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RESEARCH ARTICLE

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Understanding diverse approaches to predator management among gamekeepers in England

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Abstract

1. Disagreements and disputes over the management of predatory animals are a frequent feature of conservation conflicts. In the UK, there are long-standing conflicts surrounding legal and illegal killing of predators as part of management fostering game species as quarry for sport shooting. Despite the central role of gamekeepers as stakeholders and actors in this predominant form of predator management, little direct attention has been paid to their perspectives and motivations.

2. We conducted semi-structured interviews on the subject of predator management with 20 gamekeepers across the south of England and applied a social-psychological approach to explore the underlying beliefs, norms and information sources associated with their actions. Data were analysed for patterns in terminology, rationalization or subject and synthesized into broad 'motivations', which were structured using a framework from the Theory of Planned Behaviour (TPB).

3. Six primary motivations for predator management emerged: professional identity, personal norms, potential penalties, perceived impact, personal enjoyment and perceived ease. Perceived impact of predators on released game, and wildlife more broadly, was a central driver of predator killing. We identified three indirect influences on how this impact is judged: 'maintaining balance', 'appeal to nature' and 'problem individuals'. We find that predator killing by gamekeepers is not solely a function of perceived economic loss but a product of multiple factors, including perceived professional norms, a sense of personal responsibility for game and non-game wildlife, and assessments of predator populations and behaviours based on personal encounters.

4. Motivations were well characterized within the TPB framework, with links to subjective norms, attitudes and perceived behavioural control. Our use of this social-psychological approach to understanding the actions and preferences of these key stakeholders highlights how behaviours that are central to conservation conflicts have multiple social and ecological drivers. Characterizing the multiple motivations behind predator killing might help address aspects of the social

conflicts with which sport shooting is currently associated, if actions, deliberation and, where appropriate, mediation, can be targeted at the key concerns of these central stakeholders and actors.

KEYWORDS
conservation conflict, game management, gamekeepers, predator control, wildlife management

1 | INTRODUCTION

When humans and predators share spaces, there can be disagreement over how these animals are, or should be, managed. Where conflict develops, it is often due to disparity in how people perceive predators (Cavalcanti, Marchini, Zimmermann, Gese, & Macdonald, 2010). To some, they are ecologically or culturally valuable, while to others they represent threats to human safety, livestock or game (Woodroffe, Thirgood, & Rabinowitz, 2005). These differences can vary spatially (dos Santos, de Almeida Jácomo, & Silveira, 2008), as levels of predator acceptance are also influenced by direct experience (Eriksson, Sandström, & Ericsson, 2015). Where people feel threatened by predators, responses can be made privately, through legal or illegal killing (Liberg et al., 2012), or more publicly, through exerting political and legal pressure in pursuit of public or statutory controls, or to loosen protections (Parrott, 2015; Warren, 2016). Such actions can elicit strong opposition, in some cases giving rise to social conflicts (Redpath et al., 2013).

Attempts to understand conflicts among people around predatory animals and their management have frequently addressed the ecological and economic aspects of impacts (Dickman, Marchini, & Manfredo, 2013; Marchini, 2014), often in attempts to identify quantitative underpinnings for decisions, advice or solutions. For instance, an economist might apply rational choice theory to quantify the utility of predators, using cost–benefit analyses (Hanley, Czajkowski, Hanley-Nickolls, & Redpath, 2010). The proposed mitigation measures arising from such work have included offering financial compensation, advising on animal husbandry and a variety of technical solutions, including lethal control (Graham, Beckerman, & Thirgood, 2005). From a conservation perspective, the underlying aim of such initiatives is to promote coexistence and stop or reduce undesired killing. However, these mitigation efforts often assume that reducing impact will lead to a proportionate reduction in the motivation to kill predators (Dickman, 2010; St John, Edwards-Jones, & Jones, 2010). This has been described as a 'bio-rational' understanding of the problem (Cavalcanti & Gese, 2010).

An important criticism of bio-rational approaches to addressing conflicts is that they neglect other influences on human behaviour (Burton, Kuczera, & Schwarz, 2008; Cavalcanti et al., 2010). 'Humans are not financially rational beings' (St John et al., 2010) and actions towards wildlife can be better understood when placed in the context of wider motivations (Duffy, St John, Bram, & Brockington, 2016). For example, while predator killing can be a response to livestock depredation (Ontiri et al., 2019), it may also be motivated by broader factors such as deep-rooted fear for human safety (Miranda, Ribeiro Jr., & Strüssmann, 2016), expected social rewards (Inskip, Fahad, Tully, Roberts, & MacMillan, 2014) or political defiance (Pohja-Mykrä, 2016). Decisions about predator management might also, therefore, be produced by affective responses such as fear, by social norms, or as a response to political, rather than solely economic, circumstances.

Recognizing this, researchers from anthropology and geography have adopted different approaches to understanding human–predator interactions. Anthropological research has traditionally employed ethnographic or discourse analysis to explore and elucidate cultural narratives and framings of predators (Knight, 2001; Sjölander-Lindqvist, 2015), and how these affect people's worldviews and behaviours. Other strands of social research have applied material-semiotic approaches such as actor-network theory, or Foucauldian analysis of biopower and politics, to disentangle relations between humans, predators, livestock, and political landscapes (Collard, 2012; Dempsey, 2010; Doubleday, 2018).

A further approach is to use more structured social psychological frameworks to understand both internal and external influences on decision making and behaviour (St John et al., 2010). These address the various cognitive variables that influence how people view, and behave towards, animals, including individual (e.g. experience, emotions, values and beliefs) and societal/cultural factors (e.g. social norms and social identity; Dickman et al., 2013).

