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Broadening the toolset for stakeholder engagement 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 one biologist. 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 different social sectors, and a simplification of the methodology which some participants found too complicated and time consuming.

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 (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 and 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 (Hanley, 2015; Kansky et al., 2014; Mishra, 2016; Redpath et al., 2015). Large carnivores are a group of species

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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 and Skogen, 2011) but are also considered charismatic animals that can come to symbolize notions of wilderness and of the need to preserve it (Figari and Skogen, 2011; Linnell et al., 2015; Marvin, 2012). 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 (Ghosal et al., 2015; Skogen and Krange, 2003).

A large body of literature has been dedicated to exploring the multiple ways in which people perceive and value carnivores (Dressel et al., 2015; Goldman et al., 2010; Lescureux and Linnell, 2010; Marvin, 2012; Pooley, 2016), and how wildlife can become entangled in wider social tensions (Evans and Adams, 2018; Pellis et al., 2018; Skogen and Krange, 2003). 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 (Adams, 2015; Cortes--Vazquez and Ruiz-Ballesteros, 2018; Lundmark et al., 2014; Sandström, 2009). Through these debates, coexistence has come to be understood not just as an emergent relationship between humans and wildlife, but also as a relationship between humans with different worldviews and competing interests concerning wildlife (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 are acceptable to all.

Where traditional approaches (e.g., law enforcement, damage compensation policies and instruments) have failed to mitigate social conflicts, it is essential to experiment with innovative solutions to address social tensions and ecological imbalances. 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-making 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, making them 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. These arguments view participation in environmental decisions as a democratic right, necessary to increase the legitimacy and equity of conservation decisions (Hutton et al., 2005; Reed, 2008), and furthermore stress participation's transformative character, 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 and Westberg, 2015; Lundmark and Matti, 2015; Sjölander-Lindqvist et al., 2015; Von Essen and Hansen, 2015; wolves in Spain: Grupo Campo Grande, 2016). Most critiques to participatory processes focus on the influence they have in shaping policy (Cooke and 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 experiences (Madden and 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 take into account 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 (see for example Ferri, 2014).

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 conflicts 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 and Geneletti, 2017). We based our approach on Dryzek and 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 (Marino et al., 2016). Wolf conservation and management in the province of Grosseto is further complicated by a high level of hybridization between wolves and 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 (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. 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 (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, perceived lack of influence, and resistance to the use of damage prevention measures were widerspread (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 and Mitchell, 2005). Such approaches stress the need to validate multiple values and views, and recognize the power dynamics between them (Dryzek and 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, 2000a; 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 by 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 that of uncovering or constructing a normative meta-consensus across groups (Dryzek and 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 achieved through 7 steps (Fig. 1).

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 workshops, the participatory methods, and the people who took part). The first workshop was carried out 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 (Davies et al., 2013; Todd, 2002; Von Essen and Hansen, 2015). Ensuring the continued participation of farmers proved a real challenge, due to the experimental scope of the workshops, their everyday work commitments, and their disenfranchisement with consultation processes. We therefore chose to also invite technicians from the three main livestock breeding associations, who did not hold managerial positions and worked alongside local livestock breeders. Moreover, since it proved difficult to identify local activists of animal rights groups, we invited a member of a national association that had been vocal in the debate on wolf culling. Given that the project team contributed knowledge on wolf biology, we saw it fit to include the criteria and management option scoring of a biologist of the team in the results to increase the transparency of their contribution to the deliberative process (Kothari, 2001; Mosse, 2001; Pielke, 2007; 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 and the goal of the workshops was debated and clarified; and thirdly once the results of the research were presented in a final meeting, a report was circulated among all participants and consent to publish was obtained.

Before the workshops, we first drafted a preliminary list of criteria, consisting of all the objectives (economic, social, ecological etc.) that require addressing to mitigate social conflicts surrounding wolf conservation in the Province of Grosseto (step 1 in Fig. 1). The first two workshops were aimed at editing and adding criteria, to establish a list of norms that were considered legitimate by all (step 2). The participants then ranked the importance of each item (from 1 to 5; Redpath et al., 2004), 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. This was done through a method known as absolute normalization (Steele et al., 2009) whereby, considering one criterion at a time, participants

