Environmental Compensation in the Shadow of Extractivism: A political ecology of biodiversity offsetting in Colombia

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Declaration by the author

I declare that this thesis is my own work and has not been submitted for any other higher educational award.

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Abstract

In the context of profound socio-ecological change that has come to define the present Anthropocene moment, a suite of voluntary and state-orchestrated environmental policies known as biodiversity offsetting have become increasingly widespread during the last decade. The allure of such schemes can be understood to lie in their purported ability to reconcile the historically conflictual relationship between economic development and environmental conservation. Policies of this ilk are designed to deliver the provision of 'additional' environmental gains, which are framed as balancing out the ecological degradation tied to economic growth. Based on secondary document analysis and semi-structured interviews with key stakeholders, this thesis explores the formulation, implementation, and regulation of a national system of biodiversity offsetting in the context of Colombia.

In 2012, in the shadow of an extractivist based economy, the Colombian environment ministry sought to put in place a national framework organized around the notions of 'no net loss' to biodiversity and 'ecological equivalence' between loss and gain. Drawing on a conceptual framework broadly situated within the field of political ecology, this thesis examines the policy as a set of political, economic, ecological, and socio-cultural relations that conjoin to define the roll out of offsetting in one of the most biologically diverse nation states on Earth. Despite the intentions of an alliance of non-governmental organizations and formal state institutions involved in formulating the policy, concrete implementation with offsets has so far been extremely limited.

In deploying insights from strategic-relational state theory, I argue that the formulation of the policy and its slow rate of implementation reflect the strategic manoeuvring of social forces based within and beyond formal state institutions, who seek to advance organizational interests within the framework of the policy process. Over the course of this thesis, I also explore the intellectual and cultural labour required to establish Colombian natures as equivalent. In examining the application of the discursive frames deployed during this process, I argue that Colombia's specific agrarian political economy and lack of formalized land titles have also served to frustrate the realization of offsets on the ground. Finally, in contrast to existing analyses of biodiversity offsetting, which have largely explored such systems based on processes of privatization, I demonstrate how current implementation within the Colombian system is premised on a contrasting dynamic, where the realization of offsets is in part defined by the nationalization of private land, as regulated private firms move to buy up territory which then becomes the property of formal state institutions.

Keywords: Biodiversity Offsetting; Political Ecology; Colombia; Environmental Statehood; Territorialization.

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Abbreviations

ANLA	*Autoridad Nacional de Licencias Nacionales*, National Environmental Licence Authority
BBOP	Business and Biodiversity Offset Programme
CAR	*Corporación Regional Autónoma*, Regional Environmental Authority
CBD	Convention on Biological Diversity
CI	Conservation International
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FARC	*Fuerzas Armadas Revolucionarias de Colombia*, Revolutionary Armed Forces of Colombia
FDI	Foreign Direct Investment
GIS	Geographical Information System
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
MADS	*Ministerio de Ambiente y Desarrollo Sostenible*, Ministry of Environment and Sustainable Development
MNC	Multinational Corporation
NGO	Non-Governmental Organization
PNGIBSE	*Politica Nacional para la Gestión Integral de la Biodiversidad y sus Servicios Ecosistémicos*, National Policy for the Integral Management of Biodiversity and its Ecosystem Services
SINA	*Sistema Nacional Ambiental*, National Environmental System
SRA	Strategic-Relational Approach
TNC	The Nature Conservancy
US	United States
WWF	Worldwide Fund for Nature

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Introduction

A growing chorus of social movements and members of the scientific community are vocalizing deep concerns about what they understand to be an unparalleled anthropogenic transformation of environmental systems. At the centre of these debates lie mounting fears over the social and ecological repercussions of dwindling species of flora and fauna, primarily as a result of significant land use change and associated economic development. In communicating human-induced biodiversity loss as *crisis*, many natural scientists have turned to progressively more apocalyptic means of outlining the current socio-ecological conjuncture. A little over a decade ago, a now widely referenced study in the journal *Nature* put forward the conceptual framing of 'planetary boundaries' (Rockström *et al*., 2009: 472), as a means of classifying and quantifying human impacts on what the paper describes as 9 essential earth system processes. Each of these components are analysed in relation to what the authors deem to constitute 'a safe operating space for humanity' (*ibid*.).[1] Based on estimated species extinction rates, the analysis by Rockström *et al*. (2009) argues that 'safe' parameters regarding biodiversity loss have been overwhelmingly transgressed, with potentially profound consequences for ecosystem stability across the Earth. In the 10 years since the publication of this work, an increasing number of natural scientists have begun to discuss these acute alterations to the composition of the biosphere as indicative of a sixth mass extinction event (see Barnosky *et al*., 2011; Ceballos *et al*., 2015; McCallum, 2015; Ceballos, Ehrlich & Dirzo, 2017). In this manner, such authors draw comparisons with historic global biotic losses discussed in the field of palaeontology, in the course of asserting that contemporary biodiversity declines constitute a phenomenon previously undocumented in all human history.

Away from the pages of paywalled academic journals, beyond the comfort of the ivory tower, engaged scientific experts seek to transpose and communicate these environmental concerns within the realms of national and international policymaking. In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), a transnational research body comprised of 134 member states that seeks to inform and influence decision makers, released a draft version of its *Global Assessment Report* – a wide-ranging synthesis of academic analysis detailing best estimates relating to the contemporary status of biodiversity decline. In the press release for the report, Sir Robert Watson, then Chair of the IPBES is quoted pronouncing: 'The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide' (IPBES, 2019). These academic and policy-oriented interventions represent individual threads of larger a discursive quilt, which provide examples of what the Marxist geographer Erik Swyngedouw has termed 'apocalyptic imaginaries' (Swyngedouw, 2010: 214). Taken together, the disturbing narrative that emerges is that we are living through a truly significant socio-ecological epoch that will have – and is having – profound implications for the continued reproduction of human and non-human life. But what measures are being proposed to

[1] At the time of writing, in March 2020, this paper has been cited 8406 times according to Google Scholar. See Brown (2017) for an extended examination of the concept in the pages of *Progress in Human Geography*.

overcome this multi-faceted socio-ecological crisis? And how are governments and multi-lateral governance institutions seeking to reconfigure and re-regulate political and economic systems in such unprecedented times?

Presently, the hegemonic set of public policy responses to biodiversity decline, and other interlinked forms of environmental crisis, are heavily tied to the mobilisation of market forces to meet the elusive goal of establishing a 'green [capitalist] economy' (see UNEP, 2019). The IPBES report briefly alluded to above provides a small window into this animated and emergent project. Nested among a set of policy recommendations that follow the report's doom-laden pronouncements – between related calls for payments for ecosystem services and more radical proposals to decentre economic growth – sits a growing phenomenon known as 'biodiversity offsetting'. In recent years, this particular conservation approach has received increased attention and has diffused rapidly across the globe, appearing on the agendas of many an environmental ministry, non-governmental organization (NGO), and private sector institution.

In response to the elevation of offsetting in the midst of extraordinary anthropogenic biodiversity decline, this monograph provides a comprehensive and extended examination of one such manifestation of this policy instrument, informed by analytical tools largely taken from the field of political ecology. In doing so, the analysis that unfolds over the course of this thesis homes in on the operation and formation of a recently legislated national system in the tropical context of Colombia. The remainder of this introductory chapter unfolds as follows. To begin contextualizing the thematic parameters of this work, the following section provides a brief overview of the nature of biodiversity offset policy and the broader institutional context of its mounting prominence. These passages are then followed by a concise and selective overview of the socio-ecological conditions within which Colombia's experimentation with biodiversity offsetting is unfolding. The penultimate section of the chapter moves on to detail the rationale that lies behind this doctoral thesis, situating the work within existing literature and highlighting the contributions that this thesis has sought to provide. To end this sub-section, I set out the overall research questions posed. Finally, the chapter concludes by setting out the general structure of this monograph, succinctly detailing the form of each of the chapters that follow.

The Rise of Biodiversity Offsetting

This thesis sets out to explore the political ecology of an evolving national conservation policy in the biodiversity-rich nation-state of Colombia. Specifically, the analysis that follows delves into the complex web of socio-ecological relations that constitute the world of the *Manual for the Assignation of Compensation for Biodiversity Loss* (MADS, 2012a). Indicative of a broader international trend, this policy document is part of a wider constellation of instruments and voluntary corporate actions that are grouped together under the heading of biodiversity offsetting. Schemes of this nature seek to reconcile the historically conflictual relationship between economic development and environmental conservation. In attempting to achieve such a resolution, state-led forms of biodiversity offsetting place additional regulatory obligations on private firms engaged in ecologically destructive project development. These requirements take the form of compensatory activities, which generally refer to additional biodiversity conservation and/or ecological restoration measures financed by firms responsible for specific instances of environmental degradation. In this way, proponents of offsetting have framed the policy as a clear 'win-win', with the private sector being made to account for the

environmental implications of project design in response to what advocates posit as an internalization of ecological costs of production (see Treweek, 2009; Tew, 2011).[2]

The Business and Biodiversity Offset Programme (BBOP), an influential transnational network of organizations that promoted the use of the approach, defines biodiversity offsets as 'measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken' (BBOP, 2013: 4).[3] The broad nature of the BBOP definition captures the plurality of institutional and regulatory arrangements that constitute both voluntary and state-led systems of biodiversity offsetting. Indeed, even when one only considers state orchestrated mechanisms, there lies significant variation among the form and operation of such schemes in practice. According to the OECD (2016), public policy forms of biodiversity offsetting can be divided into three generalized categories: one-off offsets, biobanking, and *in-lieu* fee programmes. One-off offsets refer to instances where a private firm responsible for an impact undertakes the offset requirement themselves or finances work undertaken by a third party (such as an NGO or environmental consultancy). Biobanking, also referred to as mitigation banking, denotes overtly marketized regulatory schemes, where landowners in possession of areas set aside for offsetting are able to sell 'credits' to developers seeking to comply with compensation obligations. Finally, *in-lieu* fee programmes operate as a form of earmarked conservation payment, where state regulatory institutions demand a levy from environmental damaging firms that is then channelled into state managed compensatory activities.[4]

Increasingly, offset policies are being framed around the objective of achieving 'no net loss' to ecological systems, where desired environmental gains derived from compensation activities are said to balance out the loss of biodiversity recorded at sites of ecological degradation (see BBOP 2012; Aiama, 2015). In the same way, the notion of 'ecological equivalency', between impact and (projected) gain, has also become a central organizing principle that characterizes the roll out of regulatory compensation systems. The BBOP definition stated above also alludes to the necessity of preventative avoidance measures, prior to the implementation of ecological compensation measures. This sequence of actions has come to be known as the mitigation hierarchy, where offsets are posited as a 'last resort' – when all other possible mitigatory actions have been exhausted.

The embrace of offsetting as a public policy approach has been promoted at the highest levels of international conservation politics for well over a decade. In 2008, during the ninth Conference of Parties of the United Nations Convention on Biological Diversity (CBD) assembled parties adopted the Strategy for Resource Mobilization (UNCBD, 2008). Alongside environmental fiscal reform, establishing markets in 'green products', and 'business-biodiversity partnerships', offsetting is highlighted in the document as one of several 'innovative financing mechanisms', which are presented as key opportunities to support the

[2] Throughout this thesis I use the terms offsetting and offsets to refer specifically to practices related to compensation for biodiversity loss. This is done in full knowledge of the related suite of voluntary and regulatory practices known as carbon offsetting, which have been mobilized in response to the climate crisis (for an overview, see Lovell & Liverman, 2010; Corbera & Martin, 2015).

[3] The influential BBOP network ceased to operate in 2018, but was made up of 130 environmental NGOs, government ministries, corporate interests, offset service providers, and financial institutions united in the promotion of offsetting as a policy solution (Forest Trends, n.d.). For an extended discussion on the history of BBOP and its relationship with extractive enterprise, see Benabou (2014).

[4] However, as the OECD (2016) report makes clear, the division between these categories is often blurred as many systems integrate elements of each generalised category into the operation of particular forms of offset policy.

overarching goals of the convention. Within the framework of the CBD, offsetting continues to be advocated as a means of leveraging private capital for the purposes of meeting national biodiversity conservation objectives (see CBD, 2017; BIOFIN, 2020).

As noted previously, offset policies have proliferated significantly across the globe during the last decade. Recent research by Forest Trends' Ecosystem Marketplace, a strong advocate for the roll out of market-based approaches to environmental management, finds that 99 national level schemes are operational worldwide (Bennett, Gallant & ten Kate, 2017). In comparison with the organization's previous analysis, carried out only 6 years prior, the number of schemes at a national scale has more than doubled within this relatively brief time period (see Masden *et al*., 2011).[5] While this increase in legislative adoption points to the success of those that have advocated for such schemes, biodiversity offsetting remains a notably disputed policy instrument. Indeed, its elevation within national and international conservation discourse has sparked vocal concern across civil society organizations and within activist circles (see Giulia, 2017; WRM, 2017). In 2013, during the World Forum on Natural Capital held in Edinburgh, 140 civil society organizations from across the globe signed a joint statement declaring 'No to Biodiversity Offsetting'.[6] The declaration decries such schemes as a 'false solution', unable to adequately address biodiversity loss, another example of 'green washing', with the capacity to inflict negative impacts on local communities through the loss of access rights and displacement (REDD Monitor, 2013).[7]

Critical engagement with the practice of offsetting has not been the sole preserve of dissenting voices emanating from civil society. Within the academy (and aside from critical social science literature covered below), there has been considerable technical and ecological analysis that has cautioned against biodiversity offset schemes' practical capacity to meaningfully achieve the environmental balancing act asserted by advocates (see Walker *et al*., 2009; Bekessy *et al*., 2010; Curran, Hellweg & Beck, 2014). Much of the existing evaluation informed by the environmental sciences has engaged with experiences in the United States (US), where state-led offsets, in various forms and under different regional governmental administrations, have been in operation since the 1970s (Robertson, 2000). However, even in this context, the biodiversity gains promised by offset arrangements have often failed to materialize when subjected to empirical scrutiny (see Brown and Lant, 1999; Sudol and Ambrose, 2002; Mack and Miacchion 2006; Kettlewell *et al*., 2008).[8]

Megadiversity Offsetting in Colombia

With the globalization of the modern conservation movement (see Zimmer, 2004), the Colombian landmass has for a long time occupied a special place in the minds of international experts and environmental NGOs on account of the huge variation in environmental conditions that constitute the country's state territory. According to the National Environmental

[5] Bennett, Gallant & ten Kate's (2017) analysis also highlights how worldwide annual transaction value in environmental compensation during the year 2016 had also doubled since their research back in 2011.
[6] The World Forum on Natural Capital was a major international conference organized around identifying strategic opportunities for government and business leaders opened up by efforts to reframe the non-human world as composed of natural assets that provide services to society. For a critical overview of the origins and evolution of natural capital discourse, see Sullivan (2014).
[7] Moreover, as part of the same 'Nature Not for Sale' campaign, 9379 individuals and 68 organizations across Europe signed an open letter denouncing offset policy during an open consultation held by the European Commission on the application of biodiversity offsetting within the European Union (Nature Not for Sale, n.d.).
[8] Moreover, reflecting a reoccurring issue found internationally, there remains insufficient data and analysis with which to properly assess the ecological impacts of systems in the US context (Robertson & Hayden, 2008).

Information System of Colombia, the country's territory is said to be home to around 10% of all known species on Earth, with total of 56,724 documented individual forms of flora and fauna (SIAC, n.d.). This exceptional diversity of recorded species is understood as a product of the extreme bio-physical and topographical variation that make up the geographies of the Colombian landmass, where rural communities live amongst landscapes as diverse as Caribbean coastlines, arid deserts, snow-capped peaks, and humid tropical forests. Indeed, the altitudinal variation found in Colombia results in significant differences in temperature and levels of precipitation vary wildly across the country. The tripartite Andean mountain range that cuts across the Colombian land mass, stretching from the Ecuadorian frontier up towards the northern border with Venezuela, reaches altitudes just shy of 6000 metres, the formation of which established the environmental conditions for significant species endemism (Young *et al.*, 2002; Kattan *et al*., 2004).

The global significance of Colombian environments was elevated greatly within international conservation discourse in the wake of two important, and highly influential, conceptual developments in the field of macroecology (Chaves-Agudelo *et al*., 2015). Since its first articulation by Myers (1988), the notion of 'biodiversity hotspots' has retained notable currency within conservation circles and continues to inform the spatialities of international conservation funding and intervention. In brief, the notion of hotspots refers to a small collection of species rich zones understood to possess high levels of endemic flora, whilst simultaneously characterized by significant levels of habitat degradation (more than 70%). From its first usage, areas of the Colombian landmass have featured within various iterations of the idea. Myers (1988: 187) preliminary thesis identified 10 'threatened biota', which included the Choco region of the Colombian Caribbean and Amazonia.[9] The environmental profile of Colombia was also elevated significantly with the creation and development of Mittermeier, Gil & Mittermeier's (1997) influential categorization of 'megadiverse' countries, which labelled Colombia as 1 of only 17 nation-states set apart on account of the sheer volume of recorded endemic and diverse species.

While cross-comparative biotic analysis has marked out the country for its endemic species and biodiversity richness, Colombia has also been highlighted as having an extremely poor record regarding documented cases of socio-environmental conflict, which are largely driven by the expansion of capital accumulation strategies in rural zones. According to analysis and mapping exercises carried out by the major Environmental Justice Organizations, Liabilities and Trade project – led by renowned ecological economist Joan Martínez Alier – Colombia is one of the highest ranked countries internationally in terms of documented conflicts of this nature (Environmental Justice Atlas, n.d.). As the Colombian project lead of the initiative has discussed, these recorded struggles are principally tied to the proliferation of hydrocarbon and mining projects, indicative of the country's embrace of an almost continent-wide extractivist growth paradigm that has reconfigured Colombian landscapes during the last 15 years (Pérez-Rincón, 2014).

[9] Subsequent expansion and development of the concept led to the growth of the list to 25 international sites, which includes 2 zones that overlap with Colombian territory: the Tropical Andes and region of Choco/Darien/Western Ecuador (see Mittermeier et al., 1998; Myers *et al*., 2000).

Map 1: Colombia

Source: PAT (n.d.)

Amid the hegemony of extractivism and ongoing disputes between rural peasant communities impacted by interventions on the part of fractions of extractive capital, Colombia's environmental ministry – in concert with several of the world's most established international environmental NGOs – set to work constructing a national system of biodiversity offsetting in 2008. Eventually, the *Manual for the Assignation of Compensation for Biodiversity Loss* was ratified with the passing of Resolution 1517 in 2012 and came into force at the start of 2013.[10] The policy adopts many of the hallmarks of such compensation schemes elsewhere, with the objective of no net loss to biodiversity taking centre stage, alongside the notion of ecological equivalency, and the application of offsetting as part of a mitigation hierarchy. The policy functions through the country's land-use planning system and is

[10] Henceforth, this policy document is referred to as the Manual (2012).

applicable to large-scale projects within the infrastructure, mining, electrical, hydrocarbon, and maritime/port sectors – which are regulated by a centralized national environmental licencing authority. The system operates on a one-off offset basis, where obligated firms are tasked with co-ordinating private offset actions. With the codification of the Manual (2012), major sectors of the Colombian economy suddenly became legally responsible for delivering and financing large-scale conservation and ecological restoration projects on behalf of the Colombian state.

The implementation of this research work occurred in the midst of a truly momentous socio-political conjuncture. As I arrived in Colombia mid-way through 2016, after over half a century of complex and violent civil war, representatives from two of the country's most significant armed protagonists were engaged in peace talks in the Cuban capital city of Havana – the leftist guerrilla organization the Revolutionary Armed Forces of Colombia (*Fuerzas Armadas Revolucionarias de Colombia*, FARC) and the Colombian state. The eventual agreement that was struck between both parties was then subject to a national plebiscite in October 2016, ending with a largely unforeseen victory for the coalition of right-wing forces that had voraciously campaigned against the transitional agreement. Despite the rhetoric of peace, agrarian reform, and post-conflict, events since the Colombian National Congress accepted a revised version of the Havana Accords represent a marked shift from the palpable optimism that seemed to linger in the popular press during late 2016. Unfortunately, the post-agreement epoch has been characterized by a reconfiguration of the geographies and modalities of violence, rather than significant steps toward their resolution. Evidence of this assessment is laid bare by the horrific rise of brutality against progressive forces engaged in local-level struggles for human rights, land reform, and social and environmental justice. A joint report released in May 2019 by *Indepaz* and *Marcha Patriótica* documented a total of 702 social leaders and 135 ex-FARC combatants that had been murdered since the purported post-conflict era commenced (El Espectador, 2019). This is what Colombian political ecologists Diana Ojeda and María Camila González (2018: 89) have neatly described as 'The paradox of post-conflict amid war'.

Unsurprisingly, the demobilisation of the FARC has had significant effects on Colombian political ecologies, as state and non-state regimes of environmental governance have shifted in the territorial power vacuums that were left as the FARC transitioned from guerrilla group to political party, leaving behind its rural strongholds – colloquially known as 'red zones'. In the wake of the Havana Accords, the environmental repercussions of a possible 'post-conflict' Colombia have been the subject of a slew of comment pieces written in the national and international press (e.g. Bustos & Jaramillo, 2016; Betancur Alarcón, 2019; Parado Ibarra, 2019). This theme has also been the driver behind a host of scholarly interventions that have appeared within the pages of major scientific journals (Baptiste *et al.*, 2017; Negret *et al*., 2017; Readon, 2018; Salazar *et al*., 2018). Reflecting on the politics of conservation and land use planning, these articles reflect mounting concerns over the potential of heightened natural resource extraction and agricultural expansion in coming years, as foreign and domestic capital moves into zones previously considered too risky for investment owing to the presence of armed forces and attendant social geographies of violence. In the context of this 'political ecology of transition' (Le Billion, 2000: 785), biodiversity offsetting has emerged as one of several core policy instruments employed by the Colombian state in the face of potential large-scale environmental consequences, tied to accelerated rural economic development, forecast in the wake of the country's historic peace deal.

Rationale Behind this Research

This thesis seeks to further contemporary debates within critical quarters of the social sciences around the application of biodiversity offsetting and broader discussions pertaining to the political ecology of contemporary state-mediated, yet market-based, environmental governance regimes. While productive insights have been gleaned from existing works covering biodiversity offsetting, the overwhelming empirical focus of said studies has been firmly placed on a handful of systems operating in countries found in the Global North. As noted in the brief discussion above, the ongoing proliferation of offset systems is a truly international phenomenon, which is composed of a diversity of state-orchestrated regulatory and institutional governance arrangements. If one surveys the contributions of existing critical engagement it becomes clear that their focus has been heavily skewed towards the development and operation of schemes in the United Kingdom (e.g. Sullivan, 2013; Carver, 2015; Lockhart, 2015; Apostolopoulou & Adams, 2017; Carver, 2017; Carver & Sullivan, 2017) and the US (e.g. Robertson, 2000; 2004; 2006; Pawliczek & Sullivan, 2011; Barral, 2020). Additional studies focused on the Global North have provided insight into schemes in France (Dauguet, 2015), Spain (Maestre-Andres *et al.*, 2020), and Australia (Hillman & Instone, 2010).[11] In this manner, the full gamut of legal and institutional governance arrangements that fall under the umbrella term of biodiversity offsets has yet to be subject to sustained empirical and conceptual analysis, informed by insights from political ecology. Owing in part to this geographical bias, current critical analysis of ecological compensation systems within human geography and cognate disciplines has strongly prioritized the examination of schemes premised on processes of commodification, or biobanking in the terminology of the OECD (2016).

The literature's almost exclusive focus on offset schemes based on systems of commodity exchange is likely to derive from a wider trend within critical studies of environmental policy/governance, where analyses of processes of neoliberalization have constituted a central thematic pillar for well over a decade (see Bakker, 2010; Castree, 2011; Büscher *et al*., 2012; Fletcher *et al*., 2014; Bigger & Dempsey, 2018). Although not exclusively, these works are often directed toward exploring the expansion of frontiers of capitalist relations into environmental management, through the privatization, commodification, and marketization of aspects of non-human nature. By exploring the emergence and early implementation of Colombia's national system of biodiversity offsetting, this study provides an opportunity to explore and dissect the workings of a system that is not premised on the sale of 'credits' as the means of allocating and distributing purported environmental gains. As Apostolopoulou, Greco & Adams (2018: 881) have recently argued 'a nuanced understanding of biodiversity offsetting requires consideration of its breadth of implementation'.

Furthermore, despite the state-orientated nature of many of the empirical cases explored in the literature, existing engagement has largely shied away from deploying the SRA as a means of conceptualizing and making sense of biodiversity offsetting in practice.[12] In response to this lacuna, this work is a sustained attempt to ontologically bring forward 'the state' as a locus of analysis, with the purpose of examining how the formulation and implementation of offset policy is itself the result of political manoeuvring by social forces both within and beyond the formal institutional apparatus of the state. In doing so, this contribution reflects a broader invigorated move to bridge conceptual discussions between the fields of political geography

[11] Work carried out by Brock (2015) on biodiversity banking in Malaysia is the exception to this general trend.
[12] The exception to this trend comes with Robertson & Wainwright's (2013: 890) work on the 'value of nature to the state'. However, this paper largely centres on disputes over how 'value' should be conceptualized during the evolution of mitigation banking in the US, with the SRA making a modest appearance at the end of the article.

and political ecology via engagements with 'the state' (see Harris, 2017; Loftus, 2020). By theorizing the role of state-centred relations in the production of nature and territory, this analysis has also sought to explore how the emergence of environmental policy reconfigures institutional orders of governance in the course of mobilizing the labour and organizational capacities of actors external to formal state institutions. In doing so, the present study responds to calls to foreground and explore the concrete acts of cultural and intellectual labour that constitute the semiotic and material production of nature (Ekers & Loftus, 2013; Kirsch, 2014).

In the course of selecting Colombia as the case study for research, this PhD has also drawn upon and seeks to contribute to existing empirical analyses that have explicitly focused on the politics, institutional forms, and implications of Colombian state conservation strategies (see Asher & Ojeda, 2009; Palacio, 2010, 2011; Ojeda, 2012; Ojeda & Camila González, 2018). Building upon many of the themes of these works, this research's engagement with offsetting has sought to forward understandings of the changing nature of territorial discourse emanating from the realms of formal Colombian state institutions, with the purpose of exploring how agrarian political economy impedes and is reconfigured by changing socio-environmental regulatory frameworks and associated semiotic constructions of nature.

Based on the above rationale, this doctoral investigation responds to the following set of research questions:

1. What form does the institutional ensemble of actors take during the production of equivalent natures?
2. How do involved actors use their position in relation to the state to forward their own objectives around biodiversity offsetting?
3. What practices and processes characterize the forms of labour required to produce nature as equivalent within Colombia's offsetting framework?
4. What tensions emerge in the implementation of 'no net loss' discourse?
5. How does biodiversity offsetting reconfigure agrarian relations in Colombia?

Outline of the Thesis

The second chapter of this thesis sets out the theoretical framing that has acted as an ideational handrail throughout the execution of this research project. In general terms, I situate this work within the ever-expanding and diverse field of political ecology, which is broadly concerned with critically informed theorization of socio-environmental relations, processes, and effects. Although progressively pluralist in nature, the conceptual apparatus I employ draws heavily on a neo-Marxian tradition that continues to constitute the basis of much of the field. With the purpose of elevating state-centred relations in this analysis, I develop a framework that utilises concepts taken from Jessop's (2008; 2016) strategic-relational approach (SRA) to the state, which helps to move away from totalizing ideas of state power toward a relational notion of diverse institutional power centres, with particular organizational interests in the sphere of offsetting. This framing is used in combination with ideas taken from Ioris' (2014) recent work on the political ecology of environmental statehood and the Foucauldian inspired notion of 'geopower' (see Luke 1995; Parenti, 2015). Together, this approach is constructed with the purpose of exploring offsetting as a state-orchestrated governance regime that results in discursive and material productions of nature. In forwarding this reading, technologies of geopower are also coupled with insights derived from the emerging study of 'critical metrology' (Cooper, 2015: 1787), linked to works in the field of science and technology studies. Finally, the adoption and operation of the Manual (2012) is theorized in relation to concepts derived from the Regulation Approach to institutional political economy, which

enables an entry point with which to consider how attempts are made to overcome the (ecological) crisis prone nature of capitalist relations. This perspective is employed in concert with Marxian-inspired works within human geography that have theorized the reconfiguration of regulatory regimes and environmental governance as forms of ecological or socio-ecological fix (e.g. Castree, 2008; Ekers & Prudham, 2015).

In Chapter 3, I set out the methodological approach that has informed the operation and analysis of this research. This section begins with a discussion of the ontological and epistemological commitments that form the basis of this thesis. In doing so, I outline and defend the central tenants of critical realism as a philosophy of science, which performs the role of a philosophical 'under-labourer' (Sayer, 2000) throughout this work. Having set out these more abstract methodological considerations, the chapter then moves on to outline the qualitative methods utilized for data collection and addresses practicalities faced when undertaking fieldwork in Colombia. This research relied heavily on semi-structured interviews with key informants involved in the development and implementation of the policy, with a total of 74 individual and group interviews carried out with 103 separate participants. Drawing upon an array of legal, technical, and grey literature pertaining to the operation of the policy, this analysis was also supplemented by additional qualitative data in the course of carrying out secondary document analysis. Finally, the chapter discusses my positionality as a foreign researcher and summarizes ethical considerations that were tackled in the course of undertaking this project.

Chapter 4 is the first of three major discussion chapters that constitute the empirical and analytical basis of this thesis. In this section, I draw heavily on theoretical insights taken from Jessop's (2016) SRA to the state in combination with Ioris' (2014) work on environmental statehood. In operationalizing these components of the conceptual apparatus, I examine the ensemble of social forces and interests brought into orbit with one and other through the formulation and initial implementation of Colombian offset policy. This analysis begins by historicising the institutional architecture of environmental statehood with the purpose of contextualizing the emergence of the Manual (2012) in the midst of an extractivist-orientated regime of accumulation. In doing so, the discussion explores the institutional manoeuvring on the part of affiliated social forces as they seek to obstruct, influence, or exploit the operation and political spaces opened up through offset governance configurations. In this way, this chapter is principally concerned with responding to the first and second research questions that have been outlined above.

In the fifth chapter of this thesis, I examine concrete forms of cultural and intellectual labour that characterize processes by which distinct fragments of Colombian territory come to be constructed as 'equivalent', through the operationalization of offset policy. In doing so, this analysis examines the cartographic construction of equivalency through the production of state-centred metrological practices and demonstrates how such actions are built upon a broader history of statecraft, which establishes a governable and calculable form of territory. Drawing on recent work by Parenti (2015) and others, the development and implementation of offsetting is theorized as, and enacted through, an assortment of metrological technologies of geopower, which are orientated toward particular forms of the 'governmental production and management of territorial space' (Ó Tuathail, 1996: 6 cited in Parenti, 2015: 835). In undertaking this analysis, the application of offsetting as a form of knowing natures is shown to be a digitally mediated exercise, established through the use of remote satellite imaging and geographical information system (GIS) mapping software, which results in the construction of new semiotic objects of nature. This discussion's focus on the experiences of a labour force tasked with carrying out offset arrangements exposes the practical and epistemic issues that arise in the

course of enacting the policy's ecological equivalence frame. In examining these aspects, the analysis engages with broader obstacles in the path of offsetting associated with the country's historically contingent agrarian relations, in addition to reoccurring cartographic inconsistencies that undermine the basis of equivalence. By focusing on these thematic points, the discussion that constitutes this chapter seeks to develop responses to the third and fourth research questions set out in the study rationale above.

In Chapter 6, the third and final empirical analysis section, I explore further tensions that arise in the course of the implementation of offsetting and theorize the political economy of the Manual (2012) as a form of state-mediated socio-ecological fix, which is framed as a resolution to the environmental degradation wrought by the country's extractivist model of development. In undertaking this analysis, the discussion asserts that the Colombian offset system principally operates as means of diverting surplus value produced by firms obligated to comply, in contrast to existing critical literature that has primarily explored offsets as a form of capital accumulation in and of themselves. This discussion also critically engages with and unravels the policy's central objective of no net loss to biodiversity, drawing upon the perspectives and everyday experiences of a diverse web of actors that labour to implement and regulate offsetting within the policy's legal framework. This includes an examination of the regulatory realities of key pillars of offset discourse, including the production of environmental baselines, the application of a mitigation hierarchy, and the epistemic boundaries of ecological restoration in the tropics. Directing attention toward the origin of offset practices, the state, I argue that the system is productively conceived as a means of state-orchestrated territorialization and demonstrate how initial implementation has served to bolster existing strategies of green territorial control. In this way, this chapter primarily engages with the fourth and fifth research questions that have guided this doctorate.

In the final chapter of the thesis, I draw together the principal findings of this research as a whole and discuss each set of conclusions in relation to the research questions that have motivated and guided this academic project. This concluding section of the thesis also reflects on some of the limitations that have characterized this analysis of offsetting in the Colombian context, whilst at the same time connecting these concerns with potential future prospects for research. Specifically, I argue that this macro-level exploration of the Manual (2012) needs to be combined with case study analysis of particular offset projects to gain further insight into the socio-ecological repercussions of the scheme on the ground in Colombia – and in the Global South more broadly. As biodiversity offset governance regimes continue to gain popularity in policy-making circles social science analysis must play a key role in highlighting how their use impacts marginalized actors and interests within existing relations of power and domination.

2

Towards a Political Ecology of Biodiversity Offsetting in Colombia

> *Theorists thus do intellectually what clinical researchers do surgically. They dissect a whole (e.g. a social system, a particular city) in order to inspect the parts so that the particular function of these parts and their inter-relationships can be understood* (Castree, 2010: 1735).

In this chapter, I lay out the theoretical apparatus that is employed to make sense of the formulation and roll out of biodiversity offsetting in the empirical case explored throughout this thesis. With this objective, I outline and draw upon a range of what I perceive to be complementary approaches and areas of enquiry that provide fertile conceptual ground with which to examine the range of socio-ecological relations, processes, and analytical objects that relate to the application of biodiversity offsetting in Colombia. The emergence of offset schemes, and state environmental policies more generally, take place within and through historically contingent sets of political, economic, and socio-ecological relations. In this way, the exploration of the application of biodiversity offsetting raises a host of lofty conceptual questions regarding how one should approach the study of state-society, state-environment, and socio-environmental relations more broadly.

In order to address these interlinked ideas, I begin by situating this work within the scholarly and activist tradition of political ecology. In this first section, I discuss some unifying principles that provide coherence to this body of work before moving on to outline the ways in which the notion of nature has been approached within this sphere of thought. In the following section, I outline the utility of Jessop's (e.g. 2016) SRA to the state to draw out key ideas that can be applied to conceptualize the formulation and implementation of the environmental policy in question. With the aim of enhancing this approach for the purposes of political ecology research, the discussion then moves on to discuss recent works that have explicitly sought to forward critical understandings of state-environment relations. After this, I draw upon ideas taken form the Regulation Approach and then move on to examine Marxian theorization surrounding the notions of spatial, institutional, and socio-ecological fixes. In doing so, I explore how these ideas have been related to environmental governance practices with the objective of critically analysing socio-ecological relations and the nature(s) of contemporary capitalism. Throughout these discussions, I situate existing critical literature on biodiversity offsetting within the broader thematic divisions that constitute the chapter as a whole. In this way, I acknowledge the centrality of previous analyses in developing the theoretical framing of this work and signpost some of the thematic contributions made by this thesis. In the final section, having surveyed varied and interrelated approaches, I tie together the overarching conceptual framework established by way of a conclusion.

Political Ecology and the Study of Socio-ecological Relations

I situate this work within the theoretically pluralistic tradition of political ecology, which operates as a form of meta-frame that connects the varied schools and literatures that I discuss over the course of this chapter. Proponents of political ecology can come from many disciplinary homes (such as human geography, anthropology, sociology, to name a few!) and conceptually approach the study of socio-ecological relations in a myriad of different ways. The diversity that characterizes the field have led some to depict those that engage in scholarly and/or activist labour under a political ecology banner as simply a 'community of practice' (Robbins, 2012: 20; Meehan & Molden, 2015: 441), rather than a coherent discipline, differentiated by rigid modes of thought or strict ontological commitments.[13] In his widely cited and pithy description, Robbins (2012: 13) contrasts the work of political ecologists against what he refers to as 'apolitical ecologies'. In doing so, this position juxtaposes political ecology endeavours against dominant modes of conceptualizing environmental concerns, found within fields such as ecology, which negate the normative and inherently politicized dimensions of such forms of knowledge production and their application. While attempts at defining this community of practice are perhaps destined to fail at capturing its full diversity, I highlight a few existing attempts here in order to demarcate the particular approach developed and employed in this thesis. In their widely read edited volume, *Liberation Ecologies* (1996), Peet & Watts (1996: 6) broadly articulate the practice of political ecology as 'a confluence between ecologically rooted social science and the principles of political economy'. For Palacio (2006: 147), political ecology 'is an inter and trans-disciplinary field of discussion that considers and discusses relations of power relating to nature, or parts of it, in terms of its social fabrication, appropriation, and control by different socio-political agents'.

While there is much that differentiates the theory and praxis of political ecologists, there are a few commonalities that can be said to establish a shared sense of purpose and meaning amongst its practitioners and followers. According to Bridge, McCarthy & Perreault (2015: 7), these include 'a *theoretical commitment* to critical social theory and a post-positivist understanding of nature and the production of knowledge about it, which views these as inseparable from social relations of power'; 'a *methodological commitment* to in-depth, direct observation involving qualitative research' (*ibid*.); and 'a normative *political commitment* to social justice and structural political change (*ibid.*: 8). In light of the particular 'theoretical commitment' articulated above and Palacio's (2006: 147) allusion to 'social fabrication', it is worth unpacking and expanding upon this 'post-positivist' dimension, which underlies many of the intersecting literatures explored over the course of this chapter.

Contemporary political ecology approaches move beyond the idea that 'nature', or particular iterations of the idea of nature (such as biodiversity, primary forests, or ecosystems), can be treated as an unproblematic ontological given, divorced from history and contingent social relations that serve to imbue such terms with meaning. Taking hold in the early 1990s onwards, a suite of theoretical approaches, operating across a diversity of academic spheres in the social sciences, sought to critically interrogate the apparent 'nature of nature' (Castree, 2001: 5; Nygren & Rikoon, 2008: 768), coming to be grouped under the category of the 'social construction of nature' (Castree & Braun, 1998; Proctor, 1998; Demeritt, 2002). These academic currents emerged from discursive approaches grounded in post-structuralist critique, informed by the likes of the French philosopher Michel Foucault; a growing field of science and technology studies; and, ontological innovations occurring through the development of actor network theory (Castree & Braun, 1998; Demeritt, 2002). Whilst simplifying differing

[13] In concluding a recent edited handbook on the field, McCarthy, Perreault & Bridge (2015: 621) go as far to assert that 'political ecology is whatever anyone is doing and calling political ecology'.

claims somewhat, a unifying thread across much of this literature relates to an understanding that the production of knowledge regarding the environment arises from particular historical and socio-cultural practices, which are dynamic and subject to change over temporal horizons. In this way, and in contrast to forms of positivism and naïve realism, our ideas regarding the nature of reality (and objects of nature, specifically, in this context) should not be accepted as unchanging 'truths' that unproblematically reflect their referents. Within political ecology, the consolidation of such approaches resulted in a theoretical and empirical reorientation, which began to place greater emphasis on the centrality of particular forms of environmental knowledge in the (re)production of social relations of power and their connections to forms of environmental access, control, and appropriation.[14] In the wake of these discussions, most political ecology work has embraced a (largely) soft constructivist take on 'social nature' (Castree & Braun, 2001: xi) that simultaneously maintains an ontological commitment to the materiality of human and non-human natures (Robbins, 2012).

Beyond the notion that our ideas of nature are socially produced, political ecology has also been attuned to the ways in which non-human natures are materially (re)constituted through social practice. For members of this community of practice that draw inspiration from the Marxist canon, this position is often traced back to notes by Marx that situate human labour as one of many material forces of nature (see Swyngedouw & Heynen, 2003; Robertson & Wainwright, 2013; Parenti, 2015). In the words of Marx (referring to the labourer here):

> *'He opposes himself to nature as one of her own forces, setting in motion arms and legs, head and hands, the natural forces of his body, in order to appropriate nature's productions in a form adapted to his own wants'* (Marx, 1967: 177 cited in Smith, 2010b: 54).

Developing scattered insights left by Marx on the subject of nature, Neil Smith's influential text *Uneven Development: Nature, Capital and the Production of Space* (2010b) sets out the argument that, despite dominant perceptions of nature as 'external', what is commonly referred to as nature can in fact be understood as the historical product of the social relations that constitute the labour process – encapsulated in his memorable phrasing of 'the production of nature' (Smith, 2010b: 49). Put simply, labour's metabolic interaction with the rest of nature can be said to actively produce new material forms, ensembles, and entanglements. In considering this position, the apparent delineation between that which is 'social' and that which is 'natural' collapses when one considers the historically contingent environmental forms existent today.[15]

This Marxian work on overcoming the nature-society dualism has been hugely influential within the sphere of political ecology, though it has not always been explicitly acknowledged (Bridge, McCarthy & Perreault, 2015). Indeed, the approach continues to be pushed in new directions. For example, critical of Smith's propensity to discuss labour in the abstract, Ekers & Loftus (2013) assert the need for greater empirical engagement with the 'multitudinous' dimensions of real-world labouring that feed into the material reconfiguration of putatively 'natural' forms. Drawing on the historicism of Antonio Gramsci, they argue for the necessity to 'highlight the different types of concrete labour (artistic, intellectual, scientific, manufacturing) that are formative in the production of nature' (Ekers & Loftus, 2013: 235).

[14] Early works indicative of this shift include the post-structural political ecology outlined by Arturo Escobar (1996; 1999) and Peet and Watts' (1996: 263) discursive theorization of 'environmental imaginaries'.

[15] Indeed, as Swyngedouw (2011: 254) attests, in the Anthropocene present, where human action has been posited as the interruptive force that has ended the Holocene epoch, Smith's thesis 'has now been put firmly on the agenda' (see also, Millar & Mitchell, 2017).

Together with work by Eaton (2011) and Kirsch (2014), their discussion also opens up 'production' as an analytical device, encouraging further consideration of the importance of culture (i.e. meaning making) within scholarship that has tended to be been framed around materialist orientations.

Drawing on these more recent appraisals of Smith's production of nature thesis, in this examination of offsetting I understand the act of labour – understood in both an immaterial and material sense – as a unifying conceptual category, which is capable of tying together both the discursive (i.e. constructivist) and materialist notions relating to the social constitution of nature that have been discussed here. Such a perspective acknowledges that it is through concrete labour practices that specific ideational categories of nature are established and perpetuated, whilst remaining cognisant of the ways in which the materialities of environmental systems are reconstituted through human and non-human imbrications. In this way, I follow previous works that have formulated the production of nature as both a discursive and material approach to the study of socionatural relations (e.g. Castree, 1997; Castree & Braun, 1998; Swyngedouw, 1999; Asher & Ojeda, 2009; Parenti, 2015).[16]

A Strategic-Relational Approach to the State

As I mentioned in the introductory chapter, existing critical engagement with offsetting in the form of state policy exhibits a tendency to exclude the tools provided by strategic-relational state theory in the course of interpreting and interrogating the operation of these systems of environmental management. While the state often appears in these works (e.g. Robertson, 2004; Brock, 2015; Lockhart, 2015), the theorization of this 'messy concept' (Mann, 1984: 187) largely remains hidden and additional analytical value enabled through overt theoretical engagement with this approach is missed. With the objective of making sense of the operation of biodiversity offsetting, as a particular state policy implemented and regulated by state institutions, this section explores state theoretical contributions provided by the British sociologist Bob Jessop (1990; 2002; 2008; 2016).

Drawing upon 20th century European approaches to state theory, Jessop (2016: 26) builds upon what he describes as the conventional 'three-element approach', which conceptualizes states as being composed of three core features: '(1) a politically organized coercive, administrative, and symbolic apparatus endowed with both general and specific powers […] (2) a clearly demarcated core territory under more or less uncontested and continuous control of the state apparatus […] and (3) a permanent or stable population, on which the state's political authority and decisions are binding'. This triadic starting point is then complemented with an additional fourth dimension that relates to the peculiar capacity of state practices to discursively and materially (re)produce boundaries relating to territory, but also 'the demarcation of the political from one or more ostensibly non-political spheres' (*ibid*.: 48). In developing this fourth component, Jessop's approach seeks to accommodate the dynamic and interwoven nature of reified state-society relations, where the delimitation of commonly held binaries such as public/private are in constant flux and the 'institutional orders' of putatively separate non-state domains (such as the economy, religion, or civil society) are in reality heavily imbricated with 'state-mediated processes' (*ibid*.). It is this attentiveness to the permeable and fluid boundaries of mutually constitutive state-society relations, and its

[16] By theorizing biodiversity offsetting as specifically tied to the social production of nature, I draw upon an existing body of work (Robertson, 2000; Apostolopoulou & Adams, 2017; Apostolopoulou, Greco & Adams, 2018).

relevance for theorizing the nature and actualization of state power(s), that provides the basis for considering state policy and practice in the context of this research.

Beginning from Poulantzas' (see 2000) reworking of Marx's memorable insight that 'capital is not a thing, but a social relation between persons' (Marx, 1990: 932), the SRA proceeds from this relational proposition that understands states as constituted by social relations within and external to the formal institutions that comprise the state apparatus. In developing this formulation, Jessop posits that the state should be conceptualized as a: 'relatively unified ensemble of socially embedded, socially regularized, and strategically selective institutions, organizations, social forces and activities organized around (or at least involved in) making collectively binding decisions for an imagined political community' (Jessop, 2002: 40). However, the principle concern of the SRA is not to attempt to articulate a generalized template of the state, *per se*, but rather to 'study its changing forms, functions, and effects' (Jessop, 2016: 54).

