# Using scenario planning to assess governance reforms for enhancing biodiversity outcomes

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## ABSTRACT

Governance arrangements frame and direct how land managers respond to the multiple demands and challenges of conserving biodiversity. Biodiversity conservation requires attention to how social-ecological systems (SES) change and can be influenced over time. It is important that governance settings within these systems can support achievement of biodiversity outcomes. Two questions then arise. Will current arrangements lead to desirable biodiversity outcomes, and if not, are there other arrangements that plausibly might do better? However, methods for answering these questions in collaboration with critical stakeholders such as policy makers and land managers are not evident in the literature. The aim of this paper is to explore the use of a participatory scenario planning process to test the efficacy of proposed governance reforms for enhancing biodiversity outcomes in two contrasting landscapes in Australia. A workshop process was used to consider the effect of the reform options on key drivers of change, and thus how these affected drivers would in turn modify future scenarios, and the biodiversity outcomes of these scenarios. In both landscapes, there was a preference for reforms that retained governmental influence or control, in contrast to academic calls for adaptive governance that emphasises the importance of self-organisation and devolution of authority. The workshop process, although complex and cognitively challenging, was regarded by participants as suitable for testing the utility of alternative governance options for biodiversity conservation. Challenges for the future include designing and considering reforms based on what is possible rather than probable or preferable, and engaging participants over time to build knowledge, engagement and trust. The paper concludes with suggestions for addressing these challenges.

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## 1. Introduction

Incorporating strategies to manage biodiversity loss and climate change into land use planning represents a significant governance challenge. The issues involved are long-term, systemic and complex (Underdal, 2010), and require planning for social and ecological system dynamics that co-evolve (Rammel et al., 2007; Rands et al., 2010), with an awareness that human intervention can result in unintended consequences and feedbacks (Carpenter et al., 2006; Lambin and Meyfroidt, 2010). Such an approach to planning needs to be adaptable. That is, it requires a shift away from

"planning-then-doing" to one of "planning-by-doing" as an iterative process (Mitchell et al., 2014a; p. 308).

However, a long-term and adaptable approach to planning does not sit well with current neoliberal approaches to governance, where lean government, market mechanisms and the short-term political cycle predominate. While neoliberal governance regimes enable a degree of flexibility associated with increased devolution of responsibilities and the pursuit of networks spanning public, private and community interests, any benefits arising from uptake of these opportunities are often curtailed by simplistic one-dimensional accountability arrangements (Eakin et al., 2011), and the inherent contradiction between profit motives and public good outcomes (Büscher et al., 2012). Those pursuing biodiversity enhancement in the field often end up excluded from planning and decision-making responsibilities, and are burdened with reporting requirements that have little to do with enhancing biodiversity

outcomes (McDonald-Madden et al., 2010). Planning processes are needed that can more immediately respond to learnings that arise from those doing the intervening, and transparent processes through which planning objectives can be modified in response to new learnings and unexpected developments.

In response to such issues, many scholars have called for governance reforms, and have detailed the attributes that might constitute adaptive governance (Folke et al., 2005; Lebel et al., 2006; Lockwood et al., 2012) as an alternative, preferred approach to those currently in place. The term 'adaptive governance' extends the notion of 'adaptive management' by conveying "the difficulty of control, the need to proceed in the face of substantial uncertainty, and the importance of dealing with diversity and reconciling conflict among people and groups who differ in values, interests, perspectives, power, and the kinds of information they bring to situations" (Dietz et al., 2003; p. 1911). 'Management' can be too easily associated with notions of command and control, thus clashing with the self-organising behaviour of co-evolving social-ecological systems (SES), and the ability all humans have for anticipating, imagining, and potentially influencing the future (Davidson, 2010). Instead, institutions and policies need to be reformed through governance processes (Paavola, 2007) so that planning processes can become more nimble and responsive to change. Such reform is particularly sought to improve biodiversity conservation outcomes (Steinberg, 2009; Armitage et al., 2012; Lockwood et al., 2012; Curtin, 2014).

A key challenge is how adaptive governance can be implemented in practice, something we (the authors) have been investigating as researchers and practitioners, leading to a need addressed through this paper for processes through which the practical efficacy of governance reforms can be assessed. Reforming governance to make it more adaptive in the context of biodiversity conservation is challenging, and it is even more difficult to determine the extent that governance reforms are achieving the adaptability sought. Post hoc evaluations and case studies are one approach, but these do not readily allow consideration of future unknowns and the uncertainties that may lead to a range of possible futures. Intervention in current governance, then observing and measuring the effects is another research possibility, but requires years of highly adaptable and transdisciplinary research effort. Given these constraints, scenario planning appears to offer a pragmatic method that allows explicit consideration of governance reforms in the context of uncertainties and diverse futures. In this research, a modified approach to participatory scenario planning was developed to enable biodiversity conservation stakeholders to evaluate a set of proposed governance reform options aimed at improving biodiversity outcomes.

Scenario planning is extensively used and promoted to engage stakeholders in contexts involving a high degree of uncertainty and low levels of controllability (Peterson et al., 2003). The technique has been promoted as a means for businesses to think 'outside the square', and to prepare for the unexpected (Schwartz, 1996). Scenario planning is well suited to participatory approaches for assessing the adaptive and transformative possibilities of particular systems of interest, as it enables a diverse range of plausible futures to be imagined systematically (Walker et al., 2002). Participatory approaches are also a useful way to help stakeholders analyse complex SES in which they are embedded (Hanspach et al., 2014).

A systems approach to participatory scenario creation involves workshop activities where interactions between different trajectories of the key drivers of change are identified and explored, often focusing on the extreme ends of two critical uncertainties to create four scenario spaces (e.g. O'Connor et al., 2005). Narratives are then created to characterise these scenario spaces, and each is given a title. Scenarios can also be used to detail and/or visualise

future circumstances given current trajectories, especially when planning for or raising awareness about climate change impacts (e.g. Shaw et al., 2009). By combining elements of both approaches, it is possible to explore current trajectories as they might eventuate across a diverse range of plausible futures, as has been undertaken by Haward et al. (2013). Similar approaches have been used for scenarios involving future trajectories related to different policy options (Soliva et al., 2008; Hirschi et al., 2013), adaptation strategies (Ravera et al., 2011), and community priorities (Bohnet and Smith, 2007; Reed et al., 2009).

The need to incorporate governance aspects into participatory scenario planning is also recognised, with different strategies proposed (Wangel, 2011). Governance has been included as a theme to help characterise differences between future scenarios (Vervoort et al., 2014). Scenarios representing alternative governance regimes have been developed by stakeholders in a water conflict (Kuzdas and Wiek, 2014), and scenarios have been used to explore the consequences of specific governance strategies that could be adopted by Indigenous communities in Canada responding to polar bear conservation legislation (Dowsley et al., 2013). An alternative strategy has been to use participatory processes to develop contrasting scenarios, and then create discussions around the kind of governance arrangements needed to deliver the preferred characteristics of each (Carvalho-Ribeiro et al., 2010; Southern et al., 2011).

