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Reframing water governance praxis: does reflection on metaphors have a role?

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Abstract

Action for adaptation is needed in the face of anthropogenic climate change. The record of adaptation in the field of freshwater governance is poor to date, as it is apparently constrained by operational frameworks. Analyses based on the Contemporary Theory of Metaphor can reveal underlying, often institutionally reified, operational frameworks. We present a desktop metaphor mapping study of one UK and one Australian water management planning document. This mapping demonstrates the potential of metaphor analysis, with further methodological and praxis development, to support the new ways of thinking and acting that are needed to challenge deeply held social and cultural norms of linear, rather than systemic, causality. We suggest that metaphor has the potential to help practitioners expose and examine reified operational frameworks and practices, and to change those that hinder adaptive and systemic praxis.

Prologue- operational frames matter

In 1999 NASA's Mars Climate Orbiter was "lost" as it approached the red planet because of incorrect in-flight adjustments. The adjustments were wrong because the Jet Propulsion Laboratory engineers used one unit of measurement, and NASA engineers used another- and crucially **no one in either team thought to question** what units they and the other team were working in (Ober, 1999). The failure of the mission was caused directly by the non-reflective assumption of similar operational frameworks. We preface the following paper

with this infamous tale of loss to emphasise the practical importance of actively reflecting on the operational frameworks in which action occurs.

Introduction

The context

On a global scale there is immense anthropogenic pressure on land, freshwater and biodiversity (Rockström et al., 2009). Failure to slow or reverse anthropogenic climate change in the next decade will have catastrophic economic and social consequences (Intergovernmental Panel on Climate Change, 2007). Radical action is needed to maintain human wellbeing, action that requires not only mitigation, but also adaptation (Stern, 2007; United Nations, 2007). The IPCC (2007) define adaptation as “Adjustment in natural or *human systems* [emphasis in original] to a new or changing environment”. Etymologically ‘adaptation’ means ‘fitted or suited’, and to adapt is ‘to fit’ or ‘make suitable’. As outlined by Collins and Ison (2009a; 2009b) two possible conceptions arise from these meanings that have significant practical and policy implications. The first is that of ‘adaptation as fitting into’- that is something (predetermined) is fitted into a situation (also predetermined or knowable in advance) to which it is suited. Within this conceptualisation it seems plausible to create one phenomenon (e.g. research results) in isolation from another (e.g. policy development). The other way of conceptualising adaptation is as the structural coupling of a system to its environment over time (as per Maturana, 2007); this is ‘adaptation as co-evolution’. Co-evolution implies processes of mutual interaction, which in human social systems can be seen as processes of learning and development (Fairtlough, 2007; Ison et al., 2007a; Parsons, 2002). We argue that if climate change adaptation is to move from the abstract to the concrete, the praxis (theory informed practical action) of natural resource/environmental managing must become adaptive in the co-evolutionary sense. In this

paper we explore application of the Contemporary Theory of Metaphor (CMT) as a facilitator of co-evolutionary adaptation.

Water governance and the need for active change

The need for grounded, co-evolutionary adaptive praxis is particularly pressing within the context of water governing and managing (Intergovernmental Panel on Climate Change, 2007; Ison et al., 2011). The future of water and its management is increasingly recognised as one of the world's gravest concerns (Brouwer et al., 2013; Pahl-Wostl et al., 2011). Despite the recognised need for change, the record of innovation and reform in water governance and managing is poor, notwithstanding the level of activity undertaken under the labels of adaptive management and integrative practice. In Australia, for example, adaptive management theoretically underpinned the \$1.4 billion National Action Plan for Salinity and Water Quality (NAP) (Australian Government NRM Team, 2003) and provides a foundation for the current National Water Initiative (National Water Commission, 2005). Unfortunately this rhetorical support has rarely translated into institutional arrangements conducive to the long-term sustainable management of Australia's rivers (Connell, 2007; Dovers, 2005; Head, 2005). Similarly, attempts at water governance in Europe, in the form of Integrated Water Resources Management, have proved difficult because of political processes (Saravanan et al., 2009). Quite simply our current institutions and the practices they mediate rely on entrenched ways of knowing (Cook and Wagenaar, 2011), and have a propensity for systemic failure (Ison, 2010). Both Ingram (2008) and the Intergovernmental Panel on Climate Change (2007) point to the need for 'strategies that involve different ways of knowing' for policies and practices associated with water governance and concurrent climate change adaptation. Hajer and Wagenaar (2003) refer to a necessary practical task that is also deeply theoretical i.e., to unlearn embedded intellectual reflexes and break out of patterns of thinking.

Facilitating *unlearning* is of central concern in this paper. In particular we are interested in

ways to reframe the management and governance of water as the traditional command and control operating framework appears to be incapable of supporting adaptation. Behind our metaphor based approach is awareness that what humans do is achieved through living in language (see Ison, 2010; Maturana and Poerksen, 2004).

