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Engaging More Effectively With Visitors to Coastal Regions for Improved Management Outcomes: Insights From the Ningaloo Coast, Australia

Christopher Cvitanovic[1,2], E. Ingrid van Putten[2,3], Rachel Kelly[1,2], Hannah R. Feldman[1], Tatiana J. van Steveninck[2], Mary Mackay[2,3], Nicholas Badullovich[1] and Tegan Gourlay[4]*

[1] Australian National Centre for the Public Awareness of Science, Australian National University, Canberra, ACT, Australia, [2] Centre for Marine Socioecology, University of Tasmania, Hobart, TAS, Australia, [3] Oceans and Atmosphere, CSIRO, Hobart, TAS, Australia, [4] Department of Biodiversity, Conservation and Attractions, Exmouth, WA, Australia

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***Correspondence:**
Christopher Cvitanovic
christopher.cvitanovic@anu.edu.au

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A key component of successful coastal management efforts is an effective communication and engagement strategy focused on raising awareness of a region to different stakeholders to encourage more pro-environmental behaviors. Accordingly, in recent times there has been a proliferation of research focused on improving engagement and communication with different users of the coastal environment. Despite this effort, a paucity of evidence is available to guide better communication and engagement with visitors (i.e., tourists). Addressing this knowledge gap is critical given the adverse impacts of current global coastal tourism on ecosystem health, and projected future increases in coastal tourism. Using a case study of the Ningaloo Coast World Heritage Area (WHA) in Australia, we contribute toward filling this gap by identifying visitors' perception of the region and their self-reported and intended pro-environmental behaviors. We also identify the types of information they access and trust, and explore whether different message framings on the value of the WHA influence visitors' intended pro-environmental behavior. We determine that although visitors to the Ningaloo Coast WHA are optimistic about the future sustainability of the region, they have low understanding of the rules and regulations in place to support its management. Further, we find that visitors consider tourism to be a serious threat to the future of the region. However, most participants in our study considered the quality of their *own* environmental behavior to be high, and thus not contributing to these threats, although this did differ by gender. Finally, we highlight that visitors to the Ningaloo Coast WHA, for the most part, obtain their knowledge of the region during their visit, primarily through local signage and visitors centers. We discuss the implications of these results, and highlight future considerations for coastal managers when developing visitor-focused communication and engagement strategies.

Keywords: communication, message framing, trust, World Heritage Area, coral reef, tourism

INTRODUCTION

Coastal ecosystems are among the most productive globally, providing a range of critical goods and services that underpin societal well-being and prosperity (Barbier et al., 2011). The services that these ecosystems provide include, for example, food, shoreline protection from storm surges, income from tourism, and numerous cultural and spiritual benefits (UNEP, 2006; Cracknell, 2019). As such, coastal ecosystems are an essential component of the basic global life support system for more than 40% of the world's population (Seto, 2011; Neumann et al., 2015). However, despite their value and importance to humanity, increased direct pressures from a growing population (e.g., through coastal development), as well as other anthropogenic sources of pressure (e.g., from climate change), threaten the long-term persistence of these ecosystems and the services they provide (Halpern et al., 2008). Accordingly, the development and implementation of effective and integrated coastal management strategies that reduce human pressures and maintain societal benefits is critical for ongoing societal well-being.

A critical component of any successful coastal management strategy is an effective stakeholder communication and engagement program (Stephenson et al., 2019). Communication and engagement efforts underpin stakeholder awareness about the value of an ecosystem and the current rules and regulations in place to protect it (Kelly et al., 2019). Through increased understanding, stakeholders are more likely to accept and abide by the rules and regulations that are in place, thus fostering pro-environmental behaviors (Jolls et al., 1998). However, while in theory this is achievable, on a practical level establishing communication and engagement strategies capable of influencing people's behaviors are difficult to achieve. This is partly due to the challenges associated with developing messages that can be salient across the broad diversity of worldviews, beliefs and values held amongst and between different groups of stakeholders (Dean et al., 2019). Further, the logistics of communicating across wide geographies and large numbers of stakeholders often also necessitates linear (i.e., one-way or top-down) modes of communication (Stocklmayer, 2013), which are likely to be less effective than those founded upon two-way engagement processes.

Recognizing these difficulties in stakeholder communication and engagement has led to an increased research focus on identifying improved ways to more effectively engage with diverse groups of stakeholders, in oftentimes remote or geographically spread coastal regions. For example, in Australia, MacKeracher et al. (2018) investigated the extent to which different user groups associated with the Great Barrier Reef trusted information from five different sources: research institutions, non-government organizations, the primary management agency (the Great Barrier Reef Marine Park Authority), industry groups, and friends, family, and co-workers. They found that the extent to which people trusted information from different sources differed between stakeholder groups, suggesting a need for more tailored communication protocols for engaging diverse groups in achieving environmental stewardship. Similarly, Dean et al. (2019) examined the effectiveness of different types of message frames (e.g., environmental, economic, lifestyle) in engaging and influencing different segments of the community in relation to the sustainable management of Moreton Bay in southeast Queensland. Finally, Cvitanovic et al. (2018) demonstrated how an understanding of the diverse perceptions and values held by community members can help local decision-makers develop a more nuanced and targeted communication and engagement strategy within the Ningaloo Marine Park in northern West Australia, potentially leading to improved social and environmental outcomes. These three case studies are only a sample of growing research in this space, but also highlight some more recent efforts to improve understanding on how to engage with diverse stakeholders in coastal regions.

Despite this recent progress, however, significant knowledge gaps remain. In particular, with much research to date focused on understanding how to improve communication and engagement with community members (i.e., permanent residents), there is a paucity of evidence available to guide communication efforts with visitors (i.e., non-permanent) to coastal regions. Addressing this knowledge gap is critical, given the adverse impacts of current global coastal tourism on ecosystem health (e.g., Hall, 2001; Davenport and Davenport, 2006; Machado et al., 2017), as well as the projected future impacts to coastal ecosystems from increased tourism (e.g., Boavida-Portugal et al., 2016). This study seeks to contribute to addressing this knowledge gap, and investigates the case study of the Ningaloo Coast World Heritage Area (herein, referred to as the Ningaloo Coast WHA, or the WHA) in Western Australia, Australia.

