

Mayhew, Michael ORCID: <https://orcid.org/0000-0002-2934-5489> , Convery, Ian ORCID: <https://orcid.org/0000-0003-2527-5660> , Armstrong, Roy ORCID: <https://orcid.org/0000-0002-8748-8787> and Sinclair, Billy (2015) Public perceptions of a white-tailed sea eagle (*Haliaeetus albicilla* L.) restoration program. *Restoration Ecology*, 24 (2). pp. 271-279.

Downloaded from: <http://insight.cumbria.ac.uk/id/eprint/2089/>

Usage of any items from the University of Cumbria's institutional repository 'Insight' must conform to the following fair usage guidelines.

Any item and its associated metadata held in the University of Cumbria's institutional repository Insight (unless stated otherwise on the metadata record) may be copied, displayed or performed, and stored in line with the JISC fair dealing guidelines (available [here](#)) for educational and not-for-profit activities

provided that

- the authors, title and full bibliographic details of the item are cited clearly when any part of the work is referred to verbally or in the written form
 - a hyperlink/URL to the original Insight record of that item is included in any citations of the work
- the content is not changed in any way
- all files required for usage of the item are kept together with the main item file.

You may not

- sell any part of an item
- refer to any part of an item without citation
- amend any item or contextualise it in a way that will impugn the creator's reputation
- remove or alter the copyright statement on an item.

The full policy can be found [here](#).

Alternatively contact the University of Cumbria Repository Editor by emailing insight@cumbria.ac.uk.

1 **Title**

2 Public Perceptions of a White-Tailed Sea Eagle (*Haliaeetus albicilla* L.) Restoration Programme

3

4 **Authors:** Mic Mayhew, Ian Convery, Roy Armstrong, Billy Sinclair.

5

6 **Author Addresses:**

7 Centre for Wildlife Conservation, University of Cumbria, Ambleside, Cumbria LA22 9BB, UK

8

9 ***Corresponding Author:**

10 Dr Ian Convery, Centre for Wildlife Conservation, University of Cumbria, Cumbria LA22 9BB, UK.

11 E-mail: ian.convery@cumbria.ac.uk

12

13 **Author Contribution:**

14 MM, IC, BS & RA conceived and designed the research; MM carried out the fieldwork and initial

15 data analysis; IC, BS & RA contributed to subsequent data analysis and data presentation; MM, IC,

16 RA & BS wrote and edited the manuscript.

17

18 **Abstract**

19 The historic persecution and decline of European raptor populations precipitated the use of

20 reintroduction as a species restoration tool in the late twentieth century. One of the key

21 requirements of the IUCN Reintroduction guidelines concerns the need for social feasibility studies

22 to explore the attitudes of local human populations towards restoration and reintroduction

23 proposals. Ahead of any formal proposals to reintroduce White Tailed Sea Eagles to Cumbria, UK,

24 We conducted a baseline public attitudinal survey (n=300). We identified broad public support for

25 this reintroduction, which transcended differences in the demographic, geographic and

26 employment profiles of the study cohort. There was public recognition that White-Tailed Sea
27 Eagles could deliver a broad range of socio-economic and environmental benefits with few
28 detrimental impacts. Whilst the value of attitudinal surveys of this nature has been questioned,
29 we would argue that they provide a useful baseline ‘snapshot’ ahead of a more structured and
30 focused reintroduction consultation. These results reinforce the emergence of public interest in
31 the restoration of European raptors in the late twentieth and early twenty first century.

32

33 **Key words:** Cumbria, England, public attitude, raptor, reintroduction, White-Tailed Sea Eagle.

34

35 **Implications for Practice**

- 36 • Whilst there is broad public support for a WTSE reintroduction in the study area, there were
37 also public concerns regarding the proposed reintroduction. This understanding provides the
38 platform to develop a more focused education and awareness campaign, including further
39 consultation work to evaluate the attitudes of an ‘informed public’ prior to the development
40 of a WTSE reintroduction project.
- 41 • Attitudinal surveys therefore provide a useful baseline ‘snapshot’ ahead of more structured
42 and focused consultation programmes

43

44

45

46 **Word Count:** 5268

47

48

49

50

51 **Introduction**

52 Across Europe, the on-going persecution of raptors between the early seventeenth century and
53 the middle of the twentieth century resulted in national extinctions and catastrophic declines of
54 many species (Love 1983; Hatzofe 2003; Pohja-Mykra et al. 2011). From the 1960s onwards, the
55 growing influence of conservation organisations and a renewed environmental awareness
56 amongst the general public, provided the impetus for the modern conservation movement and
57 altered the fortunes of many birds of prey (Love 1983; Pohja-Mykra et al. 2011). The traditional
58 perception of raptors as pest species began to change, and this resulted in increasing public and
59 political support for their protection (Pohja-Mykra et al. 2011). Nevertheless the restricted range
60 and population size of many birds of prey prevented them from naturally recolonizing their former
61 geographic range (Love 1983; Whitfield et al. 2009), and prompted conservation managers to use
62 reintroduction as a tool to augment and restore populations (Griffith et al. 1989; Seddon et al.
63 2007).

64
65 Despite the growing popularity of reintroduction methods in the 1970s and 1980s, many early
66 attempts to reintroduce raptors were ill-conceived, under resourced and destined to fail (Griffith
67 et al. 1989; Seddon et al. 2007). The publication of the Reintroduction Guidelines by the
68 International Union for Conservation of Nature (IUCN 1998; Seddon et al. 2007) improved project
69 outcomes by advocating a rigorous scientific approach. These provided a comprehensive
70 framework to assess the feasibility of a reintroduction proposal and to offer advice regarding
71 project planning and implementation. In the last forty years reintroduction projects have assisted
72 the recovery of several British raptor species including the Red Kite (*Milvus milvus* L.), Osprey
73 (*Pandion haliaetus* L.) and White-Tailed Sea Eagle (WTSE) (Love 1983; Evans & Pienkowski 1991;
74 Evans et al. 1997; Evans et al. 1999; Carter & Grice 2000).

75

76 Following the extinction of WTSEs in Great Britain in 1918, a reintroduction initiative was
77 implemented in the north-west Highlands and the east coast of Scotland in three stages between
78 1975 and 2012 (Love 1983; RSPB 2012). Scotland now has a secure breeding population, but it
79 remains fragmented and well below carrying capacity (Whitfield et al. 2009). In addition, the slow
80 maturation rate and philopatric tendencies of juvenile birds, act to restrict the rate of range
81 expansion in the breeding population (Whitfield et al. 2009). Consequently, it is widely
82 acknowledged that further reintroductions are required to restore WTSEs to their historic range
83 and density throughout the British Isles (Whitfield et al. 2009).

