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## Improving engagement in managing reintroduction conflicts: learning from beaver reintroduction

Roger E. Auster\* , Stewart W. Barr  and Richard E. Brazier 

*College of Life and Environmental Sciences, University of Exeter, Exeter, UK*

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Social factors hold implications for the success or failure of wildlife reintroductions. Potential conflict issues may prevent projects from proceeding or succeeding. The manner in which wildlife managers engage with affected people in conflict scenarios may prevent or contribute toward conflict escalation, so an understanding of how to improve engagement is required. We conducted interviews with individuals who reported conflicts with beavers (*Castor fiber*) within the case study of a reintroduction trial in England, called the ‘River Otter Beaver Trial’. Using a qualitative thematic analysis, we identified five themes to be considered when engaging with affected people in beaver reintroduction conflicts: (1) *Proactive Engagement or a Fast Response*; (2) *Appropriate Communication*; (3) *Shared Decision-Making*; (4) *Sense that Humans are Responsible for Conflicts with Reintroduced Species*; (5) *A Need for Certainty*. We conclude that engagement with affected individuals will likely be improved, with reduced conflict potential, where these themes are addressed.

**Keywords:** Engagement; Eurasian beaver; human-wildlife conflict; human dimensions; thematic analysis; reintroduction

### 1. Introduction

Wildlife translocation is where individuals of a species are moved between areas (Seddon *et al.* 2014). Wildlife reintroduction is a form of translocation where a species is returned to an environment where it was previously resident but no longer exists, often to support species populations or for ecosystem restoration (Seddon, Armstrong, and Maloney 2007). Reintroduction is a growing field of interest (Seddon, Armstrong, and Maloney 2007; Seddon *et al.* 2014; Taylor *et al.* 2017) and guidelines are set out by the International Union for the Conservation of Nature, which stipulate factors that require consideration, including environmental conditions, ecological resource availability and social implications (Cheyne 2006; IUCN & SSC 2013).

Social factors, including ‘human-wildlife conflicts’, influence the outcome of reintroduction projects. Human-wildlife conflict refers to negative interactions between humans and wildlife, whether they are ‘real’ or ‘perceived’ (Messmer 2000; Torres, Oliveira, and Alves 2018). It is recognized these conflicts are often conflicts between people *about* wildlife rather than direct conflicts between people *and* wildlife (Madden 2004; Redpath, Bhatia, and Young 2015). Conflicts particularly occur where there are

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\*Corresponding author. Email: [rea213@exeter.ac.uk](mailto:rea213@exeter.ac.uk)

differing opinions about wildlife management (Madden 2004; Marshall, White, and Fischer 2007). For example, in England, there are conflicts between people with differing attitudes toward managing badgers (*Meles meles*) to reduce transmission of *Bovine tuberculosis* to domestic cattle, including debate about culling versus vaccination (Keenan et al. 2020). Ideally, conflicts should be addressed early to prevent them escalating and becoming more difficult to resolve (Seddon, Armstrong, and Maloney 2007; Reed 2008; Redpath et al. 2013; Clark, Workman, and Jung 2016; Crowley, Hinchliffe, and McDonald 2017a). In reintroductions, however, practical conflicts with a specific species do not yet exist as the animal is not yet present, though theoretical conflicts over the principles of reintroduction may occur prior to reintroduction. Conflicts should be anticipated proactively (Auster, Puttock, and Brazier 2020) as projects may be more likely to fail where conflicts are significant (IUCN & SSC 2013; Perring et al. 2015; Sutton 2015; Lopes-Fernandes and Frazão-Moreira 2017). For example, a proposal to reintroduce lynx (*Lynx lynx*) was rejected by the UK Government in 2018. In the justification for the decision, it was suggested that those proposing the project had not sufficiently engaged with key stakeholders. It was noted that the farming community had raised concerns of conflicts with lynx, yet “the farming community has not actively been involved and there is no evidence they accept the proposed measures or that they address the breadth of their concerns” (DEFRA 2018). As such, when conflicts with a reintroduced species occur there will need to be appropriate engagement with the affected individuals to reduce potential for conflict escalation. Thus, an understanding of what constitutes appropriate engagement is required.

In Great Britain, reintroduction of the Eurasian beaver (*Castor fiber*) is underway. The species was historically resident until hunted to extinction approximately 500 years ago (Macdonald et al. 1995; Halley, Rosell, and Saveljev 2012). Its reintroduction is being considered at a devolved government level. In Scotland, following a trial phase and monitoring of a free-living population on the River Tay, beavers were listed as a European Protected Species in May 2019 (Gaywood et al. 2015; Tayside Beaver Study Group 2015; Gaywood 2018; Scottish Government 2019). In England there are a number of enclosed beaver trials (behind a fence) and one official free-living trial – the River Otter Beaver Trial (ROBT). In August 2020, the UK Government announced that the River Otter beavers could legally remain and consultations on a national approach to further releases and management are expected later in the year (UK Government 2020). In Wales there is no formal reintroduction as yet but proposals have been put forward by the ‘Welsh Beaver Project’ (Wildlife Trusts Wales 2012).

