Understanding Leadership in the Environmental Sciences

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ABSTRACT

Leadership is often assumed, intuitively, to be an important driver of sustainable development. To understand how leadership is conceptualised and analysed in the environmental sciences and to discover what this research says about leadership outcomes, we conducted a review of environmental leadership research over the last ten years. We find that much of the environmental leadership literature we reviewed focuses on a few key individuals and desirable leadership competencies. It also reports that leadership is one of the most important of a number of factors contributing to effective management. Only a sub-set of the literature highlights interacting sources of leadership, disaggregates leadership outcomes or evaluates leadership processes in detail. We argue that the literature on environmental leadership is highly normative. Leadership is typically depicted as an unequivocal good and its importance is often asserted rather than tested. We trace how leadership studies in the management sciences are evolving and argue that, taking into account the state-of-the-art in environmental leadership research, there is still significant potential to progress more critical approaches to leadership research in environmental science.

INTRODUCTION

Many widespread and repeated patterns of human behaviour cause social and environmental problems (Rockstrom et al. 2009). Leadership is intuitively recognised as important for motivating a change in human behaviour towards more sustainable practice. Engaging political leaders is considered imperative for the success of global and regional sustainable development (e.g., Walker et al. 2009), while at more localised scales, interactions between contemporary and traditional leadership structures are recognised as important (e.g., Johannes 2002). As environmental problems escalate the impetus for understanding where and how effective leadership can be found and fostered has increased.

Leadership studies comprise a multi-disciplinary field closely aligned with management science and organisational studies that has emerged over the last 60 years. Traditionally underpinned by psychology and positivist social science methodologies the field attempted to predict corporate outcomes by identifying the attributes and behaviours of individual leaders (Stodgill 1948, 1974, Tannenbaum and Schmidt 1958, Likert 1961, Fiedler 1967, Hersey and Blanchard 1988). Variations of such research persist to this day in mainstream studies of leadership. Nevertheless, alternative perspectives on leadership that go beyond the notion of the individual, 'heroic' leader underpinning conventional concepts of leadership are also emerging. (see Hosking 1988, 2001, Gemmill and Oakley 1992, Maccoby 2000, Banerjee and Linstead 2001, 2004, Jones 2005, 2006, Warner and Grint 2006, Carroll et al. 2008, Lemmergaard and Muhr 2013). In this paper we aim to understand how leadership is conceptualised in the environmental sciences. We reference our findings against some key trends in leadership studies to identify what opportunities more critical approaches to leadership studies offer to the field of environmental sciences.

To capture the way leadership is presented in the environmental sciences we use a broad conceptualisation of leadership to include people (leaders, entrepreneurs, champions, brokers) and organisations or groups, and associated characteristics, roles and actions that affect environmental outcomes. In analysing this literature we seek to understand, firstly, how leadership is conceptualised and, secondly, what sustainability outcomes are attributed to leadership. From these foundations we then discuss the potential for more critical research on environmental leadership that is informed by contemporary scholarship in leadership studies.

METHODS

We reviewed the environmental sciences literature over the last ten years to identify how research has portrayed and investigated leaders and leadership. We began with a systematic search of published literature on ISI Web of Science between 2003-2013. As we were interested in environmental outcomes we focused our search on conservation, natural resource management, and governance of social-ecological systems (see Appendix A for specific search terms). Our search returned over 850 records. A scan of titles excluded 378 papers that were not about the natural environment (e.g., 'environment' referred to a context such as an information technology environment). A scan of paper abstracts then excluded a further 302 papers. Papers were excluded where leaders or leadership were not the focus or

finding of the research itself, for instance: i) leaders were referred to in setting up the paper's argument or as research end-users; ii) leaders were sampled as part of a study on other topics, or; iii) the importance of leadership was simply asserted in a conclusive statement but the body of the paper did not refer to or discuss leadership (see Appendix B for further details).

