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Research on the Coordinated Development of Ecological Restoration and Tourism Development in Natural Scenic Areas

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ABSTRACT
Natural scenic areas possess precious natural ecosystems. While providing recreational experiences for people, striking a balance between ecological conservation and tourism development is of critical importance. Many natural scenic areas, such as forests and wetlands, are inherently fragile and often face problems such as vegetation destruction, soil erosion, and biodiversity degradation during tourism development. If economic benefits are pursued at the expense of ecological carrying capacity, the natural environment is likely to degrade gradually. Conversely, focusing solely on environmental restoration in closed-off areas may undermine the benefits of tourism development, making it challenging to secure sustained community support for conservation efforts. Therefore, this paper explores how to harmonize ecological restoration objectives with tourism development needs, aiming to provide managers with practical solutions that effectively implement conservation while fostering sustainable development.

KEYWORDS
Natural scenic area; Ecological restoration; Tourism development

1 Introduction

Healthy ecosystems in natural scenic areas are not only the foundation for sustaining biodiversity but also essential venues for humans to connect with nature and understand ecological systems. However, natural scenic areas also face the pressure of tourism activities, and the dense crowds and infrastructure development associated with tourism inevitably exert a profound impact on the original environment. Furthermore, the strictness of protective measures directly correlates with economic development potential, as well as residents' understanding of and willingness to participate in conservation efforts. Forcing strict closures without considering tourism development needs often lacks community support, making financial investments unsustainable; conversely, allowing unchecked tourism expansion that encroaches on ecological spaces damages the foundation of natural resources and is not sustainable in the long term. Therefore, this paper will examine the key interaction points between environmental restoration projects and tourism-related activities at the implementation level, proposing practical coordination methods grounded in reality to provide actionable insights for developing integrated management models that balance multiple objectives.

2 Current status of the ecological environment in natural scenic areas

2.1 Basic characteristics of the ecological environment in natural scenic areas

Natural scenic areas are not isolated tourist attractions, but rather ecosystems composed of multiple natural elements, including water, air, naturally growing vegetation, animals inhabiting the area, and the rocks and soil beneath our feet, all of which form an interconnected ecosystem [1]. This healthy ecosystem sustains the basic conditions for life on this land. Taking a mountain forest scenic area as an example, dense trees not only have aesthetic value but also have well-developed root systems that firmly grip the surface soil and crushed rock, preventing slopes from collapsing or sliding during heavy rains and thereby reducing soil erosion. The canopy layer also reduces the direct impact of rain on the ground, allowing more rainwater to seep into the ground and form streams. The rich soil beneath the forest absorbs and stores water, slowly releasing it over time to maintain stream flow even during dry seasons, nurturing the various organisms that depend on this water source. This interdependent ecological chain of water, soil, vegetation, and organisms determines the overall environmental quality and ecological stability of the region, such as clean air, clear water, and healthy soil, which ultimately decides whether external flora and fauna can establish themselves and thrive here.

2.2 Main factors contributing to ecological and environmental degradation

When discussing the threats facing natural scenic areas, it is crucial to recognize that the pressure stems primarily from human activities, not spontaneous environmental changes. If these activities exceed the natural carrying capacity of the land, their negative impacts far exceed people's intuitive imagination and intentions. To facilitate visitor access and

experiences, scenic areas require the construction of roads, parking lots, and cable cars, as well as the development of reception facilities. While these changes may seem localized, they directly alter the original topography and disrupt existing vegetation cover. This not only reduces the living space for wildlife, making it more difficult for them to forage, mate, and avoid danger, but can also block migration routes, leading to the decline of animal populations. During construction, excavation, and earthwork, large areas of bare ground are exposed. If heavy rainfall occurs, the loose topsoil is easily eroded, not only polluting water sources but also causing soil degradation, making vegetation restoration more challenging.Additionally, the activities of a large number of tourists cannot be ignored. Long-term trampling can compact the soil and damage surface vegetation, leading to soil hardening. Randomly discarded garbage not only affects aesthetics but also directly pollutes water sources and soil [2].

3 The impact of tourism development on the ecological environment

3.1 The direct impact of tourism development on ecosystems

The most fundamental change that tourism development brings to ecosystems is the construction of ground-level infrastructure and facilities, which directly alter the landscape and disrupt the original balance between water, soil, and vegetation. To facilitate visitor access and activities, land must be leveled, roads and bridges built, and buildings and service points constructed. These engineering activities directly remove the original surface vegetation, carrying away the loose and fertile upper layer of soil and exposing the underlying harder or more porous soil. The surface is thus reshaped, altering or blocking the original rainfall infiltration pathways. When rain falls on exposed or hardened surfaces, it cannot effectively infiltrate and instead forms large pools of surface runoff. This flowing water erodes exposed soil and gravel, directly eroding the land. The sediment carried by the water eventually flows into rivers and lakes, causing water turbidity, increased suspended solids, and even siltation of riverbeds, harming aquatic ecosystems. Plants destroyed or removed by construction projects, especially slow-growing native species dependent on specific environmental conditions, cannot quickly restore their original coverage and species structure.

3.2 The impact of tourism development on biodiversity

The primary way in which tourism development undermines biodiversity is through habitat fragmentation. Natural areas are continuous spaces where numerous species depend on one another, but large fixed structures, such as scenic area roads, buildings, and fences, create physical barriers. These barriers divide once-connected forests, grasslands, and even water bodies into isolated small areas. For wildlife that require large areas for foraging, mating, or avoiding danger, this forced division places them in perilous situations. Their movement paths are blocked, and safe migration routes lose their original connections, causing populations to survive in increasingly isolated and shrinking areas. Additionally, the dense footsteps and noise of tourists disrupt the quiet environment animals require, camera flashes disrupt their day-night cycles, making it challenging to avoid dangers, and attempts to approach or feed them directly interfere with their foraging patterns. Many small organisms sensitive to light and sound (such as nocturnal mammals and birds) are forced to abandon habitats near human activity areas, losing their original survival advantages and further compressing their living space [3].

