Tourism Management 74 (2019) 297–299

Contents lists available at ScienceDirect

Tourism Management

journal homepage: www.elsevier.com/locate/tourman

Using long-term integrated research programs to improve whale shark tourism at Oslob, Philippines

In their responses to our paper (Ziegler et al., 2018, 2019), Meekan and Lowe (2019a,b) continue to advance a straw man argument that misrepresents our past and continuing research of whale shark tourism in Oslob, Philippines. Their primary critiques center on the lack of interviews with locals and their disagreement with conclusions of three peer-reviewed biological impact studies (Araujo et al., 2014; Schleimer et al., 2015; Thomson et al., 2017). In contrast, our article is about tourists' self-reported ethical perceptions of whale shark provisioning. We have additional manuscripts focused on interviews with local operators that are currently under review. If they had issues with prior published biological and behavioural studies, then they should have responded to those studies directly, not a social science study focused on tourists' perceptions.

Their response contains direct, personal, and unfounded attacks on the ability of our research teams in Oslob. Meekan and Lowe use *ad hominem* attacks to question the integrity of the researchers involved when they insinuate that the outcomes of our studies "are predetermined by the viewpoints of researchers" and accuse us of "biased advocacy". We have a very experienced team of social scientists specializing in marine wildlife tourism. We do not have all the answers, but we are confident that both here and elsewhere we conduct sound research that is undeserving of the accusations of Meekan and Lowe (2019a,b).

Contrary to Meekan and Lowe's assertions, our research teams are intimately familiar with the local situation. We have had researchers based at the site every day for the last 7 years who work closely with both the local community and the Local Government Unit of Oslob. Members of our team sit on the site advisory committee at Oslob. They are actively working with the community, as well as municipal and provincial government officials, to determine acceptable tourism carrying capacity numbers for the site.

Meekan and Lowe's experience at Oslob is restricted to 19 interviews conducted over a few weeks with unspecified local officials and community members, using an unspecified survey instrument (Lowe & Tejada, 2019). Our research record at the site consists of over 2500 days in the water and over 2000 visitor surveys over the last 7 years, as well as continual participation in local meetings with the community and officials since official tourism activities commenced at this site in 2012. Our "unsubstantiated claims" regarding negative impacts on whale shark health or poor water quality and rubbish discarded by tourists are based on the views of such officials, as are the threats to shut down the site if it isn't managed more sustainably. It is totally fallacious to fault the validity and effort we have invested at the site in comparison to the brief field sojourn made by Meekan and Lowe.

Meekan and Lowe claim the impetus for limiting tourist numbers at Oslob stems from the community (bottom-up approach), when, in fact, it was initiated by the provincial government (top-down approach). Furthermore, plans to limit tourist numbers are on hold after local stakeholders (i.e., local businesses) complained about the impact of such limits on their income. The boatmen's association, TOSWFA, meanwhile, have accepted Ziegler et al.'s (2018) results on tourists' willingness to pay and they support limiting tourist numbers at Oslob if the tour price increases in due time. These outcomes are the result of meetings held with local, provincial, and regional stakeholders at which the authors participated.

Meekan and Lowe (2019a,b) also make unfounded claims regarding conservation benefits of whale shark tourism activities at Oslob, primarily based on key informant interviews outlined in Lowe and Tejada (2019). Key informant interviews as a standalone method is an inappropriate approach to assess ecological conservation outcomes (Bergseth, Russ, & Cinner, 2015; Coad et al., 2015; St John, Edwards-Jones, & Jones, 2011; Wardle, Buckley, Shakeela, & Castley, 2018); triangulation using a variety of approaches is essential (Bergseth et al., 2015). Participant observation is a more robust method to track behavioural changes in illegal fishing methods, and should be paired with biological assessments to assess coral reef health, fisheries health, and the effectiveness of marine protected areas (MPAs).

While Meekan and Lowe assert positive conservation outcomes, Sumilon Island, one of five MPAs supported by funds from whale shark tourism in Oslob,[1] was shut down by the Cebu government in 2018 due to accumulated garbage and human waste management. Further, an assessment of coral reef health in Oslob found that whale shark provisioning was having a negative impact on the reefs (Wong et al., 2018), and interviews with TOSWFA members determined that most still fish despite working in whale shark tourism (Ziegler et al. under review). It is ironic that Meekan and Lowe critique us for a lack of data, but make unfounded assertions regarding conservation benefits of whale shark tourism. We invoked the precautionary principle for this exact reason; the onus needs to be on proof of conservation benefits, not proof of negative impacts.

