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Protecting Nature in Federal Systems: States, Private Interests, and Conservation Units in Brazil

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Protecting Nature in Federal Systems: States, Private Interests, and Conservation Units in Brazil

By

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Abstract

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This research addresses the decentralization of policy making. Much of the literature argues that decentralization is more efficient because local policy makers are more responsive to local demands than are national policy makers. However, I find that centralization often provides greater environmental policy effectiveness. While both national and subnational tiers of government must weigh economic growth against environmental goals, the balance of these conflicting goals is different for subnational than for national governments. Through an empirical analysis of the location, type, and degree of implementation of federal and state conservation units (*unidades de conservação*, or UC) in Brazil, I argue that political incentives to establish more or less strict types of conservation units differ across levels of government due to the character and political influence of local economic interests. Two key variables explain variation in conservation unit types: the *tier of government* – national or subnational – enacting a conservation unit, and the *type of industry* present where a conservation unit is proposed, as well as the importance of that industry in the economy of the state. National governments have a geographically broader mandate, and so are less vulnerable to capture by local economic interests that oppose environmental policy than are subnational governments. Further, subnational governments are more dependent on local economic interests for revenue and income generation. As a result, subnational environmental protection is often weaker than national environmental protection, because subnational governments accommodate the interests of powerful local economic actors. Nevertheless, the stringency of environmental policy and outcomes vary across subnational jurisdictions, depending on the type of industry present in an area and the industry's importance in the jurisdiction. Areas characterized by industries that require complete land conversion in order to produce – including urban development, ranching, and modern agriculture – pose considerable challenges to conservation efforts. In contrast, areas characterized by industries that do not require complete land conversion – including timber and mining firms, as well as small-scale "traditional" extractivism (e.g. rubber tapping, fruit gathering), are more amenable to compromises between environment and development.

I make this argument first on the basis of an analysis of federal and state UC creation and implementation across all of Brazil's 26 states and Federal District of Brasília (Chapter 2). I then analyze in depth three Brazilian states located in two regions of the country: Pará (Chapter 3) and Amazonas (Chapter 4), in the Amazon rainforest in Brazil's north; and Minas Gerais (Chapter 5), which straddles the arid Cerrado savannah and the Atlantic forest, in Brazil's southeast. Brazil is a particularly good country in which to compare national and subnational environmental policy because the federal and state tiers of government in the country have common authority to establish and manage UCs, and operate under the same federal law. I chose these three states to maximize variation in region, state-federal relationships, and strength of industries that require complete land conversion.

My findings are based on 15 months of field research in Brazil, and build on data from over 90 interviews with key informants, large-N datasets of UC creation and management, and Geographic Information Systems (GIS) spatial data to analyze UC proximity to or overlap with population centers and different types of economic activities. GIS and large-N data sets facilitate broad comparisons across Brazil's 312 federal and 600 state UCs, while key informant interviews provide historical background on national and state politics, as well as individual UCs. The conclusions drawn hold implications for debates about the advantages and disadvantages of decentralization for environmental policy effectiveness, as well as the challenges that federal democracies face in defining and implementing environmental policy goals across multiple tiers of government.

I dedicate this book to
my parents, Jan and Gordy,
my sister, Rebecca,
and my nephew, Odin.

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Field research can be a solitary endeavor, but several people made my time in Brazil enjoyable. Good friends and colleagues at IPEA and the University of Brasília made field research in Brazil fun. Igor Ferraz da Fonseca generously invited me to participate in his research, and our collaboration on an article from 2010 to 2012 was a true pleasure. Félix Lopez kindly invited me to stay in the spare room of his apartment in Asa Sul, rent-free, for five months. Constantino Cronemberger Mendes gave me sage advice at several points along the way, both in Brasília and later, while he was in residence at UC Berkeley. Tânia Monteiro helped me navigate IPEA's bureaucracy and along the way became a friend. Igor Brandão is a great friend and an equally valuable sounding board about the challenges of researching environmental politics in Brazil. Finally, I owe a deep debt of gratitude to the more than 90 Brazilian scholars, bureaucrats, and activists who took time out of their busy schedules to speak with me.

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Chapter 1. The Importance of Tier of Government and Local Economic Geography in the Creation of Federal and State Conservation Units in Brazil

The Argument in Brief

As global climate change and the exhaustion of natural resources threaten the web of life and humanity's place in it, activists, politicians, and scholars have turned their attention to delineating the best ways to protect the environment. Preventing deforestation and accompanying biodiversity loss is key to this task. According to *National Geographic*, "seventy percent of Earth's land animals and plants live in forests," and many species cannot survive losing their habitats ("Deforestation" 2015). Deforestation also contributes to global greenhouse gas emissions, a main driver of climate change: Trees absorb carbon dioxide from the atmosphere and produce oxygen. The clearing of tropical forests – often to make way for cattle ranching, agriculture, or urban growth – released an average of 3.0 billion tons of carbon dioxide per year from 2000 to 2005 – equal to about 10% of global carbon emissions (Winrock International and Woods Hole Research Center 2012, 6).

The crucial issue of reducing deforestation to prevent biodiversity loss and climate change raises several governance questions, one of which is whether policies to protect biodiversity in the long run are best carried out by central or local governments. I argue that all else equal, central governments have potential to enact more aggressive environmental policies than subnational governments generally do, because the former have looser ties to local economic and political interests than the latter do. Subnational governments, in contrast, often have closer ties to local elite economic firms and groups, and so are more likely to tailor environmental policy to these groups' interests. I support this argument with evidence from Brazil.

In all democracies, politicians and bureaucrats are under pressure from electorates to promote economic growth, which may cause environmental harm. Given this growth imperative, scholars are divided on the merits of decentralization for all types of policy, including economic, social, and environmental. Some analysts expect decentralization under democratic regimes to generate better policy outcomes, through subnational governments' greater use of local knowledge in policy making (Hayek 1945, Scott 1998), willingness to experiment with different policy models (Greve 2001), and provision of more opportunities for citizens to participate in decision making (e.g. World Bank 2001, Zamboni 2007). But other literature finds that subnational governments are under particular pressure to compete for mobile capital and maximize local growth, while central governments have broader social concerns. These scholars argue that decentralization may exacerbate corruption and reinforce the power of local elites (Molotch 1988, Peterson 1981), to the detriment of non-elite sectors of society and possibly natural environment, as well. Through a comparative study of environmentally protected area creation and implementation by both the federal government and four subnational governments in a decentralized, federal democracy – Brazil – I extend Peterson and Molotch's logic to environmental policy. In contrast to much prior environmental politics literature that focuses on the preferences and strategies of scientists, activists, non-governmental organizations (NGOs), and change agents within state institutions (e.g. Hochstetler and Keck 2007, Steinberg 2001); I find that variation in conservation outcomes across subnational jurisdictions is better explained by the power resources and preferences of potential opponents of environmental policy – i.e. dominant industries in each subnational jurisdiction – and

by the tier of government responsible for enacting conservation policy – i.e. national or subnational. By focusing on the power resources and preferences of potentially ecologically destructive industries, I draw implications for the efficacy of conservation units created and managed by different tiers of government.

I examine the creation and implementation of environmental conservation units using three measures, which together operationalize my outcome of interest: First, the type, or *stringency*, of conservation unit – strict protection (a conservation unit with more stringent rules of use) or sustainable use (a more permissive area meant to reconcile conservation with certain types of economic development). I code Brazilian conservation units as *strict*, *moderately strict*, *moderately permissive*, and *permissive*, based on the legal restrictions they impose on human activity within their borders. Second, I evaluate the *location* of conservation units in relation to significant economic activities. And third, I discuss the *degree of implementation* of management institutions on the conservation unit, including management council establishment and publication of a management plan. Together, these measures indicate the degree to which the government responsible for conservation units – federal or subnational – expends political capital to protect the environment. All else equal, stringent conservation units impose greater restrictions on economic activities, and so are harder to enact on lands coveted by land intensive industries. But it is in contentious areas that strict protection conservation units have the potential to make the most difference to deforestation rates. Under what conditions, then, are governments more likely to enact strict units – and under what conditions are more likely to enact more permissive types of units?

I argue that political incentives to establish more or less stringent conservation units differ across tiers of government, due to the character and political influence of local economic interests. Two key variables explain variation in conservation unit types: the *tier of government* – national or subnational – enacting a conservation unit, and the *type of industry* present where a conservation unit is proposed, as well as the importance of that industry in the economy of the state. In this study, I demonstrate three points: First, all else equal, national governments enact stricter conservation units than subnational governments. Second, all else equal, national governments do so in more politically contentious locations than subnational governments. Third, the reason that national governments enact stricter conservation units, and do so in more contentious locations, is that subnational governments are more responsive to the preferences and demands of local industries – including ecologically destructive industries – than national governments are. Subnational government responsiveness to ecologically destructive industries is greater when the industries constitute a larger part of the subnational jurisdiction's economy, and if the subnational government is dependent on the industry for jobs and economic growth. Although national governments also respond to industrial preferences in crafting environmental policies, industry lobbying is better offset by environmental lobbying at the national than it is at the subnational level. National governments often can, therefore, count on more organized support for stronger environmental policies than subnational governments can.

In the political process of creating conservation units, there are environmental interests that favor conservation, and vested economic interests that may oppose it. Each has a set of power resources and strategies that differ at the two levels of government. While the power resources of environmental and vested economic interests are more equal at the national level of government, they are more unequal at the subnational level – and the asymmetry of influence at the subnational level favors vested economic interests.

I argue that subnational governments respond more effectively to major local industries

than national governments do – and subnational governments often do so to the detriment of environmental interests. Subnational governments, I argue, are more dependent on these concentrated, organized vested interests than is the national government, and so they seek to reconcile conservation with the preferences of these interests, including those that may be ecologically destructive. At the same time, organized environmental interests are often diffuse and have a national or international – rather than a local – constituency, and so lobby more effectively at the national than at the subnational level.

I argue that vested economic interests are more effective at shaping the actions of subnational than national governments for two reasons: First, because they generate employment and revenue, so the state government may be more dependent on them than the federal government is. Second, vested economic interests often lobby intensively, funding political campaigns, providing expertise to policy makers, threatening to withhold investments, and/or nominating their own candidates for election. Because these interests are more important to subnational districts' economies than to the national economy, subnational governments are more likely to tailor policy to these firms' preferences than the national government is. The upshot is that subnational governments may find it difficult to resist pressure from private firms – and given that these firms create jobs and income, subnational governments may not *want* to oppose them.

Vested economic interests are also often located in or near to areas slated for proposed conservation units or other forms of environmental protection. These interests may, therefore, be directly affected by environmental protection, and have incentives to exert pressure on both subnational and national governments in order to loosen, or outright oppose, environmental policies that could limit these firms' access to natural resources. But vested economic interests' pressure is more effective at the subnational than at the national tier, due in large part to their importance to the subnational district's economy – and to the fact that environmental groups lobby more effectively at the national tier of government.

Unlike vested economic interests, which are concentrated and lobby at both levels of government, environmental groups constitute dispersed, diffuse interests that accumulate at the national level. In contrast to vested economic interests, environmental groups tend to have diffuse interests. While firms and industry associations care primarily about investment opportunities and profits, environmental groups – whether organized as social movements or as non-governmental organizations (NGOs) – care about a variety of issues related to the environment and sustainability. These issues may include pollution, climate change, deforestation, and the preservation of endangered species. These diverse issues lead different environmental organizations to specialize in different issues and strategies, and prevent the movement as a whole from coalescing around one single issue or strategy. While there are thousands of environmentally-focused NGOs in Brazil, for instance, few of these work directly with conservation units – and even those that do work with conservation units do so as part of a broader political strategy dealing with conservation. Hence environmental interests are diffuse.

Environmental groups are also often physically *distant* from conservation units. Many environmentalists – that is, individuals who believe that some degree of environmental protection is necessary – live in regional capital cities, nationally important cities, or abroad; rather than in or near to natural areas slated for conservation units. In Brazil, for instance, much of the area of conservation units is located in the Amazon. Of the few major environmental NGOs that work with Amazon conservation units, none are headquartered *in* or *near* to conservation units: Instead, several are headquartered in nationally important cities, including São Paulo, Rio de Janeiro, and Belo Horizonte. Others are headquartered in Amazonian state capitals, including Belém, Pará, and

Manaus, Amazonas. NGOs with sufficient resources and personnel may open local offices in or near some conservation units, but the bulk of personnel and strategies are developed at a distance.

Being distant from conservation units, and having diffuse priorities, environmental interests have strong incentives to seek allies across state and national borders. Doing so encourages these groups to adopt policy platforms and lobbying strategies that can cover more than one jurisdiction, and so environmental interests are better suited to lobbying national governments and international organizations, rather than investing significant resources into swaying the preferences of subnational governors or mayors. Therefore, it is at the highest tier of government – the national tier – that environmental NGOs are best able to offset lobbying by organized vested economic interests. The upshot is that environmental interests – and the preservation of natural areas – may benefit from at least some degree of centralization of policy making in the national government, rather than complete policy decentralization.

With respect to conservation policy, and specifically to the establishment of conservation units in developing countries such as Brazil, I argue that vested economic interests exert a strong influence over conservation unit negotiations – and that these interests are stronger when the subnational, rather than the national, government is creating the protected area. Consequently, while subnational governments do feel that they need to respond to demands from international, national, and local environmental groups, they seek to reconcile environmental demands with the needs of major local industries – and subnational efforts to reconcile competing interests yield on average weaker environmental policy at the subnational than at the national level of government.

My study employs a subnational comparative design (Snyder 2001) to evaluate political incentives and outcomes in one policy area across the federal and state tiers of government in three states in Brazil. This design provides me with several advantages over cross-national studies. By focusing on one policy area – conservation unit creation and implementation – I can compare outcomes across political jurisdictions, as well as across federal and state tiers of government within each jurisdiction. By comparing outcomes across *states* I gain leverage over the influence that different types of industries exert in different states. By comparing outcomes across *tiers of government*, meanwhile, I am able to evaluate the different preferences and actions of the federal and state governments in each state – and in some cases, on the same plots of land. By choosing subnational districts within one country, I gain some degree of control over national institutional and regime variables. Finally, by examining a policy area in which both the state and federal governments have authority, I can observe federal and state actions *during the same time periods*, rather than exclusively comparing currently decentralized to historically centralized policy making.

This chapter proceeds as follows: First, I examine the ongoing debate on decentralization, and I argue that determining the merits and demerits of decentralization for environmental policy requires a closer look at local economic geography – that is, the presence and political resources of key economic interests that may act as veto players in the policy process. Second, I propose a theory to explain variation in protected areas for the federal and state governments that builds on the empirical observation that the federal and state governments in Brazil differ in their relative proportions of more or less stringent categories of conservation units. Finally, I discuss the subnational comparative design and the selection of the four state cases examined in this study, and conclude with a brief discussion of how economic geography and environmental activism interact.

Policy Decentralization and Conservation in the Literature

Decentralization is "the downward transfer of resources, responsibilities, or authority from

national to subnational governments" (Falleti 2010, 1), and usually occurs over time and with different processes and outcomes in different countries (ibid.). There is disagreement in the literature regarding whether policy decentralization is good or bad for social, economic, and environmental outcomes. On the one hand, subnational governments can adapt policy to local needs, and promote policy innovation, because they have better access to local information than national governments do. On the other hand, vested economic interests may be more powerful at the subnational than the national level, resulting in subnational governments that are more prone to capture by such interests than their national counterparts are. With respect to environmental conservation policy, I argue that observers must pay close attention to the concentration and interests of potential veto players in subnational jurisdictions. In particular, the location, organization, and political influence of key industries in a subnational jurisdiction prior to the enacting of environmental policies influence the location, type, and degree of implementation of environmental conservation units.

Developing countries began to carry out decentralizing reforms in the 1980s. These reforms coincided with the demise of the authoritarian developmental state and the import substitution industrialization model in Latin America, and the onset of democratization and a neoliberal, market-oriented model of development that promoted a reduced role for the central state in fostering growth (Falleti 2010, 6). Scholars and multilateral institutions advocated for decentralizing reforms in developing countries, arguing that local governments are likely to be more sensitive to local needs than central governments are (World Bank 2001), and improve resource allocation efficiency through subnational competition (Tiebout 1956, Weingast 1995). Decentralization's detractors, meanwhile, argue that local governments often lack capacity to implement policy, and that they are more prone to corruption and capture by dominant interests than central governments. This section will evaluate these arguments, and assess their application to environmental conservation. It will then posit that to understand different patterns of federal and state conservation unit creation in one national setting, scholars must pay greater attention than they have so far to the location, needs, and organization of key economic interests.

Arguments in favor of decentralization date to Montesquieu and the American constitutional debate (Treisman 2007, 10), in which the anti-Federalists defended a decentralized polity in which local governments retained limited autonomy *vis-à-vis* the federal government, and therefore provided better representation to citizens (Kramnick 1987, 44-45). With respect to state performance, decentralization, according to these and later defenders, should increase administrative efficiency; cultivate more honest, efficient, and responsive government through local competition for mobile residents and capital; check central government abuses and protect individual freedoms; foster policy innovation through the use of local information most easily accessible to the local government; and reduce ethnic conflicts by satisfying demands for limited autonomy (Treisman 2007, 11-14). In addition, proponents of decentralization of forest governance argue, for mostly the same reasons, that local control over resources can reduce deforestation and resource exhaustion (for an overview of the literature, see Andersson and Gibson 2007; Larson and Soto 2008; Ostrom 1990; and Tacconi, Siagian, and Siam 2006).

These arguments make intuitive sense to the informed observer: Indeed, if information is decentralized and aggregation by central authorities is difficult (Hayek 1945, 519; Scott 1998), then local governments should be able to make better-informed policy decisions, as the quantity of information they must process is necessarily smaller than it is for a central government. Local governments should also employ local knowledge to embrace policy innovations (Greve 2001)

and/or adapt other jurisdictions' policy to local needs (Karch 2007), leading to overall better outcomes for firms and citizens than in a centralized state (Shah 1994, 1998).

However, the expected consequences of decentralization for environmental policy are less clear, as private firms may vote with their feet in response to onerous regulations: If firms can relocate from one subnational jurisdiction to another in a decentralized polity, then local governments have incentives to provide regulatory contexts (Oates 2002, 15-16) and public goods that firms favor. Whether or not firms favor restrictions on access to land for productive purposes depends on whether or not these firms require complete land conversion to produce.

