Visitor satisfaction with a beach-based wild dolphin tourism experience and attitudes to feeding wild dolphins.

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Declaration

I declare this thesis is my own account of my research and contains as its main content work which has not been previously submitted for a degree at any tertiary education institution.

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Abstract
This research was conducted to gain insight into visitor’s satisfaction with a beach-based wild dolphin experience operated by the Dolphin Discovery Centre (DDC) on Koombana Beach, Bunbury, Western Australia and to understand visitor attitudes to the feeding of wild dolphins. Understanding visitor satisfaction and attitudes is important to wildlife tourism managers as it highlights areas of potential improvement for their operations with the goal of maintaining visitor satisfaction. To collect this information a pen and paper questionnaire was carried out to sample a cross section of visitors to Koombana Beach. Importance-Performance Analysis (IPA) was incorporated into the questionnaire and used as a measure of visitor satisfaction. This revealed that visitors to the DDC (n= 342) were satisfied with their experience at the DDC. However, there was an apparent barrier to people revisiting the DDC more than three times. The visitor satisfaction information was then examined at a finer scale to present aspects of the operation that have the potential for improvement to better meet visitor expectations. In regards to visitor awareness and attitudes to wild dolphin feeding, it was found that Koombana Beach visitors (n= 569) indicated a high awareness of the potential negative impacts of dolphin feeding and were against unregulated feeding of wild dolphins. There was also evidence to suggest that visitation to the DDC may discourage unregulated feeding and increase visitor knowledge in regard to wild dolphin feeding being illegal. This study reports the benefits of incorporating educational information into such wildlife experiences to assist in the reduction of harmful unregulated interactions. The results of this study reveal the importance of understanding visitor satisfaction and attitudes for wildlife tourism operations in order to foster repeat visitation as well as motivating others to visit. This work contributes to best practice dolphin tourism management by revealing that there is public support for the beach-based dolphin interaction provided and controlled by the DDC. This study also shows that visitors to Koombana Beach are likely to support actions that could reduce illegal dolphin feeding and injury from recreational boating.
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Chapter 1: Introduction

1.1 Dolphin Tourism and Visitor Satisfaction

Dolphins are perceived by humans as intelligent, charismatic animals that appear to have many traits similar to ourselves, including a playful, and curious nature (Curtin, 2005; Smith, Lee, Newsome & Stoeckl, 2006). Dolphins also show an apparent willingness to interact and socialise with humans as well as each other, which plays on the human desire for an emotional connection and contributes to the great appeal of dolphin tourism experiences (Barney, Mintzes, & Yen, 2005; Smith, Lee, Newsome & Stoeckl 2006; Zeppel & Muloin, 2008a). Tourism that connects humans with wild dolphins has long captured the interest of visitors to coastal areas, with experiences and interactions shifting from incidental and uncommon to mainstream tourist attractions with visitation to dolphin tourism destinations increasing globally (Peters, Parra, Skuza & Möller, 2013).

A growing number of people are in search of a personal experience with these charismatic wild animals, which has resulted in the development of many dolphin specific tourism operations that present opportunities for human-dolphin interactions (Higham & Lück, 2008; Peters et al., 2013). These interactions include swim with dolphin tours, boat tours, dolphin feeding, and beach-based up-close viewing (Constantine, 2001; Neil & Holmes, 2008; Peters et al., 2013; Stensland & Berggren, 2007). Tourists engaging in these dolphin interactions report that they gain many benefits, including improved physical and emotional wellbeing; therapeutic benefits and the lifting of the human spirit; and it has been reported that interactions with dolphins can even alleviate depression (Antonioli & Reverley, 2005; Curtin, 2006; Taylor, 2003; Webb & Drummond, 2001).

Newsome, Moore and Dowling (2013, 23) report that “Satisfaction of visitors with the ecotourism experience is essential to the long-term viability of the ecotourism industry ... and satisfaction should be second only to the conservation and protection of the resources
on which tourism is based”. Visitor satisfaction is the ability for a product or experience to meet the expectations of visitors and is an essential component of a wildlife tourism operation. Visitors who are satisfied with their experience are likely to re-visit or recommend the experience to family or friends through word of mouth and evermore commonly through online platforms such as Facebook, Instagram and TripAdvisor (Gier, Christie & Amolo, 2017; Jurdana, Frleta & Župan, 2017; Newsome et al., 2013; Patroni et al., 2018a). This is essential to enable the continuation of these experiences as the income from tourists is vital and having satisfied visitors makes these experiences worth-while (Schleimer et al., 2015; Wilson & Tisdell, 2003).

Visitor satisfaction studies involving dolphin tourism experiences indicate a trend of high satisfaction with the overall experience. The most important aspects of an experience are the viewing of dolphins in their natural environment, receiving education about the dolphins, and the tour companies possessing the appropriate licencing and to minimise harm to wild dolphins (Aragones, Talaue-McManus, Roque, Amor & Keith, 2013; Filby, Stockin & Scarpaci, 2015; Sitar et al., 2017). Literature on visitor attitudes towards wild dolphin experiences highlight that in general visitors express a concern for the welfare of the wild dolphins (Draheim, Bonnelly, Bloom, Rose, & Parsons, 2010; Filby et al., 2015; Mayes, Dyer, & Richins, 2004; Sitar et al., 2017). Most humans’ hold a romanticised view of the gentle, playful nature of dolphins; however, as with any interaction with wild animals there are risks (Smith, Samuels, & Bradley, 2008).

1.2 Dolphin Welfare

Dolphin tourism is recognised as a vexed issue as concern for dolphin welfare (Figure 1) conflicts with the desire of visitors for close proximity and contact with the wild dolphins (Bach & Burton, 2017; Mayes et al., 2004; Sitar et al., 2017). Negative impacts of dolphin tourism have been reported in many studies (Foroughirad & Mann, 2013; Orams, 2002;
Scarpaci, Nugegoda & Corkeron, 2010; Steckenreuter, Möller & Harcourt, 2012). Human-dolphin interactions have the potential to cause harm to dolphins and disrupt their natural behaviours. Some of the greatest risks to dolphins include; lessening their wariness of humans which can lead to increased boat strikes; other impacts include increased stress; and change in time spent engaged in important behaviours such as foraging, resting, caring for their young and socialising (Donaldson, Finn & Calver, 2010; Steckenreuter et al., 2012).

Figure 1. Conceptual model for the relationships between visitor satisfaction, feeding of wild dolphins, and the tension between feeding and dolphin welfare.

1.3 Feeding for Wild Dolphin Tourism

The feeding of wild dolphins for tourism arises from the desire of visitors for close proximity experiences. Operators and private individuals want predicable sightings to avoid visitor disappointment and, in an attempt to guarantee sightings, often feed wild dolphins (Figure 1), but such feeding can additionally impact on dolphin health and welfare (Foroughirad & Mann, 2013; Orams, Hill & Baglioni, 1996; Scarpaci et al., 2010). The feeding of wild dolphins for tourism is thus controversial, and management approaches differ greatly between tourist operations and between countries. Some places ban the feeding of wild dolphins while
others have no regulations at all (Mustika et al., 2017; Newsome & Rodger, 2008; Orams, 1997; Mustika et al., 2017; Steckenreuter et al., 2012.

Feeding of dolphins by anyone who is not licensed is illegal in Australia, as well as in many countries around the world, including the United States, United Kingdom and New Zealand (Duda, Beppler & Horstman, 2013; Orams, 1997; Wu, 2013). Such interactions are referred to as unregulated feeding and can be harmful as the amount and type of food is typically not controlled and the feeding is done by the general public, including recreational anglers and boaters (Donaldson et al., 2012). The difference in opinion about whether feeding is acceptable or not provides a mixed message to the general public regarding the circumstances in which feeding wildlife is allowed (Newsome & Rodger, 2013). Understanding the attitudes of visitors can provide an insight into their behaviours towards dolphins (Newsome & Rodger, 2008; Newsome & Rodger, 2013).

1.4 Balancing Tourism and Dolphin Welfare

For the reasons outlined above, having appropriately managed dolphin tourism experiences that satisfy the desires of visitors to interact with dolphins is important. Wildlife tourism that includes effective education and communication has the potential to contribute to species conservation by increasing visitor awareness of potential risks to dolphin welfare, encouraging appropriate environmental behaviours, and assisting in the reduction of unregulated interactions (Barney et al., 2005; Bach & Burton, 2017; Garcia-Cegarra & Pacheco, 2017; Sitar et al., 2017; Zeppel & Muloin, 2008b). Filby et al. (2015) proposed that with the correct education, visitors could potentially encourage licenced operators and other visitors towards increased compliance. This is especially the case if visitors are educated about the negative impacts of dolphin tourism and are willing to trade proximity to dolphins for greater dolphin welfare (Bach & Burton, 2017; Barney et al., 2005; Filby et al., 2015; García-Cegarra & Pacheco, 2017).
With the high desirability of wild dolphin interactions and the associated potential for risk to the health of dolphin populations, such human-dolphin interactions require highly considered management, monitoring and enforcement to ensure a balance exists between visitor satisfaction and dolphin welfare (Newsome & Rodger, 2008). The factors that influence visitor satisfaction and the extent of dolphin impacts differs between operations, which means that an understanding of each tourism situation as a specific case is important (Inman, Brooker, Dolman, McCann & Wilson, 2016; Patroni, Simpson & Newsome, 2018b; Smith, Frère, Kobryn & Bejder, 2016).

Moreover, the long-term sustainability of wildlife tourism is dependent on integrating visitor desires and demand with resource management (Bach & Burton, 2017; Newsome et al., 2013; Sotiriadis, 2017), therefore an understanding of tourist attitudes, motivations, and satisfaction regarding a wildlife tourism experience is important (Bach & Burton, 2017). Previous studies report that the major factors contributing to visitor satisfaction with dolphin tourism are the close experience with dolphins and that the dolphin welfare is considered and no harm is caused to the dolphins (Filby et al., 2015; Mayes et al., 2004; Sitar et al., 2017).

1.5 Aims and Research Questions

There are several dolphin tourism experiences currently operating in Australia. In Western Australia, two dolphin experiences provide the context for what are now deemed iconic tourism experiences. The Monkey Mia dolphin experience, in the Shark Bay World Heritage Area, has been the focus of many studies (e.g. Bach & Burton, 2017; Bejder et al., 2006; Smith et al., 2006). The dolphin experience managed by the Dolphin Discovery Centre (DDC) at Koombana Beach, Bunbury has received more research attention in recent years (e.g. Cong, Wu, Zhang & Newsome, 2016; Patroni et al., 2018a). As yet there has been no research investigating the social dimensions of visitor satisfaction at the DDC.
To ensure the satisfaction of DDC visitors and the continuation of the dolphin tourism operation, it is important to investigate aspects of the DDC’s beach-based dolphin interaction in terms of visitor satisfaction with their experience and visitor attitudes regarding potential negative impacts to dolphin welfare. This understanding of visitor satisfaction and attitudes can and provide a focus for management to further improve their wildlife tourism operation. For the purpose of this thesis the term visitor is used to describe the people visiting Koombana Beach at the time of survey, which includes residents of Bunbury; those visiting from the surrounding regions, and tourists from Perth, other Australian States, and international destinations.

The aim of this study was to determine the satisfaction of visitors with both the DDC in general and with the beach-based wild dolphin interaction operated by the DDC more specifically. This study also investigates the attitudes of visitors to Koombana Beach regarding public awareness of negative impacts to dolphin welfare and opinions concerning the feeding of wild dolphins. A questionnaire-based survey was conducted to investigate the following research questions in order to better understand visitor satisfaction and attitudes:

1. How satisfied are DDC visitors with their Koombana beach-based dolphin interaction experience?
2. Are visitors to Koombana Beach aware of the adverse effects of unregulated feeding of wild dolphin?
3. Do visitors support wild dolphin feeding at Koombana Beach and the wider Koombana Bay?
4. Would the DDC Koombana beach-based experience motivate visitors to feed wild dolphins at other times and places?
1.6 Organisation of this Thesis

Chapter 1: Introduction. This chapter introduces the research topic and provides background on dolphin tourism, including the benefits, visitor motivations and satisfaction, and visitor opinion on feeding wild dolphins. This chapter also provides an overview of the potential impacts of dolphin feeding, the importance of management and education, and concludes with the aims for this study. Further, the chapter sets the framework and research questions for this thesis.

Chapter 2: Literature Review. This chapter examines the academic literature regarding major topics of dolphin tourism, including social and ecological aspects. This review also discusses the techniques commonly used to study visitor satisfaction, specifically the application of visitor surveys and Importance-Performance Analysis and justifies their application for this study.

Chapter 3: Methods. This chapter explains the methods used in this research starting with a description of the study site and the operation of the beach-based dolphin interaction at the DDC. This is followed by the development and structure of the questionnaire and integration of the Importance-Performance Analysis (IPA). The fieldwork element is then discussed, including the sampling method and data collection. Finally, the methods used in statistically analysing the data are presented.

Chapter 4: Results. This chapter presents the findings of the study. This section begins with the satisfaction of visitors to the DDC based on the Importance-Performance Analysis. The attitudes and awareness of all Koombana Beach visitors in terms of impact awareness and support for wild dolphin feeding are then reported.

Chapter 5: Discussion. This chapter describes and interprets the above results and the significance of the findings in relation to previous studies and the published literature. The
research questions are addressed in light of the findings of this study and the literature regarding social and ecological aspects of dolphin tourism.

**Chapter 6: Conclusion.** The final chapter, the conclusion summarises what was found and reiterates the answers to the research questions. Recommendations are suggested for the direction and focus for further research into the satisfaction, awareness and attitudes of visitors to marine tourism destinations.
Chapter 2: Literature Review and Research Context

2.1 Introduction

Numerous articles address the potential ecological impacts that dolphin tourism can have on the dolphins, the risks to people, and the economic benefits to local communities (Newsome et al., 2005; Orams, 2002; Senigaglia et al., 2016; Wilson & Tisdell, 2003). The literature however reports fewer studies into the social aspects of dolphin tourism such as visitor satisfaction and attitudes. Such aspects are an important consideration in any management strategy to keep wild dolphin tourism operations sustainable by balancing the welfare of the dolphins with the desires and expectations of tourists (Bach & Burton, 2017; Newsome et al., 2013; Sotiriadis, 2017). Each tourism operation is unique and requires a management approach unique to the species, location, and visitor desires (Dubois & Fraser, 2013). This review addresses the literature of visitor satisfaction with dolphin tourism experiences and considers the importance of understanding social aspects, such as visitor attitudes to dolphin welfare and environmental education. Literature that underpins the questionnaire-based Importance-Performance Analysis and other survey methods for studying the social aspects of a dolphin tourism operation are also discussed. The literature regarding the impacts of tourism on dolphin welfare, the benefits that are derived from dolphin tourism, and management techniques employed to ensure a sustainable dolphin tourism operation are also explored.

2.2 Dolphin Tourism

Many tourists in search of nature-based experiences are traveling to coastal and marine destinations for wildlife tourism experiences as these diverse habitats house a great diversity of species including those that are charismatic and of appeal to tourists (Gier et al., 2017; Newsome et al., 2013; Schleimer et al., 2015). Such areas often enhance their destination image by offering a range of recreational activities including scuba-diving, snorkelling, and
boat tours, providing the opportunity for tourists to view marine wildlife in their natural habitats (Madden, Rashid & Zainol, 2016; Newsome et al., 2013). The viewing of animals in the wild however is not guaranteed and tends to rely on chance encounters, with the possibility of leaving visitors dissatisfied when their expectations are not met.

### 2.3 Motivations for Dolphin Interactions

The social aspects of dolphin tourism vary greatly from that of other marine wildlife, in part because dolphins have held great appeal to humans for a long time, and are widely considered as being among the most charismatic wildlife (Barney et al., 2005). Curtin (2006) reported that participants felt their dolphin experience improved their physical and emotional wellbeing and that the dolphins appeared to enjoy the interaction and be smiling, which was clearly transference of human behaviours to the dolphins. Webb and Drummond (2001) also reported therapeutic benefits, and the lifting of the human spirit as a result of interacting with dolphins. Taylor (2003) and Antonioli et al. (2005) further suggested that swimming with dolphins can alleviate depression or illness. Several authors have considered the justification for some species being more sought after than others, with Freeman and Kreuler (1994) and Smith, Lee, Newsome and Stoeckl (2006) suggesting that humans connect with the playfulness, curiosity, and social habits of dolphins and their apparent desire to interact with humans, which mirror attributes present in humans themselves (Zeppel & Muloin (2008a). Furthermore, dolphins are aesthetically pleasing to humans, give off a graceful and agile sense of movement, and the sounds of their communication appeal to humans (Weiner, 2015). McIntosh and Wright (2017) and Cater and Cater (2007) describe the attraction of visitors to wild dolphin experiences. Those authors report that marine mammal tourists desire a psychological benefit and emotional connection, which makes close proximity with the target species and species relatability an important part of the experience. The same authors also suggest that this emotional and perceived connection can
be gained through connecting in a human way with dolphins, including eye contact with
dolphins, which gives participants a sense of acknowledgement and connection. Additionally,
Cater and Cater (2007) suggested tourists interpret the curve in dolphin’s rostrum as a smile,
giving the impression the dolphin is enjoying the interaction and feels some sort of emotional
connection. Swimming with dolphins is one of the most desired dolphin experiences, Weiner
(2015) proposes that swimming alongside a dolphin enhances the emotional connection and
is more intimate than a birds-eye view, fulfilling the human desire for such emotional
connections. Supposed signs of engagement from the dolphins are however easily
misinterpreted and visible signs of stress can be neglected or misinterpreted as playful
behaviour. For example, while eye contact is a form of communication or connection
between humans, many animals, including dolphins, perceive eye contact as threatening, so
the assumption in the mind of the tourists that dolphins use the same social cues creates a
potentially harmful misunderstanding (Curtin, 2006; Desmond, 1999; Wiener, 2013).

Treating dolphins in a human manner arises from the expectations visitors have for the
experience. Dolphins have long been romanticised as friendly caring creatures, not only by
their mannerisms, but also by the way they are portrayed in movies and how captive dolphins
are trained to behave (Weiner, 2015). The perceptions humans have of dolphins can
influence the way visitors behave in their presence, which Weiner (2015) found was without
a great deal of concern or caution. Wursig and Wursig (2003) argue that these interactions,
even when dolphins participate out of their own free will, interpreted as shared enjoyment
by humans, results in the exertion of energy that could be better expended into necessary
life processes. Human emotions are easily evoked, and it has been observed that just being
in proximity of a dolphin is sufficient to feel excitement (Besio, Johnston & Longhurst, 2008).
2.4 Attitudes and Satisfaction with Dolphin Tourism

Visitor satisfaction is a vital component of dolphin tourism experiences (Newsome et al., 2013). Visitor satisfaction is the ability for an experience to meet the visitor’s expectations and desires, which are often formulated before the actual experience. Ensuring an experience meets the expectations of visitors makes it likely they will return or become regular visitors and they may recommend the experience to others through word-of-mouth and online sharing of their positive experience (Chen & Segota, 2015; Lai & Vinh, 2013; Madden et al., 2016). This is important as these tourist operations rely on the income from visitors to ensure they can keep operating and providing the wildlife tourism experience (Gier et al., 2017; Schleimer et al., 2015; Wilson & Tisdell, 2003). Understanding the satisfaction of visitors also provides an indication of what is working well and what can be improved in order to keep visitors satisfied and further improve to compete with other similar experiences being offered (Taplin, 2012).

