

Protected Areas and Their Contribution to Sustainable Development

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Towards the end of the 19th century, a small fraction of humanity finally embraced an “official” consciousness regarding the conservation of nature. This realization materialized alongside the establishment in the United States of America of what would come to be recognized as the first Natural Protected Area (NPA) under the designation of a “National Park”—Yellowstone, delineated as a substantially quadrangular expanse between the states of Montana, Idaho, and Wyoming.

The conception and analysis of NPAs have been approached from various perspectives to date, encompassing (i) their status as a key tool for nature conservation, particularly of their now-renowned biodiversity; more recently, (ii) their role as a reference for mitigating climate change; and (iii) their ability to foster the development of local culture, primarily through synergies with the now highly developed tourism systems.

We should consider that the rational management of natural resources—including material resources (rocks, metals, wood, meat, etc.), fossil energy (coal, oil, gas, etc.), or other sources (solar radiation, wind, firewood, food, etc.), as well as space (for habitation, construction, landscape enjoyment, etc.)—must be based on judicious administration [1]. In the context of Natural Protected Areas (NPAs), this administration should encompass both the perceived natural context and the rural-cultural aspects of the regions in which these spaces are situated. In its early decades, Yellowstone represented a vast territory for the enjoyment of wilderness and hunting activities. However, among other biological drawbacks, this facilitated the extinction of the gray wolf (*Canis lupus*) in the early 20th century. Reintroduced nearly a century later from Canada, and now with population dynamics approaching a natural state, the gray wolf served as a demographic indicator of the interrelationships that wild populations can maintain within these spaces. Today, the roles of NPAs are wide-ranging, from their synergy with the conservation of biodiversity and threatened natural populations—although the popular idea of these spaces as “botanical gardens and open-air zoos” should certainly be excluded—to the maintenance and promotion of rural cultures besieged by industrialization and relentless development devoid of sensible environmental perspectives.

On the other hand, there are increasingly critical viewpoints advocating for governance frameworks and the active involvement of local populations. These perspectives caution against the potential misuse of these frameworks as tools for territorial re-appropriation in the pursuit of capitalizing on geographic spaces, in accordance with certain neoliberal strategies linked to some conceptions of nature conservation [2,3].

In any case, far from an idea of uncompromising nature conservation, the over 100,000 protected areas worldwide represent 15% of the Earth’s land surface, almost half of the agricultural land, and have displaced 130 million refugees [4]. When these spaces are sensibly managed, they are often seen as the most significant achievement among the currently existing instruments for nature conservation.



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Some territories maintain geographical frameworks where nature constitutes a recognized heritage of great importance, requiring different types of territorial zoning and the implementation of management plans for all their natural resources—material, energy-related, and spatial [1]—according to their characteristics and values.

Classical conservation approaches focus on preserving biodiversity, recognizing emblematic rare species and landscapes with a wilderness appearance, with reserves often being delineated subjectively. Faced with increasingly severe human impacts on space and time, as well as resource limitations, conservation strategies are being complemented based on a more holistic approach [5–7]. Nevertheless, although these approaches recognize the significance of NPAs, they concentrate on achieving genuine sustainability through a management approach that ensures biodiversity preservation and natural cycles, with alteration rates slower than recovery rates across broader areas. This includes consideration of multifunctional landscapes, encompassing inhabitants, their livelihood activities, and the impact of symbolic representations on the territory's landscape conformation [8]. From this perspective, the planning and management models of these spaces must consequently contemplate the interactions between their residents and the fostering of a regional-artisanal socio-economy, thereby reducing dependence on extensive transportation networks that heavily rely on massive energy consumption. With this perspective, our initial reference to the involvement of NPAs in mitigating climate change can be better understood. The administrators of these areas, along with their visitors, given the increasing significance of tourism, have the opportunity and responsibility to acknowledge that the value of many of these now heritage-protected areas stems primarily from the historical interaction of natural processes with other cultural factors.

Certainly, the diverse approaches to analyzing NPAs unveil an intriguing and unquestionably fertile field of investigation for contemplation.

The current diversity in management and regulatory policies, along with the extensive array of potential uses that can be implemented within a single region, reflect diverse perspectives on what merits “being valued”. The utilization of these spaces as a vehicle for development grounded in socio-ecological perspectives entails a noteworthy array of roles and interests often necessitating consensus-building measures and negotiation. Over the past few decades, the historical trend of vertical government management across various categories of NPAs has started to shift towards alternative models. These models incorporate new stakeholders such as local communities, the private sector, or integrated mixed management networks. In the predominant naturalistic paradigm governing NPAs, there is already an emerging socio-environmental conception emphasizing the interdependence between territory and culture, highlighting the necessity of governance in these areas. Socio-ecological sustainability emerges as a pivotal consideration in the management of these areas and their capacity as a developmental instrument.

