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Title:

Broadening the toolset for stakeholder engagement: A participatory Multi-Criteria Decision Analysis to explore consensus over wolf management

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Abstract:

Facilitating coexistence between people and large carnivores is critical for large carnivore conservation in human-dominated landscapes, when their presence impacts negatively on human interests. Such situations will often require novel ways of mediating between different values, worldviews and opinions about how carnivores should be managed. We report on such a process in an agricultural area of recent wolf recovery in central Italy where unsolved social tensions over wolf presence have radicalized opinions on either side of the wolf debate, resulting in a stalemate. Where previous mitigation policies based on top-down damage compensation have failed, we tested the potential for applying a participatory approach to engage different stakeholder groups in a dialogue aimed at sharing a deep understanding of the problem and co-creating potential solutions. We based our approach on the theory of meta-consensus, using a decision support tool known as Multi Criteria Decision Analysis (MCDA). Over the course of three months we carried out five workshops with stakeholder representatives from farming, hunting and environmental associations, and researchers. Stakeholders shared several objectives and agreed over many management interventions, including the management of free-ranging dogs, the implementation of damage prevention measures, and a damage compensation system suitable for farmers. The process facilitated agreement over actions aimed at improving relations between stakeholders and enhancing the state of knowledge on the issues at stake. Most importantly, we recorded positive social and relationship

outcomes from the workshops, and observed a willingness from participants to engage in further discussions over disputed management preferences. Overall, we found MCDA to be a useful tool for laying the groundwork for further participatory and deliberative processes on wolf management. However, challenges ahead included the involvement of a larger number of representatives of the different sectors of the society, and a simplification of the methodology, that some participants found too complicated and time consuming.

Keywords:
deliberative democracy; human-wildlife conflict and coexistence; multi-criteria decisions analysis; participatory environmental governance; theory of meta-consensus; large carnivores.

1. Introduction

Human relations with wildlife can take on a variety of forms, and people's experiences of living alongside wildlife are often fraught with complexity (Marvin & McHugh, 2014; Pooley et al., 2017). Wildlife is known to bring a variety of benefits to people who may value it as a resource or prey base, as important to the delivery of ecosystem health and services, as part of their natural and cultural heritage, as a source of emotional and affective attachment, or as a lifeform valuable in its own right (Goldman et al., 2010; Lescureux & Linnell, 2010; Ripple et al., 2016; Singh, 2018). Coexistence between people and wildlife can, however, be problematic when it results in a threat to human safety or health, in damages to crops, livestock or other property that may constitute livelihood income, in competition with hunters over wild prey, or in restrictions in hunting, land use or access rights (Bulte & Rondeau, 2005; Kansky et al., 2014; Hanley, 2015; Redpath et al., 2015; Mishra, 2016). Large carnivores are a group of species known to cause strong and polarized reactions. They can be seen as a threat to livelihoods and traditional practices such as livestock farming and hunting (Figari & Skogen, 2011) but are also considered charismatic animals that can come to symbolize notions of wilderness and of the need to preserve it (Figari & Skogen, 2011; Marvin, 2012; Linnell et al., 2015). Often used as a flagship species, they can help leverage support for the conservation of ecosystems (Dempsey, 2010). In Europe and elsewhere, the natural expansion of large carnivore populations into areas where they had been previously absent for many decades, has been facilitated by processes of agricultural and rural abandonment, particularly in marginal areas dedicated to extensive farming (Chapron et al., 2014; López-Bao et al., 2015). In

addition to the damages that large carnivores can cause to local livelihoods, their return is therefore also associated with notions of landscape change and of rural areas' decreasing cultural and political influence (Skogen & Krange, 2003; Ghosal et al., 2015).

A large body of literature has been dedicated to exploring the multiple ways in which people perceive and value carnivores (Goldman et al., 2010; Lescureux & Linnell, 2010; Marvin, 2012; Dressel et al., 2015; Pooley, 2016), and how wildlife can become entangled in wider social tensions (Skogen & Krange, 2003; Evans & Adams, 2018; Pellis et al., 2018). Some of these studies have shed light on the power dynamics between different stakeholder groups, and the politics through which they negotiate their values and interests (Sandström, 2009; Lundmark et al., 2014; Adams, 2015; Cortés-Vázquez & Ruiz-Ballesteros, 2018). Through these debates, coexistence has come to be understood not just as being between humans and wildlife, but between humans with different worldviews and competing interests concerning wildlife and the landscape they inhabit (Young et al., 2010; Robbins, 2012; Redpath et al., 2013). Many of the challenges raised by carnivore conservation, therefore, go well beyond the field of ecology, and play out in the political and social realms that mediate human relations with carnivores. Although science can inform decisions regarding carnivore management, decisions remain inherently political. This recognition requires a significant shift in approach, both in terms of how conflict is understood, and in how this understanding is integrated into policy (Bennett et al., 2017). The challenge lies in developing approaches capable of capturing the existing plurality of value and knowledge systems, and structuring these into wildlife management policies that can be acceptable to all.

Where traditional approaches (e.g., law enforcement, damage compensation policies and instruments) have failed to integrate value and knowledge systems and mitigate social conflicts, it is essential to experiment with innovative solutions to address social tensions and ecological imbalances, especially in areas where these result from large carnivore recovery or recolonization. Recognizing that conflicts over carnivore conservation need to be tackled through the involvement of affected stakeholders has marked the beginning of a “deliberative turn” in carnivore conservation. Calls for greater grassroots involvement in carnivore decision follow two main arguments: pragmatic, and normative (Stirling, 2006; Redpath et al., 2017). Pragmatic arguments view participation as a means to an end, and focus on how its application can improve decision outcomes. Participation is considered to increase the efficiency and the quality of conservation interventions, as they are expected to be better suited to local needs and priorities and better adapted to local conditions (Hutton et al., 2005; Sterling et al., 2017). Participation in this context is also thought to create a sense of ownership of and responsibility towards the decision outcome, in this way fostering higher rates of adoption and compliance (Agrawal, 2005; Reed, 2008; Redpath et al., 2017; Sterling et al., 2017). Pragmatic arguments also claim that participation can increase the sustainability of conservation decisions by creating economic incentives and by forging more stable alliances between stakeholder groups (Hutton et al., 2005). Normative arguments in favour of participation focus on the process as an end in itself. Participation in environmental decisions is considered a democratic right, necessary to increase the legitimacy and equity of conservation decisions (Hutton et al., 2005; Reed, 2008). Other normative claims focus on the transformative character of participation, with regards to its potential to empower, promote social learning, and

increase trust among stakeholder groups and towards the government (Reed, 2008; Redpath et al., 2017). Examples of participatory governance of large carnivores are few and with varying degrees of institutional reach and conflict mitigation success (wolves in America: Todd, 2002; wolves in Scandinavia: Sandström, 2009; Hallgren & Westberg, 2015; Lundmark & Matti, 2015; Sjölander-Lindqvist et al., 2015; Von Essen & Hansen, 2015; wolves in Spain: Grupo Campo Grande, 2016). Most critiques to participatory processes focus on the extent to which they represent all interests, the influence they have in shaping policy (Cooke & Kothari, 2001; Homewood, 2017; Young et al. 2013) and whether they result in positive conservation outcomes (López-Bao et al., 2017). In addition, in highly polarized contexts, involving all interested parties may be a challenge as mistrust towards other stakeholders, management authorities and participatory processes in general may be based on a long history of negative interactions and experiences (Madden & McQuinn, 2014; Young et al., 2016).

In situations where views are polarised, trust is low, conservation and livelihoods are suffering, and where traditional top-down approaches have failed, there is a need for participatory approaches that can integrate the critiques highlighted above and share the lessons learned. The Province of Grosseto, in central Italy, is one such context where previous conflict mitigation measures have failed to improve coexistence with wolves and build trust among stakeholders and towards the government. This area primarily depends on an agricultural economy, in which livestock herding practices over the past 50 years evolved in the absence of a stable population of wolves. Due to a range of factors, the wolf population began to increase in size and distribution in the 1980s, but the process was not met with proactive measures to prevent damages or to build social awareness. The damage compensation systems implemented were

not developed in consultation with the affected livestock holders, and their functionality and social acceptability were never systematically monitored by the competent authorities (Marino et al., 2016). Retaliatory killing and poaching are widespread and go largely unaddressed, and social conflicts are compounded by the sensationalist approach taken by the local media when reporting depredations and disputes between livestock farmers and animal welfare groups.