Indeed, even decentralization's supporters admit that positive outcomes such as welfare enhancements and forest preservation can only be expected under stringent conditions, such that scholars can draw few if any sweeping generalizations about the virtues of decentralization. Shah (1998, Abstract), for example, argues that fiscal decentralization is "suitable" in developing countries only

> when [it is] supported by strengthening the rule of law, an independent central bank, an independent judiciary, a charter of rights, appropriate limits on various levels of government, institutions for conflict resolution and for the evaluation of government efforts at all levels, and mechanisms (including a free media) for listening and making government accountable to the citizenry.

Andersson (2006, 26) also identifies demanding necessary conditions for positive outcomes, including reconciling poverty reduction with forest conservation: popular participation, local governments that have high technical capacity and are downwardly accountable to natural resource users, and secure sources of funding. Even with such conditions in place, responsible environmental policy cannot be expected in all settings: As evidence from my case studies shows, states may be downwardly accountable to elite economic interests, rather than to poor, rural populations; and populations living in or near to forests may prefer jobs and economic development to forest preservation.

The stringent conditions for success show that there may be significant disadvantages to policy decentralization, including deterioration of economic, social, and environmental conditions in subnational jurisdictions. Decentralization may increase income disparities between wealthy and poor regions of a country, undermining of administrative efficiency and increasing corruption (Prud'homme 1995). In addition, decentralization may worsen policy outcomes because of subnational bureaucracies' lack of technical capacity, since central agencies tend to attract the most competent personnel (ibid., 210). Several scholars find that technical capacity, combined with accountability of local governments to their local constituents, is key to successful conservation outcomes in forest governance decentralization (Andersson 2006, 26). Where such capacity is lacking, local governments may make poor decisions with respect to managing fragile natural resources – or may be unable to implement or enforce good decisions. Finally, because subnational power is exercised in a narrower setting[1] than is national power, subnational governments may be more prone to capture by local economic elites than national governments are (Bardhan 2002, 193; Lowry 1992, 17; Molotch 1988; Peterson 1981), and the effects of decentralization on citizens' welfare and the preservation of natural resources depend on the extent to which local governments

[1] A "narrow setting" refers to a setting in which the scope of political conflict is narrow, and thus organized interests advocating for maintaining the status quo have the advantage: "Pressure for the status quo from private good interest groups, such as business and industry, is theoretically more effective at the state level than pressure for change from public good groups, such as environmentalists" (Lowry 1992, 16). In contrast, national politics features a wider scope of conflict, which by implication opens more space for different groups to participate and influence policy.

are free from elite capture (Bardhan and Mookherjee 2005, 702; Larson et al. 2007, 251).

The effects of elite capture on the creation and implementation of conservation units, I argue, depends on the type of industry present in a subnational jurisdiction: Where industries require complete land clearing to function, elite capture may lead to weakly enforced or no conservation units. In contrast, where industries do not require complete land clearing, then some compromise may be possible between environmental and vested economic interests, leading to permissive conservation units, and even some enforcement of them.

Given different industrial contexts in different subnational jurisdictions, prevailing theory argues that subnational governments' responsiveness to environmental concerns varies by *type* and by *cost*. First, by type, pollution that originates in one state but damages quality of life in a neighboring state – that is, pollution with primarily trans-boundary consequences – places the onus on the originating state to incur the costs and potentially reduced competitiveness of enacting more restrictive emissions standards, but does not provide sufficient incentives for that state to take action. Such problems, then – which include industrial- and energy-related air pollution, as well as river pollution originating in upstream states – may require central, national emissions standards to control. In this way, trans-boundary pollution problems suffer from similar scale differences between costs and benefits that much biodiversity conservation and climate change policy does: Those who benefit are often not the same as those who pay.

In contrast, with respect to pollution or other environmental harms that are only local – i.e. in which the consequences originate and remain within one political jurisdiction – citizens may appeal to their local government to reduce the contamination, and thereby improve the state's quality of life. In such cases, decentralized standard setting may suffice to improve environmental governance.

But the financial and political cost of addressing environmental issues also varies by subnational jurisdiction. State governments are more likely to respond when the financial cost of clean-up or environmental harm reduction is low enough that the state does not risk losing investments, than when the cost is higher.[2] States (like central governments) are also more likely to respond when environmentally conscious citizens have institutionalized or personal access to policy makers (Kelsey and Madden 2013, Klyza and Sousa 2008, Steinberg 2001 and 2005), or where opponents of prevailing practices are able to bring national or global attention to local environmental conflicts (Gibson 2005). Such personal connections and *boomerang* strategies (Keck and Sikkink 1998) raise the political cost of inaction. In such cases, in the absence of institutionalized mechanisms of participation, intervention from higher tiers of government, or of deleterious consequences for politically powerful industries directly attributable to deforestation – such as soil erosion that damages farming, or violent conflicts over land in regions with weakly institutionalized property rights – states are unlikely to be interested in investing political capital in reducing deforestation in the absence of sufficient public and federal pressures to do so.

Because environmental regulations may be economically and politically costly, federalism and decentralization have long been expected to produce an environmental "race to the bottom" among states competing for mobile investments. That is, to attract investment states will enact only lax environmental policies and underinvest in environmental protection (Oates 2002, 5).

Much econometric research examines this contention. Oates and Schwab (1988) and Wilson (1996) find that states do have incentives to choose lax environmental standards to attract

[2] Such states may then appeal to the federal government to institute national standards, in order to reduce their relative costs further and undermine the competitiveness of dirtier states.

mobile investment. Studies of new plant births in polluting industries find that firms take environmental regulations into account in locating new plants, often investing in sites with lower pollution levels that may have more lax regulations (Becker and Henderson 2000; Jeppesen, List, and Folmer 2002; List et al. 2003) and reducing manufacturing employment growth in jurisdictions with more stringent pollution standards (List and Kunce 2000). Similarly, devolution of environmental policy responsibility to subnational jurisdictions has been found to trigger "beggar they neighbor" patterns of underinvestment in environmental protection, especially when costs are borne locally and benefits are uncertain (List, Bulte, and Shogren 2002).

Scholars, however, have identified a great deal of heterogeneity in decentralized policy outcomes across countries and subnational jurisdictions. Some scholars have found mostly negative subnational outcomes: Bardhan and Mookherjee (2005) find that in developing countries, when local governments are not captured by private interests, decentralization of social policy delivery may improve cost-effectiveness compared to delivery by the central government. In contrast, Crook and Sverrisson (2001, iii) argue that responsiveness to the poor in decentralized developing countries is "quite a rare outcome... mainly associated with strong commitment by a national government or party to promoting the interests of the poor at the local level...." Larson et al. (2007, 251) find evidence that forest governance decentralization may increase local inequalities when not accompanied by redistributive policies and oversight of local authorities, but "needed changes rarely come about without specific organized demands of local actors' associations and movements." Indeed, non-elite residents of subnational jurisdictions may need to find allies in other jurisdictions and at the national tier of government to counterbalance the power of elites at the subnational tier (Gibson 2005, 128).[3]

On the other hand, some subnational jurisdictions do invest in ambitious environmental sustainability programs, which raises question of *why*? The answer lies with subnational industrial structures – states' competitive economic advantages. With respect to subnational competitive economic advantages, it stands to reason that jurisdictions whose firms favor environmental policies risk less political backlash from enacting such policies than jurisdictions whose firms oppose such policies. The former types of jurisdiction risk less in cleaning up pollution or in reducing other environmental harms caused by local industries than the latter do. Such states are likely either to have "green" industries, or "brown" industries that do not require complete land clearing to function. For example, American states such as California and Colorado, which have taken steps toward reducing carbon emissions and incorporating renewable sources into their energy grids, are relatively wealthy states with skilled labor from which firms are comparatively unlikely to flee. California's economy includes a formidable green technology sector that stands to benefit from progressive climate change legislation, and ranchers in eastern Colorado can earn money by building wind farms on their land (Kelsey and Madden 2013). New York, in which Republican Governor George Pataki vastly expanded environmental protections in the Adirondack State Park, has an economy driven by finance and an urbanized population heavily concentrated in New York City (Klyza and Sousa 2008). In contrast, emissions reduction policies or renewable energy standards have been more difficult to enact in poorer states such as Kentucky, North Dakota, or West Virginia, where land intensive industries such as coal mining and oil and natural

[3] "A basic theoretical insight is that provincial democratization is an outcome of the nationalization of subnational conflict. Local authoritarian elites strengthen boundaries that minimize outside involvement in provincial politics, while oppositions struggle to breach those boundaries and turn parochial struggles into national contests" (Gibson 2005, 128).

gas extraction dominate.[4]

This overview of states' incentives demonstrates that industrial and demographic structures matter to environmental policy outcomes in subnational jurisdictions. All tiers of government are sensitive to elite and popular demands for economic growth and job creation, but subnational governments, I argue, are more sensitive compared to national. All else equal, we should expect subnational environmental policies to demonstrate greater compromises with local dominant industries than national policies. Whether outcomes are positive or negative for biodiversity conservation or other environmental issues depends on a state's industrial structure at least as much as it does on institutional structures.

The Power of Business Interests in Decentralized Environmental Policy

In this and the following sections, I develop an argument based on business structural power (Culpepper 2010, Fairfield 2015, Hacker and Pierson 2002, Lindblom 1977) to explain variation in conservation unit creation across subnational jurisdictions. I argue that subnational environmental policy action is more contingent on what industries are present in a jurisdiction, and on how much forest clearing these industries need in order to produce, than national environmental policy is. The gap between subnational and national policy making reflects the observation that firms and industrial organizations exercise more influence at the subnational level than environmental organizations do.[5] Conversely, environmental organizations have certain organizational advantages at the national level that they lack at the subnational, rendering their ability to offset industrial organizations' interests greater at the national than subnational level.

Lindblom (1977) introduced the concept of business structural power when he argued that business occupies a privileged position in policy making, because "governments in market societies depend on business to invest and produce in ways that foster collective prosperity" (Fairfield 2015, 42). While prior literature had concentrated on business *instrumental* power – that is, the political resources that firms have to influence policy making, including lobbying, partisan linkages, personal relationships with policy makers, and candidate recruitment (see ibid., 28-42) – Lindblom's concept of *structural* power relates to the investment decisions that firms may make in response to public policies (ibid., 42). Firms exercise structural power by threatening to disinvest in response to policy proposals that they oppose – and potentially by disinvesting if the policy is passed (ibid., 43). Business structural power operates via policy makers' anticipations of private

[4] While the Obama administration has worked to enact climate change legislation and promote green energy alternatives, politicians from both major parties in these states oppose federal policies that would harm economic growth in their states: Senator Rand Paul (R-KY) has argued that climate change science is inconclusive (Barron-Lopez 2014). Senator Jay Rockefeller (D-WV) opposed U.S. EPA regulation of greenhouse gas emissions from coal-fired power plants in 2010 (Chemnick 2011), and in June 2014, Representative Nick Rahall (D-WV) introduced legislation in Congress to allow coal plants to emit unlimited quantities of carbon pollution (Atkin 2014). As of August 2014, the League of Conservation Voters' website scored Senator John Hoeven's (R-ND) lifetime environmental voting record at 16%. His Senate counterpart, Heidi Heitkamp (D-ND), despite a 69% lifetime score, opposed a bill to price carbon pollution in 2013 ("Dem. Senator: EPA Will Come..." 2014). In state politics, Kentucky Democratic Governor Steve Beshear acknowledged that the state must address climate change, but argued that it can be done without omitting coal entirely (Peterson 2013). While acknowledging that the state must be pro-active in climate change, West Virginia Democratic Governor Earl Ray Tomblin prioritized shale oil and gas extraction in his 2014 State of the State address ("West Virginia Governor..." 2014).

[5] The gap in influence between business and environmental interests vis-à-vis the state government is likely to be greater than it is vis-à-vis the federal, or central, government. This gap works to the advantage of business interests. All else equal, business organizations face fewer challenges to lobbying governments than do environmental interests, because the former's frequently have financial advantages and common cause (Lowry 1992, 16).

actors' behavior, but policy makers' perceptions may be shaped by private sector threats. Disinvestment threats may take one of two forms: *exit*, in which firms with capital mobility threaten to leave a jurisdiction entirely; and *withholding*, in which firms threaten to cancel or postpone productive investment (ibid.). (The withholding threat is related – though not equivalent – to Albert Hirschman's (1970) concept of "voice," so to simplify the conceptual discussion I employ Hirschman's language below.) Even in the absence of business instrumental power, both exit and withholding threats can lead policy makers to anticipate that their policy proposals will have deleterious consequences for investment, and this anticipation may make them less willing than they otherwise would be to enact policies that businesses oppose.

Hacker and Pierson (2002, 282) supplement Lindblom's thesis by arguing that businesses exert greater pressure in decentralized federal systems. Because moving across subnational jurisdiction boundaries is often financially and administratively easier than moving between countries, they argue that subnational governments are more vulnerable to private firms' threats of exit than national governments are. Firms may also exercise voice: Businesses with high capital mobility can credibly threaten to "exit" a subnational jurisdiction by disinvesting entirely, while those with low capital mobility exercise "voice," by vocally supporting or opposing policies, and threatening to withhold productive investments (Fairfield 2015, 43; Hirschman 1970). In some cases, firms may simply need to *threaten* to exit in order to force subnational politicians' hand:

> What matters is not so much the degree of capital mobility and the credibility of the exit threat, but rather the successful exploitation of policymakers' fear of unknown consequences. As Lindblom himself already remarked, businessmen 'often predict dire consequences when a new regulation is imposed on them, yet thereafter quickly find ways to perform under it'. (Roos 2012, 5)

If we follow Roos, and acknowledge that businesses can use fear tactics – voice – to cement their structural power by influencing policy makers' choices, then the question is why we should expect businesses' structural power to be greater at the subnational than at the national tier of government. I argue that business interests are less likely to be strongly opposed by environmentalist lobbies at the subnational than at the national level (Lowry 1992, 16). The greater presence of environmental lobbies at the national level combines with the international community's concern for forest conservation – in Brazil, this is especially true for the Amazon rainforest – to counterbalance business interests at the national level. The same does not hold true at the subnational level, however, where business interests are on average less strongly opposed by environmental groups, and where international institutions exert less pressure on governments.

Given the local limitations that environmental interests often face, some centralization of environmental policy may be necessary to overcome subnational government resistance.[6] National environmental policy goals may also provide incentives for states to enact environmental legislation, by helping to empower local environmental actors, or by placing conditions on the distribution of federal funds.[7]

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[6] Independent agencies can help offset business' advantages in subnational politics, and bodies such as the Brazilian Ministério Público (MP) (McAllister 2008) can and do advocate for diffuse interests – including environmental policy and management – at subnational tiers of government. However, in poorer subnational jurisdictions, these bodies may themselves be federal, as is the case in Pará, Brazil, where the federal MP is more involved in environmental and social policy issues than the state MP (McAllister 2008).

[7] Lowry (1992), for instance, finds that environmental leadership emerges in American states when there is high federal pressure on states to raise standards, and/or low competition with other states in the policy area.

If vested economic interests exercise greater influence over subnational than national governments, on average we should expect variation in environmental policy and outcomes that reflects different industrial types and importance in different subnational jurisdictions. Specifically, we should expect states dominated by ecologically destructive industries whose interests cannot easily be reconciled with environmental governance to enact weaker environmental policies, all else equal, than states whose industries either are not ecologically destructive, or are ecologically destructive but can be reconciled with environmental governance. By a similar logic, states that possess ecologically destructive industries in some locations, but not in others, should prefer to avoid conflict with these industries, and enact environmental policies in areas that are not inconvenient for industry, and/or to tailor such policies to accommodate industrial interests. In consequence, business structural power may appear to the outside observer as consensus, as politicians predict business opposition to regulatory initiatives and adjust their proposal accordingly: "...We should not expect to see the influence of narrow interests overtly. Indeed, the representative will know in advance what those powerful interests are and just act in advance to support them. They [subnational politicians] are agents of the interests" (McConnell 1966, 180).

Though international survey evidence shows widespread citizen support for environmental protection even in developing countries,[8] effective subnational action is often contingent at least partially on industrial support. Ecologically destructive firms can be expected to oppose most environmental measures, and even ordinary citizens may support loosening environmental protections to continue to better their economic situations by exploiting natural resources – including cutting down trees (Tacconi, Siagian, and Syam 2006, 2).[9]

A few key lessons emerge from this section's discussion of decentralization studies. First, under strict conditions, subnational governments may enact progressive environmental policies. These conditions include a low dependence on land intensive industries. Indeed, we see progressive environmental outcomes in some states in the United States (Kelsey and Madden 2013, Klyza and Sousa 2008, Oates 2002, Rabe 2002).[10] Where subnational governments depend for revenue and employment generation on land intensive industries, however, subnational governments may be vulnerable to elite capture, and may not enact progressive environmental policies (e.g. Logan and Molotch 1987, Peterson 1981, Prud'homme 1995).[11]

To summarize, the extant literature expects the effects of decentralization on environmental and other regulations to be contingent partially on democracy, state administrative capacity, and

[8] In the 2005-2009 wave, 52.4% of Brazilians responded "Agree" or "Strongly Agree" to "V105 – Would give part of my income for environment." (World Values Survey, accessed 10 September 2014)

[9] Such compromises are not limited to developing societies: In a study of wilderness area designation in Washington and Oregon, Booth (1991) found that the U.S. Forest Service had designated fewer wilderness areas in Oregon, largely because the state depended more heavily on logging for its economic growth than Washington did.

[10] Most of Rabe's case studies indicate support for the idea that local economic structure and interests matter: Texas has ample open space in the west, and enacted climate policy to establish itself as a leader in renewable energy; Minnesota shelved a carbon tax proposal opposed by industry, in favor of extensive tree plantings; North Carolina linked greenhouse gas emissions to hog waste, and after reaching settlements with hog producers, began to invest in methane capture technology to fuel farm generators.

[11] A similar logic would argue that better environmental conservation is expected in wealthier states than in poorer states, unless political entrepreneurs in poorer states can find industrial allies to advocate for reform (Kelsey and Zysman 2013, Rabe 2002), or national governments place pressure on states to reform, or interstate competition to gain or retain polluting or environmentally destructive industries is low (Lowry 1992).

vertical pressures (including federal pressure and/or intervention, and institutionalized mechanisms of vertical accountability such as democratic elections and the presence of civil society organizations capable of monitoring state actors). Without rejecting the importance of these variables, I argue that the political power of business *vis-à-vis* the state often renders subnational governments less conservation-oriented than national governments. In the rest of this study, I operationalize the structural power of business as *economic geography* – the type, location, and importance of specific industries in a state or region – to explain variation in average locations and types of environmental conservation units (CA) across tiers of government in three states in Brazil.