The language of water governance

In line with broader responses to climate change, specific discourses around rivers and their management have expanded from linear hierarchical water management to more socially complex, dynamic water governance (Fisher, 2006). While there are various understandings of what this “governance turn” involves, all feature forms of collective action, and partnerships, with some stressing the importance of non state actors (Bulkeley et al., 2007). This expansion of intent and concept presents both an opportunity and a challenge. The opportunity is to develop processes and techniques to draw attention to - and thus into experience, conversation and practice - fresh understandings of current framings of human/freshwater relationships. The challenge is to capitalise on the expansion from management to governance by ensuring that change is underpinned by robust praxis rather than (a) more of the same or (b) mere abstract and/or discursive shifts. Our concerns are conceptually similar to those of Seddon (2008) in his critique of New Labour in the UK. He presents evidence of significant systemic failure in public sector management because of the failure to develop a systemic praxis to enact the governance shifts associated with ‘the third way’ and notions of ‘joined-up government’, as well as a lack of appreciation of the perverse effects of adopting a ‘targets culture’. His practical response is to develop a systemic praxis in which service providers learn their way into new context sensitive designs that meet their client’s needs. In the process, clarity of purpose is a contextualised and emergent- rather than predetermined- outcome. We suggest that in a climate change world, where policies and practices can no longer be based on ‘stationarity’ (Milly et al., 2008), water managing must be active and

adaptive in a co-evolutionary sense, and it is questionable whether traditional governance mechanisms (for example regulation, fiscal mechanisms or information/education) will be sufficient (Ison et al., 2007a; Ison et al., 2007b).

Clearly it is practically difficult to move away from historical commitments and deeply embedded traditions of understanding out of which people think and act (Russell and Ison, 2007). Central to any approach to change is reflection and reflexivity. Schön (1991) notes that “reflecting” includes active examining of practice and prior knowledge during an activity (reflection-in-action), as well later exploration of why we did what we did (reflection-on-action). Reflexivity can be understood as a higher order form of reflection, where we can pause to think about ‘what it is we do when we do what we do’. This apparently awkward phrase is not redundant, it is circular. In considering this question, an answer is not an account, or justification or rationalisation, nor is it even a review of all the influences that lead to an action. An answer is a consideration of action through a process of stepping outside the framework in which normal reflection occurs (Ison and Blackmore, 2010). Reflexivity starts to operate with a shift beyond reflection and interpretation (first-order processes) to reflection on reflection or interpretation of interpretation (second-order processes). Reflexivity concerns both what and why in a context of awareness of how context, including institutions and history shape what we do.

The difficulty of reflecting on, and changing, a dominant operating framework has long been acknowledged. In their seminal paper Rittel and Webber (1973) recognised the constraints to policy and practice; they can be interpreted as arguing for a focus on framing choices and sensitivity to initial starting conditions, what they called a ‘second generation systems approach’. Both Pacanowsky (1995) and Parsons (2002) report over 30 years of recurring public policy failure in relation to issues that could be called ‘wicked’, yet praxis for enacting a second generation systems approach has not entered the mainstream, as highlighted in the

report of the Royal Commission on Environmental Pollution (2010) . The observations of Rittel and Webber (1973) remain relevant today but, despite the rhetorical “governance turn” and the dominance of critical and deliberative social science research, the limited change to date in environmental, natural resource and water governance policy and practice gives little confidence that (i) the prevailing governance frameworks are likely to transform soon (Sharp et al., 2011), or (ii) that current rationalities/ framings and practices will prove capable of encouraging and supporting co-evolutionary adaptation (Ison et al., 2011).

The remainder of this paper presents a desk-top metaphor mapping study. Our question - are metaphors a useful basis for re-ordering, reframing and possibly transforming operational frameworks as part of reflective and reflexive praxis ?- is addressed by considering the potential value of the results of our desktop study. Before presenting and discussing the study we provide a brief review of how operational frameworks are understood before focusing on metaphors as a specific element of framework formation. Current understandings of metaphors in dialogue and cognition are explored, followed by examples of how metaphor analysis could be used to both reveal operational frameworks and promote reflection and learning in water governance praxis.

Frames and metaphors

In the half century since Bateson (1972), followed by Goffman (1975), proposed that individuals understand and interpret their world by reference to frameworks, the explanatory value of frames (or schema, scenarios, scripts, or the interpretive rationalities of Schön, 1991) has been explored and accepted in disciplines as varied as psychology, philosophy, linguistics, education and politics (Bednarek, 2005). Although there is no single “theory of frames”, it is apparent that humans (individuals and social groupings) understand and relate to the world around them with the help of frameworks that mediate what is observed, what it

means and what is considered as wise action. These frameworks reflect physical contexts, but the main influences on them are social; they are developed and maintained via discourse, and in particular, spoken and written language (Penman et al., 2001). While all language is important, metaphor has been shown to be disproportionately influential in developing and reinforcing frames (Norgaard, 2010; Philippon, 2005; Thibodeau and Boroditsky, 2011).

Metaphors, a fundamental aspect of human language and cognition (Ramachandran, 2011), are a form of description recognised by the use of the words 'is' and 'as'. Following Schön (1979) a metaphor can be understood as "seeing as", that is "seeing X **as** Y. Seeing X as Y suggests that one thing is like another, but because that thing is not really the other, metaphor promotes the understanding of one thing *through* the other (Romanyshyn, 2001). Metaphor use in everyday language is so common that metaphors are often used unconsciously (Lakoff, 1991). To better understand the relationships between operational frames and metaphor it is necessary to consider how metaphors function in discourse and language.