The Theory of Planned Behaviour (TPB; Ajzen, 1985, 1991) is a commonly used social psychological model that has shown good explanatory power across diverse decision-making scenarios (Armitage & Conner, 2001). The TPB details how a person's behavioural intentions are guided by three antecedents: (a) attitude (a person's positive or negative evaluation of a behaviour), (b) subjective norms (a person's perception of social acceptance and pressure to conduct that behaviour) and (c) perceived behavioural control (a person's perception of their capability to carry out the behaviour; Ajzen, 1985, 1991). By bringing together these influences, the TPB details an individual's psychological tendency to consider a particular action (e.g. predator killing) as favourable or unfavourable. Although the TPB places particular emphasis on individual agency, the framework has been successfully applied to understand decisions and behaviour in a range of professional contexts, where authorized discretion (or unauthorized disobedience) has influence on outcomes of interest. This includes the driving behaviour of truckers (Poulter,

Chapman, Bibby, Clarke, & Crundall, 2008), the methods of teachers (Underwood, 2012) or the enforcement decisions of police officers (Ishoy, 2016). Indeed, when quantified, meta-analyses suggest there is little difference in the amount of variation explained when the TPB is applied to professional (in this case healthcare professionals; Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008) or broader contexts (Armitage & Conner, 2001).

Research on human behaviour towards predators has explored both the explanatory power of the TPB constructs and the background factors that might influence them (Marchini & Macdonald, 2012; St John et al., 2018). For instance, Marchini and Macdonald (2012) demonstrate how perceived threats to livestock and human safety (background factors) influence ranchers' attitudes towards jaguar killing (TPB construct) and how this, in turn, explains their intention to kill jaguars.

We have used the TPB to explore and examine views and practices in relation to predator control. We do so with specific focus on gamekeepers in the UK, as this profession is central to a number of current controversies concerning predator management (see Section 1.1). Using frameworks of this kind to structure interview questions and analyses is beneficial when, as in this case, there is little existing research on the community in question. Our aim was to denote and describe gamekeepers' motivations for predator control. We used qualitative interviews and structured thematic analysis to elicit the norms, values, beliefs and information sources that influence gamekeepers' decision making. We used the TPB as a means of structuring our enquiry, and as an analytic tool to work through and discuss our findings.

1.1 | Study system: Gamebird management in Great Britain

Recreational hunting of gamebirds plays important social, ecological and economic roles within rural communities in the UK (Oldfield, Smith, Harrop, & Leader-Williams, 2003; Park, Graham, Calladine, & Wernham, 2008). In lowland landscapes, the majority of the birds shot for recreation are ring-necked pheasants *Phasianus colchicus* and red-legged (also referred to as French) partridges *Alectoris rufa* of which >20 and >2 million, respectively, are released annually from captive-bred stock (Park et al., 2008). The spatial extent of such releases is broad, covering 5%–10% of the UK land area (Tapper, 1999); one in twelve woodlands in England is thought to contain a pheasant release pen (Sage, Ludolf, & Robertson, 2005). In order to rear gamebirds, conduct releases and oversee shooting during the hunting season, many shooting estates and syndicates employ gamekeepers. Alongside gamebird and habitat management, the majority of gamekeepers also conduct predator control in some form (Reynolds & Tapper, 1996).

There is a diversity of wild animals (under various levels of protection) that could be considered predators of gamebirds or their eggs (GWCT, 2011). There is also evidence that removing some of these species increases both populations and the harvestable surplus of

game, as well as the density and/or breeding success of other native wildlife (Roos, Smart, Gibbons, & Wilson, 2018). However, predator killing has become an area of social conflict, centring on concerns for animal welfare and threats to some conservation objectives that may not align with sporting interests (such as maintaining or increasing populations of birds of prey: Roos et al., 2018; Thirgood & Redpath, 2008). These conflicts are primarily a consequence of differences in what the various actors consider to be acceptable management options (Marshall, White, & Fischer, 2007) and the different wildlife value orientations that guide such assessments (St John, Steadman, Austen, & Redpath, 2019). Conflicts are exacerbated by illegal predator killing, which is often linked to game management (Amar et al., 2012; Melling, Thomas, Price, & Roos, 2018). Illegal killing threatens the conservation status of several predatory species in the UK (Whitfield & Fielding, 2017) and the ensuing conflict has eroded trust between organizations advocating primarily on behalf of bird conservation and of shooting interests (Redpath et al., 2013). This, in turn, has made dialogue on broader issues difficult (Hodgson, Redpath, Fischer, & Young, 2018), even in situations when both parties share common objectives (Ainsworth et al., 2016).

Despite the large spatial extent of game management (Sage et al., 2005) and the central roles of gamekeepers in management practices, and in social disagreements over wildlife (Marshall et al., 2007; White et al., 2009), there is little published literature considering their motivations for particular actions. This is surprising as research on predator management in the uplands has shown that, despite similar wildlife value orientations (St John et al., 2019), there is variation in how respondents with shooting interests view predator management options (Marshall et al., 2007). Indeed, unpublished gamekeeper survey data suggest there are differences in both how predators are viewed and in the control regimes (which animals were targeted and with what intensity) that are enacted (GWCT, 2011). There is also evidence from a recent qualitative study on invasive species control in the UK, which included some gamekeepers among its respondents, that socio-cultural factors facilitate the legal killing of wildlife as part of commonplace land stewardship (Crowley, Hinchliffe, & McDonald, 2018). This is consistent with social research with game managers in Spain where, as well as a perceived benefit for hunting opportunities, intentions to control predators are influenced by broader social factors (such as tradition) and ecological factors; such as perceptions of predator population size (Delibes-Mateos, Díaz-Fernández, Ferreras, Viñuela, & Arroyo, 2013). In the context of these findings, and on-going conflicts over predator management, there are clear benefits arising from characterizing the drivers of predator management by gamekeepers.