Motivations for reintroducing beavers are rooted in a number of benefits resulting from ‘ecosystem engineering’ behaviors of dam-building and tree-felling, including: biodiversity increase (Stringer and Gaywood 2016; Law et al. 2019; Nummi et al. 2019); water flow attenuation (Puttock et al. 2017; Brown et al. 2018); water quality improvement (Puttock et al. 2017, 2018); and ecotourism opportunities (Campbell, Dutton, and Hughes 2007; Auster, Barr, and Brazier 2020). However, there are potential conflicts, with examples in Europe and also in America with the similar North American beaver (*Castor canadensis*). Conflicts may include: water behind a dam flooding agricultural land and/or roads or floodplain infrastructure (Jensen et al. 2001; Morzillo and Needham 2015; Campbell-Palmer et al. 2016); felling trees of social significance (Campbell-Palmer, Schwab, and Girling 2015, Campbell-Palmer et al. 2016); and burrow collapses in agricultural fields (Gurnell 1998; Campbell-Palmer et al. 2016). Management techniques exist to mitigate negative beaver impacts. These

include direct measures (e.g. flow devices to lower water levels behind dams, or translocation of ‘problem beavers’) and indirect measures (e.g. compensation for damage, or payment of landowners to host beavers (Morzillo and Needham 2015; Campbell-Palmer *et al.* 2016; Wróbel and Krysztofiak-Kaniewska 2020). These conflicts result from the same beaver-induced landscape change that identifies them as ecosystem engineers, but here their activities may be at odds with human objectives for land or water use.

When conflicts occur, reintroduction practitioners will need to engage with affected individuals. The response from a wildlife manager needs to be appropriate from the stakeholders’ point of view if conflict is to be reduced or avoided rather than escalated (Treves, Wallace, and White 2009; Decker *et al.* 2014, 2015, 2016). However, in a previous nationwide attitudinal survey which explored public perceptions of beaver reintroduction (Auster, Puttock, and Brazier 2020), the majority of respondents indicated they did not feel they could express their opinion where it may influence decision-making and ‘engagement methods’ were identified as one of four key elements that require consideration in reintroduction projects.

Our research aimed to build on this knowledge and develop an understanding of what constituted ‘better’ engagement practice from beaver managers in response to conflicts, from the perspectives of affected individuals. We used a traditional thematic analysis case study approach to identify the key themes for engagement. This qualitative technique employs a systematic approach toward coding textual data – in this case from interviews. It explores meaning in the codes and identifies key themes and the relationships between them (Vaismoradi *et al.* 2016; Castleberry and Nolen 2018). Using this technique, we sought to identify and understand key themes (or concepts) pertaining to engagement, the relationships between the themes, and the implications for improving engagement in beaver reintroduction conflict scenarios.

## 2. Methods

### 2.1. Study context

This study was undertaken within the catchment area of the ROBT, the base of the first licensed free-living population of beavers in England. The catchment of ca. 250 km<sup>2</sup> with 1190 km of riverbank is situated in Devon, south west England. It is largely rural with 50% of land use being improved grassland and 28% arable and horticulture. Settlements are small and dispersed (Brazier *et al.* 2020, 12).

Prior to 2015, a small group of free-living Eurasian beavers (of unknown origin) was discovered on the River Otter. Devon Wildlife Trust (DWT) was granted a license to monitor the beavers for 5 years following a locally-driven campaign and subject to health-screening (Natural England 2015; Crowley, Hinchliffe, and McDonald 2017b). The ROBT has monitored the beavers and collated evidence on their impacts, both positive and negative (Devon Wildlife Trust 2017). In 2015, there were two known breeding pairs of beavers in the lower river, rising to seven throughout the main river by 2019 (Brazier *et al.* 2020, 14). Where conflicts with beavers were reported, DWT Officers engaged with the affected individuals to determine appropriate management. ROBT findings were reported for UK Government in 2020, including details of the management undertaken by DWT where conflicts occurred and a proposed framework for managing beavers in the future (ROBT 2019; Brazier *et al.* 2020).

## 2.2. Participant recruitment

Purposeful participant recruitment is common within qualitative case study research as qualitative research values the understanding of a situation, thus selection criteria are based upon recruiting participants who provide useful insights (Sandelowski 1995; Guest, Bunce, and Johnson 2006; Trotter 2012). Herein, participants were purposefully selected as land- or property-owners/managers who reported a direct conflict with beavers and received a management response from DWT, within the duration period of data collection (January 2018 to December 2019).

As holders of the reintroduction license, DWT was responsible for management interventions so had access to individuals who reported direct conflicts with beavers. A partnership approach was used to invite participation, whereby DWT informed individuals of the study on our behalf when conflicts occurred. It was stated to participants that researchers were independent of DWT and interviews would be undertaken without the presence of a DWT member so participants could speak without influence. DWT informed the researcher when conflicts were reported.

There was a natural limit to the number of possible interviews based upon where conflicts with the beaver population occurred and the willingness of individuals to participate. In the data collection period there were seven incidents of reported conflicts with land-/property-use. One conflict case was reported by four neighboring landowners who were all invited to participate, to which one responded. Seven interviews were possible, with at least one participant from each conflict site (see section 3.1). At the participants' requests, there were four interviews in which there were multiple participants meaning thirteen individuals took part in total. When individuals engaged, study information was provided in advance of the interview (see section 2.4).

