NATURAL ENGLAND

Evaluation Report

Hen Harrier Brood Management Trial (HHBMT) interim social science evaluation.

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Contents

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Executive Summary

Defra's Joint Hen Harrier Action Plan (2016) set out six actions which were agreed can contribute to the recovery of the hen harrier population in England. Action 6 of the plan was 'Trialling a Brood Management Scheme'. Brood management involves removing hen harrier broods from driven grouse moors once breeding numbers reached a density that would significantly impact grouse numbers. Broods are moved to a rearing facility away from the managed moorland. Young are reared in pens, in suitable habitat, until fledging, at which point the birds are tagged and released into the wild.

Natural England subsequently developed a 5-year project to implement Action 6 of the plan, with the following project aims:

Aim: The project will implement a field trial to test the design and help understand the practicalities of a brood management scheme and evaluate its contribution in delivering more hen harriers to the Northern uplands.

Specifically, the trial will test:

1. the practicalities of brood management: can eggs or chicks be taken from the wild and raised in captivity, can those chicks be released back into the wild and the implications for their subsequent behaviour and survival.
2. changes in social attitudes by those involved in upland land management to the presence of hen harriers on grouse moors with a brood management scheme in place.

The aim of this report is to evaluate any changes in social attitudes by those involved in upland management. Specifically, it explores perceptions of attitude and behaviour change thus far (and the dynamics between them) amongst those who have participated directly in the trial.

Reflecting these objectives, the interim social science evaluation has sought to answer the following specific evaluation questions:

1. To what extent has the project produced the anticipated outcomes among moorland owners and gamekeepers participating in the trial? Specifically,
   a. Changes in moor owners' attitudes/behaviours towards hen harriers on grouse moors?
   b. Changes to keepers' attitudes/behaviours toward hen harriers on grouse moors?
2. What are the main social mechanisms by which outcomes have been produced?
3. Is there any variation in outcomes in different social contexts?
4. How effectively has the trial been delivered? What, if any, changes are required for the future of brood management?

Methods

The evaluation adopted a theory-based approach informed by the realist evaluation tradition to conduct a process and impact evaluation of the hen harrier brood management trial. The method adopted has been driven by the requirement to explore attitude and or behaviour change among those that have participated in the trial. To achieve this, a qualitative semi structured interview design was adopted, and interviews conducted with staff working on the project within Natural England or other organisations, and with moorland managers and keepers on the moors involved in the trial. To determine adequate sample size, the research used the concept "information power" (Malterud, Siersma & Guassora, 2016) as a guide, with a total sample of 19 being deemed sufficient for obtaining information power. This sample consists of 7 staff from within Natural England who have had direct involvement in the trial as well as 12 individuals from outside Natural England who have directly participated in the trial in some capacity, including moorland owners, gamekeepers, individuals employed to assist in the licensing process and those involved in the brood management itself.

Template Analysis (Brooks et al., 2015), a form of thematic analysis, was chosen to analyse the interview data. Template analysis allows for a collaborative approach to qualitative analysis enabling sense checking between researchers as well as the provision of thick description and both deductive a priori coding, and inductive coding. A code book was developed by the researchers and tested and reformed in an iterative process with the data. A number of themes and subthemes were developed to help frame and structure the data and address the research questions and evaluative components (process and impact) of the project.

Findings:

Impact evaluation

The analysis provides evidence that the brood management trial is changing attitudes and behaviours among those grouse moor owners and keepers who have participated in it.

The report identifies that there is recognition of the need and desire for better coexistence with hen harriers on grouse moors and that brood management is perceived to be a tool that can enable this. There is evidence that the trial is improving moorland owners, managers and gamekeepers' views that hen harrier predation of grouse is manageable.

Participants acknowledge that change in attitudes and behaviours takes time. It is suggested that brood management has been able to tap into and harness a more general recognition of the need to change and coexist with hen harriers', but that different levels of support exist within the grouse shooting community.

The ecological success of the trial and the increasing general hen harrier population during the trial period is suggested as evidence of wider attitude and behaviour change beyond those who have directly participated in the trial.

The analysis identifies that the mechanism driving this change in attitudes and behaviours is that brood management creates a perceived 'safety valve' that is able to prevent hen harriers colonising a grouse moor.

The report provides evidence that moorland owners and managers are concerned that in high densities, hen harriers will overrun grouse moors, making them unprofitable. Perceptions of hen harriers overrunning grouse moors are (in part) driven by reference to the Langholm Moor demonstration project within which a similar process was perceived to have unfolded.

There is evidence to suggest that the availability of brood management allays concerns about hen harriers overrunning grouse moors. We can be infer from this that it is likely that brood management alleviates a driver of illegal persecution (although we don't have evidence that it does reduce persecution beyond those who participated in the research).

There is support for maintaining brood management as an option beyond the trial period.

The report provides evidence that the Theory of Change underpinning the attitudinal and behavioural change component of the Hen Harrier Brood Management Trial Monitoring and Evaluation Plan (2016) is valid.

Findings:

Process evaluation

Analysis identifies that perceptions of trust and legitimacy are vital for successful interpersonal and interorganisational relationships and work in the uplands.

Participation in the brood management trial has strengthened trust between moor owners and keepers and those working on the trial from Natural England, in particular, those involved in monitoring harriers on the ground.

However, positive experiences of working on the trial and relationships with NE were explicitly differentiated by those from within the shooting community to their negative experiences of working with NE on other issues in the uplands.

Moor owner and keeper relationships with environmental non-government organisations (ENGO's) and raptor conservation groups were perceived to be relatively unchanged despite their moors participation in the trial, while there was a perception that NE's relationship with such groups has worsened due to their involvement in the trial.

The financial cost of brood management, together with perceptions of the increasing bureaucracy of the paperwork involved and the scale at which the intervention can be undertaken were all identified as issues requiring consideration in relation to the process of brood management.

The issue of scalability was also linked to concerns about restrictions with regards to where brood managed harriers can be released due to limits placed upon them by Special Protection Area (SPA) designation.

The need for a clearer and improved communication strategy around brood management, its results and related positive stories was raised. It was perceived that most of the information that can be found publicly about the trial is negative and that this may create reticence among moor owners and keepers who have not yet undertaken brood management. The communication strategy may limit the trial's effectiveness in publicising the 'safety valve' effect for grouse moor managers. It may also fail to identify the conservation success of the scheme in improving hen harrier population numbers.

Given the sampling framework and research method adopted we are not able to generalise these conclusions beyond those participating in the trial. Caution must therefore be taken in extrapolating the potential effects of rolling the trial out more widely.

1. Introduction

This report outlines the findings of the interim social science evaluation of Natural England's Hen Harrier Brood Management Trial. This evaluation was carried out between April 2021 and April 2022 by Natural England social researchers. This social science evaluation provides insight into the impact of the trial on the attitudes and behaviours of moorland owners and managers who have directly participated in the trial. It also provides evidence about the processes involved in the trail and how it has worked in practice. The report is intended to provide the basis for additional social science research on the impact of the trial on attitudinal and behavioural change among wider grouse moor stakeholders. The project also sits alongside ornithological research that is investigating the impact of the trial on the hen harrier population in England as part of the monitoring and evaluation framework.

The Intervention

Defra's Joint Hen Harrier Action Plan (2016) set out six actions which were agreed can contribute to the recovery of the hen harrier population in England. Action 6 of the plan was 'Trialling a Brood Management Scheme'. Brood management involves removing hen harrier broods from driven grouse moors once breeding numbers reached a density that would significantly impact grouse numbers. Broods are moved to a rearing facility away from the managed moorland. Young are reared in pens, in suitable habitat, until fledging, at which point the birds are tagged and released into the wild.

Natural England subsequently developed a 5-year project to implement Action 6 of the plan, with the following project aims:

Aim: The Brood Management project will implement a field trial to test the design and help understand the practicalities of a brood management scheme and evaluate its contribution in delivering more hen harriers to the Northern uplands.

Specifically, the trial will test:

a) the practicalities of brood management: can eggs or chicks be taken from the wild and raised in captivity, can those chicks be released back into the wild and the implications for their subsequent behaviour and survival.
b) changes in social attitudes by those involved in upland land management to the presence of hen harriers on grouse moors with a brood management scheme in place.

The trial has established a number of pre-conditions that must be met for hen harriers to be brood managed, specifically:

- Nests can only be managed with the consent of landowners and managers;
- Nests can only be managed where they have the potential to reduce the shootable surplus of grouse, established by:
    - The density of hen harrier population could affect the shootable surplus of grouse (i.e., is another nest within 10km of the nest being considered);
    - There is a grouse shoot on the land and the hen harriers to be managed could have an impact on the shootable surplus of grouse.

Since the start of the trial five broods of hen harriers have been managed involving seven different grouse shooting estates:

- Broods managed by year: 1 in 2019, 2 in 2020 and 2 in 2021.
- Number of estates involved: 4 estates as brood management intervention sites and 3 estates as receptor sites.
- The trial is supported by the whole Moorland Association membership but only those estates that were eligible for intervention or suitable to be used as release sites have so far participated.

The Need for Social Research

A Hen Harrier Brood Management Trial Monitoring and Evaluation Plan (2016) was developed to support the trial. The plan identified 10 evaluation questions that need to be answered to assess whether the trial has achieved its objectives, of which question 6 focused on the attitudes of grouse moor owners and managers.

Question 6 in the evaluation plan (2016) tests the hypothesis that, as a result of the availability and practice of brood management, grouse moor owners and managers would become more tolerant of hen harriers on their land. A theory of change (figure 1) was developed to specify the process through which the brood management trial could lead to attitude/behaviour change among grouse moor owners and keepers.

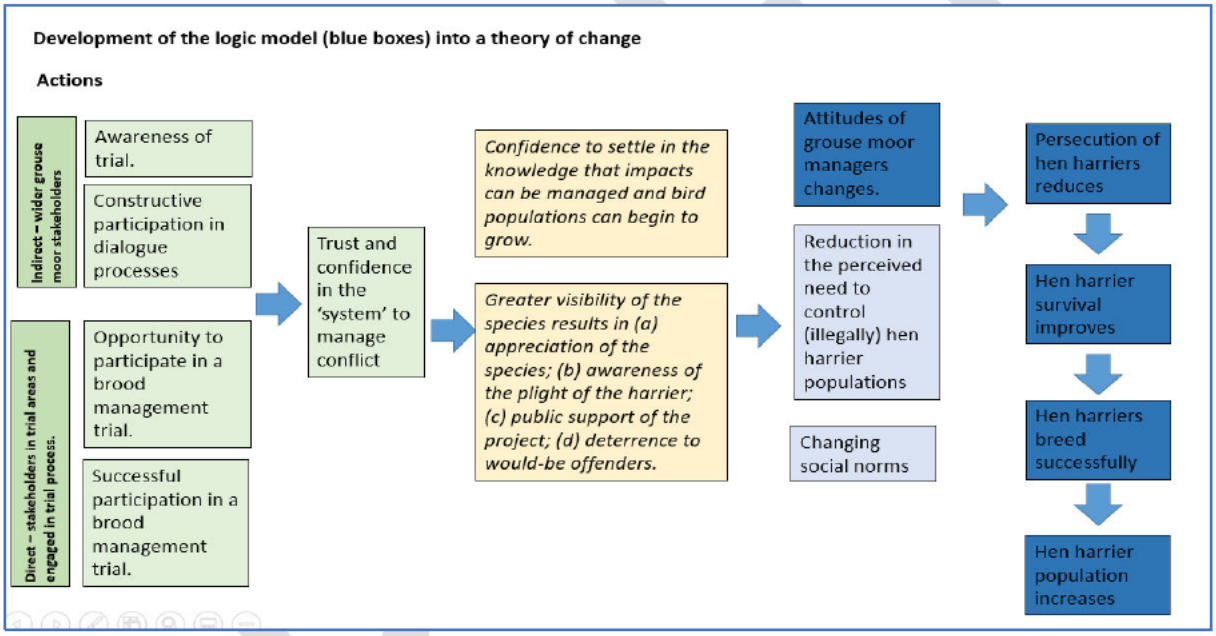

Figure 1. Theory of change for brood management trial.

The plan noted that the brood management scheme will give persons involved in grouse moor management the confidence to coexist with nearby hen harrier nests and a rising national hen harrier population. This is because it provides a "safety valve" that would preserve the economic viability of the grouse moor if local hen harrier nesting density were to increase beyond levels which have been scientifically shown to have an impact on grouse. Attitudinal/behavioural change among persons involved

in grouse moor management is therefore a central component of 'success' for the brood management trial.

As research question 6 refers to changes in attitudes and behaviours, it requires social scientific research to assess whether the project has achieved its original objectives. Social science research has identified that attitudes and behaviours do not necessarily interact in a linear way (with a change in one leading to a change in the other) (e.g., see Newell, et al., 2015; Shove & Walker, 2007). There is an established body of literature pointing to the gap between individuals' attitudes, values, beliefs and intentions and their actions, behaviours and practices. This has been explored variously in terms of the attitude-behaviour gap, the value-action gap, the intention-behaviour gap, the knowledge-attitudes-practices gap, and the belief-behaviour gap (Gabler, Butler & Adams, 2013; Grimmer & Miles, 2017; Sheeran & Webb, 2016). Research suggests that an individual's agency is often limited by social norms, financial and resource constraints as well as wider structural and systemic factors including systems of production and consumption (Reynolds, Subašić, & Tindall, 2015). Therefore, when researching attitude and behaviour change in relation to the brood management trial it is important to capture and analyse data about both attitudes and behaviours as well as the context within which any change is occurring rather than making assumptions about one from data on the other.