How metaphors work – theoretical basis, methodological issues and current contestations

The traditional, Aristotelian view of metaphor as a superficial linguistic flourish is now largely displaced by the cognitive linguistic recognition that metaphorical speech reflects metaphorical thinking. This understanding underpins the Contemporary Theory of Metaphor (CTM), originally referred to as Conceptual Metaphor Theory (see for example Johnson, 1987; Lakoff, 1993; Lakoff and Johnson, 1980). The foundation of CTM is that metaphorical expressions cluster together under conceptual root metaphors in a systematic way because metaphorical expressions reflect underlying conceptual structures (Shen and Balaban, 1999). Metaphors thus structure understanding by enabling conceptual "mappings" between source concepts (domains) and target concepts, achieved through systems of *entailments*, or mental associations between corresponding elements of the concepts in metaphoric relation.

Entailments enable people, individually or in groups, to use selected understandings from the source domain to interpret and understand related target concepts (Landau et al., 2010). The development of CTM has emphasised both structural and orientation metaphor domains. Structural metaphors are those that structure one concept in terms of another (Lakoff and Johnson, 1980). For example, when contemporary politicians speak of “going forward” they are invoking the metaphor of LIFE AS A JOURNEY, specifically that of POLICY AS A JOURNEY. Some of the entailments of travelling are mapped onto the political process, making it appear congruent to speak not only of “going forward” but also of “roadmaps”, “bumpy roads”, “stalled negotiations” and “drivers” in relation to policy. Orientation (also called primary) metaphors map physical and cultural experiences onto other conceptual domains, such as that UP is good, and DOWN is bad, and FOWARD is positive progress, while BACKWARDS is negative (Lakoff and Johnson, 1980). So, while the politicians in the example above may speak of “going forward” as part of the policy journey, they may also dream of being rewarded by moving “up the ladder”.

CTM promotes understanding of the impact on behaviour of the use of particular metaphors in a given situation. For example, Morgan (1997) suggests that by conceptualising organization, and by extension organizations, through the metaphor of machines we have been shaped to expect organization to involve orderly relations between clearly defined parts.

Some scholars consider CTM an insufficient tool for understanding human behaviour, as they believe the focus on cognitive processes ignores how metaphors work in active discourse. For example A'Beckett (2012) notes that describing and labelling sets of metaphors may obscure the ways in which the receivers of metaphors may react, and she suggest that “Understanding the dynamic relations between the metaphor and society requires a thorough revision of the dialogic properties of the metaphor”. The “blending theory” of Tendahl and Gibbs (2008) suggests such emergent meaning may develop in a “space” between the source and target

domains; the resultant new understandings share some characteristics of both domains.

Koller (2008) corroborates the importance of examination of the metaphor's discursive properties as well as its origins. Summing up concerns with CTM, Musolff (2012) argues that discursive-pragmatic factors as well as socio-linguistic variation have to be taken into account in order to make cognitive analyses more empirically and socially relevant.

Despite these misgivings, CTM remains the most popular theoretical framing with adherents, such as Ruiz de Mendoza Ibanez and Perez Hernandez (2011) arguing that many of the criticisms of CTM are based on old and/or mis-understandings of CMT. Recent developments in complexity theory and dynamic systems theory suggest that metaphor is no longer seen as a static mapping, "but a temporary stability emerging from the activity of interconnecting systems of socially-situated language use and cognitive activity" (Cameron et al., 2009). Thus, rather than suggesting that metaphors and entailments are fixed, CTM promotes active exploration of the dynamics of sense making through metaphor.

Examples of active exploration of sense making are provided by McClintock (1996) and later Helme (2002), who undertook their CTM informed research within a social constructivist framing that drew heavily on hermeneutic research traditions (see Ison, 2005). The hermeneutic circle, as espoused by Gadamer (1975) and Heidegger (1962), gives an account of how understandings can emerge; it thus points to the role that metaphor can play in a critical praxis. Snodgrass and Coyne (1990) describe the hermeneutic circle: '... (as) the circular relation of the whole and its parts in any event of interpretation.' The 'operation' of the hermeneutic circle is, we suggest, central to appreciating how understandings, and thus practices, shift; something that is more nuanced and demanding in praxis terms than merely selecting new or alternative metaphors. As noted by Chilton and Ilyin (1993), using metaphor may achieve three simultaneous outcomes: the hearer is required to make inferences from knowledge the speaker assumes is shared; metaphor can create common ground by appealing

to a cultural operational frame; and metaphor can act as a heuristic device for the exploration of new concepts. In addition metaphors provide people with a way to ‘express aspects both of themselves and of situations about which they may not be consciously aware, nor be able to express analytically and/or literally’ (Marshak, 1996), and to examine topics which are emotionally difficult to talk about (Tracy et al., 2006). Cornelissen et al. (2011) suggest that new metaphorical framings are a useful way of helping groups “buy in” to substitutive changes in practice.

Working with metaphor theory for governance innovation

Taking all this together, CTM within a contextualised praxis (see Ison et al., 2013; McClintock et al., 2003) appears to have potential for enabling understanding and transformation of current operational framings of water governance. How innovative practices based on CTM theory might contribute to more reflexive water governance by triggering new understandings among key actors is a challenging research topic, which our study goes some way to addressing.

It should be possible to explore the implications and potential viability of current water governance trajectories using CTM based metaphor analysis. This seems an important task at this historical moment and given that a large number of water governance ‘experiments’ are underway across the globe, including the European Water Framework Directive and the Murray-Darling Basin Plan in Australia.