This paper presents and analyses a different strategy to those outlined above. Our research strategy involved two phases. In the first, participants created a range of future scenarios all under the assumption that governance arrangements would not substantially change by 2030. This is in contrast to other approaches where participants created scenarios in terms of governance arrangements that had changed in opposing directions (e.g. Vervoort et al., 2014), or who had 'backcasted' the kind of governance arrangements needed to achieve a desired future (e.g. Southern et al., 2011). The reason for the strategy of initially creating alternative future scenarios with no change in governance arrangements was to enable determination, in a second phase, of the effect of proposed governance reforms on these scenarios.

Our research aim, therefore, was to explore the use of a participatory scenario planning process to test the efficacy of proposed governance reforms for enhancing biodiversity outcomes. The final stage of the research process is presented here, in which stakeholders in two contrasting case study contexts participated in workshops in 2014 to assess the effect of proposed governance reforms on the 2030 scenarios developed at workshops the previous year (Mitchell et al., 2015b, 2016). Because the scenarios had been created assuming relatively constant governance arrangements, participants in the 2014 workshops could then assess the extent they considered the proposed governance arrangements would influence the scenarios and hence change biodiversity outcomes relative to their likely futures under current arrangements.

The paper continues with an overview of the context for the research leading up to the workshop where the proposed governance reforms were tested. The methods used for this workshop are then presented, followed by the results organised to follow the staged logic of the approach. We conclude with a discussion of what these results imply for those seeking to put biodiversity governance reforms into practice, with associated recommendations for how to improve the participatory scenario planning approach adopted.

## 2. Research context

As this paper reports on the final stage of a research project, it is necessary to provide a brief overview of the project, the two case study contexts, and the scenarios and reforms used as the basis for the 2014 workshop deliberations. More detail is available else-

where (Mitchell et al., 2015a,b, 2016). The research was framed by SES analysis (Resilience Alliance, 2010), which provided the basis for the case study descriptions and scenario construction. Governance attributes important for adaptive capacity were embedded in this SES analysis to facilitate assessment of how proposed governance reforms could support or impede this capacity.

### 2.1. Case study systems

Two case study regions provide the focal systems, with details on systems, their focal biodiversity features, key drivers of change, governance influences and critical uncertainties summarised in Table 1. The case studies were selected as part of a broader nationally-funded research project investigating how to improve approaches to landscape-scale biodiversity conservation (www. lifeatlarge.edu.au). The case study contexts provided contrasting landscapes with high profile and critical biodiversity issues: an undulating predominantly privately-owned agricultural landscape in central Tasmania, an island state off the southern coast of the Australian mainland (Tasmanian Midlands—Fig. 1); and an extensive mountain range traversing south-eastern Australia, encompassing public land managed as national parks administered under multiple jurisdictions (Australian Alps—Fig. 2). The Tasmanian Midlands is one of 15 national biodiversity hot-spots identified by the Australian Government. Its landscape is largely cleared for agriculture, including livestock grazing and cropping, with irrigated land use increasing. The Australian Alps is National Heritage-listed and one of 15 National Landscapes promoted internationally for tourism. Our focus within this landscape was iconic alpine and sub-alpine areas threatened by climate change (Hennessy et al., 2008; Lockwood et al., 2014).

### 2.2. Scenarios

The scenarios were developed at previous workshops in 2013 drawing on SES modelling (Mitchell et al., 2015b, 2016). Participants first identified the most important drivers and influences of change on the system, before considering which of these drivers had the greatest level of uncertainty concerning their future state by 2030. This process enabled participant identification of two critical uncertainties for each case study context to determine the key constructs for the scenarios (i.e. 'farmer profitability' and 'social and human capital' for the Tasmanian Midlands, and 'invasive processes' and 'community attitudes to achievement of conservation outcomes' for the Australian Alps—as shown in Figs. 3 and 4). Participants were also responsible for choosing the scenario labels. The scenarios ranged from worst case scenarios in the top left position through to best case scenarios in the bottom right position. Climate change was viewed as a consistent driver across all scenarios as its origins are primarily external to the focal systems. There was, however, some uncertainty about the effects of climate change, such as on new land use opportunities in the Midlands, and on invasive processes in the Alps. The year 2030 was chosen to ensure the scenarios did not exceed a reasonable planning timeframe. Following the workshops in 2013, the scenarios and their anticipated biodiversity outcomes were further refined in consultation with local and scientific experts, and the resulting report distributed to those intending to participate in the 2014 workshops (Mitchell et al., 2014b,c).

### 2.3. Governance reform options

The reform options used in the two case study analyses were developed through a diagnosis of current governance arrangements, consideration of adaptive governance and public administration theories, and examination of best practice case studies (Clement et al., 2015). A key contribution of the diagnosis was to accept that the reforms are more likely to succeed if they scaffold onto existing successful governance arrangements and work with and improve current capacities (Ansell, 2011). In the Midlands such scaffolding is evident in the efforts of conservation organisations to work with landholders on land management and conservation issues, particularly through the innovative 'Midlandscapes' project and its associated conservation fund (Cowell et al., 2013). In the Alps, scaffolding was present through the Australian Alps Cooperative Management Program (based on an MOU signed in 1986 and still current). This program is internationally recognised for enabling national parks agency staff from four jurisdictions (the states of NSW and Victoria, the Australian Capital Territory, and the Australian Government) to share experiences and strategies on key cross-border management issues such as those relating to water resources, invasive species and climate change (Jacobs and Anderson, 2012; Weiler et al., 2012).

Two reforms for application across the four scenarios were considered (Table 2). Having two options provided a degree of variability; any more than two would have overextended the cognitive complexity of the workshop process. The two Midlands reforms focus on governance that facilitates self-organising and networking by landholders, given they are responsible for the bulk of biodiversity features of interest in the focal system. The two Alps reforms aim to achieve greater continuity and coordination across the landscape, and improved buffering of park agencies against the vagaries of politics and short-term policy and funding cycles.

## 3. Methods

A one-day workshop was held in each case study region in 2014 as the final stage of a research project to explore whether there are better ways to govern for biodiversity given anticipated social-ecological changes. The purpose of the workshops was to enable key stakeholders to assess the efficacy of governance reforms options (Table 2) to enhance biodiversity outcomes under a range of 2030 scenarios.

A staged process was used within these workshops to consider the effect of the governance options on: key drivers of change and associated governance influences; scenario outcomes; outcomes for focal biodiversity features; and the likelihood of the scenarios eventuating (see Fig. 5). The staging intended to assist participants make judgments about the effects of reforms on SES model drivers (Activity 1), and take these effects into consideration when exploring how the reforms might affect the 2030 scenarios (Activity 2). The effects of reforms and scenarios could then inform participants' judgements about biodiversity outcomes under each option (Activity 3). If participants judged that the reforms could affect one or more system drivers, then it is logical that there should be consequential effects on scenarios and biodiversity outcomes. Activity 4 provided an additional means to test the efficacy of the reforms. If the governance reforms were to lead to positive outcomes, it is reasonable to assume that worst case scenarios would be less likely to occur, and best case scenarios more likely to occur.