According to the SRA, the articulation of state power(s) reflects the 'prevailing balance of forces [,] as this is institutionally mediated through the state apparatus with its structurally-inscribed strategic selectivity' (Jessop, 2003: 14). From this perspective, the capacity for social forces to achieve particular ends and implement associated strategies within a society is largely differentiated by said forces capacity to influence, and/or control, facets of the social ensemble that comprise the state. In this way, the state becomes a 'key site in the strategic codification of power relations' (Jessop, 1990: 248). However, the state operates as an uneven playing field, given that it does not provide the same level of opportunity to all social forces engaged in forwarding particular political interests, where existing state structures can act to filter and prevent the realization of counter-hegemonic projects. This is what Jessop refers to with his notion of the 'strategic selectivity' (*ibid*.) of the state. Yet, the SRA forwards a dialectical understanding of the inter-relationship between structure and agency, where structures are never fixed but, instead, are constituted, maintained, and potentially transformed through the strategic actions of agents. Thus, the structural context in which future strategic actions occur is conceptualized as dynamic and contingent on the outcomes of past political struggles. Moving beyond the notion that state systems operate autonomously as a collective whole, the SRA acknowledges that the state 'does not exist as a fully constituted, internally coherent, organizationally pure and operationally closed system but is an emergent, contradictory, hybrid and relatively open system' (Jessop, 1990: 346).[17] Any appearance of institutional or operative unity across the social relations that constitute the state are said to derive from the dominance of particular state projects, which act to give an impression of organizational coherence (Jessop, 2016).

This relational understanding of the state emphasizes the need to situate this ensemble within the wider social formation with which it is constituted, as state powers are not understood as simply flowing through the formal state apparatus. In the words of Jessop (2008: 1) 'there can be no adequate theory of the state without a theory of society. For the state and political system are parts of a broader ensemble of social relations'. This is why Jessop's view of the modern state is necessarily infused with a Marxian understanding of capitalist political economy, as a historically contingent and evolving mode of production. However, from this

[17] Interestingly, neo-Gramscian approaches to the state – of which the SRA is part – have frequently been applied in the course of understanding state-centred relations in the Colombian context (see Asher & Ojeda, 2009; Ballvé, 2013; Hristov, 2014). With the exception of Asher & Ojeda (2009), these studies have explored the ways in which contemporary Colombian statecraft has been evidently influenced and carried out in concert with illicit social forces external to the operation of the formal state apparatus – I refer here to a history of collusion between paramilitary and state forces.

perspective, this is not to suggest that the activities of capitalist states are reducible to the whims and fancies of capital, in the vein of some takes on Marxian state theory. On the contrary, even if successful strategic moves and structurally favourable conditions have led to the logic of capital maintaining a position of 'ecological dominance' (Jessop, 2002: 25) with regard to societalization, state managers quest to maintain legitimacy and adequate social cohesion will usually mean that they have 'regard to the codes, programmes, and activities of other functional systems and the dynamic of the lifeworld' (Jessop, 2008: 8).[18] In the present context, the development of environmental regulation is a case in point.

Having sketched out some key defining principals that characterize the SRA, for conceptual clarity, it is worth acknowledging some of the similarities and differences between Jessop's position and another approach, which is popular within the field of political ecology and human geography more broadly. Namely, Foucault's writings on governmentality, or his 'analytics of government' (Dean, 1999: 20), as laid out in his posthumously published lectures presented at the *Collège de France* between 1977 and 1979 (see Foucault, 2008, 2009). While I resist the temptation to discuss Foucault's later works at length here, it is of course necessary to provide a cursory outline of the approach in order to compare and contrast the SRA with the aforementioned works.[19]

Foucault introduced the notion of governmentality as a conceptual device to make sense of changing forms of 'governmental practice' (Foucault, 2008: 2), or the 'art of government' (*ibid*.), deployed from the emergence of early state formations in Ancient Greece to a nascent neoliberalism of the late 1970s, with the objective of governing subjects to achieve political ends. Drawing on Lemke (2007), Foucault's theoretical approach to the analytics of government can be summarized with reference to three defining elements. Firstly, in deploying the notion of governmentality, he relies on a distinctive form of historical nominalism 'that stresses the central importance of knowledge and political discourses in the constitution of the state' (Lemke, 2007: 43). Secondly, in seeking to make sense of contingent expressions of social relations of power, the analytics of government approach focuses on governmental rationalities and technologies, which 'denote a complex of practical mechanisms, procedures, instruments and calculations' (*ibid*: 50) organized to shape the conduct of a social body. Finally, states are constituted by diverse and conflicting governmentalities, which are challenged by both state and non-state actors that seek to bring forth alternative means of governing (*ibid*.).

As the reader may well have picked up on, there are clear points of conceptual alignment between Foucault's writings on governmentality and the SRA. For example, as argued by Biebricher, (2013: 396), both approaches eschew essentialized notions of the state and avoid depicting states as some form of 'intrinsic entity'. Moreover, each theoretical approach dispenses with the idea that states be considered as a unitary actor, or subject, opting instead to emphasize the conflictual and tension-ridden nature of statecraft (*ibid*.). Furthermore, Foucault and Jessop put forward analyses that problematize clear delineations between forms of state organization and their institutional surroundings, where state-society boundaries shift and evolve on account of the emergence of particular governmentalities, in the case of Foucault, or state projects, as articulated by Jessop (*ibid.*). Finally, the writings of both theorists pay close

[18] The notion of "ecological dominance refers to the structural and/or strategic capacity of a given system in a self-organizing ecology of systems to imprint its developmental logic on the other systems' operations far more than these systems are able to impose their respective logics on that system" (Jessop, 2002: 25).
[19] For an accessible, yet comprehensive, discussion of Foucault's governmentality approach and its contributions to state theory, see Lemke (2007).

attention to the semiotic, or discursive, dimensions of statehood and are attentive to the social construction of the very idea of the state (c.f. Abrams, 1988).

Despite these convergences, I argue that the approach adopted here provides further conceptual clarity than Foucault's work on governmentality, which has been described as 'more of a fragmentary sketch than an elaborated theory' (Lemke, 2007: 45). While the development of the SRA has clearly been influenced by a particular reading of Foucault's later works,[20] Jessop (2016: 173) has argued that analyses that draw heavily on the French Philosopher 'tend to focus on the logic, rationalities, and practices of government or governmentality in isolation from broader concern with the state's key role as a site in the collibration and institutional integration of power relations, modes of governance, and social domination'. Jessop's use of the term 'collibration' is important here, as it refers to the ways in which governments 'provide the ground rules for governance' (*ibid*.: 172). In this way, the SRA is attentive to the specific role states play in partnering with organizations external to the formal state apparatus. However, in contrast to applications of the governmentalities approach, Jessop's work also emphasizes the means by which states serve to modulate and reconfigure non-state governance structures to forward particular state objectives, through forms of 'meta-governance' (*ibid*.: 165). This is captured in Jessop's memorable formulation of the state as 'government + governance in the shadow of hierarchy' (*ibid.*: 176). Similarly, despite the strengths of the governmentality approach, it has been accused of offering 'little assistance to understanding state action and failures, given that it essentially diverts our attention away from the state' (Ioris, 2014: 11) and tends to 'minimise the socioecological centrality of the state as both a mediator and a champion of the demands of groups, classes and class fractions' (*ibid.*). Although I do not adopt Foucault's thinking on governmentality here, I do indirectly draw upon some of his innovative thinking around biopower, which is explored later in this chapter.

While Jessop's work provides a great deal of theoretical insight into the nature of states and the functioning of state powers, his own application of the SRA has not tended to apply these ideas in relation to the organization and implementation of particular forms of state policy. Recent work by Jones (2019), however, employs the SRA to explore the evolution of regional economic policy development and provides a clear translation of Jessop's approach in relation to the policy process:

> *'attempts to analyse the policy process need to uncover the strategic contexts, calculations, and practices of actors involved in strategically selective, or privileged, sites. This can be summarised as a framework that demonstrates "systems analyses" for the undertaking of "systematic" forms of public policy analysis – drawing attention to the intricate links between actors and forms of representation, institutions and their interventions and practices, and the range of policy outcomes available. The state, then, is both a strategic and relational concern, forged through the ongoing engagements between agents, institutions and concrete policy circumstances'* (Jones, 2019: 29).

When considering the relations that constitute the operation of state policy it is important to remain cognisant of the idea that the 'effectiveness of state capacities depends in turn on links to forces that operate beyond the state's formal boundaries and act as 'force multipliers' or, conversely, divert, subvert, or block its interventions' (Jessop, 2016: 54). Although Jessop's work provides a robust starting point for thinking about state relations and the exercise of state power(s) in the context of offset policy, it is not an approach that has explicitly grappled with

[20] Jessop's (2008) text *State Power: A Strategic-Relational Approach* includes an entire chapter on Foucault's writings, which also compares these insights to the work of Nicolas Poulantzas.

the means by which states exercise control over, and are implicated in, the discursive and material (re)making of socionatures. In light of this conceptual lacuna, I now turn to recent scholarship in political ecology and political geography with the theoretical objective of wedding these developments with the principals of Jessop's SRA outlined above.

Environmental Statehood, Geopower, and Territorialization

Having established the strategic-relational basis with which to consider the formulation and operation of biodiversity offsetting, here I consider how these theoretical insights can be fruitfully enhanced by works that have specifically sought to advance an understanding of state-environment relations; an area that has been subject to reinvigorated analytical engagement in recent years. For Bridge (2014: 118), this trend is linked to 'momentous political-ecological transformations' illustrated by resource 'grabs' of various forms (see Wolford *et al*., 2013), changing (statal and/or extra-statal) resource governance, and a neo-extractivist turn in parts of Latin America (Burchardt & Dietz, 2014). However, in Bridge's (2014) view, despite a clear eagerness to make sense of the role of the state in these instances, there has been insufficient explicit engagement with state theory and the political geographies of the state. In a similar vein, Robertson (2015) has asserted that the field of political ecology has maintained a tendency to connect in-depth grounded ethnographic forms of analysis with global political and economic dynamics. Such a strategy has 'kept political ecology circling state theory and political geography but rarely fully engaging with it' (Robertson, 2015: 458).[21] Arguably, in the years that have elapsed since these disciplinary assessments were made, there has been a concerted effort to respond to these alleged theoretical shortcomings (for recent reviews, see Harris, 2017; Loftus, 2020).

In his recent book length treatment on the political ecology of the state, Ioris (2014) seeks to advance a critically informed understanding of the evolution and limits of contemporary 'environmental statehood'. Employing a neo-Marxian approach to state theory, which draws on insights provided by Marx, Poulantzas, Lefebvre, and Jessop, Ioris (2014) defines the practice of environmental statehood as 'the combination of discursive, ideological and material efforts by the state to deal with socioecological problems' (Ioris, 2014: vii). Over the course of its gradual emergence and evolution within the modern state, the institutionalization of this state concern has manifested itself in the expansion of regulatory bodies, legal frameworks, economic incentives, and educational initiatives connected to elements of the state's apparatus (Whitehead, Jones & Jones, 2007; Ioris, 2014). But, as we shall see, a political ecology reading of the state should be attentive to interrelated dynamics beyond these, relatively marginal, aspects of state practice.

Centring his analysis on the capitalist state and its multitudinous relations with socioecological processes and effects, Ioris (2014) introduces his work by recalling Conca's (1993) distinction between 'explicit' and 'implicit' forms of ecological politics. In this interpretation, explicit ecological politics refer to a 'common sense' understanding of state environmental policy, which encapsulates the application of specific legislative, institutional, and regulatory changes aimed at promoting environmental policy objectives (such as biodiversity conservation, the reduction of pollution, or the management of ecological restoration). On the other hand, implicit ecological politics constitute a much broader set of

[21] Calls for political ecology to engage further with and develop the state theory and political geographies are not new (see Robbins, 2008).

state policy concerns, which invariably result in particular socioecological impacts and the reconfiguration of established, and historically contingent, environmental conditions.[22] Though perhaps obvious to those familiar with the nature of political ecology, all aspects of statehood performed by capitalist states necessarily have environmental dimensions and repercussions. Importantly, for Ioris (2014: 15), attempts at ameliorating the socio-ecological implications of capital's exploitation of socionatures always occur within 'the limits of the hegemonic political and economic priorities that shape environmental statehood', reflecting the existing composition of material class interests that shape the capitalist state. In this way, the consistent failures of state environmental policy are said to be tied up with an:

> '*inherent tension between rationality and irrationality that characterizes contemporary environmental statehood[, which is] closely related to, and actually derives from, the basic responsibility of the capitalist state towards private property and profit maximisation, at the expense of the commons and the social groups directly dependent on the commons for their survival'* (Ioris, 2014: 28).

In trying to make sense of the subordination of environmental statehood, as but one particular state project, a political ecology analysis of state-environment relations requires acknowledgment of the capitalist state's overriding need to facilitate the continued reproduction of capital and, in this way, should posit 'the state apparatus as a key force behind the production of nature' (Ioris, 2014: 14).

Echoing this final proposition, recent work by Parenti (2015) asserts that if one is to make sense of capital's metabolic relation with non-human nature, proper consideration must be given to the integral role that modern states play in this process of material re-ordering.[23] Capital (and the labour process it initiates) does not simply 'confront' nature's use-values in the course of commodity production within a given territory unaided; they are delivered through juridical-political systems that govern and mediate this interaction. In Parenti's (2015: 844) words, 'When we speak of capital having a metabolism, we must think of the state as an indispensable mediating membrane'. But in what ways does this interaction manifest itself? 'To deliver nature to production the state must continually measure, describe, categorize, represent, and scientifically render legible and accessible the powers of biophysical reality' (Parenti, 2015: 834). To summarize Parenti's (2015) central thesis, fractions of capital require use-values found in nature (e.g. fertile soil) to produce commodities for market-mediated and profit-orientated exchange. These existing use-values tend to be found on the surface (or sub-surface) of the earth, which is demarcated and controlled (to greater and lesser extents) by nation states.[24] In this sense, states mediate and facilitate the production of nature in three ways: 1) through the allocation and administrative organization of private property rights; 2) through the production of infrastructure; and 3) through state-sponsored intellectual endeavours to make non-human nature 'economically' knowable and accessible.[25] Together, these functions

[22] This broad categorization would include state interventions as diverse as tax reform, the privileging of specific accumulation strategies, or alterations to public health policy.

[23] Despite this call to take seriously the dominant role of the state in the production of nature, arguably, Parenti (2015) fails to provide a compelling articulation of how one should approach this contested concept analytically. For this reason, this work is built upon attempts to integrate insights provided by the SRA.

[24] Parenti makes the claim that state control over territory is a prerequisite for capital's operation. However, Colombia's recent history demonstrates that that is not always the case, as private firms have been known to operate in areas not under direct control by the Colombian state. Indeed, the taxation of such activities by the FARC was central to the financing of their operations (Brittain, 2010).

[25] Indeed, as Meehan & Molden (2015: 441) have argued, state institutions often enable 'the calculus and legibility of nature for capital'.

result in the capitalist state operating as 'an "environment making" institution' (Parenti, 2015: 830).

In exploring the centrality of the state in the production of nature, specifically developing the third element of the above trio, Parenti's (2015) work seeks to unify elements of (eco-)Marxian and Foucauldian inspired state-environment theorization, which have been commonly held at odds (c.f. Whitehead, 2008). In particular, his work provides a (historical) materialist and discursive application of the Foucauldian inspired writings of Luke (1995) and Ó Tuathail (1996; 1997). In these works, these authors developed the notion of 'geopower' as a variant of Foucault's seminal writings on 'biopower' (see Foucault, 2003).[26] While Foucault's genealogy of statecraft includes an exploration of the modalities by which populations came to be the object of particular state strategies through biopolitics and the application of biopower – memorably articulated as 'the right to make live and to let die' (Foucault, 2003: 142) – the geopower of the state can be understood to refer to an ongoing constitution, calculation, and government of territory and non-human natures, in the course of the realization of state functions and interests.[27] In Parenti's (2015: 835) words:

> '*If biopower accesses the powers of bodies and populations, then geopower is similarly the statecraft and technologies of power that make territory and the biosphere accessible, legible, knowable, useable. As such, geopower is the ensemble of state practices that make environments. […] Each of these in turn and in combination have ecological reverberations; all of these administrative and scientific practices continually make and remake capitalist social nature*'.

This allusion to state practices that 'make environments' points to the material reconfiguration of landscapes mediated by states, but also to the constructivist-orientated notion of natures being socially produced, through the development and administration of specific forms of environmental and territorial knowledge. Enforced by state actors and associated regulatory regimes, these discourses operate as a vehicle for strategies of socio-ecological control and, in this way, constitute particular modalities through which state powers are actualized. As has been captured by Ó Tuathail (1996: 6 cited in Parenti, 2015: 835), geopower encapsulates an 'ensemble of technologies of power concerned with the governmental production and management of territorial space'. The diverse technological apparatus of geopower includes state-mediated practices as diverse as 'exploring, describing, cadastral surveys; building roads, canals, dams, railroads, telegraphs; establishing property rights, borders, policing and identification systems; scientific surveys, and all the applied natural sciences, like botany, agronomy, and geology' (Parenti, 2015: 835). Taking up the theme of geopower to examine its role in the historical development of capitalism, Moore (2018: 253) describes geopower's special capacity to establish 'units' of 'abstract social nature', which emerge 'through a repertoire of strategies comprising law, property[,] surveying, [and] mapping'.

Whilst I concur with Parenti's general argument, building on Jessop's comments cited above, I would add that it is not necessary to theorize the application of technologies of

[26] The notion of geopower discussed here is not to be confused with Elizabeth Grosz's (2011) concept of the same title, which has been defined 'as a way of characterizing the geological, inhuman and preindividuated forces that subtend and provoke organic life' (Grosz, Yusoff & Clark, 2017: 134).

[27] While it should be acknowledged that Foucault's work on biopower and biopolitics have been extended to non-human natures within political ecology and human geography (for a recent review, see Biernmann & Anderson, 2017), the explicit focus on geopower is applied given that the nonhuman natures that are constructed and governed in this theorization do not exclusively refer to living entities (e.g. geological components).

geopower as *simply* strategies to aid the process of valorization (in the way that he does).[28] As recent work by Bertoncin *et al.* (2019: 25) has argued, the capacity of the state apparatus to employ this form of power enables states: '(a) to assert its power over other actors, (in order to reiterate its sovereignty within its territory); (b) to organize territory according to its project; and (c) to strengthen the state economy (thereby, its own budget)'. Thus, the specific operationalization of technologies of geopower also needs to be considered in light of the varied and contradictory policy objectives of the state (conceived here as an assemblage of institutional power centres), which includes those parts of the apparatus concerned with forwarding the objectives of environmental statehood.

The importance of examining the application and effects of particular 'state epistemologies' (Harris, 2017: 91), in relation to the environment, has long been a central facet of political ecology works that has sought to make sense of the discursive nature of statecraft (e.g. Robbins, 2000; Asher & Ojeda, 2009). A frequently cited text within this tradition is James Scott's seminal anthropological work, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (1998). Although analytically light on conceptualizations of state(s) and nature(s) (Harris, 2017), Scott similarly examines the manifold ways in which particular state strategies to manage and render the non-human sphere legible result in abstracted, simplified, and governable constructs, which more often than not feed into failed policy, built on the exclusion of alternative epistemological approaches.[29]

In considering state institutions' capacity to construct new forms of nature, one of the major strengths of critical engagements with biodiversity offsetting policies, so far, has been their attentiveness to processes of environmental valuation required to establish non-human natures in a commodity form (e.g. Robertson, 2012; Sullivan, 2013; Carver & Sullivan, 2017). The development of the required metrics to achieve this objective is memorably captured by Robertson's (2012: 389) notion of such practices resulting in 'socially necessary abstractions'. In seeking to understand the labour required to produce equivalent natures in the Colombian context, this research contributes to these works by seeking to explore the operation of such practices when the objective is not to produce 'credits' for sale. Drawing upon the works of Barry (2002: 273) and Cooper (2015: 1787), one can conceptualize this subset of the state's technologies of geopower as being in part constituted by specific 'metrological regimes', which refer to the varied practices of categorization that delineate the material world through acts of standardization. Barry's (2002) notion of a metrological regime derives from the work of Callon (1998) and his influential exploration of processes of framing. In adopting this approach here, there are clear parallels with existing critical work on biodiversity offsetting that has deployed Callon's later work (see Sullivan, 2013; Carver & Sullivan, 2018). These studies have specifically used the concept of a 'calculative device' (Callon & Muniesa, 2005: 1243), which refers to socio-technical delineations drawn in the process of establishing a particular good for exchange. In these cases, the economic goods explored are representative of a 'unit' of additional biodiversity gain. However, in the case of offsetting in Colombia, this concept is not quite applicable, as the calculative practices that define the operation of the policy are not restricted to establishing objects for economic exchange.

Whitehead, Jones & Jones' text *The Nature of the State* (2007) also highlights the explicit role of state institutions in shaping the production of historically and geographically specific forms of what they refer to as 'state natures' (Whitehead, Jones & Jones, 2007: 2). Of the

[28] Moore's (2018) application of the concept reflects this position to a greater extent than the formulation provided by Parenti (2015).

[29] See Robbins (2008) for a discussion of elements of Scott's (1998) work in relation to the intersection between political ecology and political geography.

various ‘moments’ explored, ongoing processes of national and sub-national state territorialization are posited as fundamental and core components of the state-environment nexus. Written in the wake of important works within the political ecology tradition that have explored the relations between state power and territorialization processes (e.g. Vandergeest & Peluso, 1995; Neumann, 2004), Whitehead, Jones & Jones (2007: 16) assert that this process entails ‘the construction of spaces that facilitate and order the gathering of political knowledge’ in combination with specific ‘territorial strategies to physically control nature and social interactions with the natural world’. While no longer considered to be the sole preserve of formal state actors (see Corson, 2011; Basset & Gautier, 2014; Rasmussen & Lund, 2018), the actualization of state powers to demarcate space and natures in the course of establishing socio-ecological control continues to provide a fertile thematic crossover point between the fields of political ecology and political geography (see Peluso & Lund, 2011; Correia, 2019; Ramcilovic-Suominen, 2019). Indeed, in considering the practices that constitute the state-environment nexus, the centrality of territorialization as a core dimension of environmental statehood reflects the notion that ‘Land is the symbolic and material ground on which states produce and reproduce themselves’ (Wolford *et al*., 2013: 199).

Although an argument has been made to take seriously the centrality of state institutions in producing landscapes, it would be misguided to do so without further discussion of additional actors beyond conceptually disputed state-society boundaries. An increased presence of private sector and other non-state actors within the realms of environmental management and conservation is reflected in the evolution of the conceptual lexicon of those analytically engaged with such issues. In line with broader theorization of post-Fordist regulatory restructuring, geographical scholarship has increasingly employed the notion of *governance* to refer to the growing presence of non-state actors in environmental management (see Himley, 2008; Bridge & Perreault, 2009; Castree, 2011; Ioris, 2014; Ioris, 2015). In the words of Ioris (2015: 643), ‘In contrast to the prescriptive, centralized, responses of the previous decades the search for sustainability through environmental governance incarnated the argument for fresh associations between the state apparatus and non-state players, such as business sectors, NGOs, think-tanks and so on’. This may appear to lend credence to the notion that states maintain a more modest position of power within the institutional and organizational configurations that govern the production and regulation of non-human natures. However, for many, the state is still regarded as central in such dynamics (e.g. Whitehead *et al.,* 2007; Whitehead, 2008; Ioris, 2014; 2015; Parenti, 2015).

The complex intersection between formal state actors and the pluralistic nature of environmental governance invites an understanding of state powers that does not set itself the impossible task of delineating where the state stops and where the rest of society begins, but at the same time remains cognizant of the role of state institutions play in the collibration of non-state governance regimes. As I have outlined above, this is one of the advantages of employing the SRA in the context of this work. Following Ioris (2014), the introduction of novel forms of environmental governance, which have been explored at length within literatures on neoliberal natures and conservation (discussed below), reflect a reorganization of the institutional landscape through which types of state power operate. In this sense, new networks of environmental governance are conceptualized as the latest stage in the constant evolution of environmental statehood (understood in its inclusive sense).

The Regulation Approach

As part of the of the development of the macro-theoretical framing for research, this section turns to consider the Regulation Approach, as a means of conceptualizing a set of overlapping actors and institutions that link the emergence of biodiversity offsetting (as state policy) to the Colombian state's focus on extractivism as the defining feature of its growth strategy. The Regulation Approach, now as a diverse school of thought, began life in France during the 1970s as an institutionalist variant of Marxian political economy, which sought to offer macro-level analyses of the changing nature and institutional forms that characterize the evolution of capitalist social relations (Boyer, 1990; Jessop & Sum, 2006). Its emergence in that period grew out of a staunch critique of neoclassical conceptions of rationality and market equilibrium, in addition to the dominance of structural interpretations of Marxism across the critical social sciences (Boyer, 2002). Many early Regulationist works were orientated toward historical analyses of the mediation of the crisis-prone nature of specific national forms of capitalism, such as American Fordism (see Aglietta, 1979).

In general terms, works that comprise this branch of scholarship tend to be unified around a focus on the changing blend of economic and extra-economic institutions and practices, which work to enable a level of temporal stability in the face capitalism's crisis tendencies and innately contradictory character (Jessop & Sum, 2006). In this sense, capitalist economies are understood as socially embedded systems, which cannot be reproduced without the intervention of extra-economic forms. Within Regulationist thinking, there are two core concepts that form the basis of attempts to discuss the interconnected operations of these economic and extra-economic dimensions: an *accumulation regime* and its *mode of social regulation*. A particular accumulation regime is understood to refer to 'the social organization of production, circulation, consumption and distribution, including relations with non-capitalist forms' (Andreucci & Radhuber, 2017: 281). The complementary notion of a mode of regulation enables a conceptual articulation of the means by which contradictions and crisis tendencies are (temporally) mediated and addressed. Jessop (2013: 8) has recently defined this as 'an ensemble of norms, institutions, organized forms, social networks, and patterns of conduct that can temporarily stabilise an accumulation regime through its *régulation-cum-governance* of specific structural forms'. Taken together, these two concepts constitute a particular 'mode of growth' or 'mode of development', observable within specific national settings (Boyer and Saillard, 2002; Brand *et al*., 2016).

To put these ideas into the context of Colombia, this research follows recent applications of the Regulation Approach that have conceptualized the rise of extractivism in Latin America over the last two decades as particular national accumulation regimes (see Brand *et al.*, 2016; Andreucci & Radhuber, 2017). In this way, Colombia's extractivist-dominated economy is framed as a context-specific regime of accumulation. That is to say, the process of accumulation within Colombia is largely orientated towards the extraction and production of primary resource commodities, the overwhelming majority of which are then exported and sold on to meet the needs of consumers located elsewhere in the global economy (see Brand *et al.*, 2016).

The Regulation Approach has traditionally failed to engage with analysis beyond putatively 'social' concerns when considering the stabilization of crisis tendencies that characterize the accumulation of capital. In the words of While *et al.* (2010: 78), it has remained 'eco-light' regarding its theoretical apparatus and empirical application. However, there does exist a body of work, largely located within human geography, that has adapted the approach with the specific purpose of integrating and analysing the ways in which the capitalist appropriation

and/or governance of non-human natures is regularized through particular institutional forms and practices (e.g. Bakker, 2000; Bridge, 2000; Bridge & McManus, 2002; Brand & Görg, 2003; Robertson, 2004; Prudham, 2005; While, Jonas & Gibbs, 2010; Himley, 2013; Huber, 2013; Andreucci & Radhuber, 2017). Much of these applications have shifted from a macro-level theorizing, which dominates standard Regulationist work, toward specific examples of environmentally orientated regulatory restructuring, which serve to prolong particular forms of accumulation in the face of socio-ecological crisis tendencies and social challenges to their continuation. In the context of the empirical focus here, the proliferation and evolution of state environmental policy can be conceptualized as part of a wider mode of regulation that seek to address, albeit in often piecemeal and flawed ways, capital driven forms of environmental degradation (Bakker, 2015). As has been noted by Himley (2013: 398), when discussing the Regulation Approach, 'efforts to "environmentalize" the state (ie [sic.] through the construction of state-based environmental law) can indeed be interpreted as regulatory responses to the ecological crisis tendencies of capitalism'. In expanding the approach to encompass environmental concerns and the contested notion of 'nature', there are some important conceptual clarifications that must be made during this translation. In framing his theoretically holistic empirical work on timber production in the Pacific Northwest of the US, Prudham (2005) provides some astute comments on the application of concepts from the Regulation Approach in the course of theorizing political economy and environmental crises:

> '*if there are ecological crises or contradictory tendencies of capitalism […], then it should be possible to examine how such tendencies are addressed, with varying degrees of success, within particular regulatory formations, and reflecting the ways in which environmental change is contested in the social realm. This includes looking at the key arenas of state policies and practices in natural resource and environmental management; at the formation and tactics of social movements, their discursive and institutional strategies and efficacies; and at the role of science and scientific constructs and discourses'* (Prudham, 2005: 21).

Considering the present empirical case, Prudham's (2005) final points on the importance of discourse within the Regulationist frame is of particular importance here. In this light, one can conceptualize the regularization of particular regimes of accumulation as partly guided by the application and institutionalization of specific semiotic representations, which can serve to downplay, or obscure, the severity of environmental issues and represent institutional restructuring in ways that accentuate their capacity to rectify environmental crisis tendencies (c.f. Bridge & McManus, 2000; Whitehead, 2003). In applying elements of the Regulation Approach as a means of analysing the relations, processes and effects of biodiversity offsetting, this theoretical framework follows early critical analysis articulated by Robertson (2004) in his work on mitigation banking in the US. With the objective of further articulating how social modes of regulation relate to the application of particular state strategies to stabilize accumulation regimes, I now turn to consider theorization that centres on the Marxian concept of 'fixes' and how their application helps to understand shifts in environmental governance and policy.

Marxian Notions of Fix and the Neoliberalization of Nature

Within critical geography, the genealogy of Marxist theorization relating to the conceptualization of forms of fixes begins with the work of David Harvey in his much-acclaimed text *Limits to Capital* (2006).[30] In this treatise, Harvey sought 'to integrate the

[30] Originally published in 1982.

financial (temporal) and geographical (global and spatial) aspects to accumulation within the overall framework of Marx's argument in a holistic and dialectical rather than segmented and analytical way' (Harvey, 2006: x). In addressing these objectives, Harvey proposed the notion of a 'spatial fix' to articulate how crises relating to the overaccumulation of capital are temporally averted. For Harvey, a spatial fix refers to the spatial expansion and restructuring of the capital circulation process that serves to temporally avert crisis-tendencies of accumulation. The maintenance of the continued accumulation of capital is dependent upon ensuring that capital, as 'value in motion' (Harvey, 2006: 194), continues to flow and expand in the course of its circulation. However, continued commodity production runs into problems when demand fails to match with production. In this instance, capital starts to become overaccumulated. This crisis tendency shows itself as the 'overproduction of commodities', 'surplus inventories of constant capital', 'idle capital within production', 'surplus money capital', 'surpluses of labour power', and 'falling rates of return on capital' (Harvey, 2006: 195).

In more recent work, Jessop (2013) widens the application of Marxian fixes in order to relate them to the *regularization* of particular regimes of accumulation, rather than simply the circulation of capital (in the vein of Harvey). Specifically, Jessop (2013: 9) discusses the notion of an 'institutional fix', which is defined as 'a complementary set of institutions that, via institutional design, imitation, imposition or chance evolution, helps to provide a temporary, partial, and relatively stable solution to the *régulation*-cum-governance problems involved in constituting and securing a social order'. Such fixes 'emerge, to the extent that they do, in a contested, trial-and-error process, involving different economic, political, and social forces and diverse strategies and projects; and they typically rest on an institutionalised, unstable equilibrium of compromise' (*ibid.*). In this way, Jessop's concept of the institutional fix places emphasis of the agency of social forces to influence the evolution and potential of emergent reconfigurations, to the benefit or detriment of context-specific fixes to operate successfully. These forms of fix are not purely technical in nature but represent the 'institutionally-mediated balance of forces in a given situation' (Jessop, 2013: 11).

Over the last decade, there have been varied attempts to theoretically articulate changes in environmental policy and governance arrangements by applying the concept of a fix to connect such shifts to ecological and economic crisis avoidance strategies. These works have been tied to the proliferation of what have been referred to as neoliberal forms of environmental policy and governance (see Bakker, 2004; Bakker, 2009; Castree, 2008).[31] For Castree (2011: 10), these changes are exemplified by processes of: 'privatization'; 'marketization'; 'de-regulation'; 'market-friendly re-regulation'; 'the use of market proxies in the residual state sector'; "strong encouragement of 'flanking mechanisms' in civil society"; and "the creation of 'free', 'self-sufficient', and self-governing individuals and communities". As this expansive set of processes makes clear, the operation of neoliberalism in practice refers to a gamut of political, economic, and institutional reconfigurations that elevates 'the market' and recasts the role of the state. Stemming from these debates within human geography around the 'neoliberalization' (Peck & Tickell, 2002)[32] of nature, a sub-disciplinary emphasis emerged that specifically sought to unpack and explore practices of 'neoliberal conservation' (see Büscher *et al*., 2012; Fletcher, 2020). In contrast to the neo-Marxian learnings of many of the

[31] However, as Castree (2008) notes, most of these case study works do not explicitly frame examples of 'neoliberal natures' as fixes *per se*. For a recent overview of the neoliberal natures field, see Bigger & Dempsey (2018).

[32] Peck & Tickell's (2002: 380) writings on 'neoliberalization' as a process have been particularly influential in these writings, given that it captures how the application of neoliberal ideals to specific institutional and political settings creates specific and contingent 'local neoliberalisms'.

earlier works in the neoliberal natures canon, neoliberal conservation scholars' conceptual framing often draws heavily on Foucault's writings on governmentality (see Fletcher, 2017b; Fletcher & Cortes-Vazquez, 2020). While these works have provided much insight into the means by which conservation practices have become imprinted and reworked along neoliberal lines – as touched upon above – in seeking to expose particular governmental rationalities that underlie environmental governance, such studies can often focus on institutional webs of non-state and state actors without empirically interrogating the central role of the state in terms of meta-governance, or 'collibration' (Jessop, 2016: 178).

Returning to the use of the Marxian notion of a 'fix' within neoliberal nature debates, stemming from her influential work on the privatization of water, Bakker (2004; 2009) articulates the concept of an 'ecological fix' to account for two specific processes: 1) the expansion of market relations into hitherto untapped non-human natures, leading to new avenues for capital accumulation; and, 2) the devolution of ecological costs of production unto others. From this perspective, "an 'ecological fix', simply put, refers to strategies of externalization and internalization of socioenvironmental conditions, in search of profit, both by states and by capitalists" (Bakker, 2009: 1782).[33] In one of several surveys of the expansive literature on the 'neoliberalization of nature', Castree (2008) has also provided his own foray into these debates. In trying to piece together trends across this literature, Castree delineates between what he conceives of as four distinct forms of 'environmental fix', which serve to overcome the issue of sustained economic growth. In this reading, each fix 'constitutes a way of achieving strategically a core objective for capital and/or the state' (Castree, 2008: 146). These take the following forms:

1. The marketization and privatization of ecosystems and resources with the aim of ensuring greater conservation;
2. Allowing fractions of capital access to previously protected or state controlled non-human natures to facilitate further accumulation, without an overt conservation agenda;
3. Further environmental degradation of environmental conditions of production;[34]
4. State strategies that pass on responsibilities to civil society and/or the private sector or the adoption of a minimal state position to begin with.

In this theorization, Castree moves beyond the idea of fixes as simply related to market expansion and profit-driven processes to include the centrality of the state in manoeuvring to avoid legitimacy, fiscal or rationality crises related to maintaining the 'conditions of production' (O'Connor, 1998). Much of the existing critical literature on forms of biodiversity offsetting has framed such policies as examples of the neoliberalization of nature, which can be read as premised on the first and fourth fix outlined by Castree (2008) (see Robertson, 2004; Pawliczek & Sullivan, 2011). More recently, building on these discussions, Ekers & Prudham (2015) introduced the notion of 'socio-ecological fixes'. Such fixes are said to contribute to the reproduction of capitalism and are premised on the reorganization of socio-natural relations resulting in the production of new forms of nature and space. In tying together a collection of articles that their paper introduces, Ekers and Prudham (2015) assert that their conception of socio-ecological fixes relates to two particular dynamics. Firstly, they connect Harvey's conception of a spatial fix to the 'ways in which landscapes are produced, how human and nonhuman organisms and socio-natural relationships are transformed, and how labor [sic.]

[33] See also, Cohen & Bakker (2014).

[34] For O'Connor (1998: 145), these conditions, which exist external to the economy, include 'environmental conditions' (biophysical resources), 'personal conditions' (all that is needed to reproduce a person) and 'communal conditions' ('physical and social infrastructure (e.g. roads and education respectively) and also human-made space)'.

processes are restructured in order to address or offset (at least temporarily) entangled social and environmental crises of capitalism' (Ekers & Prudham, 2015: 2438). Secondly, socio-ecological fixes are theorized to encompass dynamics beyond simply the fixing of capital into the 'built environment' (*á la* Harvey). In this second instance, fixes are also related to changes in regulatory regimes, resulting in the production of space and nature, which arise in response to crises of legitimacy.

Conclusion

In this chapter I have drawn together and discussed various complementary theoretical approaches with the objective of establishing a conceptual framework that serves to examine the political ecology of biodiversity offsetting in Colombia. I began this task by exploring the 'post-positivist' approach to nature that has come to define works within the tradition of political ecology. I then moved on to draw from Smith's (2010b) influential Marxian thesis on the production of nature. Drawing on variations of this work, I argued that an explicit focus on concrete material and immaterial labour practices undertaken in relation to biodiversity offsetting establishes a means by which to explore how constructivist and materialist readings of the social constitution of nature can contribute to an understanding of environmental compensation activities designed and carried out in accordance with the Manual (2012).

In response to existing critical analyses of biodiversity offsetting, I then discussed insights provided by Jessop's (2016) SRA with the purpose of applying the notion of the state as a social relation to explore the politics and competing interests around offsetting – which constitutes one particular field of state intervention. With the objective of enhancing this conceptual framing with insights from political ecology that have explored the state-environment nexus, I then examined Ioris' (2014) work on environmental statehood, Parenti's (2015) discursive and materialist approach to geopower, and Whitehead, Jones & Jones' (2007) argument that ongoing processes of territorialization should lie at the heart of environmental state theorization. By way of bringing together these ideas, one can argue that the modern capitalist state should be conceptualized as an environment-making institutional ensemble, comprised of competing social forces pursuing particular political strategies and interests, with the special capacity to modulate and incentivize the discursive and material production of nature and state territory.

To theorize offset policy within the wider context of Colombian political economy, I discussed the utility of concepts taken from the Regulation Approach. In particular, I highlighted the twin notions of an accumulation regime and its related social mode of regulation. Moving beyond traditional Regulationist concerns, I then drew upon from reformulations of these ideas that have posited the emergence of environmental policy as one particular facet of the stabilization of accumulation in the face of capitalism's ecological crises tendencies. Pushing this theme further, I then turned to review (neo)Marxian works that have used the notion of fixes to conceptualize the reproduction of capitalism. In doing so, I paid particular attention to efforts within human geography that have explored ways in which environmental policy and governance can be viewed in these terms and in relation to processes of neoliberalization. In the next chapter I turn to consider the methodology that enabled the implementation of this research.

3

Methodology

This chapter sets out the methodological approach adopted in the course of undertaking this thesis. I begin by discussing some key tenets of a philosophy of science known as critical realism, with the objective of outlining the ontological and epistemological basis of this work. The second section of the chapter moves on to outline specific data collection strategies and the process of empirical analysis that relate to the design and implementation of this study. In the final discussion section, I provide a critical account of the methodological components of this work, giving particular consideration to issues relating to positionality, reflexivity, research in a second language, and ethics.

Critical Realism

In recent years, there has been somewhat of a renewed interest in discussing ontological issues in relation to political ecology theory and research practice. Interventions relating to such concerns have been situated within broader academic debates across this community of practice, which have provided insight into decolonizing research (Schultz, 2017), post-humanist approaches (Sundberg, 2015), the green economy (Sullivan, 2017), and the emergence of right-wing 'post-truth' politics (Neimark *et al*., 2019). In considering the ontological and epistemological basis of this thesis, I turned to critical realism as a means of grappling with the philosophical basis of social scientific enquiry. In doing so, I follow in the footsteps of many authors in political ecology that have drawn on this approach to guide the study of socio-ecological relations (e.g. Forsyth, 2003; Peet & Watts, 2004; Neumann, 2005; Ioris, 2012; Sullivan, 2017). The outline of critical realism developed here constitutes a set of rather abstracted meta-physical ontological components that should be understood as working behind the theoretical framework established in the previous chapter. In this sense, the preceding chapter established a set of 'domain-specific ontologies' (Elder-Vass, 2010: 68), whereas this discussion pulls back the curtain further to examine the ontological propositions that informed their construction.

Critical realism emerged as a philosophy of science in the 1970's and was born out of a dissatisfaction with the prevalence of positivist and constructivist conceptions of reality. Roy Bhaskar's (1975; 1979) pioneering works sought to challenge existing philosophical approaches through immanent critique in the hope of forwarding an alternative approach to the philosophical basis of science. The application of critical realist thought by Sayer (2000; 2010) has been particularly influential in the field of human geography and in discussing the approach here I draw predominantly from his works. Although critical realism still occupies somewhat of a side-lined position in the realm of the social sciences, it has become 'a rallying point for radical theorists in the English-speaking world who wish to escape from empiricism without falling prisoner to postmodernism' (Callinicos, 2008: 567).

Critical realism's basic commitments regarding ontology – theory of what exists – can be summarized as follows. Fundamentally, it makes the claim that a world exists separate from our knowledge of it. This is encapsulated by Bhaskar's (1975) delineation between the

‘transitive’ and ‘intransitive’ dimensions of reality. The objects of study – physical or social phenomena – form the intransitive dimension, while the transitive dimension is comprised of the theories and discourse of scientific inquiry. Competing disciplines and perspectives have different transitive objects (theories) (though these can be studied too) (Sayer, 2000: 10-11). However, the objects that these theories attempt to explain do not change simply because theories do; though of course socio-ecological phenomena within the intransitive dimension are not static, unchanging, objects. In this sense, scientists construe the world in different ways, but they do not actively construct the social world with their knowledge (Sayer, 2000; 2010). Bhaskar criticised positivism’s failure to differentiate between ontology and epistemology, resulting in what he termed the epistemic fallacy (Fletcher, 2017a). This transitive-intransitive distinction asserts that that our experience of the world should not be confused with what exists.

Another important foundation of critical realist ontology is the differentiation between ‘the real’, ‘the actual’ and ‘the empirical’. This articulation of reality is often referred to as stratified, which lies in contrast to a flat ontology that is understood to underlie alternative theoretical currents in the social sciences, such as actor network theory. The notion of the real refers to whatever exists (‘natural’ or ‘social’), regardless of whether it is an empirical object or not. (Sayer, 2000; Sayer, 2010). The real is conceived as ‘the realm of objects, their structures and powers’ (Sayer, 2000: 11). At this level, objects and structures are understood to possess causal properties that have the potential to result in certain events. The level of the actual refers to the actualization of these causal properties leading to some form of change; these may or not be directly observable through human understanding and perception. The final dimension, the empirical, refers to the realm of human experience. In direct contrast to empirical realism, critical realist ontology posits that this sphere is composed of human perception and empirical analysis, which does not match one-to-one with the causal mechanisms present in the realm of the real (Fletcher, 2017a). Reflecting on this ontological level, one might ask the question, if our knowledge of reality is inherently fallible, why bother with empirical investigation in the first place? Proponents of critical realism respond with the position that simply acknowledging the distinction between knowledge and a separate social and physical reality does not imply that all forms of knowledge are equally flawed (Sayer, 2006; 2010). Indeed, it is through critique of existing objects that comprise the transitive dimension that such formulations can be revised and improved.

As is implied by the above discussion, the notion of causation lies at the centre of critical realist ontology. However, critical realist practitioners dismiss a successionist theory of causality, which can be seen at work across empiricist and positivist perspectives (Pratt, 2009). Bhaskar (1978) refers to this approach as the Humean notion of causality, where empirical regularities are perceived as indictors of causal relations and thus constitute the basis of establishing predictions. Critical realists are deeply sceptical of such a position owing to their understanding of contingency and the complexity of reality. From this perspective, consistent empirical regularities are only likely to occur within particular closed systems (e.g. in a controlled laboratory experiment) (Sayer, 2000). When dealing with open systems, events can be the result of a number of emergent and contingent relations between objects, with the actualization of casual properties only occurring in specific circumstances (*ibid.*). In this way, critical realist social research places emphasis on positing ‘the qualitative nature of social objects and relations on which causal mechanisms depend’ (Sayer, 2010: 2). Given these ontological commitments, critical realists tend to rely upon a form of logical inference known as retroduction. Such an approach seeks to postulate and establish causal mechanisms that provide possible explanations of observed events uncovered through data collection (Wuisman, 2005; Sayer, 2010; Fletcher, 2017a). In basic terms, the retroductive approach begins by asking

'what must the world be like for "x" to occur?' (Jessop, 2015: 240).[35] Critical realist social research is epistemologically open in the sense that both qualitative and quantitative approaches are deemed valid, depending upon the research context in which they are deployed (Sayer, 2000). The key concern when considering the methodological approach to be pursued during research is the unification of research method(s), the object(s) of analysis, and how these relate to the research questions posed (Sayer, 2000; 2010). To consider these issues, the next section turns to discuss data collection methods deployed in the context of this work.

