diversity

MDPI

Article

Attitude Index of Local Communities toward Wildlife and Their Management Methods in Malaysia

Siti Mastura Hasan * and Sándor Csányi

Department of Wildlife Biology and Management, Institute of Wildlife Management and Nature Conservation, Hungarian University of Agriculture and Life Sciences, Páter Károly u. 1., H-2100 Gödöllő, Hungary
* Correspondence: smasturahasan@gmail.com

Abstract: Wildlife have an important role in the lives of local people and conservation practitioners in Malaysia because of their rare and elusive status, socioeconomic impacts, and management conflicts. However, few studies have evaluated the local attitudes toward wildlife and their management methods in Malaysia. In this study, we used indices to measure attitudes toward wildlife and their management methods in Malaysia. The iterative item reliability analysis was executed on online questionnaire data from a random sample of 585 local respondents using Cronbach's alpha. The result yielded two indices of locals' attitudes; (i) Wildlife Attitude Index (WAI); and (ii) Wildlife Management Method Attitude Index (WMMAI). The WAI had a Cronbach's alpha coefficient of 0.71 and the WMMAI had a Cronbach's alpha coefficient of 0.73. The following variables had significant determinants of WAI and WMMAI in Malaysia: (i) gender; (ii) age; (iii) level of education; (iv) residential area; (v) familiarity (experience); and (vi) nature engagement. These attitude indices could be significant in assisting conservation practitioners and decision-makers in understanding locals' attitudes to prioritize wildlife management practices and showing the relationship between management and local demographics with the assumption that high-scoring individuals are more likely to favor wildlife conservation initiatives and activities.

Keywords: attitude; attitude index; wildlife; wildlife management; wildlife management method; local; Malaysia

Citation: Hasan, S.M.; Csányi, S. Attitude Index of Local Communities toward Wildlife and Their Management Methods in Malaysia. *Diversity* **2023**, *15*, 202. https://doi.org/10.3390/d15020202

Academic Editor: Xie Yi

Received: 31 December 2022
Revised: 22 January 2023
Accepted: 26 January 2023
Published: 1 February 2023

1. Introduction

Wildlife create complex social, ecological, economic, and management conflicts involving many stakeholders with various backgrounds and preferences [1]. The interactions between wildlife and local people's attitudes can be multifaceted, possibly resulting in both negative and positive thoughts, feelings, or behaviors [2]. This interaction grows the range and number of decision-makers involved in wildlife management. Seeing wild animals in human areas (habitations) and properties may have particular value for local areas portrayed as a natural environment [3]. However, wildlife may impact local properties and potentially be exposed to a greater risk of acts of cruelty by local people toward them [1].

Repeatedly, human–wildlife interactions have generated negative impacts [4]. Interactions that create negative consequences for either humans or wildlife or both are termed human–wildlife conflict [1]. Human–wildlife conflict can cause stress on local livelihoods by threatening human life [5], destroying crops [6], and attacking livestock [7], often resulting in lost income [8]. These costs can result in negative attitudes toward wildlife management and conservation among locals [9]. Such costs have significant implications for wildlife conservation, but attempting to mitigate them by regulating local activities often results in limited local acceptance of wildlife management initiatives [10].

The management of wildlife through several methods, such as controlling the number, relocating, or influencing wildlife behavior, is a significant matter of considerable controversy amongst many stakeholders, including the local community [11]. This further increases the range of locals potentially involved in and influencing their management, some

of whom may be unfamiliar with "traditional" wildlife management methods, and hence, question their legitimacy. Furthermore, wildlife is being increasingly encountered in rural and urban areas. The limited space increases these human encounters with wildlife [12]. Human–wildlife conflict can intensify when humans compete for similar resources such as food or space [13], highlighting the need to find ways of co-existence between local people and wildlife [14].

In Malaysia, various forms of wildlife management methods these days significantly need to consider local needs, opinions, and attitudes. For efficacy in wildlife management and conservation, locals' attitudes toward wildlife must be considered [15]. The management of wildlife through various methods, such as habitat management, hunting, euthanasia, education, and capture and relocation, is a conflict issue amongst locals and conservation practitioners who have different opinions and are involved in wildlife management decision-making, e.g., [16,17]. Consequently, there is consensus that more than the biodiversity and ecology information alone is needed to understand locals' attitudes and ensure support for wildlife and their management. Therefore, information about local socio-demographics, nature engagement, familiarity (experience), and the influence on attitudes toward wildlife is necessary to develop and improve wildlife management. Socio-demographic factors, such as age, gender, level of education, residential area, and familiarity (experience), are the most frequently cited in the existing literature [18].

Attitudes provide an essential means of assessing the performance of conservation [19] and management practices. Attitudes are the culmination of thoughts, feelings, or opinions about a particular object or personal experience [20]. Local attitudes toward management efficiency have strongly influenced active participation in management and conservation [21]. The assessment and understanding of local attitudes toward wildlife conservation are growing into an integral component of wildlife conservation and management [22]. There has been a variety of attitude studies in the previous literature. Yet, the majority of the studies did not specify the quantitative evaluation used to measure the locals' attitudes toward wildlife management methods. This study aimed to investigate locals' attitudes through a quantitative evaluation using a multi-item index and to determine the key factors of attitudes toward wildlife and their management methods, including socio-demographic factors. In this study, we explored the preference for wildlife management methods in Malaysia and how the acceptability of wildlife and their management methods are influenced by local attitudes.

2. Materials and Methods

A total of 585 local respondents were selected based on simple random sampling techniques for the survey. Vaske (2008) [23] noted that a sample size of 400 is considered suitable for generalizing a population number at the 95% of confidence level with a ±5% margin of error for human dimension studies.

2.1. Study Area and Data Collection

The four pages of the questionnaire were distributed online using the Google Form platform from 18 May to 23 May 2021 among locals living in Malaysia. Malaysia has a total area of 328,660 sq. km, and the local population is estimated to be 32.7 million, with an annual growth rate of 0.2% per annum in the year 2022. The male population outnumbered the female population, with 16.8 million and 15.9 million, respectively [24]. The median age of the population in Malaysia is 30.3 years.

Malaysia has two administrative regions: Peninsular Malaysia and East Malaysia, the latter of which consists of Sabah and Sarawak (Borneo). Although the regions fall within the same country, they differ regarding the human population, social economic activities, and prevalence of human–wildlife conflicts. The population of the Borneo region is widely spread out, with 46% of the population in Sabah state and Sarawak state living in rural areas as opposed to the national average of 29%, and 20% within Peninsular Malaysia. The lower population density of these two states correlates with their respective levels of

urbanization. The population density in Malaysia is estimated to be 99 per km^2, and 78.4% of the population is an urban community.