Previous quantitative research by St. John et.al., (2018), identified how understanding the value orientations[1] and attitudes of stakeholders helps explain differences in levels of support for management approaches, including brood management. The research also identified that it was important to focus on relationships, deliberation, and trust in addition to exploring co-management interventions. This interim social science evaluation of the brood management trial has aimed to consider these components to

[1] modes of conduct or qualities of life that we hold dear, such as honesty or freedom, influence people's attitudes and norms, which in turn affect behaviour (St John, 2018).

help identify any attitudinal/behavioural changes that may have occurred during the trial so far, and the factors that have shaped or inhibited them. It has also sought to identify what has worked well or could be improved or changed in the implementation of the brood management trial.

2. Evaluation/Research Questions

The objectives of the interim social science evaluation of the hen harrier brood management trial were defined as:

1. Clearly define and analyse the sample of interest i.e., who are the key stakeholder organisations and individuals within them who were involved with the development of the trial;
2. Refine and test the theory of change (figure 1, p.11);
3. Explore perceptions of attitude and behaviour change thus far (and the dynamics between them) amongst those who have participated directly in the trial;
4. Explore and agree best available methods (and associated resourcing) to enable the final social science evaluation to be completed.

Reflecting these objectives, the interim evaluation has sought to answer the following specific evaluation questions:

1. To what extent has the project produced the anticipated outcomes among moorland owners and gamekeepers participating in the trial? Specifically,
   a. Changes in managers' attitudes towards hen harriers on grouse moors?
   b. Changes to keepers' behaviours around hen harriers on grouse moors?
2. What are the main mechanisms by which outcomes have been produced?
3. Is there any variation in outcomes in different contexts?
4. How effectively has the trial been delivered? What, if any, changes are required for the future of brood management?

3. Methodology

Evaluation Design

In accordance with guidance laid out in the Magenta Book (2020), this evaluation has adopted a theory-based approach to the process and impact evaluation of the hen harrier brood management trial. Theory-based approaches are suited for the evaluation of complex interventions or simple interventions in complex environments and are particularly suited to evaluating the brood management trial because they not only account for what has changed as a result of an intervention, but also explore the mechanisms through which this change has happened (Astbury, & Leeuw, 2010). The theory-based approach fits well with the purpose of the brood management trial project as the approach is iterative, allowing for the theory of change developed at the inception of the trial to be critically examined and adapted according to findings from the evaluation.

The method adopted here has been informed by the realist evaluation approach (Pawson & Tilly,1997). Realist evaluation overcomes issues associated with 'black box evaluation', whereby social programs (such as the brood management trial) are viewed primarily in terms of effects (change in attitude or behaviour to hen harriers), with little attention paid to how those effects are produced (Astbury, & Leeuw, 2010). The realist approach taken in this study has sought to ''unpack'' the black box so that not only can the evaluation address the effects of a programme, but also the inner workings and operations of its components and how they are connected (Kazi, 2003)

Reflecting realist principles, evaluation design has been driven by the requirement to test and refine the theory of change and explore attitude and or behaviour change among those that have participated in the trial. This means that engaging with individuals involved in the trial, either as staff working on the project within Natural England or other organisations, or moorland managers and keepers on the moors involved in the trial. To achieve this, a qualitative semi structured interview design was adopted. This design was chosen as it is recognised that qualitative interviews

with participants to uncover implicit assumptions about how a program works links well with white box evaluation and a realist approach (Astbury, & Leeuw, 2010). A qualitative semi structured interview approach also enables flexibility in data gathering (e.g., technology, location) that can help increase participation as well as offering flexibility in subsequent data analysis (deductive and inductive) that sits well with testing and refining the trial's theory of change.

Sampling

In both quantitative and qualitative studies, researchers must decide the number of participants to select (i.e., sample size) and how to select these sample members (i.e., sampling scheme) (Onwuegbuzie & Collins, 2007). Given the qualitative focus of the research, the research used the concept "information power" as a guide to adequate sample size (Malterud, Siersma & Guassora, 2016). Information power indicates that the more information the sample holds, relevant for the actual study, the lower number of participants is needed. Malterud, Siersma & Guassora (2016) suggest that the size of a sample with sufficient information power depends on (a) the aim of the study (with the more focused the aim the smaller the sample needed), (b) sample specificity (the greater the specificity of experiences, knowledge, or properties among the participants included in the sample the smaller the size needed), (c) use of established theory (a study supported by specific theories for planning and analysis requires a smaller sample), (d) quality of dialogue (a study with strong and clear communication between researcher and participants requires fewer participants to offer sufficient information power), and (e) analysis strategy (a project seeking in-depth analysis of narratives from a few, selected participants would require smaller sample for sufficient information power). Using the concept of information power to inform sample size recognises that meaning is generated through interpretation of, not excavated from, data (Braun & Clark , 2021). Therefore, judgements about when to stop data collection were linked to discussions among the researchers about the developing analysis and its ability to address questions associated with the purpose of the research.

This review and reflection process resulted in a total sample size of 19 being deemed sufficient for obtaining information power. This sample were identified and chosen using a purposive sampling strategy (Robinson, 2014) whereby those individuals perceived as best suited to providing information about the topic of investigation are identified and then sampled from. The project board of the brood management trial provided a list of names all those that had participated in or worked on the trail. The research team then approached Natural England staff on the list directly to enquire if they would be willing to participate. A project board member then approached those on the list external to Natural England to ask if they would be willing to participate. The contact details of those that agreed were then passed onto the research team who approached them about participation.

The final sample consists of 7 staff from within Natural England who have had direct involvement in the trial as well as 12 individuals from outside Natural England who have directly participated in the trial in some capacity, including moorland owners, gamekeepers, individuals employed to assist in the licensing process and those involved in the brood management itself. The specific breakdown of the different roles of the 12 external participants will not be included for ethical purposes (protection of anonymity), which will be discussed later in this chapter, but analysis will indicate their role or organisational affiliation where quotations are used.

Interviews

Interviews took place between July and November 2021. Researchers divided the data gathering between them with one member interviewing staff from within NE about their thoughts and experiences of the brood management trial and the other two interviewing those who had participated in the trial (as owners and keepers on moors where hen harriers had been removed, or who had acted as receptor sites for the release of brood managed harriers as well as those who had involvement in the rearing and release of the harriers or with the licensing and identification of receptor sites). Interviews were conducted either via the use of Microsoft Teams or by phone with the

full audio being recorded (see ethics and analysis sections for more detail) for transcription and analysis purposes.

Analysis

Given the purpose of the research to both test and refine the theory of change as well as capture perceptions of any attitudinal and/or behavioural change among those who participated in the trial, the choice of analytical method needed to allow for both deductive and inductive analysis (Roberts, Dowell, & Nie, 2019). Template Analysis (Brooks et al., 2015) was chosen as it sits somewhere in between positivist orientated approaches to qualitative research and interpretivist ones (Braun & Clarke, 2019) and is therefore well suited to the project's realist framing. It also allows for a collaborative approach to qualitative analysis enabling sense checking between researchers as well as the provision of thick description and both deductive a priori coding, and inductive coding.

Template analysis sets out key procedural steps (6 steps in total) for researchers to follow (Brooks et al., 2015). In line with O'Connor and Joffe (2020) the process first involved the independent coding of a small amount of data (three interviews one NE staff member, one moor owner and one keeper) by each of the research team before a meeting was arranged and the codes and data discussed to allow informal comparison of codes and initial themes to be explored and developed. This led to the development of an initial codebook, which was reapplied by the first author to the initial three interviews. The codebook and data captured by it were then further reviewed and discussed between the research team to further refine the codebook before it was then applied by the first author to the remaining larger set of data. The code book included a miscellaneous theme to allow data that didn't appear to fit within the codebook to be captured and raised with the rest of the team. New themes where either then created to capture this data or existing themes were reviewed and refined to incorporate it.

Limitations of the method

It is important for an evaluation to reflect on the limitations of the method employed, and any potential implications this has for conclusions that can be drawn from the evidence. Reflecting the rigour of the sampling and analysis employed, confidence can be placed in the conclusions drawn.

However, it is important to recognise a number of potential limitations of this study. First, although the researchers are not part of the project delivery team, their affiliation with Natural England may have limited respondents' willingness to be open and honest about their experiences of the trial. Second, to provide evidence for the process evaluation, the sample is limited only to those who have been delivering or participating in the trial. There have only been a limited number of grouse moors on which the density threshold for using brood management has been met as well as receptor sites assessed as suitable for harrier release within the same SPA. This has resulted in the comparatively small sample size in this research compared to the total number of grouse moors and people involved in grouse shooting. As such, participants are likely to be among those members of the moorland management community who are most receptive to the idea of brood management and who recognise the need to change attitudes and behaviours. Caution must therefore be taken in extrapolating the potential effects of rolling the trial out more widely and concluding that the trial has had a similar impact on the wider grouse shooting community.

4. Findings

Analytical structure

The interview data were thematically analysed using template analysis (Brooks et al., 2015) and organised through the creation of a code book to form a narrative account of participants' experiences of the trial. The structure of the analysis derived from the codebook was developed to enable analysis of participant perceptions of the processes involved in the trail, the impact of the trial on attitudes and behaviour and the wider contextual factors that frame these experiences. The extracts from the qualitative data presented were selected for their representativeness within the relevant thematic category with the use of n= signifying how many of the 19 participants had data coded from their interviews as part of that theme. For example, n=12 after the theme heading means that 12 of the 19 participants had extracts of their interview coded as relevant to that theme. Each interviewee may have had multiple extracts of data coded to a single theme. The analysis consists of five component parts.

Part 1) Background context relevant to evaluating the brood management trial: This provides an overarching context to both evaluation objectives.

Part 2) The theory of change: addresses objective 1 and questions 2 and 3.

Part 3) Process evaluation: addresses questions 2, 3 and 4.

Part 4) Impact evaluation: addresses objective 2 and questions 1a and 1b, 2 and 3.

Part 5) Additional considerations for brood management and hen harrier conflict reduction: addresses objectives 1 and 2 as well as questions 2, 3 and 4.

An important point to note is that many of the issues raised and addressed are cross-cutting and as such the analysis and its constituent parts should be read holistically rather than in isolation.

Part 1. Background context relevant to evaluating the brood management trial

Theme 1: The history of conflict around harriers on the uplands

This theme captures discussions about how brood management has developed within a context of conflict around grouse shooting. A perception exists among those interviewed who work on or for grouse moors that hen harriers have become symbolic of the polarisation between those that want to ban shooting and those that don't. Because of this polarisation, there is a sense that the wider role that grouse moors may play in terms of positive contributions to conservation in the uplands is ignored. These two factors have created apprehension among those working on or for grouse moors about participating in the trial. Participants in the trial expressed concern about the possible negative attention participation might create from those opposed to shooting. They were also concerned that if brood management was to be stopped for whatever reason then grouse moors would be left facing a situation in which they had helped to create harrier colonies on grouse moors which would impact negatively on their livelihoods.

1.1 A drive to ban shooting (n=5)

This subtheme highlights a view discussed by moor owners, keepers and others employed by shooting interests in the uplands that while persecution has and does occur and that grouse moors need to do more to support harriers, conflict between different groups and organisations is more about banning shooting and that harrier conservation is secondary to this. In relation to persecution, a moor owner noted that,

[redacted]

[redacted]

Despite this recognition, those participants working within the grouse shooting industry were explicit in their view that they felt conflict between groups was less about hen harriers and more about banning grouse shooting. Within this wider conflict around banning shooting harriers had an important symbolic value. For example, an interviewee who worked with grouse moors noted how they felt that,

[redacted]

Within this framing of the focus of the conflict as being between different groups and values, there was acknowledgement by those interviewees within the shooting sector that hen harriers had and do face persecution on some grouse moors but that to try and ban all grouse shooting on all moors because of this was unfair. For example, an interviewee who helped to look after brood management release sites noted,

[redacted]

1.1 The role of grouse moors in conservation and maintaining ecological "balance" on the uplands (n=11).

This sub-theme highlights a perception on behalf of the moorland community that grouse moors contribute to conservation and concern from within the grouse shooting world that if moors are not managed for grouse then it will damage habitat and impact on ecological balance. The idea that grouse moors make a positive contribution to conservation in the uplands through the management practices of game keepers and that those within the shooting community would call themselves conservationists was acknowledged by Natural England staff, for example,

[redacted]

Natural England staff also identified that if some of the practices involved in grouse moor keeping were to be stopped, then rather than leading to a simple increase in harrier numbers, it might result in different problems. For example, harrier predation from other predators that keeper's control as part of their work to protect grouse. An NE staff member explained their view that solutions to hen harrier conservation needed to involve grouse moors,

[redacted]

Keepers argued that grouse shooting helped sustain their wider conservation work by paying their wages. They used this to counter arguments to ban shooting. For example, two keepers explained,

[redacted]

Participants from the grouse shooting sector expressed their concern that the lack of acknowledgement of the conservation benefits of grouse moor management and how the drive to ban shooting could lead to degradation of habitat suitable for both hen harriers and other species. As a moor owner explained,

[redacted]

1.1 Considerations / reservations about participating in the trial (n=6).

The context of conflict discussed in 1.1 and 1.2 created concerns among some in the grouse shooting fraternity who were interviewed about participation in the brood management trial. These concerns revolved around being attacked by certain interest groups who they felt want to ban shooting and for whom brood management was not a popular practice. To cite one keeper,

[redacted]

Another example of participant anxiety focuses on future decisions and the permanency of brood management. A moor owner noted that,

[redacted]

Part 2. The Theory of Change

One of the key objectives of this project was to refine and test the Theory of Change (see fig 1. P.11) incorporated within the Monitoring and Evaluation Plan (2016). The Theory of Change specified the process through which the brood management trial could lead to attitude/behaviour change among grouse moor owners and keepers which would reduce persecution and lead to increases in harrier numbers.