We selected the Ningaloo WHA as a case study for several reasons. First, the Ningaloo Coast is globally marketed as a premier tourist region; between the years 2016–2018, the average annual number of visitors to Exmouth (the largest settlement along the Ningaloo Coast) was approximately 159,900 individuals (Tourism Western Australia, 2019a,b). Second, the Ningaloo coast is home to the world's largest fringing coral reef and is unique in that, to date, the reef state is relatively pristine in comparison to other sites where reefs have been heavily impacted by multiple pressures, including tourism (e.g., Great Barrier Reef). Globally, there is extensive evidence of impacts from tourism on coral reefs (e.g., via direct habitat destruction associated with activities such as snorkeling and scuba diving, e.g., Renfro and Chadwick, 2017), through increases in local levels of eutrophication (e.g., Wong et al., 2019), or by increasing the prevalence of coral disease (Lamb et al., 2014). Finally, the Ningaloo coast is among the most comprehensively studied coastal ecosystems worldwide, as a result of the support of the AUD$36 million Ningaloo Research Program (Cvitanovic et al., 2016), which ran from 2006–2011 and included 40 individual research projects across the broad domains of biodiversity, physical environment, socio-economics and human-use. The Program included extensive research on the socio-economics of tourism in the region (Jones et al., 2011), thus providing a baseline of information on visitor behaviors in the region that serves to guide the development, design and implementation of this study. Thus, in light of these three reasons, the Ningaloo Coast WHA represents a suitable case study to begin to

understand the broad objectives of this study as specified above. Thus, building on these, the specific aims of this study are to (i) elucidate visitors' broad perceptions of the Ningaloo Coast WHA and their environmental behaviors while visiting the area, (ii) determine how visitors to the Ningaloo Coast WHA access information and their levels of trust in these different information sources, and (iii) understand what types of message framings are likely to be most effective in eliciting pro-environmental behaviors among visitors to the region.

MATERIALS AND METHODS

Study Site

The Ningaloo Coast World Heritage Area is a 604,500 hectare (∼1,500,000 acre) marine and terrestrial property stretching over more than 300 km along the Western Australian coast. It was inscribed onto the World Heritage list on the 24th of June, 2011 under two of the World Heritage Outstanding Universal Value Criteria:

(vii) – to *contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance*; and

(x) – *to contain the most important and significant natural habitats for in situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.*

The primary terrestrial feature of the Ningaloo Coast is the extensive Karst system and network of underground caves and watercourses of the Cape Range National Park (Allen, 1993), which support a diversity of highly specialized species, including the Blind Gudgeon (*Milyeringa veritas*) and Blind Cave Eel (*Ophisternon candidum*) which are both also endemic to the region. Above ground, the Ningaloo Coast WHA includes the Cape Range Peninsula, which belongs to an arid ecoregion recognized for high levels of endemism and species richness, particularly for birds and reptiles. The coastal and marine portion of the WHA nomination comprise a diversity of habitats including the intertidal system and rocky shores, lagoon, reef, open ocean, and the continental slope and shelf. These waters are renowned for whale sharks (*Rhincodon typus*) with annual aggregations in the region reaching an estimated 300–500 individuals (Wilson et al., 2001), as well as manta rays (*Manta alfredi*), dugongs (*Dugong dugon*), multiple species of whales and turtles, and numerous other species (Storrie, 1998). Much of the coastal and marine area along the coastline is offered protection via the Ningaloo Marine Park; the park was first established in 2004 and was expanded in 2011 to cover the entire Ningaloo Reef Area.

In addition to its natural beauty, the Ningaloo Coast WHA supports two permanent human settlements, the largest of which is Exmouth, with a permanent residential population of approximately 2,600 individuals. The smaller town of Coral Bay, which lies 150 km south of Exmouth, has a permanent population of 200 residents. The economies and ongoing viability of both towns are dependent upon the tourism sector, although the area is also a key service point for the offshore oil and gas industry. Outside of the townships of Exmouth and Coral Bay, the coastline contains several pastoral leases that are managed by long-term leases with grazing rights. Many of these properties also accommodate tourists via the provision of campsites (Smallwood et al., 2013).

The Western Australian Department of Biodiversity, Conservation and Attractions (DBCA) has primary responsibility for the management of the Ningaloo Coast WHA, and is supported by an independent State-Cabinet appointed Ningaloo Coast World Heritage Advisory Committee (from herein referred to as "the Committee"). The Committee provides advice to Commonwealth and State Environment Ministers and other managing agencies on the protection, conservation and management of the natural world heritage values. The Committee also serves to represent the view point of the local and broader community and circulate information on key matters relevant to the WHA throughout the community. Committee members are chosen for their diversity and ability to represent community interests, and thus have knowledge and/or background in areas such as tourism, planning, indigenous heritage, conservation and scientific expertise relevant to the protection and conservation of the WHA.

The DBCA are, therefore, also the primary agency responsible for communicating the World Heritage values of, and the rules and regulations associated with, the management of the WHA to local communities and visitors. This is achieved in numerous ways and through various mediums, for example, through local signage positioned throughout the WHA, via the Milyering Discovery Centre (a visitors center in Cape Range National Park), via social media (e.g., Facebook and Instagram), and through the DBCA regional Facebook account, to name a few. Local Government also play an important and complementary role in communicating about the WHA to community members and visitors, for example, via the recent construction of the Ningaloo Visitor Centre in Exmouth, which was undertaken by the Shire of Exmouth. Thus, close collaboration between DBCA, the Committee and local government is important and a key focus in the region.

Survey Design and Implementation

The logistical challenges associated with a study such as this included: obtaining a sufficiently large sample size, the geographic spread and remoteness of respondents and the difficulty of eliciting information from holidaying visitors (who are unlikely to want to spend a long period of time contributing to scientific research). As such, a relatively short quantitative survey, that would be implemented in the main visitor hubs, was considered the most suitable approach for addressing the first two aims of this study (Bryman, 2012) [i.e., (i) elucidate the broad perceptions of visitors about the Ningaloo Coast WHA and their environmental behaviors while visiting the area, and (ii) describe how visitors to the Ningaloo Coast WHA access information and their levels of trust in different information sources]. The quantitative survey questionnaire was developed by drawing upon and adapting previous studies aimed at understanding the perceptions of stakeholders within World Heritage Areas (e.g.,

Marcotte and Bourdeau, 2006; Jimura, 2011; Song and Kim, 2019), and in relation to environmental issues more broadly (e.g., Jones et al., 2011; Kim et al., 2011; van Riper et al., 2012).

To increase the efficiency of the survey, and reduce the time needed for completion and thus, maximize potential participation, the majority of questions were presented to respondents as a statement. The respondents were asked to indicate how strongly they agreed or disagreed with each statement on a 10-point Likert scale, where a score of 1 indicated that the respondent strongly disagreed with the statement, and a score of 10 indicated that the respondent strongly agreed with the statement (following Cvitanovic et al., 2018). Using this scale, there is no mid-point; a score of 5 indicated that the respondent slightly disagreed with the statement, while a score of 6 indicated that the respondent slightly agreed with the statement. Prior to implementation, the survey was piloted by members of the research team who were not involved in its design, as well as members of the Ningaloo Coast World Heritage Advisory Committee and staff employed within the local management agency (the Western Australian Department of Biodiversity, Conservation and Attractions). Based on feedback from these groups, the survey was further refined to remove ambiguity and increase clarity and ease for the respondent. The final survey instrument used in this study can be found in **Supplementary Appendix I**.