Participant selection for the workshops was purposeful rather than representative, but the broadest range of representation possible with respect to biodiversity and its management was sought. All those invited had particular expertise to contribute constructively to an assessment of the effect of governance reforms on future biodiversity outcomes, as scientists, land managers, communities of interest or governance authorities (Table 3). The predominant participation from state governments at the workshops is explained by responsibility for land management resting with the states under the Australian constitution. Most of the Alps workshop participants came from state-run national park agencies, and were
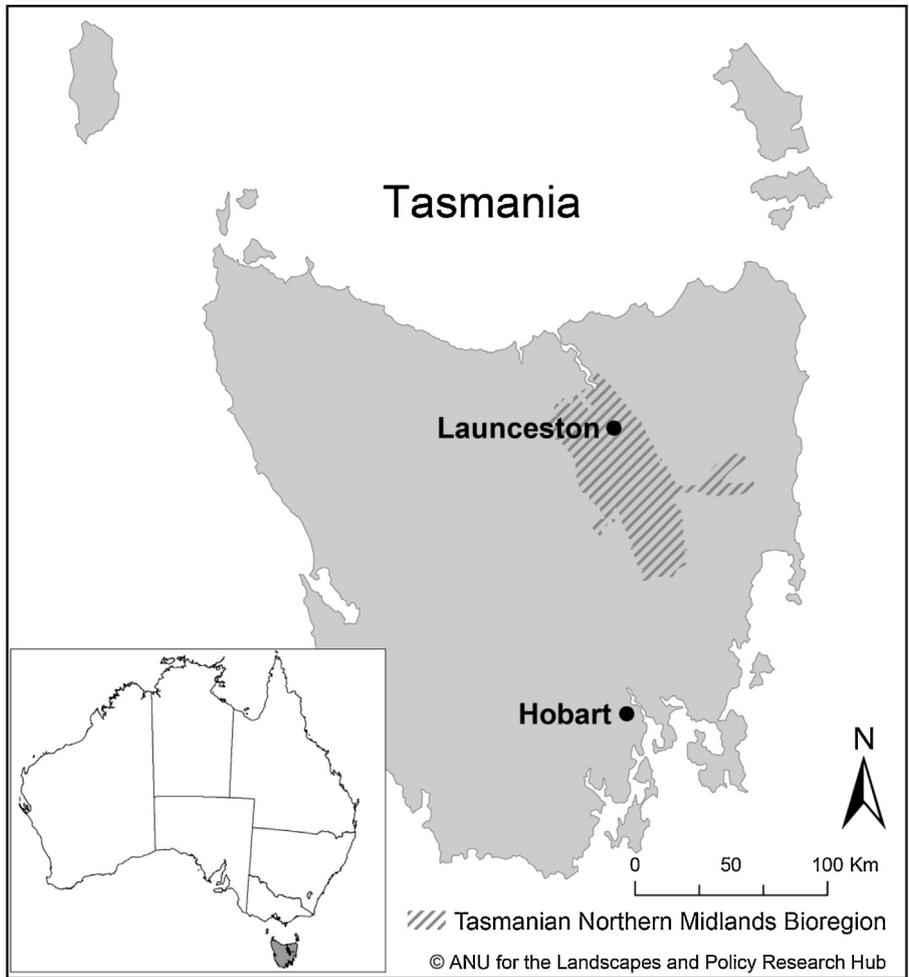
**Fig. 1.** Tasmanian Northern Midlands Bioregion—based on the Interim Biogeographic Regionalisation for Australia developed by the Australian Government (Department of the Environment, 2013).
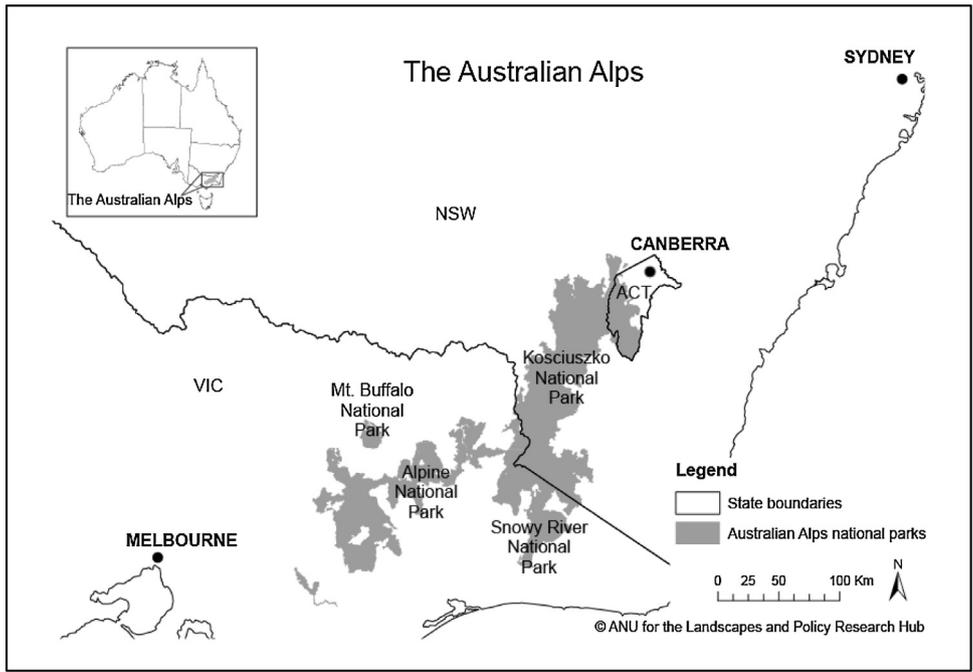


**Fig. 2.** Australian Alps national parks (shaded area covers all 11 national parks and reserves).

**Table 1**
Descriptive overview of the two case study systems.

| Case study system | Focal system | Focal biodiversity features | Key biophysical drivers of change[a] | Key social drivers of change[a] | Important governance influences[a] | Critical uncertainties[a] (two most important and 'uncertain' drivers) |
|---|---|---|---|---|---|---|
| Tasmanian Midlands | Tasmanian Northern Midlands bioregion (415,445 ha)[d] encompassing largely cleared farmlands with scattered remnant native vegetation | Temperate lowland grasslands in a continuum of grassy woodlands and forests, with remnants scattered largely on privately-owned farmlands—including Lowland Native Grassland Ecological Community remnants, listed as a Matter of National Environmental Significance[b,c] | Invasive species, effect of irrigation on land use change, climate change | Enterprise profitability, level of trust between actors, landholder engagement in conservation practices | Effectiveness of engagement processes, longevity of programs, supportive political will | Farmer profitability, social and human capital |
| Australian Alps | Alpine and subalpine areas of the Australian Alps, comprising treeless peaks and plains (160,000 ha)[3] as well as extensive woodlands, managed as 11 national parks and reserves (5 in Victoria, 4 in New South Wales and 2 in the Australian Capital Territory) | Mosaic of alpine and subalpine wetlands, grasslands, heathlands, boulder heath, snowpatch and feldmark ecological communities and their dependent threatened species, including those listed as Matters of National Environmental Significance[b] (Alpine Sphagnum Bogs and Associated Fens Ecological Community, 14 plant species and 6 fauna species)[e] | Climate change, invasive and predation processes, fire regimes | Community values and attitudes, social and human capital | Supportive political will, strength of legislative protection, priority setting and resources | Community attitudes to achievement of conservation outcomes, invasive processes |

Sources: [c] DEWHA (2010); [d] Department of the Environment (2013); [e] McDougall and Walsh (2007)

[a] As determined by stakeholder assessments during the 2013 workshops (see Section 2.2). For a list of other key drivers and influences, see Tables 4 and 5.

