

## RECREATIONAL SERVICES WITHIN ECOSYSTEM SERVICES: BENEFITS, CHALLENGES, AND STRATEGIES FOR SUSTAINABLE USE

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**Abstract:** Recreation and leisure activities are vital aspects of a balanced life, as they offer a much-needed break from the routine stress of daily life, fostering both mental and physical well-being. Especially nowadays, people increasingly prefer recreational services in nature and ecosystems to escape from the hustle and bustle of urban life. At the same time, the increasing recreational desire within ecosystems can lead to habitat degradation, and unsustainable practices often threaten the ecological integrity of natural systems. Hence, given the increasing demand of recreational and leisure activities within the ecosystem and the need for sound knowledge to manage this demand, the study aims to examine the benefits, challenges, and sustainable management strategies related to the growing demand for recreational services within ecosystems. Using the integrative literature review approach, 78 Scopus-indexed journal articles were examined to achieve the intent of the review. The review revealed several recreational benefits and services in terms of physical, mental, social, economic, and environmental conservation. Conversely, the study found that demand for the recreational services within ecosystems contributes to their degradation. These findings provide potentially important information for decision-makers in developing effective recreational services and management strategies within ecosystems. The paper concludes that sustainable use of ecosystem services requires an integrated management approach that balances ecological preservation with social, cultural, and economic interests.

**Keywords:** ecosystem service, recreational service, sustainable ecosystem, environmental preservation, integrative literature review approach

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### INTRODUCTION

Nature and a healthy ecosystem are highly important, as they provide numerous direct and indirect benefits to human beings for sustaining life, maintaining well-being, and supporting economic development (Yang et al., 2023). According to Assessment, 2005, ecosystems offer different services, including provisioning, regulating, supporting, and cultural services. Provisioning services are a type of ecosystem service that directly provide tangible benefits (Narotzky, 2022; Solomon, 2023) that are crucial for human well-being and economic development, such as food, freshwater, raw materials, bioenergy, medicinal plants, and natural materials used in artistic and cultural practices (Shackleton, 2021; Yarnvudhi et al., 2021; Koundouri et al., 2024). Ecosystem services are also playing a critical role in controlling ecological and biophysical processes that influence the overall functioning of ecosystems (Grebner et al., 2022; Makovniková et al., 2023; Malatyinszki et al., 2025), including climate regulation, flood and erosion control, water purification, pollination, disease regulation, water regulation, nutrient cycling, air quality regulation, and drought resistance (Seidl et al., 2019; Włodarczyk-Marciniak et al., 2020; Baskent, 2020). Additionally, although supporting services may not always have direct and immediate benefits for humans (Assessment, 2005), they are crucial for long-term sustainability of our planet by facilitating the cycling of essential nutrients (such as nitrogen, phosphorus, and carbon), soil formation and fertility, habitat provision, water cycling, carbon, and ecosystem resilience (Koundouri et al., 2024; Nowak-Olejnik et al., 2024).

Furthermore, as societies become more urbanized and maintain access to ecosystem areas (Dadashpoor et al., 2019; Chen & Chi, 2022), the cultural importance of ecosystem services is well known and reflected in much literature (e.g., Nowak-Olejnik et al., 2020, 2022, 2024). For instance, Wang et al. (2024) highlighted the importance of cultural ecosystem services in enriching human experiences and cultural heritage, recreation and tourism, aesthetic and scenic value, and spiritual and religious significance. Likewise, Kosanic & Petzold (2020) also emphasized aspects of cultural ecosystem services with respect to human physical and mental well-being. Moreover, education and training, art and literature, therapeutic and wellness benefits, cultural exchange and social bonding, and cultural practices and traditions become increasingly imperative.

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Especially due to numerous mental, physical, and social benefits to human beings (Coventry et al., 2021), the positive role of healthy ecosystem services for recreational and leisure activities is paramount (Hernández-Blanco et al., 2022).