Within a broader EU LIFE Project (Medwolf, www.medwolf.eu), the objective of our study was to test the adequacy and feasibility of a participatory approach in the Province of Grosseto, where long-term and unsolved social conflict over wolf presence have radicalized opinions on either side of the wolf debate. We sought to explore whether a participatory approach could (i) provide a neutral and transparent setting for productive discussion, (ii) promote a better understanding of the context, complexity and plurality of experiences and interests regarding wolf management, and (iii) help in reaching a common ground across groups. We used Multi Criteria Decision Analysis (MCDA), a method previously applied to conflicts over resource conservation and forest and marine ecosystems (Redpath et al., 2004; Huang et al., 2011; Mustajoki et al., 2011; Zia et al., 2011; Esmail & Geneletti, 2017). We based out approach on Dryzek & Niemeyer (2006)'s theory of meta-consensus, drawing from the field of deliberative democracy and its critiques. Our aim was not to produce policy changes, but to test the potential for MCDA in the participatory planning of large carnivore management in a context of intense conflict. We report back on this process and argue that our case study offers lessons that are relevant to other areas being recolonized by large carnivores, which may lack the traditions, knowledge and institutional capacity necessary to facilitate coexistence.

2. Study area

The province of Grosseto in southern Tuscany, Italy, exemplifies the types of conflicts occurring in human-dominated landscapes of recent wolf recolonization in Europe. Although wolves were never completely extinct from the area, slow recovery beginning in the 1980s resulted in the establishment of 22-24 wolf packs across the territory's mountainous, hilly and seaside landscapes in 2017 (Ricci et al., 2018). This expansion coincided with a decline in the competitiveness of the area's free-ranging and family-run livestock breeding sector. Despite the difficulties it faces, dairy sheep breeding remains a driving economic activity of the territory, with about 1200 farms and 20,000 sheep (BDN, 2014). Current sheep herding practices evolved in the absence of a dense wolf population and under modernization forces that exacerbate depredations (Marino et al., 2016). Wolf conservation and management in the province of Grosseto is further made difficult by a high level of hybridization between wolves and free ranging dogs, which was likely facilitated by frequent retaliatory killing of wolves causing disruption of the social cohesion of wolf packs therefore enhancing opportunities for interbreeding with widely present free-ranging dogs (Salvatori et al., 2019).

The area witnessed several abrupt changes in the compensation system for wolf damages. This oscillated from an ex-post compensation system first implemented by the regional administration in 1982, to a voluntary insurance system in 2006, and back again in 2014 to an ex-post system capped at 15,000 € per farmer under the State Aid

European Policy (Article 81 in Regulation (EU) 1305/2018 on rural development). Despite being heavily subsidized by the Regional Administration, subscription to the insurance was limited to few farms, so that the large majority of depredations went unclaimed (Marino et al., 2016). The high level of unclaimed damages and mismatch between local expectations and policy have undermined trust in management authorities and polarised opinions. In 1994 (Reg Law 72/1994) the Tuscany Regional Administration also made funding available to incentivize damage prevention systems, but farmers showed low levels of uptake and most funding remained unclaimed (Banti, 2005). Between 2011 and 2016, several illegally killed wolves were exposed in public spaces as statements of dissent. Despite these growing tensions, no research on key aspects of the conflict was officially requested nor conducted before 2017 (Salvatori et al., 2020). However, several interactions with livestock farmers within the setting of an EU-funded LIFE project (MEDWOLF, www.medwolf.eu) aimed at improving coexistence with wolves in the study area, brought to light how perceptions of marginalization, mistrust towards conservationists and perceived lack of influence were stronger among those farmers that resisted the use of damage prevention measures (Marino et al., unpublished data; Salvatori et al., 2020). These findings suggested that entrenched conflicts such as those characterizing the Province of Grosseto may be addressed only through a bottom-up approach aimed at building trust and developing locally relevant policy.

3. Theoretical and methodological framework

The aim of participatory processes can vary considerably depending both on the context and on the theoretical approach with which they are undertaken. Literature on deliberative democracy provides a useful framework through which to better understand what participation, pluralism and consensus might look like in the context of large carnivore governance (Parkins & Mitchell, 2005). Such approaches stress the need to validate multiple values and views, and recognize the power dynamics between them (Dryzek & Niemeyer, 2006). Deliberative democrats stress the potentially transformative powers of free and unconstrained rational argumentation and reflexive listening, through which participants' positions are expected to converge as result of the deliberative process (Elster, 1998). Instead, critical pluralists claim that deliberation should aim to transform antagonists into agonists, each pursuing their own interests while positively validating the positions of others (Mouffe, 2000b; Peterson et al., 2005). The ideal goal of deliberation may be broken down into three separate levels of consensus (Elster, 1998). Normative consensus concerns the agreement over the values driving a decision; epistemic consensus the agreement over how the effects of particular actions map onto values; and preference consensus the agreement over what should be done. A softer and more critical "meta-consensus" approach was developed Dryzek and Niemeyer (2006), who define normative meta-consensus as an agreement over the legitimacy of different values, which nonetheless allows for differing priorities. They define epistemic meta-consensus as an acceptance of the credibility of different belief systems. Finally, they define preference meta-consensus as an agreement over the nature and process behind disputed choices. The meta-consensus framework acknowledges that expectations of universal consensus across all the groups may at best be naïve, but that groups are likely to agree over elements of each other's positions. Particularly, it considers the main task

of mediators as uncovering or constructing a normative meta-consensus across groups (Dryzek & Niemeyer, 2006). In this study we apply a meta-consensus theoretical framework using a methodology known as Multi Criteria Decision Analysis (MCDA). The structure of MCDA mirrors the three levels of meta-consensus building (Fig. 1), as it brings to light stakeholder values and priorities (i.e. normative meta-consensus) and uses them as criteria with which to evaluate different management practices (i.e. epistemic meta-consensus) to finally identify agreeable management options (i.e. preference meta-consensus). This is chieved through 7 steps (Fig. 1).

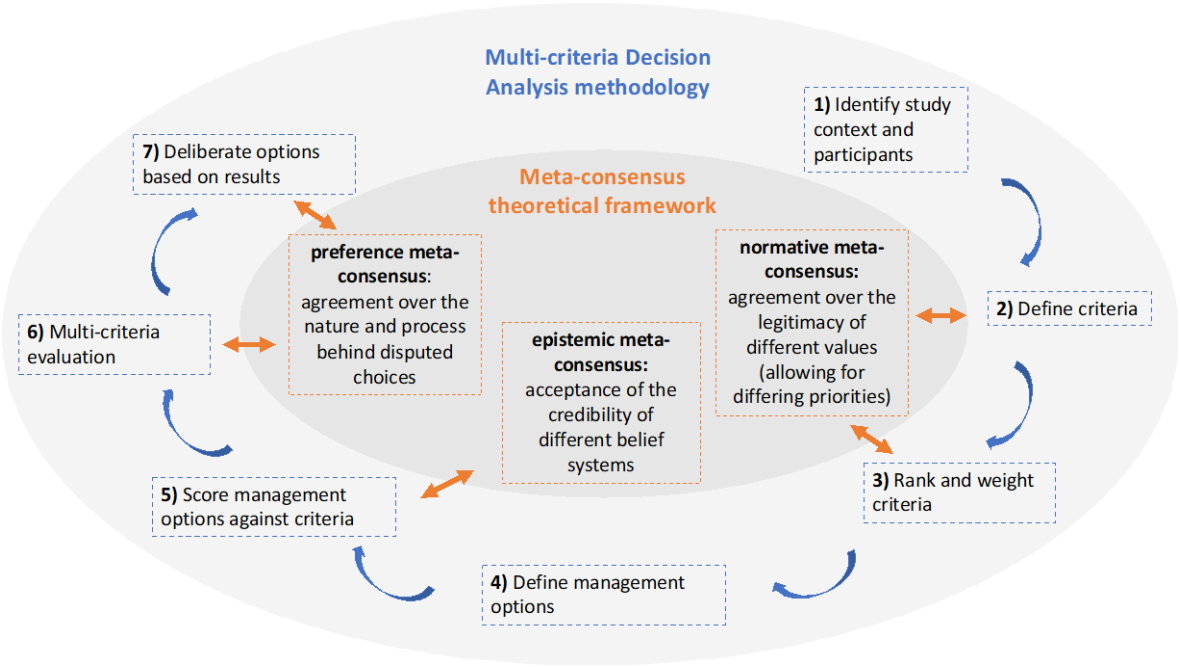

Figure 1. Functional association between the meta-consensus theoretical framework (Dryzek and Niemeyer 2006) and multi-criteria decision analysis (Davies *et al.,* 2013 and Gregory *et al.*, 2012).