While the majority of visitors who engage in dolphin experiences are highly satisfied, surveys have highlighted concerns for the welfare and health of the dolphins. Participants in the study of Sitar et al. (2017) reported that the most important aspects of dolphin watching experiences were: receiving education about the dolphins; having the tour company follow codes of conduct to minimise harm to dolphins; and having the appropriate licencing. Similarly, responses to a questionnaire by Filby et al. (2015) reported visitors are unsatisfied when tour operators are non-compliant with codes-of-conduct. This concern provides a conflict with visitor’s strong desire for an up-close experience, however the Bach and Burton (2017) survey on the trade-offs visitors were willing to make between dolphin welfare and access at Monkey Mia in Western Australia found that participants were willing to pay more to gain close proximity. While the Monkey Mia visitors placed greatest emphasis on the predictability and proximity to dolphins, 80% were willing to accept decreased time and
proximity if the benefits to dolphin welfare were clearly communicated. Filby et al. (2015) also found that visitors reported the most important aspects of a dolphin-swim tour to be observing dolphins in their natural environment; opportunity to see dolphins; and knowledgeable staff (Filby et al., 2015). Seeing large numbers of dolphins and being in close proximity were both ranked last in the reasons for taking a swim tour. Aragones et al. (2013) explored visitor perceptions of dolphin watching and found that 67% were satisfied with the overall quality of tours as they got to watch groups of dolphins in close proximity within their natural environment for a practical price, while approximately 91% of visitors indicated the need for a ‘Special Management Plan’ focusing on cetaceans and their habitats.

2.5 Measuring Visitor Satisfaction and Attitudes

2.5.1 Questionnaire design

Visitor surveys are important in the area of wildlife tourism as they provide management with valuable information for understanding in terms of meeting visitor expectations. The appropriate management of tourism sites is essential for the sustainable use of natural areas by visitors (Moore et al., 2009). Information collected to inform management decisions can include, who visits, what they do and how satisfied they are (Moore et al., 2009). The design of pen and paper surveys has been discussed by many authors for example Jennings (2010); Kelley, Clark, Brown and Sitzia (2003) and Rossi, Wright and Anderson (2013). Jennings (2010) and Moore et al. (2009) believe that selected questions should be strongly based around the aims of the research to ensure the collection of only relevant information. Jennings (2010) also recommends that the wording of the questions should be simple and that question wording be as short as possible, while still explaining the question by providing relevant definitions if needed. This enhances understanding by a range of participants and increases the likelihood of all questions being answered. When using multiple tick box questions, it is important to ensure all possible responses are listed, because if the option a visitor requires
in order to respond is not there, then the question may be skipped (Jennings, 2010). Additionally, there is value in allowing for the inclusion of unframed opinions such as an ‘other’ or ‘cannot report’ option, as this increases the chance of visitors answering as many questions as they can outside of the given options (Jennings, 2010). Having a mix of both tick box or scale ranked questions (closed answer) and open answer questions are important as this provides opportunity for respondents to express their opinions in more detail, which can also provide greater insight and reasons for their closed answer responses (Rowley, 2014).

Several authors have recommended that questionnaires begin with questions asking about basic visitation information to build visitor profiles, for example Burgess (2001) and Leung (2001). This is followed by more in-depth analysis questions associated with the main research aims. It is suggested that questions relating to more personal information are asked last, questions on age, gender and place of residence for example (Burgess, 2001; Leung, 2001). It is thought that having these personal questions last will ensure the majority of the questionnaire is completed as if these questions are at the beginning and participants do not want to answer, there is the possibility they will not complete the rest of the survey (Burgess, 2001; Leung, 2001).

### 2.5.2 Sampling design

Using pen and paper surveys that are completed in person on the tourism site has the advantage of allowing for clarification to be given on any questions that the visitors may be unsure about or need more detail on, which makes it more likely they will answer and that the questionnaire will be completed correctly and the response rate will be enhanced (Horneman, Beeton & Hockings, 2002; Kelley et al., 2003).

As for the sample size required to achieve a representative sample of the population being studied, Horneman et al. (2002) report that surveys of visitors to natural areas have a sample size that typically ranges from 100 to 500 participants. Surveys with less than 100 participants
cannot be used to infer information about the sample population and studies have shown that at a certain point the data set becomes representative enough to not warrant the cost of further surveying (e.g. Horneman et al., 2002). Sample size calculators support the target number and indicate that when sampling at a 95% confidence and 5% accuracy (Australian Bureau of Statistics [ABS], 2017), a minimum of around 350 surveys are required to be confident that the population of visitors to an area have been sampled when assuming a 60% minimum response rate (CheckMarket, 2017). Such sample sizes provide some level of statistical significance in relation to the visiting population (CheckMarket, 2017).

2.5.3 Convenience intercept sampling method

Convenience intercept sampling is a method of sampling in which the potential respondents are approached in a public area and asked to respond to a short questionnaire. This method of sampling is often considered to be of the least favourable sampling techniques as it is prone to biases and generalisations about the population cannot be drawn as it samples people in a specific location at a specific time (Bornstein, Jager & Putnick, 2013; Horneman et al., 2002; Jennings, 2001).

This method however, has a fast turn around and the potential for a large volume of responses making it useful in the field of tourism research (Weinreich, 1996). Researchers need to be aware however that as convenience sampling is opportunistic and voluntary the views and opinions of the sampled participants may differ from those in the target population (Horneman et al., 2002; Watters & Biernacki, 1989). This may also be a benefit as convenience sampling may provide some additional information from those populations who may not be readily sampled using other methods (Horneman et al., 2002; Watters & Biernacki, 1989). Convenience sampling is often used when it is not possible to predetermine all the people in the sample from which to generate a random sample which tends to be the case with visitors to a specific area such as tourists. Despite these nuances convenience
sampling is capable of producing samples of the population that are reasonably representative, provided the survey is conducted in appropriate locations to reach a representative sample of the target population (visitors to a specific area) and the response rates are adequate (Horneman et al., 2002; Young, 1999).

Convenience intercept sampling is considered semi-quantitative as responses are not collected from a random sample of the target population (Aref, 2011; Naidoo, Ramseook-Munhurrun & Seegoolam, 2011). However, the population numbers from closed responses can prove useful in assessing a range of responses, which is often the goal in tourism research (Aref, 2011; Naidoo et al., 2011; Young, 1999). Also, convenience intercept sampling is commonly used in tourism research, due to the nature of tourist populations and potential area constraints regarding the specific locations tourists visit. (Aref, 2011; Naidoo et al., 2011; Young, 1999). Furthermore, tourism research needs participants who have participated in the nature tourism experience (Sotiriadis, 2017).

2.5.4 Importance-Performance Analysis

Research that investigates visitor opinions and satisfaction with dolphin tourism often utilises questionnaires to obtain information from visitors (Bach & Burton, 2017; Draheim et al., 2010; Filby et al., 2015; Mayes et al., 2004; McIntosh & Wright, 2017; Sitar et al., 2017). First described by Martilla and James (1977), Importance-Performance Analysis (IPA) is the comparison of importance that visitors place on the attributes of an experience (e.g. Knowledge of staff and volunteers, Educational experience, and/or Well-maintained facilities) and their perception of the performance of the experience with respect to those attributes (Moore & Taplin, 2014; Oh, 2001; Taplin, 2012). This technique is used as a measure of visitor satisfaction and has been widely applied to tourism research, both internationally (Boley, McGehee & Hammett, 2017; Oh, 2001; Sörensson & Von Friedrichs, 2013), and specifically in Western Australia (Taplin, 2012; McGuiness, Rodger, Pearce,
Newsome & Eagles, 2017; Tonge & Moore, 2007). However, only few papers have incorporated the use of Importance-Performance Analysis (IPA) to wildlife tourism experiences specifically. The attributes or services of an experience used in IPA are typically displayed in a two-dimensional plot, with importance on the vertical axis and performance on the horizontal axis of the plot. The original IPA of Martilla and James (1977) utilises a matrix with four quadrants with different requirements for management actions (Figure 2). This highlights which areas require potential management improvement, less management focus and those attributes which are working well and should be maintained in accordance with the relative satisfaction of visitors (Taplin, 2012). Accordingly, IPA provides managers with a statistically simple indication of what areas of the operation require more attention, less attention, and those that should be maintained (Moore & Taplin, 2014; Oh, 2001; Taplin, 2012; Tonge, Moore & Taplin, 2011).

Figure 2. Importance-Performance plot (Taplin, 2012).
Two studies on whale watching and whale shark tourism have used this technique and were able to identify key areas where management needed to be improved. Ziegler, Dearden and Rollins (2012) used IPA to identify that crowding on a boat tour was a major issue, while Bentz, Lopes, Calado and Dearden (2016) determined management needed to focus on providing more educational information, fixing misleading advertising, and reducing crowding and costs. That study ultimately led to the uncovering of a larger issue of uncontrolled growth of the whale shark tourism industry, which also needed addressing (Bentz et al., 2016). Filby et al. (2015) used a technique similar to IPA by administering questionnaires before and after dolphin swim experiences in order to compare expectations with the actual experience, which generated management suggestions based on the expectations and experience of tourists. Ranking suggestions from visitors allows management to understand what visitors find most important, which in some cases is not what management expected. For example, close proximity to dolphins was amongst the least important aspects in the study of Filby et al. (2015) and even without close proximity visitors were satisfied with their experience. This can allow for higher compliance with codes of conduct as a result of operators having a better understanding of visitor satisfaction and what is actually important to optimise the wildlife tourism experience. The IPA methodology provides insightful information to managers on ways to gauge tourist satisfaction and uncovers areas which may be of concern in a simple visual way that is easy to understand (Taplin, 2012). This is important for monitoring and research targeted to reducing the impacts of wildlife tourism through best practice management while keeping visitor satisfaction high.

Both Taplin (2012) and Moore and Taplin (2014) discuss an enhanced analysis added to the original IPA technique called Gap Analysis, which uses the mean performance minus the mean importance. Gap Analysis enhances the IPA quadrant analysis, as it is a one-dimensional measurement that is simple to report and facilitates statistical analysis, such as
one sample t-tests for non-zero gaps (Taplin, 2012). Positive gaps in which the performance exceeds importance are considered satisfactory while negative gaps in which the performance is lower than the importance indicate management attention may be required (Taplin, 2012; Moore & Taplin, 2014). This provides a form of benchmarking where performance is measured against importance and appropriately implies higher performance is more desirable for attributes with higher importance (Taplin, 2012).

Despite the relative simplicity of the general approach to IPA, the technique has been known to encounter some issues where the application and underlying assumptions are not considered (Azzopardi & Nash, 2013; Moore & Taplin 2014; Oh, 2001). One of the main controversies with IPA includes the question of where to place the cross hairs for the IPA Matrix. Commonly placed at either at the mid (neutral) point of the scale or at the grand means for importance and performance, which results in a different allocation of the attributes into the four quadrants (Oh, 2001; Ryan & Cessford, 2003).

A second key assumption for the correct application of IPA is that the scales for performance and importance are the same, which provides opportunity for a linear relationship to exist between performance and importance (Taplin, 2012). A statistically important assumption associated with the Gap Analysis IPA is that the differences between importance and performance for individual visitors need to be normally distributed to prevent any data distortion in results, and this should be checked before proceeding with the analysis (Lai & Hitchcock, 2015).

2.6 Dolphin Feeding for Tourism

Dolphins are highly regarded by humans and are one of the most popular species for wildlife tourism experiences (Curtin, 2005; Orams, 1995 and 1997; Smith, Newsome, Lee, & Stoeckl, 2006). Interest in wild dolphins has given rise to many different types of experiences being
offered including: swimming with dolphins’, boat tours’ and general up-close beach-based viewing experiences (Orams, 1995; Wiener, 2013; Peters et al., 2013).

To greatly increase the chance of a sighting of marine wildlife in their natural environment provisioning is often used as a tool by tourism managers to encourage proximity and predictability (Newsome, Dowling, & Moore, 2005; Patroni et al., 2018b; Orams, 2002). The acceptability of feeding of wildlife for tourism is however a contentious practice with many differing opinions as to what constitutes best practice management (Lewis & Newsome, 2003; Patroni et al., 2018b; Semeniuk, Haider, Beardmore & Rothley 2009). The use of provisioning aims to meet the desires and expectations of visitors for an up-close wildlife interaction. Examples of such feeding are the experiences offered at Bunbury and Monkey Mia in Western Australia, and Tangalooma and Tin Can Bay in Queensland, Australia, and also at Negro River, Brazil (Table 1). Feeding practices at each of these locations have different management strategies and regulations with differing levels of operator control and visitor participation (Bach & Burton, 2017; Orams et al., 1996; Smith et al., 2008).

Feeding of dolphins for tourism is controversial and there is currently no consensus on how to sustainably manage it, with different management strategies and regulations (Table 1) occurring at different sites (Newsome & Rodger, 2008; Newsome & Rodger, 2013; Orams, 1997; Patroni et al., 2018a). While these experiences provide visitors with the up-close interaction they desire, the negative impacts to dolphins are numerous (see Section 2.7.1) and as dolphins are social animals, many aspects of their natural behaviour can be interrupted (Orams, 2002; Scarpaci et al., 2010; Steckenreuter et al., 2012).

Tourists who feed dolphins as part of a tourist experience that lacks an educational component on the potential impacts and illegality of feeding wildlife without a licence may try to seek out opportunistic experiences on their own. An understanding of when feeding is and is not acceptable can be complicated by differing tourism scenarios and policies.
(Newsome & Rodger, 2013). This can lead to unregulated feeding in which visitors seek the up-close experience with wild dolphins outside of managed tourism experiences. This can occur when fishing vessels or recreational boats come into contact with dolphins. Such unmanaged/unregulated encounters may then lead to negative impacts (Constantine, 1999; Donaldson et al., 2012; Markwell, 2015; Newsome et al., 2005). Unregulated feeding has been known to result in negative impacts in addition to those caused from planned tourism interactions. For example, Donaldson et al. (2012) discusses the occurrence of illegal dolphin feeding by recreational fishers in southwest Western Australia. Donaldson et al. (2010) and Hazelkorn, Schulte and Cox. (2016) report that such illegal feeding practices can cause dolphins to be attracted to vessels to beg for food, which creates higher instances of dolphins being struck by boats and entangled in fishing equipment.

2.7 Dolphin Welfare

Wildlife tourism can produce social, economic, and conservation benefits; however, many studies report on negative impacts on health and behaviours that arise from feeding wildlife and wildlife tourism in general (Newsome et al., 2005). When compared to terrestrial wildlife tourism, marine wildlife is exposed to additional impacts which can include: collisions with boats; water quality decline; and species being caught as bycatch or entangled in equipment as habituation attracts targeted wildlife to the presence of humans and their vessels (Murray, Becker, Hall & Hernandez, 2016; Orams, 2002; Patroni et al., 2018b). Furthermore, the research into marine wildlife tourism tends to be focused on the ecological impacts of tourism on charismatic and iconic species such as whales and dolphins, which are of great interest to both tourists and tourism industry stakeholders (Gallagher & Hammerschlag, 2011; Smith et al., 2008; Vianna, Meekan, Pannell, Marsh & Meeuwig, 2012).
Table 1. Examples of different provisioning styles employed in dolphin tourism.

<table>
<thead>
<tr>
<th>Site</th>
<th>Approach to Provisioning</th>
<th>Management Style</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dolphin Discovery Centre, Bunbury, Western Australia</strong></td>
<td>Maximum of 350g (two fish) per day which is max. of 5% of daily requirement Dolphins appear least conditioned with variable visitation habits. Nine (9) female dolphins fed, but not when accompanied by a dependant calf Management discretely feed dolphins Educational component</td>
<td>Controlled Operator Only Feeding</td>
<td>(Dolphin Discovery Centre [DDC], 2015a)</td>
</tr>
<tr>
<td><strong>Monkey Mia Beach, Western Australia</strong></td>
<td>Up to one third (33%) of daily requirement (total weight not specified) Dolphins conditioned, reported to visit every day Five (5) females fed Fed by management and 3-4 selected visitors Educational component Incidental touching by visitors</td>
<td>Controlled Operator and Selected Visitor Feeding</td>
<td>(Smith et al., 2008; Shark Bay, 2018).</td>
</tr>
<tr>
<td><strong>Tangalooma Island Resort, Queensland, Australia</strong></td>
<td>Fed 10-20% of daily requirement (total weight not specified) Dolphins conditioned Up to 11 dolphins fed each night Fed by management and visitors (those on accommodation and day cruise packages can feed dolphins once per person per stay) Educational component</td>
<td>Controlled Operator and Selected Visitor Feeding</td>
<td>(Mayes et al., 2004; Tangalooma Island Resort, 2018)</td>
</tr>
<tr>
<td><strong>Barnacles Dolphin Centre, Tin Can Bay, Queensland, Australia</strong></td>
<td>Up to 3kg per dolphin per day Up to 9 dolphins Dolphins highly conditioned Fed by management and any visitors who purchase fish Limited educational component</td>
<td>Limited Control Visitor Feeding</td>
<td>(Mayes et al., 2004; Barnacles Dolphin Centre, 2008)</td>
</tr>
<tr>
<td><strong>Novo Airão, Negro River, Brazil</strong></td>
<td>Unlimited feeding (no quantity or quality control) At least 13 dolphins (at least 10 males) Dolphins highly conditioned Visitors feed (no regulations, management, or trained staff) No educational component Touching allowed</td>
<td>Not Controlled</td>
<td>(Alves, Andriolo, Orams &amp; Azevedo, 2012)</td>
</tr>
</tbody>
</table>
2.7.1 Ecological impacts of wild dolphin feeding

As previously mentioned, the provision of food as rewards for wild dolphins to encourage them to come into close contact with tourists is commonly used by tour operators to enhance the visitor experience and satisfaction, however feeding can have implications for the welfare and natural behaviours of the dolphins (Orams, 2002; Senigaglia et al., 2016). Dolphins are intelligent animals living and existing in social groups and tourism activities can disturb these social behaviours, group relationships, and communications (Orams, 1997; Newsome et al., 2013). Several studies report on these impacts, Foroughirad and Mann (2013) for example report that female dolphins provisioned for tourism have reduced levels of parental care to their calves and ultimately a higher calf mortality rate. Those authors also reported that even with reduced levels of provisioning, calf behavioural development was impacted. In contrast, a study on calf survival rates at a provisioning site in Tangalooma found that calf survival was 100%, even for orphaned calves (Neil & Holmes, 2008). Neil and Holmes, (2008) hypothesised this outcome to be the product of the isolated location and high-water quality in combination with the controlled management routine that limits duration of the interactions and provides quality fish as a food source (Neil & Holmes, 2008). Many authors describe the impacts of feeding on the social behaviour of wild dolphins, which are ecologically important as dolphins feed and live in social groups, and it has been reported that some provisioned dolphins have even become solitary animals (Dans, Crespo, Pedraza, Degrati & Garaffo, 2008; Orams, 1997; Scarpaci et al., 2010). Dolphin feeding for tourism also effects dolphins physically, with feeding leading to dolphins being conditioned to humans and therefore having a higher risk of being struck by passing vessels or getting tangled in or injured by commercial and/or recreational fishing equipment (Donaldson et al., 2010; Hazelkorn et al., 2016).
2.7.2 Impacts of boat traffic

The time spent resting, feeding, and socialising are important components for reproductive success in dolphins (Peters et al., 2013). One of the most commonly studied impacts of human-dolphin interactions concerns how boat traffic affects the time wild dolphins spend foraging (Dans et al., 2008; Meissner et al., 2015; Scarpaci et al., 2010; Weiner, 2015), and the complexity of this impact is illustrated by the studies of Steckenreuter et al. (2012) and Trone, Kuczaj and Solangi (2005). Steckenreuter et al. (2012) report a reduced activity budget in the presence of boats, as the time dolphins spent feeding decreased by 66.5%, time spent socialising decreased by 44.2%, and the dolphins also showed reduced resting time, which was influenced by the number of boats present. In contrast, Trone et al. (2005) found no short or long-term changes in dolphin behaviour. The only behaviour changes they reported was the amount of time spend playing, and that increased with human interaction. In contrast, it has been reported that dolphins change their typical range or group cohesiveness in order to avoid vessel operation areas (Bejder et al., 2006; Peters et al., 2013). The noise of vessels has also been observed to interrupt and override the communication between dolphins and biologically important sounds (Luis, Couchinho & Santos, 2014; Pine, Jeffs, Wang & Radford, 2016; Sims, Hung & Wuersig, 2012). But again, this is countered by the study of Pine, Wang and Wang (2016) who reported that the feeding activity by dolphins in the presence of vessel noise was unaffected.

