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Research article

Empowered communities or “cheap labour”? Engaging volunteers in the rationalised management of invasive alien species in Great Britain

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ABSTRACT

Volunteers are increasingly involved in the delivery of nature conservation policies, usually supported by a twofold rationale: volunteering can (a) enhance citizen participation in environmental governance and (b) ensure a workforce is in place to support conservation work in times of budget shortages. Here, we ask how these two rationales correspond to volunteers' own motivations to engage in a specific nature conservation activity, namely the control of invasive alien species (IAS). We use qualitative interviews with professional project managers, local group leaders, and volunteers to examine the interactions between policies aiming to rationalise the management of IAS and the motivations for and goals of volunteer engagement. Our findings suggest that although volunteering can lead to positive conservation outcomes, satisfying experiences and empowerment, the different interests do not always align in practice. We investigate the implications of strategies that aim to improve the efficiency of invasive species and volunteer management, and discuss organisational arrangements that reconcile different objectives.

1. Introduction

Invasive alien species (IAS) can be defined as plants and animals introduced outside their “natural past or present distribution”, “whose introduction and/or spread threaten biological diversity” (CBD, 2002). They have become a key factor in environmental change and biodiversity erosion at the global scale (Simberloff et al., 2013; Kumschick et al., 2015) and, as a result, have gained prominence in recent international and European conservation policies (Aichi Target 9; EU Regulation 1143/2014; Dick et al., 2017). While the number of eradication attempts has rapidly increased since the 2000s, cases of successful initiatives away from confined island settings are few (Genovesi, 2005; Robertson et al., 2016). Professionally-led management of established invasions over extensive areas is unlikely to be feasible without extensive resources (Rejmánek and Pyšek, 2002; Simberloff, 2002). As current funding is considered to be insufficient to tackle even the most concerning invasions (Larson et al., 2011), conservation organisations increasingly seek to involve local stakeholders and the general public in the prevention, control and surveillance of IAS (Genovesi and Bertolino, 2001; Bryce et al., 2011), and such campaigns can take many forms (e.g., Harvey et al., 2016; Atchison et al., 2017).

In this paper, we focus on volunteering as a particular form of

community engagement in IAS management. We understand volunteering as a non-remunerated activity for the benefit of the environment or other people, which is “planned” and embedded in a more or less formalised organisational context (Penner, 2002). Volunteers have become increasingly involved in the management and monitoring of the natural environment worldwide (Conrad and Hilchey, 2011; Tulloch et al., 2013). They represent a significant workforce and source of information in nature conservation projects (Theobald et al., 2015), notably in IAS management programmes (e.g. Delaney et al., 2008; Marchante et al., 2017). Understanding what facilitates and how to encourage people's engagement in volunteering activities is therefore important to improve the success of IAS management.

Volunteering in IAS management can be conceptualised as a form of “local environmental stewardship”, consisting of “actions taken by individuals, groups or networks of actors, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts” (Bennett et al., 2018, p. 599). Reluctance to endorse IAS control has often been attributed to people's views on species, such as functional and emotional attachments to certain IAS (Gardener et al., 2010; Crowley et al., this issue; Shackleton et al., this issue-c) and differing perceptions of their impacts and benefits (Bach

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et al., this issue), or concerns regarding the feasibility, costs, risks and morality of management strategies (e.g. Gardener et al., 2010; Cowan and Warburton, 2011; Varnham et al., 2011). Capacity for collaborations between local communities, governmental authorities, scientists and other professional organisations may also be hindered by lack of resources such as long-term funding (Delaney et al., 2008), lack of trust and legitimacy (Warner and Kinslow, 2013; Crowley et al., this issue; Wald et al., this issue) and disputes over the governance of IAS management programmes and decision-making processes (Weeks and Packard, 2009; Mackenzie and Larson, 2010). Furthermore, IAS managers' use of militaristic metaphors and nativist arguments to communicate about their initiatives have been found to dampen motivations and weaken capacity for collective action by fuelling conflicts and mistrust between actors (Larson, 2005; Lidström et al., 2016). In this paper, we propose to examine in more depth the implications of the political context on the roles given to volunteers in IAS management and on their motivations and capacities for action.

In Britain, the need to better engage civil society in the problem presented by IAS and in the management interventions they require was first formalised in the Invasive Non-Native Species Framework Strategy for Great Britain (Department for Environment, Food and Rural Affairs [DEFRA], 2008). The Framework Strategy called for broader awareness of the impacts and risks of biological invasions, “a stronger sense of shared responsibility across government, key stakeholder organisations, land managers and the general public” (DEFRA, 2008, p. 2), and improved coordination and rationalization of management effort at and between different levels of governance. It was recognised that these policy objectives might be best addressed at the local level by the development and consolidation of ‘Local Action Groups’ (LAGs), i.e. collective initiatives led by community groups and larger non-governmental or private organisations (e.g. Wildlife Trusts, The Conservation Volunteers, or Rivers Trusts) to detect and manage local threats, to raise awareness of the problem and to promote good practice in biosecurity (DEFRA, 2015). LAGs thus had the dual purpose of providing opportunities for citizens to engage in the conservation of their local natural environment and of addressing past inefficiencies in IAS management arrangements.