Recreational services are a specific subset of cultural ecosystem services that are narrowly focused on benefits derived from the active or passive recreational use of ecosystems (Chakraborty et al., 2020). They are vital aspects of a balanced life, as they offer a much-needed break from the routine stress of daily life (Noszczyk et al., 2022), fostering both mental and physical well-being (Kurniawan et al., 2022). Especially nowadays, people increasingly prefer recreational services in nature and ecosystems to escape from the hustle and bustle of urban life (Bertoni, 2022; Erdoğan, 2023) as well as engage in outdoor activities (Coventry et al., 2021). Moreover, recreation in ecosystems not only enhances individual physical fitness (Yeh et al., 2021) but also fosters a deeper connection to the environment and inherent tranquility that promote relaxation and reduce stress (Wolsko et al., 2019). Therefore, it is increasingly important to maintain and protect ecosystems to maximize their potential for recreational and leisure activities (Bamwesigye et al., 2021).

Ecosystem services are not just nice to have; recognizing their benefits, managing them sustainably, and integrating them into policies and practices are essential for a sustainable future (Morgan et al., 2022; Ali & Kamraju, 2023).

However, despite the significance of cultural ecosystem services, specifically when it comes to recreational and leisure services provided by ecosystems, the literature is insufficiently explored. Although there have been studies emphasizing cultural ecosystem services (Hernández-Morcillo et al., 2013; Plieninger et al., 2015; Cheng et al., 2019; Kosanic & Petzold, 2020), only some of them have highlighted the benefits of such services (e.g., Schirpke et al., 2022; Nowak-Olejnik et al., 2022). Moreover, despite several studies on ecosystem services, none of the existing literature has thoroughly examined recreational services within ecosystem services. Rather, they focus on and address different topics within the line of research (e.g., Chee, 2004; Daily & Matson, 2008; Fu et al., 2013; Ninan & Inoue, 2013; De Araujo Barbosa et al., 2015; Wolff et al., 2015; Lee & Lautenbach, 2016; Hasan et al., 2020). Furthermore, the increasing demand for recreational services can sometimes create conflict with the need to enhance and preserve ecosystem services, leading to loss of biodiversity and environmental degradation. Therefore, given the increasing demand for recreational and leisure activities within the ecosystem and the need for sound knowledge to manage this demand, the study aims to examine the benefits, challenges, and sustainable management strategies related to the growing demand for recreational services within ecosystems. This paper contributes to the existing research and literature on ecosystem services and sets the stage for future research agendas.

## MATERIALS AND METHODS

This section outlines the integrative research approach adopted for this review. An integrative research review is defined as “a summary of past research by drawing overall findings and conclusions from several studies” (Broome, 2000, p. 234). This approach was selected for its ability to synthesize current knowledge and provide a comprehensive and integrated synthesis of the existing literature (Fain, 2016). Additionally, it is effective in generating new perspectives and provides a more varied and in-depth understanding of the topic at hand (Russell, 2005). Guided by the integrative review steps proposed by Russell (2005), the researchers conducted the current review in five main phases: problem formulation, literature search or data collection, data evaluation, data analysis, and interpretation and presentation of results (Figure 1).

### Problem formulation

The problem identification and the formulation of reviews’ main purposes allowed us to define the scope of the paper and data collection efforts (Sauve-Ciencewicki et al., 2019). Consequently, we determined the study’s scope by designing research questions as follows:

1. What are recreational services and benefits provided by ecosystem services?
2. What challenges are ecosystem services experiencing due to the surge in demand for recreational services?
3. What are strategies to address the challenges that ecosystem services are facing due to the high demand for recreational services?