84

85 In recent years Cumbria, a relatively large (6,768 km²), sparsely populated county (population of
86 496,200, with a population density of 73 per km²) in Northern England, has been suggested as a
87 potential reintroduction area on the basis that it was the last stronghold for WTSEs in England
88 (Love 1983), and there is consensus amongst many stakeholder groups that the extensive
89 freshwater and coastal habitats could still support the ecological requirements of the species
90 (Mayhew 2013). To date the Suffolk Coast and Heaths Area of Outstanding Beauty is the only
91 location in England that has been evaluated for a WTSE reintroduction (RSPB 2009). A feasibility
92 study was launched in 2007 as a partnership between Natural England and the RSPB, but
93 subsequently abandoned in 2010 (Natural England 2010).

94

95 As Arts et al. (2012) indicate, the reintroductions of charismatic animals present ambitious
96 conservation interventions, with the potential for inducing vehement controversy. Historically the
97 reintroduction of predator species was managed by environmental scientists who prioritised
98 comprehensive biological feasibility studies but failed to establish and address public concerns
99 regarding translocations (Marshall et al. 2007; O'Rourke 2014). Wilson (2004) identified that
100 attitudes to reintroductions (and particularly carnivores) tended to be favourable amongst the

101 general public, but negative amongst those likely to be adversely affected. The decision to
102 reintroduce WTSEs to Killarney National Park (2007-2012) in Ireland without adequately consulting
103 the farming community resulted in intractable conflict and the poisoning and destruction of
104 almost a quarter of the birds by the spring of 2013 (O'Rourke 2014). The illegal persecution of Lynx
105 in Switzerland is the legacy of a reintroduction programme in the 1970s that excluded and
106 disenfranchised sheep farmers and hunters (Breitenmoser et al. 2004).

107

108 As a result of such experiences, it is now accepted that in addition to ecological research,
109 reintroduction outcomes are determined by the attitudes and behaviour of the public and regional
110 stakeholder groups (Marshall et al. 2007; Thirgood & Redpath 2008). Therefore a broad based
111 public consultation is an essential tool to reveal contentious issues and identify those parties who
112 will oppose the reintroduction due to perceived threats to their interests. These findings will
113 enable conflict mediators to acknowledge concerns and seek solutions through an inclusive and
114 transparent approach to public engagement. This paper aims to evaluate public opinion regarding
115 the socio-economic and environmental impacts of a WTSE reintroduction in Cumbria and will
116 compare the findings with a similar public consultation conducted in 2009 as part of the Suffolk
117 feasibility study (Manly 2009).

118

119

120 **Methodology**

121 A questionnaire survey was employed to collect quantitative and qualitative data regarding public
122 opinion and the possible reintroduction of WTSEs in Cumbria.

123

124 The Cumbrian questionnaire was based on the Suffolk feasibility study (Manly 2009) and consisted
125 of a photograph of a WTSE, a short information sheet, and a series of attitudinal and classification

126 questions. The information sheet was designed to provide background information on the
127 reintroduction and introduce the key themes that would be explored via the attitudinal questions.
128 To maintain objectivity, the content of the information sheet was sourced from published peer-
129 reviewed literature (Love 1983; Marquiss et al. 2002; Helander & Stjernberg 2003; Whitfield et al.
130 2009; Simms et al. 2010; Birdlife International 2012) and subjective narrative styles such as the use
131 of superlatives were avoided.

132

133 Using a broadly similar approach to other species reintroduction – public attitude studies (for
134 example, Nilsen et al. 2007; Scott Porter Research & Marketing, 1998), an initial
135 knowledge/awareness question was followed by 10 attitudinal questions, constructed to explore
136 the perceived social, environmental and economic impacts of the reintroduction. The attitude
137 questionnaire consisted of a combination of closed and open questions, enabling rapid collection
138 of large amounts of quantitative data without compromising the freedom and spontaneity of
139 respondents to express their views. All responses have been anonymised and an interview coding
140 system is used for this paper (prefix R, suffix interview number, e.g. R051). The full list of
141 responses can be viewed in the online version of this paper.

142

143 Classification questions were constructed to establish the extent to which the demographic profile
144 of the study cohort was representative of the wider population within the study area. In addition
145 to age, gender and ethnicity, participants were asked to describe whether they lived in an urban or
146 rural location. The first part of the post code (outward code) was collected to verify the location,
147 whilst retaining the anonymity of the respondents. The postcode directory resources from the
148 Edina UK Borders website (UK Borders 2012) and the National Statistics Postcode Directory (Office
149 for National Statistics 2010) were used to categorize outward codes as rural or urban.

150

151 Six sites were chosen to represent a mixture of rural, urban, coastal and inland locations within
152 north Cumbria; Maryport marina, Carlisle city centre and high street locations in Silloth, Kirkbride,
153 Burgh by Sands and Wigton. The National Statistics Postcode Directory from the Office for
154 National Statistics (2010) was used to define urban locations in England as settlements with a
155 population ≥ 10000 . Maryport and Carlisle were categorized as urban and Silloth, Kirkbride, Burgh
156 by Sands and Wigton were classified as rural.

157

158 The lead author conducted 300 face-to-face questionnaires over the period of July to August 2012,
159 using non-random quota sampling techniques. There are a number of advantages and
160 disadvantages associated with this approach. The main advantage is speed; non-random quota
161 sampling is much quicker and easier to carry out than alternative approaches, for example
162 probability-sampling techniques, as it does not require a sampling frame and the use of random
163 sampling techniques. It should also improve the representation of particular groups within the
164 sample (whilst also ensuring that some groups are not over-represented).

165

166 The main drawback is that the sample has not been chosen using random selection, which makes
167 it impossible to determine the possible sampling error. There is also the risk that the selection of
168 participants is based on ease of access and cost considerations, resulting in sampling bias.
169 Interviewers may also be tempted to interview those people in the street who look most helpful,
170 again adding bias. In order to minimise such issues, all interviews were completed by 1 person, in
171 accordance with a clear interview protocol based on three distinct stages of sample design;
172 determining the stratification and dividing the population; determining a proportion for each
173 stratum; recruiting the maximum number of participants to each stratum within the allotted time
174 period (recruitment times were similar at each of the five locations).