The water field is replete with framings (some complementary, others contradictory) that can be unpacked by even the most elementary engagement with metaphors. These range from the polarities evident in ‘water as commodity’ compared with ‘water as process’ or ‘water as human right’, to the nuanced differences between “river health”, “river function” and “river integrity”.

Ingram (2008) was clearly not impressed with the record of water governance innovations but as far as we know there has been no study that sets out to systematically explore the constraints that may arise because of confusion and/or conflicts in underlying operational frameworks, or of even understanding that operational frameworks exist. But based on our research and workshop experiences in a range of different contexts, invoking the metaphor ‘catchments as social-ecological system’, even among those who promote its uptake, for example, the Resilience Alliance¹, does not lead to the fundamental shifts in understanding and praxis that might be anticipated. Our thesis is that much in the literature on social–ecological systems reifies these as single systems with an ontological status. It is as if by changing the language and admitting into a compound formulation the social and the biophysical, policy actors will engage with and admit different understandings and practices. Collins and Ison (2009b) exemplify what we mean through the use of the metaphor of walking which realises a different understanding, that is, walking as a practice arises as the relational dynamic between two systems – a person and a medium, such as a floor. If one or other is removed, even if, say the legs keep moving, walking does not arise. Our experience, arising from many presentations and workshops, is that when asked to explain how walking arises as a practice, the great majority of people draw on a linear, causal explanation (that is, placing one foot in front of the other) rather than a systemic, relational one (the interaction between the foot, as part of a living system with a social and evolutionary history and the floor). This leads us to posit that systemic governance does not arise unless a social-ecological system is conceptualized as structurally coupled social and ecological (or biophysical) systems that are mutually adapting in a co-evolutionary dynamic. Structural

coupling is the term for structure-determined, and structure -determining, engagement of a given unity with either its environment or another unity. Structural coupling has connotations of both coordination and co-evolution (see Maturana and Varela, 1987).

A shift in understanding from that of walking as arising through linear, causal process to one where walking is relational, systemic and recursive presents interesting theoretical and methodological challenges for how CMT might be made practical. Clearly the adoption, say, of the metaphor of ‘governance as walking’ gains little if the shift of domains retains for the listener the same underlying causal commitments; that is, the practical consequences of the shift of metaphor lead to a business-as-usual set of practices. Thus a key research question that arises from our review of current literature is how might metaphors, if at all, trigger shifts in underlying causality commitments? One possible answer rests with how the metaphor is experienced; that is, how metaphor is built into praxis particularly praxis that is experiential and performative in ways that have the potential for shifts in embodiment (Lakoff and Johnson, 1999). For example our experience is that asking an audience to do the exercise of explaining how walking happens gives rise to a different way of hearing what is subsequently said, in say, a presentation.

Developing methodological possibilities: a brief metaphor study

Methods

To begin exploring whether CMT based processes may be useful in the water governance domain we conducted a brief metaphor analysis of two recent documents drawn from contemporary UK and Australian water governance ‘experiments’. As our focus is on praxis we analysed activity “planning” documents. Methodologically this study acts as a precursor to purposefully designed workshops involving key stakeholders in water governance situations; the study outputs act as inputs into the design of such workshops.

The first document, “Your Tidal Thames” (Thames21 and Thames Estuary Partnership, 2012), reports on a pilot project undertaken in the London area of the UK in 2012. The project sought to develop a Working Catchment Plan, within the context of the UK needing to implement the EU Water Framework Directive (WFD) and emerging evidence that across the EU ‘the degree of mainstreaming [of climate change adaption in WFD implementation] that has taken place differs widely’ (Brouwer et al., 2013). The project included structured conversations with over one thousand people and 53 organisations with a stake in the tidal section of the Thames river (Thames21 and Thames Estuary Partnership, 2012).

The second document is the Basin Plan (Murray-Darling Basin Authority, 2012), developed within Australia’s National Water Initiative. In part the Basin Plan was developed to determine a sustainable limit to water extraction within the Murray-Darling Basin which, using irrigation, is one of the most agriculturally productive areas in Australia. The Basin Plan, developed using scientific research and modelling and socio-economic studies, was adopted by the Australian Government in 2012, after a year of public consultation on a draft plan.

Our metaphor mapping aimed to expose and document the diversity of metaphors rather than measure the frequency or prevalence of any one metaphor in the two plans. Documenting the range of metaphors in this way provides an accessible summary of each whole, complex document. Analysis of the mapped metaphors then enabled exploration of the implications for water governance of these metaphors and their entailments.

Following the approach of Allan (2007), our metaphor mapping of each document involved close reading with the intent of documenting all text relating to a form of structural metaphorical domain. These snippets of text were clustered, and their root metaphors named to reflect the metaphorical intent of the cluster.

Metaphor mappings

All metaphorical text snippets and our metaphorical root names are provided in two figures below.