[b] Under the Australian Government's *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

invited for their roles related to issues requiring transboundary cooperation between agencies, such as water management, pest management and the monitoring of climate change effects. There has also been increased devolution of delivery of natural resource management programs in Australia to regional agencies. Participants from such agencies attended the Midlands workshop but were unable, although invited, to attend the Alps workshop. While there were not many participants who were full-time farmers at the Midlands workshop, other participants from non-governmental organisations represented their interests or were rural land-holders attending under another capacity. All rural landholders who did participate were actively involved in considering issues concerning governance arrangements related to biodiversity management. Additional full-time farmers had been invited but instead chose to make their contributions in different ways, which is not surprising given time constraints and the voluntary nature of their contributions.

A number of the participants in the 2014 workshops had attended previous workshops in 2013 where the scenario narratives were constructed. Over half of the participants were able

| | | Farmer Profitability | |
|---|---|---|---|
| | | Low | High |
| Social and Human Capital | Low | **Death by a Thousand Cuts**<br>- Slow death of farming enterprises with associated increase in land no longer used for agriculture<br>- Little capacity among farming community to adjust to change | **Cha Ching**<br>- Land dominated by corporate agribusinesses new to the area with little attachment to place<br>- Intensive irrigated agriculture pursued ruthlessly with little regard for long-term environmental impacts |
| | High | **People's Republic of Northern Midlands**<br>- High cooperation among farmers for landscape-level water retention and use<br>- Strong sense of place and economic motivation enables creation of alternative uses for the landscape that enhance rural lifestyle and solidarity | **Marvellous Midlands**<br>- Landscape prized nationally as the place to combine the good life, excellent profits and a love for the local cultural and natural heritage<br>- Community vibrant with a wide range of innovative and successful pro-sustainability agricultural enterprises in place |

**Fig. 3.** 2030 scenario spaces developed for the Tasmanian Midlands (ranging from worst case scenario top left through to best case scenario in bottom right position).

| | | Invasive Processes | |
| --- | --- | --- | --- |
| | | Large Increase | No Change |
| Community Attitudes to Achievement of Conservation Outcomes | Strongly Antagonistic | **R.I.P. – Take the Package Now**<br>- Increased populations of invasive species such as horses, deer, rabbits, cats, and foxes<br>- Landscape irreversibly altered; wetlands severely degraded; the Alps have been abandoned to their fate<br>- Tourism business struggle to remain financially viable | **Multi Use Park**<br>- Landscape change not seen as a problem except insofar as it restricts use values<br>- Landscape appreciated for use over biodiversity conservation; funding diverted accordingly<br>- Opposition to 'green tape' development restrictions |
| | Strongly Supportive | **We Care, But is it Too Late?**<br>- Increased populations of invasive species such as horses, deer, rabbits, cats, and foxes<br>- Landscape substantially altered, but park managers are attempting to minimise loss of value with the support of the community and community volunteers | **Alpine Dreaming**<br>- Landscape change is addressed by park managers through community-supported adaptive approaches that are mitigating the worst of the impacts<br>- Community pride for restoration and conservation outcomes<br>- Increased public and private support for well-targeted and adaptive conservation programs |

**Fig. 4.** 2030 scenario spaces developed for the Australian Alps (ranging from worst case scenario top left through to best case scenario in bottom right position).

**Table 2**
Summary of reforms.

| Governance reforms | Key features |
| --- | --- |
| Midlands Reform Option 1. Landholder-Driven Regional Program of Action | - 'Bottom-up'; focus on self-organising by a working group of private landholders, with seed funding from government<br>- Starts as an informal network supported by farming organisations, in time becoming a formalised entity relying on regional planning |
| Midlands Reform Option 2. Midlands Alliance | - Formalised alliance with broad stakeholder representation (government and non-government, landholders)<br>- Based on ten-year agreement reviewed every five years |
| Alps Reform Option 1. Partnerships for One Park One Plan | - Significantly develops and extends the existing network of partnerships<br>- Collaboration focused around whole-of-Alps management plan |
| Alps Reform Option 2. Transboundary Statutory Authority | - Transboundary statutory authority established through legislation<br>- Authority responsible for overseeing development and implementation of whole-of-Alps plan, policies and programs, in consultation with stakeholders |

to attend both workshops, but given that the workshops were separated by twelve months, there was inevitably a significant proportion of new participants at the 2014 workshops (Midlands 44% new; Alps 38% new).

To begin analysing the reforms, Activity 1 involved participants assessing the potential effect of the two governance reforms on the most important SES model drivers and governance influences identified at the 2013 workshop (as detailed in Section 4). They were asked to assess these effects in terms of both degree and direction of change by allocating votes for each driver and influence along a scale of 'much worse for biodiversity' (−2); 'worse for biodiver-

sity' (−1); 'no change' (0); 'better for biodiversity' (+1) and 'much better for biodiversity' (+2), relative to the situation if no reforms were made. Activity 2 involved small group discussions to identify whether the effects identified from the first activity would change any aspects of the scenarios. The groups were divided according to the four scenarios. Their views were documented and then reported back to the whole workshop.

Activity 3 explored the effect of the governance options on the focal biodiversity features for each of the scenarios. The effects were first discussed and documented in small groups, again divided according to scenarios. After a report back from these discussions

**Table 3**
Origin and affiliations of participants at the 2013 and 2014 workshops.

| Tasmanian Midlands Workshops | I 1 Mar 2013 | II 25 Mar 2014 | Australian Alps Workshops | I 10–11 Apr 2013 | II 1–2 Apr 2014 |
|---|---|---|---|---|---|
| Government officials | | | | | |
| Federal | 1 | 0 | Federal | 3 | 3 |
| State (Tas) | 6 | 5 | State (Vic, NSW & ACT) | 14 | 15 |
| Regional (NRM) | 2 | 2 | Regional (NRM) | 0 | 0 |
| Local | 2 | 2 | Local | 3 | 3 |
| Non-government officials and representatives | | | | | |
| Agriculture-related | 4 | 5 | Tourism-related | 3 | 3 |
| Conservation-related | 3 | 4 | Conservation-related | 0 | 2 |
| Other | | | | | |
| Local farmers/graziers | 2 | 1 | Aboriginal traditional owners | 1 | 1 |
| Researchers and knowledge brokers | 7 | 4 | Researchers and knowledge brokers | 8 | 8 |
| Research team organisers | 5 | 4 | Research team organisers | 3 | 4 |
| Total | 32 | 27 | Total | 35 | 39 |
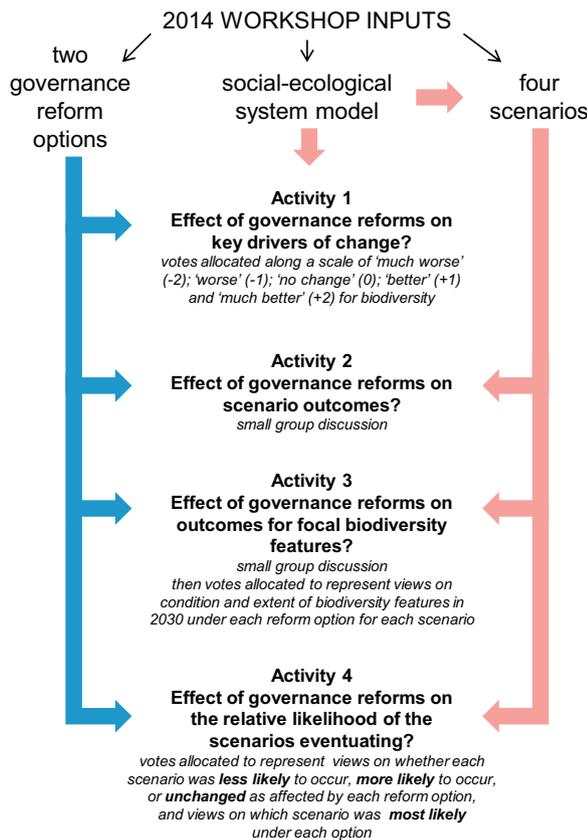


