

Climate Change Impacts, Conservation and Protected Values: Understanding Promotion, Ambivalence and Resistance to Policy Change at the World Conservation Congress

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Abstract

The impacts of climate change imply substantive changes to current conservation policy frameworks. Debating and formulating the details of these changes was central to the agenda of the Fourth World Conservation Congress (WCC) of the International Union for Conservation of Nature (IUCN). In this paper, we document the promotion of, and resistance to, various proposals related to revising conservation policy given climate impacts as they unfolded at this key policy-setting event. Our analysis finds that, during one-on-one interviews, many experts acknowledged the need for new policy means (including increased interventions) and revised policy objectives given anticipations of habitat and species loss. However, this same pattern and the implied willingness to consider more controversial strategies were less evident at public speaking events at the WCC. Rather, active avoidance of contentious topics was observed in public settings. This resulted in the reinforcement (not revision) of conventional policy means and objectives at this meeting. We suggest that this observation can at least partly be explained by the fact that the difficult trade-offs (species for species or land base for land base) implied by nascent proposals severely violate prevailing value-based conservation commitments and so understandable resistance to change is observed.

Keywords: climate change, protected areas, protected values, conservation, policy change

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INTRODUCTION

The impacts of climate change pose fundamental challenges to existing conservation policy and practice. Evidence continues to accumulate that changing precipitation and temperature regimes will interact with other stressors (e.g., land-use change) to initiate a cascade of impacts on biological processes and species distributions (Thomas *et al.* 2004; Parmesan 2006; Rinnan *et al.* 2007; Suttle *et al.* 2007; Lenoir *et al.* 2008). These system dynamics are at odds with conventional conservation approaches, which are commonly predicated on assumptions of stable biodiversity targets and that seek to protect these targets within static protected areas. The increasingly well-recognised challenge is that some conservation targets (e.g., species or ecosystems) will no longer be viable in reserve areas created or maintained for their protection (Loarie *et al.* 2009). As stated in the popular science press: ‘the entire rationale behind parks and other protected areas is going to need to be rethought for a warming world’ (Kunzig 2008).

This question of how to design conservation policy given the impacts of climate change was a central focus at the 2008 World Conservation Congress (WCC) of the International Union for the Conservation of Nature (IUCN). Prior to the Congress, IUCN Chief Scientist, Jeff McNeely, noted, ‘climate change is poised to trump everything’ (pers. comm., meeting with research team, September 2008). Climate-related topics comprised one of the three central organising themes at the WCC. The ‘New Climate for Change’ theme included over 60 sessions on aspects of both climate change mitigation and adaptation in the context of conservation. A subset of these sessions specifically addressed adaptation dimensions of climate change impacts. In combination with efforts towards mitigation, adaptation is important given: a) that we are committed to some degree of warming regardless of efforts towards mitigation (IPCC 2007), and b) ongoing climate-related impacts on ecological processes and species distributions (Parmesan 2006).

Specific examples of adaptation-related sessions at the WCC

included: 'What Will it Cost to Make the World Protected Areas Network Resilient to Climate Change?'; 'Climate Change and Species Extinctions: New Approaches to Support Decision Makers and Planners'; and 'Climate-Proofing Biodiversity Inside and Outside Protected Areas Through Connectivity Conservation Initiatives'. Echoing ongoing debates in other settings (e.g., academic conferences, conservation practice workshops, conservation biology literature) over the past 7–10 years¹ the key question being asked in these sessions was: In what ways does conservation policy and practice need to change given climate change impacts?

This particular challenge of how to respond to climate change impacts can be viewed as one contemporary example (albeit a potentially extreme one) amidst a longer list of other factors (e.g., colonialism, pollution, markets, habitat fragmentation, demography, and changing values) that have in the past influenced, and continue to influence, environmental decision making in general and conservation policy in particular. Seen in this context, it is useful to consider some commonly used concepts in environmental decision making prior to examining the specific case of climate impacts and conservation policy.

Key to contemporary environmental decision-making is the language and likely necessity of *trade-offs*. The idea of trade-offs is understood differently across disciplines and critiqued by some. We use the term here as a point of entry for discussing how individuals and groups promote, resist, modify and navigate decisions including quests to achieve specific objectives. We wish to be clear that in doing so we are not advocating any one particular model of understanding, nor do we necessarily prescribe to the practical application of 'trade-off thinking' as described below. In fact, it has been our experience that the concept is both useful and problematic at different stages of the research process. Thus, our intention is to draw from various disciplinary perspectives to create a framework for understanding and communicating both the explicit and implicit tensions and competing goals as they occurred at the WCC.

Interdisciplinary Perspectives on Trade-offs in Environmental Decision-making

Below, we draw examples of trade-off-related thinking from the fields of decision analysis, ecological anthropology, environmental sociology and behavioural decision-making. The examples do not represent an exhaustive list of all possible relevant theoretical perspectives on the expansive and rather unwieldy topic of trade-offs in environmental decision-making. Rather they are illustrative of perspectives relevant to the concept of trade-offs as applied in this study.

For many, one of the defining characteristics of environmental decision-making, including conservation, is the observation that decisions are commonly made in the context of competing objectives (things people care about, or desired 'ends') across multiple actors. It is a rare if non-existent decision context in which all involved (and affected) actors realise all of their objectives for all values across all scales. Rather, trade-offs

across objectives are the norm. For example, a specific area designated as 'protected' may achieve some set of biodiversity objectives, at the cost of resource extraction objectives, and with variable impacts for local and regional groups each of which have their own objectives. For these reasons, in a very basic material sense, some decision analysis scholars see trade-offs as arising from decisions about what to do, by what means, where, and when (Gregory 2002) given constraints on resources including space (i.e., land availability) and cost.

Working within this perspective, others recognise a hierarchy of trade-offs exercised within an overarching decision framework. Frameworks (*constitutions* as seen by economists, or *paradigms* as seen by others²) reflect the objectives (statements of fundamental desired endpoints or goals that matter to the actors in a given decision context), means (specific methods or management strategies designed to achieve a specific objective), knowledge, and expectations of managerial control and outcomes at the time of their design. They also tend to prevail for lengthy (decades or more) periods of time. Within these frameworks, trade-off decisions are made that reflect the divergent objectives and values of the actors involved and a given set of constraints. Interacting drivers from different domains (e.g., technological, biophysical, social) can trigger a new decision framework (with new means, objectives, expectations and norms) (Buchanan 1987) over time. With change comes a new set of rules in the trade-off space, where previously rejected objectives, means and stakeholders become newly acceptable.

Others see socio-cultural factors ranging from the more tangible (e.g., markets and institutions) to the less tangible (discursively constructed narratives about 'good users' and 'bad users', or what is 'natural' or 'unnatural') as strongly implicated in both shaping environmental decisions and our understanding of them (Hajer 1995; Sundberg 1998; Neumann 2004). For instance, scholars working from a politics of knowledge perspective highlight the influence of discursively constructed understandings of particular environmental problems and the problem framing (the overarching framework) that results. Using social theories of discourse, and their often-unrecognised powers of persuasion, these researchers underscore that particular problem framings are imbued with normative judgments of what may otherwise be seen as a 'logical' or presumed 'natural order of things'. Importantly, these specific problem framings have the effect of rendering some objectives and alternatives more visible/acceptable while simultaneously erasing others (Brosius 1999).

From this perspective, knowledge itself can be actively portrayed to highlight specific problem dimensions in order to support specific problem frames (e.g., Gieryn 1995) and the option space for acceptable alternatives that results. Moreover, discursively produced frames tend to demarcate some fields of expertise as legitimate stewards of decision making, including determination of the scale at which decisions should be made, and who should be included in the process.

Still others similarly note the discursive character of environmental decisions, but set as their focus the dynamic

process by which these understandings (or framings, or overarching frameworks) are forged across networks of both human and non-human actors (e.g., maps, charismatic species) in particular places. For some sociologists studying the politics of nature, there is nothing inherent or static about so-called development or conservation objectives and thus nothing inherent about trade-offs themselves. In other words, attempts to rationally label a set of trade-offs in order to prescribe their navigation are problematic. Rather, trade-offs are seen as dynamic and negotiated through collectives of actors as they actively work to co-produce a given understanding and forge new structures (e.g., new forms of governance; new resource management practices) and outcomes at particular places and points in time (e.g., Latour 2005; Page 2010).

