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Individual and collective responses to large carnivore management: the roles of trust, representation, knowledge spheres, communication and leadership

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Overseeing the continued recovery, dispersal and management of large carnivore populations while simultaneously considering human viability and welfare requires delicately balancing local concerns for rural communities' livelihood prospects and property vulnerability with international concerns for saving threatened species. In this article, we propose an integrated analytical perspective to elucidate how competing interests and power relationships influence the governance and management of contested wildlife resources. However, simply identifying these patterns is not enough. It is also imperative that the interrelationships between broader biophysical, social, political, economic, and cultural contexts and histories be explored in order to describe, analyze and better understand how and why individual and collective responses vary. In doing this, we drew from findings from a variety of social science disciplines (environmental communication, environmental psychology, human ecology, human geography, political science, public administration and social anthropology) and, here, present how social science approaches can enhance understanding of the different layers and contexts of contested natural resource management. Highlighting the individual, socio-cultural, political and institutional dimensions, the article concludes by identifying five recurrent concepts that must be understood and consciously applied to large carnivore governance and management: 1) establishment of trust between people and groups interacting on the subject; 2) fair representation of stakeholder interests; 3) acknowledgement of the different knowledge-spheres, including those based on personal experiences, culture and tradition, and science; 4) communication, based on dialogue about pluralistic perspectives, to collectively formulate and agree on set goals; and 5) leadership emphasising empowerment.

Large carnivores, such as the brown bear *Ursus arctos*, lynx *Lynx lynx*, wolf *Canis lupus* and wolverine *Gulo gulo*, have recently returned to the Swedish landscape. Since their return, conservation and management of these species has become more of a political and socio-cultural challenge than a purely biological matter (Treves et al. 2006). A pattern visible in most of Europe where large carnivores are recolonising their former distribution range (Dressel et al. 2015). Managing the associated socio-ecological conflicts, without destroying the viability or welfare of wildlife and humans, requires balancing local concerns for rural community livelihoods and vulnerable property with international concerns for saving threatened species (Treves et al. 2006, Sjölander-Lindqvist 2009). It is increasingly important to articulate these concerns while being sensitive to human individual factors, such as perceptions, triggered emotions, values, attitudes, and norms, pertaining to large carnivores. These factors must be understood within a wider context consisting of social, cultural, and political dynamics. The humanities and social sciences are crucial for understanding these dimensions, which shape the legitimacy of policy development, implementation and management.

Ten years ago, the first steps were taken in Sweden to explore the political–institutional and socio-cultural dimensions of Swedish large carnivore management (Cinque 2008, Sjölander-Lindqvist 2006, 2008, 2009). This research field has grown and now encompasses various theoretical perspectives and disciplines, including economics, environmental communication, environmental psychology, human ecology, human geography, political science, public administration and social anthropology. Different study designs and quantitative and qualitative data provide insights into how we can understand human–societal responses to large carnivores and related management efforts. Departing from this research field, which developed over the last decade, we aim to synthesize these approaches and present an integrated analytical model of recurring findings. Our goals are to visualize broader contexts, and realize the different individual, social, cultural, institutional and political dimensions involved. Our work departed from a workshop aimed at gathering Swedish social scientists involved in research on large carnivores and was funded by the Swedish Environmental Protection Agency and the Swedish Association for Hunting and Wildlife Management through the Wildlife Management

Fund ('Viltvårdsfonden'). The research presented at this workshop is reported in six scientific papers presented in this volume (Cinque 2015, Eriksson et al. 2015, Hallgren and Westberg 2015, Frank et al. 2015, Lundmark and Matti 2015, Sjölander-Lindqvist 2015).

While we by triangulation contrasted and combined results from different studies, two specific patterns appeared in the papers that may contribute to an assessment of the current status of large carnivore governance and management. First, analyses of individuals' perspectives on large carnivores and their management at the national and local levels provided an important basis for understanding public as well as stakeholder responses to politics and different management efforts. Second, at the collective level, investigations of arrangements and the capacities of institutions, i.e. rules and norms, and institutional arrangements to reduce conflicts and enhance legitimacy, indicated the significance of understanding the relationships between the designs of such measures and their contributions to increasing local leverage. Our investigations also suggested a need to create a more resilient administration that is attentive to local conditions.

Hence, the governing and managing of ecosystems as complex and adaptive and socio-ecological systems demands an integrated human-in-nature viewpoint for handling aspects of legitimacy (Fig. 1). We argue that this shift creates a need for considering how diversity in individual and collective human responses relates to, and shapes, the systems (Newell et al. 2005, Folke 2007, Ostrom 2009). In the context of large carnivore management, individuals and groups engage with different animal species. Here, we acknowledge the role of the animal species while putting humans, as individuals and as groups, in the limelight. We address individual and collective responses to changes, initiated by increasing populations of large carnivores, in socio-cultural, political–institutional systems. These responses may be expressed by individuals as feelings, thoughts, and actions, which may, in turn, shape group responses that could manifest through political mobilization at various societal levels and in different fora. In Sweden, the latter has prompted the development of new institutional arrangements and management procedures to satisfy both individuals and groups. Thus, individual and collective responses feed jointly back into the socio-ecological system, and can be assessed through various aspects such as for example trust and representation contributing to the legitimacy of the system.