Therefore, this editorial aims to summarize the Special Issue “Protected Areas and Their Contribution to Sustainable Development”, which has been created to highlight the complexity of maintaining and managing sustainable protected areas that contribute to socio-environmental resilience and the challenge of NPAs as a tool for sustainable development.

Protected areas have demonstrated their potential as tools for the conservation of species and ecosystem processes, as well as in the face of the challenges posed by climate change. They also represent recreational spaces in contact with nature and enhance a multitude of ecosystem services that promote sustainable development. However, the concept of protected areas derives from a specific biocratic conservation model that maintains and reinforces the dichotomous conception between natural and anthropized spaces inherent in Western naturalistic ontologies. Adequate environmental management must necessarily address socio-ecological connectivity processes from a perspective of ontological justice. Otherwise, they may be perceived as instruments of capitalist self-reproduction that legitimize and divert attention from certain unsustainable models of production and consumption beyond their limits (contribution 1).

Despite the widespread consensus on the need to include local participation in the context of biodiversity conservation policies, local perceptions are rarely considered in the management of protected areas in practice. This is often the case for Marine Protected Areas (MPAs). The Sea Around Us project provides an excellent example of how the effective inclusion of local perceptions from various stakeholders regarding fishing pressure in MPAs promotes a better understanding of current marine protection levels (contribution 2). This project has proven to be an effective tool for the public dissemination of local observations, which allows management deficiencies to be identified in order to transform “paper parks” into effective MPAs.

The perception of perceived impacts by the administrations of protected areas in Slovakia is another example of the importance of taking the observations of the local populations involved into account to achieve proper environmental management (contribution 3). The results of this study reveal that the status of large-scale protected areas does not play a role in the perception of the impacts of tourism in these spaces.

Understanding the relationships established between people and a place can provide valuable insights for managing a protected area. The sense of place of tourists and residents was investigated in the Garden Route National Park, South Africa (contribution 4). The differences between both groups may be obvious, with residents exhibiting a stronger sense of attachment compared to the generalized sentiment of tourists. However, the willingness of both groups to sustainably maintain the place for future generations links their perception to physical, social, and ideological variables of sense of place. The sense of place can be conceptualized as a cultural ecosystem service. Taking into account the ideals of the various stakeholders involved can impact the improvement of management decisions in these areas, fostering greater support and better environmental administration by society.

Some indicators have proven effective in assessing the sustainability of ecotourism in many countries. However, the specificities of destinations require case analyses to exemplify and empirically contextualize the tourist experiences of each place. The criteria and indicators developed for the sustainable management of the Camili Biosphere Reserve in Turkey showed that ecotourism activities in the area have a high potential for sustainability. However, to ensure their maintenance, they emphasize significant legal, political, and institutional requirements (contribution 5). The issues arising from the lack of participatory studies considering a balance between local expectations, ecotourism investments and revenue, as well as the need for an interdisciplinary “central government authority” that promotes communication among different stakeholders in management processes, pose particular reflections applicable to other case studies that enhance understanding of this tourism model and its relationship with socio-environmental resilience.

On the other hand, the novel combination of a methodology that includes the systematic approach of ISO 14090 [9], the theoretical framework of ecosystem services assessment, and the participation of different stakeholders, within the framework of the INTERREG Project ECO-SMART, has proven effective in evaluating a selection of Natura 2000 sites along the Adriatic at high risk of experiencing losses of ecosystem services due to climate change (contribution 6). The results revealed that climate-related issues affect the habitats and ecosystem services of each site differentially, despite being on the same coast. This methodology presents itself as a generally applicable tool for various stakeholders in planning sustainable conservation measures.

Another computational method based on ecological niche modeling has been used in China, proving successful in predicting the potential geographic distribution of species. Its application to future scenarios of *Picea* species distribution based on climate change predictions in China has helped define priority areas for implementing appropriate nature reserves (contribution 7). The results have revealed deficiencies in the current planned management for the conservation of these species according to climate predictions and point out optimization strategies. The method constitutes an empirical decision support system regarding biodiversity preservation and territory management.

In summary, this Special Issue presents a compilation of rationales, analytical methods, and case studies from around the world that promote inductive reflection based on specific contexts, demonstrating interconnected dynamics and processes through which to understand the strengths and weaknesses of protected areas as tools for sustainable development.

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