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Ecotourism for Conservation?

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Abstract

Ecotourism originated in the 1980s, at the dawn of sustainable development, as a way to channel tourism revenues into conservation and development. Despite the "win-win" idea, scholars and practitioners debate the meaning and merits of ecotourism. We conducted a review of 30 years of ecotourism research, looking for empirical evidence of successes and failures. We found the following trends: Ecotourism is often conflated with outdoor recreation and other forms of conventional tourism; impact studies tend to focus on either ecological or social impacts, but rarely both; and research tends to lack time series data, precluding authors from discerning effects over time, either on conservation, levels of biodiversity, ecosystem integrity, local governance, or other indicators. Given increasing pressures on wild lands and wildlife, we see a need to add rigor to analyses of ecotourism. We provide suggestions for future research and offer a framework for study design and issues of measurement and scaling.

Contents

1. INTRODUCTION

Conservation and tourism have worked in tandem since the early twentieth century (1). Indeed, the first US National Parks were created with both in mind. The architects of parks such as Yosemite, Yellowstone, Grand Canyon, and Sequoia envisioned setting aside public lands to "conserve the scenery and the natural and historic objects therein," and to ensure people of all backgrounds, in melting pot fashion, could enjoy the natural wonders of their (newly united) nation while also keeping such places "unimpaired" for "present and future generations" (2). Tourism and recreation in the parks were meant to serve as engines for nation building and economic development (3). Innovations included expanded railway lines, visitor centers, hiking trails, campgrounds, and scenic overlooks (4). Through national parks, conservation and tourism have always been connected (5).

Ecotourism: responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education

Sustainable development: development that meets the needs of the present without compromising the ability of future generations to meet their own needs

Livelihoods: means of making a living; encompass people's capabilities, assets, income, and activities required to secure the necessities of life

Ecotourism is both an expansion and a refinement of the connection between tourism and conservation. It builds on the idea of using tourism to reinforce conservation and vice versa, while deepening the criteria for sustainability. It emerged in the late 1980s, in the dawn of sustainable development. The early planners saw it as a form of tourism that could and should be designed and managed proactively with concern for channeling revenues to conservation and community development. It was meant to take place in parks, in keeping with the older ideas about tourism from the first national parks, but also to extend beyond parks, to enhance the livelihoods of people in local communities, and to protect not just recreation opportunities or the scenery, but also to meet more contemporary priorities of protecting biodiversity and maintaining ecosystem integrity (6).

Ecotourism is designed to ensure a positive feedback loop between tourism and conservation—not simply that they can work together, but that they must. Explicit in all definitions of ecotourism is the hypothesis that tourism, when designed and practiced as ecotourism, can benefit wildlife and biodiversity, create incentives to protect landscapes, and support local communities (7). In this way, ecotourism is a specific kind of tourism, distinguished from nature tourism and outdoor recreation by its conservation and development goals. Although there are many definitions of ecotourism, all adhere at least to a principle of making tourism support an array of social and environmental goals. The International Ecotourism Society offers the following—widely cited—definition: "responsible travel to natural areas that conserves the environment, sustains the well-being of the

local people, and involves interpretation and education" (8). The deepened focus on sustainability includes the concepts of "responsibility," "the well-being of local people," and "education."

Since the late 1980s, scholars and conservationists have questioned the feasibility, significance, and true value of ecotourism (9–18). Others have challenged the fundamental, neoliberal philosophy of marketing communities and ecosystems, cultural traditions and endemic species, and "consuming" them to "conserve" them (19–26).

Biodiversity: the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems

Recently, scholars in ecology and conservation biology have begun to take harder aim at ecotourism (27), arguing it is not only helpful to conservation, but in fact, may be harmful to wildlife. Much of the work is conducted by biologists, basing their perspectives on theories related to risks of predation or physiological measures related to stress (e.g., 28). Authors contributing to the recent literature state ecotourism habituates animals to human presence, increases the likelihood of being preyed upon by both other animals and humans, and decreases a population's overall fitness for survival (28–34). A counterargument questions the plausibility of habituation transferred to a suite of wild predator species and suggests, instead, that an "ecotourism shield" can serve to protect entire wildlife populations over vast areas with human-wildlife interactions occurring in a few small locations (35).

As Weaver & Lawton (36) noted, "Despite the essential nature of this research to the management of the ecotourism experience, almost none of the empirical studies have been undertaken by tourism specialists or found in specialized tourism journals. Rather, just one scientific journal, *Biological Conservation*, appears to account for most of them" (but see 7, 12). Although there is evidence of the biologists' findings being overreported (e.g., 37), the recent critiques have tended to conflate ecotourism with other kinds of tourism (i.e., the more conventional ideas of what people do in parks and visitor centers, hiking trails, and campgrounds), missing, misunderstanding, or misstating how and why ecotourism is or ever was heralded or established in later decades as a tool for conservation (e.g., 38 and references therein).

Assuming all tourism that occurs outdoors or somehow involves nature is "ecotourism," and then arguing such activities fail to achieve conservation, is problematic. All research depends on careful definition and measurement of terms. The hypothesis that ecotourism is beneficial to conservation and development cannot be rigorously tested when assessments are biased by inclusion of data from activities that were not designed with the goals of ecotourism. As behavioral scientists Paul Ferraro and Merlin Hanuaer (39–41) describe, many conservation programs have depended on intuition and anecdote to guide both the design of conservation programs and the evaluation of their impacts (42). Generalizing critiques of tourism can undermine support for ecotourism and potentially thwart efforts that would otherwise build incentives for conservation, sustain protected areas, or facilitate community development (35, 43–45).

Our intent is to provide an overview of ecotourism research, building clarity and cohesion from the literature to summarize how and under what conditions ecotourism works for conservation. We are not reporting a new, empirical analysis of ecotourism in a specific place or time, but rather offering a synthesis. We first provide a history of ecotourism, with definitions and aims, and we give attention to the rise and fall of the idea, mirrored by greenwashing in marketing and analysis. We distinguish ecotourism from other kinds of nature-based tourism, noting how ecotourism is a specific concept with specific ideas and principles for implementation to achieve conservation. In doing so, we also acknowledge the real and potential benefits of other forms of tourism, and we provide a table for comparison (**Table 1**).