2.7.3 Risky interactions

As for the interactions between humans and any form of wildlife, the interactions between humans and dolphins have in many cases been described as risky. Dolphins are wild animals and can be unpredictable and dangerous, despite the common perception of dolphins being friendly and playful animals (Cong, Bihu, Zhang & Newsome, 2017). Despite tourists perceiving physical risk from dolphin interactions to be low, several cases describe dolphins being both accidentally and deliberately harmed and killed by humans, making the
monitoring and enforcement of unregulated interactions all the more important (Orams, 1997). However, this is not the only circumstance of risky interactions on record, although dolphins are viewed as gentle, friendly creatures’ people have been injured and killed by wild dolphins and for this, and other reasons regarding dolphin welfare, feeding has been banned in the United States, New Zealand and the United Kingdom (Orams, 1997, Finn, Donaldson & Calver, 2008). Orams et al. (1996) refers to circumstances in which dolphins have become ‘pushy’ and presenting forceful contact with humans in Tangalooma during feeding, also Orams (1997) describes cases of people being dragged out to sea and divers being held under water. Smith et al. (2008) suggest this aggression at Tangalooma increases with longer wait time before feeding the dolphins as competition between the dolphins, and especially males, increases. Excessive touching by humans is also thought to aggravate this behaviour. Finn et al. (2008) and Orams (1997) indicate that provisioned dolphins become accustomed to humans and can be the initiators of contact and harass people expecting food or wanting to engage in playful behaviours.

2.8 Socioeconomic Benefits

In addition to the satisfaction derived from visitors being able to interact with wild dolphins in their natural environment, tour operators and local communities benefit greatly from dolphin tourism, as it provides income to the community, job opportunities and increases tourist visitation through personal and electronic (online) word of mouth (Gier et al., 2017; Schleimer et al., 2015; Wilson & Tisdell, 2003). These benefits are regarded as important for small towns or developing communities, as such locations tend to rely heavily on income from tourism to support local business (Mustika, Birtles, Welters & Marsh, 2012). For example, dolphin watching in Indonesia brings in around 37,000 tourists a year and contributes a minimum of 46% of the total direct expenditure for accommodation, transport and food and beverage at dolphin tourism destinations in Indonesia (Mustika et al., 2012). The Scottish cetacean watching industry in the year 2000, produced 59 full time and one-
part time job, and in remote coastal areas of Scotland up to 12% of the local income came from the cetacean tourism industry (Parsons, Warburton, Woods-Ballard, Hughes & Johnston, 2003). Parsons et al. (2003) also highlighted that non-consumptive cetacean tourism in rural, coastal communities of Scotland had a value three times greater than that of the commercial whaling in similar communities in Norway. This clearly demonstrates that conservation has an economic value.

2.9 Education and Management

Education and interpretation have long been discussed as important aspects of marine wildlife tourism in two main contexts. Firstly, for the encouragement of environmental awareness, and positive conservation behaviours, and for spreading information and awareness to others from visitors who receive such educational experiences. Secondly, for the satisfaction of visitors, a majority of who indicate a desire to be educated as part of the experience (Orams, 1997; Sitar et al., 2017). For example, Ballantyne, Packer and Hughes (2009) report tourist support for conservation messages in wildlife tourism with over 90% of surveyed tourists agreeing or strongly agreeing they wanted to receive information about marine wildlife, conservation messages and what visitors can do to protect marine wildlife. In the same study, only 26% of tourists believed that operators should let people view marine life without providing basic facts. Further, Lück (2015) examined not only the importance of this education component, but also the specific topics tourists were most interested to receive more information about. He reported that while tourists were highly satisfied with their experience overall, many of the tourist’s desire to learn was not sufficiently met. These results show that the visitors have a desire for more information about wild dolphins and the wider marine environment.

Education also promotes pro-environmental behaviour in those visitors that have been exposed to educational content and interpretation (Barney et al., 2005; Bach & Burton,
2017). Aragones et al. (2013) demonstrated how visitor and stakeholder opinions and discussions can be used in a participatory management process, which resulted in the formation of an association for dolphin and whale operators and the eventual production of cetacean watching protocols in the Philippines. Combining this participatory process with monitoring, visitor information and stakeholder involvement assisted greatly in the management of cetacean tourism in the area.

Filby et al. (2015) suggests that education of visitors could even assist in situations where tour operators may break codes of conduct in order to increase perceived visitor satisfaction by facilitating close proximity to marine wildlife. As most tourists are happy to comply with regulations and do not want to impact dolphins negatively, Filby et al. (2015) proposed that with appropriate education visitors can even direct operators towards increased compliance. Visitors can thus be encouraged to act in accordance with management practices. This may also facilitate tour operator compliance with established codes of conduct. This in turn would take the pressure off operators to deliver ‘up-close’ experiences as visitors themselves would be more understanding of the rules regarding interactions with wildlife.

Several studies report on the ability of visitors to influence how wildlife tourism operations are managed (Ballantyne et al., 2009; Barney et al., 2005; Bach & Burton, 2017). Weiner (2015) suggests that education can assist management by informing visitors of the harm their actions may cause and create a change in the way they behave. Such awareness and potential changes in behaviour also has the ability to reduce instances of unregulated interactions as visitors have indicated they do not want to endanger the welfare of the dolphins (Ardoin, Wheaton, Bowers, Hunt & Durham, 2015; Barney et al., 2005; Smith et al., 2008).

Curtin (2006) discussed touch as being part of the experience as to how humans connect, although some participants disagreed with touching wild dolphins as part of an experience
as they respected the dolphins were wild animals. However, these attitudes come down to the education of the visitors as well as their expectations of the experience (Barney et al., 2005; Lai & Vinh, 2013; Bach & Burton, 2017).

Dubois and Fraser (2013) posit that all cases of wildlife feeding are unique and the magnitude and type of negative impacts differ according to different species and site conditions. They devised a framework for the circumstances under which wildlife feeding is acceptable for certain species based on the capacity for the feeding to be controlled and managed and whether the operation has conservation benefits to the target species. Adopting a framework for cases where feeding may be acceptable could assist in preventing damage at wildlife tourism destinations and to species that are especially sensitive to the impacts of feeding. Furthermore, with some people having the desire to interact closely with dolphins, including touching and swimming, it may also be valuable to employ a generic wildlife interaction framework. Such a framework was proposed by Rodger, Smith, Newsome and Moore (2011). That framework recommends gathering information on ecological characteristics of the target species and environmental conditions, determining the current knowledge of impacts and whether any monitoring is in place. The framework also requires the gathering of knowledge on operational and social aspects, such as details on the nature and frequency of interactions taking place, the educational information delivered, visitor expectations, and compliance with licence conditions and codes of conduct. Such an approach clarifies the circumstances for each individual wildlife tourism operation/experience, including both social and ecological aspects, in order to create an experience that ensures wildlife welfare alongside visitor satisfaction.

The long-term sustainability of wildlife tourism is dependent on integrating visitor desires and demands with resource management, therefore it is important to understand tourist
motivations for visiting and their satisfaction and opinions regarding dolphin interaction experiences (Bach & Burton, 2017; Mlozi et al., 2013; Sotiriadis, 2017; Weiner, 2015).

2.10 Conclusions and Research Focus

Human attitudes towards marine mammals ultimately reflects the way dolphin tourism is developed and managed, therefore gaining an understanding how people view and think about dolphin tourism is important. The dolphin tourism industry provides benefits to local economies, tour operators, and the tourists who enjoy these experiences. The potential impacts that can arise from dolphin tourism therefore need to be regulated and minimised by the actions of government authorities and tour operators in order to ensure the welfare of the dolphins and the satisfaction and conservation education that visitors gain from such experiences. Further research is needed as human-wildlife interactions are complex and every situation and species is affected differently. The application of Importance-Performance Analysis in the wildlife tourism space is limited, but this tool provides much needed insight into what is important to the visitors and how satisfied they are with aspects of their wildlife tourism experience. Such information provides management with clear focus for those attributes that increase satisfaction without impacting on the dolphins. Visitors have the ability to modify the way wildlife tourism is managed and understanding what is important to their experience as a start to the optimised management of these interactions, for tourist as well as catering for the welfare of the target species. Varying management styles and differing laws and protection levels between and within countries highlights the complexity of managing human-wildlife interactions. A combined ecological and social research approach is the way forward in tackling this complexity. Furthermore, social data concerned with understanding visitor awareness, knowledge, expectations and satisfaction have a vital role to play in best practice management.
Chapter 3: Methods

3.1 Study Site

The coastal city of Bunbury is a major regional center and tourist destination located approximately 180 kilometers south of the state capital of Perth, Western Australia (Figure 3). It is the second largest urban center in Western Australia, having a population of approximately 34,000 people (ABS, 2017; City of Bunbury (COB), 2015; Fenech, 2011). The southwest of Western Australia experiences a Mediterranean climate comprising hot semiarid summers and cooler wetter winters (Australian Government Bureau of Meteorology [BOM], 2016; Simpson, 2011; Simpson & Newsome, 2017), which makes coastal recreation popular during the summer period. Summer visitors to Bunbury can experience many activities including: sightseeing, swimming, recreational fishing and boating, interacting with the resident wild dolphins, and other nature-based tourism experiences (Fenech, 2011; COB, 2017a). Koombana Beach and the Dolphin Discovery Centre (DDC) are on the southeastern shore of Koombana Bay (Figure 3) a short walk from the shopping, entertainment and business district of the city Centre and neighboring Koombana Bay holiday accommodation (TripAdvisor, 2017; COB, 2017b).

3.1.1 Dolphin Discovery Centre

The DDC is a not for profit organization noted as an iconic tourist attraction located on Koombana Beach in Bunbury, Western Australia (COB, 2017b). The DDC provides the opportunity for visitors to engage in a number of wildlife experiences focused on the resident wild Indo-pacific Bottlenose Dolphin (Tursiops aduncus) population and also features aquariums of small marine fauna and digital displays (DDC, 2015b). The DDC offers a beach-based wild dolphin interaction experience, dolphin boat-based eco cruises, and swim-with dolphin tours (DDC, 2015b).
The main focus for this study is the beach-based wild dolphin interaction (DDC, 2015a), which can be experienced by both paying visitors to the DDC and any other visitor to Koombana Beach. This interaction allows for visitors to engage in an up-close viewing of the wild Koombana Bay dolphins while standing knee deep in water at the edge of the beach (Figure 4). Selected dolphins may receive a strictly management-controlled minimalistic food reward during the interaction experience. The management feeding style at the DDC aims not to condition the dolphins that visit Koombana Beach and their presence is therefore not predictable. The experience at the DDC differs from other Australian wild dolphin experiences, such as those at Monkey Mia, Tangalooma and Tin Can Bay as the presence of the Koombana Beach dolphins is not predictable and some days no dolphins come in at all (Bach & Burton, 2017; Orams & Hill, 1998). The experience at the DDC also differs from other operations in terms of feeding style (Table 1). Operations in Monkey Mia, Tangalooma and Tin Can Bay allow visitors to be involved in the feeding process and hand feed the dolphins. Viewing wild dolphin at the DDC is not a feeding experience for the visitors, but a viewing experience. This is in contrast to other operations (Table 1) where food is obviously provided.
to dolphins by operators and selected visitors (Bach & Burton, 2017). In contrast the DDC conduct the feeding discretely and the dolphins are fed only by the staff and trained DDC volunteers standing either side of the visitors in the interaction line (Figure 5). Most visitors would be unaware that the dolphins are being rewarded (Figure 5). The reward feeding at the DDC is highly regulated with only 350g of local species of fish provided per day, which is a small amount as compared with the 8-14 kg of food that adult dolphins require each day (DDC, 2015a). Only nine select female dolphins are hand fed a food reward by a DDC trained volunteer standing a few meters away from the line of visitors, and no feeding occurs if a calf under six months off age is present. The visitor behavior during the interactions is closely monitored by volunteers interspersed throughout the interaction line with no touching or harassing of dolphins permitted. While an interaction is in progress, the DDC also performs an important role in educating visitors about dolphin biology, tourist etiquette and conservation. Further, DDC staff and volunteers record data about the environmental conditions and the dolphins engaged in the interaction.

Figure 4. The Dolphin Discovery Centre beach-based dolphin interaction.
3.2 Research Instrument (Questionnaire)

This study is an extension of a previous pilot study conducted by Murdoch Honours student Alicia Day in the Austral summer of 2014-2015 (Patroni et al., 2018a; Simpson, Newsome & Day, 2016). In addition to the survey of visitor attitudes to the feeding of the Koombana Beach dolphins previously investigated, this study used Importance-Performance Analysis (IPA) to investigate satisfaction with the beach-based dolphin experience.

The questionnaire (Appendix A) had 16 main questions focused on the aims of the study. Other than two open ended questions, the questionnaire comprised questions asking respondents to either tick a box or circle the response that aligns with their agreement with the statements presented, to provide categorical data. This design makes answering the questions simple and quick, which is recommended to prevent survey fatigue (Rowley, 2014).

In line with recommended best practice (Leung, 2001; Burgess, 2001), the questionnaire begins with questions on visitation information to build a visitor profile. Those questions are followed by more in-depth questions that analyse satisfaction, attitudes and knowledge of...
visitors. Questions on the more personal information such as age, gender, and place of residence are asked last as Leung (2001) and Burgess (2001) recommend.

3.2.1 Importance-Performance Analysis

Importance-Performance Analysis (IPA) was used to gauge DDC visitor satisfaction (Taplin, 2012; Moore & Taplin, 2014). The question style is based on the recommendations of Taplin (2012) and uses questions that are simple, short, sharp descriptions of the different aspects relating to the dolphin experience and general aspects of the DDC. The wording of the importance and performance questions are also based on Taplin (2012) using the questions “How important are the following attributes?” and “How good did you find the following attributes?” The IPA questions used a 5-point Likert scale to allow visitors to select their level of agreement with specific attributes importance and performance ranging from strongly disagree to strongly agree, with a neutral midpoint of neither agree nor disagree.

An original scale-centred IPA grid with the axis set at the neutral mid-point of the question scale (Martilla & James, 1977) is provided to understand the overall visitor satisfaction with the DDC experience. Additionally, as recommended in Taplin (2012) and Moore and in Taplin (2014), an enhanced IPA with the cross-hairs placed at the grand means of importance and performance is also presented. This second IPA provides greater insight into which attributes are performing below average compared to other attributes for a more in-depth consideration of potential areas for further improvement of the DDC experience (Section 2.4.4). This enhanced analysis approach provides more relevant information on the priority of the attributes for management action. An enhanced Gap Analysis IPA is also presented to understand how these attributes are performing in relation to the expectations of DDC visitors (above or below expectation). This analysis is applied to all visitors to the DDC and also to compare the expectations and satisfaction of the visitors who were planning to revisit the DDC that day and those who were not planning to revisit the DDC.
3.3 Visitor Survey

3.3.1 Sampling design

Convenience intercept sampling was used to survey visitors to Koombana Beach with the potential respondents approached in a public area and asked to respond to a quick questionnaire (Weinreich, 1996). The convenience intercept approach was chosen as it is not possible to generate a random sample of respondents by predetermining who may be visiting Koombana Beach at the time of the survey (Section 2.4.3). Convenience sampling can produce reasonably representative samples of the population, if conducted in appropriate locations to reach the target population (Horneman et al., 2002). There were two cohorts of visitors for this survey, for the visitor satisfaction component it is critical that those surveyed are known to have visited the DDC in order to comment on the importance and performance of the experience attributes. However, to survey the attitudes and awareness of Koombana beach visitors regarding the potential negative impacts of unregulated feeding on dolphin welfare, all visitors to Koombana Beach were surveyed to ensure a broad reflection of opinions (Sotiriadis, 2017).

The targeted sample size of returned questionnaires was set at 400 and this was calculated using visitation rates to Bunbury to sample at a 95% confidence with 5% accuracy (ABS, 2017). EVOLVE Strategic Solutions, (2015) indicated there would be a population of approximately 2500 visitors to Koombana Beach during the peak tourist season in January. To satisfy the above criteria, a minimum of 350 questionnaires were required to be confident that the population of visitors to Koombana Beach had been sampled, assuming a 60% minimum response rate (CheckMarket, 2017). Such a sample size provides a reliable level of statistical significance for the population visiting Koombana Beach and the DDC (CheckMarket, 2017). The final number of completed questionnaires was 569.
Ethics approvals were obtained from the Murdoch University ethics committees to conduct the visitor survey (2017/234) at Koombana Beach and to record human-dolphin interactions observed from the beach that may have negatively impacted dolphin welfare (O2995/17).