A total sample of 585 local respondents from all regions was selected (Table 1) based on a combination of multi-stage and simple random sampling techniques [25] for the survey. We recorded local surveys in each region based on the population and housing census of Malaysia 2020 [24]. This resulted in 8.2 million local households forming the sampling frame for this survey. We then clustered the respondents according to the sub-areas and allocated each sub-area the proportion of the survey target based on proportional random sampling. We recorded a random sample of 585 respondents from all clusters with a simple random selection technique using a random number table [26]. We then administered the questionnaires to respondents (>18 years). The survey recorded local socio-demographic data and assessed the attitudinal responses to 16 Likert items on a five-point Likert scale. For each item, the respondents were asked to indicate and rate their level of agreement using 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree [27].

Table 1. Distribution of samples from each region.

Regions	Land (sq. km) *	No. of Sub-Areas	Population (Millions) *	No. of Households (Millions) *	No. of Respondents
Peninsular Malaysia	130,590	14	26.16	6.9	476 (81.4%)
Sarawak	124,450	8	2.74	0.6	65 (11.1%)
Sabah	73,620	6	3.80	0.7	44 (7.5%)
Total	328,660	28	32.70	8.2	585

* Data was obtained from the Department of Statistics Malaysia and Malaysian Aviation Commission [24,28].

2.2. Design of Questionnaire

The questionnaire was constructed based on the scientific literature and also guided by the research objectives. We constructed a structured questionnaire considering the various socio-demographic and cognition variables, such as knowledge and experience [29], that are likely to affect the attitudes of local people toward wildlife and management. The questions on socio-demographics and experience (familiarity) were measured on a nominal scale. The residential area of the respondents and their gender, age, and level of education were measured in continuous quantitative values. Some questions in the questionnaires required the respondents to indicate the extent to which they agreed with the given statements concerning their attitudes toward wildlife and management methods on a five-point Likert scale.

The four-page final questionnaire was constructed in the English language and included an introduction page and three pages of questions with four sections. The Section 1 contained questions about local experience with wildlife in Malaysia. The Section 2 included 9 questions about local attitudes toward wildlife and different wildlife management method preferences. The Section 3 included 5 questions regarding locals' attitudes toward wildlife. The Section 4 included 7 questions regarding locals' demographic information. A preliminary survey was given to 20 students at the Hungarian University of Agriculture and Life Science, Gödöllő to check for the content and clarity of the wording. Adjustments were made using the feedback from the preliminary survey, and then a pilot study was conducted. The pilot study was analyzed using Cronbach's alpha to test the survey's validity and reliability before the final survey was conducted. Questions that did not meet the minimum acceptable size of Cronbach's alpha, which is between 0.60 and 0.70 [30], were removed and adjusted.

2.3. Design of Attitude Indices

The attitude indices were constructed based on the scientific literature following Babbie (2014) [31] and also guided by the research objectives. To measure the attitudes

toward wildlife and their management methods in Malaysia, we constructed indices for attitudes toward wildlife (Wildlife Attitude Index, WAI) and attitudes toward wildlife management methods (Wildlife Management Method Index, WMMAI) based on the 16 Likert-type items. All the indices of attitudes were tested for content validity (how much a measure covers the range of meanings within the concept and if it is published in the scientific literature and pre-survey clearly defining the construct of attitude at the outset of the study); face validity (the extent to which empirical measures may or may not conform to our common understanding and individual images concerning a particular concept, measured by working with conservation practitioners and researchers to scrutinize and review the dimensions); and construct validity (referring to the logical relationships among the variables based on the statistical analysis) [31].

In this study, Cronbach's alpha coefficient was used to identify the internal consistency reliability of the scale used. We constructed this using Cronbach's alpha and item analysis, resulting in a single index with a moderate level of reliability (0.7) [30]. We computed the two types of indices in SPSS version 27 software following [32]:

$$Attitude\ Index = \frac{(Average\ of\ item\ set\ scores) - Minimum\ scores}{Maximum\ score - Minimum\ score} \times 100$$

The minimum and maximum scores were yielded from the lowest score (1) and the highest score (5) on the 5-point Likert scale, respectively. The indices of attitude were scored from 0 to 100, with 0 indicating the most negative attitudes and 100 indicating the most positive attitudes. We constructed scoreboards for each attitude index to represent negative, neutral, and positive attitudes. The mean, standard deviation, minimum and maximum scores, and Cronbach's alpha of internal consistency were calculated in order to demonstrate the reliability of the study scales attitude toward wildlife (WAI) and attitude toward wildlife management methods (WMMAI).

2.4. Data Analysis

A total of 586 local respondents participated in an online cross-sectional survey, but 1 respondent failed to fully complete the questionnaire survey. Thus, 585 local respondents were considered in the final analysis. All survey data were collected and analyzed using Statistical Package for the Social Sciences, SPSS version 27 [33]. The data were analyzed using descriptive and inferential statistics. We compared mean attitude scores for WAI and WMMAI between the rural and urban locals and among different regions in Malaysia. We established regression models for WAI and WMMAI and multiple potential socio-demographic variables. We used Chi-square, Tukey's posthoc tests, independent sample *t*-tests (equality of variances using Levene's test), univariate analysis of variance (ANOVA), Spearman's correlation, and general linear regression modeling. All the statistical tests in the study were two-tailed, and the level of significance was defined as $p < 0.05$, while p values of <0.1 were considered to suggest trends that may be useful for future studies.

3. Results

3.1. Local Socio-Demographic Information

Table 2 presents the socio-demographic information of the surveyed local population. The majority of the surveyed respondents were (N = 317, 54.2%) females; more than 60% (N = 358, 61.2%) belonged to the 25–34 age group, and (N = 122, 20.8%) belonged to the 18–24 age group. This is because our survey was conducted online, and young generations are more connected to the Internet; hence, more young locals participated in this study. A total of 585 respondents participated, 59.8% of whom were urban people (compared to rural), and 41.0% of the respondents had a secondary level of education. Most of the respondents engaged in hiking activities (N = 397, 68.0%), followed by fishing (N = 159, 27.1%), hunting, and other activities. However, 0.2% (N = 1) of the respondents stated that they did not engage in any nature activities. Some respondents (42.6%) reported having

experience with wildlife (familiarity), and others did not have any experience with wildlife (57.4%), as shown in Table 2.