The Argument of the Study: Economic Geography and Tier of Government as Determinants of Conservation Unit Type and Placement

I argue that the conservation units that are enacted by state governments in Brazil accommodate each state's economic structure and needs more clearly than federal conservation units do, because vested economic interests exert greater influence over state environmental policies than they do over federal. Specifically, I claim that the value and share of different types of industry and services in a state's GDP, the physical location of the industries in the state's territory, and the industries' political organization or connections to government condition both how states respond to federal policies and pressures for environmental reform, and each state's capacity and willingness to invest political capital in environmental policy.

I define *economic geography* as the *location*, *type*, and *importance* of economic activities that take place within a certain political jurisdiction. Location defines where the activities take place in space, and type includes the activities' sector(s) – agriculture, industry, or services (including government) – and accompanying land use needs. Economic activities in political jurisdictions are measured by their share of total GDP, share of employment (where data exist), and land use (area in hectares). I also consider the industry's degree of political organization, which may be manifested in formal political representation in peak associations and Congressional caucuses, or in more informal relationships with elected politicians and bureaucrats (measured where possible).[12]

These three factors contribute to building different levels of grassroots resistance to conservation units. All else equal, firms and individuals whose income growth would be restricted by conservation units placed near to their area of current activities, or in an area that they covet for productive purposes, should oppose the creation of new conservation units. Such firms are more likely than not to require large quantities of land for production, and/or lands or territories with specific features. The firms' or individuals' degree of economic power – measured by political organization and/or overall value – conditions their capacity to respond to environmental policy proposals. Table 1.1, below, arrays selected industries along a spectrum from *low* to *high* forest clearing need.

Table 1.1. Economic Activities Arrayed by Land Conversion (Forest Clearing) Need

[12] Economic geography, in its consequences for conservation policy, is similar to economic diversification – the degree to which the economy of a specific political jurisdiction is diversified. However, diversification is inappropriate, as the type of local economic activity matters as much as the diversity of activities. For example, a remote Amazonian municipality dependent on rubber tapping may invite proposals to create an Extractive Reserve, while residents of a similarly remote municipality whose main industry is modern agriculture may resist conservation unit creation altogether.

Rubber Tapping, Small-Scale Extractivism	Timber, Mining	Ranching, Modern Agriculture
<----------	----------	---------->
LOW		HIGH

On the high end of the spectrum in Table 1.1, both extensive cattle ranching and modern agriculture require large-scale and often complete forest clearing. These industries are difficult to reconcile with conservation units because the industries require access to extensive tracts of land in order to operate. On the low end of the spectrum, in contrast, rubber tappers – which in Brazil are concentrated in the Amazon – depend on the forest for their livelihoods. After numerous federal efforts to clear rainforest and cultivate rubber on plantations in the Amazon since the early 20th century, rubber tapping remains a small-scale and sustainable industry in Brazil. In the middle of the spectrum, timber and mining both produce limited forest clearing: timber to extract valuable hardwoods, such as mahogany and *ipê*, and mining to access valuable minerals, such as iron and bauxite. Mining only produces local deforestation. Timber, in contrast, can involve extensive clear cutting, but with proper incentives, timber firms can adopt sustainable practices. Both mining and timber interests can be reconciled with some permissive conservation units.

Different contexts, involving various types and degrees of dominance of economic activities lead to different conservation units. I posit that variation in type of conservation unit is contingent on two factors – land intensive industry presence and tier of government. From these factors, I derive four expectations, shown in Table 1.2, below. First, I expect land intensive industries to exert more pressure on subnational governments than on national governments. Environmental interests, in contrast, exert greater pressure on national governments, and in so doing offset to some degree business lobbying. With respect to conservation units, where an industry is present and has a vested interest – either current or planned investments or operations – the industry will seek to influence the type of conservation unit, if not oppose the unit entirely.

Table 1.2, below, shows the expected outcomes for conservation unit types along two dimensions: First, whether or not a land intensive industry is dominant in a state, as well as in an area slated for a conservation unit; and second, whether the tier of government proposing the conservation unit is national or subnational.

Table 1.2. Average Expected Conservation Unit Outcomes: Industry by Level of Government

		Land Intensive Industry	
		Dominant	Weak
Tier of Government	National	**2. Moderately Strict**	**1. Strict**
	Subnational	**4. Permissive**	**3. Moderately Permissive**

The numbers in the outcome cells correspond to a scale in which "1. Strict" identifies the strictest types of conservation units, in terms of the restrictions on human residence and use of natural resources, and "4. Permissive" identifies the least restrictive categories of conservation units, where restrictions on human residence and use of natural resources are weak or *de facto* non-existent. Moving from right to left in the table (from weak to dominant land intensive industry

presence), I expect conservation units to be stricter where industry presence is weak (or absent), and more permissive where land intensive industries dominate. Moving from top to bottom (from national to subnational tiers of government), I expect national level policy with respect to conservation units always to be stricter than subnational policy, all else equal.

Dependent Variables: Placement, Type, and Implementation of Conservation Units

Placement and Type

Placement of a conservation unit encompasses the natural and socio-economic characteristics of the area in which the conservation unit is located. The placement measure also takes into account distance from major economic activities or population centers, and/or overlap with them. I argue in this study that, all else equal, it is harder to place a conservation unit in an area characterized by a strong presence of industries that require land clearing than it is to place a unit in an area characterized by the predominance of industries conducive to conservation – such as rubber-tapping – or the absence of key industries and residents.

Type of conservation unit refers to the stringency – stricter, or more permissive – of rules on a conservation unit. This variable is operationalized by two sets of indicators: First, in Brazilian law, a conservation unit is either *strict protection* – a set of strict categories that exclude direct extraction of natural resources from within the boundaries of the unit – or *sustainable use* – a set of categories that are generally more permissive than strict protection, and that may permit varying direct uses of the conservation unit, including human residence in and extraction of natural resources from the unit's interior. Second, a conservation unit falls into a subcategory of strict protection or sustainable use.

Where industries that require complete land conversion are present and able to exert pressure on the federal or state government, the tier of government responsible for creating a conservation unit is more likely to place a more permissive unit in that location, all else equal. Because we would expect state governments to be more vulnerable to, or "captured" by, local elite interests than the federal government, we would expect to see more federal conservation units along contentious deforestation frontiers, and fewer state conservation units in such areas.

In contrast, where industries are absent or weak, establishing a conservation unit is comparatively easy. Policy makers may choose conservation unit categories based on technical criteria, and discount political criteria more than they must when land intensive industries are present. Given that these contexts are comparatively easy for conservation, we would expect to see either (a) a stringent conservation unit, covering a relatively pristine forested area; or (b) a sustainable use conservation unit that favors small-scale extractivist communities, where these communities exist.

Overall, the federal government is more likely to create strict conservation units than the state government is. Stringent units restrict economic activities in an area, and the federal government, having a geographically broader mandate, is more likely to take the political risk of imposing stringent units in contentious areas. In contrast, state governments prefer either to create more permissive conservation units in similarly contentious areas, or more permissive or more stringent units in remote areas, non-contentious areas where political risks are minimal.

Degree of Implementation

Degree of implementation measures the federal or state government's investment in establishing management institutions on the conservation unit, as well as other indicators, such as land titling (*regularização fundiária*), law enforcement, and, where applicable, infrastructure and

sustainable development investments. Implementation is an important set of steps that demonstrate a government's continued willingness to invest in conservation in an ongoing manner after establishing a conservation unit.

Management institutions, which include consultative or deliberative management councils, and management plans, are required by SNUC law. Some states took discrete efforts to create management councils and draft management plans prior to the SNUC, but broader measures of these institutions across state and federal conservation units is possible only since 2000.

Measures taken by government agencies and NGOs are intermittent and incomplete, but the data that are available indicate that implementation is poor at both tiers of government. However, creation of management councils and publication of management plans converge over time between tiers of government in the case studies included here. In general, the federal government began earlier, and state governments followed later – after they had expanded their conservation unit system. Bureaucratic mandates and capacity matter for implementation. The federal government reformed its conservation unit management institutions before or around the same time as most states, with the consolidation of IBAMA in 1989 and the creation of ICMBio in 2007.[13] Minas Gerais reformed IEF's mandate starting in 2007, but the reforms were ongoing when I interviewed IEF personnel in 2012. Pará enacted reforms to SEMA in 2007-2009, but the Department of Protected Areas within it remains a department, and does not have independent agency status. Amazonas created an agency in 2003, and reformed it beginning in 2007 (when it enacted its State System of Conservation Units law) – but it languished after the 2011 change in governor. In contrast to the state environmental agencies, though ICMBio suffers from a limited budget and has not consolidated itself as a powerful institute, it has functioned at a relatively consistent and competent level since its founding.

Supplementary Variables

Economic geography and tier of government are the driving explanations for variation in the stringency of conservation unit systems across states in this study, but my study also brings in other variables, including NGOs, federal and state bureaucratic capacity, and partisanship. Below, I will examine each variable in turn, and justify my emphasis on economic geography and tier of government. I argue that the variables below mediate the relationship between economic interests, tier of government, and conservation unit outcomes, but do not fundamentally alter it.

Activists and Non-Governmental Organizations (NGO)

Environmental activist organizations and NGOs play key roles in the design, enacting, and governance of conservation units. Much of the literature emphasizes this. Studies of conservation units (Steinberg 2001) and environmental policy in developing countries (Hochstetler and Keck 2007, McAllister 2008, Steinberg 2005) call attention to the key role played by environmental activists inside and outside of government. Given the limited public budgets and multiple priorities of governments in developing countries, little governance of protected areas (or implementation of environmental policies, broadly speaking) is expected without environmental NGO cooperation (Steinberg 2005). Activists, especially when organized into movements or NGOs, may raise the salience of environmental issues, and may collaborate with local peoples and/or provide technical expertise and collaboration to state institutions seeking to undertake environmental reforms. This

[13] São Paulo reoriented the missions of its Forestry Foundation and Forestry Institutes in 2006 (Author interview with Forestry Foundation personnel, 2010).

holds true in Brazil, in which federal and state agencies work with civil society groups to design and implement conservation units. Brazil has a great deal of environmental activism, both outside and inside the state apparatus. In 2002, the Brazilian Institute for Geography and Statistics (IBGE) counted 1,593 environmental NGOs spread unevenly throughout the country, including 101 in the Amazon, 809 in the Southeast, and 128 in the Center-West (summarized in Hochstetler and Keck 2007, 107).

Environmental movement and NGO cooperation and pressure are necessary to induce states to create conservation units, and I discuss key NGOs in the empirical case studies where such groups are relevant. However, the outcomes in terms of type and location of conservation units reflect compromises between conservation-oriented groups and economic development interests that are not explained by an exclusive focus activist strategies. Indeed, conservation unit proposals emanating from NGOs and state allies may reflect the balance of economic and environmental interests in a specific area, including the interests of economic veto players. In states in which ecologically destructive industries are dominant, environmental NGOs may have to make greater compromises to achieve their goals than in states with diversified economies in which ecologically destructive industries are weaker or absent. Furthermore, environmental NGOs are only as influential in policy making as state or federal government actors permit them to be, so where state or federal governments oppose environmental conservation, environmental NGOs may have to change their priorities, or risk exclusion from policy making processes. To understand variation in conservation unit outcomes across states and tiers of government in Brazil, I argue, we must focus attention instead on the power resources, preferences, and actions of relevant vested economic interests in each state and region.

Federal and State bureaucratic capacity

Federal and state bureaucratic capacity constitutes another supplementary explanation for variation in conservation unit outcomes in Brazil. Incorporating social and economic needs into conservation system plans may help states to overcome a challenge that they face to a greater degree than does the federal government: comparatively low bureaucratic capacity to manage and protect conservation unit systems. Extant literature expects that subnational jurisdictions with lower state capacity will produce worse outcomes, and in fact both state and federal environmental budgets and personnel in Brazil are lower than environmentalists argue is necessary for effective implementation and management of conservation units. However, conservation unit agencies may compensate for low capacity by working with civil society organizations (Amengual 2013), and bureaucratic capacity building may also be an *outcome* of conservation policy enactment. Therefore, the role of state capacity in conservation unit system expansion and consolidation must be studied empirically.

Bureaucratic capacity can be measured several ways, including by budget, personnel, and stability. Although a recent study found that overall the states spend more money on environmental management than the federal government (Young et al. 2012), how much of this spending funds conservation unit management is uncertain, and state agencies suffer from problems deriving from frequent institutional reforms and corruption scandals. Such problems are especially acute in the Amazon states, where personnel, budgets, and leadership may shift radically with each change in administration, and corruption scandals limit effective functioning by paralyzing activity and inducing new rounds of reform (Hochstetler and Keck 2007; Author interviews with personnel in

IEF (Minas Gerais), SEMA (Pará), SDS (Amazonas)).[14] In contrast, federal agencies are more stable: though the principal federal environmental enforcement agency suffered a shock reform in 2007 with the creation of the Chico Mendes Institute for Biodiversity Protection (ICMBio), federal conservation unit governance has steadily improved since 2000, even as the national conservation unit system has expanded. The environmental budget has stagnated, but most conservation unit managers in IBAMA (before 2007) and ICMBio (after 2007) have career stability that many of their state counterparts do not have. Bureaucratic incapacity and instability exacerbate conservation unit governance problems at both tiers of government, but vested economic interests remain a better explanation for variation in conservation unit type and location than capacity. The case studies in the chapters to follow show this by tracing developments in federal and state conservation bureaucratic capacity building.

Partisanship

Finally, federal-state partisan relations might influence conservation unit decisions. Where federal and state parties are not aligned, conflicts between tiers of government may produce deadlock and hamper policy enactment and implementation. Partisan differences may also induce state governments to resist implementing federal directives. Alternatively, within the federal or state tier of government, a governor from a business-friendly right-wing party might be less inclined to create conservation units than a governor from a left-wing party, since the latter may have environmental organizations in its coalition.

Expectations of partisan conflict across tiers of government are not irrelevant to environmental policy in Brazil, and the case studies to follow incorporate partisanship considerations. Indeed, environmental movements and NGOs were a constituency of the Workers' Party (PT) when Lula da Silva was elected President in 2002 (Hochstetler 2008), and Marina Silva, Lula's Environment Minister from 2003 to 2008, has a long record of environmental activism. But the Lula Administration built on initial steps taken by Lula's predecessor and political foe, Fernando Henrique Cardoso – a member of the center-right Brazilian Social Democratic Party (PSDB) –, who signed the National System of Conservation Units (SNUC) into law in 2000. Such continuity indicates that conservation unit politics, at least under some conditions, transcend partisan conflicts.

Partisan cooperation and conflict between tiers of government do not appear to drive federal intervention and state responses in conservation unit creation and implementation in Brazil. Partisan alliances may facilitate environmental policy coordination between tiers of government, but I observe in the case studies that both the federal and state governments make progress in creating and implementing conservation units even in states that are not aligned with the federal government's party. Furthermore, there is no discernible difference between the typical *types* of conservation units established by either the federal or state governments in any state under study that an observer could reasonably argue is due to partisan alignment.

Research Design and Case Selection

This study comprises a subnational comparative analysis of the role of the state and federal government in creating and implementing conservation units within each state in Brazil. I compare across tiers of government within each state to evaluate hypotheses relating to federal and state choices with respect to type, placement, and degree of implementation of conservation units. Brazil

[14] Even the most established state agency of my four subnational cases, the State Forestry Institute (IEF) of Minas Gerais, was recovering from a corruption scandal when I traveled to Belo Horizonte to interview IEF personnel.

began decentralizing revenues, policy, and administration after democratization (Falleti 2010) – including environmental policy. But with respect to conservation units, states and the federal government have long had common authority: the first National Park, Itatiaia, was created in 1937, and the first state park, Campos do Jordão, in São Paulo, in 1941. Conservation unit creation, therefore, provides a long historical lens from which to compare national and subnational actions in environmental protection.

This dual cross-tier and cross-state comparison serves two purposes: First, within-state comparison across tiers of government elucidates the different political influences that economic and environmental interests exert at different tiers of government. In conducting the cross-tier within-state comparison, I hole subnational jurisdiction constant to compare how states and federal governments value preserving natural. Second, the cross-state comparison of differences between federal and state behavior illuminates the effects of different degrees of land intensive industry dominance in different states.

I acquired data from a variety of public and governmental sources, as well as over 90 interviews with key informants during 15 months of field work in Brazil from 2010 to 2013. Because of the greater international attention paid to the Amazon than to other regions of Brazil, some data sources regarding conservation units – including over-time deforestation trends, and news clippings – are more complete for Amazonian conservation units than for those located outside of the Legal Amazon. In addition, data are more complete for federal conservation units than for state. Nevertheless, sufficient data exist to draw some conclusions regarding non-Amazonian state environmental politics.

The variety of data employed in this study serves several complementary purposes: First, large-N and spatial data relating to conservation units and the location of economic activities allow me to identify broad patterns in the placement of different types of units across Brazil's territory – both in the three state cases under examination here, and in the remaining 24 states. Second, the interview and document data permit me to flesh out the stories of my state cases, as well as trajectories of regions and individual conservation units within each state. Both types of data are employed in the case study chapters to follow.

Below I justify the selection of Brazil as a crucial case for the study of conservation unit creation and implementation. I then provide preliminary evidence to defend the contention that the federal government is less beholden to local economic interests in deciding placement and type of conservation units compared to state governments. Finally, I explain the selection of the four state cases analyzed in depth in this study, and provide brief overviews of their conservation unit system trajectories.

The Choice of Brazil

Brazil is a federal democracy with a great deal of socio-economic and ecological diversity across its territory, and has actively pursued development and environmental protection with varying degrees of success. The country's size, extensive forests, and the challenges it faces with tropical and sub-tropical deforestation and other forms of environmental degradation make Brazil an excellent – and environmentally important – case in which to examine the respective ability and willingness of federal and state governments to engage in conservation.