**Fig. 5.** The staged process used in the 2014 workshops to assess efficacy of governance reforms.

to the whole workshop, all participants then allocated votes representing their views on the condition and extent of the focal biodiversity features in 2030 under each of the reforms for each of the scenarios. For condition the descriptors were 'very poor', 'poor', 'moderate', 'good' and 'very good', and for extent the descriptors were 'large decline', 'small decline', 'stable', 'small increase' and 'large increase' as compared with current extent. The expert assessments of condition and extent for the biodiversity features by 2030, if current governance arrangements remained unchanged, were also indicated on these charts for reference.

Activity 4 involved participants assessing whether the two governance options for their case study region would make any difference to the relative likelihood that the four 2030 scenarios would eventuate. Participants allocated votes according to whether each scenario was less likely to occur, more likely to occur, or unchanged

in terms of the likelihood of occurrence of the scenario, as affected by each of the two governance options, as well as which scenario was most likely under each of the options.

All participants were aware they were part of a trial to test a new approach for developing and analysing governance arrangements for improved biodiversity outcomes. Their feedback on the trial was acquired through a 7-point Likert-style questionnaire completed prior to leaving the workshops.

## 4. Results

### 4.1. Effect of governance reforms on key drivers of change (Activity 1)

For both case study regions, participants perceived the effect of the more formal governance options (Midlands Alliance in the Midlands case study and the Transboundary Statutory Authority in the Alps case study) (Table 2) on key SES drivers of change as having a better outcome for biodiversity. For example, in both cases, a substantially greater number of participants thought the effect of the more formal governance options on invasive species and processes would be better for biodiversity than the alternative options.

Further evidence of this preference for the more formal governance option in the Midlands case is shown in Table 4. More than half of workshop participants considered the effect of the Midlands Alliance option on ten drivers and influences would lead to better outcomes for biodiversity, compared to five for the Landholder-Driven option (see shaded cells in Table 4). Also, at least 30% more workshop participants perceived better outcomes for biodiversity from the Midlands Alliance relative to the Landholder-Driven option, given the comparative effect of the options on a range of biophysical and social drivers and governance influences, with the differences being greatest for quality and adequacy of information and level of trust between actors (54% and 39% respectively). Some participants remarked at the time that these results may in part reflect workshop composition with few rural landholders being present, and a comparatively larger representation from government and non-government officials who may harbour views that giving landholders greater control would be detrimental for biodiversity.

For the Alps, Table 5 shows that over 50% of workshop participants considered the effect of the Transboundary Statutory Authority on 14 drivers and influences would create better outcomes for biodiversity, compared to 10 drivers for the Partnerships option. At least 30% more workshop participants perceived the effect of the Transboundary Statutory Authority on invasive processes and three governance influences would have better outcomes for biodiversity relative to the corresponding effect of the

**Table 4**
Effect of governance reforms on key drivers of change on Tasmanian Midlands' focal biodiversity features.

| Key drivers[a] | Effect of governance reforms on drivers considered better for biodiversity (%)[b] | |
| --- | --- | --- |
| | Landholder-Driven Regional Program | Midlands Alliance |
| **Biophysical drivers** | | |
| Water availability | 23 | 45 |
| Invasive species | 24 | 62[c] |
| **Social and economic drivers** | | |
| Enterprise profitability | 43 | 40 |
| Landholder values and attitudes | 76 | 70 |
| Landholder engagement in conservation practices | 84 | 71 |
| Level of trust between key actors | 21 | 60[c] |
| Landholder economic motivation | 05 | 30 |
| Landholders' terms of trade | 24 | 32 |
| Time constraints and prioritisation | 05 | 10 |
| **Governance and management influences** | | |
| Longevity of programs | 64 | 95[c] |
| Effectiveness of engagement programs | 43 | 70 |
| Grazing management practices | 50 | 62 |
| Supportive political will | 52 | 70 |
| Quality and adequacy of information | 23 | 77[c] |
| Level of financial incentives | 48 | 83[c] |

[a] i.e. Drivers of change that the 2013 workshop participants had determined as most important from a more comprehensive list (see Mitchell et al., 2015a).

[b] % Of workshop participants who considered the effect of the reforms on key drivers of change would be better or much better for biodiversity (+1, +2 on the assessment scale of −2, −1, 0, +1, +2). Shaded cells are those where >50% of workshop participants considered the effect of the reform on a driver or influence as better for biodiversity than their future states under current governance arrangements. Full spread of results is provided as Supplementary material no. 1.

[c] >30% of participants considered that the effect of the Midlands Alliance on the particular driver or influence would be better for biodiversity than the corresponding effect from the Landholder-Driven governance option.

Partnerships option. The difference was greatest for the effect of the two reforms on strength of legislative protection (81% vs. 6%). As with the Midlands workshop, views were expressed that these results may reflect the composition of the workshop, with a high proportion of parks agency staff who may harbour interests of opposing any perceived weakening of biodiversity protection measures. Interestingly, although the effect of the Transboundary Statutory Authority option appeared 'better' for most drivers relative to the Partnerships option, the perceived effect was reversed

for several drivers, including adaptive management and social and human capital (full spread of results are provided as Supplementary material no. 1 and 2).

### 4.2. Effect of governance reform options on 2030 scenarios (Activity 2)

In general, the results identified and detailed in Tables 4 and 5 regarding the reforms affecting drivers of change did not trans-

**Table 5**
Effect of governance reforms on key drivers of change on Australian Alps' focal biodiversity features.

| Key drivers[a] | Effect of government reforms on drivers considered better for biodiversity (%)[b] | |
| --- | --- | --- |
| | Partnerships for One Park | Transboundary Statutory Authority |
| **Biophysical drivers** | | |
| Invasive processes | 44 | 76[c] |
| Present pests | 50 | 77 |
| Altered fire regimes | 25 | 39 |
| Climate change | 00 | 12 |
| Predation processes | 38 | 66 |
| **Social and economic drivers** | | |
| Community values and attitudes | 58 | 52 |
| Social and human capital | 45 | 32 |
| Type and availability of information and education | 67 | 59 |
| Aboriginal aspirations | 58 | 44 |
| **Governance and management influences** | | |
| Supportive political will | 45 | 87[c] |
| Strength of legislative protection | 06 | 81[c] |
| Priority setting and resources | 77 | 81 |
| Leadership | 68 | 77 |
| Adaptive management | 65 | 52 |
| Coordinated governance and management | 52 | 91[c] |
| Quality and adequacy of information | 48 | 50 |
| Effectiveness of engagement processes | 44 | 50 |
| Effectiveness of plans and programs | 52 | 77 |
| Supportive vision and strategic direction | 63 | 85 |

[a] i.e. Drivers of change that the 2013 workshop participants had determined as most important from a more comprehensive list (see Mitchell et al., 2015b).