Research Design: Methods and Data Analysis

Drawing on Harré (1979), Sayer (2010) distinguishes between social science research premised on 'extensive' or 'intensive' approaches to research design. The former refers to the use of methods capable of establishing discernible regularities, or patterns, observable across a sample constructed so as to be representative of a specific population (Clifford, French & Valentine, 2010; Sayer, 2010). This form of research is commonly premised on the use of standardized surveys, questionnaires, and statistical forms of analysis applied to specific taxonomic groupings. In this way, such a design is tied to the production of quantitative data sets, which are constructed in the hope of establishing a set of 'generalizable' research findings. In contrast to design of this nature, an intensive approach begins by exploring individuals (a person, or organization) within the context of a specific case study, where emphasis is placed on examining specific casual and structural relations between individuals in order to provide a textured and qualitatively rich account of a particular case (or cases) (Clifford, French & Valentine, 2010; Sayer, 2010). With this objective, intensive research is carried out with the use of qualitative methods, such as semi-structured interviews or participant observation, in order to produce an in-depth dataset capable of providing insight into the casual nature of events and specific practices that relate to the nature of the research phenomena in question. Reflecting the questions posed at the outset of the project, this research adopted an intensive approach, which sought to pursue an empirically rich examination of the particularities of biodiversity offsetting in Colombia. In doing so, the project relied upon qualitative research methods to achieve its aims. Such an approach is also particularly advantageous for the exploration of relatively unstudied phenomena, where little is known about the nature of the relations and structures that relate to the area of study (Sayer, 2010). This was certainly the case with regards to the Manual (2012), where scant information was available about the functioning and progress of the system when I embarked on fieldwork in Colombia.

Semi-structured interviews were utilized as the primary method to explore the experiences of actors involved in the formulation, implementation and regulation of offsetting. As has been argued by Hoggart *et al*. (2002), interviews provide a suitable means to approach relatively unexplored phenomena and enable the researcher to access rich personal accounts. With this in mind, semi-structured interviews were considered most appropriate given the exploratory nature of the project, where participants were approached to provide insights into specific practices, forms of labour, and personal experiences of biodiversity offsetting, which related to the activities of their respective organizations and their relations with others. While statements made by participants could not be treated as unproblematic truths, 'cross-validation' (Hoggart *et al*., 2002: 211) of events and experiences across separate interviews served to lend greater weight to certain accounts of processes and experiences uncovered during data collection.

[35] For some, this approach is strengthened through with the integration of dialectical reasoning (Roberts, 2014; Jessop, 2015).

With the objective of including a diverse range of voices in the dataset, I adopted a combination of purposive and snowball sampling techniques during my time in the field. The practice of purposive sampling refers to the selection of research participants, by the researcher, based on their experiences in relation to research topic explored (Cloke *et al*., 2004; Longhurst, 2010). This component of the sampling strategy relied on desk-based research into the social relations surrounding the Manual (2012), which I based on the analysis of legal documentation and grey literature located online. I also entered key terms related to the policy into an online search engine in order to compile a database of organizations directly involved in various aspects of the offset process. The use of snowball sampling denotes the practice of enrolling research participants into the sampling strategy by directly asking them to draw upon their own knowledge of the phenomena in question in order to suggest other potential individuals or organizations that could be approached to participate (Cloke *et al.*, 2004; Longhurst, 2010). This proved to be a fruitful combination of strategies, resulting in a comprehensive interview dataset.

Fieldwork began in June 2016 and came to a close in March 2018.[36] During this time, a total of 74 semi-structured face-to-face interviews were carried out, which involved the participation of 103 individual research participants. Although I did not specifically plan to undertake interviews with more than one participant simultaneously, upon arrival at an agreed location my initial contact often suggested that other colleagues familiar with the policy should engage in the process. The inclusion of 2 or more individuals from the same institution provided a different dynamic to these interactions, where perspectives provided by one interviewee could then form the basis of dialogue between the interview participants present. In contrast to the rural landscapes that international fieldwork might evoke, my experiences undertaking interviews occurred predominantly in rather more mundane urban spaces. These exchanges took place in public and private office spaces, corporate coffee houses, public libraries, and living rooms, mostly situated in the capital city of Bogota, which was home to the headquarters of many of the organizations that participated in the research. However, in tracing the institutional linkages forged by offset policy, I also ventured to other major urban areas across the country, such as Barranquilla and Medellin, to meet with participants.

Prior to each interview, I would prepare by writing up a document outlining all available information pertaining to the role and experience of the organization regarding the offset process. With reference to the broader context of the research aims of the thesis, these ideas were then translated into a rough interview guide, which was usually comprised of a selection of pre-formulated questions and thematic bullet points. With 2 exceptions, all interviews were administered in Spanish. On average, interviews tended to last for around an hour, which was dictated by the work schedule of each respondent. All interviews were recorded using a digital recording device, with one exception due to a technological mishap. During the first few months of my fieldwork, this was an essential practice, given my status as a 'less-than-fluent' (Gibb & Danero Iglesias, 2017: 134) researcher. At this stage, taking notes, whilst attentively following a participant's discourse, then responding to their comments with follow up questions, would have been an impossible task.[37]

All recorded interviews were transcribed so as to facilitate systematic coding of data at a later stage. The task of transcribing interviews in a second language was a time-consuming and laborious process that formed a key part of a multipronged strategy to reach the highest level

[36] Fieldwork was paused on a couple of occasions during this period. This included a month-long trip back to the United Kingdom at the end of 2016 and a break from my studies due to illness during spring of 2017, which lasted a total of three months.

[37] I discuss issues relating to undertaking research in a secondary language further below.

of language fluency, while at the same time helping me to become immersed in the data and the themes that emerged as more interviews were undertaken. I transcribed around two thirds of the interviews and was able to have the rest transcribed for me by a research assistant, who was also employed to check my transcriptions for errors. After completion, all interview transcripts were then uploaded into Atlas.ti, a qualitative data analysis software tool, which provided a methodical means of organizing and exploring the wealth of interview data collected in the field. Using this software, the dataset was subject to a systematic regime of coding. Following Cope (2010), initial codes developed using Atlas.ti were generally descriptive in nature and served as a means of getting to grips with the broad range of issues that emerged through various readings. After this initial phase, each transcript was subject to rounds of re-coding with the objective of building on preliminary descriptive markers and moving toward more analytical forms of code. This second stage sought to connect initial descriptive codes with ideas raised during the construction of the project's theoretical framework, whilst making more concrete links to the project's research questions. Using the 'families' function in Atlas.ti, both descriptive and analytical codes could then be grouped together into manageable categories, which corresponded to overarching themes of interest. In critical realist terms, this qualitative data analysis was concerned with a search for 'demi-regularities' (Fletcher, 2017a: 184), understood as general tendencies uncovered in the dataset, which could then be related back to the project's construction of domain-specific ontologies.

Potential participants for the study were contacted by email and/or by telephone. Generally, the process of recruitment began with a brief email summarizing the intentions of the research, with a more comprehensive outline of the project and a consent form (discussed below) attached. Given the professional status of my research subjects (see Table 1) and the fact that I often established contact through their employer, many respondents were simply too busy with work commitments to engage when first approached. However, rather than express a desire for non-involvement, many would often (and repeatedly) suggest getting back in touch at a later date. I kept a detailed record of each correspondence with the date and time of every email or phone call related to each organization. During this process, it was important to tread a fine line between persisting with possible leads, whilst also being conscious of not coming across as an annoyance and potentially burning bridges required to establish a comprehensive dataset.

In combination with primary qualitative data obtained through interviews, this research also relied upon the collection of secondary data with the purpose of undertaking document analysis. These sources took the form of online newspaper articles, organizational websites, NGO publications, digital presentation slides, legal documents, and project documentation shared by actors that had worked explicitly around the policy. I also utilized recent freedom of information legislation (Law 1755 of 2015) to obtain a dataset from the centralized environmental authority that regulates the policy, the National Authority of Environmental Licences (*Autoridad Nacional de Licencias Nacionales*, ANLA), which detailed all environmental licences granted since the Manual (2012) came into force. Although qualitative secondary documentation was not subject to the same intensive process of coding used for interview data, analysis of these sources was crucial to contextualize and deepen the insights established through the production of primary data.

Table 1: **Type of organization represented by interviewee and number of interviews**

Type of organization represented by interviewee	Number of interviews [38]
National state environmental institution	11
Regional state environmental institution	6
Private consultancy firm	31
NGO	12
Environmental licence holder	7
Think tank	2
Foreign aid organization	1
Private business association	1
Public university (academic)	2
Private offset provider	1

Initially, it had been my intention to combine national level analysis of policy implementation with an in-depth case study of a particular offset project and accompanying impact site.[39] However, as became clear during fieldwork, progress relating to the final execution of offset actions was non-existent.[40] While there were no finalized projects at the phase of execution, I was able to focus my efforts on analysing the preliminary stages of progress that had been made with the Manual's (2012) implementation, which included the construction of compensation plans, the experiences of state regulators, and experiences of those that had been engaged in the formulation of the policy. Since leaving Colombia, however, there have been advances with regard to the number of private firms that have produced detailed biodiversity offset proposals that have then been approved for implementation. In 2019, the ANLA altered public accessibility to its online database, enabling greater access to legal documentation pertaining to development projects governed by the Manual (2012). Given these advances, part of the secondary data that informs Chapter 6 of the thesis includes an analysis of all state approved offset plans (35) (from the date they were retrieved online, 27th of December 2019).

Positionality, Reflexivity, and Ethics

In critically reflecting upon my academic practice as a PhD student it is vital to 'to make the observer visible' (Sundberg, 2003: 188). As a white, British, male, in a position of mobile and economic privilege, who travelled to Colombia to undertake social science research on state policy, there are various components to positionality that require elaboration and unpacking in order to provide a reflexive account of this research. Feminist geographers have, for a long time, paved the way in exploring the nature of researcher positionality (e.g. Nast, 1994; Rose, 1997). Indeed, the researcher and the researched 'embody multiple positions in relation to one another, depending on several axes of intersectionality (i.e. gender, culture, economic status,

[38] The number of interviews attributed to each organizational category in Table 1 refers to the professional role that the research participant had on the date that the interview took place. It should, however, be noted that some interviewees had direct experience working on the policy's implementation from more than one institutional vantage point. Details of the varied roles of such participants and further information relating to each interview are included at the end of the thesis as an appendix.

[39] Before leaving for the field, I had been able to obtain a small sample of approved environmental licence applications that included proposals for offset activities regulated by the Manual (2012), which had been located online. Moreover, given the large number of environmental licences that had been granted since the policy had come into force in January 2013, I was confident that it would be easy to fulfil my ambition of carrying out local level case study analysis during my time in the field. However, at this stage, the extent of non-compliance was unknown to me.

[40] I discuss the factors that contributed to this situation over the course of the thesis.

educational background, etc.)' (Caretta, 2015: 490). Arguably, researchers can never achieve a full account of the multiple and dynamic positionalities of the numerous participants who are enrolled in research (Mukherjee, 2017). Moreover, the extent to which they can grasp such positional complexities is reduced further if the researcher-researched interaction takes place within short time frames, such as a single hour-long interview (as was the case in this project). With these caveats, the research participants interviewed over the course of this work can be loosely defined as a hybrid set of public and private elites, comprised of well-educated male and female Colombian professionals from relatively high socio-economic backgrounds. While there was distinct variation across the sample, all actors occupied relative positions of power and privilege through their professional roles within social organizations engaged in various aspects of offset policy.

The nature of data accessed from research subjects has been theorized as impacted by the extent to which a researcher is understood as an 'insider' or 'outsider' in relation to the research subject, based on perceptions of identity (e.g. race, class, nationality) (Mullings, 1999). However, this insider/outsider dichotomy, which has long been discussed in relation to qualitative research, masks a much more complicated and fluid set of positionalities that alter over time (Cormode & Hughes, 1999; Herod, 1999; Mullings, 1999; Harvey, 2010; Caretta, 2015; Mason-Bish, 2018). Thinking beyond this binary, its arguably more useful to think of positionality and subjectivity as partially constituted through 'degrees of outsiderness' (Herod, 1999: 326), as well as being spatially and temporally 'tempered' (Sultana, 2007: 282) in specific contexts.

There were moments during my research where my positionality as a British national representing a foreign university, who had travelled far to explore a relatively obscure aspect of Colombian planning law, appeared to award me greater access than if I had been a local researcher. For example, very early on during my time in the field, after having completed an interview with a pair of a civil servants based at a national state environmental institution, I found myself in conversation with a fellow post-graduate geographer, a Colombian, who just the week before had been denied interview access by the very same institution. As has been argued by Herod (1999), in the case of elite interviewing, interviewee perceptions of the researcher as an 'outsider' can sometimes enable favourable access conditions. Numerous reflections on interviewing elites have detailed the difficulty of securing interviews with such subjects (e.g. Harvey, 2010; Johnson, 2014). Although I was able to achieve a good sample size by the end of the data collection process, this was the result of many hours of correspondence with potential participants and repeated polite requests for involvement.

Research of this ilk, where I (a relatively privileged white westerner) arrived to undertake research in a post-colonial context is potentially open to forms of post-colonial critique, where the act of data collection can be conceptualized as a form of neo-colonial 'theft' (Robbins, 2006: 311). As Katz (1994) has discussed, most benefits that accrue from undertaking academic fieldwork are likely to be enjoyed by the researcher, and not by the participants that have given over their time to contribute to the study. Indeed, many western academics have arguably established their careers by skilfully transposing stories collected – 'out there' in the field overseas – into largely inaccessible and prolix formats. Such endeavours regularly appear to do little to assist the everyday plight of marginalized communities, who are often cast as central protagonists in carefully crafted research outputs that subsequently appear, locked behind the paywalls of academic publishers. In the words of Robbins (2006: 311), 'by making a living off the stories of other people and the records of environmental conditions in other places, research is unambiguously extractive'. To temper the capacity to direct an 'extractive' critique at this work, all those that participated in data collection during fieldwork did so under the agreement

that a summary of results would be provided to all interviewees after the completion of the project. In this way, an effort was made to ensure that the knowledge produced during this thesis would be disseminated and shared as a means of establishing a form of exchange with those that participated in its construction.[41]

Research in a Second Language

A transparent and reflexive account of fieldwork in a second language must provide details of the process of language learning and the extent to which the process of data collection and analysis were impacted (Gibb & Danero Iglesias, 2017). In a recent edited collection on international fieldwork, Gent (2014: 55) rightly notes that 'the demands of doing research in a second language should not be underestimated'. Reflecting on the research process as a whole, my decision to undertake data collection in Spanish was taken without full awareness of just how much additional time and labour it would take to achieve a level of confidence required to come close to what Scott *et al*. (2012: 718) call the '*ideal researcher*: someone who is brave and assertive about negotiating access, building relationships and executing methodologies'. It was a long and arduous path to get close to embodying such an ideal and I had not reached this point when I first started interviews.

Prior to starting my doctoral research, I only possessed a very basic level of Spanish proficiency. At the start of my PhD studies, I, therefore, embarked on an intensive programme of language training, which included private one-to-one lessons and enrolment in classes held at the Cervantes Institute based in Manchester. Not only was Spanish proficiency preferable in relation to carrying out interviews and immersing myself in the complexities of Colombian environmental law, the university with which I was first affiliated – the National University of Colombia – required all non-native Spanish speaking visiting students to have passed an internationally accredited exam, as part of their application process.[42] I also continued formal (and informal) language lessons throughout my time in the field.

Whilst using a translator for interviews was an option available to me, I was sceptical of the potential for such an approach to facilitate the depth of insight required to examine the intricacies of the phenomena under investigation. Rather, I started from the position, as articulated by Veeck (2001: 35), that 'The greater the level of fluency and understanding, the more complete and accurate the exposition of the problem'. Moreover, translators are not merely neutral mediums through which data flows (Smith, 2010a). Their use establishes an additional barrier between research participant and researcher, refracting and altering the

[41] Keen to move beyond the idea that my presence in Colombia was merely extractive, I also sought to engage in unwaged work, outside of data collection, to help establish a sense of meaningful exchange with others. These activities included: editorial translation work for the Colombian geography publication *Perspectiva Geográfica* (see Volume 22, Number 2, 2017), as well as participating in peer review for one article submitted to the journal; assistance with English translation of a report produced by the critical environmental NGO CENSAT-AGUA VIVA; informal English conversation classes with fellow geography students during my stay at the National University of Colombia; and research assistance with fieldwork pursued by Dr Nohora Inés Carvajal Sánchez of the Pedagogical and Technological University of Colombia, where I also held a position as a visiting student.

[42] This meant that I had to submit certification of having obtained a B1 level according to the Common European Framework of Reference for Languages, which was undertaken prior to leaving for the field. Spanish is a pluricentric language, which of course presented its own issues. Having obtained my qualification in Castilian Spanish, upon arriving in Colombia I was instantly required to become familiar with the country's own particular codified forms. What appear as simple and innocuous phrases in Castilian Spanish can take on quite different meanings outside of the Colonizer country.

substance and understanding of meaning (Hoggart *et al*., 2002; Watson, 2004). In addition, relying on a translator – without obtaining a high level of fluency – would have likely restricted my data collection to interview transcripts and only a small sample of key documents, which would have required translation. Given restrictions relating to the funds available for transcription services, imposed by my research funding body, there would have been no means of financing the translation of a large body of secondary documents necessary to meaningfully explore and analyse the offset system.

However, despite a strong motivation to proceed in this manner, the first half of my time in the field was plagued by a profound sense of incompetence, doubt, and a reoccurring bout of imposter syndrome. In fact, after the first round of 8 interviews, I took the decision to take a step back from primary data collection in order to concentrate on achieving a level of language proficiency required to effectively take advantage of the interview space. The feelings mentioned above were not only restricted to the academic spaces and roles I navigated – meetings with my Colombian supervisor, academic presentations, and research interviews – but also permeated other spheres of social interaction. As Gade (2001; 376) has noted, 'Reluctance to open one's mouth for fear of uttering a grammatically incorrect phrase imposes fatal restrictions' and it took time to establish the confidence to move pass these fears. During my time in the field, there was a clear trajectory of bilingual research confidence and competence. Initial interviews were almost always carried out with the support of a research assistant, whose role was to be on hand if I was unable to understand a certain turn of phrase or had trouble articulating a follow up question. For this reason, the use of an assistant was essential during the early stages of research. Although interviewees were highly educated, I felt as though no presumption could be made that speaking English would be an option and I was keen to avoid cultivating an identity as a privileged *gringo*, who had not taken the time learn the language of his research subjects.

Ethical Considerations

Prior to fieldwork, this study was subject to ethical appraisal according to Lancaster University's internal review process, which entailed an evaluation by the University Research Ethics Committee. This meant that before fieldwork could take place the research design, methods, and aims of the project were assessed and approved by the university's internal body tasked with upholding the institution's ethical code of practice. Given the project's reliance on semi-structured interviews with actors engaged in the process of offsetting, strategies were put in place so as to fully inform participants of the use of data, the nature of the study, and their role within it. Before interviews took place, I shared a document that detailed the general objectives and nature of the study with all participants. This strategy was employed to ensure that all interviewees were given an opportunity to raise any questions they might have about the nature and purpose of the investigation before involvement. Furthermore, prior to participation, all interviewees were required to read and sign a consent form that clearly articulated their rights as a participant. This included the fact that they were awarded the right to withdraw from the investigation up to two weeks after the date of the interview. I have attached both these documents at the end of the thesis as an appendix. All participants names have been excluded from the research and a decision was made to exclude the names of almost all organizations. This was due to the fact that many interviewees were contacted through their employer, rather than being contacted personally, external to their place of work. The only organizational names that are attributed to particular quotations have been kept in the text due to the fact that there were multiple interviewees from the same organization, meaning that it

would be impossible to trace quotations included to any one individual, or where the organization was no longer the place of work for the research participant. Finally, before data collection could begin, the project's design was subject to a risk assessment evaluation within my university department. Through this process, precautions and systems were put in place to establish the highest level of safety for myself as a researcher in the field, which included regular contact with my supervisors and the avoidance of areas of the country that could be deemed as potentially unsafe.

Conclusion

In this chapter I have laid out the methodological basis of this research. I began by outlining the assumptions of a critical realist ontology, which has acted as a philosophical under-labourer behind the theoretical framework outlined in the preceding chapter and has also informed the analysis of data collected in the field. As I have discussed, I adopted an intensive approach to research design for this thesis, which was primarily built on the use of qualitative semi-structured interviews with key actors involved in the formulation, implementation, and regulation of Colombia's biodiversity offset system. In combination with this strategy, I also relied upon the collection of secondary data in various forms in order to contextualize and supplement insights derived from the interview process. The final section of this methodological discussion provided an opportunity to critically reflect on the issue of positionality in the field, undertaking research in a second language, and the ways in which I dealt with potential ethical concerns that required consideration during the data collection process. The next chapter is the first of three analysis chapters that outline the findings of this study.

4

Biodiversity Offsetting and the State as Socio-natural Relation

> *To understand environmental policies, we have to understand the environmental governance regime in which they interact, are subordinated, or are related. We have to do "political ecology"* (Palacio Castañeda, 2011: 94).

This chapter sets out to explore the social relations of power surrounding the formulation and early implementation of the Manual (2012). In doing so, the application of biodiversity offset policy in the Colombian context is examined as a specific terrain of institutional strategy and political calculation, where a diverse ensemble of competing interests, located within and beyond the formal state apparatus, seek to influence, impede, or facilitate the realization of objectives set out in the policy document. In advancing this reading, the empirical analysis that constitutes this chapter draws principally upon Jessop's SRA to the state with the purpose of examining biodiversity offsetting and the broader state project of environmental statehood as a complex, multi-scaled, and contradictory web of socio-ecological relations. In this way, this discussion contributes to recent efforts within political ecology, and critical geography more broadly, that have sought to deploy elements of neo-Gramscian state theory to examine contemporary forms of state-centred socio-ecological governance as emergent, dynamic, and contested phenomena (see While, Jonas & Gibbs, 2010; Brand, Görg & Wissen, 2011; Ioris, 2012; Andreucci, 2017; Andreucci & Radhuber, 2017; Brand & Wissen, 2018). The empirical analysis outlined below responds to the following two research questions:

- What form does the institutional ensemble of actors take during the production of equivalent natures?
- How do involved actors use their position in relation to the state to forward their own objectives around biodiversity offsetting?

In homing the analysis in on relations of interest and strategy, this chapter provides a textured and empirically informed account of the multiscalar politics of offsetting, illuminating political processes beyond works that focus analysis of offsets in relation to structures of capital expansion (e.g. Dauguet, 2015). While the neoliberal context in which offsetting has emerged is integral to an adequate explanation of related political and economic processes, offsetting is not reducible to it. In making this point, there is resonance with Dempsey's (2016: 102) framing of the related notion of ecosystem services as a particular form of 'political-scientific strategy'. In this work, Dempsey (2016: 103) discusses the social forces around the promotion of ecosystem services and makes the key point that they 'cannot be reduced to mere representatives of the neoliberal context'.

The chapter takes the following structure. Firstly, the discussion begins by outlining the recent historical context of Colombian environmental statehood. In this manner, I situate the introduction of the Manual (2012) within the historically contingent and contradictory logic that encapsulates the state – as a mediating locus through which socio-natures are produced through the governance of a diverse cast of social actors (Ioris, 2014; Parenti, 2015). In the shadow of an extractivist-dominated regime of accumulation, the emergence and form of the Manual (2012) as a state-orchestrated socio-ecological fix can productively be understood as a part of a wider set of 'institutionalized compromise[s]' (Jessop, 2016: 85) that reflect the negotiated complexity and structured power relations that surround environmental policy formation and implementation (see While, Jonas & Gibbs, 2010).

Secondly, the discussion moves on to highlight the political and economic alliances that played key roles in altering the form and content of the draft policy prior to its ministerial ratification by Resolution 1517 of 2012. The emergence of the Manual (2012) at this moment provides as an analytical entry point with which to consider the overlapping and competing agendas that establish environmental statehood as a negotiated and contested process. Specifically, this discussion explores the relations and interests between a coalition of environmental NGOs, capital, and a plurality of formal state institutions that form the environmental state apparatus. At this point, I also outline the operational form of the policy in full. Thirdly, having mapped out the diverse set of actors that surround offsetting, the discussion moves on to analyse how the structured agential capacities of different social forces manoeuvre to block or facilitate policy advances in line with their political and organizational interests. Given the limited progress with implementation, a key part of this discussion is concerned with exploring the contradictory relations and interests that provide clues with which to explain the failures of the Manual (2012) during the course of its first 5 years. The chapter ends with concluding remarks that summarize the central arguments that have been outlined during the course of this analysis.

Environmental Statehood in the Key of *Uribismo* and the Consolidation of Extractivist Accumulation in Colombia

From the outside looking in, it is hard to comprehend the extent to which Colombia's former President Álvaro Uribe Velez (2002-2010) and an ultraright *Uribismo*[43] project continues to influence the direction of Colombian political discourse. Whilst in the field, I bore witness to an animated and ferocious political campaign against the Havana Accords, negotiated between the FARC and the government of Juan Manual Santos (2010-2018). With Uribe at the helm and the support of Evangelical and Catholic organizations, the 'no' campaign came to invigorate the country's conservative base, resulting in a largely unforeseen defeat for the peace deal in the 2016 national plebiscite.

In the sphere of Colombian environmental statehood, the legacy of Uribe's time as president still looms large, though it has of course evolved during the proceeding Santos administration. In beginning this SRA to the Manual's (2012) formation, it is necessary to start by historicising

[43] *Uribismo* refers to an ideological position that emerged in the wake of Uribe's rise to the presidency. In large part, it has been defined by a fierce opposition to guerrilla and progressive social forces and is characterized by an embrace of authoritarianism, militarization, neoliberal socio-ecological reform, and ultra-right conservatism (for discussions of *Uribismo* as a political and ideological project see Palacio Castañeda, 2010; Hristov, 2014; Rodriguez, 2014).

the position of the environmental ministry[44] and the National Environmental System (*Sistema Nacional Ambiental*, SINA) in relation to the wider institutional ensemble that constitutes the Colombian state.[45] As has been articulated by Palacio Castañeda (2010), the status and functioning of the country's environmental ministry can only be properly understood in relation to broader political state projects and practices that have characterized the evolution of contemporary Colombian statecraft in general. Starting from this cue, the institutional legacy of Uribe's policy programme is explored so as to historicise environmental statehood prior to the policy's adoption in 2012. In doing so, attention is first directed toward the administration's sustained attack on formal state institutions tasked with forwarding environmental conservation and regulation objectives. This analysis is then complemented with a discussion of the implicit components of environmental politics that characterized the Uribe administration's approach to environmental statehood. Specifically, emphasis is placed on exploring the broader institutional reforms and reconfigurations that consolidated Colombia's export-orientated extractivist accumulation regime.

While Colombian environmental legislation has a longer historical trajectory, which included major advances in the 1970s (relating to the designation of protected areas), the formal institutionalization of environmental concerns within the architecture of national government occurred in earnest during the early 1990s. It was César Gaviria Trujillo's (1990-1994) administration that created the Ministry of Environment and SINA with the passing of Law 99 of 1993. In the face of concerted opposition by the National Association of Colombian Businessmen and interests in the construction and oil sectors, this elevation of environmental statehood was in part assisted by unprecedented international political will in the wake of the 1992 United Nations Conference on Environment and Development in Rio (Mance, 2008; Rodríguez Becerra, 2009). As argued by Mance (2008), the discursive influence of the 'Earth Summit' declaration on the content and form of Law 99 of 1993 is evidenced by its adoption of the language of 'sustainable development'.

Through Law 99 of 1993, the Ministry of Environment was tasked with governing SINA, a complex multi-scalar aggregate of public and private environmental institutions comprised of 33 Regional Environmental Authorities (*Corporaciones Regionales Ambientales*, CARs), 6 Urban Environmental Authorities, 5 public research institutions, and the National System of Parks.[46] In addition, SINA encompasses the governance of non-state institutions involved in environmental management (such as NGOs and private sector organizations) (MADS, 2018). The passing of law 1993 was a major achievement for the social forces that had coalesced around the objective of 'greening the state' (Eckersley 2004: 14).[47]

As analysis by Tobasura Acuña (2006) and Guhl Nannetti (2015) has shown, the National Development Plans set out by the governments of Ernesto Samper (1994-1998) & Andres Pastrana Arango (1998-2002) generally maintained a commitment to the integration of environmental policy as a pillar of Colombian statecraft, in line with the obligations set out in the 1991 Constitution. However, the arrival of Uribe as president in 2002 marked a disenable shift in the balance of forces between explicit and implicit environmental politics, with the

[44] The term environmental ministry is used here to refer to the government ministry that is tasked with carrying out obligations placed upon on the formal state regarding environmental matters set out in the 1991 Constitution. As will become clear throughout this discussion, the ministry in question has taken numerous forms since its inception.

[45] As has been argued by Ioris (2014: 34), 'the actual implementation of environmental statehood is highly reflective of the particular historical and geographical circumstances of the state apparatus'.

[46] The system of national parks is over seen by National Natural Parks of Colombia.

[47] See Rodríguez Becerra (1994), the country's first Minister of Environment, for an in-depth reflection on establishing the Ministry of Environment.

consolidation of private and public forces shifting significantly in favour of the interests of extractive and multi-national capital. The Uribe administration's hostility toward social forces engaged in forwarding environmentalist interests became apparent even prior to taking office, when the Interior Minister-in-waiting, Fernando Londoño, likened environmental NGOs to green subversives (Mayr, 2003 cited in Palacio Castañeda, 2010; Rodríguez Becerra, 2009). As the first Minister of Environment for Colombia has described when reflecting on this political conjuncture, 'Never, in the history of environmentalism in Colombia, had a government commenced so far from environmentalists' (Rodríguez Becerra, 2009: 24).

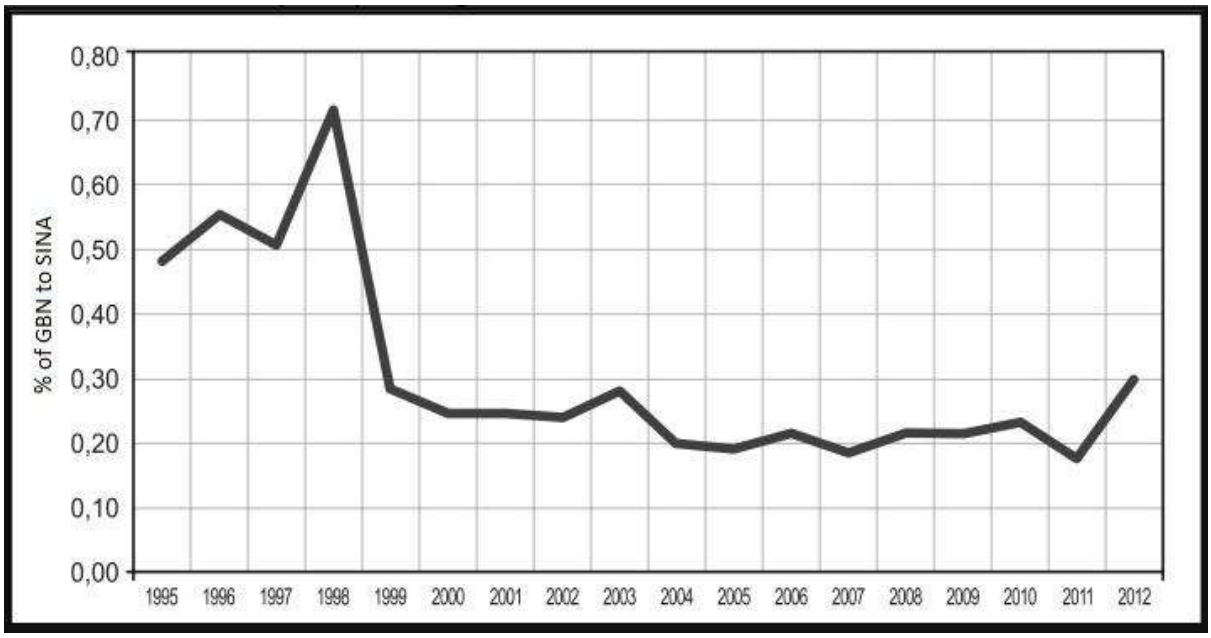
Upon arriving in power in the wake of a major economic recession in 1999, Uribe's administration moved to restructure the architecture and distribution of labour across government ministries, reflecting a recalibration of an existing order of state interests and projects. This had the effect of reducing the functional capacity and power of the those tasked with facilitating and enacting dimensions of environmental statehood (Rudas Lleras, 2008; Rodríguez Becerra, 2009; Palacio Castañeda, 2010). Specifically, the Uribe administration moved to fuse the Ministry of Development with the Ministry of Environment, creating the Ministry of Environment, Housing, and Territorial Development. In restructuring the state system, the Minister of Environment was relegated to the position of Vice Minister, reflecting a subordination of the political authority it had enjoyed since its conception (Mance, 2008; Rudas Lleras, 2008; Rodríguez Becerra, 2009). Moreover, the Environmental Policy Unit situated in the National Department of Planning was all but eliminated in 2003 (Rodríguez Becerra, 2009). Together these changes were indicative of a concerted push to debilitate the integration of environmental concerns in the negotiation and regulation of state-led economic and social development.

As part of its attack on the functional capacities of the SINA, the Uribe administration also moved to significantly weaken the environmental licence process through the introduction of Decree 1728 of 2002 (Rodríguez, 2011; Guhl Nannetti, 2015). This move set in motion a series of market-friendly adjustments that debilitated the country's environmental licencing process until it became little more than an administrative formality (Negrete Montes, 2013; Guhl Nannetti, 2015).[48] What once appeared as a potentially powerful administrative tool with which to elevate social and environmental planning concerns in the face of the circulation of capital came to be characterized as weak, inefficient, and largely subordinated by economic interests (Santacoloma Méndez & Negrete Montes, 2014).

As has been argued by Heigl (2011: 84) in her application of the SRA in the context of failed attempts at oil industry privatization in Mexico, a key proxy for considering the institutional weight of formal state actors that constitute the state apparatus relates to their access to economic resources. Figure 1 shows that between 1995 and 2012 the percentage of Colombia's state budget allocated to the SINA never returned to the levels reached by Ernesto Samper's government (1994-1998). As is shown, the Uribe administration sets the record for the lowest levels of public investment in SINA – as a percentage of the General Budget of the Nation – since its formation in the early 1990s. Although Uribe's first term was marked with an initial increase from the previous Pastrana regime (1998-2002), the general trend shows a discernible relegation of state priorities concerning the objectives and functionality of the SINA.

[48] Subsequent modifications include: Decree 1180 of 2003, 1220 of 2005, and 2820 of 2010 (Guhl Nannetti, 2015).

Figure 1: Percentage of General Budget of the Nation (GBN) allocated to SINA 1995-2012



Source: adapted from Guhl Nannetti (2015: 98)

Beyond the attacks on this network of environmental institutions, Uribe's time in office also had profound effects on the material production of the Colombian landscape through the administration's management of implicit dimensions of environmental politics. Especially significant in this regard are the economic and regulatory reforms that sought to restructure the country's mode of regulation, benefitting fractions of capital that would go on to radically transform the Colombian countryside, as successive governments embraced an extractivist model of growth. In the words of German Palacio Castañeda (2011: 109), Colombian 'environmental politics must first be read through the modification of mining codes and rounds of concessions and negotiations'.

While the rise of extractivism and the reprimatization of the Colombian economy are well documented in the Anglophone and Hispanic literature (in political ecology and beyond), (see Duarte, 2012; Sankey, 2013; Göbel & Ulloa, 2014; Vélez-Torres, 2014a; 2014b; Sarmiento-Castillo & Pérez-Rincón, 2015; Tauss & Large, 2015; Ulloa & Coronado, 2016; Dietz, 2017; Sankey, 2018), it is important to highlight its institutional and legislative legacy in the context of this discussion and situate its rise within a broader set of political and economic reforms that mark Colombia's embrace of a neoliberal project. This is proposed given the necessity to comprehend the broader institutional ensemble of state power centres through which the Manual (2012) emerged and the positioning of private firms that would come to be regulated by its eventual adoption. Furthermore, an understanding of the contradictory tensions inherent in environmental statehood is especially important given the 'asymmetric internal relation' (Sayer, 2010: 61) between biodiversity offsets and the material production of new socio-natures through an extractivist regime of accumulation.[49]

Under the Presidency of César Gaviria Trujillo (1990-1994), the early 1990s marked the beginning of profound changes to Colombia's political economy that have since come to be

[49] An asymmetric internal relation refers to a relation between two objects, where one object can only exist in relation to another (Sayer, 2010). In this case, offsetting can only exist in relation to the development projects subject to an environmental licence from the ANLA. From 2013-2018, around 60% of the 457 licences granted relate to the hydrocarbon and mining sectors (environmental licence data provided by ANLA).

referred to as the '*apertura económica*' (economic opening) (Bonilla Gonalez, 2011: 51; Hylton & Tauss, 2016: 255). Gaviria's administration sought to restructure and reform economic policy away from a model of import substitution industrialization, which had been dominant in the region in the latter half of the twentieth century, moving instead to integrate the national economy into circuits of international capital flows through trade and financial liberalization (Hristov, 2014; Hylton & Tauss, 2016). This trajectory of neoliberalization was embraced and continued through subsequent administrations. In 1995, under President Ernesto Samper (1994-1998), Colombia joined the World Trade Organization and Samper's government also signed a free trade agreement with Mexico in 1994, which were the first of many bilateral and multilateral trading agreements established over the following two decades (SICE, n.d.).

In the second half of the Andrés Pastrana Arango administration's term (1998-2002), the government initiated the first of a wave of extractivist-orientated institutional, regulatory, and fiscal adjustments in response to the economic recession of 1999 (Vélez-Torres, 2014a). In exchange for a substantial loan from the International Monetary Fund in the midst of the crisis, the Pastrana government embarked upon a structural adjustment program, which 'aimed to shift Colombia's neoliberal accumulation model even more towards the extraction and export of minerals and hydrocarbons, primarily oil, coal, nickel, and gold' (Hylton & Tauss, 2016: 256). A key moment in this shift was the introduction of the Mining Code set out in Law 685 of 2001, which – for the first time – enabled foreign ownership of concessions and was crafted with the purpose of establishing favourable conditions for Foreign Direct Investment (FDI) in the mining sector (Duarte, 2012; Hristov, 2014). As detailed by Ramírez Cuellar (2005 cited in Gordon & Webber, 2008: 80-81) and Duarte (2012), the code itself was the product of work funded by the Canadian International Development Agency and has been directly linked to Canadian mining firms and domestic extractive interests.

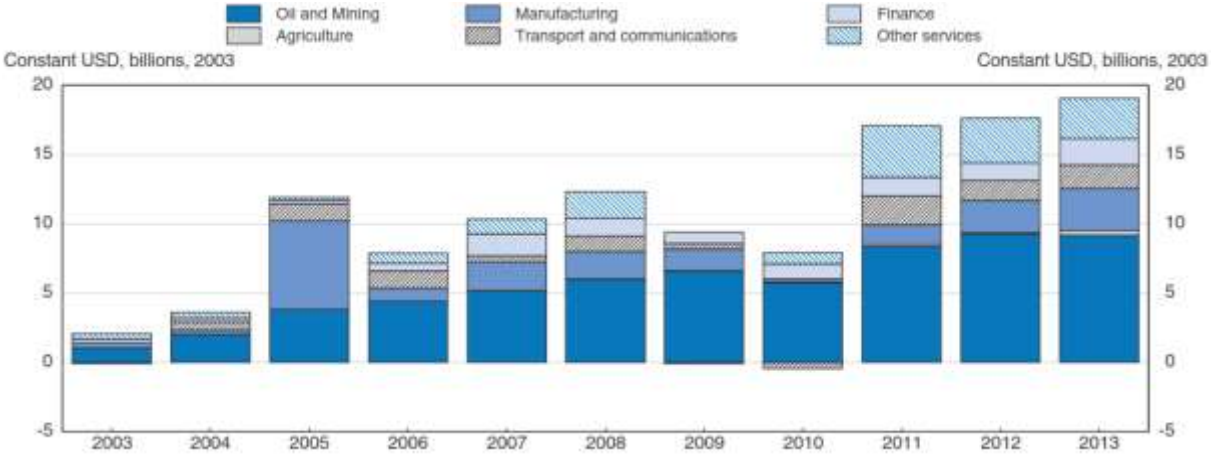
During his time in office, Uribe pushed the country's neoliberalization agenda further, which resulted in labour deregulation, pension reforms, and the privatization of public services and state industry (Urán Carmona, 2011; Hristov, 2014). Especially pertinent to the discussion here are the regulatory changes that impacted industries that would later become subject to the compensatory obligations set out in the Manual (2012), which broadly map onto fractions of capital engaged in extractive and infrastructural enterprise. Specifically, these include the mining, hydrocarbon, infrastructure, electric, and maritime/port sectors (MADS, 2012a).

After a failed peace deal with guerrilla forces attempted by the Pastrana government in 2002, the Uribe administration drastically changed tack and embarked upon a fierce counter-insurgency project that forced the FARC to cede much of their territorial control. This amped up militarization of Colombian state strategy markedly improved the investment conditions for foreign extractive capital, leading to heightened interest and a growing presence of transnational corporations from the hydrocarbon and mining sectors (Urán Carmona, 2011; Hristov, 2014; Vélez-Torres, 2014a; Vélez-Torres & Ruiz Torres, 2015). Under the banner of 'democratic security', military spending was increased, activities financed under the US' *Plan Colombia* took a more militaristic form, and collaboration between paramilitaries and public officials continued, while thousands of rural Colombian communities were displaced by an ensuing mix of paramilitary, state and guerrilla violence (Franz, 2016). Sankey (2018: 63) goes so far as to suggest that, 'While coercive state power was justified as a strategy for containing the guerrilla insurgency, it was predominantly a matter of securing the conditions for the entry of extractive companies. Two-thirds of the [Colombian military's] troops were dedicated to protecting oil and mining industry infrastructure' in this era. Furthermore, rather than documented 'para-state' violence being incidental to the hegemony of extractivist interests,

violent land acquisition and forced displacement that occurred during Uribe's presidency were key mechanisms that fuelled the burgeoning extractive economy (see Grajales, 2013; Vélez-Torres, 2014a).

Although trade and financial liberalization reforms had begun in the previous decade, with the objective of redirecting international capital flows, FDI increased dramatically under Uribe's presidency. In 2003, net inflows of FDI were at 1.72 billion US dollars, but by 2005 this figure had jumped to 10.235 billion US dollars, predominantly concentrated in the hydrocarbon sector (World Bank, n.d.; Rojas, 2009; Tauss & Large, 2016). As illustrated by Figure 2, the arrival of foreign extractive capital into the Colombian economy continued to dominate rising FDI flows in the subsequent decade. The centrality of extractivism as the basis of the government's strategy toward facilitating accumulation within state territory is reflected in a number of policy documents and regulatory modifications of the Uribe era. To pick one example, *Colombia Mining Country: National Plan for Mining Development*, published in 2006, was key a moment for the ascension of extractive capital as the basis of the Colombian growth model (Sarmiento-Castillo & Pérez-Rincón, 2015). This national plan set out a number of objectives orientated toward facilitating the growth of the domestic extractive sector as well as establishing the country as a top destination for multinational corporations (MNCs) seeking to invest in Latin America (UPME, 2006). As Coronado Delgado & Barrera Ramírez (2016: 66) have described, the Uribe government successfully 'liberalized the rules of the game for the extractive sector with the intention of reducing costs and uncertainty'. Between 2006 and 2008, the Colombian government also further promoted trade liberalization, signing free trade agreements with Chile (2006), the US (2006), the Northern Triangle (El Salvador, Guatemala, Honduras) (2007), Canada (2008), and the European Free Trade Association (Iceland, Liechtenstein, Norway, Switzerland) (2008) (SICE, n.d.). On top of this, Uribe's government also initiated trade talks with the European Union, which successfully resulted in a formal agreement in 2012 (Sankey, 2018).

Figure 2: Foreign Direct Investment by Sector (2003-2013)



Source: OECD (2015: 9)

In the wake of these market-friendly regulatory reforms, mining interests enjoyed the support of, and successfully permeated, differing blocs that constitute the Colombian ruling elite class (Sankey, 2013). Indeed, when Juan Manual Santos – who served as Minister of Defence under Uribe – assumed the Presidency in 2010, Colombia's extractivist project continued apace, as clearly evidenced by his government's first National Development Plan (2011-2014), which again positioned the hydrocarbon and mining sectors as fundamental to the country's growth model. While Uribe's regularization of extractivism was premised upon a strategy of

'securitization' (Rojas, 2009: 231; Sankey, 2018: 64), the Santos administration built upon these advances by enticing further FDI, through a combination of efforts aimed at 'juridical stability, institution building, competitive fiscal policy, combatting illegal mining activity, and provision of physical infrastructure' (Sankey, 2018: 64). According to analysis carried out by Negrete Montes (2013), by the end of 2012 – the year the country's biodiversity offset policy was ratified – around 40 million of the 114 million hectares that make up Colombian national territory was designated as 'strategic mining areas', formally requested for concession, or already allotted to private firms in the form of mining titles.

The above discussion has sought to examine the historical and institutional context within which Colombian environmental statehood has been structured and contested during the Uribe presidency. In addition, I examined how state strategies were deployed to ensure the regularization of extractivism as an accumulation regime over successive presidencies. It has been shown that the decade preceding the emergence of the country's national biodiversity offsetting policy was characterized by ongoing financial and regulatory debilitation of the SINA and institutions tasked with forwarding state environmental commitments. Moreover, this relegation of environmental concerns across the state as socio-ecological relation occurred in combination with the ascension of mining and hydrocarbon interests, which represented a clear commitment to extractive accumulation as a defining feature of the Uribe era's approach to implicit environmental politics – a trend that bled over into the Santos regime. In the following section, I turn to examine relations of social forces around the negotiated emergence of the Manual (2012).

