

Power of Experience: How Wildlife Watching Trips Shape Education and Perception of Conservation.

A dissertation submitted in partial fulfilment of the requirements for the degree of Master of Science (MSc) In Marine Biology.

The Power of Experience: How Wildlife Watching Trips Shape Education and Perception of Conservation

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This work has not previously been accepted in substance of any degree and not being concurrently submitted in candidature for any degree.

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3 **Power of Experience: How Wildlife Watching Trips Shape Education and Perception of**
4 **Conservation.**

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6 **Running page head:** Influence of wildlife watching boat trip

7

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10 **KEYWORDS:** Marine Tourism, Education, Conservation Intent, Cetacean.

11 **ABSTRACT**

12 A shift from captive to wildlife viewing, has caused the demand for nature-based tourism to be at its
13 all-time highest. The effects of this shift upon wildlife and the habitats they inhabit is a well-
14 documented topic. However, understanding into what positive effects these can have is lacking. This
15 study seeks to examine how marine wildlife tourism can foster environmental education and promote
16 a positive attitude to conservation, in addition to finding what aspects can generate the greatest of
17 these effects. This was completed through the use of a questionnaire within New Quay, Wales,
18 questioning individuals who attended a wildlife watching boat trip, in comparison with individuals
19 who did not. The findings of the study discovered that these trips can positively impact an individual's
20 self-perceived knowledge, in addition to fostering a greater attitude to conservation. It was also
21 uncovered that an encounter is vital in generating the most positive change, specifically one in close
22 proximity. Further research is required to understand why proximity is significant at generating this
23 change, to allow future wildlife tourism activities to adopt and benefit from this effect.

24 **1 | Introduction**

25 The demand for nature-based tourism is at its highest and is becoming increasingly popular in
26 the modern age. The most popular form being wildlife tourism in which tourists interact with animals
27 in their natural environment through activities such as photography or simply observing. With a
28 current estimated global attendance of 220 to 440 million visitors yearly (Moorehouse et al., 2015),
29 and this figure estimated to double by the year 2060 (French et al., 2011), the demand is evident. This
30 pressure can be seen throughout Wales, specifically with coastal and marine tourism being at the
31 forefront of demand due to the diverse communities and beautiful scenery on offer. Coastal tourism is
32 a major contributor to the Welsh economy, with reports totalling an approximate 4.4% of Gross Value

1 Added (GVA) and an employer of over 88,000 people (Woodward, 2015). This form of tourism
2 within Wales, like many areas, is experiencing a steady growth of 10% annually (Wales Government,
3 2015).

4 Marine wildlife watching, is among the highest sought after wildlife viewing experience, with
5 cetacean species such as whales and dolphins at the forefront of public appeal (Lück, 2011). Dolphins
6 are singled out and frequently listed as the most-loved animal for many due to continuous depiction in
7 mass media. In this fashion, bottlenose dolphins (*Tursiops truncatus*) are commonly named as the
8 favourite due to their universal public appeal and their ability to ignite positive, aesthetic and
9 humanistic views (Kellert, 1999).

10 Nature-based tourism requires observing nature to be sustainable with minimal environmental
11 impact (Goodwin, 1996). However, the large-scale appeal of these animals has the possibility to
12 create detrimental effects. Shackley (1990) drew attention to a phenomenon phrased “Loving nature
13 to death”, in which the large-scale public appeal of human-animal interaction results in negative
14 consequences to the animals or habitats in question. This issue can be hypothesised to be rooted
15 deeply in the personalisation of wild animals, resulting in the demand for direct human-animal
16 interaction. One key example of this is human-mediated feeding (provisioning), adopted by tour
17 operators as a method to attract a target species. It is found that this method is found to have multiple
18 adverse effects on fauna, such as anticipated feeding times (Gaspar et al., 2008), changes in overall
19 abundance, diversity and species evenness (Ilarri et al., 2008), and encouragement of other unnatural
20 behaviours (Burgin & Hardiman, 2015).

21 Direct human-animal interaction is not the only negative impact for humans to have upon
22 marine species. The rise of boat traffic within the marine environment is also a key contributor.
23 Koroza & Evans (2022) investigated bottlenose dolphin responses to boat traffic. Noting that the
24 smaller personal watercrafts such as speedboats, small motorboats and kayaks are found to most
25 commonly break the Code of Conduct set in place to minimise human impacts on wildlife
26 populations, resulting in disturbance to marine communities. This finding is commonly found
27 throughout the literature, with Vergara-Peña (2020) also noting recreational watercrafts to most
28 commonly break Code of Conduct, where visitor passenger boats do not. In addition to Koroza (2018)
29 who noted small and medium motorboats to have the lowest observed compliance to this Code of
30 Conduct. Thus, by increasing the public's knowledge on the marine environment, the community
31 which inhabits it and the effect they can have on the environment, individuals will understand the
32 impact they can have upon the marine ecosystem.

33 From this the importance of awareness of marine mammals and their habitats is shown.
34 Therefore it is a necessity to increase the awareness that an individual has on their impact to the
35 natural environment to combat future concerns. To accurately do this individuals must be educated on

1 the effect they have on the environment. Wildlife watching trips can be adopted as a tool for
2 educating members of the public (Andersen & Miller, 2006), wherein the term “edutainment” has
3 been adopted. This phrase is described as education designed to be entertaining, providing a situation
4 in which learning is gained through exploration and interactivity. This process involves individuals
5 enjoying themselves so much that they do not realize they are learning at the same time (Green &
6 McNeese, 2007). This is a concept adopted by many leisure attractions, namely museums, zoos,
7 aquariums, and ecological education centres. Wildlife tourism adopts the purpose as edutainment
8 simply because it is both an entertaining and educational activity (Packer & Ballantyne, 2004).

9 Wildlife tourism can be ideal for the exploration of personal interests due to its nature to
10 provide a vehicle for personal and professional development (Buhalis & Law, 2008). In this manner,
11 wildlife tourism is known to greatly benefit the health and well-being of the visitors who attend and is
12 found to do this much more effectively than captive viewing. Packer & Ballantyne (2012) investigated
13 the personal benefits to wildlife viewing in natural settings as an alternative to captive viewing. It was
14 uncovered that viewers described noncaptive wildlife viewing as a more intense and emotional
15 experience, harbouring a greater emotional connection between the viewers and the animals, all while
16 providing a much more engaging experience.

17 Within Wales, New Quay is a hot spot for marine tourism. It serves as a tourist hub for
18 marine wildlife watching trips, with an estimated ten thousand visitors taking wildlife watching boat
19 trips each summer. This is thanks to scenic coastal views (Vergara-Peña, 2020) and the semi-resident
20 population of bottlenose dolphins, with totals lying between 200 to 300 individuals (Baines & Evans,
21 2012; Feingold & Evans, 2014). Cardigan Bay is protected by two Natura 2000 sites which, while
22 providing a network of core breeding and resting site for this species (European Commission, 2008),
23 also forms a key feature of interest to tourists from across the globe. The dolphin watching industry in
24 New Quay alone was estimated to generate a £4.9 million income for Ceredigion (Hernandez, 2015).

25 *Objectives*

26 Within New Quay is a British marine environmental research organisation called Sea Watch
27 Foundation who bring together a network of the general public and scientists to conserve and protect
28 cetaceans in British and Irish waters. By conducting citizen science projects like land watches, or
29 larger events such as National Whale and Dolphin Watch and Orca Watch (Sea Watch Foundation,
30 2023) through a partnership with Sea Watch Foundation. This study aims to examine the effectiveness
31 of marine wildlife watching boat trips in educating members of the public and the effect they have
32 upon visitors’ conservation intent. The study will explore which aspects make such trips beneficial in
33 this regard while also examining which of those aspects are key in encouraging the desired effects.

34 This study will aim to address three main research questions. What are the factors that
35 contribute to the appeal of wildlife watching trips? How effective are wildlife watching trips in terms

1 of environmental education and fostering positive attitudes towards conservation? What are the most
2 effective methods or approaches adopted by wildlife watching trips at promoting these factors?

3 **2 | Methods**

4 **Data collection**

5 Data collection occurred within New Quay, Ceredigion, a small village in Cardigan Bay,
6 West Wales. Cardigan Bay is a popular tourist destination for its sandy beaches, walking trails, and
7 marine wildlife viewing. The location is also home to an array of cetacean species such as harbour
8 porpoise and common dolphin in addition to a large bottlenose dolphin population of which a portion
9 of the population occurs here year-round (Evans & Waggitt, 2023; Lohrengel et al., 2017). Data was
10 collected within this location during June 2023 while tourism is at its highest.

11 A questionnaire was adopted to test the research questions (see Annex). This was split into
12 four sections: general information, the boat trip, conservation, and education. The education section
13 primarily examined self-perceived knowledge on four subjects; marine mammals, local birds, local
14 history and local geography. Each question was designed to be compared within the analysis to
15 examine the objectives of the project. Individuals were given two options in how they would like to
16 answer the questionnaire - 1) Fill it out themselves using a pre-printed copy of the questionnaire, or 2)
17 in the form of an interview in which the answers are read and written down by the researcher.
18 Individuals were targeted from two groups: those who have attended a wildlife watching boat trip and
19 those who have not. Participants were given a consent form to read and sign prior to conducting the
20 questionnaire (see Annex), in addition to also being informed that they were able to skip any question
21 they desired and end the questionnaire at any time.