The Theory of Change hypothesises both a direct and indirect route to attitude and behaviour change. The direct route specifies that participation in the brood management trial will improve trust and confidence in the 'system' to manage conflict. In turn, this will lead to a reduction in the perceived need to illegally control hen harrier populations among moorland owners and managers. The indirect route hypothesises that awareness of the trial and engagement between those who have and have not participated will contribute to attitude and behaviour change. The current project is able to address aspects of this indirect route through analysis presented in part 3 of the analysis (subtheme 4.4 the need for a communication and engagement strategy) and part 4 (subtheme 5.2 the mechanisms of change). However, the issues raised about the indirect route of the Theory of Change in these components is provisional and requires testing, exploration and expansion through further specific social science research on this indirect route to behaviour and attitude change.

Theme 2: The spectre of Langholm

The action plan (2016) suggested that the brood management scheme will give persons involved in grouse moor management the confidence to coexist with nearby hen harrier nests and a rising national hen harrier population. This will be achieved by providing a "safety valve" that would preserve the economic viability of the grouse moor if local hen harrier nesting density were to increase beyond levels which have been scientifically shown to have an impact on grouse. This report provides evidence that moorland owners and managers are concerned that in high densities, hen harriers

will overrun a grouse moors, making them unprofitable. Perceptions of hen harriers overrunning grouse moors are (in part) driven by reference to the Langholm Moor Demonstration Project within which a similar process was perceived to have unfolded. For example, a grouse moor owner explained that,

The evidence in this report suggests that brood management acts as a tool to relieve pressure on grouse moors where there is a high density of hen harriers on moorland, allaying owners/managers' concerns about hen harriers overrunning the moors. We can infer from this that it is likely that brood management alleviates the drivers of illegal persecution (although we don't have evidence that it does reduce illegal persecution beyond those who participated in the research). In this respect, we have some evidence that the Theory of Change is valid, but we can't extrapolate this beyond people directly involved in the trial. Furthermore, the analysis provides greater context to the Theory of Change by providing more detail about how participants perceive the 'safety valve' of brood management as leading to attitude and behaviour change. The 'safety valve' can be better understood in terms of mitigation, pressure relief and the provision of a legal alternative for managing impacts of harriers on grouse. These will now be explored in more depth.

2.1 Brood management as mitigation tool against colonisation (n=10).

As a mitigation tool, brood management was viewed as a means for avoiding hen harrier colonisation, as occurred at Langholm, as it enabled keepers and owners to remove nests if the density threshold was met. By acting as a mitigation tool, it increased acceptance of harriers on moors by providing confidence that colonisation could be avoided. As a Natural England participant explained,

This idea of brood management acting as a mitigation tool was supported by owners and keepers who discussed how it would allow the impact of harriers to be shared over a greater area. For example, a keeper explained,

Furthermore, it was the fact that brood management hadn't been a part of what had been tried in the Langholm Moor Demonstration Project that made it attractive to those in the grouse shooting industry and therefore increased their support for the trial. For example, a moor owner explained,

[redacted]

2.2 Brood management a tool to relieve pressure and create balance (n=8).

Reference was also made to the pressure grouse moors and gamekeepers are under to produce enough grouse to make driven grouse shooting financially viable. One of the ways in which they traditionally do this is through predator control to prevent grouse predation. Hen harriers predate on grouse and at certain densities can have a detrimental impact on overall numbers, meaning they are perceived as a part of this pressure. By engaging in brood management our evidence suggests this pressure from hen harriers is alleviated. As a person working on the trial explained,

[redacted]

Brood management was also discussed as a tool that helps create balance between harriers and other species, including grouse, so that a type of equilibrium that benefits

the diverse range of animals found on moors can be maintained by keepers because grouse numbers are sustainable, and shooting can continue to pay for their work. As a moor owner explained,

[redacted]

2.3 Brood management as a legal tool for managing harriers (n=8).

Explanations about the purpose of the brood management trial and how it could act as a safety valve for moors, therefore promoting behaviour change and co-existence, were also discussed in terms of how it provides a legal means to manage harriers. By providing a legal remedy to address the impact harriers could have on grouse moors it was suggested that it could prevent people undertaking illegal remedies thereby reducing persecution. A moor owner discussed the context in which such illegal behaviour may happen and the way in which brood management changes this context and therefore the associated behaviour,

[redacted]

[redacted]

Part 3. Process Evaluation Findings

Theme 3: Interpersonal and Interorganisational Relationships

This theme looks to unpick the processes involved in delivering the trial that relate to how it operated and worked in practice. It encompasses aspects relating to perceptions about relationships between people and between people and organisations during the trial. It captures participant discussion of issues such as the importance of trust between those working on the trial, what has worked well within these relationships and ways of working, what hasn't worked well and why. It also examines how brood management has impacted upon relationships and the implications of these relationships for future conflict management in the uplands.

Analysis identified that perceptions of trust and legitimacy are vital for successful interpersonal and interorganisational relationships and work in the uplands. Participation in the brood management trial has strengthened trust between moor owners and keepers and those working on the trial from Natural England, in particular, those involved in monitoring harriers on the ground. However, positive experiences of working on the trial and relationships with NE were explicitly differentiated, by those from within the shooting community, from their negative experiences of working with NE on other issues in the uplands. There was also a sense that there are tensions internal to NE around the trial that can affect work on the trial. It was perceived that positive relationships between those grouse moors involved in the trial and those not, helped the former address any concerns raised by the latter, particularly around location of receptor sites. Moor owner and keeper relationships with environmental non-government organisations (ENGO's) and raptor conservation groups (RCG) were perceived to be relatively unchanged despite participation in the trial. There was also a perception that NE's relationship with such groups has worsened due to their involvement in the trial.

3.1 Relationships (Trust and legitimacy) needed for success (n=6).

This subtheme identifies the role that trust has played, at both an individual and organisational level, in delivering brood management on grouse moors on the uplands. Trust was perceived as a vital part of good interpersonal relationships through which Natural England staff and game keepers could work productively together on the ground to conserve hen harriers. For example, an NE member of staff explained how

relationships of trust built with keepers meant that keepers were more forthcoming with information about harriers that was useful for their protection,

[redacted]

Building on this theme of the importance of trust between gamekeeper and Natural England staff, a keeper explained how it was important that they had time to get to know Natural England staff, to build rapport and trust. They explained how overcoming preconceptions about each other was important to see past a label and get to know the person,

[redacted]

Another NE staff member explained the importance of relationships built on trust for the success of both brood management and harrier conservation more generally. They explained how trust enabled honest conversations to occur and allowed the sharing of divergent views as well as identified how it is important to get to know each moor, owner, or keeper rather than treat them as a homogenous whole,

[redacted]

Trust was also discussed as an important factor for those working with each other on brood management from within the same organisation or interest group. For example, an NE staff member discussed how they felt that there were inter-organisational

tensions around brood management within Natural England that could at times make working on the trial uncomfortable,

[redacted]

By contrast, trust between moors was seen as a vital part of successfully rolling out brood management. This was particularly so with moors neighboring those that acted as receptor sites for brood managed harrier release. It was explained how good interpersonal relationships at both keeper and owner level were important for alleviating concerns about harriers being released nearby. For example, a moor owner explained,

[redacted]

3.2 The process of participation (n=11)

This subtheme follows on from the theme of trust and focusses on discussions about what has been good or bad about ways of working on the ground during brood management. While strong interpersonal relationships which build trust between NE staff and moors (owners, keepers) were seen as vital to successful working, interviewees also discussed how participating in the trial had actually helped strengthen those relationships and led to greater trust. For example, an NE staff member explained how,

[redacted]

A moor owner also described how working with others on the ground to deliver brood management has had a positive impact on their relationships and that experience of working on the trial was different to that they expected and have experienced in relation to other issues. They explained how,

A perception existed among those within the grouse shooting community as well as from within Natural England that the ways of working and the relationships built throughout the brood management trial were particularly positive and key to success. This was often contrasted to experiences of working together on other issues. In this sense the work between Natural England and grouse moors on the brood management trial was held up as a model of good practice. For example, an NE staff member explained how a generally high turnover in NE staff has negatively impacted on wider relationship building and thus ways of working in the uplands. In this sense it was suggested that the benefits of interpersonal relationships and the importance of trust for conservation work in the uplands are perhaps not fully appreciated within Natural England,

This was reflected in discussions with keepers and owners who contrasted their relationship with NE staff on the ground during the brood management trial to their experiences with NE more generally. In this way brood management was seen as something that had been developed collaboratively and within which they had been

listened to, which they suggested they felt was often not the case for other issues. For example, a keeper explained,

[redacted]

3.3 Natural England's wider relationship with upland managers/keepers and ways of working in the uplands (n=9).

This sense of contrast between the experience of the brood management trial and experiences of working with Natural England on other issues in the uplands was made apparent when interviewees were asked to discuss their views on the relationship between Natural England and grouse moors more generally. A NE staff member explained how poor relationships in relation to other issues in the uplands could negatively impact upon working relationships with people around hen harriers,

[redacted]

Interestingly, interviewees involved in grouse shooting were able to disentangle the positive experiences they had had from working on the brood management trial with Natural England from their more general experiences and views of Natural England. As a moor owner explained,

[redacted]

[redacted]

Keepers interviewed discussed how for them grouse shooting is not just about a job but a way of life. A keeper explained how they feel this is not understood and this caused anger towards Natural England beyond the trial itself,

[redacted]

3.4 Relationships with ENGO's and raptor conservation groups (n=9)

This subtheme looks at perceptions about the impact that participation in the brood management trial has had on both grouse moor and NE relationships with ENGO's. It identifies that there has been a lot of negative publicity around brood management and that the term brood meddling is often used by those who hold negative views of it. It was suggested by some that this opposition is linked to perceptions that certain groups are more interested in banning shooting than harrier conservation and that is why both grouse moor and NE participation in the trial has not been supported by some groups.

In relation to Natural England's role in the development and ownership of the trial, NE staff discussed their perception that it has led to certain groups claiming that the organisation works at the behest of the grouse shooting industry and that this is making working relationships with some groups more difficult. In discussing the impact that NE's participation in the trial has had on relationships with certain groups an NE staff member explained,

[redacted]

Keepers doubted that their involvement in brood management would alter prevailing criticism of their role, for example,

[redacted]

Building relationships between different interest groups and organisations was identified as important for the future sustainability of both grouse moors and harriers. As a moor owner explained,

[redacted]

Theme 4: Issues with the trial and considerations for the future of BM

This theme refers to perceptions about what has or hasn't worked well during the trial and why. It captures a range of topics that participants identified that they felt could/should be changed or which require attention if the trial is to continue or become permanent in the future. Issues around the cost of brood management, the increasing bureaucracy of the paperwork involved and the scale at which it can be undertaken were all raised by participants. The issue of scalability was also linked to concerns about restrictions in terms of where brood managed harriers can be released due to limits placed upon them by special protection area (SPA) designation. Ways of working within Natural England were also discussed, and it was suggested that a more unambiguous corporate position in support of brood management would help. Resource requirements to enable NE to effectively deliver brood management and hen harrier monitoring on the ground were also raised as was the need for greater focus on engagement work and building trust in interpersonal relationships on the uplands. The need for a clearer and improved communication strategy around the trial, its results and positive stories was raised. The perception was held thatmost of the information that can be found publicly about the trial are negative and that this may create reticence among moor owners and keepers who have not yet undertaken brood management.

4.1 Sustainability of brood management procedures and practices (n=12).

Discussions around sustainability of the trial primarily focused on issues such as the financial cost of brood management, the level of security required and its relationship to cost, the paperwork involved in licensing brood management and issues about future scalability. In relation to the financial costs involved, issues associated with tagging and monitoring and security were most commonly raised. An NE staff member summarised such discussions when explaining that,

[redacted]

A moor owner discussed their concern that if brood management is to continue beyond the trial then costs need to be considered, as those incurred during the trial could potentially dissuade moors from undertaking brood management in the future. They explained how,

[redacted]

There were also discussions about the paperwork involved in applying for a license to brood manage and the perception that this had become more complicated and time consuming throughout the trail and that this could negatively impact upon moors engaging with brood management in the future. An NE staff member described how they felt,

[redacted]

This issue of the burden that the requirement for extensive paperwork could have on a moors' willingness to engage in brood management in the future was also discussed by a moor owner,

The other issue that was raised by interviewees was the scale at which brood management could operate. It was noted that the greater the number of harriers in the future, the potentially greater demand for brood management there might be, but there was a point at which this would become impractical and therefore the future sustainability of brood management was brought into question. For example, an individual working on the trial explained how,

4.2 Issues for consideration about the future sustainability of brood management (n=8).

This theme examines other issues that were discussed in relation to the future sustainability of brood management. In relation to the issue of scale discussed in 4.1, the requirement to release harriers back into the same Special Protection Area (SPA) as designated under the European Union Directive on the Conservation of Wild Birds was an issue raised. In particular, how this directive impacted upon the ability to find suitable receptor/release sites and created concerns that in the long term this might lead to high densities of harriers in relatively small geographical areas. A NE staff

member described how they felt disappointed with the grouse moors at the start of the trail as they had had difficulty finding receptor sites. However, they also noted how through involvement in the trial they understood the difficulties that the SPA requirement created for those involved,

A keeper also discussed how not being sure where hen harrier nest density might occur in advance to enable brood management to be used meant that those that volunteered to act as receptor sites were often unable to because they were not in the same SPA. He suggested that since, in his view, the long-term goal should be for harriers to be found all over the uplands that this seemed unnecessary. He explained,

The problems created for brood management in the long-term through the issue of SPAs and receptor sites was also discussed by an estate director who explained that,

[redacted]

4.3 Issues that require attention in terms of effective ways of working to deliver brood management (n=8).

This subtheme examines additional issues that interviewees raised about the processes involved in brood management that they felt needed to be acknowledged when decisions were being made about its future. These issues predominately focused on Natural England and included issues about ways of working and the resources required to deliver brood management and build from some of the issues described in 3.2. and 3.3. There was also discussion about the potential for mixing broods of harriers raised in captivity so that those of a similar development stage and size can be released together regardless of whether they came from the same nest originally.