The participation of multiple individuals in four interviews occurred spontaneously at the participants' requests; thus it was ethically appropriate to accommodate their wishes as participation was voluntary. The method accounts for this naturally occurring variation as the study is exploratory, and group interviews allow for data to be gathered on interpretations of events that require group input (Frey and Fontana 1991; Frey 2004). These interviews consisted of a 'group' (either a couple or family) who experienced the conflict as a collective. In these interviews we followed the same interview procedure whilst ensuring all participants had opportunity to speak.

## 2.3. Interview process

Interviews were semi-structured in nature. Open-ended questions for participants were designed to explore: (1) beaver impacts experienced; (2) views on beaver reintroduction; (3) engagement with or by a ROBT member; (4) management interventions undertaken; (5) views *on* and advice *for* the future of beavers. Open-ended questions allowed participants to respond freely, setting the direction of discussion whilst allowing us to probe responses if appropriate. Thus, the interviews followed a flexible structure (McIntosh and Morse 2015). Each interview was approximately one hour in duration (range = 45–90 min). Where participants consented, we audio-recorded interviews for later analysis. One participant did not consent, so notes were taken (including verbatim quotes).

#### **2.4. Ethics and consent**

We provided participants with study information and statements on data use prior to interview. This included: clarity that participation was anonymous and voluntary; study funding details; clarification the study was impartial. We asked participants to give a signature of consent for participation and for the interview to be recorded (an example consent form is available as [Supporting Information](#)). To abide by data protection laws, participants' personal contact details were not shared with us directly but instead provided with ours. The study was approved by the University of Exeter Geography Department's Ethics Committee (application number: eCLESGeo000033).

#### **2.5. Analysis**

After each interview, we transcribed data verbatim from the recordings (except for the interview in which notes had been taken, including verbatim quotes). We produced a summary of each interview, with associated quotes as evidence, to aid our mental processing of the data. We shared these summaries with participants to provide opportunity for comment and ensure their perspectives were accurately reflected. This was the process of 'compiling' where data is transposed into a usable form (Castleberry and Nolen 2018).

We coded the data following each interview. This process, described by Castleberry and Nolen as 'disassembling', is where raw textual data are broken down into usable data by identifying similarities or differences between sections of text (Austin and Sutton 2014; Castleberry and Nolen 2018). In the first coding round we identified raw features within the data, generating codes from the data itself in a 'data-driven' process (Gibbs 2007). Preliminary codes were then subject to 'reassembling', where codes were arranged and put into context with one another (Castleberry and Nolen 2018). This enabled us to recognize nine 'intermediary codes' which, through a second round of 'reassembling' after data collection was complete, led to identification of five final themes ([Appendix 1](#)). Positive and negative reactions to management responses could be coded for within the same theme as concepts included factors contributing toward whether participants viewed management responses as more or less acceptable. The same textual passage could be coded for under multiple themes. We checked the validity of final themes by reviewing them against the data.

### **3. Results and discussion**

#### **3.1. Summary of participants**

Interviews consisted of three with property-owners (seven participants), two with land-owners (four participants), one with a tenant farmer (one participant) and one with a farm manager (one participant) ([Table 1](#) and [Supporting Information](#)). There were nine male and four female participants. All participants were aged greater than thirty years old. Notes on practical management interventions undertaken by DWT at the times of interview are provided in [Table 1](#), whilst management interventions since the interviews are reported in Brazier *et al.* (2020).

Table 1. Overview of interview participants, reported beaver conflicts and practical management undertaken by the time of interview.

Interview	Approximate time between beavers' arrival and interview	Number of participants	Participant description	Conflicts with beavers reported by respondents	Practical management interventions undertaken by DWT (at time of interview)
1	2 months	1	Property owner (Male)	<ul style="list-style-type: none"> <li>• Dam in watercourse between four neighboring properties.<sup>a</sup></li> <li>• Respondent reported removing dam once, which the beavers subsequently rebuilt.</li> </ul>	<ul style="list-style-type: none"> <li>• Dam removal</li> </ul>
2	2 months	2 (A couple)	Landowners (1 Male, 1 Female)	<ul style="list-style-type: none"> <li>• Dam in stream which runs through respondents' property.</li> <li>• Respondents reported removing the dam a few times, with the beavers having rebuilt it.</li> </ul>	<ul style="list-style-type: none"> <li>• Dam removal</li> </ul>
3	4 months	4 (A family)	Property owners (1 Female, 3 Male)	<ul style="list-style-type: none"> <li>• Felled wisteria of sentimental value</li> <li>• Felled Bramley apple tree in orchard</li> </ul>	<ul style="list-style-type: none"> <li>• Planted new Bramley apple tree</li> <li>• Protection of remaining apple trees with sand paint</li> <li>• About to trial electric fencing to keep beavers off property</li> <li>• Protected remaining trees with fencing</li> </ul>
4	1 month	2	Property owners (1 Female, 1 Male)	<ul style="list-style-type: none"> <li>• Felled willow tree of sentimental value</li> </ul>	<ul style="list-style-type: none"> <li>• Protected remaining trees with fencing</li> </ul>
5	18 months to two years	1	Farm Manager (Male)	<ul style="list-style-type: none"> <li>• Wetting of fields used for a spring calving dairy herd by damming, close to the milking parlor</li> </ul>	<ul style="list-style-type: none"> <li>• Flow device installation</li> <li>• Considering options of dam removal or compensation</li> </ul>
6	2 years	1	Tenant Farmer (Male)	<ul style="list-style-type: none"> <li>• Flooded arable land behind a beaver dam.</li> <li>• Waterlogged cattle crossing</li> <li>• Felled poplar trees, with one falling onto fence</li> </ul>	<ul style="list-style-type: none"> <li>• Considering compensation for affected arable crop</li> <li>• Considering installation of a new cattle crossing</li> </ul>
7	1 year	2	Landowners (1 Female, 1 Male)	<ul style="list-style-type: none"> <li>• Waterlogged fence-line.</li> <li>• Gnawing of trees on neighboring land.</li> <li>• Tenant farmers' ram fell in collapsed beaver burrow</li> </ul>	<ul style="list-style-type: none"> <li>• Protected remaining trees with fence</li> <li>• Some preemptive tree felling (for safety)</li> <li>• Lowered water level with discussions ongoing.</li> <li>• Protective paint applied to affected trees.</li> <li>• Discussing ram impact.</li> </ul>