We tested the application of the 7 steps of MCDA across 5 days of workshops, between May and October 2017 (see Appendix 1 for a detailed breakdown of the

different workshops, the participatory methods we employed, the people who took part, and the mathematical methods we employed). The first workshop was carried out in plenary form with the technicians and partners of the LIFE MEDWOLF project, whilst the remaining workshops were attended by the project team, sheep breeders and representatives of the main sheep breeding associations of the area, hunters and representatives of environmentalist and animal welfare associations (a total of 9 participants attended all of the workshops, as well as 1 facilitator, 3 project staff and 2 external observers; Appendix 1).

We selected participants among people known to have diverse viewpoints and strong opinions but willing to discuss and listen to others. We intended to include participants that would bring forth different stakeholder interests but that did not hold high ranking roles in particular associations and were therefore not officially or politically accountable to any group of people, in order to provide space for reflexive positioning (Todd, 2002; Davies et al., 2013; Von Essen & Hansen, 2015). Ensuring the continued participation of farmers proved a real challenge, both due to the experimental scope of the workshops, everyday work commitments, and to a general disenfranchisement with consultation processes. We therefore chose to also invite technicians from the three main livestock breeding associations. The technicians did not hold managerial positions within their associations and worked alongside many livestock breeders of the territory. In the case of animal rights groups it proved difficult to identify local activists and, given the vocal role that some national level associations had in the debate on wolf culling, we chose to invite one member of their staff to attend. Given that the project staff contributed knowledge on wolf biology and wolf conflict management, we saw it fit to include the criteria and management option scoring of a

biologist in the results to increase the transparency of their contribution to the deliberative process (Kothari, 2001; Mosse, 2001; Pound, 2015). Data have been anonymised to ensure the privacy of participants and informed consent was sought in three stages: firstly in telephone conversation when the participants were invited; secondly after the participatory method was explained, participant's expectations were voiced and debated, the goal of the workshops was clarified, and the criteria tree (see below) was formulated; and thirdly at the end of the research process after the results of the research were presented in a final meeting, a report was circulated among all participants and consent to publish them was obtained.

Before the workshops, we first drafted a preliminary criteria tree, consisting of all the elements describing the context of wolf conservation in the Province of Grosseto (step 1 in Fig. 1). The first two workshops were aimed at editing and adding to the criteria tree, to establish a list of norms that were considered legitimate by all (step 2). The participants then ranked the importance of each item on the criteria tree, expressing their individual priorities with regards to the shared set of norms (step 3). The brainstorming of management options (step 4) was followed by an independent evaluation by each participant of the performance of each management option against the criteria, and group deliberation regarding the reasons behind disputed beliefs (step 5). We chose to score the performance of management options qualitatively and to involve both stakeholders and experts in the entire process (Redpath et al., 2004; Stirling, 2006; Treves et al., 2009). Our intent was to integrate scientific and local knowledge, explore differences in beliefs, and highlight gaps in or mistrust of information (Clark & Murdoch, 1997; Dryzek & Niemeyer, 2006; Davies et al., 2013; Ainsworth et al., 2020). Multi-criteria evaluation was carried out to derive overall values

for each management option across all the criteria (step 6; see Appendix 1 and 2). We aggregated the individual results by stakeholder group and allowed participants to discuss them (step 7). We grouped the representatives of the environmental and animal welfare associations together in the results, and both were referred to as "environmentalists". Finally, we invited the participants to reflect on the experience, through group discussion and an anonymous questionnaire (Appendix 3).

4. Results

4.1. Criteria and their valuation

The criteria identified in the first two workshops were divided into 5 clusters or factors affected by wolf management, namely: economic, socio-cultural, ecological, landscape, animal welfare and political administrative factors (Table 1 and Appendix 2). Participants' valuation of criteria identified several areas of overlap across the stakeholder groups, especially with regards to the economic and socio-cultural criteria (see Appendix 4 for criteria weights by stakeholder group). Stakeholders largely agreed over the importance of reducing time/money farmers spend on bureaucratic procedures, on reducing the economic impact of depredations, on promoting or maintaining the whole production chain associated with livestock breeding, on increasing cultural and nature tourism. There was also very strong consensus regarding the need to maintain traditional herding practices and livestock breeds, improve/maintain farmer's quality of life, prevent human depopulation and loss of traditions of the area, consider the intrinsic value of wildlife and ecosystems, increase cohesion and mutual respect across social sectors, increase awareness and

availability of reliable data regarding the wolf. Many criteria relating to ecological, landscape, and animal welfare factors were instead valued differently between groups, although there was moderate agreement over the importance of reducing the impact of non-natural food sources on the wolf's ecology and behaviour, protecting the genetic identity of wolves from hybridization, and increasing the social carrying capacity for wolves. The welfare of livestock was valued strongly by both farmers and environmentalists.

Economic	Socio- cultural	Landscape	Ecological	Animal wellbeing	Political & administrative
- Income from milk and meat production - Milk v.s. meat production - Time & money for bureaucracy - Time & money for prevention - Market opportunities - Impact of depredations - The whole livestock production chain - Gastronomic & cultural tourism - Nature tourism - Work for conservation technicians - Hunting tradition, leisure & revenue	- Traditional herding practices - Farmers' quality of live - Traditional livestock species - Rural depopulation & loss of traditions - Communication between stakeholder groups and social cohesion - Knowledge of wolves - Reliable data - Intrinsic value of wildlife and ecosystems - Threat to human safety - Threat to domestic and hunting dogs - Wolf as symbol	- Landscape management: agricultural v.s. natural - Aesthetics (ex. issue of livestock fences)	- Impact of non-natural trophic resources of wolf ecology - Wolf as regulator of prey - Impact of hybrids on wolf's genetic identity - Impact of dogs on wolf's genetic identity - Presence of other predators in competition with wolves - Ecological carrying capacity - Socio-economic carrying capacity	- Livestock's wellbeing (quality and specificity of product) - Wolf's wellbeing - Hybrid's and feral dog's wellbeing - Wellbeing of LGDs	- Efficacy of management option in mitigating conflict - Rationalization of cost - Law & rule enforcement - Legal limitations - Acceptability for: - Farmers - Hunters - Ecologists - Animal welfare groups - Local pop. - Italian pop.

Table 1 Summary of criteria describing the relevant objectives of wolf management in the context of the Province of Grosseto (see Appendix 2 for a more detailed explanation of each criterion).

4.2. Management options and their ranking

The management strategies developed in the course of the 3rd workshop (Table 2), were structured into management orientations (e.g. damage prevention, damage compensation, management of “other” predators), each containing one or more specific management options (e.g. in the case of the wolf population management orientation, several alternatives were identified: the status quo, a regulated cull, a zoning system). Participants also identified a set of transversal actions to be adopted as guiding principles in the design and implementation of each of the other management options.

