Title: Producing hybrid forests in the Congo Basin: A political ecology of the landscape approach to conservation

Author Name: Nathan Clay^a

Affiliation Address: ^aThe Pennsylvania State University, Department of Geography, 302 Walker Building, University Park, PA, 16802, USA; njc173@psu.edu

Corresponding author: Nathan Clay, njc173@psu.edu

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1. Introduction

Tropical forests have become tied more deeply within global political economies and transnational governance processes (Peluso, 2012). The growing potential for extracting forest products (including timber and wildlife) and agricultural expansion (Laurance et al., 2014) is met by expanding initiatives of forest management and conservation (Naughton-Treves et al., 2005), the majority of which center on human-dominated landscapes (Zimmerer et al., 2004). In tropical forests, such initiatives now frequently include decentralized approaches (e.g. community forestry), market mechanisms (e.g. sustainability certification and carbon trading schemes), and territories managed by international non-governmental organizations (NGOs), in addition to state-operated national parks (Agrawal et al., 2008). Over the past decade these management tactics have been increasingly mobilized in unison under the umbrella of a “landscape approach” or ecosystem-based conservation (Sayer et al., 2007; Sayer, 2009; Reed et al., 2015).

Variants of ecosystem-based conservation—also referred to as “ecosystem approaches,” “integrated landscape approaches” or “landscape-scale conservation”—are being implemented worldwide by most major international conservation NGOs, including the International Union for Conservation of Nature (IUCN), Wildlife Conservation Society (WCS), and World Wide Fund for Nature (WWF). The approaches are premised on enlarging conservation territories by uniting private extractive industries, local resource users, international NGOs, and national governments in day to day management operations (Sunderland et al., 2012). In this way, ecosystem approaches hinge on cooperation where there has often been discord. In Congo Basin forests, for example, wildlife conservation NGOs and logging companies are now partnering with the state and local communities. An archetype of “hybrid governance,” that is, collaboration among state, private, and civil interests (Lemos and Agrawal, 2006), the hope is for

ecosystem approaches to facilitate inclusivity of multiple resource users' concerns alongside enhanced efficiency in management (Sayer et al., 2005).

On the other hand, ecosystem approaches to conservation could be similarly prone to issues that have long plagued other conservation and development projects (Forsyth, 2005). Indeed, the shift to transfrontier and large scale conservation areas arguably derives from conservation's increasingly neoliberal ethos (Buscher, 2010; Adams et al., 2014). A core question is thus whether ecosystem approaches acknowledge and can adequately address longstanding social justice challenges, at the root of which are often pre-existing, uneven power relations between diverse social, ethnic, and economic groups (Hirsch et al., 2011). Alternatively, ecosystem approaches could produce new trade-offs between conservation and development, as other neoliberal conservation programs have done (Fletcher, 2012).

Understanding how such trade-offs are embedded in processes of control and marginalization has been fundamental in political ecology analyses of conservation (Robbins, 2012) which have scrutinized a wide variety of conservation and development schemes. Community-based conservation (CBC), co-management, biosphere reserves, Integrated Conservation and Development Projects (ICDPs), and transboundary conservation areas (Peace Parks), as a few examples, have been critiqued for adherence to rigid spatial and social hierarchies which can impinge on local resource access (Neumann, 1998), eschew intra-community and intra-household power structures (Agrawal and Gibson, 1999), and overlook non-equilibrium ecological dynamics (Scoones, 1999; Zimmerer, 2000). Landscape-level conservation schemes that are increasingly common to carbon forestry and Reduced Emissions from Deforestation and Forest Degradation (REDD+) have been critiqued on similar lines (McCall, 2016). Few studies, however, have taken a political ecology perspective to investigate hybrid governance arrangements such as those underlying ecosystem approaches to conservation (but see Forsyth, 2005; Adams et al., 2014).

This article presents a case study of hybrid governance in a conservation landscape, the *Tri-National de la Sangha* (TNS) in the Congo Basin. The TNS conservation landscape has since 2000 united logging companies, professional hunting outfits, the state, local communities, and international NGOs in pursuit of an ecosystem approach to conservation. Spanning Cameroon, the Central African Republic, and the Republic of Congo, the TNS landscape is envisioned as a way to promote regional development while maintaining stable populations of high-value timber species such as sapele (*Entandrophragma cylindricum*) and large mammals such as forest elephant (*Loxodonta cyclotis*) and chimpanzee (*Pan troglodytes*). The research informing this article was conducted in the Lobéké region of southeast Cameroon from June to August 2010. Qualitative methods (semi-structured interviews, focus groups, and participatory activities) facilitated understanding of how various groups (including hunter-gatherers, smallholder farmers, loggers, safari hunting guides, and conservation employees) interact to produce the hybrid architecture of the TNS conservation landscape. This article thus adds to the limited empirical material regarding how hybrid conservation arrangements emerge and change over time (Hardin, 2011).

A set of robust concepts to investigate the hybrid governance apparatus of the TNS and other conservation landscapes is found in burgeoning political ecology scholarship on the co-production of conservation outcomes (Goldman et al., 2011; Ogden, 2011; Sundberg, 2011). This scholarship has demonstrated the value of considering how resource management operations are shaped through particular social and ecological histories, including encounters between humans and nonhumans. This article demonstrates the value of considering the partial and contested process of hybridization underlying ecosystem-level conservation, wherein the nature and extent of society-environment interactions are continuously negotiated (Swyngedouw, 1999; Bakker, 2005). In so doing, it follows Zimmerer (2000) in depicting conservation activities in non-equilibrium human-dominated landscapes as the “production of nature-society hybrids” (p. 356).

This article begins by discussing landscape approaches to conservation, suggesting that political ecology work on neoliberalization and co-production can enrich understanding of these complex, hybrid conservation endeavors. The article continues by discussing histories of forest use and management in the Congo Basin to frame how the vision of landscape-level hybrid governance has been implemented in a dynamic social-ecological landscape in Southeast Cameroon. I then detail how socio-spatial processes of forest management intersect with complex webs of interaction among an array of human (loggers, safari guides, indigenous peoples, migrant agriculturalists) and nonhuman actors (roads, old-growth trees, large-bodied mammals). Demonstrating that the richness and complexity of these human-environment entanglements is overlooked by management plans that emphasize spatial calculability of narrowly defined ecosystem functions, I argue that efforts to script particular viable interfaces among diverse actors has obfuscated other (divergent or unpredictable) society-environment interactions. While hybrid governance activities continuously influence such interactions, they account for neither pre-existing nor produced intimacies. I demonstrate that a political ecology perspective on ecosystem-level conservation can bring to light how distributive justice concerns therefore arise in unexpected places for certain groups. These results suggest that the impacts of the landscape approach to conservation can be better understood by attention to the dynamic social-ecological interactions that it helps to produce.