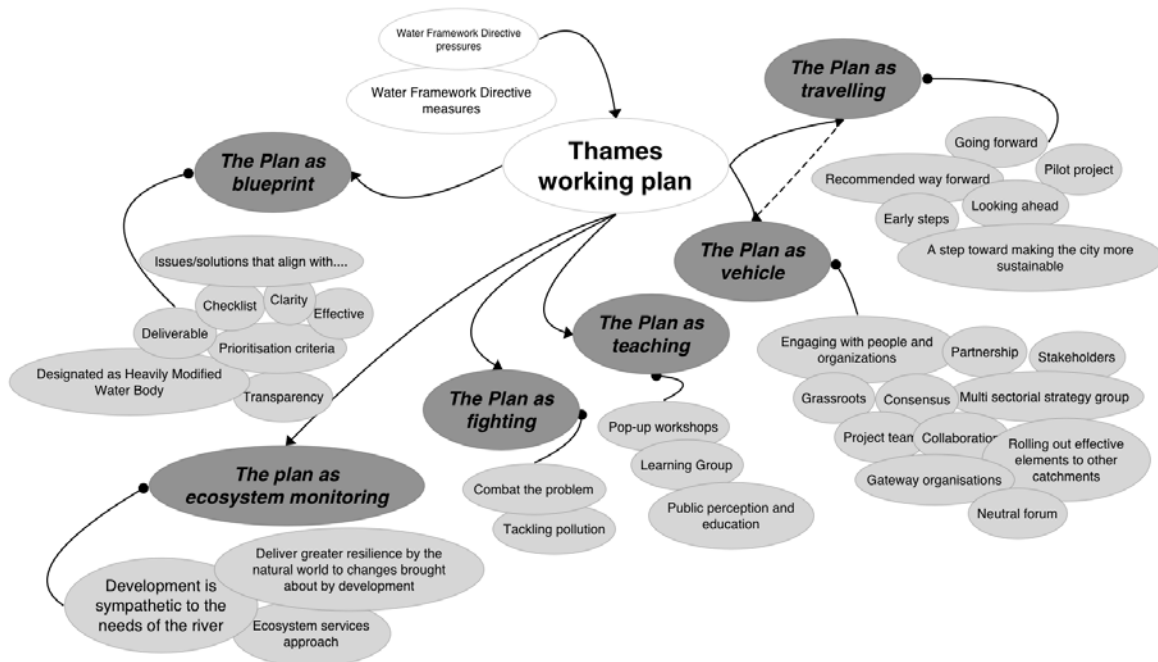


Figure 1. A metaphor map of the Thames Working Plan. Words in standard roman font are from the document, and the bold italicised word bubbles are our proposed root metaphors for the clusters of ideas

Figure 1 presents metaphors found in “Your Tidal Thames”. Reading this metaphor map suggests various conceptualisations of the Plan. Firstly, the authors of the Plan appear to see it as a blueprint or guide for action. This acknowledges and legitimises a predetermined end point, and reinforces the purpose of the plan as moving from the current situation to that desired, predetermined endpoint. The remaining metaphor clusters relate to means of achieving the predetermined endpoint, by taking some sort of journey, possibly a journey of community education, and/ or struggle. Ecosystem monitoring is used to check the progress of the journey/ struggle.

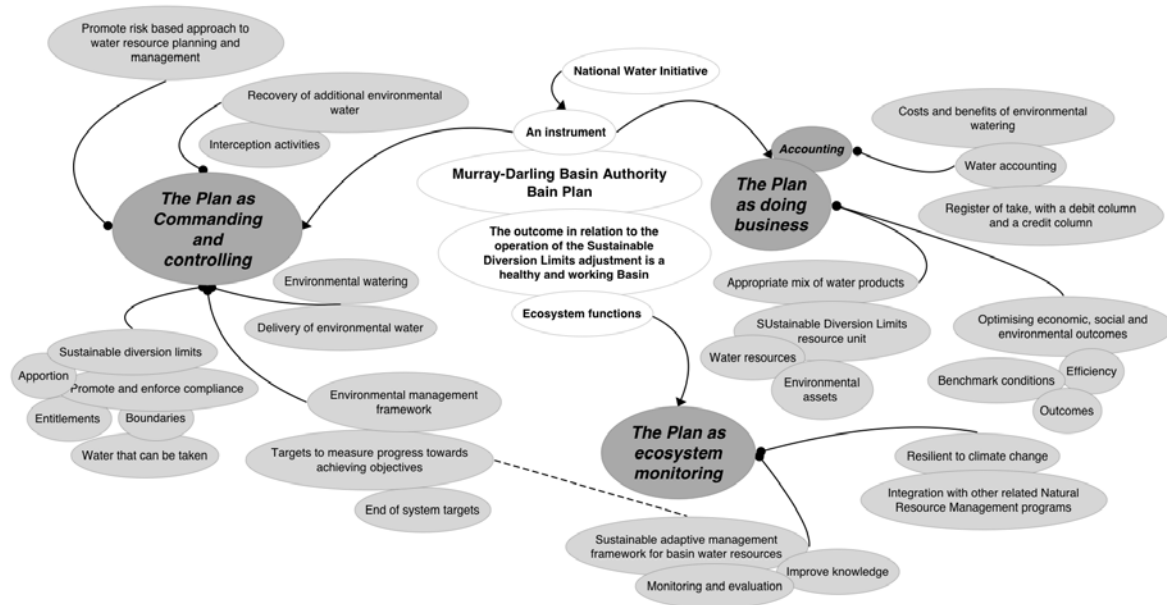


Figure 2. A metaphor map of the Murray-Darling Basin Plan. Words in standard roman font are from the document, and the bold italicised word bubbles are our proposed root metaphors for the clusters of ideas.