2 | METHODS

To understand gamekeepers' motivations for predator management, we conducted qualitative, semi-structured research interviews. This method allowed us to investigate this social-ecological system from the perspective of these participants, and enabled the identification

of 'insider viewpoints that could easily be missed using predesigned, structured surveys based on outsider perspectives' (Rust et al., 2017, p. 1305). Similar methods applied elsewhere have yielded detailed insights into motivations and preferences for wildlife management (Crowley et al., 2018; Dandy et al., 2012; Maye, Enticott, Naylor, Ilbery, & Kirwan, 2014; Pohja-Mykrä, 2016). We conducted 20 one-to-one interviews with individuals currently employed as gamekeepers in five counties across the south of England (Table 1) between September and November 2016. 'Go-along' interviews (*n* = 11), were conducted while the gamekeepers carried out their daily activities, in conjunction with static interviews (*n* = 9) as the former provided 'a unique means of obtaining contextually based information about how people experience their local worlds' and the consequences these experiences have on actions (Carpiano, 2009, p. 271). All interviews were conducted by one researcher (GS) and, with the exception of a single telephone interview, all were conducted face to face.

We employed a 'snowball sampling' recruitment method whereby gamekeepers known to the research team were contacted first and then asked to recommend others. The use of known individuals, rather than 'cold-calling', also served to build a foundation of trust, which was particularly important as the research topic contained inherent sensitivities. Although there were no explicit refusals to participate, four individuals did not respond to initial requests. There is a limitation within this sampling method as respondents may, intentionally or unintentionally, recommend others that have traits similar to themselves (Tracy, 2013). Therefore, in selecting participants, we sought individuals with a diversity of experience and backgrounds, in order to sample from the spatially and organizationally diverse gamekeeping profession in southern England, acknowledging that this may not be a quantitatively representative cross-section of the wider profession.

Gamekeepers are largely solitary and autonomous in how they conduct their work, with a high degree of volition on much of the detail relating to game releases and predator management. As management regimes were idiosyncratic to each estate or shooting area,

we are unlikely to have identified the full range of specific gamekeeper practices in relation to predator control. However, in terms of broader motivations and approaches to predator management, we reached coding saturation during analysis and therefore consider our sample size appropriate for this exploratory study.

Prior to interviews, all participants were supplied with information on the research and provided written (verbal in the case of the single telephone interview), informed consent. To ensure anonymity, we removed participant names, locations and any other details that might be used to identify individuals from the transcript. The project received ethical approval from the University of Exeter College of Life and Environmental Sciences (Penryn Campus) Ethics Committee (2017/1561).

Seventeen of the respondents were employed full time, while three had part-time positions. Within the sample, six respondents were second- or third-generation gamekeepers. Each participant represented an average of 21 years of experience (range = 4–45).

Interviews followed a schedule of thematic questions (Appendix S1), beginning with personal background and professional development before moving on to predator impact and management decisions. In accordance with a framework provided by the TPB, we asked general, open questions structured around subjective norms, perceived behavioural control and attitude. In addition to intention, we considered past behaviour (although not strictly within the TPB) to be a proxy for future behaviour where it was presented as habitual (Hrubes, Ajzen, & Daigle, 2001).

The interviewer did not introduce specific predatory species as subjects to the interview to avoid preconceptions biasing results. Instead, respondents were encouraged to discuss their attitudes to any species (both protected species and those that were legally controllable) that the gamekeepers perceived killed or ate gamebirds or their eggs. By allowing respondents to consider a diversity of predatory species we aimed to uncover the broader motivations for predator control. In some instances, concepts or statements brought up in previous interviews were introduced for the purposes of creating an indirect dialogue and a more developed discussion. We focused

TABLE 1 Research participants categorized by position and size of gamebird shoot. Shoot size was defined by the gamekeepers themselves as the number of birds released was found to be a sensitive question

Shoot size	Headkeeper: *Responsible for all gamekeepers and game management*	Single-handed keeper: *Only gamekeeper, responsible for all game management*	Beatkeeper: *Responsible for game management on their 'beat'*	Underkeeper: *Responsible for a 'beat' but under the supervision of a Headkeeper*
Small		4[c]		
Medium	6[a]	2[d]	3[e]	2[g]
Large	2[b]		1[f]	
Total	8	6	4	2

[a]2 West Sussex, 1 Cornwall, 1 East Sussex, 1 Kent, 1 Devon.

[b]1 West Sussex, 1 Cornwall.

[c]2 East Sussex, 1 Cornwall, 1 Kent.

[d]1 Cornwall, 1 West Sussex.

[e]3 West Sussex.

[f]1 West Sussex.

[g]2 East Sussex.

on the respondents' use of legal methods to control predators and did not seek to identify those conducting illegal behaviour. However, as we were interested in the context in which illegal behaviour is rationalized, we used 'projective' questioning, whereby respondents were asked about how they suspect others might think about illegal killing, to shed further light on possible motivations behind this behaviour (Nuno & St John, 2014).

2.1 | Analysis

Interviews were digitally recorded and fully transcribed. One respondent asked not to be recorded but allowed detailed notes (including direct quotes) to be taken. Transcripts were then analysed using NVivo for Mac (v11) software. The analytical process had three stages. First, transcripts were thematically coded to identify patterns in terminology, rationalization, description, subject or content concerning predators and their management (Tracy, 2013). Second, we combined those codes that justified or explained predator killing into broad 'motivations' to characterize the key drivers of this suite of practices and behaviours. By analysing the text in this way, motivations emerged both from the questions in the interview guide and also inductively from the gamekeepers' reasoning and experience. Motivations included information sources that influenced management decisions as decision making is, in part, an evaluation of the available evidence (Ajzen & Fishbein, 1980). Thus, we define these motivations broadly as 'the basis for the corresponding attitude, norm or perception of control' (Manfredo & Dayer, 2004, p. 318). Finally, we restructured putative motivations within the TPB framework, based on whether they aligned with subjective norms, attitudes, or perceived behavioural control. This included sorting motivations

into a hierarchy on the basis of whether they directly (primary) or indirectly (secondary) informed the framework. Although we present motivations as influences of intention and behaviour, we use the TPB framework itself chiefly as an analytic tool to structure our findings rather than taking an epistemological stance by attempting to expand or refine it.