This systematic search identified 187 papers that we considered to represent leadership research in environmental sciences. All 187 abstracts were read and summarised by the lead author. We then conducted a selective review of this pool of papers. We included all the conceptual review or synthesis articles (n = 24), meta-analyses (n = 2) and large-N studies (n = 6). As our intention was to get an over-arching sense of the field rather than to conduct our own meta-analysis we selected a sub-set of the empirical case-studies for manageability (n = 25). Case-study papers were chosen to reflect major environmental fields (conservation, fisheries, forestry, water and climate change) and a diversity of perspectives on leadership. Case-studies of leadership by regional bodies and conventions like the European Union or Convention on Biological Diversity were considered beyond the scope of this paper. We also recognise that leadership can be broadly interpreted and, therefore, that there may be research in the environmental sciences which is implicitly about leadership but which is not identified by our search terms. These would not have been captured in our review.

In total we reviewed 57 papers (see Appendix C for details of all papers reviewed). These papers were read in full. Using an open and inductive approach, information was extracted on: i) how leadership (or a similar term) was defined or conceptualised by the authors, ii) what factors were associated with effective leadership, if any; iii) what governance outcomes were associated with leadership, and; iv) how links between leaders, leadership and outcomes were deduced.

RESULTS

Conceptualising leadership

In this section we convey the different ways that leaders and leadership are conceptualised in the environmental sciences. We find that much of the environmental leadership literature we reviewed focuses on a few key individuals and desirable leadership competencies. Only a sub-set of the literature highlights multiple, interacting sources of leadership or evaluates leadership processes (tactics) in detail.

Leadership as individual leaders
In the literature we reviewed, the most common approach to conceptualising environmental leadership is to identify individual leaders or leadership positions responsible for delivering specific outcomes. The large-N studies and meta-analyses primarily document the presence or absence of a single (village, community or group) leader (Pagdee et al. 2006, Van Laerhoven 2010, Gutiérrez et al. 2011). The synthesis and case-study papers also tend to focus on less than a handful of individual leaders. Some papers refer to these individuals in the abstract. For instance, Walters (2007: 306) argues that "at least one single individual" can be credited for the few successful examples of adaptive fisheries governance. Other papers refer more specifically to

named individuals or formal leadership positions. For example, Kates et al. (2012) and Smith et al. (2009) identify specific individuals who in their formal political positions as County Executive, Governor, or City Mayor have catalysed climate change adaptation planning and action in the United States and United Kingdom, respectively.

Increasingly the environmental sciences literature, particularly research associated with social-ecological systems, complex systems and resilience, refers to entrepreneurs rather than leaders. Social entrepreneurs recognize social problems and use entrepreneurial principles to organize, create, and manage an initiative to bring about social change (Biggs et al. 2010). Institutional entrepreneurs recognise environmental problems as institutional failures and leverage resources to create new institutions or transform existing ones to address particular problems (Rosen and Olsson 2013). Similarly, policy entrepreneurs connect environmental problems to policy processes, and exchange resources for future policies they favour (in Folke et al. 2005; Huitema and Meijerink 2010). Westley et al. (2013) argue that focusing on entrepreneurship rather than leadership can encompass and recognise the agency of a more diverse set of actors. Indeed, Rosen and Olsson's (2013) analysis of the Coral Triangle Initiative (CTI) identified up to fifty institutional entrepreneurs who were involved in developing and promoting the CTI regional policy. Nevertheless, our review finds that many papers continue to emphasise the importance of individual entrepreneurs – specifically or in the abstract – reflecting the trends described above.