2. Political ecology and landscape approaches to conservation

Political ecologists situate conservation within historically specific political economic and ecological contexts, emphasizing how social and environmental change are linked and often co-constituted (Zimmerer and Bassett, 2003; Robbins, 2012). As a form of “governance through nature” (Bridge and Perreault, 2009, p. 492), conservation typically employs scaling and boundary-making in order to criminalize activities and police spaces, shifting local livelihoods into the purview of external

management (Zimmerer, 2000) and its accompanying techno-scientific protocols (Goldman, 2009). Political ecologists' critiques of conservation thus often center on power imbalances between marginalized local people (peasants and indigenous groups) and authoritative external actors (the state, NGOs, private industry) (Peluso, 1993; Neumann, 1997; Adams and Hutton, 2007). Such "conservation and control" (Robbins, 2012) research demonstrates how technocratic governance uncouples dynamic society-environment interactions, thereby destabilizing social and ecological processes (Scoones, 1999; Goldman, 2003; Zimmerer, 2006), impinging on livelihoods and resource access (Leach et al., 1999), or expropriating land and evicting communities (Schmidt-Soltau, 2009; Cavanagh et al., 2015).

Given vast expansions of conservation territories (4.5 million km²) throughout human-inhabited areas between 1950 and 2000 (Zimmerer et al., 2004), political ecologists look more and more to conservation "where people live and work" (Miller and Hobbs, 2002). Buffer zones, biosphere reserves, and community based natural resource management (CBNRM) are a few prominent models employed throughout Sub-Saharan Africa (King, 2009) in search of elusive win-win solutions for biodiversity conservation and poverty alleviation (Wells and McShane, 2004). These conservation platforms are increasingly coordinated through NGOs and private enterprises in addition to the state (Agrawal et al., 2008). Undergirding such organizational shifts is often a neoliberal mindset that emphasizes tying conservation activities into market mechanisms in effort to achieve economic growth (Buscher and Dressler, 2012).

Fundamental to these now prevalent neoliberal mechanisms of environmental governance is commodification and privatization of resources, upheld through alternating strategies of de-regulation and re-regulation (Castree, 2008), a cycle that keeps social and ecological processes in a perpetual state of "neoliberalization" (McCarthy and Prudham, 2004). Neoliberal conservation measures shape local resource access in complex ways that rework earlier coercive conservation forms as well as their related political economic structures and livelihood practices (Brockington and Duffy, 2010; Dressler and Roth,

2010; Buscher and Dressler, 2012). Fundamentally, neoliberalization is a partial and contested process, the negotiation of which both draws upon and recreates the scaffolding of society-environment interaction (Bakker, 2005). The following paragraphs introduce the landscape approach to conservation as a fundamentally neoliberal framework (Adams et al., 2014) that is therefore inherently partial and requiring of continual negotiation in order to make it work (Bakker, 2010).

Adopted with fanfare in conservation practice (Defries and Rozenwig, 2010), ecosystem approaches (referred to henceforth interchangeably with ‘landscape approaches’) are a fundamental component of the United Nations Convention on Biological Diversity (CBD) and have become integral to the portfolios of most major international conservation NGOs (Table 1). Ecosystem-based programs share a distinctive structure of hybrid governance in that they require cooperation of local resource users, large-scale extractive industry, NGOs, and the state to protect globally-important species (Sayer et al., 2013). The approaches are therefore especially prevalent in tropical forests, where charismatic mammals and old-growth trees exist amidst socio-political contexts characterized by international logging operations, historically marginalized local resource users, and relatively absent state institutions (Wilkie et al., 2008).

Table 1. Major international conservation NGOs and agencies employing landscape/ecosystem approaches.

NGO or Agreement	Name of Approach	Descriptors of Approach
Convention on Biological Diversity (CBD)	“Ecosystem Approach”	<i>“appropriate scientific methodologies focused on levels of biological organization” (CBD, 2016)</i>
World Wide Fund for Nature (WWF)	“Conservation Landscape” or “Landscape Approach”	<i>“core conservation areas;” “buffer zones;” “matrix of human settlement” (WWF, 2016)</i>
Wildlife Conservation Society (WCS)	“Living Landscapes Program”	<i>“large, wild ecosystems within wider landscapes of human influence” (WCS, 2002)</i>
International Union for Conservation of Nature (IUCN)	“Protected Landscape” or “Ecosystem Approach”	<i>“lived-in working landscapes;” “complement protected area system” (IUCN, 2005)</i>
The Nature Conservancy (TNC)	“Sustainable Landscapes Program”	<i>“support sustainable rural development while achieving environmental goals” (TNC, 2014)</i>
The World Bank Group (WBG)	“Landscape Approach”	<i>“core elements of natural capital and the ecosystem services they produce” (WBG, 2012)</i>

In the words of its proponents, the ecosystem approach aims to address “the increasingly complex and widespread environmental, social and political challenges that transcend traditional management boundaries” (Reed et al., 2015, p. 2). As such, it appears to diverge from territory-based conservation strategies. Yet, political ecologists have speculated that the landscape approach could problematically adhere to standardized ecosystem functions defined by powerful actors (Forsyth, 2005). Indeed, the approach, like many conservation procedures (Zimmerer, 2000), increasingly resembles and may be circumscribed by definitions given in international agreements, notably the CBD’s ten ecosystem principles (CBD, 2004, 2016). Rooted in core conservation biology concepts such as island biogeography theory, the CBD’s ecosystem principles emphasize harmonizing land uses to secure larger areas of connected habitat such to enhance stability of meta-populations (Sayer et al., 2014). Standard conservation mechanisms founded on island biogeography theory—like corridors and buffer zones—are therefore common to the landscape approach (Chazdon et al., 2009), as are checklists of quantifiable objectives (Lindenmayer et al., 2008).

At the same time, the landscape approach is offered as a flexible organizing framework that can facilitate multi-functional management and diverse stakeholder participation (Sayer et al., 2014). Invoking Mosse (2005), it would appear that the landscape approach embodies a degree of “interpretive flexibility,” and as such is perhaps capable of deviating from CBD rubrics so as to confront the numerous “logistical challenges” of dynamic, tropical environments (Sunderland et al., 2012). Yet, such flexibility could be beguiling if it serves, as Forsyth (2005) admonishes, to facilitate collusion among powerful actors in setting management objectives. Indeed, ecosystem-based conservation is demonstrated to entail negotiations among the state and NGOs over the scales at which governance should occur in a given area (Sievanen et al., 2013). Such ‘re-territorialization’ “has accompanied a significant neoliberal shift within conservation thought and practice” (Adams et al., 2014, p. 584). As landscape approach proponents Sayer et al. (2013) explain: “drawing on ecosystem definitions, we define a landscape as an area delineated by

an actor for a specific set of objectives” (p. 8349). From this wording, the crucial question arising is which actors have agency.

