



A cup of tea? – The role of social relationships, networks and learning in land managers' adaptations to policy change

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ABSTRACT

Within international and, more specifically, European policy there is a shift towards managing land for multiple benefits and in the public interest. This necessitates greater collaboration between different actors, often with diverging management objectives, across a landscape. Here we present the findings of a qualitative study exploring the influence of social relationships, networks and associated power on land managers' decision-making, collaborative management and implementation of policy change across a national park in Scotland. We found that social relationships and networks were key in facilitating transformative change in land management but could also consolidate the status quo of land management practices and thus hamper change. Consequently, we observed a polarisation of management practices across the national park shaped by social relationships and networks; with one trend towards an intensification of traditional land use (grouse shooting), and another one towards landscape restoration and nature-based solutions. Top-down collaborative groups, composed of participants with divergent views and perspectives, and designed to promote policy uptake, had not yet improved mutual understanding or social learning. By contrast, voluntary collaboration between like-minded estates strengthened existing views, resulting in polarisation. Poor relationships and distrust between some actors constrained social learning and collaborative decision-making between land managers with diverging interests. However, personal one-to-one relationships, developed over time, between agency staff and land managers could moderate patterns of polarisation, where land managers were amenable and had the capacity to make changes to management.

Our research shows that collaborative arrangements may not be the silver bullet for policy uptake or adaptation to change. We instead suggest that a better understanding of where social relationships and trust need to be built would be more effective. Explicit attention should also be placed on the design of collaborative processes to increase the sense of fairness, balance out power dynamics and facilitate social learning.

1. Introduction

1.1. Adaptive co-management and social dimensions in managing landscapes

Within international and, specifically, EU policy, there is a shift towards managing land in the public interest and for multiple benefits, with multifunctionality of the land becoming an increasingly explicit consideration (Bouwma et al., 2018; CBD Convention on Biological Diversity, 2010). Operationalising this shift necessitates substantial co-operation and collaboration between different actors at multiple

scales across a landscape (Prager, 2015; Westerink et al., 2017). The actors in these complex socio-ecological systems are often diverse, ranging from private landowners and government agencies to not-for-profit conservation organisations. These diverse actors, often with different and conflicting values, perspectives, and thereby management objectives, must operate within and adapt to an array of ever-changing environmental conditions as well as rules and regulations, whether state, informal or market-driven (Fischer et al., 2013).

Adaptive co-management is lauded as a collaborative approach to manage complex socio-ecological systems, i.e., systems that have to adapt to changing conditions and deal with uncertainty (Olsson et al.,

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2004). Adaptive co-management is hoped to enable faster and more appropriate responses to system change, as it draws on the capacities and competencies of a diverse set of actors, whilst continuously improving practices in a learning-by-doing process (Plummer et al., 2017). However, as Fabricius and Cundill (2014) point out, a large part of the adaptive co-management literature focuses on frameworks and theory. The few existing empirical studies that have looked at collaborative processes over time indicate continuing challenges associated with adapting to change; stakeholder apathy, power dynamics and the lack of continued reflection and monitoring (Butler et al., 2015; Caves et al., 2013; Suskind et al., 2012). In recognition of these challenges, Plummer et al. (2017) call for a diagnostic approach to be able to draw more robust evidence-based findings that identify causal relationships between the different variables of adaptive co-management, actual outcomes and successes or failures.

In response to the call by Plummer et al. (2017), in this paper we draw explicit attention to social relationships and networks, exploring in depth their intertwining roles in three key aspects of adaptive co-management, in particular, in the context of adaptations to policy change: trust, power and processes of learning in social contexts. We explore these in the context of land management in rural Scotland and understand social relationships here as the one-to-one relations and connections between individuals, or in some cases, organisations. Social networks are the empirical phenomena of the interconnected patterns emerging from these relationships (Bellotti, 2015).

Whilst the majority of adaptive co-management studies indicate the importance of social relationships and networks in learning, collaboration, decision-making and adapting to change (Olsson et al., 2004; Armitage et al., 2008; Cundill and Fabricius, 2010; Butler et al., 2015; Levesque et al., 2017; Siddiki et al., 2017), one has to turn to other natural resource management and collaborative research for more in-depth studies on the role of social dimensions with regards to trust and social learning.

The importance of **trust and power** in collaborative decision-making has been investigated by numerous authors (Stern and Coleman, 2015; Levesque et al., 2017; Siddiki et al., 2017; Dandy et al., 2014). Power is not only a key factor in direct social relationships, where one person has direct power over another person's decision making (conduct-shaping), but also indirectly through context-shaping (Hay, 1997). Context-shaping power is the capacity of actors through institutions and organisations to shape what is socially, politically and economically possible to do (Hay, 1997). The importance of context-shaping power, through agenda-setting, is illustrated empirically in studies on collaborative deer management by Dandy et al. (2014).