Initiatives such as LAGs have been described by the UK government as an attempt to apply a “Big Society” approach to nature conservation (Thomas, 2011). The “Big Society” policy (Cabinet Office, 2010) aimed for a decentralisation of powers from the state to citizens and communities, along with greater responsibilities for voluntary activity and organisations in the delivery of public goods and services formerly provided by the state (Bell and Vanner, 2011; Pattie and Johnston, 2011). Its vision rested on normative and instrumental claims about the benefits of public participation, i.e. the idea of volunteer engagement as (1) “an essential element of good governance” that “serves the vital function of safeguarding citizen liberty from an over-powerful executive” (Davis Smith, 2000, p. 10); and (2) a solution for the delivery of public policies in a context of fiscal crisis (Lorimer, 2010). Although the term “Big Society” has fallen out of favour, volunteering has become truly embedded in how organisations – health care, nature conservation and otherwise – relate to their audience; with digital platforms and secondary organisations increasing to ‘help’ people find the ‘right’ volunteering initiative for them. However, as voluntary organisations and their members are increasingly enrolled in the delivery of policies that aim to rationalise and increase efficiency – something that could be seen as instrumentalisation – it is uncertain whether these participative claims are or can indeed be realised. At the same time, there is a substantial body of literature that examines the dynamics and complexity of volunteers' own motivations (e.g., Asah and Blahna, 2012), increasingly also in relation to IAS control (e.g., Atchison et al., 2017; Crowley et al., 2018; Pagès et al., 2018). This raises three questions that we attempt to address in our analysis. First, how do voluntary organisations and volunteers relate to aims striving for the rationalisation of IAS management? Second, what are the implications of the rationalisation

of IAS management for voluntary organisation structures and, more specifically, for volunteer engagement (i.e. volunteers' recruitment and the nature of their participation)? Third, to what extent are the participative and instrumental roles of volunteers compatible?

To address these questions, we investigated how professional conservation organisations that recruit and manage volunteers and volunteers themselves envisage, implement, and experience their engagement in LAGs. Here, we pay particular attention to the different organisational forms in which voluntary activities can take place, including initiatives and projects led by (a) professionals in local authorities, (b) professionals in non-governmental or private organisations, and (c) self-organised volunteers. First, we present volunteers' motivations (Section 3.1) and professional managers' objectives for volunteer engagement (Section 3.2). We then deconstruct the different manifestations of the rationalisation of IAS management (Section 3.3), highlighting the tensions between increasing efficiency and volunteers' motivations, and examine the trend towards professionalisation of volunteering activities (Section 3.4). Finally, we present the implications of rationalisation of both IAS management and volunteering activities for the functional and normative claims underpinning volunteer engagement in IAS management, and discuss organisational arrangements that accommodate both the participative and the instrumental role of volunteering (Section 3.5). By doing so, we contribute to a relatively small body of literature on the political ecology of IAS management (e.g., Aitken et al., 2009; Kull and Rangan, 2015; Crowley et al., 2017), looking not at the perceptions of species or attitudes towards management options (see Shackleton et al., this issue-b, for an overview), but – using IAS management in the UK as an example – at the ways in which the resulting management practices are embedded in governance contexts, and the implications that this contextualisation has for volunteer engagement.

2. Methods

To examine motivations, goals, and practices of volunteering from the perspectives of both those who do and those who manage volunteers, we conducted semi-structured interviews with sixteen project officers employed by local authorities, non-governmental and private organisations, eight unpaid volunteers leading self-mobilised local community groups and seven other volunteers involved in initiatives run by professional organisations or community groups. These 31 individuals were active in 21 partially overlapping groups or partnerships located in northern England and northern Scotland (Table 1). These projects managed two invasive mammals (American mink, *Neovison vison*; grey squirrel, *Sciurus carolinensis*) and various invasive plants, including Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzianum*), and rhododendron (*Rhododendron ponticum*). Volunteers and community group leaders were selected among initiatives that specifically aimed to control grey squirrels and Himalayan balsam. Initiatives spreading over > 5000 km² consisted of regional partnerships and umbrella organisations responsible for the coordination of multiple local projects. The latter included multi-river catchment initiatives, with a working area of 500–5000 km², and town- or catchment-based groups covering < 500 km².

Projects and interviewees were selected by snowball sampling, starting at the level of regional partnership coordinators and progressing towards local initiatives. The sampling strategy aimed to include representatives of professional- and volunteer-led projects at the three levels of scale described above, and volunteers involved in different roles (group leaders and regular volunteers).

Interviews were carried out face-to-face, over the phone and in the field during eight work parties organised by two community groups and five professional organisations, between November 2012 and September 2013.

The interviews were exploratory and covered the topics presented in

Table 1

Characteristics of the IAS management projects investigated (ordered by spatial scale). LA: Local Authority, NGO/P: Non-Governmental Organisation or Private organisation.

Project	Target species	Operational spatial scale in km ²	Type of leading organisation	Number of interviewees (managers, community group leaders)	Number of interviewees (volunteers)
1	American mink	> 5000	Professional – NGO/P	1	
2	Multiple invasive species	> 5000	Professional – LA	1	
3	Multiple invasive species (riparian)	> 5000	Professional – NGO/P	1	
4	Grey squirrel	> 5000	Professional – NGO/P	3	
5	Grey squirrel	> 5000	Volunteer-led	1	
6	Multiple invasive species (riparian)	> 5000	Professional – NGO/P	1	
7	Multiple invasive plants (riparian)	500–5000	Professional – NGO/P	1	
8	Multiple invasive species (riparian)	500–5000	Professional – NGO/P	1	
9	Multiple invasive species (riparian)	500–5000	Professional – NGO/P	1	
10	Multiple invasive species (riparian)	500–5000	Professional – NGO/P	1	
11	Himalayan balsam	500–5000	Volunteer-led	1	
12	Multiple invasive plants (riparian)	500–5000	Professional – NGO/P	1	
13	Multiple invasive plants (riparian)	500–5000	Professional – NGO/P	1	
14	Grey squirrel	500–5000	Volunteer-led	1	
15	Himalayan balsam	500–5000	Professional – NGO/P		1
16	Multiple invasive plants (riparian)	500–5000	Professional – NGO/P	1	
17	Himalayan balsam	< 500	Volunteer-led	1	
18	Himalayan balsam	< 500	Volunteer-led	2	3
19	Grey squirrel	< 500	Volunteer-led	2	1
20	Grey squirrel	< 500	Professional – NGO/P	1	
21	Himalayan balsam	< 500	Professional – LA	1	2