The Emergence of the Manual (2012)

One can trace the emergence of key concepts found in the Manual (2012) back to the introduction of Colombia's most recent political constitution in 1991. This reformulation of governing principals and the administration of political power occurred in the context of a profound crisis of legitimacy for the state, which has been explained as the product of a combination of heightened narco-violence against political elites and citizenry, the ongoing civil war, extensive political corruption, and the country's own form of 'savage capitalism' (Palacios, 2006: 247). The prominence given to notions of sustainable development and environmental protection within this new framework for executive power has meant that it is often referred to as the 'green' or 'ecological' constitution (see Amaya Navas, 2016). However, as is the case in many nations around the world, any hint at radical socio-ecological reform that might have seemed possible during this era of environmental politics has not come to fruition in any meaningful sense. Despite this, through the 1991 Constitution the protection and governance of non-human natures was at least legally recognized as a core component of state responsibility and legitimacy. Thus, the emergence of the Constitution marked a key turning point in the history of Colombian environmental statehood. In addition to Articles 8 and 95.8 that note the obligation of the state to protect the cultural and natural wealth of the nation, Article 80 of the 1991 Constitution declares that:

> *The state will plan the management and exploitation of natural resources in order to guarantee their sustainable development, conservation, restoration or substitution. In addition, it must prevent and control the factors that lead to environmental degradation, impose legal sanctions, and demand the reparation of damages caused* (Consejo Superior de la Judicatura, 2010: 40).

As the above quote demonstrates, the principles of offsetting have been constitutionally codified for over 25 years. The formulation of the Manual (2012), therefore, represents the most recent incarnation of an ongoing evolution of environmental compensation, reflecting a

broader struggle between capital interests and environmental regulators – which has overwhelming been successful for the former camp. This discussion now turns to consider the efforts of an alliance of social forces, within and beyond the formal state apparatus, that coalesced around the objective of forwarding biodiversity offsetting as a means of financing conservation in the context of the broader campaign to debilitate the SINA, which characterized the Uribe era.

In the context of Uribe's second presidential term and the lowest levels of public funding destined to the SINA since its inception (as a percentage of the national budget), forces within the Ministry of Environment, Housing, and Territorial Development moved to revisit environmental licence obligations as a neglected front with which to forward the organization's biodiversity conservation aims. In 2008, this led to the Ministry seeking external, non-governmental, assistance regarding the development of possible policy options, resulting in a formal working relationship with three of the world's most established international environmental NGOs – each with long-standing permanent headquarters in the country. Association Agreement 09 of 2008 was signed between the above-mentioned Ministry and Worldwide Fund for Nature (WWF), The Nature Conservancy (TNC), and Conservation International (CI). Each of these organizations were active members of the BBOP network (BBOP, 2013). Although this research was unable to uncover comprehensive details of the terms of the agreement, which were not publicised, the Ministry's alliance with NGO partners was in part pursued as a means of leveraging financial and technical resources, external to state funding channels. As mentioned in the course of interview with a representative from one of the participating NGOs:

> *the government at the time was looking for support. It was widely convened and consulted […with] the academies, some academies, but it decided to work with these organizations, TNC, WWF and CI, because the government was also seeking a counterpart in terms of resources. I remember that our organization put forward something like close to $80,000 USD, or a little more, in the common fund* (Interviewee 10).

As an interviewee from another of the NGOs involved in the agreement testified, the strategic potential to collaborate on leveraging financial resources to pursue shared environmental aims was clear: 'it seemed to us that it was a very good opportunity to achieve conservation because in the end a lot of money is moved through offsets' (Interviewee 93). As a Ministry of Environment, Housing, and Territorial Development report described the following year, a key objective of the agreement was to deliver a set of proposals to integrate biodiversity valuation concerns into the development and planning of megaprojects, which were subject to existing national environmental licencing regulations (MAVDT, 2009). This included undertaking a series of five pilot projects focusing on each of the sectors that would eventually be regulated by the Manual (2012), with the purpose of formulating tools for establishing ecological equivalence for potential compensatory sites (see Saenz *et al*., 2013).[50]

The rise of offsetting within international conservation discourse resonates across environmental ministries around the world. In the midst of state budgetary relegation in the Colombian context, state managers and institutions within SINA look to the framing of conservation beyond the currents of domestic politics. As one of the named authors of the Manual (2012) noted when interviewed:

[50] The following discussion chapter includes a detailed exploration of the discursive construction of equivalence during the formulation of the Manual (2012).

> *Each institution [international conservation NGO] arrives with their magic formula, their book of good practice, their 12 principles. It's like returning to the notion of colonization and imposing an offset bible. In this sense, governments are invaded and say 'ah, yes, we have to move to offsetting because there lie resources for conservation'* (Interviewee 9).

This domestic attentiveness to buzzwords that emerge within international conservation discourse is a recurring strategy employed by underfunded and side-lined environmental ministries. In this way, they adopt the language of emergent trends in order to heighten the probability of accessing symbolic, financial, and technical resources at the disposal of international actors. As Rodriguez de Francisco & Boelens (2015: 490) have shown in their discussion of the emergence of payment for ecosystem services in Colombia, domestic environmental state institutions adopt, often uncritically, the discourses of emerging policy paradigms in order to enter into specific international 'epistemic' policy communities. However, it should be said that merely framing the translation of dominant policy programmes around a subordination to hegemonic discourse can have a tendency to rob analytical attentiveness to the political agency of formal and non-formal state actors that forward such schemes. Rather than simply being subject to passive discursive inculcation, the strategic and political calculation of such moves should also be acknowledged.

The NGOs that participated in the design of the policy assembled as a united front with the idea of pursing environmental compensation as a pragmatic advance for the realization of conservation objectives. Through the agreement signed with the Ministry of Environment, Housing, and Territorial Development, TNC, CI, and WWF were provided with a privileged position in advocating for a methodological and semiotic shift regarding how the notion of environmental compensation should be understood and operationalized. Whilst the compensation obligations originating from Law 99 of 1993 lacked any established criteria with which to calculate offsets, an informal system of calculation had emerged – referred to by many interviewees as 'tree for tree'. In this era, the notion of compensation tended to revolve around actions orientated toward reforestation, but there was little in the way of a codified system through which to navigate the specificities of projected environmental degradation. Rather, a crude and subjective system of multipliers was employed, with the quantity of trees felled as the principal means through which to negotiate and calculate compensatory obligations carried out by the licence holder. This flexibility, granted by the absence of an established protocol, resulted in a system where obligations were subject to the will of the civil servant tasked with liaising with the private capital representative. One representative that worked directly on the Manual (2012) within the alliance of NGOs described these negotiations:

> *the representative of the company's environmental impact study arrived, sat down with the official, and discussed the magnitude of the compensation, then, the official would say 'no, that's three for one', 'no, let's do this seven for three ', 'You know what? One for one', 'or not, do nothing'* (Interviewee 10).

Trees emerged as the unit, or currency, through which private capital interests negotiated with formal state representatives tasked with evaluating and stipulating fair exchange owed to 'the nation', in the words of the 1991 Constitution. In the course of compensating for project degradation, environmental licence holders were obligated to ensure that these reforestation-based offsets lasted for a duration of three years. Many of the interviewees that participated in this project shared stories detailing the failures of this period. Reforestation attempts used non-native tree species, land reverted back to agricultural use immediately after the three years

elapsed, and no formal registry detailing the location or investment of compensation sites was maintained by state environmental authorities.

Although initial momentum around developing biodiversity offsetting came from the agreement signed by the Ministry of Environment, Housing, and Territorial Development and the bloc of international environmental NGOs, the contents of the final version of the Manual (2012) were largely the result of work carried out by employees working within the Colombian wing of TNC (Interviewee 93).[51] In fact, as laid out in the first few pages of the policy document, authorship is credited to only four members of staff at the NGO. As expressed during an interview with a representative from a consultancy firm that was part of the BBOP network, 'it was written by one *gringo* NGO in Colombia and everyone knows it […] advisors writing it from their desk, without consultation' (Interviewee 21). Although a formal consultation process on the first version of the policy document was launched by the Ministry of Environment and Sustainable Development (*Ministerio de Ambiente y Desarrollo Sostenible*, MADS), the capacity of this process to meaningfully solicit input from actors external to the Association Agreement was criticised by some interviewees, given that the process was not widely publicised and the window for responses was launched on the 24th of December 2011 and closed on the 31st – during the Christmas recess – when few organizations were working (Interviewee 16 and 21).

Through the terrain opened up by the agreement signed with the Ministry, TNC pushed to modify and upgrade the compensatory basis of the system, from (unspecified) tree to (specified) ecosystem. This move was made on the grounds that a more expansive, comprehensive, and scientifically grounded means of establishing loss and gain was essential to the provision of what they construed as meaningful compensation. As one of the authors of the Manual (2012) would write later, the rationale underpinning these changes could be boiled down to the notion of an 'eye for an eye, ecosystem for an ecosystem' (Walschburger, 2018). Whilst prevailing trends internationally had moved toward ecosystem condition as the basis for state-led offset schemes, forces within the MADS were emphatic in wanting to maintain the use of multipliers – a defining feature of the previous system – given the extent to which the country had become accustomed to them (Interviewee 9). The permanence of offset governance arrangements was also a sticking point, with TNC pushing to secure compensation activities in perpetuity – an idea that was seen as untenable by state managers in the Ministry (Interviewee 96).

TNC's position as a member of the BBOP network meant that Colombia's national policy also received input from individuals that have been central to the promotion of offsetting, and market-based environmental policy more generally, within academic and policy forums internationally. These included Kerry ten Kate, Director of the BBOP, Juan Carlos Belausteguigoitia, then Lead Environmental Economist for Latin America at the World Bank, Ray Victurine, then Director of the US-based NGO Wildlife Conservation Society, and notable figures from other arms of TNC, such as Bruce McKenney and Joe Kiesecker, all of whom have played considerable roles within the international epistemic community that has pushed for offsetting as a policy mechanism. As one of their reports proudly boasted following the adoption of the Manual (2012), the BBOP's organizational discourse around best practice directly 'informed recent policy developments in Colombia' (BBOP, 2013: 10). However, as I outline in the following discussion, the strategically selective nature of the state also meant that

[51] After having signed the ministerial Association Agreement, WWF's involvement in the promotion of offsetting in Colombia became largely focused on gaining case-study experience through their involvement in developing mitigation measures for an infrastructure development initiative, the Pasto-Mocoa Road Project (see Rincón, 2014).

the positionality of established political interests in the orbit of the environmental licencing process were also able to influence the policy's final ratified form.

Organizational Interests within SINA

While the role of state managers should not be over emphasized in discussing the emergence of public policy, their influential position in mediating the access to and prioritization of policy projects does provide them with particular agential capacities within the social structures surrounding policy formation (Jessop, 2016: 56). After several years of technical work on the part of TNC and civil servants located within the environment ministry, forces working on the promotion of biodiversity offset policy still lacked the effective support of a ministerial state manager that fully endorsed and elevated offsetting as an emergent policy programme. According to one of the Manual's (2012) named authors that participated in interview, the arrival of Adriana Soto as Vice Minister of the newly established MADS,[52] in 2011, marked a discernible shift in the relative prioritization of the project within the Ministry:

> *finally we got a Vice Minister, Adriana Soto, who was the one who really said 'I'm going to promote it', 'I think it's important for the country' […] she really was the one, one of the forces, that really achieved, if it had not been for her, we would probably still be with the old system* (Interview 93).

In this way, the support of Adriana Soto awarded biodiversity offsetting greater prominence within the MADS and helped to shift the balance of forces in favour of the policy within the organizations of the SINA. As demonstrated by a co-authored journal article published after her departure from the Ministry in 2013, the Vice Minister perceived the introduction of the Manual (2012) as a notable advance for the prospects of Colombian environmental conservation. With regard to the political economy of state-led conservation, the development of the national offset system was also understood as a key opportunity to establish a consistent flow of financial resources, reducing the Ministry's reliance on the national budget and thus helping to increase its operational autonomy to forward environmental statehood objectives (see Soto & Sarmiento, 2014).

This issue of political and economic autonomy also brought to bear on the evolution of the content and form of the Manual (2012) itself. The mechanisms through which offsetting actions are carried out, which I discuss in full in the following section, represent a set of inter-institutional compromises that demonstrate how offsetting interacts with existing environmental policy regimes. For a significant period of time, Colombian environmental policy discourse and practice has been dominated by what many refer to as the model of 'fortress conservation' (Brockington, 2002), where state territorialization occurs through the designation of areas of social exclusion with the objective of meeting biodiversity conservation objectives through the creation of protected areas (see Brockington, 2002; Neumann, 2004; Adams & Hutton, 2007). This is not particular to the national context explored here, but rather reflects a hegemonic policy paradigm found across the world and perpetuated by the CBD, which continues to evolve often in more militarized forms (see Lunstrum, 2014; Duffy, 2016). This institutionalization of the fortress conservation approach within the SINA played directly into the negotiation around how offsets were to be envisioned and discursively constructed.

[52] In 2011, the Santos administration reorganized the ministerial division of labour in relation to the practice of environmental statehood, reversing Uribe's reforms that saw the Ministry of Environment folded into the Ministry of Development. This resulted in the formation of the MADS and the ANLA, a separate institution specifically tasked with environmental licencing procedures.

As has been discussed by Sullivan (2013), academic and policy discussion on offsetting best practice has frequently cited the notion of 'additionality' as a central organizing principle (see BBOP, 2012; 2013; OECD, 2016). This refers to the idea that all compensatory actions should be supplementary to prevailing conservation actions and commitments within territorialized spaces where compensation schemes unfold. For this reason, the exclusion of present national protected areas as an option for offset action has been highlighted as a fundamental component of offset policy (see Maron *et al*., 2016).[53] This is because establishing a counter-factual baseline scenario of biodiversity loss with which to calculate ecological gains from is often based on the assumption that existing conservation commitments are met by actions external to the functioning of offset systems. Reflecting this position, the alliance of NGOs led by TNC advocated for the declaration of this principle within the national policy programme. To some extent, they were successful in securing its inclusion during the Manual's (2012) formation. However, this was not without institutional compromise with forces from within SINA.

At the end of 2013, the National System of Parks included 56 National Protected Areas, totalling 14,578,778 hectares (around 7% of the total area of the Colombian landmass) (Guhl Nannetti, 2015). The total area covered under the protected area system has gradually risen since SINA and the Ministry of Environment were first established, back in 1993. However, this increase in administrative and territorial responsibility was never accompanied by access to centralized state budgetary resources commensurate with such changes (Villa Vélez, Zárate Yepes & Villegas Palacio, 2016). During this period, the governance of fortress conservation became heavily reliant on funding from international donors, particularly the Dutch government (Guhl Nannetti, 2015; Villa Vélez, Zárate Yepes & Villegas Palacio, 2016). With the Ministry's turn toward biodiversity offsetting, the state administrative body responsible for the coordination and management of public protected areas, National Natural Parks of Colombia, viewed a strategic opportunity to secure access to further economic support.

> *That was also a fight that they [Natural National Parks of Colombia] put up, then, at the start of the compensation manual. It was desired to leave out the possibility that companies could do restoration or compensation with National Parks […] [However,] the director of Parks here [Julia Miranda Londoño] is really good at negotiating affairs and managed to get Parks in as well […] she had friends working on the policy* (Interviewee 21).

Despite resistance from within the alliance of NGOs and wider discursive academic debates surrounding the practice of 'additionality', the national parks authority successfully manoeuvred and lobbied the Ministry to include actions within the state's national protected area system as part of the Manual's (2012) series of compensation options. This reflects the institutionally mediated and path dependent nature of policy making as a strategic terrain, which reformulates and conditions emergent policy paradigms through the broader institutional balance of forces that, in this case, constitute the realization of environmental statehood within the SINA.

Capital Fights Back

After several years' worth of practical work forwarded by TNC, with input provided by National Natural Parks of Colombia, the ANLA and the MADS, a working version of the national offset policy had been established. The technical sophistication of the document far surpassed the crude compensation scheme that had been unsuccessfully implemented in the

[53] For an alternative view that posits public conservation funding as a non-given, see Githiru *et al*. (2015).

years after the passing of Law 99 in 1993. On the cusp of solidifying a tactical victory for the balance of forces that had assembled in support of the development of offsetting, a last-minute move was made by business associations on behalf of capital interests that would become subject to the compensatory obligations laid out in the policy draft. Prior to ministerial ratification, the Manual (2012) had been conceived as a check and balance that would form part of the evaluation of environmental licence applications submitted to the ANLA. In this scenario, and in addition to other licence obligations, large-scale development projects would be granted on the basis of having provided a concrete offset plan that explicitly outlined the compensatory actions to be executed by the applicant.

For the fractions of extractive and infrastructural capital faced with an unfavourable recalibration of environmental governance obligations, this proposed alteration was perceived as a disenable threat to the streamlined and flexible reforms that had characterised the licensing process since the Uribe administration's assault on the environmental wings of the state apparatus. Moreover, the inclusion of upfront designs for offset actions would entail further costs without any certainty that an environmental licence would be granted. At risk of eroding the privileged position enabled through the course of Colombian ultra-right neoliberalization, private business interest groups successfully lobbied to weaken the Manual (2012) by essentially removing concrete offset requirements from the environmental licence application process altogether. Instead, business associations advocated for the evaluation of concrete offset proposals a year after an application had been approved by the ANLA. As outlined by one of the principal authors of the Manual (2012) when reflecting on the removal of offset proposals from the licence application stage:

> *It needs to be made clear that this was an issue of political negotiation, not a technical issue. More or less, the sectors [subject to the manual] declared 'if you don't add a year, we won't let the Ministry sign it' […] They were saying this 'it's going to be really strict, we have to find a way of relaxing the obligation'. And well, that was the means* (Interviewee 9).

The power wielded by fractions of capital in the course of influencing and altering the content of state policy exhibits the 'strategically-selective' (Jessop, 2008: 98) nature of the state as a set of socio-ecological relations, which reflects historical and tactical moves made by social forces to advance material interests. Over the course of the preceding Uribe presidency, the neoliberal reforms that defined an ultra-right shift in the country's politics had bolstered and maintained the capacity for capital-orientated lobbying in the halls and corridors of governmental power. Indeed, as has been discussed by the Colombian political ecologist and environmental historian German Palacio Castañeda (2010: 39), through a raft of legislative reforms, the establishment of a form of 'corporate hegemony' across the Colombian social formation came to be recognised as a defining feature of the Uribe era approach to environmental statehood. In this case, the incipient MADS – the formal state institution tasked with forwarding the objectives of environmental statehood – was unable to pursue policy formation without bowing to external pressures applied in the interests of capital. This exemplifies the way 'State policies are never determined purely by the logic of the state or by the interests of state managers but are linked to economic strategies and state projects that reflect a multiscalar equilibrium of compromise, shaped by a changing balance of forces' (Jessop, 2016: 207).

In summary, as I have argued, the content and form of the Manual (2012) was the result of negotiated and strategic manoeuvring on the part of a diverse ensemble of social actors, composed of formal state institutions that make up the SINA, high-profile international NGOs, and fractions of capital that were keen to head off the potential for reduced returns from

accumulation. In the course of advancing their specific interests, these actors formed negotiated alliances to enhance organizational capacity, or used their privileged position in relation to the state as a reflection of a broader balance of social forces to fundamentally weaken the policy's final operational design. In the following section, I outline the final version of the Manual (2012) in full and then turn to consider how the policy's eventual ratification has altered the form and function of contemporary Colombian environmental statehood.

Offsetting as a New Social-ecological Governance Regime

In 2012, after a lengthy process of gestation that began in 2008, the MADS published a comprehensive and overarching policy document known as the *National Policy for the Integral Management of Biodiversity and Ecosystem Services* (*Política Nacional para la Gestión Integral de la Biodiversidad y sus Servicios Ecosistémicos,* PNGIBSE*)* (MADS, 2012b). The document lays out a broad framework for managing socio-ecological systems in accordance with the demands of the CBD's Aichi Targets, to be met by the year 2020, and served to update Colombia's previous National Action Plan tied to the CBD, which had been adopted back in 1996 (MADS, 2012b). Being developed in tandem, the publication of the Manual (2012) was directly linked to objectives set out in the third strategic axis of the PNGIBSE – titled 'Biodiversity, Economic Development, Competition, and Quality of Life' – which highlights a need to integrate economic and non-economic values associated with biodiversity within the decision-making stages of economic production and infrastructural development.[54] Having already laid out some key aspects of offset policy in the discussion above, I use this section to outline the content and operation of the Manual (2012) so as to frame the analysis that follows. After summarizing the policy, I reflect on the implications of this new socio-ecological governance framework in relation to practices of environmental statecraft and provide details of the types of firm obligated to carry out compensatory activities, using a database of environmental licences granted since the offset scheme came into force.

Like other state regulated and compulsory forms of biodiversity offsetting, the Colombian scheme operates through an established land-use planning system, which governs the activities of private individuals and organizations that wish to engage in forms of land-use change resulting in environmental degradation (MADS, 2015). Environmental licences are granted to such parties on the basis of the completion of a project application, which is evaluated by regional or centralized environmental authorities, depending on the scale of the activities proposed. CARs regulate small-scale activities that require a licence within the frontiers of their regional jurisdiction, whereas large-scale activities are placed under the remit of the centralized ANLA. The state's environmental licencing process only covers project activities within the mining, hydrocarbon, infrastructure, electricity, and maritime/port sectors.[55]

[54] Specifically, as is noted in the Manual (2012: 5-6), the development of Colombia's national biodiversity offset policy responds to the fourth and sixth strategic focus of the PNGIBSE: 'Identification and evaluation of the costs and economic, ecological, cultural, and social benefits in the long term, derived from the relation between productive activities and the maintenance of ecosystem services derived from biodiversity ("trade-offs")' (MADS, 2012b: 86); and, 'Strengthen institutions and activities related to the evaluation of environmental impacts and the assignation of environmental compensation of biodiversity loss tied to projects subject to environmental licences at a national, regional and local scale for the maintenance of the resilience of socio-ecological systems and the provision of ecosystem services fundamental for quality of life' (*ibid.*).

[55] Large-scale agricultural development is conspicuous in its absence, given that it is one of the pillars of Colombian extractivism. However, since its inception (initiated by Law 99 of 1993), the environmental licencing process has always excluded agriculture and livestock from its remit, despite both being highlighted as key drivers of deforestation and biodiversity decline (MADS, 2012b; Krause, 2020).

Although Colombia's biodiversity offset system was updated in 2018 to include all project activities subject to environmental licences (see MADS, 2018), the analysis that constitutes this thesis relates only to the original formulation of the policy, which stipulated that only project activities governed by the ANLA require biodiversity offset actions (MADS, 2012a).

Parties that seek to obtain an environmental licence are required to formally initiate the process by declaring their interest before the ANLA and paying a fee that covers the cost of processing and evaluating documentation submitted as part of an application (ANLA, 2015a). All parties wishing to carry out activities that fall under the remit of the ANLA must carry out an Environmental Impact Assessment (EIA), which should detail all anticipated impacts on 'natural' ecosystems and 'secondary vegetation' in accordance with the regulatory process set out in *General Methodology for the Presentation of Environmental Studies* (MAVDT, 2010).[56] In broad terms, the EIA should describe the general nature of the project (e.g. design, schedule, use of raw materials, etc.) and analyse the potential repercussions of the proposed project on the 'biotic, abiotic, and socio-economic environment' (MAVDT, 2010: 21). Applicants are required to adhere to specific terms of reference to carry out this process, which differ according for each of the economic sectors outlined (ANLA, n.d.). This analysis should combine primary data collected during field visits with official state sources in order to establish an environmental baseline for the proposed intervention. The information outlined within the EIA constitutes the primary means by which decisions are made by the ANLA regarding the environmental viability of project proposals laid out on in environmental licence applications.

The analysis that constitutes the EIA results in the formation of another component that makes up part of the environmental licence application – the Environmental Management Plan (EMP). This document should outline the bulk on the necessary measures that have been pursued to comply with the steps of the mitigation hierarchy. It also includes a programme of activities necessary to monitor socio-environmental impacts in line with the quality assurance standards adopted by the ANLA, contingency plans in the event of environmental emergencies, the cost and schedule of environmental monitoring activities, and details on the process of project abandonment/termination (MAVDT, 2010). Based upon analysis set out in the EIA and EMP, any 'residual impacts' identified at the stage of project design must be compensated through the design and execution of offset activities. These actions should be outlined in a compensation plan that details the quantity of offset required (based on ecosystem type and area impacted), the type of offset pursued, and the location of the intervention, which is assessed by the ANLA (MADS, 2012a). As discussed in the previous section, companies are given a year to submit a complete compensation plan.

Depending on the specifics of the project outline, civil servants within the ANLA that have been assigned to a particular application usually then undertake a fieldtrip to the proposed project site, as part of the process of evaluating the information that has been presented before the regulatory body. Once all the necessary documentation has been evaluated and is deemed adequate in the eyes of the Technical Committee of the ANLA, the regulatory authority issues a Technical Document of Environmental Viability (*Concepto Técnico de Viabilidad Ambiental*), which legally signals the go ahead to pursue the project. Once a licence has been granted, the environmental obligations set out in the document (including those pertaining to

[56] The notion of 'natural' here is, of course, problematic. The idea of a 'natural', 'pristine' or 'wild' nature, distinct from the social, has been thoroughly deconstructed and critiqued for more than two decades within the environmental social sciences (for early interventions, see: Cronon, 1995; Escobar, 1999; Castree & Braun, 2001; Smith, 2010b). In the diverse field of political ecology, this is perhaps one of the few unifying principals that binds its practitioners theoretically.

offsets) are monitored by the ANLA on the basis of Environmental Compliance Reports, which licensees are required to periodically submit after a licence has been awarded.

Modes of Offsetting in the Colombian Case

The Manual (2012) defines offsets as 'Actions that compensate for biodiversity impacts and negative effects that cannot be avoided, corrected, mitigated, or replaced that involve biodiversity loss within natural ecosystems and secondary vegetation. In this way, offsets should guarantee the effective conservation of an ecologically equivalent area where a permanent conservation and/or ecological restoration strategy is achieved, which compares with the ecological baseline, guaranteeing no net loss' (MADS, 2012a: 7). The notion of ecological equivalence here refers to the stipulation that ecosystems impacted must be offset by actions carried out in the same category of ecosystem (I discuss the processes by which equivalence is discursively constructed at length in the following chapter). As the above excerpt makes clear, Colombia's offset scheme only relates to compensation for terrestrial biotic impacts to areas with ecosystems categorized as natural or secondary vegetation. In the incarnation discussed here, the policy 'does not contemplate offsets in relation to impacts on the aquatic biotic, abiotic, or socio-economic environment' (*ibid.*). However, work is currently underway to develop state-mandated offset mechanisms for degradation caused to fresh water and marine environments by sectors regulated by environmental licencing protocol (MADS, 2012a).

The Manual (2012) divides permissible biodiversity offset activities into two camps: *in situ* conservation and ecological restoration. However, in practice, an individual offset action can combine these two forms within a single designated site. With regard to the timeframe of environmental compensation, firms or individuals obligated to carry out such activities are responsible for ensuring that offsets last for, at a minimum, the duration of the environmental licence of the respective development project (MADS, 2012a). However, depending on the course of action taken (as discussed below), some forms of private offsets subsequently become integrated into existing regimes of state environmental management – establishing the possibility of longer-term gains for biodiversity after a development project has ended. The policy stipulates that compensation actions can take the following three forms.

1. ***Offsets in Public Parks*** – In this case, offsets are realized through the creation, enlargement, or consolidation of public protected areas that make up the National System of Protected Areas.[57] Offsets in this category consist of a combination of the following activities: i) funding the process of public park declaration; ii) purchasing private land; and, iii) financing the preparation, execution, and monitoring of a management plan for the site. These activities must be undertaken in concert with the CAR that has jurisdiction over the area proposed for offsetting (MADS, 2012a).

2. ***Offsets in Private Parks*** – This action refers to the creation or enlargement of *private* protected areas within the National System of Protected Areas, known as Civil Society Nature Reserves. As above, this action includes a combination of the following activities: i) financing and carrying out the process of park declaration; ii) buying up property to establish or enlarge a private park; and, iii) developing, implementing, and monitoring a management plan for the site (MADS, 2012a).

[57] The notion of 'consolidation' here refers to the act of buying up private land situated within existing designated public protected areas, a process known as *saneamiento predial*, which I discuss further in Chapter 6.

3. ***Conservation Agreements*** – This final mode of offsetting refers to the establishment of a contract between a licence holder and landowners/tenants in possession of land that corresponds to the Manual's (2012) stipulations for ecological equivalency. In this instance, payments are made to the landholder to ensure the conservation of biodiversity on private lands, where licence holders are required to carry out an environmental monitoring plan over the course of the environmental licence.

In addition, the Manual (2012) states that as an alternative to *in situ* conservation, licence holders can compensate for impacts by pursuing forms of ecological restoration, which should be carried out in accordance with objectives and stipulations set out in the Colombian Government's *National Restoration Plan* (MADS, 2012c). The decision whether to pursue conservation, restoration, or a mix of both, rests with the environmental licence holder. However, the regulatory requirements pertaining to restoration activities, as set out in the policy document, are more demanding, given that they entail the submission of additional documentation in line with the criteria of the *National Restoration Plan* (Murcia *et al*., 2017).[58] Restoration actions can be advanced in any one of the mechanisms outlined above (through public parks, private parks, or conservation agreements) (MADS, 2012a). These forms of environmental management are defined by the policy as 'the ensemble of activities that partially or totally re-establish the composition, structure and functions of biodiversity that have been transformed or degraded' (MADS, 2012a: 31). Specifically, the policy differentiates between three distinct categories of environmental management under the heading of ecological restoration, which differ slightly in terms of objective and scope. These include ecological restoration, ecological rehabilitation, and ecological recuperation/reclamation (summarized in Table 2).

Table 2: Categories of ecological restoration

Categories of Ecological Restoration	
Ecological restoration	Interventions that initiate or accelerate the recuperation of an ecosystem by re-establishing its function, components, structure, and complexity, with reference to a historic state (MADS, 2012a).
Ecological rehabilitation	Management that seeks to achieve the partial re-establishment of a degraded ecosystem's structure and function with reference to a historic state (MADS, 2012a).
Ecological recuperation/reclamation	Forms of intervention that aim to enhance a degraded ecosystem, but without reference to an original state. In this way, management is orientated toward goals such as aesthetic improvement, stabilization, or increasing an ecosystem's utility (MADS, 2012a).

Source: MADS (2012a: 31-32).

The Manual (2012) places restrictions relating to the location of potential offset sites but acknowledges that firms may struggle to establish agreements with (public or private) landowners in possession of land that corresponds to the ecosystem categorization of the impact site. For this reason, the policy establishes a sequence of available options that seeks to ensure that offsets are located 'as close as possible to the impact site' (MADS, 2012: 27). Firstly, licence holders should attempt to establish compensation sites within the area of influence of their project – defined as the jurisdiction of the CAR (Murcia *et al.*, 2017). If this is not feasible,

[58] While compensation activities related to conservation only have only a limited number of documents that have to be presented as part of a compensation plan, restoration activities are required to comply with an additional 14 forms of documentation (Murcia *et al*., 2017).

offsets can be located within the same hydrological subzone, as defined by spatial units of analysis set out in IDEAM (2010).[59] Failing this, firms are then permitted to turn to surrounding hydrological subzones having exhausted the previous options (MADS, 2012a).

Table 3: Key actors and their roles within the offset process

Key actors	Roles within the offset process
Ministry of Environment and Sustainable Development (MADS)	Government ministry in charge of formulating, co-ordinating and implementing national environmental policy.
National Authority for Environmental Licencing (ANLA)	Evaluates and approves applications for environmental licences and subsequent detailed compensation plan. It is also responsible for periodic monitoring of progress with compensation activities.
Regional Environmental Authorities (CARs)	Firms are required to coordinate with CARs that have jurisdiction over proposed compensation sites. CARs must formally accept the proposed actions of private firms before such proposals are submitted for evaluation by the ANLA.
National Natural Parks of Colombia	Provide opportunities for firms to comply with legislation through the expansion or purchase of land within the national system of parks.
Environmental/development consultancies	Private sector organizations that are contracted to put together the application for an environmental licence and are sometimes contracted to develop and implement concrete compensation plans.
Private firms with an environmental licence	Companies that seek to accumulate capital through large-scale development projects that entail offset obligations. In adhering to the Manual (2012), these firms become responsible for conservation practice until their environmental licence elapses.
Landowners	Private and collective landowners engage in offsetting by either selling land to developers or participating in conservation agreements.
NGOs	These organizations tend to be employed when a detailed compensation plan is required after an environmental licence is granted to a project developer.

In establishing a compensation plan, the licence holder must consult with the CAR that holds jurisdiction over the area of the proposed site, who must acknowledge and formally accept their proposals. While the Manual (2012) places no obligation on firms to engage in consultations with communities over proposed areas of compensation, the document does state that firms must inform (*socializar*) 'communities that are to benefit from the offset action' (MADS, 2012a: 30). The evaluation of a firm's compensation plan, undertaken by civil servants at the ANLA, does not entail a trip to the field to valid and assess the information provided (Murcia *et al*., 2017).

[59] This categorization is taken from *The National Water Study* (IDEAM, 2010), which divides Colombia's landmass into 309 categories of hydrological subzones, 41 hydrological zones, and 5 large hydrological areas (MADS, 2012a).

Reworking Environmental Statehood through Offset Policy

The final negotiated version of the MADS' national policy established the legal governing framework for a confluence of disparate institutional entities, which covers national and regional public environmental authorities, private firms in possession of environmental licences, and third-party organizations contracted to deliver offset proposals and carry out concrete actions.[60] In the context of the country's extractivist-orientated regime of accumulation, the reformulation of environmental compensation obligations, specifically targeted at extractive capital megaprojects and infrastructural development, represents an emergent component of a broader mode of social regulation, which seeks to stabilize the crisis tendencies and contradictions that derive from Colombia's historically and geographically contingent growth model. In the present case, moves made by the environment ministry are viewed as an attempt to constrain extractivism's ecological crisis tendencies through the Manual (2012), as a specific form of institutional and regulatory recalibration, or 'eco-state restructuring' in the Regulationist framing of While, Jonas & Gibbs (2010: 76). As part of this process, a web of public and private institutions become enmeshed in the production and regulation of offsetting as a socio-ecological governance framework. As existing analyses of offset systems elsewhere have argued (see Robertson, 2004; Sullivan, 2013), the enrolment of non-state actors and private sector involvement in Colombian conservation reflects a broader process of neoliberalization.

However, rather than simply pointing toward a purported 'shift from government to governance', as discussed in some quarters of the neoliberal natures literature (e.g. Himley, 2008; Bigger & Dempsey, 2018), a SRA to the state (and state powers) problematizes this framing of the inclusion of non-state actors in relation to the functioning of modern statecraft. The emergence of public-private, or hybrid, governance arrangements, premised on the coordination and cooperation of an array of institutions external to the formal state apparatus, may appear to indicate a clear retraction of state governing functions. However, arguably, this interpretation rests on a restrictive conception of the state and the operation of state powers from the outset. In the words of Jessop (2016: 183), "Such a view ignores other modalities of state power and implies that, if the state employs other techniques of rule, it must be 'in retreat'".

In this way, the inclusion of civil society actors and private firms into emerging networks of socio-ecological governance is not framed as indictive of a zero sum move away from government (i.e. the state). Rather, the regulatory inclusion of social actors external to formal state institutions is understood as a recalibration of the institutional means through which state powers are actualized, in this case, with the objectives of advancing ministerial aims through a form of 'flexible environmental statehood' (Ioris, 2014: 21). That said, this is not to proclaim that such practices play out through an uncontested and hierarchical structure of command. Indeed, as the following section of this chapter attests, environmental policy objectives organized around an expansive ensemble of actors engaged in governance results in a diverse set of organizational interests, strategies, and complexities, which are prone to governance failure. Through the implementation of the Manual (2012), the actualization of state powers in relation to the realization of environmental conservation objectives is premised on the capacity

[60] The practices that characterize these forms of labour are explored in detail during the following discussion chapter.

to incentivise and coordinate the 'active consent' or 'passive compliance' (Jessop, 2016: 176) of actors beyond the formal state apparatus.

Recent work by Apostolopoulou, Greco & Adams (2018: 863) has argued that biodiversity offsetting 'involves the deregulation and market-friendly reregulation of environmental and planning legislation to facilitate development […] in line with the interests of developers'. While this may be true in some cases, as argued by Apostolopoulou & Adams (2017) in the context of the United Kingdom, this form of universalist theorizing around the use of offsetting neglects the country-specific context and regulatory starting point that surround the roll out of such policies. Offsetting in Colombia can be viewed as 'market-friendly', but only to the extent that its operation does not fundamentally challenge the overall hegemony of capital interests that comprise sections of the country's present accumulation regime.[61] Rather than viewing this case of offsetting as a form of reregulation that is inherently favourable to such interests, it should be acknowledged that sectors covered by the policy have effectively taken a considerable hit with regard to production costs when compared to the environmental licence obligations existent prior to the Manual's (2012) codification.

Although the dysfunctional system of environmental compensation that existed prior to 2013 (discussed above) was premised on enrolling corporate actors in meeting conservation objectives, present demands placed upon private firms represent heightened administrative responsibility, which extends for the lifetime of the licence (this could be as long as 30 years, in some cases). A key difference between the previous system and the Manual (2012) relates to its aim of incentivizing private land acquisition, which is then supposed to become state property once the environmental licence expires. In this way, the re-territorialization of land for state conservation purposes is enacted by firms seeking to comply with environmental licence obligations. Beyond these new administrative, economic, and legal burdens placed upon capital, the policy also attempts to incentivise the territorial extension of conservation practice into private and collectively owned land through the use of conservation agreements.

Having offered some thoughts on how Colombia's offset system serves to reconfigure the nature of environmental statehood in the country, it is worth providing some empirical detail on the types of corporate actors obligated to comply with environmental licensing protocol and the distribution of licences across regulated economic sectors. Analysis of a database of 457 licences, provided by the ANLA during the end of my time in the field, shows that the majority of projects given state approval between January 2013 and April 2018 sit within the hydrocarbon sector, with 255 licences awarded during the period (see Table 4). It should be emphasized here that not all these projects will result in biodiversity offset activities, as many will not impact ecosystems categorized as natural or secondary vegetation. In fact, according to ANLA (2019c), as of July 2018 only 161 environmental licences have been awarded on the understanding that biodiversity offset actions be undertaken by regulated firms.

[61] It is understood that this is not the generally accepted notion of market-friendly reregulation used in the neoliberal natures literature. Noel Castree, perhaps one of the most cited human geographers on this topic, defines the phenomenon as 'reconfiguring the state so as to extend the frontiers of privatization and marketization' (Castree, 2011: 10). While the expansion of a market in environmental services opened up by the Manual (2012) is a form of marketization, privatization processes are not at work in relation to offsetting in Colombia.

Table 4: Environmental licences granted between January 2013 and April 2018 by sector

Sector	Number of Licences	Percentage of Total
Hydrocarbon	255	55.8 %
Infrastructure	137	30 %
Energy	47	10.3 %
Mining	18	3.9 %

Source: Data provided by the ANLA

Table 5: Environmental licence holder by organizational type

Environmental Licence Holder	Number of Licences	Percentage of total
Domestic firms(s)	217	47.5 %
Includes MNC(s)	214	46.8 %
Formal State Institution	25	5.5 %
Nongovernmental Organization	1	0.2 %

Source: Data provided by the ANLA and combined with author's own research

Table 6: Top 5 countries of origin for foreign MNCs and number of environmental licences

MNC Country of Origin	Number of Licences
Canada	63
Spain	29
US	23
China	17
Italy	12

Source: Author's own research

A little under half of all licences granted since the Manual (2012) came into force were awarded to projects undertaken by foreign MNCs or consortiums that included a foreign MNC. This reflects Colombia's now established position within an internationalized division of labour, thanks to successive economic liberalization reforms. Of the projects backed by FDI, the overwhelming majority are concentrated in the hydrocarbon sector, with a strong presence from Canadian, Spanish, and US firms (as laid out in Table 6). Extractive foreign MNCs from these countries that were awarded multiple licences during this period include the Canadian Gran Tierra Energy Incorporated (13), Spain's *Compañía Española de Petróleos* (9), known as CEPSA, and the American Occidental Petroleum Corporation (4). In the next section, I turn to explore the first phase of implementation of Colombia's national biodiversity offset system.

Early Implementation

In conceptualizing the application of the Manual (2012) as a contested process that reflects the strategic possibilities and differentiated agency of an ensemble of actors, this section seeks to exhibit the ways in which the form and material realization of offsets has been subjected to the actions of multiple institutions acting as 'force multipliers' (Jessop, 2016: 55) or obstacles that block such interventions. It should be emphasized here that when leaving the field in Spring 2018, over 5 years after the Manual (2012) came into effect, very little progress had been made with regard to concrete compensation activities on the ground.[62] In this way, part of this discussion is concerned with exploring the contradictory tensions, relations, and interests that

[62] The relatively small sample of formal offset proposals accepted by the ANLA is discussed in the final discussion chapter.

have contributed to the failures of offsetting during its initial roll out phase. In doing so, I argue that actors operate within and beyond the legal framework set out by the policy so as to shelter or forward their organizational interests.

International Geopolitical Alliances

With the purpose of developing further tactical institutional alliances and moving beyond the confines of limited centralized government funding, state managers within the MADS turned to international aid just as the Manual (2012) came into force in January 2013. Just three months into the policy's application, then Vice Minister of Environment and Sustainable Development, Adriana Soto (2011-2013), was part of diplomatic meetings with Germany's Federal Ministry of Economic Cooperation and Development in Berlin. Principally, these meetings took place with the purpose of discussing bilateral cooperation regarding the management of protected areas in the Amazon region and technical support for the operation of the Manual (2012) through the PROMAC project, implemented by the German Corporation for International Cooperation (MADS, 2013a; GIZ, 2017). Launched in December 2012 and lasting till the end of 2017, this bilateral initiative provided a key source of non-domestic funding for the MADS and proved to be integral to the promotion and development of offset policy at a regional level.

Over the course of the project up to 11 million euros were made available to facilitate the realization of a series of targeted objectives (GIZ, 2017). Although the scope of PROMAC was broader than biodiversity offsetting, the institutional priority placed upon environmental compensation appears to have heightened as the project began its second phase in 2014. At this time, a lead TNC team author responsible for drafting the Manual (2012), Shirley Saenz, was recruited to head up the technical support of PROMAC policy on compensations. A large part of the project's effort was focused on developing the institutional and technical capacity at the level of CARs, specifically the development of portfolios of compensation sites to be made available for environmental licence holders through GIS shape files. In forwarding this aim, the German Corporation for International Cooperation worked closely with CARs in the departments of Atlantico and Tolima, resulting in the adoption of specific regional regulatory frameworks in line with the national policy. The PROMAC initiative also sought to the facilitate the implementation of offsetting by upgrading the SINA's digital National Environmental Information System, which provides an online depository of ecological and cartographic information available to consultants, NGOs, and environmental licence holders to assist in the design of compensation actions.

Avoid, Mitigate, ~~Offset~~ Delay

On account of the agency granted by the policy, environmental licence holders have played a defining role in influencing exactly how offsetting has played out since the Manual (2012) came into force. Although the actions of private capital firms obligated to deliver conservation/restoration projects on behalf of the state have varied, some discernible and obstructive tactics have been deployed that have contributed to the slow rate of progress with concrete actions on the ground. Fractions of capital that successfully lobbied for the removal of concrete compensation proposals during the evaluation of environmental licence applications opened up the possibility of embarking on respective capital accumulation activities without effectively engaging with the regulatory obligations that offsetting entails. In the course of interviews with civil servants from the ANLA and consultancy firms that work

directly on the elaboration of such plans, many respondents discussed how licence holders employ strategies to delay private investment in state-mandated offsetting, through deliberate acts of non-compliance. As discussed by one ANLA civil servant tasked with regulating the activities of licence holders:

> *After a year passes since the presentation of the [original] plan, monitoring is done, and when that obligation arrives, one revises – the noncompliance is considered…Two or three years can pass telling the company that they have to submit the offset plan for biodiversity loss* (Interviewee 85).

In avoiding and delaying the compensatory obligations placed upon them, private firms exploit the weak organizational capacity and political authority of the ANLA within the broader assemblage of institutions that constitute the formal state. This tactic highlights their ability to operate as disruptive social forces within the ensemble of institutions that constitute offsetting as a socio-ecological governance regime – ultimately frustrating and obstructing the policy objectives pursued by the MADS. During an interview with a representative from a major consultancy firm, specializing in the sale of ecological restoration services, the position of many companies obligated to comply with the additional economic and administrative burdens of offsets was discussed as follows:

> *its not happening. They never did that, because they were holding on to the money, like 'ahh mmm mmm, this, if we build enough critical mass, we'll be able to lobby!' And that's what they did. So they held onto the money […] we've presented projects to companies, saying we can operate your [offsets], what you have been asked to do, we can operate that, with your money. And we can show the impact of it being properly done. […] And we've gone to these, for example, infrastructure concessions, saying you will be, last December, you will be fined! If you don't do something... and they're like 'how much is the fine again?' 'Don't make me laugh.* (Interviewee 16).

