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On the coattails of climate? Opportunities and threats of a warming Earth for biodiversity conservation

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ABSTRACT

The relationship between climate change and biodiversity was a central issue at the 10th Conference of the Parties (COP 10) to the Convention on Biological Diversity (CBD). In this paper we draw from participant observation data collected at COP 10, and related policy documentation, to examine how concerns about climate change are shaping the conservation policy landscape – in terms of the knowledge and rationales used as inputs, networks of actors involved, objectives sought, and actions proposed. We find that debates at the intersection of climate and biodiversity were overwhelmingly framed in relation to, or through the lens of carbon. Through a discussion of four core *Climate-Motivated Responses*, we illustrate how "carbon-logic", and the initiatives that it generates, simultaneously creates threats to the objectives sought by some actors, and opportunities for the objectives sought by others. We situate our observations in the context of some of the historical dilemmas that have faced conservation, and discuss this current moment in the dynamic trajectory of conservation governance: a moment when decisions about conserving biodiversity are becoming entangled with carbon-logic and the market. In this case, while some actors seek opportunities for biodiversity ends by *riding the coattails of the climate* agenda, the threats of doing so may undermine the biological and social objectives of the CBD convention itself.

1. Introduction

For decades, scientists have sought to understand the implications of climatic change wrought by increases in atmospheric concentrations of greenhouse gases (GHGs) for biodiversity conservation policy and practice (Peters and Darling, 1985). Today, scientists, practitioners and policy makers face the challenge of how to adapt conservation to climate-attributed shifting, expanding and contracting species distributions (Parmesan, 2006), altered disturbance regimes (e.g. Littell et al., 2010) and multiple amplifying feedbacks (Chapin et al., 2008) resulting from changes in global temperature and precipitation patterns (IPCC, 2007). Simultaneously, conservationists have become entwined in strategies to mitigate GHG emissions through carbon-sequestration services provided by conservation landscapes, wetlands and seascapes (Secretariat of the CBD, 2009).

Scholarly attention to the impacts of climate change for biodiversity conservation has risen sharply over the past decade (Fig. 1), as has attention in the media to climate issues more broadly (Jinnah, 2011). Alongside this evolving knowledge base and general climate awareness, communities, governments, non-governmental organizations (NGOs) and scientists have begun to re-evaluate approaches to biodiversity conservation (and ecosystem management more broadly) in light of climate change. These re-evaluations are occurring at all scales of governance from community-based initiatives (e.g. Breen et al., 2007; Kronik and Verner, 2010) to regional state-wide plans (e.g. Washington State's Integrated Climate Change Response Strategy) to national climate change assessments and strategies (e.g. U.S. Climate Change Science Program), to transboundary initiatives that span state, provincial and federal borders (e.g. Landscape Conservation Cooperatives facilitated by the US Department of the Interior),

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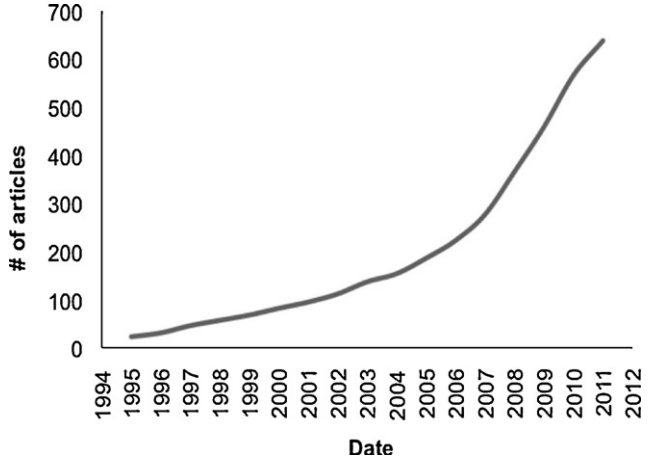

Fig. 1. Cumulative number of articles related to climate change impacts and biodiversity conservation (web of science search June 9, 2011). Search terms: climate SAME impact AND (species OR ecosystem OR biodiversity OR conservation OR "protected area" OR ecological OR restoration) NOT (aerosol* OR agricultur* OR tourism OR health OR climatology OR NPP or productivity OR production OR palaeo* or paleo* OR atmosphere* OR pleistocene or soci* OR holocene OR crop* OR disease OR metero*).

to global institutions including the Convention on Biological Diversity (CBD).

Existing research at the intersection of biodiversity conservation and climate change addresses four broad lines of inquiry. One research stream focuses on quantifying the impacts of climate change on species and ecosystems, and projecting shifts in species distributions over time. These analyses are done in support of efforts to design conservation responses that could enable non-human species to adapt (Hannah et al., 2002; Williams et al., 2005). A second line of inquiry focuses on the role of ecosystems in helping people adapt. These analyses include ecosystem-based adaptation initiatives such as investigations into the role of wetland restoration in increasing flood control, or reforestation to minimize the risk of landslides (Dudley et al., 2010). A third approach is the design of policy mechanisms that could mitigate climate impacts by reducing deforestation, and simultaneously achieve biodiversity objectives (Harvey et al., 2010; Midgley et al., 2010). These efforts include analyses that seek to identify coincident high carbon-biodiversity areas (e.g. Strassburg et al., 2010). Lastly, a fourth group includes examinations of human-dimensions of both adaptation and mitigation initiatives. These analyses focus on governance including the role of knowledge, participation, and human rights related concerns associated with the implementation of various climate-motivated responses (e.g. Schroeder, 2010; Whyte et al., 2010).

This widespread recognition of climate impacts on biodiversity, combined with a proliferation of climate-related initiatives, proposals and counter-proposals has combined to create a fluid moment in conservation policy and governance.

1.1. Objectives

Drawing on participant observation data collected at the 10th Conference of the Parties (COP 10) to the Convention on Biological Diversity (CBD), and related policy documentation, the objective of this paper is to examine how the conservation policy landscape is changing in response to climate-related topics and concerns at this specific forum. By policy landscape we mean the inputs (e.g. knowledge, values, consideration of biophysical drivers), structures of governance (e.g. networks of actors, institutions and decision-making processes), and the preferred actions (policy means) to achieve a given and potentially evolving set of objectives (policy ends). Broadly speaking, our approach is similar in scope to other empirical, overview accounts written about the content and tenor of core debates at key conservation meetings (e.g. Brosius, 2004).

The CBD is one of three UN environmental conventions that originated from the Rio Earth Summit in 1992. Currently, there are 193 Parties to this legally binding convention (United Nations, 1992). The goals of the CBD are threefold and include the conservation of biological diversity, the sustainable use of the components of biological diversity and the fair and equitable sharing of the benefits arising out of the use of genetic resources. The CBD is comprised of a range of institutional bodies, including the 'Subsidiary Body on Scientific, Technical and Technological Advice' (SBSTTA), the 'Working Group on the Review of Implementation' (WGRI), numerous topically-focused working groups including 'The Ad Hoc Technical Expert Group (AHTEG) on Biodiversity and Climate Change', a clearing-house mechanism, a financial mechanism, and the Secretariat. In addition to these formal components, the CBD is open to civil society groups including NGOs, intergovernmental organizations (IGOs) and indigenous and local communities (ILCs), also referred to as indigenous peoples and local communities (IPLCs). The COP, which meets approximately every two years, is the governing body of the CBD where Parties come together to debate the programme of work and adopt specific decisions.