3.3 The impact of tourism development on local communities and culture

The most significant social issue arising from long-term tourism development is the shift in local communities' resource utilization practices toward commercialization, which in turn alters the developmental trajectory of local cultural traditions. Historically, residents living near tourist attractions had developed a sustainable balance of resource use with the natural environment over time, ensuring stable livelihoods. Tourism activities have brought new job opportunities and service-based income, which have exerted a significant attraction on residents, immensely stimulating large-scale commercial profit-driven behaviors. The purchase and sale of local foods, such as wild mountain vegetables or wild river fish products, have become the core competitive points for operating shops. This business trend has driven excessive harvesting and fishing, leading to a sharp decline or even depletion of local resources, with slow regeneration rates. Meanwhile, the tourism economy's pursuit of standardization and convenience has also impacted local culture. Traditional dwellings have been gradually replaced by modern buildings, foreign spices and flavor combinations have influenced local cuisine, and the use of local dialects has significantly decreased among younger generations [4].

4 Coordination mechanism for ecological restoration and tourism development

4.1 Conflict and synergy between ecological restoration and tourism development

Ecological restoration and tourism development often conflict due to their differing fundamental objectives. Ecological restoration focuses on damaged natural environments and typically requires closed areas and restricted activities to ensure the recovery of fragile ecosystems. Tourism development, on the other hand, focuses on visitor convenience and scenic area benefits, and tends to favor open spaces and the construction of facilities to accommodate more activities. The two are in direct conflict in terms of spatial utilization, resource allocation, and time management. However, they also share a foundation for synergy, with the key being the need to reach a consensus: tourism that depletes natural resources is inherently unsustainable. In contrast, protection goals that completely exclude tourism impacts often lack practical support. Based on this understanding of reality, strict protection zones should be designated within key ecological barrier areas or highly sensitive zones within tourism regions, and ecological restoration should be implemented to make these areas an essential environmental foundation and unique landscape resource for the tourism zone itself. A portion of the economic benefits generated by tourism operations should be consistently invested in these areas for long-term restoration and management, providing a sustainable funding source for ecological conservation. This mutually reinforcing mechanism of "tourism supporting ecology and ecology enhancing tourism" forms the foundation for the coordinated functioning of both parties [5].

4.2 Best practices and technical measures for ecological restoration

Effective ecological restoration hinges on combining physical interventions with biological recovery measures based on the extent of damage, thereby restoring the ecosystem's self-regulatory and self-recovery capabilities. For areas with acute or severe bodily harm, such as landslides or severe erosion, relying solely on vegetation planting yields limited results. Physical engineering measures must be prioritized to stabilize the underlying structure. For example, to address unstable slopes, lightweight retaining materials or protective mesh layers can be used to temporarily stabilize loose soil and rock on the surface and halt the deterioration trend. Once the physical structure has achieved initial stability, suitable pioneer drought-tolerant grass and shrub species that align with local natural patterns and grow rapidly should be introduced for coverage planting. The root systems of these plants can effectively consolidate the soil, further enhancing the stability of the physical structure. Once the regional foundation environment has stabilized and soil and moisture conditions have improved, gradually transplant longer-lived, ecologically more robust native tree and shrub species to steadily guide the ecological environment toward natural maturity. Throughout the process, closely monitor progress, adjust technical solutions as needed at different stages, and ensure the achievement of restoration objectives.

4.3 Strategies and policy recommendations for sustainable tourism development

To achieve long-term sustainability, tourism development must incorporate ecological carrying capacity constraints and innovative protection and compensation mechanisms into management processes, forming a dynamic coordination framework. The primary task of planning is to establish three categories of red line rules based on ecological assessments: open areas, restricted activity buffer zones, and core zones subject to strict protection and restoration. These red line rules should clearly define the nature of permitted tourism activities, visitor capacity limits, and facility construction and management standards within each zone, serving as rigid safeguards that cannot be bypassed in subsequent approvals and daily oversight. For example, core cultivation zones adjacent to water sources should explicitly prohibit unauthorized personnel from entering or engaging in disruptive activities. Local governments may establish an "ecological resource occupation compensation fee" system to mandate the collection of fixed environmental resource damage compensation fees from tourism projects entering nature reserves or utilizing specific public resource spaces. The collected funds should be centralized into a regional ecological restoration special reserve fund, strictly adhering to the principle of dedicated use. Concurrently, clear responsibility regulations should be established to ensure transparent and efficient fund utilization, preventing waste.

5 Conclusion

The article discusses the complex relationship between ecological restoration and tourism development, which are both mutually restrictive and mutually reinforcing. The conflict lies in the difficulty of directly reconciling the restrictive requirements of environmental restoration with the open-ended objectives of tourism development. Therefore, regional practices must take ecological carrying capacity as an unshakable prerequisite for all development decisions. Specifically, the following three points must be addressed: first, establish clear and protected ecological spaces from the outset of

planning; second, establish a long-term mechanism to ensure that a portion of tourism revenues is sustainably and specifically reinvested in environmental maintenance and restoration; and third, ensure that local communities derive tangible benefits from protection efforts and are deeply involved in management. By implementing these key points, it is possible to effectively balance the dual objectives of protection and development, ultimately achieving the sustained restoration of natural ecosystems and the long-term prosperity of the tourism industry.

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