbian Chiefdom Settlements with Stone Spheres. These dialogues are pertinent in a sustained manner to consolidate strategic actors over time.
IX. Recommendations

Based on the actions carried out in the archaeological conservation field season carried out in 2022 and considering previous work, the following is recommended:

- Monitor and maintain the interventions in the zenithal plane of spheres A, B, D, E and F of Farm 6.
- Monitor the conditions of the natural environment of the areas of Finca 6.
- Compare the temperature and humidity measurements (environmental and surface) recorded in 2018, 2020 and 2022 in the Finca 6 monument to provide input on the topic of roofing.
- Evaluate the placement of provisional roofs in the semi-buried areas of Farm 6, to reduce the impact of exposure of the interventions due to direct exposure to solar radiation and rain.
- Monitor and maintain interventions in the sphere and the exposed segment of the cobblestone of the El Silencio monument.
- Plan in a multidisciplinary way the designs of a suitable roof for El Silencio, which considers the type of roof, size and the sphere-cobblestone-environment relationship. Previously, the cobblestone intervention must be completed and surrounding areas archaeologically liberated.
- Carry out image studies (three-dimensional survey or photogrammetry) of the zenithal plane of spheres A, B, D and E of Finca 6.
- Promote interdisciplinary research with public institutions in Costa Rica that contribute to the restoration process of the stone spheres.
X. Bibliografía

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