Table 2. They initially aimed to scope the diversity of initiatives engaging volunteers in IAS management and to investigate the activities they proposed to participants, the outcomes and challenges of the projects, and volunteers' experiences. The rationalisation theme emerged during these interviews, i.e., was identified in a grounded way rather than a priori, and was explored in greater depth at the data analysis stage.

Interviewees' names were changed to ensure anonymity. Written or verbal consent was obtained from all respondents before commencing face-to-face or phone interviews respectively.

The interviews were transcribed verbatim and thematically coded using the qualitative data analysis packages NVivo Version 10 and QDA Miner Lite. Pre-defined categories were used to organise the data: project design, including the different practices associated with volunteer recruitment and management and with the control and monitoring of IAS; volunteers' motivations to get involved in IAS management programmes and managers' motivations to engage volunteers; attributes of the social, political and ecological contexts influencing project design and motivations; and, finally, the perceived outcomes of the initiatives and challenges encountered. We then identified data that addressed more specifically the relationships between professional managers' objectives to rationalise the work of volunteers and the design of the project, and how this impacted on volunteers' motivation.

3. Results

3.1. Volunteers' motivations in IAS management

IAS initiatives involved a broad range of volunteers, with different

backgrounds and motives. Some people such as fisheries staff or gamekeepers volunteered as part of their work, whereas others checked mink traps on their Sunday walk or shot the occasional grey squirrel from their kitchen window. Some volunteers were more interested in experiencing the work than its conservation implications. Others sought to gain practical experience to improve career prospects. Differences in motivations were observed between volunteers involved in the management of a same species, between participants engaged in different activities and within individuals over time.

Most volunteers in both plant and animal control projects sought to 'help nature', although this motive could entail different perspectives. Hands-on control was often perceived to be necessary to preserve native species and their diversity, and to prevent other damage to natural habitats. The emergence of volunteer groups was often triggered by a first-hand witnessing of the expansion of an alien species and rising sense of urgency to take action where remnant communities and populations could still be saved:

25 years ago, grey squirrels weren't on the top of my agenda, you know. I heard of them but that was it. [...] the first time I saw one it was about ... '94, somewhere around there. Very close to here and then I realised that obviously there was a threat and the squirrel pox virus that sort of loomed and I thought, well, we better do something about it. (Roger, leader of a local red squirrel conservation group)

Other volunteers saw IAS as threats to human activities (recreation, land- and water-based businesses) and personal property. Personal attachment to local places and species often underpinned volunteers' engagement in IAS control. Some Himalayan balsam volunteers wished to preserve native plants that they had enjoyed their entire life and

Table 2

Themes explored in interviews with professional managers, community group leaders and volunteers.

Themes explored with project managers and community group leaders	Themes explored with volunteers
<ul style="list-style-type: none"> • History of the project: who initiated it; what motivated the set-up of the project; evolution of the project over time • IAS management: target species; area covered; techniques used • Volunteer management: objectives of volunteer involvement; recruitment; roles of volunteers; communication and capacity building activities (e.g. training, supervision) • Perceived benefits and challenges of involving volunteers 	<ul style="list-style-type: none"> • First contact with the project and reasons for initial engagement • Current motivations to volunteer, positive experiences and benefits gained • Barriers to volunteering and negative experiences • Suggestions of changes to improve the project or their experience

those involved in grey squirrel control showed a strong affinity for the native red squirrel, sometimes rooted in childhood encounters of the species, and a great affection for individual animals visiting their garden or their neighbourhood:

My father and my mother used to have a house in [a neighbouring town] and they used to have red squirrels there and I always remember how wonderful they were, it was seeing them. And then when we moved here, we had them here, which was great. [...] if I hadn't them in my garden, I'm not sure I wouldn't have set up a group, I don't think. (David, leader of a local red squirrel conservation group)

Concerned that IAS could lead to disastrous impacts locally, volunteers also perceived themselves to have a responsibility in addressing the issue, particularly where conservation authorities and landowners seemed unwilling to take action or lacked resources to deal with the problem effectively.

Species (non-)nativeness had different implications for volunteers' motivations. Native species could be seen as more natural and therefore more valuable. More commonly, volunteers expressed greater attachment to certain native species (e.g. wildflowers, red squirrels) that had long been part of their local environment. Exotic species were generally perceived to be more invasive than native species – because of the absence of natural predators or other evolutionary mechanisms of regulation – and more damaging to wildlife. Whereas the overabundance of native species, such as gorse and bracken, was considered to be a natural process that could become a “land management issue” where it interfered with human activities, the spread of introduced alien species was often described as unnatural and regarded as a conservation threat.

