Public Consultation Report

White-Tailed Eagle Project

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Document Notes

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Document Summary:
This is the final report describing public opinion regarding the ecological, economic and social impacts of a proposed white-tailed eagle re-introduction in Cumbria.

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1) Introduction

Prior to the nineteenth century, White-tailed eagles (WTEs, Haliaeetus *albicilla* L.) were broadly distributed within suitable habitat in the United Kingdom (Green, Pienkowski and Love, 1996; Love, 1983). Widespread persecution during the nineteenth century, lead to a significant population contraction within Great Britain and throughout their western Palaearctic range (Love, 1983) which culminated in the extinction of the species in the United Kingdom in 1918 (Love, 1983).

Between 1975 and 1998 a partnership between the Royal Society for the Protection of Birds (RSPB) and the Nature Conservancy Council (NCC) succeeded in re-introducing white-tailed eagles in two stages to the North West Highlands of Scotland (Love, 1983). Between 2007 and 2012, effective collaboration between the RSPB, Scottish Natural Heritage and the Forestry Commission resulted in the third Scottish re-introduction in the lowlands of Tayside and Fife (RSPB, 2012). Despite these successful conservation initiatives, the white-tailed eagle is still an extremely rare bird with an estimated British population of no more than 60 pairs (Anon, 2012). To date there are no breeding pairs on territory in England despite a feasibility study undertaken on the Suffolk coast in 2009 (Natural England, 2010).

Cumbria provided the last refuge for white-tailed eagles on the English mainland until the species was rendered extinct at the end of the 18th century (Love, 1983). The slow breeding rate and restricted dispersal, makes it unlikely that white-tailed eagles will naturally recolonize the county in the near future (Whitfield et al., 2009). A successful re-introduction would help to secure the future of the species in Great Britain and would make an important contribution to the international conservation effort.

The University of Cumbria is conducting a feasibility study to re-introduce white-tailed eagles (Haliaeetus albicilla) to the County of Cumbria. This report supports the wider feasibility study and describes a public consultation that was administered to objectively evaluate public opinion regarding the ecological, economic and social impacts of a proposed re-introduction. The consultation was designed to satisfy the requirements of the IUCN re-introduction guidelines and to support a licence application from Natural England for a Schedule 9 species.

The public consultation aims to answer the following research questions:

- To what extent does the population of Cumbria support a WTE re-introduction?
- What are the perceived ecological, economic and social impacts of a WTE re-introduction in Cumbria?
- Are there significant demographic differences in public opinion towards the re-introduction?
- To what extent do public perceptions differ between the current feasibility study in Cumbria and the study conducted in Suffolk in 2009.

2) Methods

The evaluation of public opinions towards a WTE re-introduction was completed through the design and implementation of a questionnaire based on a series of attitudinal and classification questions. Considering the significant challenges associated with the design of attitudinal surveys (Oppenheim, 1992), consent was sought from Natural England to use the questionnaire from the feasibility study conducted in 2009 regarding the proposed re-introduction of WTEs into Suffolk. The availability of a template that had been comprehensively piloted and used in a lengthy consultation process assisted the design quality of the Cumbrian survey. Despite the unsuccessful outcome of the re-introduction initiative in East Anglia (Natural England, 2010), it stands out as the only English WTE reintroduction attempt in recent history and was incorporated into the Cumbrian study to allow for interesting qualitative and quantitative comparisons. Following evaluation of the Suffolk questionnaire, the Cumbrian equivalent was designed with an increased number of attitudinal questions (11in Cumbria, 4 in Suffolk) to produce a more comprehensive data set relating to a greater variety of themes. In line with the key objectives of the research, attitudinal questions were constructed to explore the three core study themes namely the social, ecological and economic impact of a WTE re-introduction.

2.1) Participants

To ensure that the views of the study cohort reflected those of the wider Cumbrian population, a non random quota sampling technique was used, based on census data acquired from the Cumbria County Council website through the Cumbria Intelligence Observatory (Cumbria Intelligence Observatory, 2013). Participants were chosen to be representative of the demographic profile of north Cumbria by the selection of predefined quotas of individuals according to age, gender, and ethnicity. Based on the available human and financial resources, 300 surveys were collected during working hours, between Monday 16 July 2012 and Thursday 02 August 2012. In addition to those individuals willing to participate in the survey, the number of refusals was also documented.

2.2) Procedures and protocols

The study locations were chosen to correlate closely with those selected in the Suffolk feasibility study. Six survey sites were chosen to represent a mixture of rural, urban, coastal and inland locations within north Cumbria. The National Statistics Postcode Directory, from the Office for National Statistics (2010) was used to define urban locations in England as settlements with a population equal or greater than 10000. Of the six survey sites Maryport and Carlisle were categorized as urban and Silloth, Kirkbride, Burgh by Sands and Wigton were classified as rural.

Consideration was given to the questionnaire delivery method and it was decided that data would be collected through the use of face to face rather than postal questionnaires. This was based on the assumption that a self administered questionnaire would be more representative and time efficient and would have a higher response rate than data collected through a postal survey. Furthermore face to face delivery can accommodate respondents who are visually disabled and those with poor literacy skills. A pilot study was conducted in the village of Hayton near Brampton in Cumbria to inform the final questionnaire design.

2.3) Design

The questionnaire consisted of three parts; an A4 sized image of a WTE (Appendix 1.), a short information sheet (Appendix 2.), and a series of attitudinal and classification questions (Appendix 3.). The average time taken to complete the questionnaire was 7 minutes. During the pilot study it was discovered that the response rate to the questionnaire increased significantly with the inclusion of a photograph. Respondents commented that the image of a large raptor alluded to the subject of the research and created an incentive to participate. Further encouragement to participate was provided through the use of a short verbal introduction to the project prior to the respondents being asked to read and complete the questionnaire. Respondents were informed of the nature of the research and the association with the University of Cumbria. Furthermore assurances were given that the content of the questionnaire would be treated as confidential and the participants would remain anonymous.

The information sheet consisted of five short paragraphs occupying a single sheet of A4 paper. It was designed to provide background information on the re-introduction scheme and to introduce the key themes that would be explored further through the use of attitudinal questions. To ensure the objective nature of the information sheet and avoid the introduction of bias, the content was sourced from published peer reviewed literature and efforts were made to avoid subjective narrative styles such as the use of superlatives.

Prior to the attitudinal questions participants were asked if they had previously heard of WTEs. This question was included to give some indication of their knowledge base and the results could inform conservation managers regarding the need for a public information campaign following the completion of the consultation process. Attitudinal questions were designed to be easily understood and less than 20 words in length. The collection of 11 questions was purposefully ordered to avoid sequences of questions that explored similar themes and constructed to assess a balance of both the positive and negative impacts of a WTE re-introduction. The attitude survey consisted predominantly of closed questions with the exception of the final open question inviting participants to add further comments. This combination of open and closed questions allowed for the relatively rapid collection of a large amount of quantitative data without compromising the freedom and spontaneity of respondents to express their views. To allow for statistical analysis and quantitative comparisons with the results of the Suffolk study, responses were categorized using the 5 point Likert scale.