### Literature search and database

Given the study’s focus on recreational services within the context of ecosystem services, the primary keywords “recreational services” and “ecosystem services,” along with another synonymous term, were selected. We acknowledge the possibility that some studies may have been missed. While ecosystem services are largely about the benefits that people obtain from ecosystems (TEEB, 2010), in this study, the term has evolved to incorporate recreational services and their associated benefits, challenges, and management strategies. The researchers utilized the Scopus database due to the high-quality coverage of scholarly information. As a result, the initial set of search terms that was used as a selection criterion primarily represented a combination of two alternative keywords related to the study’s title and research questions:

1. (recreational AND services AND benefits AND within AND the AND ecosystem AND services) AND PUBYEAR > 2018 AND PUBYEAR < 2025 AND ("Recreational Services" OR "Recreational benefits")

2. (challenges AND recreational AND services AND on AND ecological AND services) AND PUBYEAR > 2018 AND PUBYEAR < 2025 AND ("Ecosystem Services")

Initially, this keyword combination generated 771 studies across various languages and publications, including conference papers, reviews, journal articles, books, book chapters, and editorials. However, the analysis was restricted to journal articles. Thus, after further filtering the search results based on publication type, 522 studies remained. We recognize that incorporating various types of publication would have yielded a more comprehensive analysis of the topic. Yet, we assert that articles published in Scopus-indexed journals are often considered significant platforms for the production, dissemination, and evaluation of rigorous scholarly research.