Table 2. Socio-demographic information of the local respondents (*N* = 585).

Variables	*N*	%	Variables	*N*	%	Variables	*N*	%
Gender			**Residential Area**			**Familiarity (experience)**		
Male	268	45.8	Urban	350	59.8	Yes	249	42.6
Female	317	54.2	Rural	235	40.2	No	336	57.4
Age			**Nature Engagement**			**Education**		
18–24 years	122	20.8	Hunting	19	3.2	Primary	10	1.7
25–34 years	358	61.2	Fishing	159	27.1	Secondary	240	41.0
35–44 years	68	11.6	Hiking	397	68.0	Undergraduate	161	27.5
45–54 years	23	3.9	Other	9	1.5	Graduate	174	29.8
55–64 years	7	1.2	None	1	0.2			
>64 years	7	1.2						

3.2. Validation of Attitude Indices

Seven items were directly related to the wildlife management method, while six were associated with wildlife. These items provided valuable information that assessed locals' attitudes toward wildlife and their management methods in Malaysia. The WAI included six items and resulted in a Cronbach's alpha coefficient of 0.71, whilst the WMMAI had seven items and recorded a coefficient of 0.73, reporting good internal consistency reliability, as suggested by the guidelines of Griethuijsen et al., (2014) [30]. Other than that, all the items recorded more than 0.30 scores for inter-item correlation. Table 3 summarizes the results of the reliability analysis.

Table 3. Reliability analysis for attitude index of wildlife and their management methods.

Items	Mean	*Sd.*	Inter-Item Correlation	(α)
Attitude toward wildlife (WAI)				
Wildlife should be conserved for a future generation.	4.69	0.75	0.46	0.71
Wildlife contribute to the local economy.	2.85	1.18	0.83	
Wildlife is not a threat to the local community.	3.42	1.14	0.51	
Wildlife are responsible for more damage to local property than they are worth.	3.17	1.05	0.79	
The risk of being injured by wildlife is high.	3.97	1.16	0.34	
Wildlife are a nuisance.	2.97	1.23	0.37	
Attitude toward wildlife management methods (WMMAI)				
Use regulated hunting to manage wildlife numbers.	3.41	1.26	0.36	0.73
Euthanize wildlife that repeatedly causes problems for people.	2.98	1.21	0.44	
Capture and relocate wildlife from human areas.	3.64	1.02	0.48	
Educate the locals about human–wildlife conflict.	4.66	0.65	0.55	
Remove attractants from human areas (garbage, bird feeder, etc.).	3.71	1.04	0.85	
People do not have to manage wildlife.	3.98	1.07	0.71	
Wildlife are properly managed in Malaysia.	3.18	1.06	0.53	

3.3. Local Experiences and Attitudes toward Costs and Benefits Associated with Wildlife

Most of the respondents (93.7%) reported that they are aware and familiar with wildlife present in their local area (Table 2), with the majority (54.7%) stating that they had seen wildlife during the past 12 months. Relatively more than a quarter of the respondents claimed to have seen multiple wildlife and offspring (34.5%). The responses to a series

of statements were designed to draw out attitudes toward wildlife that are present and cause damage to local people's properties (Figure 1), further affecting the acceptability of management methods (Figure 2).

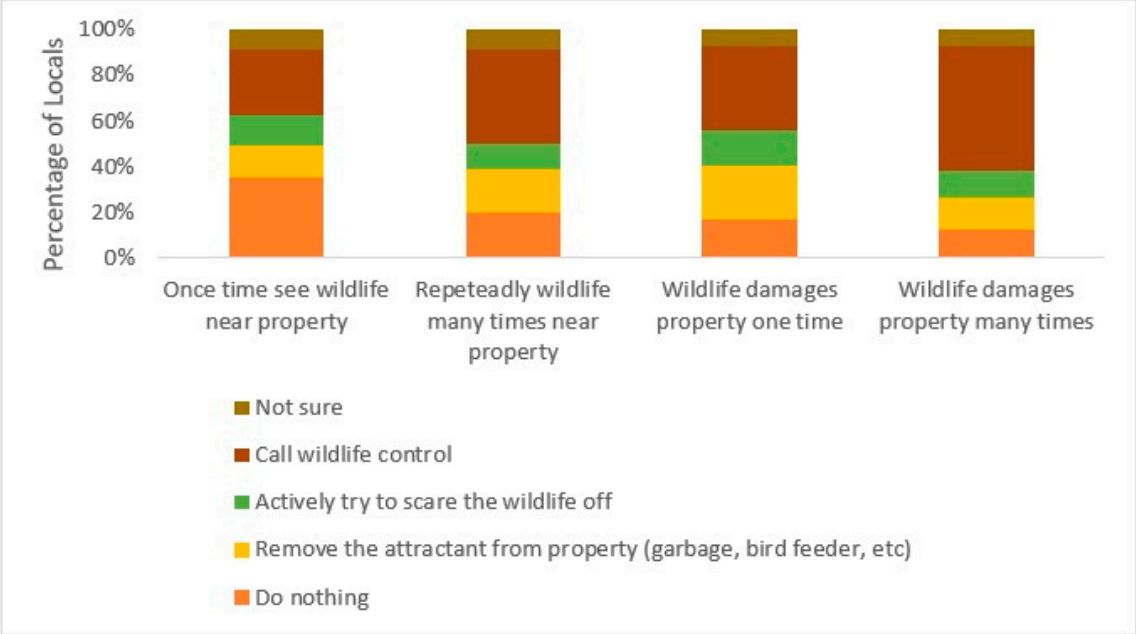

Figure 1. Attitudes toward wildlife on property among locals.

Figure 2. Locals' acceptability of wildlife management methods in Malaysia.

For example, as shown in Figure 1, a greater proportion of local respondents preferred to call wildlife control and were more likely to agree that wildlife are deserving of wildlife control when found multiple times near locals' property (41.4%) and causing damage either one (37.1%) or multiple times (54.5%) to the property. However, 35% of the respondents agreed they were more likely to do nothing when wildlife was present one time near their property. In addition, less than 10% of the respondents reported having less opinion and

were not sure about their response toward wildlife in all four situations, further highlighting the locals' lack of knowledge and awareness on the subject.