In terms of ways of working, an NE staff member described how consistency of approach, ownership and support for brood management was needed within NE if brood management was to be continued in the future. The NE staff member noted that,

[redacted]

Another NE member of staff discussed how brood management and the time demands its places on staff would need to be factored into any decision on the future of brood management. They summarized the future sustainability of brood management in the following way,

[redacted]

Interview analysis suggests that the way Natural England proceeds with brood management in the future needs to be tied into wider discussions about how they work with grouse moors more generally around hen harriers. One staff member explained,

[redacted]

The idea about streamlining the process involved was linked by participants from grouse moors to discussions about how NE could better enable them to undertake other practices around moorland management that can also support harrier conservation. As a keeper explained,

[redacted]

Three participants also expressed concern about the differential rates at which brood managed harrier chicks grew. Release dates had to be delayed to allow the smallest

chick in a brood to develop. It was suggested that this was a problem that could be addressed through the mixing of different broods based on size and readiness for release back into the wild. This involved listening to those with different expertise, now that participants had gained experience about what happens during the trial and what might be best for the harriers. For example, a trial participant explained how,

[redacted]

4.4 The need for a communication and engagement strategy (n=7)

This subtheme captures discussions about the need for better and clearer communication around the brood management trial both internally within organisations such as NE and the Moorland Assocation as well as externally to the public and those communities in the uplands who had not yet engaged in brood management. It also reflects participants' desire to see more positive stories about the work being done whilst being aware of the politically contentious nature of the trial. This subtheme has particular relevance to the 'indirect action' component of the theory of change (p.25), where awareness of the trial and constructive dialogue between those who have participated and those who have not is hypothesised to lead towards greater trust and confidence in the ability of the brood management system to manage conflict around harriers.

Natural England staff spoke about their desire to see the organisation get better at publicly supporting the trial as that would help them feel more confident in the work they are doing. For example,

[redacted]

Another NE staff member explained how the lack of public engagement about brood management fed into the narrative that brood management demonstrated that NE was in league with the shooting industry. They suggested that a more open approach to communication might be more effective,

[redacted]

Reflecting this, participants from the grouse moor community also expressed surprise that a lot of people that they spoke to from NE, beyond those involved in the trial, knew little about it nor how harrier numbers were currently increasing. For example, a participant working on the trial noted that,

[redacted]

A grouse moor keeper also discussed how it was very difficult for anyone to find out any positive information about the trial publicly and that most stories that could be found were negative. This has implications for the 'indirect actions' route for attitude and behaviour change identified in the theory of change. For example, the keeper stated,

[redacted]

Part 4. Impact Evaluation Findings

Theme 5: The meanings/mechanisms of success and the outcomes of the trial

Step 6 in the Hen Harrier Brood Management Trial Monitoring and Evaluation Plan (2016) refers to testing the hypothesis that, as a result of the availability and practice of brood management, grouse moor owners and managers become more tolerant of hen harriers on their land. Attitudinal/behavioural change among persons involved in grouse moor management is therefore a central component of 'success' for the brood management trial as changing attitudes and behaviours among those owning or working on grouse moors is seen as a crucial mechanism by which hen harrier persecution will be reduced. One of the key evaluation questions for this project was to explore perceptions of attitude and behaviour change thus far (and the dynamics between them) amongst those who have participated directly in the trial. This also includes what success means or looks like for different participants and what participants perceive to be some of the key outcomes of the trial so far.

The research provides evidence of attitude and behaviour change toward hen harriers on grouse moors by those who have participated in the trial. Those participating in the trial clearly recognise the need for coexistence and an end to illegal persecution. They also suggest that especially within the last five years there has been a wider change in attitude toward harries among the grouse shooting community due to recognition that the future of grouse shooting is intrinsically linked with the future of hen harriers. Brood management was perceived to have tapped into this change and helped harness it in a practical way. However, participants also identify that change attitudinal and behavioural change takes time, behaviours might be changing quicker in some places and with some people than with others, while similarly attitudinal change towards harriers' variers among grouse moors. The championing of those that have participated in the trial and demonstrated that it works was seen as an important mechanism for influencing wider change among those who have not yet been involved in brood management. The ecological success of the trial and the wider increase in the hen harrier population during the trial period was also suggested as demonstrating wider attitude and behaviour change as well as that brood management does not negatively impact upon hen harriers themselves. Finally, those that participated in the trial indicated that they would do so again and that they hoped that brood management would continue to be available to grouse moors beyond the trial period.

5.1 Attitude/ behaviour change (n=14).

There is evidence that brood management is contributing to attitudinal and behavioural change. For example, participants suggested that, especially within the last five years, there has been a general attitude change within the grouse shooting industry towards increasing tolerance of harriers and the role that grouse moors can play in their conservation. They believe that brood management has tapped into and been able to harness this. There was also recognition that there are still some who haven't changed. As a moor owner described,

[redacted]

Others similarly discussed what they saw as a wider shift in attitudes towards harriers, as well as recognition that while such change isn't universal, brood management is playing an important role in facilitating change. For example, another moor owner explained how,

[redacted]

Brood management was discussed as something which has been able to harness and solidify the wider change in attitudes, as a NE staff member identified,

It was noted that change in attitude and behaviour will take time, but any change will be beneficial, and that brood management is assisting in this change. As another moor owner described,

The wider context for change was also discussed by keepers who noted how their experience of brood management has impacted on their own attitude and behaviour as well as how they think that a change in moorland owners' attitudes will help cement change over time. For example, discussing his experience as a keeper on a moor that acted as a receptor site an interviewee described how,

[redacted]

Natural England staff were also able to provide examples of where they had experienced a change of behaviour from keepers and owners during the trial, for example,

[redacted]

Additional examples of change in behavior among owners and keepers were discussed by others that had participated in different roles in the trial. It was suggested that the increase in harrier numbers in the last few years beyond those that were brood managed is evidence of reduced persecution and therefore behavior change but that changing attitudes might take more time. For example, an interviewee described how from their perspective,

[redacted]

5.2 Mechanisms of change (n=6)

This subtheme relates to the ways in which interviewees discussed how participation in the brood management trial was helping to influence attitudes and behaviour amongst the wider grouse shooting community through the sharing of experience and

the championing of those that had participated. It also identifies how some of the processes involved in brood management, such as the tagging and monitoring of brood managed birds may also be leading to change. This subtheme has relevance to the indirect action route of the theory of change as it speaks to the hypothesis that those not directly participating in the trial may change their attitude and behaviour towards harriers on their moors through exposure to the experiences of those that have.

A participant working with grouse moors for the trial explained how they are trying to influence the wider grouse shooting community about the benefits of brood management as a means of supporting grouse shooting and reducing persecution of harriers,

[redacted]

Sharing and promoting the benefits of brood management or at least trying to reduce anxieties associated about potentially participating (see theme 1.3) through the sharing of personal experiences was also another attitude and behaviour change mechanism identified. As a keeper explained,

[redacted]

Brood management enabled moors to hold each other to account for any persecution through greater self-policing. For example, a NE staff member commented that,

[redacted]

[redacted]

Finally, in terms of mechanisms of change it was noted by an NE staff member how the tags put on birds that are brood managed, and the greater data that this provides, is key to changes in attitude and or behaviour. This is because the data helps alert staff to any persecution, and this awareness potentially increases self-policing within shooting communities,

[redacted]

5.3 Ecological success of the trial (n=11).

Analysis of participant interviews identified that the ecological outcome of increased hen harrier numbers during the period within which the brood management trial was taking place was seen as an indicator of the success of the trial. This success was further supported not only by the increase in harrier numbers overall, but also by the view that participants felt it had been demonstrated that brood managed birds can thrive and integrate into the wild just as well as non-brood managed harriers. As an NE staff member explained,

[redacted]

It was suggested that brood management has helped to increase harrier numbers by giving chicks a better start in life thereby increasing survivability. For example, a moor owner described,

[redacted]

A gamekeeper suggested that the ecological success of the brood management trial demonstrates that grouse moors can help conserve harriers,

[redacted]

5.4 Support for the continuation of brood management (n=9)

This subtheme of success/outcomes of the trial relates to participants attitudes to ongoing participation and support for brood management and whether having been part of the trial they believe it should or should not become a permanent tool to assist with grouse moor management and hen harrier conservation. A keeper discussed how,

[redacted]

Another keeper explained their support for the availability and use of brood management on an ongoing basis by reference to their perception that there are limited alternative options for managing harrier conflict which enable both harriers and moors to positively benefit and therefore that stopping it would be problematic,

[redacted]

Awareness that attitudinal and behavioral change takes time, and that brood management helps this process while also delivering short term outcomes, was given as a reason for keeping brood management beyond the life of the trial. A moor owner explained that not making it available longer term would have a detrimental impact on moors,

[redacted]

Perceptions about the possible detrimental impact that not continuing with brood management beyond the life of the trial would have were echoed by NE staff. For example,

[redacted]

Part 5. Additional considerations for evaluation

Theme 6: Additional considerations for brood management and hen harrier conflict reduction

This theme refers to perceptions about the wider pressures grouse moors face and the role such pressures play in the acceptance, support and use of brood management. The theme illustrates that when discussing the future of brood management, it is important to recognise that it is not taking place in a vacuum. There are other issues impacting upon behaviours, attitudes and relationships on the uplands that could help or hinder' engagement with brood management.

Analysis identifies that keepers and moor owners perceive that they face a number of other pressures which impact on the sustainability of grouse shooting and grouse moor management that are not alleviated by brood management. Issues about licensing to control other predators as well as about heather burning are creating a context in which they feel under siege. Despite this, there is agreement that the trial is holding up well and is a bright spot within these wider issues. While pressure created by several different types of predator were discussed, it was that posed by Gull species that is creating the greatest concern and frustration for keepers and moor owners. Participants wanted greater support with this issue. It was discussed how this support could be explicitly focused on those moors that were demonstrating their commitment to hen harrier conservation through brood management and diversionary feeding. Questions were also raised by a small number of participants about whether brood managed harriers were artificially inflating harrier numbers more generally and whether this was ok or not. This was linked to concerns about whether keepers are not persecuting harries because they cannot differentiate between brood managed and non-managed harriers rather than because there is a change in attitude and behaviour more generally. Finally, discussion revolved around what the future of grouse shooting, and hen harriers might look like in terms of sustainable and acceptable numbers of both and how this may shape the future of grouse shooting.

6.1 Wider pressures on grouse moors (n=10).

In the uplands, grouse moors are facing pressures in relation to a range of other issues that impact on the attitude and behaviour of owners and keepers. It is important to have awareness of these issues and the cumulative impact they have on relationships and behaviour on grouse moors when considering brood management and hen harrier

conservation more broadly. A Natural England staff member explained this wider context,

An interviewee who works with grouse moors and had helped with the brood management trial discussed how it is important to situate brood management within the range of wider issues that are impacting upon relationships and therefore the attitude and behaviours of people living and working there. Their view was that the trial was an exception to the general problems and issues faced,

Expanding on the suggestion that brood management has worked well despite everything else going on, a gamekeeper discussed how they face a range of pressures from other predators that predate on and reduce grouse numbers that they feel they are unable to do anything about. In this context, any tool, such as brood management that can in some way help to alleviate these impacts and thus the pressure on keepers is seen as a good thing,

Taking this issue of the pressure from a wide range of predators further, one of the biggest issues raised by participants was the perception that issues associated with licensing processes for the management of predators creates problems. As an interviewee working with the Moorland Association explained,

[redacted]

6.2 Predator control and licensing on grouse moors (n=9)

This subtheme explores frustration from those working on grouse moors at the perceived lack of ability to obtain licenses to help manage other predators. While predominately these issues were raised and discussed by interviewees external to NE, they were also noted by NE staff. For example, a NE staff member discussed how consideration for granting licenses should take account of overall conservation goals and that those actively demonstrating their commitment to harrier conservation through participation in brood management or diversionary feeding should be supported where appropriate in the application for licenses to control other predators,

[redacted]

While brood management appears to have been well received by those who have participated in the trial, the perception remains that the inability to obtain licenses to control other predators that predate on grouse creates pressures that are not fully

mitigated by the 'safety valve' of brood management. For example, an individual working on the trial in the uplands explained how,

[redacted]

Problems associated with perceptions about wider licensing create a context within which grouse moors perceive that they are not listened to and feel under pressure to change what they do and how they do it. An individual working with the grouse shooting industry explained how people talk each other and share experiences and how this creates a shared sense of victimization that impacts on the willingness of people to engage with NE on conservation issues. Despite this, brood management was still differentiated from experiences of this wider context,

[redacted]

Keepers were explicit about the problem of trying to obtain licenses to control other predators that negatively impact on grouse moors, both in terms of grouse numbers but also other ground nesting birds. They suggested that the evidential requirements needed to obtain a license to control other predators is very difficult and they want greater support to help them do this. For example,

[redacted]

Another keeper explained how the cumulative impact of a range of predators on limited prey created both imbalance in predator/prey relationships on grouse moors but also greater pressure on keepers to try and maintain grouse numbers for shooting. Consideration of this they suggest would help create a context where grouse moors feel more confidence in supporting harrier recovery,