Note: <sup>a</sup>No response to the interview invitation was received from the remaining three property-owners.

### 3.2. Study limitations and research recommendations

Rather than seeking to understand proportional representation of phenomena in society, we sought to understand the nature of a situation and perspectives of those involved. Our case study approach allowed for a deep, qualitative understanding of the situation (Firestone 1993; Crouch and McKenzie 2006; Flyvbjerg 2006; Gibbert, Ruigrok, and Wicki 2008; Tsang 2014). The small sample of interview participants (naturally limited by the low number of reported direct conflicts with the beaver population) helped to foster closer associations between researchers and participants (Crouch and McKenzie 2006) and enabled us to identify the key themes which we believe to be useful in conceptualizing how to engage with individuals in reintroduction-related conflicts in other reintroduction contexts. However, we recognize that a small number of interviews and a lack of randomization in participant recruitment limits the study's empirical generalisability to wider reintroduction contexts; we suggest further study to test our concepts in other species reintroduction scenarios.

### 3.3. Themes

We developed a set of five themes, from the affected peoples' points of view, which contribute toward improved engagement in reintroduction conflict management: (1) *Proactive Engagement or a Fast Response*; (2) *Appropriate Communication*; (3) *Shared Decision-Making*; (4) *Sense that Humans are Responsible for Conflicts with Reintroduced Species*; (5) *A Need for Certainty*. For each theme we use verbatim quotes to describe the concept and demonstrate their relevance through application of the wider literature. For ease of discussion, DWT representatives are referred to as 'managers'.

#### 3.3.1. Proactive engagement or a fast response

Previous research has recognized how earlier responses to conflicts are more likely to prevent escalation, and an understanding of attitudes toward management may help reduce potential for conflicts in reintroductions (Reed 2008; Redpath *et al.* 2013; O'Rourke 2014; Crowley, Hinchliffe, and McDonald 2017a; Auster, Puttock, and Brazier 2020). A similar principle emerged here as a key factor in how participants viewed engagement in management responses. This was both in terms of whether there should be a management intervention prior to conflicts with beaver and the rapidity with which the issue was responded to.

The interview 1 participant felt strongly they did not have the opportunity to voice their concerns prior to beavers impacting their land:

"I feel angry that there was no consultation. [...] The Trial has been reactive rather than proactive." – *Interview 1*

The interview 2 participants, who live near to the interview 1 participant and whose own conflict experience (Table 1) occurred within the same beaver territory, agreed early engagement may have reduced the conflict level for the participant in interview 1:



“If people like that [participant in interview 1] had been got involved earlier, before the beavers necessarily showed any signs of turning up on their land, it might have avoided some of the problems that we have now. [...] If they’d known it ahead and they were prepared it might have been a slower boil to where you had them.” – *Interview 2*

A participant in interview 3 described similar feelings that their apple tree issue (Table 1) should have been considered before it occurred:

“Sometimes you think maybe they should have perhaps looked into it before it [apple tree] got bitten off. [...] it’s like shutting the door after the horse has bolted.” – *Interview 3*

If possible it would be desirable to intervene in potential conflict scenarios prior to conflicts occurring. However, as resources in the environment or conservation sectors are limited (Walls 2018) it may be challenging, even impossible to engage with all riparian land/property-owners before any conflicts occur. This factor was recognized by a participant in interview 2:

“I can understand the argument why it’s difficult because of the resource constraints to be proactive with everybody, but I do believe it should be possible to identify the key people who have got houses along the river or stands of trees very close to the river and to have done something.” – *Interview 2*

The participant has highlighted that strategic engagement may be a feasible approach when resources are limited. Regarding beavers, it has been shown that areas of suitable habitat and reaches capable of supporting dams can be modeled at large spatial scales (Macfarlane *et al.* 2017; Brazier *et al.* 2020). With this understanding, combined with a spatial description of land-use and at-risk infrastructure, developing further modeling or management strategies that identify those areas more likely to experience conflict is achievable (Brazier *et al.* 2020; Graham *et al.* 2020).

In addition, a participant in interview 2 suggested education as a possible avenue to reduce conflict escalation potential.