22 Adults present on New Quay pier at the time of data collection were targeted to take part
23 within the questionnaire. The pier was used as a location to recruit respondents as it is the place where
24 individuals go to seek out marine wildlife, in addition to being the location from which wildlife
25 watching boat trips depart.

26 **Data analysis and visualisation**

27 A series of software programmes were used within the data analysis and visualisation. Before
28 conducting data analysis all answers from the questionnaire was compiled into one data sheet within
29 Microsoft Excel. This provided opportunity to see the results in one place and offered the chance for
30 initial analysis to be made by generating totals and percentages of each section within the
31 questionnaire. Microsoft Excel was also adopted to visualise the collated data graphically. ArcMap
32 10.8.1 was also used to visualise some of the data collected as it used to generate a bubble map of the
33 total number of respondents from each hometown named within the questionnaire.

1 Four different forms of analysis were implemented within this report, all using the base
2 version of RStudio version 4.3.1. Regression analysis was used to examine how a scale within the
3 questionnaire can predict another scale and was adopted when addressing a visitor's rating of
4 satisfaction on the trip. Furthermore, it was used in predictions involving willingness to contribute
5 more to conservation and perceived knowledge regarding each of the four categories: marine
6 mammals, local birds, local history, and local geography. Paired t-tests were utilized to examine the
7 difference between the answers in the four categories of perceived knowledge, current contribution to
8 conservation and willingness to contribute more. It was adopted to examine the difference between
9 individuals who have been on a marine wildlife watching boat trip and those who have not. Finally,
10 the use of Anova was also adopted with analysis to examine if groups were significantly different
11 from one another. Specifically investigating if the quality of the most recent encounter generates a
12 statistically significant result in the willingness to contribute more to conservation and perceived
13 knowledge in the four education categories. A Pearson's Chi-squared analysis was also used to
14 examine how proximity to marine mammals and number of individuals effect the quality of
15 encounter.

16 **3 Results**

17 A total of 128 different respondents took part in the questionnaire survey. It was seen that less
18 respondents attended boat trips (40.6%, n = 52) than people who did not (59.4%, n = 76). The
19 following section reports on the findings from the questionnaire, covering demographic data, the
20 results from their boat trip, and answers to questions relating to conservation and education.
21 Percentages were relating to the total 128 respondents, unless otherwise stated.

22 **Demographic Data and Boat Trip**

23 *Hometown*

24 The hometowns of respondents differed greatly between individuals and were found to vary
25 in distance from New Quay (Figure 2). The most common distances for visitors to travel from were
26 between 50 - 100 miles (34.4%, n= 44) and 100 - 200miles (34.4%, n = 44). It was common for
27 respondents to be visiting from neighbouring towns within 25 miles (15.6%, n = 20) and less
28 common to find individuals visiting from hometowns within 25 – 50 miles (7.8%, n = 10). Finally, the
29 least common response being from distances further afield 200 – 500 miles (3.9%, n = 5) and 500+
30 miles (3.9%, n = 5).

31 Visitors were predominantly from the UK, primarily from England (49.22%, n = 63) and
32 Wales (43.75%, n = 56), with the minority from Scotland (2.3%, n = 3) and Ireland (0.8%, n = 1).
33 Interestingly only 4.7% of respondents were from New Quay itself (n = 6). Visitors were also found to

1 be from further afield including Germany (1.5%, n = 2), Belgium (0.8%, n = 1) and USA (1.5%, n =
2 2).

3 Respondents between the two categories: those who attended a boat trip, and those who did
4 not, were found to closely follow each other, with the majority of differences being under 3 or fewer
5 individuals. However, there is one key exception, in which visitors from hometowns 50 – 100 miles
6 from New Quay was highly dominated by individuals who did not attend a boat trip (25.8%, n = 33).

7 Respondents were also asked to state if their hometown was rural, urban, or suburban (Figure
8 3). The most common were those from urban areas (45.3%, n = 58), closely followed by hometowns
9 described as rural (42.9%, n = 58). The least common description was suburban (11.7%, n = 15). It
10 was found the differences between the groups who came from rural and urban hometowns closely
11 followed each other, displaying attendees from a rural background (18%, n = 23) and not attendees of
12 this background (25%, n = 32). Similar results were seen in visitors from urban backgrounds, as
13 18.75% of individuals attended the boat trip (n = 24), and 26.6% did not (n = 34). Suburban was the
14 least common response with 3.9% of individuals attending (n = 5) and 7.8% not attending boat trip (n
15 = 10).

16 *Gender and Age*

17 Sixty-nine females (53.9%) and 56 males (43.8%) responded to the questionnaire throughout
18 the survey period. Additionally, two non-binary individuals took part (1.6%) and one individual who
19 preferred not to say. Females who did not attend a boat trip (18%, n = 23) were half as common as of
20 those who did attend (36%, n = 46). Whereas the male respondents were closely related with only a
21 two-person difference in attendees (21.1%, n = 27) and those who did not attend (22.7%, n = 29).
22 Both non-binary individuals were found to attend a boat trip (1.6%), while the one individual who
23 selected prefer not to say did not attend a boat trip (0.8%).

24 The majority of respondents were within the 65-74 age class (24.2%, n = 31), followed by the
25 age class 45-54 years (18%, n = 23), 75+ (14.1%, n = 18), and 35-44 (12.5% n = 16). Age classes 18-
26 24 and 55-64 years each totalled 10.9% of the overall sample size (n = 14). The age class of 25-34
27 years (9.4%) formed the smallest group (n = 12). The difference between the age classes of those who
28 attended boat trips and those who did not was very similar in the majority of categories with only a 1
29 individual difference. However, a notable difference was seen in the age classes 18-24, 55-64 and 75+
30 in which each was dominated by individuals who did not attend, with an 8 person difference in the 18-
31 24 and 75+ age classes, and a 6 person difference in the 45-54 age class.

32 *Level of Education*

33 All respondents were found to have secondary education or higher. The most common level
34 of education was an undergraduate degree (30.5%, n = 39), closely followed by secondary education

1 (28.1%, n = 36). This was then followed by A-level or equivalent (17.2%, n = 22), master's degree
2 (11.7%, n = 15), vocational qualification (5.5%, n = 7), and professional qualifications (4.7%, n = 6).
3 The least common level of education was PhD (2.3%, n = 3). None of the respondents had primary
4 school education or no formal education as the highest levels of education. No significant difference
5 was seen in the level of education between attendees and non-attendees of boat trips as the majority of
6 answers from respondents closely followed one another, however it was noted that the vast majority
7 of individuals who had a master's degree was dominated by non-attendees, 14 of 15 individuals.
8 Additionally, 100% of individuals who had a PhD were attendees of boat trips (n = 1).

9 *Reason for Visiting.*

10 Respondents were also asked what brought them to New Quay that day. The great majority
11 highlighted the purpose for visiting was for a relaxing beach holiday (39.8%, n = 51). This response
12 was over double the amount compared with the second most popular response which was wildlife
13 watching (14.8%, n = 19), followed by individuals living within New Quay and conducting voluntary
14 work (14.1%, n = 18), and those on day trips (13.3%, n = 17). Others were in New Quay for hikes
15 (6.3%, n = 6), were locals of New Quay (4.7%, n = 8), there for the scenery (3.1%, n = 4), and there to
16 visit family (2.3%, n = 3). The least common response was people in New Quay to conduct scientific
17 research, such as a master's thesis (1.6%, n = 2). No notable difference was seen in the reason for
18 visiting New Quay between people who did attend a boat trip and did not a boat trip, however it was
19 seen that all groups had a greater response rate if they did not attend a boat trip, apart from locals of
20 New Quay which saw triple the amount attending trips.

21 *Boat Trip*

22 Attendees described various reasons why they attended a boat trip (Figure 8), the most
23 popular being to have the opportunity to see wildlife in its natural habitat (75%, n = 39). 9.6% of
24 individuals stated they were on a trip to see the natural scenery (n = 5) and 15.4% stated they attended
25 the trip to see the town (urban scenery) from the water (n = 8), whilst only one respondent (1.9%)
26 chose other, which in this case was for photography.

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1 **Conservation**

2 This section covers conservation aspects of the questionnaire, and the answers given by
3 respondents within. It also includes analyses between the answers from the boat trip section and
4 answers from the conservation section.

5 The questionnaire asked in what way do they think wildlife watching trips are effective at
6 contributing towards conservation (Figure 9), unlike the other questions, required individuals to select
7 all answers they agree with. The most common response was chosen by 82.8% of individuals and was
8 that wildlife watching trips are effective as 'they raise awareness of animals and their habitats'
9 (n=106). This was followed by the choice 'the trips are educational' and 'it is a positive alternative to
10 captive wildlife viewing' where both of these options were selected by 76.6% of respondents (n = 98).
11 In addition to this 65.6% of respondents selected 'they allow people to bond with nature' as an
12 effective way wildlife watching trips contribute towards conservation (n = 84). All but one of the
13 responses were high (n=>80). The least popular answer was that 'the trips help charities', which was
14 only selected by 23.4% of individuals (n = 30).