175

176 Participants were selected to be representative of the wider population of north Cumbria on the
177 basis of their age, gender and ethnicity and with reference to demographic census data acquired
178 from Cumbria County Council (Cumbria Intelligence Observatory 2012). Whilst North Cumbria is
179 not officially designated, it is usually taken to mean the districts of Allerdale (population of 96,300)
180 and Carlisle (105,200). During periods of recruitment the demographic profile of each successive
181 participant was recorded to enable the author to recruit subsequent participants to each strata in
182 approximately the correct proportions. Informed consent of the respondents was obtained and
183 ethical approval was granted in accordance with university policy.

184

185 Quantitative data was displayed using descriptive statistics (SPSS Version 19) and analysed using
186 Pearson's chi-squared goodness of fit tests to establish the extent to which observed values within
187 the Cumbrian study cohort and between the Cumbrian and Suffolk cohorts, differed from the
188 expected values (Norman & Steiner 1993). Yates' correction for continuity was applied to
189 determine chi-squared values from two by two contingency tables (Norman & Steiner 1993).
190 Responses to closed attitudinal questions were categorized using the five point Likert scale to
191 enable quantitative comparisons with the results of the Suffolk study (Manly 2009). Qualitative
192 data from open questions were analysed using the grounded theory—constant comparison
193 method, which identifies and compares themes within and across respondent responses (Pope et
194 al. 2000).

195

196 **Results**

197 Overall 88.7% of respondents were in favour of the proposed reintroduction (Figure 1), 2.0% were
198 against and 8.3% were undecided. When asked if they had heard of WTSEs prior to reading the
199 information sheet, 50.7% of respondents answered "yes", 42.0% answered "no" and 7.3% left the

200 question unanswered. Of those who were in favour of a reintroduction, the majority were familiar
201 with the WTSE (55.8%) whereas of those who were opposed to the project, the greatest
202 proportion was not familiar (66.7%) with the species.

203

204 Of the 300 completed questionnaires there were marked differences between the number
205 administered at each of six chosen survey sites, with the highest number completed in Maryport
206 (n=98) and the lowest number in Kirkbride (n=16). Completion rates were influenced by a number
207 of factors including the available population size, variation in weather patterns and higher
208 response rates in rural locations (Wigton, Burgh by Sands, Silloth and Kirkbride) compared to
209 urban locations (Carlisle and Maryport).

210

211 No significant differences were established between the gender of the respondents (51.3% males,
212 48.7% females) and that of the wider Cumbrian population ($\chi^2 = 0.86$, $df = 1$, N.S.). There was a
213 significant difference between the age range of the respondents and the population data from the
214 Cumbrian census ($\chi^2 = 18.62$, $df = 5$, $P < 0.05$). The largest proportion of the participants were 56
215 to 65 years old (24.7%) the smallest proportion aged between 26 and 35 (6.9%). Although the
216 ethnic diversity was too limited to analyse with statistical methods, study findings were an
217 accurate representation of the Cumbrian population as a whole (97.0% white British, 3.0% black
218 and minority ethnic groups).

219

220 Geographic profiling revealed that 41.3% of respondents lived in urban areas and 58.3% lived in
221 rural areas; 0.4% of participants declined to reveal their location. 69.7% were local to the area,
222 27.3% were on holiday and 3.0% specified other reasons for their presence in the study area such
223 as working away from home. The employment rate of the respondents was 57.0% which contrasts
224 with a figure of 63.9% for the wider Cumbrian population (Cumbria Intelligence Observatory

225 2012). The majority of those not in works described themselves as either retired, as students, or as
226 housewives looking after young children. Amongst the working population, the largest sector were
227 categorized as “Skilled Trades” and “Office Based” whereas the least abundant work types
228 included “Fishing” and “Tourism” (Table 1).

229

230 Analysis was performed to establish significant relationships between the profiles of the
231 respondents and their response to the question: ‘*Overall would you say you are in favour of the*
232 *WTSE re-introduction project?*’ Chi-squared analysis revealed no significant differences between
233 the following categories: Farming/Other Work Type ($\chi^2 = 5.26$, $df = 2$, N.S.); Urban/rural ($\chi^2 = 4.45$,
234 $df = 2$, N.S.); Local/Tourist and other ($\chi^2 = 3.06$, $df = 4$, N.S.); Male/Female ($\chi^2 = 3.29$, $df = 2$, N.S.);
235 Ages less than 46/ages greater than or equal to 46 ($\chi^2 = 1.10$, $df = 2$, N.S.).

236

237 There was broad consensus of opinion (89.3%) that WTSEs would benefit the local tourist industry
238 (Table 2); however respondents expressed more uncertainty regarding impacts on local farming
239 interests and the cost of the project. Approximately the same number of respondents was
240 undecided (40.7%) as disagreed (45.6%) with the statement that WTSEs could harm domestic
241 livestock and therefore threaten livelihoods of Cumbrian farmers. 33.3% of participants were
242 undecided and 47.0% disagreed that the cost of the project would outweigh any future benefits to
243 the local economy.

244

245 A large majority of respondents (80.4%) agreed that WTSEs would be good for the environment,
246 whereas the potential impacts of the raptor on endangered species of fauna were more equivocal.
247 40.3% were undecided and 44.3% disagreed with the question “WTSEs could pose a threat to rare
248 species of wildlife in the local area”. This uncertainty could reflect the knowledge base of the

249 respondents (as discussed, 42% confirmed that they had never heard of WTSEs prior to their
250 participation in the study).

251

252 Overall respondents expressed strong views of agreement or disagreement, towards the questions
253 that explored the social impacts of a WTSE reintroduction. When asked if their experience of
254 nature would be enriched by the return of WTSEs, nine out of 10 respondents agreed. A clear
255 majority disagreed with the statements that WTSEs could be a threat to cats and dogs (68.7%),
256 and young children (88.0%).

257

258 37 individuals or 12.3% of participants responded to the open question by providing further
259 comments about the project. As indicated in Figure 2, these remarks were assigned to 11 distinct
260 themes within three broad category areas; environmental, economic and social. The theme with
261 the greatest number of comments (12 out of 37 comments) described a positive sentiment
262 towards the reintroduction. One individual wrote '*Good thing all round*' (R17), while another
263 wrote '*Let's make it happen*' (R26).