Second, we provide an overview of the economic, ecological, and social benefits that have resulted from committed application of ecotourism principles. We summarize the ecotourism literature over the past thirty years, citing a range of studies from the social and natural sciences, including some of our own, and cataloging ways ecotourism has supported conservation either

Table 1 Types of tourism associated with conservation, categorized by their predicted impact on biodiversity conservation

Type of tourism		Conservation impact			
Term	**Description**	**PA**	**IL**	**ED**	**SI**
Outdoor recreation	"Experiences that result from recreational activities occurring in natural environments" (46, p. 11)	+/−	−	−	−
Wildlife tourism	The viewing of, and non-consumptive encounters with, wildlife solely in natural areas (47, p. 23)	+/−	−	−	−
Nature-based tourism	"Any form of tourism which uses natural resources in a wild or undeveloped form" (48, p. 25)	+/−	−	−	−
Pro-poor tourism	"Tourism that generates net benefits for the poor. Benefits may be economic,but they may also be social, environmental or cultural" (49, p. 2)	−	+	−	−
Responsible tourism	Widely considered a pre-cursor for ecotourism: "(1) minimum environmental impact; (2) minimum impact on— and maximum respect for—host cultures; (3) maximum economic benefits to the host country 'grassroots'; and (4) maximum 'recreational' satisfaction to participating tourists" (50)	−	−	−	−
Sustainable tourism	"Tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities" (51, p. 12)	+/−	+	+	−
Geotourism	"A form of tourism that specifically focuses on geology and landscape. It promotes tourism to geo-sites and the conservation of geodiversity and an understanding of earth sciences through appreciation and learning" (47, p. 25)	+	−	−	−
The International Ecotourism Society	"Responsible travel to natural areas that conserves the environment, sustains the well-being of local people, and involves interpretation and education" (8)	+	+	+	+
Ecotourism (academic)	"Sustainable, non-invasive form of nature-based tourism that focuses primarily on learning about nature first-hand, and which is ethically managed to be low impact, non-consumptive, and locally oriented (control, benefits and scale). It typically occurs in natural areas, and should contribute to the conservation of such areas" (48, p. 24)	+	+	+	+
Conservation tourism	"Commercial tourism that makes an ecologically significant net positive contribution to the effective conservation of biological diversity" (44, p. 2)	+	+	+	+

Abbreviations: ED, environmental interpretation and ethics; IL, diversified livelihoods; PA, support for wildlife and protected areas; SI, strengthened resource management institution.

directly or indirectly. Finally, we offer a research agenda for the future and a framework for conducting rigorous analyses of ecotourism. We include six research design principles for assessing the net positive conservation benefits over time and place.

2. ECOTOURISM: RISE AND FALL?

In the mid-twentieth century, with the rise of international development, governments and newly formed aid agencies promoted tourism as a tool for advancing traditional or underdeveloped societies (52, 53). Market integration through tourism was meant to catalyze a transition to new societies (54). Economies were perceived as following "stages to modernization," and tourism was an explicit indicator of national progress (55, 56). Large-scale tourism, in particular, with high-rise hotels and transportation networks, was heralded enthusiastically and often uncritically

as fuel for development. The concept of comparative advantage resulted in entire island nations and coastal areas of the world marketing themselves as paradises, promising sun, sand, sea, and sex as they lured foreign and multilateral investors with tax breaks, fee exemptions, and devalued local currencies (41).

By the late 1980s, development specialists began to reject these modernizing, top-down approaches. They questioned the value and impacts of economic growth and challenged the idea that tourism could provide countries with a "passport to development" (57). They favored more democratic and holistic concerns for people and nature—a new paradigm of "sustainable development," best summarized in the 1987 WCED Report "Our Common Future" (aka the Brundtland Report), which drew strong attention to social and environmental dimensions of development (58).

In the realm of conservation, new thinking around sustainable development led to community-centered conservation strategies aimed at improving human welfare while simultaneously protecting the environment (59). Sustainability challenged growth as the ultimate goal of development, and new forms of alternative tourism came to be viewed as a "green passport" to development (60). The fresh coining of ecotourism led development specialists and conservationists in public, private, and NGO sectors to promote ecotourism as a "win-win" for both communities and ecosystems (59, 61, 62) (**Figure 1**). The expectations for ecotourism were high. It was meant to provide sustainable economic development (17, 63), effective mechanisms for biodiversity conservation (18, 40, 62, 64, 65), strategies for empowering marginalized peoples (66, 67), ethical practices for

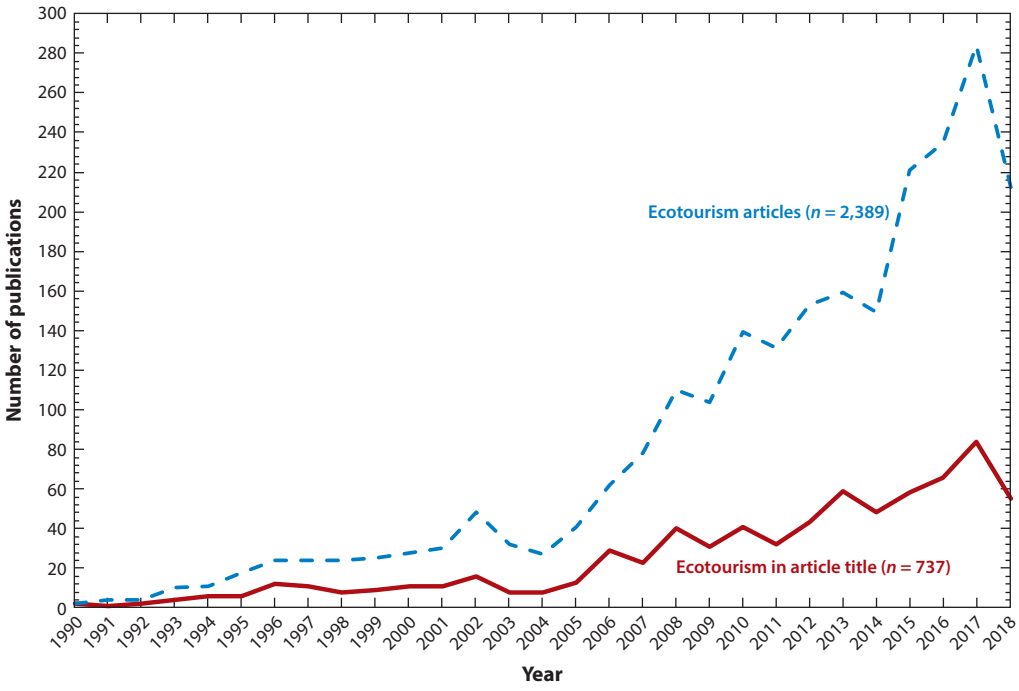

Figure 1

The literature referring to ecotourism has increased substantially since 1990. A search on Web of Science recovered 737 journal articles with "ecotourism" in the title. A similar search with "ecotourism" as a broad topic recovered 2,389 articles. Many of these articles were studies of several types of tourism, ranging from ecotourism, to park visitation, to recreational activities with ecotourism mentioned in the article.