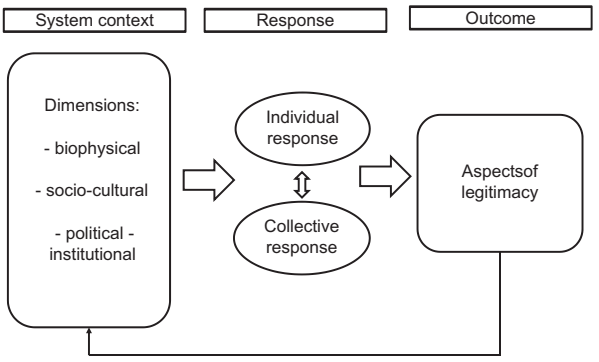

Figure 1. Integrated analytical model of human responses to large carnivore governance.

Individual and collective responses to changes in the socio-ecological system

There is continuous interaction between a person and his/her physical and social environments. This suggests that any change in the person's internal state or external environmental condition will be appraised and will thereby trigger a response (Moser and Uzzell 2003, Gifford 2007). An appraisal may occur via different degrees of processing, e.g. automatic versus highly cognitive processing which takes abstract criteria into account (Leventhal and Scherer 1987; for application on large carnivore stimuli see Johansson et al. 2012a, Flykt et al. 2013). In our case, abstract criteria would include environmental value orientation (Bjerke and Kaltenborn 1999, Skogen and Thrane 2008), wildlife value orientation (Fulton et al. 1996) and personal norms (Heberlein 2012). Appraisal at the cognitively elaborate level will, according to Küller's Human environment interaction model (1991), depend on the situation, and will account for: physical (e.g. presence of a certain animal species) and social (e.g. relationships with the local community and the authorities) conditions; activities in which a person is involved (e.g. hunting, farming, berry-picking); and personal characteristics (such as age, gender, personality, previous experiences, values, attitudes, norms and knowledge). The resulting response could be either status quo, or change of perception, emotion and/or behavior towards the presence of the carnivores and/or their management.

In terms of collective responses, the analysis of large carnivore governance and management has focused primarily on institutional change and the extent to which new management practices may mollify individual and collective reactions, to increasing populations of large carnivores. This study approach developed from the understanding that formal rules and informal norms set the framework for interaction between humans and large carnivores (Sandström et al. 2009, Decker et al. 2012). This approach also considers the changing function of the state, as indicated by the heading, 'from government to governance', the roles of public and private actors, as well as power-sharing in various decision-making arrangements, and the related implications for creating and mitigating conflicts (Decker et al. 2012). Exploring formal rules, informal norms (that govern society's behaviors), and various institutional settings helped to clarify how group interactions are interpreted and potentially transformed into collective action. The aspects we explored also elucidated the extent to which governance is perceived as legitimate (Ratamäki 2008, Hiedanpää and Bromley 2011, Stöhr and Coimbra 2013). As we outline in Fig. 1, the different case studies, analyzed in the individual articles of this special issue, explore to varying degrees individual, social, cultural, political and institutional dimensions of large carnivores and large carnivore management. We suggest that these different dimensions can be understood in terms of individually and collectively situated responses to changes in the natural, socio-cultural, political, and institutional environments of people. These responses, in turn, can be assessed through different key aspects of legitimacy. First, however, we describe the biophysical context to which these aspects are a response to.

The socio-ecological system; biophysical, socio-cultural and political–institutional dimensions

The histories and developments of the four large carnivore populations in Sweden exhibit a common element – intensive hunting by humans, including bounty hunting of wolves and bears for fur, and protection of domestic livestock. In all four cases, the carnivores were near extinction and were therefore protected from hunting, (the wolverine: since 1969; the lynx: 1928–1942 and 1986–1995; the bear: 1913–1981; the wolf: since 1965); as a result, they slowly increased in numbers (Fig. 2).

There are currently about 3300 bears in Sweden. The number of lynx has also recovered, and according to the latest survey results from 2012 there were about 1000 animals. Both species populations are large enough, in parts of the country, for annual licensed hunting. The wolverine population has also increased to about 720, but is still considered vulnerable, which is why no licensed hunting is conducted.

The wolf population was estimated at only four in Scandinavia (Norway and Sweden) in the early 1980s. Since then, increases in the number of wolves, packs and scent-marking pairs have occurred. These increases are jeopardized by inbreeding and illegal hunting, with the latter perceived as symptomatic of current social conflict (Committee of Environment and Agriculture 2009/10:MJU8, Liberg et al. 2005, 2011, Sand et al. 2010, Ministry of the Environment 2007). In sum, Fig. 2 visualises the recovery of Swedish large carnivore populations.