However, Table 4 indicates that more than 40% of the respondents felt that wildlife was responsible for more damage than they were worth. Although more than 97% of the respondents agreed that wildlife should be conserved in Malaysia, 63.8% felt that the risk of being injured by wildlife is high. In terms of benefits, more respondents (63%) felt that wildlife do not contribute to the local economy.

Table 4. Locals' attitudes toward wildlife and their management methods.

Items	Agree	Neutral	Disagree
Attitude toward Wildlife (WAI)	**(%)**	**(%)**	**(%)**
Wildlife should be conserved for the future generation.	97.3	2.2	0.5
Wildlife contribute to the local economy.	16.8	20.2	63.0
Wildlife are not a threat to the local community.	72.4	18.3	9.2
Wildlife are responsible for more damage to local property than they are worth.	40.7	28.6	30.7
The risk of being injured by wildlife is high.	63.8	18.2	18.0
Wildlife are a nuisance.	25.8	11.5	62.7
Attitude toward Wildlife Management Method (WMMAI)	**(%)**	**(%)**	**(%)**
Use regulated hunting to manage wildlife numbers.	50.2	27.4	22.5
Euthanize wildlife that repeatedly causes problems for people.	34.8	31.8	33.4
Capture and relocate wildlife from the human area.	59.9	27.6	12.5
Educate the locals about human–wildlife conflict.	93.7	5.0	1.3
Remove the attractant from human areas (garbage, bird feeder, etc.).	59.6	28.9	11.5
People do not have to manage wildlife.	70.9	19.0	10.1
Wildlife are properly managed in Malaysia.	42.7	30.6	28.7

3.4. Local Acceptability of Wildlife Management Methods in Malaysia

Table 4 also shows that more than 70% (70.9%) of local respondents agreed that people do not have to manage wildlife and that nature should be allowed to take its course. One-tenth (10.1%) disagreed with this statement, while the remaining 19.0% were neutral. Concerning the locals' attitude toward (a) supporting or (b) opposing management, five factors were ranked by their level of acceptability. For both issues, humane treatment appeared to be the most important factor. Wildlife management methods were also more likely to be accepted if proven to be effective.

Management methods that do not involve any direct killing (non-lethal), such as education (93.7%), were considered the most acceptable among the locals, while lethal methods were ranked as the least acceptable. For example, one-third of the sample population (34.8%) considered euthanasia unacceptable in some or all cases, while the corresponding figure for the use of regulated hunting to manage wildlife numbers was only 22.3% (Figure 2). Remarkably, hunting was the most acceptable lethal method (50.2%), proving it was almost as acceptable as the commonly practiced capture and relocation method, and more acceptable than the euthanasia of wildlife (34.7%).

3.5. Attitudes of Locals toward Wildlife and Their Management Methods in Malaysia

We performed a linear regression analysis to assess the influences of potential variables on the Wildlife Attitude Index (WAI) and the Wildlife Management Method Attitude Index (WMMAI). The results show that the model with the WAI as the dependent variable was significant ($F_{(4585)} = 42.73$, $p < 0.001$) with a goodness of fit of 32% of the observed to expected values. Respondents who resided in urban areas and age were the main factors of positive attitudes toward wildlife. In contrast, respondents who resided in rural areas and had more familiarity (experience) with wildlife had increased negative attitudes toward wildlife. This result was expected since the majority of rural areas share a border

with the forest in Malaysia. Additionally, rural areas have both positive and negative direct interaction (familiarity) with wildlife, and locals have raised problems concerning their experiences with human–wildlife conflicts. Table 5 summarizes the results of the regression model.

Table 5. Regression analysis of Wildlife Attitude Index (WAI).

Variable	*B*	*SE*	β	*t*	*p*
Wildlife Attitude Index (WAI)	18.76	3.88	0.00	4.72	<0.001
Age	0.83	0.15	0.37	8.80	<0.001
Urban area	6.21	1.60	0.19	3.88	<0.001
Rural area	−3.67	0.85	−0.19	−3.88	<0.001
Familiarity (experience)	−7.26	0.34	−0.62	−21.67	<0.001

Note. $F_{(4585)} = 42.73$, $p < 0.001$, $R^2 = 0.32$.

The WMMAI as the dependent variable recorded a significant relationship ($F_{(7585)} = 503.98$, $p < 0.001$), with a goodness of fit of 79%. The results (Table 6) prove that residing in a rural area, a higher level of education, age, and familiarity with wildlife increased engagement with nature and significantly led to positive attitudes toward wildlife management methods. Contrarily, respondents who resided in urban areas and were highly engaged with nature had lower WMMAI scores.

Table 6. Regression analysis of Wildlife Management Method Attitude Index (WMMAI).

Variable	*B*	*SE*	β	*t*	*p*
Wildlife Management Method Index (WMMAI)	8.76	3.84	0.00	4.42	<0.001
Age	1.23	0.05	0.87	42.15	<0.001
Education	2.88	0.56	0.21	5.54	<0.001
Familiarity	1.69	0.38	0.88	4.76	<0.001
Rural area	2.19	0.42	0.09	4.85	<0.001
Urban area	−7.32	−0.37	−0.62	−19.56	<0.001
Gender	−2.32	0.35	−0.20	−8.61	<0.001
Nature engagement	−1.37	0.64	−0.05	−2.24	<0.001

Note. $F_{(7585)} = 503.98$, $p < 0.001$, $R^2 = 0.79$.

4. Discussion

The results of this study help to determine the efficiency of WAI and WMMAI as new wildlife conservation tools in Malaysia and identify the factors that influence the attitudes of locals toward wildlife and their management methods in Malaysia. The results of this study identify the gender and age of the respondents, their level of education, residential area, familiarity (experience), and nature engagement as significant factors influencing attitudes toward wildlife and their management [34–36]. The results presented here represent the assessment of attitudes toward wildlife and their management methods amongst locals in Malaysia. We found that influential factors toward wildlife management methods have different levels of acceptance among locals. The results suggest that locals may have preferences for wildlife management methods that differ from similar locals elsewhere e.g., [18,37]. Local attitudes toward wildlife and their management methods will likely affect local people's tolerance of protecting or conserving wildlife populations. Gender, age, level of education, residential area, nature engagement, and familiarity (experience) were the main factors that shaped attitudes [38] toward wildlife management methods in this study. However, there is limited information and exposure on how such management methods are accomplished in wildlife conservation practices in Malaysia.