Although the ANLA possesses the authority to financially sanction licence holders, the capacity for this tool to alter firm behaviour is contingent on a regulatory process that awards private firms with space to prolong and draw out the financial sanction procedure. Licence holders must present progress relating to compensation and other additional obligations to the ANLA through the submission of Environmental Compliance Reports. However, these semestral presentations can simply state that efforts to locate compensation sites have been made but were unsuccessful (e.g. owing to an unresponsive CAR, failed land acquisitions, or the collapse of negotiations with landowners over potential conservation agreements).[63]

'Working with the devil'

The range of offset options available to private firms within the legal framework set out by the policy allows for a certain degree of flexibility regarding how equivalent natures come to be framed and materially produced. The intellectual labour required to design and eventually implement compensation plans is usually beyond the in-house capacity of licence-holding private firms, though it is not unheard of to have specialist teams working within some large-scale corporate entities. For this reason, NGOs, specialist environmental consultancies, and research institutions that offer consultancy services, are awarded some capacity to influence

[63] These complications may of course have a basis in fact, but many interviewers questioned the integrity of such claims, given the extent of non-compliance seemingly reflecting a rejection of the offset responsibility by firms.

the form and content of offset proposals when contracted to design and carry out compensation activities. While these institutional relations constitute new forms of environmental governance, far from being horizontal networks of decision-making, they are characterized by structured relations of power, which are premised on the buying and selling of labour required to engage with policy requirements.[64] In this way, the social relations surrounding design and implementation are slanted deeply in favour of the environmental licence holder, who's operational logic is, in general terms, characterized by an inbuilt tendency to reduce the flow of diverted surplus value and ensure the maintenance of existing accumulation activities.

Environmental NGO alignment with extractive capital and other fractions covered by the Manual (2012) is of course a contentious issue, on account of the severe socio-ecological impacts that such forms of capital accumulation leave in their wake. However, many NGOs seek such collaborations in the course of engaging in forms of 'strategic-context analysis' (Jessop, 2016: 55), which reflect the limiting social structures surrounding the pursuit of organizational objectives. This entails an evaluation of the contemporary conjuncture of Colombian environmental politics and the political economy of conservation funding through the prism of operational pragmatism and political possibility. Or to put it another way, as a form of realpolitik. In this way, the reconfiguration of environmental compensation, as a means to capture and direct economic resources toward biodiversity conservation and restoration, presented itself as an ethical dilemma for civil society organizations in possession of the technical expertise necessary to deliver offsets. As recalled by one representative from an NGO involved in contractual relations with a major domestic firm engaged in coal extraction:

> *there were two basic positions that the different NGOs adopted at the national level with respect to working with the enemy... There were many that said "No, no, no, nothing good can come out of this"… [we said] "Look, well … Let's rehearse, let's see, because the mine is going to be there, we can't get rid of it… better for someone to do compensation well, then to do it badly* (Interviewee 56).

For Adams (2017a: 200), these forms of 'Faustian Bargain' are sought with the purpose of facilitating access to power and financial resources. Interviews undertaken with NGOs involved in the process of offsetting would seem to support this proposition. Their engagement with ecologically destructive corporate entities is premised on the belief that such relations open the possibility to fund land management practices and restoration efforts that align with their organizational interests. In addition, the ecological monitoring and fieldwork that offset provision entails establishes opportunities to undertake research on degraded and understudied ecosystems.

Despite this perceived potential, interviewees working on compensation plans spoke of their relationship with private firms as being strongly dictated by a desire to reduce cost, responsibility, and inconvenience, indicating that their institutional agency remains limited. This is not to say that such limitations would negate collaboration as a tactical option, but rather the route itself is generally understood as imperfect and heavily restrictive. As recalled by one interviewee when discussing negotiations with a licence holder: "Out of having to plant a couple of hectares and doing restoration in wetlands they bought the least common denominator, 'which is the least we have to do to comply?' […] the smallest, the easiest, the cheapest" (Interviewee 16).

[64] As has been discussed elsewhere, in such cases, the 'Relations between corporations and conservation organisations are in no sense equitable. Businesses are enabled to carry forward their work with only marginal changes to corporate strategies' (Adams, 2017a: 252).

That said, it should also be noted that the institutional weight of larger NGOs is likely to play a role in modulating their position with regard to influencing action. This is considered given some NGOs' reported capacity to push for preferred forms of offset, such as conservation agreements or 'participatory ecological restoration' (Interviewee 12), over the acquisition of private land. The Manual (2012) provides very limited acknowledgment of the social basis of conservation, but some larger NGOs have seemingly been able to advocate for compensation actions that fit with their own organizational commitments to more socially embedded conservation practices relating to community participation.

> *There can be no compensation actions, even if they are in a park, that are not related to people. So that makes it a little bit difficult because when we structure the biodiversity offset plan for [client name removed] [they say] 'but why are you talking so much about social issues?' We… because all the actions have to do with the community, all of them! We have to socialize […] From the point of view of the quality of work, we have a huge undertaking because this is a permanent battle with the companies: 'increase the area', 'what we are proposing is very well supported', 'it has very good information', 'it's robust'* (Interviewee 5).

Scalar Tensions Between Regional and National Environmental Authorities

The role and agency of CARs within the web of offset relations presents an interesting example of how the immediate local interests of regional state environmental institutions interact with, and disrupt, the ambitions of national conservation policy coordination and implementation. Although the Manual (2012) does not provide a detailed explanation of the role of CARs within the multi-scaled public-private governance structure surrounding the roll out of offsetting, their actions are key in facilitating or obstructing the realization of national policy objectives on the ground. This is due to the agency granted to such organizations before concrete offset proposals are evaluated by the ANLA, when environmental licence holders are obligated to coordinate and receive approval from CARs prior to the submission of finalized plans to the ANLA. This is a key moment in the stepwise sequence that occurs before local level implementation can occur.

The Manual (2012) dictates that licence holders are legally responsible for the design and implementation of compensation actions. However, this obligation ends once the 'useful life of a project' (operational life of the licenced intervention) comes to a close. If an offset has been secured through the course of establishing a conservation agreement on private or collective land, all agreed conservation actions end and full control over land management practices is returned to the landowner(s). On the other hand, if offset actions are premised on the acquisition of private land, the Manual (2012) stipulates that these areas become part of the National System of Protected Areas. In this way, these lands become the property and responsibility of formal environmental state institutions (CARs or National Natural Parks of Colombia, depending on the particular type of park designation).[65] However, in the years since offset policy has come into force, this regulatory change has provoked reaction by regional government authorities within SINA. As outlined by one senior ANLA civil servant interviewed:

[65] As mentioned earlier, the National System of Protected Areas does include a small category of private parks, referred to as Civil Society Nature Reserves. These areas are not the property of the state and only constitute less than 1% of the overall total landmass within the national system (Guhl Nannetti, 2015).

> *Corporations [CARs] are reluctant to receive land because management generates an increase in their administrative costs. If they have one site and then receive another, and another, they have to be equally aware that they, [offset sites], aren't invaded, that animals do not enter, that the enclosure is maintained […] they incur expenses, but their budget remains the same* (Interviewee 78).

Consistently during the course of interviews participants discussed the importance of the position of CARs in relation to the advance of local-level activities. The economic and administrative implications of agreeing to accept designated offset areas has been a core sticking point that has resulted in what one interviewee described of as an ongoing game of 'hot potato' (interview 16), where public authorities are unwilling to receive the economic and administrative burdens entailed by the acceptance of offset proposals, which would eventually come under their administrative control.

In addition to simply rejecting additional drains on their resources, CARs also play a key role in facilitating the direction of offsets in ways that suit their existing set of conservation priorities. No doubt, the inclusion of CARs within the offset governance framework was intended to establish such a link, as promoted by the idea of regional compensation portfolios. But the authority and differentiated organizational capacity of CARs has resulted in situations where the facilitation of the MADS' national policy objectives is met with indifference or resistance. This issue was neatly captured when one ANLA employee noted how CARs 'don't think like the state' (Interviewee 86). This comment came in the course of a discussion between two ANLA civil servants conversing about the importance of local-level political interests in understanding the functioning of CARs.

Ecological consultants and NGOs also spoke of their relation working with CARs and highlighted a range of experiences dependent on multiple factors. Importantly, CARs have the capacity to influence the form and location of offsets even when the proposals presented meet established criteria set out in the national policy. The position of these entities as both 'judge and jury' (Interviewee 59), as one NGO representative reflected, leads to situations where offset proposals are rejected, not because of the administrative and economic responsibilities that they entail, but rather, because CARs utilize their political agency to direct investment toward sites that correspond to existing conservation priorities.

Conclusion

This chapter has sought to provide insight into the complex institutional formation that emerged during the development and implementation of Colombia's biodiversity offsetting system. In line with recent efforts to bring debates around the state into robust conversation with political ecology analysis (Bridge, 2014; Robertson, 2015; Harris, 2017; Loftus, 2020), this discussion has placed a SRA to state theory at the heart of its analysis in the hope of demonstrating the utility of theorizing the state, and state intervention, as a strategic terrain for a complex ensemble of socio-ecological relations. By historicizing the political economy of Colombian environmental statehood, it has been argued that the historically contingent conditions and social relations in which offsetting emerged have played a central role in determining the discursive and operational form of the policy. The environmental ministry's initial move to revisit environmental compensation as a tool for forwarding its organizational objectives was itself an effort to reduce its reliance on the national budget in the wake of a series of debilitating reforms during the Uribe administration.

Contestation surrounding the Manual's formulation as a socio-ecological fix is itself part of a broader set of institutional and socio-ecological conflicts that play out in the shadow of an extractivist accumulation regime. In this way, the final legislative framework adopted represents a set of institutionalized compromises between formal state institutions that comprise the state apparatus tasked with environmental statehood and participating NGOs, but also fractions of capital that sought to weaken its operational form. In establishing alliances with international environmental NGOs and the German Corporation for International Cooperation, the MADS sought to draw upon the technical and financial resources of institutions external to formal apparatus.

By applying a SRA to environmental statehood, this chapter has demonstrated how a diverse collection of social forces bought into orbit with one and another, through the legal framework set out by the MADS, have been able to direct and influence the implementation of offsetting as a state-led socio-ecological fix. In the course of exploring the operation of the Manual (2012), it has been shown that many private firms seek to exploit the weak monitoring capacity of the ANLA and avoid complying with offset requirements. This is achieved by using the space opened up through lobbying that took place before the policy was ratified. In contrast, NGO engagement with private firms is premised on a pragmatic assessment of offsetting's potential to enable access to financial resources to fund conservation activities and research that fits their organizational aims. Within the state apparatus, CARs also play a significant role in stalling the realization of offset actions on the ground by rejecting compensation proposals that would entail an increase in administrative and economic burdens. In addition, the agency granted to them within the process enables them to direct firms toward actions that meet their existing conservation commitments. In the next chapter, I turn to explore the forms of labour and technologies that facilitate the production of nature as equivalent through the operation of the Manual (2012).

5

Geopower, Labour, and Struggles to Produce Ecological Equivalence

'Nature made the state, and the state made nature'

(Kelly *et al*., 2017: 1)[66]

In 2018, a private consortium responsible for the construction of a major road infrastructure project between Barranquilla and Cartagena paid the Caribbean subdivision of Natural National Parks Colombia a total of $523,179,000 Colombian pesos (around $136,700 US dollars). This transaction took place to fund a very a specific set of environmental management practices that sought to rehabilitate hydrological functionality around the *Mallorquín* wetland – situated on the outskirts of the city of Barranquilla in the Department of Atlantico. These interventions included the deepening and alteration of the stream of *Las Playitas* and the removal of sediment that had built up and restricted the flow of fresh water to the lands below. As part of the same action, *Concesión Costera*'s money would also fund the removal of areas of bulrush around the stream and the planting of 1558 mangrove seedlings (including red mangrove, *Rhizophora mangle)* and 520 mountain immortelle seedlings (*Erythrina poeppigiana*). Not far away, situated within the municipality of Usiacuri, two landowners had entered into negotiation with *Concesión Costera* regarding the sale of private property located within a designated protected area, known as the *Luriza* Regional Integrated Management District. Together, the properties in question, *Calacoto* and *Las Palmitas,* make up an area of 235.6 hectares and are home to Caribbean tropical dry forest; an ecosystem much referred to within Colombian conservation discourse, owing to its status as one of the most endangered ecosystems in Colombia (Pizano & Garcia, 2014).

Together, the alteration of legal property relations within the *Luriza* park and the material interventions aimed at hydrological rehabilitation on the outskirts of Barranquilla constitute the ANLA approved compensation plan for Functional Unit 6 of the Barranquilla – Cartagena road development.[67] These 'equivalent natures' (Apostolopoulou, Greco & Adams, 2018: 861), internally and asymmetrically related to the environmental degradation of the road development itself, are the outcome of the intellectual and cultural labour that lies behind the Manual (2012). Through the codification of new 'ways of seeing', in the words of the late John Berger, spatially distinct fragments of the Colombian landscape come to be discursively intertwined. In considering this unintuitive reality, this chapter sets itself the task of exploring the cultural and technological procedures that underlie offsetting as a mode of environmental governance. Furthermore, by delving into the labour practices that produce and sustain the production of equivalent natures, the chapter also explores the obstacles that have impacted the

[66] In introducing their recent edited collection on environmental histories of 'nature states', Kelly *et al*. (2017) play on the sociologist Charles Tilly's (1975: 42) noted passage: 'war made the state, and the state made war'.
[67] One of 30 '4th generation' road concessions announced in 2012 during the first Santos administration and described, at the time, as 'the most ambitious highway project in the history of the country' (Chacón Gonzales, 2012).

realization of biodiversity offsetting. In this way, this chapter contributes to answering the following two research question posed at the start of the thesis:

- *What practices and processes characterize the forms of labour required to produce nature as equivalent within Colombia's offsetting framework?*
- *What tensions emerge in the implementation of 'no net loss' discourse?*

The following analysis explores the intellectual and administrative work that establishes offsetting as but one part of a broader set of practices of environmental statehood. Using this locus of analysis, the emergence of the Manual (2012) is conceptualized as an extension of ongoing efforts to map and rationalize Colombian geographies, where the construction of 'calculable territory' (Hannah, 2009: 66) serves to render natures technocratically governable (see Robbins, 2008; Dempsey, 2016). Indeed, as Neumann (2004) has argued, such practices have come to be seen as part-and-parcel of modern statehood (see also Craib, 2004; Elden, 2007; Radcliffe, 2009; Parenti, 2015).

In conceptualizing the role of state institutions in undertaking these endeavours, the following discussion draws upon Parenti's (2015) take on the Foucauldian-inspired concept of 'geopower'. While Parenti explicitly employs the term to consider the centrality of the state *vis-á-vis* the capitalist production of nature, as "ultimate 'landlord'" (2015: 836) and 'mediating membrane' (2015: 844), here I explore practices of *geopower* called upon to incentivise the production of territorialized spaces of conservation. Understood from this perspective, biodiversity offsetting is seen as part of a much broader 'techno-managerial apparatus of administration, science, and governance' (Parenti, 2015: 834).[68] In this way, this chapter details and explores the, always, 'political work' (Bigger & Robertson, 2017: 72)[69] required to codify and enact new systems of socio-ecological valuation. Placing analytical attention upon these acts and their 'relations of stateness' (Painter, 2006: 752) provides a means with which to empirically trace the constituent work necessary to produce 'equivalent natures' – understood as the localized effects of state policy. By exploring the labour called upon in the course of offsetting, this analysis contributes to recent calls for 'a deeper socially and culturally textured account of practical activity' (Ekers & Loftus, 2013: 234) when considering the production of nature.

As the proceeding chapter has touched upon, biodiversity offsetting, and explicit environmental statehood more broadly, is not simply restricted to the concrete labour of civil servants, ensconced in offices, or outposts, of formal state institutions. Taking up this theme, the discussion that unfolds below traces the ways in which offsetting has been constructed to draw upon the labour, expertise, and financial resources of social forces beyond the realms of formal state institutions. This 'flexible environmental statehood' (Ioris, 2014: 11) is in large part carried out by a workforce of individuals found in consultancy firms, NGOs, and research organizations, who sell their services to private firms that are obligated to comply with the regulations set out in the Manual (2012).

The structure of the chapter proceeds as follows. To begin, the intellectual and cartographic basis of the manual is sketched out, with specific reference given to state mapping as an ongoing practice of geopower. This involves a discussion of the digitalization of Colombia's national ecosystem inventories and the methodological approaches employed to enable a fixed representation of the socio-ecological complexities that characterize Colombian territory.

[68] In undertaking this analysis, the chapter builds upon existing work that has explored how the Colombian state is constituted through varied forms of territorial regulation and the material and semiotic production of specific socio-ecologies (see Asher & Ojeda, 2009; Ballvé, 2013; Leal, 2017; Palacio Castañeda, 2018).
[69] See also Cooper (2015).

Essential to this task is the construction of new ideational frames that enable a relational valuation of Colombian natures. To explore this element, the latter half of this discussion outlines and analyses the construction of the Manual's (2012) compensation factors as 'metrological regimes' (Cooper, 2015: 1788). The second half of the chapter examines the cultural and administrative labour practices required for the production of equivalent natures in the Colombian system. In doing so, this analysis engages with the technical and practical tensions that arise when offset theory is employed and its confrontation with the realities of the country's rural political economy of land.

Geoinformatics as Geopower and Adequate Abstraction

In 2003, a US Military research centre, known as the Strategic Studies Institute, released a report entitled *Mapping Colombia: The Correlation Between Land Data and Strategy* (Demarest, 2003). The military geographer that authored the report, Geoffrey Demarest, sought to critically engage with ongoing counter-narcotics and counter-insurgency strategies of the US and Colombian governments, through an analysis of the Colombian state's capacity to maintain and enforce property rights. In the manuscript, Demarest (2003) laments the absence of effective cartographic and cadastral systems and, like many a critical political geographer, emphasizes the centrality of mapping as a tool for territorial statecraft.

As this section explores, a preoccupation with calculating the character of territory is not solely of militaristic concern; it has also come to constitute a central component of explicit environmental statehood. In the years since Demarest's (2003) work was published, Colombian state institutions' territorial monitoring capacity has greatly advanced with the continued development of digital and satellite technologies, which have served to bolster macro-level ways of knowing and representing territory. Clearly, the ways in which state institutions go about representing and categorizing socio-ecological systems are of profound political import. It is, after all, these modalities of geopower that precede and inform the material and localized effects of state policy and planning. With this in mind, this section engages with environmental mapping as a core technology of geopower, which facilitates state institutions' capacity to categorize, document, and govern the socio-ecological complexity of Colombian territory. In doing so, it is argued that the mapping and re-mapping of socio-ecological systems are central to the continued production, or act, of ecological equivalence. Furthermore, in examining the intellectual and cultural work that underpins the policy, this section describes and interrogates the Manual's (2012) particular relational system of valuation, providing insight into the ways in which socio-ecological systems are discursively construed within the policy framework.

State Maps of Legibility: Macro-ecology as Statecraft [70]

The practice of biodiversity offsetting is first premised upon determining a workable inventory of the nature(s) that are understood to exist. Without having at least some approximation of the natures 'out there', one cannot begin the task of calculating and producing their equivalent. In the case explored here, the production of ecological equivalence begins with the development of state-sponsored acts of scientific classification and codification, which Parenti (2015: 835) cites as central to the operation of geopower. The act of establishing a uniform set of characteristics that define an ecosystem category is itself premised upon processes of

[70] The term 'state maps of legibility' is taken from Scott's (1998: 3) *Seeing like a State.*

homogenization and abstraction, which run contrary to alternative place-based notions of nature (and space) and broader frameworks of ontological difference. Prior to exploring detailed and offset specific processes, it is important to acknowledge scientific categorization in general, and taxonomic biology in particular, as the starting basis of commensuration within such forms of environmental governance.

Biodiversity, in all its alpha, beta, gamma complexity is immeasurable. Therefore, any attempt to capture and offset such diversity will always be reductive (Apostolopoulou & Adams, 2017). In constructing the Manual (2012), the alliance of NGOs contracted by the environment ministry were assigned the job of establishing a set of 'socially-necessary abstractions' (Robertson, 2012: 386) upon which a compensation policy could operate. To begin this work, the TNC-led group drew upon existing centralized state-led efforts to map and categorize the exceptional ecological complexity of the Colombian landmass.[71] These technologies of geopower are foundational in enabling the rationalization and classification of socio-ecological geographies for the purpose of governance – enabling the first step on a path to offset equivalence. Specifically, the Manual (2012) draws upon ecosystem and biome[72] characterization exercises undertaken by formal state institutions responsible for producing, what was at the time, the country's most advanced ecosystem inventory: *The Continental, Costal, and Marine Ecosystem Map of Colombia* (IDEAM *et al.*, 2007) (henceforth referred to as the Ecosystem Map of Colombia).[73] Bringing together the expertise of all the state's research institutes within the SINA, this nationally unprecedented mapping operation synthesized geopedological, climatic, and landcover information through digital geospatial analysis.[74]

The map itself is at a scale of 1:500,000 and its development drew from mix of national and international digital data sources. These include spectral imaging data captured by the US Geological Survey and National Aeronautics and Space Administration during the operation of the Landsat 7 satellite; [75] topographical information collected by NASA's Shuttle Radar Topography Mission; and datasets held by SINA research institutions relating to temperature, precipitation, soil, and geology (IDEAM *et al*., 2007). As a result of this multi-layered geospatial mapping exercise, the research bodies within SINA that carried out the project constructed and categorized a total of 32 biomes and 311 different costal and terrestrial ecosystems – where ecosystem categories are relative to specific biomes (*ibid.*). In establishing a national environmental baseline, as the map's introduction notes, this SINA collaboration resulted in the production and advance of 'key information for the administration and management of territory' (*ibid.*: 9).

The development of the Ecosystem Map of Colombia marked a key moment in the digitalization of Colombian environmental statehood and, with it, the elevation of GIS as a now fundamental technology for regimes of environmental governance. In the wake of the map's

[71] In considering state-relations of cartography, this analysis concerns itself with an 'ontogenetic' conception of mapping, where maps are conceived of as 'contingent, relational, and context-dependent' (Kitchen & Dodge, 2007: 335).
[72] The ANLA (2019b) defines biomes as 'areas defined and delimited by climatic and geomorphological characteristics with similar ecological conditions in terms of plants, animals and microorganisms'.
[73] This map was the product of the European Commission-funded project 'Improving Cartographic Systems of the Colombian Territory', administered by the Augustin Codazzi Geographical Institute.
[74] These organizations include: the Augustin Codazzi Geographical Institute, the Alexander von Humboldt Research Institute for Biological Resources, the Marine and Costal Research Institute, the Sinchi Amazonian Institute of Scientific Research, the Institute of Hydrology, Meteorology and Environmental Studies, and the John von Neumann Pacific Institute of Environmental Research.
[75] The majority of images used for IDEAM *et al*. (2007) were taken between 2000-2003.

publication, geoinformatics started to become formalized as a means of regulating and monitoring the activities of environmental licence holders. The introduction of Resolution 1503 of 2010, which sets out the methodology of environmental assessments presented to the ANLA, obligates firms engaged in the environmental licence process (and subsequent periodic monitoring) to submit geographic information systems data, in the form of geometric shape files (ANLA, 2019).[76] These digital submissions feed into a centralized storage model administered by the ANLA, known as the GEODATABASE, facilitating a largely desk-based and centralized form of regulation – echoing what Miller & Rose (2008: 18) describe as 'governing at a distance'.

In addition to terrestrial ecosystem and biome classification exercises carried out by IDEAM *et al*. (2007), those tasked with the development of the national offsetting policy also drew upon previous efforts to spatially delineate terrestrial patterns of species distribution – which had been carried out in the course of conservation prioritization analysis for the National System of Protected Areas. Specifically, the policy utilizes Corzo & Andrade's (2010) characterization of biogeographic districts, which divides the nation's territory into 41 separate zones, demarcated by the dispersal of flora and vertebrate fauna (see CONPES, 2010). In formulating a base unit of analysis with which to commensurate, the TNC-led group agreed upon the construction of the category of 'biogeographical ecosystem district'. This 'socially-necessary abstraction' (Robertson, 2012: 386) is the result of combining IDEAM *et al.'s* (2007) ecosystem and biome classification scheme with Corzo & Andrade's (2010) biogeographical district boundaries. The subsequent digital composite – the biogeographical ecosystem district – constitutes the foundational biodiversity proxy upon which all calculations of ecological equivalence are based.

This brief discussion has demonstrated how existing state-sponsored environmental mapping – as a technology of geopower – provided the ledger with which to begin the intellectual labour of establishing ecological equivalence as an ideational frame. The centrality of geoinformatics to Colombian offsetting is indicative of a broader trend toward what has been termed 'conservation by algorithm' (Adams, 2017b: 338; 2018: 1) – where technological devices play an ever-increasing role in the administration, mediation, and surveillance of socio-ecological relations and territory for the purposes of conservation. In this way, the evolution of conservation practice has elevated the importance of computer code for contemporary environmental statehood – resulting in a digitally-inflected turn in state-mediated semiotic and material productions of nature (see Nost, 2015). This theme is developed further below as the focus of discussion turns toward the fine-grained technics that underpin the Manual's (2012) relational valuation system.

The Metrology of Equivalence

Building upon the above discussion of digital state cartography, this analysis now turns to explore additional modalities of geopower called upon in the production of offsets. Opening up the bonnet of the Manual (2012), this entails a discussion of the micro-technologies that establish ecological equivalence as a semiotic object enshrined in the sphere of Colombian planning law. In doing so, this analysis explores the specific nature of metrological regimes of environmental valuation and demonstrates how macroecology concepts, distinct cartographic exercises, and existing state territorialization frameworks come to together in the course of

[76] The regulation of the EIA and the EMP are all orientated around the use of GIS, which feeds into the ANLA operated Geographical Storage Model (ANLA, 2016b).

constructing the semiotic basis of offsets as a mode of governance. As shall be articulated, the intellectual labour that produces the framework of equivalence is premised on varied processes of abstraction and quantification, which coalesce to form a taxonomic hierarchy of biodiversity proxies.

Calculating the proportion of land required to compensate for anticipated ecological degradation relies upon a series of what the Manual (2012) refers to as compensation factors. The logic behind these factors, or multipliers as they are otherwise known, very much depends upon the objectives of their respective policy framework, as we will see below. At their core, in place of 1 for 1 spatial ratios of compensation (in terms of impact to offset area), multipliers tend to be employed as an attempt to deal with a host of uncertainties. As Bull *et al.* (2017) argue, these include epistemic unknowns (poor ecological data or capacity to predict ecosystem response), time-lag between biodiversity loss and gain, and risk management regarding the potential for offset failure.[77]

In many respects, the methodology that defines the Manual's (2012) compensation factors is novel when compared to offset metrics that have been employed elsewhere – which are often determined on a case-by-case basis or relate to the form of compensation activity proposed (e.g. restoration or conservation) (see McKenney & Kiesecker, 2010; Bull *et al.*, 2017). In contrast, the TNC-led alliance of NGOs and the MADS opted to link compensation factors to broader conservation concerns and objectives constructed on the scale of national territory as a whole. These include the integration of national level issues of ecosystem scarcity, hypotheses of expected rates of anthropogenic ecosystem loss, historic ecosystem spatial distribution, and current levels of state territorialization in the form of protected area status. Each of these elements are explored below.

The Manual's (2012) metrology divides the country's terrestrial ecosystem inventory into two distinct categories: natural and secondary vegetation (with the latter defined as those with less than 15 years development). The compensation factor for biogeographical ecosystem districts classified as natural range from 4–10. In the case of secondary vegetation, the values assigned range from 2–5. During interviews with those that worked on producing the legislation, it was emphasized that the rationale behind the multiplier framework was strongly linked to the belief that such an approach could influence the design of environmental licence projects, by sending indirect price signals to deter degradation of high-ranking areas. As articulated by one of the architects of the policy: 'they give a signal to change behaviour. For one type of ecosystem, they can be so high, that they transfer the signal to the user – the owner of the environmental license – that it's best not to intervene' (Interviewee 9). Calculating the amount of area required to offset each natural category impacted relies on the following equation, where Offset Area (OA) is equal to Impact Area (IA) multiplied by the sum of assigned compensation factors (CF).

$$\mathbf{OA = IA \times \sum CF}$$

The overall compensation factor for each biogeographical ecosystem district is equal to the sum of 4 individual factors, which are numerically weighted with scores that range between 1 and 3 (see Table 7). The rationale and basis for each of these factors is expanded upon in the discussion below. For secondary vegetation, the equation to calculate offset area is slightly modified with the purpose of reducing the proportion of offset area required, indicating lesser importance in the policy's environmental valuation hierarchy. In this case, secondary

[77] The Manual (2012: 38) itself does allude to these rationalities and states that there cannot be any 'perfect substitute' for environmental degradation

vegetation offset area (SVOA) is equal to impact area (IA) multiplied by the sum of assigned compensation factors (CF) divided by two.

$$\mathbf{SVOA = IA \times (\sum CF/2)}$$

Table 7: Compensation factors and numerical value

Compensation factors	Numeric range
Representation	1-3
Rarity	1-2
Remanence	1-3
Predicted rate of loss	1-3

Source: Adapted and translated from MADS (2012a: 16)

Representation

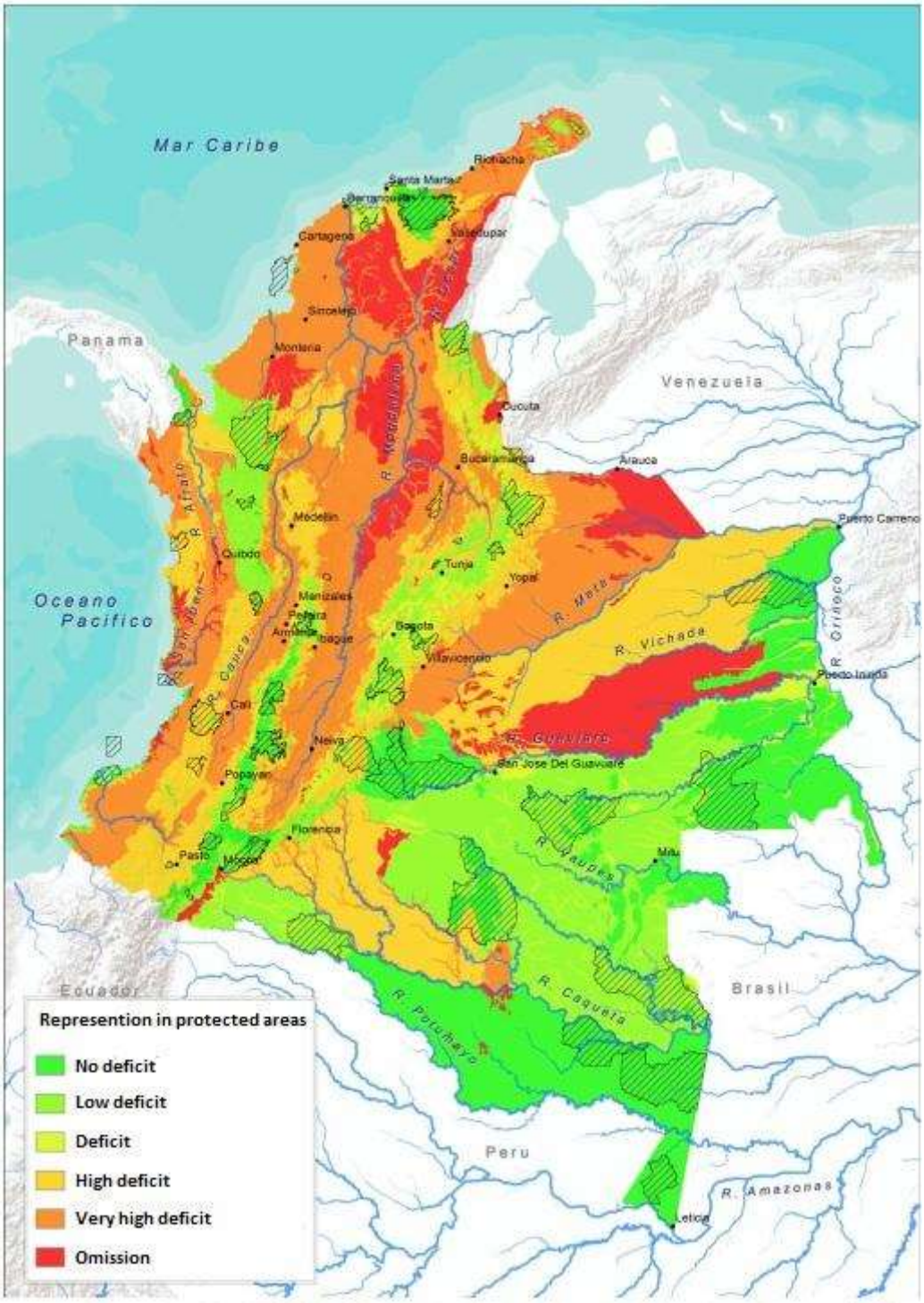
The first of the compensation factors outlined in Table 8 relates to the current representation of each biogeographical ecosystem district within the National System of Protected Areas. The current composition of state-territorialized lands that constitute Colombia's parks system is ecologically diverse, but, as one would expect, unevenly distributed across biodiversity proxy categories – with some classifications of biogeographical ecosystem district absent all together. In order to integrate this concern into the calculation of compensation area, this sub-factor is weighted in sync with Colombia's protected area commitments under the United Nations CBD. In this way, the semiotic production of equivalence is in part wedded to an existing international regime of environmental governance. As detailed in Table 8, the numeric values applied for this factor range from 1.00 to 3.00 – where biogeographical ecosystem districts are divided into categories that correspond to the extent to which their conservation has been secured in line with minimum CBD targets for the declaration of protected areas.

Table 8: Compensation factor for representation of biogeographical ecosystem districts in the National System of Protected Areas – types of prioritization

Biogeographical ecosystem district	Numeric range
Omission (units of analysis that are not represented)	3.00
Very high deficit of representation (units of analysis that, despite low levels of protected area status, do not reach levels necessary for proposed conservation objectives) (Less than 1% of conservation objective reached)	2.50
High deficit of representation (units of analysis that, despite low levels of protected area status, do not reach levels necessary for proposed conservation objectives) (Less than 10% of conservation objective reached)	2.00
Deficit of representation (units of analysis that, despite low levels of protected area status, do not reach levels necessary for proposed conservation objectives) (Less than 50% of conservation objective reached)	1.50
Low deficit of representation (units of analysis that, despite low levels of protected area status, do not reach levels necessary for proposed conservation objectives) (Less than 99.9% of conservation objective reached)	1.25
No deficit (units of conservation that surpass or meet conservation goals set and therefore suppose sustainability for conservation *in situ* (conservation goal met)	1.00

Source: Adapted and translated from MADS (2012a: 16)

Map 2: Compensation factor for representation of biogeographical ecosystem districts in the National System of Protected Areas – Types of prioritization



Source: Adapted from MADS (2012a: 17)

Rarity

The second compensation factor described here relates to the metrology of ecological scarcity, where the policy's core biodiversity proxy – the biogeographical ecosystem district – is disassembled into two of its constituent parts in order to discern both a national and regional

conception of rarity, based on the spatial distribution of two units of analysis. This entails separating the category of ecosystem from the remaining cartographic layering of biome classification and biogeographical district demarcation – resulting in the following two parts: 1) ecosystems and 2) biome-biogeographical districts.

To arrive at the final compensation factor in this case, two forms of spatial analysis are undertaken resulting in two individual subfactors. The first of these compares the spatial distribution of each category of biome-biogeographical district to the total area of national territory. Those with more limited spatial presence across the country are awarded a higher score using a range from 1.00 to 2.00. The second subfactor compares total area of each individual ecosystem category in relation to the total area of the biome-biogeographical district in which it is located. Using the same logic, ecosystem categories that cover less area are given a higher score, again with a range from 1.00 to 2.00. To arrive at the final compensation factor for rarity, each of the two subfactors described are compared and the highest value of the two is selected.

Table 9: Compensation factor by rarity of biogeographical ecosystem district

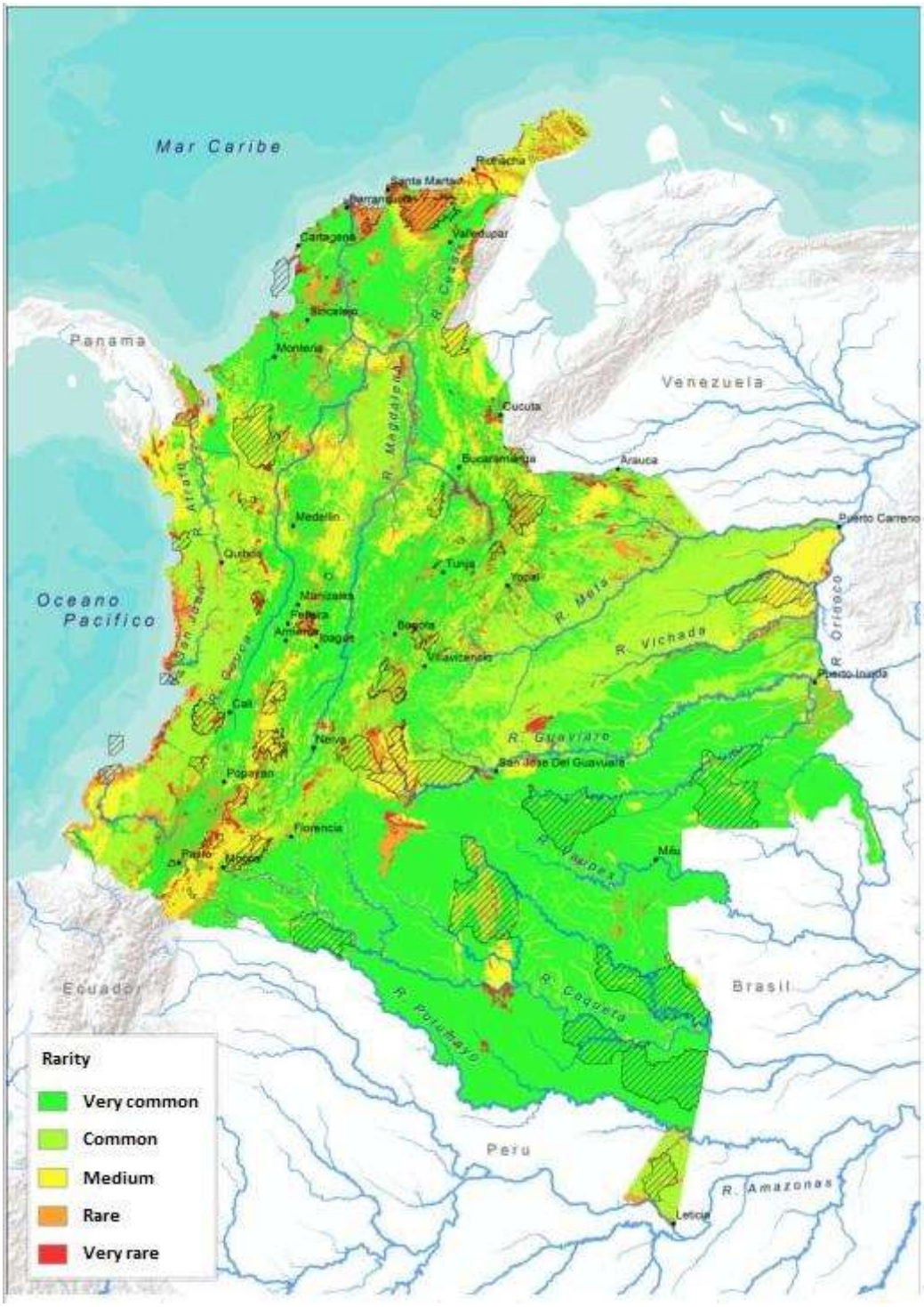
Rarity of biogeographical ecosystem district				
Biome-biogeographic district/country	**Subfactor 1**	**Ecosystem/biome-biogeographic district**	**Subfactor 2**	**Compensation by rarity**
Very rare (very restricted distribution) (< 0.1%)	2.00	Very rare (very restricted distribution) (< 5%)	2.00	The compensation factor for rarity corresponds to the highest value of the two calculated subfactors
Rare (restricted distribution) (>0.1 <0.2%)	1.75	Rare (restricted distribution) (>5 < 15%)	1.75	
Medium distribution (> 0.2 < 0.5%)	1.50	Medium distribution (> 15 < 30 %)	1.50	
Common (extensive distribution > 0.5 < 1%)	1.25	Common (Extensive distribution > 30 < 75%)	1.00	
Very Common (very extensive distribution > 1%)	1.00	Very common (very extensive distribution > 75%	1.00	

Source: Adapted and translated from MADS (2012a: 18)

Remanence

This compensation factor relates to the current distribution of natural vegetation category within each biome/biogeographical district and compares this to their estimated historical distribution, using existing analysis undertaken by IDEAM *et al*. (2007) (Saenz *et al*., 2013). This element is calculated based upon known area of each remaining natural vegetation category and the total area of the biome/biogeographical district in which they are located. The quotient of these two factors is then multiplied by 100, resulting in an estimation of the percentage of remaining 'natural' ecosystems. In this case, the numerical values assigned range

Map 3: Compensation factor by rarity of biogeographical ecosystem district



Source: MADS (2012a: 19)

from 1-3, with the resulting distribution forming a U curve (see Figure 3). The decision to assign the highest numerical value to both ends of the remanence spectrum appears counter-intuitive – given that one would assume that quantified values would descend from very low to very high remanence. However, under the assumption that higher numerical values will deter intervention (and thus degradation), it is asserted that ecosystems with higher remanence are

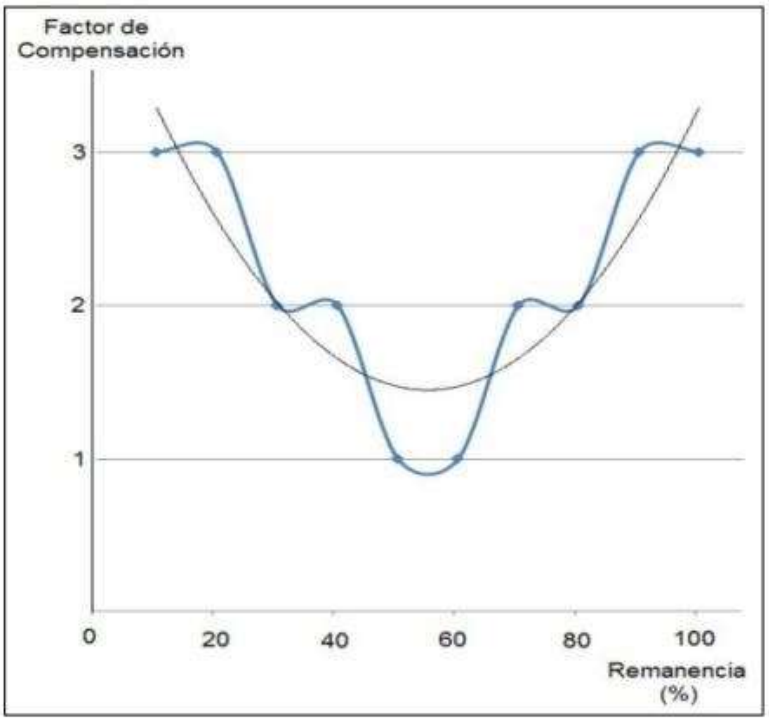
likely to be more 'pristine'[78] therefore their protection should be incentivized through the compensation scoring system. On the other hand, ecosystems with low levels of remanence in relation to historical distribution are also awarded a high quantified value, with the understanding that such ecosystems should be safeguarded as a matter of scarcity.

Table 10: Compensation factor for natural remanence of ecosystems within biomes/biogeographic districts

Remanence of biome/biogeographic district	Numeric range
Very high (≥ 90%)	3.00
High (< 90% ≥ 70%)	2.00
Medium (< 70% ≥ 50%)	1.00
Low (< 50% ≥ 30%)	2.00
Very low (< 30%)	3.00

Source: Adapted and translated from MADS (2012a: 20)

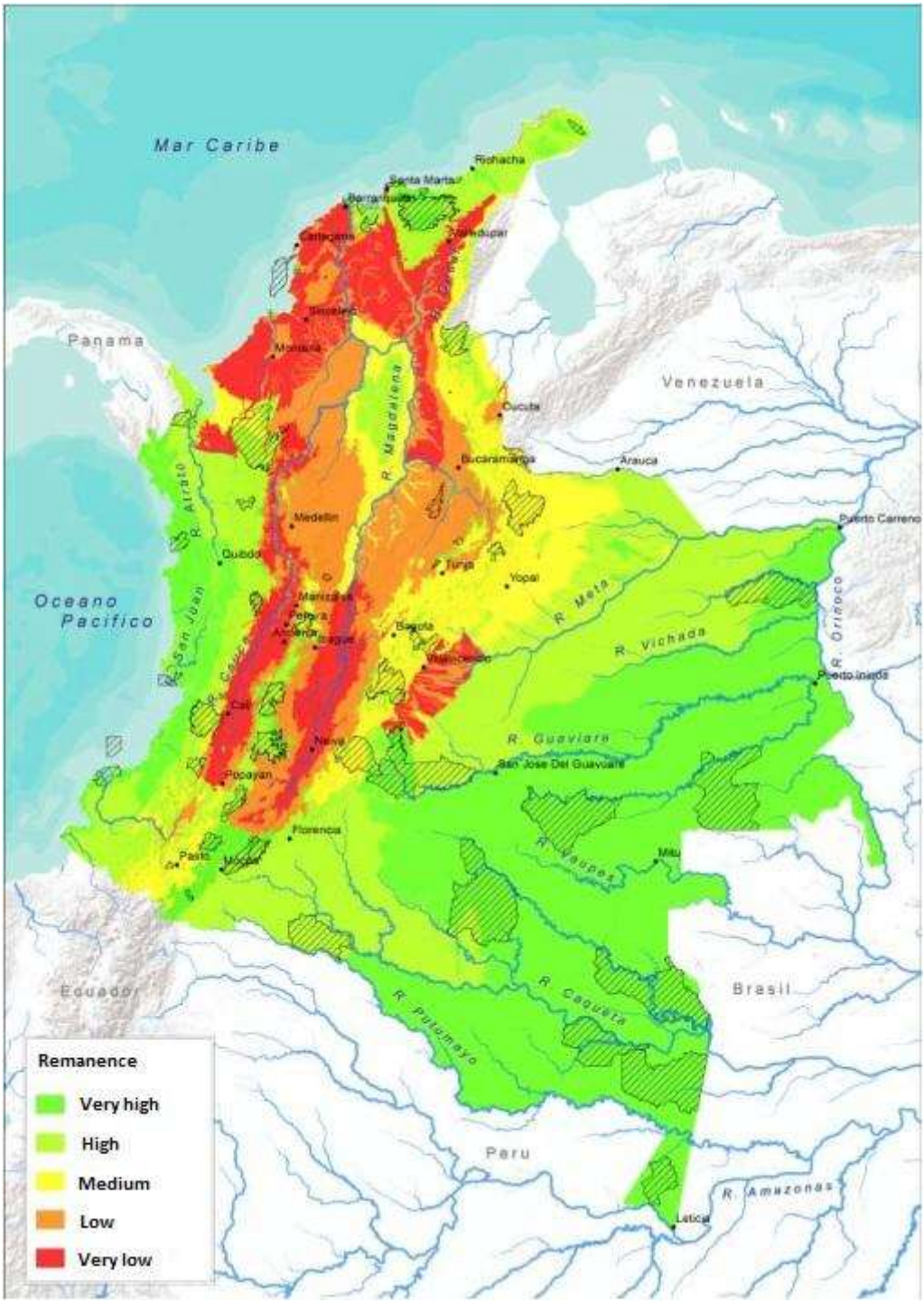
Figure 3: Ecosystem remanence percentage against compensation factor



Source: MADS (2012a: 21)

[78] See footnote 56.