The socio-cultural system – individual responses

In recent years, research on the consequences of the return of large carnivores to Sweden has intensified. The re-colonisation of large carnivores can be considered a success based on their population increase and geographical dispersal (Carlgren 2009). A majority of Swedes upholds positive attitudes about the presence of large carnivores in Sweden. The most favorable attitudes are expressed towards lynx, followed by brown bear, wolverine and wolf (Sandström and Ericsson 2009). However, it appears that attitudes about wolves became more unfavorable again in wolf areas. For example, in 2004, 58% reported favorable attitudes in Mid Sweden, while 48% were of the same opinion in 2009 (Ericsson et al. 2013, 2015), a trend that have also been identified in other countries (Treves et al. 2013). Surveys also demonstrate a strong divide between people residing within and outside of areas colonized by large carnivores (Eriksson et al. unpubl.). Interview studies demonstrate how the return of grey wolves, in particular, to rural Mid Sweden has elicited strong feelings among the local community (Sjölander-Lindqvist 2008, 2009). Some residents appreciate the local presence of large carnivores in the immediate vicinity, which may provide livelihood opportunities such as ecotourism (Ednarsson 2005). Others perceive it as a nuisance or source of stress (Johansson et al. 2012a, Sjölander-Lindqvist 2008, 2009) and feelings of fear are not uncommon (Frank et al. 2015). Farmers, hunters, and reindeer herders living in or adjacent to large carnivore territories see the animals as intrusive on local life and culture, and obstructive of small-scale farming, hunting, reindeer husbandry and outdoor activities (Pyka et al. 2007, Sjölander-Lindqvist 2008, 2009, Zabel and Holm-Müller 2008). Econometric estimates confirm increased social costs due to greater numbers of large carnivores (Bostedt and Grahn 2008).

For fear of exposing dogs and livestock to prowling wolves, hunters, farmers and reindeer herders have argued for control of the wolf population to protect rural heritage and the rights and property of people residing in wolf-inhabited lands (Woodroffe et al. 2005, Sjölander-Lindqvist 2009). Recent studies show that people who coexist with large carnivores in rural areas are likely to differ from managing

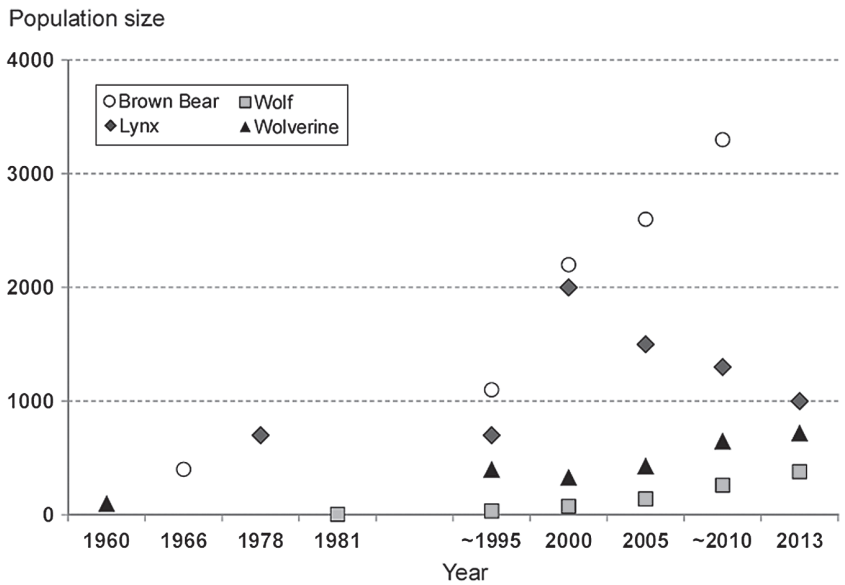

Figure 2. The development of brown bear, wolf, lynx and wolverine populations. Population sizes are not directly comparable since estimates are based on different monitoring methods, and the years of measurement differ slightly (lynx population: Liberg and Andrén 2006, Andrén and Liberg 2008, Andrén et al. 2011, Zetterberg 2013, brown bear population: Kindberg et al. 2011, wolverine population: Persson and Brøseth 2011, wolf population: Sand et al. 2010, Svensson et al. 2013).

authorities in their appraisal of the species, e.g. perceived danger (Johansson and Karlsson 2011), and their value orientation (Ericsson and Heberlein 2003, Skogen and Krange 2003). According to another argument, the resurgence of large carnivore populations resulted from dominance of managing authorities' urban environmental values over rural residents' traditional values (Blekesaune and Rønningen 2010).

As protests against the growth of large carnivore populations and its socio-cultural and political impact have increased, mobilization of groups in favor of species conservation has also gained momentum. Besides the World Wildlife Fund (WWF), there are two major national organizations that promote large carnivore conservation in Sweden. The Swedish Carnivore Association's sole purpose is to protect large carnivores, and the Swedish Society for Nature Conservation works with a broad range of environmental issues. Research shows that all three organizations are strongly supported by the public and, by taking advantage of opportunities to appeal government decisions to the European Court of Justice and Swedish Administrative Courts, they maintain firm influence on large carnivore governance and management (Sandström and Ericsson 2009).