(i) Management options					
Damage prevention measures		**Compensation**	**Management of "other" predators**		
1. Incentives for dogs, fences etc... : generated though (bottom-up) **participation** and **adapted to farmer's needs** and depredation risk	**2. Payments to farms that** adopt **damage prevention measures**	**3. Compensation** policy negotiated with farmers	**4. Reduction of feral dogs** through awareness raising on responsible dog ownership, and by removing feral dogs from the wild	**5. Removal of hybrids from the wild**	**6. Sterilizing and releasing hybrids** back into the wild
Wolf population management				**Law enforcement**	**Farming quotas**
7. Status quo: No culling and no actions undertaken to reduce the area's ecological carrying capacity	**8.** Wolf population management without culling, through **reduction in ecological carrying capacity and wolf fertility**	**9. Allow limited culling** in accordance with current legislation (under specific conditions and following authorization by the Ministry of Environment)	**10. Zoning**: creation of areas where wolves are culled	**11.** Increased police presence to **counteract illegal killing of wolves**	**12. Farming quotas** couple with income protection policies
(ii) Transversal actions					
a. Promoting farming and rural development, incentives for modernizing farms, support for bureaucratic procedures, funding for public services, start-ups, cultural associations etc.		**b. Information and communication**	**c. Research**	**d. Monitoring** efficacy of management strategies	**e. Participatory management**

Table 2. List of management orientations and specific management options identified during the workshops.

Of all the management strategies, the transversal actions were those that received the higher levels of consent from the stakeholder groups (Fig. 2). Participants overall agreed that communication and awareness building, research, monitoring and participation should underlie the design and implementation of wolf management. Participants also generally agreed that wolf management should be integrated into a wider strategy to support the farming sector and rural development in general. With regards to specific management options (Fig. 2), participants agreed over the importance of damage prevention and compensation and most groups seemed to consider reducing free-ranging dogs and wolf-dog hybrids a priority, although they disagreed over how to manage the latter. Disagreement also remained over wolf population management options, with environmentalists favouring the status quo and farmers and hunters favouring a regulated cull or a zoning system. The option to reduce the ecological carrying capacity for wolves was supported by farmers and hunters, whilst the options to carry out law enforcement and limit farming activities through quotas received moderate backing from environmentalists. There was, however, a large variability within the results of the environmentalist group (Fig. 2).

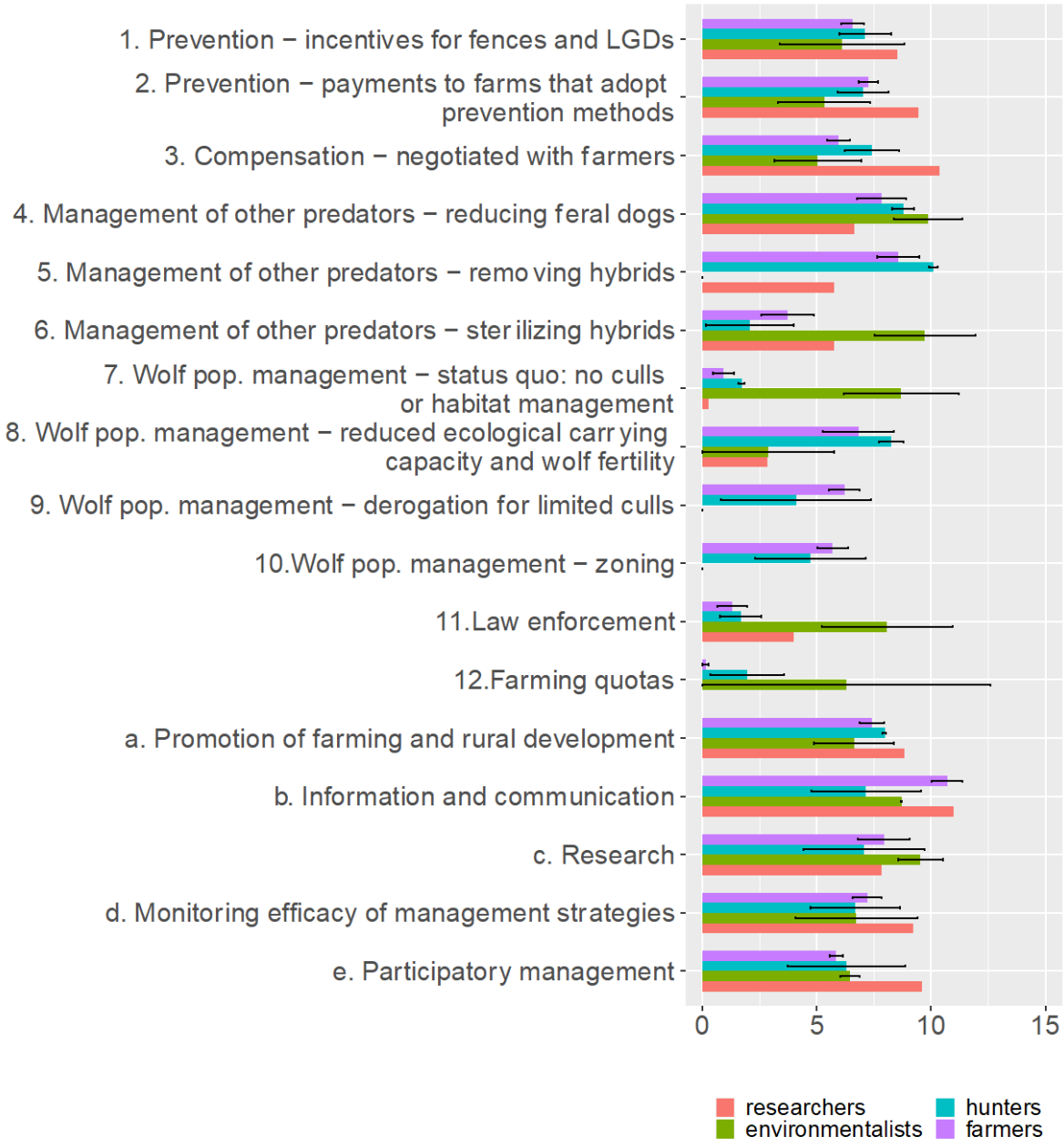

Fig. 2 Ranking of management options by stakeholder groups. The error bars represent variability within the stakeholder groups (n= 3 farmers, 3 hunters, 2 environmentalists and 1 researcher/ wolf biologist).

4.3. Participants' evaluation of the approach

Participants were asked to set out their expectations at the beginning of the first workshop and were invited to evaluate the process in the final workshop (Appendix 3). Participants expected the experience to be challenging but hoped to come out of it with higher level of mutual understanding. By the end of the workshops all of the participants felt that their expectations had been met (Appendix 3). The representative of the animal welfare association, for example, acknowledged that the workshop would be a "personal challenge, because sitting with hunters is the opposite of what my association represents". Similarly, one of the livestock owners admitted that he needed "to exchange ideas with the other stakeholders because livestock owners feel they have been abandoned […] in dealing with the problem".

Overall, participants deemed the MCDA approach as helpful particularly because its structure allowed for the discussion to focus on ideas rather than personal criticisms. One hunter claimed "it was an exceptional event that allowed people who usually fight, to communicate […] It's interesting to hear people speaking from a scientific perspective and from an emotional perspective, because that is how we progress on this issue". There was an acknowledgement that such an exercise can be demanding and emotional, but nonetheless worth the effort, as one farmer claimed at the end of the last workshop "I no longer feel alone […] we shared ideas (and got to) a joint understanding". On the other hand, participants felt that the high number of criteria and length of time required to score the performance of the management options was excessive. Furthermore, the environmentalists were surprised by their MCDA outcome as they would have expected damage prevention to rank higher among their preferred management options.