Stern and Baird (2015) and Stern and Coleman (2015) offer thoughts on the interconnectedness of social relationships and trust in their typology of four concepts of trust in natural resource management: dispositional, rational, affinitive and systems-based. They suggest that personal relationships, by improving affinitive trust, can buffer against dispositional trust, i.e., the predisposition of individuals to trust or distrust based e.g., on personal history. They describe affinitive trust as arising from feelings of social connectedness, positive shared experiences, perceptions of shared identities or assumptions of similar values. The concept of affinitive trust may explain why Sayles and Baggio (2017) found that the type of social relationship (mandatory, funded or shared interest) had an impact on the productivity of collaborations between organisations involved in salmon restoration in the U.S.A., with mandatory relationships being less productive. The concept of systems-based trust, defined as trust in procedures or sets of rules (as opposed to trust in individuals or organisations) (Stern and Baird, 2015), complements the typology and can, as we will see, be useful to unpack relationships in the field of land management.

Learning, particularly social learning, is viewed as essential in adaptive collaborative management (Berkes, 2009; Pahl-Wostl, 2009; Cundill, 2010; Leys and Vanclay, 2011). Social learning is defined as a

change in understanding that occurs beyond the individual, becoming situated in communities of practice through social interactions between actors in a social network (Reed et al., 2010). Social learning is supposed to enable different understandings, traditions, and knowledge bases to be shared and new creative approaches and governance solutions to emerge and develop, allowing for improved environmental and social-economic sustainability (Dyball et al., 2009). Learning can have different levels of intensity and scope (Pahl-Wostl et al., 2007), conceptualised in the theory of multi-loop learning (Hargrove, 2002). Single-loop learning entails incremental changes or modifications to existing practices (Sutherland et al., 2012). Double-loop learning occurs where there is a reframing of the assumptions underpinning an issue; the ensuing adaptation is a new way of thinking about a problem. Triple-loop learning goes further in that the individual transforms the context or point of view in which they operate, which the literature describes as a 'major change' or change in trajectory (Sutherland et al., 2012). Developing this idea further, Pahl-Wostl (2009) proposes that governance structures, such as those associated with new collaborative arrangements, also undergo changes alongside different levels of learning. Pahl-Wostl suggests that actors stay mainly within their communities of practice under single-loop learning, reach out for advice outside their established network with double-loop learning, but under triple-loop learning there are changes to network boundaries and connections, as new collaborations are formed.

Adding depth to the idea of multi-loop learning, Siddiki et al. (2017) show that participant diversity in collaborative settings can both enable and impede social learning, depending on the type of learning and the type of participant diversity. For example, they showed that diversity in organisational affiliation can inhibit learning as it may signal an administrative, legal or economic threat thereby eliciting a defensive response that inhibits learning. By contrast, diversity in beliefs can promote social learning. Such complex interactions between social relationships and trust in multi-level collaborations may explain why Cundill (2010) questions social learning through multi-level networks, a basic assumption of adaptive co-management (Pahl-Wostl, 2009).

In this study, we offer an in-depth empirical analysis of the role of social dimensions in shaping land managers' decision-making in an increasingly complex social and political environment that demands adaptation to policy change. We highlight the importance of understanding adaptive management, collaboration and multifunctionality from the perspectives of those who 'do' the adaptation on the ground; the land managers, by asking: How do social relationships, networks and power facilitate, or hinder, learning and adaptation to policy change by land managers?

1.2. Study context – the Cairngorms National Park

Our study focuses on the Cairngorms National Park (CNP), an area covering 4528 km² in the Scottish Highlands. In the last decade, the Scottish Government has implemented a substantial number of new strategies and bills, all with a greater focus on managing land more inclusively, collaboratively, and in the public interest for multiple benefits. Examples include the Land Use Strategy (Scottish Government, 2016a, 2016b) the Land Reform (Scotland) Act (2016), and the Scottish Outdoor Access Code (2005).

Like land in the rest of the UK, most of the land in the CNP is privately owned. However, significant areas are also owned by not-for-profit conservation organisations as well as by government agencies such as Forest and Land Scotland¹ and NatureScot.² The governance

¹ Formerly Forest Enterprise Scotland, an agency of Forestry Commission Scotland.

² Crown Estate Scotland is a public corporation and manages land and property owned by the Monarch in right of the Crown, as distinct from the state (<https://www.crownestatescotland.com/about-us>).

arrangements of the different estates are diverse and often complex. They range from state-owned and state-managed nature reserves and forests to privately-owned estates, where the landowner is either resident and actively managing the land, or managing from further afield, with day-to-day management undertaken by resident land manager (e.g., head gamekeeper) or via a factor employed by a land management agency. Private estates, often governed by trustees, tend to be divided up further into shooting or agricultural tenancies, as is the case with land owned by Crown Estate Scotland.³

Whilst the collaborative landscape management of the CNP does not purport to follow an adaptive co-management approach, there are several initiatives that resemble governance structures and processes seen in adaptive co-management approaches. Some of these are self-organising, whilst others are supported by statutory agencies or the CNP Authority (CNPA) (Table 1).

The ambitious national policies for multi-functional landscapes pose a significant challenge, not only for the CNPA, but for land managers themselves, whose management objectives can vary greatly from, or be in conflict with, those of neighbouring estates or national policies. For example, national and CNPA priorities (CNPA, 2017) for woodland expansion to support natural flood management and climate change mitigation may come into conflict with the management of private sporting estates, whose business models rely on intensively-managed red grouse moors or high numbers of deer. Indeed, a study by Hodgson et al. (2018) identified fragile relationships between some estates and the CNPA and distrust between individuals, neighbouring estates and organisations. At the same time, calls abound for introducing and tightening regulatory measures such as the licensing of sporting estates, a possible indication that current voluntary collaborative approaches are perceived not to be working.

