LIVING IN UNCERTAIN LANDSCAPES: AN NRM LENS ON THE IMPLICATIONS OF CLIMATE CHANGE FOR REGIONAL FUTURES

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ABSTRACT: Climate change raises important challenges for regional futures, including how communities might live in and manage landscapes, and therefore what kinds of regional futures may emerge. Drawing on a larger study on climate change adaptation in natural resource management (NRM), we present insights from interviews with planners from Victoria's Catchment Management Authorities (CMAs) who are dealing with many practical and philosophical challenges in planning for climate changing regional futures. This NRM perspective highlights the need for planning and governance of regional futures that will enable communities to live well with uncertainty and change, including in regions already undergoing significant transitions such as the LaTrobe Valley in Victoria, Australia.

KEY WORDS: Regional futures; climate change adaptation; catchment management; natural resource management.

1. INTRODUCTION

Climate change raises important questions and challenges for how communities might live in and manage landscapes into the future, and therefore, for the kinds of regional futures that may emerge. We argue that understanding the implications of climate change through a Natural Resource Management (NRM) perspective is crucial for regional futures

for a number of reasons. Primarily, communities all fundamentally depend on water, land, ecosystems and biodiversity for our existence, quality of life, health, wellbeing, and livelihoods. In referring to communities here we include ourselves as researchers, to reflect that responding to climate change challenges is a collective societal endeavour. Secondly, dynamic and uncertain responses to a changing climate in species, ecosystems, water and soil regimes, will significantly influence livelihoods, food and water security, and cultural connections to place. Intersections of systems' responses with existing pressures means that the static basis of much NRM and conservation, reflected in objectives to maintain and enhance existing systems and states, may become progressively infeasible or suddenly irrelevant (Bodin and Wiman, 2007; Milly *et al.*, 2007; Dunlop *et al.*, 2013).

In turn, by exacerbating many existing threats and pressures on environmental and natural resources (CSIRO and BoM, 2015), climate change is intensifying tensions between differing stakes and values regarding water, land, ecosystems, and biodiversity (Dunlop *et al.*, 2012; Wallis *et al.*, 2017). Finally, an NRM perspective on regional futures engages with the notion of regions as naturally occurring areas defined by a 'water catchment' managed for integrated social-environmental values. Such a perspective enables systemic understandings of challenges and response options and consequently, brings together multiple partners with differing perspectives. This is crucial in any planning and governance of regional futures because the ability of societies to adapt with climate change is determined, in part, by the ability to act collectively (Adger, 2003), and no single group has clear access to understanding the issue and its resolutions (Collins and Ison, 2009).

Given these dynamic uncertainties, there is a need to reflect upon how communities will live in and manage future landscapes, including questions of regional governance and the role of environmental and natural resource management therein. Our emphasis on an NRM perspective stems from our ongoing work with natural resource managers. These 'street-level bureaucrats' (Lipsky, 1980) are grappling with profound social-ecological change, for their organisation's formal remit, those of their partner agencies, and for the communities in which they live and work.

Drawing on interviews conducted between 2013 and 2016 with NRM planners, we identify two particularly important issues that are pertinent to considerations of regional futures; the uncertainty associated with ecological change triggered by a shifting climate, and the sense of loss

associated with ecological change to regional places to which people have deep attachments. We conclude that any policies, planning, and governance regarding regional futures such as those of the Latrobe Valley in Gippsland, must not only be informed by a sophisticated understanding of the implications of climate change for their natural resource contexts, they must also more critically engage with these essentially philosophical questions. While these questions are profound, there are "pockets of positive futures in the present" (Sharpe *et al.*, 2016) from which communities might learn and build. We highlight ideas of adaptive governance, informed by systemic insights enabled through an NRM catchment scale perspective, as key areas of scholarship and practice that may provide fruitful support for sustainable regional futures under a changing climate.

2. AN NRM PERSPECTIVE

Appreciating an NRM perspective on Australian regional futures, requires some understanding of the governance settings within which NRM operates in the country. Australia's approach to NRM operates at the 'watershed' scale, guided by the internationally accepted concept of Integrated Catchment Management (ICM) (Ewing, 2003, p. 393). The state of Victoria implements this approach through two main legislative instruments—the Catchment and Land Protection Act (CALP Act 1994) and the Water Act (1989). These establish a catchment management framework centred around a statewide Council responsible for preparation of a statewide catchment condition report, and 10 regionally based Catchment Management Authorities (CMAs) responsible for the development and oversight of five-year Regional Catchment Strategies (RCS) that identify priorities and targets. The CALP Act requires that the Council and 10 CMAs have a community-based membership: broadly focussed on "people working better together to coordinate planning, investment and on-ground activities to achieve a range of environmental, economic, and social outcomes" (DELWP, 2016, p. 14). Each CMA is governed by a board, which sets regional strategic priorities, evaluates the effectiveness of outcomes, monitors external and internal CMA environment, and identifies strategic opportunities. The Boards and CMA staff are responsible for developing and implementing programs, and for liaising with communities, government and other organisations (DELWP, 2016). Victoria's Catchment Management Framework was re-invigorated in 2016 with the release of *Our Catchments Our Communities* (OCOC)

(DELWP, 2016), which also seeks to "create and sustain climate smart and resilient landscapes, communities, and industries".