3.3.2 Convenience intercept survey

This survey was completed over one sampling period of 3 weeks from the 3rd to the 24th of January 2018, which was chosen for being the peak tourist visitation season for Bunbury. This period falls in the Austral summer holidays, where visitation to the beach due to the warm weather is high, and ensures a sufficiently large sample of visitors are present and representative of visitation to Koombana Beach (Horneman et al., 2002; Patroni et al., 2018a Simpson et al., 2016). The survey period included both weekdays and weekends in order to cover any difference in experiences (Horneman et al., 2002). The questionnaire was pen and paper based and conducted in person, with participants recruited from along Koombana Beach at the Western and Eastern (DDC) ends of the beach. Despite survey periods being dictated by wind strength and/or rain, the survey was balanced (Table 2) with five morning and five afternoon surveying sessions at either end of the beach giving ten survey days in total. Chi-squared analysis of the averaged values reported in (Appendix B, Table B1) provided no evidence that the time spent surveying or the rate of questionnaire return varied for either location or time.

Table 2. Balance and effort for Koombana Beach visitor satisfaction survey given as values with 95 % confidence intervals for the survey effort and questionnaires collected at each survey location.

<table>
<thead>
<tr>
<th>Survey Times</th>
<th>Metric</th>
<th>Survey Location</th>
<th>Koombana Beach West</th>
<th>Koombana Beach East</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning (AM)</td>
<td>Survey Sessions</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Hours/Survey Session</td>
<td>1.9 ± 0.8</td>
<td>3.7 ± 0.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Questionnaires/Session</td>
<td>26 ± 10</td>
<td>28 ± 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Questionnaires/Hour</td>
<td>14.6 ± 2.8</td>
<td>7.8 ± 2.3</td>
<td></td>
</tr>
<tr>
<td>Afternoon (PM)</td>
<td>Survey Sessions</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Hours/Survey Session</td>
<td>2.4 ± 0.7</td>
<td>2.4 ± 0.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Questionnaires/Session</td>
<td>39 ± 6</td>
<td>22 ± 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avg. Questionnaires/Hour</td>
<td>16.3 ± 2.3</td>
<td>10.6 ± 4.2</td>
<td></td>
</tr>
</tbody>
</table>
Two Murdoch University Researchers (a female and a male) wore Murdoch branded attire and a Murdoch branded marquee and banners was set up during the survey to attract the visitors of Koombana Beach (Figure 6). The Researchers also opportunistically intercepted visitors and asked them to participate in the survey. The approach to all visitors was standardised. Within groups of people multiple people were invited to fill out the questionnaire independently to ensure a representable sample of the apparent gender balance of visitors to the beach and to maximise the range of opinions obtained. For reasons of safety, solo adults who were clearly supervising children were not approached to complete the questionnaire.

Figure 6. Koombana Beach, Bunbury visitor survey site set up January 2018.

A pilot survey revealed that only about 50% of visitors to Koombana Beach, regardless of their place of residence, had visited the DDC (Patroni et al., 2018a). This confirms that a representative sample of visitors who have both visited and not visited the DDC could be sampled and therefore no bias would be expected between the number of visitors to the DDC and those who visit Koombana Beach for other purposes. For this study, it was important to ensure a mix of visitors who had visited and not visited the DDC were surveyed.
in order to address any difference in attitudes or awareness between those two groups and
a broad range of answers encompassing the opinions of all visitors to Koombana Beach was
collected. The analysis of Simpson et al. (2016) and Patroni et al. (2018a) also suggested there
was no requirement to stratify participants based on gender or place of residence.

3.4 Data Transcription and Analysis

3.4.1 Data transcription

Anonymous data from the completed questionnaires was collected and organised in an Excel
spreadsheet (2016) for coding of responses and analysis. Demographic data was arranged
into frequency tables with percentages and confidence intervals to visualise the visitor
profile to Koombana Beach (Appendix C and D). Frequency tables were also made for the
Yes-No and tick box questions to explore possible patterns in visitor responses. The
demographic questions were analysed for all visitors and then separated by people who had
visited the DDC previously, those who had not visited the DDC, and by the people who
planned to visit the DDC on their current visit to Koombana Beach. The convenience intercept
survey method may be prone to bias in relation to group, gender, or non-response bias. In
order to check for these forms of bias, visual assessment of gender among the beach
population was conducted to assess the rate of questionnaire respondents with the ratio of
visitors on the beach at the time of surveying.

3.4.2 Analysis of demographic and Likert attitudinal data

The questions were primarily analysed using contingency table analyses for frequency of
responses. Chi-squared analysis with 95% confidence level (significance of \( \alpha = 0.05 \)) were
also conducted to identify possible statistical relationships between visitor response and the
respondents’ gender, place of residence, and whether they visited the DDC (Berenson, Levine
& Krehbiel, 2006; McDonald, 2014). As with most Likert surveys, the categorical data was
skewed in distribution and potentially ordinal, which made the non-parametric chi-squared
test appropriate to analyse the data and differences in the responses of visitors (Berenson et al., 2006). Conover (1999) suggests that the expected values for the chi squared test can be as small as 0.5 if most of the values are over 1, without endangering the test validity. The expected values were checked while conducting the tests, responses were pooled and then analysed. As appropriate quantitative data is reported as counts or averages and percentages (proportions), which were reported with the 95% confidence intervals. Only statistically significant outcomes and relationships identified by the data analysis were reported in the text of this thesis.

3.4.3 Reporting of demographic profile of visitors

The demographic data collected as part of the visitor survey had minimal application for the research questions of this study. That data was however of importance to the DDC and City of Bunbury. Reporting demographic data follows the historical conventions that prevail with respect to questionnaire-based ecotourism research. Additionally, while this data does not directly contribute to the research questions, understanding the profiles of the four visitor cohorts (i.e. All Koombana Beach Visitors; Previously Visited DDC; Never Visited DDC; and Planning to Visit DDC Today) strengthens the satisfaction and attitudinal analyses presented below. For these reasons, a summary of the demographic profile of visitors is provided in Appendix C; the proportions and 95% confidence intervals for the categorical classifications are provided in Appendix D; and the associated chi-squared analyses of independence are presented in Appendix E.

3.4.4 Importance-Performance Analysis

The IPA questions were first assessed for their compliance with the assumptions of the technique using a Pearson correlation analysis to determine that responses for the attributes show a linear relationship between their importance and performance and that the gaps between the importance and performance (Performance - Importance) are normally
distributed (Lai & Hitchcock, 2015; Oh, 2001). All the attributes of the DDC (Table 6) showed this linear relationship. The mean values of importance and performance for each attribute were calculated and plotted to produce the importance-performance matrix (Martilla and James, 1977) and a Gap Analysis was conducted as described in Taplin (2012). Approximation of the residuals of the Gap Analysis to a normal distribution and linearity of responses for each attribute was checked before IPAs were plotted, the descriptive statistics function in Excel was used to ensure that the mean and skew of the gaps was between -1 and +1 and that the Kurtosis was between -3 and +3 (Lai & Hitchcock, 2015; Oh, 2001). A 45-degree line indicating the equality of performance and importance (i.e. the Gap is zero) was placed on the matrix for the Gap Analysis. A one sample t-test was then used to test whether the gaps were significantly greater than zero.

3.4.5 Comment analysis

The two open ended questions regarding what visitors most enjoyed and their suggested improvements for the beach-based dolphin interaction were used as examples to support and explain responses to the closed answer questions. Those comments were especially helpful in understanding the differences in satisfaction levels of the IPA attributes. Examples of comments when asked to “please provide a reason for your answer” related to the closed Question 12 “Do you believe people should be allowed to feed wild dolphins?” were extracted as examples of the types of reasons for different visitor responses to the question to explain in more detail the opinions of visitors on wild dolphin feeding.
Chapter 4: Results

The first section of this chapter reports the results derived from the responses to the questionnaire for the Koombana Beach visitor satisfaction survey. The first section of these results reports the visitation, intention to revisit, and recommendation intentions as indicators of satisfaction among DDC visitors (n= 342). This section also presents Importance-Performance Analyses (IPA) that explore overall visitor satisfaction with the DDC (Original Scale-centred IPA), and two enhanced IPAs (Data-Centred IPA and Gap Analysis IPA) that suggest possible management actions. Finally, a Gap Analysis IPA comparison between previous DDC visitors who plan to revisit that day and those who do not plan to revisit the DDC on the day of they were surveyed are presented. The second section of this chapter explores the knowledge of Koombana Beach visitors (n= 569) regarding potential negative impacts of unregulated feeding of wild dolphins and recreational boating on dolphin welfare. The final section of this chapter explores the attitudes of visitors to feeding wild dolphins and the motivation of visitors to Koombana Beach to feed wild dolphins as a result of the DDC beach-based dolphin interaction. As previously mentioned the demographic data for the visitors to Koombana Beach is reported in the appendices (Appendix C and Appendix D).

4.1 Dolphin Discovery Centre Visitor Satisfaction

Visitor satisfaction is an important aspect of wildlife tourism and is a key indicator of performance in tourist destinations (Ziegler et al., 2012). Understanding visitor satisfaction provides insight into the desires and expectations of visitors and allows tour operators to provide satisfying experiences, increasing the likelihood that visitors would return or recommended to others. This also brings with it increased economic support for such operations and potentially gives tourism operations a competitive advantage over other operations (Mlozi, et al., 2013; Pereda, 2002; Sotiriadis, 2017; Ziegler et al., 2012).
4.1.1 Revisitation and recommendation

Revisitation and personal (word-of-mouth WOM) or online (eWOM) recommendations of wildlife tourism experiences are widely reported as indicators for levels of visitor satisfaction (Chen & Segota, 2015; Lai & Vinh, 2013; Madden et al., 2016). Revisitation rates (Table 3), intention to visit (Table 4), and the likelihood of recommending the DDC to family and friends (Table 5) provide insights regarding visitor satisfaction with the beach-based dolphin experience (n=342).

Visitors to Koombana Beach (95%) were split between those who had never visited the DDC (40%) or those who had visited the DDC between one and three times (45%). While four out of every ten visitors to Koombana Beach had never visited the DDC (Table 3), almost half of those visitors (47%) planned to visit the DDC that day (Table 3). In addition, the majority of people planning to visit the DDC that day would be visiting the DDC for the first time, but a third of those planning to visit the DDC that day (34%) had previously visited the DDC between one and three times. Of the Koombana Beach visitors who had previously visited the DDC, three quarters (75%) had visited the DDC between one and three times and this group was split evenly between those who had visited once (38%) and those who had visited two or three times (37%).

Two or three visits appears to be a saturation point for how often the majority people revisit the DDC. In addition to the fact that only one quarter of previous DDC visitors revisit the DDC on four or more occasions (Table 3), a barrier to people revisiting more than two or three times is also evident in the data for all Koombana Beach visitors and for those planning to visit the DDC that day. Only 15% of all visitors to Koombana Beach had visited the DDC more than four times and less than one in five of the people (19%) who planned to visit the DDC that day had previously visited on four or more occasions. There is a statistically significant
relationship ($\chi^2 = 210.6; \text{df} = 10; p < 0.001$) that validates the variability between how often people had visited the DDC for the different visitation categories and the three-visit barrier.

Table 3. Profile for visitation and revisitation to the Bunbury Dolphin Discovery Centre.

<table>
<thead>
<tr>
<th>Number of Previous Visits to DDC</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>39.9 ± 4.0</td>
<td>Not Applicable</td>
<td></td>
<td>47.1 ± 7.1</td>
</tr>
<tr>
<td>1</td>
<td>22.9 ± 3.4</td>
<td>38.0 ± 5.1</td>
<td></td>
<td>17.5 ± 5.4</td>
</tr>
<tr>
<td>2-3</td>
<td>22.1 ± 3.4</td>
<td>36.8 ± 5.1</td>
<td></td>
<td>16.9 ± 5.3</td>
</tr>
<tr>
<td>4-5</td>
<td>6.9 ± 2.1</td>
<td>11.4 ± 3.4</td>
<td></td>
<td>5.3 ± 3.2</td>
</tr>
<tr>
<td>6-10</td>
<td>4.0 ± 1.6</td>
<td>6.7 ± 2.7</td>
<td></td>
<td>6.4 ± 3.4</td>
</tr>
<tr>
<td>10+</td>
<td>4.0 ± 1.6</td>
<td>6.7 ± 2.7</td>
<td></td>
<td>6.9 ± 3.6</td>
</tr>
<tr>
<td>No response</td>
<td>0.2 ± 0.3</td>
<td>0.3 ± 0.6</td>
<td></td>
<td>Nil</td>
</tr>
</tbody>
</table>

All three categories of Koombana Beach visitors were equally likely to visit the DDC that day, with approximately one third of each group planning to visit (Table 4).

Table 4. Profile for visitors planning to visit the Bunbury Dolphin Discovery Centre that day.

<table>
<thead>
<tr>
<th>Plan to visit the DDC today</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>33.2 ± 3.9</td>
<td>29.2 ± 4.8</td>
<td>39.2 ± 6.4</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>No</td>
<td>66.4 ± 3.9</td>
<td>70.2 ± 4.8</td>
<td>60.4 ± 6.4</td>
<td></td>
</tr>
<tr>
<td>No Response</td>
<td>0.4 ± 0.5</td>
<td>0.58 ± 0.8</td>
<td>0.44 ± 0.9</td>
<td></td>
</tr>
</tbody>
</table>

While DDC revisitation intention declines sharply after two to three visits, at least seven out of every ten Koombana Beach visitors would recommend that family or friends visit the DDC (Table 5). As for the visitation and revisitation data (Table 3), there is a statistically significant relationship ($\chi^2 = 58.59$, $p = <0.001$, df = 4) between the visitation categories and rate of recommendation. This relationship relates to the higher proportion of all visitors to Koombana Beach (23%) and those planning to visit today (12%) who were unable to report if they would recommend the DDC.
Table 5. Profile for visitor recommendation of the Bunbury Dolphin Discovery Centre.

<table>
<thead>
<tr>
<th>Would you recommend the DDC to others</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>70.8 ± 3.74</td>
<td>86.8 ± 3.6</td>
<td>Not Applicable</td>
<td>85.7 ± 5.0</td>
</tr>
<tr>
<td>No</td>
<td>4.6 ± 1.72</td>
<td>6.4 ± 2.6</td>
<td>1.1 ± 1.5</td>
<td>11.6 ± 4.6</td>
</tr>
<tr>
<td>Unable to Report</td>
<td>23.4 ± 3.5</td>
<td>6.1 ± 2.5</td>
<td>11.6 ± 4.6</td>
<td>1.6 ± 1.8</td>
</tr>
<tr>
<td>No Response</td>
<td>1.2 ± 0.9</td>
<td>0.6 ± 0.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.1.2 Importance-Performance Analysis

Importance-Performance Analysis provides an indication to managers on how satisfied visitors are with their experience, it combines the importance of attributes to the visitor experience with how well they are performing and meeting the expectations visitors have for their experience. The descriptions for the attributes identified by Taplin (2012) and DDC management are displayed in Table 6, along with the sample size (n), mean importance (I), mean performance (P) and mean gap between attribute performance and importance (Gap) together with the statistical significance (Sig.) that the gap between importance and performance differs from zero for each attribute. These mean performance and importance values are plotted in Figures 12 to 14.

Table 6. Importance-Performance Analysis results for Dolphin Discovery Centre beach-based dolphin interaction. Sample size (n), mean Performance (P), mean Importance (I) and Gap (P-I), with statistical significance (Sig.) of the Gap.

<table>
<thead>
<tr>
<th>Attributes of DDC Experience</th>
<th>n</th>
<th>I</th>
<th>P</th>
<th>Gap</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Beach-based dolphin interaction experience</td>
<td>350</td>
<td>4.13</td>
<td>4.01</td>
<td>-0.12</td>
<td>*</td>
</tr>
<tr>
<td>b Dolphin conservation and research activities</td>
<td>359</td>
<td>4.33</td>
<td>4.05</td>
<td>-0.28</td>
<td>***</td>
</tr>
<tr>
<td>c Doing something different</td>
<td>275</td>
<td>3.86</td>
<td>3.84</td>
<td>-0.02</td>
<td>0.36</td>
</tr>
<tr>
<td>d Educational experience</td>
<td>390</td>
<td>4.02</td>
<td>3.96</td>
<td>-0.07</td>
<td>0.09</td>
</tr>
<tr>
<td>e Enjoying nature</td>
<td>323</td>
<td>4.45</td>
<td>4.39</td>
<td>-0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>f How beach-dolphin interaction is managed</td>
<td>350</td>
<td>4.36</td>
<td>4.13</td>
<td>-0.22</td>
<td>***</td>
</tr>
<tr>
<td>g Knowledgeable staff and volunteers</td>
<td>355</td>
<td>4.34</td>
<td>4.15</td>
<td>-0.19</td>
<td>***</td>
</tr>
<tr>
<td>h Numbers / Crowd size at dolphin interaction</td>
<td>342</td>
<td>4.10</td>
<td>4.00</td>
<td>-0.09</td>
<td>*</td>
</tr>
<tr>
<td>i Up-close viewing of wild dolphins</td>
<td>326</td>
<td>4.15</td>
<td>4.08</td>
<td>-0.07</td>
<td>0.11</td>
</tr>
<tr>
<td>j Value for money</td>
<td>378</td>
<td>4.23</td>
<td>4.05</td>
<td>-0.18</td>
<td>***</td>
</tr>
<tr>
<td>k Well maintained facilities</td>
<td>305</td>
<td>4.59</td>
<td>4.09</td>
<td>-0.50</td>
<td>***</td>
</tr>
</tbody>
</table>

Levels of statistical significance are denoted as * for p < .05, ** for p< .01, and *** for p < .001. Values of Gap do not always equal P-I due to rounding.
The original scale-centred IPA of Martilla and James, (1977) shows that overall DDC visitors are highly satisfied. All attributes regarding visitor experience at the DDC are placed within the *Keep Up the Good Work* category (Figure 7). The scale-centred axes indicate the change points from not important to important and not good to good (performance measure). This indicates that all aspects of the DDC experience are performing well overall.

Figure 7. Importance-Performance Analysis (IPA) for Dolphin Discovery Centre visitors. Crosshairs are placed at the centre of the attribute scale.

For high performing wildlife tourism operators such as the DDC, an enhanced approach to the scale-centred IPA can identify management actions that will potentially further increase visitor satisfaction, better allocate scarce resources, and maintain or improve their commercial advantage in the competitive wildlife tourism market. Two such enhanced methods of the IPA are a data-centred analysis, where the axes are set at the grand mean of importance and performance, and the Gap Analysis IPA (Taplin, 2012; Tonge et al., 2011).
4.1.3. Data-centred Importance-Performance Analysis

A data-centred IPA (Figure 8), with the axis intersecting at the grand means of the importance and performance (Blue Grid), suggests there are two attributes for which management could act to improve overall visitor satisfaction with their experience at the DDC. While most of the attributes are now in the Keep Up the Good Work quadrant or the Low Priority for Management quadrant (Figure 8), the attributes Dolphin conservation and research activities (Attribute b) and Value for money (Attribute j) are located in the Concentrate Management Here quadrant. This means that while overall the attributes of the DDC are meeting visitor expectations, those two attributes could potentially be improved by management.

Additionally, the Up-close viewing of wild dolphins (Attribute i) is in the Possible Overkill section meaning that the performance for that attribute exceeds visitor expectations. That finding is explored later in this thesis (Section 5.2).