Leadership interactions
Only a sub-set of the environmental leadership literature we reviewed is explicit about interactions among different sources of leadership (e.g., Olsson et al. 2008, Zulu 2008, Marschke and Berkes 2009, Gupta 2010, Marin et al. 2012). To give examples, Marin et al. (2012) identify both a governance network and people within the network as sources of leadership, claiming that the network "revolutionized ecosystem management" and that, in turn, the success of the network is attributable in part to "key" actors. Olsson et al. (2008) also suggest a nested form of leadership. In their analysis of the re-zoning of the Great Barrier Reef Park, Australia they refer to: leadership by the Great Barrier Reef Marine Park Authority in general; the Senior Management Forum within the Authority, responsible for communicating a common vision, and; the two executive directors who led the Forum and navigated both internal and external politics. Rosen and Olsson (2013: 201) argue that "the interactions among several types of individuals and organizations" are of great importance in institutional change.

Most studies that recognised leadership interactions portrayed them as mutually supportive. Olsson et al. (2008) acknowledge the involvement of senior scientists, environmental NGOs, and lobbyists from the tourism and fishing industries in the Great Barrier Reef re-zoning process but they emphasise the success of the Authority and its senior management and did not evaluate other, potentially contested, interactions. Relatively few studies in our review document contestation or conflict among leaders (Fleishman et al. 2008, Carruthers and Rodriguez 2009, Huitema and Meijerink 2010, Hu 2011, Ernstson 2013). An insightful exception is a series of studies on fisheries co-management in Malawi (Russell and Dobson 2009, Njaya et al. 2012). As Njaya et al. (2012: 663) describe, "the Department of Fisheries, members of the Beach Village Committees, and the traditional leaders have all been endowed some form of power, which they use to create rules, make decisions, and adjudicate in

relation to fisheries management". In many but not all fisheries this has led to tensions between contemporary elected leaders and traditional, non-elected (hereditary) village heads which has undermined new co-management processes (Russell and Dobson 2009, Njaya et al. 2012). In an empirical case examining water management, Sherval and Greenwood (2012) note tension between water management agencies and community groups over the decision to build a dam. This contested leadership played out in alternative discourses with communities engaging more effectively with the media and essentially determining the leadership outcome. More conceptually, in summarising policy entrepreneurship in water management Huitema and Meijerink (2010) emphasise the potential for opposing (advocacy) coalitions, while Ernstson (2013) describes competing actor-networks and processes of value articulation for urban ecosystem services.

Leadership competencies
In the literature we reviewed, it is common for papers to focus on desirable leadership competencies. Competencies refer broadly to personality traits or attributes leaders possess (e.g., intelligence), leadership functions or strategies (e.g., meaning-making), and styles of leadership (e.g., visionary leadership) (Carroll et al., 2008).

The desirable personality traits of leaders identified in the environmental sciences literature include charisma, strength, commitment / perseverance, and reputation. The synthesis papers tend to emphasise more 'transformational' qualities such as vision and charisma. For example, Scheffer et al. (2003) discuss, at an abstract level, charismatic opinion leaders with high social capital. The meta-analyses, large-N studies and other empirical case-studies refer more often to strong, committed and/or motivated leaders (Pagdee et al. 2006, Gutiérrez et al. 2011 but see also Huitema and Meikerink's 2010 review of policy entrepreneurs). In his analysis of natural resource management policy, Biggs (2008) notes that individuals or organisations responsible for change were effective at the policy level, well respected professionally, and known for their long-term commitment to issues of social justice. Similarly, Walters (2007: 306) observes that individual leaders "made a very large personal investment of time and energy to make sure the programme actually succeeded". In this case, the author emphasizes that these individuals were 'middle managers' and would not be called inspiring or charismatic. Attributes associated with negative outcomes include domineering, corrupt, weak or insecure, and inactive or absentee leaders (Zulu 2008).

Our review identified numerous strategies or functions that leaders do, or should, perform (Table 1). For instance, alongside visioning and sense-making Folke (2005) identifies six other functions that leaders perform. Many studies agree on the key strategies or functions of successful environmental leadership as indicated by the number of references supporting each one. The literature also emphasises over-arching leadership styles (Table 2). Some styles are common to management and organizational sciences, including democratic, transformational, and visionary leadership. Other styles arguably reflect general principles and concepts developed within environmental sciences, including adaptive, complexity, systems-thinking, and tipping-point leadership.