reversing colonial legacies of social and environmental injustice (68), and better cross-cultural understanding (69).

As the goals and standards for tourism shifted to ecotourism, stakeholders throughout the industry took on new possibilities and roles. Local communities partnered with tour companies and NGOs, hoping to channel outside attention on their lands, traditions, and resources to positive changes for their communities (70). Regional and national governments adopted discourses of using ecotourism to protect biodiversity and alleviate poverty. Tourists were encouraged to gaze more respectfully, listen more closely, ask where their money goes, and change their worldview. NGOs increasingly served as mediators among stakeholders collaborating in new partnerships, lobbying for policies favorable to tourism, and promoting the idea of environmental responsibility in tourism.

By the early 2000s, several scholars began to publish critiques of ecotourism, demonstrating empirically that the practice does not always live up to the ideals. For example, Weaver (71) and Kontogeorgopoulos (72) described ecotourism as a vanguard activity that is likely to create a foothold in culturally and biologically sensitive areas that are later exploited through mass tourism development. Kiss (12) questioned whether resources used to develop community-based ecotourism would not in fact be better spent on direct, fortress-style conservation over large areas, whereas others characterized ecotourism as a Western construct that privileges tourists' pleasure at the expense of local communities and environments (e.g., 10, 26).

Several environmental anthropologists and geographers brought critical social theory to ecotourism (see 21–23, 73–78), analyzing its meaning and effects as a Western phenomenon in relatively poor countries. Their work has interrogated ecotourism as an expression and manifestation of Western values about nature and its inhabitants, including humans. They argue ecotourism is inseparable from a political-economic context of neoliberalism (78).

As examples, in his ethnography, *Romancing the Wild* (75), Fletcher showed how ecotourism is an organized set of ideas, practices, and values that does not simply represent—but rather shapes—places and peoples to cohere to Western values and market forces. In her analysis of ecotourism in Madagascar, Duffy (74) argued that ecotourism is popular among a range of powerful interest groups, including the World Bank and global donors "precisely because a commitment to ecotourism by national governments, NGOs and local communities does not challenge the wider policy framework of liberalizing and diversifying economies, and in fact, relies on opening them up to the global market through the neoliberalisation of nature" (p. 341). Neoliberalization of nature is a process in which nonhuman phenomena are subject to market-based systems of management and development. Indeed, Duffy (74) contends, ecotourism seems to address numerous agendas: capitalist development, community development, poverty alleviation, wildlife conservation, and environmental protection.

The enthusiasm and extensive promotion of ecotourism is partly the reason so many kinds of tourism have been relabeled as ecotourism, while lacking accountability to the core principles of the idea (79). Honey (80) called this greenwashing. Tourism ventures mislabeled as ecotourism range from those that promise minimal impacts on the environment without tangible support for conservation to those that include no more than visiting a natural area with no connection to conservation actions or policies (e.g., nature-based tourism, wildlife tourism, adventure tourism, and outdoor recreation) (81). Ceballos-Lascurain (82, p. 2) noted "a lingering problem in any discussion on ecotourism is that the concept of ecotourism is not well understood, and therefore, it is often confused with other types of tourism development." With so much greenwashing, some have argued ecotourism is so overapplied that it is meaningless (83, 84). Recent literature in ecology and conservation biology takes an iconoclastic view of tourism and argues that "ecotourism" harms wildlife and ecosystems. Such critiques may be the upside down of greenwashing—rather

than calling everything ecotourism and lauding the positive results, they are calling everything ecotourism and decrying the negative.

Greenwashing and its opposite are problematic both in marketing and research. By failing to measure or distinguish tourism and ecotourism carefully, scholars risk dismissing or missing altogether the specifically defined conservation purposes of ecotourism. Also, conflating ecotourism with all forms of nature tourism creates an apples and oranges problem in research, making rigorous understanding difficult (45). Compounding the challenge of mixed terms is a lack of time series data in many studies. This can preclude understanding of how or under what conditions ecotourism affects local conservation practices, levels of biodiversity, ecosystem integrity, governance of resources, or any other social or ecological indicator over time. Ultimately, poorly designed impact studies of ecotourism can thwart conservation efforts on the ground. For a counterpoint to this, see the work of Ferraro & Hanauer (39–41), which draws on the ability to infer causality from nonexperimental data, estimating the effects of a range of conservation programs on social and environmental outcomes.

The biological literature on the effects of ecotourism on animal populations has lacked consideration of scale. Mismatches of observation and conclusions seem to arise from a combination of case studies from a mix of tourist and recreational activities conducted at relatively small scales. In many cases, physiological and behavioral studies have been focused on a sample of animals in contact with people, then they have been discussed in terms of much broader effects, such as on entire wildlife populations or communities (see 37). This sort of sampling bias can lead to conclusions that the population is different than it actually is, and it masks the degree to which patterns may or may not scale up to the level of populations across entire landscapes. Ironically, most studies of the effects of tourists on animals take place in areas that are protected by and for tourism, and are subject to strict permits and protocols.