The high importance and lower performance regarding the Well-maintained facilities (Attribute k), is also discussed in the following chapter (Section 5.2). Also, of note, the Enjoyment of nature is the second most important and highest performing attribute for visitors to the DDC.

Taplin (2012) also recommends the attributes near the axis separating the quadrants on the data-centred plot (Figure 8) be examined further as the importance or performance could easily change pushing them into another quadrant. Well-maintained facilities (Attribute k) is located near the Priority for Management quadrant, (Figure 8) meaning management attention may be required to increase the satisfaction of visitors and meet their expectations. Similarly, the attributes: Dolphin conservation and research (Attribute b); How beach-dolphin interaction is managed (Attribute f); Knowledgeable staff and volunteers (Attribute g); and Value for money (Attribute j), are also located near the Priority for Management quadrant and should also be investigated.
Figure 8. Data-centred Importance-Performance Analysis (IPA) for the Dolphin Discovery Centre. Crosshairs are placed at the means of Importance and Performance. Data labels for attributes are described in Table 6.

### 4.1.4 Gap Analysis

As previously mentioned, a second enhanced IPA approach is the Gap Analysis IPA, in which the gap between attribute importance and performance to visitors is analysed (Taplin, 2012). A line of parity where importance equals performance highlights those attributes where there is a disconnect between visitor expectations and the performance of the experience. Management should target those attributes with the largest significant gaps first. Seven attributes of the DDC experience had significantly negative gaps (Table 6). A negative gap means that visitors rate importance of an attribute significantly higher than its performance, in other words the attribute is performing below the expectations of visitors.
As previously identified, visitors ranked the importance of *Well-maintained facilities* significantly higher than its performance (Figure 9), this attribute was also rated the most important of all the DDC attributes. As a result, this attribute is furthest from the line of parity (Green Line) and would be of the highest management priority. To a lesser extent, this also applies for the attributes *Dolphin conservation and research* (Attribute b); *How beach-dolphin interaction is managed* (Attribute f); *Knowledgeable staff and volunteers* (Attribute g); and *Value for money* (Attribute j) as they also had significantly negative gaps between their importance and performance. The *Beach-based dolphin interaction* (Attribute a) and *Numbers/crowd at interaction experience* (Attribute h) also have significantly negative gaps, however not as strong as those mentioned above. That means those two attributes have the potential to be improved, if management chooses, but are a lower priority than those with the larger significant gaps.

*Doing something different* (Attribute c); *Educational experience* (Attribute d); and *Up-close viewing of dolphins* (Attribute i) showed no significant gap between their importance to visitors and their performance, meaning these attributes are meeting the expectations of visitors and do not need to be prioritised for management action. *Enjoying nature* (Attribute e) also did not show a significant gap and was also placed in the *Keep Up the Good Work* quadrant in the scale-centred IPA (Figure 8), indicating that visitors to the DDC are satisfied with this attribute of their experience.

**4.1.5 Intention to revisit**

Comparison of importance and performance of attributes, for those who planned to revisit the DDC on their current trip and those who did not indicates there is a significant difference in responses of the two cohorts ($F = 7.92, p = <0.001, df = 43$). This difference is reported in the significant difference between the importance of DDC attributes for each group of visitors ($t = 3.26, p = <0.01, df = 10$). The grand mean of the importance of all attributes to
those who planned to visit the DDC that day was 4.34 compared to 4.20 for those not planning to visit (Table 7 and 8). Similarly, the performance of the attributes was significantly higher for those planning to revisit at an overall mean of 4.20 compared to 3.99 for those who did not plan to visit ($t = 6.78$, $p < 0.001$, $df = 10$). The Gap Analysis IPA was applied with the twin foci of whether previous visitors to the DDC planned to revisit the DDC that day (Figure 10) or did not plan to revisit during their current trip to Koombana Beach (Figure 11).

Figure 9. Gap Analysis IPA for the Dolphin Discovery Centre. Diagonal line indicates equality of performance and importance (Gap = 0). Attributes represented by green diamonds are those with no significant gap between attribute importance and performance, while the blue circles represent attributes with significant gaps. Data labels for attributes are described in Table 6.
Table 7. Importance-Performance Analysis results for visitors planning to visit the Dolphin Discovery Centre on their current trip to Koombana Beach. Sample size (n), mean Performance (P), mean Importance (I) and Gap (P-I), with statistical significance (Sig.) of the Gap.

<table>
<thead>
<tr>
<th>Attributes of DDC Experience</th>
<th>n</th>
<th>I</th>
<th>P</th>
<th>Gap</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Beach-based dolphin interaction experience</td>
<td>81</td>
<td>4.40</td>
<td>4.25</td>
<td>-0.14</td>
<td>0.08</td>
</tr>
<tr>
<td>b Dolphin conservation and research activities</td>
<td>88</td>
<td>4.46</td>
<td>4.22</td>
<td>-0.24</td>
<td>**</td>
</tr>
<tr>
<td>c Doing something different</td>
<td>92</td>
<td>3.97</td>
<td>4.00</td>
<td>0.03</td>
<td>0.36</td>
</tr>
<tr>
<td>d Educational experience</td>
<td>93</td>
<td>4.18</td>
<td>4.22</td>
<td>0.04</td>
<td>0.32</td>
</tr>
<tr>
<td>e Enjoying nature</td>
<td>97</td>
<td>4.45</td>
<td>4.45</td>
<td>0</td>
<td>0.37</td>
</tr>
<tr>
<td>f How beach-dolphin interaction is managed</td>
<td>83</td>
<td>4.43</td>
<td>4.35</td>
<td>-0.08</td>
<td>0.19</td>
</tr>
<tr>
<td>g Knowledgeable staff and volunteers</td>
<td>89</td>
<td>4.47</td>
<td>4.31</td>
<td>-0.16</td>
<td>0.05</td>
</tr>
<tr>
<td>h Numbers / Crowd size at dolphin interaction</td>
<td>85</td>
<td>4.17</td>
<td>4.02</td>
<td>-0.16</td>
<td>0.81</td>
</tr>
<tr>
<td>i Up-close viewing of wild dolphins</td>
<td>76</td>
<td>4.61</td>
<td>4.20</td>
<td>-0.21</td>
<td>*</td>
</tr>
<tr>
<td>j Value for money</td>
<td>91</td>
<td>4.32</td>
<td>4.14</td>
<td>-0.18</td>
<td>*</td>
</tr>
<tr>
<td>k Well maintained facilities</td>
<td>97</td>
<td>4.53</td>
<td>4.11</td>
<td>-0.42</td>
<td>***</td>
</tr>
<tr>
<td>Grand Means</td>
<td></td>
<td>4.34</td>
<td>4.21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Levels of statistical significance are denoted as * for p < .05, ** for p< .01, and *** for p < .001. Values of Gap do not always equal P-I due to rounding.

Table 8. Importance-Performance Analysis results for visitors not planning to visit the Dolphin Discovery Centre on their trip to Koombana Beach. Sample size (n), mean Performance (P), mean Importance (I) and Gap (P-I), with statistical significance (Sig.) of the Gap.

<table>
<thead>
<tr>
<th>Attributes of DDC Experience</th>
<th>n</th>
<th>I</th>
<th>P</th>
<th>Gap</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>a Beach-based dolphin interaction experience</td>
<td>148</td>
<td>3.97</td>
<td>3.86</td>
<td>-0.10</td>
<td>0.14</td>
</tr>
<tr>
<td>b Dolphin conservation and research activities</td>
<td>142</td>
<td>4.32</td>
<td>4.01</td>
<td>-0.31</td>
<td>***</td>
</tr>
<tr>
<td>c Doing something different</td>
<td>184</td>
<td>3.81</td>
<td>3.76</td>
<td>-0.05</td>
<td>0.26</td>
</tr>
<tr>
<td>d Educational experience</td>
<td>150</td>
<td>3.85</td>
<td>3.79</td>
<td>-0.05</td>
<td>0.26</td>
</tr>
<tr>
<td>e Enjoying nature</td>
<td>227</td>
<td>4.45</td>
<td>4.36</td>
<td>-0.10</td>
<td>*</td>
</tr>
<tr>
<td>f How beach-dolphin interaction is managed</td>
<td>145</td>
<td>4.39</td>
<td>4.06</td>
<td>-0.34</td>
<td>***</td>
</tr>
<tr>
<td>g Knowledgeable staff and volunteers</td>
<td>138</td>
<td>4.34</td>
<td>4.07</td>
<td>-0.28</td>
<td>***</td>
</tr>
<tr>
<td>h Numbers / Crowd size at dolphin interaction</td>
<td>134</td>
<td>4.08</td>
<td>3.99</td>
<td>-0.10</td>
<td>0.13</td>
</tr>
<tr>
<td>i Up-close viewing of wild dolphins</td>
<td>136</td>
<td>4.07</td>
<td>3.99</td>
<td>-0.08</td>
<td>0.20</td>
</tr>
<tr>
<td>j Value for money</td>
<td>145</td>
<td>4.29</td>
<td>3.92</td>
<td>-0.37</td>
<td>***</td>
</tr>
<tr>
<td>k Well maintained facilities</td>
<td>207</td>
<td>4.63</td>
<td>4.09</td>
<td>-0.53</td>
<td>***</td>
</tr>
<tr>
<td>Grand Means</td>
<td></td>
<td>4.20</td>
<td>3.99</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Levels of statistical significance are denoted as * for p < .05, ** for p< .01, and *** for p < .001. Values of Gap do not always equal P-I due to rounding.
For the visitors planning to revisit the DDC on this trip to Koombana Beach, there were four attributes that had significantly negative gaps (i.e. did not meet visitor expectations). The attributes that were underperforming based on their importance to visitors were: *Dolphin conservation and research activities* (Attribute b); *Up-close viewing of dolphins* (Attribute i); *Value for money* (Attribute j); and *Well-maintained facilities* (Attribute k).

![Gap Analysis IPA](image)

*Figure 10. Gap Analysis IPA for the visitors planning to visit the Dolphin Discovery Centre on their current trip to Koombana Beach. Diagonal line indicates equality of performance and importance (Gap = 0). Attributes represented by green diamonds are those with no significant gap between attribute importance and performance, while the blue circles represent attributes with significant gaps. Data labels for attributes are described in Table 7.*

For previous visitors to the DDC who did not plan to revisit the DDC that day, there were six attributes with significantly negative gaps indicating these attributes were performing below expectation. For those who did not plan to revisit the DDC that day, the attributes *Enjoying*
nature (Attribute e); How beach-dolphin interaction is managed (Attribute f); and Knowledgeable staff and Volunteers (Attribute g), did not meet visitor expectations. In addition, those attributes were of lower importance for this group than for those visitors planning to revisit the DDC. Further, those attributes did meet the expectations of visitors planning to revisit the DDC that day. Additionally, some of the attributes involving the beach-based dolphin experience were less important to visitors who did not plan to visit the DDC that day. This includes the Beach-based dolphin interaction (Attribute a); Crowds at the interaction (Attribute h); Up-close viewing of wild dolphins (Attribute i); Educational experience (Attribute d) & Doing something different (Attribute c).

Figure 11. Gap Analysis IPA for the visitors not planning to visit the Dolphin Discovery Centre on their current trip to koombana Beach. Diagonal line indicates equality of performance and importance (Gap = 0). Attributes represented by green diamonds are those with no significant gap between attribute importance and performance, while the blue circles represent attributes with significant gaps. Data labels for attributes are described in Table 8.
4.2 Visitor Attitudes and Awareness of Tourism Impacts

Despite the benefits of wildlife tourism, the ecology and tourism literature highlight negative impacts that can arise from dolphin tourism and in particular the feeding of wild dolphins (Foroughirad & Mann, 2013; Murray et al., 2016; Patroni et al., 2018a). For this reason, understanding visitor attitudes and awareness regarding these impacts can inform management and regulators to the concerns of visitors (Sitar et al., 2017). This allows dolphin tourism operations and unregulated dolphin interactions to be adjusted accordingly (Filby et al., 2015; Sitar et al., 2017).

4.2.1 Ecological impacts of feeding dolphins

The visitors to Koombana Beach overall agreed with the statements regarding the potential ecological impacts of feeding on dolphin welfare (Table 9). Most visitors either agreed or strongly agreed that feeding wild dolphins can have a negative impact on dolphin health, and that wild dolphins can lose their natural ability to hunt and find their own food if fed by humans. Visitors were more neutral regarding the statement Feeding can change the natural behaviours of wild dolphins by making them more aggressive to humans and each other. Similarly, the statement Regular feeding can cause wild dolphins to be excessively / unnaturally attracted to humans also had many neutral responses, but overall more visitors agreed with that statement (Table 9).

4.2.2 Impact of recreational boating

Most visitors to Koombana Beach agreed or strongly agreed that provisioning wild dolphins can make them more vulnerable to injury by boat strikes and other harm caused by humans. Visitors also agreed or strongly agreed that; Boats and jet skis speeding within Koombana Bay endanger the wild dolphin population and Boats and jet skis accessing ‘No Boating’ zones in Koombana Bay can stress the wild dolphins, especially mothers with calves and juveniles (Table 9). Of all the statements about negative tourism impacts on dolphin welfare, visitors most strongly agreed that the Rules and regulations for safe boating should be enforced at Koombana Bay, with a mean level of agreement of 4.32 out of 5 (Table 9).
<table>
<thead>
<tr>
<th>Statement</th>
<th>Sample Size</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Mean Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding wild dolphins can have a negative impact on their health.</td>
<td>565</td>
<td>9</td>
<td>27</td>
<td>104</td>
<td>213</td>
<td>211</td>
<td>4.04</td>
</tr>
<tr>
<td>Wild dolphins can lose their natural ability to hunt and find their own food if fed by humans.</td>
<td>563</td>
<td>8</td>
<td>25</td>
<td>84</td>
<td>229</td>
<td>216</td>
<td>4.13</td>
</tr>
<tr>
<td>Feeding can change the natural behaviours of wild dolphins by making them more aggressive to humans and each other.</td>
<td>562</td>
<td>19</td>
<td>58</td>
<td>234</td>
<td>131</td>
<td>120</td>
<td>3.49</td>
</tr>
<tr>
<td>Regular feeding can cause wild dolphins to be excessively / unnaturally attracted to humans.</td>
<td>561</td>
<td>13</td>
<td>30</td>
<td>168</td>
<td>214</td>
<td>136</td>
<td>3.77</td>
</tr>
<tr>
<td>Feeding wild dolphins can make them more vulnerable to injury by boat strikes and other harm caused by humans.</td>
<td>564</td>
<td>9</td>
<td>22</td>
<td>122</td>
<td>230</td>
<td>181</td>
<td>3.98</td>
</tr>
<tr>
<td>People should be prosecuted for illegally feeding the wild dolphin in Koombana Bay.</td>
<td>563</td>
<td>18</td>
<td>35</td>
<td>137</td>
<td>171</td>
<td>202</td>
<td>3.9</td>
</tr>
<tr>
<td>Boats and jet skis speeding within Koombana Bay endanger the wild dolphin population.</td>
<td>564</td>
<td>11</td>
<td>21</td>
<td>75</td>
<td>221</td>
<td>236</td>
<td>4.15</td>
</tr>
<tr>
<td>Boats and jet skis accessing ‘No Boating’ zones in Koombana Bay can stress dolphins, especially mothers with calves and juveniles.</td>
<td>565</td>
<td>11</td>
<td>16</td>
<td>72</td>
<td>202</td>
<td>264</td>
<td>4.22</td>
</tr>
<tr>
<td>The rules and regulations for safe boating should be enforced at Koombana Bay.</td>
<td>565</td>
<td>10</td>
<td>9</td>
<td>64</td>
<td>187</td>
<td>295</td>
<td>4.32</td>
</tr>
<tr>
<td>The DDC dolphin interaction experience has/would motivate me to feed the dolphins at Koombana Bay.</td>
<td>556</td>
<td>144</td>
<td>140</td>
<td>166</td>
<td>73</td>
<td>33</td>
<td>2.48</td>
</tr>
<tr>
<td>The DDC dolphin interaction experience has/would motivate me to feed marine wildlife at other places and/or times at other beach locations.</td>
<td>555</td>
<td>166</td>
<td>151</td>
<td>147</td>
<td>55</td>
<td>35</td>
<td>2.41</td>
</tr>
</tbody>
</table>
4.3 Visitor Attitudes about Wild Dolphin Feeding

4.3.1. Attitudes to feeding wild dolphins

The attitudes of the Koombana Beach visitors in regards to the feeding of wild dolphins indicated that over half of the visitors believed people should not feed the wild dolphins (55%). There was a good level of support (41%) from visitors who agreed that dolphin feeding should be allowed as part of a government licenced and regulated program such the DDC beach-based dolphin interaction. The least favoured proposition was that people should be allowed to feed the dolphins anywhere/anytime (4%), which was significantly less than both the support for not feeding at all or feeding at the DDC (Figure 12).

![Figure 12. The proportion (± 95% Confidence Intervals) of Koombana Beach visitor’s opinions on whether people should be allowed to feed wild dolphins.](image)

An open question provided visitors with the opportunity to clarify/justify their beliefs about feeding wild dolphins. Examples of visitor responses are provided in Table 10.
Table 10. Examples of visitor justifications for responses to the question: “Do you believe people should be allowed to feed wild dolphins?”

<table>
<thead>
<tr>
<th>Do you believe people should be allowed to feed wild dolphins?</th>
<th>Exemplar explanation/justification/rationale for answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer Option 1: Yes, people should be able to feed wild dolphins anywhere/anytime.</td>
<td>Dolphins belong to everyone- Male, 55-59, Bunbury resident Because it’s no different to feeding any other wild animal. - Female, 18-24, Resident of Regional WA If people are told what they can feed them with, then it shouldn’t be a problem and you are not paying the Dolphin Discovery business for the privilege to do so- Female, 45-49, Resident of Regional WA. We the people of WA are shareholders/responsible for wildlife. Who is the Gov or business to tell me I have to PAY to feed our nature. - Male, 25-29, Perth Resident</td>
</tr>
<tr>
<td>Answer Option 2: Yes, but only as part of a Government licenced and regulated feeding program.</td>
<td>I think it would be a wonderful learning experience for children and adults and a proper programme will educate people on feeding dolphins. - Female, 40-44, Bunbury Resident As long as it is controlled by professionals acting in the best interest of the dolphins. - Female, 30-34, Perth Resident I think it is amazing seeing the dolphins and if it is regulated could be a good tourist attraction. - Female, 50-54, Bunbury Resident For education and better understanding of these amazing creatures, this interaction is great but needs to be regulated by people who understand what they are doing. - Female, 45-49, International Visitor</td>
</tr>
<tr>
<td>Answer Option 3: No, people should not be allowed to feed the wild dolphins.</td>
<td>wild means wild. - Male, 60-64, Resident of Regional WA can be dangerous for dolphin and people. - Female, 55-59, International Visitor Even though the dolphins might approach people for food and seem friendly, it is still a wild animal which can be unpredictable and vulnerable. - Female, 40-44, Bunbury Resident. As I believe even if we were allowed to feed them under supervision it would encourage people to feed them outside of supervision and the program as well. - Female, 70-74. Bunbury Resident</td>
</tr>
</tbody>
</table>
4.3.2. Motivation to feed marine wildlife

Visitors overall disagreed that the DDC beach-based dolphin interaction would motivate them to feed the dolphins at Koombana Bay (Table 11) or that the DDC beach-based dolphin interaction would motivate them to feed marine wildlife at other places and/or times (Table, 12). However, many visitors responded neutrally to these statements (Table 11 and 12). In addition, there was a significant difference in the responses of Koombana Beach visitors who had and had not visited the DDC in relation to the beach-based interaction motivating them to feed wild dolphins at Koombana Bay ($\chi^2 = 13.72; p = 0.008, \text{df} = 4$) and marine wildlife at other beach locations ($\chi^2 = 19.47; p = 0.0006; \text{df} = 4$).