Importantly, squirrel and balsam volunteers expressed very different motivations regarding the control activity itself. Though recreational shooting was mentioned, none of the volunteers we interviewed killed grey squirrel for pleasure and some people indeed experienced the activity as unpleasant and sometimes upsetting. By contrast, Himalayan balsam volunteers openly expressed their enjoyment of “bashing” invasive plants and the addictive nature of the activity. Thus, performing IAS control was revealed to be a key motive in some plant management volunteering initiatives but often, yet not always, a deterrent in mammal eradication programmes. Experiential motivations could inform volunteers' choice of activity and management techniques. For example, Laura and Susan, who together managed a Himalayan balsam group, expressed their preference for hand-pulling balsam over the use of potentially more efficient control techniques such as strimming and spraying herbicides, because it allowed them to work in close contact with the natural world:

Susan: I don't want to [use a strimmer]. What I really enjoy most of all is walking down a low river in my wellingtons, picking up [Himalayan balsam] from the river edge, you know, just the odd plant [...] from really nice flowery bits. That is the most satisfying to me.

Laura: You see the odd kingfisher, you watch the dippers. [...] It does take you to lovely places.

Moreover, and in contrast to the solitary nature of mammal trapping or shooting, Himalayan balsam volunteers enjoyed working in the company of like-minded people. Because Himalayan balsam and grey squirrel control catered for different experiential motives and interests in the natural world, very few volunteers engaged in both.

Differences in motivations were also observed between group leaders and more “casual” volunteers. The latter varied widely in their level of commitment and motivations but often mentioned particular constraints (e.g. lack of time) that prevented them from managing a group themselves. Volunteers in a leadership position in both Himalayan balsam and grey squirrel projects appreciated managing an

initiative autonomously and considered their volunteering as a form of work:

I've never really had a career. I've done different things in my life and in a way since I've retired this has taken me over a bit. In the summer especially. So, in a way, I feel it's my baby because I started it. And that's very satisfying when people do say you've made an enormous difference. (Laura, leader of a Himalayan balsam group)

Recognition by the community was particularly gratifying and the status of group leader could bring a certain level of prestige in the local community that might be exploited to gain political clout. Empowerment, in the way of influencing the management of the natural environment, was a key motive and outcome of volunteering for group leaders but this was not necessarily the case for other volunteers.

Finally, volunteers' motivations could change over time. More specifically, their perception of control feasibility could shift from optimistic views on the controllability of species and effectiveness of management, to more nuanced (and sometimes pessimistic) perspectives on its long-term sustainability. Importantly, while volunteering allowed people to learn more about IAS, it did not always foster personal ownership of the issue:

I mean right now all I'm doing is that we turn up here, they drop us somewhere with the van and they say ‘right, pull all this up!’ [...] I'm definitely not a botanist. [The manager] is really good on this and she knows all about the background. She's telling us. It's even funny, some of the people we bumped into, we are getting rid of the Himalayan balsam, they say ‘oh good, good, good’. Everyone seems to think the same thing but I've never even heard of it before I came up here to be honest! (Ben, volunteer in a professionally-led Himalayan balsam project)

This examination of volunteers' motivations emphasised the complexity of the objectives served by volunteering. People involved in IAS control were not only invested in making a practical contribution to conservation but also described volunteering activities as a lived experience that entailed different dimensions, of enjoyment, self-fulfilment, and political and/or personal empowerment. Furthermore, as the following section shows, a duality appeared in the image of the volunteer, which was alternatively described as a “casual” helper involved in nature conservation as a pastime, or as a professional characterised by strong commitment, reliability and expertise.

3.2. Volunteering from the perspective of professional managers

The various functions and visions of volunteering were also expressed in professional managers' objectives for volunteer engagement. They sought to minimise the costs of IAS control and monitoring through the use of volunteers, sometimes in an attempt to compensate for budget cutbacks and staff reduction, but also to resolve the mismatch between short-term and spatially targeted funding opportunities and the considerable geographic and temporal scales at which programmes aimed to address biological invasions. Bernard reflected on the challenges of controlling IAS with limited resources, and on the possible roles of volunteers as “cheap labour”:

Our grant is for five years. We're signing a contract [...] to say we will eradicate rhododendron. But the Forestry Commission own guidance says it needs ten years. So we're signing a contract to say we're doing the impossible. But this is where the volunteers come in. [Our professional team] stop it setting seed, we prevent any more spread and we do everything we can within the budget for five years. After that the volunteers will come along and they will probably get their free holiday and, instead of spending all their time cutting and burning, they will be walking the hills with a little machete, taking out the bushes. (Bernard, invasive plant manager)

Professional managers made a distinction between “casual”

participants, professional volunteers (i.e. those who carried out volunteering activities as part of their work), and those who had the potential to become “para-professionals” (i.e. to take responsibilities at the level of paid staff, without being formally employed by the organisation).

All professional managers acknowledged some of the motives underlying people's involvement, in particular the desire to preserve local species and places and the enjoyment of the experience. Volunteering was also believed to be conducive to transformational outcomes, most notably awareness raising through practical involvement and word-of-mouth:

You can write an article and put it in the paper and a few people will read it and they will forget it tomorrow. But if they've spent a day bashing [Himalayan balsam] and got the blisters and tell their friends about what they did, that's a really useful way of spreading the message. (Bernard, invasive plant manager)

Some further envisioned volunteering as an opportunity for personal and collective empowerment and for democratising the management of the natural environment:

I'm just trying to link people, give them a feeling that this is their river. This is not just about rich people fishing for salmon, this is a really important resource and anybody can get involved in it. (Lawrence, riparian IAS manager).