[Insert Table 1]

[Insert Table 2]

There is a tendency within the environmental sciences literature we reviewed for authors to advocate rather than critically analyse or test leadership competencies. For example, Black et al. (2011: 335) provide a list of "recommended characteristics, qualities and actions that a systems thinking leader should apply in a conservation setting". There is also evidence of scholars projecting positive qualities on to leaders. Pagdee et al. (2006) and Gutiérrez et al. (2011) infer that the presence of a leader suggests strong leadership that is committed to community forestry or fisheries co-management, respectively. Relatively few studies investigate *how* key strategies, such as sense-making or conflict resolution, are achieved in practice. The exceptions are highly insightful. For example, Rosen and Olsson (2013) elaborate in detail the tactics used by institutional entrepreneurs to 'secure wider political support' and 'mobilise resources' for the CTI, such as packaging the initiative in terms of the priorities of the Nations they were trying to bring on board. In a study focused explicitly on leadership for innovation, Scholten (2010) suggests that individual leaders need to use and 'bend' the rules to achieve the innovative policy change they seek. Importantly, Meijerink and Huitema (2010) suggest that policy entrepreneurs resisting change employ very similar strategies to others who promote it.

Links between different competencies such as particular leadership styles and strategies are not evident in either the conceptual or empirical studies we reviewed. Indeed, the empirical case-studies, which more closely reflect the messiness of governance-in-practice tend not to assign particular leadership strategies or styles to different sources of leadership (e.g., traditional and contemporary leaders). This reflects the difficulty of categorising or generalizing which forms of leadership work in particular contexts for particular governance outcomes.

The importance of leadership

In this section we highlight the range of environmental governance outcomes attributed to leadership. The literature reports on the importance of leadership in maintaining existing governance processes (e.g., monitoring, enforcement, and sanctioning) and, more commonly, in driving change and innovation (e.g., formulating and implementing new approaches to environmental management). We consider these types of outcome together. We find that the environmental leadership literature we reviewed commonly reports that leadership is one of the most important factors for 'effective' or 'successful' management. Only a subset of literature critically analyses how leaders or leadership affect different social (e.g., livelihoods) and environmental (e.g., water quality) outcomes.

Leadership is key to success
Across the papers we analysed leadership is considered to be one of the key requirements for emergence and effective implementation of environmental governance and climate change policy (e.g., Folke et al. 2005, Walters 2007, Biggs 2008, Christie et al. 2009, Smith et al. 2009, Biggs et al. 2010, Gupta 2010, Black et al. 2011, Kates et al. 2012, Lockwood et al. 2012). Leaders are associated with the emergence of ecosystem-based water management (Biggs et al. 2010), they are "directly related (at statistically significant levels)" to successful implementation of large-scale marine management (Christie 2009: 381), and they are critical for successful scaling up of natural resource management in policy (Biggs 2008). This

evidence is supported in the large-N studies and meta-analyses, which find that the presence of a leader has a high (Pagdee et al. 2006, Van Laerhoven 2010, Gutiérrez et al. 2011) to moderate or mixed (Ruttan 2006, Cinner et al. 2012) positive influence on environmental governance outcomes. Leadership is often identified as one of a range of important factors and is frequently found to be one of the most important factors.

An absence of leadership is also connected to ineffective management outcomes. Fabricius et al. (2007: 1) suggest that communities who cope with disturbance events but do not adapt to them "lack the capacity for governance because of a lack of leadership, of vision, and of motivation". And in a review of thirty cases of fisheries management, Walters (2007: 306) finds that most initiatives failed and that "of the three main causes of implementation failure, easily the most important has been lack of leadership". More broadly Scheffer et al. (2003) conclude that a lack of 'strong' leadership can lead to inertia in addressing new problems in social-ecological systems. These studies contrast with a few examples showing that an absence of leadership or leadership failures can instead lead to positive outcomes through emergent leadership at other scales (also expressed through ideas of shadow networks which form in response to an undesirable status quo). Pesqué-Cela and colleagues' (2009) large-N study of 115 villages in China shows that distrust of township leaders is associated with increased participation in self-governing community organisations. Gupta's (2010) review of climate change policy also shows that a lack of "real statesmanship" has, in particularly stark cases, led to the emergence of sub-national leadership of initiatives that diverge from national rhetoric in Australia and the United States of America.