These policy settings mean that CMAs must work across a multitude of research, policy, and practice boundaries, and promote adaptive forms of catchment governance. The discretion necessary in such governance and policy implementation is enacted by people in service delivery roles (Bevir and Rhodes, 2001); in the present case, NRM planners. These people are centrally involved in negotiating across and between differing values and knowledge, and make (or at least support) important policy development and implementation choices (Bosomworth, 2015). As they are now also grappling with planning for climate change, their boundary-spanning role (Moloney *et al*., in Press) provides significant insights into a range of implications for regional futures. Consequently, this paper draws on 12 one-on-one, semi-structured interviews with NRM planners from Victoria's ten CMAs. The rolling series of interviews occurred between 2013 to 2016 as part of a larger ongoing project that is co-developing approaches and capacities to planning for NRM in a climate changing world. The semi-structured interviews focused on current activities, challenges, and possibilities in adaptation planning and action in each region (Wallis *et al*., 2017; Bosomworth *et al*., 2017). All interviews were recorded (with consent) and transcribed.

3. CHALLENGES OF UNCERTAINTY, CHANGE, AND POTENTIAL LOSS

Two distinct issues stood out across the series of interviews: concepts and senses of place are being challenged by current and potential loss of 'known' ecologies, and shifting social-ecological system boundaries are demanding reconsideration of regional-scale governance structures and functions. For these NRM planners, questions of how to live in and manage landscapes in an uncertain future relate not only to how to make choices around which species or land management techniques in which to invest limited resources, but also about the implications for individual and communities' 'sense of place' and potential loss of things different people value differently. For NRM planners, this is most often revealed in questions of the potential loss of species and ecosystems:

> *"I think we've often in this world of conservation ideas, fallen into the trap of protecting every species and we have to have it forever. I don't know if that's realistic given what we've done to our landscapes and climate. If somebody said to me, 'This particular bird was no longer going to exist in the environment' I'd go, 'That's really sad but ... I've built resilience in my system and if .. there's still trees on that hill and birds fluttering around and still animals. Am I going to be better off or worse off if that one species didn't exist?' I know it sounds harsh. If I had my way I'd go and save everything. But ... we don't have the money, the capacity and I don't think we have the tools to do it."* (Participant 1)

This example questions (predominantly colonial) notions of place as static, and requires more dynamic conceptions in any regional future. Yet asking people to entertain futures in which ecologies that they view as 'belonging to' places they have managed and valued which may no longer persist in their present form, has the potential to generate disillusionment and exacerbate tensions between different stakes and values. However, NRM planners have to engage with such challenging issues. Adger *et al.*, (2009) have argued that undervaluation of loss of places and culture disguises real, experienced, but subjective limits to adaptation and thereby, to sustainable regional futures. Questions (and choices) of loss are profoundly ethical and require sensitive consideration of lived experience in adaptation and futures planning (Barnett *et al.*, 2016; Tschakert *et al.*, 2017). Responding to community grief of the potential loss of familiar ecosystems viewed as 'belonging' in a given place is emerging as a governance challenge (Ogden *et al.*, 2013); not least because species movements will have substantial implications for material human well-being (Pecl *et al.*, 2017). In a very fundamental way, recognising and exploring potential losses can challenge the traditional ideas of conservation upon which current investment decisions are made (Dunlop *et al.*, 2013) and complicate broader questions of regional planning and development.

As established in the environmental management literature, connections and associations people feel with place are inseparable from the way environmental management challenges are understood, interpreted and acted upon (Trigger *et al.*, 2010). For example, the Latrobe Valley is situated in broader conceptions of 'Gippsland as a place' that has been prominent in many community efforts, policies, and programs to

reconnect fragmented habitats (Beilin and Bohnet, 2015). Yet shifts in climatic envelopes will challenge the efforts to reafforest lands which were cleared during colonisation and logging insofar as those efforts remain informed by static notions of ecological legacy and even conservation 'redemption'. Yet, as one NRM planner stated:

> *"Some of them [experts] were like, yeah, of course, we're going to lose, you know, we're losing now. And then there was others that were like, no, we can't accept loss because by accepting it then you're saying it's okay to lose things. But we're like, we know it's not okay, but we are, and we will. So, [they said] nope, it shouldn't be in the strategy, because you're saying, you're putting down that it's okay to lose things. I'm a bit more at that point where I think we need to decide."* (Participant 3)

This comment articulates the way in which deeply held values and beliefs can influence how NRM planners perceive, interpret, and think about risks and their management, fundamentally influencing on decisions and choices (Moser and Ekstrom, 2010). Moreover, values differ among individuals, communities, and societies (Eriksen *et al.*, 2011) and can change as people and societies change (O'Brien, 2010, Bosomworth *et al.*, 2016). For regional governance under a changing climate, ideologies based on a dominating pattern of values can act as barriers or drivers to adaptation processes (Kahan and Braman, 2006), and can undermine the adaptive capacity of others, reinforcing inequities and injustices, and undermining sustainability (e.g. Eriksen *et al.*, 2011).