Brazil contains very diverse population demographics and economic structures across its territory. The country's 26 states and the Federal District of Brasília contain 198.7 million people (2012), distributed unevenly over 8.516 million square kilometers. States vary greatly in area, population, ecologies, natural resources, and socio-economic characteristics. Most heavy industry

is concentrated in the wealthier states of the Southeast (São Paulo, Minas Gerais, Rio de Janeiro, and Espírito Santo) and South (Rio Grande do Sul, Santa Catarina, Paraná). The Center-West region, including parts or all of Mato Grosso do Sul, Mato Grosso, Goiás, Minas Gerais, Tocantins, Bahia, and Maranhão – is home to vast stretches of extensive agriculture, including soy bean farming. In contrast, the Legal Amazon region (including Acre, Amapá, Roraima, Rondônia, Amazonas, Pará, and parts of Mato Grosso, Maranhão, and Tocantins) is smaller in population and gross domestic product, and presents extensive deforestation frontiers characterized ranching, timber extraction, soybean farming, mining, and a host of small-scale extractive activities. While much of the Amazonian economy is based on agriculture, cattle, and extractive activities, Manaus, Amazonas, hosts a large consumer goods manufacturing sector.

Brazil is also a moderately decentralized federation, in which states and municipalities have rights to automatic transfers, and can enact a limited range of policies. Political, administrative, and fiscal decentralization accompanied democratization in the 1980s. The outgoing military dictatorship reinstated direct gubernatorial elections in 1982, and the 1988 Constitution established two tools to redistribute federal revenues directly to the states and municipalities: The State (FPE) and Municipal (FPM) Participation Funds. The FPE returns 21.5% of federal revenues collected from income and industrial production taxes to the states, and is highly redistributive: The poorer, less industrialized states of the North, Center-West, and Northeast receive 85% of FPE distributions, while the Southeastern and Southern states, which are wealthier, receive only 15%.[15] Excessive state bank debt led the federal government to recentralize fiscal matters partially, by eliminating state banks in the 1990s and enacting the Fiscal Responsibility Law in 2000 (Fishlow 2010). In addition, states collect the Tax on the Circulation of Merchandise and Services (ICMS), which accounts for approximately 22% of state revenue (Montero 2014, 32), and may attach conditions to the distribution of receipts to municipalities: To date, 17 states have enacted some form of "Ecological" ICMS to incentivize municipalities to invest in environmental reforms and management (Nature Conservancy 2008).[16]

In environmental policy, Brazil has enacted national policies and plans, while also transferring limited responsibilities piecemeal to states and municipalities. The 1981 National Environmental Policy (Lei No. 6.938 de Agosto de 1981) created the National Environmental System (SISNAMA), which permitted states to define environmental norms and included state and municipal representatives in the National Environmental Council (CONAMA) (Greenpeace 2006a, 2). Article 225 of the 1988 Constitution established common responsibility for environmental governance across all levels of government. In the 1990s, environmental licensing for construction, mining, and other polluting industries was devolved to states and municipalities (ibid., 3). The 2000 National Conservation Unit System (SNUC, Lei 9.985 de 18 Julho de 2000) reinforced subnational governments' authority to create conservation units, and established common conservation unit categories and procedures for creation and implementation applicable to all tiers of government. Finally, in 2006 the National Forestry Law devolved forestry licensing and concession authority to subnational tiers. Nevertheless, as recently as 2006, there were "conflicts of competencies [between tiers of government], lack of commitment in the states to invest in

[15] In this system, Pará receives 6.112%, Amazonas 2.7904%, Minas Gerais 4.4545%, and the Federal District of Brasília 0.6902% (the lowest share of all states). The state that receives the highest share is Bahia, with 9.3962% (Ministério da Fazenda/STN 2012).

[16] Of the states examined in depth in this study, Amazonas and Brasília have not enacted an Ecological ICMS, while Pará and Minas Gerais have.

environmental agencies, [and] lack of clear rules and coordination on the part of the federal government to consolidate SISNAMA" (Greenpeace 2006a, 3).

Brazil is an especially important case for the study of tropical forest conservation: The country contains 60% of the Amazon rainforest, as well as five other ecological biomes with different characteristics: the dry, partially forested Cerrado (located along the frontier with the Amazon, and comprising 2 million km^2, or 22% of the national territory) and Caatinga (approximately 844,000 km^2, or about 11% of the national territory) that encompass much of the Center-West and inner Northeast of the country; the lush Atlantic Forest (1.3 million km^2), which spans 17 states along the Atlantic seaboard; the Pampa grasslands (176,000 km^2, or 2% of national territory) in the far southern state of Rio Grande do Sul; and humid, partially forested Pantanal savannah (150,000 km^2, or 1.76% of the national territory) along the Paraguayan border in the Center-West states of Mato Grosso and Mato Grosso do Sul. These biomes face different socio-economic contexts, population pressures, and environmental challenges (MMA, "Biomas").

Brazil's deforestation problems, particularly in the Amazon, are acute, which renders environmental protection a politically salient policy area. Brazil faces high rates of forest clearing in several of its biomes. Deforestation challenges in the Amazon are best known abroad: approximately 17% of the Amazon rainforest has been cleared. Spikes in the Amazon's deforestation rate occurred in 1995 and 2004 – years in which over 27,000 km^2 of forest were cleared – while declines were recorded from 2008 to 2011 (INPE 2014). Amazon deforestation has declined over time, due to legal changes, increasing federal and state capacity to enforce environmental laws, and the expansion of federal and state conservation units. Though such declines are to be applauded, observers express concern that Amazon deforestation has begun to increase once again in recent years (Bragança 2015, Pegurier 2014).

But the Amazon is not the only biome suffering from deforestation: 48% of the Cerrado (MMA, "PP Cerrado") and 88% of the Atlantic forest (S.O.S. Mata Atlântica 29 July 2014) have also been cleared. Though these two biomes do not receive the same amount of global attention as the Amazon receives, the destruction that they have suffered means that, despite improvement in the Amazon, Brazil has yet to design an economic growth model that does not involve deforestation.

Two observations drive the theory developed in this chapter: First, in Brazil, all three tiers of government – federal, state, and municipal – have the power to establish conservation units, and all three tiers have done so. Currently, there are 312 federal and 615 state conservation units in Brazil, indicating political commitment to conservation at multiple tiers of government, and providing some support for optimistic assessments of decentralization in regards to environmental policy. However, in Brazilian law, there are two broad *groups* of conservation units: strict protection and sustainable use. Strict protection conservation units, as their name implies, impose more stringent regulations on human occupation and use, while sustainable use units are in general more permissive. Table 1.3, below, shows the different trends in number, group, and subcategory of conservation units across the federal and state tiers.

Table 1.3. Summary of Brazilian Federal and State Conservation Units, by Category, as of January, 2010

	Federal			**State**		
Category/Group	Number	Area (hectares)	Percentage of total federal UC area	Number	Area (hectares)	Percentage of total state UC area
Strict Protection	131	35,601,408.13	**46**	302	15,409,790.73	**20.4**
Ecological Station	31	6,862,260.49	9	58	4,796,846.39	6.35
Natural Monument	2	44,179.73	.05	13	62,599.41	.08
National/State Park	64	24,658,349.29	32	195	9,063,804.27	12
Biological Reserve	29	3,867,514.73	5	29	1,358,291.05	1.8
Wildlife Refuge	5	169,103.88	.2	7	128,249.61	.17
Sustainable Use	173	41,247,363.17	**54**	313	60,131,159.75	**79.6**
Environmental Protection Area (APA)	31	9,660,625.28	**12.57**	187	33,230,809.62	***43.99***
Area of Relevant Ecological Interest	17	43,432.51	.05	25	37,278.89	.05
National/State Forest	65	19,208,330.98	25	45	13,889,585.43	18.39
Sustainable Development Reserve	1	64,441.29	.08	28	10,914,292.76	14.45
Extractive Reserve	59	12,270,533.12	**16**	28	2,059,193.06	**2.73**
Total	304	76,848,771.30	100	615	75,540,950.48	100

Source: Drummond, Franco, and Oliveira (2010; 361, 374)

Table 3 shows that close to 80 percent of the area of state conservation unit is *sustainable use* (though the total numbers of strict protection and sustainable use are close at the state tier – 302 strict protection vs. 313 sustainable use units). In contrast, sustainable use conservation units occupy only 54% of total area at the federal level. Reinforcing the observation that states tend to opt for less stringent types of conservation units, close to *half* (44%) of the area of state conservation units is contained in APAs (*Áreas de Proteção Ambiental*, or Environmental Protection Areas) – the least stringent conservation unit category, in which there are few formal restrictions on occupation and use. In contrast, APAs comprise only 13% of federal conservation unit area. Finally, states' 33 million hectares of APAs are spread across 187 units, while the federal government's 9 million hectares of APAs are contained in only 31.

Similar differences across tiers are evident for stringent conservation units: There are 24 million hectares of national parks, but only 9 million hectares of state parks, for example. With

respect to Extractive Reserves – a category of conservation unit that may be considered stringent in areas where competing interests desire to use the same land and natural resources, but permissive where land use is not contentious – the federal government has also been more aggressive than state governments, establishing more such reserves (59), and placing more of them in contentious areas.

These data provide a first indication that, on a national scale, patterns of preferences and actions in conservation unit creation differ across tiers of government – and that, on the whole, the federal government exhibits greater ambition to create strict protection areas than state governments do. Preferences for different categories of federal and state conservation units differ across states, and are contingent on state and federal government political alliances with different industries present in the state, as well as where those industries are located.

What is interesting to note about the aggregate outcomes presented in Table 1, above, however, is that while each tier of government exhibits different trends, *both tiers have created conservation units* – including deforestation, species extinction, and watershed degradation. Their strategies, measured by areas contained in different categories of conservation units, however, are often different. These outcomes support the observation in academic literature on decentralization that subnational governments tend to be more responsive to local economic interests than national governments. I examine federal and state outcomes for all of Brazil in Chapter 2, and in Chapters 3-5 I explore the processes by which states and the federal government created conservation unit systems in the states of Pará, Amazonas, and Minas Gerais.

The Selection of the State Cases

I chose the state cases deliberately to illustrate state and federal differences in conservation unit creation and implementation patterns, as well as to exploit regional and socio-economic variation both across and within states. The three states chosen are located in the Amazon (Amazonas and Pará), and the Cerrado and Atlantic Forest (Minas Gerais), so they cover three of Brazil's six ecological biomes, and two of the country's five macro-regions (Amazonas and Pará are in the North, and Minas Gerais is in the Southeast). The state cases also vary socio-economically, with manufacturing and small-scale extractivism dominating the economy of Amazonas; forestry, ranching, mining, and services distributed throughout Para; and mining, manufacturing, silviculture, ranching, and services dominating Minas Gerais. Finally, each state currently has relatively balanced shares of state and federal conservation units.

By choosing three states within one country, I control for the structure of national institutions and political regimes over time. This control is imperfect, as federal intervention in the Amazon – including colonization programs, land reform settlements, and federalization of territory – is more assertive than elsewhere (see, e.g., Hochstetler and Keck 2007, chapter 4). However, I address the Amazon's unique history with a paired comparison of Amazonas and Pará, both of which are located in the Amazon, but whose economic structures, deforestation rates, and conservation unit system outcomes differ considerably.

These cases also permit analysis of variation across tiers within the same state, and across states: Placement, types, and degree of implementation of state and federal conservation units vary across the four selected states, as do economic structure, political partisanship, as well as the biomes in which the states are located. This variation permits a more nuanced perspective on the political and economic drivers of conservation unit system creation and implementation than a single, national-level case study of Brazil would permit. Exploring subnational, rather than cross-national, variation also allows me to hold constant national-level variables, such as regime type

(e.g. Hochstetler 2012), and focus on local and regional variables.

The empirical chapters to follow begin with the state cases of Amazonas and Pará, the two largest Amazonian states in terms of territory. In both of these states, intense federal and international pressures, and federal interventions during and after the 1964-85 military dictatorship opened the state territories to migrant settlements, and then sought to reduce deforestation beginning in the late 1980s. Both states established a few conservation units in the 1990s, but not until the 2000s did they embark on similarly ambitious – but institutionally different – conservation unit creation programs. Responding to national and global concerns over Amazonian deforestation, and to increasingly pro-active federal interventions to protect the forest, both states sought to establish conservation units with minimal disruption to the states' economies, but the structures of each state's economy led to different outcomes: While Amazonas' conservation unit creation program largely appealed to poor small-scale rural extractivists (including "traditional" communities), and dovetailed with federal concerns with traditional peoples in the Amazon; in Pará, the state government favored conservation units that promised to improve the position of the state's struggling timber industry. To create and manage the conservation units, both states established new, or reformed existing, environmental agencies, but to date have taken few actions to institutionalize them or enhance their governing capacity, thus leaving state conservation units relatively unguarded and with ambiguous and poorly-enforced rules.

The state cases conclude with an examination of Minas Gerais, a wealthy, industrialized state in Southeastern Brazil, which straddles the Cerrado and Atlantic forest ecological biomes. Minas Gerais' environmental policy history dates to the early 1960s, giving it a longer trajectory than the environmental policy histories of Pará and Amazonas. But the broad outlines of the case resemble the Amazonian states: Minas Gerais established its first forestry institute in 1962 to help guarantee a continued supply of trees to power the state's steel mills, which ran on wood-based charcoal. Only after eucalyptus plantation projects for steel mills and paper pulp industries had been exhausted, and international financing for conservation increased, did the state forestry institute turn toward conservation, and conservation units, as its principal focus.

The two Amazonian cases analyzed in this study control for geographical, political, and institutional contexts that are unique to Amazônia, while demonstrating variation across states in the Amazon. The case of Minas Gerais demonstrates that the argument elaborated first in the Amazonian states applies to Brazilian states outside of the Amazon. The three sub-sections below discuss each of the state cases in greater depth.

Pará

Pará (Chapter 3) is a case of a state that has a large land intensive industry – including timber, ranching, and mining – distributed throughout the state's territory, and whose government depends on land intensive industry for job creation and economic growth. As a result, the state has been highly responsive to the preferences and demands of land intensive industry. In consequence, consistent with my prediction, the federal system of conservation units in the state is stricter than the state system, and located in more contentious areas, including along major highways and the eastern deforestation frontier. In establishing its conservation unit system, the state government has exhibited very limited cooperation with the federal government.

Pará is an Amazon frontier state of 1.248 million km^2 and 7.97 million people in 2013, with a history of immigration from other regions of Brazil, high deforestation, major logging, mining, and ranching industries, and elite state politics whose historical bases of support are located largely in the northern part of the state, where settlement is less recent. The state system of

conservation units was small prior to December 2006, with 12 mostly small UCs, but included an APA covering the Marajó archipelago (which is formalized in the 1989 state constitution). The state invested little in UC implementation and management, and though management has improved somewhat since 2007, it remains weak.

By the mid-2000s, Pará had garnered a bad reputation for rural conflicts and extensive illegal deforestation, and like other Amazonian states was in the process of designing its Macro-Ecological-Economic Zoning (ZEE), to zone economic activities and conservation throughout the state. The state completed its first draft in 2006, and in that document, it set aside the Calha Norte (CN) region for conservation. In December 2006, the outgoing governor, Simão Jatene, decreed seven new UCs for his state – five in CN, and two in the south, in the Terra do Meio; and committed the Calha Norte Consortium, which included several state and non-state organizations, to implement the UCs decreed in CN.

Much of the progress in state conservation unit creation and implementation was made in response to the national and international attention paid to the Amazon, including legal changes to environmental policy, and strengthening of federal environmental governance mechanisms. The mosaic of state conservation units in the CN region was established in part to preempt federal action in the region: at the time, the federal environmental agency was developing plans to create its own, federal, mosaic in the region. Nevertheless, the state focused on establishing conservation units in remote, comparatively uninhabited areas, and the UCs closer to population centers are sustainable use – four State Forests, and one APA. These choices have enabled the state to protect forests while supporting one of its principal industries, timber.

During 2002-10, the federal government took a harder line in Pará than the state government did, tightening environmental enforcement in much of the Amazon region, and in Pará, rapidly decreeing a mosaic of large strict protection and sustainable use conservation units in the southern BR-163 highway and Terra do Meio regions between 2004 and 2006 – the principal frontiers of illegal logging and rural land conflict in the state. Though several of the conservation units established by the federal government in Pará during this time were National Forests – sustainable use UCs that permit forestry – the federal government's actions were more forceful and punitive toward the logging and ranching industries in those regions: Among other actions, the federal government sent troops into Terra do Meio in 2005, in the wake of the internationally infamous murder of American nun, Dorothy Stang.

Finally, the federal government, from the late 1990s through 2009, established several new Extractive Reserves in the Terra do Meio, along the Amazon River, and along the coast. These UCs begin the process of formalizing natural resource use rights for traditional communities – often to the detriment of larger industries, such as forestry and commercial fishing. A sort of conservation unit-cum-land reform program, federal Extractive Reserves are indicative of the federal government's greater concern with reconciling equity and environmental sustainability compared to the state government.

Amazonas

Amazonas (Chapter 4) is a case of a state that has a small land intensive industry, and whose economy is instead dominated by manufacturing – a non-land intensive industry based largely in the state capital, Manaus. As a result, the state has been less responsive to land intensive industry preferences, and more responsive to the problem of rural poverty. In consequence, and in line with my prediction, the federal conservation unit system is more strict than the state system, but the difference is less stark than it is in Pará. The case study chapter will show that the state

enacts more *moderately permissive* units, including Sustainable Development Reserves, that appeal to local communities, rather than timber or ranching interests. In addition, the state government cooperates more with the federal government, and participates in more federal conservation initiatives along highways (which are deforestation frontiers in the Amazon), than the state of Pará does.

With 1.571 million km^2, Amazonas is of comparable size to Pará, but has only 3.808 million people (in 2013) – just under half Pará's population –, relatively little cumulative deforestation, and a manufacturing-based economy centered in Manaus, the capital. In further contrast to Pará, Amazonas's interior possesses a chiefly subsistence-based rural economy that causes comparatively little environmental damage. Nevertheless, prior to 2003, Amazonas's political culture resembled Pará's: It was characterized by "chainsaw populism" and little investment in environmental policy. But beginning in 2003, with the inauguration of Governor Eduardo Braga, in 2003, the state embarked on an ambitious program to strengthen environmental policy, including creating 26 new conservation units between 2004 and 2008.