To address the third aim of this study – (iii) understand what types of message framings are likely to be most effective for eliciting pro-environmental behaviors among visitors to the region – we adapted the methodology outlined by Dean et al. (2019) to examine how the framing of information might impact visitors' understanding and perceptions. Framing, in its broadest sense, refers to how particular aspects and/or phrases within a message are accentuated to make that information more persuasive (Chong and Druckman, 2007; Nisbet, 2009). By doing so, theory suggests that the way in which information is presented (i.e., the frame) influences how people perceive and process that information for themselves, and also influences their individual behavior (Chong and Druckman, 2007).

Building upon an example of how the Ningaloo Coast WHA is commonly described by the local management authorities (i.e., our framing control – see **Supplementary Appendix II**), we developed four alternate frames following the language used by Dean et al. (2019). Our first framing was a *factual environmental message*, which focused on talking about the environmental uniqueness of the region, and the importance of a healthy ecosystem for the region. Building on this, the second frame developed was a *moral environmental message*, which sought not only to focus on the uniqueness of the region, but also to highlight the broad moral foundations underpinning its protection. The third message was an *economic message*, focused on emphasizing the economic importance of the region for human well-being, and the ways in which economic benefits are dependent on having a healthy ecosystem. The final message framing tested was a *lifestyle message*, which emphasized the social importance of the region.

Each of these five different framings were included in different versions of survey instrument (see **Supplementary Appendix II**). Following Dean et al. (2019), a framing message (e.g., 1, 2, 3, 4, or 5) was placed as text at the start of the survey to allow testing for the influence of the frame on the responses for the proceeding questions (i.e., the questions that investigated (i) perceptions and environmental behaviors, and (ii) information access and trust). Further to this, the frame was repeated at the end of the survey. The aim of repeating the framing message was to test two other aspects. First, it allowed us to investigate how *reflective* the message was of the respondent's own perception of the WHA. Second, it allowed us to test how *comprehensive* the framing was (i.e., was it a framing that the respondent might use themselves). These two aspects would help to contextualize the influence of the framing on (i) and (ii), and also to understand whether the influence of framing is "unconscious" or simply as a result of the frame reflecting the respondent's values.

The survey was conducted *in situ* at multiple sites along the Ningaloo Coast, but was concentrated in the areas surrounding Exmouth and Coral Bay, over 2 weeks during July and August 2019. July and August fall within the peak tourist season for the region, coinciding with Australian School holidays and key tourist drawcards such as the opportunity to swim with whale sharks and humpback whales. Three members of the research team (RK, HF, and TvS) implemented the survey questionnaire. To ensure a random sample of respondents, the interviewers positioned themselves in visitor hubs (e.g., outside shopping centers, alongside boat ramps, within local visitor centers, etc.) in both Exmouth and Coral Bay (following Cvitanovic et al., 2018). We tested the data for interviewer bias and found there to be no statistical difference in the survey responses between the three interviewers. The five different versions of the survey described above (i.e., with the different frames) were randomly distributed between the three researchers to avoid any researcher bias. The researchers randomly approached people as they walked past. Once a respondent had self-identified as a visitor to the region and indicated their willingness to participate, they were provided with the study information sheet and invited to complete the survey questionnaire. As part of the survey questionnaire, a range of demographic information was collected (and subsequently anonymized) for each respondent, including: interview location (Coral Bay or Exmouth), country of origin (and if in Australia, city/town of origin), age, gender, and the length of visit to the region. Ethical permission to conduct this research was approved by Australian National University Human Ethics Research Committee (Protocol number 2019/424).

Data Analysis

In total, 163 visitors to the Ningaloo Coast WHA took part in the study: 33 completed the survey using the control message frame, 31 using the *factual environmental* message frame, 36 using the *moral environmental* message, 31 using the *economic message* frame, and 32 using the *lifestyle message* frame. Respondents ranged in age from 19 to 85 years old; 68 males (41%), 91 females (56%), and 4 who chose not to identify a gender. Ten respondents were solo travelers, 69 with a partner, 19 with friends, and 61 with family. International respondents represented 24% of the sample population (n = 41) and spanned 17 different countries. Of the Australian participants, 36% (n = 59) were from other parts of

Western Australia, mostly from Perth (n = 32), the capital of Western Australia, approx. 13 h drive south of Exmouth.

Data were entered into Microsoft Excel, and the software package "R" (version 3.2.0) was used for the data analysis. We used simple statistical tests of difference to test whether the mean scores for each question were from a single population (t-test for continuous variable or Chi square tests for categorical variables). We test for differences in the answers given by groups of people characterized by different demographics (i.e., male/female, visitor origin, age-group). We consider p-values of 0.05 as significant as we have a reasonably large sample size of 163 (but see Boos and Stefanski, 2011; Wasserstein and Lazar, 2016; McShane et al., 2019 for debate on the use of p-value).

RESULTS

Visitor Perceptions and Behaviors in Relation to the Ningaloo Coast WHA

Survey results show that respondents of this study have a very high level of awareness that the Ningaloo Coast is a WHA, and that they strongly agree that it deserves to be designated as a WHA (**Table 1**). However, results also show that visitors to the region have a lower awareness about the boundaries of the WHA, the rules and regulations in place to protect the WHA, and the management agency charged with the protection of the WHA (**Table 1**). Further, while results showed that visitors to the region would have come irrespective of the WHA designation, all respondents strongly supported the need for management actions focused on preserving and protecting the environmental sustainability and cultural heritage of the region (**Table 1**).

Results also show that visitors generally found that the Ningaloo WHA lived up to their expectations, was in good condition, and that it was well managed (**Table 2**). In general, respondents were optimistic about the long-term future of the region (**Table 2**), although many respondents also indicated concern about its long-term viability. In particular, visitors to the region showed concern about the potential impacts of climate change and plastic pollution to the WHA (**Table 2**). These concerns were largely in relation to the marine environment, with less concern shown about the condition and future of the Karst system and underground caves (**Table 2**).

When asked about their own behaviors whilst visiting the Ningaloo Coast WHA, the results indicate that respondents of this study believe that they generally behave in an environmentally responsible manner and also encourage others to do so (**Table 3**). Respondents indicated that they did not litter or interfere with the animals, and generally do not go off the designated roads (**Table 3**). When respondents were asked about the environmental behaviors of other visitors to the region, or residents of the region, results show that they believed that both residents (mean 7.59, SD 1.75) and visitors (mean 6.85, SD1.84) behave in an environmentally responsible manner in the WHA, although visitors were perceived to behave slightly less responsibly. Interestingly, however, this result was lower than for their self-assessed behavior (mean 9.20, **Table 3**).