The above perspectives can be seen as different ways of understanding the features and the social production of an overarching decision framework (or constitution, paradigm, or collective). Within a decision framework, one can envision the so-called option space that is acceptable/made visible at a given point in time. At this level, some see the practical challenge as one of developing insights for 'navigating trade-offs' (Garnett *et al.* 2007). Conservationists working from this perspective have synthesised prescriptive lessons in effort to identify, analyse and negotiate conservation and development trade-offs. This type of approach asks that: 1) trade-offs be recognised/identified, 2) trade-offs be explicit, and that 3) there is a transparent deliberative process for decision-making that attends to key dimensions of representation, fairness and transparency (Garnett *et al.* 2007; Advancing Conservation in a Social Context 2008).

The above prescriptive insights are seen by many as crucial elements of fair and transparent decision-making. At the same time, we have also discussed the view that trade-offs between objectives are neither inherent nor necessarily easily identifiable/navigable. Additionally, scholars working at the intersection of decision sciences and behavioural decision-making note that limits to knowledge and cognition can hamper efforts to achieve the first criteria (e.g., trade-off recognition), and resistance to make difficult trade-offs across objectives (trade-off avoidance) can derail hopes that contentious trade-offs be made explicit (e.g., Gregory 2002; Gregory *et al.* 2006; Satterfield & Levin 2007).

Psychologists working in this field see the problem of trade-off avoidance as one of 'protected values'. Protected values are values that people resist negotiating because doing so challenges held beliefs, values or norms. Importantly, individuals typically resist even *participating* in a decision-making process where protected values are at stake (Baron & Spranca 1997). Others describe these difficult and perceived illegitimate comparisons as 'taboo trade-offs' (Tetlock *et al.* 2000). As a result, problems of protected values can tend to masquerade as problems of scientific or other concern (Satterfield & Levin 2007). This latter observation is particularly relevant to understanding trade-offs in the context of 'science-based conservation' given climate change impacts.

Lastly, and importantly, scholars across disciplines note that beliefs that define objectives and specific problem framings

are durable, but also prone to change through time (e.g., Kuhn 1962; Cronon 1996; Brosius 1999).

The above disciplinary perspectives combine to provide a set of analytical tools to understand various dimensions of either a) an overarching decision framework (how it comes to be constructed and produced, and how it both resists change and changes through time), or b) the social dynamics that shape trade-offs and their negotiation that occurs within that space at a given point in time for a given context. Here we argue that the challenge of designing conservation policy given climate impacts cuts across both of these dimensions. In other words, a climate-adaptive policy response for conservation may require changes in the overarching decision framework (new objectives, new policy mechanisms and new expectations of control and success) *and* changes in the types of trade-offs that occur within that framework. Lastly, we underscore points made by Zerner (2000), Harper (2002), Brockington *et al.* (2006) and others who call for close attention to topics relating to governance, access and rights with respect to both the process and the potential impacts of any such effort towards policy redesign.

Objectives

The aim of the analysis that follows is to document and examine debates surrounding the challenge of how to design conservation policy given climate change impacts specifically as they occurred at one high profile event (the WCC). We asked: 1) What were the key debates and areas of tension related to proposals for adapting conservation policy to the impacts of climate change? 2) How did these debates play out in different settings of the Congress? and 3) To what extent did the WCC outcomes diverge from conventional approaches? To varying extents we draw insights from the perspectives outlined above to help us understand observed patterns of durability and (less so) change in ongoing efforts to modify conservation policy to the impacts of climate and other concurrent changes.

At least three aspects of our event-centric approach require clarification. First, the WCC is best understood in the context of a much broader field of other events, policy instruments and institutions that are simultaneously addressing this very same challenge but in different contexts and from different perspectives. Over the past seven years, we have followed these debates at various other events and venues (Hagerman 2009). This previous work provides an essential context for interpreting the results presented here. While the WCC ought to be read within the broader context within which it is situated, the WCC itself is an analytically appropriate and rich object of inquiry with respect to understanding and shedding light on some of the social dynamics that permeate the ostensibly scientific question of how to adapt conservation policy given climate change impacts.

Second is the reasonable concern that a major event like the WCC is more a site of calculated messaging than a site of negotiation. One of the main goals of the WCC may indeed have been to present a united front in advocacy for greater

resources for conservation. However, as the data below demonstrate, we did observe tension and friction at various fora at the WCC. To be sure, much of this tension was lost in the glossy communication of Congress outcomes—but the documentation and analysis of this tension where it existed is precisely the purpose of this paper.

Third, and lastly, we underscore that this work is not intended as an examination of how a specific institution (the WCC/IUCN) is changing or resisting change. Rather it is to examine more broadly how a philosophy of conservation science and practice is changing/resisting change as encapsulated by observations at this particular event (and supported by analysis of our supporting work in other contexts).

With these clarifications in mind, this paper examines debates about climate change impacts and conservation policy in the particular context of the WCC, and in so doing provides a unique window into how these debates are framed, promoted and contested at a major global and policy-relevant meeting. Our central argument is that the process of adapting conservation decision frameworks to the impacts of climate change is currently stalled in policy spheres as a consequence of the recognised, anticipated and currently undesirable *within* conservation trade-offs (e.g., species for species or ecosystem for ecosystem) that would result with a new option space. In other words, trade-off avoidance derived from commitments to conventional preservationist principles of conservation at least partially explains why the existing decision framework has remained intact, despite increasing recognition of its untenable foundations given forces of climate change.

This paper proceeds from here in three parts: we begin with a description of the methods, this is followed by the empirical data and analysis, lastly we conclude with reflections on the extent to which climate change ‘trumped everything’ at the WCC, and discuss some implications for understanding policy change in this context.

METHODOLOGY

Site

This research was conducted at the WCC held in Barcelona Spain, October 5–14, 2008 and hosted by the IUCN. The IUCN is the world’s ‘largest global environmental network’ whose stated mission is to ‘influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable’. Organised as a ‘democratic membership union’, it consists of over 1,000 members [200 government and 800 non-governmental organisations (NGOs)] across 140 countries and 11,000 scientists who volunteer in six commissions.

The WCC is held every four years and heralded as ‘the world’s largest and most diverse conservation event’ whose aim is ‘to improve how we manage our natural environment for human, social and economic development’ (IUCN 2010). Over 7,800 representatives from NGOs, governments,

indigenous groups, academe and business attended the event. Considering the above and its official observer status at the UN General Assembly, the activities of the IUCN including the WCC represent a key site of conservation agenda setting and opportunity to examine the formulation, promotion and debate of policy alternatives as they unfold.

Approach

The work presented here is part of a larger collaborative ethnographic project examining the social context of conservation trade-offs across various topical domains (e.g., biofuels; indigenous rights; marine issues) at the WCC. It is collaborative in the sense that co-researchers share data and insights for the purpose of gaining a more comprehensive understanding of trade-offs as they were debated at the WCC than could be achieved by a sole researcher. This work is also part of a longer seven-year trajectory of research that has aimed to better understand the linked ecological and social challenges of designing conservation policy tailored to adapt to the impacts of climate and other concurrent changes (Hagerman 2009). Thus this work can be read both as an element within the topically diverse ethnographic investigation of trade-offs at the WCC, and an element along the temporal trajectory of research on the topically specific challenge of how to design conservation policy that accounts for climate change impacts.

In this study we used ethnographic methods to document the content and social context within which key debates on this topic were identified, framed, promoted and contested at the WCC. This event ethnography approach can be viewed as a combination of rapid or time-constrained ethnographic assessment (cf. Low *et al.* 2005) and institutional ethnography (e.g., Gusterson 1992), whose purpose is to capture engagements between scientific experts, decision makers and NGO actors in the context of a time-condensed policy-setting meeting. By documenting and analysing the social interactions and production of knowledge that emerges at these events, this paper follows in the methodological tradition of ‘studying up’ (Nader 1972, 1996; Gusterson 1997), and is in keeping with calls for anthropology to overcome the ‘continued aversion to studying power brokers such as scientists, government decision makers, industry leaders...’ and *in addition to the local*, focus analyses on ‘institutions and populations of power and provide rich accounts of how knowledge and policies are produced....’ (Lahsen 2008).

