

Upper Cauca River Basin Geopark: an opportunity to conserve the natural and cultural heritage of the region

Geoparque de la cuenca alta del río Cauca: una oportunidad para conservar el patrimonio natural y cultural de la región

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Letter to the editor

Humanity is currently facing an alarming global ecological crisis. Effects such as the increase in temperature, the loss of biodiversity and the degradation of ecosystems, show the levels of impact caused on the planet, compromising the capacity of ecosystems to sustain life (1,2). The upper basin of the Cauca River (CARC) has also been degraded, especially in its quality, but its recovery is a priority because it is an important part of the natural, cultural, ecological, social and economic heritage of the nation. This part of the basin is characterized by having a high ecosystem and biodiversity value, from its source in the Sotará páramo at 4000 meters above sea level in the Colombian Massif (department of Cauca), to its mouth in the Magdalena River 2 km from the town of Pinillos (department of Bolívar) at 15 meters above sea level, (3).

Since the second half of the twentieth century, with the formation of the Club of Rome (1957), evidence has been presented on the environmental deterioration of the planet and in response multiple conservation strategies have been proposed with insufficient results, but they reflect a global recognition of the ethical, ecological and civilizational need to preserve life on the planet. As strategies to conserve natural heritage have been deepened, the understanding has grown that there are areas that harbor a mixed ecological and cultural value derived from the interaction between human beings and nature. For this reason, the Convention on World Cultural and Natural Heritage recognizes that significant cultural expressions must also be preserved along with biodiversity (4). As awareness of the loss of these heritages has evolved, strategies such as the Geopark, promoted by UNESCO and the World Geoparks Network (GGN) in the early 2000s (5), have emerged.

A Geopark is a recognition of the geological, natural and cultural value of continuous areas, which transcends the superficial (short-term) view and is anchored in long-term geological and cultural processes. A Geopark is fundamental to understanding conservation holistically, as it is a designated area that exhibits and preserves a heritage with unique geological characteristics and that encompasses landscapes and ecosystems of international importance. The objective of Geoparks includes increasing public awareness of Earth sciences, and they promote geotourism and support for local economic development (6).

How to cite?

Upper Cauca River Basin Geopark: an opportunity to conserve the natural and cultural heritage of the region. Ingeniería y Competitividad, 2026, 28(1) e-40115165

<https://doi.org/10.25100/iyv.v28i1.15165>

Received: 15/08/25

Reviewed: 10/08/25

Accepted: 15/08/26

Online: 27/04/26

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Spanish version



Geoparks are areas chosen for their exceptional geological importance, but they also incorporate cultural, historical and ecological elements, often containing sites of archaeological significance, traditional communities and diverse flora and fauna ecosystems, referred to as geosites. They provide opportunities for the social appropriation of knowledge from scientific research, outdoor education and recreational activities, while preserving geological and cultural heritage for future generations.

Why make the effort to describe the conservation figure of the UNESCO Global Geopark?

The answer opens up a series of opportunities in the region that deserve all the attention and promotion from the Universidad del Valle, in a space of collaboration between all the institutions and inhabitants of our territory irrigated by the Cauca River to take advantage of this natural wealth. Consequently, this leads to a more specific question: Is the CARC an area that contains all the heritage wealth to be elevated to the quality of a UNESCO Global Geopark? The evidence from multiple disciplines of scientific knowledge and traditional knowledge of communities that have lived in harmony with the Cauca River and its related ecosystems, indicates that it can be, in Figure 1 seven heritages are synthesized that evidence it.

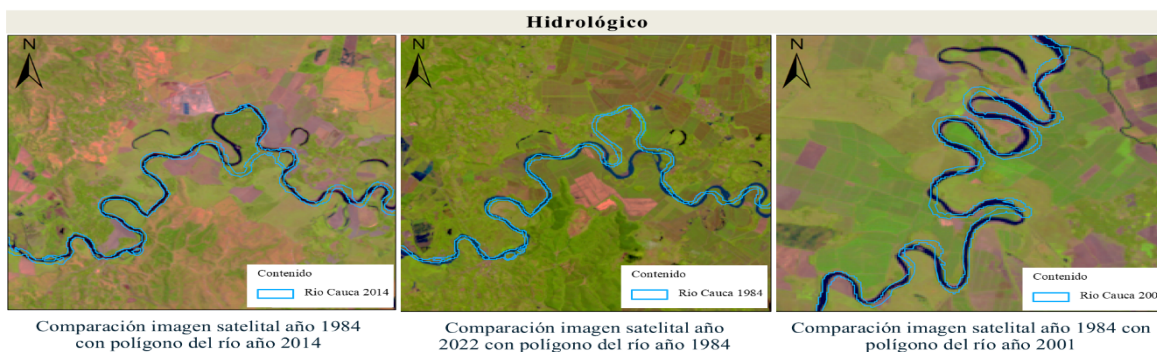


Figure 1. Heritage of the Upper Cauca River Basin. Source adapted from (10)