This program, called the Green Free Trade Zone (Zona Franca Verde, or ZFV), responded to the state's need to extend the lifespan of its economic lynchpin, the Free Trade Zone of Manaus. To rescue the ZFM, and diversify it by developing the rural economy, Governor Braga and Secretary of the Environment, Virgílio Viana, enacted the ZFV, and called national and international attention to Amazonas's sustainability investments, including rapid creation of conservation units in the state's interior, which are largely sustainable use, to begin to foster rural production and link it to Manaus's market. UC creation, therefore, functioned as a sort of conservation-cum-land reform to promote production and income growth, and was supplemented in 2008 by *Bolsa Floresta*, a minimum income program styled after Brazil's *Bolsa Familia* – and currently administered by a private-public foundation headed by Viana, the Sustainable Amazonas Foundation (FAS).

The state's actions in the 2000s dovetailed with federal programs in a way not seen in Para: While Para's state government reacted to federal initiatives, Amazonas's government took initiative, participating actively in formal discussions of conservation plans for the BR-319 highway, and in 2005 seeking information on regional rural economies in a series of forums with community leaders and residents. Throughout, however, economic growth remained prime concerns for the state government: First, extending the life span of the Manaus Free Trade Zone, and second, diversifying the free trade zone's production by linking markets in the capital and the interior. In contrast, while the federal government never lost sight of economic growth objectives, the conservation units it established, mostly in the south of the state, were more restrictive on average than those created by the state government, and so indicate that reducing deforestation remained a stronger priority for the federal government than for the state.

Minas Gerais

Finally, I add a third state, outside of the Amazon. Minas Gerais (Chapter 5) is historically different from Amazonas and Pará, having cleared much of its native forest by the middle of the twentieth century. Deforestation was initially due to an expansion of mining early in the century, and later to supply wood-based charcoal to the state's growing steel industry. In consequence, Minas Gerais is a case in which mining caused early deforestation, and led to a powerful steel industry that exacerbated deforestation due to steel mills' dependence on wood-based charcoal for power.

An industrial state, Minas Gerais had a population of 20.59 million (in 2013) distributed

across 586,528 km^2 – a considerably smaller territory than Amazonas or Pará. The state is characterized by dense land intensive industries, including mining, agriculture, and ranching. Nevertheless, due in large part to the charcoal industry's dependence on wood for fuel, Minas Gerais became a pioneer in environmental governance, creating its first conservation unit in 1944 (Rio Doce State Park), a state forestry institute in 1962, and the country's first participatory policymaking body, COPAM, in 1977.[17] Minas Gerais underwent an economic transition in the 1970s from heavy reliance on natural resource (including mineral) extraction to expansion of manufacturing, and studies commissioned by the state government in the 1970s and early 1980s showed the deleterious consequences of the transition for urban air and water pollution – and deforestation – at a time when Brazil had begun to re-institute gubernatorial elections (FJP 1998, 63). Urban environmental issues and the scarcity of native forests sparked the rise of an elite environmental movement in the 1970s.

Minas Gerais' story of conservation unit creation is longer than those of the Amazonian states, but like the Amazonian states, Minas Gerais did little to implement governance on its state units – with a few exceptions, including the APA Sul-RMBH – until 2008. Meanwhile, though its environmental agencies exhibit greater governance capacity than those in the Amazon, like Amazonian agencies, Minas' agencies have periodically suffered from destabilizing reforms and, recently, a corruption scandal.

Minas Gerais both contrasts and converges with the Amazonian states of Amazonas and Pará: The latter two states effectively had to *create* environmental institutions from scratch in the 2000s after a history of virtually ignoring environmental issues. Minas Gerais's environmental institutions, and conservation unit creation initiatives, are older, with the State Forestry Institute (IEF) dating to 1962, when it was an agricultural extension agency housed in the Sectretariat of Agriculture. The IEF was incorporated into a unified environmental bureaucracy in 1996, and save for some reforms within the member environmental agencies since then, the system has remained stable. Minas Gerais also entered the 2000s with a much larger conservation unit system (in number, not area) than Amazonas and Pará: 40 conservation units. Finally, regional integration is more complete within Minas Gerais than in any of the Amazonian states: all areas are accessible by road. Yet in areas dominated by land intensive industries, the state of Minas Gerais, like Amazonas and Pará, has opted for more permissive conservation units than the federal government has.

With respect to conservation unit creation, Minas Gerais has been a leader in the field, exceeding federal efforts in the state in terms of numbers of conservation units. The state possesses 74 conservation units, while the federal government has established 18 to date. Included in the state conservation unit system are 39 state parks, 8 of which are open to visitation (IEF), 17 APAs, and 2 state forests.[18] Many of the remaining state units are strict protection Ecological Stations, and they occupy a much smaller area of the state than the sustainable use units and state parks do. Nevertheless, permissive APAs and "Areas of Special Protection" (APE, a category unique to Minas Gerais that resembles an APA) occupy the largest area of state units in Minas Gerais.

Amazonas and Pará illustrate distinct growth trajectories of conservation unit systems in middle-income states with different levels of land intensive industry on a deforestation frontier. In contrast, Minas Gerais shows the compromises made to preserve remaining natural areas in a

[17] Decree No. 18.466 of 29 April 1977 instituted COPAM (Comissão de Polítical Ambiental).

[18] Much of Minas Gerais's wood production for charcoal is produced on eucalyptus tree farms, and not harvested from virgin timber.

wealthy, industrialized, non-deforestation frontier state with a high level of land intensive industry.

Conclusion

The argument put forth in this chapter is that local economic geography influences the choices that states make in where and what type of conservation unit to establish. Organized business interests exercise a structural power that does not always succeed in resisting the creation of conservation units, but that may induce governments to reconcile conservation with industrial needs. Moreover, local economic geography has different effects on different tiers of government, producing diverse patterns of conservation unit systems across tiers of government and states in Brazil. All else equal, subnational governments are more likely than national governments to heed the interests of local economic groups and establish protected areas that minimize harm to drivers of employment and state GDP. Where possible, states will seek to use conservation units as engines of economic growth. Federal actions contrast partially: While federal governments are as concerned with economic growth and employment creation as states (if not more so), the broader geographical distribution of federal governments' electoral mandates compared to state governments means that the federal government can impose stricter environmental standards, including stringent conservation units, in areas that may be too risky for states.

I expect this argument regarding land intensive industry and tier of government to travel well not only to other states in Brazil, but also to other federal democracies with sufficient economic diversification such that ecologically destructive industries do not dominate national politics. Though a study of subnational variation in conservation policy in one country may only generate imperfect predictions in other national contexts, *ceteris paribus* I expect national politicians in federal democracies to be more receptive to environmental advocacy than subnational politicians in districts dominated by land intensive industries. In contrast, countries that are unitary, and/or where national economies depend as heavily on land intensive industries as subnational economies do, should present outcomes that deviate from the predictions generated by this study.

Tier of government and land intensive industry dominance do not alone explain differences in conservation unit systems, of course, but rather they interact with political institutions, the presence or absence of local activism, and financial support from different sources. In fact, each of these variables plays some role in the case studies that follow: For example, local activists and allies in NGOs or state agencies and the media bring attention to environmental issues; and financial support from multilateral agencies (and elsewhere) can help agencies with limited resources to achieve their goals.

I acknowledge the importance of these factors, and incorporate them into the analysis that follows. However, I supplement extant studies of the influence of environmental movements, political regimes, and institutions on environmental policy with attention to the importance of tier of government and prevailing economic concerns in and around areas slated for protection, to show how these factors affect conservation unit outcomes. By comparing federal and state decisions regarding conservation units over time in the same subnational jurisdictions in Brazil, I contribute to the growing body of literature on federalism, decentralization, and environmental policy in developing countries.

The following four chapters apply the argument developed above to Brazil, and then to three states within the country. Chapter 2 provides an historical overview of conservation unit categories and institutions in Brazil, and then provides a large-N analysis of the relationship between tier of government, land intensive industries, and conservation units across all of Brazil's 26 states and the Federal District of Brasília. Chapters 3-5 examine individual states, and provide

a closer look at variation across tiers of government and land intensive industry dominance. Each chapter begins with an overview of the federal and state conservation unit systems, as well as a discussion of the state's economic geography. Each then traces the development of federal and state conservation unit systems over time, and concludes with a local case study in which the federal and state governments proposed different conservation units on the same land. Chapter 3 discusses the state of Pará, Chapter 4 Amazonas, and Chapter 5 Minas Gerais. Through the national empirical chapter and the three state case studies, I show how the land use needs of dominant economic interests vary across states and yield different conservation unit outcomes.

Chapter 2. The Evolution of Conservation Units in Brazil: National-Level Analyses

Introduction

In Chapter 1 I argue that the federal government is expected to enact more stringent conservation policies than subnational governments because land intensive industries exert greater pressure on the latter than on the former, while environmental interests offset industry lobbying better at the national than the subnational level. I argue that two variables – tier of government and strength of land intensive industries in a state – explain much of the variation in the character of conservation unit systems across states.

In this chapter, I make two sets of observations based on economic and conservation unit data for all of Brazil's 26 states and the Federal District of Brasília: First, although the states have created about twice as many conservation units as the federal government, the federal and state conservation unit systems in Brazil are roughly equal in size. Second, and more importantly, the state conservation unit systems are, on average, much more permissive by type, and less aggressive by placement, than the federal system is. I begin this chapter by tracing the historical development of conservation unit types, and discuss my coding of them as *strict*, *moderately strict*, *moderately permissive*, and *permissive*. I then present single variable analyses that show that in most states in Brazil the federal government is more likely than states to enact strict, moderately strict, and moderately permissive conservation units – while the states are more likely to opt for permissive units. Finally, I present bivariate correlations to show that the federal government is more likely than state governments to enact stricter types of conservation units even in states characterized by large land intensive industries. The expectations that drive the analyses in this chapter are the following: First, the larger the size of a land intensive industry in a state, the more permissive and smaller the conservation unit systems in that state or region are likely to be. Second, all else equal, on average federal conservation units will be stricter than state in any given state, irrespective of measures of land intensive industry.

This chapter is organized as follows: First, I provide an overview of the historical development of conservation unit categories, culminating in a discussion of the categories as codified in the 2000 National System of Conservation Units (SNUC) law. Second, I present summary national statistics on the timing, types, and locations of federal and state conservation units over time. Third, I present a series of correlations between key land intensive industry indicators and conservation units at the state level.

Brazilian Conservation Units – Understanding the Categories and their Histories

In this section, I analyze the development of environmental institutions and conservation unit categories over time in Brazil, to show how politics and conservation unit categories have evolved from the colonial period to the present. Conservation has a long history in Brazil, beginning with efforts during the Colonial and Empire periods to rationalize logging. In this section I trace the history of Brazilian environmental governance from the late Colony to the enacting of the National System of Conservation Units (*Sistema Nacional de Unidades de Conservação*, or SNUC) at the beginning of the 21st century. I conclude the section with a discussion of the categories of conservation units included in the SNUC.

Governmental efforts to manage resource extraction in Brazil date to the colonial era, when governors sought to control exploitation of wood and water. The *Regimento do Pau-Brasil* of 1605 and the *Carta Régia* of 1797 limited exploitation of brazil wood (*pau-brasil*) in the colony, and expressed the necessity of preserving cedar, mahogany, and other valuable hardwoods, which were important resources in Portugal (Medeiros 2006, 43). In Rio de Janeiro, the expansion of coffee plantations in the 1760s toward the Tijuca forest led to excessive forest clearing, which caused a decline in coffee plantation productivity and blights in the first half of the nineteenth century. In 1861, the Barão de Bom Retiro, the Minister of Business for the Empire, began expropriating *fazendas* devastated by the coffee plantations and established the Tijuca and Palmeiras Forests. According to Medeiros (2006, 44; translation mine), "... [these forests] were effectively the country's first protected areas, a draft of what would later become *florestas protetoras* [protective forests] instituted by the Forest Code of 1934."

The seed of the idea for conservation units emerged in Brazil in 1876, when Brazilian scientist André Rebouças, inspired by the creation of Yellowstone in the United States in 1872, proposed two National Parks for Brazil (ibid., 44-45). However, during the First Republic only one park – São Paulo State Park (1896) – was created, and the first National Park would not be established until 1937. In 1911 another scientist, Luís Felipe Gonzaga de Campos, published the first Forest Map of Brazil (*Mapa Florestal do Brasil*) with the explicit intention of helping government authorities to create a National Park system that – like in the United States at the time – would protect natural scenic beauty. The government responded to the map by decreeing two National Parks in the Acre territory in western Amazônia, but it never implemented the decrees. The country, however, forgot about these parks until the 1990s – by which time much of the forest area ostensibly protected by the parks had already been destroyed (ibid.).[1] In 1914, the state of Rio de Janeiro decreed the Guaratiba Biological Reserve, and in 1934, the federal government under Getúlio Vargas established the Lorena National Forest, also in Rio de Janeiro (MMA CNUC).

Vargas institutionalized forestry and limited protection: In 1934, the administration promulgated the Second Republican Constitution along with two key pieces of legislation that instituted the first conservation unit categories: The Forest and Hunting and Fishing Codes (Decree No. 23793/1934). The Forest Code established National Parks and three Forest categories: Remaining (*Remanescente*), Income (*Renda*), and Model (*Modelo*); and Biological or Aesthetic Protection Reserves. The Hunting and Fishing Code established Parks of Nurturing and Refuge for Animals, a precursor to SNUC's Wildlife Refuges (*Refúgios de Vida Silvestre*, or RVS) . While the codes left the division of responsibilities between the states and the federal government imprecise, they legitimized the actions of a few existing state Forest Services.[2] In 1937, the government decreed the first National Park, Itatiaia, on the border of Rio de Janeiro and Minas Gerais. Iguaçu and Serra dos Órgãos National Parks followed in 1939, as did Campos do Jordão and Morro do

[1] The only preserved part of these two forgotten National Parks is located in the Rio Acre Ecological Station, along the Acre-Bolivia border.

[2] Though some forest-protection institutions existed at the time, and continued from 1934 to 1964, conservationists at the time worked to draft a new Forest Code largely because the 1934 Code, according to historian Warren Dean (1996, 288),

> had never been enforced: Sufficient funds were never provided, and for many years [the 1934 Forest Code] had been policed by volunteers, many of whom were on the take. Their duties were then assigned to untrained civil police. A multiplicity of agencies was responsible for executing the code. Prosecution was undercut by a new penal code, which reduced forest crimes to misdemeanors, and by a reluctance to apply a law that was being rewritten.

Diabo State Parks in São Paulo in 1941, and Rio Doce State Park in Minas Gerais in 1944 (MMA CNUC).

The Forest Code established the first protected area categories in 1934, and new ones were developed over the following decades. In 1961, the Villas-Boas brothers' fight to set lands aside in northern Mato Grosso for indigenous tribes, to protect those tribes from violent Brazilian land grabbers, yielded the 2,642,003 hectare Xingu National Park (now Indigenous Park) (ISA 18 December 2014). This was the first indigenous set-aside, and began a long-running process of demarcating indigenous lands for tribes that culminated in the Indian Statute of 1973 (Law 6001 of 19/12/1973), and to date has led to the establishment of 695 indigenous lands occupying roughly 13% of the Brazilian national territory, run by the National Indian Foundation (*Fundação Nacional do Índio*, or FUNAI) in 2014 (ISA 2014a).[3]

In 1965, the military regime revised protected area categories when it promulgated the New Forest Code (Law 4771/1965), which incorporated conservation unit types defined in the 1934 Forest Code and added National Parks, Permanent Preservation Areas (*Área de Preservação Permanente*, or APP), and Legal Reserves (*Reserva Legal*, or RL).[4] APPs protect fragile ecological zones, such as riverbanks, from development and exploitation; while RLs require rural landowners to set aside certain percentages of their lands for permanent preservation. (Neither of these two categories constitutes a conservation unit, defined by the SNUC law.) In 1967 the Animal Protection Law (Law 5197/1967) codified Biological Reserves and Federal Hunting Parks, while a series of international agreements in the early 1970s created the Biosphere Reserve, Ramsar Site, and Natural World Heritage Site categories. (These last four categories are not included in the 2000 SNUC law as conservation units.)[5]

After the 1965 Forest Code, environmental institutional development proceeded apace in Brazil: In 1967, the military regime created the Brazilian Institute for Forestry Development (*Instituto Brasileiro de Desenvolvimento Florestal*, or IBDF; Decree-Law No. 289 of 28 February 1967), an independent federal agency linked to the Ministry of Agriculture. The IBDF's mission was to "formulate a forestry policy as well as orient, coordinate and execute or enforce the necessary measures for the rational utilization, protection, and conservation of renewable natural resources" (quoted in Medeiros 2006, 53; translation mine).[6] IBDF's responsibilities included enforcing the Forest Code as well as all legislation relating to renewable natural resources, as well as managing Rio de Janeiro's Botanical Garden, the National Parks and Forests, Biological Reserves, and Federal Hunting Parks. "In other words, a fortified and prestigious institution was being created, with an ambitious attribution: to manage all of the existing protected areas in the country" (Medeiros 2006, 53).

But institutionalization of forest management and protected area categories in the 1960s did not lead the government to embrace sustainable development: Despite growing international

[3] Though indigenous lands do often help to preserve forests, especially in the Amazon, they are not explicitly created for the purposes of conservation, and so are not analyzed in this study.

[4] "The military, annoyed at the intransigence of large landowners before any sort of reform and fearful of radicalization of the strike movements that had preceded their takeover, were trying to grasp the agrarian issue for themselves and at the same time stimulate efficient land use. Thus the generals brought together the issues of landownership and conservation" (Dean 1996, 289).

[5] "The principal characteristic of this period was bringing into Brazilian legislation the first elements capable of guaranteeing a differentiated regime of protection and management of parcels of the Brazilian territory, even though this was not effectively reflected in an expressive form in the number of instituted areas" (Medeiros 2006, 51; translation mine).

[6] According to Dean (1996, 300), the IBDF at this time was toothless with respect to enforcement.

concern for the environment in the 1970s, at the Stockholm Conference in 1972 the Brazilian delegates adopted a defensive, developmentalist posture that defended national sovereignty and rejected stringent international environmental measures (Guimarães 1991, 147-157).[7] However, domestically the government had already begun to see the necessity for a central body to carry out environmental policy and planning. In the late 1960s, the Brazilian Congress had advocated for a national environmental policy, and in 1967 the government created a National Council for Environmental Pollution Control in the Ministry of Health (Guimarães 1991, 160).