2. Materials and methods

To explore the social dimensions that influence decision-making and learning across landscapes, between 2017 and 2018, we conducted fifteen in-depth interviews with land managers (n = 12) and land management advisers (n = 3). The land managers were purposively selected to cover a range of estates of different size, ownership (private, public, NGO), governance and management arrangements (trustee, individual, via management companies), and management objectives (including conservation; agriculture; sport/shooting; tourism). All land managers came from different estates. Interviews explored the key factors which had influenced changes in land management as well as the

Table 1
The main types of collaborative groups currently operating in the CNP (names of specific partnerships are pseudonymised).

Groups	Description
DEER MANAGEMENT GROUPS (DMGs)	DMGs comprise several neighbouring estates with the purpose to facilitate collaboration in the management of red deer populations across the landscape.
WILDSCAPE PARTNERSHIP (WP)	Self-organising conservation-orientated partnership of private, state and NGO owned estates. The main aim of the partnership is to improve landscape-level habitat and species connectivity and restoration.
SUSTAINABLE MOORLANDS (SM)	A CNP initiative, comprising six estates, established in 2015 to demonstrate best practice in moorland management.
MOORLAND GROUPS (MGs)	Self-organising groups initiated by gamekeepers to educate the public on the multiple benefits of sporting estates for the local economy and wildlife.

³ Formerly known as Scottish Natural Heritage, or SNH

role of collaborations with other land managers or organisations (see Appendix A for interview guidelines).

During the interviews, one of us noted down influential factors mentioned by interviewees onto post-it notes. Most of these referred to people and organisations, but events (e.g., for experience sharing) or institutions (e.g., specific policy schemes) were also included. These details were used in the second part of the interview in the development of a participant-led sociogram (see Appendix A). Using a methodology inspired by Hogan et al. (2007), this part of the conversation focused on the relative importance of each person, organisation or event mentioned during the first part of the interview, for the land manager’s decision-making. Interviewees were asked to place each post-it note onto a sociogram with three concentric circles identifying highly, somewhat or least influential factors (see Fig. 1). Due to interviewees’ time limitations, this second exercise was undertaken with only ten of the fifteen interviewees. The second part of the interviews allowed interviewees to expand on aspects of the interview through the process of interactively creating a sociogram as a visual aid. In total, the interview and the sociogram exercise lasted between 60 and 150 min.

Both parts of the interviews were audio-recorded and transcribed verbatim. Data were managed with NVivo 12, and transcripts were coded inductively. An initial review and preliminary analysis led to the identification of broad themes: 1) Background, 2) Objectives of management, 3) Change, 4) Collaboration, 5) Governance structures and power, 6) Influences on decision making, 7) Relationships (evaluation as positive or negative), 8) Level of influence (least, somewhat or highly influential), 9) Trade-offs, tensions and conflicts between land managers and land use, 10) Factors supporting/constraining change in management.

Through further exploration and iterative analysis, we identified sub-themes that reflected topics and relationships within and between the broad themes, for example, different types of social learning. The qualitative data generated by the participant-led sociogram was used to identify patterns of relationships and helped to draw out further insights into the influence of social relations and networks on learning and change in the land management.

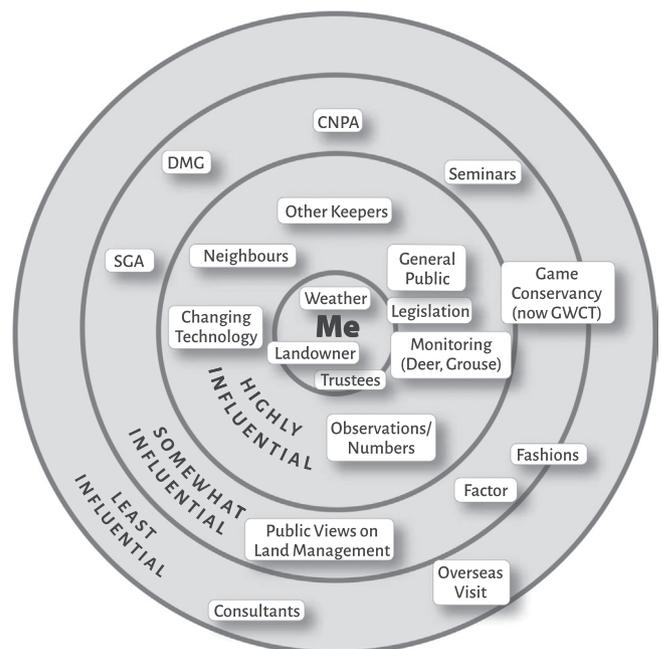


Fig. 1. An example of a participant led sociogram from a land manager interview (DMG = Deer Management Group; SGA = Scottish Gamekeepers Association; CNPA = Cairngorms National Park Authority).

3. Results

In this section, we explore how learning and management practices were influenced by land managers' social relationships (3.1), networks (3.2) and associated power dynamics (3.1–3.3) and examine further how these then impacted partnerships and collaborations across a landscape (3.3).