The series of classification questions were constructed to establish the extent to which the demographic profile of the study cohort was representative of the wider population within the study area. Furthermore the demographic data could be incorporated in the analysis of the attitudinal study to determine significant statistical differences in attitude between groups with dissimilar demographic profiles. In addition to their age, gender and ethnicity, participants were asked to describe whether they lived in an urban or rural location. To verify the accuracy of responses, they were also asked to include the first part of their postcode, (the outward code). The postcode directory resources from the Edina UK Borders website (UK Borders, 2013), were used in conjunction with the National Statistics Postcode Directory (Office for National Statistics, 2010) to categorize outward codes as rural or urban, and respondents were given a verbal assurance that their home address could not be established from the first part of their post code.

3) Results

3.1) Location

Out of the total of 300 completed questionnaires there was significant variation between the number administered at each of six chosen survey sites, with the highest number completed in Maryport (98) and the lowest number in Kirkbride (16) (Table 1.). There were also marked differences between the survey locations in the percentage of individuals who declined to participate. The two most important factors that account for the discrepancies described in Table1. Include the population size at the survey site and the response rate or willingness of individuals to participate. Due to the abundance of wet windy weather during the period of the survey and the time constraints imposed on the study, some survey work was conducted during inclement weather conditions with proportionately lower response rates. Furthermore response rates were significantly lower in the urban locations of Carlisle and Maryport compared with the rural locations of Wigton, Burgh by Sands, Silloth and Kirkbride (Chi-squared = 7.42 at $\alpha = 0.05$ with $v = 1$ and Chi-crit = 3.4). Table 1. demonstrates that among the urban locations Carlisle had the lowest response rate (23.5%), and within the rural locations Burgh by Sands had the highest response rate (46.6%).

Table 1. The number of questionnaires completed, the total number of individuals approached and the response rate at each of the six chosen sites in the study area.

Survey location	A) Number of questionnaires completed	B) Total number of individuals approached	Response rate percentage (A/B x 100)
Carlisle	36	153	23.5
Silloth	77	192	40.1
Kirkbride	16	49	32.6
Wigton	46	114	40.4
Burgh by Sands	27	58	46.6
Maryport	98	327	30.0
Total (N)	300	882	

3.2) Attitudinal questions (1-11 inclusive)

3.2.1) Main Findings

Overall based on the cumulative response percentages to question 10 (Table 2.), 88.7% of recruits are in favour of the sea eagle reintroduction project, 2.0% are against and 8.3% are undecided. Figure 1 demonstrates that within the 5 categories of the Likert scale the greatest proportion of respondents "agreed" with question 10 (51%) whereas the smallest proportion "strongly disagreed" (0.3%).

Table 2. The frequency, percentage and cumulative percentage of responses across all six survey locations to question 10; "Overall would you say you are in favour of the sea eagle reintroduction project?"

Response category	Frequency	Percentage	Cumulative percentage
Strongly agree	113	37.7	37.7
Agree	153	51.0	88.7
Undecided	25	8.3	8.3
Disagree	5	1.7	1.7
Strongly disagree	1	0.3	2.0
Unanswered	3	1.0	
Total	300	100	

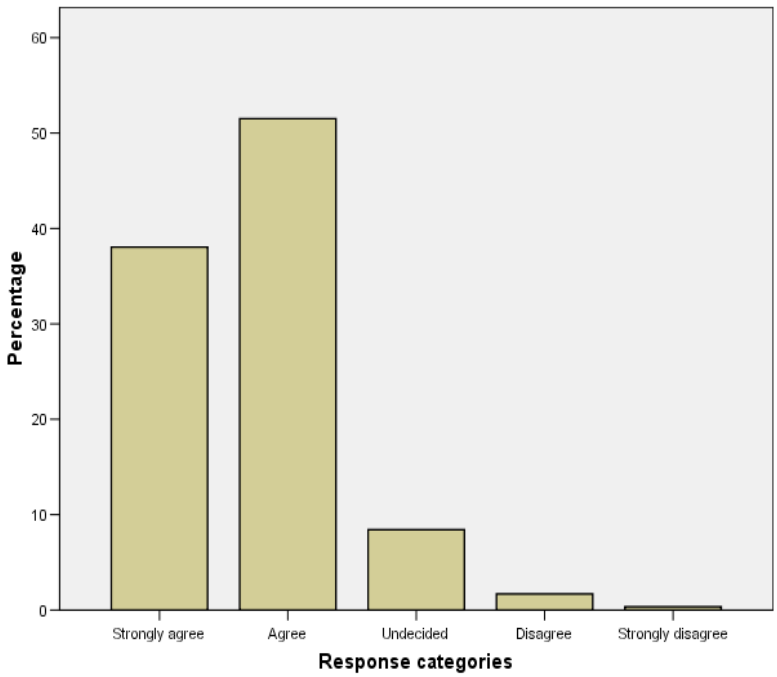


Figure 1. Bar chart of the percentage response in each category to question 10.

3.2.2) Question 1

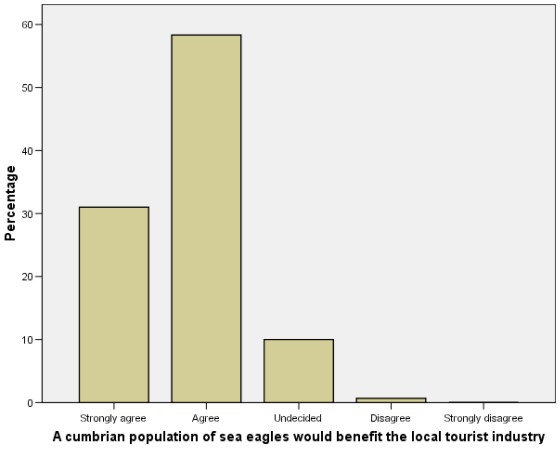
This question aims to establish the knowledge base of the participants by asking them if they had heard of sea eagles prior to reading the information sheet provided. 50.7% of respondents answered "yes", 42.0% answered "no" and 7.3% left the question unanswered.

3.2.3) Questions 2-9 inclusive

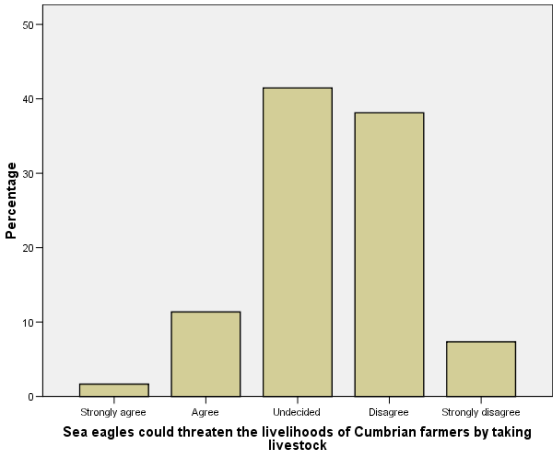
Questions 5 and 6, explore the ecological impacts of a white-tailed eagle reintroduction. The results of question 5 demonstrate that a large majority of respondents (80.4%) agreed that sea eagles would be good for the environment, whereas the result to question 6 was more ambiguous due to a high proportion of undecided results (40.3%) with 44.3% of respondents disagreeing with the question "Sea eagles could pose a threat to rare species of wildlife in the local area".