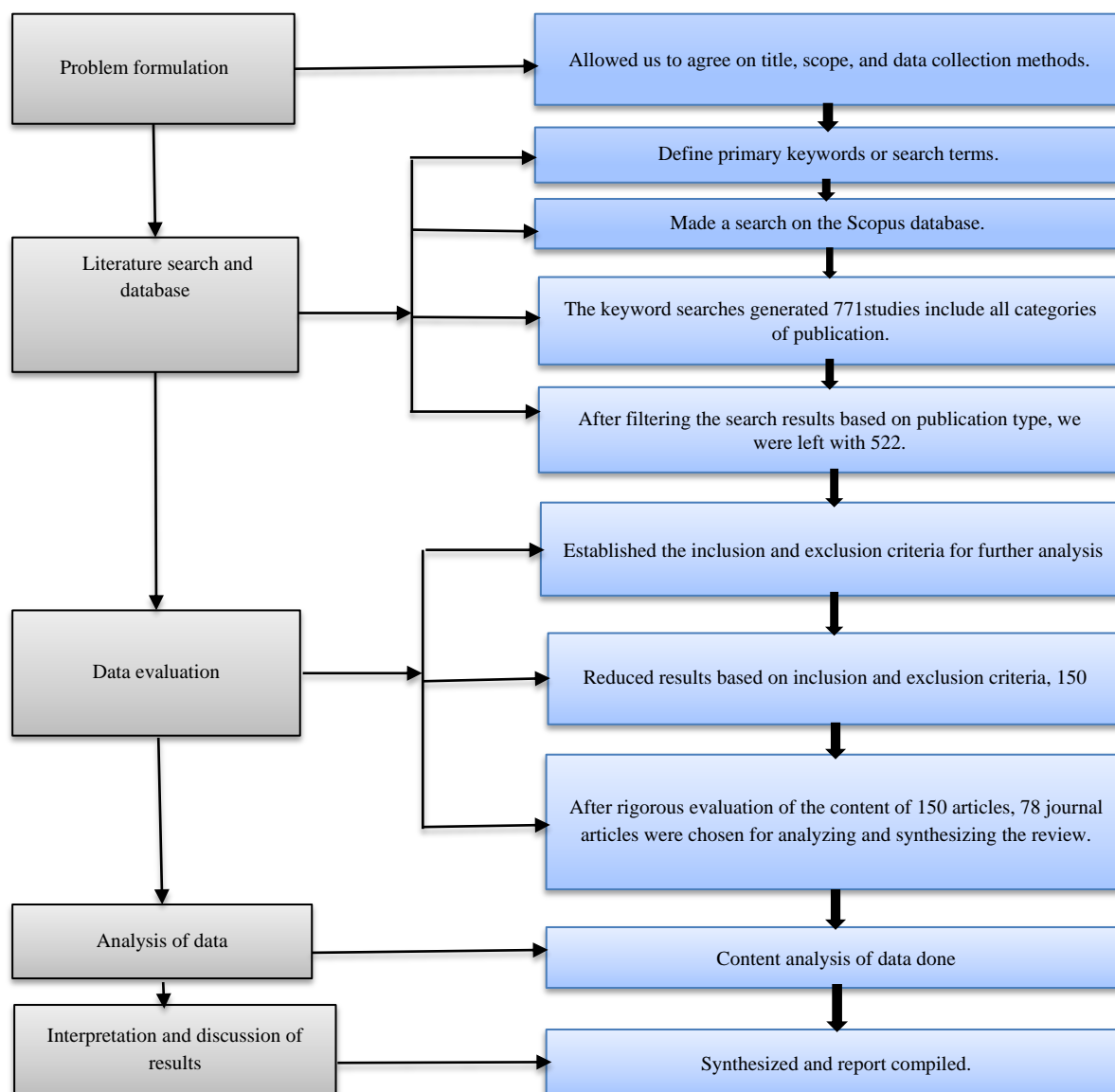


Figure 1. Flow chart of the study process (author's own construction)

### Data evaluation

This step focused on the evaluation of relevant articles for further analysis. The data evaluation involved assessing the quality and relevance of the articles through specific inclusion and exclusion criteria (Sizo et al., 2019). The criteria were as follows: (1) the study must be related to ecosystem services, and it must discuss recreational services and benefits within ecosystems; (2) the study must discuss issues related to recreational services within ecosystem services; (3) the article must be published in English only; and (4) the study must have been published between 2019 and 2024. After further reducing the results based on the criteria, 150 articles remained. Nevertheless, there were cases in which the abstract was irrelevant to the current study; consequently, we proceeded to another phase, where a full-text screening was conducted. Following a rigorous evaluation of the articles' content (abstract, introduction, methodology, and conclusion) of 150 papers, 78 appropriate journal articles were chosen for analyzing and synthesizing in the review.

## RESULTS AND DISCUSSION

### 1. Recreational services and their benefits

From all the articles reviewed, the primary recreational services and benefits provided by ecosystem services were extracted. As can be seen from Table 1, ecosystem services generate a range of recreational leisure services and benefits for human beings. We categorized the benefits into three major areas: physical health benefits, mental health benefits, and social benefits. Categorizing the benefits of recreational activities provided by the ecosystem was not straightforward, as some recreational activities were related and offered several benefits. Classification was performed as follows: all recreational activities aimed at physical health improvement were classified under physical health benefits, including mountain biking, cycling, hiking, walking, trekking, and rock climbing. Recreational services aimed at enhancing mental health were categorized under mental health benefits, including birdwatching and wildlife observation, forest bathing, scenery watching, and photography. All recreational services that encourage social

interaction, strengthen relationships, and build a sense of community were classified under social benefits, including camping, tent camping, nature-based festivals, and caravan camping.

Table. Recreational services and benefits provided by ecosystem services (Source: author's own construction)