264

265 Six comments described economic themes relating to the proposed reintroduction. Two
266 comments described benefits to local business, while one referred to the opportunities created in
267 the Cumbrian ecotourism industry; R02 stated that '*Cumbria's tourism industry is centred around
268 nature and wildlife therefore this would only benefit*'. Other remarks related to the detrimental
269 economic impacts of the project; Two respondents highlighted concerns regarding the potential
270 cost of the project, and one retired farmer alluded to the financial implications of a WTSE
271 population on the livestock sector: '*I am only in favour of the reintroduction if a compensation
272 scheme is in place for farmers*' (R11).

273

274 11 respondents commented on a range of ecological issues. Four described environmental
275 benefits in a general sense, whereas three comments specifically described the advantages
276 derived from the ability of an apex predator to control species perceived as pests at the local level.
277 For example R25 stated that *'white-tailed eagles are needed to keep down the population of*
278 *nuisance sea gulls in Dumfries'*. In contrast, respondents also expressed concerns regarding
279 impacts on the wider ecosystem and the need for such a reintroduction to be contingent on an
280 environmental impact assessment. One participant described the persecution of raptors through
281 the use of illegal poisons, as an on-going threat to the reintroduction project: *'Some lads I know*
282 *lay poison baits for the buzzards'* (R19).

283

284 Participants also addressed social issues associated with the reintroduction proposal. Five
285 comments related to the (positive) experience of seeing a WTSE in the wild; *'I would like to see*
286 *these birds free rather than in a zoo'* (R27). One comment related to the opportunities of the
287 project to deliver WTSE based environmental education initiatives: *'White-tailed eagles would be*
288 *great to watch and would benefit everyone and education'* (R6).

289

290 A comparison of the attitudinal questions used for the North Cumbrian and Suffolk studies shows
291 that there were three common questions, as indicated in Table 3 (Manly 2009). Both
292 questionnaires included an open question inviting participants to provide further comments about
293 the respective projects. The Suffolk study administered 523 questionnaires and collected 160
294 written comments (Manly 2009), whereas the Cumbrian study consisted of 300 questionnaires but
295 only yielded 37 comments.

296

297 Despite the discrepancy in comment numbers collected, the majority of categories were shared by
298 both studies. The potential benefits to local tourism and the wider economy were described, as
299 were concerns regarding the cost of the project and the need to consult with the farming
300 community to evaluate risks to livestock. The potential for persecution post release was
301 documented and comments were made regarding the educational benefits of a WTSE
302 reintroduction.

303

304 A number of unique categories were documented in the Suffolk study (Manly 2009). Multiple
305 comments were made regarding the threat of an apex predator to local wildlife, pets and small
306 children. Respondents also voiced concern regarding the impact on marine fish stocks and
307 commercial freshwater fisheries. Several submissions described Suffolk as an inappropriate
308 landscape for such a reintroduction initiative: *'In Scotland they don't have the free range farms*
309 *that we do in this area (so against the project)'* and *'Completely inappropriate for this area'*.

310

311 A significant difference was established between the proportion of respondents in favour and
312 against the reintroduction at the two study sites ($\chi^2 = 20.84$, $df = 2$, $P < 0.05$). The Cumbrian study
313 documented more support and less opposition towards the reintroduction (88.7% in favour, 2.0%
314 against), compared to the Suffolk study (78.0% in favour, 9.0% against). Significant differences
315 were also established regarding the proportion of respondents who thought a reintroduction
316 would benefit the local tourist economy ($\chi^2 = 108.80$, $df = 2$, $P < 0.05$) with a larger majority in
317 Cumbria describing economic benefits (89.3% agreed, 0.7% disagreed, 10.0% undecided) than in
318 Suffolk (58.0% agreed, 14.0% disagreed, 28.0% undecided).

319

320 **Discussion**

321 Overall the study demonstrates support for a WTSE reintroduction in Cumbria, and reinforces the
322 findings of several authors regarding the emergence of public interest in the conservation of
323 raptors in the late twentieth and early twenty first century (MacLennan & Evans 2003; Cairns &
324 Hamblin 2007; Martinez-Abraín et al.). Martinez-Abraín et al. (2008) evaluated attitudes to birds of
325 prey in Spain in the latter part of the twentieth century and concluded that increasing public
326 sympathy was attributed to the influence of mass media and an urbanising population who were
327 no longer in conflict with raptors. In Great Britain, MacLennan and Evans, (2003) and Cairns and
328 Hamblin, (2007), recognised that contemporary attitudes to raptors were shaped by ecotourism
329 initiatives such as public viewing facilities at raptor nest sites, exposure to wildlife documentaries
330 and environmental education campaigns. However, this finding does come with a number of
331 caveats, not least that 42% of respondents had never heard of WTSEs. This highlights the need for
332 an education and awareness campaign, combined with a further consultation survey to evaluate
333 the attitudes of an 'informed public' prior to the development of a WTSE reintroduction project in
334 Cumbria. There was also a sample bias towards older participants (56 to 65 years old cohort,
335 24.7% of the sample) and there is evidence from elsewhere that this group is less supportive of
336 reintroductions compared to younger cohorts (Smith & Convery, 2015).

337

338 Considering the economic case for a reintroduction, a majority of respondents (89.3%) were
339 convinced of the benefits to the local tourist industry. This is likely to be related to a growing
340 awareness of the economic importance of tourism in rural areas. More specifically, it also reflects
341 the valuable (and highly publicised) contribution that high profile ecotourism initiatives such as
342 the Bassenthwaite Osprey Project (Ospreywatch, 2013) make to local and regional economies.

343

344 Since the middle of the twentieth century a growing environmental awareness and increased
345 leisure time have resulted in increasing numbers of people visiting spectacular landscapes for

346 recreation (Dickie et al. 2006). More recently the marketing of flagship species by wildlife film
347 makers and conservation groups has driven the development of species specific ecotourism
348 initiatives and brought measurable economic benefits to some local communities (Martinez-
349 Abraín et al. 2008; Dickie et al. 2006). In 2010, a study commissioned by the RSPB revealed that
350 WTSE tourism on the island of Mull, in Scotland, generated an annual spend of £5 million and
351 supported up to 110 full time equivalent jobs (Molloy 2011).