Questions 2, 3 and 4 examine the economic implications of the re-introduction. There is broad consensus of opinion regarding the benefits of sea eagles to the local economy with 89.3% of respondents agreeing with question 2 and only 0.7% disagreeing. However the results to questions 3 and 4 are less clear cut due to a high percentage of undecided results. Regarding question 3 approximately the same number of respondents were undecided (40.7%) as disagreed (45.6%) with the statement that sea eagles could harm domestic livestock and therefore threaten the livelihoods of Cumbrian farmers. There was also significant uncertainty regarding the response to question 4 with 33.3% of undecided results and 47.0% of respondents disagreeing when asked if the cost of the project would outweigh any future benefits to the local economy.

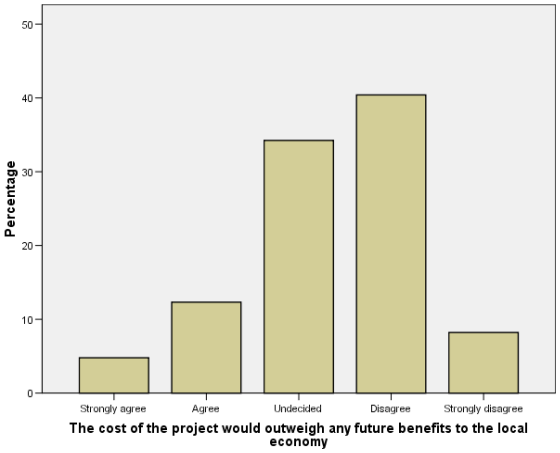
Questions 7, 8 and 9 examine the perceptions of participants to the social impacts of a white-tailed eagle re-introduction. Overall respondents expressed strong views of agreement or disagreement towards the questions, with a relatively low percentage of undecided results. The responses to question 7 were more polarised than those to questions 8 and 9, with a substantial majority (90.0%) of participants agreeing and only 2.7% disagreeing that restoring sea eagles to the skies of Cumbria would enrich their experience of nature. With regard to questions 8 and 9, a clear majority of people disagreed with the statements that sea eagles could be a threat to cats and dogs (68.7%, question 8) and young children (88.0%, question 9). However respondents were less sure of the potential risk to pets than young children with 22.0% of respondents undecided to question 8 and only 8.7% undecided to question 9.



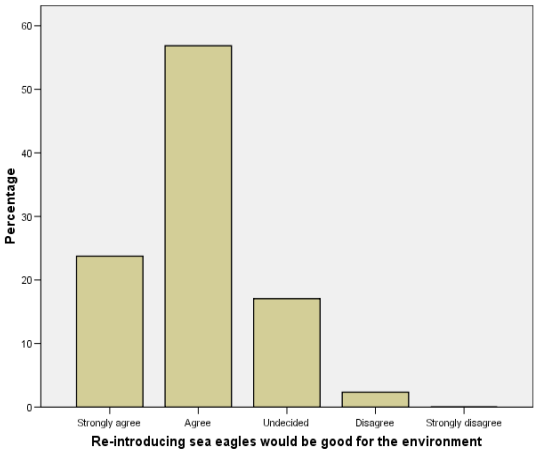
Question 2.



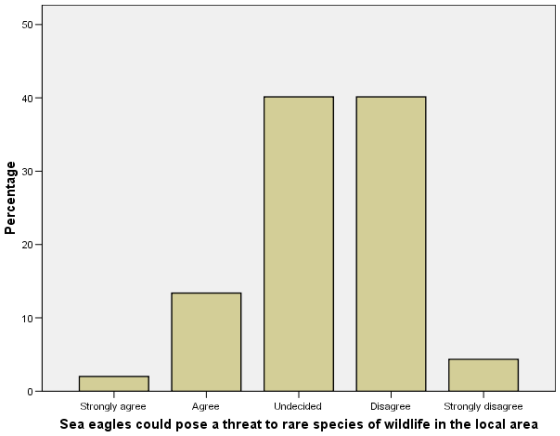
Question 3.



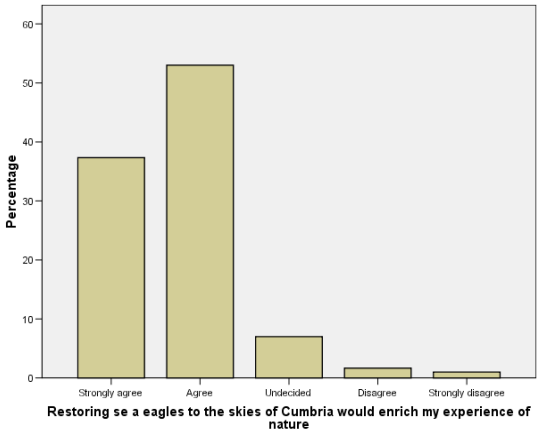
Question 4.



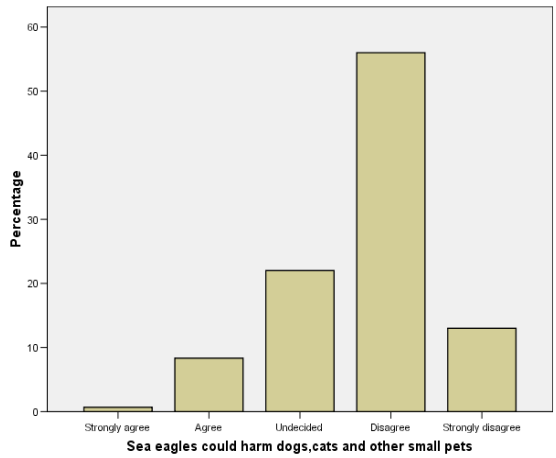
Question 5.



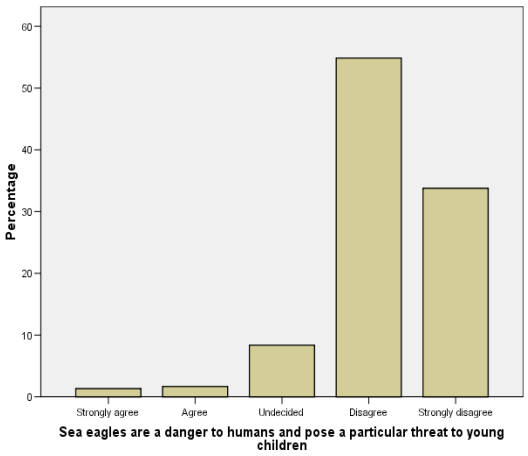
Question 6



Question 7



Question 8.



Question 9.

Figure 2. Response percentages in each of five categories to questions 2-9.

3.2.4) Question 11.

Of the 300 members of the public who participated in the questionnaire, 37 individuals or 12.33% responded to question 11 by providing further comments. The most common theme identified in the comments (13 out of 37 comments) was a general positive sentiment towards the project without any specific reason to support that feeling. One individual wrote '*Good thing all round'*, while another wrote '*Let's make it happen*'.