6.3 Brood managed and non-brood managed harriers and future population questions (n=4).

This theme considers questions pertinent to data collected as part of Natural England's monitoring work on hen harriers. While only raised by a few of the interviewees the relationship between brood managed birds and their population success compared to non-BM birds is worthy of note. This is because it has relevance to the analysis of attitude and behaviour change as it addresses the issue of whether harrier persecution is still happening and if so, how much. It also has relevance to the cost consideration issue raised in 5.1. around satellite tagging of brood managed harriers. An NE staff member raised a question about the acceptability of the trial if results over time suggest the population of harriers increases but is driven by brood managed birds compared to non-brood managed harriers. They noted,

[redacted]

Another NE staff member described the process through which this could occur. They discussed whether a harrier's involvement in brood management and subsequent satellite tagging offers it greater security from persecution than those which have not been brood managed and satellite tagged,

[redacted]

The issue was also discussed by someone working on the trial external to NE who explained how longer term it is an important issue to review,

[redacted]

6.4 Questions about longer term 'balance' and sustainability in the uplands (n=11)

This subtheme examines questions raised by participants about what the future might be in terms of social and ecological balance in the uplands. For example, how many hen harriers are enough? How many predators are enough and what do sustainable levels of grouse for driven shooting look like in the future? In discussing the future of brood management an NE staff member raised questions about its limits going forward and how it should act as a bridge between current conservation concerns about harriers and a sustainable future with a viable hen harrier population,

[redacted]

Another NE staff member discussed how as harrier numbers hopefully continue to increase there will need to be greater flexibility in how, where and when brood management can be used and such considerations should form the basis of ongoing

and continuous dialogue between the different parties involved in hen harrier conservation on the uplands,

[redacted]

A keeper also raised questions about what a viable and sustainable number of harriers might be in the future and concerns about the impact high numbers of harriers could have on grouse moors if such populations are not more widely distributed across suitable habitats,

[redacted]

Another keeper also raised questions about what sustainable and suitable numbers of grouse might be in the future and the need for discussions from within the shooting industry about balance on moorlands,

[redacted]

[redacted]

A grouse moor owner explicitly raised the issue about the future of grouse shooting and what is both financially viable as well as ecologically desirable. They discussed how there may need to be a concerted effort from within the industry in terms of how they advertise and sell grouse shooting to interested parties that focuses as much on the experience of being on the moors for the day as it does on the number of grouse people should expect to shoot. By doing so they suggest that you can support harriers as well as other species that benefit from the management and habitat that grouse moor management creates while still providing the finances required to do so,

[redacted]

5. Conclusions

This report sought to answer the following specific evaluation questions:

1. To what extent has the project produced the anticipated outcomes among moorland owners and gamekeepers participating in the trial? Specifically,
   a. Changes in moor owners' attitudes/behaviours towards hen harriers on grouse moors?
   b. Changes to keepers' attitudes/behaviours toward hen harriers on grouse moors?
2. What are the main mechanisms by which outcomes have been produced?
3. Is there any variation in outcomes in different contexts?
4. How effectively has the trial been delivered? What, if any, changes are required for the future of brood management?

In relation to question 1, changes in moor owner and keepers' attitude and behaviour, the research provides evidence of positive attitude and behaviour change toward hen harriers by those who have participated in the trial. Those participating in the trial clearly recognise the need for coexistence and an end to illegal persecution. They are actively working to help conserve hen harriers as part of the trial and provide space for harriers on their moors. They are also trying to promote brood management to the wider grouse shooting community.

Moor owners and keepers also suggest that within the last five years there has been a wider change in attitude toward hen harriers among the grouse shooting community due to recognition that the future of grouse shooting is intrinsically linked with the future of hen harriers. Brood management is perceived to have tapped into this change and helped grouse moor owners harness it in a practical way. However, participants also identify that change takes time, behaviours might be changing quicker in some places and with some people than with others, while attitudinal change towards harriers varies between grouse moors.

The ecological success of the trial in terms of the wider increase in the hen harrier population during the trial period suggests attitude and behaviour change beyond those that have directly participated. Finally, those that participated in the trial indicated that they would do so again and that they hoped that brood management would continue to be available to grouse moors beyond the trial period.

In relation to question 2, the main mechanisms by which outcomes have been produced, the report identifies that the Theory of Change developed to hypothesise the route through which attitudinal and behavioural change may occur is valid. Grouse moor owners and keepers acknowledge a fear that large numbers of hen harriers can threaten the economic viability of a grouse moor through the impact of their predation on grouse. This fear is (in part) driven by reference to the Langholm moor demonstration project where a similar process was perceived to have unfolded.

Within this context a lack of clarity and certainty about the future of brood management is a potential barrier for wider engagement with it. Grouse moor owners and keepers do not want to be left in a situation in which they have helped to create colonies of hen harriers on grouse moors which threaten their viability without a legal remedy.

Brood management is a tool that is perceived to offer a suitable legal remedy to this situation. There is evidence that brood management acts as a tool to relieve pressure on grouse moors where there is a high density of hen harriers on moorland, allaying owners/managers' concerns about hen harriers overrunning the moors. Furthermore, the championing of those that have participated in the trial and have demonstrated that it works was seen as an important mechanism for influencing wider change among those who have not yet been involved in brood management.

In relation to question 3, any variation in outcomes in different contexts, the report identifies that the wider context of conflict within which brood management has developed has an impact on engagement with it. A perception exists among those interviewed who work on or for grouse moors that hen harriers have become symbolic of the polarisation between those that want to ban shooting and those that don't. Because of this polarisation there is a perception that the positive role that grouse

moors may play in conservation in the uplands, including through brood management, is ignored. These two factors have created apprehension among those working on or for grouse moors about participating in the trial, particularly in terms of the possible negative attention participation might create from those opposed to shooting.

Analysis identifies that keepers and moor owners perceive that they face a number of other pressures which impact on the sustainability of grouse shooting and grouse moor management that are not alleviated by brood management. Issues concerning heather burning and licensing to control other predators are creating a context in which they feel under siege and may impact on engagement with brood management.

While pressure created by several different types of predator were discussed, it was that posed by Gulls that is creating the greatest concern and frustration for keepers and moor owners. Greater support and help with this issue was wanted. It was discussed whether this could be explicitly focused on those moors that were demonstrating their commitment to hen harrier conservation through brood management and diversionary feeding. Finally, the report identifies a desire to explore what would constitute a sustainable population of both grouse and harrier and how this may shape the future of grouse shooting.

In relation to question 4, how effectively has the trial been delivered and what, if any, changes are required for the future of brood management, participation in the brood management trial has strengthened trust between moor owners and keepers and those working on the trial from Natural England, in particular, those involved in monitoring harriers on the ground.

The report identified that perceptions of trust and legitimacy are vital for successful interpersonal and interorganisational relationships and work in the uplands. However, positive experiences of working on the trial and relationships with NE were explicitly differentiated by those from within the shooting community from their negative experiences of working with NE on other issues in the uplands.

Moor owner and keeper relationships with environmental non-government organisations (ENGO's) and raptor conservation groups were perceived to be relatively unchanged despite participation in the trial while there was a perception that NE's relationship with such groups has worsened due to their involvement in the trial. Issues associated with the cost of brood management, perceptions of the increasing bureaucracy of the paperwork involved and the scale at which it can be undertaken were all raised by participants as issues requiring further consideration.
Resource requirements for NE to effectively deliver brood management on the ground were also raised as was the need for greater focus on engagement work and building trust in interpersonal relationships on the uplands.

The need for a clearer and improved communication strategy around brood management, its results and related positive stories was raised. It was perceived that most of the information that can be found publicly about the trial is negative and that this may create reticence among moor owners and keepers who have not yet undertaken brood management. The communication strategy may limit the trial's effectiveness in publicising the 'safety valve' effect for grouse moor managers. It may also fail to identify the conservation success of the scheme in improving hen harrier population numbers.

Limitations and future research

It is important to recognise a number of potential limitations of this study. First, although the researchers are not part of the project delivery team, their affiliation with Natural England may have limited respondents' willingness to be open and honest about their experiences of the trial. Second, in order to provide evidence for the process evaluation, the sample is limited only to those who are delivering or participating in the trial. There have only been a limited number of grouse moors where the density threshold for using brood management has been met as well as receptor sites assessed as suitable for harrier release within the same SPA. This has resulted in the comparatively small sample size of this research compared to the total number

of grouse moors and people involved in grouse shooting. As such, participants are likely to be among those members of the moorland management community who are most receptive to the idea of brood management and who recognise the need to change attitudes and behaviours. Caution must therefore be taken in extrapolating the potential effects of rolling the trial out more widely.

This second limitation has implications for validation of the Theory of Change. As noted on page 25 of the report and seen in figure 1 (p.11) the Theory of Change hypothesises both a direct and indirect route to attitude and behaviour change. The direct route specifies that participation in the brood management trial will improve trust and confidence in the 'system' to manage conflict. In turn, this will lead to a reduction in the perceived need to illegally control hen harrier populations among moorland owners and managers. The evidence provided by this report supports that hypothesis. The indirect route hypothesises that awareness of the trial among the wider shooting community will contribute to changing their attitude and behaviour change. This indirect route component of the theory of change and its wider sample of grouse moor stakeholders has only been evidenced indirectly in this report (subtheme 4.4 and 5.2) and is an important gap in the evidence required for overall evaluation of the success of the trial. Behavioural change among this wider sample is difficult to study and may better be evidenced through analysis of hen harrier population data during the trial period. Further data on attitudinal change and behavioural intentions among the wider grouse shooting community could be captured through quantitative questionnaire-based approaches that build upon both the pre-trial research of St. John et al., (2018) and the evidence provided by this report.

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Appendix 1: Theory of Change

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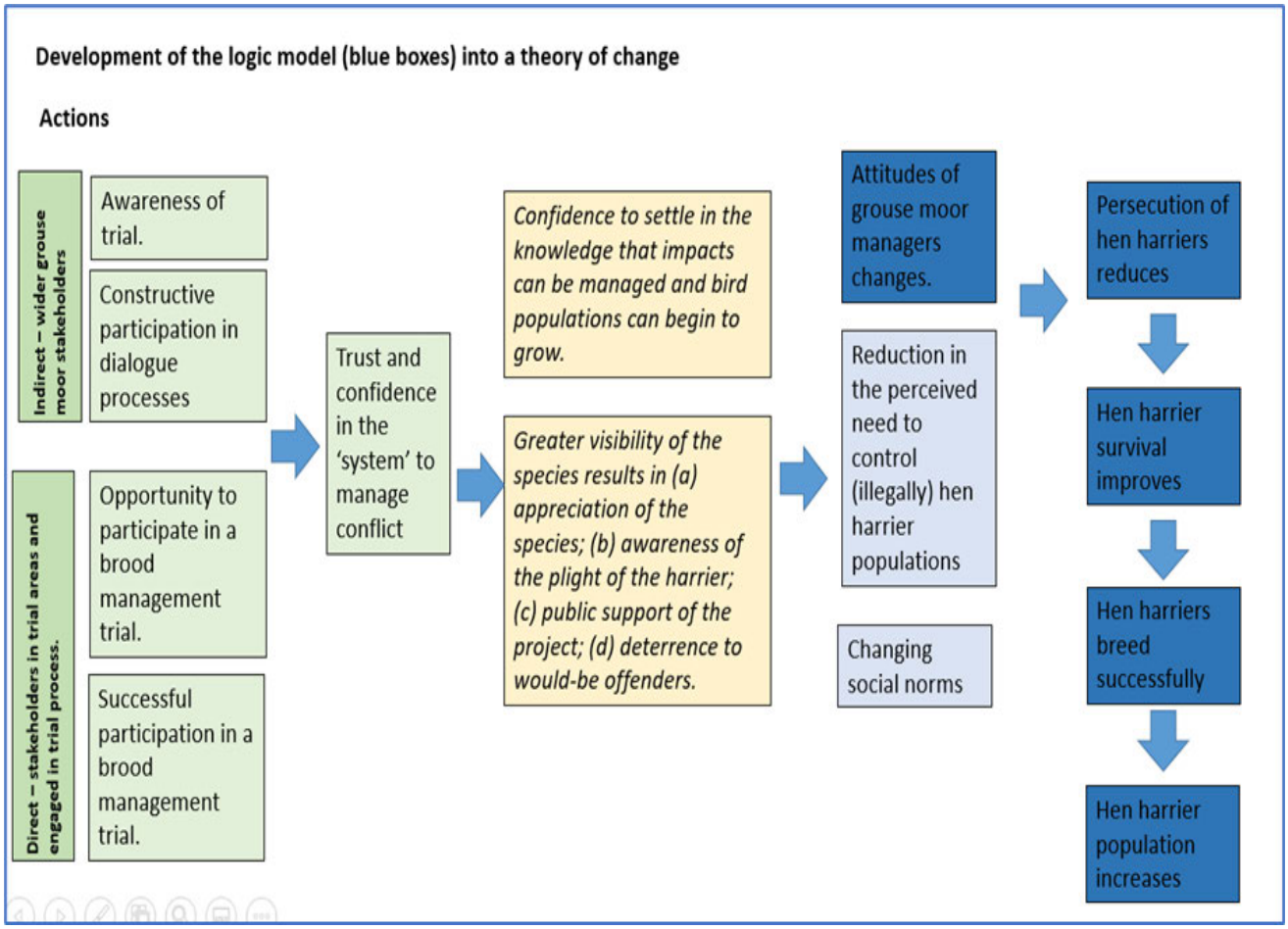

Appendix 2: Research Tools

Semi-structured interview schedule: Non moor owner/worker interviews.