When asked about their intended future behaviors while visiting the Ningaloo WHA, respondents indicated that they would seek to minimize their individual impact, but were less sure if they might be able to influence the behavior of others (**Table 3**). In fact, they were less sure that they even had the ability to find actions (and carry them out) to help protect the Ningaloo Coast WHA. In general, they were also unsure if they were able to communicate the importance of responsible behavior to others in the region.

Statistical differences in the perceptions and behaviors of study respondents varied according to where the visitors originated from, the type of group they traveled in, their age, their gender, and the length of their stay as discussed in the next sections.

The Origin of Respondents

Respondent understandings of the WHA differed between groups of people and were dependent upon their place of origin (i.e., WA, interstate, or overseas; see **Table 1**). Specifically, people from WA were more aware of all aspects related to the WHA, including the locations of the boundaries of the WHA ($p = 0.001$), the management agency for managing the WHA ($p < 0.001$), and the rules and regulations in place to protect and conserve the WHA ($p = 0.001$). Respondents from other Australian States or Territories were slightly better informed than people from overseas, who had the lowest levels of awareness. Another statistically significant difference associated with the origin of the visitors was related to the importance of tourism as a threat to the WHA; people from overseas perceived threats associated with tourism to pose a greater risk to the region than the Interstate and WA visitors ($p = 0.0256$; **Table 2**).

Travel Party

Data analysis shows WA visitors to the Ningaloo Coast WHA tended to travel in family groups (55%) more than visitors from overseas (29%) or interstate (25%). Visitors

TABLE 1 | Visitors' awareness and understanding of the Ningaloo Coast WHA and its management.

Visitor origin (n = 160)*	Awareness of WHA Mean (SD)	Awareness WHA boundaries Mean (SD)	Awareness managing authorities Mean (SD)	Awareness rules and regulations Mean (SD)	Deserves WHA status Mean (SD)
West Australia (n = 60)	9.64 (1.35)	7.44 (2.51)	6.64 (3.04)	7.64 (2.30)	9.27 (1.81)
Interstate (Aus) (n = 59)	8.78 (2.83)	5.50 (3.00)	4.13 (2.77)	6.19 (2.81)	9.37 (1.81)
Overseas (n = 41)	8.73 (2.61)	5.79 (3.30)	3.94 (3.11)	5.68 (3.26)	9.55 (1.51)
All respondents	9.05 (2.41)	6.27 (3.03)	5.03 (3.20)	6.56 (2.92)	9.35 (1.84)

*Scores are based on a Likert scale between 1 (representing strongly disagreed) and 10 (representing strongly agreed). *Three respondents did not identify their origin.*

TABLE 2 | Visitors' perceptions of the Ningaloo Coast WHA, and concerns for its future.

Visitor origin (*n* = 160)*	WHA lives up to expectation Mean (SD)	WHA is in good condition Mean (SD)	WHA is well Managed Mean (SD)	Optimistic for future of WHA Mean (SD)	Concern – increasing tourism Mean (SD)	Concern -climate change Mean (SD)	Concern – Pollution Mean (SD)	Concern – oil and gas sector Mean (SD)	Concern for Marine Environment Mean (SD)	Concern for Karst system Mean (SD)	Concern for Terrestrial Environment Mean (SD)
West Australia (*n* = 60)	9.15 (1.47)	8.26 (1.60)	8.28 (1.72)	7.77 (2.22)	7.02 (2.76)	7.85 (2.79)	8.58 (1.97)	7.56 (2.59)	7.68 (2.49)	6.58 (2.94)	7.32 (2.45)
Interstate (Aus) (*n* = 59)	8.98 (1.45)	7.88 (1.77)	8.04 (1.80)	7.98 (1.97)	6.92 (2.67)	8.14 (2.54)	8.64 (1.90)	8.11 (2.14)	7.60 (2.40)	6.89 (2.61)	6.96 (2.67)
Overseas (*n* = 41)	9.31 (1.03)	8.42 (1.61)	8.39 (1.80)	8.03 (2.07)	8.37 (2.14)	8.50 (2.00)	8.71 (2.19)	7.84 (2.43)	8.17 (2.23)	6.66 (2.97)	7.24 (2.99)
All respondents	9.13 (1.36)	8.11 (1.76)	8.18 (1.85)	7.87 (2.15)	7.34 (2.62)	8.08 (2.52)	8.64 (1.98)	7.80 (2.40)	7.75 (2.41)	6.70 (2.80)	7.17 (2.66)

*Scores are based on a Likert scale between 1 (representing strongly disagreed) and 10 (representing strongly agreed). *Three respondents did not identify their origin.*

TABLE 3 | Visitors' behaviors within the Ningaloo Coast WHA.

Visitor origin (*n* = 160)*	*My* env responsible behavior (mean SD)	Encourage *others* env responsible behavior Mean (SD)	*My* littering behavior Mean (SD)	Pick up *others* litter Mean (SD)	*My* interfering with animals Mean (SD)	*My* staying on the road Mean (SD)	Intention minimize my impact Mean (SD)	Intention influence others behavior Mean (SD)	*My* ability to help protect Mean (SD)	Intention to take action to protect Mean (SD)	Intention communicate responsible behavior Mean (SD)
West Australia (*n* = 60)	9.15 (1.16)	9.22 (1.13)	9.80 (0.71)	8.67 (2.11)	8.68 (2.67)	8.63 (2.56)	9.55 (0.96)	8.41 (2.42)	8.21 (1.97)	8.38 (2.16)	8.20 (2.26)
Interstate (Aus) (*n* = 59)	9.42 (1.34)	9.51 (1.26)	9.77 (0.98)	8.14 (2.37)	9.53 (1.42)	8.93 (2.51)	9.64 (1.08)	7.98 (2.38)	7.67 (2.52)	7.82 (2.25)	7.48 (2.42)
Overseas (*n* = 41)	8.88 (1.67)	8.82 (1.93)	9.86 (0.43)	7.63 (2.97)	9.19 (2.01)	9.29 (1.78)	9.48 (1.20)	8.38 (1.82)	7.89 (2.39)	7.81 (2.49)	7.67 (2.52)
All respondents	9.20 (1.35)	9.25 (1.40)	9.81 (0.77)	8.22 (2.45)	9.13 (2.12)	8.89 (2.37)	9.56 (1.07)	8.22 (2.28)	7.95 (2.28)	8.05 (2.27)	7.78 (2.39)

*Scores are based on a Likert scale between 1 (representing strongly disagreed) and 10 (representing strongly agreed). *Three respondents did not identify their origin.*

from interstate and overseas traveled predominately with their partners (59% and 44% respectively). Visitors from overseas had the highest proportion of solo travel (15%). There are some differences between the types of travel party in terms of their understanding and perceptions of the Ningaloo Coast WHA. For example, the sustainable management of the WHA was more important to people who traveled individually (p = 0.001, their mean score was 9.90 as opposed to 9.35 for all respondents). Preserving the cultural heritage of the Ningaloo Coast World Heritage Area was also more important to solo travelers (p = 0.030, their mean of 10 as opposed to 8.94 for all respondent). Solo travelers were also more concerned than other travelers about the terrestrial environment (flora and fauna) in the Ningaloo Coast WHA (p = 0.041, average was 7.17).