Whilst participants believed that the invited stakeholders were given equal opportunity to contribute to the process, part of the discussion centred on whether participants fully represented the variety of interests regarding the issue, and the extent to which they should (Appendix 3). One participant challenged the relevance of inviting environmentalists not residing in the study area, whilst others regarded aspects of local wolf management a matter of national interest, especially given that any culling program would require a change in national legislation. Farmers felt that the variety of viewpoints from their group had not been represented fully, as the more vocal anti-wolf advocates had not been invited because they were deemed too confrontational. At the same time, they recognized the difficulties in obtaining adequate representation on the one side, and in creating a climate favourable to constructive engagement and reflexive dialogue on the other. Dissemination and sharing of the results was considered the next important step, but most of all, participants called for action to follow the work done in the workshop. The process was viewed as an initial step towards something bigger which would invariably require an active engagement on the part of governmental authorities. The participants claimed to be willing to form part of a task force to continue the work in the future.

5. Discussion

In this study we trialled a participatory MCDA method in terms of bringing together stakeholders into a constructive dialogue regarding the highly contested issue of wolf management in the Province of Grosseto. We sought to examine the possibility of constructing a normative and preference meta-consensus across groups (Dryzek and Niemeyer 2006). This refers to whether participants share common values despite

having different priorities, and whether they understand the process and nature behind each other's management preferences. Our results were positive as we highlighted several areas of overlap. Furthermore, we recorded positive social and relationship outcomes from the workshops, and a willingness on the part of participants to engage in further discussions over disputed management preferences. Our approach faced challenges that are common to most participatory processes, namely, issues of representation, scale and capacity to influence decisions. Here, we provide a brief analysis of these challenges along with a reflection on how our methods might be improved to better represent stakeholder opinions and better facilitate the deliberative process.

5.1. Exploring meta-consensus over wolf management

The list of criteria characterizing the context of wolf management in the Province of Grosseto and their relative ranking by participants provide the basis for a shared understanding of the problem among stakeholders and an important first step towards its effective mitigation. Although participants disagreed on the importance of some criteria, as could be expected, various areas of overlap were identified. Many criteria within ecological, income generation and socio-cultural contexts received similar rankings across the stakeholder groups. Although environmental issues have often been understood as stemming from a conflict between those who value human wellbeing and those who value environmental protection, in reality most people are likely to value both elements, giving priority to one over the other depending on context (Dryzek & Niemeyer, 2006). This agreement on the legitimacy of basic values shows

that our approach has been successful in uncovering a normative meta-consensus between different stakeholders.

We found strong consensus over the transversal actions suggesting that stakeholders, although they did not necessarily agree on specific management options, share the idea of having a general management approach that includes research, monitoring, information dissemination and participation as its guiding principles. This result reflects the state of confusion that currently characterizes wolf management in the area, and the recognition on the part of all stakeholders of the need to base decisions on reliable data and transparent decision-making processes. Participants agreed that including stakeholders in research, monitoring, and communication actions would improve the local relevance and acceptance of the data. Results also highlighted areas of disagreement (i.e. over the management of hybrids and wolf population control), which will require further deliberation and ultimately an assessment of trade-offs between stakeholders (Pound, 2015). The results provide a useful basis on which such consensus-oriented deliberation might occur, but most of all they highlight contentious areas underlying the plurality of views surrounding the issue. In this regard, trade-offs should be viewed as inherent to decision making and the decision outcome must be understood as temporary and open to future contestation, should context and power balances shift (Mouffe, 2000b; Dryzek & Niemeyer, 2006; Stirling, 2006). Agreement, therefore, will represent only what each group can accept in view of what would come otherwise.

The social outcomes reported by participants, in terms of increased trust and social learning across stakeholder groups and project staff, are important results. The

dialogue that took place in the workshops and later social events appeared to have had a transformative effect on the relationships between participants, as stakeholders came to view each other no longer as enemies, and gained a better understanding of each other's perspectives (see also Hallgren & Westberg, 2015). Moreover, as the process evolved, stakeholders came to acknowledge that the conflict was complex, revolved around social dimensions, and was not easily resolved through the implementation of technical fixes. This realization seemed to allow stakeholders to take greater ownership of the problem and the challenges it presented, promoting a sense of shared responsibility and willingness to engage in negotiation.

5.2. Representation, scale and influence

The biggest challenges we encountered in the organization and development of the workshops are ones that can be considered intrinsic to most participatory processes, namely, issues of stakeholder representation, scale, and influence. In our case, full representation of the livestock breeding sector was hindered by the fact that the more vocal anti-wolf advocates were not invited to attend the workshops. The decision was taken to prevent extreme views to be confronted, given the experimental nature of our process. It is important to recognize that, although lack of full representation will influence the outcome of the participatory process and potentially hinder its implementation, success also depends on the inclusion of participants willing to engage in constructive dialogue and willing to accept the legitimacy of other points of view. However, the issue raises questions regarding how best to extend communication and engagement towards non-participating groups. Most of all, they place increased pressure on the process to deliver tangible outcomes in order to ensure that the levels of trust we recorded among workshop participants also extent

towards wider society and democratic institutions. Moreover, the large variability we recorded within the environmentalist group, reflects the distinct ideologies of the representatives of the environmental and animal welfare associations, and highlights the importance of accounting for difference within stakeholder groups.

Questions regarding the scale at which participatory processes are conducted relate to the representation of interests, both across space and time (Cash et al., 2006; Young et al., 2013; Linnell, 2015). One of the major critiques to environmental participatory processes comes from proponents of the public trust doctrine, who view participation outcomes as being disproportionately influenced by a restricted pool of local resource users or economic interests (Peterson et al., 2005; Treves et al., 2015; López-Bao et al., 2017). They see wider society and future generations as having legitimate rights over nature. These concerns relate to the external legitimacy of participatory outcomes, which should correspond to the values of the groups represented in the process (for example, livestock owners), but also to the values of broader society external to the specific system if they are to receive political backing (Lundmark et al., 2014). Some have called for participation to be conducted at regional rather than local scales, to capture a wider variety of views, yet wider participatory scales may preclude the integration of local knowedge, which is by definition context specific (Clark & Murdoch, 1997). Moreover, the essential problem remains of addressing the differential distribution of costs and benefits provided by large carnivores across geographic and temporal scales (Linnell, 2015). One possible solution would be a multilevel engagement model that uses a regional process to address large-scale issues and in parallel a local process to address areas of special

concern (Peterson et al., 2005). Multilevel spheres of deliberation would be bridged through cross-level engagement by stakeholders and managers, to ensure that decisions made at one level account for decisions made at another (Peterson et al., 2005; Cash et al., 2006). These systems could serve to formalize and expand co-management governance structures, providing the type of multilevel solutions needed in an increasingly complex and layered world (Agrawal & Ostrom, 2006; Cash et al., 2006). Some studies have explored the potential of MCDA to address scale challenges, and suggest it may be a useful tool to elucidate differences in value across scales and between managers and local stakeholders
(Zerger et al., 2011; Zia et al., 2011; Davies et al., 2013).

The central question determining the legitimacy of a participatory process is the level of influence it has on the actual management decisions (Reed, 2008; Pound, 2015). Consensus oriented approaches would argue that processes should be given direct decision powers (see for example Todd, 2002), while public trusts proponents would argue that participatory processes of the kind we developed should be consultative, and that the weight of responsibility should be placed on policymakers to make sense of disputed preferences and to balance them against broader society goals (Peterson et al., 2005). Whichever approach is taken, the process must achieve practical outcomes if participants are expected to remain invested over time, or it otherwise risks exacerbating conflict and mistrust in management authorities as well as in participatory processes. The participants involved in our workshops were aware of the experimental nature of the process, which brings us to stress the importance of having clear, realistic and agreed upon goals (Reed, 2008). Nonetheless, they wanted action to follow. This would require participation to continue with the involvement of policy

makers, thus becoming a more institutionalized process (Stringer et al., 2006; Reed, 2008). The potentially iterative structure of MCDA makes it a method that can be easily repeated as representation is extended, conditions change, and new information becomes available (Davies et al., 2013). Since this experience, a new participatory process is now underway within the EU platform on coexistence between people and large carnivores. This has seen the involvement of four same participants from this study and is aimed at reaching further agreement on the implementation of wolf management actions (Salvatori et al., 2020).