Research on the TNS and other conservation landscapes has employed frameworks that seek to understand impacts and trade-offs of ecosystem-based conservation through participatory analysis, visualization, and modeling (e.g. Sayer et al., 2005; Endamana et al., 2010; Boedhihartono et al., 2015). These studies have considered decision-making, livelihood, and conservation outcomes emanating from TNS landscape management in terms of economic costs and benefits, suggesting that challenges can be met by improving the communicative platforms by advanced techniques that acknowledge stakeholder views. Political ecological scholarship on ecosystem-based conservation adds important nuance to this research, demonstrating how knowledge and power intersect in the design and implementation of conservation landscapes in ways that may benefit the powerful at the expense of the marginalized (Forsyth, 2005; Sievanen et al., 2013). To gain further understanding of the origins and implications of this structural unevenness, I suggest that it is instructive to empirically document how ecosystem-based conservation may serve to uphold or rework power asymmetries and shape anew society-environment interactions in ways that make stakeholder engagement inadequate.

Particularly germane to investigating the social and ecological hybridity of ecosystem-based conservation is the concept of co-production. While political ecology has always promoted dialectical social-ecological narratives (Blaikie and Brookfield, 1987; Zimmerer and Bassett, 2003), resurgent attention to co-production has recently demonstrated its value to research on conservation and development (Goldman et al., 2011). As Robbins (2012) puts it, “the landscape is produced from the very ideas through which it is apprehended, even while those ideas are rooted in the material activities and changes of the landscape” (p. 142). Work in this vein has demonstrated how satellite imagery intersects with state forestry institutions to shape agro-silvo-pastoral landscapes and livelihood opportunities in India (Robbins, 2001) or how the conservation corridor concept is produced in East Africa through collaborations among geo-technology,

ecological survey techniques, and local knowledge (Goldman, 2009). These studies exemplify political ecology's increasing attention to how power and agency come to exist alongside social-ecological change (Robbins, 2012).

Similarly, appeals for environmental governance research to pursue “nuanced analyses of how power is produced and exercised over and through the nonhuman world” (Bridge and Perrault, 2009, p. 485) have been earnestly addressed in work on natural resource commodification, where biophysical and chemical properties of trees or water have been depicted as alternately resisting or allying with privatization efforts, necessitating recursive and intricate regulatory policies (Prudham, 2003; Bakker, 2005). Such work gives impetus for political ecology to historicize society-environment interactions, as in Swyngedouw's (1999, 2003) production of socionature analytic, which prioritizes not resulting hybrids but the historical material process of hybridization, in which multiple actors are enrolled with varying degrees of power and agency, each with the possibility of making strategic alliances such to enhance its own power (Bakker and Bridge, 2006).

To this burgeoning scholarship, this article contributes empirical material on how ecosystem-based conservation is, in form and function, influenced by histories of society-environment interaction just as the daily activities of hybrid governance further delineate the scope of those interactions. As I demonstrate, the value of a political ecology perspective in assessing ecosystem-based conservation lies in its ability to understand how social and ecological factors may intersect to shape opportunities for some and constraints for others. Indeed, mechanisms of neoliberal conservation are understood to elide structural inequalities, thereby augmenting discord between various resource users and producing “the appearance of irreconcilable trade-offs” (Fletcher, 2012, p. 297). There is, furthermore, recognition of the hybrids that neoliberal mechanisms form with pre-existing governance strategies, reworking them to serve new agendas (Brockington et al., 2008; Dressler and Roth, 2010). However, little is known about how such governance reconfigurations may arise within ecosystem-based conservation. With a case study

of the TNS conservation landscape, I depict how socionatural hybrids result from attempts by various actors to define territory, scale, and boundaries (Zimmerer, 2000). In doing so, I suggest that attention to shifting dialectical relationships can paint a more complete picture of ecosystem-level conservation than has been afforded by participatory modeling approaches (Sayer et al., 2005; Endamana et al., 2010; Boedhihartono et al., 2015).

The empirical material informing this article was collected during ten weeks of ethnographic research in forested areas of Cameroon and the Republic of Congo; including time in three logging concessions, one safari hunting concession, two community-operated hunting concessions, one national park, one community forest, one community use zone, three Bangando communities, and three Baka communities. The findings concentrate on 48 semi-structured and unstructured interviews as well as nine focus group interviews in addition to participatory mapping and participant observation of hunting/gathering, commercial logging, safari hunting, and conservation activities. Forest walks with local resource users, loggers, agriculturalists, *ecoguards* (armed park rangers), and hunting guides facilitated experiential understanding of socio-spatial aspects of forest knowledge, governance, and use. Secondary material includes management plans and reports of the various conservation and development units as well as a vast repository of conservation biology literature detailing ecological aspects of the TNS area.

3. Historical geographic transformations and Congo Basin socionature

Under the premise of ecosystem-based conservation in the tropical deciduous forests of the Congo Basin, unlikely alliances have recently taken shape. Although their missions are generally considered antipodal, logging companies are working with conservation NGOs. These newfound conservation partnerships have, in many ways, reshaped the socio-spatial basis of forest management and form a cornerstone of the

ecosystem approach in the TNS conservation landscape. This has occurred through deliberate as well as inadvertent reworking—as neoliberal conservation is wont to do (Roth and Dressler, 2012)—of institutions that were forged through social-ecological transformations. In this section, I describe the forest landscape of the TNS and Lobéké area of southeast Cameroon as a socionatural hybrid that “embodies a multiplicity of historical-geographical relations and processes” (Swyngedouw, 2003, p. 95), narrating how humans and nonhumans were intimately involved (and continually entangled) in the daily activities that comprise shifting socio-spatial institutions of conservation and resource extraction.