4.1. Wildlife Experience Affects Locals' Attitudes

Our result analyses demonstrate that some of the active wildlife management methods (some of the intervention actions) were widely accepted by locals in this study instead of the "people do not have to manage wildlife" (leave wildlife alone) responses. Although only a few of the locals were not aware and had little experience with wildlife in their local area, the locals also felt that actions should be taken for them to be protected and conserved fairly. However, more differences in preferences between those who see wildlife around the area they live in and those who do not were expected. Direct observation of wildlife can influence the attitudes of locals toward wildlife [39]. Locals tend to have positive attitudes toward certain wildlife if they are frequently observed [40]. Familiarity with wildlife can be a highly valued wildlife experience and can become particularly essential for a local to shape opinions and become more tolerant toward wildlife and their management methods. According to Pinheiro et al., (2016) [41], interactions with wildlife can potentially support locals' tolerance and influence positive attitudes by reducing locals' fear of wildlife.

In addition, more than half of the respondents had no experience with wildlife, and consequently had a neutral or negative attitude and low tolerance toward wildlife [42]. Locals with more experience with wildlife (familiarity) and nature engagement tended to have more positive attitudes. Previous research suggested that experience affects the locals' attitudes toward wildlife conservation [36]. When locals had direct experience with wildlife and conservation, they tended to support management practices and initiatives. People from areas where human–wildlife conflicts happen are most likely to show negative attitudes toward wildlife and their management and conservation [43]. The results also suggest that human–wildlife conflict did influence local attitudes, especially when involving local property damage. The rural areas closer to the forest negatively influenced local attitudes, whereas the urban area far away from the forest positively influenced local attitudes and their management. Most locals living in urban areas only encounter urban wildlife species, which, therefore, come to represent all wildlife [44]. In contrast, the so-called extinction of experience that comes with a lack of exposure to wildlife can influence locals' attitudes toward them [45]. On this point, familiarity (experience) is a significant motivational factor for locals to shift their attitudes and support wildlife management practices.

Most of the locals living in rural areas, especially in the Borneo region, do have direct frequent interaction experiences with wildlife, and management practices are intuitive. This study demonstrates that locals living in rural areas, which generally share boundaries with forests and have a large wildlife population, tend to have negative attitudes toward wildlife and its management. Much of the existing literature has also proven the negative attitudes of locals who live closer to forests toward conservation and management activities [21,34–36]. This indicates that locals in rural areas not only experience the direct impacts of human–wildlife conflicts but are also affected indirectly. For example, because of frequent property damage, the general threat of wildlife, and the lack of economic benefits from wildlife, these locals might feel it is unnecessary to support wildlife conservation and management activities.

4.2. Influential Factors on the Acceptance of Wildlife Management Methods

Our survey found that urban and rural locals in Malaysia preferred the capture and relocation method and indicated a higher tolerance environment for wildlife. Despite the lower number of respondents with no experience with wildlife, locals preferred to avoid killing wild animals and to call wildlife control when they cause problems (Figure 2). Similar findings of preferences for non-lethal methods have been reported in other studies [46,47]. Generally, locals consider the method of capture and relocation as capturing wildlife and sending them to the zoo, not releasing them back into the wild [48]. According to DWNP, in Peninsular Malaysia, conflicts with animals often stem from human intolerance for livestock and crop damage. In Malaysia, reports about wildlife road kills are more common, e.g., [49–51]. In contrast, human injuries and fatalities from wildlife are relatively less reported, showing that certain negative attitudes and fears toward wildlife

are unfounded. Locals generally agreed on resettling wildlife outside the property, mainly due to personal anxiety, destruction, and intrusion into property [39]. Thus, there is potential for locals to coexist with wildlife and have the right understanding of wildlife risks. As capture and relocation often ends badly for certain species, future local education on wildlife management strategies should better communicate the humaneness and limitation of practices in order to achieve better alignment between local and wildlife expert views [11]. Education was the highly preferred method of wildlife management by the respondents with higher education levels and experience with wildlife in this study. Levels of education are significantly important in influencing attitudes toward wildlife management. Although Newhouse (1990) [52] argued that attitudes toward environment conservation depend on life experience rather than education, Woodroffe et al., (2005) [53] positively stated that education on wildlife conservation could be a knowledge platform to generalize attitudes. In a survey of local urban attitudes influenced by socio-demographic background, Nik Mohamad (2011) [54] also found local knowledge of the importance of wildlife and their interest and experience in Malaysia. Additionally, Pinheiro et al., (2016) [41] in their research, also found that negative attitudes toward snakes may be explained by the level of education, and an increase in knowledge can dispel some myths related to snakes. Therefore, educating locals about wildlife and their management methods is significant for gaining support for wildlife conservation. In addition, a higher level of education also leads to a positive attitude toward wildlife possibly because of the awareness and understanding of wildlife conservation practices [55,56]. Innovative methods, such as dance and role playing, to educate locals about wildlife conservation and teach locals to benefit from wildlife tourism is the only way to favor wildlife conservation [57].

The habitat management method and removing attractants are also strongly preferred by the locals. Most locals agreed that the presence of garbage and wildlife feeding in human areas might lead to a significant increase in the number of wildlife encounters. Wildlife not only utilize food waste, but they can also become over-reliant on these food sources and create conflict with locals via direct or indirect feeding [58]. This shows the desire of locals to avoid human–wildlife conflict and appreciate wildlife in a good environment setting. According to Gamborg et al., (2020) [59], stakeholders have highlighted naturalness as a significant value in wildlife management. In this context, our analysis demonstrates that the conservation of wildlife habitat is strongly supported by females with the highest education and who come from rural areas.

Many studies, e.g., [38,60,61], have noted strong differences between male and female respondents concerning lethal methods. Gender has significantly contributed to negative attitudes, especially among females in this study. Males tend to be more tolerant and conscious about wildlife and their management methods because most male respondents are involved in fishing and hunting activities. Historically, young men in Malaysia sometimes hunt wildlife to achieve status, and hunting is the basis of many cultures and beliefs [57]. The majority of Malaysian women stay at home taking care of the family after marriage, and men tend to take risks and engage more in nature activities, such as fishing and hunting. Cooper et al., (2015) [62] indicated that locals with an interest in wildlife, such as hunters, were 4–5 times more likely than those with no such interest to have positive attitudes and behaviors. Furthermore, the negative attitude of females toward wildlife could be attributed to a great awareness of dangerous wildlife species [63] and conservation.