| Reference  | Recreational services | Benefits  |
|--|-----------------------|---|
| Liu et al., 2021; Zieris et al., 2023; Grossmann & Randler, 2023 | Birdwatching          | Improved mental health and positively impact cognitive resources, mobility, and overall biopsychosocial health.                 |
| Curtin & Kragh, 2014   | Wildlife Watching     | Provide a profound appreciation for the beauty and diversity of nature, which can have therapeutic effects on mental health.    |
| Széchy & Szerényi, 2023  | Hiking and trekking   | Enable visitors to engage in direct contact with nature and allow them to breathe fresh air.                                    |
| Pelicice et al., 2023  | Angling               | Combat anxiety, stress, and improve concentration and patience.   |
| Balasubramanian, 2020; Zhou et al., 2022                         | Picnics               | Enhance cultural awareness, enjoyment, and overall socialization.   |
| Silva et al., 2022   | Canyoning             | Reduce stress, release endorphins, and boost mood while improving strength, endurance, and balance.                             |
| Stinson & Grimwood, 2022   | Rock climbing         | Boost confidence and self-esteem while allowing them to experience the beauty and serenity of nature.                           |
| Erdoğan, 2023  | Photography           | Allow to express artistic sensibilities and enhance the ability to create aesthetically pleasing images.                        |
| Craig, 2021  | Tent camping          | Allow visitors to disconnect from the overcrowding of busy life and appreciate the creation of nature while smelling fresh air. |
| Jo et al., 2019  | Scenery watching      | Release stress and achieve physiological relaxation   |
| Bergström et al., 2021   | Orienteering          | Enhance physical and mental health while improving navigation skills  |
| Evju et al., 2021  | Mountain biking       | Provide an excellent cardiovascular workout and strengthen the heart and lungs.   |
| Kotera et al., 2021  | Walking in nature     | Reduce anxiety and depression and increase mental health.   |
| Ertaş, 2022  | Mountaineering        | Improve overall physical and mental health.   |
| Jamal et al., 2019; Lewandowicz & Bac-Bronowicz, 2022            | Rafting and kayaking  | Improve cardiovascular health, reduce stress, and strengthen bonds between people.  |
| Wood et al., 2022  | swimming              | Enhance overall physical and mental health.   |
| Farkic et al., 2021  | Forest bathing        | Allow opportunities for mental and physical restoration, which ultimately contributes to overall physical well-being.           |
| Rhoden & Kaaristo, 2020  | Boating and sailing   | Physical and mental benefit.  |
| Shaban et al., 2020  | Snorkeling and diving | Physical and mental benefit0  |

### Physical health benefits

Forests and parks with all scenic landscapes, mountains, lakes, glaciers, streams, clean air, wildlife, and vegetation have a great aesthetic human value (Malatyinszki et al., 2025), which contributes largely to human health and pleasure (Erdoğan, 2023; Stoltz et al., 2024). It is widely accepted that recreational activities in nature have positive impacts on an individual physical and mental well-being (White et al., 2019). Similarly, literature indicates that recreational activities within ecosystems can enhance psychological well-being and improve physical fitness while immersed in nature (Doughty, 2013; Hanson & Jones, 2015; Pasanen et al., 2019; Ramalho & Petrica, 2023). However, the magnitude and consistency of these benefits appear to vary across the studies depending on the types of recreational activities. Moreover, water bodies, including rivers, lakes, ponds, beaches, marine areas, and artificial fountains, have a significant impact on physical well-being (Meyerhoff et al., 2019; Alikhani et al., 2021; Meyer et al., 2021; Kulczyk et al., 2024), though their positive impacts may be influenced by water quality, accessibility, and safety perceptions.

### Mental health benefits

Recreational services within ecosystems not only enhance individual physical fitness (Yeh et al., 2021) but also foster a deeper connection to the environment and inherent tranquility that promote relaxation and reduce stress (Wolsko et al., 2019). Recreational activities that involve observation and mindful engagement may yield particularly strong well-being outcomes. Scientific studies have shown that spending time among the whirring sounds of nature, watching thriving fauna and flora, bird watching, wildlife observation, and appreciation of creatures in their natural habitat have a significant positive impact on physical and mental health (Cox et al., 2017; Hammoud et al., 2022).

For instance, birdwatching is the second most popular hobby in the United States, with more than 46 million people doing it (Ramalho & Petrica, 2023), suggesting a growing public interest in nature-based experiences.

Especially for people in the second half of their lives, birdwatching has become a popular pastime and recreational activity (Hedblom et al., 2017) and allows them to rejuvenate and immerse themselves in stillness and the beauty of nature while getting mentally stimulating and rewarding experiences (Zieris et al., 2023). Likewise, recreational activities in and around waterbodies have a significant impact on enhancing overall health, reducing the risk of chronic diseases, and boosting mood through the release of endorphins (Stott, 2019; Deng et al., 2020).

### Social benefits

Recreational activities within ecosystems are not only beneficial for mental and physical health (Akçakese et al., 2024) but also for strengthening relationships and building a sense of community (Chashina et al., 2020). Hiking, trekking,

rafting, orienteering, and camping provide opportunities for social interaction and engagement, which help to build a sense of belonging in the social fabric (Irvine et al., 2022). Moreover, recreational and leisure activities in nature promote physical activity (White et al., 2016), cultivate consistent interaction with peers, and strengthen group solidarity (Akçakese et al., 2024), which leads individuals to expand social networks, develop meaningful relationships, create a sense of belonging, and produce empathy for others (Chashina et al., 2020; Morse et al., 2022).