The WCC represents a rich site to apply this approach particularly because of the diversity of groups participating. As mentioned above, the challenge of incorporating climate impacts into conservation policy is simultaneously being considered at other regional-national academic conferences, NGO meetings and within various government agencies. The benefit of conducting research at the WCC is the concurrent participation of a wide range of scientists, decision makers, agency managers, indigenous groups, and NGOs from around the world. At the same time, it must be noted that the structure of the event itself and the historical distribution of power amongst different groups unquestionably shaped the degree of

participation and influence that different groups had. Higher-order questions of structure, organisation and power at the WCC provide ample grist for analysis beyond the purview of this study, but are examined in detail in other contributions to this issue.

The first author was a member of the collaborative event ethnography research team at the WCC, and she conducted all of the data collection presented here. The use of plural pronouns throughout this paper reflects the longer collaboration between the three authors on this topic.

Our analysis is based on: 1) detailed participant observation at more than 13 workshops, knowledge cafés and pavilion events during the Forum section of the Congress, 2) observations conducted during contact groups and plenary sessions of the Members' Assembly and 3) Eight semi-structured interviews (between 45 and 90 minutes) with leading biodiversity-climate change experts working for academic institutions, NGOs and the IUCN secretariat. Combined, these research activities amount to over 50 hours of observational data on the content and nature of debates around the implications of climate change for biodiversity conservation.³ The strength of this approach as applied in this policy-relevant setting and in relation to our questions is to reveal nuance between the perspectives of individuals voiced in private, and how and why these perspectives are mobilised (or not) in social contexts where specific objectives are sought.

Even with the benefit of working with the other event-ethnography collaborators, some key debates/conversations were surely missed. This outcome could hardly have been otherwise at such a large event. Unquestionably, there were important conversations that occurred in closed sessions, over dinners, on public transit to the Congress, or at informal workshops that the author was not privy too. The following strategies were used to gain as rich a data set as possible: being present at all relevant scheduled events on this topic (and unscheduled ones as they occurred), paying close attention to the informal discussions that occurred after sessions and workshops, and engaging in informal hallway conversations with participants. Within the bounds of these methods—clearly outlined above—the observations presented below provide an important window into how various actors are grappling with this challenge in the context of the meeting of the world's largest conservation organisation.

Selection and General Characteristics of Interviewees

The 10-day WCC event meant that interviews were scheduled within a compressed period of time. Given this constraint, and considering that interviews were one of other sources of data, we specifically targeted scientists with biodiversity and climate adaptation expertise for interviews. Criteria for invitation were both substantive and practical. Substantive criteria included demonstrated expertise and involvement in climate change and biodiversity research (as indicated by academic publications, involvement in regional or global scale climate change and/or

conservation policy development). Practical criteria included attendance at the WCC. The majority of individuals were identified prior to the WCC while a few were invited at the event itself.

Eleven individuals were invited to participate. Of these, nine agreed, one declined, one did not respond and one did not get scheduled despite repeated planning attempts. A total of eight interviews were ultimately completed. Of these, four interviewees were male and four female. All but two were doctorates in a related discipline, and all conduct research or are working at the interface of climate change impacts and biodiversity conservation. As befits the event itself, this small pool of experts was closely affiliated with conservation NGOs.

The WCC

The 10-day meeting was organised into two distinct halves: the Forum (Days 1–5) and the Members' Assembly (Days 6–10). The Forum is described as a 'grand public gathering... bringing together people from all over the world to discuss, share and learn' (IUCN 2008a). The activities of the Forum were part spectacle, festival, and marketplace. The opening ceremonies included Cirque du Soleil acrobats, a live orchestra, slide shows, and the Prince of Asturias. The Forum consisted of four fast-paced days of over 800 concurrent workshops, roundtables, film premiers, book and journal launches, dance parties and receptions that began and ended in the early hours of the day.

The frenetic pace of the Forum was followed by five measured days of the Members' Assembly. A fraction of the participants attended the latter sessions of the Congress and the locus of activity shifted from everywhere and all at once to the central location of the main plenary hall. The Members' Assembly consists of parliamentary-like proceedings where IUCN members 'debate and establish environmental policy' (IUCN 2008b). Members at this meeting debated and voted on over 100 resolutions, ultimately approved the inter-sessional programme that will guide the work of the IUCN for the next four years, and elected a new President and Council. The Members' Assembly also included 'Contact Groups' which were scheduled for motions that 'address substantial policy issues, or [if] members would benefit from greater clarification of the issues...' (IUCN 2008c). The purpose of Contact Groups is to 'provide members the opportunity to prepare consensus text and/or harmonise text to avoid contradictions in adopted resolutions or recommendations' before going to the plenary.

CLIMATE IMPACTS AND CONSERVATION POLICY AT THE WCC: PROMOTION, AMBIVALENCE AND RESISTANCE

Our combined participant observation/interview methods revealed two central observations related to discussions about conservation policy given climate change impacts at the WCC: 1) Many acknowledge in interview settings that

the impacts of climate change necessitates consideration of a revised decision framework including new interventions and revised objectives and expectations; 2) However, we observed active avoidance of related proposals in public settings of the WCC. In large part, the result was the continued promotion and persistence of the means and objectives that characterise current approaches. We suggest that these observations can at least partly be explained by the *anticipated* (and resisted) within conservation trade-offs (e.g., species for species) implicated by a more transformative framework, and that this resistance is linked to the currently held beliefs and values of many of the key actors. We describe these empirical observations and this interpretation below.

Climate Change and the Expressed Need for a New Decision Framework

At the WCC, the impacts of climate change were widely seen to necessitate a paradigm shift in conservation policy. In workshops, panellists spoke of the need to 'adopt a business unusual approach—business as usual is no longer an option'. Others asserted that: '[we need to] to move beyond a static approach' to conservation. Still others argued that we need a 'paradigm shift—we talk about paradigm shifts all the time but this actually is'. Considering over two decades of discussion on the challenges that climate change poses to biodiversity conservation as currently practised (e.g., Peters & Darling 1985; Halpin 1997; Hannah *et al.* 2002), and the stated intention of the meeting's agenda on this topic, the above expressions for change were well expected.

In public spheres of the WCC (e.g., Congress workshops, panel sessions and discussions at the Members' Assembly), the suggested attributes for conservation given climate change impacts largely reflected established practice, the most common of these proposals being the expansion of protected areas and increasing connectivity (Noss 2001; Hannah *et al.* 2002, 2008). Advocates of this approach argued that: 'climate change is...going to eliminate habitat within protected areas and make it necessary to identify new areas for protection in order to conserve species and ecosystem services...' (Panellist of session titled: 'What Will it Take to Make Protected Areas Resilient to Climate Change?'). Or, as expressed in that same session by another prominent conservation scientist: 'the key conservation response to climate change is the expansion of [the] protected area network to allow dispersal of climate change impacted species'. And further: '...we are going to be losing representation of species. Some species are going to be moving out of protected areas, and that means we need to add more protected areas to compensate'.

Further indication of the prevalence and high profile (relative to other potential strategies) of this strategy was observed at the workshop on 'Climate Proofing Biodiversity Inside and Outside of Protected Areas Through Connectivity Corridors'. In this particular session, panellists promoted the virtues of connectivity corridors in New South Wales (and other regions including the Yellowstone to Yukon Conservation Initiative)

with a world premier promotional movie projected onto two massive screens in the largest ballroom at the Congress. The message conveyed on the screens was that nature and the 'evolutionary cradle' faces 'impending crisis and evolutionary turmoil'. Without landscape connectivity, it was argued, 'species may find themselves staring down the barrel of extinction...we need to act fast. It is critical that this grand vision is achieved'.

Friction in Public and Private Spheres: Grappling with an 'Awful Nexus of Problems'

By and large, most public presentations about how to adapt conservation policy to climate impacts focused on the need for new protected areas and connectivity corridors. At the same time, a number of participants publicly questioned the details of this approach. In particular, two nascent and contentious topics emerged: 1) Appropriate intervention and management of invasive and 'non-native' species in the context of shifting species ranges, and 2) Conservation objectives, expectations and within conservation trade-offs (species for species trade-offs sometimes expressed by the concept of triage, which is described below).