Professional managers' objectives for volunteer enrolment thus reflected the pragmatic, experiential and participative dimensions of volunteers' motivations and acknowledged the potential for synergies. They often sought to empower community members to form groups of volunteers that could continue to operate with little external stimulus and support. However, as we will see in Sections 3.3 and 3.4, the role of professional organisations in implementing rationalised IAS management influenced how the different objectives of volunteer engagement were prioritised.

3.3. Rationalising IAS management: increasing efficiency

Professional IAS managers and volunteers shared a similar understanding of biological invasions as factors of environmental change and as threats to native species, habitats and landscapes. IAS removal was understood as a necessity in the absence of alternatives such as biological control, contraception or vaccines. Nonetheless, professionals and volunteers did not always share the same views on IAS management.

In a context of resource limitations, professional managers sought to improve the efficiency of IAS control through different rationalisation strategies. First, professionally led IAS control and financial support for community groups were focussed on certain species and areas. This prioritisation process followed two different rationales. A first strategy concentrated on addressing national policy priorities, such as controlling IAS in areas of conservation importance (e.g., European and national designations such as Natura 2000 sites and Sites of Special Scientific Interest). The second strategy focussed management on areas where IAS removal or the achievement of conservation goals appeared to be economically and technically feasible. This pragmatic rationale supported plant and animal control on less infested areas and on sites that were believed to be “defensible” against recolonization, and where conservation effects were expected to be maximised. This rationale is exemplified by the red squirrel reserve (later renamed “stronghold”) policy deployed in northern England since the late 1990s (Natural England, 2009), which was criticised by community groups for failing to acknowledge local concerns and investment in red squirrel conservation. These two strategies also created challenges for professional managers who sought to encourage volunteer engagement outside prioritised areas, yet largely relied on people's ability to commit personal financial resources in the activity.

Accordingly, the prioritisation of public funds entailed broader

consequences on the organisation of voluntary action, limiting the ability of individual volunteers to get involved and encouraging the formation of more structured community groups that were able to develop self-financing capacities. Furthermore, prioritisation based on conservation and cost-effectiveness criteria could fail to address local communities' concerns. Leaving these motivations untapped could be counterproductive from a pragmatic perspective but also conflicted with the objective of democratising IAS management.

In addition, professional organisations sought to operate at the landscape-scale (e.g. at the scale of river catchments) and to apply methodical control (e.g. removing riparian invasive plants or American mink from the headwaters of river catchments onwards, progressing downstream) with a view to overcome the inherent capability of many species to disperse downstream or overland over large distances and to negate control efforts through recolonization (Oliver et al., 2016). LAGs aimed to implement concerted, strategic effort at the appropriate scale. Professional organisations, such as Rivers Trusts, often took a co-ordinating role at catchment or multi-catchment levels and sought to orchestrate the action of grassroots actors by providing a “strategic overview” and “making sure that the work that they are sort of proposing to do is done to best effect” (Stephen, riparian IAS coordinator). Volunteer-based management of riparian IAS required to balance complex considerations, involving the need to minimise recolonization, health and safety and logistic concerns, and the necessity to prioritise management where they matched volunteers' physical and technical abilities and motivations. Admittedly, fitting volunteers into these strategies could be challenging:

I think you've got this tension between wanting to do something on large scales and a strategic approach, which is what the science or the biology of the species is telling you need to do. On the other side you've got this more local aspect which is what lessons from volunteer research is saying. This is what volunteers like. So your challenge is ‘how do you get that to meet?’ (Alex, riparian invasive species manager)

Community groups often lacked the capacity to address the diversity of situations found in an entire catchment (e.g. sites and species requiring the use of herbicides or mechanised tools, hazardous terrain, etc.). Thus, despite understanding the mechanisms of recolonization, they were not always able to apply methodical control.

Finally, professional managers aimed to improve systems of data collection and analysis. This objective related in part to the significance of adaptive management as a core principle in the control of biological invasions. Moreover, management based on “robust”, “good science” was deemed crucial in potentially controversial initiatives involving mass culling of mammals, because of the necessity to demonstrate good practice and to provide unequivocal evidence of the positive conservation impacts of lethal control. With these objectives came the need to expand the range of data recorded and to standardise and systematise their collection, storage and sharing. However, volunteers were not always able or willing to collect detailed or accurate data and scientific monitoring programmes could be perceived as diverting resources away from actual control. This perception was reinforced by contrasting understanding of the geographic scale and time frame at which management impacts could and should be measured:

The problem with science is that people want instant results but, you know, you're measuring something that's happening over years and years and years [...] but [volunteers] go ‘well you've done it once, why can't you tell me if we're winning?’ Well, we can't. (Mary, invasive mammal officer)

Volunteers' resistance was reinforced by mistrust over the use of the data collected, particularly where previous projects of data centralisation had failed to produce and communicate information to volunteers. Differing views on the goals of IAS management and the role of science translated into the perception of a divide between scientists, who

studied a phenomenon from afar, and the world of volunteers who “actually get their feet wet” to make a practical difference to an issue of personal interest. Collaboration between these two worlds and, more generally, between amateur and professional IAS practitioners was complicated by actors' struggle for legitimacy and volunteer groups' desire for autonomy, and these tensions could be exacerbated by the lack of inclusive co-construction and decision-making processes.

Processes of prioritisation, coordination and standardisation of IAS management thus responded to a need for greater efficiency within financial constraints. However, rationalisation strategies were also applied to volunteer management.