Shannon et al. (85) reviewed population and community-level effects of ecotourism. Unfortunately, they relied heavily on a meta-analysis (86) that included all sorts of interactions among people and wildlife resulting from recreational activities that ranged from winter sports to boating to dog-walking. Some of the impacts on biodiversity cited were also clearly not related to tourism of any kind (e.g., feral animals, invasive weeds, zebra mussels). Although ecotourists certainly engage in recreational activities such as hiking on trails and viewing wildlife from boats and platforms, ecotourism programs regulate these activities that take place in a relatively small area compared to the lands protected by ecotourism (e.g., guided visitation, restricting hiking to specific trails, etc.). Likewise, comparisons of samples from animal populations in areas with and without tourists only show the degree to which the two samples differ, and may not account for alternative hypotheses.

Using the nontourist area as a baseline assumes that effects of tourism have not already spread throughout a panmictic population. Thus, it is not possible to parse out effects of ecotourism from meta-analyses of recreational encounters with wildlife that are studied only at one scale. Discussions of population level effects of ecotourism on wildlife populations are highly speculative, and it remains a tall order to rigorously assess how wildlife interactions with people in ecotourism areas might affect population-level parameters, such as survivorship, reproduction, dispersal, and population growth. To address issues, scholars need to work at multiple scales using similar methods.

All kinds of tourism, including ecotourism, have positive, neutral, or negative effects at the scale where tourists view and interact with plants and animals along trails and in accessible areas (45). However, the ecotourism shield in many instances covers an area vastly larger than the spaces where tourist interactions occur. In general, tourists are restricted to certain zones and trails and are accompanied by guides. Even in widely accessible parks, the majority of visitors do not

venture into the back-country. Indeed, the survival of many threatened species would not be possible without the direct conservation benefits of ecotourism activities (87–89).

Institutions: formal rules, informal norms, or shared understandings that structure political, economic, and social interactions

As examples, protected areas were established for penguin colonies in Patagonia Argentina, New Zealand, Australia, and South Africa (90, 91). Each area receives thousands of visitors annually, which helps justify their existence (91). Across the board, researchers make explicit recommendations aimed at minimizing human disturbance in the colonies (90, 92). In another example, coati mundis (*Nasua nasua*) and tegu lizards (*Salvator merianae*) are habituated around the viewing areas of Iguazu Falls, a World Heritage site with national parks in both Argentina and Brazil (93). But these species range throughout these largely inaccessible parks, which protect 240,000 hectares of uninhabited interior Atlantic Forest. These examples can be transferred by analogy to most places where tourists interact with wildlife. Exceptions could be found in instances such as when tourists are allowed to view and interact with gorillas and other great apes, where it is feasible the tourists could affect a significant portion of the population through transmission of diseases (94, 95). However, ecotourism is regulated in these instances and has provided a shield of protection for these vulnerable species (96). Such a shield can alter movements of animals at landscape scales in some instances. In Grand Teton National Park, calving moose (*Alces alces*) aggregated close to roads to avoid brown bears in more remote areas. Non-calving females and males did not show this response. Brown bears are recent colonists to the park, but over time the attractiveness of roadsides may fade with increasing presence of bears "as a landscape of fear envelopes the entire ecosystem" (97). In summary, the generalization is that tourism is regulated in all these places and mismanagement, when it occurs, is generally at a small scale. In exceptional cases, behavioral change can occur at landscape scales, but the changes have not been shown to be associated with detriment to populations. As Buckley (98) noted, "for over half of the red-listed mammal species with available data, at least five per cent of all wild individuals rely on tourism revenue to survive. For one in five species, including rhinos, lions and elephants, that rises to at least 15 per cent of individuals. Yes, that's risky, because tourism is fickle: but take it away and animals are killed by hunters. It happens every single day, every time patrols stop or hungry locals lose conservation incentives. Simply put, if tourism money is cut abruptly, poaching will increase" (p. 29). At large scales, ecotourism can protect landscapes and entire wildlife populations.

3. THE CONSERVATION BENEFITS OF ECOTOURISM

Ecotourism addresses both social and environmental goals, and it can benefit biodiversity conservation in four direct and indirect ways. As summarized in **Table 1**, these are (*a*) support for wildlife and protected areas, (*b*) diversified livelihoods, (*c*) environmental interpretation and ethics, and (*d*) strengthened resource management institutions.

3.1. Support for Wildlife and Protected Areas

One documented conservation benefit of ecotourism is the protection of endangered species. Early writings on ecotourism emphasized the impacts on individual species, often those serving as the main attraction in particular destinations and projects. For instance, scholars assessed ecotourism based on numerous flagship species such as sea turtles (99–102), howler monkeys in Belize (9, 103), cetaceans (104), macaws (105), polar bears (106), lemurs (107), African wild dogs (108), Komodo dragons (109, 110), and coral reefs (111–113). Although the conservation value of ecotourism may not always offset the perils of extractive industries or less responsible forms of tourism for wildlife, these studies show evidence of increased capacity for conservation within protected areas and increased support for conservation among local populations.

In other recent studies, Ralf Buckley and colleagues used a population accounting approach to measure ecotourism's contribution to conserving IUCN Red-List mammal, bird, and amphibian species (87–89). Their results showed that in the majority of situations, ecotourism provided conservation benefits that outweighed its impacts by increasing survivorship of highly threatened species, including lions, tigers, elephants, wolves, rhinos, and other large species (87). Although much effort is needed on the ground to protect threatened individual animals, in the face of larger commercial and industrial threats, the data suggest a positive influence of ecotourism on endangered species conservation (e.g., 43, 87–89, 114, 115).

Writings on the conservation benefits of ecotourism include impacts not just on species but also across larger regions. In exploring landscape-level conservation across protected areas, researchers have documented ecotourism's (mostly) positive impacts in Tanzania's Ngorongoro Crater Conservation Area (116); Peru's Tambopata National Reserve (114, 117); and Ecuador's Galapagos Islands National Park (118, 119). Although these studies highlight the institutional challenges to implementing conservation across landscape scales, they reinforce the value of ecotourism for conservation in comparison to other competing uses of natural resources, as well as the contributions to local communities. Assessing land use changes attributed to ecotourism using more sophisticated computational analyses, researchers have demonstrated how ecotourism in Costa Rica contributes not only to a reduction in land degradation but also to net reforestation in several independent cases (115, 120–122); parallel ethnographic research in the same regions has confirmed increased economic earning potential and support for protected areas among local populations (115).