“I do think the communication piece is something the project needs to think carefully about and be proactive about educating people.” – *Interview 2*

Such a suggestion will require further research, but it may be possible for communication/education to contribute, as this principle has been observed elsewhere. For example, there was a decreased likelihood that a black bear (*Ursus americanus*) was seen as a “conflict bear” amongst people who had participated in an education program in Massachusetts than amongst those who had not (Marley *et al.* 2017). This potential was referenced by a participant from interview 3.

“It would probably be a bit better, if she [mother] could see these things [beavers] doing things she might end up liking them a bit more.” – *Interview 3*

DWT actively undertook a programme of educational outreach within the ROBT, with 384 hosted events (e.g. guided walks and presentations) which engaged with an estimated 18,000 people (Brazier *et al.* 2020, 86). In the instances where it was not possible to address issues preemptively, however, the speed of response from DWT

was found to have influenced participant views of management responses, with quicker responses viewed positively. This is demonstrated by comments from participants in interviews 3 and 4:

“I’ve only got to send an email and he’s here within, well it depends where he lives, but he’s here within half an hour or so.” – *Interview 3*

- “I thought [DWT representative] was brilliant.” - “It was a very fast response.” - “Well he just came and said he would do it [protect remaining trees (Table 1)].” – *Interview 4*

Responding quickly is likely to reduce conflict potential, but one participant from interview 5 stated this should extend beyond initial engagement and conversation should be ongoing to avoid anybody experiencing a ‘nasty surprise’:

“The sooner that the conversations could be had between the different parties, the better. And regular communication is critical so that no party suddenly gets a nasty surprise about something that’s going on.” – *Interview 5*

### 3.3.2. *Appropriate communication*

The way in which communication occurred was the second theme. Our analysis found a sympathetic approach was likely to be received positively. This is demonstrated by an exchange between the two interview 4 participants when explaining why they viewed DWT’s engagement positively:

- “I thought [DWT representative] was brilliant.” [...] - “Yes, he was sympathetic to the issue.” – *Interview 4*

DWT was viewed to have shown willingness to listen to and take the respondents’ concerns seriously, a key component of building trust. In a nationwide survey on beaver reintroduction the majority of respondents felt unable to express their opinion where it may influence decision-makers (Auster, Puttock, and Brazier 2020), but a feeling amongst stakeholders that concerns are being responded to by wildlife managers contribute toward addressing conflicts (Decker *et al.* 2016; Young *et al.* 2016). A willingness to listen is reflected in comments from three interview participants regarding how they had found the engagement with DWT to be appropriate:

“We found them really friendly, helpful, interesting. They gave us time to talk through, answer our questions.” – *Interview 2*

“It’s been good, fine. I’ve found that we’ve been able to work together with them [DWT] in a way that our views aren’t overtaken by anything else.” – *Interview 5*

“It’s surprised me actually, he [DWT representative] certainly seems to be taking it all very seriously.” – *Interview 7*

A willingness to listen will help keep managers informed, and an understanding of stakeholder viewpoints will enable decision-making processes that allow stakeholders

to trust their views are being considered (Decker *et al.* 2014; Young *et al.* 2016). There may be some challenges encountered when stakeholders hold particularly strong opinions that influence their willingness to listen to ‘managers’ in return. In interview 1, it was stated that they were unwilling to listen to information about beavers, resulting from their strong views and concern about damming in their local watercourse (Table 1).

“I don’t want to sit and listen to someone telling me about how great beavers are when I’m concerned about my land.” – *Interview 1*

When it is possible to share information with stakeholders, it is important to manage expectations. Honest, transparent information is likely to maintain trust in management authorities (Marshall, White, and Fischer 2007; Smith 2011; Decker *et al.* 2016; Young *et al.* 2016), thus alleviating potential for worry if the actual situation then deviates from the information given. Such a situation was demonstrated in interview 6 regarding the growth in height of the main beaver dam and its relationship to the area of flooded land behind it (Table 1):

“We were told that it [beaver dam] wouldn’t be that big an area and it has developed. And the thing that worries me slightly is they are still going, they haven’t seemed to steady up.” – *Interview 6*

As the participant in interview 5 commented, “communication is always critical”.

### 3.3.3. Shared decision-making

Stakeholder engagement is recognized as a key component in human-wildlife conflict decision-making, with the most effective strategies for tackling conflicts recognized as being those where conversations are held with and between stakeholders. Where problems are ‘shared as one’ they are more likely to lead to a consensus decision that is more likely to be accepted amongst the relevant parties (Treves, Wallace, and White 2009; Redpath *et al.* 2013; Rust 2017). Where stakeholders feel their interests have been considered in decision-making processes they are less likely to obstruct the implementation of decisions or reverse them as soon as possible, leading to reduced conflict potential (Madden and McQuinn 2014; Decker *et al.* 2015). DWT representatives aimed to share decision-making to address the objectives of both managers and participants, as often the participants did themselves, as evidenced in interviews 5, 6 and 7 (all interviewees of which had an association with farming (Table 1)):

“We were really trying to find a way forward that meant the farm could continue to operate as a commercial business but in a way that was allowing the beaver to create a habitat.” – *Interview 5*

“We do have to be mindful that food production has to be protected and kept going, but obviously it is important that we have a balanced view of that with not only protecting our natural habitat but also enhancing it as well. So I think having the two together is really good.” – *Interview 6*

“Ideally you’d want a situation where it’s compatible to have what we want but with the beavers creating the biodiversity and so on.” – *Interview 7*

Conversely, strong tensions were observed with the discontented participant in interview 1 who did not feel they had been provided with an opportunity to have input:

“It is a very unusual situation, to have this forced upon you.” – *Interview 1*

Where people feel inadequately empowered, the risk of conflict escalation increases (Madden 2004), which is perhaps partly why the participant in interview 1 had such strong feelings. Where a sense of empowerment is achieved meanwhile, as may be realized by including both managers and stakeholders in decision-making, this would be more likely to lead to longer-term conflict solutions (Linnell *et al.* 2010; Redpath, Bhatia, and Young 2015; Dubois *et al.* 2017).