People who had not visited the DDC were more neutral compared to those who had visited in regards to the dolphin interaction motivating them to feed dolphins at Koombana Bay (Table 11) and feeding marine wildlife at other locations (Table 12). People who had visited the DDC reported better environmental attitudes than those who had not with more people strongly disagreeing that the beach-based interaction would motivate them to feed dolphins at Koombana Bay and at other locations (Tables 11 and 12).

Table 11. The proportion (± 95% Confidence Intervals) of agreement for Koombana Beach visitors who have and have not visited the Dolphin Discovery Centre on whether the beach-based dolphin interaction would motivate them to feed wild dolphins at Koombana Bay.

<table>
<thead>
<tr>
<th>Does the dolphin interaction motivate people to feed wild dolphins at Koombana Bay?</th>
<th>Not visited DDC (n = 227)</th>
<th>Visited DDC (n = 342)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>19.4 ± 3.3</td>
<td>29.9 ± 3.8</td>
</tr>
<tr>
<td>Disagree</td>
<td>22.6 ± 3.5</td>
<td>26.9 ± 3.7</td>
</tr>
<tr>
<td>Neutral</td>
<td>34.1 ± 3.9</td>
<td>27.2 ± 3.7</td>
</tr>
<tr>
<td>Agree</td>
<td>16.6 ± 3.0</td>
<td>10.9 ± 2.6</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>7.4 ± 2.2</td>
<td>5.0 ± 1.8</td>
</tr>
</tbody>
</table>

More than half of Koombana Beach visitors were not aware that the DDC provides a minimalistic food reward for nine selected dolphins (57.19 ± 4.1%), which is significantly greater than those who were aware of the feeding (42.8 ± 4.1%). Not surprisingly, visitation to the DDC had an influence on whether the visitors were aware that the dolphins were fed
at the beach-based dolphin interaction ($\chi^2 = 6.69$, $p = 0.001$, df = 1). Respondents who had not visited the DDC were less aware of the controlled dolphin feeding occurring (36.2 ± 6.3%), while of those who had visited the DDC there was a balance between those who knew (47.2 ± 5.3 %) and did not know (52.8 ± 5.3 %) the dolphins were reward fed.

Table 12. The proportion (± 95% Confidence Intervals) of agreement for Koombana Beach visitors who have and have not visited the Dolphin Discovery Centre on whether the beach-based dolphin interaction would motivate them to feed marine wildlife at other places/times.

<table>
<thead>
<tr>
<th>Does the dolphin interaction motivate people to feed marine wildlife at other places/times?</th>
<th>Not visited DDC (n = 227)</th>
<th>Visited DDC (n = 342)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong Disagree</td>
<td>22.6 ± 3.5</td>
<td>34.5 ± 4.0</td>
</tr>
<tr>
<td>Disagree</td>
<td>24.0 ± 3.6</td>
<td>29.5 ± 3.8</td>
</tr>
<tr>
<td>Neutral</td>
<td>35.0 ± 4.0</td>
<td>21.1 ± 3.4</td>
</tr>
<tr>
<td>Agree</td>
<td>12.0 ± 2.7</td>
<td>8.6 ± 2.3</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>6.5 ± 2.0</td>
<td>6.2 ± 2.0</td>
</tr>
</tbody>
</table>

Visitors to Koombana Beach were largely (67.6 ± 3.9 %) aware that it is illegal for the general public to feed wild dolphins, with significantly less visitors unaware it was illegal (32.3 ± 3.9%). Visitation to the DDC had an influence on visitor knowledge of the illegality of feeding wild dolphins by the general public ($\chi^2 = 5.41$, $p = 0.02$, df = 1). Of the respondents who had visited the DDC, a much larger percentage were aware the feeding of wild dolphins by the general public was illegal compared with those who visited and were unaware (Table 13). Koombana Beach visitors who had not visited the DDC also had a higher percentage of visitors aware that it was illegal to feed wild dolphins compared to those who were not aware. There was however only a 16% difference between those who were aware and unaware of the illegality of wild dolphin feeding among visitors who had not visited the DDC compared to a 40% difference among those who had visited the DDC. (Table 13).

Table 13. The proportion (± 95% Confidence Intervals) of Koombana Beach visitors that had and had not visited the Dolphin Discovery Centre who were aware the feeding of wild dolphins by the general public was illegal.

<table>
<thead>
<tr>
<th>Were you aware feeding wild dolphins by the public was illegal?</th>
<th>Not visited DDC (n = 227)</th>
<th>Visited DDC (n = 342)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>41.6±5.1</td>
<td>29.2±4.7</td>
</tr>
<tr>
<td>Yes</td>
<td>58.4±5.1</td>
<td>70.8±4.7</td>
</tr>
</tbody>
</table>
4.4 Summary of Results

Overall, the DDC and the beach-based dolphin interaction it offers are shown to be a high-quality wildlife tourism experience. Visitors to the DDC were generally satisfied with both the beach-based dolphin interaction and the DDC in general, however, some elements of the DDC experience appear to be performing below visitor expectation. These underperforming attributes include: Value for money; Dolphin Conservation and research; Well-maintained facilities; and (to a lesser extent) knowledgeable staff and volunteers; and How the beach-based interaction itself is managed. Additionally, for previous DDC visitors there was a significant difference in the satisfaction and motivations to visit the DDC for those visitors planning to visit the DDC that day, and those who were not going to visit. The beach-based dolphin interaction appeared less important to visitors who did not plan to revisit and they thought that most other attributes of the DDC also performed below their expectations.

Koombana Beach visitors generally indicated high levels of awareness in regards to potential negative impacts arising from the feeding of wild dolphins. The results also suggest that visitors to Koombana Beach who visit the DDC have an increased awareness and knowledge in regards to dolphin welfare and impacts of unregulated feeding. As a result, DDC visitors were less likely to engage in unregulated interactions with dolphins at other times and places. Overall the majority visitors believed dolphins should not be fed under any circumstances, but almost as many visitors supported the minimalistic reward feeding conducted by DDC staff and volunteers. Very few visitors supported unregulated feeding at Koombana Beach.
Chapter 5: Discussion

5.1. Overall Visitor Satisfaction

There are many factors that influence visitor satisfaction with wild dolphin tourism experiences. These include close proximity and predictability of dolphins, the absence of crowding, having operators follow codes of conduct, and receiving educational information (Bach & Burton, 2017; Filby et al., 2015; Patroni et al., 2018a and 2018b; Sitar et al., 2017). Other factors contributing to visitor satisfaction with their wildlife tourism experience may be aspects outside of the dolphin experience, including the facilities provided by the operation and the condition of the beach (Taplin et al., 2012). Satisfaction is often used as a measure of how well an experience meets visitor expectations and needs and is often used to measure the quality of an experience (Ziegler et al., 2012). Having satisfied visitors is important as many marine tourism destinations rely on tourism as a source of revenue and visitor satisfaction leads to visitors sharing their experience through word of mouth and encouraging more visitors to these areas (Gier et al., 2017; Jurdana et al., 2017; Prakash et al., 2018; Schleimer et al., 2015; Wilson & Tisdell, 2003). Understanding visitor satisfaction enables a tour operator to provide an experience that meets expectations and can also confirm visitors are satisfied with the experience or whether changes may be necessary (Taplin, 2012; Ziegler et al., 2012).

In relation to the satisfaction of DDC visitors with the beach-based dolphin interaction operated by the DDC, this study demonstrates that overall visitors are satisfied with their overall experience. This is indicated by all the attributes on the scale-centred IPA matrix (Figure 7) being in the Keep Up the Good Work quadrant, this means all the attributes examined for the visitor experience at the DDC are important to DDC visitors and are performing well (Taplin, 2012). This confirms that the DDC beach-based dolphin interaction is a high-quality wildlife experience. Most visitors to Koombana Beach agreed they would
recommend the DDC to family and friends. Revisit and recommendation intentions are key indicators of visitor satisfaction (Gier et al., 2017; Wilson & Tisdell, 2003). Revisits and recommendation are important for operations such as the DDC to remain financially sustainable through income derived from new visitors and retuning visitors, as well as being able to perform the important function of visitor education (Gier et al., 2017; Hosany, Prayag, Van Der Veen, Huang & Deesilatham, 2016; Wilson & Tisdell, 2003).

The current literature on dolphin tourism experiences align with the results found in this study in regards to visitor satisfaction with the majority of visitors being highly satisfied with their marine wildlife experiences (Aragones et al., 2013; Lück, 2015; Mayes et al., 2004; Ponnampalam, 2011; Ziegler et al., 2012). In the study by Ziegler et al. (2012), participants rated their overall satisfaction with the wildlife tour a mean score of 4.09 out of 5. This however is not always the case, Sitar et al. (2017) and Mustika, Birtles, Everingham and Marsh (2013) found that dolphin-watching tourists were dissatisfied with the number of boats present, the manner in which dolphins were approached, desired additional education, and wanted more evidence that operators to use practices that ensured dolphin welfare. This highlights the concerns of visitors for dolphin welfare and the importance to visitors of having an operation that has a management programme that protects dolphin welfare.

5.2 Enhanced Importance-Performance Analyses

While visitors expressed a high level of satisfaction, the enhanced scale-centred Importance-Performance Analyses (Figure 8) and the Gap Analysis IPA (Figure 9) highlight aspects of the visitor experience at the DDC that could be potentially improved by DDC management.

Based on the enhanced Importance-Performance Analyses reported in this study, visitors were satisfied with the level of education and crowd size, indicating that these aspects of the experience at the DDC are performing well. However, having knowledgeable staff and volunteers had a significantly lower performance compared to its importance, which
indicates there is potential for improvement in the interpretation and information presented by staff and volunteers during the dolphin interactions. Another potential area of improvement suggested by the results (Figure 9) could be the management of the beach-based dolphin interaction. Although the management of the beach-based interaction falls in the keep up the good work quadrant indicating visitors are satisfied (Figure 8), it has a significantly higher importance indicating it does not meet visitor expectations (Figure 9). This finding is similar to studies at other locations that also found the way wildlife tourism activities were managed to be of high importance to visitors (Aragones et al., 2013; Filby et al., 2015; Sitar et al., 2017).

The most important component of the visitor experience at the DDC was the centre having well-maintained facilities, followed by enjoying nature. The importance of enjoying nature was matched with the highest performance for all the DDC attributes examined. Having well maintained facilities was of the highest importance for visitors, yet its performance was significantly lower than expectation, indicating that the DDC should consider improving its facilities. The DDC is currently undergoing a major redevelopment and upgrade of the current facilities, including improved toilets and changerooms, enhanced aquarium displays, and enhanced café facilities (DDC, 2018). This is likely to increase visitor’s satisfaction with these important aspects of the DDC’s operation.

In marine wildlife tourism research, many studies report that one of the most important aspects to visitors is realizing close proximity to the wildlife (Aragones et al., 2013; Bach & Burton, 2017). In contrast, Filby et al. (2015) reports that visitors ranked close proximity and number of dolphins to be ranked amongst the least important attributes of an Australian swim-with dolphin experience. Similar to Filby et al. (2015), this study also found that visitors to the DDC ranking proximity to dolphins amongst the least important aspect of their experience, which resulted in this attribute being placed in the possible overkill section of
the scale-centred IPA analysis. This finding, in combination with the strong awareness visitors demonstrated regarding potential impacts on the dolphins, is in line with the study of Bach and Burton (2017), who reported that visitors who are educated about potential tourism impacts on dolphins were willing to accept decreased proximity and contact time to ensure the welfare of the dolphins. This demonstrates that with appropriate education content, visitors are likely to support high levels of control implemented by the DDC for the beach-based interactions.

Visitors often rank education amongst the most important aspect of a wildlife tourism experience (Lück, 2015; Pratt & Suntikul, 2016; Sitar et al., 2017). Lück (2015) found that while visitors were highly satisfied with their experience, many felt their desire to learn was not sufficiently met. The results from this study indicate that education was in the lower range of importance in comparison to the other attributes (Figure 8), but it did meet visitor expectations as there was no significant difference between its importance and performance. As a result, visitors are satisfied with the educational aspect of the DDC’s beach-based dolphin interaction. The inclusion of education in these wildlife experiences has the capability of educating visitors thereby encouraging their engagement in positive environmental behaviours (Ballantyne et al., 2009; Barney et al., 2005; Bach & Burton, 2017). Positive educational engagement decreases the likelihood of participation in negative activities such as unregulated wildlife feeding, as well as informing other visitors who may be inclined to engage in negative interactions (Ballantyne et al., 2009; Barney et al., 2005; Bach & Burton, 2017). This makes education important for not only visitor satisfaction but for broader conservation outcomes.

Based on the enhanced IPA centred on the means (Figure 8), the two attributes of highest priority for management action would be; Value for money and the Conservation and research activities. The DDC and Murdoch University partner in research and monitoring
regarding the Koombana Bay dolphins. The finding that the Conservation and research activities of the DDC and Murdoch are below visitor expectations suggests the need for further communication to visitors on the conservation work being done and the public promotion of research to visitors. This finding is also an indication of the importance of conserving the dolphins as this attribute is of high importance to visitors, meaning they are likely to support the managed provisioning operation at the DDC and their dolphin conservation efforts. A study by Mayes et al. (2004) comparing the dolphin feeding experiences at Tin Can Bay and Tangalooma, which are both in Queensland, Australia, found that Tin Can Bay lacked information on the conservation of dolphins in their interpretive talks. The dolphin feeding experience in Tangalooma provided better conservation information and this resulted in visitors being more satisfied with the educational component of that experience. This confirms that providing more information on conservation and allied dolphin research would enhance visitor satisfaction for the DDC as dolphin conservation is a topic of interest to visitors (Mayes et al., 2004).

Visitor perceptions of Value for money has also been a factor leading to dissatisfaction with other wildlife tourism operations (Bentz et al., 2016; Ziegler et al., 2012). The results from this study found value for money to be among the lowest performing attributes (Figure 8) compared to its importance to visitors. A revision of the DDC business model aims to address this by making the beach-based interaction free of cost to DDC visitors, which should diminish visitor disappointment, if they did not get to see a dolphin. Understanding finer scale attributes such as Value for money that are performing below the expectations of visitors is a valuable tool to focus action in order to better manage the operation in accordance with the needs of visitors (Ziegler et al., 2012).
5.3 Differing Patterns of Satisfaction among DDC Visitors

The Gap Analysis IPA comparing the satisfaction of previous visitors to the DDC (n = 342) who planned to revisit the DDC on the day they were surveyed (Figure 10) and those that did not plan to revisit the DDC on their current trip to Koombana Beach (Figure 11) indicates that those not revisiting that day found the attributes of the DDC less important overall. Additionally, even with lower expectations, the performance of some of the DDC did not meet the expectations of the people not planning to visit the DDC that day.

The IPA comparison showed a major difference in the importance and performance of several attributes including *Doing something different*, the *Dolphin interaction experience*, *Educational experience*, *Crowd size at the beach-based interaction* and the *Up-close viewing of dolphins*, all of which were less important to those not revisiting the DDC on their current trip. One explanation may be as these people are not in the current target market for the DDC as they do not show a strong desire for interacting with dolphins or receiving information about dolphins. The change in satisfaction with the attribute, *Doing something different* for those who did not plan to revisit may be due to the DDC currently offering the same interpretive experiences daily, so visitors who have been a few times would have already seen all aspects the DDC has to offer. This could also be a factor in the visitation of people to the DDC appearing to be limited to between one and three visits. The redevelopment of facilities including the aquariums inside the DDC, may change the visitation pattern and satisfaction of this group. The changing business model along with the redevelopment may also address this revisitation barrier and reach a wider market of people, by offering a wider range of activities and services for people visiting Koombana Beach. Being able to enjoy the updated café and facilities without having to pay to enter may encourage visitors to return multiple times for the numerous services on offer. Further research is needed after the redevelopment to see if visitors return on a more regular basis. This is
important as return visitors keep the experience offered by the DDC sustainable by providing the income that operations such as the DDC need to keep operating (Moore, Rodger & Taplin, 2017; Ryan et al., 2018).

The information gained from this study helps to inform the DDC redevelopment. The finding of *Well-maintained facilities* and *Value for money* performing below visitor expectation indicates that the DDC redevelopment should increase visitor satisfaction. This would have the added benefit that the DDC acts as a hub to attract people who can then be engaged about dolphin conservation. Repeat visitation would thus consolidate educational value of the DDC and encouragement of behaviours that support dolphin conservation.

5.4. Visitor Awareness and Attitudes

5.4.1 Awareness of feeding related impacts

Wildlife tourism operations have a dual goal of providing experiences that are satisfying to visitors, while also ensuring there is no significant impact on wildlife (Patroni et al., 2018b; Ziegler et al., 2012). Previous work indicates that dolphin tourism and provisioning of wild dolphins can have several negative impacts on the welfare of dolphins, including changes in natural behaviour, impacts on overall health, and physical impacts such as injuries from collisions (Donaldson et al., 2010; Foroughirad & Mann, 2013; Hazelkorn et al., 2016; Orams, 2002; Scarpaci et al., 2010; Senigaglia et al., 2016; Weiner, 2015).

The visitors to Koombana Beach have shown high levels of awareness in regards to these potential impacts of unregulated wild dolphin feeding, with a majority of visitors agreeing with the statements regarding negative impacts that could happen as a result of unregulated provisioning. Awareness shown by visitors of the potential impacts that unregulated feeding can cause indicates that the visitors to Koombana Beach are concerned for dolphin welfare. This finding is similar to the studies of Lewis and Newsome (2003) and Sitar et al. (2017) and
the review of Patroni et al. (2018b) who all report visitor concern for the welfare of marine species targeted by feeding for tourism experiences.

Having visitors understand potential impacts is important as this can enhance environmental behaviours and minimise unregulated interactions (Filby et al., 2015; Lück, 2003; García-Cegarra & Pacheco, 2017). This understanding is also useful in informing the DDC and government authorities on the concerns and attitudes of visitors regarding dolphin welfare, which provides the evidence to inform the management of dolphin tourism to ensure that the impact on the dolphins is minimised, while visitor satisfaction is maximised (Ballantyne, Packer & Falk, 2011; García-Cegarra & Pacheco, 2017; Zeppel, 2008). Ballantyne et al. (2009) demonstrated similar levels of visitor awareness to those reported in this study. Ballantyne et al. (2009) reported that wildlife tourists were highly interested in conservation issues and demonstrated a high awareness of the impacts with 40% of respondents in their study stating that they often thought about the harm their actions may be doing to the environment.