Socio-cultural norms related to large carnivores in Sweden are largely characterized by lack of trust among the public, local, regional, and national authorities, and stakeholder groups, especially in areas with permanent large carnivore populations large carnivores are present (Skogen and Thrane 2008, Sjölander-Lindqvist 2008, Ericsson et al. 2013, Lundmark and Matti 2015).This warrants special attention since mistrust fuels feelings of fear (Johansson et al. 2012a). Fear is, in turn, negatively associated with a willingness-to-pay for large carnivore policy (Johansson et al. 2012b), as well as with the implementation of management strategies (Prokop and Fancovicova 2010, Jacobs et al. 2012, Slagle et al. 2012).

Political and institutional systems – collective responses

Due to increasingly intense conflicts between stakeholder groups and reduced trust in the authorities, the government decided to introduce the first coherent large carnivore policy in Sweden in 2001. The policy, an adaptation of the EU Habitats Directive (Council Directive 92/43/EEC of 21 May 1992), defines ecological criteria for the four species based on population targets, and introduces opportunities for public participation to reduce conflicts and regain trust. Brown bear and lynx species had met the population target and had achieved short-term viability at the time of the parliamentary decision. These species were assigned minimums for annual regeneration. Wolf and wolverine species were assigned temporary population targets which would be re-evaluated once achieved.

Large carnivore management proceeded in a top–down manner before the parliament decided to initiate a format for increased stakeholder participation. Its design was exclusive, only allowing external input from natural science that decision-makers deemed necessary for recovering the wolves in the fauna (Cinque 2008, Sandström et al. 2009). In light of local conflicts regarding large carnivore presence, mistrust, and the administrations' difficulties attaining local consent for politics and policy implementation, multi-stakeholder committees called Regional Predator Groups (RPGs) were introduced as an incentive that would complement the formal management process. The purpose of RPGs was to generate trust in, credibility for, and commitment to predator policy implementation, and to reduce conflict long term (Cinque 2008, Sandström et al. 2009, Cinque and Sjölander-Lindqvist 2011, Hallgren and Westberg 2015, Lundmark and Matti 2015).

In 2005, the Swedish government evaluated the RPGs. The evaluation concluded that the incentive had been insufficiently designed, and the authorities were incapable of establishing efficient, trustworthy policy implementation and meaningful participation standards (Faugert et al. 2005). Farmers and hunters continued to feel excluded from management and decision-making (Sjölander-Lindqvist 2008, Sandström et al. 2009). This inspired the establishment of Predator Emergency Groups (PEGs) in the counties of Dalarna and Värmland – an incentive intended to encourage dialogue between County Administrative Boards (CABs) and hunters and farmers who have suffered economic damages due to large carnivore attacks on livestock. PEGs were also expected to eventually lead to a reconstructed interface between the state and the public that more effectively addressed questions concerning large carnivore presence (Cinque and Sjölander-Lindqvist 2011).

Deficits in the legitimacy of previous policy, identified by both stakeholders and the general public, have influenced the launch of new regulatory arrangements supporting decentralized decision-making (Sandström et al. 2009, Sjölander-Lindqvist et al. 2010). A new structure for large carnivore management was implemented because RPGs failed to increase local leverage and locally-approved decisions (Ministry of Environment 2007). According to governmental inquiry, groups still remained polarized. Some perceived large carnivores, particularly the wolf, as part of a threatened ecosystem and requiring protection to promote faunal diversity. Others maintained that the countryside in rural Sweden, local traditions, and livelihoods were jeopardized by the reappearance of large carnivores in forest fringe and mountainous areas (Committee of Environment and Agriculture 2013/14:MJU7 2009/10: MJU8, Sjölander-Lindqvist 2008). This resulted in reform involving: discontinuation of RPGs, implementation of regional Wildlife Management Delegations, or WMDs (Hallgren and Westberg 2015, Lundmark and Matti 2015), introduction of quota-regulated wolf hunting (Cinque 2015), and a proposal to introduce 20 wolves from Finland and Russian Karelia (to strengthen the genetic diversity of the population). The last suggestion was however never realised.

One consequence of introducing quota-regulated hunting was an intense debate. Letters to the government, the ministries of Environment and culture, and the media raised concerns. The vast majority of letters expressed negative opinions about the hunt, for example: 'It's wrong to hunt wolves,' 'The hunt was an act of inhumanity,' 'Hunting wolves is immoral and unethical,' or 'The wolf hunt is not compatible with EU regulations.' On the contrary, hunters and farmers believed that political legitimacy had been reinforced, and the decision to allow the wolf hunt indicated that politicians cared. Opportunities for local participation in executive administration, which previously were limited,

had been created. The dispute over the decision to implement a quota-regulated hunt of wolves seems to have fed, rather than dissipated, polarization between the concerned parties (Sjölander-Lindqvist et al. 2010).