#### 3.3.4. *Sense that humans are responsible for conflicts with reintroduced species*

We identified a sense amongst respondents that beavers were associated with “the people that put them there” [or allowed them to escape], rather than as a wild animal. We suggest this may be a factor unique to wildlife reintroduction and translocation (and unlike other human-wildlife interactions) as a direct link has been drawn between the ‘new’ presence of an animal and humans actively putting them there. This attitude is most clearly demonstrated by a participant in interview 4 who had erected posters in their village containing an image of their felled tree (Table 1):

“I thought it [beaver reintroduction] was inappropriate. It’s not a natural species. [...] I was angry, angry. Well you’ve seen the poster, we don’t blame the beavers because they’re beavers, they’re not human beings. It’s the people who did it.” – *Interview 4*

We found this theme influenced management expectations amongst individuals, with the view that those responsible for beaver presence should take responsibility for managing negative consequences, as shown by participants in interviews 1, 3 and 4:

“The landowner shouldn’t have to take responsibility. [...] There shouldn’t be an assumption that we will give up our time for free. It’s been us who are walking up and down the riverbank and monitoring their activity.” – *Interview 1*

“So will the beaver people be responsible if I get flooded because of a dam?” -“If you could prove that caused it that’s a no-brainer, they’ve got to pay up.” – *Interview 3*

“It’s a question of responsibility. The people who put the beavers in the river in the first place were irresponsible, but who’s going to take responsibility for dealing with problems that arise? And, by and large, experience suggests nobody is going to do that.” – *Interview 4*

We believe this is the first instance of this link having been identified in wildlife reintroduction. However, a participant in interview 7 stated beavers were a ‘wild animal’, indicating the association is not necessarily unanimous amongst affected individuals.

“Beavers, I mean they’re wild animals aren’t they? So are they to blame?” – *Interview 7*

This indicates a need for managers to provide a sense for affected individuals that they, as managers, are taking some form of responsibility. However, further research will be required into how and when a reintroduced species may become ‘normalized’ as a wild animal. As the return of a wild animal is an objective of those undertaking reintroductions we suggest, beyond taking some responsibility to contribute toward conflict alleviation in the early reintroduction stages, perhaps managers should consider how they may facilitate normalization of a reintroduced species as ‘wild’ to address this link and allow management of the reintroduced species to be sustainable in the long term. This will interconnect with decisions upon future management strategy (particularly upon who may undertake management in practice under different scenarios of legal protection of the reintroduced species [Auster, Puttock, and Brazier 2020]) and allow an understanding of how long it might take for reintroduced species to be considered ‘normally resident’, above and beyond any legislation that might label them as such.

### 3.3.5. *A need for certainty*

Living alongside a reintroduced species will, for most people, be a new concept. Until recently, beavers have been absent from Britain for ca. 500 years so people in England today will not have experience of living alongside them (with the exception of migrants from where beavers reside elsewhere). This notion of beaver presence being ‘new’ could be argued to be a real example of the ‘shifting baseline syndrome’ in restoration ecology. This term refers to a change in societal perception of natural conditions over time, leading to acceptance of a ‘normal’ state of nature as one that has moved away from its original natural state (Pauly 1995; Vera 2010) – in this case acceptance amongst local people of a landscape in which beavers are absent. As a result, individuals may have been unlikely to have given thought to preventative measures or actions, as demonstrated by a participant from interview 4 regarding their felled tree (Table 1).

“We didn’t need a cage for the old one [willow tree], so why would we need a cage for this one?” – *Interview 4*

We therefore identified a sense of uncertainty about what will happen with a reintroduced species and associated management going forwards, creating worry and opposition from a ‘fear of the unknown’. We felt this to be the concept which most strongly resonated throughout the interviews. Participants from interviews 3, 4, 6 and 7 indicated how there are questions about the post-Trial situation and how this can lead to increased worry.

“What happens after 2020 then?” – *Interview 3*

“I wonder where it will end, is it [beaver population] going to explode? [...] And to what extent do they [beavers] take over an area?” – *Interview 4*

“I’d hate for, you know, in the situation like that we’ve got with the badgers where they’ve protected the setts and the badgers, I would be pretty worried if they protected the dams and the beavers in a way that we couldn’t manipulate their habitat somewhat.