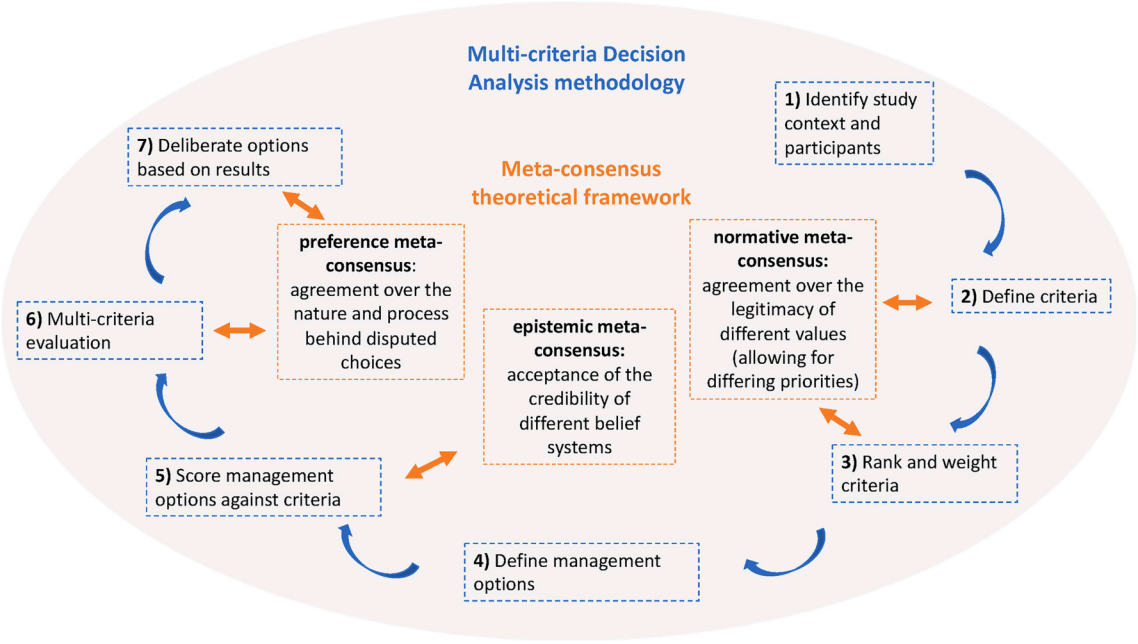


Fig. 1. Functional association between the meta-consensus theoretical framework (Dryzek and Niemeyer, 2006) and multi-criteria decision analysis (Davies et al., 2013 and Gregory et al., 2012).

assigned a score of 100 to the management action they believed best satisfied that criterion, a score of 0 to the management action that least satisfied that criterion, and a score of $0 \leq 100$ to all the other management actions (step 5). We chose to score the performance of management options qualitatively and to involve both stakeholders and scientists in the entire process, as others have done before (Redpath et al., 2004; Treves et al., 2009; Mustajoki et al., 2011). Scoring by individuals was followed by a group deliberation regarding the reasons behind disputed beliefs, which engaged scientists and stakeholders in an open dialogue. Our intent was to integrate scientific and local knowledge, explore competing claims, differences in beliefs, and gaps in or mistrust of information (Ainsworth et al., 2020; Clark and Murdoch, 1997; Davies et al., 2013; Dryzek and Niemeyer, 2006). 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 did so by first transforming the scores assigned to the criteria into weights, so that, for each participant, their sum equalled one (Steele et al., 2009). We then carried out criteria aggregation, by combining weights and scores to derive overall values of each management option across all criteria, through a method known as weighted linear combination (Esmail and Geneletti, 2017). This consists of multiplying criteria weights and management option scores. The resulting scores are then summed across each management option and normalized so that, for each participant, the sum of the scores of all the management options equalled 100. Appendix 2 contains the formulas used for the above analyses. We chose the linear weighted combination over other methods of criteria aggregation (Steele et al., 2009) as we deemed its simplicity more adequate to the multi-stakeholder nature of our workshops (Redpath et al., 2004; Mustajoki et al., 2011). We aggregated the individual results by stakeholder group and allowed participants to discuss the results (step 7). We grouped representatives of the environmental and animal welfare associations together, 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 of objectives, namely: economic, socio-cultural, ecological, landscape, animal welfare and political administrative objectives (Table 1 and Appendix 2). Participants' valuation of the criteria identified several areas of overlap across the stakeholder groups, especially with regards to the economic and socio-cultural criteria (see Appendix 4). Stakeholders largely agreed over the importance of reducing bureaucratic procedures for farmers, mitigating the economic impact of depredations, supporting the production chain associated with livestock breeding, and increasing tourism. There was also very strong consensus regarding the need to maintain traditional herding practices, support farmer's quality of life, prevent depopulation, consider the intrinsic value of wildlife and ecosystems, increase cohesion and mutual respect across social sectors and collect and communicate reliable information 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 wolf's access to non-natural food sources, 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.