The international policy-making setting of COP 10 provides an excellent case to achieve our objective, bringing together as it does actors from around the globe to negotiate at the emergent and contested edge of conservation policy. Moreover, COP 10 came on the heels of the quantified failure to meet the CBD's previously established 2010 Biodiversity Targets (Butchart et al., 2010) and the perceived failure of COP 15 of the United Nations Framework Convention on Climate Change (UNFCCC). Consequently, COP 10 was fueled by a sense of urgency to overcome these past failures, and demonstrate its relevance by delivering successful outcomes including an ambitious set of Post-2010 Targets. COP 10 was also significant in the extent to which debates about climate change permeated the various settings (discussed further below).

In this study we asked: What are the core publicly discussed *Climate-Motivated Responses* at this key policy setting event? We use the term *Climate-Motivated Responses* to describe proposals, debates or CBD decisions that are motivated, justified or designed either to respond to climate impacts (in terms of adaptation or mitigation), or to respond to climate initiatives including those in separate but related mechanisms of environmental governance (e.g. UNFCCC). The following sub-questions guided our data collection and analysis: Which actors are involved in promoting/contesting various responses? What types of knowledge (e.g. scientific, legal, local) are mobilized to support objectives? At what scale is knowledge represented? And what rationalities are used?

In the sections that follow we provide a brief background of the conceptual foundations and the methodological approach that guide this work. This is followed by an overview of climate-related debates within the CBD. We then detail a set of observed *Climate-Motivated Responses* at COP 10. Lastly, we summarize our findings as they relate to understanding global conservation governance for social-ecological systems in an era of climate change.

2. Conceptual background

This paper focuses on how concerns about the impacts of climate change and the preferred means to prevent and manage these impacts, are shifting debates about biodiversity conservation and consequently, reshaping (in some cases reinforcing) particular aspects of conservation governance. Because we are interested in

mechanisms of governance for managing social-ecological systems (SES), we link together and draw analytical insights from the fields of global environmental governance and social-ecological systems. Here, environmental governance is broadly understood as a set of "regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes" (Lemos and Agrawal, 2006). These processes and mechanisms are not static, but rather the dynamic result of the activities of networks of a range of actors (including governments, local communities, scientists, business and NGOs) that change over time and operate at different scales (Jasanoff and Long Martello, 2004). Further, following Jasanoff (2004), we assume that evolving (but sometimes durable) norms and beliefs shape and produce the different forms of knowledge that are mobilized by different actors, and that underpin particular forms of governance.

Our approach also draws insights from the perspective of social-ecological systems (Berkes and Folke, 1998; Walker et al., 2004). Cognizant of the need to integrate social and biophysical dimensions to better understand and respond to policy-relevant challenges, an SES perspective understands a given system as co-produced by interacting social and cultural (e.g. objectives, institutions, values) and biophysical (e.g. climatic, ecological) drivers that interact across temporal and spatial scales. Accordingly, concerns about the impacts of climate change, and the policy responses that result are one of a co-evolving suite of factors that interact to shape conservation policy as it develops in various fora. Researchers working from a spectrum of SES perspectives argue that analyzing some of the variables associated with these components, as we do in this paper, has the potential to provide holistic, policy relevant insights for achieving ecologically robust and socially just outcomes in environmental governance (e.g. Ostrom, 2008).

We do not seek to use SES concepts (such as resilience) as an explanatory theory for our observations. Instead, we utilize a framework of SES-thinking to identify key variables, to acknowledge the dynamic character of conservation spaces, to facilitate interdisciplinary collaboration and thinking, and to maintain a focus on policy implications. In line with the importance of addressing value-based or normative aspects of SESs (e.g. Crane, 2010), we are particularly interested in examining some of the social processes that shape the governance of conservation spaces, spaces whose character is the outcome of integrated social and ecological dimensions. Focused theoretical examinations on portions of the data presented here are forthcoming, and include theories relating to political ecology and the politics of knowledge.

Our choice to employ insights from these two fields is further motivated by the persistent tendency towards disciplinary analysis of complex environmental challenges. In this case, the pathology of disciplinary thinking is sometimes manifest as a tendency to focus on material biophysical (and economic) impacts of climate change for conservation in the absence of engaging empirically with the roles of objectives (desired ends) and values (things that people care about), governance (defined above) and participation (the inclusion – and ability to influence and make decisions – of diverse individuals and groups so as to increase and diversify knowledge and capacity, build support for decisions made and advance human rights). The consequence of this asymmetry can be a tendency to overlook some of the social processes that shape ostensibly technical conservation ideas, and more crucially, how these ideas affect different social groups through the policies and actions that result.

In part, this asymmetry reflects a history of conservation practice that has often found itself betwixt potentially competing sets of objectives: moral and ecological imperatives to preserve biological diversity, and moral and social imperatives to achieve or maintain human development objectives such as access to health care, poverty elimination, and the recognition of self-determination (Bryant, 2000; Wilshusen et al., 2002). Despite important efforts by conservationists to design more socially just conservation practice (Springer et al., 2010), disparities relating to participation, knowledge and decision-making authority prevail in many contexts (Campese et al., 2007; Colchester et al., 2008). Thus, a core intention of our analysis is to better understand the material policy implications of emerging ideas for biodiversity conservation including how ideas are forged through various social processes.

3. Methods

3.1. Approach

We conducted this work as part of a 'Collaborative Event Ethnography' (CEE) at COP 10 to the CBD. The overarching aim of the CEE project is to "analyze the dynamic role of actors situated in networks, in shaping the ideological orientation of global environmental governance, and to document the social, political and institutional mechanisms and processes used to legitimate and contest ideas about what conservation is (or should be)" (Brosius and Campbell, 2010). Following the first formal application of this methodology at the World Conservation Congress (WCC) in 2008 (Brosius and Campbell, 2010), this was the second application of the CEE approach. The methodology applies ethnographic research practice modified to suit public meetings and events as field sites. As such it includes document analysis, participant observation and interviews. As MacDonald (2010a) describes, "By being present at the site, analysts are able to record the process of knowledge being translated and to observe how it gains traction in relation to particular interests." We recognize that the CBD and the COP operate in the context of a much wider constellation of dynamic multi-scalar institutions for conservation governance. Although the CBD is by no means the sole arbiter of conservation policy setting, as a multi-lateral, legally binding treaty, CBD COP decisions and proposed policy pathways play a central role in global conservation governance.

CEE is collaborative in the sense that the seven co-authors are part of a larger group of 17 researchers that worked both off-site (before and after the COP) and on-site to refine research questions, collect and share data, and discuss observations. To maximize the benefits of collaboration, we worked within a 'matrix' dictated by topics on the agenda at COP 10 (e.g. climate change, protected areas, marine) and themes of interest to us as researchers (markets, science, and participation), and we formed smaller subgroups to track these. The benefits of collaboration are practical and substantive. Practically, the team is able to more fully cover the range of activities that occur concurrently over the course of these two-week long meetings. On-site in Nagoya, we met daily to review the schedule and ensure that we were covering the fullest possible range of events relevant to our topical and thematic interests. Substantively, this greater coverage of events provided us with more observations of the diversity of stakeholders discussing particular issues, allowing us to triangulate and sometimes challenge our individual observations. More importantly, discussions within the group lead to more nuanced understandings of the dynamics that we observed (Brosius and Campbell, 2010). Though the logistical challenges of CEE are not insignificant, the rewards have more than compensated for the organizing effort involved.