[...] I'm sort of quite happy to see the beavers, but at the same time I'm really worried that if there became legislation that we couldn't have any, manipulate dam heights or anything like that, or in extreme cases move them from one site to relocate them, that would be a worry for me." – *Interview 6*

"What happens if the trial finishes and they stop monitoring it, then whose responsibility is it then? [...] It's very clear to me that, the trial ends [...], and after then nobody knows what's going to happen." – *Interview 7*

This 'fear of the unknown' has been previously observed. Lynx in Macedonia is rarely seen and interactions with humans are scarce. For people, this lack of experience with lynx and lack of knowledge (and so their uncertainty) led to more negative perceptions of lynx (Lescureux *et al.* 2011). There is a similar principle here where individuals have had no previous experience of interaction with beavers, a species with which interactions with humans are commonplace in Europe (Campbell-Palmer *et al.* 2016). It would be desirable to avoid an increase in worry, particularly as where uncertainty exists emotions (rather than science) hold greater influence in human-wildlife conflict decision-making (Hudenko 2012).

We can conclude certainty is required in order to address these concerns. This particularly relates to certainty about what management will look like going forwards, as demonstrated by participants from interviews 1 and 6.

"This doesn't seem to be forward thinking. There doesn't seem to be a management strategy." – *Interview 1*

"I just want to know a little bit about what will happen with that [management] going forward. And, you know, whether we have to change some of our stewardship type schemes to accommodate what we are trying to achieve in the bigger picture here." – *Interview 6*

This need for certainty has been recently recognized in a study of beaver reintroduction processes in Scotland where their interviewees "called for more certainty and were anxious that guarantees could not be provided". The authors similarly suggest that implementing a management framework could help provide a sense of certainty (Coz and Young 2020). Together, these studies reinforce a previously recognized need to consider attitudes toward management early, with management decisions made as soon as possible and clearly communicated to provide as much certainty as is feasible (Marshall, White, and Fischer 2007; Redpath *et al.* 2013; Decker *et al.* 2016; Auster, Puttock, and Brazier 2020; ROBT 2019).

### 3.4. Relationships between themes

We look first at three concepts: '*Proactive Engagement or a Fast Response*'; '*Appropriate Communication*'; '*Shared Decision-Making*'. These have practical application in the approach to engaging with stakeholders, and to achieve a more positively viewed response we suggest these should appear in sequence.

'*Proactive Engagement or a Fast Response*' is about when to engage, so is naturally the first step. As referred to above, this can be through a strategic approach toward proactive engagement prior to conflict occurrence (including appropriate

information sharing and educational outreach), or where this is not possible this should be through engaging at the earliest opportunity when conflicts occur. In the ROBT, proactive engagement with educational outreach was practised where possible, but this could not reach all landowners in the 250 km<sup>2</sup> catchment. In these instances DWT aimed to provide a rapid response to conflict issues (Brazier *et al.* 2020).

'*Appropriate Communication*' should be applied from the first point of contact, so this concept needs to be addressed from the same moment as '*Proactive Engagement or a Fast Response*' (and throughout the remainder of the management response); first impressions count. As evidenced, a sympathetic approach showing a willingness to listen is more likely to foster trust and lead to stakeholders feeling able to engage (Decker *et al.* 2015; Young *et al.* 2016). It is once trust has been built and dialogue opened that '*Shared Decision-Making*' can take place, allowing for issues to be 'shared as one' (Redpath *et al.* 2013; Decker *et al.* 2015; Young *et al.* 2016).

The two remaining concepts are not so much practically applicable, but themes which underpin and influence the engagement that takes place. In the case of '*Sense that Humans are Responsible for Conflicts with Reintroduced Species*', individuals who believe the humans who put an animal into the environment (i.e. undertake reintroduction) should take responsibility. Hence, the individuals concerned would expect greater responsibility to be taken by managers throughout the application of the practical concepts, (even though here DWT was not responsible for reintroducing beavers, but took upon themselves the responsibility of running the ROBT). This is reflected in anecdotal evidence from a fact-finding trip to Bavaria where we met a representative of a regional farming union. Beavers were reintroduced to Bavaria in the 1960s and are now widespread in the province. The state employs two beaver managers who oversee approximately 500 volunteer beaver consultants across the region (Schwab and Schmidbauer 2003; Campbell-Palmer, Schwab, and Girling 2015, Campbell-Palmer *et al.* 2016; ROBT 2019). When asked whether the farming union representative would recommend reintroducing beavers he said "no", but then stated "we are able to tolerate them [beavers] because there is someone willing to help us".

Thus, as discussed, reintroduction practitioners must consider how to facilitate the normalization of the animals as 'wild' rather than as a reintroduced species. This will have implications for the social sustainability of a reintroduction through decisions for longer-term management strategies. Where possible, this could include considerations on how to engender a sense of stewardship or investment in the reintroduced species, as this is likely to go beyond just fostering tolerance and support public participation processes, encouraging *Shared Decision-Making* in long-term planning and a further reduction in conflict potential (Lute and Gore 2014; Coz and Young 2020).

The view that humans should be responsible for the reintroduced species was not held unanimously; thus affected individuals had different expectations of the managers' response. We suggest to minimize conflict potential that the precautionary principle should be applied by reintroduction practitioners in showing willingness to take some form of responsibility for conflict management, until such time as the reintroduced animal is normalized as 'wild'.