Provide an overview of the research project

Introduction

1. Tell me a little bit about yourself and what you do? (Scene setting –background, job details, experience, length of employment).

The brood management trial

2. What has been your experience of the brood management trial?

   a. What has been your involvement with the trial?
   b. Who have you worked with? (other individuals and or organisations)

3. Explain your understanding of the purpose of the Brood Management trial. How will this be achieved?

   a. Has your experience/knowledge of the trial altered your opinion about the purpose of the trial and how it will achieve its aims?

   b. Do you think participation in the brood management trial has or may change grouse moor owners, workers and game keepers' attitudes and or behaviours-around hen harrier conservation?

   c. Do you think the brood management trial has or may change conservationists' attitudes towards game keepers, grouse moor managers and grouse moor owners and hen harriers.

4. What has been good or bad (worked not worked) about the trial and how it has been delivered?

   a. Is there anything that you think could be changed about the trial at this stage?

   b. Do you think it is helping to conserver hen harriers?

   c. Do you think it is changing the attitudes and or behaviours of moor owners, game keepers to hen harriers?

5. Do you think brood management is a suitable solution for long term hen harrier and grouse moor management? Why?

   a. What do you think would happen if the stopped?

Relationships and experiences with others during the trial

(Thinking specifically about experiences related to the brood management trial)

2. How would you describe your own personal relationship (if any) with other grouse moor owners, workers and gamekeepers?

   a. Has the trial changed your relationship with them? If so, what has changed?

3. How would you describe your own personal relationship (if any) with people who work for other hen harrier/conservation organisations?
   a. Has your participation in the trial changed your experience and relationship with them? If so, what has changed?

4. How would you describe your own personal relationship (if any) with organisations that represent uplands communities such as the Moorland Association?
   a. Has the trial changed your relationship with them? If so, what has changed?

5. How would you describe your own personal relationship with Natural England staff working on the hen harrier trial?
   a. Has your participation in the trial changed your relationship with them? If so, what has changed?
   b. What else impacts on this relationship?

Semi-structured interview schedule: Grouse moor owners, workers, gamekeepers.

Provide an overview of the research project

Introduction

6. Tell me a little bit about yourself and what you do? (Scene setting –background, job details, experience, length of employment).

The brood management trial

2. What has been your experience of the brood management trial?

   a. What has been your involvement with the trial?
   b. Who have you worked with? (other individuals and or organisations)

3. Explain your understanding of the purpose of the Brood Management trial. How will this be achieved?
   a. Has your experience/knowledge of the trial altered your opinion about the purpose of the trial and how it will achieve its aims?
   b. Do you think participation in the brood management trial has or may change other grouse moor owners, workers and game keepers' attitudes and or behaviours around hen harrier conservation?
   c. Do you think the brood management trial has or may change conservationists' attitudes towards game keepers, grouse moor managers and grouse moor owners.

4. What has been good or bad (worked not worked) about the trial and how it has been delivered?

   a. Is there anything that you think could be changed about the trial at this stage?

5. What do you think about hen harriers on grouse moors?

   a. Has your experience of the trial changed what you think about hen harriers on grouse moors?

   b. Has the trial had an impact on what you do in terms of grouse moor management?

6. Do you think brood management is a suitable solution for long term hen harrier and grouse moor management? Why?

   a. What do you think would happen if the stopped?

Relationships and experiences with others during the trial

(Thinking specifically about experiences related to the brood management trial)

7. How would you describe your own personal relationship (if any) with other grouse moor owners, workers and gamekeepers?
    b. Has the trial changed your relationship with them? If so, what has changed?

8. How would you describe your estates relationship with other grouse moor owners, workers and gamekeepers?
    a. Has the trial changed your estates relationship with them? If so, what has changed?

9. How would you describe your own personal relationship (if any) with people who work for hen harrier/conservation organisations?
    a. Has your participation in the trial changed your experience and relationship with them? If so, what has changed?

10. How would you describe your estates relationship with people who work for hen harrier / conservation organisations?
    a. Has your estates participation in the trial changed the relationship with them? If so, what has changed? If so, what has changed?

11. How would you describe your own personal relationship (if any) with organisations that represent uplands communities such as the Moorland Association?
    a. Has the trial changed your relationship with them? If so, what has changed?

12. How would you describe your estates relationship with organisations that represent uplands communities such as the Moorland Association?
    a. Has your estates participation in the trial changed the relationship with them? If so, what has changed?

13. How would you describe your own personal relationship with Natural England staff working on the hen harrier trial?
    a. Has your participation in the trial changed your relationship with them? If so, what has changed?
    b. What else impacts on this relationship?

14. How would you describe your estates relationship with Natural England?
    a. Has your estates participation in the trial changed the relationship with them? If so, what has changed?
    b. What else impacts on this relationship?

Appendix 3: Code book

			N (19) =	[redacted]
1.	**Theme: the history of conflict around harriers on the uplands.** *This theme encompasses aspects relating to participants discussions about the conflict surrounding grouse shooting and hen harriers, the sense of a lack of acknowledgement about the conservation benefits grouse moor management provides and how this creates anxieties for participation in BM*			
		1.1	*A drive to ban shooting.* This subtheme captures discussion around conflict and a sense that it is about banning shooting and the disempowerment of uplands communities not protecting HH.	5

		1.2	*The role of grouse moors in conservation and maintaining ecological balance on the uplands.* This subtheme captures the view that grouse moors contribute to conservation and concerns that unmanaged or rewilded moors will damage habitat and impact on ecological balance.	11	[redacted]
		1.3	*Considerations / reservations about participating in the trial.* This subtheme addresses reticence about participating in the trial	6	
2.	**Theme: *The Spectre of Langholm*** *This theme encompasses information about participant perspectives about the rationale and purpose of brood*				

	management. It includes aspects relating to moorland fears about the impact hen harriers can have on grouse numbers as exemplified through Langholm moor Scotland and the way in which brood management may alleviate this fear.			[redacted]
		2.1.	*Brood management as mitigation tool against colonisation.* This subtheme discusses the view that brood management can reassure owners/keepers as it acts as a mitigation tool for hen harrier colonisation.	10
		2.2	*Brood management a tool to relieve pressure and create balance.* This subtheme explores perceptions that brood management is a practical tool in the keeper's toolbox that can be used to relieve pressure and create	8

			balance on grouse moors.	
		2.3	*Brood management as a legal tool for managing harriers.* This subtheme examines perspectives that brood management creates a legal route through which moors can reduce the impact of harrier predation on grouse and therefore reduce those taking illegal routes.	8
3	**Theme: The meanings/mechanisms of success and outcomes of the trial.** *This theme encompasses perceptions relating to what success means or looks like for different participants in the trial and what they perceive some of the key outcomes have been.*			
		3.1.	*Attitude/ behaviour change.* This subtheme specifically looks at participant discussion about attitude and	14

			behaviour change as a result of participation in brood management. It includes identification that some will be positive, but some won't change. Acknowledgement that changes take time. But any change will help HH		[redacted]
		3.2	*Mechanisms of change.* This subtheme looks at discussions about some of the ways in which the direct participation of those on the trial may be having an impact on the attitude and behaviours of those who have as yet not participated. It includes issues such as social influence and word of mouth, reassuring others from experience of BM.	6	

		3.3	*Ecological success of the trial.* This subtheme covers discussion about the success of the trial in terms of bird welfare and population increase and how the increasing population provides evidence of wider attitudinal and behaviour change	11	[redacted]
		3.4	*Support for the continuation of brood management.* This subtheme covers discussions about attitudes to ongoing participation and support for brood management to become a permanent tool to assist with ongoing grouse moor management	9	
4.	**Theme: Interpersonal and interorganisational Relationships** *This theme encompasses aspects relating to perceptions about*				

	relationships between people and between people and organisations during the trial. It also includes perceptions about the impact brood management has had on them and the implications of these relationships for conflict in the uplands.		
	4.1	*Relationships (Trust and legitimacy) needed for success.* This subtheme looks at discussions about the role that trust at individual and organisational level has and its importance for successful working on the ground.	6
	4.2.	*The process of participation.* This subtheme looks at participant discussions about ways of working on the ground during brood management. What has been good and why?	11
	4.3	*Natural England's wider relationship with upland*	9

			managers/keepers and ways of working in the uplands. This subtheme contrasts ways of working discussed in the process of participation theme with experiences of working with Natural England on other issues in the uplands.		[redacted]
		4.4	*Relationships with ENGO's and raptor conservation organisations.* This subtheme examines perspectives about the impact that participation in brood management has had on relationships with ENGO's	9	
5.	**Theme: Issues with the trail and considerations for the future of BM** *This theme encompasses aspects relating to perceptions about what*				

	has or hasn't worked well during the trial and why and what could/should be changed if the trial is to become permanent in the future			[redacted]
		5.1	*Sustainability of brood management procedures and practices.* This subtheme examines perceptions about a number of different procedural/practical issues including cost, security, paperwork, scalability that have impacted upon the trial and which participants raised as points to address in future decisions.	12
		5.2	*Issues for consideration about the future sustainability of brood management.* This subtheme explores issues raised by participants that have relevance to questions about the future sustainability of brood	8

			management trial. It includes issues such as Spa's, receptor sites and colonisation questions.		[redacted]
		5.3	*Issues that require attention in terms of effective ways of working to deliver brood management.* This subtheme includes participant reflections on issues including the licensing process for brood management, relationships, resources, and brood mixing.	8	
		5.4	*The need for a communication and engagement strategy.* This subtheme examines suggestions about the requirement for better and clearer communication needed internally (within MA and NE) and externally. The desire for more	7	

			positive stories to combat the negative.	
6.	**Theme: Additional considerations for brood management and hen harrier conflict reduction.** *This theme encompasses aspects relating to perceptions about the wider context of pressures grouse moors face and the role they play in the acceptance, support and use of brood management. It identifies how brood management is not taking place in a vacuum. There are other issues impacting upon behaviours, attitudes and relationships on the uplands that could help or hinder keepers to help harriers*			
		6.1	*Wider pressures on grouse moors.* This subtheme examines perspectives about how brood management is not taking place in a vacuum and how other issues impact upon engagement with it	10

[redacted]

		6.2	*Predator control and licensing on grouse moors.* This subtheme looks at perceptions about how issues beyond brood management influence attitude and behaviour and how consideration of these might increase engagement with harrier conservation. These include issues associated with diversionary feeding, licensing to control other predators (gulls, corvids etc). Frustration at lack of ability to obtain licenses and suggestions that license could be used as carrots to increase good behaviour. E.g., grant gull licences for those who are participating in brood management.	9	[redacted]

		6.3	*Brood managed and non-brood managed harriers and future population questions.* This subtheme examines perceptions about whether brood management has reduced persecution of harriers beyond those released as part of the trial.	4	[redacted]
		6.4	*Questions about longer term balance and sustainability in the uplands.* This subtheme looks at participant perspectives around questions raised about what balance on the uplands looks like in the future? How many hen harriers are enough? How many predators are enough? What are sustainable levels	11	

			of grouse for driven shooting?		[redacted]
7.	**Theme: Miscellaneous** *This theme encompasses aspects relating to data that doesn't sit within the above themes but is of interest.*				
		7.1.		0	

Appendix 4: Research Methods

1. Introduction

The Joint action plan to increase the English hen harrier population (2016) set out six actions which were agreed to contribute to the recovery of the hen harrier population in England. Action 6 of the plan was Trialling a Brood Management Scheme. Subsequently a Hen Harrier Brood Management Trial – Monitoring and Evaluation Plan (2016) was developed to support the trial. The plan identified 10 evaluation questions that need to be answered by the evaluation in order to assess whether the trial has achieved its objectives, of which question 6 focused on the attitudes of grouse moor owners and managers.

Question 6 in the evaluation plan (2016) tests the hypothesis that, as a result of the availability and practice of brood management, grouse moor owners and managers become more tolerant of hen harriers on their land. The plan noted that the brood management scheme will give persons involved in grouse moor management the confidence to coexist with nearby hen harrier nests and a rising national hen harrier population, because it provides a "safety valve" that would preserve the economic viability of the grouse moor if local hen harrier nesting density were to increase beyond levels which have been scientifically shown to have an impact on grouse. A logic model and a theory of change were developed to identify how this outcome might be achieved in practice. Attitudinal/behavioural change among persons involved in grouse moor management is therefore a central component of 'success' for the brood management trial as changing attitudes and behaviours among grouse moor managers is a crucial mechanism by which hen harrier persecution will be reduced.

As this research question refers to changes in attitudes and behaviours, it requires social scientific research to assess whether there has been any change. Previous quantitative

research by St. John et.al., (2018), identified how understanding the value orientations and attitudes of stakeholders helps explain differences in levels of support for management approaches, including brood management. The research also identified that it was important to focus on relationships, deliberation, and trust in addition to exploring co-management interventions. This interim social science evaluation of the brood management trial will capture these components to identify any attitudinal/behavioural changes that may have occurred during the trial so far, and the factors that have shaped or inhibited them.

2. Methodological background and approach

The objectives of the interim social science evaluation of the hen harrier brood management trial were defined as to:

5. Clearly define and analyse the sample of interest i.e. who are the key stakeholder organisations and individuals within them who was involved with the development of the trial;
6. Refine and test the theory of change (included in appendix 1 of this report);
7. Explore perceptions of attitude and behaviour change thus far (and the dynamics between them) amongst those who have participated directly in the trial;
8. Explore and agree best available methods (and associated resourcing) to enable the final social science evaluation to be completed.