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

Table 1
Summary of criteria describing the objectives of wolf management in the Province of Grosseto (see Appendix2 for a more detailed explanation of each criterion).

Economic	Income from milk and meat production
	Milk v.s. meat production
	Time & money for bureaucracy
	Time & money for damage prevention
	Market opportunities
	Impact of depredations
	The whole livestock production chain
	Gastronomic & cultural tourism
	Nature tourism
	Work for conservation technicians
	Hunting tradition, leisure & revenue
Socio- cultural	Traditional herding practices
	Farmers' quality of life
	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	Landscape management: agricultural v.s. natural
	Aesthetics (ex. issue of livestock fences)
Ecological	Impact of non-natural trophic resources on 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
Animal wellbeing	Livestock's wellbeing (quality and specificity of product)
	Wolf's wellbeing
	Hybrid's and feral dog's wellbeing
	Wellbeing of LGDs
Political & administrative	Efficacy of management option in mitigating conflict
	Rationalization of cost
	Law & rule enforcement
	Legal limitations
	Acceptability for:
	Farmers
	Hunters
	Ecologists
	Animal welfare groups
	Local population
	Italian population

(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 management option.

Of all the management strategies, the transversal actions were those that received the highest 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 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 considered reducing free-ranging dogs and wolf-dog hybrids a priority, although they disagreed over how to manage the latter.

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

Management options	
Damage prevention measures	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
Compensation	3. Compensation policy negotiated with farmers
Management of "other" predators	4. Reduction of feral dogs through raising awareness 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	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
Law enforcement	11. Increased police presence to counter illegal killing of wolves
Farming quotas	12. Farming quotas coupled with policies to support farming income
Transversal actions	
a. Promoting farming and rural development: incentives to modernize 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	

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).

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). Most expected the experience to be challenging but hoped to come out of it with a higher level of mutual understanding. By the end of the workshops all 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 was eager "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 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