5.3. Methodological caveats

We also identified specific methodological limitations in our approach that may aid further application of the MCDA method in the field. As suggested by the participants, the number of criteria should be significantly reduced and better conceptualized as a list of shared norms and objectives, to allow a more in-depth discussion regarding their definition and facilitate the process as a whole (Gregory et al., 2012). Feedback from environmentalists suggested that the method produced some surprising results, as they would have expected damage prevention to rank higher among their preferred management options. Surprising results can be important as participants could be learning about their own views as well as being influenced by those of others. However, respondents should have a clear understanding of how results occurred, suggesting that calculations should be more transparent and the process iterative. Tablets and real-time analysis through pre-coded software could make the process more interactive. Management orientations were constructed as non-exclusive options, because our initial objective was to uncover areas of overlap across

stakeholder groups, but further applications of the method may consider arranging management orientations into fully exclusive scenarios to emphasize trade-offs.

6. Concluding remarks

As a whole we found the MCDA method useful in facilitating dialogue between different stakeholders, and in assisting them to explore their own views as well as the other stakeholder's views in an objective and systematic way. The method proved useful in structuring an intense but peaceful discussion despite the highly polarized and conflictual context, and could be replicated and expanded with further participation of management authorities to enhance the acceptability and legitimacy of management decisions. The results we obtained should not be taken as final, and instead should be used to understand stakeholder values, knowledge systems and preferences, forming a basis on which to further deliberate and negotiate solutions (Mustajoki et al., 2011). In this respect, some have warned against the tendency to place too much confidence on the participation method employed, stressing that this is only a tool (Hailey, 2001). More fervent supporters of the theory of pluralistic agonism would likely argue for less structured and prescriptive participatory methods. To assess the influence of the chosen method on the discursive practices that took place, greater emphasis could be given to analysing the quality of discourse taking place in the workshops identifying, for example, instances where alternative perspectives are introduced and explored, and instances when dissent is suppressed (Stirling, 2006; Hallgren & Westberg, 2015; Lundmark & Matti, 2015; Von Essen & Hansen, 2015). This would help to identify those procedures that facilitate the deliberation process and the emergence of sub-altern voices. Informal, non-formulaic forms of participant observation and collaborative behaviour can be equally important and, especially in

cases of such pronounced conflict, must proceed the participatory process. In our case, organizing and carrying out the workshops in a climate of openness was possible only because of the intensive work we previously carried out in close contact with farmers and other stakeholders.

We argue our experience offers insights regarding the role of science in the context of value and knowledge-based conflicts. By placing emphasis on stakeholder knowledge regarding the impact of management on criteria, our results could be used in the future to identify knowledge gaps, test assumptions on which value judgements are made, and prioritize areas of research in a transparent way. Having participation inform research goals may help justify research spending and increase trust in the scientific process. Our results show that research and monitoring were among the management approaches that ranked highest across all stakeholder groups. So, on the one hand our experience shows the importance of acknowledging different knowledge systems to understand how local perceptions are formed, on the other it shows the potential for collaboration and co-production of knowledge.

The field of deliberative democracy and its critiques provides a useful framework of analysis for processes aimed at mitigating conservation conflicts. Participatory approaches that transform antagonists into agonists who may have different priorities but who share a common understanding of each other's perspectives, are particularly suited to situations like ours, where full consensus may be impossible to reach, but where stakeholders are likely to converge over some fundamental values and management interventions (Mouffe, 2000a; Dryzek & Niemeyer, 2006). Large carnivore management is a divisive topic exactly because it has come to symbolize

the juxtaposition of opposites: human/nature realms, scientific/lay knowledge, local/global cultures, livestock farmers/animal welfare groups (Figari & Skogen, 2011; Marvin, 2012; Büscher & Fletcher, 2019). It is by challenging the antagonistic nature of these constructs and by accepting their respective claims for legitimacy, that we can begin to develop innovative solutions.

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8. Bibliography

Adams, W. M. (2015). The political ecology of conservation conflicts. In S. M Redpath, R. J. Gutiérrez, K. A. Wood, & J. C. Young (Eds.), *Conflicts in conservation: navigating towards solutions*. https://doi.org/https://doi.org/10.1017/CBO9781139084574.006

Agrawal, A. (2005). Environmentality community, intimate government, and the making of environmental subjects in Kumaon, India. *Current Anthropology*, *46*(2), 161–190.

Agrawal, A., & Ostrom, E. (2006). Political science and conservation biology: a dialog of the deaf. *Conservation Biology*, *20*(3), 681–682. https://doi.org/10.1111/j.1523-1739.2006.00468.x

Ainsworth, G. B., Redpath, S. M., Wilson, M., Wernham, C., & Young, J. C. (2020).

Integrating scientific and local knowledge to address conservation conflicts: Towards a practical framework based on lessons learned from a Scottish case study. *Environmental Science and Policy*, *107*, 46–55. https://doi.org/10.1016/j.envsci.2020.02.017

BDN. (2014). Banca Dati Nazionale dell'Anagrafe Zootecnica istituita dal Ministero della Salute presso il CSN dell'istituto BG Caporale di Teramo. Updated 31 December 2014. Retrieved from https://www.vetinfo.it

Bennett, N. J., Roth, R., Klain, S. C., Chan, K. M. A., Clark, D. A., Cullman, G., … Veríssimo, D. (2017). Mainstreaming the social sciences in conservation. *Conservation Biology*, *31*(1), 56–66. https://doi.org/10.1111/cobi.12788

Bulte, E. H., & Rondeau, D. (2005). Why compensating wildlife damages may be bad for conservation. *Journal of Wildlife Management*, *69*, 14–19. https://doi.org/10.2193/0022-541X(2005)069<0014:WCWDMB>2.0.CO;2

Büscher, B., & Fletcher, R. (2019). Towards convivial conservation. *Conservation and Society*, *17*(3), 283–296. https://doi.org/10.4103/cs.cs_19_75

Cash, D. W., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., … Young, O. (2006). Scale and cross-scale dynamics: governance and information in a multilevel world. *Ecology and Society*, *11*(2). https://doi.org/10.5751/ES-01759-110208

Chapron, G., Kaczensky, P., Linnell, J. D. C., von Arx, M., Huber, D., Andrén, H., … Boitani, L. (2014). Recovery of large carnivores in Europe's modern human-dominated landscapes. *Science*, *346*, 1517–1519. https://doi.org/10.1126/science.1256620

Clark, J., & Murdoch, J. (1997). Local knowledge and the precarious extension of

scientific networks: A reflection on three case studies. *Sociologia Ruralis*, *37*(1), 38–60.

Cooke, B., & Kothari, U. (2001). The case for participation as tyranny. In B. Cooke & U. Kothari (Eds.), *Participation: The new tyranny?* (pp. 1–15). https://doi.org/10.1093/afraf/101.402.132

Cortés-Vázquez, J. A., & Ruiz-Ballesteros, E. (2018). Practising nature: A phenomenological rethinking of environmentality in natural protected areas in Ecuador and Spain. *Conservation and Society*, *16*(3), 232–242. https://doi.org/10.4103/cs.cs_16_158

Davies, A. L., Bryce, R., & Redpath, S. M. (2013). Use of Multicriteria Decision Analysis to address conservation conflicts. *Conservation Biology*, *27*, 936–944. https://doi.org/10.1111/cobi.12090

Dempsey, J. (2010). Tracking grizzly bears in British Columbia's environmental politics. *Environment and Planning A*, *42*, 1138–1157. https://doi.org/10.1068/a42214

Dressel, S., Sandström, C., & Ericsson, G. (2015). A meta-analysis of studies on attitudes toward bears and wolves across Europe 1976–2012. *Conservation Biology*, *29*, 565–574. https://doi.org/10.1111/cobi.12420

Dryzek, J. S., & Niemeyer, S. (2006). Reconciling pluralism and consensus as political ideals. *American Journal of Political Science*, *50*(3), 634–649. https://doi.org/10.1111/j.1540-5907.2006.00206.x