Reflecting these objectives, the interim evaluation has sought to answer the following specific evaluation questions:

6. To what extent has the project produced the anticipated outcomes among moorland managers participating in the trial? Specifically,
    a. Changes in managers' attitudes towards hen harriers on grouse moors?
    b. Changes to grouse moor managers' behaviours around hen harriers on grouse moors?
7. What are the main mechanisms by which outcomes have been produced?
8. Is there any variation in outcomes in different contexts?
9. How effectively has the project been delivered? What, if any, changes are required for the next phase of the project?

The evaluation provides an assessment of perceptions of the behavioural and or attitudinal impacts/outcomes of the trial so far, as well as providing insight into the mechanisms through which these have occurred, particularly as this relates to the theory of change for the trial. As such, using the Government Magenta Book (2020) evaluation guidelines, it adopts a theory-based approach to the process and impact evaluation of the hen harrier brood management trial. Theory based approaches are suited for the evaluation of complex interventions or simple interventions in complex environments and are particularly suited to evaluating the brood management trial because they not only account for what has changed as a result of an intervention, but also explore the mechanisms through which this change has happened (Astbury, & Leeuw, 2010). The theory-based approach fits well with the purpose of the brood management trial project as the approach is iterative, allowing for the theory of change developed at the inception of the trial to be critically examined and adapted according to findings from the evaluation .

The method adopted here has been informed by realist evaluation (Pawson and Tilly,1997). The realist method of evaluation was chosen as it helps to overcome issues associated with black box evaluation, whereby social programs (such as the brood management trial) are viewed primarily in terms of effects (change in attitude or behaviour to hen harriers), with little attention paid to how those effects are produced (Astbury, & Leeuw, 2010). Instead, the realist approach can be used to direct focus on what is correspondingly referred to as white box evaluation (Kazi, 2003) in which attempt is made to ‘‘unpack’’ the black box so that not only can the evaluation address the effects of a programme, but also the inner workings and operations of its components and how they are connected. This approach is well suited to the current project which is interested not only what, if any, attitude, or behaviour change has occurred but also why – and in what contexts - it has occurred.

2. Design

Evaluation design has been driven by the requirement to test and refine the theory of change and explore attitude and or behaviour change among those that have participated in the trial. This means that engaging with individuals involved in the trial, either as staff working on the project within Natural England or other organisations, or moorland managers on the

moors involved in the trial. To achieve this, a semi-structured qualitative semi structured interview design was adopted. This design was chosen as it is recognised that qualitative interviews with participants to uncover implicit assumptions about how a program works links well with white box evaluation and the realist approach (Astbury, & Leeuw, 2010). A qualitative semi structured interview approach also enables flexibility in data gathering (e.g., technology, location) that can help increase participation as well as offering flexibility in subsequent data analysis (deductive and inductive) that sits well with testing and refining the trial's theory of change.

Qualitative semi-structured interviews are recognised and a vital tool within social science research that generally take the form of a two-way conversation, with discussion and follow-up questions on each point (Newing, 2010). Semi-structured interviews within realist evaluation also enables the use of theory-driven approaches for questions/topics to be used to test and refine hypotheses about how programmes and interventions work (Manzano, 2016). While not strictly adhering to Pawson and Tilley's (1997) realist interview approach where theories are placed before the interviewee for them to comment on with a view to providing refinement, the current study used both the brood management theory of change from the harrier action plan (2016) as well as the previous research of St. John (2018) on hen harrier management strategies and inter-organisational trust and legitimacy to inform question development and focus for the interviews (see appendix a, b).

When using qualitative rather than quantitative research methods it is important to clarify what criteria can be used for judging the quality of qualitative research. This is so that those less familiar with qualitative research can assess the quality of both the outputs and the processes that led to the generation of the outputs (Guba & Lincoln, 1994). While criteria for judging the quality of quantitative research necessary to achieve the scientific goal of rigour are more widely known, such as reliability, validity (internal and external) and generalisability, it is widely acknowledged that it is problematic to apply them to qualitative approaches (Lincoln and Guba, 1985). For example, while reliability (whether the result is replicable) and validity (whether the means of measurement are accurate and whether they are actually measuring what they are intended to measure) may be useful in providing checks and balances for quantitative methods, they sit uncomfortably in qualitative research

which is concerned with more experiential questions about power and influence, context and understanding (Winter, 2000). Similarly, the formal quantitative criteria of generalizability are generally unhelpful and not applicable for qualitative research (Tracy, 2010). This is because statistical generalizations require random representational samples using data that is isolated from any particular context or situation. In contrast, qualitative research engages in-depth studies that generally produce historically and culturally situated knowledge. Accordingly, qualitative research is not designed to be representative but to elicit a range of in-depth views which can be used to help to address both why a programme/intervention is operating as it is (the mechanisms through outcomes may occur) as well as the impact/outcome of the programme/intervention.

Debates about what quality criteria should be applied to qualitative research are contentious (Seale, 1999) and have generated an extensive range of concepts illustrating the creative complexity of qualitative methodologies (Tracy, 2010). While consensus may not have been reached in the same way that it has been for quantitative research (Golafshani, 2003) the work of Lincoln and Guba (1985) is widely accepted as foundational. They suggest the concepts of dependability (instead of reliability) credibility (instead of validity), transferability (instead of generalisability) and confirmability (as a replacement of positivistic notions of neutrality/objectivity) (Lincoln and Guba 1985, p.314).

What determines the dependability, credibility, transferability and confirmability of qualitative research has likewise been debated (e.g., Lincoln, 1995). Broadly speaking, the dependability of a research project can be assessed by the provision of auditing procedures and maintaining a 'decision-trail' whereby the researcher's decisions are clear and transparent, meaning an independent researcher can understand what has been done and why and if necessary, carry out the research in the same way with potentially comparable findings. In the current report this decision trail is provided within the design, sample, process and analysis sections of this chapter.

The credibility criteria of quality can be demonstrated through a process of sense checking the collection and analysis of data to enable the identification of different views and the way in which the results presented clearly and accurately presents both participants' perspectives and researcher interpretations in order to address the purpose of the evaluation (Noble and Smith, 2015). The provision of thick description (detailed examples from the data and associated analytical discussion), and generation of deductive and

inductive knowledge is important for credibility (Tracey, 2010). Again, the sample, process and analysis section of this chapter together with the presentation of data in the analysis chapter will help demonstrate how the current project meets the credibility criteria.

The transferability criteria of quality can be demonstrated through explicit consideration as to whether findings can be applied to other contexts, settings or groups. In other words, has sufficient detail of the context of the fieldwork been provided for a reader to be able to decide whether the prevailing environment is similar to other situations with which they are familiar and whether the findings can justifiably be applied to these other settings (Shenton, 2004). Transferability criteria are thus a combination of both the researcher demonstrating the credibility of the research (as noted above) combined with the reader's understanding and interpretation of the research findings and relevance to their knowledge of other settings and contexts.

Finally, the confirmability criteria can be demonstrated through acknowledging that the methods undertaken, and findings generated are intrinsically linked to the researcher's philosophical position, experiences and perspectives. As Moon et al., (2019) explain, the philosophical position of the researcher frames their theoretical perspective and forms the rationale for the chosen research methods. Therefore, by making explicit why the current research adopted a realist method of evaluation and how this informed the design of the study including the choice to use semi-structured interviews, this project has already provided one means through which to demonstrate the confirmability of this research.

3) Sample

In both quantitative and qualitative studies, researchers must decide the number of participants to select (i.e., sample size) and how to select these sample members (i.e., sampling scheme) (Onwuegbuzie & Collins, 2007). In quantitative studies, power calculations are frequently used to determine in advance which sample size (N) is necessary to demonstrate effects of a certain magnitude from an intervention (Ryan, 2013).

However, as discussed, qualitative research differs ontologically and epistemologically from quantitative research and no similar standards to power calculations for assessment of sample size exist (Malterud, Siersma and Guassora, 2016). Instead, the Magenta book

(2020) identifies that when using qualitative methods for realist evaluation it is important to consider which viewpoints should be included in the evaluation when developing sampling frameworks as a this will impact on the sample size. There are no agreed rules of thumb for how many respondents should be selected. The objective is to understand the range of views on a particular topic, and to provide deeper insights into social phenomena. Sampling within qualitative research is therefore different and requires different means of assessment for adequacy of size.

While there is broad agreement that determining qualitative sample size a priori is inherently problematic (Sim et al., 2018), there is a lot of debate and disagreement about what the means of assessment for adequacy of sample size should be (Blaikie, 2020). Linking to the credibility and confirmability criteria of quality in qualitative research discussed above, it is important to situate the sampling criteria used in this project within both the realist approach adopted as well as in relation to the specific purpose of the project. As noted, the realist approach recognises the importance of the subjective information of social actors, of context and of the independent structures that constrain and facilitate behaviours, while offering flexibility in approaches to capture this information. This supports sampling methods within which sufficiency of sample size is assessed by depth and relevance of data to the questions being addressed and correspondingly to a focus on a sample that consists of participants who are best situated to provide information about the research topic (O'Reilly & Parker, 2013). Additionally, in determining how many people would provide sufficient information to enable the purposes of the research to be addressed, the realist approach recognises that sample size is something that can and should be revisited during data collection, in a critically-reflexive, evaluative way (Braun and Clarke, 2016). In this project both the relevance of the sample to the specific purposes of the research as well and the information elicited by semi structured interviews from this sample were reviewed and discussed at numerous points throughout the project.

Given this framing, the research used the concept "information power" as a guide to adequate sample size (Malterud, Siersma and Guassora, 2016). Information power indicates that the more information the sample holds, relevant for the actual study, the lower number of participants is needed. Malterud, Siersma and Guassora (2016) suggest that the size of a sample with sufficient information power depends on (a) the aim of the study (with the more focused the aim the smaller the sample needed), (b) sample specificity (the greater the specificity of experiences, knowledge, or properties among the participants included in

the sample the smaller the size needed), (c) use of established theory (a study supported by specific theories for planning and analysis requires a smaller sample), (d) quality of dialogue (a study with strong and clear communication between researcher and participants requires fewer participants to offer sufficient information power), and (e) analysis strategy (a project seeking in-depth analysis of narratives from a few, selected participants would require smaller sample for sufficient information power).

Applying these parameters to this project, the research had clearly specified aims as well as a high level of sample specificity, sampling only from those who have had direct experience with the hen harrier brood management trial rather than others who may have an interest in it but have indirect knowledge or experience. In terms of established theory, the study used a theory of change to inform data collection and analysis therefore reinforcing sample specificity. Furthermore, the researchers undertaking the semi-structured interviews had extensive experience and expertise in the use of the method and an independent academic steering group reviewed the interview questions before interviews commenced strengthening the quality of dialogue. Finally, the analytical strategy adopted (discussed in more detail below) was selected for its suitability for enabling in-depth analysis of narratives from a few, selected participants (those with direct experience of the trial).

Using the concept of information power to inform sample size recognises that meaning is generated through interpretation of, not excavated from, data (Braun and Clark , 2021), and therefore judgements about when to stop data collection were linked to discussions among the researchers about the developing analysis and its ability to address questions associated with the purpose of the research. This review and reflection process resulted in a total sample size of 19 being deemed sufficient for obtaining information power. This sample consists of 7 staff from within Natural England who have had direct involvement in the trial as well as 12 individuals from outside Natural England who have directly participated in the trial in some capacity (this included moorland owners, gamekeepers, individuals employed to assist in the licensing process and those involved in the brood management itself). The breakdown of the different roles of the 12 external participants will not be included for ethical purposes (protection of anonymity), which will be discussed later in this chapter although quotes will be attributed to roles such as keeper or moor owner within the analysis of the report to provide greater context.

4) Process

The dependability of qualitative research projects can be assessed by the provision of auditing procedures or a 'decision-trail' in which the researcher's decisions are made clear and transparent. This section will describe the processes involved in the design and conduct of the research.

The project aimed to provide social science research and evaluation on progress so far on Action 6 (to trial a brood management scheme) of the Joint action plan to increase the English hen harrier population (2016). The project was informed by step 6 of the Hen Harrier Brood Management Trial – Monitoring and Evaluation Plan (2016) to examine the impact of the trial on the attitude of grouse moor owners and managers. Step 6 specifies that 'the hypothesis being tested is that, as a result of the availability and practice of brood management, grouse moor owners and managers become more tolerant of hen harriers on their land'. As part of the Monitoring and Evaluation plan a 'Theory of Change' (Toc) was developed to underpin this hypothesis (fig 1). At the inception of this evaluation project the theory of change was used to develop a research proposal. As identified previously this proposal had two primary purposes, to test and refine the theory of change and explore any perceptions of attitude and behaviour change thus far amongst those who have participated directly in the trial.

Given that the brood management trial has been contentious, the research team set up an independent academic steering group to offer challenge and guidance to the project as well as to help to ensure dependability and credibility criteria were met. The steering group reviewed and commented on the proposal (including the design, sampling and analysis) and commented on and provided suggestions about the design of the semi-structured interview questions. After these discussions the proposal was finalised and presented to the Hen Harrier Brood Management Board for agreement.