Interventions

On the topic of non-native species in the context of climate change, one participant noted in a workshop setting that: 'sometimes changes are indicators of adaptation and not necessarily a threat'. And further, 'that climate change would benefit some species'. A tense exchange between the questioner and the panel followed. One panellist replied: 'I am going to put my...negotiators hat on and try to be as diplomatic as possible [*long pause*], that is a real Northern and European perspective. Developing parts of the world are going to suffer. I don't know if I am overreacting, but we have to be very careful about being sanguine...we like the world as it is'. At the same time, this panellist also highlighted the fact that interactions between climate change and invasive species represent a 'huge underappreciated issue' and further that: 'I am really concerned that policy makers are going to start asking questions about why we are investing money on wimpy species and huge money in fighting species that are doing very well... [this represents] an awful nexus of problems'.

Questions surrounding the management of non-native species in the context of conservation and climate change extended beyond debates over whether or not to 'accept' or 'reject' (assuming some control over the matter) the arrival of non-native species in a given area. Discussions also touched on the controversial proposal of assisted migration.⁴ Assisted migration (the deliberate relocation of an imperilled species from its historical range to new locations not inhabited in the recent history) has been topical in the conservation literature for the past three years (McLachlan *et al.* 2007; Hoegh-Guldberg *et al.* 2008). Reflective of these within academy conversations, a participant from Parks Canada asked the

following of a panel speaking on ‘Climate Change and Species Extinctions: New Approaches to Support Decision Makers’: ‘Species translocations set us up for dreadful choices related to what to move where—are you headed this way?’ The immediate response from a conservation scientist on the panel was as follows:

Species translocations are expensive and we are not ready, policy-wise. Even if we had a species translocation solution, I don’t think it will be allowed [*pause*]. We have got to get policy-makers to think about this—we need to start experimenting [*pause*], but [we have to be] careful of letting the genie out of the box—invasive species-wise.

Another panellist immediately isolated and underscored the precautionary portion of the previous experiment/caution-blended comment by saying: ‘We need to be very careful [that we don’t cause] massive and irreversible changes’.

This exchange flowed directly into a question posed by a self-identified conservationist who asked if the future of conservation given climate change impacts would be to let nature unfold as it will, and specifically: ‘Do we have to save every species?’ Oddly, in this case the moderator did not direct the question to the panellists, but rather moved directly to the next questioner. However, the next questioner noted that the species that benefit from corridors might be non-native and/or invasive and thus expressed a similar theme to what was bypassed. At this point a panellist replied with a measure of exasperation and sarcasm saying: ‘I am delighted that the audience is setting the bar so low—arrest or adapt? We have got to do both!’ However the heart of the question was not to ask either/or, but rather to get at the thorny issue of *limits to adaptation* and the possible need to more fundamentally revise means and objectives. Picking up more directly on the questioner’s meaning, another panellist noted that despite the difficulty with these questions: ‘it forces us to examine what it is that we are trying to achieve. Is it species, ecosystem services, evolutionary processes?’

At this point, the small-medium sized conference room of 120 seats has now filled to capacity. The audience, some sitting cross-legged on the floor and others behind them standing three deep to the back door, fall quiet, looking around at each other and at the panelists with a blend of bewildered and deflated expressions. At last the moderator sighs and exclaims: ‘We have had a very static approach in the past—the climate change agenda changes all that. Issues of how to deal with this turn out to be very challenging’.

Interviews allowed for greater examination of topics relating to interventions such as assisted migration. Some scientists argued that despite uncertainties related to both climate impacts and intervention outcomes ‘we need to start experimenting’ and that it is time to ‘get our hands dirty’, and become ‘ecosystem engineers’. Others expressed a reluctance towards conservation interventions and ‘playing God’, with an NGO scientist stating that assisted migration is ‘too risky at this point’, and ‘doomed to failure’.

Expectations

The second nascent topic concerned conservation objectives and expectations of success given climate change impacts. Like the audience member who pressed panellists on the feasibility of conservation to ‘save all species’, a participant in a separate session challenged panellists advocating proposals to ‘Climate Proof Biodiversity’ by conservation corridors. Specifically, the participant questioned the message being sent to policymakers that if we act now (with new protected areas) we ‘can fix this’. He/she argued that such statements ‘imply that we can fix it when we know full well we can’t’.

With the exception of the above examples, conversations relating to expectations of success were not readily visible in the public spheres of the Congress. However, the uncomfortable recognition that some species will go extinct due to climate impacts (interacting with other drivers), along with consideration of the possibilities of increased interventions and the application of triage-like principles were all key themes in interviews.

The term ‘triage’ for conservation derives from its application in medicine where it is a strategy for priority setting in urgent situations when it is not possible to save all patients due to resource limitations (time, supplies, medical personnel, alternatives) at a given point in time. Insofar as conservation priorities are set amidst social and spatial constraints, conservation activities (e.g., the siting of protected areas or the listing of endangered species) are ranked and prioritised all the time (Margules & Usher 1981; Vane-Wright *et al.* 1991; Marris 2007). Conservation triage can be seen to be different from prioritisation because the former includes the explicit decision not to treat a given target (population/species) assessed to be non-viable (by some criteria), in favour of efforts that are focused on targets assessed as being more viable given a set of conditions and interventions at a given point in time. It also means explicitly acknowledging that this lack of effort or interventions applied in effort to protect one (deemed viable) species over another may have severe consequences for the latter.

Historically, the concept of triage in conservation has been met with harsh criticism (e.g., Pimm 2000) and described as ‘ethically pernicious and politically defeatist when applied to biological conservation’ (Noss 1996). However, the potential application of triage-like principles is increasingly referred to in agency reports (e.g., Baron *et al.* 2008; Dunlop & Brown 2008), journalistic pieces (Marris 2007), and peer-reviewed literature (Bottrill 2008; Parmesan 2008; Traill *et al.* 2010). Further, explicit triage-like thinking in response to climate change impacts is emerging in practice. In the Florida Everglades for example, some conservation researchers now question the logic of protecting areas directly adjacent to the coast given expected sea-level rise. They argue to relinquish coastal zones in favour of targeted protection further inland (Robbins 2009).

Indeed, in an interview one respondent noted the pragmatic realities of within conservation trade-offs and the application of triage-like principles.

Inevitably, one has to make some harsh decisions... and no doubt there will be species that we give up on—inevitably. If you have a species with weak populations that has no hope in hell of surviving... we would say [to policymakers] unless there is available climate space and a suitable habitat for a species, one would have to question the value of investing large sums of limited resources in protecting that species, when that resource could go into protecting other species that would benefit.

Others were less blunt, more conflicted, but pragmatic nonetheless on the topic of conservation trade-offs as expressed using the concept of triage. Here a conservation biologist and climate adaptation specialist stated:

We used this concept of triage... and I was really uncomfortable with it. But what I think is important is that since... species and ecosystems are going to unravel, it is really important that we as a conservation community... have a conversation about what should the criteria be for making decisions about what ecosystems we save... If we don't talk about the criteria, and have a process for establishing that... it is just going to be ad hoc, which could be even worse.

In this case the respondent was referring to criteria for identifying which species and ecosystems to 'save' and which to 'let go'. The task of conceptualising the criteria for triage was further highlighted by another scientist, who noted the daunting myriad interacting biotic uncertainties at play.

[Heavy sigh]...I don't think that we can...justify major choices...we just don't know [the role of species in ecosystems]. There was a conference held this year [2008] where they discussed many of these things, and the conclusion was that we actually just don't know enough to tell you that we don't need that species. We can't tell you that - we don't know...we can't make those decisions.

This respondent highlights the challenge of decision making under both high degrees of uncertainty and potentially high risks to individual species and ecosystem processes. To some extent, new science may aid in identifying potential impacts and trade-offs in this context. At the same time, decision making under uncertainty is the norm for resource management generally (e.g., Hagerman *et al.* 2010a) and conservation is no exception. Moreover, it may also be the case that more science will generate a richer understanding of a given set of dynamics whilst simultaneously increasing uncertainties (Yohe 2006) (for example by revealing previously 'unknown unknowns').

Another respondent further picked up on the issue of criteria for triage and the concept of 'tolerating loss':

One of the strategies is tolerating loss [*somber tone*]. It is assessing where we can afford to let go...I don't think

we have the framework for tolerating loss...Essentially what's got to happen is that we have to figure out, for critical ecosystems to start with, what are the minimum... set of species within functional groups that are essential for this thing to function? And not tolerate the loss of any of those things.