[b] % Of workshop participants who considered the effect of the reforms on key drivers of change would be better or much better for biodiversity (+1, +2 on the assessment scale of −2, −1, 0, +1, +2). Shaded cells are those where >50% of workshop participants considered the effect of the reform on a driver or influence as better for biodiversity than their future states under current governance arrangements. Full spread of results is provided as Supplementary material no. 2.

[c] 30% of participants considered that the effect of the Transboundary Statutory Authority on the particular driver or influence would be better for biodiversity than the corresponding effect from the Partnerships for One Park governance option.

late into any perceived significant effects on the scenarios. This perception was particularly notable in the Midlands context where anticipated differences between the scenarios under current and reformed governance arrangements were minor. Participants determined that the Landholder-Driven option was not effective in changing the outcome for those scenarios shaped by low human and social capital (Death by a Thousands Cuts and Cha Ching). The Midlands Alliance option was seen as marginally better for biodiversity because external alliances could be built and the local community would not have to rely on its low levels of social capital alone.

Similar apprehensions were expressed in the Alps workshop about the effectiveness of one of the governance options. Most participants determined the more 'distributed' Partnerships option required greater goodwill to have a positive effect than the more 'centralised' approach of the Transboundary Statutory Authority option. The former option was therefore seen as riskier, especially for the two scenarios associated with strongly antagonistic community attitudes. These interpretations were made even though more than half of the workshop participants had determined in the preceding stage that the effect of both options on community values and attitudes would be better for biodiversity (58% for Option 1 and 52% for Option 2). The Transboundary Statutory Authority option was also preferred for its potential to reduce impacts from invasive processes across all scenarios—a perception related to stronger associated legislation and other government control measures.

### 4.3. Effects of governance reform options on outcomes for the focal biodiversity features (Activity 3)

For the Midlands, the reforms were judged as having little effect on the extent or condition of the native grasslands across all four scenarios. Such conclusions were apparent from the qualitative data generated through small group discussion and the quantitative data gathered through the voting exercise (results provided as Supplementary material no. 3). One small group explained this result by suggesting that the strongest drivers of change were external to the focal scale, i.e. climate change and market forces. Participants judged that these external drivers were beyond the sphere of influence of the governance options. However, some participants raised concerns of an over-emphasis in small group discussions on considering the remnant grasslands listed as a Matter of National Environmental Significance at the expense of other important non-listed native grassland areas in a poorer condition and/or part of other ecological communities, such as grassy woodlands. These

other grasslands were seen as having better prospects for biodiversity enhancement, and that the reforms could have a positive influence on these areas.

Participants at the Alps workshop reached similar conclusions concerning the prevailing effect of climate change, concluding that the governance options would do little to counter these effects. Benefits associated with stronger legislation (linked with the Transboundary Statutory Authority option) or improved cooperation (linked with the Partnerships option) were seen as insufficient remedies. However, the results from the related voting exercise (provided as Supplementary material no. 4) suggest participants considered that the decline in wetlands would be less severe under both reform options compared with future scenarios under current arrangements, with the results more accentuated for the Transboundary Statutory Authority option. One small group specifically linked this option with less severe impact on wetlands due to the Authority's perceived stronger ability to enforce legislation and other pest control measures. The voting exercise results also suggest that many participants perceived the Transboundary Statutory Authority option to have a more positive influence on the condition and extent of boulder heath, snowpatch and feldmark ecological communities compared with future scenarios under both the Partnerships option and current governance arrangements.

### 4.4. Effects of governance reform options on the scenarios eventuating (Activity 4)

For the Midlands context, the results ran counter to what would be expected if governance reforms led to positive outcomes—that is, as explained in Section 3, it would be preferable for the reforms to reduce the likelihood of worst case scenarios and increase the likelihood of best case scenarios. Most participants in the Midlands workshop concluded that the governance reforms would increase the likelihood of the worst case Death by a Thousand Cuts scenario (Table 6, 78% for the Landholder-Driven option and 72% for the Midlands Alliance). Also, more participants thought the best case Marvellous Midlands scenario would be less likely to occur (33% for both options) than more likely to occur (11% for the Landholder-Driven option and 6% for the Midlands Alliance). The People's Republic was judged as most likely to occur by 85% of workshop participants (where social capital is high but farm profitability low).

For the Alps, in contrast, the majority of workshop participants decided that both options would reduce the likelihood of the worst case scenario (86% for the Partnerships option and 75% for the Transboundary Statutory Authority), and nobody thought this sce-

**Table 6**
Effects of governance reform options on the scenarios eventuating.

| Scenarios | Reforms | | | | | |
|---|---|---|---|---|---|---|
| | Scenario less likely to occur under reform (%)[a] | Scenario more likely to occur under reform (%)[a] | Scenario most likely to occur under reform (%)[a] | Scenario less likely to occur under reform (%)[a] | Scenario more likely to occur under reform (%)[a] | Scenario most likely to occur under reform (%)[a] |
| Tasmanian Midlands | Landholder-Driven Regional Program | | | Midlands Alliance | | |
| Death by a Thousand Cuts | 22[b] | 78[b] | 06 | 28 | 72 | 00 |
| Cha Ching | 17 | 44 | 29 | 61 | 17 | 00 |
| People's Republic | 50 | 06 | 35 | 50 | 11 | 85 |
| Marvellous Midlands | 33 | 11 | 29 | 33 | 06 | 15 |
| Australian Alps | Partnerships for One Park | | | Transboundary Statutory Authority | | |
| RIP—Take the Package Now | 75 | 07 | 00 | 86 | 00 | 00 |
| Multi Use Park | 04 | 32 | 39 | 64 | 32 | 40 |
| We care—but is it too late | 07 | 59 | 48 | 54 | 21 | 25 |
| Alpine dreaming | 21 | 28 | 13 | 07 | 45 | 35 |

[a] Percentages are for the numbers of workshop participants who assessed the likely effect of the reforms.

[b] The % of participants who assessed the reforms as having 'no change' on a scenario can be calculated by subtracting the percentages in the less likely and more likely cells for a particular scenario from 100. For example, in these two cells, the % assessing the Death by a Thousand Cuts scenario under the Landholder-Driven option as having an effect of no change is 0% (100 − (22 + 78) = 0).

nario would be the most likely to occur under either option. The results were less clear for the other scenarios (Table 6).

### 4.5. Evaluation of the effectiveness of the workshop process

Summary results from the questionnaire indicate that the majority of participants found the staged process helpful and thought that the process was of sufficient value to apply to biodiversity conservation in other landscapes (Table 7, Question 8). Some of the workshop activities related to the governance options were considered to be ineffective, especially by those at the Midlands workshop (Table 7, responses to Questions 3, 4 & 6).