15 Respondents were asked to select which statements they agree with when shown various
16 responses of which can be potential negative impacts on conservation from marine wildlife watching
17 boat trips (Figure 10). This question also allowed multiple choice. The most common response to this
18 question was 'the trips cause pollution' which was selected by 18.75% of total respondents (n = 51),
19 37.5% of respondents also believe wildlife watching trips are negative as 'the trips can scare animals'
20 (n = 48). Additionally, it was found that 32% of all respondents believe the trips are negative as 'the
21 trips are intrusive on nature' (n = 41). Much like the previous question asking the positives to wildlife
22 watching boat trips, these three answers were more commonly selected than the other. In this case, the
23 lowest chosen was that 'the trips create high level of noise disturbance', selected by only 18.8% of
24 total respondents (n = 24). Furthermore, the majority of respondents chose not to answer this question
25 (60.2%, n = 77), which in turn suggests that the majority of respondents believe there are no negative
26 impacts from boat trips, or that they do not know enough about the subject to answer. It was seen
27 within the answers to this question that individuals who did not attend the boat trip were twice and, in
28 some cases, three times as likely to state negative impacts of wildlife watching boat trips.

29 Respondents were also asked how they would invest their money and time in addition to how
30 they believe society as a whole should invest its efforts (Figure 11). These questions asked
31 respondents to pick the answer they most agree with respondents were also given a 6th option 'other'
32 in which they were could invest the resource how they liked, yet no one selected that option so it was
33 removed prior to analysis.

34 A total of 120 of 128 respondents answered the question regarding a monetary investment,
35 individuals stated different aspects of conservation they would invest their money into. The reason for

1 people not to answer can be estimated to be that they do not have any extra money to spend, or
2 uncertainty in a definite answer. Answers here were dominated by the option of investment in local
3 conservation, represented by 38.3% (n = 46). This was then followed by UK conservation and global
4 conservation which was selected by 20% (n = 24) in each case. Education and community work were
5 the least selected option for where respondents would invest their money, with 11.7% of individuals
6 stating they would invest in education (n = 14) and 10% of individuals stating they would invest in
7 community work (n = 12).

8 A total of 123 of 128 respondents answered the question regarding a time investment. The
9 reason for 5 respondents choosing not to answer can be estimated to not having any free time to use,
10 or not having a definite answer on the question. The most common option for respondents to select
11 within this question was also local conservation (26.8%, n = 33), closely followed by the option
12 community work which was selected by 25.2% of respondents (n = 31) and the investment into global
13 conservation (22%, n = 27). 16.3% of individuals stated they would invest their time into UK
14 conservation (n = 20), and least of all 9.8% of respondents stated they would invest time in education
15 (n = 12).

16 A total of 127 individuals answered the question to where society as a whole should prioritize
17 its efforts. The remaining one individual who did not answer this question, can be estimated to them
18 not knowing enough about the question. The most common response for this question was global
19 conservation in which 31.5% of respondents chose (n = 40), followed by local conservation (26%, n =
20 33). Then education (22%, n = 28), which was perhaps selected surprisingly often taking into account
21 it was the lowest selected option when respondents were asked to invest their own resources. Finally,
22 12.6% of respondents chose UK conservation (n = 16), and 7.9% selected community work as where
23 society should prioritize its efforts (n = 10).

24 An independent t-test was carried out to examine if there was a significant difference between
25 the respondents' current contribution towards conservation, between attendees of boat trips and non-
26 attendees. There was a significant difference between those who had attended a wildlife watching boat
27 trip (mean = 3.96) and those who had not (mean = 3.13, $t(126) = -4.0595$, $p < 0.01$). Additionally,
28 respondents were asked if they would increase their active contribution towards conservation, and
29 again a significant difference was seen (mean = 4.06) and those who had not (mean = 3.62, $t(126) = -$
30 2.0725 , $p = 0.04$). Since both display a significant p-value, the difference is not likely due to chance.

31 Respondent satisfaction was examined to allow an understanding of how satisfaction in the
32 wildlife watching boat trip influences any future contribution towards conservation. A linear
33 regression was therefore undertaken. The results of this analysis revealed a significant relationship
34 between the respondent's satisfaction and their view of contributing more to conservation ($\beta = 0.5332$,
35 $p = 0.016$). The positive regression coefficient indicates that higher levels of satisfaction result in a

1 greater tendency to increase their active contribution to conservation. This was described by an
2 11.74% variance in openness to increase active contribution towards conservation efforts.

3 **Education**

4 To examine how a boat trip influences a respondent's knowledge in a specific area, as
5 conveyed by the skipper or guide aboard the wildlife watching boat trip, the perceived level of
6 knowledge between individuals who attended the boat trip and those who didn't were compared (N =
7 128). Knowledge was examined by asking individuals to state their perceived level of knowledge on a
8 one to five scale for four separate categories: marine mammals, local birds, local history, and local
9 geography.

10 This was analysed through the use of t-tests. Marine mammals, local birds and history all
11 showed a significant difference between those who had attended a wildlife watching trip and those
12 who hadn't. The scale regarding marine mammals displayed a mean of 3.87 in those who had
13 attended and a mean of 2.61 in those who had not ($t(126) = -5.76, p = <0.001$). Similarly the scale
14 regarding local birds showed a mean of 3.42 in those who had attended a wildlife watching trip and a
15 mean of 2.47 in those who hadn't ($t(126) = -4.15, p = <0.001$). Finally, regarding knowledge of
16 history, a mean of 3.12 was shown in those who had been on a trip and a mean of 2.34 in those who
17 hadn't ($t(126) = -3.44, p = <0.001$). These results therefore provide evidence that boat trips will lead
18 to a higher level of knowledge within attendees was accepted. On the other hand, the question
19 regarding knowledge of geography showed no significant difference between those who had attended
20 (mean = 3.17) and those who had not (mean 2.80, $t(126) = -1.73, p = 0.08$).

21 As with the conservation questions, the majority of questions relating to education showed a
22 significant difference between the responses of those who had been on a wildlife watching trip and
23 those who hadn't. For this reason, it is again interesting to investigate further how rates of satisfaction
24 influence an individual's perception of their own knowledge in the aforementioned subjects. The
25 results of each topic were found to show no relationship. The overall regression values for each of the
26 four categories were: marine mammals ($R^2 = 0.03, F(1, 51) = 2.111, p = 0.15$), local birds ($R^2 = 0.007,$
27 $F(1, 51) = 0.3634, p = 0.55$), history ($R^2 = 0.04, F(1, 51) = 1.971, p = 0.17$), and geography ($R^2 =$
28 $0.001, F(1, 51) = 0.06891, p = 0.79$). There was also no relationship between satisfaction and self-
29 perceived knowledge in the four categories: marine mammals ($\beta = 0.11228, p = 0.152$), local birds (β
30 $= -0.04446, p = 0.549$), history ($\beta = 0.08012, p = 0.166$), and geography ($\beta = -0.01671, p = 0.794$).

31 **Factors influencing results.**

32 As the results of the analyses showed significant differences it is important to take extra steps
33 to understand what aspects of the trips are most effective at yielding a greater contribution towards

1 conservation intent and higher knowledge. Within this section different elements of the study will be
2 analysed to investigate what features of the trip are effective at generating this change.

3 An Anova test was ran to examine how quality of the trip influences both conservation intent
4 and perceived knowledge. Within analysis the impact of boat trip quality was analysed against
5 conservation intent. The Anova test revealed a statistically significant effect on the data ($F(1,47) =$
6 $5.514, p = 0.0231$). Moreover, the impact of boat trip quality was analysed against the four categories
7 within education. A statistically significant effect was also found within both marine mammal
8 ($F(1,47) = 4.126, p = 0.0479$), and local birds ($F(1,47) = 7.891, p = 0.00722$). However, no significant
9 effect of quality on history ($F(1,47) = 1.81, p = 0.185$) and geography ($F(1,47) = 2.624, p = 0.112$)
10 was not observed.

11 Though self-perceived knowledge on history and geography was seen to have not to be
12 affected by trip quality, the other elements were. Therefore, it is important to note what elements of
13 the trip influenced this outcome. To examine this a Pearson's Chi-squared test was used to analyse
14 how proximity of encounter and number of individuals spotted were examined. The Chi-squared test
15 between quality and proximity displayed a highly significant association $X^2(9, N = 45) = 55.303, p = <$
16 0.001 , yet the test between quality and number of individuals suggested no statistical significance,
17 $X^2(96 N = 45) = 11.108, p = 0.0851$. Suggesting that proximity is an important factor influencing the
18 quality of a sighting, whereas number of individuals is not.

19 **4 Discussion**

20 The results highlighted the extent of which marine wildlife watching boat trips have upon the
21 conservation intent of an individual and their perceived knowledge on a given subject. Displaying
22 how these trips are beneficial in raising visitors' conservation intent and knowledge on described
23 subjects, as supported by the significance between the responses of attendees of the boat trips.

