

# Introduction: Ecotourism's Promise and Peril

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**Fig. 1.0** Northern elephant seals (*Mirounga angustirostris*) hauled out along the Pacific Coast Highway in Central California. Photo credit Daniel T. Blumstein

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This is a book that desires to improve the positive impacts of ecotourism and nature-based tourism by properly identifying potential biological impacts so as to help develop effective mitigations and management. We focus mostly on impacts on wildlife. We, the editors, are avid eco- and nature-based tourists. We travel to natural areas to appreciate their wonder. We watch animals, botanize, and enjoy beautiful natural landscapes. We also recreate (bike, hike, climb, surf, ski, snorkel, and dive) in natural areas around the world. Professionally, we are behavioral biologists who study the natural behavior of animals to reveal general trends and understand behavioral diversity. We study animals in the wilderness and in areas with eco- and nature-based tourists. We recreate in the places that we work and we care deeply about managing negative consequences of recreation in these and other places. We also appreciate the value of natural areas in urban places and study the effects of urbanization on wildlife in our ever-urbanizing world.

Nature-based tourism is huge. Globally, a recent study suggested that there are over eight billion visitors per year to terrestrial natural areas [1]. Stated bluntly: more people visit natural areas than there are people on Earth! Alarmingly, this estimate does not include small reserves so the real extent of people interacting with wildlife and recreating in natural areas is even larger. Such high visitor numbers cannot occur without creating ecological impacts. Thus, given the tremendous potential impact of human visitation on natural areas, what can be done to reduce or manage impacts while enjoying the potential economic and conservation benefits of eco- and nature-based tourism?

There has been much written on managing wildlife-, eco-, and nature-based tourism, and we refer all to the outstanding volume, *Natural Area Tourism: Ecology, Impacts and Management*, now in its second edition [2]. Newsome et al. wonderfully review the scope of natural area tourism and discuss ways of identifying and managing impacts. It is an authoritative and comprehensive volume. It contains overviews of the sorts of impacts that natural area tourists create and strategies to minimize them. There are of course a number of textbooks that discuss, in part,

impacts of ecotourists (e.g. [3, 4]), and Buckley [5] outlined a number of environmental impacts of ecotourism. In addition, Ballantyne and Packer's [6] *International Handbook on Ecotourism* is another volume that addresses many challenges associated with ecotourism, which begins with its definition. Indeed, the first 20% of Ballantyne and Packer's book is dedicated to discussing the definition of ecotourism! We, however, follow Buckley [7] in being necessarily vague: ecotourism includes the intention to minimize impacts in a nature-based setting, where ecotourists learn about nature and may contribute to conservation and there may be benefits to the local community. Given these wonderful books, why is another book on impacts of ecotourism warranted?

We believe that we, as well as many of the chapter authors, bring a unique animal behavior-centered approach to potential impacts of eco- and nature-based tourism. Changes in behavior are usually the first reaction of animals to environmental challenges, and ecotourism can be viewed as an environmental challenge. This behavioral perspective focuses on mechanisms of how animals respond to threats and challenges. A mechanistic approach is essential if we are to develop better tools to manage impacts [8]. However, since ecotourism is expected to benefit humans as well, we have a separate chapter that discusses the implications of ecotourism to local community and to visitors.

A conflict between what is good for nature and the societal benefits that may emerge from ecotourism is more or less expected given the desire to both reduce impacts on nature while benefiting people and promoting conservation. We will focus, primarily, on impacts on animals; the variety of impacts of ecotourism on vegetation are not our primary focus. In fact, our animal-centered focus is timely since nowadays scientists are concerned with the under-recognized effects of defaunation—the loss of animal species—on ecosystem health [9, 10]. But we also recognize that in many places, ecotourism provides a vital role in community development and indeed in preserving biodiversity. On a recent trip to the Galápagos, Dan had a long and fascinating discussion with a local guide about the disconnect (as he perceived it) between what's good for nature and what's good for the local people. In a place where he said that 80% of the jobs are tied to tourism (also see [4]), his concerns about the constraints on residents (and he was a multigenerational resident of Isabella) illustrate the constant tension that may exist in many places between wildlife and development, between conservation and preservation, and between animal and human welfare.