A common theme in written feedback from participants was the complexities of following multiple lines of reasoning given the many aspects related to each scenario and governance option. The complex logic involved was noted as difficult to unpack in a short timeframe. These difficulties were compounded by the challenges of absorbing the pre-workshop reading material. On both accounts, the process improved from the Midlands workshop, which occurred first, to the Alps workshop, which benefited from improvements made to the pre-reading material and the workshop process. More time was also spent clarifying aspects of the governance options at the Alps workshop.

Despite the complexity of the process, participants expressed appreciation for the rare opportunity to consider alternative governance arrangements. For example, participants at the Alps workshop described the options as "exciting", and the discussion "a very good stimulus for forward thinking". They appreciated having their way of thinking tested and being able to think through the practical impacts with others. Several Midlands participants appreciated how the process "encouraged critical thinking", with one noting that examining different perceptions about current governance arrangements "is essential in order to bring about change".

## 5. Discussion

The aim of this paper was to explore the use of a participatory scenario planning process for testing the efficacy of proposed governance reforms to enhance biodiversity outcomes in two contrasting landscapes in Australia. The results show the difficulties stakeholders had in engaging with the potential of adaptive governance, and how to put such ideas into practice, discussed first below. This leads to a discussion of adjustments that could be made to the application of participatory scenario planning to the consideration of governance reforms.

### 5.1. Implication of results for biodiversity-related governance reforms

As researchers and practitioners interested in exploring what it might mean to put adaptive governance into practice, it was interesting to find a preference at both workshops for the more formal of the governance options presented for each case study region (i.e. the Midlands Alliance and the Transboundary Statutory Authority), coupled with considerable apprehension towards and difficulty in imagining more networked and devolved forms of governance. In the case of the Midlands, participants seemed to be concluding that reforms associated with network governance and self-organisation, widely reported as essential for 'good' adaptive governance (Folke et al., 2005; Armitage et al., 2012; Berkes, 2010), would increase the likelihood of an undesirable future. The preference for and sense of security about the efficacy of the more formal governance options is also exemplified by the high numbers of participants considering the effect of these options as 'better for biodiversity' compared with their alternatives, and, in the case of the Transboundary Statutory Authority, a tendency among participants towards believing biodiversity outcomes would be better under that option than the less formal Partnerships governance option. A significant caveat is the contrasting finding that the Partnerships option would have a comparatively 'better' effect on drivers associated with adaptive planning, such as adaptive management and social capital.

The preference for formal governance has several potential attributions for the consideration of governance reforms as part of a scenario planning process. First, this finding suggests participants were responding to the scenarios and reforms *as what would be probable rather than what might be possible*. This was particularly evident at the Midlands workshop where several participants, especially those associated with the landholder community, found it difficult to conceive a Landholder-Driven governance option securing sufficient funds and government support to be viable. This reluctance to explore such 'possible' futures has been suggested as significantly reducing the opportunity provided by participatory scenario planning processes to question current arrangements and explore new possibilities (Rickards et al., 2014). Second, there was the related perception of safety in what people know. Third, there is the assumption of control being retained by governments through formal arrangements. Such assumptions exacerbate constraints on governments giving up this "pretence of control" (Rickards et al., 2014; p. 655). The quest for certainty and greater control also sits uncomfortably with the need identified as part of the reforms to

**Table 7**
Feedback from participants on the workshop process.

| Question | Tasmanian Midlands % agreed[a] | Australian Alps % agreed[a] |
|---|---|---|
| 1. The governance options address key issues for the future of the Tasmanian Midlands/Australian Alps | 53 | 69 |
| 2. The staged process helped participants understand the connections between the alternative governance arrangements and how they would affect biodiversity outcomes | 74 | 63 |
| 3. The process used to determine effects of the governance options on key drivers of change was effective | 47 | 74 |
| 4. The process used to determine effects of the governance options on the scenarios was effective | 26 | 67 |
| 5. The process of determining the extent that the governance options would make a difference for biodiversity outcome was effective | 53 | 48 |
| 6. The approach used to consider the effect of governance options on relative likelihood of scenarios was effective | 21 | 62 |
| 7. The results of this exercise provided new insights about the future for biodiversity in the Tasmanian Midlands/Australian Alps | 58 | 63 |
| 8. The process used to identify and test the utility of alternative governance options was of sufficient value that it would be worth trying for biodiversity conservation in other landscapes | 53 | 67 |

[a] % Includes those who 'strongly agreed', 'agreed' and 'somewhat agreed' (5–7 on a 7-point Likert scale).

provide managers with greater discretion and autonomy required to adapt and learn (Ansell, 2011; Clement et al., 2015).

The results also suggest that improvements to the workshop process are needed to ensure more effective analysis of the effect of reforms on complex system dynamics through the logic of the staged approach. In particular, it was interesting to observe pessimism among participants for improved biodiversity outcomes resulting from the reforms compared with futures where governance arrangements stayed much the same as those currently in operation. Part of that pessimism seemed to stem from resignation that exogenous drivers such as climate change, community attitudes and market forces had over-riding effects on the system, thus revealing awareness of multi-scale system interactions. However, a related finding is that neither reform option was seen as being able to improve biodiversity outcomes for those scenarios when communities have low social capital and low profitability (Midlands) or when community attitudes are antagonistic towards achievement of conservation outcomes (Alps). In the face of these unmanageable, dominant critical uncertainties, workshop participants found it hard to imagine a positive future, even though they had previously assessed the reforms as having a positive influence on drivers affecting these two critical uncertainties. Such findings suggest a need to improve workshop processes to enable participants understand how governance reforms could enhance the system's capacity to adapt positively to adverse future trajectories, as further discussed below.

### 5.2. Implications for improving scenario planning methods for testing governance reforms

While workshop participants found the process cognitively challenging, their feedback shows their appreciation for the staged approach in helping them explore the connections between the alternative governance arrangements and biodiversity outcomes. That is, the methodological design provided a structure in which the effects of the reforms could be logically connected back to the fundamental system dynamics via the scenario narratives. For example, the preference among Alps participants for the Transboundary Statutory Authority option as a stronger means to protect biodiversity can be linked back to this option's perceived stronger effect on governance influences, particularly with respect to strength of legislation.

However, the ability for participants to use the SES model to help inform their decisions was not always apparent. For example, with the Midlands workshop, the finding that the effect of Landholder-Driven governance reform option on biophysical drivers would be worse for biodiversity may have resulted from insufficient attention to the effect of the governance reform on the system as a whole, and, in particular, its effect on how landholder engagement in conservation practices might positively change how biophysical drivers and associated land management practices would affect biodiversity outcomes. It was also difficult for participants to make these connections across workshop activities, especially given further complication from having to consider multiple scenarios and reform options. For example, even though the reforms were predominantly judged to have positive or neutral effects on drivers related to human and social capital (such as trust between actors and those related to landholder engagement), participants did not identify corresponding changes in scenarios, especially for those scenarios characterised by low human and social capital. Similarly, Alps participants judged their reform options as having a positive effect on community values and attitudes, yet this effect was not seen as strong enough to overcome the strongly antagonistic community attitudes that characterised the Multi Use Park and RIP scenarios.