24 Attendees of wildlife watching boat trips within New Quay were predominantly participating
25 to see wildlife in its natural habitat. With the vast population of bottlenose dolphins and other wildlife
26 within Cardigan Bay (Baines & Evans, 2012; Evans & Waggitt, 2023; Feingold & Evans, 2014b;
27 Lohrengel et al., 2017). It is understandable for the majority of tourists to visit the area for that reason,
28 specifically for those who choose to attend the boat trips. The fact that this appeal can be said to be
29 the main reason for visitors in New Quay to attend a wildlife watching boat trip can suggest evidence
30 to a shift from captive to wild animal viewing. This shift is evident within literature with multiple
31 sources claiming its rise (Chen, 2011; Higham & Lück, 2007; Hoyt, 2001) Thus, it is important for
32 residents of New Quay to understand this and ensure the continuation of support provided for the
33 wildlife in this area. In doing so will not only protect the species in question but will also generate a
34 greater economic pull for the community (Garcia-Hernandez, 2015).

1 This shift can be explained by a greater demand for sustainability and conservation, a concept
2 which is becoming increasingly popular in the modern age (Naidoo & Adamowicz, 2005). The
3 popularity and demand for conservation is reflected within this study, through the high response rate
4 to the question ‘In what aspects of wildlife watching trips effective at contributing towards
5 conservation?’. This finding can be described through the demand for ecotourism, in which tourism is
6 contributing to environmental conservation and ecological sustainability (Reimer and Walter, 2013).
7 This demand will highly benefit both the welfare of the wildlife in question (Higham & Lück, 2007)
8 in addition to the local economy as previously mentioned.

9 The potential negative effects of wildlife watching boat trips were also investigated.
10 Interestingly, it was seen that overall individuals who did not attend a boat trip were more than twice
11 as likely to indicate reasons why these trips are harmful to the environment (Figure 10). It can be
12 deduced that prior to attending a boat trip, people believe there is a greater negative impact to the
13 environment than actually occurs. It can be understood that the lack of overall responses to why the
14 boat trips in New Quay have negative impacts on the environment is down to legislation put in place
15 to minimise the impact. One key example within Cardigan Bay states that recreational vessels should
16 be aware of bottlenose dolphins and other marine mammals, stating a restriction of a minimum 100
17 metres to the animals and a maximum of 15 minutes spent with them (within 300m) additionally
18 preventing excessive and avoidable noise and boat speed (Ceredigion Marine Code, 2008).

19 The results displayed that ecotourism within New Quay are successful at educating members
20 of the public in the areas addressed on the trip demonstrated through the significance seen within
21 analysis. Throughout the literature it is well understood that that education should be a principal
22 element in any form of ecotourism (Orams, 2000; Reynolds & Braithwaite, 2001; Walker, 2018), due
23 to its influence over establishing pro-conservation attitudes (Wilson & Tisdell, 2003), while providing
24 a vehicle for personal and professional development (Buhalis & Law, 2008). Lück (2003) stated that
25 education within these trips is a sought-after effect, therefore by knowing the trips within New Quay
26 are educational, they become even more desirable for tourists. With a higher demand for such trips,
27 the local community can further benefit from a greater source of revenue for the economy and a
28 greater level of conservation intent influenced in attendees, which literature suggests is an important
29 element for the local communities (Alexander, 2000; Sekhar, 2003).

30 Though significance was seen regarding perceived knowledge in the given areas between boat
31 trip attendees and non-attendees, geography was seen to not display significance. This can be
32 explained very simply since on the boat trips, marine mammals, local birds, and history are well
33 covered, whereas geography is only briefly mentioned. This finding itself provides greater credibility
34 within the questionnaire, reflected by the fact that the three topics which were highly discussed on the
35 boat trips were those which displayed significant differences. Whereas information on geography,

1 which was only briefly mentioned within the trip, did not. This suggests that the difference noted
2 between respondents who have been on a trip is accurate and is not an element caused by socially
3 desirable bias.

4 The findings also showed that in addition to being an educator, marine wildlife watching boat
5 trips are successful at raising an individual's conservation intent. Connectedness with wildlife seems
6 to be a key factor in influencing this behaviour. In this manner, Frantz & Mayer (2014) noted that a
7 visitor's connection to nature is key as the feeling of connectivity can motivate protective and self-
8 sacrificing behaviour among individuals. With this in mind, if a wildlife watching trip was to promote
9 this connectedness, it can fulfil the role of a conservation driven activity. The findings of this study
10 found that 65.6% of respondents stated that these trips allow people to bond with nature. Therefore,
11 showing wildlife tourism within New Quay is effective at fostering conservation intent.

12 Through analysis examining what aspects are most effective at influencing a greater self-
13 perceived knowledge and conservation intent, it was uncovered that the proximity of encounters was
14 statistically significant, whereas the number of individuals sighted was not. Similarly, Mayes &
15 Richins (2008), concluded that the effectiveness of dolphin watching cruises on proenvironmental
16 attitudes and intended behaviour is characterised by close, clear encounters of dolphins. Though this
17 is an important aspect in generating these positive outcomes, the proximity of encounters is not an
18 aspect boat operators can work to achieve, due to the uncontrollability of wild animals (Margaryan &
19 Wall-Reinius, 2017). Furthermore, in order to minimise the negative impacts anthropogenic activities
20 have upon wildlife populations, legislations are put in place preventing the boats from entering within
21 a specific distance to the populations (Vergara-Peña, 2020). Therefore, it is suggested that this finding
22 be investigated further in order to understand what element of proximity causes this effect. Thus, boat
23 operators can embrace this approach to effectively influence these effects.

24 Marine wildlife is important for the majority of people interviewed. This is clearly seen
25 throughout the answers to the questionnaire as a whole. One key example of this is seen within the
26 question "Why did you go on a wildlife watching trip?", in which the vast majority stated they go on
27 these to see wildlife in its natural habitat. Additionally, further responses within the questionnaire
28 show similar results, shown within the response to "In what aspects are wildlife watching trips
29 effective at contributing towards conservation?", where respondents commonly selected answers
30 relating to marine mammals and wildlife viewing.

31 Interestingly, over 75% of respondents also stated that wildlife watching trips in the natural
32 environment are "a positive alternative to captive wildlife viewing", which provides evidence pointing
33 towards a shift from captive wildlife viewing to wildlife viewing in natural circumstances. This
34 finding is further supported by countless studies which explain the increase in non-captive wildlife
35 viewing and a decline in captive viewing. Packer & Ballantyne (2012) noted that tourists are much

1 more likely to attend non-captive sites for marine wildlife viewing such as boat watching trips, or
2 turtle viewing experiences, than captive experiences such as marine theme parks and aquariums.
3 Therefore, showing the importance of wildlife watching trips like these.

4 Limitations

5 The research sought out to examine how wildlife watching boat trips can educate and
6 influence a conservation-forward mindset within attendees yet it was limited to some degree by
7 certain aspects in the design. The key factor limiting this study is the unequal weightings between the
8 two groups, wherein 40.6% of respondents attended a wildlife watching boat trip and 59.4% did not.
9 This could potentially lead to findings that may be inaccurate due to the uneven weightings, when
10 taking into account total answers within a given question.

11 Although it is useful to know that people state they will contribute more to conservation, this
12 is not a definite promise - it is merely a statement. Therefore, the testing of actual contribution to
13 conservation should be examined in another way. Similarly, knowledge gained from these trips are
14 measured using self-perceived values selected by the respondents themselves. This brings one to the
15 argument made by Forestell & Kaufman (1991) who assumed that effectiveness should be measured
16 in terms of changes in actual behaviour, rather than changes in attitudes. This statement itself
17 challenges the validity of the study design. In order to more accurately examine how wildlife
18 watching boat trips impact education and perception of conservation within visitors, other methods
19 will need to be adopted, such as that described within Forestell & Kaufman (1991).

20 Conclusion

21 The findings of this paper uncovered that wildlife watching boat trips are successful at
22 educating the public in addition to fostering a commitment to conservation in individuals who attend.
23 Furthermore, the finding that proximity was found to be an important aspect. Education and
24 awareness link together to reach successful management and conservation. Therefore, by using the
25 lessons learnt within this paper the greater these benefits can be met. By educating the public on the
26 marine environment, and the potential impact they can have upon it, we as a society can adapt to
27 benefit the ecosystems around us while benefitting economically and personally from this effect.

28 Research into the effects of wildlife watching tourism should continue to be investigated to
29 generate a better understanding to how it can be adopted to inspire the aforementioned benefits. It is
30 suggested that the finding that the proximity of encounters is highly beneficial should be expanded
31 upon. Specifically, investigating why this element is desired within this form of tourism. In doing so,
32 operators can use the information learnt to adapt the trips they offer accordingly, to not only increase
33 the sustainability of the trips they offer, but to also generate a more fulfilling and desirable activity for
34 tourists.

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6 support was unbelievably beneficial throughout this period.