For more information on the CEE method see Brosius and Campbell (2010), in addition to the manuscripts forthcoming from topical and thematic subgroups. For example, MacDonald and Corson (2012) explore the rising prominence of the market in conservation, and related engagement of the private sector; Corson

and MacDonald (2012) discuss how the CBD generates social and political relations that create the conditions for new forms of enclosure, including land expropriations and privatization of rights to nature; Corson et al. (in preparation) examine the persistence of the concept of protected areas by analyzing how the concept has been remolded over time to achieve the objectives of a range of actors; Campbell et al. (in preparation) examine the production of the CBD targets as understood as a process shaped by both internal and external politics; and Witter et al. (in preparation) demonstrate escalating concern and efforts by ILCs to carefully manage decisions taken at the CBD in relation to activities and decisions occurring at the UNFCCC, and in relation to broader international and human rights protocols. Here, we report on the work of a subset of seven members of the CEE on the specific topic of how concerns about climate change are shaping conservation policy debates at COP 10.

3.2. Data collection and analysis

At COP 10 (October 18–29, 2010), we were accredited observers in the 'Education' sector, through the University of Georgia's (UGA) Center for Integrated Conservation Research (the CEE research conducted at COP 10 was approved by the Institutional Review Board at UGA). As such, we were able to attend the public side-events, working groups, contact groups, drafting groups, friends of the chair, press conferences, and social events. *Side events* typically consist of panel or workshop sessions hosted by conservation institutions and agencies (e.g. the World Conservation Union (IUCN), Global Environment Facility (GEF), UN-REDD program), NGOs (e.g. International Indigenous Forum on Biodiversity, Conservation International), Parties (governments) or a combination thereof. *Working Groups* are the formal parliamentary-like proceedings during which Parties and official observers voice their support, rejection and revision of the specific decisions before the COP. *Contact Groups* consist of smaller negotiating sessions of the Parties on the more contentious topics. *Drafting Groups*, and *Friends of the Chair* are still smaller groups that are tasked to refine text and seek consensus on specific sub-topics respectively. The only segment of the convention we could not access as observers was the closed high-level ministers segment.

As the climate subgroup, we documented over 500 h of participant observation data from the convention. Prior to the event, all researchers participated in a seminar on observation and note taking in this particular field. Our goal was to develop a shared understanding of practice, including the view that our own observations and notes represent situated knowledge rather than objective recordings of truth (Newbury, 2001; Wolfinger, 2002).

Each of the seven co-authors took detailed participant observation notes at the climate-related sessions and negotiations. Notes were written up, circulated within the group, and systematically coded. All sessions were audio-recorded, and photographs were taken of slides and other visuals. The predominant use of laptop computers to record observations resulted in notes that in many cases contained near-verbatim dialogue. Resources allowed for the complete transcription of a subset of the sessions while for others, we relied on detailed notes and referred back to the original audio files to confirm quotes and context. Six months after the COP, the CEE group met for a weeklong workshop to refine the analytical themes from our collective data and observations.

Participant observation data was supplemented by analyzing policy documents produced by a range of participating actors (e.g. the CBD, NGOs, ILCs and the private sector). Climate change and biodiversity-related documents were identified through a systematic search of the online CBD Information Center. Documents included Meeting Reports (including those of the Ad Hoc Technical Expert Group on Biodiversity and Climate Change), Decisions and Recommendations relating to Climate and Biodiversity, and key secretariat publications including Technical Series' documents, and Principles, Guidelines and Tools documents. For documents relating to specific conservation actors, we analyzed the publications and materials that were circulated, promoted and referenced by these groups at the COP.

4. A brief overview of climate-biodiversity debates within the CBD

The CBD has a decade-long history of engagement with topics relating to biodiversity and climate change. In 2001, the CBD initiated a "pilot assessment to prepare scientific advice to integrate biodiversity considerations into the implementation of the UNFCCC" (CBD, 2001). The Ad Hoc Technical Expert Group (AHTEG) on Biodiversity and Climate Change that was formed in 2002 has since produced multiple reports including Technical Series No. 10 (Secretariat of the CBD, 2003) and No. 41 (Secretariat of the CBD, 2009). With the second formal AHTEG on Biodiversity and Climate Change, the overarching purpose continued to be to: "provide biodiversity-relevant information to the United Nations Framework Convention on Climate Change" (CBD, 2008a), but with a focus that went beyond impacts assessment, to include adaptation and mitigation, and the need to identify:

> . . .opportunities for, and possible negative impacts on, biodiversity and its conservation and sustainable use, as well as livelihoods of indigenous and local communities, that may arise from reducing emissions from deforestation and forest degradation (CBD, 2008b).

Prior to 2004, attention to climate-related topics within the CBD traveled primarily through a handful of SBSTTA decisions. Thereafter, attention spread to include the "Biodiversity and Climate Change" Decisions from COP 7 (CBD, 2004), COP 8 (CBD, 2006) and COP 9 (CBD, 2008c). The range of the topics included within the Biodiversity and Climate Change Decisions have developed over time. For instance, the 4-page Decision from COP 7 contains most of the core elements included in the more detailed 12-page Decision from COP 9. The latter included proposals for (a) integrating climate change activities *within the convention* (for instance through National Biodiversity Strategies and Action Plans (NBSAPs) and with a focus on impacts assessment and monitoring) and (b) options for promoting synergies and mutually supportive actions *across the three Rio Conventions* (e.g. to achieve benefits to biodiversity and communities resulting from climate change mitigation and adaptation activities, and inviting the UNFCCC in particular to 'adequately address traditional knowledge. . .').

While the above shows how concerns about climate have been on the CBD agenda for over a decade, the most recent COP 10 arguably represents a watershed of institutionalized climate concern expressed both formally and informally across a range of COP settings and including a diverse range of actors. At COP 10, there were two specific climate-related decisions. Decision X/33, Biodiversity and Climate Change (CBD, 2010a), reflected the topical areas established at previous COPs and included proposals to integrate climate change activities within the convention; the need to promote co-benefits and safeguards associated with Reducing Emissions from Deforestation and Degradation (REDD+); ocean fertilization; and the promotion of synergies within the three Rio Conventions. Decision X/20, Cooperation with Other Agreements (CBD, 2010b), dealt specifically with proposals to strengthen cooperation and promote synergies across the activities of the Rio Conventions. Climate considerations also crosscut debates about

and ultimately decisions on Protected Areas (CBD, 2010c), Forests (CBD, 2010d), the Strategic Plan for Biodiversity 2011–2020 and the *Aichi Biodiversity Targets* (CBD, 2010e). Beyond these Decisions, a range of climate-related topics headlined over 45 out a total of approximately 200 scheduled side events.

In these combined settings, discussions about climate contributed to shaping emerging policy pathways and proposed actions in concrete ways. Below, we describe four core and interrelated *Climate-Motivated Responses* arising from our observations and analysis. This is followed by a brief discussion of the implications of our observations for biodiversity conservation in an era of climate change.

5. Climate-Motivated Responses at COP 10

The core *Climate-Motivated Responses* we observed at the COP derive from an observed pervasiveness of carbon-logic. Carbon-logic refers to an emergent collection of reasoning and arguments, which are framed in relation to the concept of carbon, and used by conservation actors to argue for or against a range of conservation actions and approaches (Fig. 2).