As further elaborated below, reasons for these difficulties include: (1) a lack of continuity in engagement throughout the process of developing and considering the reforms; (2) the complexity of the workshop process and the consequent difficulty to assess in practical terms the future impact of reforms on system dynamics; and (3) an underlying scepticism that reforming governance would make any difference.

First, many participants had not engaged in one or more of the earlier stages of the research: development of the SES model (39% of Midlands participants and 34% of Alps participants); generation of 2030 scenarios (39% and 37%); and generation of reform options (52% and 66%). A significant time had also elapsed (∼12 months) between the initial generation of scenarios and their presentation prior to these workshops. Consequently, these participants had limited 'ownership' of the SES model, scenarios and/or reform options. Ownership is critical to success (Soste et al., 2015; van Drunen et al., 2011). Furthermore, although detailed information was circulated prior to the workshop, questions at the workshops suggested that few had read this material. Where there should have been strong understanding by participants of the scenarios and governance options, there was often confusion about their purpose and benefits.

Second, the complexity of the workshop process undermined the capacity for participants to make informed decisions. While most participants had little difficulty in identifying whether and how the reforms might affect system drivers, the same cannot be said for how these effects might play out through the SES and the consequent implications for the focal biodiversity features. These interlinked tasks were cognitively challenging, and as indicated by the workshop feedback survey, many participants struggled to cope with this level of complexity. An example of difficulties in dealing with this cognitive complexity was participants noting changes in the drivers influencing biodiversity (Activity 1) but then failing to adjust the scenarios in response (Activity 2). This linking proved too complex for participants to act upon in the context of a 90-min workshop session. Insufficient time often undermines the success of scenario planning processes (Rickards et al., 2014). A greater focus on the SES conceptual model may have assisted participants to explore how the governance reforms affected overall system dynamics. Because each of the system interactions can be represented as part of a complex network of interactions, it could be possible to conduct a prior survey of experts to elicit probabilities that would enable representation of the model as a Bayesian Belief Network. Such a representation may have further assisted participants' understanding of system interactions and potential scenario outcomes.

In response to the complex nature of the tasks, participants in both workshops retreated to 'familiar territory', whereby a strong desire to prevent poor biodiversity outcomes associated with apprehension towards devolution of power outside government control seemed to cause a conservative retreat towards known regulatory solutions. In the Alps for example, some participants considered the Transboundary Statutory Authority to be stronger, and Partnerships as riskier with less security regarding biodiversity outcomes. In adopting this position, participants failed to fully appreciate the implications of predicted system transformation (Lockwood et al., 2014), and retreated to what they saw as a defensive position. Through this retreat participants greatly narrowed the possibilities for the future from what is 'possible' to what they perceived as 'probable', a much-reduced set of potentialities. Such a reduction in scope can greatly reduce the value and opportunities provided by scenario planning (Rickards et al., 2014).

Third, there was a degree of underlying scepticism among some participants that reforming governance would make any difference, reinforced by a view that the governance reforms would be difficult to implement. Given the limited time for engaging with partici-

pants, concerns about participants rejecting more radical reforms out of hand, and a need to minimise the demands of an already complex series of activities, two 'middle ground' options were chosen for consideration in each case study region. The scepticism affected the results for the Midlands most strongly. Though instructed to imagine the reforms were implemented as written, it proved too difficult for some participants to 'play the game' of accepting that the Landholder-Driven option could be implemented successfully. By not playing this game, they were unable to imagine how such a novel governance arrangement would affect outcomes, and instead imagined what they thought would really happen. Their response seems illustrative of a widespread issue in scenario planning where participants choose to anchor on what they believe is 'probable' rather than 'possible' (Rickards et al., 2014). The reforms were designed to be 'plausible' (so not as extreme as 'possible') but some participants in this study restricted the scope of the reforms further to what was 'probable'.

Because the reforms were designed to address deficiencies in current arrangements and strengthen current capacities, future workshop processes will need improvements to help participants identify these potential improvements in practical terms. In particular, as a response to scepticism about the efficacy of governance reforms for improving biodiversity outcomes, participants could benefit from activity prompts requiring them to explicitly consider how the reforms could enhance adaptive capacity to buffer against the effects of exogenous drivers such as climate change. For example, if the effect of the Partnerships governance option in the Alps on adaptive management and levels of social capital was better for biodiversity than under current arrangements or under the Transboundary Statutory Authority, then it is necessary to explore what that means in practice. Such exploration would need to consider how the positive effects on adaptive management and levels of social capital could enhance community support as well as counter community antagonism.

As a final note, it is useful to stress that the two case study applications of the process presented here were experimental, and it is likely that a more inclusive approach would be adopted in a non-experimental context. In particular, the process of considering reforms in predominantly privately owned landscapes would require concerted and perhaps alternative efforts to engage a greater proportion of rural landholders. If deemed necessary, this could involve a staged process, such as that undertaken by Faysse et al. (2014), to facilitate constructive discussions towards social learning between cohorts with contested views about biodiversity conservation strategies.

## 6. Conclusion

This study has illustrated the development and application of a novel, staged process of developing and assessing governance reforms using participatory scenario planning built on SES analysis. An important contribution of our workshop design to the development of new knowledge and new methodologies that helps address these challenges was substantially embedding governance in each stage of the process, from development of the SES model to final considerations of the reforms. This enabled understanding of how governance influences system dynamics and stimulated discussion on whether and how governance can influence system trajectory. Participants appreciated how such exploration pushed the boundaries of current thinking, and opened their minds to a whole new realm for system intervention. Another important feature, as designed from the outset, was to develop the scenarios assuming current governance arrangements were held constant, providing a baseline against which reformed arrangements could be compared.

Although this study provided useful results, several problems shared with other scenario planning efforts (e.g. Rickards et al., 2014; van Drunen et al., 2011) require mention and attention. The three main issues with the process were: difficulties in ensuring participants were fully engaged in and owned the whole process; issues in clearly communicating the breadth and complexity of the workshop tasks to enable participants to effectively assess future impacts of reforms on system dynamics; and the ongoing, vexing issue for all scenario planning, and with it governance reforms, of encouraging people to creatively imagine a redesigned future.

Engaging a core group could help address these issues. Such engagement would strengthen participants' ownership of each stage's outputs, and enable better connection and cognitive fit between participants' judgements about the effects of reforms on system drivers, scenarios and biodiversity outcomes. This core group of participants could also assist by bringing new participants up to speed with outcomes from prior steps and help drive a more collaborative learning environment than we were able to achieve. Ensuring stakeholder involvement in scenario development (van Drunen et al., 2011) and making sure there is time for participants to get to know each other and develop trust (Rickards et al., 2014) have been noted as essential for success.

A strengthening of the depth and extent of commitment can only be achieved if participants stand to gain substantial benefits from the process. This suggests undertaking scenario planning research using an action research approach. Such an approach would ensure an extended, effective exchange of ideas and strategies between researchers and practitioners (Rogers et al., 2013) and time for trust to develop (Rickards et al., 2014). It also has the potential to support practical application of promising reform options, as policy makers would be embedded in the process and potentially drive implementation. Such a modified process could also allow participants to examine the potential of a wider spectrum of reform options, encourage more imaginative, long-term strategic thinking, and support participants to formulate additional opportunities for governance innovation.

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## Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.landusepol.2015.10.020.

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