7 I am grateful for you all, your assistance has been vital in making this piece of work what it is today.

8 Thank you.

9

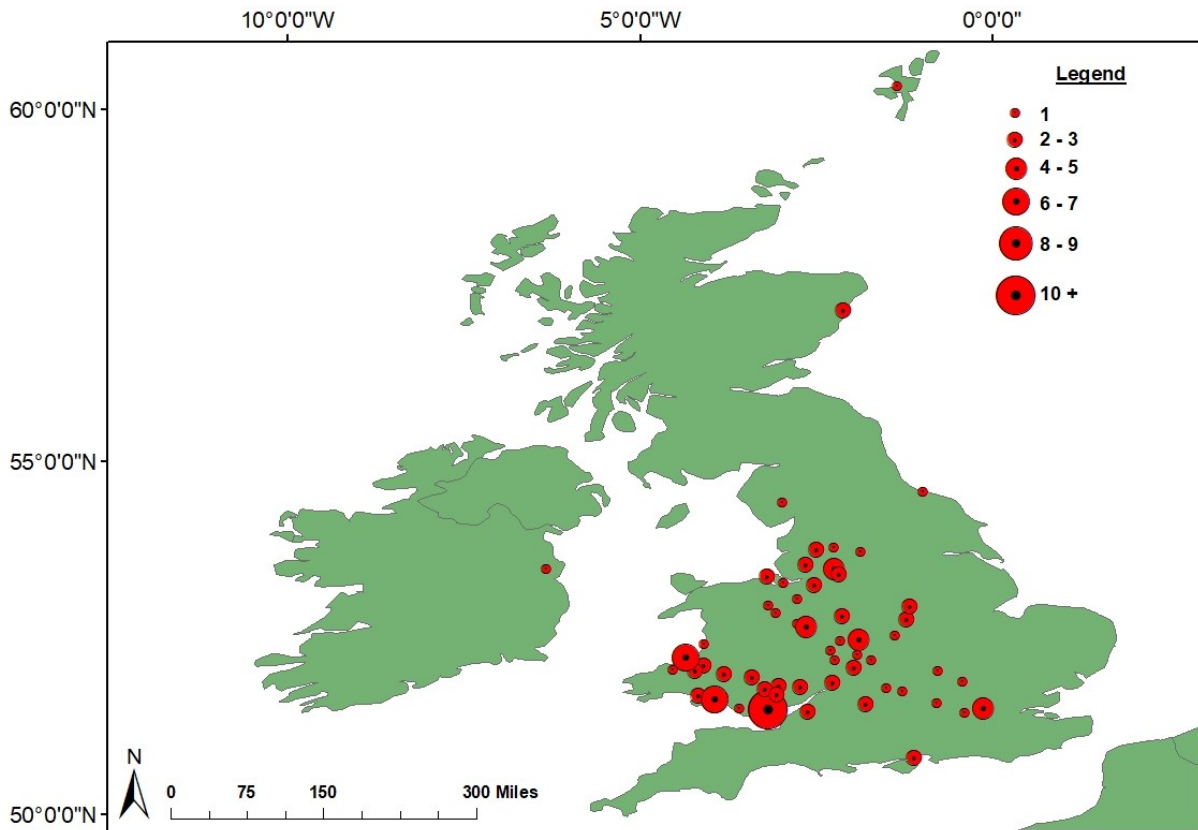
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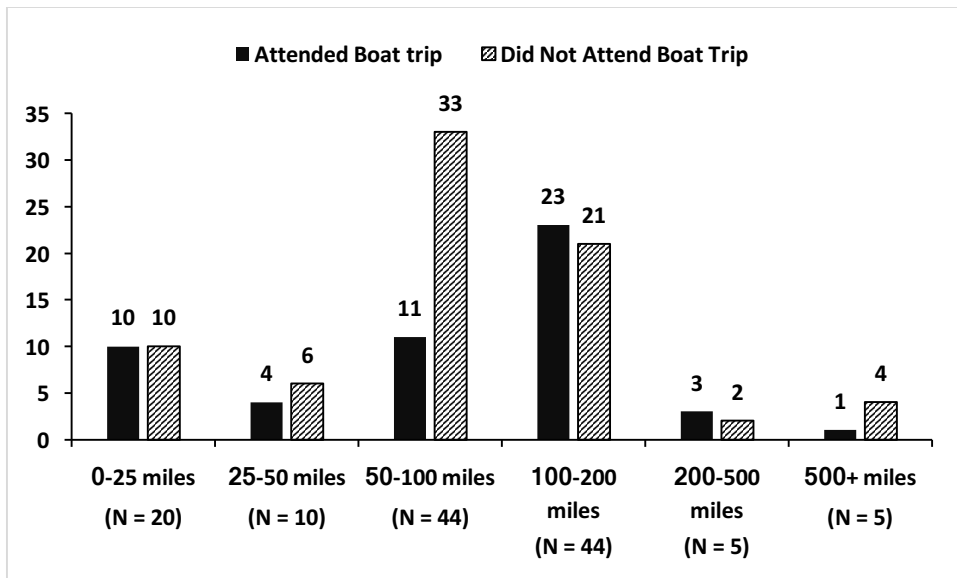
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1 **Figures**



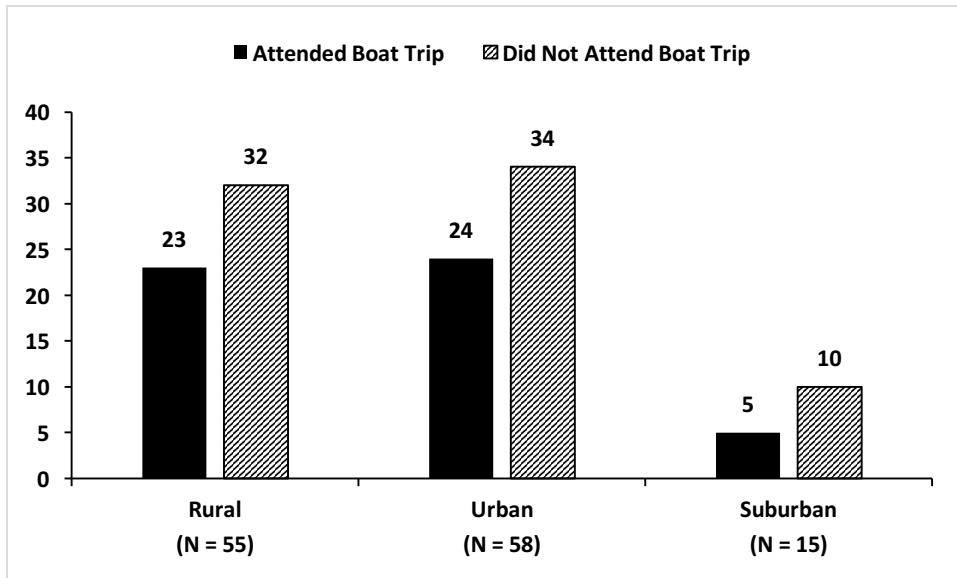
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3 **Figure 1.** A bubble map of the UK, displaying total responses from each hometown.



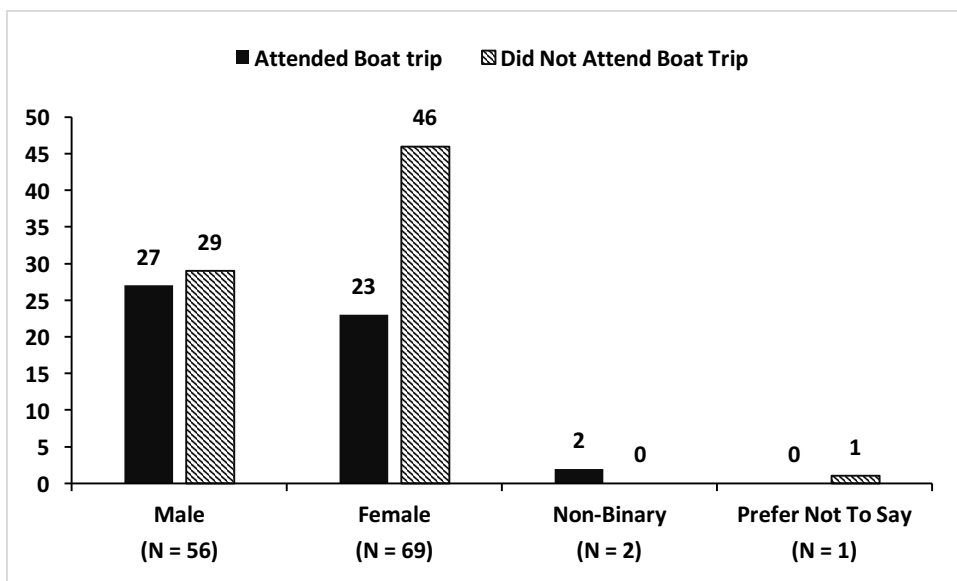
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5 **Figure 2.** The distances from New Quay to respondents hometown in miles.



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2 Figure 3. The characteristic of respondents hometowns, split between those who attended a wildlife
 3 watching boat trip and those who did not.

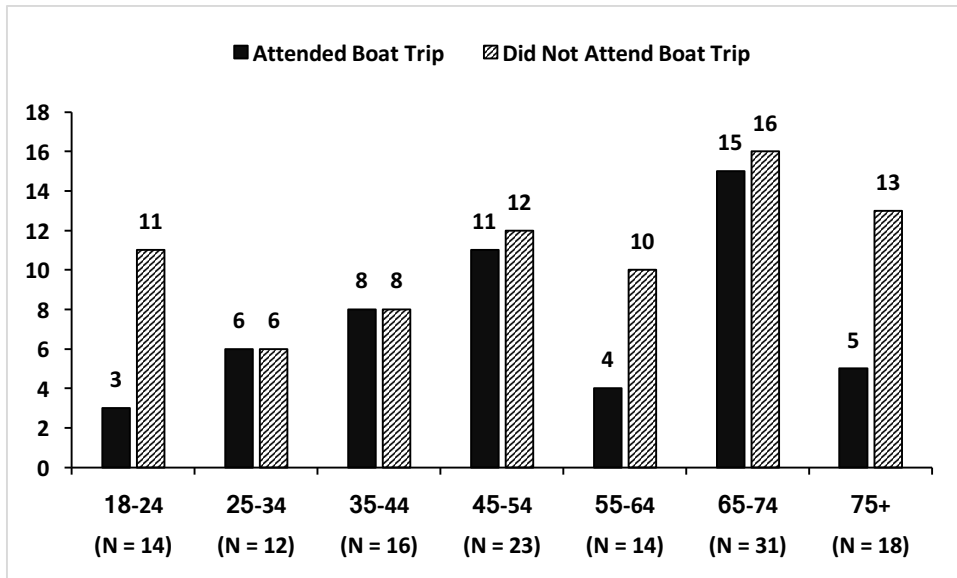


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5 Figure 4. The identified gender of respondents, split between those who attended a wildlife watching
 6 boat trip and those who did not.