352

353 Despite the majority acknowledging benefits to local tourist economy, 40.7% of respondents were
354 unsure about detrimental impacts on farming interests. This ambiguity could reflect a lack of
355 detailed subject specific knowledge, but in view of the high proportion of respondents who live in
356 rural locations, it is likely to be an affirmation of genuine concern for the livelihoods of livestock
357 farmers. Since the recovery of WTSEs in the North West Highlands, various authors have
358 documented a perception amongst sheep farmers that declines in lambing percentages were
359 related to eagles targeting live lambs (Madders et al. 2002; Marquiss et al. 2003; Simms et al.
360 2010). To quantify the extent of the problem in the Highlands of Scotland, research was conducted
361 at two separate locations (Mull: 1999-2002, Gairloch: 2009) to document the numbers of lambs
362 predated, the proportion that were taken live, and the impact on total farm incomes (Madders et
363 al. 2002; Marquiss et al. 2003; Simms et al. 2010). The studies concluded that the proportion of
364 lambs killed was insignificant compared to overall annual mortality, and that the financial impacts
365 of WTSEs on sheep farming interests would be negligible at broad spatial scales (Madders et al.
366 2002; Marquiss et al. 2003; Simms et al. 2010).

367

368 Although a substantial proportion of respondents were unsure of the risks to rare species of
369 wildlife in the locality, a large majority (80.4%) believed that WTSEs would be good for the
370 environment. This response alludes to both the suitability of the Cumbrian landscape as a habitat,

371 but also to the beneficial regulatory role of apex predators in the wider ecosystems: *'I think the*
372 *countryside would benefit from the return of these birds'* (R13). As Wilson (2004) indicates,
373 attitudes toward reintroduction projects tends to be favourable amongst the general public but
374 negative among those most likely to be negatively affected. Whilst our study indicates broad
375 support for the environmental benefits of a WTSE reintroduction, stakeholder groups likely to be
376 adversely affected (e.g. farmers, fishermen and game estates) are underrepresented in our
377 sample, and there is a need for more focused consultation. Research from Ireland, where WTSEs
378 were reintroduced in 2007, indicates the importance of engaging with such groups. For instance,
379 O'Rourke (2014) highlights the conflict between the 'raptor and the lamb', and emphasises the
380 need for the early involvement of all key stakeholders. Similarly, Burke et al. (2015) state that
381 given the sensitivity of the white-tailed eagle population, efforts to engage and inform farmers
382 and other stakeholders is crucially important.

383

384

385 An exploration of the perceived social and cultural impacts of the reintroduction in Cumbria
386 revealed that nine out of 10 participants felt that White-tailed Eagles would enrich their
387 experience of nature and the majority agreed that the raptor posed no threat to children or
388 domestic pets. This apparent groundswell of public support was tempered by comments of other
389 respondents describing the historic and contemporary persecution of raptors in Cumbria. In April
390 2014, the largest mass poisoning of raptors in modern times occurred near Inverness in Scotland
391 (Carrell 2014). The death of 12 Red Kites and four Common Buzzards (*Buteo buteo* L.) in a single
392 incident demonstrates that persecution remains a serious threat to raptor populations throughout
393 the UK (Carrell 2014). Cairns and Hamblin (2007) and, MacMillan et al. (2010) concede that
394 entrenched negative attitudes towards birds of prey still exist amongst a minority of individuals in
395 rural parts of the UK, who view raptors as pest species that require to be controlled.

396

397 Although the Suffolk study also documented majority support for the proposed reintroduction
398 (Manly 2009), there was almost a five-fold increase in the number of respondents opposed to the
399 project in Suffolk compared to the one in Cumbria. This apparent discrepancy may be explained by
400 the concerns described by respondents when invited to add further comments regarding the
401 project. A substantial proportion of the comments collected in the Suffolk study identified
402 concerns relating to two distinct themes. Firstly the perceived threat of a WTSE population to pets,
403 small children and wildlife, and secondly the unsuitable nature of East Anglia in the south east of
404 England as a reintroduction site for a large raptor (Manly 2009). Although there is an absence of
405 similar comments in the Cumbrian study, comparisons between the two studies must be
406 interpreted with caution in light of the discrepancy in the number of comments collected at the
407 study sites (Cumbria: n=37, Suffolk: n=160). It is likely that the higher percentage of respondents
408 objecting to the initiative in Suffolk accurately reflects the perception that East Anglia is a heavily
409 populated and highly developed landscape that is unsuitable for a large bird of prey.

410

411 The expression of public support documented in this study mirrors the findings of other authors
412 evaluating human attitudes to contemporary predator reintroductions. Bright et al. (2000)
413 administered a questionnaire to evaluate public opinion of a pine marten (*Martes martes*)
414 reintroduction in England. They established that almost 90% of the general public and two thirds
415 of farmers and gamekeepers supported the proposal. Nilsen et al. (2007) explored public
416 perceptions of a wolf (*Canis lupus*) reintroduction in the Highlands of Scotland and revealed that
417 the general public were broadly in favour of the proposal. However more positive attitude scores
418 were recorded for the urban sample due to negative perceptions amongst some farmers in the
419 rural sample.

420 The restoration of Golden Eagles to Donegal in Ireland was preceded by a widespread consultation
421 that assured the public as well as tourism and sheep farming interests that the reintroduction
422 would deliver a range of economic, cultural and ecological benefits (O'Toole et al. 2002). However
423 since the inception of the project in 2001 many Golden Eagles have been destroyed by ingesting
424 poisoned bates and the existing population remains vulnerable (The Golden Eagle Trust 2013). The
425 persecution of large avian and mammalian predators does not diminish the importance of social
426 feasibility studies in reintroduction projects but serves to emphasize the on-going conflict that
427 exists between predators and humans competing over common resources (Marshall et al. 2007).
428 Restoration projects also develop storylines as they progress, which inevitably reflect much of the
429 above. Arts et al. (2012) provide an overview of the various 'restoration narratives' linked to the
430 reintroduction of WTSEs to the Scottish island of Mull in 2007. In particular they highlight how
431 scientists' perceptions of the species as 'a bird of wild coasts' changed over time as a result of
432 ecological research on the eagle's high productivity in inland habitats and predation on lambs, and
433 how the 'restoration storyline' was subsequently modified to reflect this change.