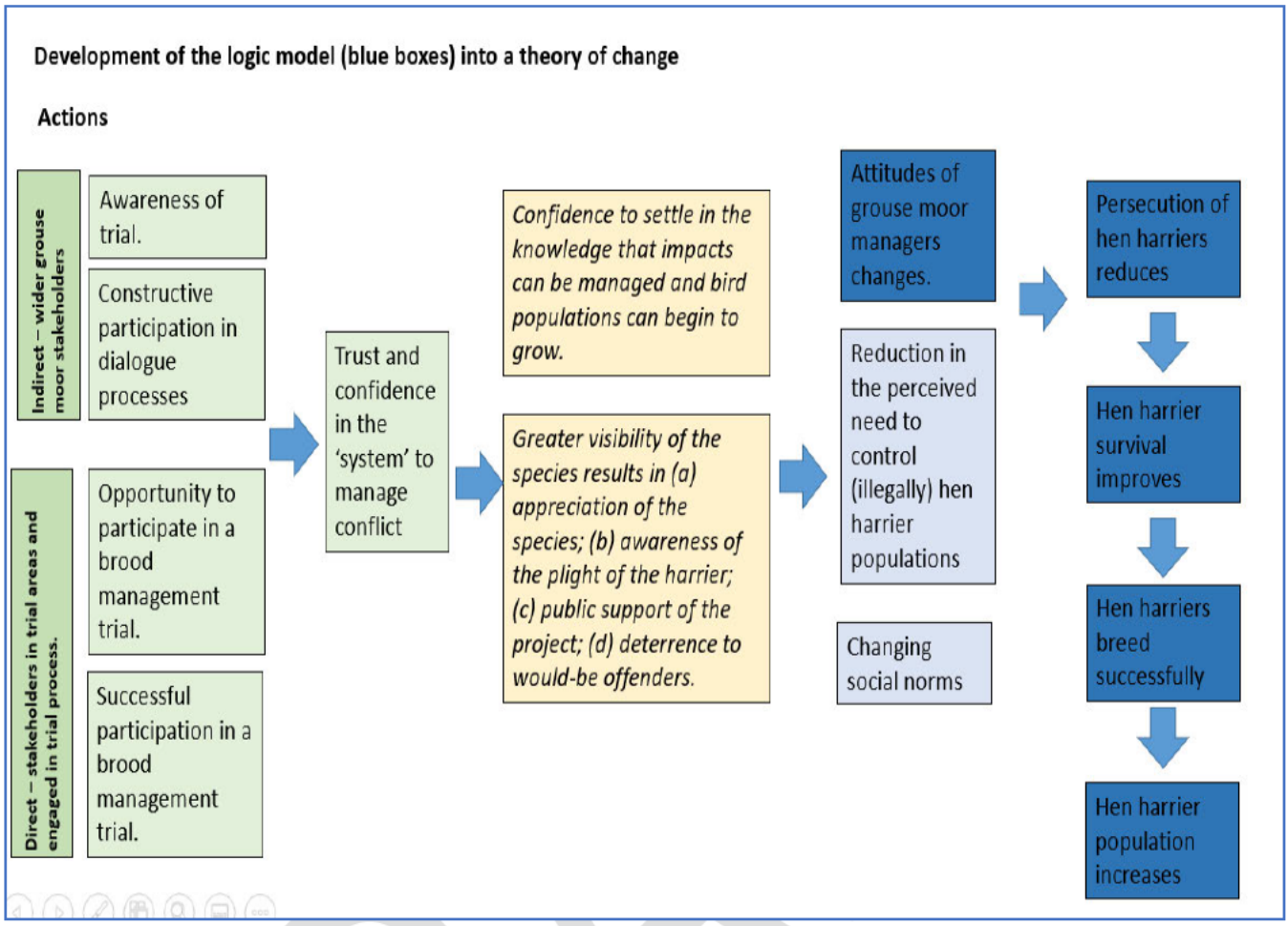

Figure 1. Theory of change of the brood management trial.

The researchers then divided the data gathering between them with one member interviewing staff from within NE about their thoughts and experiences of the brood management trial and the other two interviewing those who had participated in the trial (as owners and keepers on moors where hen harriers had been removed, or who had acted as receptor sites for the release of brood managed harriers as well as those who had involvement in the rearing and release of the harriers or with the licensing and identification of receptor sites). The Moorland Association where able to facilitate our approaches to these individuals and we thank them for their assistance in this as well as those who gave their time to speak to us about their experiences. Interviews were conducted either via the use of Microsoft Teams or by phone with the full audio being recorded (see ethics and analysis sections for more detail) for transcription and analysis purposes.

5) Analysis

In demonstrating the credibility criteria of quality for qualitative research the choice of technique for analysis and the transparent discussion of the development of the analysis is important to enable readers to see how the lines of inquiry have led to particular conclusions (Nowell et al., 2017). The process of sense checking the collection and analysis of data, the provision of thick description and concrete detail within the analysis as well as explication of deductive and inductive knowledge are therefore all important. The analytical approach adopted should also fit with the wider philosophical framing of the research. The realist approach adopted for this work acknowledges that both the researcher's perspective and that of the research participants regarding the phenomena of study are important and further that claims to the validity of the research is framed by recognition that other perspectives on the phenomenon are also possible (Brooks et al., 2015). A method of analysis was required that allowed for these perspectives to be captured and form part of the analysis process. Furthermore, given the purpose of the research to both test and refine the theory of change as well as capture perceptions of any attitudinal and/or behavioural change among those who participated in the trial, the choice of analytical method also needed to allow for both deductive and inductive analysis (Roberts, Dowell, & Nie, 2019). This is so focus could be given to both a priori themes defined in advance of the analysis process informed by the theory of change, as well themes that developed during the analysis process itself which were judged relevant to capturing participants' experiences and the context informing those experiences that help shed light on the brood management trial.

Template Analysis, sometime called codebook thematic analysis was chosen as the method of analysis (Brooks et al., 2015). It was chosen as it sits somewhere in between positivist orientated approaches to qualitative research and interpretivist ones (Braun and Clarke, 2019) and is therefore well suited to the project's realist framing. It also allows for a collaborative approach to qualitative analysis enabling sense checking between researchers as well as the provision of thick description and both deductive a priori coding, and inductive coding.

Template Analysis is a form of thematic analysis which is a technique for thematically organising and analysing qualitative data. According to Brooks and King (2012) the essence of template analysis is that the researcher produces a list of codes (their 'template') representing issues identified in the textual data. The template is organised in a way which

represents the relationship between codes and themes, as defined by the researcher while also providing an audit trial for others to refer to when assessing the outputs of the research thereby demonstrating its credibility and dependability. Template analysis preserves the contextual, subjective nature of the data and lends itself to the deductive and inductive creation of a codebook. Furthermore, the process of collaborative review ensures both consensus about what is meaningful and relevant within the data, addresses the purpose of the research as well as the consistent application of the codebook to the data. Template analysis has been shown to enable more systematic coding of a dataset than approaches that are more specifically linked to an individual's own interpretive processes and interaction with the data (Brooks et al., 2015).

Like other forms of thematic analysis (e.g., reflexive thematic analysis, Braun and Clarke, 2006), template analysis sets out key procedural steps (6 steps in total) for researchers to follow (Brooks et al., 2015). This procedural guide also provides greater clarity to readers about the process through which the analysis was carried adding to the credibility and dependability of the research. The procedural steps, which have been adapted slightly to reflect the specifics of this project are set out below in figure 2. These steps were shared between the three researchers on the project to follow and the different stages of the analysis involved collaboration between the three researchers.

In line with O'Connor and Joffe (2020) the process first involved the independent coding of a small amount of data (three interviews) by each of the research team before a meeting was arranged and the codes and data discussed to allow informal comparison of codes and initial themes to be explored and developed. This led to the development of an initial codebook, which was reapplied by the first author to the initial three interviews. The codebook and data captured by it were then further reviewed and discussed between the research team to further refine the codebook before it was then applied by the first author to the remaining larger set of data. The code book included a miscellaneous theme to allow data that didn't appear to fit within the codebook to be captured and raised with the rest of the team. New themes where either then created to capture this data or existing themes were reviewed and refined to incorporate it.

This iterative (re-) development of the codebook and the subsequent coding structure is a vitally important part of Template analysis (Brook and King, 2012). Within this process, it was also important to recognise when to stop refining the code book and coding data. As

with Brooks and King (2015) pragmatic decisions about when the analysis had met the needs of the research project (allowing the purpose of the project to be addressed) and about resource availability determined this.

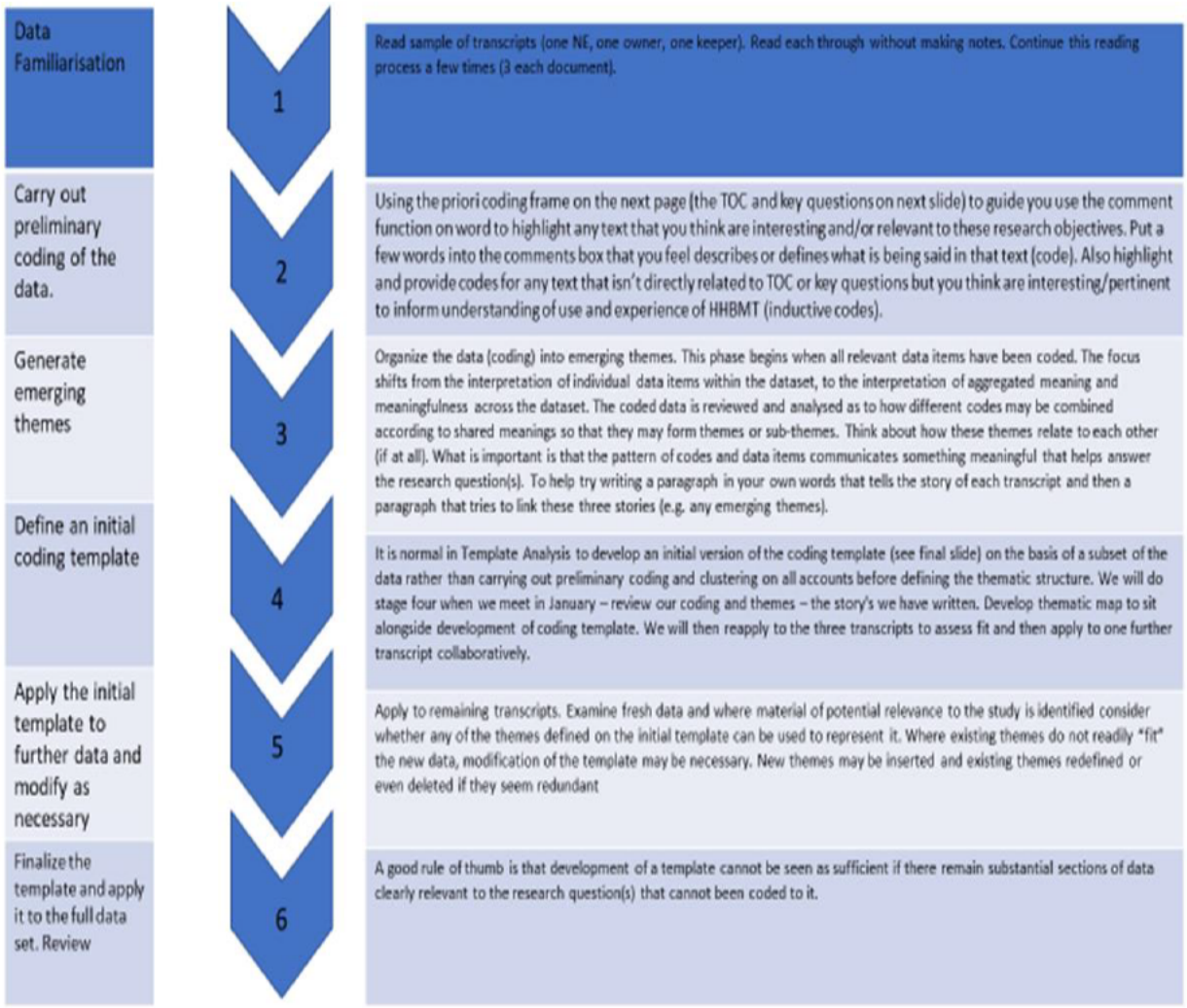

Figure 2. the 6 steps of the Template Analysis process.

5) Ethics

The Hen Harrier Interim Research Evaluation adheres to the five key ethical principles identified within the GSR Professional Guidance Ethical Assurance for Social Research in Government document.

1. **Sound research methods and appropriate dissemination and utilisation of the findings.** Ensuring the research meets a clear organisational need, doesn't place any unnecessary burden on respondents, and is based on sound methods that ensure evidence is robust, usable and accessible
2. **Participation based on valid informed consent** – it is clearly voluntary and participants have sufficient information to decide whether to take part
3. **Enabling participation** through method and sample design, with consideration given to likely barriers to participation and reasonable steps taken to address these
4. **Avoidance of personal and social harm** including avoidance of undue stress.
5. **Non-disclosure of identity and personal information** ensuring confidentiality and data protection and that participants are not identified or identifiable in research outputs.

The research proposal, the interview questions and an information and consent sheet were developed for the research and reviewed by an independent academic steering group. Once comments and suggestions were made and documents revised, they were then presented to the Natural England ethics committee who were able to review and ask questions about it. The study only continued once ethical approval had been obtained from this panel.

Participants were provided with an information and consent sheet in advance of the interviews and asked to read and either return a signed copy or confirm via email that they had read about the study and its ethical guidelines they were happy to participate. At the beginning of each interview participants were taken through the information and consent form and asked to verbally provide consent. They were given the opportunity to ask any clarification questions before the interviews commenced. Only once this consent had been noted did interviews begin.

Interviews were recorded via Dictaphone or Microsoft teams and then transcribed in full using the digital transcription software Otter.AI. The audio recordings, together with the written transcripts were saved onto a dedicated Share Point Online Site that had access restricted to the three members of the research team.

All interviewees were then assigned an alphanumeric code to help make their identities anonymous. Transcripts were then also read and names and identifying details of participants or others were then removed and replaced with XX XX in the text.

Evaluation Plan

If you have any questions about this evaluation plan template, please contact the Evaluation Team at evaluation@naturalengland.org.uk

Further resources are available on the Evaluation Team's SharePoint page.