A number of comments related to the potential economic impacts of a re-introduction. 2 respondents described benefits to local business, while one comment referred to the opportunities created in the Cumbrian ecotourism industry. Other themes related to the detrimental economic impacts of a white-tailed eagle re-introduction. 2 comments highlighted concerns regarding the potential cost of the project, and 1 comment alluded to the financial implications of a white-tailed eagle population on the livestock sector: '*I am only in favour of the re-introduction if a compensation scheme is in place for farmers*'.

Various themes emphasized the ecological aspects of the proposed re-introduction. 4 comments described environmental benefits in a general sense whereas 3 written remarks specifically described the advantages derived from the ability of an apex predator to control species perceived as pests by the general public: '*Sea eagles are needed to keep down the population of nuisance sea gulls in Dumfries'.* In contrast to the ecological benefits described, one respondent was concerned about the impact on the wider ecosystem and commented that the re-introduction should be conditional upon an environmental impact assessment. Another respondent described the potential persecution of raptors through the use of illegal poisons: 'Some lads I know lay poison baits for the buzzards'

Only one comment referred to the social opportunities of the project to deliver sea eagle based environmental education initiatives: '*Sea eagles would be great to watch and would benefit everyone and education'.*

3.3) A comparison of questionnaire results in Suffolk and Cumbria.

A comparison of the attitudinal questions between the two study areas identified three questions that were designed to explore the same theme (Table 3.). These thematic similarities allowed for meaningful quantitative and qualitative analysis between the study conducted in Cumbria and the Suffolk study.

Table 3. Three attitudinal questions drawn from the studies in Cumbria and Suffolk that explore similar themes.

1	Cumbria study	Overall would you say you are in favour of the sea eagle re-introduction project?
	Suffolk study	From what you have read and heard, would you say you are for or against the white-tailed eagle project?
2	Cumbria study	A Cumbrian population of sea eagles would benefit the local tourist industry
	Suffolk study	I think the project would be a benefit to the local economy
3	Cumbria study	Please use the space provided to add any further comments you wish to make about this project
	Suffolk study	Do you have any further comments about the project?

Comparative analysis of question 1 (Table 3.) demonstrates a significant difference in response between the study sites in Suffolk and Cumbria (Chi-squared = 20.72 at $\alpha = 0.05$ with $v = 2$ and Chi-crit = 5.99). The Cumbrian study documented a higher percentage of respondents who were in favour of a sea eagle re-introduction (88.7% in Cumbria, 78% in Suffolk) and a lower percentage that were against (2% in Cumbria, 9% in Suffolk) in comparison to the results of the Suffolk study.

Significant differences were also established between the study sites with regard to question 2 (Table 3.)
(Chi-squared = 93.14 at $\alpha = 0.05$ with $v = 2$ and Chi-crit = 5.99). An overwhelming majority of the respondents in Cumbria shared the view that a re-introduction would benefit the local tourist economy (89.3% agreed, 0.7% disagreed, 10% were undecided), whereas just over half of the participants in the Suffolk study agreed with a similar question (58% agreed, 14% disagreed, 28% undecided).

Question 3 (Table 3.) invites the respondents to write any further comments they may have about the project. The Suffolk survey administered 523 questionnaires and collected 160 written comments, whereas the Cumbrian study consisted of 300 questionnaires but only yielded 37 comments. Despite the obvious discrepancy in numbers of comments collected, the majority of themes identified between the two studies were similar. The most frequent comment in the Suffolk study described the general positivity of respondents to the initiative. The two studies shared a number of specific themes relating to the economic, ecological and social implications of a white-tailed eagle re-introduction. Firstly respondents commented both on the potential benefits to local

tourism and the wider economy, but described concerns regarding the cost of the project. Secondly respondents highlighted the need to consult with the farming community to evaluate risks to livestock. Thirdly the potential for persecution post release was documented and finally comments were made regarding the educational benefits of a white-tailed eagle re-introduction.

A number of unique themes were documented in the Suffolk study that were absent from question 11 in the Cumbrian study. Multiple comments were made regarding the threat of an apex predator to local wildlife, pets and small children and respondents also voiced concerns regarding the impact of white-tailed eagles on marine fish stocks and commercial freshwater fisheries. Finally several written comments expressed the opinion that Suffolk was the wrong landscape for such a re-introduction initiative: '*In Scotland they don't have the free range farms that we do in this area (so against the project*)' and '*Completely inappropriate for this area'.*

3.4) Classification questions

3.4.1) Demographic profile of respondents

To ensure the validity of the questionnaire results, it was important to establish that the demographic characteristics of the study cohort were representative of the wider Cumbrian population. With regard to gender and ethnicity Chi-squared analysis revealed no significant difference between the 300 respondents in the study and demographic data acquired from the Cumbria Intelligence Observatory (Gender: Chi-squared = 0.59 at $\alpha = 0.05$ with $v = 1$ and Chi-crit = 3.84; Ethnicity: Chi-squared = 1.05 at $\alpha = 0.05$ with $v = 1$ and Chi-crit = 3.84) (Cumbria Intelligence Observatory, 2013). However there was a significant difference between the age range of the respondents and the population data from the Cumbrian census (Chi-squared = 18.62 at $\alpha = 0.05$ with $v = 6$ and Chi-crit = 11.07).

Considering the equal age classes displayed in Table 4, the largest proportion of the participants were 56 to 65 years old (24.0.7%) and the smallest proportion had a range of ages between 26 and 35 (6.9%). The study cohort consisted of approximately equal numbers of males and females (51.3% males, 48.7% females) and displayed the distinct lack of ethnic diversity that is characteristic of the wider population of Cumbria. Overall 97.0% of respondents described themselves as "White British", with the remaining 3.0% drawn from a variety of black and minority ethnic groups (Figure 3).

	Age Range	**16-25**	**26-35**	**36-45**	**46-55**	**56-65**	**Over 65**	**Not disclosed**	**Missing**	**Total**
Gender	**Male**	6.7	4.3	6.0	9.0	10.7	14.0	0.3		
	Female	6.3	2.6	6.0	8.3	13.3	11.3	0.3		
	Total	13.0	6.9	12.0	17.3	24.0	25.3	0.9	0.6	100

Table 4. The proportion of male and female respondents within 5 equal age classes and the proportion of males and females over the age of 65.

3.4.2) Geographic profile of respondents

Of the 300 recruits to the survey, 41.3% lived in an urban location and 58.3% lived in a rural area. 0.4% of participants declined to answer the question. Furthermore 69.7% of recruits were local to the area, 27.3% were on holiday and 3.0% specified other reasons for their presence in the study area such as working away from home. The questionnaire did not offer respondents a spatial reference to help define "local" in terms of the distance from the respondent's home to the study location. However there was very little confusion regarding the subjective interpretation of the words "local" and "on holiday" and the formulation of an appropriate response.