We believe that unless environmental conservation is at the core of nature-based tourism, its long-term sustainability is ultimately at risk. Dan wrote *An Ecotourist's Guide to Khunjerab National Park* [11], in part because local shepherds wished to develop a trekking industry following the government takeover and protection of the land that they had grazed and hunted on for hundreds of generations. Yet such industries are fragile and susceptible to changes in perceptions of safety and uncontrollable international events. Relatively, few people trek in Northern Pakistan these days compared with Northern India or Nepal.

So why is a biological focus important? We, the editors, share a keen interest in understanding antipredator behavior. Since virtually all animals face some risk of predation at some point of their life, the field of antipredator behavior provides

numerous examples of strategies that animals employ to reduce their risk of being killed. These strategies start by simply avoiding areas where there are predators, extend to strategies to detect predators using various senses (which may differ from humans' senses), and include a variety of evolved escape mechanisms.

As behavioral ecologists, we are interested in explaining this behavioral variation by thinking about both the costs and benefits of adopting a particular antipredator strategy. A striking insight from this economic approach is that we can't simply assume that animals will leave a risky or disturbed area. Animals may suffer negative consequences from disturbances because they have no other options. This means that an individual may seemingly appear to tolerate a threat because it's too expensive for them to respond to it, but the threat may, nonetheless, take a toll on its ability to survive or reproduce [12].

Because animals often perceive humans as predators [13], our expertise positions us nicely to address questions of ecotourism's impacts in a novel and essential way. Novel, because this book summarizes recent results in a way that is designed to be accessible to both ecotourists and to operators. Essential, because by thinking deeply about how animals perceive and manage predation risk, we identify potential unrecognized threats to the biodiversity that we all seek to enjoy when we travel to natural areas. And, once identified, we make novel suggestions to reduce the myriad of potential impacts in biodiversity-friendly ways [12].

We have engaged a diverse set of contributors, and together, we believe that we have created a novel perspective on potentially negative effects of ecotourism on wildlife while making a great effort to figure out the ways to reduce them. As you will see, there is some redundancy in the following chapters. We believe this is acceptable and indeed necessary. First, each chapter has a different focus, but together they illustrate the myriad of human impacts on wildlife that may result from ecotourism, and this web of impacts is interconnected. Second, readers are able to acquire isolated chapters instead of the entire book. For this reason, the chapters should be stand-alone, containing the key concepts and conclusions so that readers can have the proper perspective should they only read a single chapter.

You will also see that we provide extensive references. We argue for an evidence-based approach and the references are the evidence supporting authors' conclusions. We believe that access to this evidence is essential for scientists, nonscientists, and managers. All may wish to dig deeper into the evidence. Many of these sources, and certainly most of their abstracts, are available online and without charge. For those without access to a university library, we suggest that you search for the paper's title; many authors make PDFs of their paper freely available.

In Chap. 2, Geffroy et al. [14] review a set of physiological and behavioral consequences of nature-based tourism on wildlife. Behavioral responses are often, but not always, indicators of underlying physiological stress responses. These stress responses are part of a series of homeostatic mechanisms by which animals manage stressors in their environment. Stress responses, themselves, are not bad, but chronic stressors can affect the health and well-being of animals or lead them to change their activity pattern; all these may reduce survival and reproduction. Thus, by understanding how human activities may lead to chronic stress, operators and informed ecotourists can reduce activities that may inadvertently stress animals.

In Chap. 3, Shannon et al. [15] focus on the ecological effects and describe the various and sundry ecological consequences of nature-based tourism on wildlife and the biotic communities in which they live. A growing literature shows that when the behavior of individuals is altered by ecotourists, there may also be ecological consequences to the community as a whole. For instance, tourism-related activities can directly harm animals. For instance, an increase in vehicular collisions can reduce population sizes in specific locations. And, by providing supplemental food by tourists and ecotourism operators, animals will use different areas. Changes in the distribution and abundance of animals modify the relationships between them (e.g., competition and predation) and may have consequences that cascade down to impact vegetation. By recognizing the potential drivers that result in ecological impacts, operators and informed ecotourists can reduce or modify the activities that inadvertently cause them.