In the last Section (3.4), we bring together our empirical findings from the results with concepts from the adaptive co-management literature to construct a land manager-centred framework, integrating the role of social relationships, networks, and power on learning in adaptive co-management.

3.1. The role of social relationships in influencing learning and management

Here we examine the different ways in which social relationships can influence learning and management practices on the ground. Our analysis of interview transcripts and the associated sociograms indicate that the greatest influence on land managers' decisions were immediate colleagues, the landowner or trustees of the estate and, in the case of owner-managed estates, close family members and friends.

In privately-owned estates, strong and long-term relationships with staff members, whose families may have worked and lived on the estate or nearby over several generations, often existed. Long-standing, pivotal staff (such as a head gamekeeper) could be highly influential over the management direction of the estate, trusted by the landowner due to their length of service and knowledge of the land. As one land manager commented when discussing the influence of head gamekeepers during the sociogram exercise:

"They are up there [with regards to influence]. Especially because... the head keeper has been there longer than anybody else and has a huge knowledge and a huge passion for the place and he has the ear of the owner, definitely."

When discussing relationships with governmental organisations some interviewees highlighted that personal one-to-one relationships with agency or park authority staff, built over time, were important for decision-making:

"I'd say he's [park authority staff] in the middle [of somewhat influential], because he's a particular person [...], that has the ear of the owner ... because he has made a one-to-one relationship with the owners and he kinda pops in for a cup of tea and that sort of thing. He will get much further than Joe Bloggs."

Examples were also mentioned whereby CNPA staff had acted as a 'bridging' person to help broker new management arrangements between neighbouring estates with different deer management objectives. One advisor, for example, felt that they were able to shape some estates' decision-making because they had earned the "right to be listened to", as they were known to landowners through grouse shooting events.

"I stalk deer and I'm keen on fishing, so they accept me a wee bit better than someone who just comes up an odd time, or maybe once or twice from a government agency, at a time when there's a lot of friction and difficulty about. You've got to put yourself out and you've got to deliver to them as well and show some understanding."

Whilst individual members of the CNPA could influence land managers' decision-making through positive, personal relationships, the relationship with the CNPA at an organisational level was generally viewed as negative or neutral. One land manager felt the relationship with the CNPA was getting "further apart", expressing concern that traditional landowners were being excluded from conferences and forums, and that their feedback on consultations was ignored. This land manager felt the CNPA was "off the scale" on the sociogram in terms of

influencing his decision-making (i.e. not influential at all). This lack of two-way interaction could be responsible for the development of policies and incentive mechanisms that were seen by some land managers as not fit-for-purpose.

For another land manager, maintaining positive personal relations between neighbouring estates and local residents was an objective in itself, which influenced decisions about management options, even if it meant compromising some ideals:

"If ... all we're doing is battling with our neighbours and the local community, then you can have all those ideals, but it's completely pointless, because we're never going to deliver anything on the ground. Whereas if we're willing to work with these people... if you can find ways to work with them and maintain those positive relationships... what it actually allows you to do is achieve a massive amount on the ground."

For this land manager, relations had also improved between the estate and local residents through the personal relations staff had with the local school and various clubs:

"We are all part of the community, and we like most of the people and they like us, and it's much harder to fall out with somebody that you quite like. So it is just a social thing as much as anything."

Another land manager also stressed the importance of socialising and building personal relations without an agenda, to help resolve seemingly intractable differences in land management:

"We all really want the same things in slightly different ways. And the best way to sort that out is to take the label off round your neck and go somewhere out of the way and either eat each other or come back friends. And I said to SNH [now NatureScot] for years, what you really need in these intractable situations like the raptor debate and that sort of thing; stick them on [the island of] Rum for a week with all the midges and plenty of drink and by the time they come back they will have gone a long way."

However, the ability of a land manager to implement decisions on the ground could be facilitated or thwarted by direct power relationships between the land manager and the owner or trustees of the estate. Having a supportive landowner who trusts the land manager in their decision-making, even if those decisions are controversial and may cause unease amongst staff and the local community, was key in translating decisions into action on the ground. By the same token, significant decisions could be thwarted by other powerful actors, such as the landowner or trustees of an estate. The blocking or vetoing of management decisions could severely limit the land manager's ability to adapt and change their land management, even if the land manager had undergone significant learning.

3.2. The role of social networks and trigger points in learning and adapting to change

In this section we explore how the nature of social networks could constrain learning, but also, under certain conditions, facilitate multi-loop learning and adaptation. Our analysis showed that the main objective of management, with subtle modifications, could stay relatively unchanged from one generation to the next on estates that remained in the ownership of one family over several generations. The families and local communities across sporting estates were often close to each other, having worked and socialised with neighbouring keepers, and those further afield, for many years. As one land manager commented:

"Just about all my friends are keepers, so you are always speaking to folk, just seeing how they are getting on or if there is anything you are missing out on or whatever, you know? And a lot of the time we're all helping each other as well. We live in quite remote areas, and for various shoots or

whatever, you need your neighbours to help you, and you help them as well."