434

435 This study set out to explore public opinion in North Cumbria towards a proposed WTSE
436 reintroduction and draw comparisons with a similar public consultation conducted in Suffolk in
437 2009 (Manly 2009). Study findings demonstrate that public support for a WTSE reintroduction in
438 Cumbria was widespread and transcended differences in the demographic, geographic and
439 employment profiles of the respondents. This expression of support towards a large raptor was
440 attributed to the consensus that a reintroduction programme would deliver a broad range of
441 economic, environmental and social benefits to local communities, with few detrimental impacts.
442 Public sympathy was manifest in both the Cumbrian survey and the equivalent survey conducted
443 in Suffolk in 2009, however participants in East Anglia were more 'risk averse' with regard to a

444 range of perceived threats posed by WTSEs and expressed concern regarding the suitability of
445 Suffolk as a re-introduction location.

446

447

448 Whilst the usefulness of attitudinal surveys has been questioned, we would argue that they
449 provide a useful baseline 'snapshot' ahead of a more structured and focused WTSE reintroduction
450 consultation. Indeed, considering the paucity of public consultations relating to raptor
451 reintroductions in the UK and the increasing importance of reintroductions as a conservation tool,
452 this study provides a useful case study, both in terms of IUCN requirements for social feasibility
453 studies (IUCN 2013), and the evaluation of public opinion regarding future raptor reintroduction
454 initiatives.

455

456 **Acknowledgements:**

457 The authors acknowledge the financial support for this work received from the University of
458 Cumbria Research Scholarship and Development Fund and Natural England for providing the
459 Suffolk questionnaire (Manly 2009). We confirm that the authors have no potential conflicts of
460 interest, financial or otherwise that could result from publication of this work.

461

462

463 **References**

- 464 Arts K, Fischerb A, Van der Wal R. (2012) Common stories of reintroduction: A discourse analysis of
465 documents supporting animal reintroductions to Scotland. *Land Use Policy* 29: 911–920
- 466 Birdlife International (2012) White-tailed sea eagle *Haliaeetus albicilla*.
467 <http://www.birdlife.org/datazone/speciesfactsheet.php?id=3364> (accessed 6 August 2012)
- 468 Breitenmoser U, Breitenmoser-Wursten C (2004) Switzerland. In: Status and Conservation of the
469 Eurasian Lynx (*Lynx lynx*) in Europe in 2001, von Arx M, Breitenmoser-Wursten C, Zimmermann F,
470 Breitenmoser U (eds). Bericht 19. Kora, Muri
- 471 Burke B, Finna A, Flanagan D, Fogarty D, Foran M, O’Sullivan J, Smith S, Linnell J, McMahon B
472 (2015) Reintroduction of white-tailed eagles to the Republic of Ireland: A case study of media
473 coverage. *Irish Geography* 47: 95-115
- 474 Cairns P, Hamblin M (2007) *Tooth & Claw: living alongside Britain's predators*. Whittles Publishing,
475 Dunbeath
- 476 Carrell S (2014) Scottish bird of prey colony hit by mass poisonings.
477 [http://www.theguardian.com/environment/2014/apr/03/scottish-bird-of-prey-colony-mass-](http://www.theguardian.com/environment/2014/apr/03/scottish-bird-of-prey-colony-mass-poisonings)
478 [poisonings](http://www.theguardian.com/environment/2014/apr/03/scottish-bird-of-prey-colony-mass-poisonings) (accessed 16 September 2014)
- 479 Carter I, Grice P (2000) Studies of re-established Red Kites in England. *British Birds* 93: 304-322
- 480 Cumbria Intelligence Observatory (2012) *Census 2001- Key Statistics for Cumbria’s Districts*.
- 481 Dickie I, Hughes J, Esteban A (2006) *Watched Like Never Before. The local economic benefits of*
482 *spectacular bird species. The RSPB, Sandy, Bedfordshire*
- 483 EDINA (2014) *Digimap Collections*. <http://digimap.edina.ac.uk/roam/os> (accessed 17 July 2014)

484 Evans IM, Pienkowski MW (1991) World status of the Red Kite: a background to the experimental
485 reintroduction to England and Scotland. *British Birds* 84: 171-187

486 Evans IM, Dennis RH, Orr-Ewing DC, Kjellén N, Andersson PO, Sylvén M, Senosiai, A, Carbo F (1997)
487 The re-establishment of Red Kite breeding populations in Scotland and England. *British Birds* 90:
488 123-138

489 Evans IM, Summers RW, Snell N, O'Toole L, Evans R, Smith J, Orr-Ewing D (1999) Evaluating the
490 success of translocating Red Kites *Milvus milvus* to the UK. *Bird Study* 46: 129-144

491 Griffith B, Scott JM, Carpenter JW, Reed C (1989) Translocation as a species conservation tool:
492 Status and strategy. *Science* 245: 477–480

493 Hatzofe O (2003) The reintroduction of the white-tailed White-tailed sea eagle in Israel. Pages 405-
494 412 In: Helander B, Marquiss M, Bowerman W (eds) *White-tailed sea eagle 2000*. Swedish Society
495 for Nature Conservation, Stockholm

496 Helander B, Stjernberg T (2003) Action Plan for the Conservation of White-tailed sea eagle
497 (*Haliaeetus albicilla*). BirdLife International report to the Bern Convention on the Conservation of
498 European Wildlife and Natural Habitats, Strasbourg

499 IUCN (1998) Guidelines for re-introductions. Prepared by the IUCN/SSC Re-introduction Specialist
500 Group, Gland, Switzerland and Cambridge, UK. http://www.iucnsscrg.org/policy_guidelines.html
501 (accessed 10 September 2012)

502 IUCN/SSC (2013) Guidelines for Reintroductions and Other Conservation Translocations. Version
503 1.0. Gland, Switzerland [http://www.issg.org/pdf/publications/RSG_ISSG-Reintroduction-](http://www.issg.org/pdf/publications/RSG_ISSG-Reintroduction-Guidelines-2013.pdf)
504 [Guidelines-2013.pdf](http://www.issg.org/pdf/publications/RSG_ISSG-Reintroduction-Guidelines-2013.pdf) (accessed 10 September 2013)

505 Love J A (1983) *The return of the White-tailed sea eagle*. Cambridge University Press, Cambridge

506 MacLennan A M, Evans RJ (2003) Public viewing of White-tailed White-tailed sea eagles - take the
507 birds to the people or the people to the birds? Pages 417-422 In: Helander B, Marquiss M,
508 Bowerman W (eds) White-tailed sea eagle 2000. Swedish Society for Nature Conservation,
509 Stockholm

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

513 Manly A (2009) Suffolk White-tailed sea eagle Public Consultation-a market research project.
514 Report, RSPB Market Research

