



Emerging challenges to shark-diving tourism

Austin J. Gallagher^{a,b,*}, Charlie P.M. Huvaneers^c

^a *Beneath the Waves, Inc., Herndon, VA, USA*

^b *Marine Ecosystems and Society, Rosenstiel School of Marine and Atmospheric Science, University of Miami, FL, USA*

^c *College of Science and Engineering, Flinders University, Adelaide, Australia*

ARTICLE INFO

Keywords:

Diving
Ecotourism
Marine
Provisioning
Wildlife tourism

ABSTRACT

Shark-diving tourism has become a global phenomenon and is widely promoted to contribute to pro-conservation attitudes by dispelling myths and exposing tourists to sharks in their natural habitat. It has also resulted in a stimulating scientific literature identifying pros and cons of practices, elucidating potential biological effects on associated species, and evaluating social implications. With the worldwide popularization of shark tourism in recent years, a set of new challenges facing shark-diving tourism is starting to emerge. Here, we offer our thoughts on four topics that have developed into challenges for shark-related wildlife tourism: animal welfare, ecological interactions, fitness and bioenergetics, and public safety. Our discussion primarily involves perspectives on white shark operations, and, to a lesser extent, whale shark tourism. We contend that our opinions do not necessarily reflect the most important issues to shark-diving tourism; instead, we suggest that they are timely and that this paper should be considered an ‘open letter’ to researchers and policy-makers. Consideration of emerging challenges to any field are important for adaptive management and as such will be of interest to operators and resource managers tasked with ensuring sustainable practices.

1. Introduction

Shark-diving tourism is an increasingly popular activity, which was estimated to engage ~ 590,000 people in 2012 and in over 20 countries worldwide [35,14,11,21]. This industry has experienced fast growth in the last twenty years [14,15,11] and the socio-economic importance of these practices have been used to argue that exposure to sharks may engender a positive conservation ethic within tourists [2,3] and to advocate for shark protective measures due to the now-recognized high non-consumptive values of sharks [36,37,24]. The field of research into the biological effects, socio-economics, and conservation value of the diving industry have become a developing sub-category within the greater shark research literature, with over 50 studies on the topic published since 2005 [15]. Indeed, the knowledge base as it relates to this field continues to expand each year, with new and updated information pertaining to specific species, regions, and disciplinary approaches, although many questions regarding sustainability remain.

Whereas the value and benefits of the industry have been largely recognized and will continue to add information from regional studies, the overall impacts on shark behavior remain largely equivocal and an area of interest, with some studies showing impacts on physiology and behavior [20,4,10], whereas others do not [6,19,1]. Nevertheless, one can always expect some degree of impact from tourism practices

involving wild animals [26], and as the public interest in sharks and shark-diving continue to grow, the adaptive management of emerging issues will become increasingly important for the overall sustainability and vitality of the industry, as well as the perceptions of sharks more broadly.

In the present paper, we provide new insights into emerging challenges facing shark-diving tourism worldwide, with a special focus on animal welfare (the treatment and state of sharks involved in tourism), ecological interactions (the behavior and ecology of sharks and other indirectly targeted species), fitness and bioenergetics (food rewards and increased energy expenditure), and public safety (how risk from sharks is influenced by shark-diving tourism). The context and content of our perspectives are designed to create an ‘open letter’ to researchers and policy-makers of shark-diving, and stem from recent advances and findings in the shark-diving arena as well as our own first-hand insights and experiences with local and regional stakeholders. We focus our opinions around white shark practices, and, to a lesser extent, whale shark tourism, as they are some of the most common, well-studied, and publicized forms of shark-diving tourism worldwide. White shark diving generally involves the use of a surface cage whereby divers snorkel or scuba-dive inside. Most white shark diving operations use bait to attract sharks to the cage. Whale shark diving, however, generally involves surface-swimming with snorkelers, without the use of

* Corresponding author at: Beneath the Waves, Inc., Herndon, VA, USA.

E-mail address: austin@beneaththewaves.org (A.J. Gallagher).

bait as most aggregations of whale sharks are naturally occurring. Shark-diving occurs every day around the world; as such we believe added insights into emerging issues can be useful for identifying, mitigating, and solving future problems in the shark-diving tourism sector.

2. Emerging challenges

2.1. Animal welfare

In most scenarios involving free-swimming sharks, diving operations generally include briefings that convey a code of conduct for interacting with the animals. The vast majority of operators do not allow touching of sharks, as it poses a risk for both the people and sharks, especially for predatory species [15].