According to Reiter et al., (1999) [46], non-lethal methods are most likely to be seen as humane and were found to be the most accepted. Therefore, only a small number of the respondents in this study accepted hunting (lethal method), as it is considered controversial and non-humane. According to Bennet et al., (2000) [57], the hunting of most species, even by locals in the Borneo region, is not compatible with wildlife conservation. However, this study identified higher support for hunting from males and the younger generation. The influence of the age factor on locals' attitudes toward wildlife and their management methods was also significant, with a strong negative correlation. Factors influencing the attitude of locals toward wildlife in the area included age [15]. A previous study suggested

that the youth of the local community are more tolerant of conflict species and tend to have more positive attitudes. This proves the complex and multifaceted nature of attitudes toward wildlife [18]. This result is perhaps not surprising and likely to be more common among males than females [61].

In conclusion, our study shows that residential areas and wildlife experience are most significantly important in shaping the attitudes toward wildlife management methods in Malaysia. The finding that locals prefer non-lethal methods to lethal options in contrast to wildlife experts is not surprising and highlights the disconnect between locals and management on wildlife issues. Although most people consider the conservation of wildlife to be important, this importance is influenced by the local attitudes toward wildlife and their management methods. The potential benefit of increasing local involvement is that an understanding of local attitudes may lead to the better communication of wildlife management goals and greater support for the initiatives taken [64].

5. Conclusions and Recommendations

In this study, we conducted an online survey and established two attitude indices (WAI and WMMAI) to identify the factors that influence the locals' attitudes toward wildlife and their management methods in Malaysia. We demonstrated that locals' attitudes varied based on the residential area where they lived; in the rural area closer to the forest and with more experience with wildlife, they had negative attitudes toward wildlife and positive attitudes toward wildlife management methods compared to those who lived in the urban area. The influence of locals' attitudes highlights the necessity to improve locals' tolerance and mitigation of human–wildlife conflict. The broad wildlife conservation practices of using biodiversity information to support conservation priority [65] should be complemented with social data on local attitudes.

Further research that implements and adapts the attitude index of wildlife management can help decision-makers understand the growing conflicts in terms of specific factors in the focus areas in the future [66]. It is possible that these indices could be adapted and implemented to provide insightful consideration for the specific contextual factors of the areas. It is recommended that the survey is repeated in 10 years, using the same index questions, to determine whether local attitudes have improved and whether any dedicated education or extended initiatives have been successful. The same survey should be repeated, but introducing different specific questions and attitude changes in the future could also be compared to changes in local behavior, which will act as a benchmark for the assessment of local attitudes.

Author Contributions: Conceptualization, S.M.H. and S.C.; methodology, S.M.H.; software, S.M.H.; validation, S.M.H. and S.C.; formal analysis, S.M.H.; investigation, S.M.H.; resources, S.M.H.; data curation, S.M.H.; writing—original draft preparation, S.M.H.; writing—review and editing, S.M.H. and S.C.; visualization, S.M.H.; supervision, S.M.H. and S.C.; project administration, S.M.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Not applicable.