3 | FINDINGS

We identified six 'primary motivations' that interacted to influence decisions on the control of a variety of predatory animals. These motivations represented all constructs of the TPB (Figure 1). Subjective norms were associated with professional identity (Section 3.1.1) and personal norms (Section 3.1.2), attitudes to predator control were associated with potential penalties (Section 3.2.1), perceived impact (Section 3.2.2) and personal enjoyment (Section 3.2.3) while perceived behavioural control was associated with perceived ease (Section 3.3.1). Of these six motivations, perceived impact (Section 3.2.2) appeared a central driver (judged by the number of linkages with other motivations) and so we detail an additional three 'secondary motivations' to perceived impact, that influenced how gamekeepers determined impact: (Section 3.2.2a) maintaining 'balance', (Section 3.2.2b) 'appeal to nature' and (Section 3.2.2c) 'problem individuals'. We observed that gamekeepers tended to discuss predator control as being reactive (a predator is targeted once impact is perceived) or proactive (a predator is targeted in the expectation of impact). These two categorizations resulted in sporadic targeted predator killing (reactive control) or on-going control initiatives (proactive control). In Table 2, we provide indicative extracts to illustrate how various motivations might underpin these specific actions.
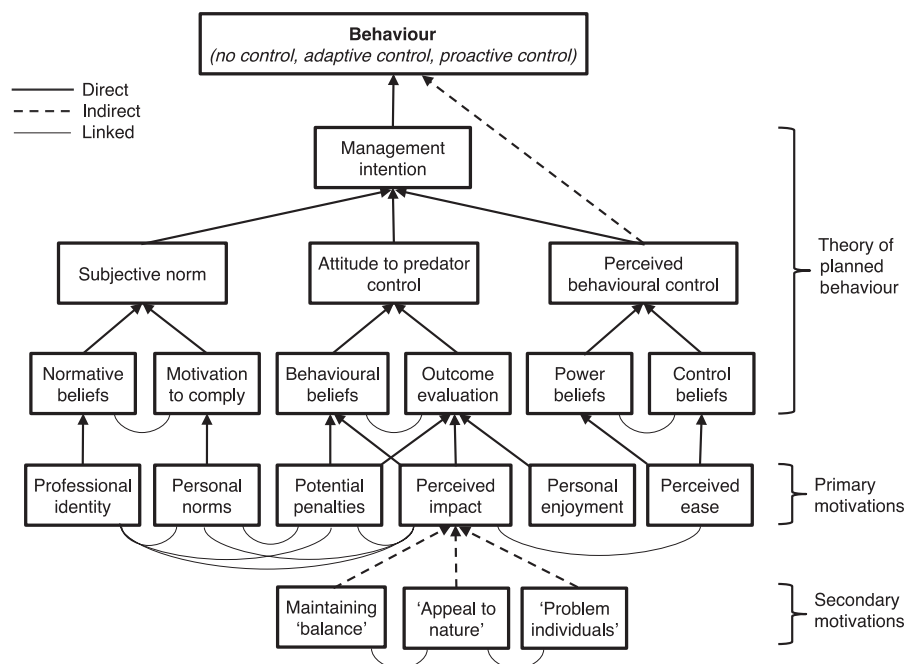
FIGURE 1 Primary and secondary motivations for predator control on game shooting estates, structured in relation to the Theory of Planned Behaviour. Direct influences are denoted with a thick black line, indirect influences are denoted with a dashed line, links are denoted with the thin black line. Adapted from Ajzen (1985) and St John et al. (2010)

Motivation	Lethal management intention (or preference)	Example
3.1.1. Professional identity	Proactive	'*We* [Gamekeepers] *all have a duty to try and keep the number of foxes down*' (G4)
3.1.2. Personal norms	None	'*I wouldn't* [kill] *something just because they're there*' (G17)
3.2.1. Potential penalties	None	'*It's not worth getting caught, I like my job too much to risk losing everything*' (G20)
3.2.2. Perceived impact	None	'*I'm not going to put down Fenn traps, which arbitrarily kill mustelids, if they're not doing any harm*' (G11)
	Reactive	'*Generally it's best to leave stuff alone unless it's an actual major problem*' (G3)
	Proactive (to protect released game)	'[I'm] *controlling small pests and predators ... all the things that are going sneak under the fence and take a poult or two*' (G18)
	Proactive (to protect other wildlife)	'*If I didn't shoot a single fox all year, you'd not have a single pair of nesting skylarks*' (G6)
3.2.2a. Maintaining 'balance'	None	'*I know they take some birds but they're rare*' (G7)
	Proactive	'*Everything has to be at a certain balance. When something becomes overpopulated... [control is required]*' (G3)
3.2.2b. 'Appeal to nature'	Reactive	'*I just think it's Mother Nature. It adapts and overcomes. That's why the populations have increased*' (G19)
	Proactive	'*Something definitely needs to happen with the buzzard population ... you see as many buzzards some days as you do pigeons flying around. Which isn't natural*' (G12)
3.2.2c. 'Problem individuals'	Reactive	'*You'll get rogue foxes and they'll just kill for the sake of killing ... they're the ones that you need to try and get on top of*' (G12)
3.2.3. Personal enjoyment	Proactive	'*I enjoy fox shooting*' (G11)
3.3.1. Perceived ease	Proactive	'*When we hadn't got Larsen traps, magpies were actually quite difficult... but then the Larsen trap come along and absolutely revolutionised catching magpies*' (G1)

3.1 | Subjective norms

3.1.1 | Professional identity

Respondents articulated pride in their profession and continuing a '*way of life*' (G13) or a '*vocation*' (G14) that was both very traditional and under threat from outside powers (those who disagreed with aspects of game management, referred to as 'antis'). Here, individual interpretations of what it is 'to be a good gamekeeper' were influenced not so much by directed actions from a supervisory body or employer (these were apparently rare) but rather by individual attributes, experiences and beliefs. This included their beliefs regarding the behaviour and expectations of others within the profession. Accordingly, these social normative

pressures helped shape various approaches to predator management. For example, one respondent claimed that '*any gamekeeper worth his salt* [good at his job] (G13)' would proactively kill stoats *Mustela erminea* and weasels *M. nivalis*, while others considered this unnecessary (Table 2). We therefore considered these beliefs as part of the respondents' professional identity—aligning within the TPB framework as part of an individual's subjective norms. Indeed, such beliefs meant respondents worried that the abundance of certain predators (principally red foxes *Vulpes vulpes* and magpies *Pica pica*) would be viewed as a reflection of their professional abilities. Gamekeepers talked of the presence of these animals on their beat [the ground for which they are individually responsible] as being '*like a stigma*' (G4) and finding it '*ridiculously embarrassing*' (G2) if they were seen during a shoot

day. Another explained how he controlled magpies, in part, because other gamekeepers '*take the Mickey*' [mocked the respondent] (G7) when they saw this species on his beat.