Figure 2 is derived from the Murray-Darling Basin Authority's (MDBA) Basin Plan. The Basin Plan also declares itself to be a plan, but is also an instrument for achieving a predetermined endpoint of a healthy working basin. Achievement of that endpoint is to be attained through both command and control and market approaches. Ecosystem monitoring in this plan is more overtly related to learning from implementation as well as checking on progress.

In each plan there are metaphors for learning, and ecosystem monitoring; but overall the root metaphors suggest the plans are framed predominantly as linear undertakings.

Analysing the metaphor mappings

Arising from our metaphor mapping, two related aspects of praxis are germane to our discussion of the use of metaphor. These are (i) what the metaphors reveal about the enactment or praxis of a water governance policy, and (ii) the forms of praxis that are possible for the researcher/facilitator in doing, interpreting and responding to CMT-based metaphor analysis.

With regards to (i), our mapping of metaphors in these two cases suggests that metaphors for systemic awareness and adapting are in limited use. The dominant metaphorical framings emphasise predetermined goals/ targets and encourage rapid (Figure 1) and efficient (Figure 2) attainment of those goals/targets. Both examples include metaphors for ecosystem monitoring, but it is unclear in each if this is for learning about the “systems”, or to measure progress toward the predetermined goals.

Exploration of what is revealed and concealed by the mapped metaphors provides greater understanding of the implications of these framings. For example, the MDBA Plan claims that the Sustainable Diversion limits (SDL) at the centre of the plan aim for a “healthy and working catchment”. The metaphor map reveals an emphasis on a particular type of “health” formulated as an asset that is managed through business approaches on the one hand, and command and control on the other. What is revealed by these metaphors is a tacit encouragement of reducing a complex system to its component parts. In the Thames Plan the metaphors reveal the extent to which the WFD goals and processes influence on-ground activities. The idea of a map and a vehicle is congruent with the first-order conceptualisation of governance as simple feedback, as in a thermostat, but this mapping shows a remarkable absence of metaphors related to second-order considerations associated with feedback, learning and purpose. The impression is of a passenger boat on autopilot, with the course set, avoiding feedback from wind or waves, launched to provide a vehicle for as many people on

the journey as possible. This is not a direct critique of the organizations involved or their commitment to engaging with many different stakeholders in producing the Thames plan, and we are aware of many organizations producing similar material in similar ways. However, the paucity of diverse languages and a signal of a monocultural landscape of metaphors used and understood relating to governance and praxis provides insight into the actual, rather than rhetorical, frame in use. With this insight the entailments of the major metaphors may also be examined. For example, the Plan as Travel Plan framing brings with it particular understandings of “success” that include staying on the prescribed path, passing milestones and arrival at the destination. Potentially, direction changes will be seen as diversions, slowing down the journey. Going back and starting again is a mark of failure, and looking back is less valued than moving on. These in turn have implications for adaptation through learning, and for operating in a systemic, rather than linear, governance paradigm.

With regards to our point (ii), it is one thing for metaphor analysis to reveal embedded conceptualisations and frameworks, but it is another to use this understanding to open up spaces for potential transformation of deeply held understandings associated with particular metaphorical framings. The work of Gregory Bateson, best known in organizational development circles for his ‘concept of second-order learning, referring to humans’ ability to self-correct through learning “about” learning contexts’ is relevant here as outlined by Jorgenson and Steier (2013); they talk of ‘the metacommunicative nature of messages, that is, how we create messages “about” our messages to allow for their interpretation...’ We have suggested a simple reading of the metaphor maps above, but each of the metaphor clusters and their entailments would warrant further exploration by the stakeholders operating within the Plan frameworks. Further research and stakeholder engagement around the metaphor clusters could initiate a more reflexive praxis. An indication of this potential is presented in Table 1 for explication of the method, but it is speculation only albeit based on our extensive

history of research in this domain, as alternate trajectories are emergent properties of the reflective and reflexive discourse around the metaphor prompts. It is only through reflective engagement with one's metaphors-in-use that shifts in understanding, and thus practice, become possible (Ison et al., 2007b; McClintock, 1996).

Table 1 Opening up spaces for potential change in water governance trajectory

Key metaphor clusters a. Your Tidal Thames	Current trajectory as revealed by the metaphor mapping	Potential alternate trajectories via metaphor facilitated reflection
The Plan as blueprint	A working plan nested within the WFD with regularities associated with the tides	<ul style="list-style-type: none"> • A context-creating plan? • A learning and adapting plan? i.e., metaphors that bring forth the plan in enactment rather than deliver it as blueprint – a plan open to surprise
The Plan as travelling	Predetermined goals and targets to facilitate rapid achievement of predetermined endpoint	Drawing attention to centrality of the journey and its progress in the plan may prompt greater reflection on the inadequacy of goal-seeking behaviour in situations of uncertainty and the appropriateness of rushing towards predetermined goals. Complementary, or even contradictory purposes and journeys may surface in an unfolding, dynamic context
The Plan as vehicle	The role of the plan implementers is to get stakeholders into the vehicle, to travel to the predetermined goals.	If the journey itself becomes more prominent, the nature of the vehicle also bears inspection. The various groups and partnerships named in the Plan may be best used, and best served, by developing a range of “vehicles” or processes for the multiple, dynamic context identified above.
The Plan as teaching	Information is mostly from the top down, as public education, so the story stays constant as the implementation progresses.	Drawing attention to teaching may prompt reflection on the nature of knowledge, particularly processes of knowing and how these may arise. Potential new sources of information, and/or new approaches to knowing through engagement become possible. Spaces may even be developed that accept some knowledge and wisdom will emerge from the implementation of the plan if