Elster, J. (1998). Deliberation and constitution making. In *Deliberative democracy* (pp. 97–122). https://doi.org/10.1017/CBO9781139567206.007

Esmail, B. A., & Geneletti, D. (2017). Multi-criteria decision analysis for nature

conservation: A review of 20 years of applications. *Methods in Ecology and Evolution*, *9*(1), 42–53. https://doi.org/10.1111/2041-210X.12899

Evans, L. A., & Adams, W. M. (2018). Elephants as actors in the political ecology of human-elephant conflict. *Transactions of the Institute of British Geographers*, 1–16. https://doi.org/10.1111/tran.12242

Figari, H., & Skogen, K. (2011). Social representations of the wolf. *Acta Sociologica*, *54*(4), 317–332. https://doi.org/10.1177/0001699311422090

Ghosal, S., Skogen, K., & Krishnan, S. (2015). Locating human-wildlife interactions: landscape constructions and responses to large carnivore conservation in India and Norway. *Conservation and Society*, *13*(3), 265. https://doi.org/10.4103/0972-4923.170403

Goldman, M. J., de Pinho, J. R., & Perry, J. (2010). Maintaining complex relations with large cats: Maasai and lions in Kenya and Tanzania. *Human Dimensions of Wildlife*, *15*(5), 332–346. https://doi.org/10.1080/10871209.2010.506671

Grupo Campo Grande. (2016). *Declaration of the Campo Grande Group toward the coexistence fo the iberian wolf and extensive stock-raising*. Retrieved from http://www.grupocampogrande.org/wp-content/uploads/2018/10/DeclaracionGCG_v3_eng.pdf

Hailey, J. (2001). Beyond the formulaic: process and practice in South Asian NGOs. In B. Cooke & U. Kothari (Eds.), *Participation: The new tyranny?* (pp. 88–101). London: Zed Books.

Hallgren, L., & Westberg, L. (2015). Adaptive management? Observations of knowledge coordination in the communication practice of Swedish game management. *Wildlife Biology*, *21*(3), 165–174.

https://doi.org/10.2981/wlb.00005

Hanley, N. (2015). Understanding conservation conflicts: an economic perspective. In S. M. Redpath, R. J. Gutiérrez, K. A. Wood, & J. C. Young (Eds.), *Conflicts in conservation: navigating towards solutions*. https://doi.org/10.1017/CBO9781139084574

Homewood, K. (2017). “They call it Shangri-La”: Sustainable conservation, or African enclosures? In M. Brightman & J. Lewis (Eds.), *The anthropology of sustainability: Beyond development and progress* (pp. 91–110). https://doi.org/10.1057/978-1-137-56636-2

Huang, I. B., Keisler, J., & Linkov, I. (2011). Multi-criteria decision analysis in environmental sciences: Ten years of applications and trends. *Science of the Total Environment*, *409*(19), 3578–3594. https://doi.org/10.1016/j.scitotenv.2011.06.022

Hutton, J., Adams, W. M., & Murombedzi, J. C. (2005). Back to the barriers? Changing narratives in biodiversity conservation. *Forum for Development Studies*, *32*(2), 341–370. https://doi.org/10.1080/08039410.2005.9666319

Kansky, R., Kidd, M., & Knight, A. T. (2014). Meta-analysis of attitudes toward damage-causing mammalian wildlife. *Conservation Biology*, *28*(4). https://doi.org/10.1111/cobi.12275

Kothari, U. (2001). Power, knowledge and social control in participatory development. In B. Cooke & U. Kothari (Eds.), *Participation: The new tyranny?* (pp. 139–152). London: Zed Books.

Lescureux, N., & Linnell, J. D. C. (2010). Knowledge and perceptions of Macedonian hunters and herders: The influence of species specific ecology of bears, wolves,

and lynx. *Human Ecology*, *38*(3), 389–399. https://doi.org/https://doi.org/10.1007/s10745-010-9326-2

Linnell, J. D. C. (2015). Defining scales for managing biodiversity and natural resources in the face of conflicts. In S. M. Redpath, R. J. Gutiérrez, K. A. Wood, & J. C. Young (Eds.), *Conflicts in conservation: Navigating towards solutions* (pp. 212–225). https://doi.org/10.1017/9781139084574.016

Linnell, J. D. C., Kaczensky, P., Wotschikowsky, U., Lescureux, N., & Boitani, L. (2015). Framing the relationship between people and nature in the context of European conservation. *Conservation Biology*, *0*(0), 1–8. https://doi.org/10.1111/cobi.12534

López-Bao, J. V., Chapron, G., & Treves, A. (2017). The Achilles heel of participatory conservation. *Biological Conservation*, *212*, 139–143. https://doi.org/10.1016/j.biocon.2017.06.007

López-Bao, J. V., Kaczensky, P., Linnell, J. D. C., Boitani, L., & Chapron, G. (2015). Carnivore coexistence: Wilderness not required. *Science*, *348*(6237), 871–872. https://doi.org/10.1126/science.348.6237.871-b

Lundmark, C., & Matti, S. (2015). Exploring the prospects for deliberative practices as a conflict-reducing and legitimacy-enhancing tool: the case of Swedish carnivore management. *Wildlife Biology*, *21*(3), 147–156. https://doi.org/10.2981/wlb.00009

Lundmark, C., Matti, S., & Sandström, A. (2014). Adaptive co-management: How social networks, deliberation and learning affect legitimacy in carnivore management. *European Journal of Wildlife Research*, *60*(4), 637–644. https://doi.org/10.1007/s10344-014-0827-y

Madden, F., & McQuinn, B. (2014). Conservation's blind spot: The case for conflict transformation in wildlife conservation. *Biological Conservation*, *178*, 97–106.

Marino, A., Braschi, C., Ricci, S., Salvatori, V., & Ciucci, P. (2016). Ex post and insurance-based compensation fail to increase tolerance for wolves in semi-agricultural landscapes of central Italy. *European Journal of Wildlife Research*, *62*(2), 227–240. https://doi.org/10.1007/s10344-016-1001-5

Marvin, G. (2012). *Wolf*. London: Reaction Books LTD.

Marvin, G., & McHugh, S. (2014). *Routledge handbook of human-animal studies*. https://doi.org/10.4324/9780203101995

Mishra, C. (2016). *The partners principles for community-based conservation*. Seattle, USA: Snow Leopard Trust.

Mosse, D. (2001). "People's knowledge", participation and patronage. In B. Cooke & U. Kothari (Eds.), *Participation: The new tyranny?* (pp. 16–35). London: Zed Books.

Mouffe, C. (2000a). Deliberative democracy or agonistic pluralism? *Political Science Series*, 1–17. https://doi.org/10.2307/40971349

Mouffe, C. (2000b). *The democratic paradox*. London: Verso.