A recent global assessment in biodiversity hotspots found that ecotourism supports conservation when the following four criteria are met: (*a*) a specific forest conservation mechanism is in place, such as a protected area, payment for ecosystem service program, or other conservation pledge; (*b*) there is a spatial boundary delineating the area governed by the conservation mechanism; (*c*) local families receive direct economic benefits; and (*d*) community-oriented monitoring and enforcement are strong (123). These criteria are concordant with the tenets of ecotourism. Other forms of nature-based tourism that do not adhere to these criteria did not lead to similar outcomes. The study provides evidence that tourism works best for conservation when it manifests as ecotourism—that is, when it increases the capacity for conservation in protected areas and in local communities.

3.2. Diversified Livelihoods

A documented contribution of ecotourism is diversifying the livelihoods of people who live in and near protected areas (40, 41). By combining conservation and development, ecotourism is a classic approach to sustainable development just as it is to other paradigms of sustainable use, integrated conservation development, or community-based natural resource management. Defenders and critics of ecotourism alike tend to describe ecotourism as "a promising route for generating benefits for those living close to tropical biodiversity without undermining its existence" (124, p. 20).

Some have described the connection between ecotourism, livelihoods, and conservation through an "alternative income hypothesis" (125). This is the notion that local residents who are dependent on wildlife and ecosystem services for their livelihoods will lessen their reliance on natural resources when they switch to work in ecotourism. Langholz (126), for example, assessed how ecotourism income caused people to reduce their reliance on commercial agriculture, hunting, logging, cattle ranching, and gold mining. Wunder (127) identified income and employment from ecotourism in the Cuyabeno Wildlife Reserve of Ecuador as influential in building local engagement in conservation. In Costa Rica, Troëng & Drews (128) found that economic benefits from ecotourism around Tortuguero National Park became incentives for residents to

protect sea turtles. In this way, people in host communities can become a first line of defense in the "ecotourism shield" (35).

The alternative income hypothesis is tied with an understanding that working in ecotourism is more sustainable than working in mining, logging, uncontrolled hunting, or farming. The logic further holds that more employment and income from ecotourism can encourage more conservation, and conversely, the loss of benefits may signal degradation (129). The hypothesis has not always proven true. In Nepal, Bookbinder et al. (130) found ecotourism benefits were insufficient to provide incentives for local residents to conserve wildlife. In Mexico, Barkin (131) found ecotourism employment opportunities from the Monarch Butterfly Reserve were not enough to curb logging of the forest. Lindberg et al. (13) reported similar results in Belize, where tourism activities failed to generate financial support for protected area management. Belsky (9) explained that decreased local livelihood security associated with ecotourism in Belize actually triggered a "violent backlash against conservation" (9). In Mexico, Young (132) found that economic revenues from gray whale watching did not reduce external pressures on inshore fisheries. In the Peruvian Amazon, Stronza (133) measured the effects of ecotourism benefits among the same households before and after a community lodge opened, and between households with varying levels of participation. She found the economic benefits from ecotourism were ambiguous for conservation—employment in ecotourism led to a general decline in farming and hunting, whereas new income enabled greater market consumption and expansion of agriculture. Taken together, these studies indicate promise from ecotourism and potential scaling limits of ecotourism enterprises. There is a clear need for further analysis of the conditions under which economic benefits can work effectively for conservation.

Although specific conservation outcomes like resource use and habitat protection are often the focus of research on ecotourism impacts, outcomes related to community development have effects for conservation as well. At the scale of entire communities, ecotourism has been associated with communities setting aside tracts of land and vital habitats, with rules assigned to protect resources and species (127, 134–138). This suggests it is in the social, cultural, and political spheres where ecotourism continues to hold promise for improving local living conditions in ways that reduce pressure on natural resources and biodiversity. In such contexts, ecotourism has been shown to contribute directly to a sense of cultural pride as well as the opportunity to showcase and support local arts and, in some cases, revitalize ethnic traditions, customs, shared identities, and even languages, many of which are tied to intact ecosystems and iconic, endemic wildlife species (67, 139–141).

3.3. Environmental Interpretation and Ethics

Ecotourism's indirect benefits to conservation extend beyond the communities and regions where it occurs by influencing the behavior of ecotourists. Despite early doubts about the potential to convert tourists to "greenies" (e.g., 142), more recent research has shed light on the ways interpretation, guiding, and messaging during ecotourism experiences can be leveraged for conservation behaviors in destinations and in tourists' places of origin (119, 143). For instance, Ham (144) assessed ecotourists' experiences during trips with National Geographic/Lindblad Expeditions in the Galapagos Islands. Beyond the support the Galapagos National Park received from visitors' entry fees, Ham's informational strategy led to a philanthropic campaign that secured up to $400,000/year in additional donations to the Charles Darwin Foundation. This has inspired other tour operators to explore similar conservation philanthropy opportunities with their clients (145).

Ecotourism experiences can also lead to new attitudes, knowledge, and behaviors once visitors return home (146). Scholars have explored how free-choice science learning during guided,

interpretive experiences in ecotourism settings can be developed in accordance with informal science education theory (e.g., 143, 147). There is emerging evidence that such experiences lead to promotion of parks and conservation messages via social media, as well as increased support for local parks in tourists' places of origin (148). One path for promoting conservation, or "proenvironmental," behaviors among tourists when they return home is to use postvisit action resources that connect the new knowledge and experiences gained in ecotourism settings to opportunities for conservation action at home (149, 150), especially reducing consumption (151, 152).

Another indirect benefit of ecotourism is new or newly deepened feelings of stewardship and environmental ethics among host destination communities. Heyman & Stronza (153) found that cultural interactions between locals and outsiders in ecotourism destinations helped build awareness of local resource scarcity, a concept that gained new meaning for people as they discussed or witnessed habitat degradation or species declines outside of their own communities. Other researchers have highlighted positive changes in the environmental ethic of both local resident hosts (e.g., 115, 127, 154) and their visiting guests (143). In Nicaragua, Hunt & Stronza (154) described how ecotourism employees acquired new environmental concern and stewardship ethics, so much so that they became critical of their own employer's environmental policies (see also 155).