In light of the ensuing debate, the government asked for proposed objectives and targets for large carnivore species in Sweden, and measures that could facilitate the natural immigration of wolves of eastern origin. In 2012, proposals suggested that Swedish objectives and targets for large carnivore species ensure the accomplishment of the goal of the Habitats Directive for these species, which is to maintain or restore favorable conservation status. In December 2013, the parliament further specified the content of the large carnivore policy, including new population targets based on a new concept – reference populations. According to the Minister of Environment these targets should be considered minimums (Committee of Environment and Agriculture 2013/14:MJU7).

An integrated analytical perspective

Our integrated analytical perspective, as described in our model (Fig. 1), enables identification of existing interdependence and interrelationships between different parts of a system. As such, it contributes to an awareness of the influences of individual and collective responses, assessed through various aspects of legitimacy to biophysical, socio-cultural and political-institutional dimensions. It also helps to recognize the consequences of competing interests, power relationships, and the organization of governance and management on achieving policy objectives. In addition to describing responses to system changes, it is necessary to develop a better understanding of how and why responses vary, and how they feed back into the system via different governance and management measures.

Eriksson et al. (2015) show how changes in a biophysical context parallel changes in public attitudes towards the existence of large carnivores and towards policy. These authors point to individual responses as triggers of the carnivore debate, since variations in personal experiences with large carnivores (biophysical context) and knowledge spheres (socio-cultural context) seem to widen attitudinal gaps between different parts of the country. Ednarsson (2005) demonstrates local attitudinal gaps, where some individuals see potential benefit in the presence of large carnivores and respond substantially, by starting companies for example; but they are hindered by the dominant local socio-cultural context. This agrees with Sponarski's et al.'s (2013) claim that the local populace is heterogeneous, including diversity in values and attitudes. This diversity again, points to the need of support by collective responses through the political/legal systems.

Sjölander-Lindqvist (2015) investigated the most critical situation prompting individual response – lethal treatment of wolves that are considered problematic because they seriously jeopardize local livelihoods. She analyzed local residents' applications to authorities for the removal of wolves along with the authorities' decisions. Her analysis describes local residents' experiences with wolf attacks on private property, and their fear of being affected in the near future if a predator wolf is not lethally removed from the area. Feelings of frustration and worry related to the risk of wolf attack are cited in arguments for controlled hunting, and we can see how such individual responses, based on experiences, underlie many other concerns mentioned in the applications. These findings correspond with Frank et al's (2015) results that people who express fear of wolf and brown bear also hold more favorable attitudes towards the implementation of management efforts to control and limit human–large carnivore interactions. Moreover, it is suggested that certain management measures, such as informational approaches, could be introduced without much dispute.

To mollify individual responses and quell the shortcomings of large carnivore management, government agencies are, as demonstrated, implementing new structures through which stakeholders, non-governmental organizations (NGOs), and the public, with varying power and competencies, are more involved in environmental planning. These developments are considered vital for generating trust, credibility and commitment regarding environmental policy implementation (Innes 1996, Brody et al. 2003, Bruby 2003), and constitutively critical in building integrative, mutually-shared visions to avoid local criticism of the value of whole state action (Abram and Cowell 2004). They are also promoted as structures that can reduce conflict over the long term (Wondolleck and Jaffe 2000). Furthermore these developments are expected to: enhance the long-term integrity of socio-ecological systems and ensure livelihood sufficiency; provide intra- and intergenerational equity; and build socio-ecological civility and democracy (Gibson 2013).

This deliberative turn in Sweden's management of large carnivores has been assessed from several perspectives. Despite formal attempts to involve stakeholders and indirectly-elected politicians in management procedures, perceived legitimacy fell one year into the existence of the reform (Duit and Löf 2012). Lundmark and Matti (2015) explored potential factors that could explain this decrease in legitimacy by combining institutional analysis of deliberative practices with an analysis of stakeholders' interests and beliefs. They found that nature conservation interests that are polarized (pro- versus anti-carnivore beliefs) hamper the ability to find compromise on several of the formal criteria for deliberative democracy (influence, transparency, equality and reasoned debate). This problem is exacerbated by substantial differences between statutory and effective representation, as interests in the outdoors and hunting are strongly over-represented (Lundmark and Matti 2015). Hallgren and Westberg (2015) assessed discursive closures and openings of communication within WMDs and showed that meeting procedures in some WMDs significantly hinder the dialogue, and reduce pluralism of values and attitudes. The knowledge of some of the involved actors was dismissed since there was limited time for participants to sort out contested, complex issues. Also, discussions were characterized by competitive behavior, which contrasts with the deliberative ideal of openness toward other participants' beliefs. In turn, these issues reduce the adaptive capacity of WMDs. In other words, successful deliberation is contingent on reasoned debate, which is dependent on the ability to ensure: fair representation, the exchange of reasonable and informed arguments that integrate multiple disciplines, and effective communication.