		processes are developed to support this
The Plan as fighting	The problem/ issue/ foe has been defined by the WFD	Focussing on “fighting” may prompt expression of deeper, locally relevant aspects of the problem/ issue/ foe. Passions may be engaged through articulation of what is valued, and what is threatened.
The Plan as ecosystem monitoring	A positive environmental impact/ environmental resiliencies is expected	Focus on the ecosystem metaphor may foreground the systemic context of management actions, prompting exploration of the limits of that system, and its connections to other, e.g., social, systems.
b. Basin Plan		
The Plan as commanding and controlling	<p>The plan is an instrument to achieve a predetermined goal, nested within the NWI.</p> <p>Sustainable diversion limits are set, compliance is enforced and, if all assumptions are correct and all action taken, predetermined environmental goals are achieved. Some capacity for feedback loops and learning is acknowledged.</p>	Drawing attention to the command and control at the heart of the plan may prompt questioning of assumptions about who has authority and knowledge, and how these can be maintained. Maybe the existing roles and authority are acknowledged and legitimised, or maybe some alternate seats of authority are considered. The role(s) of science and knowledge could become central in how the Plan is implemented.
The Plan as doing business	Classical economics is a central mechanism for achieving the goals. Water and other environmental items are viewed and treated as assets.	Highlighting the centrality of the asset metaphor in this plan may prompt discussion of the appropriateness of this metaphor, and what other metaphors for action may be possible.
The Basin Plan as ecosystem monitoring	A sustainable adaptive management framework for Basin Water Resources. This relies on sufficient resources and willingness to learn and change. There may be an inbuilt assumption that monitoring will lead to evaluation and then self-correcting action?	Displacement of the ecosystem metaphor with a structurally coupled social-biophysical systems metaphor may foreground the systemic context of management actions. Adaptive management may be explored beyond the concept of scientific feedback loops, with potential for some form of social learning to be generated. The socially embedded nature of this learning may make it less vulnerable to resourcing issues and adaptive to changing contexts.

Discussion

Transforming the operational framings of water governance – a role for metaphor?

Our desktop study shows that metaphors can be elicited and the root metaphors can be named and examined. Developing ways of using the power of this type of metaphor analysis in participatory and deliberative praxis may provide a real approach/ mechanism to capitalise on the move from management to governance by actively addressing the trap of doing more of the same or simply relabelling and renaming.

Uncovering and exploring metaphors and their entailments within policy discourses could help practitioners actively reflect – that is reflect-in-action to rework and reorder - on their operational frames, including frames that arise from the reification of particular metaphors in institutions (in the institutional economics sense per North and Willard, 1983). The final column of Table 1 speculates that alternate trajectories may emerge from reflection, but to achieve this methods and guidelines will be needed. Appropriate guidelines would encourage and enable practitioners to reflect on the existence and meaning of the metaphors they use, and how these both mirror and shape their operational frameworks. Such reflection would enable practitioners to design, facilitate and institutionalise new practices. We propose development of social processes based on CMT -informed metaphor analysis in ways that acknowledge, and even privilege the dynamic, emergent properties of metaphors-in-use, and facilitate reflection on the enabling, revealing and concealing aspects of the metaphor use under consideration.

Innovative use of CTM may be helpful for increasing the mindfulness of the differentiated sensing by actors in a situation (Weick, 2009). Weick suggests that the progress from

undifferentiated perception to shared public perceptions that are named, dimensionalized, reified, and treated as facts can be done more mindfully if there is (1) active differentiation and refinement of existing distinctions, (2) creation of new discrete categories out of the continuous streams of events that flow through activities, and (3) a more nuanced appreciation of the context of events and alternative ways to deal with that context.

Practical methodological experience supports Weick's claims. In educating mature age students in Systems Thinking in Practice (STiP), Open University (UK) educators have developed, over 40 years, a pedagogy that engages students in making framing choices. Since the 1970s this has been done through courses that start out by (i) requiring these mature age students to frame their 'real world problems' as Ackoffian messes (Ackoff, 1974) or 'wicked problems' (Rittel and Webber, 1973) and (ii) developing skills in using a range of systems diagramming techniques to surface mental models and an individual's underlying patterns of causality (Blackmore and Ison, 2012). These diagramming techniques include 'rich picturing' from which it is possible to extract underlying metaphors-in-use (Armson, 2011; Bell and Morse, 2013). When people engage in distinction-making they begin to realize just how quickly they can put their experiences into tidy and unexamined conceptual boxes (Kabat-Zinn, 2002), how reluctant they are to examine those conceptual boxes, and how much is discovered when they do examine those boxes. Discovery and recovery of meaning is a task of a critically informed praxis (Billig and MacMillan, 2005; Ravetz, 2003; Wibeck, 2012). Such a praxis, or awareness of its importance, has not yet been developed within the water governance domain.