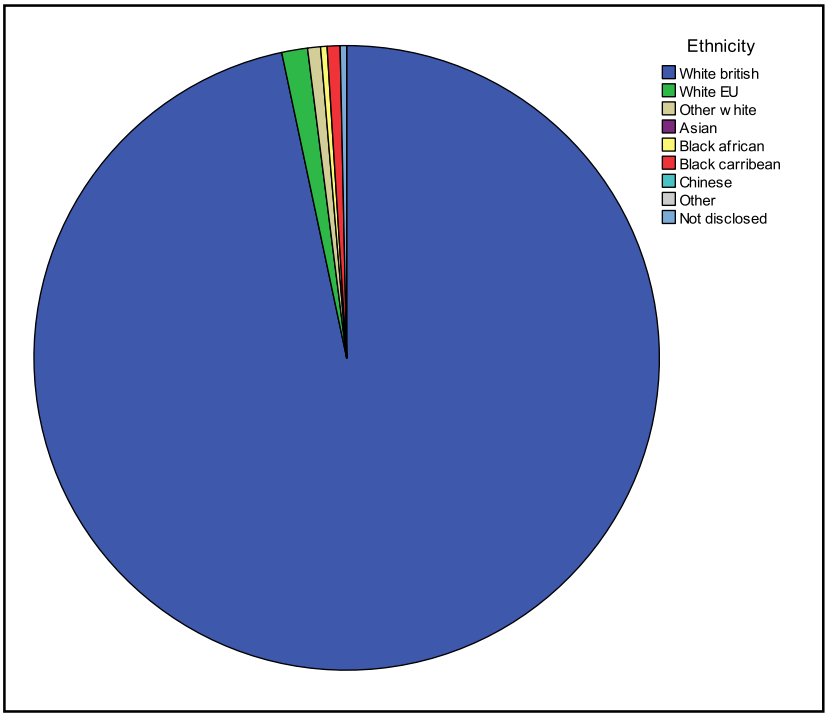


Figure 3. A pie chart displaying the relative abundance of the different ethnic groups within the study cohort.

3.4.3) Employment and leisure profile of Respondents

Overall the employment rate of the study cohort was 57.0% which contrasts with a figure of 63.9% for the wider Cumbrian population (Cumbria Intelligence Observatory 2013). The majority of participants who were not working described themselves as either retired, or as students or as housewives looking after young children. Amongst the working population, the largest sector were categorized as “Skilled Trades” and “Office Based” whereas the least abundant work types included “Fishing” and “Tourism” (Table 5.).

87.7% of respondents expressed an interest in outdoor activities, whereas 12.3% stated no interest. Of those individuals who were keen on outdoor pursuits, the most common activity described was hill walking (53.0%) (Figure 4.) and the least common activities were shooting (4.5%) and riding (4.2%). Approximately equal numbers of respondents described their preferred activity as either bird watching or fishing (10.0% fishing, 10.2% bird watching).

Work Type	Frequency	Percentage
Farming	10	5.8
Fishing	3	1.8
Tourism	8	4.7
Healthcare	25	14.6
Skilled Trades	39	22.8
Retail	13	7.6
Office Based	35	20.5
Other Working	25	14.6
Missing	13	7.6
Total	172	100

Table 5. The employment profile of the study cohort categorized into 8 distinct work types.

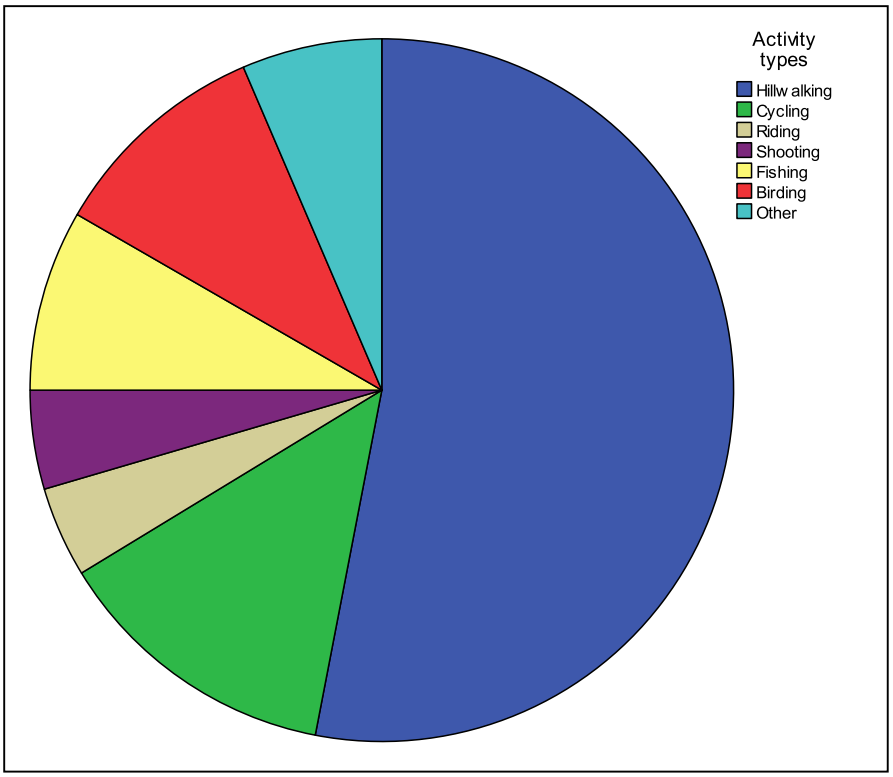


Figure 4. Pie chart displaying the proportions of 7 different activity types that respondents were most interested in.

3.5) Analysis of public opinion amongst respondents with different profiles.

Finally analysis was performed to establish significant relationships between the demographic, geographic and leisure profiles of the respondents and their response to question 10 (Overall would you say you are in favour of the sea eagle re-introduction project?). Chi-squared analysis revealed no significant differences in the response to question 10 between the following categories

- Urban/rural: (Chi-squared = 4.45 at $\alpha = 0.05$ with $v = 2$ and Chi-crit = 5.99).
- Local/Tourist and other: (Chi-squared = 2.77 at $\alpha = 0.05$ with $v = 2$ and Chi-crit = 5.99).
- Male/Female: (Chi-squared = 3.2 at $\alpha = 0.05$ with $v = 2$ and Chi-crit = 5.99).
- Interested in outdoor activities/not interested: (Chi-squared = 0.67 at $\alpha = 0.05$ with $v = 2$ and Chi-crit = 5.99).
- Ages less than 45/ages greater than 46: (Chi-squared = 1.09 at $\alpha = 0.05$ with $v = 2$ and Chi-crit = 5.99).

4) Discussion

The results of the study aim to provide a quantitative and qualitative evidence base to support the following research questions; firstly to what extent does the population of Cumbria support a WTE re-introduction and what are their views regarding the ecological, economic and social impacts of such a re-introduction. Secondly are there significant demographic differences in public attitudes towards the project in Cumbria and finally to what extent do public perceptions differ between the current feasibility study in Cumbria and the study conducted in Suffolk in 2009.