Visitors who traveled with friends to the Ningaloo Coast WHA were most likely to state that the region did not live up to their expectations as much as it did for example, for family groups (who were most satisfied) (p = 0.035). Visitors who traveled with friends also had a lower score to the question: "while visiting the region, I never interfered with animals (marine or terrestrial)" than the other travel party types on average, but this was not statistically significant. They did have a significantly lower score in terms of their intentions to minimize the impacts that their actions have on the condition of the Ningaloo Coast WHA (p = 0.034) than the other travel party types on average. In terms of their behavior, most respondents generally believed they behaved in an environmentally responsible way. However, respondents of this study who were traveling with their partners felt that they behaved on average more responsibly that those who traveled with friends (p = 0.042). Friends also had a lower score for their littering behavior (9.3 as opposed to an average of 9.8 for the whole group) but this was not statistically significant.

Age Group

Around one third of overseas visitors were less than 25 years old, corresponding to having a larger number of solo visitor respondents and respondents travelling with their partners. In contrast, almost half of the interstate visitors were between 45 and 65 years of age but these respondents also traveled mostly with their partners. 42% of the people from WA were between 25 and 45 years old (which corresponds to this visitor group traveling more as families).

When looking at the relationship between respondent age and level of concern for the WHA, younger people (< 25), not unexpectedly, had a higher concern for the effect of tourism (p = 0.006), oil and gas (p = 0.028), and climate (p = 0.003). These younger people were generally more concerned about the marine (p = 0.089) and terrestrial flora and fauna (p = 0.078) of the WHA than other age-groups, but this was not statistically significant at 0.05. Respondents aged over 65 years of age had the lowest concern for all the different environmental and sectoral use pressures. For instance, young people's score for concern about increasing tourism threatening the condition of the Ningaloo Coast WHA was 8.4, whilst only 6.6 for people over 65. Furthermore, younger people were also less likely to believe that visitors behaved in an environmentally responsible way in the Ningaloo Coast WHA (but with p = 0.063 this was not statistically significant). However, despite having higher levels of concern, these young people were the least to likely to pick up litter if they saw it in the WHA of any other groups (again with p = 0.086 this was not statistically significant).

Gender

There were slightly more female than male survey respondents (56% were female) but the gender ratio was similarly even within the three visitor groups. When looking at the influence of gender on the perceptions and behaviors of study respondents while visiting the Ningaloo Coast WHA, differences were evident. Specifically, females were significantly more aware of the rules and regulations associated with the WHA than males (p = 0.037). It was also more likely for females to say that the WHA designation was their main reason for visiting the region (p = 0.014). Similar to the results reported for younger visitors (section "Age Group"), females were more concerned about climate impacts than males (p = 0.038), and the impact of oil and gas (p = 0.027). Although the mean score is still greater than 5, females were less likely to indicate they behaved in an environmentally responsible way while in the Ningaloo Coast WHA or to have encouraged others (for example friends/family) to engage in an environmentally responsible way while visiting the Ningaloo Coast WHA (p = 0.009 and p = 0.019 respectively).

Where Do Visitors to the Ningaloo Coast WHA Get Their Information From, and What Information Sources Do They Trust?

Results show that there was surprisingly low respondent agreement that they actively sought information before they visited the WHA (a score of 6.45; **Table 4**) with approximately one third of respondents indicating they did not seek information (a score less than or equal to 5). However, if people did search for information prior to their arrival, they felt that this information was mostly informative and easy to find. Perhaps as may be expected, visitors originating from overseas were more likely to actively seek information about the Ningaloo WHA before visiting the region. On arrival to the WHA, respondents of this study confirmed that they were able to easily locate good information about the WHA (**Table 4**).

Prior to visiting the WHA, respondents to our survey stated that they mostly obtained their information from websites (**Table 5**). However, once they had arrived and were visiting the WHA, the respondents primarily received information from the visitor centers: 86% interstate, 63% WA and 68% overseas respondents went to the visitor centers during their visit to the Ningaloo Coast WHA. In regards to levels of trust in this information, respondent trust was higher for information from the visitor center before the visit, and for signs and the visitor center during the visit. The respondents' levels of trust in the different sources of information did

TABLE 4 | Visitors' information seeking and trust in that information about the Ningaloo Coast WHA.

Visitor origin (n = 160)*	Before visit find info Mean (SD)	Before visit good info Mean (SD)	Before visit easy find info Mean (SD)	After arrival good info Mean (SD)	After arrival easy find info Mean (SD)	Would like more info Mean (SD)
West Australia (n = 60)	5.78 (3.66)	5.80 (3.52)	6.00 (3.80)	7.41 (2.85)	7.47 (2.89)	6.12 (3.54)
Interstate (Aus) (n = 59)	6.44 (3.38)	6.29 (3.45)	5.93 (3.68)	7.91 (2.53)	7.70 2.53)	6.28 (3.27)
Overseas (n = 41)	7.51 (3.16)	6.73 (3.31)	7.00 (3.31)	7.54 (2.97)	8.02 (2.56)	6.95 (3.22)
All respondents	6.45 (3.49	6.21 (3.46)	6.25 (3.62)	7.65 (2.75)	7.72 (2.66)	6.38 (3.38)

*Scores are based on a Likert scale between 1 (representing strongly disagreed) and 10 (representing strongly agreed). *Three respondents did not identify their origin.*

not differ before or during their visit (**Table 6**) [e.g., of the 86% interstate respondents who went to the visitor center for information, their level of trust in this information was very high (9.25)].

Does Message Framing of the Ningaloo Coast WHA Description Influence Visitors' Perceptions and Behaviors?

The five different ways in which the Ningaloo Coast WHA area was described (i.e., framing it in terms of environmental values (with or without moral statements) or in terms of economic or social (lifestyle) values) did not influence the way respondents answered the different survey questions. The average scores for agreeing with the accuracy of the description that was given to people were generally quite high (average score of 8.81 for all respondents, SD 1.59). However, there were some minor differences between respondent groups in the level of their agreement with the different frames (but note that sample sizes are small for some groups); e.g., respondents from overseas tended to have a higher level of agreement with the description (i.e., frame) that was presented to them (average score of 9.35), and in particular, these respondents from overseas tended to agree with the environmental frame (**Table 7**).