The *Responses* can briefly summarized in terms of:

(i) Opportunities to realize financial and conservation ends through emerging carbon markets.
(ii) Opportunities to advocate for particular conservation actions (e.g. protected areas and other means).
(iii) Threats to the intrinsic and ecological value of biodiversity stemming from utilitarian views of biodiversity (e.g. conflation of biodiversity values with carbon values).
(iv) Threats to the rights of ILCs resulting from various mitigation and adaptation initiatives.

The responses we describe are not independent of each other nor are they exhaustive of all perspectives we observed at the COP. However, as indicated by our analysis, they reflect key and central threads of debate pertaining to the linkages between biodiversity and climate change as seen by different conservation actors at COP 10 (some climate-related topics, particularly those relating to ecosystem-based adaptation, the relationship between the UNFCCC and the CBD and related observations about 'climate-envy' are mentioned here only briefly, but are more fully considered in forthcoming papers). We detail the core responses below and argue that the translation of concerns about climate change though the logic of carbon is shaping conservation debates in ways that pose opportunities for the objectives sought by some actors, and threats to the objectives sought by others. In some ways, carbon-logic is contributing to reconfigurations in policy components (e.g. by providing new market opportunities, bringing in new combinations of actors, or posing relatively novel threats in the form of a utilitarian view of biodiversity). In other ways, carbon-logic is contributing to the reinforcement of entrenched policy components (e.g. by providing opportunities to advocate for and maintain commitments to protected areas), and the consequent reproduction of longstanding concerns relating to local and indigenous participation, rights, governance and the integration of local knowledge in conservation actions.

These reconfigurations and reinforcements reflect a dynamic entanglement of politics and science as different conservation actors seek to achieve particular objectives amidst the broader context of climate impacts and shifts to market-based conservation initiatives (e.g. TEEB, 2010). In this case, while some actors seek opportunities by riding the coattails of the climate agenda to support biodiversity conservation, the threats of doing so include losing a focus on the inherent value of biodiversity itself, and further undermining human rights.

5.1. Carbon-logic at the COP

One of the most remarkable features of debates about climate change and biodiversity at COP 10 was the pervasiveness with which the conservation of biodiversity was debated in reference to the logic of carbon. "Carbon" appeared to be everywhere in negotiations, decisions and side events. Conversations about carbon-sequestration, carbon stocks, carbon pools, carbon sinks, carbon finance, carbon verification, carbon markets, carbon property rights, wet carbon, blue carbon, forest carbon, carbon offsets, carbon calculators, carbon-biodiversity atlases, carbon portals and carbon partnerships were ubiquitous and inescapable (see also CBD, 2011).

5.2. Capturing carbon: opportunities of climate change for financing biodiversity

The pervasiveness of carbon-based logic at the COP had a number of consequences for shaping the focus of debate. One of these was to bring the topic of finance to the fore – specifically the promise of opportunities for capturing new funding streams for

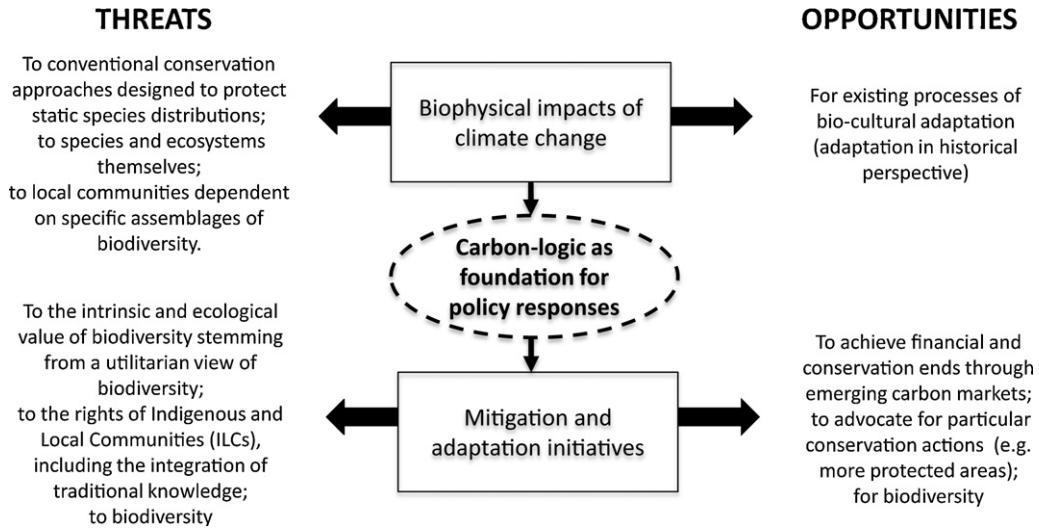

Fig. 2. Climate-Motivated Responses at COP 10 to the CBD.

biodiversity conservation. Conversations about 'innovative financial mechanisms' including for carbon services have occupied the attention of the CBD since at least COP 9 (CBD, 2008c), and they took on a particular relevance at COP 10 in terms of addressing concerns about climate change. In a document on innovative finance, released immediately prior to COP 10, CBD authors stated that:

> New approaches must be developed to successfully transform the climate challenge into a biodiversity funding opportunity (Secretariat of the CBD, 2010).

In this sense, the rise of carbon logic at the COP was intimately intertwined with the increasing focus on filling the so-called financing gap. The need to do so can be understood both as a function of the CBD's effort to establish an ambitious set of post-2010 targets, and the fact the CBD has faced insufficient financial resources to carry out its program of work from the outset (MacDonald, 2010b). The consequential application of market logics to redefine conservation in terms of profitability and services aims to attract financial investment from the private sector. Across the COP, various actors invoked ecosystem services including but not limited to carbon, in effort to engage private and public sectors and in the hopes of securing financial resources for conservation (Corson et al., in preparation; Corson and MacDonald, 2012).

Conversations at the specific intersection of carbon, innovative finance and opportunities for biodiversity conservation were overwhelmingly dominated by discussions about REDD+. REDD+ refers to the international mechanism under negotiation at the UNFCCC that involves creating incentives to reduce deforestation and degradation (as well as the conservation, sustainable management and enhancement of forest carbon stocks), through the generation of carbon credits and associated transfer of payments. REDD+ is of interest to conservationists because its potential benefits include not only the sequestration of carbon (by avoiding the release of carbon through harvesting and burning activities), but also benefits to biodiversity from land conservation and the generation of additional funds in the service of forest protection. Hopes for REDD+ are indeed high and include the prospect of "financing for tropical forest conservation and sustainable management at scales never before seen" (Harvey et al., 2010).

Below, we discuss a set of examples that illustrate how carbon-logic is creating opportunities for some actors attempting to generate financial opportunities for funding biodiversity conservation. Further, these examples reflect broader and ongoing shifts away from traditional conservation finance as primarily provided by government actors and the GEF, to increasingly include funding from wider networks including the private sector (Corson, 2010; MacDonald, 2010a,b; Brockington and Duffy, 2011).

5.2.1. REDD+ and related proposals

Discussions about REDD+ in particular and conservation finance more broadly enjoyed prominent exposure at the centrally located Rio Conventions' Ecosystems and Climate Change Pavilion (Eco-Pavilion). There, the UN-REDD Programme hosted the high profile *REDD+ Hour* series, which took place over five consecutive evenings. Marked by a brilliant red banner at the front of the convention room, the series highlighted (among other topics), *The Inter-Linkages of Biodiversity, Carbon and Economics* and *Engagement of the Biodiversity Constituency in REDD+*. Additionally, the Eco-Pavilion programme included day-long sessions with high-profile speakers on the *Economics of Ecosystem Services and Biodiversity, Climate Change* and *Land Management*; and *Forest Biodiversity: Mitigation and Adaptation*. The CBD secretariat summed up a key message from this latter session in its *Pavilion News Digest*:

> While concern has initially focused on the preservation of the forest as a carbon sink, REDD+ has the potential to catalyze financing for broader sustainable forest management investments, including public and private ones (October 22, 2010).