The intensification of grouse moor management in parts of the CNP was attributed by one land manager to an influential grouse moor consultancy from England that had worked closely with estates adjacent to the Park. In addition, several keepers from English estates had been hired by estates bordering the Park with the main objective of increasing grouse moor productivity. Other management practices that were mentioned to have changed on sporting estates included stopping the supplementary feeding of deer, changing methods of predator control to align with new legislation, and night-time predator control with spotlights. These types of modifications to management practices could be described as single-loop learning (see Section 1.1).

On conservation-orientated estates, close colleagues and advisors had the greatest influence on land managers. However, the changes to management practice, relative to what was happening already, would be best described as adjustments and refinements (single-loop learning), rather than fundamental changes to the overarching management approach or strategy. Management changes were largely based on evidence gathered from monitoring data combined with scientific advice from in-house staff or associated advisors. Examples included levels of dead wood to leave behind after thinning, or types of ground preparation to encourage woodland regeneration.

The following example illustrates the strong influence that a land manager's established social network could have on their learning. Over the last years, the CNPA had organised field trips to Norway for land managers, designed to enable experience sharing. Two of the land managers we interviewed, both embedded in different social networks, came away with very different understandings of their experience. For one of them (from a conservation-orientated estate), seeing high altitude willows and birches at similar latitudes to Scotland challenged their previous view that Scotland's current treeline was at its altitudinal limit. By contrast, the other land manager, from a sporting estate, was left with a very different impression. *"I think the trees grow higher there [Norway] than they grow here but I don't think they could ever grow to the same height here."* For one land manager, the trip thus opened new possibilities for tree expansion in Scotland (double-loop learning), for the other it seemed to largely reinforce existing understandings.

Whilst the above examples demonstrate single-loop, sometimes double-loop, modifications in management approach, in some cases, triple-loop learning, that entailed significant shifts in land management practices, had occurred. These shifts had often been triggered by a significant event or crisis, sometimes coupled with a change of owner. These trigger points were subsequently followed by a widening and often re-configuration of the land managers' social networks, to facilitate the learning required to make the changes in management approach.

The catalyst for one landowner to change their approach to visitor management, for example, was observing the stress experienced by their father in trying to manage visitors on the land.

"Well, the thing that turned the switch really was [...] watching my father having a heart attack chasing people off and telling them what to do and what not to do... we said there must be a better way of doing this. So, we then went on a learning journey."

This landowner was able to implement decisions and continue adapting the business model through their highly varied and widening social network. They reflected on their learning journey to national parks in North America:

"...that sort of turned the switch ... We went to look at the national parks, to see how they managed large numbers of people ... That was fairly transformational for us."

As well as widening their social network across the Atlantic, this landowner relied on close family, friends, and staff as a barometer to

check what was happening on the estate and to aid decision-making, thereby maintaining a diverse social network.

To make significant transformations to management practices, often diverging from the accepted norm, was described as challenging by several land managers, not least because it could create animosity and isolation within a land manager's social network:

"Then you find you are on an estate which is like the one little black chicken in a run of a hundred. You stand out, you are doing something different- all the other chickens come and peck you because you are different, so there's an element of that; you are out there, you are exposed, you are having to do something, which in terms of the wider community that you live in, the estate community you live in, is not the way things are done. So, you are in a difficult position."

In addition to widening and diversifying their networks to facilitate learning and adaptive change, the land managers who were successful in instigating transformative change on their land, despite negativity from established social networks, were either powerful landowners themselves, or had powerful landowners fully aligned with and supportive of their transformative activities.

3.3. The role of collaborative arrangements in influencing and shaping landscapes

In this section, we investigate how relationships, networks and power translated across the landscape, and the role of collaborations in shaping land management across the Park. Our findings indicated a polarisation of management approaches across the CNP over the past few decades. This was despite the existence of groups that were specifically established to encourage collaboration between estates with different management objectives. Conservation-orientated estates had come together in the Wildscape Partnership (WP), aligning their management objectives, such as habitat restoration and maintaining low deer numbers. Many of our interviewees reported on an increasing emphasis on habitat restoration, conservation and nature-based solutions across the Park. This shift in overall land use management direction, largely aligned to the policy direction of the Scottish Government and the CNPA, was in stark contrast to the approach of some estates, which had intensified their management of grouse moors, or continued with field sports (shooting and stalking) as their primary management objective. Management of some of the sporting estates had changed very little over time:

"Grouse and deer management are, broadly speaking, still operating in the same way that they have done for the last two hundred years, and it's a very slow-moving system".

This consolidation and polarisation of management approaches can be further explained by exploring the different groups and collaborative arrangements across the Park through their underlying social relationships, networks and power, especially in the shaping of contexts in which decisions are made.

3.3.1. Self-organising groups

Of the four collaborative groups in the CNPA (Table 1), two of them (the Wildscape Partnership and Moorland Groups) could be considered as self-organising. The main rationale for the creation of the Wildscape Partnership was to improve habitat and species connectivity and promote ecological restoration at a landscape level. Moorland Groups (MGs) were established by gamekeepers from estates neighbouring to each other to counter the negative public image associated with sporting estates. Together MGs organised the installation of numerous information boards for the public on the importance of moorlands for the local economy and bird diversity, as well as asking visitors to keep their dogs under control. The self-organising nature of these groups implied positive relationships and high levels of trust between group members. One

of the WP members also explicitly described how working closely together to achieve shared goals gave them a greater sense of empowerment and confidence.