Further, the respondents agreed they would use the description (i.e., the frame that had been presented to them) to describe the WHA to their friends and family (average score for all respondents 8.14, SD 2.11). There were only some minor differences in this scoring; specifically, respondents tended to agree more with the *lifestyle* framing and the *moral environmental* statement than with the other message frames (i.e., the scores were all greater than 5 and there was less spread in the scores; see **Figure 1**).

Thus, the framing had no effect on people's agreement with the accuracy (or potential use) of the description of the WHA. This may be because the framing was too subtle, and the respondents did not respond to the difference (i.e., no noticeable treatment effect) or, that the people generally agree with all the different types of framing. The latter would mean that economic, lifestyle, and environmental values are not perceived to be incongruous with the WHA.

DISCUSSION

The effective engagement of stakeholders in protecting and conserving coastal regions is critical for the long-term maintenance of natural and cultural heritage values, and positive societal well-being effects have been associated with these sustainability outcomes. Owing to the link between sustainability outcomes and engagement, there has been an increase in the number of scientific studies seeking to understand how to engage with often diverse stakeholder groups including different sectors, residents and visitors (e.g., Cvitanovic et al., 2018; MacKeracher et al., 2018; Dean et al., 2019). In popular coastal areas, the number of visitors can add significantly to local numbers and put pressure on natural resources; thus, engagement with this group is key. However, a paucity of evidence about how best to engage with visitors to coastal areas to achieve sustainability outcomes remains. To contribute toward filling this gap we used a case study of the Ningaloo Coast WHA in Australia, to identify visitors' perception of the region and their self-reported and intended behavior. We identified the types of information they access and trust, and whether or not different message framings could potentially influence visitor's environmentally sustainable behaviors. Here, we discuss our results in further detail, with a specific focus on their implications for coastal management and improved visitor engagement.

Within our study, there was a strong awareness among visitors that the Ningaloo Coast is a WHA, which our results suggest is likely a result of the extensive signage along the coastal driving route and information provided at the beaches and visitors centers. Further, our results revealed that, based on their *in situ* experience within the region, visitors believed that the region deserves to be a WHA. Accordingly, they supported the need for management and preservation of the natural and cultural heritage values of the region.

Whilst the results of this study revealed that visitors generally support the WHA, our results also suggest that they did not have a deep understanding of the WHA. For example, visitors who took part in our survey indicated that they were largely unaware of who was responsible for managing the WHA, and they were not familiar with the rules and regulations in place to protect the WHA. These results are perhaps unsurprising, as holiday-makers are more likely to focus on their leisure activities than on regulatory and management aspects in place to ensure the conservation and protection of the values. However, an understanding of why protection measures are in place (and who manages these and how) can be linked to better long-term conservation outcomes. For example, even for people who do not reside in an area and who are transient, low awareness has implications for WHA outcomes, particularly when such individuals do not feel "connected" or "attached" to the place that

TABLE 5 | Types of information accessed by the different types of visitors prior to their arrival.

Visitor origin (*n* = 160)*	Website proportion of visitor group (average trust score)	Social media proportion of visitor group (average trust score)	Friends proportion of visitor group (average trust score)	Family proportion of visitor group (average trust score)	Visitor center proportion of visitor group (average trust score)	Signs proportion of visitor group (average trust score)	TV documentary proportion of visitor group (average trust score)
West Australia (*n* = 60)	0.73 (8.82)	0.18 (7.18)	0.50 (8.87)	0.30 (9.44)	0.42 (9.40)	0.23 (9.29)	0.10 (9.17)
Interstate (Aus) (*n* = 59)	0.68 (8.11)	0.29 (6.24)	0.47 (7.71)	0.12 (7.71)	0.46 (8.98)	0.14 (9.38)	0.20 (7.17)
Overseas (*n* = 41)	0.71 (7.86)	0.37 (6.93)	0.34 (8.93)	0.05 (9.00)	0.49 (9.30)	0.10 (8.25)	0.02 (9.00)
All respondents	0.71 (8.29)	0.27 (6.59)	0.45 (8.45)	0.17 (8.96)	0.46 (9.21)	0.17 (9.19)	0.12 (7.89)

*The figures show the proportion of visitors of that groups that accessed the information and the average trust at which they scored that information. Trust scores are based on a Likert scale between 1 (representing no trust) and 10 (representing high levels of trust). *Three respondents did not identify their origin.*

TABLE 6 | Types of information accessed by different types of visitors after their arrival.

Visitor origin (*n* = 160)*	Website proportion of visitor group (average trust score)	Social media proportion of visitor group (average trust score)	Friends proportion of visitor group (average trust score)	Family proportion of visitor group (average trust score)	Visitor center proportion of visitor group (average trust score)	Signs proportion of visitor group (average trust score)	TV documentary proportion of visitor group (average trust score)
West Australia (*n* = 60)	0.20 (7.92)	0.03 (9.00)	0.12 (9.43)	0.08 (7.60)	0.63 (9.24)	0.07 (8.88)	N/A
Interstate (Aus) (n = 59)	0.22 (7.85)	0.07 (6.00)	0.10 (8.17)	0.03 (6.00)	0.86 (9.25)	0.25 (9.86)	N/A
Overseas (*n* = 41)	0.22 (8.33)	0.15 (7.00)	0.17 (9.14)	0.05 (10.00)	0.68 (8.96)	0.17 (9.29)	N/A
All respondents	0.21 (8.00)	0.07 (7.00)	0.12 (8.95)	0.06 (7.78)	0.73 (9.18)	0.23 (9.32)	N/A

*The figures show the proportion of visitors from each groups who accessed the information, as well as and the average trust at which they scored that information. Trust scores are based on a Likert scale between 1 (representing no trust) and 10 (representing high levels of trust). *Three respondents did not identify their origin.*

they are visiting (van Putten et al., 2018). Thus, while the current study provides insights into place-related aspects of "sense of place" within the Ningaloo region it was outside of the scope of our research design to explore these directly. We, therefore, suggest that future research is needed to more comprehensively understand the specific variables (not only related to place, but also the person and process – see van Putten et al., 2018) that can build and foster place attachment among visitors to the region (Gurney et al., 2017).