3.4. Reducing the cost of IAS control: rationalising volunteer management

Volunteer engagement by professional organisations was not only motivated but also shaped by resource limitations. With little time to supervise and control the quality of volunteer work, some managers were reluctant to use amateurs for skilled and potentially risky tasks, such as handling chemicals or working in difficult areas. Funding for advanced training, such as pesticide application accreditation, was scarce and managers were sometimes disinclined to invest in volunteers, whose long-term retention and turn-out at key times for control could be uncertain:

The problem is then I haven't a contract with volunteers. I spend 400 pounds training them and then they say ‘oh!’ ... they've got a job in Uganda, saving refugees or they've got a job in Tesco's. I have no come back. [...] They haven't got to work for the rest of their life but that 400 pounds has to count for something. (Bernard, invasive plant manager)

As a result, volunteers' and professionals' activities could become compartmentalised. Volunteers were often mobilised in unskilled activities that complemented the work of professional staff and contractors, for instance hand-pulling Himalayan balsam, a task that required minimum knowledge, skills, and physical abilities and that, unlike spraying of Japanese knotweed or giant hogweed, could be undertaken within a wide window of opportunity. Although volunteers' capacity to manage Himalayan balsam with limited external support indeed facilitated the emergence of self-managed community groups, professional managers reflected on the difficulty to recruit and retain volunteers to carry out what some referred to as “glorified weeding”, a task that could be experienced as unchallenging and monotonous.

Importantly, a number of professional organisations had limited experience with volunteer engagement and felt they lacked the skills to recruit and supervise volunteers or the resources to enrol on a training course to learn the basics of volunteer management. This led to scepticism as to the potential of achieving cost-effectiveness through volunteer engagement. In the absence of a formal contract with volunteers, specialist training and skilled tasks could be reserved to participants “cherry-picked” among known and trusted individuals. More generally, and with an eye on retaining a skilled workforce, some organisations pro-actively attempted to recruit volunteers with a professional background in land and wildlife management or hoped to attract experienced amateur naturalists. If professional managers mentioned the objective of involving people from all walks of life, the ambitions of IAS control and social inclusion were not easily combined:

[Collaborating with] housing trusts or groups that work with young disadvantaged children [is] certainly something we're looking at but ... I'm not quite sure how that works, because ... are you still getting as much good work done, or are you providing a service for another institution? (Stephen, riparian invasive species manager)

Professional organisations also mentioned the objective of professionalising volunteer groups themselves, in particular by encouraging them to employ their own staff for activities such as systematic grey squirrel trapping. Nevertheless, the transition from volunteer-

based to staff-run projects could conflict with normative visions of volunteering as an altruistic activity motivated by passion that could be tarnished by the introduction of financial incentives:

Money really makes a difference when it comes into volunteering. All sorts of attitudes and all sorts of involvements and things change; [...] money becomes the whole basis of it. [People] are not interested in volunteering or even red squirrels. They just hear there's money available; [...] their heart isn't in it because as soon as the money dries up, they're gone. (Ken, leader of a local red squirrel conservation group)

Thus, the process of professionalisation could generate important changes in the type of participants recruited and the nature of the incentives motivating people's engagement. This might in result erode the shared values bringing volunteers together, even though funding for expenses could also help to get a greater diversity of people involved in IAS management.

In parallel, professional organisations sought to encourage the institutionalisation of volunteer groups in order to increase self-sufficiency. Some community group leaders were yet reluctant to engage with the bureaucratic burden of managing constituted charities. Processes of professionalisation could therefore lead to a wide range of structures, in which formal organisations employing staff co-existed with small, informal, groups of volunteers. This represented an important challenge for professional organisations, who recognised the need to respect the different ambitions expressed among the volunteer community.

In summary, the desire expressed by most professional managers to “intensify, standardise, professionalise almost” the work of community groups and their individual members led to tensions over certain volunteering motives (e.g. autonomy, informality, a focus on local issues) and other social objectives such as inclusion. However, certain forms of management and organisations could help address these tensions and improve opportunities for collaborations between professionals and volunteers.

3.5. Facilitating volunteers' engagement in a rationalised vision of IAS management: the role of organisational arrangements and management

While fitting volunteering into rationalised strategies for IAS management proved to be challenging, many of the organisations and volunteers recognised the need for collaborations between unpaid labour, landowners and paid staff, and highlighted the complementarity of their approaches and competencies. Collaborative arrangements had thus emerged to attempt to integrate volunteers' motivations and capacities within professionally-led IAS management. These arrangements often involved partnerships of multiple community- and professionally-led volunteer groups, working under the umbrella of or in parallel to a larger, professional, organisation such as a Wildlife or a Rivers Trust. The organisational model was based on a separation of roles between the two types of structures with, on the one hand, the provision of technical and scientific support, large-scale strategy and coordination by the professional organisation (often in the form of a paid coordinator) and, on the other hand, local IAS management by volunteer groups, mainly with a focus on one single species. Through these collaborations, community groups were able to access funding and benefit from skilled workforce, technical advice and professional endorsement, which enhanced their legitimacy in the eyes of landowners and could be important to get access to private land, especially in England. In many cases, the effort of coordination at a larger scale led to improved control and monitoring coverage and to the perception of a reduction in IAS density and range.

Several conditions were important to the success of these arrangements. Successful partnerships engaged with volunteers' aspirations by adapting tasks to volunteers' motives and abilities, and by using professional help to better attend to their needs. For example, dense

patches of Himalayan balsam could first be mechanically cut by professionals to make the task less daunting for volunteers and reinforce the feeling of making a real difference. This work of adaptation relied in part on the ability of intermediaries to align the objectives and practices of professionals and volunteers. For example, grey squirrel community group leaders collated and standardised volunteers' sightings before they were compiled and analysed by professionals. Nonetheless, while professional organisations (and community groups) often sought to adapt tasks to volunteers' motivations, very few actually collected information on these motives or on the perceptions of IAS in the wider community. A usual assumption was that failure to recruit or retain volunteers resulted from dissatisfaction with the task or lack of awareness in the community that could be solved by education on the detrimental impacts of IAS.