Whale shark encounters are highly popular worldwide [14], earning approximately one third of all global participation and being valued at US\$42 million annually [16]. This activity is popular because virtually anyone can do it (we still categorize this as “shark-diving”, although snorkeling is the primary activity) regardless of in-water experience or training. The broad availability of this activity is likely to contribute to the high incidence of touching and disrespect to the animals [30]. For example, the ‘no-touching’ compliance rate in the Philippines has been estimated at ~80% Quiros [31] and recent studies at the same site found a 97% non-compliance rate with a code of conduct for minimum distance to whale sharks (Schleimer et al. [34], which in this particular case involves whale sharks being provisioned). Recent diver questionnaire data from the Yucatan, Mexico showed that 23% of the tourists made contact with sharks despite this being prohibited [38]. Only 16.7% of these contacts were, however, reported as intentional. Moreover, nearly half of divers surveyed felt crowded during their experience. As the survey was collected in 2008 and the number of tourists per year has more than tripled from ~18,000 to 60,000 since then [38], the number of times whale sharks are touched per season could be up to 13,800 times per season (Fig. 1).

Regulations are in place to try minimizing potentially detrimental effects of wildlife tourism on whale sharks. For example, only two people per boat can be in the water at any given time and must be accompanied by a guide. There is also a strict ‘no-touch rule’, with some guides threatening that violators will not be allowed back in the water. Touching, crowding, and general animal welfare concerns seem to be less risky to whale shark operations in certain contexts, likely due to their non-predatory nature, yet they remain important areas to consider where adequate regulations have either not been developed or are not adequately implemented.

Cage-diving for large predatory species, such as the white shark, is also a popular activity, although recent events at Isla Guadalupe in 2016 showed that the welfare of white sharks can be affected by cage-diving activities if not undertaken adequately. Isla Guadalupe, a small

rocky island off the coast of Mexico has become a prime spot for viewing large white sharks due to its clear blue water and reliability of encounters. In 2016, at least two white sharks became stuck in diving cages (<https://www.youtube.com/watch?v=93WiSq9TIoM>; http://www.huffingtonpost.com/entry/shark-gets-stuck-in-divers-cage_us_5807db88e4b0b994d4c3a8ba). In the former incident, blood could be seen as the shark left the cage. Although no one was hurt in either incident, both garnered worldwide media attention, placing the spotlight on animal welfare concerns, and negatively impacting the operators involved and white shark cage-diving tourism in general. Although these two occurrences might have been the result of the operators’ behavior, animals can also be unpredictable. It is unclear how the health or fitness of sharks are affected by these types of incidents, but the impacts could be appreciable and need to be mitigated more effectively in the future, especially since the appeal of white sharks makes for easy media coverage which can tarnish the whole industry and penalize all operators, including those that have never had such incidents (<https://www.earthtouchnews.com/oceans/sharks/newsflash-this-is-dangerous-stupid-and-illegal/>, <http://news.nationalgeographic.com/news/2014/10/141008-great-white-shark-viral-photo-cage-diving-south-africa-conservation/>).

2.2. Ecological interactions

Understanding how shark-diving tourism affects other community-level species through ecological interactions is a fairly wide open area of research, although it has been considered before [7], and a few studies have indicated that there can be impacts. For example, Rizzari et al. [32] found that shark cage-diving operations in the Neptune Islands, Australia, can affect the habitat use and residency of smooth stingrays, a non-focal species in the area. Another example from our experience in the Bahamas indicates a similar pattern albeit on different shark species. Great hammerhead shark-diving has become popular off Bimini, Bahamas since 2013 (Gallagher, Direct Observation). Hammerhead sharks are provisioned at the site using berley/chum, and it was reported to us that some operators were dumping bait to keep sharks around in between trips. In the second season (2014), we dove the area for a week to find that bull and nurse sharks had overrun most dive sites, causing issues for operators with large (> 250 cm) bull sharks becoming highly aggressive and territorial to other sharks and divers, effectively pushing away hammerheads into the distance. We observed up to 10 nurse sharks regularly crowding the bait box, causing silt and sand to kick up and impede visibility. We visited the site again in 2017 to find that the bull sharks had largely disappeared (although there have been reports that locals have killed bull sharks which have presumably become a nuisance; Guttridge, pers. comm); however, the nurse sharks remained.

Another emerging challenge to shark-diving is the aggregation of schooling fishes attracted to the stationary berley/chum as a result of frequent operations within a small area. These phenomena are now occurring in the Bahamas (at the above-listed hammerhead spot) and in white shark cage-diving operations worldwide (e.g., Mexico, South Africa, Australia, Fig. 2). In extreme cases, the large number of schooling fish has negatively affected visitor experience and satisfaction by obstructing views of the focal species.

2.3. Fitness and bioenergetics

Studies investigating the effects of tourism on elasmobranchs have shown that such activities can have a range of effects [15]. Whether these changes lead to reduced fitness at the individual or population levels is, however, mostly unknown and has been identified as requiring further investigation [7]. For example, white sharks can increase their activity when interacting with cage-diving operators [23], but energy burden from the increased activity is not rewarded by regular bait provisioning as industry regulations globally do not allow operators to



Fig. 1. Whale shark tourism off the Yucatan Peninsula (Isla Mujeres pictured), showing a high density of boats (white polygons) around whale sharks (grey specs) in August 2016. Photo by Simon J. Pierce.

Download English Version:

<https://daneshyari.com/en/article/7487535>

Download Persian Version:

<https://daneshyari.com/article/7487535>

[Daneshyari.com](https://daneshyari.com)