## **2. Challenges to the ecosystem by recreational services**

While ecosystem services provide significant physical, mental, and social benefits, the ecological impact associated with recreational activities is generally considered a significant challenge to the sustainability of ecosystems (Marzano & Dandy, 2012). The researchers extracted the primary challenges caused by the growing demand for recreational and leisure activities from all the reviewed papers. Based on our understanding of the reviewed papers and organizational purposes, the researchers categorized challenges into five major areas: habitat degradation and loss, disturbance to wildlife and spread of invasive species, overexploitation of resources, and degradation of ecosystem services.

### **Challenges related to habitat degradation and loss**

The reviewed articles indicated significant challenges caused by the growing demand for recreational activities, such as degradation and loss of habitat. Know-how and knowledge of these challenges offer information about the preparedness of ecosystem service providers and can serve as input for developing sustainable ecosystem services and minimizing degradation of habitat. As the demand for recreational activities increases (Marcelo et al., 2022), the expansion of recreational facilities within ecosystems, including the construction of roads, parking lots, tracks and trails, hotels, and lodges, invariably leads to environmental impacts (Wolf et al., 2019). In addition, irresponsible tourist behavior frequently results in the formation of new and illegal paths and trails (Aman & Papp-Váry, 2023), leading to ecological degradation and disturbances (Saputra et al., 2024). Hence, effective recreational service management requires ecosystem-specific strategies that balance human use with ecological integrity (Cervený, 2022). Furthermore, separating high-use recreational facility areas from ecologically sensitive zones can significantly reduce ecological degradation (Aman et al., 2025). Particularly in vulnerable areas, managing visitor numbers, using proper trails and road infrastructure, and providing awareness programs can help protect biodiversity (Lukoseviciute et al., 2022).

Similarly, pollution problems such as littering and noise from human activities and vehicles (Nowak-Olejnik et al., 2024) have also been identified as threats to the sustainability of ecosystem services. These challenges can cause significant habitat degradation, loss of biodiversity, and physical trampling, such as soil erosion and compaction and vegetable damage, which may adversely impact the overall environment and recreation and tourism services provided by ecosystems in the long term (dos Santos Pereira et al., 2022; Saputra et al., 2024). Likewise, water bodies, particularly inland water bodies, are sensitive ecosystems with recreational activities (Schafft et al., 2021).

For example, water contamination and pollution from recreational activities can impair aquatic life and scenic beauty, which may cause temporary or permanent damage and endanger recreational opportunities themselves (Matern et al., 2019; Meyer et al., 2021). It was frequently mentioned that sustainable tourism practices supported by visitor guidelines and certification schemes are essential to ensure the long-term sustainability of recreational services while maintaining biodiversity and ecosystem functioning (Aman et al., 2024).

### **Challenges related to disturbance to wildlife and spread of invasive species**

Some challenges of recreational and leisure activities identified by the articles reviewed related to the disturbance of wildlife. The constant presence of humans in natural wildlife habitats can cause stress and displacement to wildlife (Dertien et al., 2021; Willette et al., 2023), leading to fragmentation and potential conflict with humans and wildlife mortality (Rosenthal et al., 2022; Sganzerla et al., 2025). Some recreational activities can inadvertently introduce invasive species through organisms transported in ballast water (Bir et al., 2022). For instance, recreational activities like hiking and boating accidentally introduce invasive species (Berberi et al., 2024), which leads to disrupting ecosystem balance. Establishing buffer zones around nesting sites, breeding areas, and seasonal closures during breeding or migration periods and avoiding feeding or approaching animals can help limit stress, disruption, and displacement of sensitive species while maintaining recreational opportunities (Plowright et al., 2024).