Despite not having a strong understanding of the regulatory and management measures currently in place to protect the values of the WHA, our results suggest that visitors to the region are optimistic about the future sustainability of the region. This optimism, in part, likely reflects the reported positive perceptions that visitors had regarding the current condition of the region during their visits. The positive perceptions in the Ningaloo region, as reported here, however, are at odds with visitor feelings of "reef grief" in the Great Barrier Reef region on the east coast of Australia (Marshall et al., 2019). The pressures on the Great Barrier Reef and its consequent decline have had much publicity, and this shared detailed (and negative) information is leading the public into this grief (Marshall et al., 2019). Our optimistic results are perhaps unsurprising, given that visitors with "less knowledge" tend to be more satisfied with reef and environmental health (Leujak and Ormond, 2007), and the Ningaloo coast receives significantly less national and international media attention than the Great Barrier Reef. However, even the positive perceptions of the Ningaloo WHA reported by visitors who took part in this study were tempered by current environmental projections; e.g., because of climate change (Jones, 2019) and development (Boavida-Portugal et al., 2016). We expand on this finding in the next section.

Optimism, Tourism, Gender, and Self-Reported Behavior

In our study, the results suggest that visitors are optimistic about the future of the WHA, but simultaneously are concerned about several threats in the future, including those associated with climate change and local pollution. In particular, in the case of the Ningaloo WHA, we found that young people and females are most concerned, a result that has also been partly reported elsewhere (Van Liere and Dunlap, 1980; Davidson and Freudenburg, 1996). Although the perceived average concern about the impact of tourism was lower than for instance, climate change and pollution, four out of five people also agreed that tourism poses a threat[1]. Ironically, however, while respondents in this study did recognize tourism as a threat to the region, most considered the quality of their *own* environmental behavior to be high (i.e., they feel as though they exhibit good environmental behaviors that do not pose a threat to the WHA). In contrast, results suggest that visitors feel as though the behavior of *others* was less environmentally friendly.

Care must be taken when interpreting and comparing the result from self-reported behavior and other-reported behavior (Chao and Lam, 2011), because self-reporting can be prone to exaggeration and over reporting of pro-environmental behavior (Kormos and Gifford, 2014), for instance, due to social desirability bias (e.g., Ewert and Galloway, 2009). Nevertheless, from our results we hypothesize that from a psychological perspective, visitors to the WHA perceive themselves to be responsible for desirable outcomes but not responsible for undesirable ones. In doing so, they transfer the responsibility of undesirable outcomes to others (i.e., a blame shift; Lozano and Laurent, 2019) and thus, legitimize their own actions. Moreover, in such situations people tend to be overconfident in their own behavior and their ability to do the right thing (i.e., the overconfidence effect; Dunning et al., 1990).

Interestingly, and somewhat unexpectedly, there was also a gender dimension in our study to the respondents' own perceived environmental behavior and that of other visitors, which contradicts previous research. Since the origin of environmental behavior literature, there has been much observational evidence to suggest that women are more worried about the environment than men, and that this is reflected in their greater levels of pro-environmental behavior (e.g., Stern et al., 1993; Davidson and Freudenburg, 1996; Ramstetter and Habersack, 2019). However, females in our study self-rated their own environmental behavior as lower (i.e., less environmentally friendly) than men – which would be counter to the observational evidence (e.g., Lam and Cheng, 2002; Wallhagen et al., 2018). Given that our study was not specifically designed to test for such gender differences we do not have adequate evidence to explain these findings, however, we posit that females may under-report the adequacy of their own behavior for gender related reasons. We posit this because females in this study were also less confident that they would be able to influence the environmental behavior of others. Irrespective of which, subsequent research is needed to comprehensively understand these results, the drivers of these findings, and the associated implications for the management of coastal regions.

Visitor Access to Information and Trust in Information Sources

The ways in which individuals access (and the extent to which they trust) different sources of information has implications for their behaviors and actions (MacKeracher et al., 2018). In terms of accessing information, our results somewhat interestingly suggest that most visitors to the WHA start their search for information during, and not prior to visiting, the WHA (i.e., most information about the conditions of the region, and associated management measures are obtained *in situ*). Further, our results suggest that these *in situ* sources of information, including local signage and visitor centers, are considered more trustworthy that other sources of information, such as websites. Indeed, this reflects previous studies about the importance of visitor information centers for engaging with and educating visitors partaking in tourism activities (e.g., Ballantyne et al., 2009).

These findings have important implications for the management agencies responsible for developing and

[1] 1 out of those 4 visitors in fact strongly agreed, i.e., score of 10 on the Likert scale.

TABLE 7 | Scores of the five different framing messages (n = 160*), which did not influence respondents' answers to the survey.

Framing	WA visitors Average score (SD) sample size	Interstate visitors Average score (SD) sample size	Overseas visitors Average score (SD) sample size	Grand Total Average score (SD) sample size
A Base case	9.10 (1.91) n = 10	8.77 (1.36) n = 13	8.50 (1.20) n = 8	8.75 (1.50) n = 32
B Environmental	7.91 (1.04) n = 11	8.50 (2.76) n = 10	10.00 (0.00) n = 9	8.71 (1.85) n = 31
C Moral environmental	9.00 (1.18) n = 14	8.10 (3.18) n = 10	9.64 (0.50) n = 11	8.94 (1.88) n = 36
D Economic	9.17 (0.94) n = 12	8.38 (1.50) n = 13	8.67 (1.37) n = 6	8.74 (1.29) n = 31
E Lifestyle	8.42 (1.78) n = 12	9.00 (1.08) n = 13	9.67 (0.52) n = 6	8.90 (1.37) n = 31
All responses	8.73 (1.44) n = 59	8.58 (1.98) n = 59	9.35 (0.98) n = 40	8.81 (1.59) n = 161

*Scores are based on a Likert scale between 1 (representing strongly disagreed) and 10 (representing strongly agreed). *There was a total of 3 non-responses to this question.*