Leadership is not a panacea
As above where we argue that only a sub-set of studies recognise the potential for contestations or conflict among leaders, we find that a minority of studies we reviewed report on the contested or negative outcomes of leadership. The quantitative studies that find leadership to be one of the most important factors of success mostly consider a single management outcome or aggregate environmental outcomes (Pagdee et al. 2006, Gutiérrez et al. 2011, Kenward et al. 2011). For instance, Zimmerer et al. (2004) quantify the global spatial coverage of protected areas, Van Laerhoven (2010) uses community monitoring as a proxy for effective management, and Gutiérrez et al., (2011) calculate an index that combines eight outcome variables ranging from community empowerment to increased abundance of fish. In only a few cases are outcomes disaggregated (e.g., Ruttan 2006, Cinner et al. 2012). Importantly these latter cases report more nuanced, mixed findings for the importance of leadership. For example, Cinner et al. (2012) find that trust in leadership is not significantly correlated with 'benefits to livelihoods' but is somewhat important for 'reported compliance' to fisheries management rules. Ruttan (2006) finds that the presence of political entrepreneurs is correlated positively with water abundance but negatively with water quality in irrigation systems, and is not correlated with any successful outcomes in fisheries systems.

Empirical studies in the US, Ethiopia and Malawi show that leadership used as a tool to co-opt power or resources can result in weakened institutions, loss of trust, over harvesting, degradation, and overall management failure (Zulu 2008, Fleischman et al. 2010, Mohamed and Inoue 2012, Njaya et al. 2012). Wale et al. (2009: 12) suggest that in a participatory process an overly dominant leader can cause "an atmosphere of

dis-engagement". This is corroborated by Pahl-Wostl and colleagues' (2007) who argue that while strong, centralised leadership may be useful at critical or strategic points in a process, in general, dependence on strong individual leaders is not desirable or realistic in collaborative, multi-actor processes of decision-making. Perez-Cirera and Lovett (2006) highlight that powerful leaders may enhance the creation and enforcement of resource regulations but in doing so are able to impose higher costs on the less powerful leading to inequitable distribution of income. Further, Galaz et al. (2010) argue that under the intense social and political pressure that characterises ecological crises leaders may often by forced to make 'tragic choices' where no option is preferred (see also Adams et al. 2003 on contested problem definition).

As demonstrated by the disaggregated large-N studies, outcomes may often be mixed. In one of the most critically informed synthesis papers, Meijerink and Huitema (2010) highlight that in many of their sixteen cases of water policy transition new policies were rarely implemented fully. Instead, new and old policies often overlapped with policy entrepreneurs attempting to integrate or balance the two.

Leadership in context
While leadership is identified as one of the most important factors associated with beneficial governance outcomes it was not the only factor explaining success (Pagdee et al. 2006, Chuenpagdee and Jentoft 2007, Van Laerhoven 2010, Kenward et al. 2011). As Gutiérrez and co-authors argue (2011: 386) "fisheries were most successful when at least eight co-management attributes were present". The range of factors that reportedly work in combination with leadership is too varied to note here, but they include social capital, defined rights, participatory processes and regulatory tools. In particular, the role of institutions (Chuenpagdee and Jentoft 2007, Huitema and Meijerink 2010, Gupta et al. 2010), social networks (Folke et al. 2005, Biggs 2008, Bodin and Crona 2008), and links to political leadership (Olsson et al. 2008, Banks and Skilleter 2010, Rosen and Olsson 2013 though see Carruthers and Rodrigues 2009 for an example of negative interference by political leaders) are noted as important. As Biggs (2008: 54) articulates:

> *There was no single 'champion' that led these changes. In the case of the bamboo tubewells, the District Commissioner was important, but without the artisans and farmers who created the bamboo technology in the first place, and continued to change it, and those who changed market institutions, he would not have had a context (or alliance members) in which to be innovative.*

He concludes that giving "privileged attention to one or two people overlooks the importance of other actors on the playing field (who may or may not be seen) at the time" (2008: 54). Understanding leadership in context is important and reflects more contemporary research in leadership studies (discussed in more detail below). Nevertheless, the specifics of this wider context are typically not explored in detail in the environmental leadership literature we reviewed, which remains relatively silent on the perceptions, motivations and actions of followers, the types of institutions which foster desired leadership traits and outcomes, or how leaders shape and are shaped by their context.

In sum, the majority of the environmental sciences literature that investigates leadership finds it to be important in explaining positive governance outcomes. Relatively little analysis differentiates outcomes or explores the negative impacts of leadership. Even with some studies differentiating outcomes, there are no explicit studies systematically linking different leadership competencies with particular empirical outcomes. Further, how environmental leadership emerges from, responds to, and reflects different institutional and political contexts is not well researched in the field.

DISCUSSION AND CONCLUSION

Our investigation of leadership in the environmental sciences reveals a number of important insights into how leadership concepts are perceived and employed within this scientific field to date. In this section we outline some key trends in the leadership studies literature drawing primarily from the management sciences. This section is illustrative and does not comprise a comprehensive review of leadership studies and associated fields. We then summarise our main findings, reflecting on how conceptualisations of leadership in environmental sciences align with some of these key trends in leadership studies. We finish by highlighting the creative edge of environmental leadership research and the opportunities we see for more critical perspectives in future. By more critical research we mean that environmental sciences would challenge taken-for-granted assumptions and normative positions, and be more sensitive to different perspectives on the processes and outcomes of leadership.

Trends in leadership studies

Scholars trace the origins of modern concepts of leadership to the 'Great man' thesis of Carlyle in the early 1900s (Case et al. 2011, Haslam et al. 2011). This discourse underpins romanticised notions of the 'heroic' leader still prevalent in lay and professional analyses of corporate and political leadership today (Case et al. 2011). Leaders are thus seen as different, superior and rare. Individualistic frameworks support a focus on leadership competencies pursued through positivist psychological methods such as personality tests (Bolden and Gosling, 2006; Carroll et al. 2008). This framing of leadership is considered incomplete: it is unable to systematically predict who becomes a leader and how effective they are, and; it neglects to consider followers and their motivations (Haslam et al. 2011).

In response to these criticisms alternative perspectives consider the relationship between leaders and followers. These perspectives are informed by political science, sociology, and social psychology. Haslam and colleagues (2011) provide a full review of these approaches: Contingency approaches describe hybrid models that consider the 'fit' between leaders' competencies and the situational or problem context; Transactional approaches emphasise exchanges of resources, favour or power between leaders and followers, and; Transformational approaches view competencies as attributes conferred on leaders by followers, and aim to deduce core leadership strategies which lead followers to *want* to follow even when the leader is absent. Each approach appears to emerge in response to shortcomings in other models. For instance, transformational approaches aim to redress the loss of leader agency in contingency models and the implicit suggestion in transactional approaches that

followers need to be incentivised or coerced. Yet, transformational models have a legacy of motivating leaders to undertake significant structural change as a measure of success. Some argue that this framing is still underpinned by the notion of the heroic individual albeit one in which s/he is motivated to mobilize others to pursue collective goals and where relational dynamics are factored into leadership processes (Conger 1999 in Haslam et al. 2011).