The deliberative turn also included changes in the roles of the government and authorized wildlife managers (Cinque 2008, 2015). Cinque assessed collaboration from a manager's perspective during the organization and coordination of the very controversial wolf hunt in 2010 and highlighted the dynamic tension between autonomy and control. The results showed that efficient leadership is important for overcoming conflicts and mistrust associated with past administrations. Leadership is indeed crucial under such circumstances since individual responses and local communities must be considered when complying with rules and regulations. Facilitating dialogue and mediating different parties and interests is considered highly important for advancing collaborative processes.

The integrated analytical perspective presented in this paper suggests that individual and collective responses can be assessed through various aspects of legitimacy such as the level of 'trust' among individuals, groups, and the government. Furthermore, we emphasize the importance of fair 'representation' in deliberative fora and the inclusion of various 'knowledge spheres', for which 'communication' skills and practice, and 'leadership', become essential. We use the five italicized concepts to assess the individual and collective responses to changes in the biophysical system and how these aspects contribute to the legitimacy of the system.

Trust

Establishing trust is crucial for large carnivore management. Trust shapes the relationships between individuals and groups, as well as those between different groups. Since it is fundamental for any interpersonal relationship, trust is highly essential for initiating, establishing, and maintaining social relationships, and matters the most when there is a larger conflict of interest (Balliet and Van Lange 2013). This is neatly shown in Johansson and colleagues' model of antecedents of the fear of wolf (Johansson et al. 2012a), where lack of trust becomes a stronger predictor of fear, the closer the participants live to wolf territories. The present lack of trust in the large carnivore arena will interfere with the feasibility of introducing management efforts. These efforts must be implemented with great caution since there is a dependency between trust on one hand, and risk perception, fear, and successful implementation of the efforts on the other hand (Needham and Vaske 2008, Stern 2008, Johansson et al. 2012a).

Social trust may be described as the willingness to rely on persons representing institutions – in this case those who are formally responsible for developing policies and taking action regarding large carnivores (Cvetkovich and Winter 2003). Earle (2010) analyzed the conceptualisation of trust from a risk management perspective and distinguished between trust based on 'relations' between the trusting person and the other, called relational trust, and trust based on 'experiences of past behaviour', referred to as confidence. Earle (2010) also argues that it is relational trust that actually matters in risk management. This argument implies that it is most important for WMDs to generate trust between represented parties. One function of trust is to reduce the uncontrollable complexity of a specific situation. Hence, judgement of trust must be simple and, therefore, relies on heuristics. Two such heuristics are: similarity between oneself and the one to be trusted, e.g. shared values (also experimentally shown by Balliet and Van Lange, 2013), and positive affect of the person to be trusted (see also Schoorman et al. 2007). Relational trust is resilient to change, and as Earle put it, "this is an advantage when an otherwise beneficial relationship comes under transitory stress, but it can be detrimental when the relationship is fundamentally more harmful than helpful" (p. 569). Moreover, existing attributions of trust are likely to be preserved because they affect the interpretations and meanings of new information (Vlek and Cvetkovic 1989). The reliance on heuristics, in combination with resilience, indicates the initial psychological barriers that must be overcome in any constellation built on stakeholder representation for large carnivore management. It also explains the challenges involved with establishing trust among the public, stakeholders, groups, and managing authorities who are concerned about large carnivores.

Lewicki et al. (2006) summarized the potential for changes in trust over time and listed the following variables: 1) qualities of the trustor (the individual's disposition to trust), 2) qualities of the trustee (general trustworthiness, reliability, benevolence, integrity), 3) characteristics of the past relationship between the parties (patterns of successful cooperation), 4) characteristics of their communication process, 5) characteristics of the current relationship between the parties, and 6) structural parameters that govern relations between the parties. Transformational models suggest, however, that the nature of trust itself transforms over time. Initially, trust is based on a rational comparison of the costs and benefits of maintaining a relationship. As interaction increases, the other's behaviour becomes predictable and a knowledge-based trust develops. Finally, there is a mutual understanding of each other's interests (Lewicki et al. 2006). Although developing trust might take a long time, there are likely opportunities for building it via fair representation and communication as well as mutual understanding of knowledge spheres. Here, social science may further contribute by identifying which trust characteristics are problematic, and by designing and evaluating measures that may facilitate trust-building as it pertains to large carnivore management.

Representation

Our analysis shows that fair representation is considered a key part of establishing legitimate processes and locally tolerated outcomes of management. Forms of management that allow participation by others will permit more comprehensive input during decision-making processes and will lead to better decisions and better, more informed representation (Ostrom 2005). However, they are not so straightforward since roles and accountability in such situations often become blurred (Sandström et al. 2009, Zachrisson 2009, Lundmark and Matti 2015). Although all players are included, their varying views may conflict with territorially-based representative democracy, particularly at the local level. Furthermore, conflicts often emerge over who speaks for whom, and with what authority, e.g. when trustworthiness is questioned. The deliberative turn in Swedish large carnivore policy thus opens a discussion about representation, leadership, legitimacy and authority (Sandström et al. 2009, Cinque 2015).