In other words, explicit conservation trade-offs (here conceptualised by interview respondents as within conservation species for species trade-offs expressed in the concept of conservation triage) are a pressing reality that violates conventional conservation thinking.

Avoidance in Public Spheres

Despite interview-based acknowledgements of the need for interventions such as an 'ecosystem engineering' approach, 'harsh decisions', 'frameworks for loss' and 'triage', discussion of these thorny topics was generally diluted in the more public venues of the Forum and Members' Assembly. Across 13 panel sessions dedicated to (or with a central focus on) climate change adaptation and biodiversity conservation, these topics were raised only during the question and answer period on the two occasions as indicated above. In other words, they were not presented as important topics requiring discussion but participants raised them nonetheless.

Instead, publicly delivered discussions were dominated by topics relating to connectivity and new protected areas. Moreover, topics on interventions and expectations of success were actively downplayed and deflected when they did occur. Below, we provide two examples to illustrate how anticipation of within species trade-offs resulting from a potentially revised decision framework with new means and objectives (e.g., new interventions and expectations) were actively avoided either during the public WCC discussions, or in communicating the science for policy outcomes.

The first example comes from discussions during the Contact Group session for the central climate change, biodiversity, and adaptation resolution (Motion 99). There, after a full day of programme hearings in the main plenary hall, 10–15 people settled into one of the smaller meeting rooms, while the sponsors of the motion asked, 'who called for this?' The World Wildlife Fund representative for the Convention on Biological Diversity (CBD) was ready with new language that was read to the group. With unanimous support, the resolution would come to read (addition in *italics*): 'The World Conservation Congress at its 4th Session in Barcelona Spain, 5–14 October 2008:

2. CALLS ON the Parties to the CBD to develop specific strategies to be incorporated into their national biodiversity strategies that will:

...b) ensure that the loss of native biodiversity is not increased by measures to combat *and adapt to* climate change'.

Two days later the resolution was passed in the Members'

Assembly with 100% government and 99.3% NGO approval. The addition of the words 'and adapt to' can be read as an example of precautionary avoidance towards some of the more interventionist proposals for adaptive strategies that may further compromise currently native species.

The second example draws from an interview with a conservation scientist, where it becomes clear how discussions related to contentious trade-offs (e.g., as a result of triage-like framing) are sometimes strategically avoided in public spheres.

There is little question that we will have to be doing triage. The reality... is that if you devote yourself entirely to triage and none to increasing the amount of resources available to deal with a problem—well then you'll wind up doing lots of triage. You have to worry about triage a little bit, but that is not where we want to put our main focus. You don't want to give people the impression that triage is the solution to the problem.

And further:

Triage isn't the answer to doing the least bad job... there is a social context to this and you need to make sure that you're not giving people the idea that you are just going to do triage... in the interim we may have to do a little triage on species. But the message would be, we don't want to be in a position of doing a lot of triage. At the same time in the long term you want to have intelligent triage, so that you are a maximising the positive impact of what resources you do have.

Understanding Avoidance: Resistance to Forgo Held Values and Revise Objectives

The above observations demonstrate the difficulties associated with debates relating to a potentially new decision framework and the new trade-off space that would result. Avoidance or resistance behaviour of the sort described above can at least partially be understood along two lines: precautionary ambivalence and the problem of protected values. First, the reluctance of experts to discuss engineering approaches and revised objectives in public spheres of the WCC (and beyond) may stem from entirely reasonable concerns over unleashing new alternatives under the pretext of urgency that could lead to undesirable and unintended outcomes. This can be understood as a healthy precautionary attitude to guard against emergency measures enacted or imposed in the name of urgency without careful, systematic deliberation. And yet the potential for large-scale species die-offs or loss of significant land base for human populations due to rising sea levels strongly suggests the need to consider changes to conventional practice.

Second, the problem of protected values arises when individuals resist evaluating one category of value against another (e.g., ecosystem health and cost) (Gregory 2002; Satterfield & Levin 2007) because it poses a fundamental challenge to deeply held positions including ethical ones—and

so these become 'protected' and thus often nonnegotiable (Satterfield & Levin 2007). In our study, the experts we spoke with privately (and to a lesser extent publicly) acknowledged the need for increased interventions and adjustments to objectives including frameworks for loss and the application of triage-like principles where species for species trade-offs would be the result (an example of protected values of a *within-category* type). However, this technical recognition of likely policy change is currently in conflict with the held values of many, which together offers an explanation for the observed avoidance to publicly air these topics.

In their examination of a deliberative process concerning the remediation and cleanup of a nuclear production facility, Satterfield and Levin synthesise from Baron and Spranca (1997) and Fiske and Tetlock (1997) a set of 'hallmarks' of protected values, which we similarly find evidence for in our observations at the WCC. They include: a) *Denial and suspension of unpalatable alternatives*: here observed as public resistance to interventions and triage and continued promotion of the more protected areas/connectivity proposal and b) *Slippery slope arguments*: the concern that accepting a contentious alternative will set a dangerous precedent for future management. This was observed in the form of concerns about species for species trade-offs and related triage concepts that some viewed as further placing the allocation of conservation resources at risk.

The following exchange with a conservation scientist working with a major NGO demonstrates this clash of technical understanding of biophysical change dynamics in opposition to held (more preservationist) values and linked ideals about nature.

I still think that... I am stuck on some sort of preservation paradigm [*laughing*]. Although regions should be sustainably managing change, I don't want to see some of those things change! Because if you give up on—it's just hard if you give up on that. Well then, what are you trying to achieve? So it's full of sort of contradictory stuff, all of this, and you just have to deal with it.

All combined, the observations described above underscore the social processes that both moderate efforts to achieve normative criteria for dealing with trade-offs within any decision framework, and evaluations of proposed substantive changes to an overarching decision framework.

We have argued above that our empirical evidence can at least be partially explained by the concept of protected values. This particular interpretation is particularly appropriate considering the data itself, and the value-based conservation context within which this data are situated. At the same time, other potential explanations warrant mention and consideration: particularly concepts relating to path dependency and 'paradigm changes' more broadly.

Path-dependent processes are those that shape and reinforce outcomes removed in time (Pierson 2004). Key features of path dependency include self-reinforcement (positive feedbacks)

and trajectories that become entrenched over time. The fingerprint of these features can be found in the data presented here. However, given the time-constrained nature of our data, we can only engage speculatively with this concept. As above, our research design points us to focus more specifically on understanding our data from the perspective of *why* certain alternatives have become entrenched and reinforced at this particular point in time and in this particular context.

At the same time, the general concept of path dependency can cautiously be combined with the concepts relating to policy or scientific change over time. Of these, a range of explanatory theories of change is potentially applicable (e.g., Kingdon 1995; Gunderson & Holling 2002; Repetto 2006). Below, we briefly highlight Kuhn's structure of scientific revolutions, namely, paradigm shifts (1962). Not without its critics, Kuhn's framework will likely be familiar to an interdisciplinary audience (so envisioned for this paper) and it is useful in helping us animate our data and interpretation.

Kuhn describes five concepts/stages relating to paradigm shifts. Here, we briefly define these and simultaneously map our empirical data onto his framework. *Normal science* represents a set of established rules and beliefs (a constitution) on a given topic. In our case, the conventional conservation policy framework outlined in the Introduction represents this state. *Paradigm* represents commitments to conventional traditions and assumptions. Here, this stage is represented by fidelity to protected areas and systematic conservation planning. *Crisis* represents new evidence and a failure of existing rules to uphold a particular paradigm. Here, crisis is represented by the impacts of climate change, the projected failure of protected areas to achieve the objectives that they were designed for, and mounting empirical evidence of climate-induced changes in species distributions (patterns) and processes.

Mop-up represents the activities of scientists to uphold an existing paradigm in the face of emerging contradictory evidence. Notwithstanding the glib name, 'mop-up' is arguably the most analytically relevant concept for our data. For instance, one of the core responses of conservation science has been to engage in numerical leaps of faith in an effort to project future species ranges (given climate and other impacts) to be used as insight into the siting of new protected areas (e.g., Williams *et al.* 2005). These efforts serve to uphold the same means and objectives, just with different inputs to guide decision-making. Assuming that the conservation paradigm is in the midst of some process of change, our empirical evidence suggests that the 'We Are Here' arrow be placed precisely at the *mop-up* stage.