515 Marquiss M, Madders M, Irvine J, Carrs D (2002) The Impact of White-tailed sea eagles on Sheep
516 Farming on Mull, SEERAD Report No ITE/004/99, Scottish Executive Environment and Rural Affairs
517 Department, Edinburgh, UK

518 Marquiss M, Madders M, Carrs D (2003) White-tailed sea eagles and lambs. Pages 471-480 In:
519 Thompson DBA, Redpath SM, Fielding A, Marquiss M, Galbraith C (eds) *Birds of Prey in a Changing*
520 *Landscape*. HMSO, Edinburgh, UK

521 Marshall K, White R, Fischer A (2007) Conflicts between humans over wildlife management: on the
522 diversity of stakeholder attitudes and implications for conflict management. *Biodiversity*
523 *Conservation* 16: 3129–3146

524 Martinez-Abraín A, Crespo J, Jiménez J, Pullin AS, Stewart GB, Oro D (2008) Friend or foe: societal
525 shifts from intense persecution to active conservation of top predators. *Ardeola* 55: 111-119

526 Mayhew MA (2013) Stakeholder Consultation, White-tailed sea eagle Project. Unpublished report,
527 Centre for Wildlife Conservation, University of Cumbria, UK

528 Molloy D (2011) Wildlife at work. The economic impact of White-tailed sea eagles on the Isle of
529 Mull. Report, The RSPB, Sandy

530 Natural England (2010) Natural England withdraws as lead partner from White-tailed sea eagle
531 reintroduction project. http://www.naturalengland.org.uk/about_us/news/2010/140610.aspx
532 (accessed 10 September 2012)

533 Nilsen EB, Milner-Gulland E, Schofield L, Mysterud A, & Stenseth NC (2007) Wolf reintroduction
534 to Scotland: Public attitudes and consequences for red deer management. *Proceedings of the Royal*
535 *Society B: Biological Science* 274: 995–100

536 Norman GR, Streiner DL (1993). *Biostatistics: The Bare Essentials*. Mosby, Toronto

537 O'Rourke E (2014) The reintroduction of the white-tailed White-tailed sea eagles in Ireland: People
538 and wildlife. *Land Use Policy* 38: 129-137

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

542 Ospreywatch (2013) About the project. http://www.ospreywatch.co.uk/wordpress/?page_id=4
543 (accessed 13 May 2013)

544 Pohja-Myrkä M, Vuorisalo T, Mykrä S (2011) Organized persecution of birds of prey in Finland:
545 historical and population biological perspectives. *Ornis Fennica* 89: 1-19

546 RSPB (2009) Suffolk coast could be home to eagles.
547 <http://www.rspb.org.uk/news/details.aspx?id=tcm:9-229952> (accessed 06 August 2014)

548 RSPB (2012) East Scotland White-tailed sea eagles.
549 <http://www.rspb.org.uk/ourwork/projects/details/274707-east-scotland-sea-eagles-esse>
550 (accessed 10 September 2012)

551 Scott Porter Research & Marketing (1998) Re-introduction of the European Beaver to Scotland:
552 results of a public consultation. Scottish Natural Heritage Research, Survey & Monitoring Report
553 No 121

554 Seddon PJ, Armstrong DP, Maloney RF (2007) Developing the Science of Reintroduction Biology.
555 Conservation Biology 21: 303-312

556 Simms IC, Ormston CM, Somerwill KE, Cairns CL, Tobin FR, Judge J, Tomlinson A (2010) A pilot
557 study into White-tailed sea eagle predation on lambs in the Gairloch area. Final Report, Scottish
558 Natural Heritage Commissioned Report No.370

559 Smith D, Convery I (2015) Re-introduction of the Lynx to Scotland: results of a public
560 consultation. UK Lynx Trust, Survey & Monitoring Report

561 The Golden Eagle Trust (2013) Donegal Golden Eagle update.
562 http://www.goldeneagletrust.org/index.php?option=com_k2&view=item&id=788&Itemid=93
563 (accessed: 01 January 2015)

564 Thirgood S, Redpath S (2008). Hen harriers and red grouse: science, politics and human – wildlife
565 conflict. Journal of Applied Ecology 45: 1550–1554

566 UK Borders (2012) Postcode data selector. [http://ukbsrv-](http://ukbsrv-at.edina.ac.uk/ukborders/action/restricted/startPostcodes)
567 [at.edina.ac.uk/ukborders/action/restricted/startPostcodes](http://ukbsrv-at.edina.ac.uk/ukborders/action/restricted/startPostcodes) (accessed: 17 September 2012)

568 Wilson CJ (2004) Could we live with reintroduced large carnivores in the UK? Mammal Review 34:
569 211–232

570 Whitfield DP, Douse A, Evans RJ, Grant J, Love J, McLeod DRA, Reid R, Wilson JD (2009) Natal and
571 breeding dispersal in a reintroduced population of White-tailed sea eagles *Haliaeetus albicilla*. Bird
572 Study 56: 177-186

573

574 **Figure 1:** Response percentages in each Likert category to the question; “Overall would you say
575 you are in favour of the White-tailed sea eagle reintroduction project?”

576 **Figure 2:** Further comments to the proposed White-tailed sea eagle reintroduction in Cumbria,
577 showing relationship between 11 themes within three broad categories (social, economic and
578 environmental). Numbers denote total responses in each theme.

579 **Table 1:** The employment profile of the respondents, showing the frequency and percentage of
580 eight distinct work types.

581 **Table 2:** Response percentages in each Likert category to the attitudinal questions in the Cumbrian
582 questionnaire.