Overall the results conclusively demonstrate robust support for a WTE re-introduction in Cumbria. 88% of respondents were in favour of the initiative whereas in stark contrast only 2% were opposed to it. Although the Suffolk study also documented majority support for a WTE re-introduction with over three quarters of participants approving the proposed re-introduction, significant differences were found between the results in the two surveys. Almost 1 in 10 of the Suffolk study cohort decided against the project which represents a fourfold increase in the extent of opposition between the two study sites. The basis of this discrepancy is borne out in the concerns described by respondents when invited to add any further comments regarding the project. A substantial proportion of the comments collected in the Suffolk study identified concerns relating to two distinct themes. Firstly the perceived threat of a white-tailed eagle population to pets, small children and wildlife, and secondly the unsuitable nature of East Anglia as a re-introduction site for a large raptor. Although the absence of similar comments in the current study is noteworthy, comparisons between the two studies must be interpreted with caution in light of the wide discrepancy in the proportion of comments collected. However it is likely that the higher percentage of respondents objecting to the initiative in Suffolk accurately reflects the perception that East Anglia is a heavily populated and highly developed landscape that is unsuitable for a large bird of prey.

Overall the sentiment in favour of a WTE re-introduction is manifest in both studies and reinforces the findings of several authors regarding the emergence of public interest in the conservation of raptors in the late 20th and early 21st century (Martinez-Abrain *et al*., 2008; Cairns and Hamblin, 2007). Martinez-Abrain *et al*., (2008) evaluated public attitudes to birds of prey in Spain in the latter part of the 20th century and concluded that increasing public sympathy was attributed to the influence of mass media and an urbanising population who were no longer in direct conflict with raptors. In the United Kingdom, Mac Lennan and Evans, (2003) and Cairns and Hamblin, (2007), recognised that contemporary attitudes to raptors are also shaped by television and web based environmental education campaigns and wildlife documentaries, and the development of ecotourism initiatives such as public viewing facilities for WTEs on the west coast of Scotland.

In addition to establishing the overall level support for a WTE re-introduction, the study also aimed to evaluate public opinions regarding the detailed ecological, economic and social impacts of such a re-introduction in Cumbria. As might be expected, respondents expressed established opinions of agreement or disagreement to questions of a more general nature, but were often undecided in their responses to questions that required more detailed knowledge of the subject matter. This uncertainty is undoubtedly related to the extent of the knowledge base of the study cohort, and reflects the fact that over 40% of respondents had never heard of WTEs prior to their participation in the study.

Regarding the ecological impacts of a re-introduction, a large majority of respondents expressed the opinion that WTEs would be good for the environment, but a significant proportion were unsure of the effects on other species in the wider ecosystem. Only one respondent commented on the need for an environmental impact assessment to mitigate the potential risks of WTEs on local populations of wildlife.

Considering the economic case for a re-introduction, the study cohort was broadly convinced of the benefits to the local tourist industry in Cumbria, but unsure of the potential financial impacts on local farming interests. Furthermore despite acknowledging the benefits to the local economy, a number of respondents were unsure if the cost of the re-introduction would outweigh those future benefits. Although opinions vary with regard to the perceived economic impacts on different sectors of the Cumbrian economy, the consensus of opinion suggests broad economic gains from a WTE population. This consensus is likely to be related to a growing awareness of the general importance of tourism as a driver of the Cumbrian economy. More specifically, it also reflects the valuable contribution that high profile ecotourism initiatives such as the Bassenthwaite Osprey Project (Ospreywatch, 2013) make to the local and regional economy. The uncertainties expressed regarding the cost of the project could relate to the assumption that large sums of public money will be required to implement a WTE re-introduction and the perception that during the current economic slowdown those public funds could be put to better use. Equally the significant number of "undecided" responses could simply reflect the inability of respondents to make a considered judgement in the absence of any information relating to budgets. The ambiguity expressed by the respondents about the impacts on the farming sector, could also relate to the lack of detailed subject specific information provided to respondents in the questionnaire. However in view of the high proportion of respondents who live in rural locations, it may an affirmation of genuine concern for the livelihoods of livestock farmers in North Cumbria.

A comparison of the perceived economic benefits documented in the two study sites revealed that almost 90% of respondents were convinced of the economic imperative for a WTE re-introduction in Cumbria whereas less than two thirds shared that view in Suffolk. This discrepancy is in part related to the lower proportion of respondents in Suffolk who support the re-introduction and may reflect the greater relative contribution of the tourist sector to the economy of Cumbria than that of Suffolk (Visit England, 2008). However the validity of this result must be questioned due to the subtle difference in question design. The Cumbrian questionnaire specifically aims to evaluate benefits to the "local tourist economy", whereas the Suffolk study refers more broadly to the "local economy". Although most respondents are convinced of the economic opportunities of a WTE population to local tourism, they may interpret "local economy" to include other single interest groups such as farmers who may be perceived as shouldering financial losses as a result of the re-introduction.

An exploration of the perceived social and cultural impacts of a WTE re-introduction in Cumbria, revealed that an overwhelming 9 out of 10 respondents felt that WTEs would enrich their experience of nature, however only one comment alluded to the potential educational benefits of a large raptor re-introduction. In terms of negative social impacts, very few individuals considered WTEs as a threat to young children and domestic pets. However approximately one fifth of respondents were ambiguous and undecided regarding the potential risks to cats and small dogs.

Numerous authors have established that the love or loathing of birds of prey is determined by the ability of single interest groups such as conservationists, landowners and government authorities to influence public opinion (Martinez-Abrain *et al*., 2008; Cairns and Hamblin, 2007; Galbraith et al., 2003). Undoubtedly the joy experienced by the study cohort at the sight of large raptors is influenced by the past exposure of some respondents to inspiring wildlife documentaries and educational campaigns. However considering the fundamental differences in the demographic and employment profiles of the participants and the likelihood that their perceptions of raptors were shaped by a diverse range of influences, it seems unlikely that external influences alone, account for the high percentage who agree that their experience of nature would be enriched by WTEs. Perhaps this unanimous feeling of enrichment is a manifestation of what the American Biologist Edward Wilson conceptualised as Biophilia; the inherent need of mankind to associate with nature (Wilson, 1984). He believed that human identity and spiritual and emotional fulfilment was dependent on a relationship with the natural world, and that this dependence had evolved in human history as an inherited trait.

Having established the overall level of support for a WTE re-introduction in Cumbria, it was important to identify differences in the extent of support amongst groups of respondents with a range of personal profiles. Statistical methods revealed no significant differences between the following groups of respondents: males and females, respondents whose age was more than or equal to 46 and less than or equal to 45, those interested in outdoor activities and those who expressed no interest, respondents living in urban and rural locations and finally respondents living locally and those visiting as tourists. The ethnic diversity of the study cohort was too limited to analyse with statistical methods.

These results demonstrate an unexpected degree of uniformity in the opinions of different groups of respondents towards a WTE re-introduction. The similar level of support demonstrated by respondents living in urban and rural locations, conflicts with the findings of Galbraith et al., (2003) and Cairns and Hamblin (2007), who emphasized the entrenched cultural divisions that remain between the attitudes of rural and urban communities to birds of prey in the United Kingdom. Furthermore the close correlation in the proportion of younger and older respondents in favour of the re-introduction, contrasts with the assumption that older generations harbour a traditional view of raptors as predators that require control, and younger generations who view birds of prey as threatened species requiring protection (MacMillan, et al., 2010).