We believe to have identified this as a key theme in engagement for the first time. As a new concept, we suggest this should be a focus for further research. In particular it would be useful for reintroduction practitioners to gain a deeper understanding of how reintroduced species can be (socially) normalized as 'wild' and how long that may take. This knowledge would assist decision-making processes for short and long

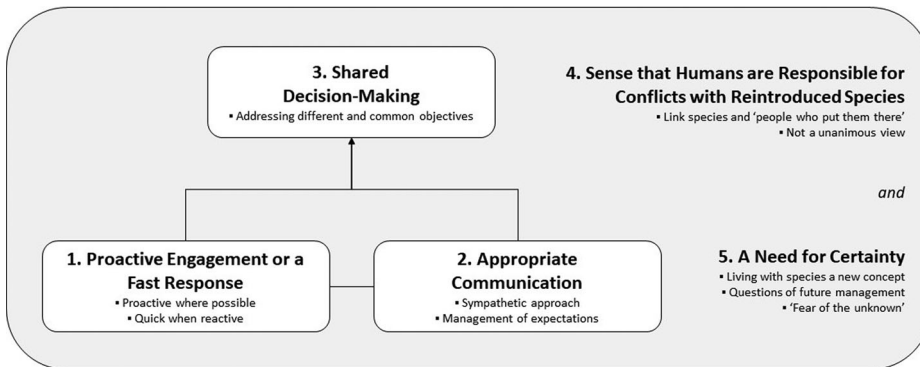


Figure 1. Outline of the relationships between the five themes, highlighting three practical concepts in sequence underpinned by two underlying themes.

term management strategies. We suggest it may be that the normalization of a reintroduced species as 'wild' could nest in part within '*Appropriate Communication*' as we identified the need to appropriately manage expectations, particularly in cases such as beavers where few peoples' views in Britain are currently informed by a full understanding of living alongside them (as discussed under '*A Need for Certainty*').

The second underlying concept is '*A Need for Certainty*'. Where there is greater uncertainty, emotions play a greater role in decision-making (Hudenko 2012) and we demonstrated the likelihood of increased worry amongst more uncertain individuals. Therefore the practical concepts – particularly '*Shared Decision-Making*' – are likely to be influenced by the affected individuals' emotions. More uncertain individuals are likely to allow emotion to play a greater role in their attitudes toward beaver management, influencing the degree to which it is feasible to undertake responses viewed as appropriate. Communications should provide a sense of certainty, which could be helped with early decisions regarding management strategies for reintroduced species, enabling information to be clearly communicated sooner – an approach advocated by Auster, Puttock, and Brazier (2020) and Coz and Young (2020).

The relationships between all five themes, with the three practically applicable and two underlying concepts, is illustrated in Figure 1.

#### 4. Conclusion

We identified five themes of engagement in management responses to human-beaver conflict and made observations regarding these themes that, if followed, may positively influence responses to beaver reintroduction amongst affected individuals. This is vital for where affected people view engagement by wildlife managers positively there is likely to be greater trust in management authorities and less risk of conflict escalation (Burgess and Burgess 1996; Redpath *et al.* 2013; Decker *et al.* 2015, 2016). We believe the themes, identified as a direct result of engagement with people who reported conflicts with beavers (Figure 1), are informative for engaging with local people in a variety of reintroduction conflict contexts. We recommend continued case study research to test the prevalence of our key themes in further reintroductions of both beaver and other species.



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## Supplemental data

Supplemental data for this article can be accessed [here](#).

## ORCID

Roger E. Auster  <http://orcid.org/0000-0001-7299-8867>

Stewart W. Barr  <http://orcid.org/0000-0002-7734-0519>

Richard E. Brazier  <http://orcid.org/0000-0002-8715-0399>

## Data availability statement

The evidenced summaries as shared with the participants are attached as Supporting Information, as well as an example of the ethical consent form for participation.

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**Appendix 1. Summary of the coding process identifying the preliminary and intermediary codes and their relation to the five final themes**

Theme	Intermediary codes	Preliminary codes	Secondary preliminary codes
Proactive Engagement or a Fast Response	Reactive engagement	Need to consider who may be affected Lack of consultation (Negative) Involve people likely to be affected earlier	
	Strategic engagement	Fast response (Positive) Should have considered issue before it happened Proactive/earlier communication better Resource limitation in engagement Education	
Appropriate Communication	Sympathetic approach (Positive)	Concern taken seriously (Positive)	Don't preach at but consider individuals' issue (Negative) Opportunity to speak (Positive)
	Expectation Management	Need to listen to everybody Need to understand what is/isn't beavers More impactful than was told it would be (Negative)	
Shared Decision-Making	Understanding different objectives	Maintain farm operations Allow for beaver presence/benefits Feeling of having beavers forced upon them (negative) Lack of understanding of individuals' priorities (Negative)	
Sense that Humans are Responsible for Conflicts with Reintroduced Species	Managers responsible for beaver impacts	Fault of those who put beavers there Shouldn't be landowners' responsibility Beaver people responsible if property flooded Reintroduction viewed as irresponsible as feel no-one will take responsibility	
	Beavers are wild animals	Beavers not to blame	
A Need for Certainty	Beavers are a new concept	Didn't need to consider tree protection before	

(Continued)

## Appendix (Continued).

Theme	Intermediary codes	Preliminary codes	Secondary preliminary codes
	Querying future management	Questioning post-Trial management	Questioning who will be responsible for management Questioning degree of beaver population growth Questioning stewardship schemes
		Need to be able to manage negative impacts Worry about possible legislation Lack of management strategy (negative)	