In the Eco-Pavilion session on *Financing Forest Biodiversity* (October 21, 2010), the Director of the Global Canopy Programme discussed some of the linkages between carbon (and other services) and innovative finance for biodiversity. This speaker gave an overview of the rationale for the "Little Biodiversity Finance Book: a guide to proactive investment in natural capital (PINC)". PINC is described as a "natural follow on from REDD" but one that is interested in valuing and generating financial opportunities from services including but not restricted to carbon. Reflecting on the motivation for the PINC book, the Director noted that:

> The reality is that no one is going to give you a billion dollars for a bug. You can get a lot of money for the Mona Lisa in Paris but you can't get it for a bug in the rainforest...we have to think differently if we are going to solve this problem of financing forest biodiversity in the future.

Thinking differently in this context refers to this speakers assertion of the need to "fill existing gaps for financing biodiversity" through innovative financial mechanisms.

> We are spending about 10's of billions today, the need is in the hundreds of billions, the potential value could be in the trillions...there is a *massive* opportunity out there for the future in the natural capital economy (emphasis from the speaker).

The opportunities, according to the Director, can be achieved through a combination of existing non-market (e.g. from government and philanthropy) as well as potential direct (e.g. from forest carbon), indirect (e.g. from forest bonds) and other innovative mechanisms (e.g. subsidy reform). While forest carbon and REDD+ were one of a larger number of mechanisms (and services) under consideration in this example, direct payments for carbon services and indirect payments through forest bonds figured prominently in addressing the funding gap so identified. In a separate Eco-Pavilion session on *Financing Biodiversity in the Context of Development and Climate Change Priorities* (October 27, 2010), the lead author of TEEB, referencing the *Interim REDD+ Partnership* and REDD+ initiatives more broadly noted that "there is clearly money available for mitigation: 4.5 billion dollars have already been put to the table."

The potential of carbon as a revenue generator for biodiversity was discussed in settings beyond the Eco-Pavilion. In the session *Vanishing Tiger – Will the Iconic Species and Asian Biodiversity Survive the Asia century*? (October 26, 2010), a presenter with WWF, US discussed how the opportunities of carbon finance are unfolding in the context of tiger conservation. The WWF presenter highlighted how Light Detection and Ranging (LiDAR) technology will be used for more precise carbon accounting of tiger rangelands. The expectation is that the less uncertain (Tier 3) LiDAR carbon information (e.g. Asner et al., 2010) will yield a higher value for carbon REDD and result in substantive financial opportunities in support of the creation biodiversity corridors in tiger rangelands.

While REDD+ dominated climate and carbon finance discussions at COP 10, consideration of the opportunities of carbon finance for biodiversity extended beyond forested landscapes. At the IUCN-hosted *Wet-Carbon: Using Carbon Finance to Restore Wetlands, Conserve Biodiversity and Secure Livelihoods* (October 20, 2010),

private sector (The Danone Group), NGO (Earthmind), and intergovernmental (Ramsar Secretariat) presenters explored the role of wetlands, mangrove forests, marshlands, and algal communities, to generate carbon offsets intended for emerging global environmental markets. Event chair, former chief economist at the IUCN, and contributing author to The Economics of Ecosystems and Biodiversity (TEEB, 2010), pointed out that in contrast to forests, wetland ecosystems remained relatively undeveloped in their exposure to carbon offsetting as a policy instrument to "mobilize carbon for wetland conservation". Presenters in this session drew from the road-map of REDD to outline what the Deputy Head of IUCN's Global Marine Programme, described as a "cost-effective, economic, scalable, and safe approach" to climate change mitigation and biodiversity conservation for wet-carbon.

Lastly, other participants presented smaller scale, nascent proposals. For instance, in the session on *An Interim Mechanism to Protect Tropical Forests* (*IMPTF*) (October 27, 2010), a representative from the Wild Foundation (an international organization dedicated to protecting wilderness with the vision to "protect at least half the planet") (The Wild Foundation, 2010) presented a proposed short term initiative to fund tropical forest conservation "through carbon markets targeted at private sector interests" (such as corporations looking to offset carbon emissions, or grant-making organizations interested in funding conservation), to be housed under the auspices of the CBD (not the UNFCCC), and with funds distributed directly to local communities. The proposed IMPTF is described as addressing a short-term funding need in advance of the slower moving REDD process, and unlike REDD, would prioritize areas that "are not only high in carbon content but are high in biodiversity value and community involvement".

Thus, the CBD's engagement with programs like REDD+ and IMPTF, contributes to the re-articulation of conservation in terms of carbon specifically, and services to society more broadly. Enabling this trend is the use of science (i.e. demonstrations of carbon/biodiversity overlaps) and technology (such as LIDAR), which serve to create new opportunities for conservation revenue through the identification of sites for carbon credits destined for the marketplace.

5.3. Carbon-logic as an opportunity to advocate for specific conservation actions

Not only did carbon-logic present opportunities for achieving financial objectives in the service of biodiversity, it also provided opportunities to advocate for specific conservation actions. Many members of the global conservation NGOs and institutions linked carbon-logic to renewed proclamations of the importance of protected areas in terms of (1) the relevance of protected areas (on the basis that they increase the capacity of non-human species to adapt to climate impacts, help people adapt, and compliment mitigation efforts through carbon sequestration) and thus (2) the need for more spatial coverage (see also Hagerman, 2011; Corson et al., in preparation).

Representatives from the World Wildlife Fund, Conservation International, the United Nations Environment Programme (UNEP) and the IUCN-World Commission on Protected Areas (WCPA) to name a few, argued that climate impacts re-assert and elevate the importance of protected areas for conserving biodiversity in an era of climate change. A presenter with the IUCN-WCPA speaking in an *Eco-Pavilion Press Conference* (October 19, 2010) exclaimed that: "Protected areas give us an opportunity to build up carbon, and they also give us the tools to address climate change". In their "*Main Asks for COP 10*", the WWF asserted that:

> ...to better secure ecosystem services, protect biodiversity, and ensure resilience and adaptation to climate change, governments must now commit to a 20% target by 2012" and that... "a strengthened PoWPA [The CBD Programme of Work on Protected Areas] must identify the central role of protected areas in economics and livelihoods by protecting key ecosystem services and supporting climate change mitigation, ecosystem-based adaptation and resilience to climate change (WWF, 2010).

At the Eco-Pavilion side event on *The Key Role of Protected Areas in Climate Change Mitigation and Adaptation* (October 19, 2010) presenters drew from a range of documents to outline various "arguments for protection". Specifically, presenters noted how protected areas can achieve biodiversity objectives by maintaining ecosystem integrity, buffering local climate and providing migration corridors as species ranges shift (see also, Dudley et al., 2010). Some participants in this session further underscored the role of protected areas in supporting "ecological and political refugees who will be moving into these protected areas" in the absence of other places to survive. Launched at COP 10, the document *Natural Solutions: Protected Areas Helping People Cope With Climate Change* (Dudley et al., 2010), sent a clear, and highly publicized message that protected areas are crucial for mitigation (by preventing carbon emissions through deforestation) and adaptation (by fostering ecological resilience and helping 'people cope'), and that more are needed to respond to the impacts of climate change.