3.4. Strengthened Resource Management Institutions

An indirect but powerful way ecotourism can work for conservation is by strengthening local institutions. Species, landscapes, communities, habitats, and places at the heart of ecotourism (and tourism) operations are often common pool resources. When common pool resources, such as wildlife and forests, are commodified as "attractions" and "destinations," the ways in which they are used and perceived, and by whom, shift, requiring strong institutions to ensure they are governed and managed sustainably (135). Two basic challenges of managing common pool resources are exclusion and subtraction. The challenge of exclusion is controlling access to potential users (e.g., too many tourists "ruining" a "pristine" habitat); the challenge of subtraction is keeping single users from diminishing or degrading the resource for all others (i.e., hunting or harassing wildlife makes it scarce and skittish) (156, 157). Tourism—or ecotourism—development can compound the problem of exclusion by opening habitats to commercial operators, tourists, and other outsiders, and by expanding the numbers of users, revenues, and technologies that can accelerate subtraction (100, 132, 158, 159). Strong local institutions are essential for overcoming these challenges.

Ecotourism, with its emphasis on engagement with local communities and participatory approaches to development, can provide the incentives and social capital to strengthen institutions (160–162). The quality and stability of local institutions influence how people in local communities are able to monitor wildlife and other resources, establish rules for use and conservation, and sanction rule breakers (163, 164). Community-based ecotourism operations that help strengthen local institutions have had clearer success in conservation (129, 135, 165). Conversely, ecotourism operations with little attention to local governance have had less success in conservation (136).

4. A FRAMEWORK FOR EVALUATION

Can ecotourism work for conservation? In this section, we point to studies that provide the way forward for conducting rigorous, empirical research to evaluate the conservation effects of ecotourism. These include comparative approaches designed to test the fundamental predictions of ecotourism, summarized in **Table 2**. Ferraro & Pattanayak (42) have argued scholars of conservation policy must adopt "state-of-the-art" evaluation methods to determine what works

Table 2 Framework for rigorous analysis of ecotourism

Research principle	How?	Why?
Defineecotourism	Adhere to accepted definitions	Avoid false equivalency and definition fallacies ("apples and oranges")
Gather longitudinal data	Panel data; long-term assessment of biodiversity	Understand changes over time on the same criteria with baseline data
Addressscale	Test questions at multiple scales using the same methodology, define scale and units of analysis explicitly	Avoid scaling mismatches and identify scaling limits, the fundamental consequences for the interpretations and conclusions drawn from analysis
Measure noneconomic benefits	Shift emphasis from biology and tourist studies to social science in local communities	Noneconomic factors have tremendous influence on conservation institutions, values, and behaviors
Conduct participatory evaluations	Ethnographic research emphasizing emic data, empowering participatory action research approaches	Deepens and expands range of possible variables that will have impact on conservation; enables local monitoring by engaging local residents a priori rather than after the fact
See the larger context	Incorporate broader socio-ecological and political ecological systems-level analysis into the study of ecotourism	Avoid "throwing the baby out with bath water"

and when. This includes evaluating effects of ecotourism on both environmental and social outcomes, emphasizing quality of research design, and exercising care in measurement and analysis.

4.1. Define Ecotourism

A first step toward a more rigorous analysis is conceding that scholars have been measuring and judging a wide variety of things and labeling all of it "ecotourism." Muddled definitions of ecotourism make it difficult to assess or compare conservation impacts across sites. In research, this is the proverbial problem of "apples and oranges," or false equivalence, describing a situation where there is a logical and apparent equivalence, for example, between outdoor recreation and ecotourism or between conventional tourism and ecotourism, when, in fact, there is none. The phenomena may share some common characteristics, but they have important differences that are overlooked, often for the purposes of the argument (166). Problematically, this approach allows cherry-picking cases to prove a point, i.e., "ecotourism is harmful to wildlife," rather than conducting rigorous analysis. Ferraro & Hanauer (39) have noted that evaluators often ignore the implications of measurement error in their treatment variable, in their outcome variable, and in their control variables. Recent research has demonstrated, however, that these errors are often not random, and ignoring them can lead to serious bias.

Despite the multiple definitions of ecotourism, it is possible to make rigorous and thoughtful comparisons of ecotourism impacts across sites. The key is providing clarity in measurement. No two communities or ecosystems or ecotourism destinations are the same, and establishing controls as one would in a laboratory setting is impossible. Nonetheless, one can identify average effects of treatments across sites and populations. This requires careful measurement or operationalization of the phenomenon studied—ecotourism—as a causal variable (167). Without providing clarity in how ecotourism is defined, operationalized, or measured, researchers risk further confusing and confounding different activities and impacts.

Clarity in measurement will ensure more rigorous assessments of ecotourism, a necessary endeavor given ecotourism remains a major conservation strategy environmentalists are busy

promoting and implementing around the world (35, 44). Although one 2001 content analysis outlined as many as 85 different definitions of ecotourism (168), a number that has almost certainly grown in the intervening years, that study made it clear that despite the large proliferation of definitions, several key variables are common to the vast majority of ecotourism definitions: (*a*) reference to where ecotourism occurs, for example, in natural areas; (*b*) ecotourism's net benefits to conservation; (*c*) ecotourism's respect for local culture; (*d*) direct benefits of ecotourism for local communities; and (*e*) ecotourism's educational value for both travelers and local residents. Perhaps the most thorough definition comes from Fennel (48): "sustainable, non-invasive form of nature-based tourism that focuses primarily on learning about nature first-hand, and which is ethically managed to be low impact, non-consumptive, and locally oriented (control, benefits, and scale). It typically occurs in natural areas, and should contribute to the conservation of such areas" (p. 24).

In **Table 1**, we considered how the definitions of nine different forms of tourism that have some connection to nature, sustainability, or conservation and that are often conflated in the literature with ecotourism compare to these two definitions of ecotourism. Among them, ecotourism is the one activity specifically designed with proactive concern and intent for channeling revenues from visitors to conservation activities and to enhancing the welfare of local people.

4.2. Gather Longitudinal Data

A second principle for conducting rigorous research on the impacts of ecotourism is evaluating changes over time. This entails collecting data on indicators before and after the program (41). Long-term conservation is an implicit goal of ecotourism, and longitudinal studies are needed to identify patterns and processes related to the presence of ecotourism, such as rebounding of wildlife populations, resilience of ecotourism ventures, and how negative and positive changes accumulate over time. Indicators of direct and indirect effects of ecotourism, either good or bad for conservation, can be measured only with understanding of the same indicators across sites, and also with panel data over time, such as in longitudinal case studies. Such controls allow researchers to evaluate impacts on species, populations, or communities in ecotourism destinations as well as on what happens to visitors' behaviors during and after travel.