### **Challenges related to overexploitation of resources**

Regardless of the economic benefits that recreational activities could bring to ecosystem service providers (Li & Wang, 2022), they need to keep in mind the issues of resource overexploitation associated with these activities (Osman et al., 2024). As mentioned in other categories, the papers reviewed several problems related to overexploitation of resources due to recreational and leisure activities within the ecosystem services. Fish and wildlife depilation, the collection of firewood, and water stress are problems related to overexploitation of resources (Iyiola et al., 2023). Irresponsible hunting practices and overfishing in popular fishing spots driven by recreational and leisure demand can exhaust the population and disrupt food webs (Ramírez et al., 2022; Jamaliah et al., 2024). Likewise, excessive firewood gathering for campfires may deplete deadwood (Uzun et al., 2021), which is an essential habitat component for numerous species. Increased water usage for activities such as golf courses, swimming pools, and landscaping in tourist destinations can strain local water resources (Arif et al., 2022), especially in arid ecosystems (Zhao et al., 2022). Promoting low-impact recreational activities and establishing clear regulations on resource exploitation is essential to prevent depletion (Arif et al., 2022).

### Tourism trends as drivers of challenges

The mentioned challenges are further intensified by the fact that recreational services are typically utilized through visits to natural or semi-natural areas. Although measuring visitor number and spatial movement is accurately difficult (Job et al., 2021), estimates indicate that during the COVID-19 pandemic, global demand for the biosphere's recreational services significantly increased (Bristowe & Heckert, 2023). Although this demand has decreased after the pandemic, some studies highlight that motivations and recreational habits have changed (Wang et al., 2023), which also means that visitors now have new expectations regarding the recreational services of the biosphere (Wunderlich et al., 2024). This shift suggests the emergence of a newer group of tourists engaging with nature that had previously not participated in such activities (Csomós et al., 2023). Broader global tourism trends, increasing health awareness, and rising life expectancy are likely to reinforce this growth in the future rather than diminish it (World Travel Market, 2024).

Consequently, systematic measurement and monitoring of visitor numbers, flows, and related perceptions and attitudes toward nature are highly desirable (Lupp et al., 2021). Several countries are adapting their medium- and long-term strategies and accordingly anticipating increased demand for outdoor recreation (Pröbstl-Haider et al., 2023). Furthermore, exemplary visitor monitoring systems already exist in some cases, which make it possible to identify both overburdened and less frequented areas (English et al., 2019; Lupp et al., 2021). Such insights can support the implementation of visitor management tools and the development of resource-use strategies (Job et al., 2021).

### CONCLUSION

This review highlights that research on cultural ecosystem services has largely emphasized human well-being, place-based values, and decision support, while giving comparatively limited attention to the recreational benefits provided by ecosystem services and to the challenges arising due to recreational activities within ecosystems.

Based on the analysis of 78 journal articles published between 2019 and 2024, the findings reveal that, although prior studies have addressed different topics within this line of research, they did not examine a comprehensive review of all recreational activities and benefits provided by ecosystems. Moreover, to our knowledge, no prior publication has extensively examined challenges arising from recreational activities within ecosystems. This imbalance suggests that literature on recreational services and their associated challenges within ecosystem services remains insufficiently explored. Hence, by systematically synthesizing recreational activities, their benefits, and associated challenges, the present research contributes significantly to the body of literature on ecotourism and recreational activities.

In doing so, the review offers readers a structured understanding of recreational activities and benefits provided by ecosystem services, as well as challenges related to recreational activities.

The review also found that ecosystem services provide several recreational services and benefits for human beings in terms of physical, mental, social, economic, and environmental conservation. However, the increasing demand for recreational services within ecosystems significantly impacts ecosystems' integrity, threatening not only the sustainability of recreational services but also overall ecosystem services, including provision, regulating, supporting, and cultural services. Understanding these trade-offs can help balance recreational services with ecosystem integrity.

Furthermore, it can help decision-makers and concerned bodies to develop effective management strategies to minimize the impact of recreational activities on ecosystems.

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