The more recent critical turn in leadership studies sees leadership as more radically relational than earlier framings. It focusses on group processes and is sensitive to context and perspective (Alvesson 2011, Alvesson and Svenningson 2003a, 2003b, Ladkin 2010). Leadership is understood as something that is *practiced* rather than *possessed* (Hosking 1988, Gemmill and Oakley 1992, Wood 2005). As argued by Carroll and colleagues (2008), the emphasis on competencies – on attributes, strategies and styles of leadership – is more about the *what* and *why* than the *how* of leadership. The result is little clarity on what leaders and followers actually do in pursuit of desired outcomes like social learning, conflict resolution, and (sustainable) collective action. Practice theories of leadership aim to understand leadership as an everyday process or set of routines (Carroll 2008). In doing so they are relational as opposed to individualistic, and take into account both emotional (Bolden and Gosling, 2006) and structural aspects of leadership (Reckwitz 2002). Other aspects of the critical turn in leadership studies emphasise the importance of perspective: how different people view the legitimacy of leaders and the success of leadership outcomes (Turnbull et al. 2012). Many leadership scholars have argued for wider anthropological (Jones 2005, 2006), post-colonial (Banerjee 2004, Banerjee and Linstead 2001, 2004) and non-western (Chia 2003, Jullien 2004, Warner and Grint 2006) perspectives on the phenomenon. Others have highlighted that leaders and leadership can often be dysfunctional, emotionally charged, and toxic (Maccoby 2000, Furnham 2010, Lemmergaard and Muhr 2013). We suggest that seeing leadership as a value-neutral *process* that can be good, bad or both, depending on perspective and context, offers a new, more critically-informed dimension to environmental leadership research.

Assuming leadership

In the environmental science literature we reviewed, leadership is too often deployed as a signifier whose meaning is simply *assumed*. That 'we all know what leadership is' appears to be taken-for-granted, which reduces it to a term of lay convenience rather than one of robust social scientific validity. As such, environmental leadership research is normative and relatively lacking in critical analysis. This is demonstrated in three ways. Firstly, authors promote rather than test desirable leadership competencies or project desirable but assumed qualities onto leaders. To give a very clear example of this is the statement by Gutiérrez et al. (2011: 387-388) that "the presence of at least one singular individual with entrepreneurial skills, highly motivated, respected as a local leader and making a personal commitment to the co-management implementation process was essential". This study captured the presence or absence of a community leader through a binary code and did not assess the skill levels, motivation, or commitment of leaders, yet projected these positive attributes onto leaders present across their global cases.

Secondly, the presence of leadership is typically associated with successful outcomes, variously defined, and the absence of leadership with failures or stalemates. Indeed, in his meta-analysis of biodiversity conservation cases Gruber (2010) finds that leadership is identified as important almost twice as often by scientists (74% of papers) as by practitioners (38% of papers), suggesting that the published scientific literature reveals a positive bias towards the importance of leadership.

Thirdly, we argue that the language surrounding environmental leadership portrays it largely as an unequivocal good. In many cases we reviewed, those who 'conform' or buy into the environmental governance process are referred to as leaders, while those who oppose it are not *regardless of whether or not they garner a following*. This suggests the presence of unacknowledged ideological assumptions within the leadership discourse. Folke et al. (2005: 454) discuss a set of "characters" that emerge in workshops on adaptive management, distinguishing those who take on leadership roles from those who "oppose and criticize". And in defining the multiple functions of visionaries and champions, Fabricius et al. (2007:8) refer to those who do not necessarily align with the environmental governance goals as "devious champions". In contrast, in their review of water policy transitions across sixteen cases Meijerink and Huitema (2010) refer to those who foster or block policy change as entrepreneurs, and they find that policy entrepreneurs employ similar strategies whether they advocate for change or the status quo. We noted relatively few studies in environmental leadership that recognised the potential for negative leadership outcomes. We would add, moreover, that leaders don't just succeed or fail overall. Whether or not a leader or leadership is seen to be 'good', 'effective', 'supportive', and so on depends very much on the perspective of the observer or those being led, so can be successful for some and fail for others. We believe it is important to redress the normative bias in environmental leadership research. Below, we explore examples of studies at the frontiers of the field while considering what more the critical turn in leadership studies, outlined in brief above, can offer to research going forward.