While overall visitors agreed with all statements regarding the potential impacts of unregulated dolphin feeding, they responded slightly more neutrally to the statements that regular feeding can cause wild dolphins to be attracted to humans and that feeding can cause dolphins to become more aggressive. Evidence for both these statements are reported in the literature (Hazelkorn et al., 2016; Pinto de Sá Alves, Andriolo, Orams & de Freitas Azevedo, 2013). This suggests that more education regarding negative impacts is necessary on and around Koombana Bay, as particular impacts such as the increase in aggression and attraction to humans may not be commonly seen by visitors. Dolphins becoming attracted to humans and associating humans with food is a particular problem as it is reported that dolphins following boats in search of food have been injured in collisions (Donaldson et al., 2010; Hazelkorn et al., 2016). Visitor perceptions about increased dolphin aggression may be influenced by the common ideology of dolphins being friendly, smiling, playful animals and
the thought of them showing aggression would seem unlikely in the minds of visitors (Curtin, 2006; Weiner, 2015).

The awareness of visitors about the potential impacts of wildlife tourism has been demonstrated in other studies to have the potential to mitigate unnecessary impacts. For example, Sitar et al. (2017) found that visitor concerns for dolphin welfare were contributing to dissatisfaction with their dolphin watching experience. These authors suggested the reported visitor concern could significantly reduce the impact of unnecessarily high intensity dolphin watching. In order to keep visitors satisfied, the concerns for dolphin welfare need to be addressed. This requires the communicating of management actions that protect dolphin welfare to visitors. Visitors who have an awareness of the impacts of dolphin tourism can even encourage compliance from wildlife tourism operators to adopt and follow the practices that minimise harm to dolphin welfare by commenting on any practices they feel could be harming dolphin welfare (Filby et al., 2015; Ponnampalam, 2011).

Research into visitor attitudes has often shown that while visitors are satisfied with wildlife tourism experiences overall, they have concerns for the welfare of the wildlife (Filby et al., 2015; Mayes et al., 2004; Sitar et al., 2017). This is consistent with the findings of this study. Overall the visitors to the DDC were satisfied with their dolphin interaction experience and aspects of the DDC itself (Figure 7), however visitors demonstrate knowledge of the potential negative impacts on dolphin welfare (Table 9) and this presents a possible conflict between visitor desires to interact with dolphins and their concern for dolphin welfare.

5.4.2 Awareness of boating related impacts

Impacts from recreational boating on dolphin behaviours are documented within the literature with studies reporting impacts of collisions with speeding boats and the disruptions boats cause to dolphin behaviours (Donaldson et al., 2010; Peters et al., 2013; Scarpaci et al., 2010). These impacts can be even worse in areas where unregulated feeding occurs, as
feeding from boats such as recreational fishing boats causes dolphins to see them as a food source and this makes collisions more likely (Donaldson et al., 2012).

The current study shows that visitors to Koombana Beach agree that unsafe boating practices including speeding, accessing ‘no boating zones’ and higher vulnerability of dolphins due to unregulated feeding have an influence on the dolphin’s overall health and well-being. Visitors also show a high level of support for the enforcement of safe boating practices on Koombana Bay, which currently appear to be lacking (personal observation). The strong response from visitors regarding the enforcement of safe boating practices at Koombana Bay may also arise from the multiple recreational uses of the Bay, as the boats and jet skis have the potential to not only negatively impact the dolphins (Donaldson et al., 2012), but also affect other recreational users, particularly swimmers in the area. The most common method to manage the boating would be to implement monitoring of boating behaviours and infringing boat users who breach speed limits and access unauthorised locations (Bechdel et al., 2009; Department of Transport, 2017).

5.4.3. Visitors attitudes regarding wild dolphin feeding

The feeding of wild dolphins for tourism is a controversial topic with many different opinions from operators, governments, industry stakeholders as well as visitors on whether it is an acceptable practice (Inman et al., 2016; Mayes et al., 2004; Newsome & Rodger, 2013; Newsome & Rodger, 2008). The management of provisioning activities also lack consensus regarding the best way to manage such tourism operations to foster the best possible balance between visitor satisfaction and protection for the dolphins (Patroni et al., 2018b; Ziegler et al., 2012).

Attitudes are positions adopted or expressions of views by visitors that influence behaviour, ideas or emotion, and can arise from beliefs, values or education (Petrosillo, Zurlini, Corlianò, Zaccarelli & Dadamo, 2007; Powell & Ham, 2008). Such attitudes are reported in some
studies to influence behaviour, which in the case of wildlife tourism is highly important for conservation awareness and the prevention of behaviours that may harm wildlife (Ballantyne, et al., 2011; Ballantyne & Packer; 2005; Ballantyne, Packer & Hughes, 2008).

Visitors to the DDC beach-based dolphin interaction were overall highly satisfied (Figure 7) but do express concerns regarding the welfare of the dolphins (Table 9). These concerns are again apparent in the responses to the question of whether visitors support unregulated or regulated feeding of wild dolphins. The majority of Koombana Beach visitors do not believe people should feed the dolphins under any circumstances (Figure 12), as they are wild animals and can become dependent on this feeding (Table 10).

A pilot survey conducted in the Austral summer of 2014-2015 found that visitors surveyed at Koombana Beach largely supported the feeding conducted at the DDC under a licenced program (Patroni et al., 2018a). One possible explanation for this difference in responses between the pilot and current survey is that people are becoming more environmentally aware of their impacts on wildlife. This results in them not supporting any dolphin feeding that has the potential to impact the dolphins. There has been some support for the idea that in general environmental awareness is increasing (Barrow, 2014; Simpson & Newsome, 2017; Tonge, Ryan, Moore & Beckley, 2015). Environmental awareness is also confirmed by other studies demonstrating visitors concern for the welfare of wildlife (Bach & Burton, 2017; Filby et al., 2015 Sitar et al., 2017). However, more research is required to understand if the difference in support for DDC feeding is a real trend or just a statistical difference in responses between the two surveys.

There is also the possibility that visitors were more in favour of no feeding of wild dolphins as they are unaware of the control and management in place at the DDC, visitors may show increased support after being educated about the way the dolphin reward feeding is managed and controlled by the DDC. This may reassure visitors that the welfare of the
dolphins is being highly considered and managed. The feeding process is so discrete that the survey indicated that many visitors were unaware that the dolphins were even fed by the operators at the interaction. Another possibility is that people misinterpreted the question, as the fact that only the trained operators feed the dolphins and not the visitors was not specified in the question. Some operations allow visitors to feed the dolphins (Table 1). Further research is needed to investigate the level of support among visitors for feeding at the DDC beach-based interaction and the specific controls and management options that visitors would like implemented to maximise their satisfaction with the experience.

Previous studies into the attitudes of visitors regarding the feeding of wildlife for tourism also contrast with the findings of this study with only 9% of all visitors to the dolphin feeding experiences in Tangalooma and Tin Can bay in Australia disagreeing with feeding dolphins for tourism (Mayes et al., 2004). This may be because visitors themselves get to feed the dolphins at these experiences and the feeding aspect is a significant part of the experience and therefore visitors have the expectation of feeding a dolphin. Another study by Semeniuk et al. (2009) into the social aspects of stingray feeding at the Cayman Islands found that approximately 68% preferred the implementation of fairly strict management rules, while the other 32% valued keeping the experience the same with its intensive human — wildlife interactions. However, people who supported stricter management and those who did not both exhibit a preference for feeding and handling of stingrays to continue. Semeniuk et al. (2009) suggested one way to implement management actions would be by altering promotional strategies for the Cayman Islands, as the experience is marketed largely as a feeding experience. This difference in feeding style may also account for the difference in visitor attitudes between this experience and the beach-based interaction at the DDC, as feeding is not a significant part of the DDC experience. However, this may also be a product of differing levels of visitor concern for wildlife welfare or education provided on potential
impacts at each experience, as many visitors to the Cayman Island ray feeding had little knowledge of the potential impacts.

The results from this study provide important information about the possibility of visitors becoming more aware of the impacts of tourism on dolphin welfare. Understanding the attitudes of visitors to marine wildlife experiences is important as it gives an indication of the levels of awareness, education, and likelihood of participating in unregulated dolphin interactions. Understanding visitor attitudes also gives an insight into the issues of unregulated interactions and can indicate whether further education of the general public is required. Visitor attitudes can also inform management of wildlife tourism interactions by supporting the regulation and control of experiences and encouraging tourism operators to apply best management practices. Visitors consider experience management and the welfare of wildlife to be of the most important aspects of wildlife tourism and are satisfied when measures are in place to protect the dolphins.

5.4.4. Motivation to feed wild dolphins

Previous studies theorise that allowing people to feed wildlife in circumstances such as wild dolphin feeding experiences can confuse visitors on the acceptability of feeding marine wildlife. This could potentially encourage unregulated feeding, because if visitors can feed or see dolphins being fed in one case, they may seek that experience outside of licenced feeding programs (Donaldson et al., 2012; Markwell, 2015; Newsome et al., 2005).

This study demonstrates that most visitors to Koombana Beach strongly disagree regarding the beach-based dolphin interaction motivating them to engage in unregulated feeding (Table 11 and 12). One possible explanation for this response could be that people are becoming more aware of the impacts humans may be having on wild animals (Table 9). However, another explanation for the strong disagreement response to visitor motivation for unregulated wild dolphin feeding may be the design of the questionnaire. Visitors were
asked to respond to potential impacts of unregulated feeding of wild dolphins before they were asked about their motivation to feed, which may have had some influence on the response (Bach & Burton, 2017; Ballantyne et al., 2009; Barrow, 2014; Sitar et al., 2017).

The responses to whether the beach-based dolphin interaction at the DDC would influence visitors to feed dolphins or other marine life at other times or locations showed a significant difference in responses based on whether the visitors had been to the DDC or not. Visitors who had previously visited the DDC had a higher proportion of visitors that strongly disagreed that they would feed dolphins at other times or locations compared to those who had not previously visited the DDC, who responded more neutrally to the statement. This finding suggests that well managed marine wildlife tourism experiences provide important interpretive information that may increase visitor awareness of ecological impacts and influence environment behaviours (Lück, 2003; Powell & Ham; 2008; Pratt & Suntikul, 2016; Zeppel & Mulion, 2008b). The results from this study further indicate the DDC is providing an educational experience to its visitors that has the potential to assist in the minimisation of unregulated feeding activities by tourists.

Further evidence suggesting that the DDC enhances environmental education of visitors is the response to question concerning the awareness of visitors that the feeding of dolphins by the general public is illegal. Most visitors were aware that it is illegal, however there was again a significantly greater awareness among those who had previously visited the DDC (Table 13). Visitors to the DDC showed a larger proportion of people being aware that feeding by the general public was illegal (70%) compared to those who had not visited (58%). The higher awareness about the impacts and illegality of feeding among visitors who had previously visited the DDC also highlights the value of having education incorporated in wildlife tourism experiences. Visitor awareness of the rules and regulations put in place to protect wildlife strongly encourages visitors to think about the impacts and provides a
consequence for an illegal action that is likely to discourage unregulated feeding by those who are aware.

The results indicating higher awareness and knowledge from visitors who previously visited the DDC confirms the benefits of having education as part of wildlife tourism experiences and the ability for tourism operation to inform and educate visitors on potential impacts and regulations that are in place to ensure the welfare of the dolphins. Overall making a large contribution to the sustainability of the operations and conservation in general (Pratt & Suntikul, 2016; Trave, Brunnschweiler, Sheaves, Diedrich & Barnett, 2017).
Chapter 6: Conclusions and Further Research

In relation to key research questions explored by this thesis: overall visitors were satisfied with the DDC beach-based dolphin interaction; visitors indicated high levels of awareness regarding potential negative impacts of feeding of wild dolphins; and the DDC beach-based dolphin interaction is unlikely to motivate tourists to participate in unregulated feeding at other times or places. Additionally, visitation to the DDC appears to reduce motivation to feed dolphins outside of regulated interactions, but further research would be required to confirm that educational aspects of the wildlife tourism experience are influencing visitor attitudes and behaviours. This study identifies an apparent change in level of support for feeding at the DDC among Koombana Beach visitors from the pilot study, in which a majority of visitors supported dolphin feeding at the DDC, to the current position where many visitors do not support the feeding of wild dolphins. This apparent change in attitude also requires further research to determine if this is a trend or simply statistical variability in the survey findings. The apparent concern for dolphin welfare indicated by Koombana Beach visitors also provides an insight into visitor support for wildlife feeding tourism operations. Further education on the way these operations are controlled and managed may result in increased visitor support for feeding by tourism operation such as the DDC. The decision to deal with the issue of wild dolphin feeding for tourism is socio-political, environmental, and economic and for these reasons performing IPA and understanding visitor satisfaction and attitudes provides an insight that can assist management decision making processes. Visitors can significantly impact the way wildlife tourism is managed and understanding what is important to their experience can inform better management of these interactions for tourists themselves, as well as the welfare of the target species.

The results from this study cannot be generalised to other locations or experiences due to differing management, location, species and external factors that influence visitor
satisfaction and the degree of potential impacts on the dolphins. This study has indicated the need for further research into the complex interactions between humans and dolphins. The application of Importance-Performance Analyses in the wildlife tourism space are limited, yet the technique provides much insight into what is important to the visitors and how satisfied they are with the aspects of their experience. Such insight provides a clear focus for management for increasing visitor satisfaction and addressing visitor concerns for dolphin welfare. For this reason, an IPA analysis for the DDC after the redevelopment is recommended to compare and benchmark satisfaction levels. Further research is also needed on attitudes of visitors regarding wild dolphin feeding, but this needs more detailed investigation, perhaps through a longitudinal study to monitor the potential changes in awareness and attitudes of visitors to wildlife tourism experiences.

In summary, the results of this study reveal the importance of understanding visitor satisfaction and attitudes for wildlife tourism operations in order to foster repeat visitation as well as motivating others to visit. This work contributes to best practice dolphin tourism management by revealing that there is public support for the beach-based dolphin interaction provided and controlled by the DDC. This survey also shows that visitors to Koombana Beach are likely to support actions that reduce illegal dolphin feeding and injury from recreational boating.
Reference List


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Appendices
Appendix A: Visitor Satisfaction Questionnaire

Visitor Satisfaction Survey: Dolphin Experience at DDC
We value your feedback.

Dear Visitor,

The primary aim of this survey is to obtain your views about the beach-based dolphin experience available at the Dolphin Discovery Centre (DDC) and the unregulated/illegal feeding of wild dolphins. This information will inform the future management of wild dolphin tourism at Koombana Bay, Bunbury.

This questionnaire will take about ten minutes of your time. Your personal details are not required, meaning your responses to questions are totally confidential.

Please return your completed questionnaire to the Murdoch University researchers.

Q1. Including this visit, how often do you visit Koombana Bay?  
Please tick [v] one box only

- First Visit
- Once every 1-2 years
- Once a year
- Once every 3-5 years
- 2 to 5 times a year
- Other ................................

Q2. Will you be going to the Dolphin Discovery Centre during this visit to Koombana Bay?  
Please tick [v] one box only

- Yes
- No

Q3. Prior to this visit, were you aware of the beach-based dolphin experience available at the Dolphin Discovery Centre?  
Please tick [v] one box only

- Yes
- No

Q4. Prior to this visit, how many times have you visited the Dolphin Discovery Centre?  
Please tick [v] one box only

- None
- 4-5 times
- Once
- 6-10 times
- 2-3 times
- More than 10 times

Q5. Would you recommend the Dolphin Discovery Centre to friends and family?  
Please tick [v] one box only

- Yes
- No
- Unable to report
### Q6. How important are the following attributes for the quality of a visit to the Dolphin Discovery Centre and/or Koombana Beach?

*Please circle one number for each attribute*

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<th>Indifferent</th>
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<th>Very Important</th>
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<td>3</td>
<td>4</td>
<td>5</td>
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### Q7. How good did you find the following attributes during your visit(s) to the Dolphin Discovery Centre and/or Koombana Beach?

*Please circle one number for each factor.*

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<td>Educational experience</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Enjoying nature</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>How beach-dolphin interaction is managed</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Knowledgeable DDC staff and volunteers</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Numbers/crowd size at dolphin interaction</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Up-close viewing of wild dolphins</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Value for money</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Well maintained facilities</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Q8. Please tell us what you most enjoyed about your visit to the Dolphin Discovery Centre and/or Koombana Bay?

Q9. Below are some statements regarding what could happen as result of unregulated/illegal boating and wild dolphin feeding at Koombana Bay?  
*For each statement, please circle the number that best reflects your views.*

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeding wild dolphins can have a negative impact on their health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Wild dolphins can lose their natural ability to hunt and find their own food if fed by humans.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Boats and jet skis speeding within Koombana Bay endanger the wild dolphin population.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The DDC dolphin interaction experience has/would motivate me to feed the dolphins at Koombana Bay.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Regular feeding can cause wild dolphins to be excessively/unnaturally attracted to humans.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Boats and jet skis accessing 'No Boating' zones in Koombana Bay can stress the wild dolphins, especially mothers with calves and juveniles.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>People should be prosecuted for illegally feeding the wild dolphin in Koombana Bay.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeding wild dolphins can make them more vulnerable to injury by boat strikes and other harm caused by humans.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The DDC dolphin interaction experience has/would motivate me to feed marine wildlife at other places and/or times at other beach locations.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>The rules and regulations for safe boating should be enforced at Koombana Bay.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Feeding can change the natural behaviours of wild dolphins by making them more aggressive to humans and each other.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Q10. Are you aware that a limited number of specially selected dolphins may be rewarded with a small amount of food during beach-based interactions?  
Please tick [✓] one box only

☐ Yes  ☐ No

Q11. Are you aware that it is illegal for the general public to feed wild dolphins in Koombana Bay?  
Please tick [✓] one box only

☐ Yes  ☐ No

Q12. Do you believe people should be allowed to feed wild dolphins?  
Please tick [✓] one box only

☐ Yes, people should be able to feed wild dolphins anywhere/anytime.  
☐ Yes, but only as part of a Government licensed and regulated feeding program.  
☐ No, people should not be allowed to feed the wild dolphins.

Please provide a reason for your answer:

-------------------------------------------------------------------------------------------------------------------------

-------------------------------------------------------------------------------------------------------------------------

Q13. Please tell us about anything that may improve the beach-based wild dolphin interaction experience at Koombana Bay?

-------------------------------------------------------------------------------------------------------------------------

-------------------------------------------------------------------------------------------------------------------------

Q14. To which age group do you belong?  
Please tick [✓] one box only

☐ 18-24  ☐ 25-29  ☐ 30-34  ☐ 35-39  ☐ 40-44  ☐ 45-49  
☐ 50-54  ☐ 55-59  ☐ 60-64  ☐ 65-69  ☐ 70-74  ☐ 75 plus

Q15. How do you describe yourself?  
Please tick [✓] one box only

☐ Female  ☐ Male  ☐ Prefer not to say  ☐ Other ...........................................