Mindful, CMT-informed metaphor processes should facilitate consideration of enabling and disabling operational frameworks via context-aware consideration of the metaphors-in-use, and the active seeking of different metaphors if needed. For example, Morgan notes "... it is important to understand how and when we are engaging in mechanistic thinking and how so

many popular theories and taken-for-granted ideas about organization support this thinking. One of the major challenges facing many modern organizations is to replace this kind of thinking with fresh ideas and approaches..." (Morgan, 1997).

When any complex and uncertain situation is understood in a taken-for-granted manner (that is, non-reflexively) then the opportunity for making the situation worse, rather than better, exists. This is particularly true of team-based working, an essential ingredient of any multiple-stakeholder situation such as water governance, where typical praxis is that individuals support their own positions, and assume knowledge of other peoples' motivations, with little self inquiry, "The consequence is that we create self-sealing defensive routines where issues become "undiscussable," and their very "undiscussability" itself is undiscussable. We are entangled in a situation that makes learning almost impossible" (Pacanowsky, 1995). These habits of practice can have profound implications for governance as evidenced in the second and third columns of Table 1. For example, if the asset metaphor in the Murray-Darling Basin Plan remains unexamined and undiscussed water may be conceptualized differently by, say, an economist and a water ecologist, but each may talk of assets and they may think they are speaking of the same conceptualisation.

Larson (2011) explores this "taken-for-grantedness" in the natural resource management realm, examining numerous limitations arising from entangling physical environmental problems with unsuitable metaphorical entailments. McClintock (1996) distinguishes between enabling metaphors, i.e. metaphors that enhance the ability to act in certain contexts, and appropriate metaphors, i.e. metaphors that facilitate different understandings in a given context: "Whereas 'enabling' metaphors rely on what aspects are revealed by using a metaphor in a certain context, appropriate metaphors include both revealed and concealed aspects. Different understandings can arise just as much from what a metaphor conceals, as much as from what a metaphor enables" (page 83). There may also be value in reflection on

the enabling and constraining aspects of specific entailments revealed by understanding the metaphors-in-use.

With carefully crafted processes, there is potential for groups to use their understanding of what their current metaphors reveal, conceal and enable, to create new and more functional operational frameworks by deliberately and purposefully creating new metaphors, and thus new operational framings for water governance. This in turn may allow dissolution, abandonment or rebuilding of some disabling institutions that are no longer relevant to contemporary circumstances. It follows that praxes that address issues of institutional complexity in water governance are needed (Wallis and Ison, 2011) as are those that contribute to innovations in praxis for strategizing in situations of uncertainty and complexity (Ison et al., 2014). Our study provides evidence that pursuit of praxis innovation is a worthy strategy; the next stage is research which evidences a transition from first-order mapping as reported here, to the purposeful design and testing of context-sensitive 'learning systems' (Ison et al., 2007a; Ison and Russell, 2000) based on CMT.

Conclusion

We have argued that CMT offers new methodological and theoretical possibilities for triggering transformative trajectories of water catchment governance. Current, traditional framings of water catchments conceive a social system in which historically privileged actors are able to define and control a separate hydrological or biophysical system, exemplifying linear, reductionist thinking. Overcoming the systemic failings of the current governance trajectory requires a social-ecological system to be understood as two systems which are coupled in a mutually influencing co-evolutionary dynamic. Such a conception demands new ways of thinking and acting, and challenges deeply held social and cultural norms of linear, rather than systemic, causality.

Operational frames that may be inimical to our contemporary circumstances are widespread. For example the reframing of mainstream economics in the account of institutional economics by Paavola and Adger (2005) identifies limited cognitive capacity of agents in multi-stakeholder situations as a major issue: “agents need time for learning and for clarifying their goals and preferences [and] highlight the importance of procedures for learning, participation, and deliberation in environmental decision making” (page 360). We argue for methodological and praxis development in which CMT plays a central role, not necessarily exclusively, but whenever new policies are designed, multi-stakeholder processes are initiated and extant policies and practices are found wanting.

As noted by the Royal Commission on Environmental Pollution (2010), practices which address initial starting conditions, of which different conceptual and operational frames is perhaps the least addressed, are needed if successful strategies of climate- change adaptation are to be enacted. Critically examining how metaphor theory can inform a range of deliberative research and policy development processes that are ‘language focused’ seems warranted to underpin moves towards deliberative decision making and deliberative democracy more broadly. Breaking out of deeply held patterns of understanding is however, very difficult and may be more complex than merely resolving operational frame conflicts (Saarikoski, 2006) which continue to circulate around the axes of existing metaphors.

In theoretical if not yet well-developed methodological and governance terms CMT based reflection has the potential to help practitioners expose and examine reified operational frameworks and practices, and to change those that hinder adaptive and systemic praxis. To our knowledge there is as yet no research to suggest how this exposition and examination is best achieved in a water governance context. Drawing on our discussion above we argue for approaches that enable water governance stakeholders to become more mindful of the others’ ways of seeing and doing water governance, that is becoming more mindful of their and

others' operational frameworks. As Pahl-Wostl et al. (2011) note in relation to contemporary water governance "evidence from the fields of science, policy, and management... demonstrates a lacuna in the translation of political rhetoric into change at the operational level." They claim that: "learning processes and critical reflection on innovative management approaches" are keys to the required paradigm change.

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