The creative edge of environmental leadership research

A sub-set of the environmental leadership scholarship represents the state-of-the-art. This includes research that: i) considers leadership as a value neutral variable, so does not assume *a priori* that it is either good or bad but treats this as an empirical question; ii) queries followers' perceptions of leaders and disaggregates outcomes, and; iii) conceptualises leadership as a process and empirically investigates leadership tactics. Conceptually, Huitema and Meijerink (2010) note the possibility of opposing (advocacy) coalitions – well recognised in the political science literature (e.g., Sabatier and Weible 2007, Fidelman et al. 2014) – that block or contest the direction of policy change. They suggest that opposition coalitions are particularly effective during implementation stages where shadow networks and formal policy networks interact. Empirically, some key studies consider interactions between sources of leadership and/or positive, negative and mixed governance outcomes (e.g., Chuenpagdee and Jentoft 2007, Fleishman et al. 2008, Carruthers and Rodriguez 2009, Hu 2011, Njaya et al. 2012, Sherval and Greenwood 2012, Ernstson 2013).

As outlined in the previous section, the more contemporary leadership studies literature explicitly considers the perceptions and motivations of followers to help explain leadership outcomes. This approach is not typically the focus of research in

environmental leadership, despite its use in explaining and, perhaps, predicting outcomes. The only exceptions are the few studies that explore (dis) trust in leaders (Pesqué-Cela et al. 2009, Cinner et al. 2012). The bulk of research on leadership competencies in the environmental sciences assumes that trust, legitimacy, and affirmation of leaders results automatically from the application of the right normative approach.

Finally, Westley and colleagues (2013) have recently argued that expanded concepts of entrepreneurship in environmental sciences should replace leadership as the focus of analysis because it can encompass more diverse, more numerous, and more institutionally or contextually embedded 'change agents'. Meijerink and Huitema (2010) refer to this as 'collective entrepreneurship'. The concept of entrepreneurship emerges from literature that investigates the role of agents within broader policy and problem domains or inter-organisational contexts and so is particularly appropriate for research on environmental leadership. As such, the research emphasis shifts to the practices of a number of actors at different stages of the process and at different scales in the system. Parallel work on brokers in network theory emphasises the linking function of leaders or change agents and in doing so recognises the embeddedness of such actors in social and institutional structures (Bodin et al. 2006, Bodin and Crona 2008, Ernstson 2013). These conceptual developments are important and need the support of more empirical research. Westley and colleagues (2013) recognise that more work is needed to identify who these entrepreneurs are and how they practice their craft or "mobilise the central skills" to sense-make, build partnerships, resolve conflicts, leverage resources and so on (see also Huitema and Meijerink 2010). We would add that, in particular, understanding the relationships (synergistic and antagonistic) among entrepreneurs is key to explaining governance outcomes.

To sum, the creative edge in environmental leadership research is beginning to critically analyse: i) multiple, interacting leaders; ii) leadership practices and processes; iii) leadership in different contexts, and; iv) leadership outcomes from different perspectives. These efforts should be the focus of future environmental leadership research. Furthermore, our paper suggests that where studies acknowledge synergistic or contested interactions between leaders and the potential for both positive and negative leadership outcomes, they have rarely considered the views, motivations, and behaviours of followers. Giving followers a voice is essential for understanding environmental leadership outcomes from different perspectives. Going forward, treating leadership interactions, processes and outcomes as analytical rather than normative concepts will significantly improve the scientific robustness of environmental leadership research. This paper only hints at the rich insight to be gained from contemporary leadership studies. We suggest that environmental leadership research would benefit from closer engagement with disciplines including sociology, social and political psychology, and geography with long traditions in more critical thinking.

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