Professional identity was also linked to participants' views on the killing of protected predators. One of the younger participants, in response to projective questioning, suggested that some older keepers had the attitude: '*I'm a gamekeeper, therefore I have to kill absolutely everything*' (G6). Conversely, some of the older keepers perceived that it was younger individuals who, apparently misguidedly, thought that illegal predator killing was expected of them: '*they think that it's to kill everything*' (G2). This is not to say that such norms were static, and references were made to a perception of current change within gamekeeping. For some, this professional change ran parallel to a personal change:

> *My thinking has definitely changed over my lifetime... I'm far more lenient and far happier to let live and not over-react... there is a greater acceptance now that we must be more lenient in our approach to say, for instance, birds of prey, because those old days have gone.* (G17).

3.1.2 | Personal norms

The motivation of individuals to comply with their own normative beliefs was related to their moral beliefs about what was right and wrong. These can be described as 'personal norms' (Carter et al., 2017) and, within the framework, their influence on predator control emerged as a complex composite of professional/social norms, perceived impact and conformity with the law. Gamekeepers often described the responsibility they felt to protect both game and non-game wildlife by controlling predators in terms of moral obligation. For example one gamekeeper used the metaphor of a pet that had been left in their care:

> *It's like if you dropped a dog off at me to look after, it's my responsibility to make sure that dog comes back to you in perfect health. It's the same with pheasants come the start* [of the shooting season]. *Not only is my boss expecting it, but I'm expecting it.* (G2).

A responsibility to protect game was also used during projective discussions as to why other gamekeepers might engage in illegal killing of protected predators:

> *If you spent 12–14 hours a day, from when they're little chicks, keeping something alive and then it's getting attacked every day by something and you've tried your scarecrows and you've tried your bangers and you've tried all that sort of thing, then I think it could push some people over the top.* (G8).

Indeed, one respondent expressed frustration about how he felt illegality in the profession was framed by the media and conservation

organizations: '*We're not bird of prey killers. We're game protectors*' (G17). For others, however, the responsibility they felt for their pheasants did not outweigh the moral cost of breaking the law by removing protected predators: '*I'm sure my percentages* [the proportion of birds harvested of those released] *are not as good as other keepers, I don't give a fuck, at least I can live with myself*' (G11).

3.2 | Attitudes to predator control

3.2.1 | Potential penalties

A total of 11 mammal and 13 bird species were implicated in predation of pheasants, partridges or their eggs on the estates visited. Half of these species (12 of 24) could be subject to legal lethal control without prior application for a licence. Alongside professional identity, personal norms and perceived impact, the threat of potential penalties for being caught killing protected predators was also highlighted as having an influence on decision making. As one gamekeeper imagined: '*If I do* [get caught killing a protected predator], *I'm going to lose my job, lose my livelihood, lose my car, lose my house and, more than likely, lose my missus* [informal term for wife]' (G2). Furthermore, respondents perceived collective social penalties linked to their shared professional identity, in that every gamekeeper caught breaking the law reflected badly on their profession (e.g. through a loss of public support): '*Every time somebody gets caught doing something wrong... actually sets us back*' (G1). In relation to the TPB, this perception linked both to their outcome evaluations and with their attitudes towards the behaviour, in this case illegal predator killing. Were the chances of being caught lower, however, some imagined that illegal behaviour would be more common. For instance, on estates with little public access there would be little chance of being observed committing a crime: '*Why would you not? You're never going to get found out*' (G4).

3.2.2 | Perceived impact

Perceived impact of predators, on both game and non-game wildlife, was a strong motivation for predator removal, detailed by all respondents. This is an expected finding as the primary purpose of gamekeeping is to produce gamebirds for recreational hunting. Gamekeepers considered that predation resulted in reductions in the number of gamebirds available to shoot and that this impact would be reduced with predator removal (the outcome evaluation within the TPB). Predation was therefore seen as a threat to their job security. This '*pressure to produce*' (G16) was referenced during projective discussions about the illegal behaviour of others: '*You're forced to break the law, or some people are, if you're under a lot of pressure*' (G5). Within the TPB, we present perceived impact as central and with interacting connections to other motivations. For instance, perceptions of heavy impact may influence how potential penalties are evaluated or, alternatively, strong professional norms

may limit the importance of perceived impact in decisions (Table 1). Respondents also referenced three additional concepts ('maintaining balance', 'appeal to nature' and 'problem individuals') that could indirectly influence how predator impacts were perceived and we outline these 'secondary motivations' as separate subsections below.

Impact and risk were primarily evaluated through daily interactions with predators (or predation) and through occasional transfer of knowledge with other gamekeepers. Individuals frequently recounted instances where they had witnessed particular, or particularly severe, predation events or their aftermath first-hand, making the potential harm that could be done by that species thereafter self-evident. When predators were not observed directly, predation could be attributed to particular species through smell, tracks, or in situ field examinations of remains (e.g. '*Fox, you'll always know, you can smell it.*'—G10). Predator impact or population trends were '*always a topic of conversation*' (G17) between gamekeepers, suggesting a pathway of knowledge exchange. Respondents' retold other gamekeepers' experiences of predation, including instances where job insecurity or dismissal had been attributed to the impact of protected predators. References to other sources of information were less common, though scientific studies, the shooting press and various shooting NGOs were occasionally specified. Accordingly, we use the term 'personal ecological knowledge' to describe respondent beliefs regarding wildlife, as this incorporates the role of the gamekeeper's own observations and experience alongside other formal and informal sources.