The success of the WP was thought to be responsible for the shifting direction in the type of land management that was deemed acceptable. As one land manager put it:

“Habitat restoration is now a legitimate form of land use and I think there are too many people who are keen for it not to be, because it doesn't fit with their model of land use in the uplands. But more and more people are doing this and the Victorian views that we've had of the uplands of Scotland are changing. And they are changing quite dramatically.”

This influencing role of the WP and, in particular, of one of the landowners in changing the discourse around land management to focus on large-scale ecological restoration and even rewilding was noted by the manager of another privately-owned estate.

“It's a bit of a buzz-word [re-wilding] and people talk about it, and it's the kind of fashionable thing to do. I mean obviously in the Cairngorms you have got [name of estate], which is this huge influence, so [land-owner], his whole rationale is about re-wilding and that has started a bit of trend.”

This shifting trend was prominent in landowners who shared characteristics with the landowner in the WP (e.g., because they were international businesspeople). Whilst in this case the landowners only knew of each other through their social networks and not personally, the associated affinity between the landowners seemed a sufficiently influencing factor in beginning to reframe land management, what was deemed acceptable in the Park, and what was even considered as “a bit hip”.

3.3.2. Groups as top-down collaborations

The other collaborative groups operating across the CNP were Deer Management Groups (DMGs) and Sustainable Moorlands (SM), the latter initiated by the CNPA. Whilst voluntary in constitution, and self-organising in their original inception, the DMGs had been supported by NatureScot and predecessor organisations, which have recently imposed stricter accountability and direction of goals.

Our research showed that such ‘imposed’ collaborations were less successful in bringing about change or affecting decision-making. Those land managers who were part of DMGs with diverging management objectives did not consider their current DMG to be very influential in their own decision-making, and many felt they were ineffectual in collaborative deer management or improving habitat quality. One land manager thought that collaboration had been much better in the past when landowners had similar management objectives:

“Thirty years ago, we very firmly – all the estates were working together to try and get good stags ... There was more collaboration, everyone was trying to do the same thing.”

This had changed over the years, as landowners' and managers' backgrounds, values and management objectives diversified – which might have led to a reduction in affinitive trust among the members of the DMGs.

Similarly, since SM was established in 2013, interviewees felt they had seen very little progress towards delivering change on the ground, which was put down to resistance to change:

“I think a number of partners ... are instead of seeing it as a vehicle for change, they're seeing it as a vehicle to justify, to give some sort of credence to their existing management rather than changing.”

These examples illustrate how landowners with decision-making autonomy could maintain the status quo regarding their land management, rather than adapt to policy change. Another possible barrier to policy adaption was that some incentives for promoting change were seen as not-fit-for purpose. For example, targets for tree-planting were regarded as being too financially risky and unrealistic for the uplands.

However, interviewees were hopeful that the recent employment of a co-ordinator for the partnership would help drive actions on the ground and help bridge relationships and therefore understandings between land-owners and CNPA.

To conclude, we found that self-organising groups, with like-minded individuals, and which included powerful actors (private, state and NGO actors), could have a significant impact on land management across a landscape. However, due to fragmented social networks, views on land use remained polarised and further consolidated. One partnership (WP), in particular, was beginning to change the context of what type of land management was deemed acceptable in the CNP, which can be seen as empirical evidence for indirect, context-shaping power.

By contrast, ‘imposed’ collaborative groups, comprising land managers and actors with different objectives and values in land management had to overcome significant challenges regarding trust and power sharing in decision-making, and were, to date, relatively ineffectual in instigating collective change across a landscape in line with changing policy direction.

3.4. A land manager-centred framework for adaptive co-management

In Sections 3.1–3.3, we identified the integral role that social relationships, networks and power played in influencing management practices to change, or to maintain the status quo. Such changes ranged from the adoption of new deer culling rates to an increase in the intensity of grouse moor management to larger changes in an estate's approach to conceptualising and managing visitors.

In our framework, emerging from our results but building on the adaptive co-management literature, the **land manager** (Fig. 2) and their decision-making are central, as ultimately this is where the potential influences of institutions and other actors are enacted. We follow North (1990) understanding of **institutions** as the formal and informal rules that guide human behaviour. **Actors** within our framework are individuals and organisations that interact with each other through **social relationships**, which develop, in turn, into recognisable patterns or **social networks** to exert potential influence on land management or policy directions. It was the character of these social relationships, networks and power dynamics, and their interplay, that shaped management decisions on the ground. **Learning**, i.e., a change in understanding or meaning, was an essential step that preceded changes or adaptation in management practices. **Social relationships** and **networks** acted as a medium through which knowledge and **learning** passed through, as well as resources that could facilitate adaptive change, such as access to funding.