> All Brazilian states [at the time] had at least one agency related to pollution abatement. General Figueiredo... had also called attention to the need for a national policy of pollution control to be formulated by the federal government. The Declaration of Stockholm called for the creation of a specialized agency. (Guimarães 1991, 160)

The following year the government instituted the Special Secretariat for the Environment (*Secretaria Especial do Meio Ambiente*, or SEMA; Decree No. 73030 of 30 October 1973). SEMA was linked to the Ministry of the Interior and addressed pollution issues, but it was also "'oriented toward the conservation of the environment and the rational use of natural resources', dividing with the IBDF the responsibility for the management and oversight of Brazilian policy for protected areas" (Medeiros 2006, 53).[8]

SEMA was initially underfunded and understaffed for a national environmental secretariat, but it benefited from dedicated leadership. SEMA's first Secretary, Paulo Nogueira Neto,[9] had a staff of just three and almost no budget, but lamented his country's institutions' ineffective protection of forests and in response designed a new type of conservation unit: Ecological Stations.

> Since national parks and forests were under the auspices of the [IBDF]... [SEMA] came up with a creative alternative: ecological stations set up in parallel to the IBDF's parks, covering around 3.2 million hectares of land by the early 1990s. The term "station" (*estação*) evoked experimentation and research rather than conservation per se, so when the secretariat submitted a bill authorizing the creation of ecological stations, it passed unanimously. The law allowed 10 percent of the areas to be used or modified for research purposes. State governments ceded land, with permission for their universities to use it.

[7] "It was suspected that the industrialized countries had invented still another obstacle to Brazil's elevation to their ranks, and it was theorized that one of Brazil's comparative advantages consisted precisely in its undiminished capacity to absorb industrial pollution. 'Let pollution come, as long as the factories come with it,' exulted José Sarney, a northeastern senator who was to become president a decade later. The government's representative to the conference offered an insincere populist formula that was to be repeatedly relied upon: 'The worst form of pollution is poverty'" (Dean 1996, 292).

[8] "SEMA was created in response to an instance of environmental contamination.... when, fortunately for environmentalists, waves of stench emanating from a wood-pulp plant sickened residents of the home state of the *chefe do gabinete civil*, the chief of staff for the president of Brazil. Every time the wind blew toward Porto Alegre, the capital of Rio Grande do Sul, nausea, vomiting, and sickness affected an increasingly vocal population. After contact was made with the Interior Ministry, which was supposed to have a say in urban planning and zoning, this matter was brought to the attention of the Gabinete Civil through a decree that was tailor-made for the situation. Its backers were ready with the necessary E.M. occasions. This decree provided for a specific agency to be charged with solving specific problems such as the one in question." (Guimarães 1991, 160-161)

[9] "Paulo Nogueira Neto, a lawyer and biologist, had been an environmental activist in São Paulo since the mid-1950s. In 1955 he co-founded one of Brazil's first conservation associations, the Association in Defense of the Environment (Associação em Defesa do Meio Ambiente), after campaigning to support Governor Jânio Quadros's proposal for a protected forest reserve in the area of Pontal do Paranapanema, in the southwestern part of the state. Active in international conservation circles, he was named to the executive board of the International Union for the Conservation of Nature (IUCN) in 1970" (Hochstetler and Keck 2007, 27).

> INCRA, the federal land reform institute, allocated around 2 million hectares in the state of Amazonas, the navy provided an island on the Paraguai River of which the secretariat had not even been aware, and organs like the Funding Agency for Studies and Projects (FINEP) financed research. Even agencies whose activities financed destruction, like SUDAM (Agency for Amazonian Development), contributed money. This gave [SEMA] access to resources that IBDF could not get, despite [the IBDF's] formal responsibility for protected areas. (Hochstetler and Keck 2007, 29)[10]

After the progress made by SEMA on Ecological Stations in the 1970s, the next institutional watershed occurred in 1981, when the government approved the National Environmental Policy (*Política Nacional do Meio Ambiente*, or PNMA). The PNMA codified Ecological Stations and Environmental Protection Areas (*Áreas de Proteção Ambiental*, or APA). The latter is a category meant to rationalize human occupation and development of territory. The APA model was inspired by European Regional Natural Parks and sought to "establish a model of protection that saves areas with a certain level of occupation, especially in urban areas, without the need for the Union to acquire these lands" (Medeiros 2006, 54; translation mine). APAs generally cover large swathes of territory, permit private property and may include cities within them. Because of this, APAs are generally much more threatened by deforestation and ecological degradation than other types of conservation units, and so are considered by knowledgeable observers to be a comparatively weak category of conservation unit.[11] (Both Ecological Stations and APAs would later be included as SNUC categories.)

The two national conservation-oriented agencies, SEMA and IBDF, remained fragmented through the 1980s, but their structures and responsibilities were combined in 1989, when President José Sarney founded IBAMA. With the promulgation of PNMA in 1981, the IBDF maintained control over National Parks and Forests, while SEMA's responsibilities expanded from Ecological Stations to APAs. In 1984, the categories of conservation unit managed by SEMA expanded to four, with the inclusion of Ecological Reserves and Areas of Relevant Ecological Interest (ARIE). In 1989 IBDF and SEMA, as well as SUDHEVEA (Superintendence of Rubber) and SUDEPE (Superintendence of Development of Fishing), would be extinguished, and conservation unit governance – along with other environmental policy responsibilities – would be consolidated in the Brazilian Institute for the Environment and Renewable Resources (IBAMA) (Souza 2010).

Included in the mandate of the new agency, but still a low priority, was conservation unit creation and management, which was handled by three separate directorates: the Directorate of Ecosystems (DIREC), which managed all strict protection conservation units, as well as APAs and ARIEs; the Socio-Environmental Directorate (DISAM), which managed Extractive and Sustainable Development Reserves; and the Directorate of Forests (DIREF), which managed National Forests. These Directorates operated separately within IBAMA, with little common

[10] Hochstetler and Keck (2007, 29) continue: "Ecological stations had no budget line, and the secretariat was not allowed to hire guards. This was a problem, as SEMA had around 317 employees to the IBDF's six or seven thousand. Each ecological station had two to four resident caretakers, who called INCRA and the federal police whenever they detected an invasion. Nogueira Neto had written into the law a stipulation that the land had to belong to the public sector, to avoid creating the kinds of 'paper parks' that the IBDF created, with boundaries drawn around private land whose ownership was often unclear, and there was no money to buy it anyway."

[11] In analyzing conservation unit effectiveness, some Brazilian scholars exclude APAs (Author interview with José Augusto Drummond, Brasília, 2011). Environmental historian Warren Dean (1996, 341) critiqued the APA category, alleging that APAs are a "sort of zoning instrument that merely prohibit[s] activities that residents within the APA itself might decide [are] undesirable."

vision. IBAMA prioritized environmental licensing of economic projects and law enforcement over the needs and demands of conservation unit managers, even as the federal conservation unit system continued to expand. This changed only in 2007, when conservation unit competencies and personnel were severed from IBAMA and placed in the newly founded Chico Mendes Institute for Biodiversity Conservation (ICMBio) (Author interview with Pedro Eymard, ICMBio, 2012).

Further institutional reforms followed quickly on the heels of IBAMA: Later in 1989, the government created the Superior Council of the Environment, with IBAMA below it (Law 7.804, July 1989). In 1990, the government established the Secretariat of the Environment (SEMAM, Decree 99.244) and kept IBAMA as the Secretariat's implementation arm. In 1992, the Secretariat became the Ministry of the Environment (M.P. 309/Law 8.490), and in 1993 the Ministry changed once again, to the Ministry of the Environment and Legal Amazônia (which attests to the rising profile of Amazônia as a target region for environmental policy) (Hochstetler and Keck 2007, 38-39).

Conservation Unit Plans and Innovations, 1981-2000

The 1981 PNMA coincided with political liberalization, and a new institutional focus within the IBDF on preserving the Amazon. As environmental activism increased and institutions fortified with the PNMA, the IBDF produced two plans for a National System of Conservation Units. The first, published in 1979, proposed a national system with 16 categories and 13 new National Parks, Biological Reserves, and Ecological Stations in the Amazon (IBDF and FBCN 1979, 22). The second, published in 1982, proposed 14 categories (IBDF and FBCN 1982, 20-22). These plans responded to concerns that SEMA and the IBDF were duplicating efforts – indeed, the objectives of Ecological Stations managed by SEMA and Biological Reserves managed by IBDF are quite similar (Medeiros 2006, 54) – and constituted the first attempt by the Brazilian government to bring the disparate types of conservation units emerging at the time into one coherent national plan.[12] The plans were also the first federal environmental plans to focus specifically on the Amazon – a focus that continues today. Paulo Nogueira Neto of SEMA and Maria Tereza Jorge Pádua of IBDF saw the more proximate Atlantic Forest as doomed, "...already degraded with little left to protect, at best a reminder of what might happen if immediate measures were not taken in the north" (Dean 1996, 304). Efforts to design a national plan continued through the 1980s and led to the drafting of a National System of Conservation Units bill that was presented to Congress's Chamber of Deputies in 1992.

Two conservation unit innovations, in 1985 and 1996, highlighted the need for a national ordering of conservation unit categories. In 1985 the Acrean Rubber Tappers' Union leader Francisco "Chico" Mendes began advocating for the establishment of Extractive Reserves, set-asides

[12] Medeiros (2006, 54; translation mine) states:

> ...the existence of two governmental agencies with similar tasks duplicated the government's effort and it was evident that the new types created by SEMA presented a certain degree of overlap in relation to those subordinated to the IBDF. In practical terms, to cite just one example, SEMA's ESECs and IBDF's REBIOs achieve very proximate objectives.
>
> Beyond that, studies developed in the scope of the IBDF pointed out as early as the middle of the 1970s, the necessity of promoting a greater ordering of the process of creating protected areas, especially in the Amazon region, through a reorganization under the form of a single and integrated system... These studies and debates were the basis for the construction of a proposal that contemplated the creation of a system of "Conservation Units" in Brazil. Two proposals, one from 1979 and another from 1982, were the embryos for what would later be... the SNUC.

that would both preserve the forest and provide a better income and freedom to rural Amazonian rubber tappers who at the time worked in systems akin to debt peonage (Revkin 1990). The federal government established the first three Extractive Reserves (*Reserva Extrativista*, or RESEX) after Mendes's murder in Acre.[13] This category of reserve – like indigenous territories – explicitly permitted "traditional" rubber tapping communities to reside in and use natural resources.[14] In 1996, responding to advocacy led by biologist Márcio Ayres and international allies (Inoue 2007), the state of Amazonas established a similar type of set-aside: Governor Amazonino Mendes signed a decree changing the Mamirauá Ecological Station (established in 1990) into Brazil's first Sustainable Development Reserve (*Reserva de Desenvolvimento Sustentável*, or RDS) to protect the rights of villages in the Ecological Station that depended for their survival on fishing and other direct natural resource use (Medaglia 2010).

The work begun by IBDF to establish a national system of conservation units in 1979 continued through the 1980s. The first National System of Conservation Units (SNUC) bill (*Projeto de Lei*, or PL) was written by the environmental NGO Fundação Pró-Natureza (FUNATURA) at the IBDF's behest in 1988. FUNATURA's working group counted on the participation of key figures who had designed the 1979 and 1982 IBDF plans, including Maria Tereza Jorge Pádua and Angela Tresinari from IBDF. The working group submitted its draft project to IBAMA in 1989, and IBAMA and CONAMA spent three years revising it before submitting it to the Office of the Chief of Staff (*Casa Civil*) of the Presidency. According to Mauricio Mercadante (1999a), a participant in the SNUC debates, the Chief of Staff made the first major modification to the plan, which was to weaken the proposal by replacing criminal penalties for "aggressions to conservation units" with administrative sanctions, before submitting the project to the Chamber of Deputies in 1992.

Once in Congress, the PL (No. 2892/92) exposed divisions in Brazil's environmental community, with *conservationists* on one side advocating for the inclusion only of conservation units that prohibit direct use of natural resources within their boundaries – thereby excluding Extractive and Sustainable Development Reserves. On the other side, *socio-environmentalists* argued for the inclusion of categories that permit human occupation and resource use (Mercadante 1999b; Author interviews with Adriana Ramos and Nurit Bensusan, 2012). In addition to the human presence in conservation units, conflicts surrounded the issue of popular participation in the process of creating and managing conservation units. Meanwhile, ruralists and other Congressional lobbies sought to ensure that landowners would be compensated for expropriations for conservation units (Medeiros 2006, 57). As a result, to secure public support for new conservation units, the SNUC required both technical studies and public consultations, as well as – after establishing a conservation unit – the creation of a management council consisting of both representatives of public institutions and civil society.

[13] Sarney's environmental chief, Fernando César Mesquita, convinced Sarney to sign three extractive reserve decrees in Acre, Rondônia, and Amapá, on 12 March 1990 – three days before Sarney's term expired (Revkin 1990, 292). Collor appointed José Lutzenberger, the "most outspoken environmentalist in Brazil", to Secretary of the Environment (ibid., 291).

[14] Chico Mendes, Mary Allegretti, and collaborators had developed the idea of extractive reserves – as well as the idea for the *Conselho Nacional dos Seringueiros* – during a national rubber tappers' conference at the University of Brasília, 11-17 October 1985. At the time, they considered extractive reserves to be "a special system of agrarian reform.... reserved for 'extractive' activities such as rubber and nut harvesting" (Revkin 1990, 201-202). At the same time, Mendes' movement began to shift from exclusively social and economic concerns toward the environmental rhetoric for which it is now famous – "We demand to be recognized as [the] genuine defenders of the forest" (quoted in ibid., 203).

Conservationists initially dominated the SNUC debate in Congress. Deputy Fábio Feldmann, a conservationist, first sponsored the SNUC bill, and removed socio-environmentalist elements from the draft text. But the PL changed hands in 1995, placing socio-environmentalist Deputy Fernando Gabeira in charge. That same year, Deputy José Sarney Filho (who would become Minister of the Environment under President Cardoso) held six public hearings – in Cuiabá, Macapá, Curitiba, São Paulo, Rio de Janeiro, and Salvador – to build public support for the bill. The following year, environmental NGO Instituto Socioambiental hosted a workshop to analyze concrete conservation unit experiences involving traditional or rural populations. The Chamber of Deputies also hosted two seminars that year, "the first, quite controversial, about human presence in conservation units, and the second dedicated to the Private Natural Heritage Reserves – RPPN" (Mercadante 1999a; translation mine). In the end, conservationists' and socio-environmentalists' preferences were both represented in the SNUC: Conservationists got Ecological Stations, Biological Reserves, National Parks, and other *strict protection* (*Proteção Integral*, or PI) areas; while Socio-environmentalists got Extractive Reserves, Sustainable Development Reserves, National Forests, and other *sustainable use* (*Uso Sustentável*, or US) areas.[15] APAs were included with little debate (Author interview with Adriana Ramos, ISA, 2012). The inclusion of RPPNs (effectively conservation easements) sparked controversy, however, as these reserves – created in perpetuity on private lands at the request of landowners – are not owned or managed by public agencies.

[15] Ecological Stations and Biological Reserves are nearly identical, but both were included as a personal compromise between Maria Tereza Jorge Pádua – who had overseen Biological Reserves in IBDF – and rivals, who preferred Ecological stations (Author interview with José Drummond, Brasília, 2011).

Table 2.1. Brazilian National System of Conservation Units (SNUC) Categories

Conservation Unit (UC) Group	**UC Category (*Name in Portuguese*)**	**Characteristics**
Strict Protection (PI)		
1. ESEC or EE	Ecological Station (*Estação Ecológica*)	The most restrictive category, which focuses on preservation of nature. Research is the only human activity permitted in its area, and it is only permitted in 10% of the territory.
2. REBIO	Biological Reserve (*Reserva Biológica*)	Objective is preservation of nature. Research is the only human activity permitted, and is permitted on 100% of the UC.
3. PN, PES	National Park (PN), State Park (PES), and Natural Municipal Park (*Parque Nacional, Estadual, Municipal*)	In addition to scientific research on 100% of its area, development of education, recreation, and ecological tourism activities are permitted.
4. RVS	Wildlife Refuge (*Refúgio de Vida Silvestre*)	Objective is to protect natural environments to ensure conditions for reproduction of species or communities of native or migratory flora or fauna.
5. MN	Natural Monument (*Monumento Natural*)	To preserve natural sites that are rare, unique, or of great scenic beauty.
Sustainable Use (US)		
6. RDS	Sustainable Development Reserve (*Reserva de Desenvolvimento Sustentável*)	Human occupation and the managed use of natural resources is permitted, as long as a zone within it is dedicated to full protection.
7. RESEX	Extractive Reserve (*Reserva Extrativista*)	There is no full protection zone in its interior, and it permits the sustainable use of resources, as long as they do not include wood extraction.
8. RF	Animal Reserve (*Reserva de Fauna*)	Natural area with populations of native or migratory animal species, adequate for technical-scientific studies of sustainable economic management of animal resources.
9. FLONA, FES (or FLOTA)	National Forest (FLONA), State Forest (FES or FLOTA), and Municipal Forest (*Floresta Nacional, Estadual, Municipal*)	Sustainable use and management of natural resources is permitted, including wood extraction. These are the last units in the SNUC system not to permit private property in their areas.
10. ARIE	Area of Relevant Ecological Interest (*Área de Relevante Interesse Ecológico*)	Private property is permitted, as long as respect is shown for an area within it delimited for forest preservation.
11. APA	Environmental Protection Area (*Área de Proteção Ambiental*)	Area of human occupation, generally located near to (or overlapping) cities, in which private property is not only permitted but exists in the area; the area exists more to facilitate territorial ordering than conservation *per se*.
12. RPPN	Private Natural Heritage Reserve (*Reserva Particular de Patrimônio Natural*)	Among the sustainable use conservation units, this is the most restrictive. It functions as a strict protection conservation unit under private domain.

Source: CEPAL, Governo do Amazonas, and GTZ (2007: 71-72; translation mine); SNUC (Law 9985/2000).