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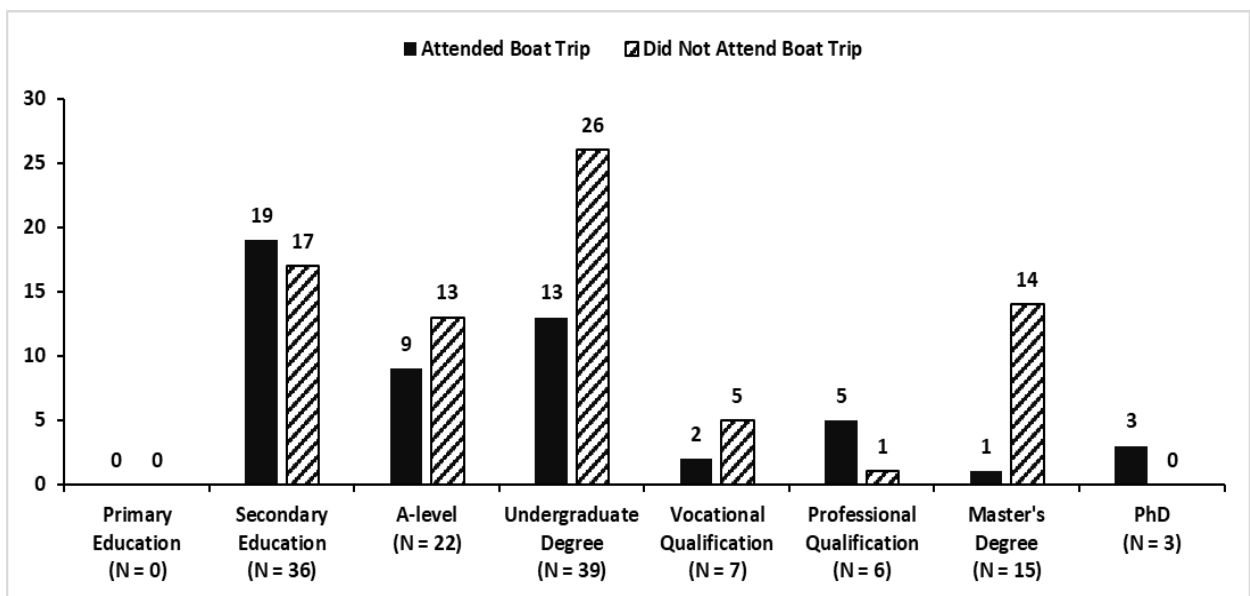
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2 Figure 5. The age classes of respondents, split between those who attended a wildlife watching boat
 3 trip and those who did not.

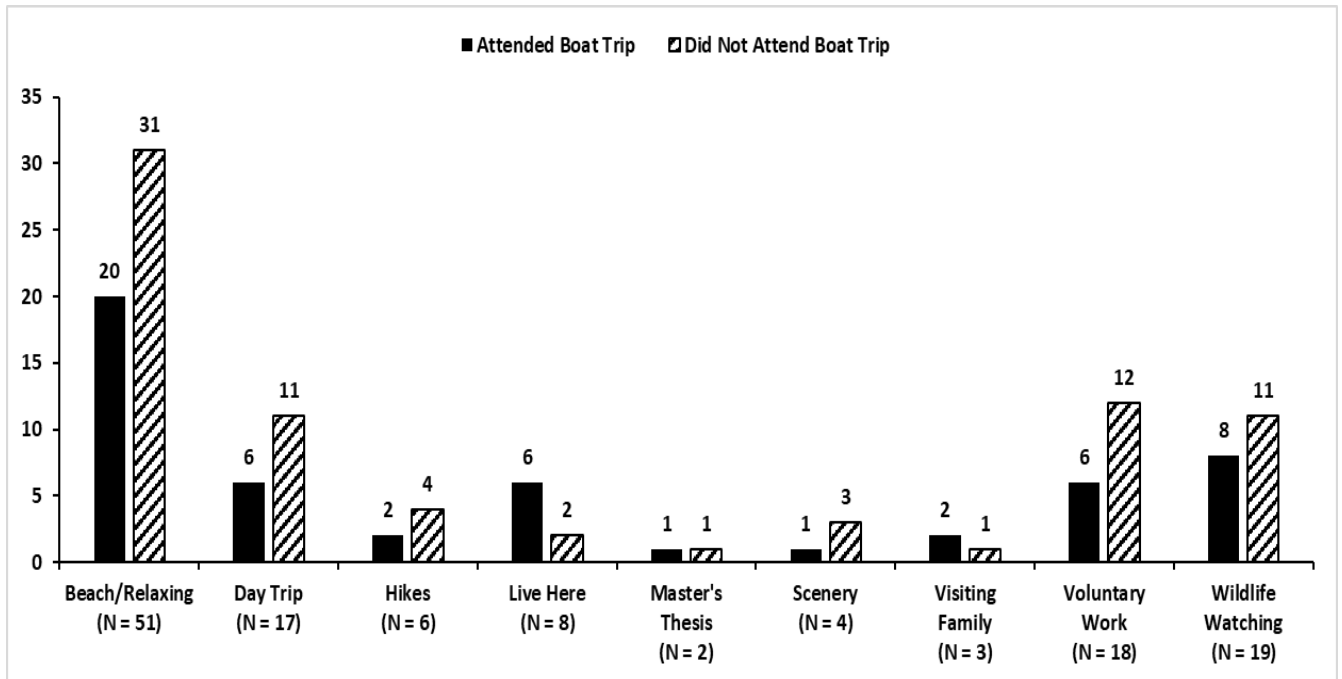
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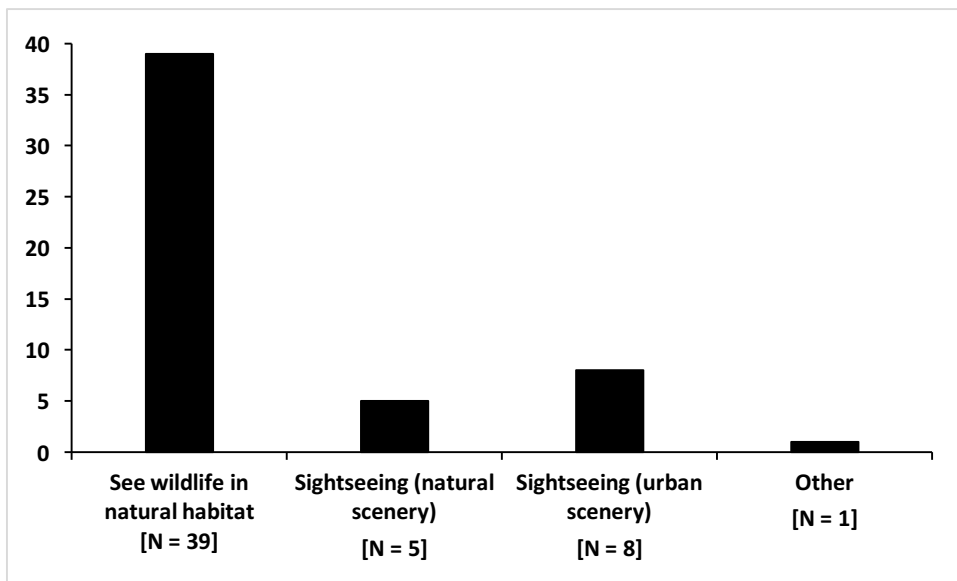
6 Figure 6. The highest level of education of respondents within New Quay, split between those who
 7 attended a wildlife watching boat trip and those who did not.