Beyond asserting the relevance of protected areas, carbon-logic was directly linked with quantitative arguments for expanding the global coverage of protected areas. Most prominently, carbon-logic infused the highly public debates about the post-2010 biodiversity targets. Conservation International (CI) led a campaign for Target 11 (the protected areas target) in support of 25/15% global terrestrial and marine protected areas. With the endorsement of high profile supporters (including actor Harrison Ford, CI Vice Chair, Board of Directors and Ahmed Djoghlaf, Executive Secretary of the CBD), CI presented a carbon-based calculus in support of their call to more than double the target for global terrestrial protected areas coverage.

> Our analysis shows that at least ~17% of Earth's land needs to be protected to conserve known biodiversity. Roughly, an additional ~6–11% needs to be protected to ensure adequate storage of biomass carbon in natural ecosystems...Given these calculations, moving towards protecting 25% of Earth's land is not only necessary to protect biodiversity and its services, it is also within reach and sensible in both economic and social terms (Conservation International, 2010).

Opportunities to advocate for more protected areas on the basis of climate change and related carbon-logic extended to related discussions of conservation corridors. At the side event on *Resilient Landscapes, Protected Areas and Climate Change* (October 21, 2011), representatives from the United Nations Development Programme (UNDP), IUCN, WCPA and the Ugandan Wildlife Authority presented a set of cases where corridors and protected areas have been advocated for in terms climate change mitigation and adaptation. The UNDP presenter noted: "It is difficult to implement this [conservation corridors]. You need arguments – climate change gives us arguments."

5.4. Threats: REDD+

While the above discussion illustrates how the intersection of carbon-logic and finance provided opportunities for some actors within global conservation communities to advocate for financial or biodiversity ends, for others at the COP, carbon-logic was seen as threat to both the value of biodiversity and to human rights. These concerns reflect historical debates within the CBD, specifically in

relation to REDD. For instance, at COP 9 Decision IX/16 (CBD, 2008b) welcomed REDD as a potential mechanism to conserve biodiversity, but also invited Parties to ensure that REDD did not contradict the objectives of the CBD. Accordingly, debates at COP 10 took the form of (1) the need to avoid negative impacts on biodiversity from REDD, while enhancing co-benefits (*biological safeguards*) and (2) institutionalizing consultation with indigenous and local communities in order to ensure benefits reach affected groups (*social safeguards*).

5.5. Carbon-logic and the contested value of biodiversity: 'Forests are not just sticks of carbon'

Concerns about the pervasiveness of carbon-logic for achieving biodiversity objectives were particularly visible in discussions about metrics of conservation effectiveness. Tension centered on the coincidence of carbon values with biodiversity values in the context of protected areas and REDD+. On the one hand, some participants highlighted carbon values as key metrics of conservation effectiveness. At the Eco-Pavilion's press conference for the launch of *Natural Solutions* (*and the World Bank's Convenient Solutions to an Inconvenient Truth: Ecosystem Based Approaches to Climate Change*) (October 19, 2010) the Director of Conservation for WWF Brazil exclaimed the following:

> Only 13 protected areas [of ARPA supported protected areas] could save 1 billion [tonnes of] carbon in terms of emissions in 40 years. The other impressive figure is that the whole amount of protected areas including indigenous lands in the whole Brazilian Amazon is expected to bring us...8 billion [tonnes of avoided] carbon emissions.

As detailed in the Convenient Solutions document, "The carbon stock in ARPA (The Amazon Region Protected Areas Program) reserves is estimated at 4.5 billion tC, with potential reductions in emissions estimated at 1.8 billion tC." During this same press conference, a representative with the UNDP explained how their organization was "working in Russia, in virgin forests...where we are helping in reorganizing the protected areas system to help protect additional carbon pools." Indeed, the summary of key policy statements from the *Natural Solutions* document includes a list of protected areas from Belarus to Brazil matched with their estimated tonnes of carbon emissions avoided. At the global level, that document reports the UNEP-World Conservation Monitoring Centre (WCMC) estimate that "there are already 312 Gt of carbon stored in the world's protected area network, or 15 per cent of the world's terrestrial carbon stock." Still others, like the UNEP-WCMC enthusiastically discussed the Carbon-Calculator tool (http://www.carbon-biodiversity.net/Interactive/CarbonCalculator), an online exploratory mapping program that calculates carbon values for existing, and user-expanded protected areas.

Yet, for all of the enthusiasm surrounding carbon effectiveness, the relationship between the mutual achievement of carbon and biodiversity objectives was contested on both empirical and normative terms. On the former, participants in many of the REDD+-focused side events and negotiations contradicted each other in terms of the extent to which the conservation of lands for carbon sequestration will effectively protect biodiversity. In the side event on *Interlinkages Between REDD Mechanisms and Biodiversity Conservation* (October 18, 2010), co-hosted by the Japanese Environment Ministry and Hiroshima University, panelists presented results showing only weak correlations between forest biomass and biodiversity, underscoring how the protection of biodiversity and carbon are two very different things. More specifically, at the *Corporate Ecosystem Valuation: Business Guidance and Examples* side event (October 27, 2010), hosted by the World Business Council on Sustainable Development (WBCSD), a presenter with the IUCN reported that carbon values comprised over 80% of the total estimated benefit of a forest conservation project in Madagascar (notably dwarfing the estimated benefits for biodiversity and other services including water supply and soil conservation). Yet, in the UN-REDD hosted REDD+ hour event on *The Inter-linkages of Biodiversity, Carbon and Economics* (October 19, 2010), panelists including representatives from the Canadian Forest Service asserted that "there is a very strong correlation between forest carbon stocks and biodiversity...in most of the publications we looked at." And that: "Biodiversity confers resilience within forest systems at multiple scales...[and] also provides most of the ecosystem services and thus the long-term stability of the forest carbon stocks."

These debates reflect ongoing controversy in the linked fields of ecology, conservation science and ecosystem services (McCauley, 2006; Armsworth et al., 2007; Chan et al., 2007). If in some cases, relatively low levels of species richness are sufficient to sustain the provisioning of carbon-storage for example (Schwartz et al., 2000), then conserving biodiversity for species richness and inherent biodiversity values may be seen as less important to decision-makers relying on an ecosystem services framework (Redford and Adams, 2009). The lead author of TEEB reflected these concerns to the audience in the side event on *Financing Biodiversity in the Context of Development and Climate Change Priorities* (October 27, 2010). In a discussion about REDD+ and the multiple values and roles of forests, the lead author noted: "Reforestation is a great idea, reducing deforestation is a great idea...but carbon is not the only thing that forests do. Forests are not just sticks of carbon."

In other words, a key concern is that while the influx of money through REDD+ could lead to positive impacts on biodiversity through incentives for forest conservation, it could also negatively impact biodiversity and other forest values via conversion to plantations of non-native species that might happen to perform carbon-sequestration services better than mixed standing forests. Further expressing these concerns, an audience member asked the following of panelists at the side event on *Carbon, Biodiversity and Ecosystem Services: Exploring Co-benefits* (October 20, 2010):

> I found it remarkable that you said in order to communicate with the climate change convention people we need to translate biodiversity into CO_2 equivalents. Do you really think that is the way we should go? Or should we have the ambition rather, to teach more about biodiversity to the climate change convention people?