Acknowledgments: We are very grateful to all of the local respondents and the anonymous reviewers' thoughtful suggestions and recommendations for our manuscripts.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Nyhus, P.J. Human-Wildlife Conflict and Coexistence. *Annu. Rev. Environ. Resour.* **2016**, *41*, 143–171. [CrossRef]
2. Almeida, A.; Vasconcelos, C.; Strecht-Ribeiro, O. Attitudes toward Animals: A Study of Portuguese Children. *Anthrozoös* **2014**, *27*, 173–190. [CrossRef]
3. Hou, Y.; Liu, T.; Zhao, Z.; Wen, Y. Estimating the Cultural Value of Wild Animals in the Qinling Mountains, China: A Choice Experiment. *Animals* **2020**, *10*, 2422. [CrossRef] [PubMed]
4. Madden, F. Creating Coexistence between Humans and Wildlife: Global Perspectives on Local Efforts to Address Human–Wildlife Conflict. *Hum. Dimens. Wildl.* **2004**, *9*, 247–257. [CrossRef]
5. MacDonald, K.; Sillero-Zubiri, C. Large carnivores and conflict: Lion conservation in context. In *Lion Conservation Research: Workshop 2—Modelling Conflict*; Loveridge, A.J., Lynam, T., MacDonald, D.H., Eds.; Wildlife Conservation Research Unit, Oxford University: Oxford, UK, 2002; pp. 1–8.
6. Hill, C.M. Conflict of Interest Between People and Baboons: Crop Raiding in Uganda. *Int. J. Primatol.* **2000**, *21*, 299–315. [CrossRef]
7. Kissui, B.M. Livestock predation by lions, leopards, spotted hyenas, and their vulnerability to retaliatory killing in the Maasai steppe, Tanzania. *Anim. Conserv.* **2008**, *11*, 422–432. [CrossRef]
8. McGuinness, S.; Taylor, D. Farmers' Perceptions and Actions to Decrease Crop Raiding by Forest-Dwelling Primates Around a Rwandan Forest Fragment. *Hum. Dimens. Wildl.* **2014**, *19*, 179–190. [CrossRef]
9. Gadd, M. Conservation outside of parks: Attitudes of local people in Laikipia, Kenya. *Environ. Conserv.* **2005**, *32*, 50–63. [CrossRef]
10. Naughton-Treves, L.; Holland, M.B.; Brandon, K. The role of protected areas in conserving biodiversity and sustaining local livelihoods. *Annu. Rev. Environ. Resour.* **2005**, *30*, 219–252. [CrossRef]
11. Dubois, S.; Harshaw, H.W. Exploring "Humane" Dimensions of Wildlife. *Hum. Dimens. Wildl.* **2013**, *18*, 1–19. [CrossRef]
12. Soulsbury, C.D.; WhitePiran, C.L. Human-wildlife interactions in urban areas: A review of conflicts, benefits and opportunities. *Wildl. Res.* **2016**, *42*, 541–553. [CrossRef]
13. König, H.J.; Ceauşu, S.; Reed, M.; Kendall, H.; Hemminger, K.; Reinke, H.; Ostermann-Miyashita, E.-F.; Wenz, E.; Eufemia, L.; Hermanns, T.; et al. Integrated framework for stakeholder participation: Methods and tools for identifying and addressing human–wildlife conflicts. *Conserv. Sci. Pract.* **2021**, *3*, e399. [CrossRef]
14. Miller, J.R.; Hobbs, R.J. Conservation Where People Live and Work. *Conserv. Biol.* **2002**, *16*, 330–337. [CrossRef]
15. Hariohay, K.M.; Fyumagwa, R.D.; Kideghesho, J.R.; Røskaft, E. Awareness and attitudes of local people toward wildlife conservation in the Rungwa Game Reserve in Central Tanzania. *Hum. Dimens. Wildl.* **2018**, *23*, 503–514. [CrossRef]
16. White, P.C.; Ward, A.I. Interdisciplinary approaches for the management of existing and emerging human-wildlife conflicts. *Wildl. Res.* **2010**, *37*, 623–629. [CrossRef]
17. Gebresenbet, F.; Bauer, H.; Vadjunec, J.M.; Papeş, M. Beyond the numbers: Human attitudes and conflict with lions (*Panthera leo*) in and around Gambella National Park, Ethiopia. *PLoS ONE* **2018**, *13*, e0204320. [CrossRef]
18. Tobias Ochieng, N.; Elizabeth, K.N.; Nigel, L.W. Measuring the conservation attitudes of local communities towards the African elephant, *Loxodonta africana*, a flagship species in the Mara ecosystem. *PLoS ONE* **2021**, *16*, e0253234. [CrossRef]
19. He, S.; Wei, Y. Measuring the conservation attitudes of local farmers towards conservation easements in the Qianjiangyuan National Park. *Glob. Ecol. Conserv.* **2022**, *36*, e02123. [CrossRef]
20. Perry, L.R.; Moorhouse, T.P.; Jacobsen, K.; Loveridge, A.J.; Macdonald, D.W. More than a feeling: Cognitive beliefs and positive—But not negative—Affect predict overall attitudes toward predators. *Conserv. Sci. Prac.* **2022**, *4*, e584. [CrossRef]
21. Sirivongs, K.; Tsuchiya, T. Relationship between local residents' perceptions, attitudes and participation towards national protected areas: A case study of Phou Khao Khouay National Protected Area, central Lao PDR. *For. Policy Econ.* **2012**, *21*, 92–100. [CrossRef]
22. Guerbois, C.; Dufour, A.B.; Mtare, G.; Fritz, H.I. Insights for Integrated Conservation from Attitudes of People toward Protected Areas Near Hwange National Park, Zimbabwe. *Conserv. Biol.* **2013**, *27*, 844–855. [CrossRef] [PubMed]
23. Vaske, J.J. *Survey Research and Analysis: Applications in Parks, Recreation and Human Dimensions*; Venture Publishing, Inc.: Stage College, PA, USA, 2008; ISBN 9781892132796.
24. Department of Statistics Malaysia. Current Population Estimates, Malaysia, 2022. Available online: https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=155&bul_id=dTZXanV6UUdyUEQ0SHNWOVhpSXNMUT09&menu_id=L0pheU43NWJwRWVSZklWdzQ4TlhUUT09 (accessed on 9 July 2022).
25. Poate, C.M.; Daplyn, P.F. *Data for Agrarian Development*; Cambridge University Press: Cambridge, UK, 1993.
26. De Vaus, D.A. *Surveys in Social Research*, 3rd ed.; UCL Press: London, UK, 1991.
27. Likert, R. A technique for the measurement of attitudes. *Arch. Psychology.* **1932**, *140*, 5–55.
28. Malaysian Aviation Commission. Profile East of Malaysia. Available online: https://www.mavcom.my/en/industry/public-service-obligations/profile-of-east-malaysia/ (accessed on 11 July 2022).
29. Tadesse, S.A.; Kotler, B.P. Attitudes of local people towards the Mountain Nyala (*Tragelaphus buxtoni*) in Munessa, Ethiopia. *Afr J. Ecol.* **2016**, *54*, 488–499. [CrossRef]
30. Griethuijsen, R.A.L.F.; Eijck, M.W.; Haste, H.; Brok, P.J.; Skinner, N.C.; Mansour, N. Global patterns in students' views of science and interest in science. *Res. Sci. Educ.* **2014**, *45*, 581–603. [CrossRef]
31. Babbie, E.R. *The Practice of Social Research*, 14th ed.; CENGAGE Learning Custom Publishing: Boston, MA, USA, 2014.

