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Review

Are we killing them with kindness? Evaluation of sustainable marine wildlife tourism

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ABSTRACT

The increasing popularity of marine wildlife tourism (MWT) worldwide calls for assessment of its conservation outcomes and the development of appropriate management frameworks to ensure the conservation of the species and habitats involved as well as the long-term sustainability of this industry. While many studies have examined the positive and/or negative implications of particular forms of MWT, few have attempted to identify factors of concern shared across different types of marine tourism, or examine their implications for sustainability in a broader perspective. We reviewed the existing literature to highlight common impacts on animal behaviour, health and ecology, and to identify successful cases based on minimal negative affects and/or lack of chronic/irreversible impacts on target species or habitats. To ensure the achievement of both economic and ecologic objectives, the following steps should be integrated in MWT management: 1) Increase of research on the biology and ecology of target species/habitat and application of relevant information for the development of suitable policies, frameworks and management strategies; 2) Structured enforcement of existing policies and enhancement of ecological awareness of visitors through active education; 3) Application of an adaptive management framework to continuously improve the codes of conduct employed; 4) Involvement of different stakeholders and local communities in the development and improvement of the MWT activity. Combining these strategies with the extrapolation of frameworks and policies from cases where adverse ecological impacts have been addressed and successfully resolved can further contribute in ensuring the long-term health and conservation of the species/habitats involved in MWT activities.

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1. Introduction

Wildlife tourism, the practice of observing wild animals in their natural environment has been steadily increasing along with human population growth, with the number of participants estimated to be between 79 and 440 million (International Ecotourism Society, 2000; Moorhouse et al., 2015) and projected to double over the next 50 years (French et al., 2011). If conducted responsibly, wildlife tourism can provide substantial financial benefits to local communities (Ballantyne and Packer, 2013; Gallagher and Hammerschlag, 2011; O'Malley et al., 2013) while at the same time contributing to conservation efforts. The protection of the species and habitats involved in this practice (Troëng and Rankin, 2005; Wilson, 2003) and the conversion to a more environmentally-focused use of ecological resources (Ballantyne and Packer, 2013, Brunnschweiler, 2010, Landry and Taggart, 2010) are primary objectives of wildlife tourism. However, it is also imperative that wildlife tourism itself is managed efficiently to ensure negative impacts do not outweigh the positives gained. Environmental impacts range from changes in behaviour, health or ecology of specific species involved (e.g. Clarke et al., 2013; Haskell et al., 2015; Orams, 2002) to broader scale ecosystem changes, such as habitat alterations (e.g. Green and Higginbottom, 2001; Tisdell and Wilson, 2005a).

At present it is still unclear whether wildlife tourism is truly succeeding in achieving its conservation objectives, or if the direct and indirect effects on the environment counter its ecological benefits. Additionally, while the success of a tourism operation is evaluated for its 'ecological sustainability', a clear or commonly agreed on definition of this term has not yet been developed (Harding, 2006; Hardy et al., 2002; Swarbrooke, 1999). This leaves room for loose interpretations, misunderstandings and general lack of clarity in determining the conservation benefits of individual wildlife tourism operations and the industry as a whole. In the context of this paper we define an ecologically sustainable activity as one that does not result in chronic or irreversible detrimental changes. This includes long-term negative changes in behaviour, physiology, fitness and population dynamics of the organisms involved and alteration of the habitat structure or ecosystem functions. For example, despite the detection for different shark species of short-term behavioural changes linked to provisioning events, feeding operations do not appear to drive their long-term movements (Brunnschweiler and Barnett, 2013; Huveneers et al., 2013; Laroche et al., 2007; Meyer et al., 2009). This suggests a limited level of impact of this particular tourist activity on the animals involved, as no long-term or irreversible effects on their behaviour were observed.

To assess ecological sustainability of marine wildlife tourism in general, we reviewed the published scientific literature on marine wildlife tourism activities to (1) compare and contrast the environmental impacts and potential trends between the different forms of marine wildlife tourism (MWT; see Box 1 for definitions), (2) highlight key examples of sustainable MWT to derive successful management frameworks, (3) identify common hindrances to the achievement of ecologically sustainable MWT, and (4) discuss core elements and management strategies that can been employed at local or international level to maximize ecological benefits and minimize negative impacts of MWT practices.

Box 1
Terminology. Definitions of terms associated with wildlife tourism derived from the literature covered in this review.

Marine wildlife tourism (MWT) – A form of non-consumptive tourism that focuses on the observation of marine species and habitats, and in some cases even direct human-animal interaction.
Megafauna-watching – The practice of observing large wild marine animals from the shore or using operator manned vessels, without directly interacting with them.
Swim-with megafauna – The practice of observing large wild marine animals in the water through regulated snorkelling/SCUBA-diving activities.
Provisioning – The practice of using food to attract target marine species increasing the chances of observing them, or to promote a direct interaction between tourists and animals in a controlled situation by means of feeding.
Ecological sustainability – Ensuring that the tourist practices performed don't have chronic or irreversible ecological changes when compared to the existing baseline information collected through scientific research or local historical records.

2. Methods and results

Search engines Google Scholar, Web of Science and Science Direct were used to obtain peer reviewed publications related to marine wildlife tourism. A first selection was made with the use of the following keywords and combinations of these words: marine wildlife tourism, marine ecotourism, sustainable tourism, whale-watching, SCUBA diving, shark diving, provisioning, sea turtle tourism, pinniped-watching, marine bird-watching and tourism management. This preliminary search led to over 90.000 results, the majority of which however resulted to be not relevant to this review as focusing on topics not related to MWT ecological impacts and management. Grey literature e.g. unpublished theses, conference proceedings and non-peer reviewed publications were also excluded. A further selection was then carried out by sorting the publications obtained using the following criteria: the study should have as main focus MWT-related research, monitoring, management and/or sustainability. This led to a total of 396 publications with a wide geographical range, extending from Arctic to the tropics. Each study was then sorted in one or more categories based on the different types of MWT discussed, focusing on those most commonly studied in the literature (see Box 1).

Whale-watching was the most investigated topic, with 121 studies (30.5% of the 396 publications selected) focusing on evaluating direct and indirect impacts of whale-watching practices on different species and analysing/proposing management strategies. 63 publications (15.9%) addressed the topic of SCUBA diving (or 'reef' diving) in relation to environmental impacts, compliance to policies and current management practices or codes of conduct. 56 studies (14.1%) focused on elasmobranch tourism (mainly shark species), 30 (7.6%) on sea turtles. And 19 studies each (4.8%) for both pinniped- and shorebird-watching.

Management frameworks, achievement of set conservation goals and socio-economic implications were addressed in almost all papers examined, either by merely acknowledging their importance for the