Revolution is Kuhn's fifth and last stage. As just stated, even with the proliferation of so-called climate-adaptive conservation proposals, our data do not support this stage as being the location of current debate. One important requirement for revolution is the presence of a 'viable' alternative. Arguably, alternatives in this context do exist (e.g., triage-principles and engineering like alternatives) (Hagerman *et al.* 2010b). The obvious but also crucial point is that the mere presence of an

alternative does not lead to change—particularly when key actors view it as unpalatable, dangerous or morally corrosive. This brings us full circle back to the protected values argument (now with complementary insights from the literature on paradigm shifts and path dependency). Put simply, the beliefs and values of many key conservation actors are not currently aligned with a framework-for-loss type of paradigm and so mop-up activities ensue and existing trajectories are reinforced. Within this explanatory framework, debates on this topic may cycle back and forth between the stages of (semi-) crisis and mop-up for a period of time until a more severe triggering crisis or set of triggers prompts more 'revolutionary' thinking towards some new and as yet undetermined set of conservation means and objectives.

Trade-off Invisibility and the Organisation of the WCC

In the above discussion we have shown how scientists considering the specific challenge of how to adapt conservation policy to the impacts of climate often see trade-offs in terms of within conservation trade-offs. But so-called conservation and development trade-offs are also seen by many as important because regardless of the specific conservation strategies that are implemented, they need to be considered in the context of those whom the strategies will most impact. The structural organisation of the WCC agenda by topically focused 'streams' and 'journeys' meant that sessions addressing adaptation strategies for biodiversity conservation were largely considered in isolation from other topics discussed at the meeting—topics such as human rights and livelihoods. So while conservation scientists deliberated the financial costs of implementing new protected areas in response to climate change, in other sessions, as part of the rights and conservation journey for example, indigenous groups and other actors voiced concern about conservation activities more broadly. In the latter case, key topics included those common to the literature on social impacts of protected areas that has shown that protected areas can have a range of impacts on social practices, including the alteration of livelihoods, changes in resource access, the exacerbation of prior conflicts, or increasing the vulnerability of particular populations (Harper 2002; Wilshusen *et al.* 2003; Neumann 2004; Brockington *et al.* 2006; West *et al.* 2006).

One outcome of the gulf between discussions about adapting conservation policy to the impacts of climate change and discussions of social dimensions of conservation more broadly, was that topics relating to livelihoods, rights and governance were mentioned rarely and only superficially during sessions focused on the former. In one instance, a scientist with Conservation International noted in a workshop setting that when working to enhance connectivity through new protected areas as a key response to climate impacts, the conservation community needs to always keep in mind that currently 'non-protected areas are very important [for biological adaptation] and also very important for people', and therefore that in developing adaptive strategies 'we need to be especially careful to consider the needs of people'. In a second instance,

a panellist from Costa Rica speaking during the session on Climate Proofing by Biodiversity Corridors, raised the issue of governance by asserting that 'local communities have to be part of the decision-making', and further, that participation at 'fancy meetings like this in Barcelona are a hell of an expense [that many] Latin American people can't access'.

On governance and implementation broadly, one audience participant from The Nature Conservancy commented that: 'We have heard...big ideas without local implementation'. While this comment was not immediately addressed, later in the session, a strategic advisor for the Yellowstone to Yukon Conservation Initiative (Y2Y) further extolled the virtues and full support of that programme with the exclamation: 'Big fat wilderness, we've still got lots of it...there is full local support [of a Nahanni protected area initiative]...it is a wonderful thing'. Echoing the concern raised in the implementation comment, this rosy view was tempered by the panellist from Costa Rica who immediately underscored: 'A word of caution in using the same approach everywhere—people don't depend on land for food up north'. While the protection of biodiversity is a crucially important management objective, this common strategy of expanding protected areas has been widely critiqued over the past decade given the potential and documented social impacts on land-based people (mentioned above). For the above reasons (and as exemplified in this exchange) efforts to protect biodiversity through new protected areas in the absence of meaningful collaboration on topics related to rights, access and governance, are likely to be met with resistance in many locales.

Overall, this structural separation resulted in a critical missed opportunity to increase understanding of the potential conservation and development trade-offs and implementation challenges involved in climate-adaptive conservation strategies that often include expanding protected areas. It further perpetuated an implementation blindness of sorts that is sometimes present in literature on revising conservation policy given climate impacts as expressed in the statement that we need to 'expand protected areas regardless of political boundaries' (Li et al. 2006). Obviously and critically this view fails to consider the potential impacts of conservation activities on livelihoods and rights (Chan & Satterfield 2007). The importance of linking regional scale proposals with local realities was however discussed in an interview with an adaptation specialist working with a major NGO in the global south:

These conversations [livelihoods and proposals for climate-adaptive conservation] aren't meeting...there needs to be more...bringing together of these scenarios for both community and conservation. Otherwise we run into a situation...where it is much worse...we've seen how community needs and conservation needs have clashed in the past.

When asked what was required this same respondent replied:

For people who are looking at these [bioclimate envelope]

maps and scenarios...I'd say...we need to also be developing a way of feeding into the scenario planning, the information that is coming from the ground...and make the recommendations that experts make on these projections more realistic in terms of what can be achieved. I think they need to be able to relate it to the on-the-ground situation. Otherwise people are just going to look at them and say, like what the hell? What are you suggesting?

Trade-offs and Participation: A Revealing Moment

In a related conversation on stakeholder participation and climate adaptation initiatives, a different scientist with a major NGO spoke as few others did about participatory processes and conservation strategies given climate change impacts. Their view underscores the challenge of achieving fair, equal and transparent deliberation related to conservation decision making.

The reason that we want to run this...assessment as a consultative process is that we want government buy-in. We want governments to be committed to implement the adaptation strategies that come out of it. And there needs to be some trickery involved here because—well not trickery, but there needs to be a process where the government or scientists or policymakers or decision-makers or whoever, are the ones who come up with the adaptation options. Because if not, it is going to be [us] persuading them that those options are really good. And so, a whole lot of options are probably going to be discussed and brainstormed. You know, the pros and cons of each will be elaborated. But we hope that they will decide that the ones that are good for nature are going to be the ones that are adopted and implemented. So that's going to be the trick of the whole thing in that whole process. It's not necessarily to promote what we want to do, or have them do, but have them, kind of, be partners in that.

This single perspective reinforces the concerns of scholars who have sought to bring 'critical reflection on the upsurge of participatory rhetoric in local governance' (Santos & Chess 2003; Bickerstaff & Walker 2005; Kasperson 2006). For these scholars and others, 'broadening of involvement in local decision-making' is seen as a 'good thing' in effort to integrate multiple perspectives into decision-making, but one that involves analysing and grappling with the full range of challenges involved in doing so (Bickerstaff & Walker 2005). Chief among these challenges are assumptions and prescriptions for equal empowerment that embed some prescriptive checklists for 'competence and fairness' in participation (Webler 2001). As Bickerstaff and Walker (2005) demonstrate in their study of citizen planning processes, all forms of participation can have a tendency to reinforce unequal power relations.

Kasperson (2006) similarly argues that in this 'heyday of

the stakeholder express... much of what now passes under the rubric of stakeholder involvement has more to do with assuring and legitimating the goals of sponsoring managers than introducing new perspectives and knowledge or empowering those who occupy the spectator mainstream or live on the margins of community and society'. All this to say that we should be attentive in advocating and interpreting the outcomes of fair and transparent participatory decision-making as a common (and important) criteria for navigating trade-offs as outlined in the introduction.

CONCLUDING REMARKS: DID CLIMATE CHANGE 'TRUMP EVERYTHING' OR HAS THE CONVENTIONAL PARADIGM PERSISTED?

The intent of this research was to bring to light key technical discussions related to how to adapt conservation policy given climate change impacts as they occurred at the WCC, and further to examine the social processes of promotion, ambivalence and resistance related to these discussions. Our observations suggest that despite proclamations that climate change is posed to trump everything in conservation, many of the key actors involved—IPCC authors, IUCN secretariat, conservation NGOs—are still working within and publicly reinforcing the objectives, means and expectations of the decision framework (or paradigm) of the past four decades.