In Chap. 4, Møller [16] summarizes what is known about the impacts of ecotourism that span generations. Cross-generational changes in behavior and in other life history trait, such as the age at first reproduction, the number of eggs or young produced, or the offspring sex ratio, may be driven by the experiences animals have with people (i.e., they learn to avoid or tolerate certain activities) but also by natural selection acting by the differential survival and reproduction of certain types of tolerant and intolerant individuals. Møller notes that these are relatively understudied fields and that we should expect both processes to occur. Long-term operators may play an important role in citizen-science-driven projects that allow us to gain more insights into long-term changes in behavior as a function of tourist-related activities.

The next chapters focus on specific taxa and summarize the state of our knowledge about ecotourism's effects on them.

In Chap. 5, Bessa et al. [17] focus on the effects of fish tourism—both in marine and freshwater environments. Diving and fish watching are magical experiences that turned into a huge industry, which often uses food provisioning to attract fishes. The chapter deals with the impacts of human presence and artificial feeding on the physiology, behavior, and ecology of the fish and their environment.

In Chap. 6, Bearzi [18] focuses on marine mammal tourism. Because of a history of widespread exploitation, marine mammal populations throughout the world are recovering from all-time lows. People love to go whale watching and this highly regulated, but also extensive, industry affects whale behavior. But marine mammal tourism is not restricted to whales; people travel to see dolphins, seals and sea lions, manatees, and polar bears. All tourist activities have potential deleterious impacts. By understanding potential negative effects, operators can ensure successful mitigation and thereby create a truly sustainable marine mammal tourism industry.

In Chap. 7, Tablado and D'Amico [19] focus on the huge terrestrial animal tourism industry that includes bird watching—the world's most popular wildlife activity—as well as traveling to see large carnivores, charismatic ungulates, and primate tourism. While not all of those eight billion people visiting terrestrial protected areas annually do so to interact with animals, the mere presence of visitors nevertheless affects resident animals. Here too, by understanding potential negative

effects, operators can ensure successful mitigation and thereby create a truly sustainable tourist industry.

In Chap. 8, Ellenberg [20] focuses on penguin tourism. This industry, while relatively small given penguins' rather restricted locations, is also remarkably fragile. Many species live in highly vulnerable and extreme environments that can be easily harmed by well-meaning ecotourists. Moreover, given the harsh environments in which many penguins live, anything that influences their ability to forage or conserve energy may challenge their very existence. Minor disturbances may thus have profound effects on penguins. With growing economic prosperity and more visits to Antarctica and temperate regions, penguin tourism is booming. Both tourists and operators will benefit from understanding how to create best practices to reduce harmful impacts.

In Chap. 9, Zacarias and Loyola [21] bring humans back to the forefront of our discussion on impacts and prime us for thinking about how to evaluate biological impacts in a more integrated way. Ultimately, potentially deleterious impacts of tourism must be traded-off against the benefits to the communities that ultimately manage their natural resources. There are no simple conclusions to draw from this chapter aside from context is everything and the options that local communities have will influence both the costs and the benefits from ecotourism regulations. Well-meaning ecotourists must recognize these conflicts exist and may be able, through their actions, to further reduce their impacts in areas where potentially detrimental activities provide meaningful and documented benefits to local communities and incentives to protect natural resources. Armed with these ideas, it may be possible to work toward the elusive "triple bottom line"—whereby it supports economic, environmental, and social sustainability [22].

In Chap. 10, Samia, along with the authors of the book [23], create a behavioral and biologically based perspective on ecotourism best practices. We hope that this will add to the discussion on how we can reduce impacts while maximizing our enjoyment of nature's wonders. We hope that by working to adopt these suggestions, we will create a more sustainable ecotourism industry that help local communities profit from the natural resources they protect. And we hope that by creating a more sustainable industry, our children, and theirs, may experience some of the magical moments in nature that we have been fortunate to have.

In Chap. 11, we identify underexplored research and open questions regarding the impacts of ecotourism on wildlife with the goals of creating more sustainable ecotourism. We develop a research agenda that will ultimately create a culture of evidence-based ecotourism. It is through evidence-based ecotourism research that we will make ecotourism more sustainable for both the natural resources that we seek to explore and the communities that are charged with their stewardship.

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