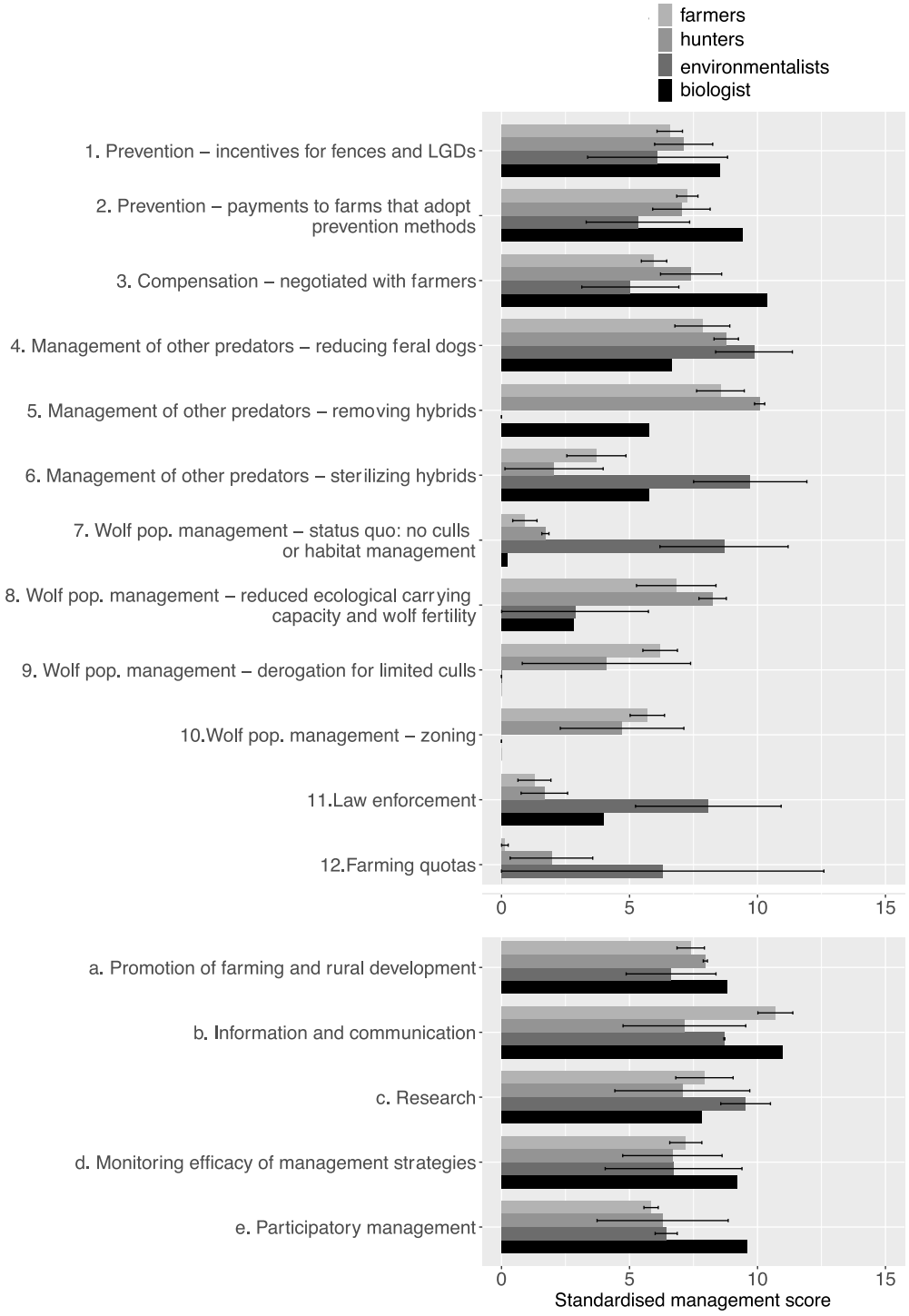


Fig. 2. Ranking of management options (1-12) and transversal actions (a-e) by stakeholder group. Bars represent standardised management scores, calculated through linear weighted combination (see text). The error bars represent standard errors within the stakeholder groups (n= 3 farmers, 3 hunters, 2 environmentalists and 1 biologist).

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, 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 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 uncovering or constructing a meta-consensus (Dryzek and Niemeyer, 2006), whereby participants share common values despite having different priorities, and 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 participants' values and goals regarding wolf management in the Province of Grosseto provided the basis for a shared understanding of the problem among stakeholders. 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 and 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.

Furthermore, although stakeholders did not always agree on specific management options, they all felt that the overall wolf management strategy should be guided by research, monitoring, information dissemination and participation. 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 felt 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 (Dryzek and Niemeyer, 2006; Mouffe, 2000a; 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 and 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. Although lack of full representation influences the outcome of the participatory process and potentially hinders its implementation, success also depends on the inclusion of participants willing to engage in constructive dialogue and accept the legitimacy of other points of view. The dilemma we faced raises questions regarding how best to extend communication and engagement towards non-participating groups and places increased pressure on the process to deliver tangible outcomes. This would ensure that the levels of trust we recorded among workshop participants also extent towards wider society and democratic institutions. The large variability in opinions we recorded within the environmentalist group, reflects the distinct ethical orientations of conservation and animal welfare approaches, 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, and the differential distribution of costs and benefits, both across space and time (Cash et al., 2006; Linnell, 2015; Young et al., 2013). A major critique to environmental participatory processes comes from proponents of the public trust doctrine, who see wider society and future generations as having legitimate rights over nature and view participation outcomes as being disproportionately influenced by a restricted pool of local resource users or economic interests (López-Bao et al., 2017; Peterson et al., 2005; Treves et al., 2015). Most practitioners will agree that participation outcomes must also reflect the values of broader society external to the specific system, if they are to receive political backing (Lundmark et al., 2014). To address this issue, 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 knowledge, which is by definition context specific (Clark and Murdoch, 1997). 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 (Cash et al., 2006; Peterson et al., 2005). 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 and 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 (Davies et al., 2013; Zerger et al., 2011; Zia et al., 2011).

Another central question determining the legitimacy of a participatory process is the level of influence it has on the actual management decisions (Pound, 2015; Reed, 2008). 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. 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 (Reed, 2008; Stringer et al., 2006). 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 (Salvatori et al., 2020). This has seen the involvement of four same participants from this study and is aimed at reaching further agreement on the implementation of some of management actions that, based on our MCDA model, received high support from all stakeholder groups (namely, the damage prevention, damage compensation, research and monitoring, improved communication and awareness building) (Salvatori et al., 2021). The management options on which consensus building approaches were implemented (Pound, 2015; Salvatori et al., 2021), do not require changes in law at the national level, and therefore represent areas of negotiation where local stakeholder participation processes such as ours may have the greatest chance for impact.