Examples in the literature include long-term research in Tambopata, Peru, by social scientists and biologists (70, 133, 135, 140, 169, 170), anthropologists, and other social scientists in Roatan, Honduras (171, 172), the Okavango Delta of Botswana (173–176), Madagascar (177), and in both Guanacaste (100, 178, 179) and the Osa Peninsula regions of Costa Rica (115, 122, 146). These studies provide greater context for understanding how ecotourism plays out against other economic activities and how ecotourism reverberates within local communities, changing how people think about, use, harvest, protect, or interact with wildlife and other natural resources. Such changes are often not discernable in one "field season" or through a single set of observations or single application of a survey instrument. In longitudinal research in the Peruvian Amazon, Stronza (133, 135, 169), for example, showed how economic benefits from ecotourism that were distributed across a community with secure land tenure fostered participation in management and decision making, generating local support for wildlife and forest conservation.

4.3. Address Scale

A third principle of rigorous research on ecotourism is attention to scale. Ecotourism bears consequences for conservation across multiple scales, ranging from individual tourists' encounters with individual animals, to broader reductions in hunting pressure and opportunities for news skills, benefits, and development for individuals, households, communities, and national governments.

In the same way ecologists have recognized for decades their studies are influenced by the scale of observation (180, 181), the scale at which ecotourism is viewed will influence conclusions about its value (182). Ecological research on effects of ecotourism on biodiversity will benefit from explicit definition of the scale at which studies on flora and fauna are conducted, and careful consideration when extrapolating results, positive or negative, to larger scales. Although it is important to document effects of people's actions on biodiversity at any scale, it is also important to frame research questions, and their answers, at the appropriate scale if one is evaluating ecotourism as a conservation endeavor. If the goal of ecotourism is to conserve biodiversity and enhance the well-being of people, then a meaningful overarching question is "what are the impacts of ecotourism at the scales that matter to biodiversity conservation, and to local communities?".

How does ecotourism scale in terms of overall benefits? The conservation benefits of ecotourism thus extend from the scale of an individual local guide to an entire community, and they bear a strong influence on national policy aimed at conservation (182). The umbrella of protection provided by ecotourism, which depends not only on land sparing but just as importantly on sustaining incentives for people to conserve biodiversity, can bring a net benefit to conservation of biodiversity at landscape and regional scales, provide revenue to support habitat conservation over large areas for decades, and influence major conservation and development policies (43, 44, 182). For example, communities set aside tracts of forest surrounding ecolodges, and the positive cumulative effects of individual lodges in a region may be more than additive in terms of lands protected and positive development outcomes. In this way, multiple community-based ecotourism projects can support conservation over large areas (115, 122, 183). Multiscale studies can identify thresholds where ecotourism is more or less impactful, as well as the governance regimes required to sustain them. Testing for and describing the scaling functions of multiple ecotourism ventures and how they interact would be a step forward in understanding its broader role in conservation. Also, understanding how far conservation incentives from ecotourism can reach, depending on markets, location, and ecosystems is a rich area for integrative research (184).

4.4. Measure Noneconomic Benefits

Measuring the conservation impacts of ecotourism often entails gathering data on numbers of visitors, rooms occupied, and expenditures, as well as calculating revenues, number of jobs, volume of local commerce, and other economic indices (185, 186). Income and employment opportunities sometimes appear in studies as indicators of successful ecotourism projects (6, 130). However, direct monetary benefits are not sufficient to ensure social and environmental objectives of ecotourism are achieved. In the absence of equitable distribution of economic benefits, secure land tenure for local residents, and social impacts in line with existing social and cultural aspirations, ecotourism is unlikely to result in conservation (9, 116, 130, 139). Scholars must look beyond economic measures of employment and income to other social, cultural, ecological, and political factors to understand the full value of ecotourism.

The next step in proper valuation of ecotourism is recognizing that economic benefits are "necessary but not sufficient" for ensuring conservation (133, 154). Aside from providing employment and revenue (178), community-based ecotourism can help build stewardship of natural resources and strengthen local institutions for managing wildlife, forests, and other common pool resources (135). Therefore, measuring impacts of ecotourism requires seeing and evaluating nonmonetary indicators—things like social capital (164, 187), feelings of well-being (66, 70), and capacity to work collectively (129, 139, 188). Adding such social science indicators can provide greater understanding of how ecotourism helps protect wildlife and ecosystems beyond protected areas (87, 115).

4.5. Conduct Participatory Evaluations

Relatively few studies of ecotourism are conducted at the local level (189). Even fewer assessments have emerged from the experiences and perceptions of local residents themselves. A more thorough analysis of ecotourism must include evaluatory criteria derived from local residents. A participatory approach implies gathering and interpreting data in ways that differ from those in studies directed solely by scholars. In participatory analyses, indicators of success are determined by emic (i.e., subjective and culturally embedded views) as well as etic ones (i.e., those defined by scholars, NGOs, conservationists, or other external actors. In cultural anthropology, an emic account of behavior is one that is couched in terms meaningful to the actor; an etic account is one that is given in terms that can be applied to other groups. Emic is culturally specific, whereas etic is culturally neutral.

Various scholars in the social sciences have taken this approach. Ross & Wall (190, 191) developed an evaluative framework, which they used to compare ecotourism in three protected areas in Indonesia, evaluating field observations and interview responses with indicators of success. Similarly, Weinberg et al. (192) compared ecotourism projects in New Zealand and Costa Rica, using interviews to solicit perceptions of ecotourism's failures and successes along specific criteria. Stronza & Gordillo (70) conducted a year of ethnographic research, gathering local narratives, insights, and experiences in ecotourism, combined with south-south peer assessments of ecolodges in three indigenous communities in Ecuador, Peru, and Bolivia (136, 153).