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

585

586

587

588

589

590

591

592

593

594

595

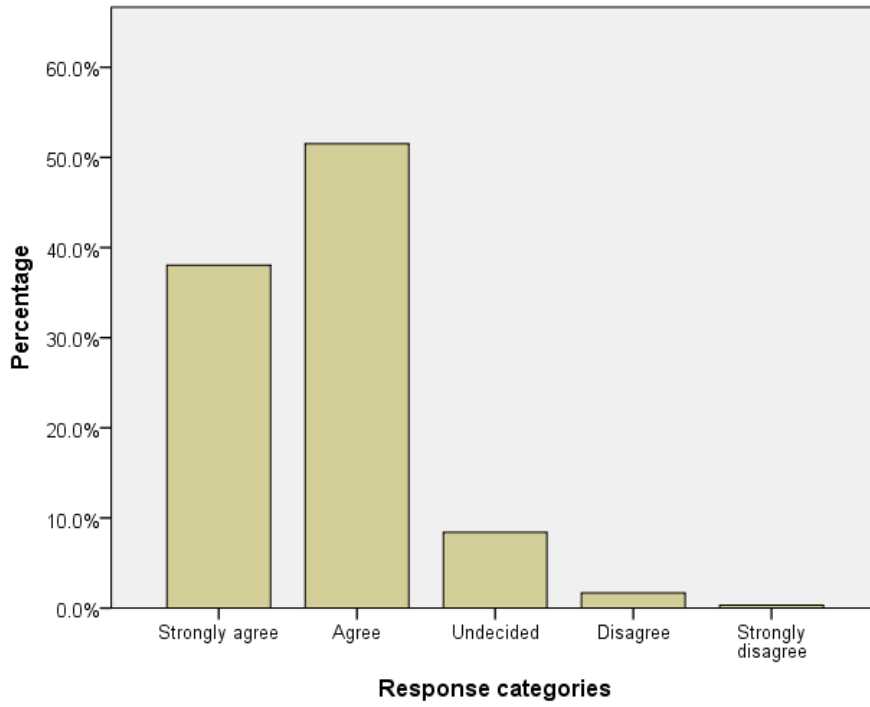
596

597

598

599 Figure 1.

600



601

602

603

604

605

606

607

608

609

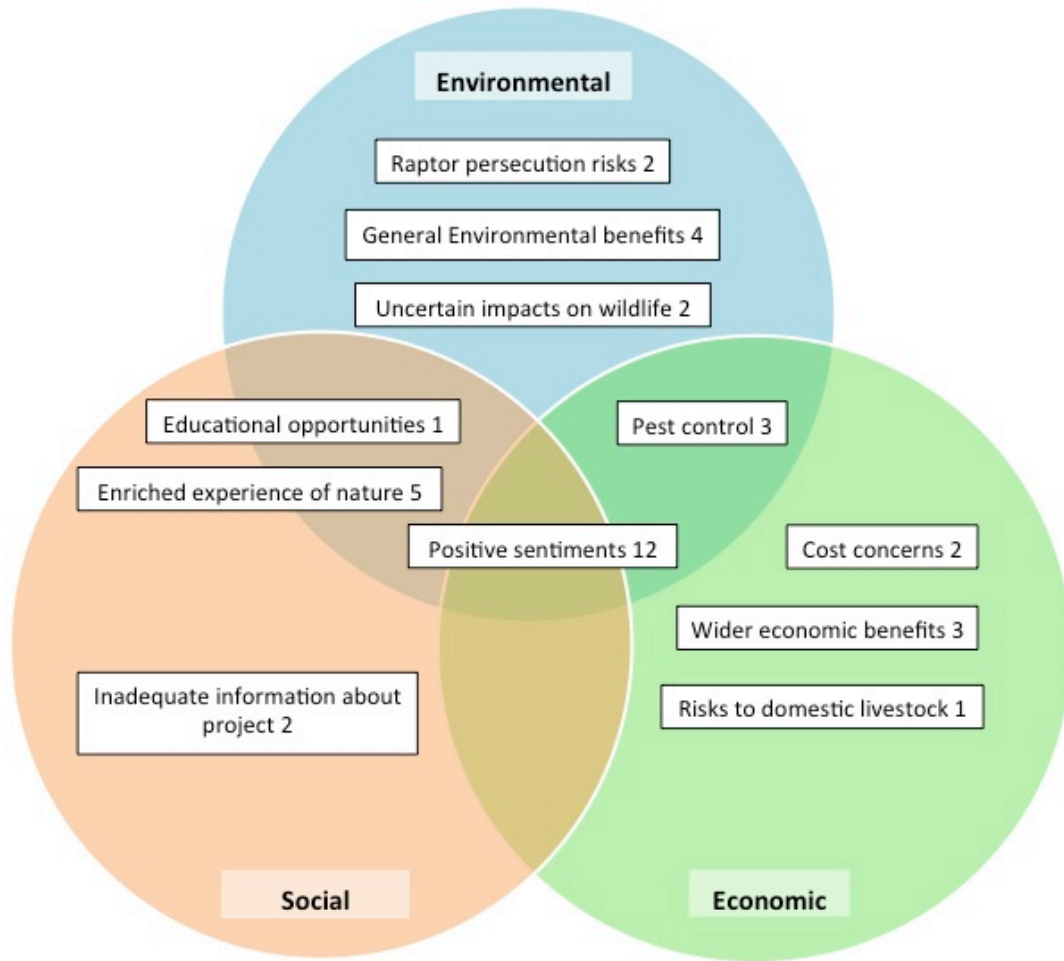
610

611

612

613

614 Figure 2.



615

616

617

618

619

620

621

622

623

624

625

626

627

628 Table 1.

Work Type	Frequency	Percentage
Farming (livestock)	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	171	100

629

630 Table 2.

631

Question	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree	Unanswered
1. A Cumbrian population of White-tailed sea eagles would benefit the local tourist industry.	31.3	58.0	10.0	0.7	0.0	0.0
2. White-tailed sea eagles could threaten the livelihoods of Cumbrian farmers by taking livestock.	1.7	11.7	40.7	38.3	7.3	0.3
3. The cost of the project would outweigh any future benefits to the local economy.	5.0	12.0	33.3	39.0	8.0	2.7
4. Reintroducing White-tailed sea eagles would be good for the environment.	23.7	56.7	17.0	2.3	0.0	0.3
5. White-tailed sea eagles could pose a threat to rare species of wildlife in the local area.	2.1	13.0	40.3	40.0	4.3	0.3
6. Restoring White-tailed sea eagles to the skies of Cumbria would enrich my experience of nature.	37.0	53.0	7.3	1.7	1.0	0.0
7. White-tailed sea eagles could harm dogs, cats and other small pets.	0.7	8.7	22.0	56.0	12.6	0.0
8. White-tailed sea eagles are a danger to humans and pose a particular threat to young children.	1.3	1.7	8.7	54.7	33.3	0.3

632

633

634

635

636

637

638

639

640

641

642

643

1.	Cumbria study	Overall would you say you are in favour of the White-tailed sea eagle reintroduction project?
	Suffolk study	From what you have read and heard, would you say you are for or against the White-tailed sea eagle project?
2.	Cumbria study	A Cumbrian population of White-tailed 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?