As Table 2.1, above, shows, the SNUC (Law 9985/2000) codifies twelve categories of conservation unit divided into two umbrella groupings: strict protection and sustainable use. The most stringent types of strict protection are Ecological Stations and Biological Reserves, for which access and use are restricted to research. Wildlife Refuges, Natural Monuments, and Parks are also stringent, but may permit tourism. Human impact on all of these conservation units should be minimal, limited to *indirect* use – that is, visiting, observing, recording, taking samples; but not exploiting the natural resources within the areas. As is true in American national parks, some allowance is made for the construction of management headquarters, trails, and other tourist infrastructure.

In contrast to strict protection areas, sustainable use areas permit varying degrees of *direct* natural resource use: Rubber tappers and fishing communities may harvest rubber and fish in Extractive and Sustainable Development Reserves, and these extractive activities, as well as commercial logging, are permitted in National and State Forests. All sustainable use categories save for Extractive Reserves are expected to be zoned such that different zones permit different activities, and at least one zone is of strict protection (CEPAL, Governo do Amazonas, and GTZ 2007, 71-2).

All categories but Private Natural Heritage Reserves (RPPN) are managed by the federal, state, or municipal government. RPPNs are qualitatively different from other conservation unit categories because they are established on private lands. RPPNs are conservation easements, decreed in perpetuity. Finally, Areas of Permanent Protection (APP) and Legal Reserves (RL) are not incorporated into SNUC as conservation units – though all conservation units ostensibly have APPs within them.

The path toward the enacting of SNUC, which was signed under President Cardoso in 2000 and had its implementing legislation enacted in 2002, took a long time. The evolution of categories incorporated into the SNUC law evolved with discrete innovations carried out by different protagonists, including Paulo Nogueira Neto and SEMA in the 1970s (Ecological Stations), Chico Mendes and the National Rubber Tappers' Council in the 1980s (Extractive Reserves) and Márcio Ayres and allies in Amazonas in the 1990s (Sustainable Development Reserves). In the end, the SNUC debate pitted conservationists – who argued that protected areas should be free from human occupation – against socio-environmentalists – who argued that local communities could be trusted to care for their natural surroundings sustainably. In the end, the SNUC became a compromise, enabling the federal and subnational government to choose to what constituencies they would appeal when proposing new conservation units.

In the following two sections, I will analyze patterns of conservation unit creation at the federal and state tiers of government, to illustrate similarities and differences between them. I begin the empirical analysis with a series of univariate descriptive statistics that show that in most states in Brazil the federal government is responsible for more land protected by strict protection conservation units than the states are. I will then conduct a series of bivariate analyses, examining the relationships between different types of land use intensive economic activities in the Brazilian states, and the relative presence of strict protection and sustainable use conservation units in those states.

Coding Conservation Unit Types

There is considerable overlap in terms of actual protection provided by the categories of conservation unit detailed above, in Table 2.1. To simplify the analyses that follow, and to draw

firmer conclusions regarding the influence of economic geography and tier of government on average conservation unit types, I discuss here my coding scheme for conservation units. I divide the categories of conservation units detailed above into four broad types: *strict*, *moderately strict*, *moderately permissive*, and *permissive*.

Strict conservation units prohibit most types of direct use, including logging, cattle ranching, mining, and other ecologically destructive activities. This type includes *all* units defined by Brazilian law as *strict protection*, including Ecological Stations, Biological Reserves, Parks, National Monuments, and Wildlife Refuges.

Moderately strict conservation units prohibit most direct use, save for sustainable extraction. There is only one SNUC category that falls under this type: Extractive Reserves. Extractive Reserves are a *sustainable use* category in Brazilian law, but they prohibit most ecologically destructive activities, including timber extraction, cattle ranching, and mining.

Moderately permissive conservation units permit greater degrees of direct use than *moderately strict* units do. Direct use on these units may (though does not always) include logging and mining. SNUC categories included in this type are Sustainable Development Reserves, National and State Forests, and Areas of Relevant Ecological Interest.

Finally, *permissive* conservation units permit almost all direct use of natural resources, with only some restrictions applied at the convenience of local residents. The only category included in this type are Environmental Protection Areas (APA), which, according to my interviews and to Dean (1996, 341), are "a sort of zoning instrument that merely prohibit[s] activities that residents within the APA itself might decide [are] undesirable." According to an interview with an APA manager, "[In an APA], what isn't [explicitly] prohibited is permitted" (Not-for-attribution interview with the author, 2012). APAs often permit, or do not explicitly prohibit, ecologically destructive activities such as mining, timber extraction, cattle grazing, and urban growth.

Empirical Analysis 1: Summary Statistics of Brazilian Conservation units

In this section, I examine federal and state trends in conservation units, and describe cross-state and cross-regional variation. Conservation unit creation in Brazil dates to 1937, when the federal federal government established its first conservation unit, Itatiaia National Park. By 2012 the federal government had created 303 more areas, totaling 76,848,771.30 hectares.[16] State units in the wealthier states of the southeast followed soon afterward: In 1941, the state of São Paulo created its first State Park, Campos do Jordão. By 2010, the states possessed 75,540,950.48 hectares distributed across 615 conservation units (Drummond, Andrade Franco, and Oliveira 2010, 374). The growth from 1937 to 2010 masks significant differences, however, between states, regions, and levels of government. In this section, I will address each source of variation in turn, and show that the state system is much more heavily oriented toward sustainable use conservation units – especially APAs, the most permissive category of conservation unit – than the federal system is, and that both the federal and state governments tend to be less aggressive about creating conservation units in regions of the country that are more productive and oriented toward land intensive industries.

[16] This figure is calculated including overlap between some conservation units (e.g. the area of strict protection areas embedded within APAs is not counted). ICMBio calculates that without overlap, the federal conservation unit system totaled 73,987,193.58 hectares. There is some uncertainty about the total overlap – reflecting some uncertainty in the borders of some conservation units – as ICMBio calculates 74,492,386.96 hectares *with* overlap –a difference of more than 2 million hectares between ICMBio and Drummond, Andrade Franco, and Oliveira 2012.

Below, in Table 2.2, I provide system-wide summary statistics to illustrate the national variation between level of government and type of conservation unit.

Table 2.2. Distribution of Federal and State UCs by Type

	Federal			State		
Category/Group	Number	Area (hectares)	Percentage of total federal UC area	Number	Area (hectares)	Percentage of total state UC area
Strict	**131**	**35,601,408.13**	**46.25**	**302**	**15,409,790.73**	**20.4**
Ecological Station	31	6,862,260.49	9	58	4,796,846.39	6.35
Natural Monument	2	44,179.73	.05	13	62,599.41	.08
National/State Park	64	24,658,349.29	32	195	9,063,804.27	12
Biological Reserve	29	3,867,514.73	5	29	1,358,291.05	1.8
Wildlife Refuge	5	169,103.88	.2	7	128,249.61	.17
Moderately Strict	**59**	**12,270,533.12**	**16**	**28**	**2,059,193.06**	**2.73**
Extractive Reserve	59	12,270,533.12	16	28	2,059,193.06	2.73
Moderately Permissive	**142**	**31,586,737.90**	**25.13**	**126**	**26,900,350.10**	**32.89**
Area of Relevant Ecological Interest	17	43,432.51	.05	25	37,278.89	.05
National/State Forest	65	19,208,330.98	25	45	13,889,585.43	18.39
Sustainable Development Reserve	1	64,441.29	.08	28	10,914,292.76	14.45
Permissive	**31**	**9,660,625.28**	**12.57**	**187**	**33,230,809.62**	**43.99**
Environmental Protection Area (APA)	31	9,660,625.28	12.57	187	33,230,809.62	*43.99*
Total	**304**	**76,848,771.30**	**100**	**615**	**75,540,950.48**	**100**

Source: Drummond, Andrade Franco, and Oliveira 2010, 361, 374.

Table 2.2 reproduces and modifies Table 1.3 (Chapter 1) by re-categorizing Table 1.3's *strict protection* and *sustainable use* conservation units as *strict*, *moderately strict*, *moderately permissive*, and *permissive*. Table 2.2 shows a different balance between strict, moderately strict, and moderately permissive units across the federal and state levels of government in Brazil – even though the total areas of each tier's conservation unit system are close to equal. Notably, 46% of federal area is in strict protection categories, while only 20.4% of state area is in these categories. Meanwhile, almost 44% of the states' conservation unit systems is accounted for by APAs, the most permissive category of conservation unit, while moderately permissive State Forests and Sustainable Development Reserves account for only 18.39% and 14.45% of state UC area, respectively.

Conservation unit types are unequally distributed across states. With respect to state strict protection – *strict* – areas, Alagoas, Piauí (in the Northeast), and Roraima (in the North) did not have any strict protection areas in 2010, though Alagoas finally established one – a Wildlife Refuge – in 2012. Acre and Sergipe have only one state strict protection area each. The three states with the highest number of strict protection state UCs are São Paulo (57), Minas Gerais (51), and Paraná

(33). Mato Grosso has 26 strict CAs, Rio Grande do Sul 19, and Rio de Janeiro 16. In all of the states, strict UCs represent small proportions of total state UC area: Pará – 34.9%, Amazonas – 23.7%, Mato Grosso – 10.3% (these three states also account for 69% of the total area of state strict UCs in the country), Rondônia – 6.35%, São Paulo – 5%, Acre – 4.5%. These six states possess 85% of state strict protection UC area. The imbalance by number is similar: State Parks account for 58.8% of state strict UCs and Ecological Stations 31%. Minas Gerais, São Paulo, and Paraná lead the country on both: 89 State Parks (of 195 nationwide) and 39 Ecological Stations (of 58). But total areas are small: Strict protection areas, though numerous, protect only 4.2% of São Paulo, 1% of Minas Gerais, and 0.32% of Paraná (ibid., 376). The most numerous category in all states that have state strict protection areas is State Parks (Drummond, Andrade Franco, and Oliveira 2010, 374).

With respect to moderately permissive and permissive conservation units, the northeastern state of Bahia possesses the largest number of state APAs – 32 – while the state of Pará has the largest area of APAs – 6,863,925.24 hectares. Maranhão, which has 10% of all state sustainable use conservation unit by area – encompassing moderately strict, moderately permissive, and permissive units –, has *all* of its sustainable use area accounted for by APAs. Amazonas, where the category of Sustainable Development Reserve was invented, has the largest number (15) and most area protected by this category – 90% of the total national area of state Sustainable Development Reserves, or 9,898,418.37 hectares (ibid., 377-8).

Summary Statistics by Region

In this section, I show the distribution of different types of conservation units by state and political-geographical region in Brazil. Administratively, the 26 Brazilian states and Federal District of Brasília (DF) are divided into five regions: the North (Amazon), Northeast, Center-West, Southeast, and South. These administrative regions map imperfectly onto ecological biomes, as the six biomes cross administrative regions: the North, for instance, incorporates all of the Amazon and part of the Cerrado, while the Center-West has Cerrado, Pantanal, and Amazon; the Northeast has Cerrado, Caatinga, and Atlantic Forest; the Southeast has Atlantic Forest and Cerrado; and the South has Atlantic Forest, Pampa, and a small area of Cerrado. Nevertheless, employing political rather than ecological regions allows us to analyze state and federal interventions inside and outside of the Amazon and across states.

Overall, the state systems of conservation units are more heavily weighted toward sustainable use areas than the federal system is, and the Amazon ecological biome possesses on average more, and larger, conservation units than the other biomes in Brazil, indicating a strong federal drive to protect the world's most famous rainforest – and a preference for establishing large conservation units in states with relatively greater shares of empty lands. The federal government's stronger emphasis on the Amazon than elsewhere responds to international and local civil society pressures, and has caused the country to deviate somewhat from its Convention on Biological Diversity (CDB) commitment to protect at least 10% of each *ecoregion*, or biome,[17] by 2010. In 2002, Brazil reinforced this commitment in its National Biodiversity Plan (*Plano Nacional de Biodiversidade*, or Pan-Bio, Decree No. 4,339 of 22 August 2002). As shown in Table 2.3, as of 2010, only in the Amazon had Brazil's states and federal government joined forces to protect over

[17] An ecoregion, or biome, is a set of natural communities that are geographically distinct that share the majority of their species, ecological processes and dynamics, and have similar environmental conditions. Brazil has six biomes: the Amazon, Caatinga, Cerrado, Pantanal, Atlantic Forest, and Pampa.

10% of the biome, though the Cerrado and Atlantic Forest come close. Table 2, below, shows the distribution of area under protection by biome:

Table 2.3. Area of Conservation units by Ecological Biome, 2010[18]

Biome	Area under Strict Protection (ha)	Area under Sustainable Use (ha)	Total (ha)	% of the Biome under Protection
Amazônia	40,808,081.00	72,652,886.00	113,460,967.00	27.03
Caatinga	859,192.00	5,277,424.00	6,136,616.00	7.27
Cerrado	5,811,057.00	10,773,725.00	16,584,782.00	8.15
Atlantic Forest	2,423,476.00	7,292,632.00	9,716,108.00	8.75
Pampa	189,888.00	422,892.00	612,780.00	3.47
Pantanal	439,325.00	0.00	439,325.00	2.92
Marine	480,175.00	4,958,975.00	5,493,150.00	*
TOTAL	51,011,198.86	101,378,522.92	152,389,721.78	

Source: Reproduced from Drummond, Andrade Franco, and Oliveira (2010, 379).
*There is no exact definition of Brazil's marine territory, so no percent of the area protected can be calculated.

Table 2.4, below, shows the states, the regions in which they are located, and the area and percent of state area of federal and state conservation units.[19] In general, UCs occupy relatively small proportions of the territories of each state, and only in Maranhão, São Paulo, Mato Grosso, and Goiás are the area of state UCs larger than the area of federal UCs. As I will show below, however, this is largely because these states have enormous APAs that account for a large percentage of state UC area.

[18] Given that the majority of conservation units in each biome are in sustainable use areas, Drummond, Andrade Franco, and Oliveira (2010, 379) argue that Brazil is farther from meeting its Pan-Bio goals than the numbers indicate. Their argument is based on the intuitive assumption that sustainable use conservation units provide less protection of biodiversity than strict protection areas. In taking this position, the authors take one side in a broader debate about the comparative effectiveness of more or less stringent conservation units at reducing deforestation and protecting biodiversity (see Campbell et al. 2008, Joppa and Pfaff 2009, Naughton-Treves et al. 2005, Pfaff et al. 2013).

[19] State areas are approximate, as they were calculated from CNUC spatial data, using an Albers South America Equal Area Conic projection. Federal areas are taken from ICMBio data, and state areas in hectares from IBGE. Calculations do not account for overlap between CAs, so areal calculations overestimate total state area covered by UCs.

Table 2.4. Summary Data – Conservation Units by State

State	region	State Area (ha)	Area of Federal UCs (ha)	Federal UCs as % of State area	Area of State UCs (ha)	State UCs as % of State Area
11 – Rondônia	Amazon	23759054.7	3417474.85	14.4	2096301	8.8
12 - Acre	Amazon	16412304	4044527.39	24.6	754823	4.6
13 - Amazonas	Amazon	155915914.8	22861376.78	14.7	19309709	12.4
14 - Roraima	Amazon	22430050.6	1610356.8	7.2	1564729	7.0
15 – Pará	Amazon	124795466.6	20279286.87	16.3	20217316	16.2
16 – Amapá	Amazon	14282852.1	6030891.24	42.2	3266160	22.9
17 - Tocantins	Amazon	27772052	1259480.33	4.5	2354075	8.5
21 – Maranhão	Northeast	33193745	1312320.29	4.0	6304632	19.0
22 – Piauí	Northeast	25157773.8	2839379.05	11.3	0	0.0
23 – Ceará	Northeast	14892047.2	1025293.7	6.9	67515	0.5
24 - Rio Grande do Norte	Northeast	5281104.7	10028.54	0.2	69694	1.3
25 – Paraíba	Northeast	5646977.8	27346.43	0.5	2568	0.0
26 - Pernambuco	Northeast	9814832.3	572393.68	5.8	11375	0.1
27 - Alagoas	Northeast	2777850.6	339704.51	12.2	162755	5.9
28 - Sergipe	Northeast	2191511.6	22602.98	1.0	894	0.0
29 - Bahia	Northeast	56473317.7	1207623.78	2.1	5345609	9.5
31 - Minas Gerais	Southeast	58652212.2	1188325.89	2.0	2233552	3.8
32 – Espírito Santo	Southeast	4609558.3	215237.05	4.7	22644	0.5
33 - Rio de Janeiro	Southeast	4378017.2	511188.9	11.7	301967	6.9
35 – São Paulo	Southeast	24822280.1	680619.98	2.7	4486502	18.1
41 – Paraná	South	19930792.2	993543.6	5.0	2573	0.0
42 - Santa Catarina	South	9573616.5	324285.55	3.4	109413	1.1
43 - Rio Grande do Sul	South	28173022.3	387668.96	1.4	254887	0.9
50 - Mato Grosso do Sul	Center-West	35714553.2	767980.14	2.2	218536	0.6
51 - Mato Grosso	Center-West	90336619.2	1887532.87	2.1	2401941	2.7
52 – Goiás	Center-West	34011178.3	599911.05	1.8	1221078	3.6
53 - Distrito Federal	Center-West	577999.9	557474.05	96.4	106080	18.4

Source: MMA (2012).