Meekan and Lowe further claim that there are no problems with unequal distribution of benefits within the community of Oslob; yet Lowe and Tejada (2019), the publication upon which these claims are based, focused primarily on interviews with the locals of Tan-awan,

[1] Sumilon Island was one of the first MPAs established in the Philippines in 1974; any positive ecological outcomes (e.g., coral and fish biomass, etc.) is therefore not due to whale shark tourism at Oslob, as it predates these activities by nearly four decades.

https://doi.org/10.1016/j.tourman.2019.04.003
Received 3 April 2019; Received in revised form 5 April 2019; Accepted 8 April 2019
0261-5177

only 1 of 21 barangays (or villages) within Oslob. Furthermore, Lowe and Tejada (2019) only conducted 19 interviews and did not state how many of each group (elected officials, TOSWFA members, Tan-awan fishermen, etc.) were interviewed. Based on approximately 4600 households in Oslob (Philippine Statistics Authority, 2019), a representative, household-level socio-economic survey would require a minimum of 355 respondents from all 21 barangays (95% confidence interval, 5% error). It is therefore unclear how they can claim there are no conflicts within the larger community, nor can they claim that they have completed a thorough socio-economic assessment of the municipality (Meekan & Lowe, 2019a), as we suggested was needed at the site (Ziegler et al., 2018).

Despite Meekan and Lowe's claims, there are issues of unequal distribution of benefits at the site. To work in whale shark tourism, one must be a resident of Tan-awan or related to someone who is. The 177 TOSWFA members who work in tourism represent less than 1% of the total municipal population, while Tan-awan represents 5% of this population; yet TOSWFA and Tan-awan retain 70% of income generated from this site (equivalent to approximately US$7 million in 2018; Dearden & Ziegler, 2019). Interviews with locals from neighbouring barangays in Oslob identified problems with conflict and unequal distribution of benefits in the broader community (Dearden & Ziegler, 2019). When whale shark tourism first started in Tan-awan, neighbouring barangays within Oslob wanted to develop similar activities in their own waters or rotate the barangay in charge of managing tourism in Oslob on a monthly basis. However, the mayor of Oslob at the time decided to allow only Tan-awan to offer whale shark tourism in municipal waters (Dearden & Ziegler, 2019). There is clearly a need to further explore issues with unequal distribution of benefits and conflict within the wider community.

In conclusion, as we noted in Ziegler et al. (2018, 2019), legitimate questions remain regarding provisioning this endangered species for tourism. Further research is needed to complete a thorough cost-benefit analysis of the activity to determine if the benefits to the community outweigh the costs, as well as to ascertain appropriate use levels (e.g., Limits of Acceptable Change; Bentz, Lopes, Calado, & Dearden, 2016; Duffus & Dearden, 1990; Roman, Dearden, & Rollins, 2007). Until such analyses are completed, the precautionary principle should be applied to minimize actual and potential negative impacts on the community, sharks, and wider marine environment.

We are not against locals earning a living from whale shark tourism; in fact, we have been amongst the earliest and strongest advocates for shark tourism as a conservation intervention (Bentz, Dearden, Ritter, & Calado, 2014; Dearden, Topelko, & Ziegler, 2008; Topelko & Dearden, 2005; Ziegler, Dearden, & Rollins, 2012, 2016). We are also not arguing for the site to be shut down, reflected in our active involvement with both local and regional stakeholders. However, our research strongly suggests that current conditions in Oslob are unsustainable and changes are required if the site is to deliver positive outcomes for conservation and livelihoods. We undertake daily research at the site to provide greater understanding of this complex socio-ecological system and as an input to improve management. The paper which started this thread (Ziegler et al., 2018) was only one input into this complicated situation, but serves to illustrate the challenges faced by tourism management in our globalized world where endangered species, low-income communities, social media, science, and government meet.

Author contributions

JZ, RR, and PD led manuscript preparation. JS, GA, JL, and AP were involved in manuscript review.

Acknowledgments

This work was supported by the Social Sciences and Humanities Research Council under Grant 435-2015-0600.

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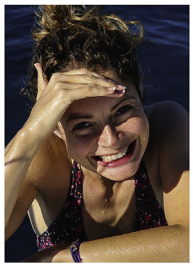

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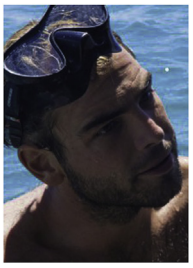

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