Mustajoki, J., Saarikoski, H., Marttunen, M., Ahtikoski, A., Hallikainen, V., Helle, T., … Ylisirniö, A. L. (2011). Use of decision analysis interviews to support the sustainable use of the forests in Finnish Upper Lapland. *Journal of Environmental Management*, *92*(6), 1550–1563. https://doi.org/10.1016/j.jenvman.2011.01.007

Parkins, J. J. R., & Mitchell, R. R. E. R. (2005). Public participation as public debate:

A deliberative turn in natural resource management. *Society and Natural Resources*, Vol. 18, pp. 529–540. https://doi.org/10.1080/08941920590947977

Pellis, A., Pas, A., & Duineveld, M. (2018). The persistence of tightly coupled conflicts. The case of Loisaba, Kenya. *Conservation and Society*, *16*(4), 387–396. https://doi.org/10.4103/cs.cs_17_38

Peterson, M. N., Peterson, M. J., & Peterson, T. R. A. I. (2005). Conservation and the myth of consensus. *Conservation Biology*, *19*(3), 762–767. https://doi.org/10.1111/j.1523-1739.2005.00518.x

Pooley, S. (2016). A cultural herpetology of nile crocodiles in Africa. *Conservation and Society*, *14*(4), 391–405. https://doi.org/10.4103/0972-4923.197609

Pooley, S., Barua, M., Beinart, W., Dickman, A., Holmes, G., Lorimer, J., … Milner-Gulland, E. J. (2017). An interdisciplinary review of current and future approaches to improving human–predator relations. *Conservation Biology*, *31*(3), 513–523. https://doi.org/10.1111/cobi.12859

Pound, D. (2015). Designing and facilitating consensus-building – keys to success. In S. M. Redpath, R. J. Gutierrez, K. A. Wood, & J. C. Young (Eds.), *Conflicts in conservation: Navigating towards solutions* (pp. 240–256). https://doi.org/10.1017/CBO9781139084574.018

Redpath, S. M., Arroyo, B., Leckie, F. M., Bacon, P., Bayfield, N., Gutiérrez, R. J., & Thirgood, S. J. (2004). Using decision modeling with stakeholders to reduce human–wildlife conflict: A raptor–grouse case study. *Conservation Biology*, *18*, 350–359. https://doi.org/10.1111/j.1523-1739.2004.00421.x

Redpath, S. M., Gutiérrez, R. J., Wood, K. A., Sidaway, R., & Young, J. C. (2015). An introduction to conservation conflicts. In S. M. Redpath, R. J. Gutiérrez, K. A.

Wood, & J. C. Young (Eds.), *Conflicts in conservation: navigating towards solutions* (pp. 3–18). https://doi.org/http://dx.doi.org/10.1017/CBO9781139084574.002

Redpath, S. M., Linnell, J., Festa-Bianchet, M., Boitani, L., Bunnefeld, N., Dickman, A., … Milner-Gulland, E. J. (2017). Don't forget to look down – collaborative approaches to predator conservation. *Biological Reviews*. https://doi.org/10.1111/brv.12326

Redpath, S. M., Young, J. C., Evely, A., Adams, W. M., Sutherland, W. J., Whitehouse, A., … Gutiérrez, R. J. (2013). Understanding and managing conservation conflicts. *Trends in Ecology & Evolution*, *28*(2), 100–109. https://doi.org/10.1016/j.tree.2012.08.021

Reed, M. S. (2008). Stakeholder participation for environmental management: A literature review. *Biological Conservation*, *141*(10), 2417–2431. https://doi.org/10.1016/j.biocon.2008.07.014

Ricci, S., Salvatori, V., & Ciucci, P. (2018). *Indagine sulla presenza del lupo in provincia di Grosseto. Progetto LIFE MEDWOLF. Istituto di Ecologica Applicata, Roma*.

Ripple, W. J., Chapron, G., López-Bao, J. V., Durant, S. M., Macdonald, D. W., Lindsey, P. A., … Zhang, L. (2016). Saving the world's terrestrial megafauna. *BioScience*, *66*(10), 807–812. https://doi.org/10.1093/biosci/biw092

Robbins, P. (2012). *Political ecology: A critical introduction* (Second Edi). Chichester, West Sussex, UK: Wiley-Blackwell.

Salvatori, V., Balian, E., Blanco, J. C., Ciucci, P., Demeter, L., Hartel, T., … Young, J. C. (2020). Applying participatory processes to address conflicts over the

conservation of large carnivores: Understanding conditions for successful management. *Frontiers in Ecology and Evolution*, *8*, 1–14. https://doi.org/10.3389/fevo.2020.00182

Salvatori, V., Godinho, R., Braschi, C., Boitani, L., & Ciucci, P. (2019). High levels of recent wolf × dog introgressive hybridization in agricultural landscapes of central Italy. *European Journal of Wildlife Research*, *65*(5). https://doi.org/10.1007/s10344-019-1313-3

Sandström, C. (2009). Institutional dimensions of comanagement: Participation, power, and process. *Society & Natural Resources*, *22*(3), 230–244. https://doi.org/10.1080/08941920802183354

Singh, N. M. (2018). Introduction: affective ecologies and conservation. *Conservation and Society*, *156*(1), 1–7. https://doi.org/10.4103/cs.cs

Sjölander-Lindqvist, A., Johansson, M., & Sandström, C. (2015). Individual and collective responses to large carnivore management: The roles of trust, representation, knowledge spheres, communication and leadership. *Wildlife Biology*, *21*(3), 175–185. https://doi.org/10.2981/wlb.00065

Skogen, K., & Krange, O. (2003). A wolf at the gate: The anti-carnivore alliance and the symbolic construction of community. *Sociologia Ruralis*, *43*(3), 309–325. https://doi.org/10.1111/1467-9523.00247

Sterling, E. J., Betley, E., Sigouin, A., Gomez, A., Toomey, A., Cullman, G., … Luz, A. (2017). Assessing the evidence for stakeholder engagement in biodiversity conservation. *Biological Conservation*, *209*, 159–171. https://doi.org/10.1016/j.biocon.2017.02.008

Stirling, A. (2006). Analysis, participation and power: Justification and closure in

participatory multi-criteria analysis. *Land Use Policy*, *23*(1), 95–107. https://doi.org/10.1016/j.landusepol.2004.08.010

Stringer, L., Dougill, A., Fraser, E., Hubacek, K., Prell, C., & Reed, M. S. (2006). Unpacking “participation” in the adaptive management of social–ecological systems: A critical review. *Ecology and Society*, *11*(2), 39. https://doi.org/10.5751/ES-01896-110239

Todd, S. (2002). Building consensus on divisive issues: A case study of the Yukon wolf management team. *Environmental Impact Assessment Review*, *22*(6), 655–684. https://doi.org/10.1016/S0195-9255(02)00034-3

Treves, A., Chapron, G., López-Bao, J. V., Shoemaker, C., Goeckner, A. R., & Bruskotter, J. T. (2015). Predators and the public trust. *Biological Reviews*. https://doi.org/10.1111/brv.12227

Treves, A., Wallace, R. B., & White, S. (2009). Participatory planning of interventions to mitigate human–wildlife conflicts. *Conservation Biology*, *23*(6), 1577–1587. https://doi.org/10.1111/j.1523-1739.2009.01242.x

Von Essen, E., & Hansen, H. P. (2015). How stakeholder co-management reproduces conservation conflicts: Revealing rationality problems in Swedish wolf conservation. *Conservation & Society*, *13*(4), 332–344. https://doi.org/10.4103/0972-4923.179881

Young, J. C., Jordan, A., Searle, K. R., Butler, A., Simmons, P., & Watt, A. D. (2013). Framing scale in participatory biodiversity management may contribute to more sustainable solutions. *Conservation Letters*, *6*(5), 333–340. https://doi.org/10.1111/conl.12012

Young, J. C., Marzano, M., White, R. M., McCracken, D. I., Redpath, S. M., Carss,

D. N., … Watt, A. D. (2010). The emergence of biodiversity conflicts from biodiversity impacts: Characteristics and management strategies. *Biodiversity and Conservation*, *19*, 3973–3990. https://doi.org/10.1007/s10531-010-9941-7

Young, J. C., Searle, K., Butler, A., Simmons, P., Watt, A. D., & Jordan, A. (2016). The role of trust in the resolution of conservation conflicts. *Biological Conservation*, *195*, 196–202. https://doi.org/http://dx.doi.org/10.1016/j.biocon.2015.12.030

Zerger, A., Warren, G., Hill, P., Robertson, D., Weidemann, A., & Lawton, K. (2011). Multi-criteria assessment for linking regional conservation planning and farm-scale actions. *Environmental Modelling and Software*, *26*(1), 103–110. https://doi.org/10.1016/j.envsoft.2010.04.001

Zia, A., Hirsch, P., Songorwa, A., Mutekanga, D. R., O'Connor, S., McShane, T., … Norton, B. (2011). Cross-scale value trade-offs in managing social-ecological systems: The politics of scale in Ruaha National Park, Tanzania. *Ecology and Society*, *16*(4). https://doi.org/10.5751/ES-04375-160407