The rich resources of the Congo Basin made the region a significant locus of European economic and political interest towards the end of the 19th century. Colonial expeditions were followed by private companies vying to extract timber, rubber, and ivory in the territory of French Equatorial Africa. In exchange for extraction rights, companies built and maintained infrastructure and transportation networks. In so doing, these industries gained considerable jurisdiction over development trajectories and resource governance (Coquery-Vidrovitch, 1972). By the 1920s, regional extraction and trade were controlled by just a few large concessions that had outcompeted other companies. The colonial mandate of exploitation was driven by African labor, sustained by meat from nascent commercial hunting operations, furthering the patriarchal relationship between concession and society (Hardin, 2011). Even after central African nations achieved independence in the mid-twentieth century, the remoteness, density, and distance of forests from central government meant that extractive industry continued to dictate natural resource management as well as development in the Congo Basin. This “formidable historical, cultural, and economic power that resides in the concessionary logging economy” (Auzel and Hardin, 2000, p. 22) has thus persisted, and continues to structure social-ecological interactions in the region. Cameroon, a part of former French Equatorial Africa, provides an interesting setting to consider how the socio-spatial model of the concession has morphed into a conservation landscape.

Commercial forest exploitation in Cameroon dates to the late nineteenth century, with an equally long history of local frustration at exclusion from forestry benefits (Bigombe Logo, 2004). While definitions of user rights have varied over the past two centuries, access has commonly been inscribed through power hierarchies established with colonial-era extraction of rubber and timber (Vermeulen et al., 1998; Hardin, 2011). Colonial administrative and legal procedures persist in that the state brandishes *de jure* rights while local people argue *de facto* rights based on their historical relationships with forest spaces (Bomba, 2004). Following economic crisis in the 1980s, Cameroon was pressured by the World Bank and IMF to implement neoliberal economic policies and intensify logging to make up for lost oil revenues (Oyono, 2005). Logging operations have since escalated. By 2010, approximately 50 million ha of Congo Basin forests were devoted to commercial timber extraction. Over six million cubic meters of timber was exported regionally, 39 percent of which came from Cameroon (de Wasseige et al., 2013). The rise in the importance of timber revenue was accompanied by revisions to forestry legislation. Directed by the World Bank, politicians, and logging companies, Cameroon's 1994 Forest Law decentralized forest management to local jurisdictions and required companies to submit concessionary management plans that specify the socially and environmentally sustainable practices with which logging companies must comply to maintain timber extraction rights (Ekoko, 2000).

These governance shifts coincided with regional conservation initiatives that increasingly operate on explicitly neoliberal grounds. Funding for conservation in the Congo Basin has historically been scarce due to low tourism revenue, little government interest, weak institutions, recurrent civil conflict, and negative international perception (Wilkie and Carpenter, 1999a; Kamdem-Toham et al., 2003; Berman and Lombard, 2008). Recognizing these challenges, the Congo Basin Forest Partnership (CBFP) was created at the 2002 World Summit on Sustainable Development in order to orchestrate hybrid governance involving NGOs, the state, logging companies, safari companies, and local communities. Cameroon's Forest Law laid the foundation for the CBFP and galvanized the privatization of environmental

governance activities by formally soliciting support of timber companies alongside conservation organizations in forest and wildlife management (Oyono, 2004).

The Congo Basin has thus seen a marked increase in both logging company and conservation NGO presence over the past few decades (Wright, 2005). In 2015, 49 million ha of the Congo Basin's over 200 million ha of forest were allocated as logging concessions; a further 45 million ha as national parks (de Wasseige et al., 2015). The oft-opposing motives of conservation and logging are certainly evident here: while industrial logging provides the highest single source of revenue in Congo Basin countries (de Wasseige et al., 2009), conservationists point to the dangers that resource extraction can pose to forest health, such as forest degradation and increased illegal commercial hunting (Wilkie and Carpenter, 1999b; Lurance et al., 2006; Fitzherbert et al., 2008; Poulsen et al., 2009).

Nevertheless, the CBF has orchestrated this regional push towards hybrid governance by giving money and power to conservation NGOs to manage twelve priority conservation landscapes (Figure 1). The TNS, on which this case study is based, is one such landscape. The TNS covers 4.5 million ha in Cameroon, the Central African Republic, and the Republic of Congo. Approximately 750,000 ha comprise the TNS's three national parks with a further 3.7 million ha zoned for multiple uses, of which 90 percent as logging and safari hunting concessions (Usongo and Nzooh, 2009) and around 10 percent for local use. Home to around 200,000 people, including 20,000 of indigenous ancestry (de Wasseige et al., 2013), the TNS supports some of the highest economic poverty in the world.

The juxtaposition of impoverished local communities and powerful external actors has meant longstanding conflicts over resource access in Cameroon. These tensions have recently escalated with amplified resource extraction and conservation initiatives (Samndong and Vatn, 2012). Looking at community forestry elsewhere in Cameroon, scholars have documented how state and NGO-led efforts to

form managerial partnerships were hampered by administrative and financial challenges as well as by the complexity of local institutions (Joiris, 1999). In some cases, governance programs entailed the creation of committees which drew almost exclusively from local elites, circumventing and marginalizing traditional authority and bringing about further social stratification and conflict (Dkamela and Oyono, 2003; Oyono, 2004). The result has been little economic benefit and constraints to livelihoods (Oyono, 2005; Garcia-Fernandez et al., 2008; Lescuyer et al., 2008) with community forests still effectively managed by the forestry department (Etoungou, 2003). In spite of the Forest Law's emphasis on indigenous access and NGOs' promotion of indigenous empowerment, customary use rights are recognized less and less (Samndong and Vatn, 2012). These studies have made great strides in understanding the social-economic challenges of discrete projects within either forestry or conservation programs, but research has not yet considered hybrid governance arrangements that involve a confluence of these multiple partners in a multi-use landscape.

3.1. Study site

The research informing this article was carried out in the Lobéké region of southeast Cameroon, part of the TNS conservation landscape and an excellent site to consider how hybrid, landscape-scale governance has taken shape through interactions among multiple human groups, plants, and animals. The Lobéké area is biophysically heterogeneous. Located on the South Cameroon Plateau, elevation ranges from 250 to 800 m throughout the region. The Sangha River, from which the conservation landscape gets its name, and its northern tributaries have complex flow regimes, including seasonal flooding. These topographic gradients and hydrological regimes intersect with broader climatic patterns to ensure two distinct dry seasons and two rainy seasons each year. While tropical deciduous forests are often assumed to have high biodiversity spread uniformly among the forest, Lobéké's biophysical and ecological processes converge uniquely such that forest composition (of plants and animals) varies spatially and temporally.