The participatory approach entails asking people not just to respond to questions, but also to help determine which questions are most relevant to ask, help gather the data, and then help interpret and present the results. This approach takes evaluation out of solely academic realms and puts it back into communities for applied learning and action. Although others have written about the role of participation in ecotourism planning and management (193, 194), this framework carries participation to the latter phases of evaluation. Participation in evaluation can be empowering, as people in local communities represent and express their own experiences with ecotourism, in their own languages, both literal and metaphorical.

4.6. See the Larger Context

A productive way to assess connections between ecotourism and conservation is to evaluate impacts in relation to other livelihood strategies and economic activities. The Union of Concerned Scientists has outlined the primary drivers of deforestation and forest degradation as emerging primarily from the soybean, beef, palm oil, timber, fuelwood, and small-scale farming sectors (195). Each of these agents of degradation represents a land use that often competes directly with ecotourism, particularly in high biodiversity regions of the tropics. The conservation value of ecotourism in such contexts, where it competes with other economic activities that are more likely to lead to deforestation, endangered species loss, environmental degradation, and reductions in biodiversity (36, 56, 81, 195), is particularly high. However, few, if any, studies make such direct comparisons, and instead only compare ecotourism's impacts on wildlife to the absence of human activity. This fails to account for ecotourism's role as an alternative to other economic activities and forms of tourism.

One of the intentions of ecotourism is to provide alternatives to activities that are more likely to lead to environmental degradation and to reduce the perverse incentives that draw marginalized residents into less sustainable livelihood activities and forms of development that create greater damage to wildlife and ecosystems (50, 80, 81). Thus, the relevant questions are not "What are ecotourism's impacts?" or "Is ecotourism better than a national park?" but rather "What are ecotourism's impacts relative to industrial logging?". What are its impacts relative to land conversion for commercial agriculture such as soybean or African oil palm production? What are its

impacts relative to mining, fishing, or illegal hunting? What is the role of ecotourism in stemming overexploitation of biodiversity, such as bushmeat hunting or fuelwood gathering? How do the impacts of ecotourism differ from those of other forms of tourism? After all, these are the things ecotourism was invented to combat.

A fruitful line of research with particular relevance to conservation policy is measuring the potential impacts of ecotourism relative to other economic activities, and modeling or predicting impacts across different spatial and temporal scales. Although such research remains scarce, it is needed to demonstrate ecotourism's value as an alternative for rural communities. Although it may be a foregone conclusion that ecotourism's monetary benefits cannot offset oil and gas development, mining, and industrial agriculture (19, 56), studies that address scale, are participatory, and consider nonmonetary valuations will serve to identify better the place of ecotourism in an array of conservation strategies and ideas. Moving forward, researchers should delineate ecotourism's impacts in relation to the activities that would be most likely to occur in its absence. This echoes the recent call for more counterfactual modeling of ecotourism's conservation impacts, a methodological approach that would better delineate ecotourism's impacts from those of other economic sectors, competing land uses, and forms of tourism (123).

5. CONCLUSION

Earth has entered the Great Acceleration of the Anthropocene, an era of unprecedented environmental change and species loss resulting from human activity (196–198). It is more critical than ever that scholars and practitioners gain better understanding of how human activities can be managed to support the survival of species—including our own—on the planet. Ecotourism remains a major conservation strategy, and increased clarity about its net positive benefits is necessary if we are to leverage opportunities provided by the world's largest industry for further protection of global biodiversity.

Ecotourism is no more a panacea than any other conservation strategy. It is subject to scaling issues and there is variance around its overall effect. Despite recent claims, ecotourism can still hold promise among an array of strategies for justifying large protected areas and building local stewardship, support, and institutional capacity for managing wildlife. As with many conservation programs, the evaluation of ecotourism impacts has lacked rigor (40, 42). Defining and measuring ecotourism carefully and writing about its impacts—both positive and negative, social, and ecological—is critical also for subjecting all forms of tourism operations to scrutiny. Added rigor in evaluation can help distinguish greenwashing from legitimate and effective forms of ecotourism.

We have provided an overview of the economic, environmental, and social benefits that can result from committed application of ecotourism principles. We identified a trend in the literature, which suggests ecotourism holds more peril than promise, and we identified problematic fallacies and mismatches in the research program. We arrived at a set of research principles that, if embraced, can lead to more rigorous empirical research that will better account for the net benefits ecotourism can offer for people, wildlife, and ecosystems over time.

SUMMARY POINTS

1. Ecotourism was designed by conservationists in the 1980s, at the dawn of sustainable development, to channel tourism revenues into support for conservation and local development.

2. Ecotourism has many definitions, but one clear set of principles. It is an alternative to other forms of tourism development, designed to ensure a positive feedback loop between tourism and conservation.
3. Explicit in all definitions of ecotourism is the hypothesis that tourism, when designed and practiced as ecotourism, can benefit wildlife and biodiversity, create incentives to protect landscapes, and support local communities.
4. Despite research over 30 years on the economic, environmental, and social benefits of ecotourism, it has been dismissed and critiqued as ineffective.
5. Although ecotourism efforts are not always successful, much of the lack of success noted in the scholarship is associated with flaws in research design.
6. Many critiques are a result of evaluating conventional tourism and outdoor recreation and calling it ecotourism. These activities are not synonymous with ecotourism, but rather are the activities to which ecotourism is designed to provide the alternative.
7. The conflation can preclude rigorous analysis of ecotourism, create a misleading implication that ecotourism is worse for conservation than the forms of resource use likely to occur in its absence, and thus impede efforts to make ecotourism work effectively as a strategy for meeting human needs while protecting the environment.
8. We provide a history of ecotourism and a review of the documented impacts. Can ecotourism work for conservation? We point to ways for conducting rigorous research to evaluate the effects and net social and ecological benefits at different scales. These include comparative and longitudinal approaches to testing the fundamental predictions of ecotourism.

FUTURE ISSUES

1. Because ecotourism does not occur in a void, researchers need to place greater attention on the contexts in which ecotourism is occurring so that the environmental impacts of competing uses of natural resources are compared with the impacts of ecotourism activities.
2. In addition to species-level assessments, greater emphasis on landscape and/or ecosystem-level outcomes is needed.
3. Further attention to social outcomes related to environmental ethics, shifting attitudes toward conservation, and changing social relations of power and capacity, particularly in longitudinal studies, will better account for the overall conservation effects of ecotourism.

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