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 and facilitate the process (Gregory et al., 2012). Moreover, tablets and real-time analysis through pre-coded software could make the process more transparent and interactive. Finally, given that our initial objective was to uncover areas of overlap across stakeholder groups, we constructed management orientations as non-exclusive options. However, further applications of the method may consider arranging management orientations into fully exclusive scenarios to emphasize trade-offs.

6. Concluding remarks

We found the MCDA method useful in facilitating dialogue between different stakeholders, and in assisting them to explore different views in an objective and systematic way. The method proved useful in structuring an intense but peaceful discussion despite the highly polarized 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 identify those procedures that facilitate the deliberation process and the emergence of sub-altern voices (Hallgren and Westberg, 2015; Lundmark and Matti, 2015; Stirling, 2006; Von Essen and Hansen, 2015). 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.

The exploratory nature of these workshops allowed us to experiment and reflect on the role of science in the context of value and knowledge-based conservation conflicts. Influenced by critical and interpretive literature on participation and conservation (Adams, 2015; Cooke and Kothari, 2001; Robbins, 2012), we sought to acknowledge the ways in which conservation scientists themselves engage in normative judgements, and the ways in which scientific knowledge interacts with 'traditional', experience or place-based knolwedge. We did this by including a biologist in the process of weighing the criteria, thereby making their values and priorities explicit, and by including stakeholders in the process of scoring the management options, thus treating them as equal experts. The dilemma we faced, as we considered the place for knowledge production within our MCDA process, exemplifies what Stirling (2006) refers to as "tensions between designing for participation and designing for analysis (… and therefore between) 'scientifically sound', 'democratically legitimate' or 'contextually appropriate' appraisal processes" (pg. 96–97). Our approach was designed to prioritize social outcomes above the scientific and analytical robustness of the MCDA model we developed. The highly conflictual setting in which we carried out the workshops demanded for an initial focus on building trust and facilitating social learning. This required awarding sub-altern forms of knowledge and experience equal legitimacy and import to that traditionally awarded to scientific knowledge. Our choice to involve stakeholders in determining the consequences and impacts of the management options facilitated a productive dialogue between the stakeholders, the biologist, and the project staff. This was an important step towards reaching an epistemic meta-consensus, and opened up the potential for future collaboration and co-production of knowledge. During the workshops, the participants often turned to the biologist with questions, seemed to value their expertise, and ultimately highly valued actions aimed at imporving research and monitoring activities.

Efforts to bring this exploratory process forward may involve reformulating the role of lay and scientific experts in the process of determining the impacts of management options. Gregory et al. (2012) suggest that stakeholder inputs and multiple sources of evidence may be treated as contending hypotheses, on which further research is developed (see also Redpath et al., 2004). Following this approach, scientific experts would take on a role of honest brokers of policy alternatives (Pielke, 2007) by synthesizing and expanding the scientific knowledge base with which to assess each management alternative. Their expertise would ultimately be used to determine the final scores of the management options but stakeholder deliberation would still be essential to identify potential and unexpected impacts of management interventions, highlight assumptions and knowledge gaps, and prioritize areas of research in a transparent way. In conflictual settings such as ours, stakeholder consultation remains an important avenue to improve the quality of the research, inform research goals, justify spending and

increase trust in the scientific process.

The field of deliberative democracy and its critiques provides a useful framework of analysis for processes aimed at mitigating value and knowledge based 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 (Dryzek and Niemeyer, 2006; Mouffe, 2000b). 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 (Büscher and Fletcher, 2019; Figari and Skogen, 2011; Marvin, 2012). 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.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jenvman.2021.113125.

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Agnese Marino: Conceptualization, Writing – original draft, Methodology, Formal analysis, Visualization; Paolo Ciucci: Conceptualization, Writing – review & editing; Stephen M. Redpath: Conceptualization, Methodology, Supervision; Simone Ricci: Conceptualization, Writing – review & editing; Juliette Young: Conceptualization, Writing – review & editing; Valeria Salvatori: Conceptualization, Writing – review & editing, Project administration, Funding acquisition

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