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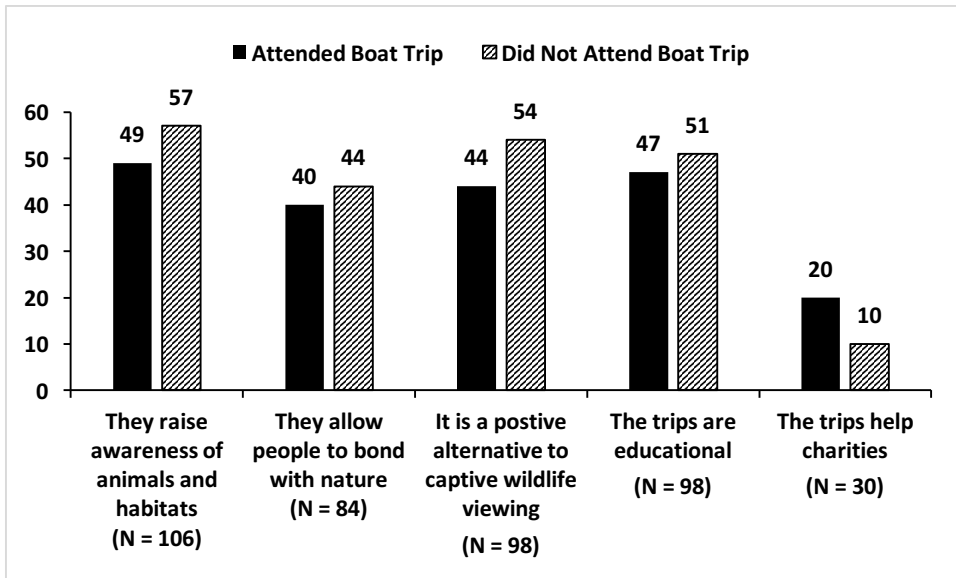
2 Figure 7. The motivation for respondents trip to New Quay, split between those who attended a
 3 wildlife watching boat trip and those who did not.



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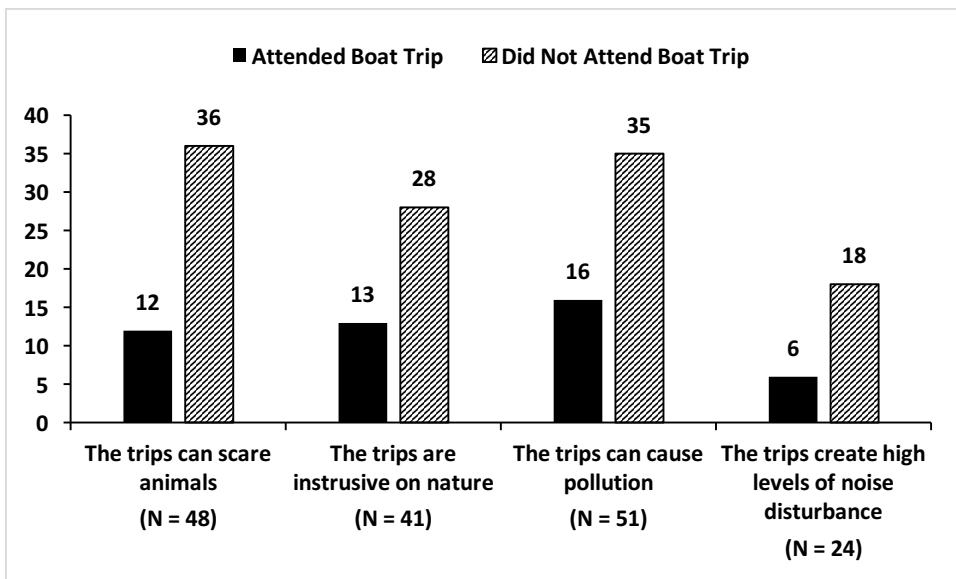
5 Figure 8. The reasons why respondents attended a wildlife watching boat trip within New Quay,
 6 Ceredigion (N = 53).

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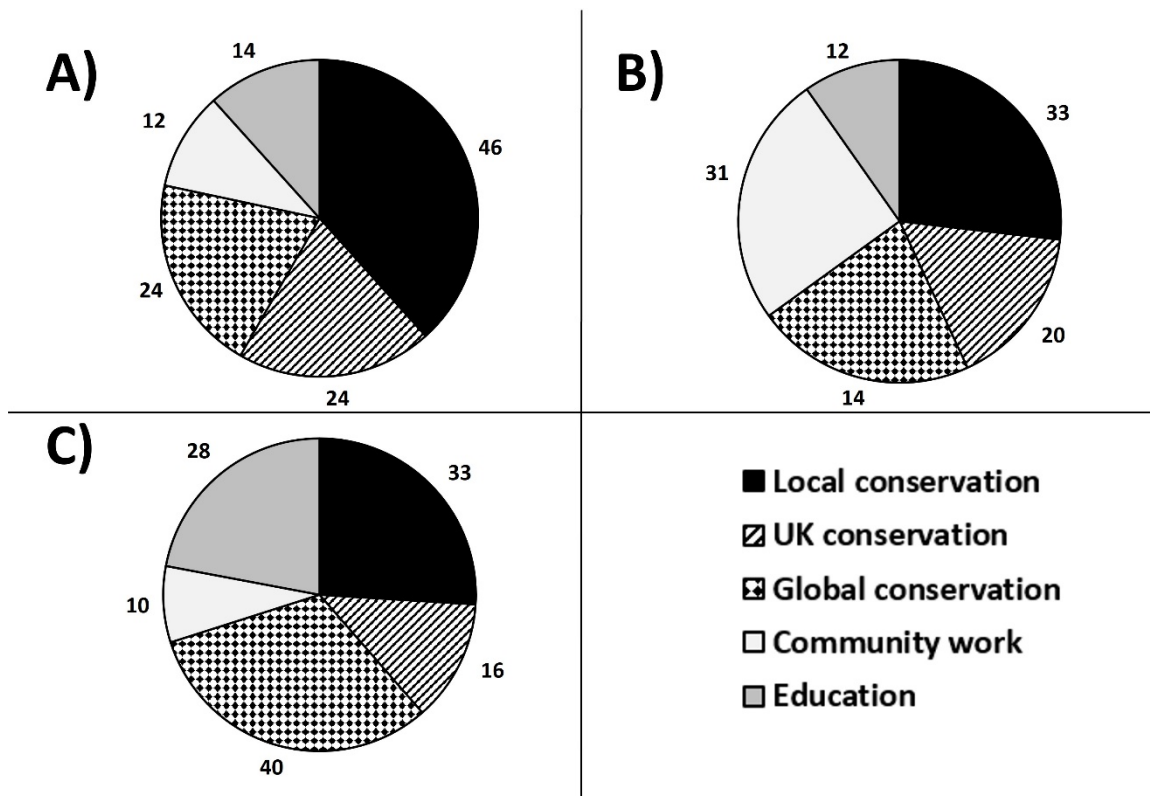
2 Figure 9. Answers to the question what aspects of wildlife watching trips effective at contributing
 3 towards conservation, provided by members of the public within New Quay, Ceredigion (N = 128)



4

5 Figure 10. Answers to the question which aspects of marine wildlife watching trips may have negative
 6 impacts on conservation, from the public within New Quay, Ceredigion (N = 128)

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Figure 11. What aspects of conservation are respondents most likely to invest their A) money, and B) time in, in addition to C) where they believe society as a whole should prioritise its efforts. Respondents were individuals present within New Quay, Ceredigion during the research period.

1 Annex | Questionnaire

2 A) General information

3 **What is your nearest hometown?**

4 (Please specify) _____

5 **Which category describes your hometown? (Tick one which best applies)**

6 Rural (Primarily dominated by countryside) Suburban (A combination of countryside and
7 town)

8 Urban (relating to a city or town)

9 **What gender do you identify as?**

10 (Please specify) _____

11 **What is your current age? (Tick one which best applies)**

12 18-24 25-34 35-44 45-54 55-64 65-74

13 75 and older

14 **What is your highest level of education? (Tick one which best applies)**

15 No formal education Primary school education

16 Secondary school education (GCSE or equivalent) A-levels or equivalent

17 Vocational qualification (e.g., NVQ) Undergraduate degree (e.g. Bachelor's
18 degree)

19 Master's degree Ph.D. (Doctorate)

20 Professional qualification (e.g., ACCA, CIMA,
21 Bar Association) Other (Please specify) _____

22 **Why are you currently in New Quay? (Tick one which best applies)**

23 Wildlife watching Hikes Beach/relaxing holiday Scenery

24 Live here Other (please specify) _____

25 B) Boat trip

26 **Have you attended a wildlife watching boat trip within New Quay? (Tick one which best applies)**

27 Yes [Go to section 1.1] No [Go to section 2]

28 **Section 1.1: If YES**

29 **Which boat did you attend?**

30 Ermol 6 Dunbar Dream Catcher Morlo Charisma Anna Lloyd

31 Sulaire Other (please specify) _____ Don't know/prefer not to say

32

1 **How many wildlife watching trips have you been on in New Quay, including your most recent?**
2 **[Tick one which best applies]**

3 1 2 to 5 6 to 10 More than 10

4 **On your trip did you encounter any marine mammals (e.g. dolphins, porpoises, or seals) [Tick one**
5 **which best applies]**

6 Yes [Go to [section 1.2](#)] No [[Skip section 1.2](#)]

7
8 **Section 1.2: If YES**

9 **On your most recent trip, please indicate the category that best describes the encounter based on**
10 **the following criteria: proximity, view quality, and number of individuals spotted. [Please tick only**
11 **one option in each section]**

12 A – Proximity of encounter

13 Very close (<50m) Close (50-100m) Far (100-300m) Very far (>300m)

14 B – View quality of encounter

15 Excellent (Clear and breath-taking sightings) Good (Enjoyable and visible sightings)

16 Moderate (Partial glimpses with fair visibility) Poor (Limited and disappointing sightings)

17 C – Number of individuals spotted within trip

18 One individual 2 to 5 individuals 6 to 10 individuals 10 or more individuals

19 **On all your trips combined, please indicate the category that best describes the encounter based**
20 **on the following criteria: proximity, view quality, and number of individuals spotted. [Please tick**
21 **only one option in each section]**