Gamekeepers' descriptions of predation suggested that perceived impact was influenced both by experiential and analytical systems (Epstein, 1994). Analytical processing (the cognitive and deliberate evaluation of information; Wilson, 2008) can be identified when individuals rationalized losses to predators by framing them in relative terms. This was apparent in statements such as '*You expect to lose 10% whether it's disease* [or] *predators*' (G2) and '*When you've got livestock in the number we've got them, you're going to get deadstock*' (G14). Often, however, evidence of experiential processing (instinctive, involuntary and largely produced by affect; Wilson, 2008) was evident; one gamekeeper described losses of pheasant poults as '*heart-breaking*' (G13), while another asserted '*every one hits me like an arrow*' (G17). Predator appearance and general behaviour also influenced how their impact was perceived at a species level. Peregrine falcons *Falco peregrinus*, for instance, had an obvious '*killer mentality*' (G12) while red kites *Milvus milvus* did not '*have that sort of killer-ness about them*' (G6).

3.2.2a Perceived impact: Maintaining 'balance'

Gamekeepers viewed 'balance' in predator populations as a point where the perceived benefit (or cost) to a species from human activities, including the activities of the gamekeepers themselves, was countered. Therefore, the perceived 'balance' of predator populations affected management intentions. This was assessed via personal ecological knowledge of abundance: '*balance is when*

you go out your backdoor and you don't see loads of predators' (G10). This concept was somewhat analogous to what was, and what wasn't, 'natural' in that it helped identify species that were '*overpopulated*' (G3), frequently as a consequence of anthropogenic disturbances:

> *I guarantee, the way the world is now, that if you didn't control any predators, things would go extinct. Not maybe nationally or worldwide but within areas they would. So yes, we* [gamekeepers] *have to balance it.* (G6).

When viewed through the lens of 'keeping a balance', management preferences for predators could be readily evaluated and decided (Table 2). There appeared to be an interaction between the number of encounters a gamekeeper has with a predator, and management preferences due to perceptions of population trends. A perceived increase in population therefore increased negative attitudes towards the species: '*Something definitely needs to happen with the buzzard population ... you see as many buzzards some days as you do pigeons flying around. Which isn't natural*' (G12). Accordingly, keepers spoke about their enjoyment, or at least tolerance, of predators they perceived to be uncommon: '*It* [a peregrine falcon] *is a rare bird and so I don't mind it having a few* [partridges] *because it's nice to know it's there*' (G7).

For some, however, the very concept of a 'balanced' population of predators on game shooting estates was an oxymoron. To these keepers, the release of game or the control of other predators had, to extend the balance metaphor, tipped the scales in favour of predators and therefore, in some cases, justified direct interventions to restore equilibrium: '*Gamekeepers are the reason why the birds of prey are at the biggest population that they've ever been...we have overstocked* [released too many gamebirds]' (G17). By supplying high densities of prey, they had created the conditions to allow predator populations to grow. Respondents therefore perceived that, '*if left, predator levels would build and build*' (G9) to a point at which they would reduce both game and non-game prey populations. This perspective effectively shifts the focus from a localized economic impact to a more powerful platform of action in relation to environmental damage, creating moral incentives to act: '*we live in a managed environment, everything needs managing*' (G16). Thus, some keepers used '*every legal method*' (G16) to '*keep on top of*' (G2) predator populations. As one respondent put it, gamekeepers '*should keep everything on level playing field*' (G17). The belief that there was a constant source of new predators being drawn in from areas not under game management was also used as evidence that predator control was unlikely ever to threaten conservation objectives: '*You'd be mad to think you could ever wipe something out on one estate*' (G4). Furthermore, when keepers were not legally able to control species that they perceived to be over abundant (principally badgers *Meles meles* and buzzards *Buteo buteo*), there was a belief that environmental harm would continue and increase: '*The protected status should be lifted and, in doing so, very quickly there will be a rebalancing of populations*' (G1).

3.2.2b Perceived impact: 'Appeal to nature'

Personal ecological knowledge was also used to determine what was, or wasn't, 'natural'. Here, gamekeepers followed an 'appeal to nature' argument, positing that because one thing is perceived as more 'natural' than another, it is therefore of higher worth and more valid (Moore, 1903). Indeed, they saw their own role not just to provide a surplus of gamebirds, but also to monitor, and when appropriate, correct that which was unnatural.

What individual gamekeepers viewed as 'natural' and how they defined it are therefore important questions. The distinction tended to relate to the benefit, or cost, of anthropogenic disturbances. The perception of predators being 'unnatural' was most clearly demonstrated in attitudes to introduced, non-native predators—which were considered out of place and '*not supposed to be here*' (G14). For this subset of species no observational checks and balances were required to guide attitudes or management, as one respondent put it when discussing control of non-native grey squirrels *Sciurus carolinensis*, '*you know you're doing good because they're an invasive species*' (G5).

That some native predators could be 'unnatural' was further developed by the idea, shared by a number of the respondents, that some individual animals were the result of introductions or releases. The behaviour of these animals or perceptions of rapid increases in population was used as evidence for these theories. One gamekeeper talked of having a particular problem with '*released*' buzzards predating pheasant pens because pheasants were '*easy pickings*' (G3)—the implication being that ostensibly released predators are unable to hunt 'naturally'. There were also species, in this instance red kite, whose rapid population increase was '*not a true representation of a natural success story if they get fed twice a day with abattoir waste in the field*' (G19).

3.2.2c Perceived impact: 'Problem individuals'

Incidents in which predators were able to kill tens, or sometimes hundreds, of gamebirds were recounted to justify attitudes or behaviours: '*I've had mass kills where you get there in the morning and there's bodies everywhere... It's very demoralising.*' (G16). Gamekeepers commonly ascribed these events to 'problem individual' animals that transgressed the limits of tolerated behaviour. These were either animals having a disproportionate impact, such as a fox that had '*figured out it can get under the electric fence*' (G11) or animals that had developed what they saw as a malicious agency, such as animals that will '*kill for the sake of killing*' (G12). In some cases it was both:

> You'll get one buzzard that might not kill a pheasant in its life. It'll be sat around eating worms and voles and that sort of stuff. Then you'll get one that'll be switched on and it'll just kill pheasants all day for fun. (G20).