Another audience member at Eco-Pavilion's event on *Engagement of the Biodiversity Constituency in REDD+* (October 23, 2010) summarized the broader policy implications of these concerns with respect to ongoing negotiations within the UNFCCC:

> The thing that worries me most about these discussion is the tone – the language we use still seems to suggest that biodiversity is an add-on...wouldn't it be nice to save biodiversity as well, rather than being as integral to the success of REDD. So yes, of course all of...us in the biodiversity world see REDD as a huge opportunity, but...those who are driving the REDD process don't necessarily see biodiversity as a necessity...It's almost like we're running behind them, while trying to hold their coattails, saying: biodiversity is important. Rather than their understanding that biodiversity is actually the stitching that holds together the coat.

These contrasting empirical and normative assertions about carbon and biodiversity values, in combination with the desires by some to 'increase the protected areas estate' (Eco-Pavilion, October 19, 2010) illustrate the instability upon which much

climate-biodiversity funding and political support is based, and broader tensions about what biodiversity conservation ought to be.

5.6. Structural separation and missed opportunities for integration

Beyond debates about appropriate metrics of conservation effectiveness, the predominance of carbon-based, global representations of biodiversity had critical consequences for delineating the nature of the climate problem for conservation and therefore the solutions and empowered stewards. In many cases, ILCs appeared to be absent from the sessions on carbon and biodiversity mapping. In one notable example, the World Wild Fund for Nature hosts of the side event *When Parks Are Not Enough: Ecosystem Resilience and Change in the Arctic* (October 27, 2010) specifically asked if anyone in the audience knew where the indigenous representatives were. One consequence of this structural separation was that the proclaimed need for more spatial converge of protected areas, appeared to be largely uncontested in these particular COP venues. However, as we show in the section below, ILCs actively engaged with debates about the implications of climate change, but they did so in different sessions and on qualitatively different terms.

5.7. ILC engagements in and disengagements with climate logic

For ILCs, their representatives, and their advocates, discussions about climate change and climate action were framed not as opportunities for advancing the conservation of biological diversity but rather, as threats to advancing the integration of traditional knowledge and indigenous rights in conservation decision-making. Debates of this nature took place in a range of side events related to REDD+ and Rights, Working Group meetings on Decisions for *Protected Areas* and *Climate Change* and contact groups on the implementation of Article 8j (defined below). The central themes of debate included: (1) concern that climate and carbon-justified protected areas and REDD+ initiatives would further undermine indigenous rights and (2) the need for locally developed scenarios and adaptation plans that draw from local knowledge and ongoing processes of adaptation.

These themes echo the now decades of experience and scholarship that underscore both the ways in which conservation projects worldwide can negatively impact indigenous peoples and other vulnerable groups (see Brockington and Igoe, 2006; West and Brockington, 2006), and the importance of recognizing and respecting the role of traditional knowledge and practices in sustainable ecosystem management (see Gadgil et al., 1993; Berkes et al., 2000). Within the CBD itself, the importance of these concerns is formally specified in Article 1 (Objectives), Article 10c (Sustainable Use of Components of Biological Diversity) and Article 8j (In situ Conservation). Specifically, Article 8j states:

> Each contracting Party shall, as far as possible and as appropriate: Subject to national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices (Article 8j. United Nations, 1992).

5.7.1. Indigenous rights and the threat of climate initiatives

A dominant concern for many ILCs with respect to climate-related discussions was that climate mitigation schemes, specifically REDD+, will undermine indigenous rights. While the complex relationship between REDD+ and indigenous rights is expected to vary by national context (see Lovera, 2010), REDD+ has the potential to impact individual and collective rights, both in substantive (related to land and livelihoods) and procedural (related to participation and decision-making) terms (Sikor et al., 2010). Of particular concern is that REDD may undermine the rights to identity and self-determination, the rights to free prior and informed consent and to participate in decision-making, women's rights, as well as the recognition of forest peoples tenure and the equitable distribution of forest benefits (Sikor et al., 2010; Lovera, 2010). More broadly, others have noted that REDD initiatives have the potential to reinforce existing global inequities by extending and increasing state and private sector control over indigenous lands and resources (Griffiths, 2009; Doolittle, 2010).

In addition to concerns that mechanisms for mitigating climate change may further disenfranchise indigenous rights, ILC representatives expressed specific alarm that decisions taken by the UNFCCC, wherein indigenous peoples have not achieved meaningful and effective participation (Doolittle, 2010), might influence the CBD in ways that would infringe on indigenous rights (Witter et al., in preparation) Although the CBD recognizes that climate initiatives have the potential to impact indigenous peoples more than other types of groups (Decision VIII/5 B, paragraph 6) ILC opportunities to shape climate policy at national and international levels have been inadequate.

As a result, some ILC representatives sought to carefully manage decisions taken at COP 10 in relation to ongoing activities within the UNFCCC. A spokesperson representing the International Indigenous Forum on Biodiversity (IIFB) stated:

> We are gravely concerned about the invasion of market based mitigation schemes from UNFCCC to the CBD. There is a danger that Protected Areas will be established in the name of climate change mitigation and completely ignore the fundamental rights of IPLCs. Many parties are already rushing to establish new Protected Areas, committing to REDD schemes and other conservation projects to get money available from climate change mitigation without the active participation and acquiring the Free Prior Informed Consent (FPIC) of IPLCs. All of this is for the sake of money and not really to stop the global climate crisis" (http://iifb.indigenousportal.com/2010/10/20/iifb-agenda-item-5-4-protected-areas/)

This perceived need to limit potentially negative consequences of UNFCCC decisions was arguably fueled by the sheer momentum with which REDD+ initiatives appear to be progressing in spite of an agreed upon international and policy framework for implementation (see also Lovera, 2010). A representative with Friends of the Earth-Brazil speaking in the side event on *CBD and REDD: Whose Rights, Who's Wronged* (October 20, 2010), described REDD+ as an "engine" for creating a global carbon market and expressed their trepidation of the view that REDD+ should and will be done when the decisions about the mechanisms for achieving sustainable forest management have not been finalized by the UNFCCC.

5.7.2. Traditional knowledge and adapting to the threat of climate change

A second key climate-related concern expressed by ILC representatives centered on the need for locally developed scenarios and adaptation plans. While ILCs contribute significantly to understanding climate adaptation in fora beyond the CBD (see Roncoli, 2006; Nyong et al., 2007), it remains the case that indigenous knowledge is rarely integrated with scientific understandings of climate adaptation, nor is it integrated into national or international adaptation plans (Nyong et al., 2007; Crate, 2008).

At COP 10, many ILC representatives addressed the need to integrate indigenous knowledge and scientific understandings of climate change in the development of national adaptation plans. For instance, a presenter with the Indigenous People's Biocultural Climate Change Initiative (IPCCA) noted that:

> The IPCCA is an indigenous biocultural response to the narrow mainstream approach to climate change with thus far little inclusion of local processes – both for understanding how they link to global processes in climate change and to build appropriate mitigation and adaptation strategies http://www.cbd.int/cooperation/pavilion/nagoya-presentations/2010-10-26-session4-Argumedo-en.pdf

Initiatives like the IPCCA seek to underscore the importance not only of the role of traditional knowledge in developing adaptation plans based on local realities and bio-cultural understandings, but also the right for those most effected by climate change and climate action to participate in decision-making.