We identified different types of social learning in terms of intensity and scope which resulted from the dynamics of interplay between social relationships, networks and power (Table 2). Single-loop learning was described by some of the land managers we interviewed, and could be attributed to small, relatively closed networks (A and B in Table 2). Double-loop learning (C in Table 2) occurred on a number of estates, where building positive social relationships between actors was seen as an explicit objective in its own right, whether between an estate and the local community, or between two land-owners with different management objectives. In our case study, triple-loop learning (D in Table 2) only occurred following a significant event or **trigger point** (see Section 3.2) in a land manager's professional or personal life. This catalyst led to a widening or change in the land manager's **social network** as they sought new knowledge and learning to enable adaptation.

Power dynamics mediated directly through **social relationships**, or indirectly through **social networks** by shaping the context in which decisions on land management are made, were a fundamental influence on how and whether land managers could and would adapt to policy change. The direct power of owners or trustees over a land-manager's decision-making could either facilitate or thwart (C in Table 2) a land manager's ability to change management practice, by either supporting or vetoing decisions. However, we also see how indirect power, typically

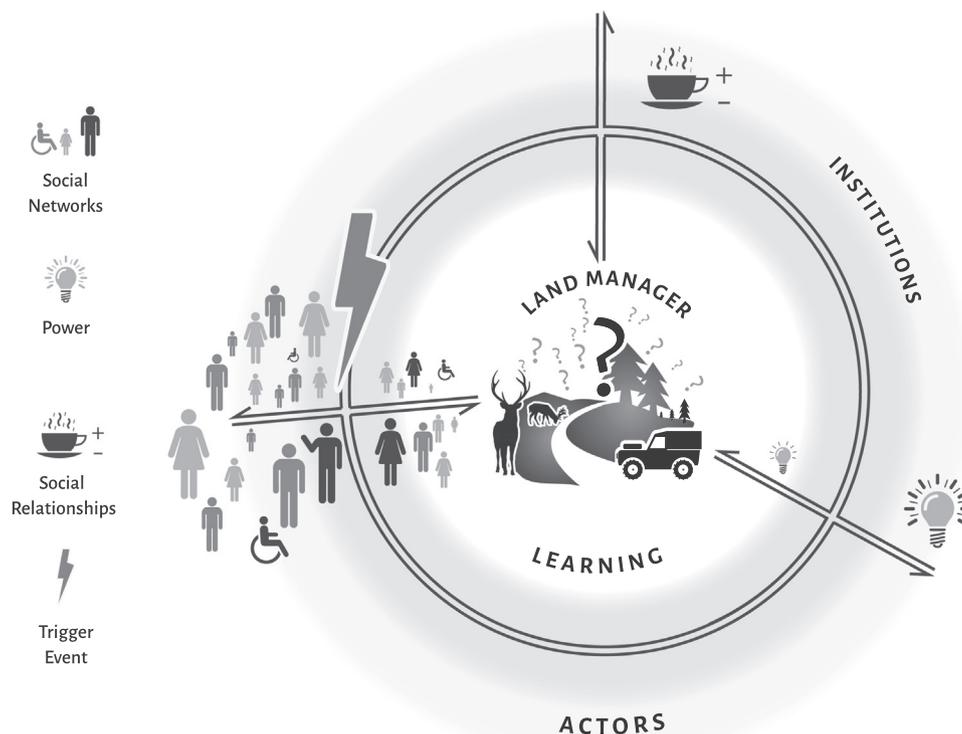


Fig. 2. A land manager-centred framework for adaptive co-management. See Section 3.4 for further explanation.

Table 2

The interplay of social relationships, networks and power in learning within estates and across the Cairngorms National Park.

Type of management	Relationships	Networks	Power	Learning
A Maintain status quo (opposite to policy)	Positive with similar actors. Poor with government organisations	Strong, close networks with similar actors	Shaped by established concepts of land management	Single-loop
B Maintain status quo (aligned with policy)	Positive with government organisations	Strong, close networks with similar actors	Aligned with new concepts of land management	Single-loop
C Adapting to new policy (incremental)	Positive with government organisations	Variable networks with range of actors	Shifting towards new concepts of land management but subject to direct power of landowner	Double-loop
D Adapting/shaping policy (after trigger)	Neutral or positive with government organisations	Diverse, evolving networks	Strategic collaborations to re-shape contexts and concepts of land management	Triple-loop

operationalised through **institutions**, was mediated through the land manager’s **social network**, which influenced and shaped the context and acceptable parameters within which decisions were made.

Social networks which self-organised into collaborative groups and partnerships could consolidate beliefs, practices and context-shaping **power** rather than being used as a forum for sharing diverging perspectives and understandings. This limited social learning between diverse actors and groups led to a polarisation of management objectives and practices across landscapes. Such a polarisation could include both the intensification of management approaches contra to policy direction, but also changes in the acceptability and legitimacy of alternative land uses aligned with policy direction (e.g., landscape level habitat restoration). Collaborative groups that were ‘imposed’ were not necessarily effective in building trust or facilitating **social learning** between participants with differing values, understandings, and management objectives.

4. Discussion

Three key findings emerge from our study, related to (i) social relationships and networks and how these influence land management change, (ii) the importance of building trust in ‘imposed’ collaborative

arrangements for effective learning and adaptive management, and (iii) how triple-loop learning in powerful actors can initiate behavioural tipping points. We discuss these below.