The CARC has a wide heritage wealth that is little valued and recognized. The geological heritage is characterized by being meandering and gave shape to the Cauca River alluvial plain as a system whose formation dates back 7 million years. After a collision between the Panama plate and the coast of Colombia, the isthmus joined South America causing the tectonic plate below this subcontinent to flatten. The result of this collision reconfigured the river system. Before the collision there were two Cauca rivers, one in the Valle area, which moved south, but there was another Cauca river that was born in the mountains of Antioquia, which, due to that tectonic change, led to the mountain that was to the north beginning to rise and that river that was to the north began to change its gradient to the south, until it finally reached Valle del Cauca and joined the other existing river. This created the great Cauca River that we have today, leaving a paleontological vestige along its spectacular course. However, there is still much to study about this international heritage (7).

The paleontology of the Cauca River has been revealed by the river itself through the deposits in its bed and in the lagoons that existed in the Zarzal area, where fossils and fish have been found. The archaeological heritage is explained by the multidisciplinary research, especially archaeological research, that has been carried out during the last 90 years in the territory of the CARC and has made it possible to establish a sequence of pre-Hispanic socio-cultural development, which occupies about 10,000 years, from the beginning of the Holocene, until the Spanish conquest of the territory, in the first half of the sixteenth century (8).

The hydrogeological heritage is vital for water sustainability and the environmental and social economy of the region, where there is an aquifer system of intermontane alluvial origin dating back to the Quaternary, with a water reserve of close to 10,000 million cubic meters, which is recharged annually with 3,500 million cubic meters of water, where only 25% of its annual recharge is extracted on average (9). The hydrological heritage shows that the river is of global interest because meandering changes are observed in a few years, in addition, it generated the richness of the region's landscape. The anthropological heritage preserves a great variety of cultures that preserve their ancestral values; in the department of Cauca the indigenous communities and in the department of Valle del Cauca the Afro-descendant communities. In addition, the soil heritage characterizes the soil of the Cauca River valley of high fertile richness due to a great variety of geological, climatological and hydrological aspects of the river.

The bibliometric review of the CARC shows that there is a collection of studies that account for the dynamics of the Cauca River from different disciplines (Figure 2), however, evidence related to disciplines such as geology, archaeology, paleontology presents a lower number of publications and the recognition of the geological, natural or cultural heritage in an explicit way is not evident. Of the total of 448 publications, only 9 articles are specific to archaeology, anthropology or geology, and none were found referring to paleontology.



Figure 2. Publications by category on the Cauca River

Source: Web of Science, accessed October 2023 (Scopus 413, Web of Science 448)

There is also a natural heritage with great biodiversity, such as the Sonso lagoon, which is one of the most privileged sites on the planet for bird watching and maintaining balance on migratory routes. In addition, there is paleontological evidence of macrofauna around the river wetlands and the interaction of the latter as groundwater outcrops (hydrogeological heritage). The CARC is the source of a cultural mix of dances, gastronomy, ancestral medicine and festivals. Thus, evidence could continue to be given as to why it is relevant to understand this world-class wealth and recognize that it is a privilege to inhabit it, but that it is also an ethical duty to conserve it.

What we leave in this letter to the editor is only the first step of a large, but necessary effort to protect the heritage of global importance contained in the CARC. That is why reaching its future designation as a UNESCO global geopark is to protect the heritage of our local territories, but with the relevance it has worldwide, in accordance with the preservation of ecosystems and the ancestral practices of the peoples; it is to establish new livelihood alternatives for communities through geosites.

Finally, a geopark proposal requires new capacities, the creation of new training programs, especially in geosciences; in addition to the implementation of processes of social appropriation of knowledge, based on formal and non-formal education around the needs of geopark management. These changes in educational processes will generate pride in the inhabitants of the geopark, sustainability of the region and a positive economic impact, with the demand for new professions or specific knowledge to manage, conserve and strengthen the figure of geopark and heritage protection. This is the beginning of a long road, which we must begin to travel.



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