Map 4: Compensation factor for natural remanence of biogeographical ecosystem districts



Source: MADS (2012a: 21)

Predicted Loss

The final compensation factor of the set seeks to integrate counterfactual claims about the predicted future rate of loss for each individual biogeographical ecosystem district. These estimates were based upon rates of observed landcover change during the 6 years prior to the Manual's (2012) release (Saenz *et al*., 2013). In doing so, the TNC-led group synthesized existing analysis of remote sensing data undertaken by the SINA's Institute of Hydrology, Meteorology and Environmental Studies as part of the country's engagement with the international carbon trading mechanism Reduced Emissions from Deforestation and forest Degradation (see Cabrera *et al*., 2011). This analysis was combined with similar work carried out using the TERRA I landcover monitoring system.[79] In this case, numeric values assigned to each biodiversity proxy range from 1 to 2, with higher values assigned to those that are understood to have declined more rapidly in terms of spatial distribution during the preceding 6 years. In looking back to predict the future, the Manual's (2012) forecast of loss assumes that the anthropogenic factors that contribute to, or curtail, environmental degradation remain static. Unbeknownst to those constructing the policy at the time, in the aftermath of its adoption, the country would experience one of the most momentous political events in its contemporary history – the signing of the Peace Accords established between the Santos Administration and the FARC. The territorial power vacuum that ensued from the demobilization of the guerrilla organization had immediate consequences for the articulation of what had become established non-state regional environmental governance regimes. As recent work by Prem *et al.* (2019) demonstrates, areas previously controlled by the FARC have seen a marked increase in deforestation rates since the ceasefire was declared in December 2014.

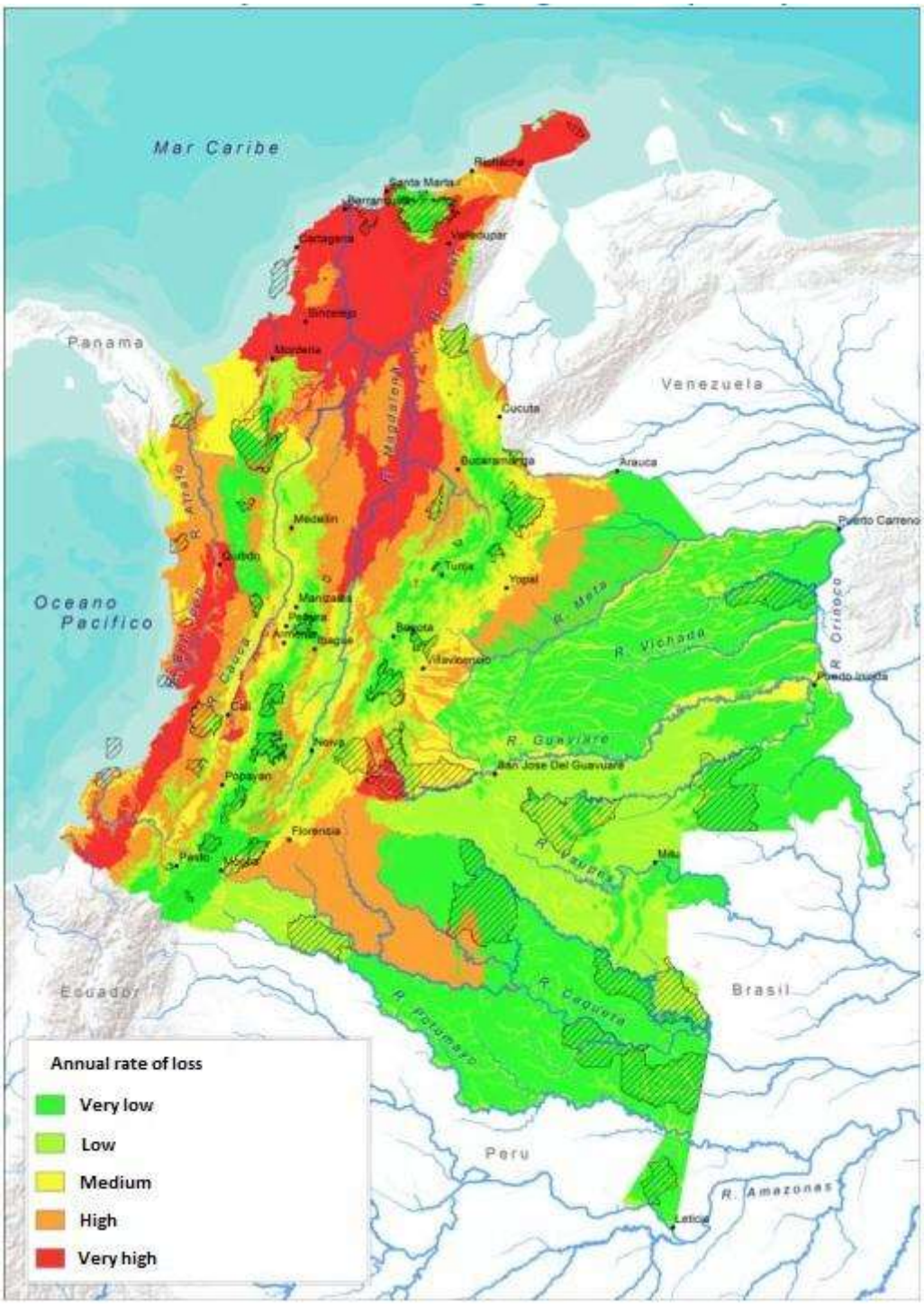
Table 11: Compensation Factor for Annual Rate of Loss of Biogeographical Ecosystem Districts

Annual rate of loss of ecosystems – biomes/biogeographic districts	**Numeric range**
Very high (> 0.50%)	2.00
High (< 0.50% ≥ 0.20%)	1.75
Medium (< 0.20% ≥ 0.10%)	1.50
Low (< 0.10% ≥ 0.05%)	1.25
Very low (< 0.05%)	1.00

Source: Adapted and translated from MADS (2012a: 22)

[79] See Reymondin *et al*. (2012).

Map 5: Compensation factor for annual rate of loss of biogeographic ecosystem districts



Source: MADS (2012a: 23)

Chorography and Novel Natures

The cultural labour behind the development of the Manual (2012) established a new means of conceiving and discursively producing the Colombian landscape. In doing so, those tasked with developing the policy constructed new taxonomies and objects of nature. Explicitly, through

the creation of the biogeographical ecosystem district, the policy establishes a cartographic composite, which comes into being through the amalgamation of ecosystem, biome, and biogeographical classification. By overlaying these elements, the policy formulates a cartographic biodiversity proxy that serves as the basis to abstract from site-specific ecologies of flora and fauna – arriving at a singular homogenized category.

As the above discussion has shown, the act of quantification occurs in two principal ways. Firstly, hectares are used as a spatial unit of measure with which to numerically articulate the proportion of biogeographical ecosystem district impacted. Secondly, quantification is foundational to the development of the policy's compensation factors, which taken together, enable the construction of a taxonomic hierarchy of environmental value. In agreement with existing analysis of policies elsewhere (see Sullivan, 2013; Apostolopoulou & Adams, 2017; Sullivan, 2017), the quantification that forms the basis of the Manual's (2012) metrology establishes site-specific ecologies as commensurable across spatially and temporally distinct horizons.

Returning to the vignette outlined at the start of the chapter, in Table 12 we can see how the aforementioned processes of abstraction and quantification appear when applied to fragments of the Caribbean landscape reconfigured by *Concessión Costera's* road development. In the course of applying the policy's criteria for equivalence, the environmental degradation associated with this infrastructure project forms the rationale for material interventions elsewhere, in the form of ecological rehabilitation activities within the *Vía Parque Isla Salamanca* protected area. Furthermore, the application of the policy's compensation criteria results in the alienation of property rights within the boundaries of the *Luriza* public protected area, re-territorializing the frontiers of existing systems of environmental governance.

Table 12: Biodiversity offset activities for *Concessión Costera's* Unit 6 road development

Biogeographical ecosystem district	Impact Area (hectares)	Overall Compensation Factor	Area to compensate (hectares)	Offset activities
Secondary vegetation in the Caribbean dry tropical zonobiome	29.42	8	235.36	Purchase of two private properties, totalling 236 ha, within the *Luriza* Regional Integrated Management District (public protected area)
Sub-desert within the Caribbean dry tropical zonobiome	0.03	8.5	0.28	
Mangrove forest within the Magdalena and Caribbean helobiome of within the dry peri-Caribbean belt	1.49	10	14.9	Ecological rehabilitation activities in *Vía Parque Isla Salamanca* (public protected area)
Total	30.94		250.54	

Source: ANLA (2018)

The evolution of state environmental policy has led to a gradual integration of the 'methods, techniques, and categories of environmental science into the operation of government' (Himley, 2014: 1072). However, as the above discussion and the work of Robertson (2006) and Dempsey (2016) demonstrates, the incorporation of these epistemological concerns into the realms of public policy does not occur without their substance being altered during

transposition. As one of the Manual's (2012) architects noted, when reflecting on the accomplishment of the policy:

> *In theory, it's a very nice topic. But, in the end, it's necessary to make it practical. Many people told us that "your manual is really simple, too simple!" […] And "those [compensation] factors there!". But you try doing something more complex and see how you get on with the private sector! If this manual seems super simple… They complain, then they say, "it's too difficult!"* (Interviewee 93).

Echoing Scott's (1998) seminal work on state legibility, Dempsey (2016: 114) deftly captures this dynamic when she notes how 'making ecosystems relevant to modern institutions of rule – from governments to firms – requires further and further simplification of complex ecological relations'.[80] The degree of abstraction that characterizes the offset system is not lost on those that contributed to its construction and eventual codification. When asked about the form in which the system's compensation factors operate, one interviewee directly involved in their development expressed the following: 'Given that I was an author […] I feel bad saying that they're not great because it's a proxy. Land cover ... a biogeographic hypothesis (because that's all it is) and the biomes – on a super general scale. That's the approximation we use […] It's a very crude proxy' (Interviewee 16).

The chorographic practices that underlie the offset valuation framework negate innumerable alternative socio-ecological understandings of the territories they represent. Critical engagement with cartography has long demonstrated the capacity of maps to exclude and elevate certain representations, ways of knowing, and ways of being (see Harley, 1988; Wood, 1992; Crampton, 2010). In the context explored here, the territory depicted through digital geospatial layering centres on a very particular frame with which to interpret the socio-ecological configurations that constitute particular places. What's striking is how these depictions are almost devoid of sociological depth – bar the inclusion of place names. Some examples of the 'silences', as Harley (1988) memorably described them, include: social conflict, the presence of armed groups, and cadastral systems. In the following section, these issues come to the fore as the discussion turns to practical experiences of ecological equivalence theory by those obligated to employ its frame.

Colombia's Offset Labour Force: Putting Theory to Work

The above discussion has engaged with the metrological regimes that underpin the Manual (2012) as a means of understanding, calculating, and valuing terrestrial ecosystems. However, the mere development of such systems marks only the beginning of a lengthier process that draws upon the resources and labour of actors located outside formal state institutions. Equivalent natures do not simply appear; their fruition derives from an organized and concerted effort to establish and enact a shared sense of meaning – an agreed abstraction of site-specific socio-ecologies. In the case explored here, the operationalization of these ideas depends upon further cultural and administrative work of a labour force positioned to reproduce such frames and trade in the necessary consultancy services required to comply with the policy's legal framework.

In developing this theme, this section examines the concrete experiences of workers contracted to make biodiversity offset abstractions 'work' in practice. In making sense of these forms of labour, this discussion provides insight into the 'environmental consultancy cultures'

[80] For further discussion of Scott's (1998) insights and their application to political ecology, see Robbins (2008).

(Spiegel, 2017: 87) that surround attempts to formulate offsets. The actors that engage in these forms of labour are required to navigate and deal with a host of administrative, legal, and socio-environmental tensions that arise when trying to realize the policy on the ground. Whilst the theory behind the policy's compensation factors and equations for ecological equivalence is characterized by an ordered and numerical neatness, those tasked with the application of these metrological regimes are met with their practical fragility when confronted with the socio-ecological complexity of Colombian territory.

In exploring this group of actors, the following discussion focuses on several key reoccurring themes that emerged in the course of data collection, which are divided into two camps. The first of these relates to technical experiences connected to ecological data and epistemological concerns relating to the labour necessary to operationalize the metrology of the Manual (2012). The second camp pertains to the particularities of Colombia's own historically contingent social formation, where relations of property and dominant forms of accumulation bear the marks of the country's colonial past, waves of failed land reform, complex internal armed conflict, and attendant forced displacement. In exploring these forms of work, this discussion provides a window onto the 'transformative cultural work of coding things for value' (Kirsch, 2012: 440) and offers a means to explore how the neat abstractions that define Colombian offsetting policy are negotiated, or obstructed, when confronted with entangled socio-ecological relations on the ground.

Consultancy labours of offsetting

While there are various forms of work called upon in the offset process – which would include the earthly and material acts of planting, erecting fencing, and such – the following discussion focuses its efforts on exploring the experiences and work practices of actors contracted to develop concrete compensation proposals, which are submitted to the ANLA for approval prior to implementation.[81] As has been detailed in the preceding chapter, a strategic move on the part of fractions of capital that were to be regulated by the Manual's (2012) introduction meant that firms were awarded a 'year of grace' (Interviewee 21) after the acceptance of an environmental licence with which to develop a concrete set of offset actions. During the course of many interviews, it was emphasized that compensation obligations set out in the environmental licence application tended to be undertaken by non-specialist consultancy firms contracted during the preparation of environmental licences.

In contrast, the concrete compensation plan set out after an environmental licence has been granted is generally, although not exclusively, undertaken by more specialist organizations. These actors include public research institutions (such as The Alexander von Humboldt Research Institute for Biological Resources), specialized consultants, and environmental NGOs with experience orientated toward restoration and conservation projects. The organizations that make up this set of actors are comprised of educated teams of workers literate in the ecological sciences and trained in the use of GIS-related software.[82] The demand for a specialized workforce to implement the ideational framing set out in the Manual (2012) is

[81] This empirical focus primarily reflects the slow rate of offset implementation on the ground during the period spent in the field. Although the particular local level case study work envisioned at the outset of this work was not possible, I was, however, able to gain deep insight into the initial stages of offsetting, where the practical realities of putting offset theory to work are confronted and negotiated.

[82] Throughout this discussion, I refer to this group as a whole as consultants, given that they all engage in offsetting by selling their labour to firms in the course of establishing concrete compensation plans. However, these activities are differentiated from the consultancy labour sold for the purposes of environmental licence applications (which includes rudimentary references to offsetting intentions).

reflected by the offer of university-level training explicitly linked to the policy's application. In the aftermath of the release of the policy, The Department of Ecology and Territory of the Pontifical Xavierian University, one of Colombia's oldest and most prestigious educational institutions, began to offer a diploma entitled 'Environmental Compensation for Biodiversity Loss: Area, Infrastructure, Technology, Productivity, and Environment' (Pontificia Universidad Javeriana, 2016). In offering training to the workforce tasked with implementing and regulating the policy, the diploma helps to proliferate equivalency as a new mode of seeing and understanding the Colombian landscape.

So as to introduce and contextualize the activities discussed below, I now briefly turn to the obligations set out in the Manual (2012). To begin, these proposals are required to demonstrate the correct application of the compensation factors outlined above. In doing so, plans submitted to the ANLA must include georeferenced mapping exercises at a minimum scale of 1:10,000 and provide further information regarding ecosystem type, structure, landscape context, and species richness (MADS, 2012a). These exercises can be based on both secondary and primary data, but for the first few years of the policy there was no legal obligation to include primary data (Interviewee 84). In addition, plans are required to include legal documentation that declares the involvement of the relevant state environmental authority and/or landowner(s), which stipulates the non-sale and protection against entry by third parties on land destined for offsetting (in terms of conservation and/or restoration). Upon establishing a labour relation with an environmental licence holding private firm, offset consultants concern themselves with answering three principal questions that arise from the framework set out by the policy:

1. How many hectares of land does the law obligate for each biogeographical ecosystem district affected?
2. Where can equivalent sites be located?
3. Through what mode(s) of offsetting can compensation be carried out?

To address these concerns, offset consultants take on a variety of intellectual, administrative, and practical tasks, as they work to construct compensation proposals. In undertaking these concrete acts of labour, offset consultants act as a form of go-between – linking together the licence holder, the regional environmental authority with jurisdiction over the area where offsets are to be located (who are required to valid proposals), and landowners in possession of property that can be cast as equivalent.

Their work begins by reviewing the details of the initial proposals submitted as part of the environmental licencing process. In lieu of concrete proposed compensation activities, the plan presented at this stage very often simply applies the compensation factor equations to ecosystems at an impact site and, then, arbitrarily highlights areas that meet the criteria for ecological equivalence. This is done without any actual indication that landowners, or environmental authorities, are in anyway able or willing to allocate land for offsets or accept the costs that such land management regimes imply. As captured by one consultant: 'There are [environmental licence] studies or companies that simply present the area, the map, and that's it. When it's time to implement the study, the owner appears and says 'but, they haven't spoken with me! What do you mean you're going to intervene into my property?'. It's a huge problem' (Interviewee 25).

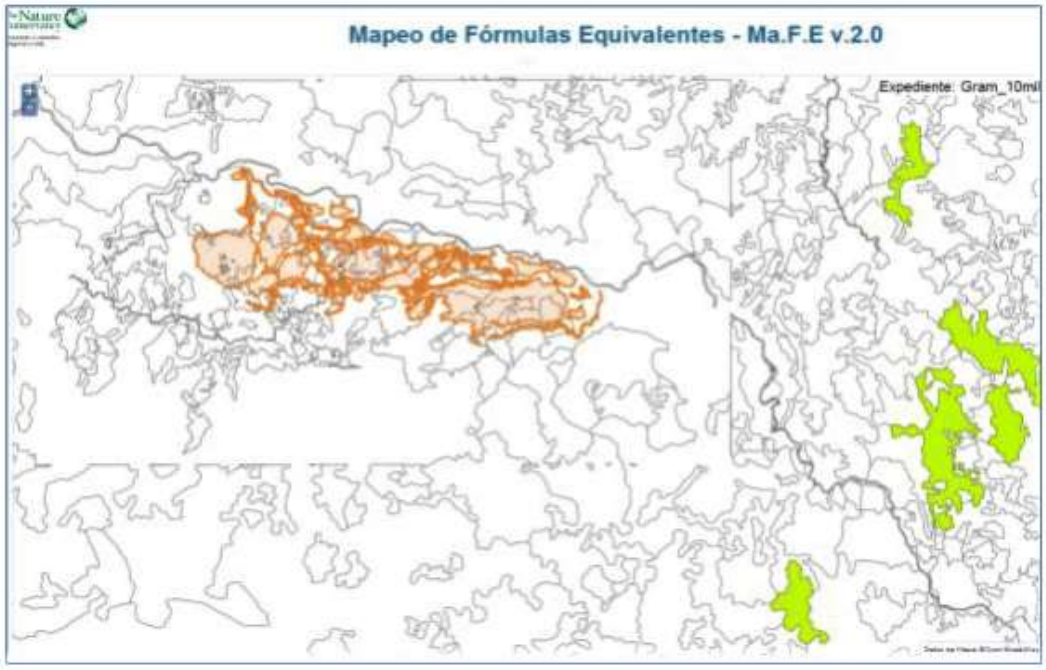
The desk-based beginnings of plan development start in earnest with the interpretation of remote sensing data, in the form of orthorectified satellite images or aerial photography. This is undertaken with the purpose of (re)classifying ecosystems impacted, (re)applying compensation factors, and exploring potential sites for compensation. To achieve this, consultants rely on variations of GIS software required for the layering of cartographic data to

construct biogeographic ecosystem district maps; and/or rely upon a purpose-built software tool developed for the policy (discussed below). In the following section, I explore a set of recurring practical and epistemic tensions experienced by consultants tasked with enacting the equivalence frame. These issues revolve around how the technological mediations required to arrive at workable offset abstractions are prone to blunder, or stumble, when put into practice.

Temporality, Scale, and Epistemic Uncertainty

As part of their efforts to facilitate the implementation of the Manual (2012), TNC, the MADS and the ANLA developed Mapping Alternatives for Equivalents (MAFE) (MADS *et al*., 2012). This custom-built computer programme enables users to input the georeferenced parameters of project impact sites to detect locations that fall within the same classification of biodiversity proxy. Based upon the technological framing provided by the policy's compensation factors, the software's algorithms throw up commensurate zones within a demarcated area of influence from the impact site (MADS *et al*., 2012).[83] Map 6 provides an example of the programme in use taken from the environmental licence application of the Gramalote gold mine situated in

Map 6: Mapping alternatives for equivalents



Source: AngloGold Ashanti (2015)

Antioquia. In this case, the orange polygons represent impact areas of secondary vegetation within the overlap between the *Los Andes* lowland orobiome and the *Sinú-San Jorge* biogeographic district. The green areas highlighted correspond to selected fragments of the landscape that fall within the required criteria for ecological equivalence. However, as I now

[83] MAFE is part of a suite of computer modelling and software tools that have emerged from the Natural Capital Project – an ongoing international collaborative programme comprised of several ivy league university departments and international environmental non-governmental organizations, such as TNC and WWF. See Dempsey (2016) for a discussion of The Natural Capital Project's Integrated Valuation of Ecosystem Services and Trade-offs (InVest) software – a similar modelling tool designed to calculate and map ecosystem services for land planning decisions.

move onto discuss, the empirical accuracy of these projections had what can fairly be described as mixed results.

One key issue faced by offset consultants, consistently raised in the course of interview, relates to temporal divergencies between the digital construction of biodiversity proxies and the material reality of territories on the ground. In particular, interviewees often reflected upon the variance between the satellite imaging data used in the construction of the Ecosystem Map of Colombia and their own trips to the field undertaken to validate potential areas for compensation. Upon arriving at georeferenced locations thrown up by MAFE, those tasked with producing compensation plans would often encounter a vastly different biophysical materiality to that represented on their computer screen back at the office desk. In the words of one interviewee, 'There are areas where you arrive to carry out the compensation and identify wooded or natural landcover and, the truth is, they're not there!' (Interviewee 60). Or, as testified by another consultant based in Medellin, 'when we go to see the vegetation cover it doesn't match because the information is really old and there are areas that change… the dynamic of vegetation cover change in Colombia is considerable. So, it's not always the same' (Interviewee 99).

Whilst the cultural labour that went into the metrological construction of the Manual (2012) successfully segregated, classified, and ranked the Colombian landscape based upon existing state cartography, the material world 'out there' did not abide by such fixity – anthropogenic forces continued to act on the land, generating new socio-ecological configurations, undermining the policy's attempt to rank the nation's landscapes through the production of its specific taxonomy. In the words of one consultant, the dated official cartographic information that constitutes the basis of policy means that 'MAFE and all the compensation values it has are obsolete' (Interviewee 51). Owing to this and other technical complications associated with the use of MAFE (such as a failure to operate on scales below 1 hectare), many of the consultants shunned the use of the programme, opting instead to construct biogeographical ecosystems district maps using other forms of geospatial technologies, such as ArcGIS.

For those employed to produce equivalence, the cartographic scale upon which the policy has been constructed also presented itself as a reoccurring issue. While the policy includes a list of over 400 biogeographical ecosystem districts, with corresponding compensation factors based on analysis carried out by TNC, this compilation of biodiversity proxies was constructed on the scale of 1:500,000 using the Ecosystem Map of Colombia. In contrast, compensation plans are obligated to operate on a significantly reduced scale of 1:25,000 or 1:10,000. In complying with the policy's stipulations, such plans require up-to-date orthophotos or satellite data that represent the development project site and potential areas selected for offset evaluation.

This reduction of scale means that consultants preparing plans are presented with a much more detailed cartographic representation of the landscape(s) in which their clients are operating. Although the biogeographic ecosystem district categories do often correspond with project level mapping, increased cartographic precision regularly throws up previously unaccounted vegetation cover within biome/biogeographic districts – which are absent from the categories included in the policy. The equivalence methodology outlined in the Manual (2012) is not replicable at the scale that consultants are obligate to operate – given that the cartographic data required to construct compensation factors do not exist as such a scale. In situations where consultant's analysis of project impact areas fail to correlate with the biodiversity proxy constructions established in the policy document, consultants are required to start formulating their own estimations of equivalence producing compensation factors. In

the following interview extract, an offset consultant based in Bogota explains how he and his colleagues respond to the subjectivity inherent in attempting to arrive at such estimations:

> *I assigned the same ecosystems to another professional and I did the same. All of us came up with distinct [compensation] factors! It gives rise to the interpretation of each person using their own criteria. Do I put the factor of the closest thing [on the list]? For example, sometimes grasslands as a basic unit don't appear. If there's no grassland, what do I do? First of all, I go up in terms of category, so I look for shrubland. If the shrubland isn't listed, I look for forest and I assign the compensation factor for forest, but really, I'm affecting grassland and the effect on a forest is quite different to that of a grassland, depending on the type of project […] We try to implement a protocol to resolve that kind of situation. What do I do? First, search to see if the ecosystem that the project gives me is on the national list and I assign that. Second, if it's not there, because grasslands aren't listed, I switch category of land cover to shrubland. So, if there's a type of shrubland that's in that helobiome and that [biogeographical] district – so in that way. Well, that was the way of resolving [the issue] because anything else was speculation* (Interviewee 44).

In operationalizing equivalence framing, consultants are often required to come up with creative solutions in response to the environmental blind spots that are folded into governable simplifications. The epistemic uncertainties that exemplify consultant's experience of trying to make offsetting function practically only became apparent in the aftermath of the policy document's publication. As discussed during interview with a representative from one of the NGOs that worked on its development:

> *[after publication] they started to see loads of errors and a significant lack of information in the manual, […] little clarity at the technical level, it gave a lot of space for subjectivity, which, in a process where a company or project has to have a compensation plan and an environmental authority has to evaluate it, is a serious problem* (Interviewee 103).

This section has shone a light on the technical and practical issues that arise during the day-to-day implementation of the Manual (2012). In doing so, it has explored reoccurring scalar, temporal, and epistemic tensions that emerge in the course of the articulating the semiotic construction of equivalence on the ground. The following section outlines the broader agrarian political economy upon which biodiversity offsetting plays out with the objective of contextualizing the experiences of offset consultants discussed below.

The Political Economy of Land as the Backdrop to Offsetting

Not only does biodiversity offsetting necessitate a fixed inventory of natures that are to be compensated, its operation is also premised on the existence of a formalized system of legally recognized property rights. While not all offsets in the Colombian case relate to the alienation of property, land acquisition is key to several of the offset options available to private firms. Specifically, these include the land consolidation strategy of Natural National Parks Colombia (where parks authorities secure control of territory of private property in designated protected areas) and land purchases made on the part of environmental licence holders – who are then required to hand over these areas to public authorities (such as municipalities and CARs) after the time period assigned to a specific environmental licence has expired. While other offset

options, such as the use of conservation agreements, do not result in the sale of property, their use is premised upon the environmental licence holding firm establishing a binding contract with the legal land owner – who agrees to sacrifice land-use rights for the purposes of conservation/restoration. Herein lies a significant obstacle for those tasked with the production of ecological equivalence.

As was repeatedly highlighted by offset consultants, the country's composition of rural property relations presents significant hurdles for those attempting to secure land in the course of establishing offsets. The current distribution and concentration of land in Colombia is widely understood to be one of the most unequal in the world (Arantxa, 2017: Faguet *et al*., 2018). While it is impossible to do justice to such an expansive and complex issue here, in order to contextualize the experiences of consultants I highlight several key issues that relate to the country's protracted history of land-use conflict.[84]

Academic analysis of the determinants for such regressive dispersal begin as far back as the colonial era, when the Spanish Crown set about carving up the land mass now known as Colombia as it plundered and pillaged the continent in the 1500s (Machado, 2009; Ibánez & Muñoz, 2010; Thomson, 2011; IGAC, 2012).[85] After independence from the Spanish Crown, the vestiges of colonial era relations of titled property remained largely intact, with a large estate system – *latifundia* – dominating and preserving a grossly inequitable portioning of formalized property rights (Machado, 2009; Thomson, 2011). It was not until the first half of the 20th century that land concentration came close to being effectively challenged with the reforms established by Law 200 of 1936 (*ibid.*). However, even these efforts at restructuring agrarian relations were repealed only a few years later, on account of counter-offensive measures pursued by large landowning interests, who continued to enjoy a privileged position within the political class composition of the elites that ruled over the country (Ibánez & Muñoz, 2010; Richani, 2012).

While progressive inroads were made by reforms in the 1960s, from the 1980s onwards, land has become increasingly concentrated in the hands of fewer and fewer property owners (IGAC, 2012). In the context of a violent civil war that led to waves of forced displacement and the rise of a 'narco-bourgeoisie' (Richani, 2012: 51) – who viewed land as a central means through which to launder profits – land concentration increased even further. Work carried out by IGAC (2012) demonstrates that in 2009, 3.8% of private landowners were in possession of a staggering 42.4% of available rural area. Not only is the countryside characterized by intense and regressive concentrations of private property ownership, successive moves to block meaningful reform and piecemeal land formalization schemes throughout the 20th century has resulted in large swathes of informal occupancy without legal recognition. According to Jorge Enrique Vélez (2015), Colombia's former Superintendent of Notary and Registry, based upon the country's cadastral census, between 40% and 50% of rural property has no formal land title. These figures include informal occupancy arrangements on public lands, which include *baldíos*[86] and designated protected areas that comprise the country's park system. Excluding

[84] For a brief general overview of the question of land concentration and the agrarian question in Colombia, see Ibánez & Muñoz (2010) and Thomson (2011). For a more comprehensive historical analysis, see Muchado (2009). Specifically, on the rise of drug trafficking and its effects on land concentration, see Richani (2012).

[85] Beginning in 1549, the Spanish Crown granted conquering Spaniards the use of indigenous forced labour and territory through the *encomienda* system (Machado, 2009). While no formal title to land was granted by the Crown through this arrangement, with the passing of time, this evolved into a large estate system, as public lands were privatized and sold to the country's agrarian elite (*ibid*.).

[86] *Baldíos* is a specific legal term that refers to tracts of land that have never been titled and are categorized as property of the nation. The literal translation in English would be 'wasteland', so the Spanish original has been used here.

these categories of state ownership, more recent work by Muñoz-Mora *et al*. (2018) notes that approximately 22% of private rural land is not formally titled, with around 89% of these lands measuring less than 20 hectares.

Finally, as a consequence of a prolonged period of civil conflict, Colombia has one of highest numbers of internally displaced persons in the world (IDMC, 2018). In response to this issue, during the first term of the Santos administration (2010-2014), a set of legal redistributive mechanisms were established with the aim of restoring property to victims of forced displacement. After passing the Victims and Land Restitution Law (2011), the Land Restitution Unit was established to process and legally adjudicate applications made by victims. According to their most recent annual report, so far, 120,233 individual requests have been made, which covers a total of 2,310,227 ha of land (URT, 2018). Having briefly rehearsed the status of agrarian political economy, the next section links the character of such social-ecological relations with the experiences of consultants tasked with establishing compensation plans for environmental licence holders.

Locating Equivalence Out in the Field: "MAFE doesn't talk to the landowners"

After assembling the cartographic criteria for equivalence, consultants begin trips into the field to negotiate with CARs and property owners in possession of land that meets the Manual's (2012) specifications. While many consultants interviewed had been able to submit concrete compensation plans to environmental licence holders, complete with proposed areas, the dominant experience across the sample was that this was a complex and protracted process, with some organizations having failed completely. In discussions with land owners, such actors are confronted with the reality that the idea of relinquishing private territorial control is not a proposition that has widespread appeal.[87] In the course of interviews, it was common to hear how the historically persistent and regressive dynamic of land concentration on the part of cattle ranchers, agro-industrial interests, and large-scale land owners in general presented itself as a major difficulty for those tasked with enabling the offset regime. As explained to me during a group interview held at a consultancy firm based in the capital:

> *When you carry out compensation measures, or propose them, the things is, you're going out to look for land and it's tough because of the tenure of the land on the part of latifundistas, [large-scale landowners]… it's complicated; they won't permit you one or 10 hectares, let alone 900 hectares to do a rehabilitation or reforestation project* (Interviewee 61).

The accumulation of capital in rural zones goes hand-in-hand with the capacity to secure and defend the control of land as a factor of production.[88] Surrendering territorial control over productive assets, either through vendition or the establishment of conservation agreements, so that environmental licence holders can comply with regulatory obligations made little sense to many of those propositioned by consultants. In the words of one interviewee, 'There's land,

[87] As discussed in the previous discussion chapter, firms obligated to comply with biodiversity offsetting have an economic interest in holding back on spending funds on property or conservation agreements. In this way, complaints from such actors about the difficulties of locating offsets might want to be taken with a pinch of salt. However, the data that comprises this section comes from consultants explicitly employed to locate offset areas. In this sense, conversely, they have an economic interest in successfully securing such areas.
[88] This is of course true for both legal and illegal means of producing surplus value.

but put a finger here, who do you find? You find the landowner, the cattle rancher. They aren't willing to cede a millimetre of their land […] if there's profit in using that land that's not compatible with conservation, nobody's going to hand it over' (Interviewee 50).

Discussions of this dynamic were common in the course of many interviews. In the office space of another consultancy, similar experiences were relayed to me: 'You arrive at a property and say to the property owner "I'm going to buy a piece of land just for conservation". For him it's not profitable, what he wants to do is cut down all the trees in order to have more cattle, more livestock, to cultivate more things, more rice […] more palm' (Interviewee 36). Even when firms are able to locate interested parties occupying land that fits the equivalence frame, the bloodied history of internal forced displacement and the failure on the part of state institutions to make significant inroads with land formalization complicates matters further. In conversation with an offset specialist working for an energy company based in Medellin, she explained the experiences of her employer:

> *in terms of the tenancy of land, I mean, there's no clarity, also in the country [right now] we're in the process of expropriation, that is to say, expropriation for those [lands] that were acquired illegally […] the issue of land restitution. We have little clarity regarding tenancy. When we find a property, we find it to be irregular in legal terms, we find that its part of a succession. A lot of the time we start the process and when we're just about to finalize the purchase, it falls through because there's no way of buying [legally]* (Interviewee 89).

In addition to issues regarding legal tenancy, land concentration, and general disinterest in participation, for others tasked with constructing offset arrangements on the ground, the persistence of territorialized zones of control on the part of non-state social forces continues to play an important role in dictating the spatial horizons in which conservation is considered.

> *"There's no denying the armed conflict in the county, I mean, there are areas in which nobody can enter because of armed groups, paramilitaries, guerrillas. It's sad, but it's a reality that can't be left unrecognised – everything – I mean, there are also political groups and monopolies that have zones that no-one can get involved with here. There are a lot of issues, right, a lot of factors"* (Interviewee 57).

Since leaving the field in March 2018, there has been a steady trickle of advances relating to the approval of concrete compensation proposals. Indeed, as mentioned in Chapter 3, a review of the ANLA's online archive, undertaken in December 2019, shows that there are 35 concrete compensation plans have now been officially approved by the central state regulatory body. In this way, the issues discussed above should not be understood as insurmountable for the realization of offset interventions. However, the experiences of consultants tasked with putting equivalence theory to work demonstrate the sociological, technical, and legal complexities that characterize the political economy of land upon which biodiversity offsetting plays out.

Conclusion

This chapter has sought to shed light on the cultural labour practices and technological mediations that form the basis of the production of ecological equivalence. In doing so, this examination has centred on two loci of analysis. Firstly, it has been argued that the Manual (2012) relies upon technologies of geopower to produce a calculable territory, with the aim of producing new territorialized spaces of conservation and ecological restoration. Through the

development of biodiversity proxies in the form of biogeographical ecosystem districts, the policy semiotically produces new objects of nature – constructed to commensurate and govern the production of landscapes in the line with the biodiversity conservation objectives of the MADS. In attempting to establish offsetting as a regulatory instrument, the production of equivalence depends upon interrelated processes of abstraction and quantification – reflecting a broader trend toward the simplification of ecological complexity as a necessary basis for environmental governance.

Secondly, in exploring the concrete acts of work that characterize offset consultancy labour, this analysis has demonstrated the, often, fragile nature of cartographic and material concurrence. Through the application of equivalency theory at reduced cartographic scales, and trips into the field, consultants expose the epistemic limits of the mapping exercises that underlie the Manual (2012). This is manifested in the discovery of unaccounted categories of biogeographical ecosystem district and corresponding onsite ecological surveys. As a result, consultants often invent and establish their own equivalence framings in the course of practically advancing the spirit of equivalence. Finally, in exploring the practical work of offsetting, this chapter has examined how the ambitions of environmental compensation policy often come into sharp conflict with the country's political economy of agrarian relations. The concentration of land ownership on the part of *latifundistas*, the failures of land formalization, the presence of violent social forces, and disinterest on the part of private owners cohere to establish an agrarian context where the possibilities of realizing the sizable territorial alterations to land management and land ownership envisioned through the policy framework have so far been curtailed. In the next chapter, I explore the operation of biodiversity offsetting further by examining its operation as a particular state-mediated socio-ecological fix.

6

No Net Loss, Regulating Equivalence, and Territorialization

Furthering the conceptual framing set out earlier in the manuscript, this chapter elaborates on the notion of offsetting as a particular form of socio-ecological fix. In operationalizing this frame, the discussion that unfolds over the course of this chapter focuses in on three key areas that relate to the implementation of Colombia's offset policy: the objective of no net loss, the centralized regulation of the policy, and the role of offsets as forms of territorialization. By exploring these elements, this chapter is orientated toward responding to the following two research questions:

- What tensions emerge in the implementation of 'no net loss' discourse?
- How does biodiversity offsetting reconfigure agrarian relations in Colombia?

I begin this analysis by discussing the operational design of the offset system in relation to existing theorization pertaining to socio-ecological fixes. In doing so, I tease out the particularities of the Colombian case and discuss how its functioning relates to political economy concerns. In the following section, I then move to examine the policy's core stated objective: the realization of no net loss to biodiversity. In doing so, this section explores and interrogates the tensions that exist between official state policy discourse and the realities and expectations of those involved in the design, implementation, and regulation of the policy framework. With the objective of exploring these tensions further, the following discussion section homes in on Colombia's centralized state environmental authority tasked with administrating and regulating compensation plans – the ANLA. This analysis explores the place of offsetting within the broader remit of the institution, the application of the policy's mitigation hierarchy, and the regulatory frame with which concrete compensation proposals are evaluated and monitored by state functionaries within the ANLA. The final discussion section explores the ways in which the fix of offsetting becomes intertwined with new and pre-existing regimes of state territorialization – which are bolstered through the process of value capture that offsetting entails. Although the proportion of approved compensation plans and concrete actions on the ground remain marginal, the experiences of private firms tasked with complying with the policy and existing secondary data point to the sizable scale of state-mediated territorialization implied by the continuation of offset policy in Colombia.

Biodiversity Offsetting as Socio-ecological Fix

The previous chapter examined how techno-managerial practices of geopower and particular metrological regimes are fundamental to the production of nature as equivalent in the Colombian case. Building on these foundations, this section examines the operation of the Manual (2012) as a particular form of socio-ecological fix, which is premised on the reconfiguration of agrarian relations in the interests of forwarding the country's flexible form of environmental statehood. While a great deal of existing critical literature on biodiversity offsetting has focused its analytical eye on processes required to establish biodiversity in a commodity form (e.g. Robertson, 2004; Pawliczek & Sullivan, 2011), the socio-ecological fix explored here entails a different set of political-economic processes and relations, which do not map neatly onto analyses of privatization, marketization, and commodification.

As discussed in the course of developing the theoretical framework of this thesis, Bakker (2009) and Cohen & Bakker (2014) advocate a restrictive definition of an 'ecological fix', which is understood to refer to 'the internalization (or externalization) of socio-environmental conditions (eg [sic], costs) in search of profit' (Cohen & Bakker, 2014: 312). Considering this perspective in the context of offsetting in Colombia, this seems to go some way toward articulating how the Manual (2012) is intended to function as a whole. Through its codification and enforcement, environmental consultancy firms or NGOs are able to capitalize on the expansion of a market for services necessary to design and implement offset actions, where firms obligated to comply with the policy rely on these forms of specialized labour, which relate to conservation and ecological restoration practice.[89] On paper, at least, this appears to echo Bakker's (2009: 1782) reference to companies that engage in the clean-up of pollution as a standard example of 'negative externalities' being internalized in the pursuit of profit. However, the role of NGOs in the process problematises this profit-orientated framing somewhat, given that such organizations cannot be said to engage with offsetting as a means of accumulating capital. As discussed in Chapter 4, NGO participation is understood as a strategic means of forwarding particular organizational interests, which are enabled through contractual consultancy work. A reliance on the labour of the private sector and civil society organizations to produce equivalent natures reflects Castree's (2008) notion of a fix produced through a minimal stance taken by the state, where the regulatory framework established through offset policy results in these sectors moving in to fill this gap. While biodiversity offsetting as a fix in Colombia may therefore not be a significant means of further profit accumulation, it is indeed symptomatic of a state that seeks to govern through governance (Jessop, 2016).

Drawing on recent Marxian debates on the nature of value production in offsetting, all forms of offset in the Colombian case should function as payments made by environmental licence holders to secure entitlements to degrade environments, in the pursuit of surplus value (Felli, 2014; Apostolopoulou, Greco & Adams, 2018; Robertson, 2018). In the words of Felli (2014: 254), their realization constitutes a particular 'condition of production', which is imposed on fractions of capital regulated through the Manual (2012). However, I note that they *should* function in this way because many firms have so far not complied with offset obligations (as detailed in Chapter 4), whilst at the same time being able to pursue capital accumulation activities regulated by the environmental licence process. In contrast to other existing state policy frameworks, such as mitigation banking in the US (see Hough & Robertson, 2009), offsetting in Colombia is, for the most part, not premised on the existence of for-profit providers that control and manage land in order to sell offset credits. There are, however, now

[89] As previously mentioned in Chapter 5, this research did come across some cases of larger firms with environmental licences using in-house labour to undertake offsets.

two habit banks in the early stages of operation (see Terrasos, 2020).[90] With this exception, the profile of social actors in possession of lands that enable environmental licence holders to comply with the Manual (2012) include the following two categories:

- *Private landowners* (individual or collective), who participate by engaging in conservation agreements, through the sale of land, or by receiving funds to establish a private protected area (officially referred to as a Civil Society Nature Reserve);
- *Formal state actors* (CARs, the national parks authority, or municipal government), who enable environmental licence holders to fund environmental management practices on public land (generally within protected areas) or receive funds to establish a public protected area.

The political-economic relations instituted by the policy interact with, and are established through, an existing framework of property relations that pertain to formalized systems of public and private land ownership. In this way, the offset system is not predicated upon the development of *new* property rights or the 'privatization of biodiversity' (Ervine, 2011: 67). Rather, the geopower of the state and the application of the metrological regimes, discussed in Chapter 5, serve to inscribe existing property (land) with new legally recognized and enforced qualities. The state as 'ultimate "landlord"' (Parenti, 2015: 836) is then able to divert value toward offsetting as a particular condition of production.

In the case of conservation agreements, the construction and application of the semiotic category of biogeographic ecosystem districts enables privately owned land that fits the criteria of equivalence to be transformed into a rent-bearing 'socio-ecological asset' (Andreucci *et al*., 2017: 2).[91] Following recent discussions of Marxian approaches to a political ecology of rent (Andreucci *et al*., 2017; Apostolopoulou, Greco & Adams, 2018), here the capacity to extract value from productive capital (environmental licence holders) can be said to derive from the monopoly control of landowners over areas of land – within certain biogeographic ecosystem districts – that match the categorization of land impacted by environmental licence holding firms. By participating in conservation agreements, landowners forfeit the right to exploit the productive potential of their land over specific time periods, which corresponds to the duration of the environmental licence with which each agreement is affiliated. Interviews undertaken with members of the offset labour force, in combination with document analysis of a sample of 35 compensation plans approved by the ANLA, show that the labour carried out to materially produce equivalent natures through environmental management is not undertaken by the participating landowner during conservation agreements. Rather, these material interventions (e.g. the removal of invasive species or the planting of tree saplings) are the responsibility of the environmental licence holder and for the most part are undertaken by contracted third parties (NGOs or consultants).[92] In this way, payments made to private landowners through conservation agreements bear no relation to labour expended, but derive purely from the extraction of value through social relations of rent established by the Manual (2012).