First, our empirical study clearly demonstrates the significant and powerful nature of social relationships, networks and power dynamics, not only in influencing decision-making on individual estates, but also in shaping land use across whole landscapes. Social relationships, if actively sought and trusted by land managers, supported and informed transformative changes, i.e., triple-loop learning, usually following a trigger event. Such triggers have been shown to catalyse transformations in other studies (Sutherland et al., 2012; Olsson et al., 2004). Following a trigger event several land managers actively sought advice and new knowledge from individuals outwith their usual networks, to provide them with the knowledge to adapt their management approach. However, social relationships and networks could also, conversely, lead to the polarisation and consolidation of management approaches; some towards government policy goals, others diametrically opposed. This was because land managers’ decision-making was largely based around relatively small social networks typically including the owners, colleagues or family members, which supported incremental, single-loop learning within established paradigms. Our qualitative study supports the mixed methods social network analysis by Alexander et al. (2015) on

Jamaican fisheries which found that highly fragmented social networks led to a polarisation of norms in practice, and were a barrier to adaptive co-management.

Second, our study adds qualitative evidence that affinitive trust can be developed through the cultivation of meaningful relationships (Stern and Coleman, 2015; Stern and Baird, 2015), which in turn can influence management practices. There were many examples in our study where positive relations and trust between actors were built by social activities such as drinks events, or by being part of the same music group. Trust was developed through shared values and interests, sometimes regarding land management, other times not, for example, through the shared fondness for wildlife art. Indeed, a number of interviewees pointed out the importance of building positive personal relationships between people with different perspectives and values and moving away from identity-based conflicts and agendas. The suggestion by one land manager to solve intractable problems by taking one's "label off" and going somewhere remote to share a bottle of whisky, resonates strongly with trust research which recommends using different strategies to develop trust including field trips and alternative engagement fora (Beierle and Konisky, 2000; Hoover and Stern, 2014). These positive relationships facilitated moderate adaptations and modifications to management practices. Relationships, their quality and the level of trust and respect that exists between individuals or groups have been shown to be critical in transforming wildlife conflicts and achieving outcomes in natural resource management (Davenport et al., 2007; Goggin et al., 2019; Madden and McQuinn, 2014; Stern and Baird, 2015).

The lack of affinitive trust between individuals and different social groups (e.g. between landowners and the CNPA; or between conservation-orientated and sporting estates), but also a lack of underpinning systems-based trust (Stern and Baird, 2015) among actors in the Park may explain why top-down collaborative initiatives such as the Deer Management Groups had not achieved the desired outcomes. This corresponds to findings by Sayles and Baggio (2017) who found mandated collaborations for salmon restoration were less productive than shared interest collaborations.

Explicit attention to the design of collaborative and decision-making processes is seen as essential to facilitate learning (Reed, 2008) and systems-based trust (Stern and Coleman, 2015). Siddiki et al. (2017) suggest using neutral or mutually respected mediators to develop interpersonal trust and ensure all participants are treated fairly and power imbalances are addressed. In our study, there were still high levels of distrust between some landowners, and some landowners and the CNPA, limiting two-way learning. The lack of trust can lead to selectively screening information to confirm one's beliefs (Haidt, 2001), or to justify disengagement or sabotage (Stern, 2008, 2010). This could be another reason why a field trip to Norway made such different impressions on two different land managers (Section 3.2). We therefore concur with Armitage et al. (2008) that novel ways to engage resource-dependent individuals and communities in learning are necessary to overcome livelihood and political risks. This is particularly relevant when adapting management towards national policy is seen as a threat to accepted business models and way of life, as in the CNP.

Third, our study highlights the significant impact that triple-loop social learning coupled with indirect power can have across a landscape, in terms of land management approaches but also of land use legitimacy. As discussed above, several land managers had undergone triple-loop learning with respect to their overall approach to land management. One estate was in the process of transforming from a traditional sporting estate with high deer numbers to one where large-scale habitat restoration was at the core of its long-term vision. This estate could be described as also having undergone a triple-loop change in its actor network configuration according to Pahl-Wostl (2009), making new connections and governance collaborations with neighbouring estates, to form the Wildlands Partnership (WP). Our study suggests that the influence of the WP was beginning to reach landowners outside of the partnership, possibly due to its critical mass, or

peer-to-peer competition between landowners with similar identities and status. This trend observed across the CNP could be the start of a behavioural tipping point (Nyborg et al., 2016). While the trend was initially leveraged by policy, it was ultimately enabled and empowered by a voluntary partnership, a highly-invested landowner and the widening of social networks. This demonstrates how, whilst policies may influence land management practices, the interplay between a land manager's relationships, networks and associated context-shaping power defines the parameters and possibilities in which land management decisions are made, and hence adaptation can happen. In our case, the restoration of degraded habitats, with its associated and now widely accepted public benefits, was in the process of transforming to a socially accepted land use option.

In conclusion, collaborative arrangements may not be the silver bullet to encourage uptake of policy or adapting sustainably to change (Sayles and Baggio, 2017). However, an in-depth understanding of the interplay between different social networks, relationships and associated power and how these contribute to different concepts, perceptions and influences in a multifunctional landscape could provide government agencies with informed insight into where trust and relationships need to be built and best supported to promote learning and adaptation to policy change.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.landusepol.2021.105926.

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