Gamekeepers considered that, if left, such problem behaviour might continue indefinitely, possibly being passed on to the predator's offspring. Thus, experiencing multiple losses and/or the identification of problem individuals translated into a preference for more intense, reactive and direct management (Table 2).

3.2.3 | Personal enjoyment

For several gamekeepers, predator control was undertaken not only to reduce predation but also for enjoyment and to '*satisfy that hunting instinct*' (G11). However, this appeared to be predator specific as it was only mentioned in relation to fox and magpie control:

> If I didn't have this job where I could go lamping and shoot foxes, I would probably pay to go lamping. Especially when you get a really tricky one and you've been seeing it for weeks... Just catching it out, there's something about it. (G20).

Indeed, specific behaviours and intelligence that respondents attributed to these animals, and the skill required in killing one appeared to increase the satisfaction gained from hunting: '*You've got to get on top of a fox. He's pretty cunning*' (G11).

3.3 | Perceived behavioural control

3.3.1 | Perceived ease

Gamekeeper assessment of the value of predator control was associated with the perceived ease of the method in question. A variety of methods were utilized, including shooting, trapping and poisoning (the latter mentioned exclusively in relation to rats *Rattus norvegicus*) usually as part of a yearly cycle linked to opportunity and availability (e.g. fox shooting intensified when the crops had been cut and the young cubs were starting to disperse). In relation to the TPB, perceived ease was linked with the respondents' control beliefs concerning the factors that might facilitate or hinder predator management (e.g. crop cover). The efficacy of these methods was largely self-determined ('*You can read as many books as you like and they'll all tell you something different. The only way to do it is to do it the way that you know works.*' G14) and judged both directly by the number of predators killed and indirectly by the absence of observations of predation. Trapping allowed low efficacy methods to be implemented with little cost. For instance, one gamekeeper explained that he hadn't caught a stoat in his traps for over 8 months but still set them because '*it's that one time you don't* (that) *something is going to happen*' (G2). As a consequence of access to guns, traps and poison, there was little variation in gamekeepers' perceptions of their behavioural control over predator management as they considered it technically easy to kill most predators. This, hypothetically, included those protected by law: '*A lot of buzzards now, they've got no fear of people at all... if I wanted to shoot them, it would be pretty straightforward to be honest*' (G16).

4 | DISCUSSION

Gamekeepers are a key stakeholder group with central roles in wildlife management. Moreover, they and their practices are central to multiple associated social conflicts. We found that they articulated a complex web of social and ecological motivations influencing their predator management intentions (Figure 1) and that these were effectively captured by the TPB.

The TPB allowed the influence of broader social motivations on predator killing to be accounted for, through the subjective norms construct. Interestingly, respondents articulated normative beliefs that centred on their own interpretation of their professional role. Here, their professional identity not only was central to how they perceived and defined themselves (their 'self-concept': Ibarra, 1999), but also influenced daily management decisions through normative beliefs. This included more unusual behaviour, potentially encompassing illegal killing.

Direct instruction to kill predators was not a key motivation for respondents in our sample. Yet indirect pressures to do so were evident in the perception, real or otherwise, that employers expected high returns of birds shot, relative to those released, to make gamebird shooting financially viable. This represents an interesting example of how wider structural contexts of a practice constrain individual agency (Duffy et al., 2016). For example, increasing trends in the demand for pheasant shooting or the price of rearing a pheasant poult might, by this indirect route, translate into more intensive predator control regimes. Although we incorporate structural influences on individual behaviour via the outcome evaluation construct (e.g. removing predators will result in more gamebirds being shot), constraints on agency are a potential limitation of the TPB, and individualistic social-psychological theories in general (Duffy et al., 2016).

In comparison to subjective norms and attitudes, discussions regarding perceived behavioural control (primarily concerning the perceived ease of conducting management actions) were limited; gamekeepers, for the most part, professed to have the skills, equipment and wherewithal to facilitate the removal of predatory animals. Indeed, there are parallels between our research and recent studies that have applied the TPB to agricultural sectors and shown that farmer management intentions are principally a result of attitudinal or normative sources (Senger, Borges, & Machado, 2017; Yazdanpanah, Hayati, Hochrainer-stigler, & Hosein, 2014).

4.1 | Denoting conceptualizations of nature

Ecological interpretations, based on frequent personal observations, supported much of how gamekeepers think about, and respond to, predators. This is perhaps unsurprising considering the strong power of direct experience in shaping attitudes towards predators and their management (Eriksson et al., 2015; Maye et al., 2014). We observed an interaction between rates of encounters with predators and management preferences, via the concepts of 'balance' and 'naturalness'.

For example, frequent encounters with a predatory species were interpreted as a symptom of nature in disequilibrium and elicited increased lethal management motivations. Similar indirect feedback between predator encounter rates and management has been observed in interactions with Swedish herders and wolverines *Gulo gulo* (Carter et al., 2017). There is also provisional evidence that, in game management, those who rely on local or experiential knowledge might estimate relevant predator populations to be increasing faster than those who rely on 'scientific knowledge' (such as academic articles), which may itself lack spatial or temporal specificity (Ainsworth et al., 2016).

By identifying and exploring narratives concerning 'nature' and 'balance', this study joins those from the disciplines of anthropology and human geography that have addressed how internal conceptualizations of the natural world influence wildlife management practices (Buller, 2008; Crowley et al., 2018; Eden & Bear, 2011; Knight, 2001; Lüchtrath & Schraml, 2015; Maye et al., 2014). Such philosophies can have significant sway over how management decisions are taken (Adams, 1997; Buller, 2008). We therefore take this opportunity to discuss how gamekeeper perceptions of 'nature' and 'balance' might align, or come into tension, with alternative views of these concepts.