32. Cahyat, A.; Gonner, C.; Haug, M. *Assessing Household Poverty and Wellbeing: A Manual with Examples from Kutai Barat, Indonesia*; Center for International Forestry Research (CIFOR): Bogor, Indonesia, 2007; ISBN 978-979-1412-08-0.
33. IBM Corporation. *SPSS Statistics for Windows, Version 27.0*; IBM Corporation: Armonk, NY, USA, 2020.
34. Infield, M. Attitudes of rural communities towards conservation and a local conservation area in Natal, South Africa. *Biol. Conserv.* **1988**, *45*, 21–46. [CrossRef]
35. Newmark, W.D.; Leonard, N.L.; Sariko, H.I.; Deo-Gratias, M.G. Conservation attitudes of local people living adjacent to five protected areas in Tanzania. *Biol. Conserv.* **1993**, *63*, 177–183. [CrossRef]
36. Odebiyi, B.R.; Ayeni, S.M.; Umunna, M.O.; Johnson, J.J. Communities attitudes towards conservation in Gashakagumti National Park Nigeria. *J. Res. For. Wildl. Environ.* **2015**, *7*, 67–80.
37. Norman, D.; Stephanie, B.; Darren, M.; Robin, G.; Andrew, P.; Christopher, Q. Preferences for wildlife management methods among the peri-urban public in Scotland. *Eur. J. Wildl. Res.* **2011**, *57*, 1213–1221. [CrossRef]
38. Naiyi, Y.; Endi, Z.; Min, C. Attitudes towards wild animal conservation: A comparative study of the Yi and Mosuo in China. *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* **2010**, *6*, 61–67. [CrossRef]
39. Basak, S.M.; Hossain, M.S.; O'Mahony, D.T.; Okarma, H.; Widera, E.; Wierzbowska, I.A. Public perceptions and attitudes toward urban wildlife encounters—A decade of change. *Sci. Total Environ.* **2022**, *834*, 155603. [CrossRef] [PubMed]
40. Liordos, V.; Foutsa, E.; Kontsiotis, V.J. Differences in encounters, likeability and desirability of wildlife species among residents of a Greek city. *Sci. Total Environ.* **2020**, *739*, 139892. [CrossRef] [PubMed]
41. Pinheiro, L.T.; Rodrigues, J.F.M.; Borges-Nojosa, D.M. Formal education, previous interaction, and perception influence the attitudes of people toward the conservation of snakes in a large urban center of northeastern Brazil. *J. Ethnobiol. Ethnomed.* **2016**, *12*, 25. [CrossRef] [PubMed]
42. Kang, M.N.; Tetsuro, H.; Shinya, N. The influence of childhood nature experience on attitudes and tolerance towards problem-causing animals in Singapore. *Urban For. Urban Green.* **2019**, *41*, 150–157. [CrossRef]
43. Hart, L.; O'Connell-Rodwell, C. Human Conflict with African and Asian Elephants and Associated Conservation Dilemmas. *Center for Animals in Society in the School of Veterinary Medicine and Ecology*; University of California: Davis, CA, USA, 2000. *status*. Available online: https://www.researchgate.net/publication/228784666_Human_conflict_with_African_and_Asian_elephants_and_associated_conservation_dilemmas (accessed on 15 December 2022).
44. Lunney, D.; Burgin, S. Urban wildlife management: An emerging discipline. In *Urban Wildlife: More than Meets the Eye*; Royal Zoological Society of New South Wales: Mosman, NSW, Australia, 2004; pp. 1–7.
45. Soga, M.; Gaston, K.J. Extinction of experience: The loss of human-nature interactions. *Front. Ecol. Environ.* **2016**, *14*, 94–101. [CrossRef]
46. Reiter, D.K.; Brunson, M.W.; Schmidt, R.H. Public Attitudes toward Wildlife Damage Management and Policy. *Wildl. Soc. Bull.* **1999**, *27*, 746–758. Available online: https://www.jstor.org/stable/3784098 (accessed on 9 July 2022).
47. Massei, G.; Quy, R.J.; Gurney, J.; Cowan, D.P. Can translocations be used to mitigate human-wildlife conflicts? *Wildl. Res.* **2010**, *37*, 428–439. [CrossRef]
48. Asimopoulos, S. Human-Wildlife Conflict mitigation in Peninsular Malaysia: Lessons learnt, current views and future directions. Master's Thesis, Swedish University of Agricultural Sciences, Uppsala, Sweden, 2016.
49. Ayob, N.; Mustapha, M.A.; Senawi, J.; Ahmad, N. Herpetofauna roadkills on Langkawi Island, Peninsular Malaysia: The influence of landscape and season on mortality distribution. *Sains Malays.* **2020**, *49*, 2373–2382. [CrossRef]
50. Kasmuri, N.; Nazar, N.; Mohd Yazid, A.Z. Human and Animals Conflicts: A case study of wildlife roadkill in Malaysia. *Environ.-Behav. Proc. J.* **2020**, *5*, 315–322. [CrossRef]
51. Hui, T.C.Y.; Slade, E.M.; Chong, J.L. Roadkills in Northern Peninsular Malaysia. *Front. Environ. Sci. Conserv. Restor. Ecol.* **2021**, *9*, 637464. [CrossRef]
52. Newhouse, N. Implications of Attitude and Behavior Research for Environmental Conservation. *J. Environ. Educ.* **1990**, *22*, 26–32. [CrossRef]
53. Woodroffe, R.; Thirgood, S.; Rabinowitz, A. *People and Wildlife: Conflict or Coexistence?* Cambridge University Press: Cambridge, UK, 2005. [CrossRef]
54. Nik Mohamad, N.H. Urban residents' attitudes toward wildlife in their neighborhoods: The case study of Klang Valley, Malaysia. *Plan. Malays. J. Malays. Inst. Plan.* **2011**, *9*, 19–36. [CrossRef]
55. He, Q.; Wu, Z.; Zhou, W.; Dong, R. Perception and attitudes of local communities towards wild elephant-related problems and conservation in Xishuangbanna, southwestern China. *Chin. Geogr. Sci.* **2011**, *21*, 629. [CrossRef]
56. Deng, H.; Chen, Z.; Cao, H.; Shen, Y.; Wang, Y.; Shan, P. Perceptions and attitudes of local residents on a nature reserve: A case study in Baimaxueshan National Nature Reserve. *Int. J. Sustain. Dev. World Ecol.* **2015**, *22*, 165–170. [CrossRef]
57. Bennett, E.; Nyaoi, A.; Sompud, J. Saving Borneo's bacon: The sustainability of hunting in Sarawak and Sabah. In *Hunting for Sustainability in Tropical Forests*; Columbia University Press: New York, NY, USA, 2000; pp. 305–324.
58. Van Eeden, L.; Newsome, T. The Effects of Food Waste on Wildlife and Humans. *Sustainability* **2017**, *9*, 1269. [CrossRef]
59. Gamborg, C.; Sandoe, P.; Palmer, C. Ethical management of wildlife. Lethal versus nonlethal control of white-tailed deer. *Conserv. Sci. Pract.* **2020**, *2*, e171. [CrossRef]
60. Lauber, T.B.; Anthony, M.L.; Knuth, B.A. Gender and ethical judgments about suburban deer management. *Soc. Nat. Resour.* **2001**, *14*, 571–583. [CrossRef]

61. Zaffar, R.M.; Athar, N.; Bilal, H.; Gopi, G.V. Attitudes of Local People Toward Wildlife Conservation: A Case Study from the Kashmir Valley. *Mt. Res. Dev.* **2015**, *35*, 392–400. [CrossRef]
62. Cooper, C.; Larson, L.; Dayer, A.; Stedman, R.; Decker, D. Are wildlife recreationists conservationists? Linking hunting, birdwatching, and pro-environmental behavior. *J. Wildl. Manag.* **2015**, *79*, 446–457. [CrossRef]
63. Bjorn, P.; Kaltenborn, T.B.; Julius, N. Living with Problem Animals—Self-Reported fear of potentially dangerous species in the Serengeti Region, Tanzania. *Hum. Dimens. Wildl.* **2006**, *11*, 397–409. [CrossRef]
64. Don Carlos, A.W.; Bright, A.D.; Teel, T.L.; Vaske, J.J. Human-Black Bear Conflict in Urban Areas: An Integrated Approach to Management Response. *Hum. Dimens. Wildl.* **2009**, *14*, 174–184. [CrossRef]
65. Margules, C.; Pressey, R. Systematic conservation planning. *Nature* **2000**, *405*, 243–253. [CrossRef] [PubMed]
66. Winter, S.J.; Esler, K.J.; Kidd, M. An index to measure the conservation attitudes of landowners towards Overberg Coastal Renosterveld, a critically endangered vegetation type in the Cape Floral Kingdom, South Africa. *Biol. Conserv.* **2005**, *126*, 383–394. [CrossRef]