These static ideas of place are also an issue for public policies. Knowing that people have strong social and emotional attachments to places (Hagerty *et al.*, 1992; 1996) also drivers desire for certainty, clear targets, and well defined objectives in NRM. Consequently, like many other policy areas, NRM policy, planning, and governance has a typically static basis (Bodin and Wiman, 2007; Pugalis and Keegan, 2017), that can overlook the localised effects that will be variable under climate change (Pritchard, 2005). Some regional NRM planners questioned the utility of spatially and biophysically fixed policy and governance when 'places' and systems are changing.

> *"one of those hardest parts is what are we bound by in legislation? Sometimes there can be a conflict between the protection of the most vulnerable or endangered species versus managing whole landscapes [under climate change]."*

As Pugalis and Keegan (2017, p. 68) have argued, policy responses "preoccupied with providing the appearance of policy order" … "eschew societal complexities". We suggest such responses also eschew ecological and climatic complexities. Explicit attention is therefore needed to the ways climate change impacts upon socio-*ecological* systems, as distinct from merely socio-*economic* systems, in policies and governance for regional futures.

4. LIVING IN THE UNCERTAIN LANDSCAPES OF REGIONAL FUTURES

Climate change raises important challenges for how regional futures will evolve. Through interviews with NRM planners in Victoria, Australia, this paper has offered a broad philosophical challenge of how, whether, and where to manage or deal with potential loss that has implications for policy and governance. It emphasises the need to consider how communities might explore new ideas and imaginaries about regional futures, and demands reflection on ideas of returning to past ecological benchmarks, compelling new experiments with management and governance that can respond to uncertain and dynamic futures (Cooke and Lane, 2015; Head *et al*., 2015). This leads us to suggest two areas of existing scholarship and practice that may support sustainable regional futures: ideas of collaborative, adaptive governance, and using a 'catchment scale' perspective to provide a systemic understanding of regions and their potential futures.

The need for collaborative, adaptive governance in a changing climate is widely accepted (Clark, 2001; Voss *et al.*, 2006; Pelling, 2011; O'Brien, 2012; Chaffin *et al*., 2016; Termeer *et al*., 2017). These forms of governance are argued to encourage and enable the kind of learning, leadership, co-production, and questioning of mind-sets (Termeer *et al* 2017) needed to actively transform the current unsustainable and inequitable trajectories to more socially and ecologically sustainable and just systems (Pelling 2011; Chaffin *et al*., 2016; Termeer *et al*., 2017). While advocacy for collaborative, adaptive governance that responds to socio-ecological complexity gains pace (Chandler, 2014), this shift will

not be an easy, uncomplicated process. As highlighted here, uncertain futures that present potential for loss of (or at least significant changes to) certain 'places' raise challenging questions of who and how to enable equitable participation in planning and governance. This is because planning for regional futures under a changing climate must engage with what different people value, the diverse and nuanced meanings people attach to specific aspects of their way of life, how these values manifest, and how they change. These considerations are essential for setting the goals of adaptation and ensuring that the process and outcomes of adaptation are more equitable, inclusive, and legitimate (Wolf *et al.*, 2013; Barnett *et al.*, 2014). Concepts of adaptive governance encourage, indeed require, participation of a diverse array of stakeholders from local to bioregional and higher scales to secure resources, facilitate communications, equitably and justly engage stakeholders, and thereby develop adaptive capacities for learning and adjustment. It is within such forums that discussions, dialogues and negotiations around values and stakes within changing landscapes might be enabled.

This need to work with multiple stakeholders and perspectives also suggests that the 'catchment scale', such as that represented by Victorian CMA boundaries, could provide a lens through which to articulate adaptive policy and governance. While catchment scale planning may not be applicable for all circumstances—there are situations where watershed boundaries do not align with problem-sheds, or policy-sheds, and this can make effective participation and accountability difficult (Cohen and Davidson (2011)—planning and governance at this scale could provide a 'boundary object' that is "adaptable to different viewpoints and robust enough to maintain identity across them" (Cohen, 2012, pp.2208).

In conclusion, interviews with regional NRM planners revealed an important philosophical challenge inherent in efforts to plan for and manage regional futures under a changing climate—confronting potential losses. We argue there is much to be gained from embracing collaborative, adaptive forms of governance that are respectful of and informed by, multiple perspectives, values, and forms of knowledge in engaging with this challenge. While there has been some work focusing on the practice of such governance, there has been much less exploration of the moral and philosophical challenges presented by a changing climate. We often forget the emotional challenges presented by planning and managing for climate change given the attachment that people have to place, yet these issues are often the hardest, and likely underpin the emotionally charged nature of many arguments about what a regions

future 'should' look like. There is clearly a need for greater exploration of the moral and philosophical challenges climate change presents for regional futures, and how communities can better engage with regional landscapes as societies respond to environmental change.

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