As measured by the events and outcomes of workshops, panel presentations and Contact Groups at the WCC, the proposals that were delivered in public settings, and the policy resolutions that were ultimately agreed to, were congruent with long-standing conservation a) objectives (e.g., identify and protect vulnerable species and ecosystems), b) means (e.g., by way of more protected areas, connectivity corridors), and c) expectations of success (resistance to alternatives that would incur within conservation trade-offs). Thus, public expressions towards measurable changes in conservation policy across the above policy features remain idle. We have argued that this observation is in part a consequence of a precautionary ambivalence, as well as value-based commitments to the existing framework. We offer some final reflections on these observations below.

Despite the now strong evidence and consensus that climate change poses a fundamental challenge to conventional assumptions of conservation (e.g., Parmesan 2006; Hannah 2008), ensuing public debates over how to address to this challenge continue to be shaped within the existing (yet recognised untenable) conservation framework. As discussed above, some of the potential changes to conservation policy involve contentious revisions to both objectives and means. Resistance to these changes is arguably linked with fears about forgoing long held values, including the sense that protected areas are few enough as is, and the defence of the concept that results. The effect is that systematic, transparent discussion about potential policy alternatives remains largely constrained in public spheres.

Therefore, despite the technical understanding of biophysical

change dynamics, and ambivalent or blatant expressions for new conservation means and objectives in interview settings, the evidence presented here demonstrates the durability of prevailing value commitments to the current conservation paradigm. Indeed there is little reason to expect that values will yield easily to recalibration, however strongly implicated. While it may seem straightforward to consider re-calibrating management objectives, the history of environmental policy change tells a different story. Changes to entrenched policy paradigms are typically contentious, fraught with resistance and prolonged (e.g., Repetto 2006). At the same time, our interview-based evidence clearly illustrates that perspectives are in flux. Moreover, the history of conservation and ideas of wilderness clearly demonstrate that values and objectives do change over time (Cronon 1996). Combined, it seems reasonable to suggest a measure of caution towards the systematic and open discussion of propositions for conservation policies tailored to the impacts of climate and other changes, and simultaneously, encouragement of the necessary suspension of conventional conservation assumptions and the strong values positions on which they rest.

We conclude with one final comment on the role of the WCC itself. The WCC is promoted as a forum for learning and information exchange between actors from political and scientific worlds. Despite its potential for exchange and learning, our findings in this context suggest a reinforcement of conventional thinking as measured in public spheres and Congress outputs. In the words of one of our interviewees, the WCC is seen (in positive terms) as an instrument of 'norming'.

The gathering of the clan is always an important thing. It's for reinvigoration...for norming. To...compare results and norming the messages so that we are not saying very different things.

Indeed, despite emergent and tense discussions resting right at the conversation surface, the existing decision framework has been normed, mopped-up and reinforced. While measurable change on this topic failed to materialise at this Congress, the outcomes of the 2012 WCC (or even interim) meetings may be quite different. The year 2010 has been labelled the International Year of Biodiversity by the CBD and the IUCN. One of the key events occurring during this year will be the meeting of the Conference of the Parties of the CBD in Japan (CoP 10) in October. We will continue to trace the debates surrounding the challenge of how to account for climate change impacts in conservation policy at this upcoming event using similar methodology, hopefully interviewing some of the same (and some new) participants, and with further effort to situate the debates as they occur there within the context of our past research, the work presented here, and the wider context within which CoP 10 is situated (e.g., in relation to other UN conventions including events at CoP 15 of the United Nations Framework Convention on Climate Change (UNFCCC)).

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Notes

1. Important papers on this topic were published earlier than this period: For example, in 1985 (Peters & Darling) and 1997 (Halpin). We highlight the past 7–10 years because research activities have accelerated substantially during this time.
2. We discuss the concept of paradigm shifts as understood by Kuhn in a subsequent section.
3. In this work we focused specifically on the impacts of climate change for conservation policy, largely in the context of protected areas. We did not address related conversations at the WCC, including those surrounding Reducing Emissions from Deforestation and Degradation (REDD), or climate change and indigenous rights.
4. Also referred to as 'managed relocation' and 'assisted colonisation'.

REFERENCES

- Advancing Conservation in a Social Context. 2008. Working in a world of trade-offs. <http://www.tradeoffs.org/static/index.php>. Accessed September 2010.
- Baron, J. and J. Spranca. 1997. Protected values. *Organizational Behavior and Human Decision Processes* 70(1): 1–16.
- Baron, J.S., L.A. Joyce, B. Griffith, P. Kareiva, B.D. Keller, M. Palmer, C.H. Peterson, et al. 2008. Preliminary review of adaptation options for climate-sensitive ecosystems and resources. In: *Report by the U. S. climate change science program and the subcommittee on global change research* (eds. Julios, S.H. and J.M. West). Pp. 904. Washington, DC: U.S. Environmental Protection Agency.
- Bickerstaff, K. and G. Walker. 2005. Shared visions, unholy alliances: Power, governance and deliberative processes in local transport planning. *Urban Studies* 42(12): 2123–2144.
- Bottrill, M., L. Joseph, J. Carwardine, M. Bode, C. Cook, E. Game, H. Grantham, et al. 2008. Is conservation triage just smart decision making? *Trends in Ecology and Evolution* 23(12): 640–654.
- Brockington, D., J. Igoe and K. Schmidt-Soltan. 2006. Conservation, human rights, and poverty reduction. *Conservation Biology* 20(1): 250–252.
- Brosius, J.P. 1999. Anthropological engagements with environmentalism. *Current Anthropology* 40(3): 277–288.
- Buchanan, J.M. 1987. The relatively absolute absolutes. Draft paper prepared for presentation at SEA meeting.
- Chan, K.M.A. and T. Satterfield. 2007. Justice, equity and biodiversity. In: *The encyclopaedia of biodiversity* (eds. Levin, S., G.C. Daily and R.K. Colwell). Pp. 12. Oxford: Elsevier Ltd.
- Cronon, W. 1996. *Uncommon ground: Rethinking the human place in nature*. New York: W. W. Norton & Company.
- Dunlop, M. and P.R. Brown. 2008. Implications of climate change for Australia's national reserve system: A preliminary assessment. *Report to the Department of Climate Change*. February 2008. Department of Climate Change, Canberra, Australia.
- Fiske, A.P. and P. Tetlock. 1997. Taboo trade-offs: Reactions to transactions that transgress spheres of justice. *Political Psychology* 18(2): 255–297.
- Garnett, S., J. Sayer and J. du Toit. 2007. Improving the effectiveness of interventions to balance conservation and development: a conceptual framework. *Ecology and Society* 12: 2. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art2/>.
- Gieryn, T.F. 1995. Boundaries of science. In: *Handbook of science and technology studies* (eds. Jasanoff, S., G. Markle, J. Petersen and T. Pinch). Pp. 393–443. Thousand Oaks: Sage Publications.
- Gregory, R. 2002. Incorporating value trade-offs into community-based environmental risk decisions. *Environmental Values* 11(4): 461–488.
- Gregory, R., D. Ohlson and J. Arvai. 2006. Deconstructing adaptive management: criteria for applications to environmental management. *Ecological Applications* 16(6): 2411–2425.
- Gunderson, L.H. and C.S. Holling. 2002. *Panarchy: Understanding transformations in human and natural systems*. Washington: Island Press.
- Gusterson, H., 1992. Coming of age in a weapons lab: Culture, tradition and change in the house of the bomb. *The Sciences* 32: 16–23.
- Gusterson, H. 1997. Studying up revisited. *Political and Legal Anthropology Review* 20: 114–119.
- Hagerman, S. 2009. Adapting conservation policy to the impacts of climate change: an integrated examination of ecological and social dimensions of change. Ph.D. thesis. University of British Columbia, Vancouver, Canada.
- Hagerman, S., H. Dowlatabadi and T. Satterfield. 2010a. Observations on drivers and dynamics of environmental policy change: Insights from 150 years of forest management in British Columbia. *Ecology and Society* 15: 2. [online] URL: <http://www.ecologyandsociety.org/vol15/iss1/art2/>.
- Hagerman, S., H. Dowlatabadi, T. Satterfield and T. McDaniels. 2010b. Expert views on biodiversity conservation in an era of climate change. *Global Environmental Change* 20: 192–207.
- Hajer, M. 1995. *The politics of environmental discourse: Ecological modernization and the policy process*. Oxford: Clarendon Press.
- Halpin, P. 1997. Global climate change and natural-area protection: Management responses and research directions. *Ecological Applications* 7(3): 828–843.
- Hannah, L. 2008. Protected areas and climate change. *Annals of the New York Academy of Sciences* 1134: 202–212.
- Hannah, L., G.F. Midgley and D. Millar. 2002. Climate change-integrated conservation strategies. *Global Ecology and Biogeography* 11: 485–495.
- Harper, J. 2002. *Endangered species: Health, illness and death among Madagascar's people of the forest*. Durham, North Carolina: Carolina Academic Press.
- Hoegh-Guldberg, O., L. Hughes, S. McIntyre, D.B. Lindenmayer, C. Parmesan, H.P. Possingham and C.D. Thomas. 2008. Assisted colonization and rapid climate change. *Science* 321: 345–346.
- IPCC. 2007. *Climate change 2007: Synthesis report. Contribution of working groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (eds. Pachauri, R.K. and A. Reisinger). IPCC, Geneva, Switzerland.
- IUCN 2008a. Forum. http://www.iucn.org/congress_08/forum/. Accessed September, 2010.
- IUCN 2008b. Barcelona's parliament for nature springs into action. http://cmsdata.iucn.org/downloads/101008_daily_media_brief.pdf. Accessed September, 2010.
- IUCN 2008c. Motions manual for the World Conservation Congress 2008. http://cmsdata.iucn.org/downloads/wcc_motions_manual__part_2__final.pdf. Accessed September, 2010.
- IUCN 2010. IUCN World Conservation Congress. http://www.iucn.org/about/union/commissions/ceesp/ceesp_events/?5979/IUCN-World-Conservation. Accessed September, 2010.