If we consider commonalities across all forms of offset outlined above, the legal framework that constitutes this socio-ecological fix can be said to function as a means of establishing or reinforcing spatio-temporal delineations of resource control – where the production of equivalence facilitates the governance of land in the interests of state defined objectives relating to conservation and ecological restoration. From this perspective, all offset options within the

[90] None of the sample of compensation plans approved by the ANLA make use of these mitigation banks.
[91] As has been explored in the previous chapter, the owners of socio-ecological assets in the form of land tend to be located and propositioned by consultants contracted by environmental licence holding firms.
[92] However, in some cases, conservation agreements are based on 'passive restoration', which simply entails the removal of 'environmental stressors' (Morrison & Lindell, 2011: 170) such as livestock.

Colombian system constitute acts of state-mediated territorialization – defined broadly as 'efforts to control land, people, and resources' (Bluwstein & Lund, 2018: 458) – which are premised on establishing and enforcing the categorization of territory as an amalgamation of biogeographical ecosystem districts.[93] In linking all offsets back to the state in this way, I employ a SRA to state powers, understood as 'government + governance in the shadow of hierarchy' (Jessop, 2016: 164).

In the same way that the act of defining environmental problems is an inherently discursive exercise (O'Conner, 1998; Castree, 2008; Brand & Wissen, 2018; Surprise, 2018), so too are efforts to put forward solutions to resolve ecological contradictions that emerge through capitalist production.[94] In this manner, emergent forms of socio-ecological fix are in part constituted by particular discursive orders, which serve to frame the success or failure of resultant political-economic, regulatory, and institutional reconfigurations. As existing literature on offsetting has shown, of particular importance here are the frames with which biodiversity loss and gains are measured and formalised through governance (Robertson, 2004; Sullivan, 2013). In considering this concern and building on the previous chapter's exploration of the production of ecological equivalence, the following section explicitly engages with the central stated objective of the Manual (2012): to achieve no net loss to biodiversity.

No Net Loss in a Megadiverse State

In October 2013, a delegation of Colombian state officials travelled to Paris to partake in the evaluation of the state's environmental performance and legislative framework. This event formed part of an ultimately successful series of reviews that led to the induction of the country into the Organization of Economic Co-operation and Development (OECD) in May 2018 (MADS, 2013b; OECD, 2018). During the ceremony of presentation, the Minister of Environment and Sustainable Development at the time, Luz Helena Sarmiento, addressed the assembled crowd and declared:

> *we are the first government in the world to issue a Manual of Compensation for Biodiversity Loss, launched in January of 2013, which establishes clear criteria and actions so that the private sector reaches the objective of zero deforestation in areas subject to environmental licencing* (MADS, 2013b).

Although the Minister failed to quite articulate the buzzwords that have come to define offsetting within international policy discourse, she was clearly alluding to the Manual's (2012) explicit objective of achieving no net loss to biodiversity. In these short words lie the technocratic promise of offsetting as socio-ecological fix in Colombia – where the institutional reconfiguration of governance appears capable of eliminating the environmental crisis tendencies of the country's extractivist-orientated accumulation regime. But what exactly does it mean to speak of no net loss in one of the world's most biodiverse countries beyond such forums of political rhetoric? And how is no net loss actually operationalized during its everyday administration and application? As this section explores, within the legal framework of offsetting and among the community of actors that labour across its web of public and private organizations, this notion is characterized by a contradictory and tension-ridden duality. On one hand, national and regional state policy documents, alongside accompanying grey literature, tout this complex policy goal as central to the operation and realization of offsetting

[93] The linkages between market-based environmental governance and processes of state territorialization are discussed in recent work by Dunlap & Sullivan (2019).

[94] A point of comparison here are the ways in which discourse on the potential for future negative emissions technologies to address climate change has been operationalized as a form of fix (see Carton, 2019).

(see MADS, 2012a; CORTOMLIMA & GIZ., 2017; CRA & GIZ, 2017).[95] But on the other, many of the policy's proponents, architects, and consultants, question the sincerity of no net loss as a techno-scientific possibility. In the course of interview with such actors, the concept was frequently highlighted as an inherently problematic organizing principle, undermined by a host of scientific unknowns and technical/regulatory challenges. In beginning to explore these tensions, I first turn to the use of environmental baselines in the application of no net loss discourse.

The Illusion of Environmental Baselines

The environmental baseline upon which offset gains are defined derives from ecological surveys undertaken by private sector consultants during the preparation of a project's EIA. As discussed in Chapter 5, these operations are undertaken by consultancy firms employed during the preparation of environmental licence applications submitted to the ANLA. Baseline assessments undertaken during this process are supposed to perform a key role with regards to the objective of no net loss. They operate as a form of socio-ecological delineation upon which all assumptions regarding offset success are premised.[96] However, from the perspective of those that enter to provide consultancy services for the formulation of concrete offset proposals, the validity and integrity of these forms of assessment were often challenged and depicted as painfully sub-standard. A representative from one of Colombia's most established environmental NGOs, with multiple permanent contracts with environmental licence holders, detailed their experience of such baseline information as follows:

> ***Interviewee 5****: 'We enter when the licence is granted. So, what do we find? That all the existing information is really average'.*
>
> ***Interviewer****: 'Like, basic?'*
>
> ***Interviewee 5****: 'Basic, incomplete, done by consultants […] companies hire consultants that don't have the specialties, it's a job, the firms do impact studies of really poor quality, and I have to say, they're all like that. Then, when you enter to do the design for the licensee, […] The first thing you do is read all the existing information and you realize that they're copied studies, the field work was not judicious, the information is not complete. So, you start skating. How do I solve this if what I'm working with isn't of sufficient quality? And on top of that, touch any mountain in Colombia and 3 new species appear'.*

Likewise, in the course of interview with representatives from the National Natural Parks of Colombia a similar tone was struck regarding the nature of baselines found within environmental impact studies. In this case, the parks authority engages in the revision of such documentation in the hope of locating project obligations that can be directed toward designated areas that fall within their remit. These were described as: 'environmental impact studies with "copy-paste" […] There are a number of deficiencies […], this is not about size, it's about the quality of the studies. And obviously they hand in huge juggernauts with loads of information, and sometimes what you find, to put forward an example, is when they establish

[95] This discursive positioning resonates strongly with those perpetuated by BBOP and other international conservation policy actors (see BBOP, 2012; IUCN, 2016). Indeed, the Manual (2012) itself directly references the work of BBOP and, as noted in Chapter 4, received input from key actors within its organizational network.
[96] See Ureta, Lekan & von Hardenberg (2020) for an extended discussion of nature as 'baseline'.

species relationships, you start finding species from other types of ecosystems that have nothing to do with the project [area impacted]' (Interviewee 70). While some consultants defended the robust nature of their work during environmental assessments, others were upfront about the nature of such evaluations in the context of establishing plans for clients within limited time frames. In the words of a representative from one such firm, 'our studies in the field are very short – a rapid ecological evaluation to be able to determine what there is in different zones of the of the country' (Interviewee 34).

Even though these practices of 'baselining nature' (Ureta, Lekan & von Hardenberg, 2020: 1) are said to constitute the basis of subsequent offset actions, when one reviews existing concrete offset proposals approved by the ANLA, it becomes clear that the only factor taken into account when comparing impact and offset sites is the base level abstraction of biogeographical ecosystem district category, and its accompanying spatial quantification. As captured in the words of a tropical ecologist interviewed with direct experience assessing the application of the Manual (2012): 'here, it's purely area, ecologically equivalent area, that apparently has a similar forest structure, or similar by the end [of the offset], but there's no possibility of going beyond that to understand if species are actually located within such areas' (Interviewee 90). Another NGO representative, who at the time of interview had several contracts with environmental licence holders, discussed the relationship between the policy's use of environmental baselines and the objective of achieving no net loss as being devoid of the necessary ecological data:

> *It's difficult because you don't know, basically. You have to have a characterization of knowledge at every level, you need flora, fauna… How do you measure that? That's to say, you require a perfect baseline in order to know what biodiversity you have, what you lost, and if you compensate, you need to have the same on the other side, or if you're going to compensate in this ecosystem you have to have an idea of what you're going to gain proportionally to what you lost. I think that the principal obstacle here is that there is no information. You're going in blind. You imagine, but you don't know with any scientific certainly what there is* (Interviewee 12).

While baselines are outlined as a central component for the implementation of offsets in the Manual (2012), the experiences outlined above point towards the deficiencies that characterize their use in the system. Continuing to explore the realities of no net loss discourse, I now turn to consider critical perspectives on the centrality of ecological restoration within the offset framework.

The Limits of Tropical Ecological Restoration

A central problematic that defines Colombia's ongoing foray into offsetting as a mode of governance relates to the extreme dearth of scientific knowledge about the ecologies that it seeks to materially (re)produce. As Colombian conservation discourse turns increasingly to techniques and modalities of 'New Conservation' (see Hare, 2015), where the preservation of 'natural' systems is superseded by a greater focus on the anthropogenic production of biologically diverse systems, the epistemic uncertainty that undergirds the practice of conservation is brought into ever sharper focus. Much work within the academic field of restoration ecology is characterized by epistemic unknowns relating to the practice of replicating ecosystems in terms of their functionality, species composition, and structure. Within policy-orientated discussions of offsetting, the uncertainty of betting on the propensity of a relatively nascent field of theory and practice has been well rehearsed (see Burgin, 2011;

Maron *et al*., 2012; Curran *et al*., 2014). In the context of the tropics, the epistemic unknowns that characterize ecological restoration work elsewhere are heightened to spectacular levels. As emphasized to me by one interviewee: 'we don't even know how restoration functions, nobody knows that. There is no science that has been proven' (Interviewee 20). While the Manual (2012) presents ecological restoration as a key strategy to obtain the illusive environmental gains that the policy is orientated toward, many of those directly involved in its application and formulation remain highly sceptical of the capacity of restoration projects to meet desired objectives. In the course of interview with one of the Manual's (2012) named authors, the particularities of ecological restoration in the context of Colombia were discussed as follows:

> *There's absolutely no guarantee that the restoration of tropical ecosystems will be successful, maybe in countries in Europe or North America, restoration has been effective because they have much simpler ecosystems. You restore me a páramo! Nobody restores a páramo, a high Andean forest, nobody, there's no knowledge, nor experience. They're really diverse and complex systems, we don't know about species dynamics* (Interviewee 93).

Despite significant uncertainties regarding the replication of tropical ecosystems through environmental management regimes, the Colombian policy discursively frames restoration strategies as capable of reproducing the complexity of (socio-)ecological systems that are transformed through the capital accumulation of licence holders. One interviewee, who was working for a major energy firm while also completing a doctorate in ecology, expressed the potentially futile nature of major investments in restoration activities carried out in the context of the Colombian policy. In her words:

> *'We have to take this issue more carefully, because we have some very big failures regarding the issue of restoration […] sincerely I have my reservations as well as in the evaluation of the compensation manual. I feel that, with the issue of restoration, we don't have a clear direction at the level of the country and, as I was saying, we're investing excessive resources in something that we don't know is going to give, or not give, results in the long run'* (Interviewee 89).

The notion of no net loss is again undermined by the temporalities that offset governance regimes entail. As previously mentioned, under the stipulations set out in the Manual (2012), offset obligations relate to the 'useful life' of each particular development project. Of course, these differ significantly depending on the route towards surplus value production taken by the licence holding firm. For example, in the case of mining concessions, environmental licences can last as much as 30 years. Conversely, infrastructural concessions that relate to road development projects often only endure for as little as 3 years. In the latter case, firms seeking to comply with offset policy only need to establish a conservation agreement with a landowner for this extremely short duration. Once elapsed, the property owner regains all former land use rights and is free to make use of the land as they see fit. In the case of offsets that involve active ecological restoration practices to enhance biodiversity levels, even the most dedicated and proficient operation is unable to accelerate rates of environmental succession required to achieve environmental gains within the short timeframes established by the Manual (2012). Moreover, as recent analysis examining the diversity of tree species diversity in new growth tropical forests has shown, even after a 20-year period, the capacity for ecological restoration to achieve species diversity comparable to old growth tropical forests appears extremely limited (Elias *et al*., 2020).

No Net Loss: 'a useful fiction'?

For many of the NGO actors that engage with offsetting, the fundamental limitations and dishonesty of the scheme's organizing objective are quite apparent. In discussing the application of no net loss, one of the Manual's (2012) central architects summarized their thoughts on the concept as follows: 'there's a lot of discussion in which the issue is broken down… some trying to criticise, always looking for the perfect metric or compensation factor, when it's not been possible to find. What's lost is lost – no net loss doesn't exist in real life' (Interviewee 9). The peculiar duality of no net loss as a policy objective was again emphasized in conversation with an NGO representative that had worked directly on researching the emergence of obligatory compensation requirements in the country. When asked if it was even possible to achieve no net loss, the representative wryly replied: 'with the same ecosystem services and the same composition of biodiversity, the same ecological structure, everything? Yes, if I have to sell the guy, because if no, I don't get anything. I think no net loss of biodiversity is impossible, but necessary' (Interviewee 58). During an interview with a representative from a separate NGO, who was directly involved in offset actions for a Colombian coal firm, both the utility and absurdity of the concept was articulated from the position of someone required to maintain state policy discourse, whilst balancing the reality of personal expectations with regard to the policy's central objective:

> *It's better to have that than nothing, but it's a fiction. It's a fiction. It's like... The shit story behind it is that if you hold yourself accountable to the science, then there's no fucking way you're going to be able to create an equivalent ecosystem. It just doesn't fucking work that way […] It's like trying to say suddenly you're going to go back in Britain to what? Pre-Saxon forests? No, no, no, actually, pre-Celtic forests […] but you have to maintain that fiction, otherwise to a certain extent, from the public point of view, and from the corporate point of view, then there's simply no fucking use to it […] it's a useful fiction. But even... Whatever it is that you do in terms of equivalencies or restoration or whatever, it's never going to be like it was […] once you fuck it up, it gone. There's nothing to be done* (Interviewee 56).

Similarly, the conception of no net loss within the framework of the Manual (2012) was described by some participants actively involved in the process as nothing more than a 'utopia' (Interviewee 14 & 58). Or in the words of another NGO worker who participated in the design of the policy: 'for me it continues being on Mars and we're on Earth! So, I think it lacks a lot of development […] from my point of view there is no way of doing it in Colombia today' (Interviewee 10). Recent work by Sullivan (2017: 231) has discussed the 'chimerical promise' of no net loss as indicative on a particular ontology, where the notion of equivalent environmental losses and gains denotes a particular position on the nature of reality, held by those that formulate and perpetuate the idea. This framing would appear to imply that those that (voluntarily) pursue offsetting – and are implicated in reproducing and perpetuating the notion – subscribe to the belief that attaining no net loss is a sincere *ontological* possibility. Interestingly, as the preceding discussion has shown, throughout my time engaging with those directly involved in the design and implementation of the Manual (2012), the impossibility of ever realizing environmental gains commensurate with the complexity and diversity of ecosystems lost was almost universally acknowledged. For many of the NGOs that sell specialized consultancy services, participation in the offset system is premised on an

understanding that no net loss operates as nothing more than a 'useful fiction'. The utility of upholding the falsehood of equivalence relates to the system's capacity to divert value from productive capital (environmental licence holders) toward the implementation of conservation and restoration activities, which such organizations can have a degree of agency over. In this sense, rather than reflecting a particular ontological position, adopting the discursive construction of no net loss, by many, is more closely bound up with strategic political interest.

Regulating Equivalent Natures

This section turns to examine the institutional and everyday experiences of civil servants tasked with regulating the production of nature and space in accordance with the discursive frames that constitute offsetting as socio-ecological fix. In doing so, the discussion focuses its analysis on three key areas that provide insight into the realities of the administration of ecological equivalence and no net loss within the context of the ANLA. These include the prioritization placed on the Manual (2012) within the broader remit of the institution, the operationalization of the concept of a mitigation hierarchy within the national system, and regulatory protocol surrounding the measurement of purported environmental gains derived from offsets. In exploring these themes, it is argued that the regulation of offsetting has so far been plagued by a form of conceptual fuzziness, where many of the core organizing principles that are supposed to inform the operation of this fix remain largely undefined.

The regulation of land-use planning exemplifies the contradictory nature of the political ecology of the Colombian state and capitalist states more broadly. One the one hand, environmental regulatory procedures and mechanisms are constructed and legislated so as to curtail the deleterious environmental excesses of capital accumulation. Whilst on the other, the power and stringency of these measures continually encroach upon, and come into conflict with, the broader, more structurally dominant, state objective of facilitating the circulation and reproduction of capital (Ioris, 2014). This contradictory dynamic can be observed during the emergence of offsetting in the case explored here. Initial implementation of the Manual (2012) took place within a broader institutional and regulatory context where the presiding administration had specifically targeted the reduction of waiting times related to environmental licence applications, in an effort to promote economic growth.[97] In 2014, reflecting the priorities of the government at the time, President Santos announced his intention to streamline the regulation of major development projects – the remit of the ANLA – through his proposals for 'express' environmental licencing, under the category of Projects of Strategic National Interest (El Espectador, 2014). From the perspective of the Council of Economic and Social Policy, the ANLA's systems of project evaluation were highlighted as a significant obstacle for the realization of major infrastructure and extractive projects, which the administration's first National Development Plan (2010-2014) had rhetorically framed as the 'locomotives' of Colombian development.[98] In the aftermath of biodiversity offsets coming into force, the

[97] These efforts at streamlining the regulatory process in relation to extractivist-orientated accumulation occurred in the wake of a decline of primary commodity prices worldwide post 2011, which signalled the end of the commodity boom era that had come before. This fall in exchange value has been attributed to a reduction of demand (linked to the contraction of China's economy), increased overall production, and an amplified financialization of primary commodities (Brand, Dietz & Lang, 2016: 127).

[98] The Council of Economic and Social Policy's strategy document for projects of strategic national interest notes that 'the principal difficulties that effect the agility and viability of development projects in these sectors are, among others: the acquisition of property, prior consent of communities, *environmental permits and permissions*, relations with communities of different regions, and the internal difficulties of public entities in resolving juridical problems. Accordingly, policy guidelines are required that enable the resolution of said difficulties' (CONPES 3762 of 2013 cited in Lozano Acosta, 2014).

principal regulatory authority tasked with ensuring their realization was forced into a position where existing strains on institutional capacity were heightened by executive commands to expedite the evaluation process.

The regulation and monitoring of offset actions outlined in the Manual (2012) constitute only a minute fraction of the labour of state administrators employed to perform the functions of the ANLA. In this way, the tendency within the institution has been to focus on its primary responsibility of evaluating and granting applications for environmental licences. In the words of a senior ANLA civil servant discussing compensation obligations placed on firms: 'a lot of the time what happens is that, within the ANLA, the majority of forces are on the evaluation of projects, not so much on the follow up' (Interviewee 94). The removal of concrete offset proposals from the environmental licence process (discussed in Chapter 4) relegated offsetting to the category of follow up project monitoring, which was likely to have played into the slow rate of progress with project implementation. The relegation of offsetting on the part of the ANLA is also exhibited by the organization's annual reports during the first few years of the policy. Since offset policy came into effect in 2013, these documents make only passing reference to the Manual (2012) in the course of detailing the organization's achievements and operations over the preceding year (see ANLA, 2014; 2015b; 2016; 2017).

During interviews with civil servants within the ANLA and environmental consultants, the institutional capacity of the organization was often highlighted as a serious impediment regarding the regulation of compensation obligations. In the words of one former state functionary: 'The ANLA lacks staff for the number of cases that it has. It lacks personnel. It lacks further capacity training. At one point it tried to make a specific group for compensation, but it would need way more people to attend to all projects' (Interviewee 88). Relatedly, analysis of the ANLA's environmental licencing evaluation, undertaken on behalf of the Department of Nation Planning, also found that the institution lacked the organizational capacity to deal with the regulatory workload assigned (DNP, 2013: 15).

The Mitigation Hierarchy in Practice

Proponents of biodiversity offsetting are often at pains to emphasize that, rather than establishing a 'licence to trash' as many critics fear (e.g. de Zylva, 2018), biodiversity offsets should be understood as a last resort for residual impacts within a hierarchy of mitigatory actions – which are first premised on strategies of avoidance and minimization of environmental degradation (see BBOP, 2012; Villarroya *et al*., 2014; von Hase & ten Kate, 2016). Indeed, the international spread of state-orientated offset policy over the last decade has been heavily influenced by the BBOP's efforts to establish policy guidelines and principles, which have played a key role in the perpetuation of the 'hierarchy' framing of offsets (see BBOP, 2012). In the course of drawing up designs for Colombia's national policy, TNC – an active member of the BBOP network – also situated environmental compensation obligations within a mitigation hierarchy for land-use planning, with the act of offsetting constituting the final element of a broader process of environmental impact reduction.

While the Manual (2012: 10) articulates the centrality of the mitigation hierarchy for the regulation and implementation of offset policy, during interviews with personnel based in the ANLA's central office, the everyday experiences of state administrators demonstrates the relative weakness of the regulatory scheme in practice. Early in the course of fieldwork, I arrived at the central ANLA office to speak with two of the institution's project regulators. When questioned specifically about the application of the mitigation hierarchy, one of the assembled ANLA staff discussed its functioning as follows:

> *The Ministry's manual maps it out, yes. But, well, let's say, within the ANLA its being developed […] In the end, there's no fine accountancy of if the measure was prevented, mitigated and corrected, so that there's no compensation – no. But rather, what's done is each project that affects natural or semi-natural vegetation has to do a biodiversity offset. So, in that sense, the mitigation hierarchy that was posed by the Ministry's manual, well, it's not very rigorous* (Interviewee 3).

A year and a half later, in the final months of my time in the field, I spoke with another ANLA bureaucrat working within the institution and asked again about the experiences of administrating the implementation of this particular part of the policy's regulatory architecture. In the course of discussing the initial mitigation sequence of the scheme, he noted that: 'ANLA assumes that part had to have been done by the company, and what interests them [ANLA] are the activities that are already being done in the field […] those methodologies are not kept in mind, they're not within our remit' (Interviewee 85). In the words of another civil servant that worked on the development of the policy's regulatory protocol within the ANLA: 'the measures that firms were presenting weren't convincing, and they didn't take into account a reduction of the impact. Because, in the end, they almost don't appear […] when you present a study, you already have your management plan and what compensation assertions are proposed, but the whole [mitigation] process is never spoken about' (Interviewee 84).

As these quotes attest, the policy's emphasis on pre-emptive mitigation actions rests squarely on the will of the firm in possession of an environmental licence and those tasked with carrying out the necessary consultancy work that initial project design entails. Many interviewees in the private and public sector stressed that the notion of mitigation was principally tied to a belief that all environmental degradation was simply to be rectified through offset related transactions. As was explained to me by an NGO representative involved in the development of the policy, 'compensation is the lowest level of the mitigation hierarchy, that's irreparable damage, that permanent effect – it's something that the companies in our country have not understood [...] they set up their compensation plans with the entire footprint of a project' (Interviewee 10). In conversation with one consultant with experience working on a number of hydrocarbon projects across different firms, the mitigation hierarchy's operation, as a system of private sector self-regulation, was summarized as follows:

> *The principal problem that I see with this hierarchy is that almost no project tells me "What happens if I cannot comply with the mitigation hierarchy? What happens if I cannot prevent, nor mitigate, nor correct, nor compensate?" […] I don't know of a project that has applied the mitigation hierarchy and someone's said "wait, it's not viable because we're going to extinguish a species" […] they say "no, it can be compensated" and in theory everything can be compensated […] I personally think that not everything can be* (Interviewee 15).

The overall impression gleaned from those that took part in interviews was that this apparent cornerstone of offset policy has remained little more than an aspiration for good governance, with little application beyond the pages of the Manual (2012). While a couple of consultants spoke of productive conversations with private firms over the capacity to make adjustments to project design, this was framed as highly dependent on the proclivities of the firm in question and the specific nature of the project.

The Creativity of Discernible Gains

In this final section on the regulation of equivalence, the analysis turns to what Robertson (2004: 367) refers to as 'the problem of measurement', which has plagued the governance of environmental compensation schemes since their inception. While Robertson (2004) explored the problematic articulation between capital and science in the case of defining offset credit sales within the US mitigation banking sector, this section explores how the nascent regulatory architecture that characterizes Colombian offsetting significantly weakens its capacity to secure environmental gains in accordance with the policy framework. During interviews with many participants, the evaluation of offset proposals was frequently discussed as a fundamentally subjective exercise – where adjudication of the integrity of compensation lacked any formalized protocol with which to evaluate the objective of securing gains. As articulated by one of the Manual's (2012) named contributors, who worked on the policy within the MADS, specifics regarding the attainment of biodiversity gains were left largely undefined:

> *There's no evaluation guide for plans. Here, making a comparison with the world of carbonólogos [those that work with carbon] in the carbon market […] I know the guide with which the auditor is going to carry out the validation or verification. So, from the drafting of the project I consider all that. I already know under what parameters I'm going to be measured. Here [with biodiversity offsets], no, they remain only with the issue of the Manual* (Interviewee 80).

In contrast to the regulatory procedures that constitute the governance of carbon within Colombia's nascent voluntary carbon market, the country's biodiversity offset system was rolled out without any accompanying criteria for assessing proposals submitted to the ANLA. Within the centralized environmental authority, the assessment and monitoring of environmental licence obligations is carried out by teams of three civil servants, which are divided into social, biotic, and abiotic expertise. Many of the environmental consultants interviewed discussed their interactions with the ANLA as largely determined by the specificities of the regulatory triad encountered. During a group interview held with employees at a major Colombian consultancy company in Bogota, the experience of having submitted various plans to the centralized regulatory authority was said to have been dictated by the varied disciplinary backgrounds of the civil servants tasked with assessing project proposals:

> *There's no standardization across the evaluators, that's to say, it becomes really subjective, depending on the evaluator that assumes the determined project […] it's different if a biologist sees it or an ecologist or a forestry engineer because they don't have the same grid with which to measure a project, so sometimes in that sense, well, it's seen in accordance with the evaluator that arrives at the study – there's no objective criteria* (Interviewee 45).

This issue regarding the variability of assessment experience was consistently raised by consultants interviewed over the course of this research. Furthermore, this theme was often paired with concerns over the organization of labour within the regulatory authority. Specifically, the vast majority of bureaucrats that perform the functions of the ANLA are employed on short-term contracts. This means that state agents assigned to particular environmental licence projects consistently change when their temporary employment contracts come to an end. On various occasions, organizations employed to formulate concrete compensation plans described how a change of ANLA personnel during the course of preparing offsets had meant that designs drawn up under the regulation of one group of civil servants would then be challenged by the incoming contracted staff – underlining the subjective nature of the regulatory enterprise as a whole. Continuing on this point, on the side of the regulators

and those that design plans, there was further confusion regarding how sought-after biodiversity gains were to be measured. In the office space of a major energy firm based outside of the capital, one employee relayed their communications with the ANLA as follows:

> *So we said to the environmental authority right, we have these indicators, but tell me, how are you going to evaluate me? "Ah no, be imaginative, be creative, be such and such". So it could be that I tell them that I'm going to measure my net gains in biodiversity, or rather, I'm going to measure no [net] loss of biodiversity in [project name removed] with, I don't know, a landscape indicator "ah yes, very well", but I tell them, for this other project, I'm going to measure it through the production of corridors of connectivity for the Andean Bear… "ah yes". There's no clarity on the issue* (Interviewee 89).

During my final weeks of fieldwork, I had an opportunity to discuss the progress of the policy with one of the authors of the 2018 version of the manual, which had just been published. While reflecting on the implementation of the policy over the previous 5 years, the central objective of the policy – to secure equivalent biodiversity gains to those lost – was tightly linked to regulatory processes that characterize offset monitoring on the part of the ANLA. In their words:

> *the authority has no mechanism to assess how effective the compensation is in terms of loss of biodiversity, what they do is ask for ICAs – environmental compliance reports – and companies once a year, in a database I think it is in Excel, they report to the authority how they are doing their compensation plan. There is a person [, a civil servant,] who goes and checks in the field to see the tree[s], if it's in process, but there really is no coherent, systematic, process to determine if these projects are effectively managing no net loss. And what happens in addition? They are checked project by project, again, there is no mechanism to look at it in a more aggregated manner [across the system as a whole]* (Interviewee 103).

Through detailed engagement with the various public and private actors that labour to implement and regulate the Manual (2012), this section has exposed the regulatory realities of Colombia's foray into offsetting so far. I began this discussion by exploring the organizational capacity of the ANLA and the marginal place of offset regulation within the overall remit of the institution. I then turned to consider the application of the mitigation hierarchy and the regulation of environmental gains. In the next section, I examine how offset implementation feeds into processes of state-mediated territorialization.

Offsetting as State-mediated Territorialization

So far, this chapter has critically engaged with the central objective of offset policy – no net loss – and provided insight into the practices of state regulation applied to private firms by the ANLA. In this final section, the analysis turns to consider the impacts of offsetting on the ground and the ways in which the Manual (2012) is, tentatively, beginning to reconfigure rural agrarian relations unevenly across the territory of the nation state. While the apparent objective of offset policy might be widely dismissed as fanciful, the operation of this socio-ecological fix still has material effects and consequences for human and non-human geographies. At its heart, the fix of offsetting incentivises and feeds into the production of spatio-temporal systems of control through the cultural and semiotic production of biogeographical ecosystem district categorizations. In this way, the policy is premised on the construction of new resources. As Rasmussen & Lund (2018: 393) neatly capture, 'When new resources are discovered or become

valuable, landscapes change and new opportunities arise; new frontiers emerge and the interest in the (re)territorialization of space becomes acute'. Much work on biodiversity offsetting has examined how such policies are intimately tied to processes of privatization, which are often discussed in relation to the neoliberal character of these forms of environmental governance (Pawliczek & Sullivan, 2011; Apostolopoulou, Greco, & Adams, 2018). Drawing from a sample of ANLA approved compensation proposals, this section demonstrates how the implementation of offsetting in the Colombian case is in large part premised on a contrasting dynamic, where private firms comply with compensation obligations through the nationalization of private land. In this way, the Manual (2012) presents a means by which formal state institutions are able to leverage private capital, resources, and organizational capacities in the course of reterritorializing the frontiers of designated protected areas and the private property rights within.

The National System of Protected Areas and Saneamiento Predial

The territorialization of land through the declaration of protected areas began in Colombia as far back as the late 1950s, with the country being one of the first in Latin America to incorporate such concerns into remit of modern statehood (Leal, 2017). Since then, successive waves of reform have resulted in large swathes of the national territory becoming subject to varied forms of conservation-orientated governance regime, which differ slightly depending on the category of protected area assigned.[99] At present, the National System of Protected Areas in its entirety stretches across 15.11% of the total landmass of the country (Parques Nacionales, 2019). Reflecting a broader dynamic found internationally (see Adams & Hutton, 2007; Mollett & Kebe, 2018), the institutionalization of the fortress conservation approach in Colombia occurred in a socio-ecological context where many of the spatial demarcations that became designated as protected areas were, and continue to be, populated by rural communities. Today, those inhabiting land within the frontiers of parks include persons with legally recognised private property (land titles established prior to a particular park's designation) and informal forms of habitation (with no legally defined property rights).

According to De Pourcq *et al*. (2017), it is understood that presently close to 94,000 people reside within the 58 National Protected Areas, governed by the national parks authority, alone.[100] The production of territories of public conservation has not been without profound political-ecological consequences for rural communities, as state-led regimes of environmental governance and territorialization shift. Empirical case study work has specifically demonstrated how the evolution of the Colombian park system has been intertwined with the violent dispossession of rural populations (Tobón Quintero & Restrepo, 2009; Ojeda, 2012; Bocarejo & Ojeda, 2016).[101] While these dramatic acts of displacement and dispossession show how conservation interests come into sharp conflict with regimes of rural occupancy – in often brutal ways – state-led efforts to produce territory and nature in accordance with 'green' state projects are also mediated through more mundane acts of displacement.

As discussed in Chapter 4, the underfunded status of the national parks authority meant that strategic moves made during the formulation of the Manual (2012) successfully secured the

[99] The National System of Protected Areas is comprised of a total of 15 different categories of protected area (RUNAP, n.d.).
[100] In terms of area, National Protected Areas are the largest category of the 15 forms recognized within the broader parks system. Presently, they cover 17,466,973.55 hectares (Parques Nacionales, 2019).
[101] Specifically, Diana Ojeda's (2012) work has detailed the ways in which the evolution and production of territory within the Tayrona National Natural Park was characterized by the displacement of fishing communities and the loss of access rights depended upon for livelihoods and social reproduction.

conditions to divert value toward their institutional objectives in the context of a broader funding deficit. Whilst the policy asserts that the creation, enlargement, and declaration of areas that constitute the national parks system all constitute legal means with which to fulfil offset obligations, the governing protected area authority maintains a special interest in the capacity of offsetting to assist with the realization of spatial control mechanisms over zones within existing public protected areas. Specifically, this relates to the potential to leverage private capital vital to its strategy of *saneamiento predial* (land consolidation), where formally titled private lands within parks are bought up by state institutions in an effort to rid such areas of human settlement – the presence of which is cast as antithetical to the ambitions of pristine conservation discourse (see Ojeda, 2012; Bocarejo & Ojeda, 2016).[102] In this way, offsetting serves to bolster governing environmental authorities' capacity to assert territorial control over protected areas through the nationalization and accumulation of private assets. As one consultant explained to me when discussing offset options: 'in Colombia, the focus is that protected areas, of national character, are free of occupation – without people. Hence, there are zones within the National System of Parks that have a clear route towards *saneamiento* [*predial*], so they already know which properties are occupied, which can be bought, how much they cost, and that these are the ideal areas to start to get to work' (Interviewee 44). This institutional prioritization on the elimination of private property within the frontiers of protected areas is an issue that was emphasized in the course of interview with representatives at the organization's central office in Bogota:

> *[We have a] portfolio right now that has all the cadastral information of all the areas, territorial actions, of properties that are validated as private, that require processes of saneamiento. So, it's a strong line of action that we've been working on from the perspective of offsets […] it's a line of action that many of the Territorial Directors are targeting. For example, in the North East Andes [division], the Territorial Director is emphatic in saying that he believes in it and that he supports saneamiento predial before any other [offset] action, right. So, for him, it's a priority to consolidate land and implement other options later* (Interviewee 71).

According to the director of National Natural Parks of Colombia, Juliana Miranda Londoño, a total of 604 private properties with formalized titles have been identified as potential sites for the realization of *saneamiento predial* within the national parks system (ANLA, 2019b). In various public forums (see Foro Semana, 2017; Revista Nacional de Agricultura, 2018; ANLA, 2019b), Londoño has advocated strongly for the prioritization of offsets through the land consolidation mechanism as a low risk means for firms to comply with environmental licence obligations. During the course of interview with officials within National Natural Parks of Colombia, it was highlighted how the realization of land consolidation strategies were unlikely to be financed through conventional state funding channels: 'we know that for the efforts made by government, including sometimes those for *saneamiento predial*, there's no money. In other words, when the National Land Agency says "we're going to have some resources in order to do *saneamiento predial* for those that have a title" – there's no money' (Interviewee 70).

While the proportion of concrete compensation plans approved by the ANLA remains marginal, existing advances with project implementation demonstrate exactly where the Manual (2012) is being used to consolidate land within the frontiers of designated conservation zones. As summarized in Table 13, as of December 2019, a total of 34 individual private

[102] The national parks authority's desire to preside over areas with fewer and fewer inhabitants plays into a much broader international discourse that sees the protection of nature as synonymous with the production of ontologically distinct categories of 'social' and 'natural' realms (Adams & Hutton, 2007).

properties have been centrally approved for *saneamiento predial*. These lands are spread across 4 separate regional and national protected areas, with the most significant example of land nationalization occurring in the *El Patano* Regional Integrated Management District. In this case, through coordination between the road concession firm *Concesionaria Ruta del Cacao S.A.S.*, National Natural Parks of Colombia, and the CAR with jurisdiction over the protected area (*Corporación Autónoma Regional para la Defensa de la Meseta de Bucaramanga*), a total of 30 small-scale properties are set to be acquired in the course of compensating for the infrastructure project.

Table 13: Biodiversity offset related saneamiento predial actions

Environmental licence code	Sector	Department	Saneamiento predial
LAM3836	Infrastructure - Road construction	Antioquia	Acquisition of property (unnamed) covering 13.2 ha within the *Ensenada de Rio Negro* Regional Integrated Management District
LAV0064-00-2015	Infrastructure - Road construction	Atlantico	Acquisition of the *Calacoto* and *Las Palmitas* properties totalling 235.6 ha, situated in the *Luriza* Regional Integrated Management District
LAV0060-00-2016	Infrastructure - Road construction	Santander	Acquisition of 30 properties covering 167.3 ha within the *El Patano* Regional Integrated Management District
LAM6626-00	Infrastructure - Road construction	Bolivar	Acquisition of the *La Enea Parte 1* property covering 198 ha – 70% of which sits within the *Los Flamencos* Flora and Fauna Sanctuary

Source*:* See appendix 3.

Offsets: Laying the Conditions for Environmentally Induced Displacement

Although the Manual (2012) includes multiple options available to environmental licence holders governed by the policy, a tendency to reduce the risk of potential failure and a search for the easiest/cheapest means of complying privileges certain offset arrangements over others. In this way, the policy's reliance on private sector governance subjects compensatory actions to the internal profit-driven nature of such organizations, who are keen to rid themselves of the value diverting obligations of offsetting. As two civil servants from the ANLA attested during a joint interview, this manifests itself in a tendency toward buying up land above other compensation options:

> ***Interviewee 86****: companies don't tend to have restoration in their sights – its land acquisition.*
>
> ***Interviewee 87****: Firms don't get involved with issues of restoration because of the complexity that it entails, so the option of buying [land] is the easiest way of complying with the obligation.*

In the eyes of firms that have managed to secure the possibility of a variety of sites and methods of compensation, the acquisition of private property presents itself as a relatively risk-free means of securing this legally mandated condition of production. In the words of a consultant engaged in the design of compensation plans, but concerned with the social repercussions of offset induced land grabbing: 'why buy a property and leave it abandoned and displace the campesino that was there? It's really difficult to convince executive boards that it's not the best option, because it's the safest. I buy a property, it's mine, I enclose it, I plant a forest, and then pass me the report' (Interviewee 15). This perception of compensation through land acquisition was compared to projects based on ecological restoration by another consultant interviewed as follows: 'an ecological restoration and landscape recuperation project, which is totally different, which implies more variables, in fact, involves the community as such, companies flee from these kinds of things, up till now I haven't encountered one company that wants to do a restoration project, they've all been by means of land purchase' (Interviewee 36).

As detailed in Table 14, using the sample of all existing compensation plans approved by the ANLA, approximately 59% of the total area of offsets takes the form of private land acquisition. Firms that pursue this option are then obligated to remain in possession of these areas during the operational life of their environmental licence. Once this time frame has elapsed, the Manual (2012) stipulates that offset lands are then handed over to formal state authorities to become designated public protected areas. In the case of *saneamiento predial*, governing state authorities immediately received the legal titles for lands that have been acquired through the policy.

Table 14: Approved offsets by area and type[103]

Approved compensation plans	Area in hectares
Total area impacted	720.78[104]
Total area of offsets	3,557.28
Total offset area by land acquisition	2,105.43
Total offset area by conservation agreement	722.21
Total offset area on public land	891.78

Source: See appendix 3

While presently there are only a limited number of fully developed offset projects that have been signed off by the state, the implications with regard to state-mediated territorialization are significant. NGO research undertaken in 2015 analysed data held within the ANLA's archives and showed that across 88 separate environmental licence projects the total area required to offset these interventions totalled 180,407 hectares (Fondo Accion, Fundepúblico & WCS, 2016).[105] During the last few weeks of my time spend in the field, I was able to secure an interview with a former ANLA civil servant that had been awarded access to the organization's centralized offset inventory. At the time that they left the organization to take up a role in the

[103] The sample of approved compensation plans used here is overwhelming populated by environmental licences that correspond to infrastructure projects in the form of road developments. Out of the 35 approved compensation plans analysed, only 5 relate to other sectors regulated by the policy. These include 4 hydrocarbon projects and 1 energy project. This unrepresentative slant towards infrastructure projects relates to the operational life of these forms of capital accumulation, which have a short turnaround.

[104] This figure excludes the impact area of 2 projects within the sample, as these figures were missing from the ANLA Resolution that approved the compensation proposals. In both cases, the environmental licence for each respective project was unavailable on the ANLA website. As such, this figure should be greater than is stated.

[105] This figure should be treated with some caution as it is based on the area of intervention included in a firm's environmental licence application. Licences that relate to exploratory activities within the hydrocarbon and mining sectors are likely to include an impact area significantly larger than the eventual intervention.

private sector, midway through 2016, the total amount of stipulated compensation area was said to be 'over 220,000 hectares' (Interviewee 88). With each passing year and with each licence granted, the total area of land required for compensation increases. As of July 2018, the ANLA had 161 environmental licence projects with biodiversity offset commitments, at various levels of evaluation and implementation (ANLA, 2019).

Table 15: Environmental licence projects with offset commitments by region

Department	Number of projects
Casanare	35
Meta	32
Cesar	11
Antioquia	7
Valle de Cauca	6
Cundinamarca	6
Santander	6
Magdalena	5
Sucre	4
Arauca	4
Cordoba	4
Atlantico	4
Remaining departments	37

Source: translated and adapted from ANLA (2019a)

As has been argued by Smith (2010b), the uneven development of capitalism results in a variegated spatialization of territorial interventions and financial flows orientated toward the valorization of capital. In the context of extractive-orientated accumulation in Colombia, this dynamic is manifested in the high concentrations of environmental licences related to the hydrocarbon and mining sectors, which gravitate toward geographies of known resource reserves through state-orchestrated concession schemes. In examining projects licenced since 2013, when the Manual (2012) came into effect, this dynamic is particularly apparent in the mineral and hydrocarbon rich departments of Meta and Casanare, which include a total of 32 and 35 individual projects respectively (ANLA, 2019) (see Table 15). The Manual's (2012) stipulations relating to the geography of offset activities and their proximity to environmental impacts, which should be located as close as possible (MADS, 2012a), is likely to present greater competition for land within regions with high numbers of environmental licences granted since 2013. Although this research was unable to explore the relation between the offset process and land prices, concerns relating to the inflation of land prices were raised by many participants.

In 2017, during a public forum on environmental compensation organized by the publication *Semana*, Carlos Alberto Duque Hernandez of the Colombian energy company *Intercolombia* outlined the extent of the compensation obligations accumulated by his firm through the updated environmental licencing process, and touched upon the potential social implications of the new interests in land established through the Manual (2012):

> *At the moment, Intercolombia is constructing 2,600 kilometres of transmission lines. This affects 1,100 hectares that need to be compensated – approximately 9,000 hectares. As the Minister [of Environment and Sustainable Development] was mentioning, right now there are 117,000 hectares to compensate in 143 projects. When we start to add this all up, we realize that we have a huge demand for land in order to be able to generate compensation. It's a huge demand for land that's going to generate two things. First, a problem with price, it's going to have*

> *pressure on land prices, and second, as we have so many small-scale land owners in the countryside, we're running the risk of starting to generate problems relating to the displacement of farmers and small and medium-sized cattle ranchers toward the city. The campesino with a high-priced property, that we're going to generate with this process, is going to prefer to sell land and migrate* (Foros Semana, 2017).

The potentially sizable ramifications of biodiversity offsetting, once fully operational, were outlined by one consultant as follows: 'I'm sure, if one adds up all the hectares that have to be compensated, the whole country would be in reforestation or restoration or [land] purchase, the whole country, because I've done, I don't know, like, 10 projects and they add up to thousands of hectares – thousands!' (Interviewee 44). An employee in a firm with multiple environmental licences further accentuated the social risks implied by large-scale land acquisitions:

> *The other thing that the environmental authority didn't evaluate is that we're running a huge risk of forced displacement and we were saying to the environmental authority, "you're telling me to buy 50,000 hectares?" We're buying them, we have to buy them, but what's going to happen? We end up having to remove a load of people from those 50,000 hectares, lest within 5 years, you tell me "ah no, you caused a forced displacement", I'm going to turn the tables on you. You were the one that told me to remove them from here, now what are we going to do? So, right now, by conserving, which is really important to me – I'm a biologist – by conserving we're not evaluating the social risks that are coming down the road, because right now we have 60,000 hectares and they're going to assign us 20,000 [more]. A single company, 80,000 hectares? We could make our own national park!* (Interviewee 89).

Similarly, the capacity of offsetting to result in the displacement of rural communities, in the aftermath of so much forced displacement during the country's violent civil war, was a major concern raised during an interview undertaken with a state functionary based at a CAR:

> *this can convert into a problem if what we associate [with offsetting] is only the issue of buying up property and displacement […] We cannot generate a second displacement of communities through conservation, we have families displaced, we know full well what happened here. How are we going to encourage that again!* (Interviewee 100).

The potential for a substantial re-territorialization of land linked to biodiversity offsetting as a socio-ecological fix is only set to increase further with reforms introduced by the most recent version of the policy, released in spring 2018. Whereas the policy framework that has been the focus of this research only applied to large-scale development projects regulated by the ANLA, the reformulated national offset policy now applies to private sector interventions at smaller scales, which are regulated by CARs (MADS, 2018). This further expansion of environmental compensation obligations is likely to place even greater pressure on rural communities, as private firms operating at various scales of intervention seek to secure land as a required condition of production. However, the extent to which offsetting continues to reconfigure property relations, land-use rights, and the broader agrarian political economy will be highly dependent on the regulatory authority of regional and national environmental institutions, and the prioritization of the programme by future state managers located within the ANLA and future governments. Given the extent of non-compliance so far, it remains to be seen whether or not the project of offsetting will actually result in the levels of land nationalization that has been alluded to here.