Furthermore, successful collaborations involved some level of concertation and co-decision on IAS management. These partnerships maintained decision-making power regarding local management within community groups, while volunteers' representatives were sometimes involved in higher levels of governance:

Susan: What's really satisfying about this project is that we see the whole thing. And [the professional coordinator] has been brilliant. She's helpful and supportive. She appreciates that we are capable of just doing it and it takes a whole river out of her! [...] But they leave us to get on with it.

Laura: It is a bit of power, isn't it?

Susan: But she's good, you know. Not that I ever thought they wouldn't do that but, no, they haven't come in and said 'oh you're doing it all wrong, we need to do this'. At all. Have they? [...] They just let us get on with it. And that's been great.

This required the development of trust between volunteers and professionals and the recognition of the need for cooperation and of the investment on both sides. Interactions based on respect, openness and acceptance of criticism could be key in facilitating the emergence of a sense of reciprocity and in building mutual understanding between professionals and volunteers. However, these processes could take time and short-term LAG funding programmes might be ill-equipped to foster such changes.

4. Discussion

Collectively, LAGs were developed to provide a structure through which local energies could be harnessed to address past inefficiencies in the management of biological invasions and to overcome the resulting sense of helplessness regarding the ability to make a difference. However, this process of enrolment conveyed certain values about what constituted good environmental management (e.g. efficiency, technicity, science-based decisions), which had implications on the roles that volunteers were invited to play. Importantly, both tensions and complementarities existed between the rationalisation of IAS management, which is at the core of national policies, and key aspects of volunteering motivations such as local attachments, the satisfaction of seeing tangible results and personal fulfilment (Section 3.1; Asah and Blahna, 2012; Krasny et al., 2014; Pagès et al., 2018). Increasing the efficiency (and reducing existing inefficiencies) often led to a compartmentalisation of volunteers' and professionals' roles in hands-on activities and decision-making. It also resulted in the selective recruitment of volunteers, which favoured the enrolment of qualified and experienced individuals, willing to operate in specified locations, over inclusive engagement of all interested citizens irrespective of their locality. Selective recruitment reinforces existing challenges regarding the lack of diversity in the age and ethnicity of environmental volunteers in the UK (Ockenden, 2007). The professionalisation of voluntary organisations can constrain the range of opportunities available to volunteers and prevent the enactment of active citizenship (Fyfe, 2005; Milligan

and Fyfe, 2005). At the same time, it could be argued that ignoring opportunities for increasing the efficiency and effectiveness of management activities – for example, by choosing *not* to coordinate Himalayan balsam control from upstream to downstream areas – would be cynical, careless, and disrespectful of the volunteers' effort and time, as it would unavoidably lead to a failure of the control intervention.

4.1. Environmental management “on the cheap”?

For IAS managers, working with volunteers is one, and perhaps the only, way to address the issue at the spatial and temporal scales required to manage invasive species. However, the professional managers' goal to facilitate the development of autonomous groups of volunteers, in order to manage biological invasions in the long term, echoes broader discourses of civil society's self-reliance in the emergence of “soft neoliberal” strategies, exemplified in the UK by the “Third Way” ideology (Peck and Tickell, 2002, p. 384) and the “Big Society” policy (Cabinet Office, 2010). These discourses present volunteering as a way of activating citizenship and empowering communities and as a solution for addressing fiscal cutbacks (Fyfe, 2005; Milligan and Conradson, 2006), a strategy that has been criticised for enrolling voluntary organisations and their members in the delivery of “environmental management ‘on the cheap’” (Cook and Inman, 2012, p. 176). Nevertheless, involving volunteers effectively is not cost-free. LAGs were sometimes conceived as kick-starters that ambitiously aimed to recruit, train and produce self-reliant networks of volunteers in a short period of time. However, community groups continued to require on-going technical and administrative support (see also Arts et al., 2013), as well as public endorsement to effectively carry out IAS management. The mismatch between the ambition of devolving this responsibility to grassroots actors and the actual resources allocated to the process illustrates the “paradox of attempting to renew local community institutions and services whilst simultaneously withdrawing government funding for them” (Corbett and Walker, 2013, p. 462). In Britain, practitioner networks such as the GB Invasive Non-Native Species LAG Forum and umbrella organisations (e.g. the Rivers and Fisheries Trusts of Scotland) have certainly helped project officers share knowledge and experience with regard to IAS and volunteer management, but longer-term funding and a better integration of IAS management within existing organisations would be needed to sustain the social and ecological achievements of LAGs.

Moreover, professional organisations and, to some extent, community group leaders described a role of activators and facilitators of volunteer engagement, which evoked the Third Way rhetoric of the “enabling state” and its responsibility in building local capacity and guiding people's choices towards desirable behaviours (Corbett and Walker, 2013), a strategy that has been likened to an attempt by the state to “hold on to the steering wheel while prompting others to do the rowing” (Lindenberg, 2002, p. 78, cited and translated by Rosol, 2012, p. 241). In this rationale, volunteers are enrolled to provide labour and knowledge at the service of a pre-defined agenda and have limited opportunities for their voice to be heard in the process (Goodwin, 1998; Ellis and Waterton, 2004). Our study showed that some volunteers did not feel particularly strongly about the threat of biological invasions, which raised the question of the ability of this form of participation to foster people's ownership of IAS management, beyond learning about the issue.