- Kasperson, R. 2006. Rerouting the stakeholder express. *Global Environmental Change* 16: 320–322.
- Kingdon, J. 1995. *Agendas, alternatives and public policies*. New York, NY: Harper Collins College Publishers.
- Kuhn, T. S. 1962. *The structure of scientific revolutions*. Chicago: The University of Chicago Press.
- Kunzig, R. 2008. Is focusing on “hot spots” the key to preserving biodiversity? *Scientific American Earth* 3.0 18(4): 42–49.
- Lahsen, M. 2008. Comment on Susan A. Crate’s “Gone the bull of winter? Grappling with the cultural implications of and anthropology’s role(s) in global climate change. *Current Anthropology* 49(4): 587–588.
- Latour, B. 2005. *Reassembling the social: An introduction to actor-network theory*. Oxford: Oxford University Press.
- Lenoir, J., J.C. Gegout, P.A. Marquet, P. de Ruffray and H. Brisse. 2008. A significant upward shift in plant species optimum elevation during the 20th century. *Science* 320: 1768–1771.
- Li, M.H., N. Krauchi and S. Gao. 2006. Global warming: Can existing reserves really preserve current levels of biological diversity? *Journal of Integrative Plant Biology*. 48: 255–259.
- Loarie, S.C., P.A. Duffy, H. Hamilton, G.P. Asner, C.B. Field and D.D. Ackerly. 2009. The velocity of climate change. *Nature* 462: 1052–1055.
- Low, S.M., D.H. Taplin and M. Lamb, 2005. Battery Park City: An ethnographic field study of the community impact of 9/11. *Urban Affairs Review* 40(5): 655–682.
- Margules, C. and M.B. Usher. 1981. Criteria used in assessing wildlife conservation potential: A review. *Biological Conservation* 21: 79–109.
- Marris, E. 2007. What to let go. *Nature* 450: 152–155.
- McLachlan, J.S., J.J. Hellmann and M.W. Schwartz. 2007. A framework for debate of assisted migration in an era of climate change. *Conservation Biology* 21(2): 297–302.
- Nader, L. 1972. Up the anthropologist: Perspectives gained from studying up. In: *Reinventing anthropology* (ed. Hymes, D.). Pp. 285–311. New York: Pantheon Press.
- Nader, L. 1996. *Naked science: Anthropological inquiry into boundaries, power, and knowledge*. New York: Routledge.
- Neumann, R.P. 2004. Moral and discursive geographies in the war for biodiversity in Africa. *Political Geography* 23: 813–837.
- Noss, R.F. 1996. Conservation or convenience? *Conservation Biology* 10 (4): 921–922.
- Noss, R.F. 2001. Beyond Kyoto: Forest management in a time of rapid climate change. *Conservation Biology* 15(3): 578–590.
- Parmesan, C. 2006. Ecological and evolutionary responses to recent climate change. *Annual Review of Ecology, Evolution and Systematics* 37: 637–669.
- Parmesan, C. 2008. Where the wild things were. *Daedalus* (Spring): 31–38.
- Pierson, P. 2004. *Politics in time: History, institutions and social analysis*. Princeton, New Jersey: Princeton University Press.
- Peters, R.L. and J.D.S. Darling. 1985. The greenhouse effect and nature reserves: Global warming would diminish biological diversity by causing extinctions among reserve species. *BioScience* 35(11): 707–717.
- Pimm, S.L. 2000. Against triage. *Science* 289: 2289.
- Repetto, R. 2006. *Punctuated equilibrium and the dynamics of U.S. environmental policy*. New Haven: Yale University Press.
- Rinnan, R.A., A. Michelsen, E. Baath and S. Jonasson. 2007. Fifteen years of climate change manipulations alter soil microbial communities in a subarctic heath ecosystem. *Global Change Biology* 13: 28–39.
- Robbins, J. 2009. Between the devil and the deep blue sea. *Conservation Magazine* 10(2): 12–19.
- Santos, S. and C. Chess. 2003. Evaluating citizen advisory boards: The importance of theory and participant-based criteria and practical implications. *Risk Analysis* 23(2): 269–279.
- Satterfield, T. and J. Levin, 2007. Risk communication, fugitive values, and the problem of trade-offs: Diagnosing the breakdown of deliberative processes. In: *Half-lives and half-truths: Confronting the radioactive legacy of the cold war* (ed. Johnston, B.). Pp. 165–191. Santa Fe: SAR Press.
- Sundberg, J. 1998. NGO landscapes: Conservation in the Maya Biosphere Reserve, Peten Guatemala. *The Geographical Review* 88(3): 388–412.
- Suttle, K.B., M.A. Thomsen and M.E. Power. 2007. Species interactions reverse grassland response to changing climate. *Science* 315: 640–642.
- Tetlock, P., O. Kristel, B. Elson and J. Lerner. 2000. The Psychology of the unthinkable: Taboo tradeoffs, forbidden base rates, and heretical counterfactuals. *Journal of Personality and Social Psychology* 78(5): 853–870.
- Thomas, C.D., A. Cameron, R. Green, M. Bakkenes, L. J. Beaumont, Y.C. Collingham, B.F.N. Erasmus, et al. 2004. Extinction risk from climate change. *Nature* 427: 145–148.
- Traill, L., B.W. Brook, R.R. Frankham and C.J.A. Bradshaw. 2010. Pragmatic population viability targets in a rapidly changing world. *Biological Conservation* 143: 28–34.
- Vane-Wright, R.I., C.J. Humphries and P.H. Williams. 1991. What to protect—Systematics and the agony of choice. *Biological Conservation* 55: 235–254.
- Webler, T., S. Tuler and R. Krueger. 2001. What is a good public participation process? Five perspectives from the public. *Environmental Management* 27(3): 435–450.
- West, P., J. Igoe and D. Brockington. 2006. Parks and peoples: The social impact of protected areas. *Annual Review of Anthropology* 35: 251–277.
- Williams, P., L. Hannah, S. Andelman, G. Midgley, M. Araujo, G. Hughes, L. Manne, et al. 2005. Planning for climate change: Identifying minimum-dispersal corridors for the Cape Proteaceae. *Conservation Biology* 19(4): 1063–1074.
- Wilshusen, P.R., S.R. Brechin, C. Fortwangler and P. West. 2003. Contested nature: Conservation and development at the turn of the twenty-first century. In: *Contested natures: Promoting international biodiversity conservation with social justice in the twenty-first century* (ed. Brechin, S.R.). Pp. 1–22. Albany: State University of New York Press.
- Yohe, G.W. 2006. Representing dynamic uncertainty in climate policy deliberations. *Ambio* 35(2): 89–91.
- Zerner, C. 2000. *People, plants and justice: The politics of nature conservation*. New York: Columbia University Press.