Conclusion

This chapter has examined the Colombian biodiversity offset system as a particular form of socio-ecological fix, which is framed as capable of addressing environmental crises emanating from large-scale development interventions that form part of the country's extractivist regime of accumulation. In attempting to make sense of the political-economic basis of the system, I drew from recent political ecology works that have explored the issue of rent to argue that the Manual (2012) operates, to the extent that it has up to this point, as a condition of production, which serves to divert value produced by firms regulated by its introduction. Based upon the semiotic category of biogeographical ecosystem district, landowners in possession of ecologically equivalent lands are then able to capture this value for conservation/restoration practices, or, in the case of conservation agreements, for personal gain through a relation of rent.

In exploring the discursive construction of this fix, I then turned to examine the tensions that define no net loss as a policy objective and its regulation by state authorities. In this analysis, I drew from interviews that detailed the sub-standard nature of environmental baseline practices, undertaken in the private sector, and highlighted the profound epistemic uncertainties surrounding tropical ecological restoration. Having outlined the limitations of these elements, it was shown that for many of those directly involved in delivering and designing offsets, rather than an ontological possibility, no net loss is merely viewed as a 'useful fiction' that opens strategic opportunities for conservation funding, enabled by offsets as a condition of production. Drawing on the experiences of civil servants from within the ANLA and environmental consultants familiar with the evaluation of compensation plans, this analysis also exposed how the mitigation hierarchy, which is frequently used to defend offsetting from critique (see von Hase & ten Kate, 2016), has played little or no role in the operation of the Manual (2012) during the first phase of its implementation. Furthermore, in exploring the means by which sought after biodiversity gains are measured, this analysis also documented the subjectivity that has so far defined attempts made by state regulators to evaluate the design and implementation of offsets. Together, these findings point to considerable limitations surrounding the roll out of offsetting in this case.

In the final section of this chapter, I demonstrated how funds diverted from productive capital are being captured by state institutions that govern territories within Colombia's system of protected areas. Using a sample of existing ANLA approved compensation plans and interview data, this discussion explored how offsetting is being used to finance the acquisition of private properties located in existing designated protected areas, enabling processes of state-mediated territorialization. Rather than being characterized by a trend toward privatization, offsets in Colombia have so far exhibited a tendency to nationalize private property in the form of land. Although implementation remains limited, a preference for land purchase as a means of compliance and the ever-expanding number of projects requiring offsets could have significant repercussions regarding the displacement of communities, especially in regions home to high numbers of licences. In the next chapter, the final of this thesis, I conclude by drawing together some of the principal findings of this investigation, consider the limitations of this work, and point to potential further avenues for research.

7

Conclusion

Source**:** Antonio Caro's *Minería* (2012)

After arriving in Bogota in June 2016, I spent much of the first couple of weeks wondering around the oldest parts of the city, tentatively deploying my shoddy Spanish – complete with poor Anglo-Castilian accent – as I tried to find somewhere to live and gradually became accustomed to the rhythms of the city and my new cultural surroundings . When I walked the streets during this time, I would accidently stumble across notable cultural and historical landmarks that had previously only been known to me through academic readings undertaken on the other side of the globe, sat at my office desk in Lancaster surrounded by plant scientists. These included the site of the assassination of the Liberal presidential candidate Jorge Eliécer Gaitán on 7th Street, who's death in 1948 is widely considered to have marked the beginning of a brutal partisan wave of bloody violence between Liberal and Conservative political forces, known as *La Violencia* (The Violence). On other occasions, I would find myself in front of the Palace of Justice, rebuilt after an infamous siege undertaken by the M-19 Marxist guerrilla group in 1985, which came to a dramatic ending with the national army firing tank ammunition directly into the Palace itself.

During these early weeks, I would often end up at the National Museum on weekends and while away hours looking through the institution's art galleries, hoping to get some insight into the cultural artefacts that adorn the insides of the building and their place within a broader discursive construction of nationhood. When reflecting on how to begin this concluding discussion, I was reminded of the image above, a reproduction of the Colombian artist Antonio Caro's work, *Minería* (Mining) (2012), which hangs on one of the walls at the National Museum. Caro's reworking of the Colombian national flag is a direct and blunt intervention on the defining role that natural resource extraction has played for the nation. The yellow band that usually occupies the top third of the flag, generally understood to represent the nation's wealth and riches, has been blackened, reduced, and brandished with the title of the economic sector that has been so integral in defining the political economy, and material landscapes, of

the country over the course of the 21st century.[106] In this rendering, the natural wealth of the nation appears to have been consumed by the dark hegemony of extractive interests – 'the capitalist worldeater' as captured in the provocative title of a recently published monograph by Dunlap & Jacobsen (2020).

In the course of this thesis, I have put forward an extended attempt to conceptually and empirically flesh out a political ecology analysis of one element of the Colombian state's response to the socio-ecological crises that arise from the metabolic imperative of the country's extractivist-orientated regime of accumulation – biodiversity offsetting. In exploring this form of state-orchestrated socio-ecological fix, I have sought to examine the policy as a set of political, economic, ecological, and socio-cultural relations that conjoin to define a varied set of practices and acts of labour, which together constitute the roll out of offsetting in one of the most biologically diverse nation states on Earth. In the course of articulating this analysis, I put forward a conceptual framework that drew selectively from areas of political ecology, the Regulation School, and the SRA to the state in an effort to capture the complexity and breadth of these relations. By constructing this interlinked theoretical apparatus in my quest to make sense of offsetting, I sought to provide my own contribution to what Ioris (2015: 168) calls 'a reinterpretation of state theory in a way that posits ecological politics inside, and in relation to, statecraft and public policy-making'. While the state often rears its head in political ecology accounts of the roll out of market-based environmental policy, analysis has often shied away from explicitly engaging with the SRA, or even gesturing toward a generalized conceptualization of the state (e.g. McAfee & Shapiro, 2010; Lockhart, 2015). The overall contribution of this work has been to re-centre theorization around the state and environmental statehood specifically in the course of engaging with the ongoing, and faltering, attempts to establish a so-called 'green economy' in practice.

Reflecting on this project as a whole, the story that has unfolded over the course of this thesis is one of state and (meta)governance failure, where the rhetoric and techno-scientific basis of this ascendant policy approach has met with technical and epistemic complexities, state bureaucracy, and the contested nature of flexible environmental statehood in action. Despite having come into effect at the start of 2013, Colombia's national system of biodiversity offsetting still very much remains in the early stages of roll out, with only a small fraction of environmental licence holders having started to comply with the compensation obligations placed upon them by the regulatory framework set out in the Manual (2012). If 'offsets are the motor of a new model of sustainable development for Colombia' (MADS, 2017), as the environment ministry boldly proclaims on its government website, evaluated on its own terms, this vehicle for 'sustainable development' has clearly stalled on the state's figurative driveway. In order to begin summing up and reflecting on the contributions of this work, the following section summarizes the key findings of this project in relation to each of research questions that framed the preceding discussion chapters. The remainder of this conclusion considers the limitations of this study, reflects on offsetting in Colombia going forwards, and makes some recommendations for future research directions. The chapter ends with some final reflections on the expansion of biodiversity offsetting within the wider context of the global environmental crisis in which we find ourselves.

[106] Of course, the importance of resource extraction in defining the modern nation has a much longer and tumultuous history that dates back to the days of Spanish colonization.

A Summary of Key Findings

In Chapter 4 of this thesis, I explored the varied institutional actors brought into orbit with one and other through the offset policy framework and examined the ways in which these actors use their position in relation to the state to forward specific organizational interests. To do this, I delved into the politics and recent history of Colombian environmental statehood as a fundamentally contradictory and tension ridden set of state projects, reflecting a complex ensemble of power centres that define the state as a set of socio-ecological relations. The historical approach taken provided the means with which to make sense of the complex political and institutional context in which the Manual (2012) emerged and provided the basis with which to conceptualize the state as a strategic terrain of struggle for (offset relevant) social forces. Drawing upon the SRA and recent political ecology work on the character of state-nature relations, I have argued that the formulation and eventual roll out of offsetting in this empirical case was heavily defined by particular institutional interests and manoeuvring on the part of social forces within and beyond the formal state, which reflects its strategically selective nature, composed of pre-established social relations of power that inform the ongoing evolution of explicit environmental statehood.

The environmental ministry's initial move to revisit environmental compensation as a means to forward organizational objectives emerged in a period where the realization of the aims of environmental statehood had been under sustained attack by the presiding Uribe administration. In this context, the MADS and the alliance of environmental NGOs and formal state institutions that forwarded the formulation of the Manual (2012) sought to reconfigure the institutional and regulatory landscape through a modified flexible regime of environmental statehood. This move sought to place greater administrative, regulatory, and economic burdens on the private firms governed by the policy's legislative framework. In this way, the MADS sought to enrol fractions of extractive and infrastructural capital directly in the realization of environmental policy objectives. The finalized version of the Manual (2012) also reflected the balance of power within SINA and the assemblage of actors engaged in its promotion, with the national parks authority successfully lobbying to include compensatory actions within the frontiers of the national park system. In addition, my analysis showed that the privileged position of private capital interests, engaged in extractive and infrastructural accumulation projects, enabled them to fundamentally weaken the policy's operation, through a tactical move to remove compensation plans from the environmental licensing evaluation procedure, just prior to ministerial ratification of the policy. Aware of the limited authority and organizational capacity held by the ANLA, private firms have also been able to frustrate the realization of the Manual (2012) through efforts to delay expenditure on compensatory actions.

Beyond seeing the state as a site of discursive and material struggle, this thesis has also explored the special capacity of formal state institutions to produce and enforce new objects of nature, through the development and evolution of specific technologies of geopower, which are deployed in the course of establishing and managing systems of governance in the interests of socio-ecological control. In Chapter 5, I turned to explore the intellectual and cultural labour enrolled in the production of specific matrices of knowledge, which provide the parameters and reference points required to govern the inordinate complexity of territory (and accompanying socio-ecological relations). These activities formed the ideational and epistemic basis of the biodiversity offset framework. Here, I directed my analysis toward the technologies and discursive tactics deployed to reframe the entire Colombian landmass as a patchwork of fungible and calculable units, known as biogeographical ecosystem districts. These new discursive objects of nature constitute the basis of the policy's intrinsic and relational system

of environmental valuation, which has been shown to be premised on the quantification and abstraction of site-specific natures.

This story began with work carried by SINA's web of state research institutes, prior to the emergence of the Manual (2012). Drawing on a multitude of data sources, these state organizations coordinated and collaborated on the construction of a previously unprecedented feat of state cartography, enabled through a complex amalgamation of geoinformatics as geopower. The resulting cartographic construction eventually provided the basis for the development of a set of metrological regimes, which provide the discursive governance framework for a private offset labour force, who are employed to apply such metrology in the course of locating, negotiating, and ultimately producing offset sites on the ground. However, as has been demonstrated, the operation of the policy's equivalence framing ran into a number of problems when applied by workers contracted by regulated firms. In examining the acts of concrete work undertaken by offset consultants tasked with delivering offset proposals, this chapter laid bare the technical and epistemic challenges that plagued the commensurability of biogeographical ecosystem districts in practice. In addition, this chapter demonstrated the ways in which the political economy of land in the aftermath of civil war and the failures of state institutions to advance with the formalization of private land titles have played directly into the tardy implementation of the policy on the ground.

In Chapter 6, I turned to develop my conceptualization of offsetting as a particular form of socio-ecological fix in the course of considering how the scheme serves to reconfigure agrarian relations. I began proceedings by theorizing the political economy of the Manual's (2012) offset programme, based upon insights gleaned through the analysis of primary data collection and recent interventions in political ecology pertaining to Marxian notions of rent and their relationship to forms of market-based environmental policy. In doing so, I argued that offsetting in the Colombian case can be understood as an example of what Felli (2014: 262) has described as a 'necessary condition of production', which results in the diversion of surplus value produced by sectors covered by the Manual (2012) toward state mandated compensation activities. In the case of conservation agreements, private landowners in possession of land located within specific biogeographic ecosystem districts are able to capture this value in the form rent.

Extending the earlier discussion on the varied institutional bricolage of public and private actors that comprise the practice of offsetting, where I emphasized the need to consider Jessop's notion of state power as 'government + governance in the shadow of hierarchy' (Jessop, 2016: 164), this final discussion chapter underscored the need to link offsetting back to its principal source – the MADS. In linking this conception of state power to the implementation of offsetting, I argued that despite the entangled web of public-private governance required to produce equivalent natures, their execution should be conceptualized as particular forms of state-mediated territorialization, which constitute the material manifestation of state discourse relating to equivalence. Much work on the persistence use of market-based forms of conservation within the neoliberal natures literature has detailed the ongoing drive to privatize and commodify formally public (or unowned) aspects of non-human nature. Indeed, the phenomenon of biodiversity offsetting has frequently been framed as an exemplar of this trend (e.g. Apostolopoulou, 2016). Drawing upon a sample of existing concrete offset plans approved by the ANLA, I demonstrated how in this case, contrary to broader disciplinary debates over the privatization of nature under offset schemes, most land secured for offsets in Colombia is directly, or eventually, becoming nationalized as it moves from private to public hands. This is the case when compensation obligations are being met through the buying up of private land

within the frontiers of existing protected areas or where private land acquisition results in the transfer of ownership to regional state environmental authorities.

In exploring offsetting as a socio-ecological fix, I also explored the various tensions that arise in the implementation of the discourse of no net loss, which is highlighted as the central policy objective laid out in the Manual (2012). In doing so, I critically engaged with several core ideas that have come to define the practice of biodiversity offsetting internationally. These included the construction of environmental baselines, the application of a mitigation hierarchy, and the reliance on ecological restoration as a means of achieving environmental gains. Through interviews carried out with state regulators, policy architects, and environmental consultants, I have shown how the application and governance of environmental baseline criteria and the mitigation hierarchy play only a rhetorical role in the mediation and regulation of development interventions in the Colombian case. Furthermore, the capacity for ecological restoration activities to bring about the kinds of ecologically equivalent gains framed by the Manual (2012) – in the context of huge epistemic unknowns relating to tropical ecology – was also shown to be an accepted falsehood, even by actors directly engaged in the policy's development and promotion.

Limitations of this Work

As I came to understand, the research project that is envisaged, planned, and signed off by supervisors and ethical review committees can of course vary significantly to that which begins to come together through logistics, serendipity, and variable attempts at locating research participants during the process of fieldwork. When I reflect on the limitations that characterize this project, it seems clear that there some important perspectives that are lacking from the interview sample obtained for this research. A notable absence within the dataset are the experiences and viewpoints of individual and collective landowners that are presently being enrolled in the MADS' attempt to offset the ecological destruction wrought by major infrastructural and extractive development. The failure to include such perspectives relates to practical issues that arise when attempting to engage with a policy framework that is still very much emergent, not yet at a stage of full-scale implementation – the reasons for which have been outlined over the course of this work. Given that all but a couple of the approved compensation plans were accepted after I left the field, unfortunately there was little I could have done to have secured the participation of such actors.

Colombia's Conservation-Development Nexus Going Forwards

Since the initial institutional and regulatory changes that ushered in Colombia's extractivist mode of development at the beginning of the 21st century, the maintenance of hegemony and the reproduction of this model's accumulation regime has become a form of political common sense among the country's governing elite.[107] This sentiment was neatly expressed in the words of one NGO representative – interviewed during the course of this work – who was directly engaged in offset delivery for a major extractive capital firm: 'no government in its right mind is going to leave – no politician in its right mind will leave – those resources untapped'

[107] All the National Development Plans of Colombian governments from the turn of the century to the present day have been formulated, to varying degrees, around the specific role of resource extraction and export-orientated primary commodity production.

(Interviewee 57). Over the last two decades, Colombia's political pendulum, when viewed in terms of national election results, has swung only marginally from ultra-right neoliberal *Uribismo* (2002-2010), to the centre-right neoliberal platform of Santos (2010-2018), and most recently back again to an *Uribista* government, with the election of Ivan Duque in spring of 2018. As I witnessed in the final days of fieldwork and then later from afar, only with the political campaign of an ultimately unsuccessful leftist presidential candidate, Gustavo Petro, was a post-extractivist 'economic imaginary' (Jessop, 2010: 334) awarded the opportunity to permeate, and maintain a tentative foothold within, mainstream political discourse of the country – albeit only for a short while.

In the wake of electoral victory, the Duque administration's National Development Plan (2018-2022) – unironically named *Pact for Colombia, Pact for Equality* (DNP, 2018) – set out its ideological and political economic commitments envisioned for the next stage of the country's 'post-conflict' epoch. Organized around an unashamedly neoliberal governing formula of 'legality + entrepreneurship = equality' (DNP, 2018: 6), the document reaffirms a commitment to extractivist interests, set out under a section of the policy programme entitled the 'mining-energy pact for sustainable growth' (DNP, 2018: 140). While the document makes no explicit reference to biodiversity offsetting when outlining the environmental agenda of the administration – its 'pact for sustainability' – it does refer to the use of 'economic instruments' aimed at productive sectors of the economy, with the objective of ensuring that they are more 'innovative', 'sustainable' and with reduced 'environmental impacts' (DNP, 2018). This appears to indicate a clear commitment to a continuation of offsetting within the broader institutional context of the country's flexible approach to environmental statehood. The nexus between development and conservation policy, so clearly exemplified by offsetting, can also be seen to take on new forms within the Duque government's programme – specifically with the promotion of 'sustainable' and 'eco' tourism, underscored as key areas for future economic expansion. This reflects the sector's growing importance as a government-backed accumulation strategy, on the back of Colombia receiving ever-increasing numbers of international visitors in the aftermath of the Peace Accords (Semana, 2018).[108] Indeed, since coming to office, Duque has often rhetorically described the tourism industry as the country's 'new oil' (see El Tiempo, 2018; El País, 2020).

As mentioned earlier in the text, an updated version of the national offset policy was released in spring 2018, which includes several significant alterations to the functioning of the system explored over the course of this thesis. While it is beyond the scope of this concluding section to outline the nature of the revised system in its entirety, in light of the preceding analysis, I briefly layout what I understand to be several key changes. Firstly, the revised framework expands the operation of offset requirements beyond the ANLA's regulation of mega projects to encompass smaller development interventions regulated by CARs. This expansion of the roll out of offsetting and associated metrological regimes of equivalence will inevitably greatly heighten demand for land in an already complex agrarian context, characterized by a highly unequal distribution of land. Thus, this regulatory extension only increases the potential of the system to bleed into the dispossession and displacement of rural communities, as a direct result of corporate interests seeking to comply with state demands to secure land in line with the environment ministry's stipulations for ecological equivalence.

The policy has also been altered in two other important ways. In light of the persistent failure to ensure that obligated firms submit full offset proposals within a year of environmental licence approval, the updated manual now requires firms to submit a complete plan at the

[108] See Sánchez Supelano (2019) for a recent reflection on the role of ecotourism in the context of a 'post-conflict' Colombia, informed by an environmental justice framework.

licence application stage. As detailed earlier in the text, this was the original intention of the policy's architects and such a change goes a little way in reducing the flexibility lobbied by private capital interests during the formulation of the original policy. However, presenting a plan for approval is one thing, actually carrying out compensation activities is another. In the absence of a major commitment by the Duque administration to strengthen the capacity of regional and national environmental authorities, based on the experiences of regulators interviewed, it appears highly likely that firms will continue to pursue strategies to avoid and delay the delivery of offsets. Finally, whereas the previous system made firms responsible for the administration and realization of offsets over the operational lifetime of their environmental licence, the updated manual obligates the licence holder to administer compensatory activities until 'measurable' and ecologically equivalent gains are established (MADS, 2018). As has been discussed in Chapter 6, the implementation of offsetting has so far been plagued by the lack of any established criteria for measuring these sought-after gains with regard to the illusive objective of no net loss. Having reviewed the present stipulations, the updated framework appears to repeat the vagueness and unspecified regulatory stance of the previous system.

As I adjust and re-edit the final concluding paragraphs of this thesis, I sit at my desk confined to my shared house, in the midst of truly remarkable times. After its reported emergence in the Wuhan province of China in January 2020, scattered cases of the COVID-19 strain of the novel corona virus have grown exponentially, leading to a full-blown global pandemic. In response, states around the world have placed populations under varied forms of lock-down in a desperate attempt to prevent the spread of the contagion. In Colombia, in the context of emergency measures enacted by the Duque administration, extractive capital interests who played such a key role in defining the form and implementation of offsetting in the country to date, are again seeking to advance their interests in the face of looming major economic crises for capitalist systems. On the 3rd of April 2020, 25 private business representatives wrote to President Duque requesting that the administration take a host of deregulatory measures to stimulate economic activity – the signatories include Eduardo Pizano de Narváez, former president of the Colombian Association of Natural Gas, and Juan Camilo Nariño Alcocer, current president of the Colombian Association of Mining (Rojas, 2020). The letter specifically calls to slash evaluation times for environmental licences regulated by the ANLA and advocates for the removal of the constitutional requirement to engage in prior consultation with afro and indigenous communities (when accumulation activities are proposed within their legally recognised territories) (*ibid*.). As the primary commodity prices of many of Colombia's exports plummet in response to the global economic slowdown, and with the prospects for the country's 'new oil' also taking a heavy hit, it remains to be seen whether Duque will repeat the approach of former President Uribe and move to debilitate the SINA, in the hope of encouraging FDI during the remainder of his presidential term.

Recommendations for Further Research

As biodiversity offsetting continues to be touted as a pre-packaged policy solution to a structural imperative for compound growth under capitalism, further grounded empirical work is needed by political ecologists, and other critically minded social and environmental scientists, to determine the socio-ecological impacts of such schemes – especially on marginalized and disenfranchised voices. This is particularly pertinent in this case given offsetting's operative tendency to reconfigure land use rights and property regimes, which can very easily result in the loss of access to land, displacement, and land price inflation (due to heightened demand and competition for land). Across the globe, the implementation of state

conservation policy has demonstrated a reoccurring tendency toward inequitable and uneven impacts on poorer communities located in rural regions (see Adams & Hutton, 2007; Holmes & Cavanagh, 2017). Unless situated within radically democratic, not to mention functional, systems of land use planning and governance, the continued proliferation of state orchestrated biodiversity offsetting is highly likely to feed into and exacerbate this phenomenon. In the case of Colombia, as the pool of compensation plans accepted by the ANLA grows and further progress is made with implementation on the ground, there is much scope for additional empirical research that seeks to capture the experiences of landowners (and former landowners) enrolled in the everyday practices of flexible environmental statehood and the impacts of the scheme as a means of governing and territorializing land in the name of 'green' interests. This study has contributed to a growing, and now not unsubstantial, literature that has documented the reductive and deceptive nature of terms like ecological equivalence and no net loss through exploration of the metrology that underscores their mobilization (Robertson, 2000, 2004; Sullivan, 2013; Carver & Sullivan, 2017). As had been my original but unrealizable intention with this work, critical work going forwards within political ecology and cognate disciplines needs to focus its efforts on documenting and drawing attention to the political economy and social impacts of such schemes through detailed case study analysis, as they continue to be implemented in Colombia and beyond.

Part of this work sought to explicitly engage with the ontological primacy of labour when conceptualizing and empirically exploring the material and symbolic production of nature (Ekers & Loftus, 2013). However, as noted earlier in the text, the sluggish roll out of the Manual (2012) meant that the focus of Chapter 5 remained largely on the discursive, concerned with the cartographic production of metrology and early attempts to apply such frames on the ground. This of course represents only one aspect of a broader set of labour relations and forms of work, which include activities orientated toward material interventions, often but not exclusively, necessary for the production of state sanctioned equivalence (e.g. the erection of borders, the removal of invasive species, and environmental management under the rubric of ecological restoration/recuperation). The ongoing proliferation of offset governance regimes, which when operational are premised on these forms of work, provide opportunities to link up empirical engagement with such polices through emerging work on the geographies of 'green' labour and precarity in the 'green economy' (see Castellini, 2019; Neimark *et al*., 2020). While not making this direct connection, recent work by Apostolopoulou, Greco & Adams (2018) has partially echoed this call in asserting the need for greater empirical work that engages with forms of class-based offset analysis, capable of providing insight into the extent to which labour exploitation feeds into the realization of offset imaginaries, especially in the Global South.

This research has sought to re-centre the state within critical discussions regarding the roll out of forms of market-based environmental governance, which have sometimes framed the use of markets as indicative of a 'roll back' of the state (e.g. Holmes, 2015). While there have been recent attempts to utilize the SRA in the realms of political ecology and critical studies on environmental/resource governance (see Andreucci, 2017; Andreucci & Radhuber, 2017; Brand & Wissen, 2018), there remains much potential to advance the use of neo-Marxian relational approaches to the state in combination with the insights of an evolving discipline of political ecology. Indeed, as Loftus (2020) has argued during a recent review on the application of state theory in the field, in comparison to existing conceptual frameworks that have been applied empirically, Jessop's approach represents one of most advanced efforts to incorporate insights from both the (neo-)Marxian and Foucauldian critical traditions of state theory. As both Parenti (2015) and Nightingale (2018) have recently emphasized, critical engagement with the state (and state theory) is of critical import for political ecologists in the face of a multitude of entwined socio-ecological crises, which collectively constitute the present

Anthropocene moment. The centrality of states as relational and strategic terrains, which mediate and produce space, nature, and territory, points to a need for concerted effort to interrogate sites of strategic potential available to disrupt, reconfigure, and repurpose state-mediated socio-ecological relations for progressive and more socially and environmentally just ends. The theorization and exploration of concrete cases that exhibit, or allude to, the potential for such outcomes requires ongoing critical engagement with the complexity and evolving character of state-nature relations.

Final Thoughts

This thesis has provided an in-depth exploration of Colombia's national biodiversity offset system beginning with its early formulation and ending with reflections on its initial phase of implementation. Lauded in the international conservation policy community as a major accomplishment, through extensive qualitative research, this work has documented the failures, regulatory realities, and socially regressive potential of offsetting as an emergent, evolving, and tension-ridden regime of socio-ecological governance. Arguably, the allure of offsetting as a public policy solution, and its proven capacity to establish alliances between a range of disparate institutional actors (or unlikely bedfellows), lies in its ability to simplify, re-order, and render governable the socio-ecological complexities of territory in the course of offering a distinctly conservative approach to environmental regulatory reform – serving the interests of various parties, albeit to differing extents.

Within the ensemble of formal state institutions that engage in practices of modern statecraft, side-lined and institutionally weaker environmental ministries battle to forward their organizational interests within the ideological confines and established social power relations that characterize capitalist states. For those that rally behind the expansion of offsetting, inside and beyond such strategic terrains, the mobilization of this policy framework represents a form of pragmatic and conciliatory advance, where the reproduction of specific accumulation regimes and limited support from state budgets shape the strategic calculations of actors within social structures that dictate the 'art of the possible'. Biodiversity offsetting policy is not inherently antithetical to the practice of conservation and the relative advancement of conservation interests; the diversion of value from productive capital toward NGOs and offset consultants will result in some piecemeal and strategic victories for particular alliances of social actors engaged in developing conservation programmes. However, such schemes muddy and obfuscate the inherently political nature of the activities of capital accumulation, which act as the driving motors of profound environmental change and socio-ecological injustice. As Sullivan (2017: 231) has deftly captured 'Through this strategy, the proliferation of attention, activity and strategies for creating offsets and offset markets seems at the same time to reduce engagement with the causes of degradation underscoring the apparent need for offsets'. In this way, offsetting serves to affirm the legitimacy and perpetuation of an existing, and deeply problematic, political and economic status quo. Repurposing a line from Swyngedouw (2015: 139), one can understand the ongoing adoption and international proliferation of biodiversity offsetting as a form of 'socio-ecological fix that simultaneously ensures that nothing fundamental changes in socio-ecological structures'.

In a TED-X event recorded back in April 2016, Kerry ten Kate, of the influential (but now defunct) BBOP network of offset advocates, delivered a characteristically sanguine TED-style presentation, where she encouraged the event's assembled audience to 'think net positive' in the face of overwhelming estimated rates of biotic decline (ten Kate, 2016). During the course

of the prepared speech, she outlines some basic concepts that have come to constitute the policy jargon of offsetting (such as the mitigation hierarchy, no net loss, and residual impacts) before moving on to discuss a much-publicised voluntary offset arrangement undertaken by the Rio Tinto mining company in Madagascar. Ten Kate discusses these compensatory measures as an exemplar of best practice, showing the promise and integrity of offsetting when properly managed and executed, leaving the audience with the impression that the scheme has been an overwhelming and uncontroversial success. But as recent work by NGOs and academics have detailed, the very project she describes has been characterized by pernicious and inequitable social impacts on rural communities affected by its implementation (Kill & Franchi, 2016; Bidaud *et al*., 2017). Moreover, as analysis has shown, the offset does not even abide by the ecological equivalence framing she advocates (Kill & Franchi, 2016). As a World Rainforest Movement and Re:common report documents, 'communities that were struggling already before are now facing an increased risk of hunger and deprivation as a direct result of a biodiversity offset benefitting one of the world's largest mining corporations' (*Ibid.*: 45). For me, here lies one of the central issues with the international expansion of offsetting. In trying to 'think net positive', and through the construction of deceptive discursive categories, offset schemes seem to engender an acceptance, or wilful ignorance, of the harsh social and environmental realities that haunt the onward march of late capitalist development.

Appendix 1: Research Interview Details

Interview number and date	Organization Type	Number of participants	Interviewee number	Location
1. 30/09/2016	NGO	2	1 2	Bogota
2. 30/09/2016	National state environmental institution	2	3 4	Bogota
3. 11/10/2016	NGO	1	5	Bogota
4. 13/10/2016	Private consultancy firm	1	6	Bogota
5. 12/10/2016	NGO	2	7 8	Bogota
6. 14/10/2016	Foreign aid organization & NGO	1	9	Bogota
7. 19/10/2016	NGO	2	10 11	Bogota
8. 21/10/2016	NGO	1	12	Bogota
9. 27/02/2017	Private consultancy firm & national state environmental institution	1	13	Bogota
10. 07/03/2017	Private consultancy firm	1	14	Bogota
11. 08/03/2017	National state environmental institution & environmental licence holder	1	15	Bogota
12. 09/03/2017	Private consultancy firm	1	16	Bogota
13. 10/03/2017	National state environmental institution	3	17 18 19	Bogota
14. 13/03/2017	Private consultancy firm	1	20	Bogota
15. 15/03/2017	Private consultancy firm	1	21	Bogota
16. 18/08/2017	Private consultancy firm	1	22	Bogota
17. 23/08/2017	Private consultancy firm	1	23	Bogota
18. 01/09/2017	Private business association	1	24	Bogota
19. 12/09/2017	Think tank	1	25	Bogota
20. 14/09/2017	Private consultancy firm	1	26	Bogota
21. 25/09/2017	Private consultancy firm	1	27	Medellin
22. 26/09/2017	Private consultancy firm	1	28	Medellin
23. 27/09/2017	Private consultancy firm	1	29	Medellin
24. 28/09/2017	NGO	2	30 31	Medellin
25. 01/10/2017	Private consultancy firm	3	32 33 34	Bogota
26. 17/10/2017	Private consultancy firm	1	35	Bogota
27. 17/10/2017	Private consultancy firm	1	36	Bogota
28. 25/10/2017	Private consultancy firm	1	37	Bogota
29. 25/10/2017	NGO	2	38 39	Bogota
30. 26/10/2017	Private consultancy firm	1	40	Bogota
31. 30/10/2017	Private consultancy firm	1	41	Bogota
32. 01/11/2017	Private consultancy firm	1	42	Bogota

33. 01/11/2017	Private consultancy firm	1	43	Bogota
34. 29/11/2017	Environmental licence holder & private consultancy firm	1	44	Bogota
35. 04/12/2017	Private consultancy firm	1	45	Bogota
36. 05/12/2017	Private consultancy firm	4	46 47 48 49	Bogota
37. 06/12/2017	Private consultancy firm	1	50	Bogota
38. 07/12/2017	Private consultancy firm	3	51 52 53	Bogota
39. 22/12/2017	NGO & private offset provider	1	54	Bogota
40. 23/01/2018	Private consultancy firm	1	55	Bogota
41. 23/01/2018	Think tank	1	56	Bogota
42. 23/01/2018	NGO	1	57	Bogota
43. 25/01/2018	Private consultancy firm	1	58	Bogota
44. 26/01/2018	NGO	1	59	Bogota
45. 26/01/2018	Private consultancy firm	1	60	Bogota
46. 31/01/2018	Private consultancy firm	5	61 62 63 64 65	Bogota
47. 31/01/2018	Environmental licence holder	2	66 67	Bogota
48. 31/01/2018	Private consultancy firm	1	68	Bogota
49. 02/02/2018	National state environmental institution	2	69 70	Bogota
50. 06/02/2018	Private consultancy firm	1	71	Barranquilla
51. 07/02/2018	Regional state environmental institution	1	72	Barranquilla
52. 07/02/2018	Regional state environmental institution	1	73	Barranquilla
53. 08/02/2018	Private consultancy firm	1	74	Barranquilla
54. 08/02/2018	Environmental licence holder	3	75 76 77	Santa Marta
55. 15/02/2018	National state environmental institution	2	78 79	Bogota
56. 21/02/2018	Environmental licence holder & national state environmental institution	1	80	Bogota
57. 23/02/2018	NGO	2	81 82	Medellin
58. 27/02/2018	Public university (academic)	1	83	Bogota
59. 01/03/2018	National state environmental institution	1	84	Bogota
60. 02/03/2018	National state environmental institution	1	85	Bogota

61. 06/03/2018	National state environmental institution	2	86 87	Bogota
62. 07/03/2018	National state environmental institution & environmental licence holder	1	88	Bogota
63. 12/03/2018	Environmental licence holder & private consultancy firm	1	89	Medellin
64. 12/03/2018	Public university (academic)	1	90	Medellin
65. 13/03/2018	Regional state environmental institution	2	91 92	Bogota
66. 14/03/2018	NGO	1	93	Bogota
67. 15/03/2018	National state environmental institution	1	94	Bogota
68. 15/03/2018	National state environmental institution & environmental licence holder	1	95	Bogota
69. 21/03/2018	Regional state environmental institution	2	96 97	Valledupar
70. 22/03/2018	Environmental licence holder	1	98	Barranquilla
71. 23/03/2018	Private consultancy firm	1	99	Medellin
72. 23/03/2018	Regional state environmental institution	1	100	Medellin
73. 27/03/2018	Regional state environmental institution	2	101 102	Bogota
74. 27/03/2018	NGO	1	103	Bogota

Appendix 2: Information Sheet and Consent Form Shared with Participants

Guy Crawford,
Centro del Medioambiente,
Universidad de Lancaster,
Lancaster, LA1 4YQ,
Reino Unido
___/___/2018

Número de Identificación de Participante:

FORMULARIO DE AUTORIZACIÓN

EL NEXO DESARROLLO-CONSERVACIÓN COLOMBIANO: COMPENSACIONES POR PÉRDIDA DE BIODIVERSIDAD

A través de la recolección de datos básicos de entrevistas y análisis de documentos, esta investigación buscar explorar la teoría y la práctica de las compensaciones por pérdida de biodiversidad en Colombia.

1. Confirmo que he leído y entendido este formulario de autorización con fecha __/__/2018. He tenido la oportunidad de considerar la información, de realizar preguntas y he comprendido las respuestas obtenidas. ☐
2. Entiendo que mi participación es voluntaria y soy libre de retirarme en cualquier momento antes o durante la entrevista sin justificación alguna. ☐
3. Entiendo que puedo retirarme del estudio después de que la entrevista haya sido completada siempre y cuando la solicitud ocurra dentro de las dos semanas siguientes a la fecha de la entrevista. ☐
4. Entiendo que alguna de la información suministrada de mi parte pueda ser usada para presentaciones, reportajes o artículos académicos por el investigador. ☐
5. Entiendo que mi nombre no aparecerá en ningún reportaje, artículo o presentación. ☐
6. Acepto participar en el presente estudio. ☐

_____	_____	_____
Investigador	Fecha	Firma

Una copia de este formulario se dará al participante y el original será archivado por el equipo de investigación en: Oficina LEC A30, Universidad de Lancaster.

Este estudio ha sido aprobado por el Comité de Ética de Investigación de la Universidad de Lancaster. Si tiene alguna reclamación, puede contactar al Profesor Kevin Jones, Director del Centro del Medioambiente, Universidad de Lancaster: (+44) 1524 510230

Guy Crawford,
Centro del Medioambiente,
Universidad de Lancaster,
Lancaster, LA1 4YQ,
Reino Unido
___/___/2018

Número de Identificación de Participante:

INFORMACIÓN PARA LOS PARTICIPANTES

EL NEXO DESARROLLO-CONSERVACIÓN COLOMBIANO: COMPENSACIONES POR PÉRDIDA DE BIODIVERSIDAD

Esta investigación busca explorar la teoría y la práctica del sistema de compensaciones por pérdida de biodiversidad en Colombia. Esta política nacional representa uno de los sistemas de compensación ambiental más avanzados en el mundo, debido al objetivo de equivalencia ecológica entre pérdida y ganancia de biodiversidad. Este proyecto pretende examinar la arquitectura institucional del sistema y entender las experiencias de los actores involucrados y afectados. Para lograr este objetivo, el estudio emprenderá una serie de entrevistas con actores relevantes. Usted (o su organización) ha sido invitado para participar en este proyecto porque tiene una relación con este sistema. Debe entenderse que su participación es voluntaria y es libre de retirarse en cualquier momento antes o durante la entrevista sin dar una explicación. Si decide terminar la entrevista o retirarse del estudio durante un máximo de dos semanas después de la entrevista, los datos serán destruidos. Después de este punto, los datos se quedarán en el estudio. Un resumen de los resultados será disponible para todos los participantes.

Aunque la información que usted ha dado podrá utilizarse para publicaciones académicas, se garantiza que su nombre no aparecerá en ningún reportaje/artículo académico o presentación que podría derivar de esta investigación. La confidencialidad y el anonimato son garantizados; los nombres de los participantes serán hechos anónimos y si se solicita, el nombre de su organización no será usado. Cuando sea permitido, los datos de las entrevistas serán grabados de manera digital y serán trasladados inmediatamente del dispositivo de grabación a un dispositivo de almacenamiento protegido con contraseña para ser encriptados. Poco después este material de audio se transcribirá y los archivos de textos serán también encriptados; los archivos de audio originales serán destruidos. Todos los datos obtenidos podrían ser utilizados para investigaciones futuras. No existen riesgos o desventajas en tomar parte de esta investigación al ser esta revisada y aprobada por el Comité de Ética de Investigación de la Universidad de Lancaster. Esta investigación está financiada por el Economic & Social Research Council (ESRC), entidad encargada de la financiación para la investigación en Ciencias Sociales del Reino Unido.

Una copia de este formulario se dará al participante y el original será archivado por el equipo de investigación en: Oficina LEC A30, Universidad de Lancaster.

Este estudio ha sido aprobado por el Comité de Ética de Investigación de la Universidad de Lancaster. Si tiene alguna reclamación, puede contactar al Profesor Kevin Jones, Director del Centro del Medioambiente, Universidad de Lancaster: (+44) 1524 510230

Appendix 3: Approved Compensation Plans

Environmental Licence Code	Region	Sector	Resolution Approving Each Concrete Offset Plan
1. **LAM4340**	Casanare	Hydrocarbon	*RESOLUCIÓN N° 02339 (28 de noviembre de 2019)* *"Por la cual se aprueba un Plan de Compensación Forestal por Pérdida de Biodiversidad y se toman otras determinaciones"*
2. **LAM0263**	Antioquia, Santander	Hydrocarbon	*RESOLUCIÓN N° 01930 (26 de octubre de 2018)* *"Por la cual se evalúa un plan de compensación por pérdida de biodiversidad"*
3. **LAM0674**	Caldas, Cundinamarca, Tolima	Hydrocarbon	*RESOLUCIÓN N° 00850 (07 de junio de 2018)* *"Por la cual se aprueba un Plan de Compensación Forestal por Pérdida de Biodiversidad y se toman otras determinaciones"*
4. **LAM3836**	Antioquia	Infrastructure	*RESOLUCIÓN N° 00471 (06 de abril de 2018)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
5. **LAM6397**	Valle de Cauca	Infrastructure	*RESOLUCIÓN N° 00998 (03 de julio de 2018)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad"*
6. **LAM6705-00**	Tolima, Quindío	Infrastructure	*RESOLUCIÓN N° 00774 (08 de mayo de 2019)* *"Por la cual se modifica el Plan de inversión forzosa de no menos del 1% y se evalúa un Plan de compensación por pérdida de biodiversidad y se toman otras determinaciones"*
7. **LAM4409**	Cundinamarca	Infrastructure	*RESOLUCIÓN N° 01560 (05 de agosto de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad"*
8. **LAM6577-00**	Valle de Cauca	Infrastructure	*RESOLUCIÓN N° 01450 (04 de septiembre de 2018)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad"*
9. **LAV0055-00-2016**	Bolívar	Infrastructure	*RESOLUCIÓN N° 02039 (14 de noviembre de 2018)*

			"Por la cual se evalúa un Plan de Compensación por pérdida de biodiversidad, y se toman otras determinaciones"
10. **LAV0088-00-2015**	Magdalena	Energy	*RESOLUCIÓN N° 01392 (16 de julio de 2019)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
11. **LAV0064-00-2015**	Atlántico	Infrastructure	*RESOLUCIÓN N° 00470 (06 de abril de 2018)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y toman otras determinaciones"*
12. **LAV0031-00-2016**	Caldas	Infrastructure	*RESOLUCIÓN N° 00192 (18 de febrero de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad"*
13. **LAV0026-00-2017**	Nariño	Infrastructure	*RESOLUCIÓN N° 01256 (02 de julio de 2019)* *"Por la cual se evalúa un plan de inversión del 1% y el Plan de Compensación por Pérdida de Biodiversidad"*
14. **LAV0071-00-2015**	Antioquia	Infrastructure	*RESOLUCIÓN N° 00613 (30 de abril de 2018)* *"Por la cual se aprueba un Plan de Compensación Forestal por Pérdida de Biodiversidad y se toman otras determinaciones"*
15. **LAV0031-00-2017**	Antioquia	Infrastructure	*RESOLUCIÓN N° 00194 (18 de febrero de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad"*
16. **LAV0011-00-2017**	Cordoba	Infrastructure	*RESOLUCIÓN N° 00321 (08 de marzo de 2019)* *"Por la cual se evalúa un plan de compensaciones por pérdida de biodiversidad"*
17. **LAV0059-00-2016**	Tolima	Infrastructure	*RESOLUCIÓN N° 01871 (18 de septiembre de 2019)* *"Por el cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
18. **LAV0073-00-2015**	Cundinamarca, Meta	Infrastructure	*RESOLUCIÓN N° 01614 (15 de agosto de 2019)*

			"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad y se tomas otras determinaciones"
19. **LAV0074-00-2015**	Meta	Infrastructure	*RESOLUCIÓN N° 01937 (26 de septiembre de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad y se tomas otras determinaciones"*
20. **LAV0032-00-2017**	Sucre	Infrastructure	*RESOLUCIÓN N° 00791 (13 de mayo de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
21. **LAV0019-00-2015**	Caldas	Infrastructure	*RESOLUCIÓN N° 00698 (29 de abril de 2019)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
22. **LAV0053-00-2017**	Córdoba	Infrastructure	*RESOLUCIÓN N° 00705 (29 de abril de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad"*
23. **LAV0068-14**	Sucre	Infrastructure	*RESOLUCIÓN N° 00258 (09 de marzo de 2017)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
24. **LAV0056-00-2016**	Cordoba	Infrastructure	*RESOLUCIÓN N° 01540 (12 de septiembre de 2018)* *"Por la cual se evalúa un plan de compensaciones por pérdida de biodiversidad"*
25. **LAV0095-00-2015**	Antioquia	Infrastructure	*RESOLUCIÓN N° 01901 (23 de octubre de 2018)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad"*
26. **LAV0084-00-2015**	Tolima	Infrastructure	*RESOLUCIÓN N° 01373 (22 de agosto de 2018)* *"Por la cual se evalúa unos planes de inversión del 1% y de compensaciones por pérdida de biodiversidad"*
27. **LAV0068-00-2015**	Cundinamarca, Caldas	Infrastructure	*RESOLUCIÓN N° 01000 (03 de julio de 2018)*

			"Por la cual se evalúa un Plan de compensaciones por pérdida de biodiversidad"
28. **LAV0020-00-2016**	Caldas	Infrastructure	*RESOLUCIÓN N° 01976 (02 de octubre de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad y se adoptan otras disposiciones"*
29. **LAV0041-14**	Bolivar	Infrastructure	*RESOLUCIÓN N° 00956 (04 de junio de 2019)* *"Por la cual se aprueba un plan de compensación del componente biótico y se toman otras determinaciones"*
30. **LAV0060-00-2016**	Santander	Infrastructure	*RESOLUCIÓN N° 01176 (20 de junio de 2019)* *"Por la cual se evalúa un Plan de Compensación por Pérdida de Biodiversidad"*
31. **LAV0105-00-2014**	Cesar	Hydrocarbon	*RESOLUCIÓN N° 02312 (12 de diciembre de 2018)* *"Por la cual se evalúa un plan de compensación por pérdida de biodiversidad"*
32. **LAM6626-00**	Bolivar	Infrastructure	*RESOLUCIÓN N° 00476 (06 de abril de 2018)* *"Por la cual se aprueba un Plan de Compensación Forestal por Pérdida de Biodiversidad y se toman otras determinaciones"*
33. **LAM6843-00**	Atlantico	Infrastructure	*RESOLUCIÓN N° 00338 (31 de marzo de 2018)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
34. **LAM4221**	Tolima	Infrastructure	*RESOLUCIÓN N° 00667 (08 de junio de 2017)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*
35. **LAV0060-00-2015**	Risaralda	Infrastructure	*RESOLUCIÓN N° 00688 (10 de mayo de 2018)* *"Por la cual se aprueba un Plan de Compensación por Pérdida de Biodiversidad y se toman otras determinaciones"*

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