Q16. Where is your usual place of residence?  
Please tick [✓] one box only

☐ Perth - Postcode ......................................  ☐ Regional WA - Postcode ........................

☐ Australia - Postcode ...............................  ☐ International - Country ........................

Thank you for sharing your thoughts and experience with us.
Appendix B: Chi-Squared for Survey Balance at Koombana Beach.

Table B1. Chi squared test values for difference in survey collection between the West and East ends of Koombana Beach for each survey session (AM/PM).

<table>
<thead>
<tr>
<th>Test values</th>
<th>Average surveys per session</th>
<th>Average hours per session</th>
<th>Average surveys per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>chi-squared</td>
<td>5.67</td>
<td>1.06</td>
<td>3.72</td>
</tr>
<tr>
<td>p-value</td>
<td>0.13</td>
<td>0.79</td>
<td>0.29</td>
</tr>
</tbody>
</table>
Appendix C: Demographic Profile of Visitors.

This appendix summarises the demographic profile of the four visitation categories (i.e. All Koombana Beach Visitors; Previously Visited DDC; Never Visited DDC; Planning to Visit DDC Today). A visual interpretation of the demographic profile of visitors to Koombana Beach and the frequencies for the participants in each category is provided in Figures C1 to C5. Statistically significant relationships between and/or within the demographic and the four visitation categories are also addressed in this Appendix.

Based on the returned questionnaires, there appears to be a large imbalance in the number of females compared to males (Figure C1).

![Figure C1. Gender profile of respondents to Koombana Beach survey. All visitors to Koombana Beach (Top Left), visitors who had previous visited the DDC (Top Right), Visitors who had not visited the DDC (Bottom Left) and those who planned to visit on their current trip to Koombana Beach (Bottom Right).]
Counts of visitors on the beach conducted during surveying however showed that around two thirds of visitors to the beach visually presented as female (62%), which indicates that the completed questionnaires are representative of the gender identification of visitors to Koombana Beach. This trend in the ratio of females to males visiting Koombana Beach is mirrored in the other three DDC visitation categories, as demonstrated by the lack of a statistical difference for these data (Appendix D, Table D1).

The age profile for all visitation categories are visually (Figure C2) and statistically similar (Appendix D, Table D1). Younger visitors (18-44 years) dominated in all four visitation categories, especially given the ethics-based truncation in the 18-24 years category. The data for the age profiles presented in Appendix D are clustered with spans of 5 years, with the exception of the 18-24 years category, to provide a finer scale and more detailed analysis.

*Figure C2. Age profile of respondents from Koombana Beach survey. All visitors to Koombana Beach (Top Left), visitors who had previous been to the DDC (Top Right), Visitors who had not visited the DDC (Bottom Left) and those who planned to visit on their current trip to Koombana Beach (Bottom Right).*
The variability in the visitation categories based on place of residence shown in Figure C3 are statistically significant ($\chi^2 = 133.11$, $p < 0.001$, df = 12). Not surprisingly, the majority of visitor to Koombana Beach were Bunbury residents. People from regional WA, including towns that surround Bunbury, were the next most common group of visitors at Koombana Beach. It is interesting to note that there were a similar number of international visitors and Perth residents visiting Koombana Beach. It is somewhat surprisingly that there were relatively few visitors were from other Australian states.

Figure C3. Place of residence profile of respondents from Koombana Beach survey. All visitors to Koombana Beach (Top Left), visitors who had previous been to the DDC (Top Right), Visitors who had not visited the DDC (Bottom Left) and those who planned to visit on their current trip to Koombana Beach (Bottom Right).

A majority of all the visitors to Koombana Beach (56%) and visitors who had previously visited the DDC (71%) visit Koombana Beach between two and five times per year or more than five times per year with a relatively even distribution of visitors in either category (Figure C4 and Appendix D, Table D2). More than a quarter of the people surveyed (27%) were visiting Koombana for the first time and more than half of that cohort (56%) had not previously
visited the DDC, but almost all of them (46% of first time visitors to Koombana Beach) planned to visit the DDC that day (Appendix D, Table D2). The variability in the proportions of first time and frequent visitors (2-5 times/year and more than five time/year) were statistically significant ($\chi^2 = 201.43, p = <0.001, df = 15$) than the occasional visitor categories (Figure C4).

Figure C4. Koombana Beach visitation frequency of respondents from Koombana Beach survey. All visitors to Koombana Beach (Top Left), visitors who had previous been to the DDC (Top Right), Visitors who had not visited the DDC (Bottom Left) and those who planned to planned to visit on their current trip to Koombana Beach (Bottom Right).

Not surprisingly, awareness of the beach-based interaction was significantly greater ($\chi^2 = 83.80, p = <0.001, df = 3$) among previous visitors to the DDC and lowest amongst those who had not visited (Figure C5). Slightly more than a third of people (35%) who had never visited the DDC and almost a quarter (23%), or one in four, of the people planning to visit the DDC that day were unaware of the beach-based dolphin interaction prior to visiting Koombana Beach.
Figure C5. DDC visitor awareness of the Beach-based dolphin interaction prior to their visit to Koombana Beach. All visitors to Koombana Beach (Top Left), visitors who had previously been to the DDC (Top Right), visitors who had not visited the DDC (Bottom Left) and those who planned to visit on their current trip to Koombana Beach (Bottom Right).
Appendix D: Empirical Demographic Profile of Koombana Beach Visitors

This appendix empirically reports the demographic profile of visitors to Koombana Beach in terms of the percentages and the associated 95% confidence intervals for the four categories of visitors surveyed at Koombana Beach.

Table D1. Gender profile of visitors to Koombana Beach in each visitation category.

<table>
<thead>
<tr>
<th>Gender</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>69.8 ± 3.8</td>
<td>73.9 ± 4.7</td>
<td>63.4 ± 6.3</td>
<td>65.6 ± 6.8</td>
</tr>
<tr>
<td>Male</td>
<td>28.1 ± 3.7</td>
<td>24.3 ± 4.5</td>
<td>33.9 ± 6.2</td>
<td>32.8 ± 6.7</td>
</tr>
<tr>
<td>Other / Prefer Not to Say / No Response</td>
<td>2.1 ± 1.2</td>
<td>1.8 ± 1.4</td>
<td>2.6 ± 2.1</td>
<td>1.1 ± 1.5</td>
</tr>
</tbody>
</table>

Table D2. Age profile of visitors to Koombana Beach in each visitation category.

<table>
<thead>
<tr>
<th>Age</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>13.2 ± 2.8</td>
<td>12.6 ± 3.5</td>
<td>14.1 ± 4.5</td>
<td>12.2 ± 4.6</td>
</tr>
<tr>
<td>25-29</td>
<td>10.1 ± 2.6</td>
<td>8.2 ± 2.9</td>
<td>15.0 ± 4.64</td>
<td>9.5 ± 4.2</td>
</tr>
<tr>
<td>30-34</td>
<td>13.0 ± 2.8</td>
<td>12.9 ± 3.5</td>
<td>12.8 ± 4.34</td>
<td>10.6 ± 4.4</td>
</tr>
<tr>
<td>35-39</td>
<td>13.2 ± 2.8</td>
<td>12.3 ± 3.5</td>
<td>14.54 ± 4.59</td>
<td>9.5 ± 4.2</td>
</tr>
<tr>
<td>40-44</td>
<td>13.4 ± 2.8</td>
<td>13.5 ± 3.6</td>
<td>13.22 ± 4.41</td>
<td>11.6 ± 4.6</td>
</tr>
<tr>
<td>45-49</td>
<td>9.5 ± 2.4</td>
<td>10.8 ± 3.3</td>
<td>7.49 ± 3.42</td>
<td>13.8 ± 4.9</td>
</tr>
<tr>
<td>50-54</td>
<td>5.8 ± 1.9</td>
<td>5.9 ± 2.5</td>
<td>5.73 ± 3.02</td>
<td>7.9 ± 3.9</td>
</tr>
<tr>
<td>55-59</td>
<td>5.8 ± 1.9</td>
<td>5.0 ± 2.3</td>
<td>7.05 ± 3.33</td>
<td>6.9 ± 3.6</td>
</tr>
<tr>
<td>60-64</td>
<td>5.5 ± 1.9</td>
<td>6.1 ± 2.5</td>
<td>4.41 ± 2.67</td>
<td>6.9 ± 3.6</td>
</tr>
<tr>
<td>65-69</td>
<td>5.8 ± 1.9</td>
<td>7.6 ± 2.8</td>
<td>3.08 ± 2.25</td>
<td>5.8 ± 3.3</td>
</tr>
<tr>
<td>70-74</td>
<td>2.3 ± 1.2</td>
<td>2.3 ± 1.2</td>
<td>1.76 ± 1.71</td>
<td>2.1 ± 2.1</td>
</tr>
<tr>
<td>75+</td>
<td>1.4 ± 1.0</td>
<td>1.8 ± 1.4</td>
<td>0.88 ± 1.21</td>
<td>3.2 ± 2.5</td>
</tr>
<tr>
<td>No Response</td>
<td>0.4 ± 0.5</td>
<td>0.9 ± 1.3</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>
### Table D3. Usual place of residence of visitors to Koombana Beach in each visitation category.

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bunbury</td>
<td>39.7 ± 4.0</td>
<td>48.3 ± 5.3</td>
<td>26.87 ± 5.77</td>
<td>20.1 ± 5.7</td>
</tr>
<tr>
<td>Perth</td>
<td>15.8 ± 3.0</td>
<td>13.7 ± 3.6</td>
<td>18.94 ± 5.10</td>
<td>21.2 ± 5.8</td>
</tr>
<tr>
<td>Regional WA</td>
<td>25.5 ± 3.6</td>
<td>29.0 ± 4.8</td>
<td>19.82 ± 5.19</td>
<td>15.9 ± 5.2</td>
</tr>
<tr>
<td>Other Aus. State</td>
<td>5.6 ± 1.9</td>
<td>1.8 ± 1.4</td>
<td>11.45 ± 4.14</td>
<td>11.1 ± 4.5</td>
</tr>
<tr>
<td>International</td>
<td>13.2 ± 2.8</td>
<td>7.0 ± 2.7</td>
<td>22.47 ± 5.43</td>
<td>31.8 ± 6.6</td>
</tr>
<tr>
<td>No response</td>
<td>0.2 ± 0.3</td>
<td>0.3 ± 0.6</td>
<td>0.44 ± 0.86</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Table D5. Koombana Beach visitation frequency of visitors in each visitation category.

<table>
<thead>
<tr>
<th>Koombana Beach Visitation Frequency</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First visit</td>
<td>27.2 ± 3.7</td>
<td>8.2 ± 2.9</td>
<td>56.0 ± 6.5</td>
<td>48.2 ± 7.1</td>
</tr>
<tr>
<td>&gt; 5 times a year</td>
<td>26.9 ± 3.6</td>
<td>36.0 ± 5.1</td>
<td>12.8 ± 4.3</td>
<td>13.2 ± 4.8</td>
</tr>
<tr>
<td>2-5 times a year</td>
<td>28.8 ± 3.7</td>
<td>34.8 ± 5.0</td>
<td>19.4 ± 5.1</td>
<td>15.9 ± 5.2</td>
</tr>
<tr>
<td>Once a year</td>
<td>7.7 ± 2.2</td>
<td>9.4 ± 3.1</td>
<td>5.3 ± 2.9</td>
<td>10.1 ± 4.3</td>
</tr>
<tr>
<td>Every 1-2 years</td>
<td>3.2 ± 1.4</td>
<td>3.5 ± 2.0</td>
<td>2.6 ± 2.1</td>
<td>4.2 ± 2.9</td>
</tr>
<tr>
<td>Every 3-5 years</td>
<td>1.6 ± 1.0</td>
<td>2.6 ± 1.7</td>
<td>Nil</td>
<td>2.7 ± 2.3</td>
</tr>
<tr>
<td>Other</td>
<td>4.4 ± 1.7</td>
<td>4.4 ± 2.2</td>
<td>4.0 ± 2.5</td>
<td>5.8 ± 3.3</td>
</tr>
<tr>
<td>No response</td>
<td>0.2 ± 0.3</td>
<td>1.2 ± 1.1</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### Table D6. Prior awareness of the DDC beach-based dolphin interaction by visitors prior to their visit to Koombana Beach in each visitation category.

<table>
<thead>
<tr>
<th>Aware of beach interaction prior to visiting site</th>
<th>All Koombana Beach Visitors (n = 569)</th>
<th>Previously Visited DDC (n = 342)</th>
<th>Never Visited the DDC (n = 227)</th>
<th>Plan to Visit DDC Today (n = 189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>82.6 ± 3.1</td>
<td>94.15 ± 2.5</td>
<td>65.2 ± 6.2</td>
<td>77.2 ± 6.0</td>
</tr>
<tr>
<td>No</td>
<td>17.2 ± 3.1</td>
<td>5.25 ± 2.5</td>
<td>34.8 ± 6.2</td>
<td>22.8 ± 6.0</td>
</tr>
<tr>
<td>No Response</td>
<td>0.2 ± 0.3</td>
<td>0.58 ± 0.8</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>
Appendix E: Chi-squared Analyses for Demographic and Attitudinal Data

This appendix presents outcomes of the chi-squared analyses of independence for the demographic and attitudinal data reported in the Results (Chapter 4), Appendix C, and Appendix D. Null hypotheses are that there is no relationship between the demographic elements and visitation categories nor between the demographic elements and attitudes to feeding wild dolphins and the alternate hypothesis is that there are relationships between the relevant factors. While statistical analyses for this study are based on $\alpha = 0.05$ level of confidence, the large sample size means that $p$-values ranging from 0.03-0.05 are at best inconclusive (Berenson et al., 2006). Values of $p > 0.03$ were therefore interpreted as not providing a significant statistical signal. There is evidence of a relationship between some demographic elements and visitation category (Table E1), but there is no evidence of a difference in attitudes for the demographic categories (Tables E2 to E6).

Table E1. Test for independence of demographic data based on all visitors to Koombana Beach, those who had previously visited the DDC, those who had not visited the DDC, and those planning to visit today.

<table>
<thead>
<tr>
<th>Test Values</th>
<th>Gender (df=9)</th>
<th>Age (df=33)</th>
<th>Place of Residence (df=12)</th>
<th>Rec. DDC to Family / Friends (df=4)</th>
<th>Koombana Beach Visitation Frequency (df=15)</th>
<th>Plan to Visit DDC Today (df=2)</th>
<th>Previous DDC Visitation Frequency (df=10)</th>
<th>Aware of Beach-Based Dolphin Interaction (df=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>chi-squared</td>
<td>11.49</td>
<td>27.03</td>
<td>133.11</td>
<td>58.59</td>
<td>201.43</td>
<td>6.07</td>
<td>210.61</td>
<td>83.80</td>
</tr>
<tr>
<td>p-value</td>
<td>0.24</td>
<td>0.76</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>0.05</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Table E2. Test statistics and p-values produced using chi-squared analysis for gender, place of residence and DDC visitation based on responses to a 5-point Likert scale for potential impacts of feeding wild dolphins.

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Place of Residence</th>
<th>Previous DDC Visitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chi- squared</td>
<td>p-value (12 df)</td>
<td>chi- squared</td>
</tr>
<tr>
<td>Feeding wild dolphins can have a negative impact on their health</td>
<td>22.02</td>
<td>0.04</td>
<td>17.64</td>
</tr>
<tr>
<td>Wild dolphins can lose their natural ability to hunt if fed by humans</td>
<td>15.29</td>
<td>0.23</td>
<td>9.66</td>
</tr>
<tr>
<td>Regular feeding can cause wild dolphins to be excessively/unnaturally attracted to humans</td>
<td>10.72</td>
<td>0.55</td>
<td>16.11</td>
</tr>
<tr>
<td>Feeding wild dolphins can make them more vulnerable to injury by boat strikes</td>
<td>16.83</td>
<td>0.16</td>
<td>15.85</td>
</tr>
<tr>
<td>Feeding can change the natural behaviours of wild dolphins by making them more aggressive to humans and each other</td>
<td>8.06</td>
<td>0.78</td>
<td>17.46</td>
</tr>
</tbody>
</table>

Table E3. Test statistics and p-values produced using chi-squared analysis for gender, place of residence and DDC visitation based on responses to a 5-point Likert scale for the potential impacts of recreational boating on dolphin welfare.

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Place of Residence</th>
<th>Previous DDC Visitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chi- squared</td>
<td>p-value (12 df)</td>
<td>chi- squared</td>
</tr>
<tr>
<td>Boats and jet skis speeding within Koombana Bay endanger the wild dolphin population</td>
<td>10.25</td>
<td>0.036</td>
<td>26.30</td>
</tr>
<tr>
<td>Boats and jet skis accessing ‘No Boating’ zones in Koombana Bay can stress the wild dolphins especially mothers with calves and juveniles</td>
<td>7.42</td>
<td>0.11</td>
<td>20.87</td>
</tr>
<tr>
<td>The rules and regulations for safe boating should be enforced at Koombana Bay</td>
<td>5.04</td>
<td>0.28</td>
<td>18.98</td>
</tr>
</tbody>
</table>
Table E4. Test statistics and p-values produced using chi-squared analysis for gender, Place of residence and DDC visitation based on responses to a 5-point Likert scale for motivation to feed wild dolphins.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Place of Residence</th>
<th>Previous DDC visitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chi-squared</td>
<td>p-value (12 df)</td>
</tr>
<tr>
<td>The DDC dolphin Interaction has/would motivate me to feed dolphins at Koombana Bay</td>
<td>17.07</td>
<td>0.15</td>
</tr>
<tr>
<td>People Should be Prosecuted for illegally feeding the wild dolphin in Koombana Bay</td>
<td>11.80</td>
<td>0.46</td>
</tr>
<tr>
<td>The DDC interaction experience has/would motivate me to feed marine wildlife at other places and/or times at other beach locations</td>
<td>22.29</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Table E5. Test statistics and p-values produced using chi-squared analysis for gender, place of residence and visitation categories for yes/no question regarding knowledge that DDC feed dolphins.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Place of Residence</th>
<th>Previous DDC visitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chi-squared</td>
<td>p-value (3 df)</td>
</tr>
<tr>
<td>Are you aware a limited number of selected dolphins may be rewarded with a small amount of food</td>
<td>7.82</td>
<td>0.05</td>
</tr>
<tr>
<td>Are you aware that it is illegal for the general public to feed wild dolphins in Koombana Bay?</td>
<td>3.21</td>
<td>0.36</td>
</tr>
</tbody>
</table>

Table E6. Test statistics and p-values produced using chi-squared analysis for gender, place of residence and DDC visitation based on responses to whether visitors support the feeding of wild dolphins.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Place of Residence</th>
<th>Previous DDC visitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>chi-squared</td>
<td>p-value (6 df)</td>
</tr>
<tr>
<td>Do you believe people should be allowed to feed wild dolphins?</td>
<td>8.53</td>
<td>0.20</td>
</tr>
</tbody>
</table>