Participatory processes are often more challenging for the players involved. On one hand, they represent their

interests, or constituents who probably insist on one position. On the other hand, the players must also respect and heed social culture during the decision-making process to find compromises. This challenge may make it difficult to maintain trust and respect at both ends (Hallgren and Westberg 2015, Lundmark and Matti 2015).

Thus, there is a need for establishing conditions that avoid these pitfalls and can produce positive outcomes. Here, again, social science may contribute to participatory processes by setting up criteria for them and assessing them, as well as by assessing stakeholders' perceptions of the legitimacy of the outcomes of the wildlife management process.

Knowledge spheres

We also encounter, as shown by Eriksson et al. (2015) how the issue of large carnivore recovery ranges from commitment to conservation and restoration of ecological damage (cf. Woodroffe et al. 2005) to understanding that the presence of wolves interferes with rural livelihoods and survival (Knight 2000, Skogen and Krange 2003, Sjölander-Lindqvist 2008, 2009, 2015, Cinque 2015). Ingold's 'dwelling' perspective is useful for understanding how participation in environmental management by non-elected citizens is socially and culturally framed. By dwelling in the countryside (Ingold 1993), residents participate in activities and acquire knowledge about and experiences of the contemporary world that serve as an informative framework for how to perceive the world and the behaviour of others (Scott 1998). Consequently, humans are situated in the context of nature through ideologically-framed acts (Pálsson 1996). While the landscape embodies the experience, knowledge and memories of its 'dwellers,' these dwellers are also bound to the 'outside', policy-regulated world (Ingold 1993, Massey 2005).

As several contributors to this issue of Wildlife Biology demonstrate, implementing management incentives gives rise to the convergence of various interests, values, short and long term objectives, ideologies, and particular norms. Mobilizing a broader array of state and non-state players for dealing with issues of collective concern and seeking acceptable outcomes involves tensions, agendas, and values of the parties involved. This correlates to Scott's (1998) discussion about 'maps of activity' – while one map may reflect the planned vision, others may record actions and movements arising from encounters between differing perspectives on and conflicting interpretations of the world. Approaching such structures reflexively, that is, being attentive to people's reasons for engagement, and understanding that their meanings, intentions and aspirations will manifest in governance and planning practices, will help avoid situations where dialogue is deadlocked and where participants proffer their own arguments, each valid in their own right, and talk past one another (van Eeten 1999). Awareness of participants' perspectives, values, and social and cultural surroundings will help with implementing legitimate governance approaches and assist with facilitating dialogue occurring within the measures.

Communication

Exchange of diverse perspectives, assumptions, and values are considered crucial for managing shared resources and empowering non-elected citizens (Dalton 2004). However, research on measures promoting increased public involvement indicates that tensions and incompatible social and cultural frameworks may hinder negotiation and consensus; these measures do not facilitate communication, engagement and citizen empowerment (Tapela et al. 2007, Terence 2008). Also, public involvement measures do not automatically result in shared and agreed knowledge, and the liberation of citizens (Flyvbjerg 1998). They may instead be used as incentives that serve the interests of dominant players (Martin 2007, Hallgren and Westberg 2015, Lundmark and Matti 2015) and the legitimization of power structures (Fisher 2000, cf. Gray 1989).

As previously described, inter-organizational communication and co-operation tools and strategies that accompany the implementation of the national large carnivore policy provide the establishment for particular meeting-points in which different societal levels encounter one another (Cinque 2015, Hallgren and Westerberg 2015, Lundmark and Matti 2015, Sjölander-Lindqvist 2015). Environmental policy-making and successful policy implementation thus depend on the players' abilities to understand each other and coordinate their activities toward a single goal or direction (Hallgren and Ljung 2005). Sjölander-Lindqvist's (2015) study of applications for the controlled removal of problematic wolves is a case in point demonstrating how policy implementation is structured by a complex set of culturally-defined ideas and beliefs about the boundaries between wildlife and human social environments (Marvin 2003, Trigger et al. 2008).

The adoption of the Swedish large carnivore policy illustrates how different domains of management (government interventions, regulations, policy decisions, inspections and controls), science (research and the dissemination of scientific knowledge), and the perspectives of different stakeholders (hunters, farmers, the general public, NGOs, etc.) come together and interact. If supporting sustainable development is the purpose of empowering non-elected citizens and giving them voices in management, practitioners need to know the best approach. At the local, regional, and national levels, the public sector needs decision-making processes for new projects, policies, and programs that can recognize proximate threats to long-term wellbeing (Gibson 2013). This loops back to the legitimacy aspect of large carnivore management. Communication incentives should emphasize plurality of meanings in policy work in order to: avoid the expression of antagonisms and hostility; hinder stronger players or powerful interests from impeding a good-faith negotiation climate or from using the dialogue process to legitimize their concerns, and; support citizens' trust for decision makers (Vangen and Huxham 2003, Ansell and Gash 2008, Cox 2010, Shore et al. 2011). This emphasis is essential for understanding how personal characteristics, and socially and culturally framed commitments and features, collapse with the organizational requirements and customary practices associated with the management of large carnivores in Sweden (Cinque 2015, Frank et al. 2015). It is also essential for producing goals, aims, and reasons that are collectively formulated and agreed on.