Logging companies have needed to contend with these variations. The Lobéké region, including the Lobéké National Park, has been selectively logged since the 1970s (Makana and Thomas, 2006), and the forest is currently in various stages of regrowth. It is classified as a patchwork of mixed-species secondary (dense understory), mixed-species primary forest (open understory), swamp forests, and marshy clearings (Remis and Kpanou, 2011). Forest regeneration depends on continued use as well as soil properties. Where soils are poor, for example, it takes 25 percent longer for vegetation to regenerate (Kleinschroth et al., 2015). Animal migration patterns, particularly elephant and gorilla, also contribute to a heterogeneous forest composition through seed dispersal and path building (Wright and Muller-Landau, 2006; Blake et al., 2009). At the same time, the tens of thousands of kilometers of recently constructed roads throughout the Congo Basin shape species-specific patterns of animal movement (Laurance et al., 2006; Laporte et al., 2007).

The biophysical and ecological diversity in Southeast Cameroon is matched by sociocultural diversity. The region is home to numerous cultural-linguistic groups. Groups in the study villages are predominantly Bagweli, Baka, and Bangando, whose livelihoods depend on natural resources for subsistence and cultural purposes (Levang et al., 2015), and non-timber forest products such as wild fruits, honey, and vegetables are especially vital for women during economic crisis (Brown and Lapuyade, 2001). Colonial-era categorizations based on livelihood and linguistic tradition continue to divide more sedentary agriculturalist groups (Bangando ethnic group, Bantu language speakers) from semi-nomadic hunter-gatherers (speakers of indigenous language). Even today, these categorizations are complex and not entirely clear. While individuals and families among these broad groups have long been connected through trade and marriage, the groups retain cultural identities (Bahuchet and Guillaume, 1982). Importantly, power distributions among these groups remain uneven. Bangando chiefs, for example, have traditionally served as liaisons with external authorities, while the legitimacy of Baka

chiefdoms is still unrecognized (Joiris, 1999; Rupp, 2011). These power struggles remain important to ongoing negotiations about environmental governance.

Figure 1 about here.

Figure 1. Central Africa, TNS conservation landscape, and study area. Map by author.

4. Producing hybrid landscapes in Lobéké

The landscape approach to conservation—its activities and impacts—in Lobéké is produced through intimate and dynamic interactions among multiple human groups, animals, and plants. The following narrative addresses the need for political ecologies of conservation to “examine and acknowledge how trees and animals form ‘alliances’ and networks with human groups to establish and reinforce specific

outcomes” (Robbins, 2012, p. 195). As in other hybrid conservation spaces, social-natural entanglements in Lobéké are produced through reworkings of territory, scale, and boundaries (Zimmerer, 2000).

Towards planning the TNS conservation landscape, conservation ecologists worked within the well-trodden spatial-institutional parameters of the logging concession to study mammal species’ responses to land cover change. Somewhat unexpectedly, their research indicated that compared to unlogged forest, secondary or selectively logged forest areas house significant densities of mammals important to international conservation efforts, notably elephant, gorilla, chimpanzee, and various ungulate species. Reduced canopy cover from logging allows more light to reach the forest floor, promoting growth of shrubs and grasses on which large herbivores preferentially feed (Clark et al., 2009; Remis and Kpanou, 2011). By acknowledging the congruence of logging and conservation, these findings strongly reinforced ongoing design of hybrid governance arrangements by suggesting the promise of logging concessions to “extend the conservation estate” (Clark et al., 2009, p. 1281). Animal existence in (and apparent preference for) disturbed and secondary forest environments has in this sense given them agency in directing the landscape approach to conservation. Yet, the colonial socio-spatial institution of the concession also contributed to the manifestation of this agency in that it facilitated the research logistics that made the logging concession a unit of analysis and led to the identification of this anomalous mammal population distribution. If not for this alliance, other conservation territories may have otherwise been promoted.

Proponents of the landscape approach to conservation hold that “the landscape is defined in broad conceptual terms rather than simply as a physical space” (Sayer et al., 2013, p. 8350). However, we see here that the conceptual terms (where can animals exist) were in fact apprehended only by working within colonial articulations of physical space. Refining the conceptual basis of the Lobéké conservation landscape required negotiating the deeply spatialized institutions of logging and conservation, which on a closer look are not all that dissimilar. Indeed, conservation and logging have a common set of practices

for delimiting territory that proceeds with phases of prospecting for resources, mapping boundaries, and negotiating the circumstances of extraction, production, and wealth distribution (Hardin, 2011). Timber prospecting, for example, is based on spatial-economic assessments of valuable trees in a given area, and logging companies calculate the economic rationality of road building via inventories of trees. Similarly, conservationists determine wildlife population health via biodiversity inventories to calculate species abundance and diversity within given areas.

In the TNS, these practices of territorialization (Adams et al., 2014) have been brokered within the context of international partnerships that are sympathetic to logging and conservation, namely the CBFP. The CBFP emphasized appropriate spatial planning arrangements at an ecosystem scale, establishing formal spatial plans for timber and conservation within conservation landscapes (Sayer et al., 2012). In turn, the CBFP allocated management of conservation landscapes to conservation NGOs which had “relatively little experience of operating such large scale and ambitious programmes” (Sayer et al., 2005; p. 123) and therefore often resorted to simply scaling up pre-existing management activities.

Cameroon’s 1994 Forest Law dovetails with the CBFP’s spatial planning agenda by demarcating forest areas as either *Permanent Forest Estate* (large swaths of primary and secondary forest for commercial logging and protected areas) or *Non-Permanent Forest Estate* (narrow strips of secondary forest lining major roads for local uses such as agriculture and hunting). Within these two broad zones, the state has further partitioned land into various territories, each with a management plans that outline appropriate use. In the TNS, these subdivided zones include national parks (26 percent), logging concessions (52 percent), and agroforestry and community forests (19 percent). Safari hunting zones overlap agroforestry and logging zones, comprising 65 percent of the land area, with roughly half of the safari area managed by the state and the other half by communities. Management efforts throughout these zones are effectively controlled by conservation NGOs, or as the warden of Lobéké National Park put it “under the big hat of WWF” (Mambélé, 7/22/10).

A process of re-territorialization, this zoning scheme involved, first, decoupling of the social-ecological landscape and second, subsequent recasting so as to harmonize among the particular mixture of institutions contributing to forest management. More specifically, operationalizing landscape-scale conservation in Lobéké meant reframing the terms of society-environment interaction to accord with a vision of a particular hybrid landscape in which wildlife conservation and timber extraction can coexist. The demarcation of land-use zones was therefore premised on a few key spatial-ecological factors, namely density of forest cover and pre-existing road networks, which were identified largely via assessments of aerial imagery (World Bank forestry officer, Yaounde, 6/16/10). The nature-society hybrid that emerged from this vision thus represented an imaginary coupling of human inhabitants and nonhuman nature that is attuned to predefined indicators of economic or ecological success. This zone-based model has achieved a hybrid spatial fix which has enabled reconciliation (at least temporarily) between the competing agendas of conservation and resource extraction.