While 'natural' is popularly conceptualized as 'that which is not under the control of humans' (Clayton & Myers, 2009, p. 16), gamekeepers appeared to perceive the concept as that which *has not been affected*, for better or worse, by human activities. Accordingly, landscapes that were seen as socio-natural, and the predator populations they sustained, were 'imbalanced' and required correcting. The concepts of 'balance', 'equilibrium' and 'natural' are commonly invoked in mental constructions of biodiversity (Adams, 1997; Fischer & Young, 2007). Indeed, like our respondents, broader publics may use assessments of species population sizes to interpret the 'naturalness' of landscapes (Dandy et al., 2012; Fischer & Young, 2007). These concepts are also important in how stakeholders in other systems rationalize wildlife management—correcting supposed 'imbalance' and 'unnatural overabundance' or removing malicious 'problem' animals can motivate those conducting lethal control of animals (Crowley et al., 2018) and increase stakeholder acceptance more broadly (Campbell & Mackay, 2009; Dandy et al., 2012; Maye et al., 2014; Swan, Redpath, Bearhop, & McDonald, 2017). Conversely, those that perceive populations to be 'natural' or at 'equilibrium' might oppose similar actions (Eden & Bear, 2011). Although these studies suggest a level of conformity between stakeholders, tensions in wildlife management can be expected when interpretations of the 'natural balance' of predators differ. For example, while stakeholders discussing predator management in the uplands of Scotland (here, conflicts centre on predation of a 'fully wild' gamebird, the red grouse *Lagopus lagopus*) could agree their broad goal was 'to establish and maintain balanced and healthy populations' of predators, the concepts of balance and health within this statement signified divergent ecological realities to the various parties (Ainsworth et al., 2016, p. 14).

4.2 | Future directions

We have demonstrated how a social psychological approach can be a useful means of characterizing the different types of motivations that influence gamekeeper behaviour, and for identifying how these motivations relate to different cognitive constructs. To develop this further, it would be of interest for future social psychological research to identify the relative strength of the outlined motivations in predicting behavioural intention or behaviour through a (semi)quantitative analysis (St John et al., 2010). We have also shown how important personal narratives and ecologies are to gamekeepers' identities and actions. Future investigation into this topic might benefit from a narrative analytic approach, or an ethnographic study of the emergence and persistence of different ideas and practices in gamekeeping cultures, to understand these aspects of gamekeeping in greater depth. For example, Schatzki's 'site ontology' provides a theoretical framework for analysing the socio-professional structure of such practices (Schatzki, 2002).

Where predator management (both legal and illegal) produces social disagreement between stakeholder groups, the six motivations identified in this research have the potential to become indirect drivers of conflict, by influencing behaviour (Pohja-Mykrä & Kurki, 2014), discourse (Hodgson et al., 2018) or trust between various actors (Marshall et al., 2007). This presents both opportunities and challenges for those tasked with ameliorating such conflicts. One challenge, for example, would be that the personal enjoyment that motivates some predator removal is likely to be rooted in values that are not shared by all actors (Manfredo et al., 2017). Indeed, recent research from the uplands found that stakeholders on different 'sides' of conflicts over predators have divergent wildlife value orientations (St John et al., 2019). Yet, our findings also suggest there may be opportunities to mitigate social conflicts over predators by focusing on shared 'relational values' between stakeholders. Relational values concern the relationships and interactions between people and nature including, crucially, perceptions of responsibility and stewardship towards wildlife (Chan et al., 2016). We observed that gamekeeper professional identity was rooted in concepts of custodianship and that much predator control was undertaken with the objective of conserving game and non-game wildlife. Where the objective is to build trust between stakeholders by identifying common narratives and goals (Hodgson et al., 2018; St John et al., 2019), we suggest that a focus on these relational values has the best chance of success. Similarly, focusing on the stewardship relationships that emerged from the professional identity and personal norm motivations might have merit where the goal is behavioural change for predator conservation as targeting these would 'recognise and work within the boundaries of existing values' (Manfredo, Teel, & Dietsch, 2016).

Another productive avenue for investigation would be to apply this approach to other human actors within these conflicts. This is important as additional stakeholders may value predators, and assess their impact, very differently (Hodgson et al., 2018). Specifically, a similarly detailed exploration of the perspectives of conservationists towards predator management would provide insight into questions such as:

under what environmental conditions, if any, might lethal control be acceptable? How does this change with species? What is the overall objective of their management preferences? Such research would provide a platform from which those charged with mitigating social conflicts over predators could identify shared, or conflicting, motivations thereby helping navigate disagreement and identify compromise.

5 | CONCLUSIONS

This research provides a detailed exploration of a question central to many conservation conflicts: what are the drivers of predator killing? In setting out gamekeepers' motivations for predator control, we hope to advance the understanding of behaviour of key actors in an arena frequently characterized by conflict. By contextualizing this behaviour in relation to broad motivations, we have outlined how predator control is not just a consequence of perceived economic loss (although concerns about job security might make this an important indirect influence), but rather complex and interacting social, personal and ecological perceptions. Our participants described a duty of care over the gamebirds and non-game wildlife on the land they managed. This required their intervention to 'balance' nature, removing animals considered 'unnatural' or 'overpopulated'. This included predators that were perceived to benefit from gamebird releases. Acknowledging the multiple motivations behind predator killing provides a chance to target conflict mediation.

CONFLICT OF INTEREST
The authors declare no conflicts of interest.

AUTHORS' CONTRIBUTIONS
G.J.F.S., S.M.R. and R.A.M. conceived the study; G.J.F.S. collected and analysed the data and drafted the manuscript. All authors provided critical reviews and revisions.

DATA AVAILABILITY STATEMENT
Extended excerpts of transcripts supporting this paper are available at Zenodo: https://doi.org/10.5281/zenodo.3738186 (Swan, Redpath, Crowley, & McDonald, 2020). Complete transcripts remain confidential, as this was a condition upon which informed consent was obtained.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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