4.1) Limitations

The three elements in the questionnaire based survey should be considered separately. Firstly the image of a WTE was incorporated in the survey to encourage participation and offer respondents a visual reference relating to the research being undertaken. Although the picture was an effective way of introducing the subject matter of the questionnaire, the outline of a large raptor in flight could evoke an emotional response in the participants and influence the manner in which they completed the questionnaire. Secondly the content of the information sheet was sourced from peer reviewed published literature and was included to provide objective background information to expand the knowledge base of the study cohort. However the emphasis on "re-introduction" might suggest that the research was motivated by the desire to conserve the species and could also compromise the objectivity of the survey design. Finally with regard to the attitudinal questions a robust pilot study was carried out to inform the design of a series of questions that demonstrated a high degree of reliability and validity and examined both the threats and opportunities of a WTE re-introduction.

Although it is a considerable challenge to construct a questionnaire without the potential for bias, research conducted by an independent University is less likely to be affected by bias than that carried out by single interest groups such as conservation or field sports organisations.

Regarding the implementation of the questionnaire, it could be argued that too few surveys were completed for the opinions to be representative of the wider Cumbrian population. Nevertheless every effort was made to select a representative study cohort through the use of non random quota sampling based on the demographic profile of the population of Cumbria. Furthermore the overwhelming polarity evident in the survey results suggests that irrespective of the size of the study cohort it is likely that the data set would still demonstrate a large majority in favour of the re-introduction initiative.

4.2) -Conclusion

Despite substantial variation in the knowledge base of the participants to the study, support for a Cumbrian WTE re-introduction was widespread and transcended differences in the demographic, geographic and employment profiles of the study cohort. Public sympathy for birds of prey was manifest in both the Cumbrian survey and the equivalent survey conducted in Suffolk in 2009. However in contrast to the study population in Cumbria, participants in East Anglia were more risk averse with regard to a range of perceived threats posed by WTEs and expressed concern regarding the suitability of Suffolk as a re-introduction location. The Cumbrian survey established a broad consensus of opinion that a WTE re-introduction would benefit the environment and bolster the tourist industry. Furthermore the population in Cumbria were unanimous in expressing the sentiment that WTEs would enrich their experience of nature. Despite overarching support for the re-introduction proposal, consideration should be given to the smaller proportion that described genuine concerns or were undecided with regard to a number of issues including the cost of the initiative, the financial impacts on livestock farming and the perceived threats to domestic pets. Although it is beyond the scope of this study, these concerns must be taken seriously and could be addressed through the provision of environmental education campaigns.

5) References

Anon., (2012) 'Scotland's White-Tailed Eagles soar to new heights', *British Birds,105, p51.*

Cairns, P. & Hamblin, M. (2007) *Tooth & Claw: living alongside Britain's predators*. Dunbeath: Whittles Publishing

Cumbria Intelligence Observatory, (2013) *Census 2001- Key Statistics for Cumbria's Districts* [Online]. Available at: http://www.cumbriaobservatory.org.uk/Census/districts.asp (Accessed 1 February 2013).

Galbraith, C. A., Stroud, D.A., Thompson, D.B.A. (2003). Towards resolving raptor-human conflicts. Pages 527-535 *in* D. B. A. Thompson, S. M. Redpath, A. H. Fielding, M. Marquiss, and C. A. Galbraith (eds.) , *Birds of prey in a changing environment*. Scottish Natural Heritage, Edinburgh, Scotland.

Green, R.E., Pienkowski, M.W. & Love, J.A. (1996) 'Long-Term Viability of the Re-Introduced Population of the White-Tailed Eagle Haliaeetus albicilla in Scotland', *Journal of Applied Ecology,* 33 (2), pp.357-368.

Love, J. A. (1983) *The return of the sea eagle.* Cambridge: Cambridge University Press.

Martinez-Abrain, A., Crespo, J., Jimenez, J., Pullin, A.S., Stewart, G.B. & Oro. D. (2008) Friend or foe: societal shifts from intense persecution to active conservation of top predators. *Ardeola* 55(1): 111-119.

MacLennan, A. M., and R. J. Evans. (2003). Public viewing of White-tailed Sea Eagles - take the birds to the people or the people to the birds? Pages 417-422 *in* B. Helander (ed.) , *Sea eagle 2000*: proceedings from the International Sea Eagle Conference in Björkö, Sweden, 13-17 September 2000. Proceedings of the Swedish Society for Nature Conservation, SNF, Stockholm, Sweden.

MacMillan, D.C., Leitch, K., Wightman, A. & Higgins, P. (2010) 'The Management and Role of Highland Sporting Estates in the Early Twenty-First Century: The Owner's View of a Unique but Contested Form of Land Use', *Scottish Geographical Journal,* 126 (1), pp.24-40.

Natural England (2010) *Natural England withdraws as lead partner from white-tailed eagle reintroduction project [Online].* Available at: http://www.naturalengland.org.uk/about_us/news/2010/140610.aspx (Accessed 10 March 2013).

Office for National Statistics, (2010) *National Statistics Postcode Directory, 2010 User Guide* [Online]. Available at: http://geoconvert.mimas.ac.uk/help/documentation/10feb/Userguide/NSPDUserGuide2010v1-1.pdf (Accessed 17 September 2012).

Oppenheim, A.N. (1992) *Questionnaire Design, Interviewing and Attitude Measurement*.Continuum:London.

Ospreywatch, (2013) [Online]. Available at: http://www.ospreywatch.co.uk/wordpress/?m=201304 (Accessed 10 April 2013).

RSPB, (2012). *East Scotland Sea Eagles* [Online]. Available at: http://www.rspb.org.uk/ourwork/projects/details/274707-east-scotland-sea-eagles-esse (Accessed 10 March 2013).

UK Borders, (2013) Postcode data selector [Online]. Available at: http://ukbsrv-at.edina.ac.uk/ukborders/action/restricted/startPostcodes (Accessed 17 February 2013).