The convergence of these socio-spatial institutions has, predictably, reinforced the need for expert knowledge. Whether as advanced statistics to calculate species richness or Geographic Information Systems (GIS) to analyze remotely sensed images and map landcover, such knowledge lends credence to these managerial frameworks by distilling complex social-ecological interactions into abstract categories and is a typical component of neoliberal governance (Robertson, 2011). Categorizations (permanent forest, agroforestry zone, etc.) have served to remove political connotations from conservation and logging operations and elevate the interests of external actors over local ones. In this way, the TNS has streamlined management towards predefined goals that conform to global agendas of conservation and logging (Lescuyer, 2007). This starkly contrasts the CBFP's emphasis on community involvement and discourse that paints landscape approaches as holistic and participatory. Instead, management is largely

based on policing these forest zones. A *chef de poste* (coordinator of conservation activities in logging concessions) in Salapoumbe summarized this mentality, emphasizing the importance of forceful policing:

Poaching is the real problem. Some hard-heads resist...people do not know the laws. The manner of conservation, where the politics are concerned is good...the problem is the management of people. You don't make omelets without breaking some eggs. (8/13/10)

Indeed, community respondents voiced strongly that they were not involved in the design of the conservation landscape. As a Baka man in Dioula village explained, participatory efforts only “make it look like we are involved in management” since the zoning decisions have already been made. Moreover, although zoning was officially intended as provisional and subject to modification in the event of conflict among users, no adjustments have been made in spite of frequent conflicts over forest access (Samndong and Vatn, 2012). Thus, rather than producing a transformative platform, the landscape approach in Lobéké appears to have recreated failures of other conservation programs by decoupling social-ecological systems. That is, physically separating people who have long lived and worked in the landscape from ecological processes and outsourcing management to experts who allegedly understand those processes (Goldman, 2003; Hoole and Berkes, 2010). While this zone-based scaling conforms with resource use and management patterns of timber companies and conservation NGOs, it strikes discord with the understanding of and nature-society dynamics that underlie local resource management institutions.

4.1. Re-articulating access

Indeed, development success in the TNS is inscribed in conspicuously neoliberal terms: cash benefit distribution from logging exports (30 percent of which is supposed to go to local jurisdictions for development activities), community operated safari hunting zones, and tourism. While these benefits are for the large part yet to be realized, the zone-based governance apparatus underwriting this neoliberal vision has amounted to substantial constraints on local resource access and livelihoods. Bangando and

Baka respondents discussed frequent conflicts over resource access that resulted from hybrid governance in the Lobéké area, which I have grouped below into three overarching themes. Many of these livelihood constraints resembled longstanding issues that have been reworked and in some cases exacerbated by the confluence of powerful international actors now inhabiting the forest. Given that the TNS was designed to specifically avoid such issues, these findings resonate with the notion of trade-offs between conservation and development being paradoxically manufactured through neoliberal conservation agendas (Fletcher, 2012).

One issue that repeatedly emerged in discussions with both Baka and Bangando was that the zoning scheme corresponded poorly with traditional resource use patterns. Respondents tended to see the hybrid governance mechanisms as constraining resource access and, in some cases, as incursion into territory considered available for local use. For one, expanded territory for industrial logging and safari hunting has limited the forest area available for local use. As respondents explained it, for generations they had practiced subsistence agriculture, hunting, and gathering within many of the logging concessions; however, the conservation management now occurring in those areas has made for strict regulation. Those with agricultural fields in logging concessions reported having their homes and crops burned without compensation. Similarly, collection of non-timber forest products for subsistence or market is now prohibited in logging concessions. In a focus group, Baka women specified decreased access to wild mango, wild yam, termites, and caterpillars, important protein sources. In some cases, this was due to the fact that footpaths used for gathering have been destroyed by road building for timber extraction. Others noted that increased elephant presence at certain times of the year was a major deterrent to gathering and the limited gathering territory now available prohibited them from avoiding elephants by going elsewhere (focus group, Dioula, 8/7/10). In these ways, respondents perceived zone-based management as a rigid boundary separating them from use and management of forest resources, the spatiality of which is further tenuous due to unpredictable animal movements.

Indeed, the zone-based management model appears not to have accounted for dynamic animal movement patterns that differentiate by species as well as individuals. Elephants, for example, migrate long distances daily and seasonally, yet are highly constricted by roads (Blake et al., 2008), which for some individuals may be linked to remembered social trauma (Bradshaw et al., 2005). Gorillas prefer unique microclimates that are shaped through selective logging practice as well as human presence in tourism areas. Animal movements are also influenced by seasonal precipitation fluctuations, which also affect the ease with which humans can hunt animals (Jost Robinson and Remis, 2014). While national park and safari hunting areas are zoned to specifically manage wildlife, dynamic animal behavior complicates these efforts. Increasing human activity leads to animals becoming habituated, and while this may mean increased chances of survival it may also mean increased vulnerabilities to hunting (Remis and Hardin, 2009).

These dynamic animal agencies have implications for conservation and local livelihoods alike. Responses to forest change are site and species specific: large-bodied species like elephant appear to benefit from enhanced protection efforts in logging concessions while duiker species have decreased due to commercial hunting near human settlements (Remis and Kpanou, 2011). One reason for increased hunting pressure is anatomy: duikers' small size makes them easier to hunt via inconspicuous metal wire snares. This vulnerability is magnified by ease of transportation facilitated by extensive road networks ubiquitous in logging concessions, and duikers' "unprotected" conservation status means little penalty for commercial hunters. While the loss of duikers may be considered unremarkable by many conservationists, it is felt by Baka and Bangando communities that have long hunted them for subsistence. Respondents bemoaned increased commercial hunting of duikers, noting that species they used to hunt "have fled into the forest." Even though the conceptual design of the TNS was intended as flexible, these examples demonstrate that the conservation landscape was not able to account for dynamic relationships among the many various groups of humans and nonhumans living in the area.