Leadership

Although 'unassisted' negotiations exist, facilitative leadership is particularly important when stakeholders do not

share ownership of the process and its outcomes. Leaders must then assume the role of an honest and unprejudiced broker to keep and stimulate citizens' trust in the bureaucratic system (Vangen and Huxham 2003, Ansell and Gash 2008). Facilitative leadership also includes capacity building of individuals and stakeholder groups to enhance management performance. To accomplish this and establish legitimacy, meeting procedures must be designed to allow for the consideration of alternatives and the wide range of goals and objectives that are present in these situations (ibid.). Leadership in participative situations must also build on a willingness to share power with stakeholders. Cox (2010), for example, claims that environmental decisions that result from cooperative agreement may be dismissed when authorized officials favor a coveted decision based on, what he calls, the "indecorous" concerns and opinions of some players (often local residents) about the issues at hand (cf. Hendry 2004). Cinque's (2008) investigation of administrative discretion in Swedish wolf management demonstrates how authorized regional managers invoked the RPG meetings as a forum for involving stakeholders in the management process. At the same time, the managers reminded attendees that their primary purpose was to achieve national goals for the management of endangered large-carnivore populations. Thus, the challenge is to create inclusive processes that provide all participants with an equalized decision space that can result in citizen empowerment, instead of hindering mutual agreement and legitimizing agencies' policy implementation (Cooke and Kothari 2001, Mosse 2001, Martin 2007).

As Cinque showed in the study of how the authorities responsible handled the wolf hunt, leaders may be trapped in a number of dilemmas, e.g. between ideology and pragmatism when managing collaborative processes, or between control and autonomy for enhancing empowerment, which, in turn, might affect the options for stability or change (see also Hallgren and Westberg 2015). In sum, studies of leadership may reveal the effects of a general lack of facilitative activity, which may explain the mistrust among authorities, stakeholders and stakeholder groups engaged in collaborative governance processes.

Conclusion

Governance and management of large carnivores are complex tasks requiring in-depth understanding of humans, species and habitats (Decker et al. 2012). Many environmental managers testify that most of their time is spent dealing with human responses. Human responses to critical issues can only be understood if an interdisciplinary, social science-based perspective, encompassing both individual and collective responses, are added to natural science-based knowledge (Decker et al. 2012, Redpath et al. 2013). Our integrated analytical perspective on the Swedish research in this field strongly supports this standpoint. We identified five recurrent concepts that must be understood and consciously applied to large carnivore governance and management to assess legitimacy: 1) establishment of trust between people and groups interacting about the issues; 2) fair representation of stakeholder interests; 3) acknowledgement of the different knowledge-spheres, including those based on personal experiences, culture and tradition, and science; 4) communication, based on dialogue about pluralistic perspectives, to collectively formulate and agree on set goals; and 5) leadership emphasising empowerment. The concepts we present were identified from studies based on different theoretical and methodological approaches, and carried out by independent research teams. Hence, the key role of these concepts is strengthened by triangulation. They all hold strong policy relevance, line up with the fundamental principles of democracy, and could potentially legitimize chosen approaches. As long as legitimacy is lacking, individuals are likely to respond with feelings of frustration, anger, and fear, negative attitudes towards large carnivores and their management, and behaviours combating collective decisions and jointly-accepted solutions.

The aim of our integrated analytical perspective was to extract and connect overarching themes in current Swedish social science research. Each study cited in this article points to additional themes and concepts that were recently applied to large carnivore governance and management. The concepts of these themes deserve, for themselves, further intra-disciplinary elaboration and in-depth understanding relating to this topic. This is, however, outside of the scope of this paper. Our integrated analytical perspective has not thoroughly included Swedish research in economics. More knowledge on the association of individual and collective responses with the effects of communication might be gained from game theory and natural resource management, especially considering the effects of communication and commitment between players (Dawes 1980). In addition, humanities studies – e.g. focusing on the history of large carnivore presence to outline the impact of predatory wildlife on the economic viability of countryside livelihoods, or on the ideological trajectories of political ideas in the past, and the role of language and its use in communication and dialogue – may provide important information for contemporary understanding of human–large carnivore co-existence (Lescureux and Linnell 2010). The governance and management of large carnivores in Sweden has long been characterised by system changes. We advocate multidisciplinary research simultaneously evaluating the impacts of these changes from social science and natural science perspectives so as to understand the effective impact of, and thereby the tradeoffs between societal and biological values of, large carnivores.

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