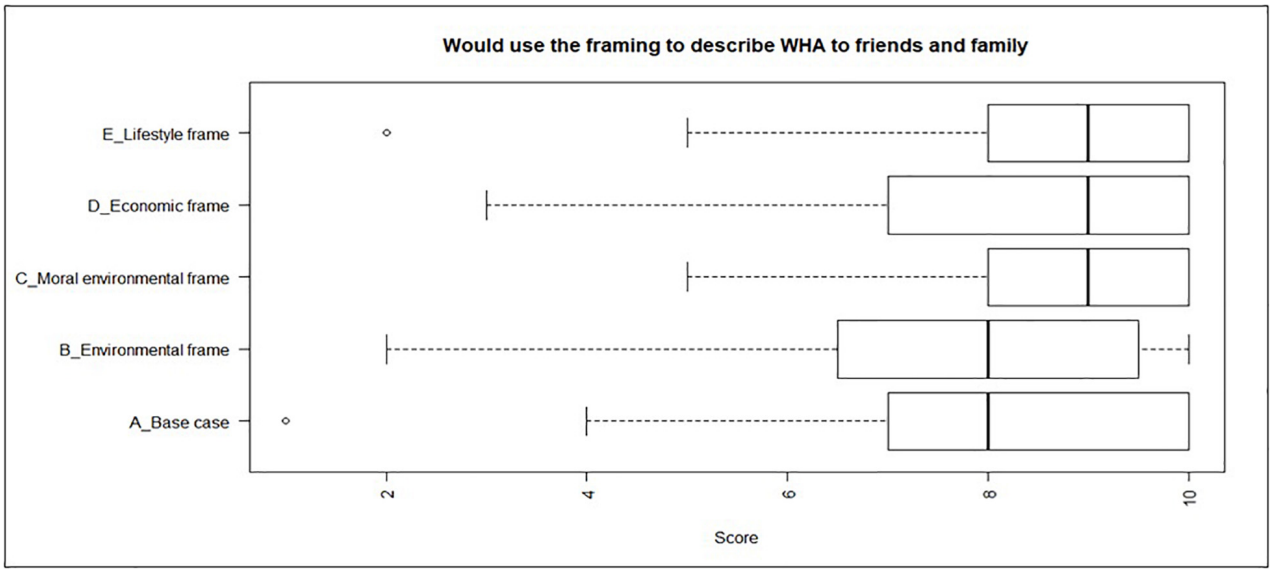

FIGURE 1 | Level of agreement (where 1 is strongly disagree and 10 is strongly agree) by survey respondent (n = 163) with the different four message frames (i.e., short statements used to describe the Ningaloo Coast WHA that accentuate certain aspect to make the information more persuasive). The four frames highlighted environmental values of the WHA [without moral statements (B) or with moral statements (C)] or in terms of economic (D) or social (lifestyle) values (E), and a base case in which a neutral description of the Ningaloo Coast WHA was given (A).

implementing communication and engagement strategies aimed at visitors. Firstly, they highlight the need to regularly update local signage and visitor information centers. Particularly in relation to signage, this can be problematic as such information sources are very static (i.e., not easily updated as new information comes to hand), and also prone to destruction such as graffiti and other forms of vandalism (Patrick, 2003). Similarly, updating exhibits and other communication tools within visitor centers can be labor intensive (in terms of planning and design) and costly (in terms of the financial resources required). Thus, our findings highlight the need for management agencies to adequately maintain (i.e., keep clean) and update local signage and visitor centers as new information comes to hand.

Further, and as previously mentioned, some visitors to the WHA were unsure if they had the ability to carry out actions to help protect the WHA, or communicate the importance of responsible behavior to other visitors. This may indicate a potential lack of confidence in their own knowledge of (i) how to behave in an environmentally responsible manner themselves and (ii) what issues might require action in the WHA, or perhaps this is simply a reflection of their perception that it is not their responsibility to communicate this. Irrespective, these findings suggest that signage and visitor centers located within coastal regions should be focused on helping raise awareness among visitors as to the type of pro-environmental actions that individuals can take to reduce their impacts while improving local sustainability.

Framing of Information About the Ningaloo WHA

There were no statistically significant differences between message framings for the intended pro-environmental behavior response variables. This result is not completely unexpected as evidence of the effect of framing (especially in the context of environmental frames) is mixed and inconsistent. The manipulations used in this study comprised of an emphasis

frame (for terminology refer to Chong and Druckman, 2007), and an associated benefit or efficacy pertaining to that frame. Although these are not necessarily competing frames, recent research has shown that in more complex framing environments, the framing effect can be diminished (Nisbet et al., 2013; Detenber et al., 2018).

In the case of the Ningaloo WHA, these findings may mean that economic, lifestyle, and environmental values are not perceived to be incongruous with the Ningaloo Coast. This type of information is important for managers and local decision makers because balancing environmental, social and economic objectives can be very difficult in areas where tourism is a major local economic activity (Wight, 1993). Our results could also be an indication of the current management success in achieving all these objectives in the eyes of visitors to the area, although future research is required to state this with certainty. Further, these findings may suggest that all of the message frames used in the present study were considered acceptable by those who completed the survey. Thus, future studies are needed to determine any intricacies of this possible result, for instance, local residents' perceptions on this issue versus that of the visitors. We suggest that future studies on message framing, either in the Ningaloo WHA or elsewhere, may also benefit from having participants explicitly compare and rank all framings in order of which best reflects/resonates with their individual views (e.g., via methods such as analytical-pared hierarchy).

However, as highlighted above, it is also likely that the respondents did not have enough personal understanding about the WHA to critique the information (i.e., the framing) that was provided to them. Thus, no difference in how the respondents understood and agreed with the five frames was observed. This result then reveals how visitors to the WHA trust in the information that is provided to them, and emphasizes the important role of the visitor centers in providing visitors with information and enabling them to understand (i) the uniqueness of the WHA, and (ii) the rules and regulations that are in place to protect it, particularly as the results revealed that respondents were not very well aware of the regulations at all. Framing effects can be difficult to isolate but it is understood that there are conditions that can result in more effective communication (Druckman and Lupia, 2017). The consistently high scores recorded in this study suggest that combining a framed message with a statement emphasizing a benefit could potentially aid in eliciting more intended pro-environmental behaviors among visitors to the WHA, and is certainly worth exploring in future research.

CONCLUSION

The long-term maintenance of natural and cultural heritage values within coastal regions requires effective engagement of visitors (i.e., tourists) in protecting and conserving coastal regions. Via a case study of the Ningaloo Coast WHA in Australia, we found that strong support for management and preservation of the natural and cultural heritage values of the Ningaloo Coast, combined with a high level of optimism about the future sustainability of the region, was prevalent among visitors. We also found that visitors to the Ningaloo coast recognize that tourism is a threat to the region, but they felt that their own environmental behavior did not contribute to that threat, and that the behavior of others was less environmentally friendly.

This study emphasizes the importance of visitor information centers and local signage for engaging and educating visitors partaking in tourism activities in coastal regions and World Heritage Areas. Key to such engagement will be adequate resourcing from local governments and other key agencies. Information centers, such as those in the Ningaloo Coast WHA, will need to equip visitors with adequate and salient information that can enable visitors to understand the uniqueness and value of the WHA, as well the rules and regulations that are in place to protect it. Effective information sharing and education is also required to ensure the long term pro-environmental behavior of visitors transient in the region, and to foster visitors' place attachment, similar to residents.

DATA AVAILABILITY STATEMENT

The datasets generated for this study will not be made publicly available: In accordance with our ethics approval to protect the anonymity and confidentiality of all project participants.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the ethical permission to conduct this research was approved by Australian National University Human Ethics Research Committee (Protocol number 2019/424). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

CC, EP, and TG conceived the study, designed the survey design, interpreted the data, and drafted the manuscript. RK, HF, and TS helped refine the survey, undertook the field-work, and contributed to writing the manuscript. MM and NB assisted with data analysis and interpretation, and contributed to writing. All authors contributed to the article and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fmars.2020.00583/full#supplementary-material

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