These dynamics were further constrained by adjustments to measures of user rights distribution. As outsiders to the management platforms, local resource users had to contend with complex management bureaucracies. As a key example, to compensate for lost forest access, a small area within the Lobéké National Park was zoned for “community use;” hunting was prohibited but individuals could collect non-timber forest products or fish for one day if they acquired a permit to do so. Although this zone would appear to facilitate these crucial livelihood activities, many respondents were unaware of the zone’s existence and even regional conservation officials were uncertain of its location. Those who had heard of the community use zone identified several obstacles to using it. Securing a permit for one day of use required travelling to the park headquarters in Mambélé to deliver a written request (over 30 km for many communities). For Baka, many of whom cannot afford transportation and are illiterate, this represents a substantial obstacle, even though the community use zone was supposedly designed with Baka in mind. Bangando men in Yenga indicated that waiting for a permit can take days or even months (8/5/10), and even if they could obtain a permit, reaching the community use zone required most of a day’s walk, and since temporary camps are now banned and the permit is good for only one day of use, there is little time to collect resources before they must return to their village homes. Regional conservation officials even acknowledged the danger entailed in such a journey on foot given the density of elephant and gorilla in the vicinity (WWF employee, Mambélé, 7/19/10).

Community members furthermore lamented that the conservation landscape had ushered stricter policing given that forest use is now monitored and enforced by several different entities, including safari hunting guides, chef de poste, and *ecoguards* (government-employed armed guards charged with patrolling the national park). While residents are legally permitted to hunt for subsistence in the agroforestry zone, respondents expressed concern over the risk of getting beaten and having meat confiscated by ecoguards. Even if collecting resources only for subsistence, respondents voiced fear of confrontations with ecoguards and conveyed similar fears regarding a specific hunting guide who harassed them for trespassing in what he referred to as “his zone,” indicating the issues in safari hunting zones and

agroforestry zones overlapping. Indeed, such fear was rooted in actual reports of violence; in one encounter a community member was reportedly shot and killed by a safari guide. A Bangando woman in Mbatika summarized the general discontent:

Animals and trees are more important than us... an elephant costs more than a human... we care about conservation and want children to see trees and animals but this conservation is not practiced in the correct way here. (8/8/10)

A third resource access issue stemmed from the fact that zoning did not account for how power-laden ethnic histories and identities are linked to local livelihoods. The agroforestry zone, which has become the predominant local use area, comprises land extending approximately five km on either side of the main road. As the name would imply, this zone predisposes agricultural and forestry uses over hunting and gathering, thereby enabling certain livelihoods while constraining others. Baka respondents pointed out that these spatially and temporally inflexible zones correspond poorly with their semi-migratory hunting and gathering strategies. Facing the shift from vast spaces to hunt and gather to a delimited zone to practice agriculture, Baka respondents were discouraged by the forced transition to less preferable livelihoods (agriculture or basket weaving). Land use in the agroforestry zone prioritizes intensive commercial production of cacao and peanuts, and Baka respondents pointed out that while they now have space to plant crops, they lack the means to pursue productive agricultural-based livelihoods, including formal land tenure, agricultural knowledge, and capital. Baka thus considered the agroforestry zone an essentially unusable area and therefore not even part of the forest at all. Loss of income from restriction of hunting in the agroforestry zone has, furthermore, pressured parents to send children to hunt illegally.

Baka experienced these livelihood constraints in conjunction with separation from their traditional forest homes and important cultural activities; as an older man in Yenga grieved, “everything is in the forest”

(8/10/10). While Bangando respondents, being involved principally in sedentary agricultural livelihoods, expressed less of a general disruption to resource flows, they did indicate dissatisfaction with insufficient land and concern that subsequent generations would not have any land. In sum, the confluence of zones for logging, safari hunting, and national park was perceived as a blanket restriction on natural resource access and livelihoods. Tellingly, members of both Baka and Bangando communities saw little point in differentiating between these zones, referring to them together as “ecozones.”

Rather than creating a more flexible transitional space between areas of core conservation and of community use then, casting logging and safari companies as enforcers of these buffer zones has heightened their control while diminishing access by local communities. A Baka woman in Mbatika succinctly expressed these cultural-economic impacts, exclaiming “we have no more forest here” (8/12/10). Importantly, by allying with conservation NGOs, logging and safari companies have renewed and bolstered their legitimacy and authority, which had been waning due to recurrent human rights violations. The neoliberal mechanisms of hybrid governance have, in this way fomented as ‘discourse coalitions’ between powerful international actors (Forsyth, 2005), serving to bolster dual agendas of conservation and logging at the expense of local livelihoods.

4.2. Co-producing hybrid governance

The above evidenced resource access obstacles that arose in the landscape approach to conservation are somewhat paradoxical given the explicit emphasis on avoiding such issues. Additional analysis is needed, however, to attend to the web of rich interactions among humans and nonhumans which have generated interesting and surprising outcomes in this complex landscape. I provide here four vignettes of these intimacies.

Baka and Bangando populations have a complicated existence in a multi-scalar social-ecological landscape. On one hand, conservation publications highlight local participation as integral to Lobéké's management, suggesting that indigenous use is compatible with conservation activities to the extent that WWF's conservation landscape was named *Jengi*, a Baka word meaning "spirit of the forest." This project ostensibly recognizes Baka as forest stewards, but other opinions remain. One chef de poste in Salapoumbe, referencing the challenges of monitoring subsistence hunting traditions and illegal commercial hunting activities, claimed that "Baka people are never consulted regarding the fight against poaching as they are all poachers themselves" (8/13/10). The assumption of local culpability for illegal hunting and other forest destruction is a narrative common in the region. Importantly, this narrative disregards the broader political economy of logging and conservation interests, where the boom and bust nature of the timber industry makes the presence of logging companies tenuous. During the 2008 crisis, for instance, more than half of timber company employees were laid off in one concession. Many former employees were forced to resort to other activities, resulting in significant increases in subsistence and commercial hunting (logging company director, Kéka, 7/17/10). Thus, while the conservation landscape is precariously tied to global processes (Endamana et al., 2010), local groups are still alternately honored and blamed for their roles in conservation.

The reliance of the landscape conservation approach on space, though unintended in its initial planning and implementation, has meant a corollary inability to account for temporal patterns or for aspatial social-ecological interactions. As one example, although monitoring and enforcing illegal hunting activities fall to timber companies, these companies virtually stop logging during the twice-yearly rainy seasons, when downpours can make roads treacherous and impassable to large timber trucks for days. Yet smaller vehicles such as those taken by commercial bushmeat hunters can easily navigate the roads and access vulnerable wildlife unhindered at these times. These spatially-oriented monitoring programs proved unable to account for temporal dynamics due to confusing chains of command and uncertainty of resources. As an example from one logging concession, vehicles for monitoring activities were provided

by an NGO while fuel was distributed by the government; one or the other of these items was often absent at crucial times. Furthermore, these resources are mediated elsewhere through a regional office in Yokadouma, located at a few hours' distance. As one chef de poste in Kéka explained, these factors make it challenging to respond in a timely manner to commercial hunting threats (7/18/10). The landscape conservation approach cannot always account for temporality of mobile resources and actors in the forest.