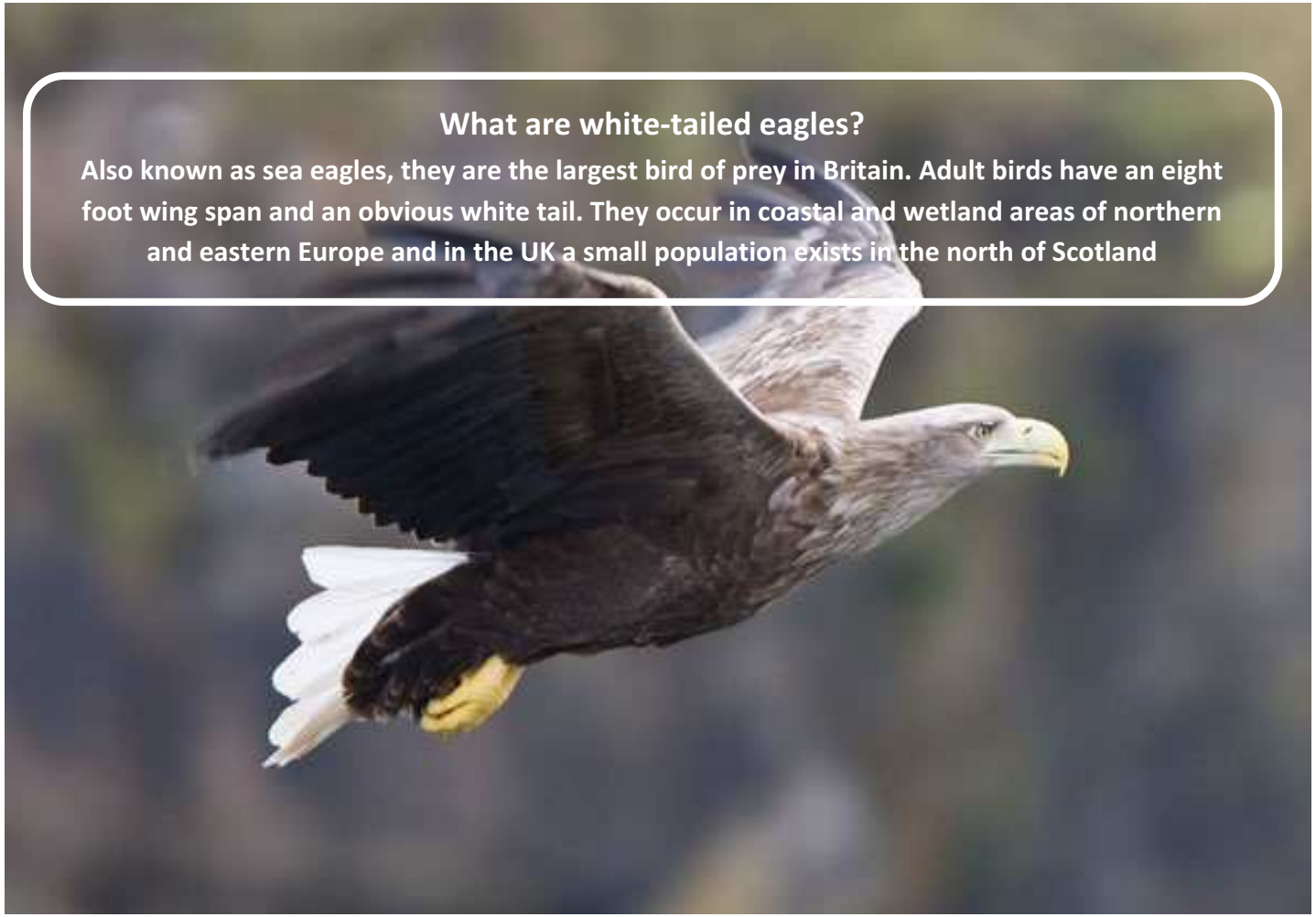
Visit England, (2008) 'What is Tourism Worth? Understanding the Value of Tourism at Regional and Sub-Regional Level' [Online]. Available at: http://www.visitengland.org/Images/Summary%20Paper%20-%20Sub-regional%20Tourism%20Value_updated%20links_tcm30-30057.pdf (Accessed 18 March 2013).

Whitfield, D.P., Douse, A., Evans, R.J., Grant, J., Love, J., McLeod, D.R.A., Reid, R. & Wilson, J.D. (2009) 'Natal and breeding dispersal in a reintroduced population of White-tailed Eagles Haliaeetus albicilla', *Bird Study,* 56 (2), pp.177-186.

Wilson, E.O. (1984). *Biophilia: The Human Bond with Other Species.* Cambridge: Harvard University Press.

6) Appendices

6.1) Appendix 1.



6.2) Appendix 2.

Information sheet

Why are we carrying out research to consider a re-introduction of sea eagles to Cumbria?

White tailed eagles are still one of Britain's rarest birds and are considered a conservation priority. A Cumbrian re-introduction would form part of an international effort to restore the species to areas where they were found in the past. As sea eagles are slow to breed and occupy new territories, it is unlikely that they will naturally re-colonize England. In Scotland sea eagle tourism benefits the local economy and helps people to connect with and enjoy nature.

What is the history of the sea eagle in the UK?

Sea eagles were once widespread throughout Great Britain, however relentless persecution in the 19th century led to the extinction of the species in the UK in 1918. Over the last 35 years a small breeding population has been re-introduced into Scotland and Ireland but sea eagles are still absent from England and Wales.

What are the key stages in the re-introduction project?

The first stage is to consult with the general public and the relevant organisations in the area, to identify key opinions and help to resolve areas of concern. If the consultation is successful a licence would be granted to remove chicks from healthy populations in Scandinavia and release them at a suitable age in Cumbria. Following their release, satellite-tags and wing tags would be used to monitor and track the birds in the wild.

What do they eat?

As well as scavenging on carcasses, sea eagles will take a variety of prey including fish, water birds and mammals. Research carried out on the re-introduced population in Scotland established that sea eagles will kill lambs; however this hunting habit was shown to be very rare.

Are they a threat to pets or people?

There is no evidence that sea eagles pose a threat to pets or people.

6.3) Appendix 3.

Sea eagle questionnaire

Please tick the coloured circle which corresponds most closely with the way you feel about the following statements. (Please tick only one circle per question)

		Yes	No
1)	Before you read the information sheet, had you heard of white-tailed sea eagles?	○	○

		Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
2)	A Cumbrian population of sea eagles would benefit the local tourist industry.	○	○	○	○	○
3)	Sea eagles could threaten the livelihoods of Cumbrian farmers by taking livestock.	○	○	○	○	○
4)	The cost of the project would outweigh any future benefits to the local economy.	○	○	○	○	○
5)	Re-introducing sea eagles would be good for the environment.	○	○	○	○	○
6)	Sea eagles could pose a threat to rare species of wildlife in the local area.	○	○	○	○	○
7)	Restoring sea eagles to the skies of Cumbria would enrich my experience of nature.	○	○	○	○	○
8)	Sea eagles could harm dogs, cats and other small pets.	○	○	○	○	○
9)	Sea eagles are a danger to humans and pose a particular threat to young children.	○	○	○	○	○
10)	Overall would you say you are in favour of the sea eagle re-introduction project?	○	○	○	○	○
11)	Please use the space provided to add any further comments you wish to make about this project.					

And now a few short questions about yourself.

A)	Are you:	Local to this area ◯ On holiday in the area ◯ Other (please specify) ◯ ……
B)	Do you live in:	An urban area ◯ A rural area ◯ Please include the first four characters of your postcode ……
C)	Are you interested in outdoor activities? If yes go to question **D)** If no go to question **E)**	Yes ◯ No ◯
D)	Which of these activities are you most interested in? **(Please tick one circle only)**	Hiking/walking ◯ Cycling ◯ Horse riding ◯ Shooting (game or wildfowl) ◯ Fishing ◯ Bird watching ◯ Other (please specify) ◯ ……
E)	What is your gender?	Male ◯ Female ◯
F)	What age are you?	16-25 ◯ 26-35 ◯ 36-45 ◯ 46-55 ◯ 56-65 ◯ Over 65 ◯ Not disclosed ◯
G)	Are you currently working?	Yes ◯ No ◯
H)	What is your occupation?	◯ ……
I)	What option best describes your ethnic group?	White British ◯ White European Union ◯ Other white background ◯ Asian ◯ Black African ◯ Black Caribbean ◯ Chinese ◯ Other ◯ Not disclosed ◯