22 A – Proximity of encounter

23 Very close (<50m) Close (50-100m) Far (100-300m) Very far (>300m)

24 B – View quality of encounter

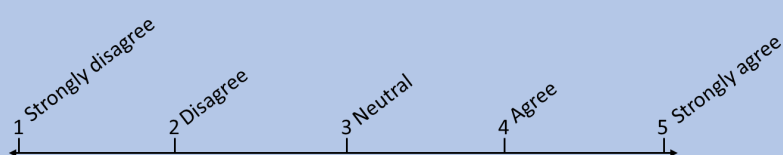
25 Excellent (Clear and breath-taking sightings) Good (Enjoyable and visible sightings)

26 Moderate (Partial glimpses with fair visibility) Poor (Limited and disappointing sightings)

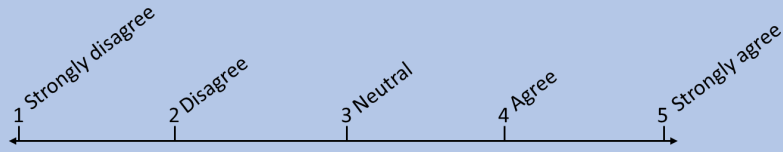
27 C – Number of individuals spotted within trip

28 One individual 2 to 5 individuals 6 to 10 individuals 10 or more individuals

29 **I will attend another wildlife watching trip within New Quay in the future [Circle a number on the**
30 **scale which best applies]**



1 I am satisfied with the wildlife watching boat trip which I have attended [Circle a number on the
2 scale which best applies]

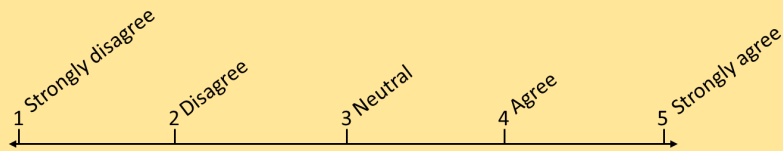


4 Why did you go on the wildlife watching trip? [Tick one which best applies]

- 5 Experience animals in their native habitat Sightseeing (natural scenery)
6 Sightseeing (Rural scenery) Other (Please specify) _____

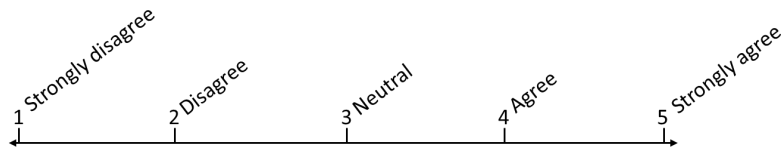
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9 **Section 2: If NO**

10 I will attend a wildlife watching boat trip in New Quay in the future [Circle a number on the scale
11 which best applies]



14 **C) Conservation**

15 I actively contribute towards conservation [Circle a number on the scale which best applies]



18 In what aspects are wildlife watching trips effective at contributing towards conservation? [Tick all
19 statements you agree with]

- 20 They raise awareness of animals and habitats They allow people to bond with
21 nature.
22 It is a positive alternative to captive wildlife viewing The trips are educational
23 The wildlife watching trips help charities

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Which aspects of marine wildlife watching trips may have negative impacts on conservation? (Tick all statements you agree with)

- The trips can scare the animals
- The trips are intrusive on nature
- The trips can cause pollution
- The trips create high levels of noise disturbance

Which aspects of conservation would you be willing to invest your money? (Tick one which best applies)

- Local conservation
- UK conservation
- Global conservation
- Community work (e.g. Beach cleans)
- Education
- Other (Please specify) _____

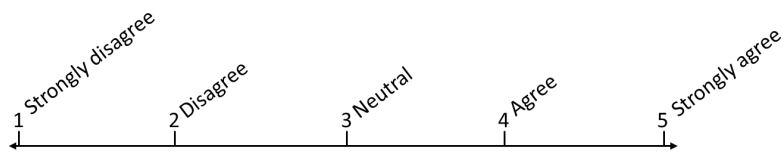
Which aspects of conservation would you be willing to invest your time? (Tick one which best applies)

- Local conservation
- UK conservation
- Global conservation
- Community work (e.g. Beach cleans)
- Education
- Other (Please specify) _____

Which aspects of conservation should society as a whole prioritize its efforts? (Tick one which best applies)

- Local conservation
- UK conservation
- Global conservation
- Community work (e.g. Beach cleans)
- Education
- Other (Please specify) _____

I am open to increasing my active contribution towards conservation efforts [Circle a number on the scale which best applies]



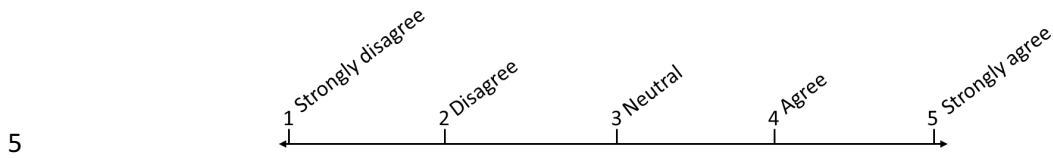
Are you currently member of a conservation group (e.g. Wildlife trust or RSPB)?

- Yes
- No

1

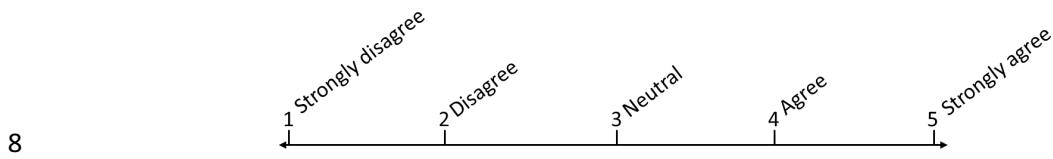
2 D) Education

3 **I have recently acquired significant knowledge about marine mammals. [Circle a number on the**
4 **scale which best applies]**



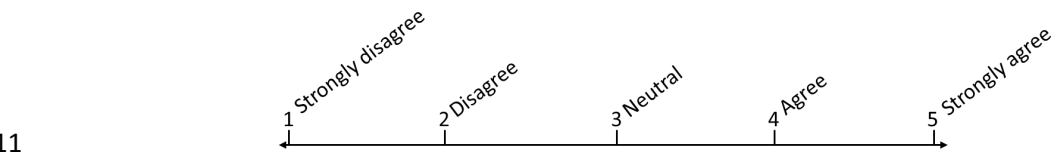
5

6 **I have recently acquired significant knowledge about the local bird. [Circle a number on the scale**
7 **which best applies]**



8

9 **I have recently acquired significant knowledge about the local history of New Quay. [Circle a**
10 **number on the scale which best applies]**

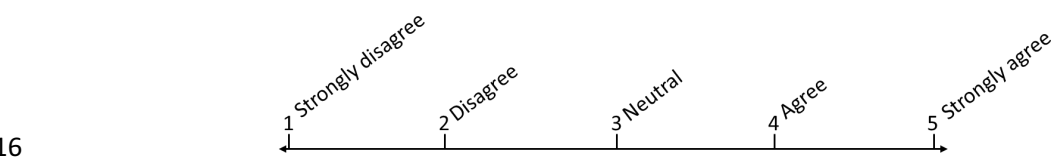


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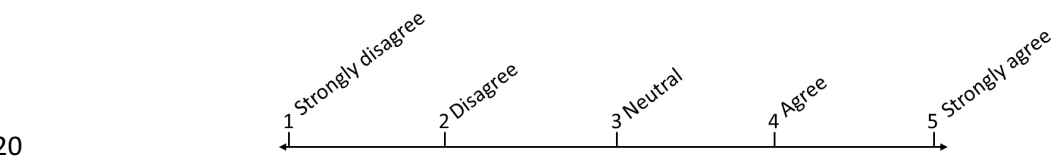
13

14 **I have recently acquired significant knowledge about the local geography of New Quay. [Circle a**
15 **number on the scale which best applies]**



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17 **It is important for the boat operator to be educated in the four aforementioned categories**
18 **(marine mammals, local bird species, local history, and local geography). [Circle a number on the**
19 **scale which best applies]**



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Information of the survey

4 My name is Tobias Swann. I am undergoing research for my thesis for an MSc in Marine Biology at
5 Bangor University in close collaboration with Sea Watch Foundation. The aim of my questionnaire is
6 to gather data to provide information on the assessment of how wildlife watching trips shape
7 perception and knowledge of conservation. You are invited to participate within this project as you
8 are currently visiting or living in New Quay and have had the opportunity to attend a boat tour.

9 Your involvement in this study is voluntary. You may choose not to participate in addition to having
10 the choice to withdraw at any time. This questionnaire includes a series of questions, which will take
11 roughly 5-10 minutes to complete. All responses to this survey will remain entirely anonymous and
12 confidential. Results will be collated at Bangor University.

13 If you have any questions about the study, please contact Tobias Swann (tbs22qrs@bangor.ac.uk,
14 07928590184).

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16 Thank you for taking part,

17 Tobias Swann
18 MSc Marine Biology
19 Bangor University

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In collaboration with



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