Given that the conservation landscape approach continues to reshape the social-ecological landscape, regional actors face constant challenges of unanticipated outcomes. In some cases, for example, historical power imbalances among local groups continue and are even exacerbated by new management strategies. Years ago Baka hunter-gatherers were regularly enslaved by Bangando agriculturalists, and while slavery is no longer practiced, a complicated social relationship persists. Given the many constraints to resource access that Baka community members now face in highly managed zones, Baka rely on Bangando to act as liaisons with timber companies regarding benefit allocation. In many cases Baka community members remarked that they are forced yet again to be “slaves” on Bangando farms to earn money since they can no longer access forest resources. Cultural relations are thus increasingly strained by current limitations on traditional livelihood activities, and new management plans are in fact co-producing new cultural norms and exchanges. While such outcomes were of course unanticipated, this narrative uncovers a pressing challenge for the landscape conservation approach, which is the need to constantly monitor, evaluate, and implement new management strategies based on dynamic social-ecological interactions.

Importantly, local level social-ecological dynamics—even at the level of individual animals—shape the outcomes of the landscape approach to conservation in ways that plans and zones cannot always anticipate or explain. Roads in particular occupy a unique niche in the spatialized conservation landscape, serving at once as borders and as dynamic spaces in and of themselves. With roads built at different times and subject to varying levels of maintenance, the road network composes a heterogeneous forest structure,

a mosaic of forest fragments of varying levels of degradation, connected by parcels of varying levels of re-growth. These configurations shape movement patterns of animals, who exist intimately with activities geared towards extraction of high-value timber. Elephants, ungulates, and apes, for example, are curious of the tremendous noises of chainsaws and bulldozers, and come to graze in newly cleared areas. Safari hunting guides are in close contact with loggers and capitalize on these curious dispersals, bringing their clientele to recently logged areas where animals congregate and where decreased vegetation makes them more visible. Stories circulated of one hunter fastening a GPS unit to a bulldozer so that he would have the most up-to-date information about logging practices for this very purpose (former president of community hunting zone, Kéka, 7/17/10). These rich interactions could perhaps not have been envisioned by any plan for landscape conservation, yet they nonetheless shape the reality of its outcomes.

5. Conclusion

By attending to society and environment dynamics, this article has demonstrated that the neoliberal precepts of the landscape approach to conservation produce similarly contentious environments as other conservation and development projects in addition to a set of new issues. In the case of southeast Cameroon, the landscape conservation approach has fallen short of the transformative potential forecast by its proponents. The overly spatialized interpretations of society-environment interaction, while easily representable on a map, have proved effective at implementing neoliberal conservation measures yet incapable of accounting for dynamic political economic and ecological systems. Rather, management schemes founded on static understandings have facilitated hybridized governance institutions to recreate a socio-natural order that reifies legacies of uneven power relationships. Communities' distrust of NGOs continues to be fueled by entrenched patriarchal relationships and memories of recent conservation abuses

that include lost territory, threats of physical violence to person and property, as well as instances of actual violence.

The corresponding mechanisms of environmental management are designed to optimize pre-determined functions of each zone, without accounting for the possibility of dynamic interactions among the zones. However, rather than streamlining environmental governance by codifying the landscape into concessions and parcels, the effect has been to undercut dynamic links of social and ecological systems. Instead of diminishing complexity through spatial-based management, negotiations of these neoliberal measures have served to increase complexity, producing a hybridized landscape of entrenched unevenness. Paradoxically, rather than escaping dichotomies (such as social/ecological, conservation/extraction, hunter-gatherer/agriculturalist), this process of neoliberalization that underlies ecosystem-based governance has enabled powerful actors to designate on which binary understandings to weld the necessary logistics of conservation.

In detailing the multiple levels of complex interactions inherent to the landscape approach to conservation, a political ecology analysis contributes valuable nuance to understanding of these relations, which other research on the TNS has indicated are straightforwardly cooperative (Endamana et al., 2010; Boedhihartono et al., 2015). Explicit attention must be given to these trajectories of community relationships and interactions in order for the landscape approach to have any hope of delivering a transformative conservation platform. This means accounting for newly arising social-ecological regimes through flexible and adaptive management institutions. The risks of exacerbating historically entrenched power asymmetries (between international organizations and local groups as well as within ethnic groups in the communities) must be explicitly recognized. This suggestion dovetails with those by other regional scholars advocating adaptive management (Remis and Jost Robinson, 2012), yet I add that the current

neoliberal conservation measures may be fundamentally incompatible with such a proposition in the TNS area unless active attention is paid to deep inequalities along class, ethnicity, and gender lines.

In spite of (and because of) hybrid management, the interactions among various groups in the dense forests of Lobéké and broader Congo Basin region will continue to produce synergistic effects (Brown and Ekoko, 2001). An ecosystem approach to conservation can actively involve such synergies, however, it will be imperative to recognize and understand nature-society relations from the starting point of active relational engagement through everyday practical dealings (Johnston, 2008). As depicted here, interacting features of different sets of organisms and environments shape and re-work the social-ecological landscape. It is through just such a collaborative encounter that elephants and gorillas have played active roles in the neoliberalization of conservation in the TNS, facilitating the logging industry's continued capital accumulation and an expanded protected habitat.

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Figure

Table

NGO or Agreement	Name of Approach	Descriptors of Approach
Convention on Biological Diversity (CBD)	“Ecosystem Approach”	<i>“appropriate scientific methodologies focused on levels of biological organization” (CBD, 2016)</i>
World Wide Fund for Nature (WWF)	“Conservation Landscape” or “Landscape Approach”	<i>“core conservation areas;” “buffer zones;” “matrix of human settlement” (WWF, 2016)</i>
Wildlife Conservation Society (WCS)	“Living Landscapes Program”	<i>“large, wild ecosystems within wider landscapes of human influence” (WCS, 2002)</i>
International Union for Conservation of Nature (IUCN)	“Protected Landscape” or “Ecosystem Approach”	<i>“lived-in working landscapes;” “complement protected area system” (IUCN, 2005)</i>
The Nature Conservancy (TNC)	“Sustainable Landscapes Program”	<i>“support sustainable rural development while achieving environmental goals” (TNC, 2014)</i>
The World Bank Group (WBG)	“Landscape Approach”	<i>“core elements of natural capital and the ecosystem services they produce” (WBG, 2012)</i>