6. Implications of carbon-entanglements for conservation governance in an era of climate change

In this paper we examined how concerns about climate change are configuring conservation policy debates at the COP 10 to the CBD. We find a pervasiveness of carbon-logic that is shifting debates in ways that pose opportunities for some actors and the objectives they seek, and threats to the objectives of other actors. Below, we discuss the broader context of, and some of the wider policy implications resulting from, the evolving entanglements between carbon-logic and efforts to achieve ecological and social objectives through international conservation governance and decision-making.

The carbon-conservation entanglements that we observed at the COP are embedded within, and a product of, a history of the oft-contentious tradeoffs between social and ecological objectives. Seeking an effective means to ameliorate these persistent conservation dilemmas, many now support an economic framework as a strategic bridge that can deliver both biodiversity and social objectives, and overcome past conflicts (e.g. Millennium Ecosystem Assessment, 2005; Armsworth et al., 2007; TEEB, 2010). The high profile of the TEEB at the COP exemplifies the swell and widespread focus of such approaches (MacDonald and Corson, 2012). The pervasiveness of carbon-logic that we observed at the COP is arguably enabled by these broader historical circumstances, and fueled by the current strategic appeal and increasingly institutionalized mechanisms for market-based approaches. Similarly, resistance to carbon-logic where it was observed at COP 10, can at least partly be read as representing longer-standing concerns about the application of market-logic writ large for biodiversity and human rights (e.g. Monfreda, 2010).

Yet for all of the enthusiasm and strategic promise of market-based approaches, contested collections of interests persist in practice. So it is perhaps not surprising that COP participants found themselves walking a fine line between the promise and pitfalls of market-logic in general and carbon-logic in particular. Four policy-relevant conclusions emerge from our empirical observations in this regard.

First, the pervasiveness of carbon-logic poses substantive risks to the very objectives of the CBD, how success ought to be measured. The concern for some COP participants is that through efforts to capitalize on the political and financial attention of carbon and channel it toward funding biodiversity, values relating to biodiversity and human rights could be undermined. If the purpose of conservation in particular places becomes understood through an optimizing calculus, for example to sequester carbon, conservation changes from what has traditionally been a political, ecological or moral imperative into an ostensibly apolitical and amoral imperative. While this transformation creates strategic opportunities, it simultaneously forecloses others (e.g. to advocate conservation on ethical or even ecological grounds). Some researchers have sought to sidestep this concern by designating the inherent value of biodiversity itself as an ecosystem service (discussed by Chan et al., 2007).

Nevertheless, as we have seen in recent years, prices ebb, markets shift, and as conservation becomes further entangled within the market, biodiversity values are increasingly placed at the whim of these abstracted processes (McCauley, 2006; Redford and Adams, 2009). More fundamentally, this embrace of the market is mutually constitutive with shifting power relationships among state, market and civil society groups. By reaching out to new actors in the financial sector, entertainment and other industries to raise funds, states, and historically important conservation actors – such as conservation scientists, ILCs, and NGOs – risk turning over influence to these new groups to define what constitutes conservation and how it should be done (MacDonald and Corson, 2012; Corson and MacDonald, 2012). The rise of carbon-logic both reflects and contributes to this transformation. It is in this sense that biodiversity is *riding the coattails of climate*. The risk is that the three pillars of the CBD – the conservation of biological diversity, sustainable use and equitable benefit sharing – become loose buttons that may fall off as climate gains momentum and markets and power relationships shift.

Second, the pervasiveness of carbon-logic, or more particularly, the dominant representations of carbon, have material implications for decision-making and human rights. The global and regional scale representations of carbon such as were conveyed by the Carbon Calculator or by LiDAR carbon mapping, served to make some problem dimensions visible, important and measurable (e.g. estimated tonnes of carbon), while simultaneously obscuring other dimensions (e.g. potential impacts to different social groups). These carbon-framings are powerful in the sense that they delineate the nature of the problem and therefore the implied solutions and empowered stewards. When asked, proponents of these tools expressed caveats for the need to "attend to issues of governance". However, considering the sheer momentum with which carbon-logic appears to be becoming enmeshed in conservation governance, these statements, however well intentioned, risk becoming platitudes in the absence of meaningful commitments to attend to such issues. Moreover, when taken in isolation, global and regional scale framings can be problematic considering that the individuals most likely to experience the impacts of climate (i.e. local communities, peasants, farmers, resource managers) are not the ones involved in creating these representations or the solutions that would be acceptable, supportable, and most effective in particular locales.

Somewhat paradoxically, a third implication of the pervasiveness of carbon-logic is its role in reinforcing commitments to conventional conservation means – specifically protected areas. At COP 10, carbon – logic was used repeatedly to reassert the relevance of protected areas and the need for more spatial coverage (see also Hagerman, 2011; Corson et al., in preparation). These observations mirror the findings of Hagerman et al. (2010) who similarly observed prevailing commitments to protected areas given consideration of climate impacts at the WCC. In that case, the authors argue that value-based commitments to the idea of protected areas appear to be as important to some actors as what protected areas might achieve in terms of ecological outcomes.

Fourth, and lastly the *Climate-Motivated Responses* that we observed at the COP illustrate our methodological assertion that debates within the CBD occur both along a temporal trajectory, and within a wider constellation of environmental governance

mechanisms. The observed linkages between the *Responses* and historical debates (e.g. concerning conservation and rights), other multi-lateral agreements (e.g. UNFCCC) and assessments (e.g. Millennium Ecosystem Assessment, TEEB), and broader ideological trends (e.g. market-based conservation) exemplify this claim. Reflecting the dynamic nature of governance (Jasanoff and Long Martello, 2004) of social-ecological systems, the consequences and contours of these linkages for conservation policy and practice will continue to unfold and change over time both within the CBD (and at future COPs), and in settings and events beyond the CBD (e.g. UNFCCC, Rio+ 20, 2012 and the Millennium Development Goal Review, 2015). The analysis presented here provides an empirically based starting point from which to further examine how the CBD will manage the strategic appeal of embracing carbon-logic without compromising its core objectives of protecting biodiversity and human rights in an era of climate change.

By drawing from an understanding of linked social-ecological systems and considering some of the social processes involved in shaping conservation responses, we describe a unique moment in the dynamic process of conservation policy and governance. A moment when decisions about conserving biological diversity are becoming entangled with carbon-logic and the market, and conservation practice and objectives entangled with mechanisms for counting carbon. In the current haste to ride the coattails of carbon, lessons relating to rights, participation and knowledge learned from decades of experience in the international effort to conserve biodiversity must come to the fore.

ILCs may be among the most vulnerable to the negative impacts of not only climate change, but also initiatives emerging from carbon-logic. Thus, these and other groups must secure meaningful participation in the UNFCCC, and in related initiatives to create local, national and regional climate adaptation plans, and to integrate human rights considerations into climate mitigation. Activities occurring since COP 10 suggest that there is positive momentum afoot on this front. Among other examples, a diverse range of conservation actors are seeking to integrate indigenous and local knowledge into the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPMCC, 2011); to apply the principles of Free Prior and Informed Consent to assessments of REDD+ Readiness (UN-REDD Programme, 2011); and to create an Indigenous Peoples Expert Body to enhance indigenous participation in the UNFCCC (Jintiach, 2011). To avoid repeating the pitfalls of the past, the momentum of, and meanings behind these important initiatives must be matched with the momentum for developing technical strategies for counting and mobilizing carbon-logic.

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