4.2. Aligning instrumental and participatory objectives of volunteering: the importance of organisational arrangements and management

Our interviewees described cost-effectiveness, satisfying experiences and empowerment as complementary goals, yet these objectives were not easily aligned in practice. Failure to reconcile instrumental and participatory goals did not always matter to project managers or volunteers but it is important to point out that different organisational

arrangements may lead to trade-offs between social and ecological outcomes.

Our findings point towards organisational arrangements that attempted to reconcile professionals' and volunteers' ambitions. Umbrella partnerships seemed particularly successful at coordinating the effort of multiple volunteer groups in an effective way. Integrating small- and large-scale levels of organisations, this type of "federal" organisations have also been found to successfully address the objectives of expansion of public service delivery and participation in the welfare sector (Milligan and Fyfe's, 2005). Whilst our analysis did not focus on the tensions and challenges emerging from different organisational forms, these have been examined in some depth for other types of community groups, e.g., in the wider environmental and sustainability arena (Fischer et al., 2017).

The success of these partnerships was largely dependent on good communication, inclusive procedures and the presence of intermediaries at the interface of volunteers and professionals. Community group leaders and professional coordinators could be seen as boundary spanners that acted as translators between funding bodies, scientists, and casual volunteers. However, rather than actively connecting the different spheres and thus, in the longer run, making themselves obsolete, these intermediaries were continuously needed to ensure the functioning of the system (Zhang, 2018). Their commitment, competencies and charisma were key to the emergence and momentum of community projects and to the integration of those groups into systematic, landscape-scale, management strategies.

4.3. Engaging volunteers in IAS management: specific barriers and opportunities

Individual and collective motivations and resources (e.g. commitment, technical abilities, time, leadership) and the wider social-ecological context (e.g. access rights, IAS density) influenced volunteer engagement success. While these factors may be important to any type of community-based conservation, barriers and opportunities specific to volunteers' involvement in IAS management could be identified.

First, there is a need for mutual and shared understanding of the problem and its significance, and of the purposes of IAS management between volunteers and professional organisations (Shine and Doody, 2011). Individual and collective action was motivated by the common perception that certain IAS presented an important threat to the environment and people but differences between local and national conservation objectives could lead to tensions.

Moreover, volunteers' involvement can be complicated by differing views on IAS management. Professional organisations may be less confident as to the feasibility and cost-effectiveness of control and, accordingly, adopt pragmatic approaches that contrast with volunteers' more optimistic perspective (Shine and Doody, 2011). Differing representations of human-nature relationships may also lead to diverging motivations for and perspectives on IAS management (see also Bach et al., this issue). Conservation organisations often described IAS control as an experiment that should be guided by scientific knowledge and aim to expand understanding of the natural world. They favoured a relatively distant role of "observers and experimenters of ecosystems" (Weng, 2015, p. 138) that could clash with volunteers' desire to enact environmental stewardship through their active involvement in removing invasive plants or animals.

Furthermore, people may be reluctant to engage in activities that intend to extract a species from natural habitats and to support lethal control of mammals in particular (see Villatoro et al., this issue). Killing mammals can be emotionally challenging and recruiting volunteers for this task proved to be difficult. Animal welfare and ethical considerations mattered to participants and communication should therefore highlight these aspects and explicitly discuss the nature of the activity (Atchison et al., 2017; Crowley et al., 2017). It is also important to ensure that 'dispatchers' are able to kill animals effectively and in

compliance with animal welfare good practice and have access to training and advice accordingly. By contrast, controlling plants does not involve the same level of affective investment but the use of aggressive language such as "bashing" or "blitzing" may alienate those who seek contemplative experiences close to nature or who envisage IAS management as an act of care rather than destruction.

In summary, differing views on IAS management, the nature of the activity and the way it is presented can hinder volunteer engagement. However these difficulties may be alleviated by enhancing opportunities for volunteers' participation in the design of management plans and by shifting communication from one-way flow of information aiming to address a perceived knowledge gap (Crowley et al., 2017) to a more open dialogue seeking to support mutual learning (Fischer et al., 2014; Shackleton et al., this issue-a). Using different ways of talking about IAS and introducing more positive metaphors could facilitate this dialogue and the imagining of new ways of engaging with biological invasions (Tassin and Kull, 2012; Lidström et al., 2016).

5. Conclusion

Our exploration of the goals of individual volunteers and of the organisations that enrol them in the management of biological invasions reveals that volunteering can take different meanings, which are not always compatible with a rationalised vision of nature management. Volunteering represents a way for citizens to engage in conservation and to be part of nature (physically, emotionally and ecologically), to help the environment, and to experience an enjoyable, self-enhancing and socially integrating activity. The overlap between different images of volunteering shows that the instrumental, experiential, and participative dimensions of volunteering activities are not mutually exclusive, but also that these dimensions need to be taken into account when engaging citizens in conservation activities. The rationalisation of IAS management, however, tends to give more credit to the instrumental use of volunteers as a source of workforce with two implications for the engagement of volunteers and community groups: one the one hand, the disenfranchisement of part of the volunteering community that resists the compartmentalisation, standardisation, and professionalisation of their activities, and, on the other hand, the reinforcement of divides between professionals and volunteers in conservation. Finally, this study sheds light on governance arrangements and management practice that facilitate the accommodation of local motivations with the interests of professional organisations. These local partnerships relied on inclusive decision-making and integration of different levels of governance through the bridging work of local leaders and professional coordinators.

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