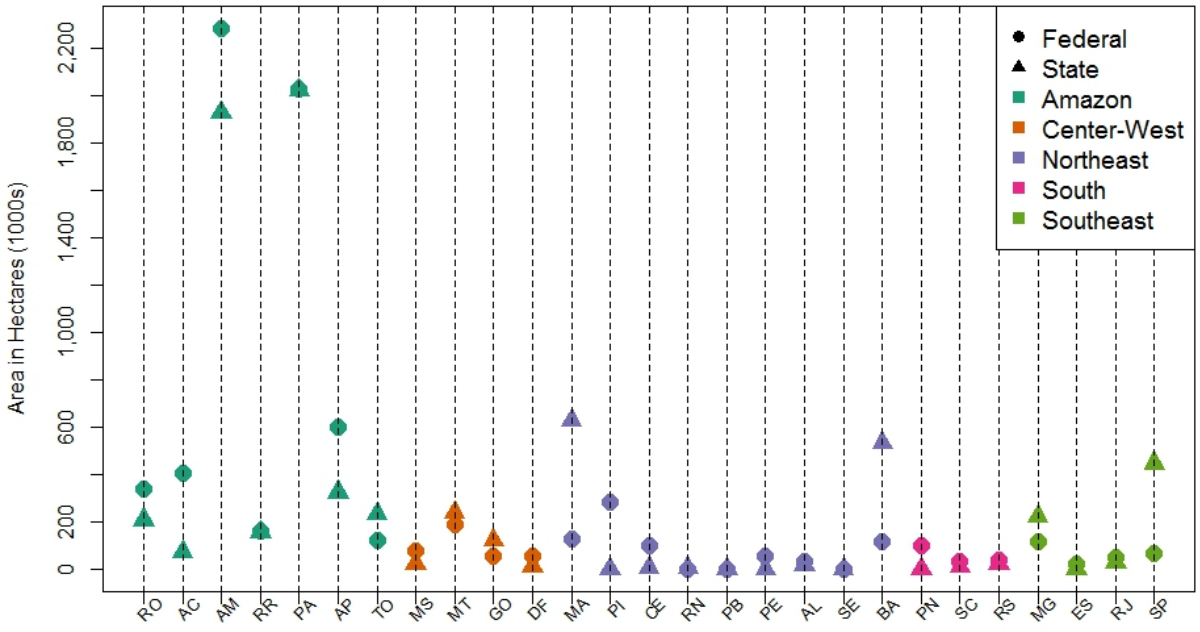
Table 2.4 also demonstrates that conservation units occupy more territory, and larger percentages of state territory, in the Amazon than elsewhere. The most visible exceptions occur in the Center-West, where the DF has over 96% of its territory covered by federal UCs – much of which is accounted for by the APA do Planalto Central, which encompasses 63% of the district's territory.

Below I provide a series of figures to help the reader visualize the distribution of conservation units across states and regions. In each of Figures 2.1-2.5, the circles represent the value

that corresponds to the federal government, while the triangles represent the value that corresponds to the state government. Notice that states are grouped by region of Brazil along the X-axis.

Figure 2.1, below, shows the distribution of the area of federal UCs in each state.

Figure 2.1
Area of Federal and State Conservation Units by State



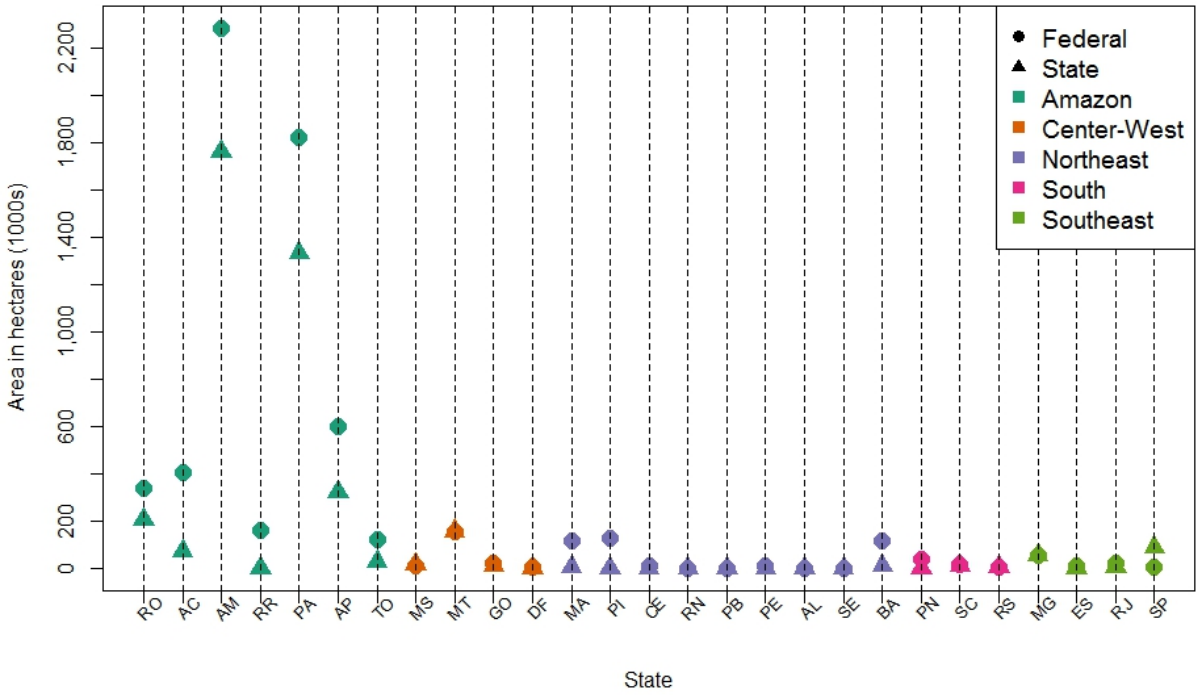
It is clear from Figure 2.1, above, that the Amazon – especially Amazonas and Pará – accounts for much of the area of Brazil's federal UCs. This is an intuitive finding given the federal government's greater attention to the Amazon than to other regions of the country. In contrast, the Center-West and South account for relatively little total UC area, though both Maranhão and Bahia possess a significant quantity of APAs. Finally, in the Southeast Minas Gerais and São Paulo possess greater areas in state UCs than the federal government, but again, much of the area in both state is accounted for by APAs. Indeed, much of the state UC area nationwide is accounted for by APAs: In 13 states APAs account for over 70% of the area of state conservation units.[20] The same is true for federal UCs in only 7 states.[21]

Because APAs are a weak category of protection, and are so large and numerous that they can paint a deceptive picture of states' commitment to biodiversity preservation, the next figure, 2.2, shows a revised area calculation that excludes APAs. Here, both federal and state totals drop slightly for all states, with the largest drop occurring in the Amazonian states. São Paulo and Minas Gerais, in the Southeast, also lose much of their state UC area. The drop is even more visible for Maranhão and Bahia, whose state area totals fall below the federal UC area totals in each state. Large portions of these states' state conservation unit system areas are accounted for by APAs.

[20] Roraima, Alagoas, Maranhão, Bahia, Paraíba, Goiás, Tocantins, Rio Grande do Norte, DF, Ceará, São Paulo, Rio Grande do Sul, and Rio de Janeiro. (In Roraima, the federal government has 0 APAs, while the only state UC is an APA.)

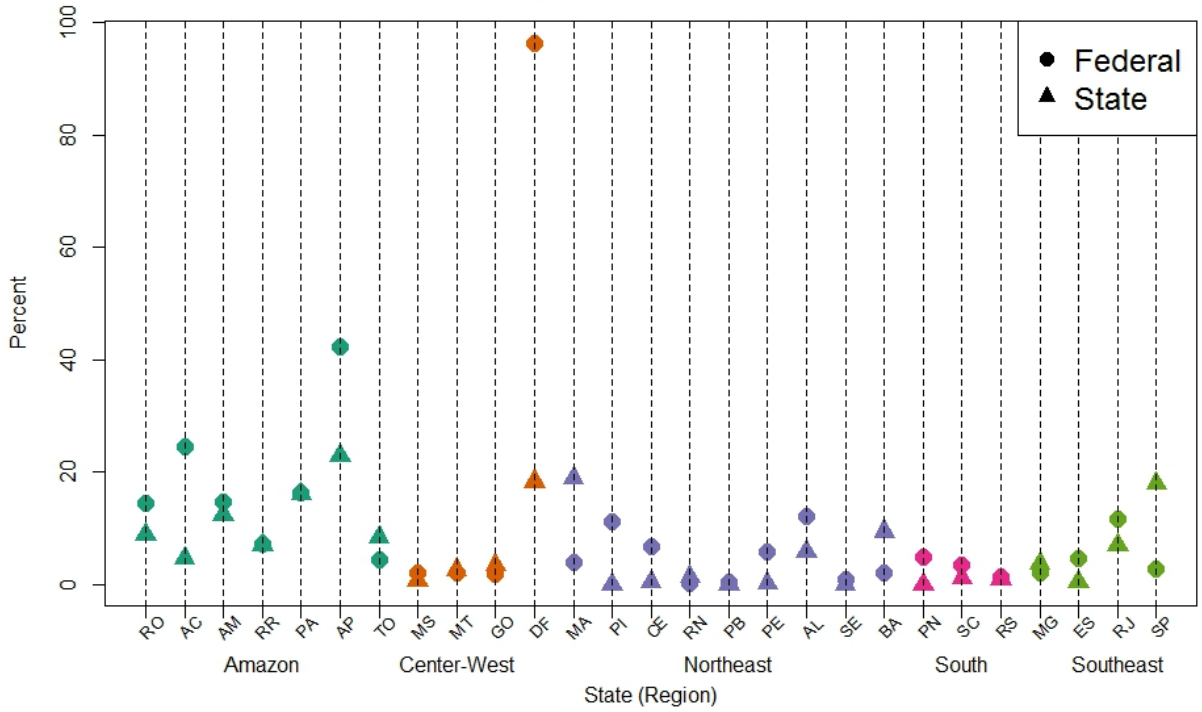
[21] Alagoas, Ceará, DF, Mato Grosso do Sul, Pernambuco, Rio Grande do Sul, and São Paulo.

Figure 2.2
Area of Federal and State Conservation Units, Excluding APAs



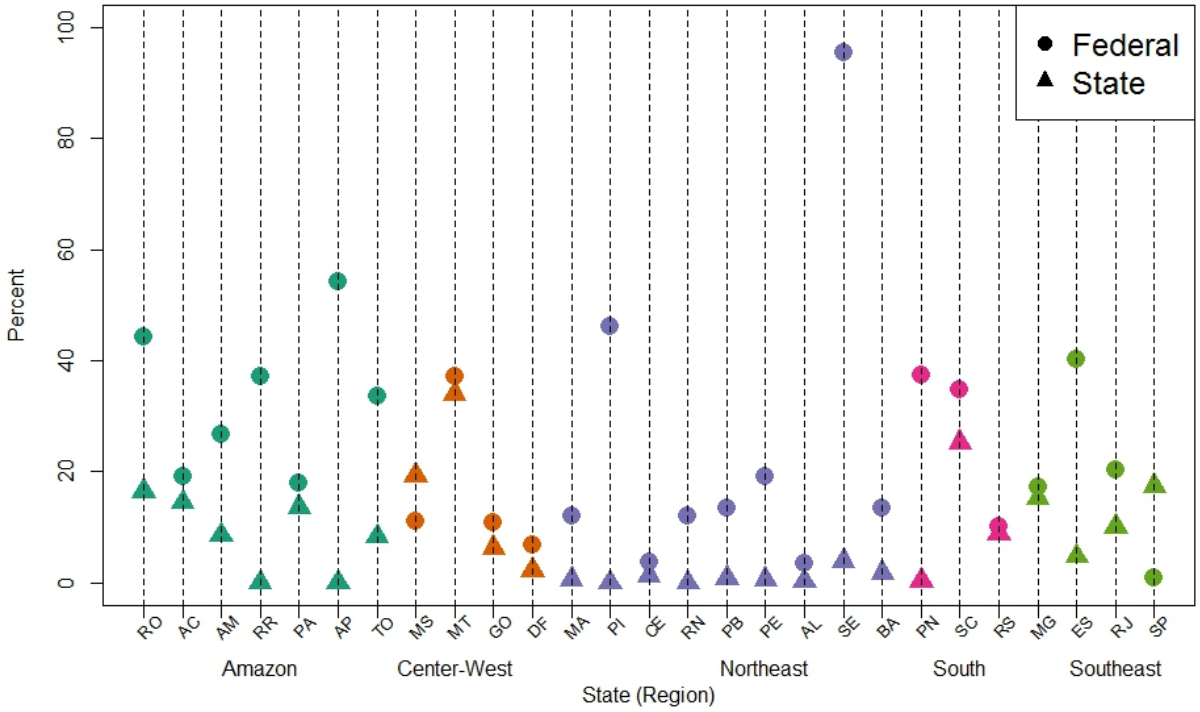
By percent of state area, shown below in Figure 2.3, the federal government stands out as more aggressive than the states: it has protected more area in 16 of Brazil's 27 states (including the Federal District) than state governments have. As is generally true for area, percent totals for both federal and state UC systems are greater in the Amazonian states than elsewhere – with the exception of the DF, where federal APAs, Parks, and Forests encompass over 90% of the district's area. By percent of state area, in addition, São Paulo's state government has out-protected even the Amazon's leaders, Amazonas and Pará – though, again, much of São Paulo's state UC area is protected by APAs. The figure below shows the percent of a state's territory that is in federal and state conservation units. Where percentage totals between federal and state systems exceed 100% of total area (as is the case in the Federal District of Brasília), this is due to overlap between federal and state conservation units.

Figure 2.3
Percent of State Area in Federal and State Conservation Units



In Figure 2.4, I show the percent of conservation unit area in each state that is in *strict protection* conservation units – that is, all of the categories of conservation units that I code as "strict." The calculation is as follows: For each state, I divided the area of each system – state and federal – in strict conservation units by that system's total area. In most states, a larger percentage of the federal system is in a strict category of conservation unit, while a smaller percentage of the state system is in the same. In general, the federal system in each state is stricter than the state system.

Figure 2.4
Percent of Conservation Unit Area in Strict Protection Conservation Units



Next, we need to account for APAs, which tend to be large, and are numerous in Brazil's conservation unit system. Table 2.5, below, shows the share of APAs in each state's federal and state UC systems. The federal government has established close to 45 APAs (there are fewer because several cross state borders, and I used spatial data to calculate number and share in each tier's system by state), while the state system has 151. With only a few exceptions, APAs represent relatively high shares of each state's state system of conservation units by area, and somewhat lower shares of each state's federal system.

Table 2.5. APAs (Environmental Protection Areas) by State

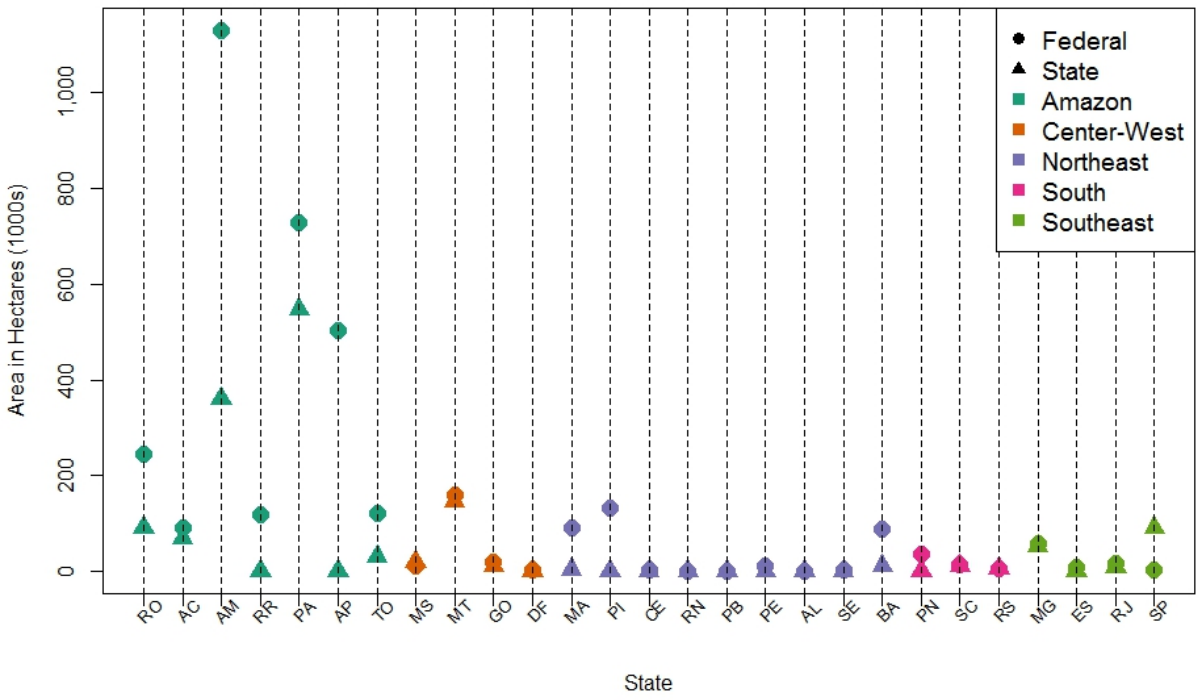
State	Region	Federal APA Count	Percent of Federal UC System in APA (area)	State APA Count	Percent of State UC System in APA (area)
11 – Rondônia	Amazon	0	0.00	1	0.32
12 - Acre	Amazon	0	0.00	2	4.66
13 - Amazonas	Amazon	0	0.00	5	8.78
14 - Roraima	Amazon	0	0.00	1	100.00
15 – Pará	Amazon	2	0.11	8	33.95
16 – Amapá	Amazon	0	0.00	2	0.67
17 - Tocantins	Amazon	2	2.97	9	87.28
21 – Maranhão	Northeast	1	10.98	7	99.24
22 – Piauí	Northeast	3	53.75	0	NA
23 – Ceará	Northeast	4	86.46	10	79.42
24 - Rio Grande do Norte	Northeast	0	0.00	3	81.46
25 – Paraíba	Northeast	1	54.55	3	90.42
26 - Pernambuco	Northeast	3	79.28	1	66.49
27 - Alagoas	Northeast	2	91.94	4	99.33
28 - Sergipe	Northeast	0	0.00	0	0.00
29 - Bahia	Northeast	0	0.00	21	97.72
31 - Minas Gerais	Southeast	4	50.06	11	59.44
32 – Espírito Santo	Southeast	1	0.00	2	50.47
33 - Rio de Janeiro	Southeast	5	57.59	13	72.98
35 – São Paulo	Southeast	4	91.13	29	79.39
41 – Paraná	South	2	61.95	0	0.00
42 - Santa Catarina	South	2	49.12	0	0.00
43 - Rio Grande do Sul	South	1	81.72	2	77.92
50 - Mato Grosso do Sul	Center-West	1	85.88	2	12.51
51 - Mato Grosso	Center-West	1	15.36	4	33.53
52 – Goiás	Center-West	3	61.71	8	88.78
53 - Distrito Federal	Center-West	3	89.74	3	81.37
TOTAL	Brazil	45*		151	

* Federal APA count overestimates total, as APAs that cross state borders are counted as one in each state. As of 2010, there are only 31 federal APAs.

Now, with respect to more stringent areas, the argument put forth in this study is that all else equal, federal conservation unit systems in each state should be more stringent than state systems, because the federal government is better buffered from the influence of local economic interests than state and municipal governments are. In fact, the total area of federal strict protection units is greater than the total area of state strict protection areas in all but two state: São Paulo and

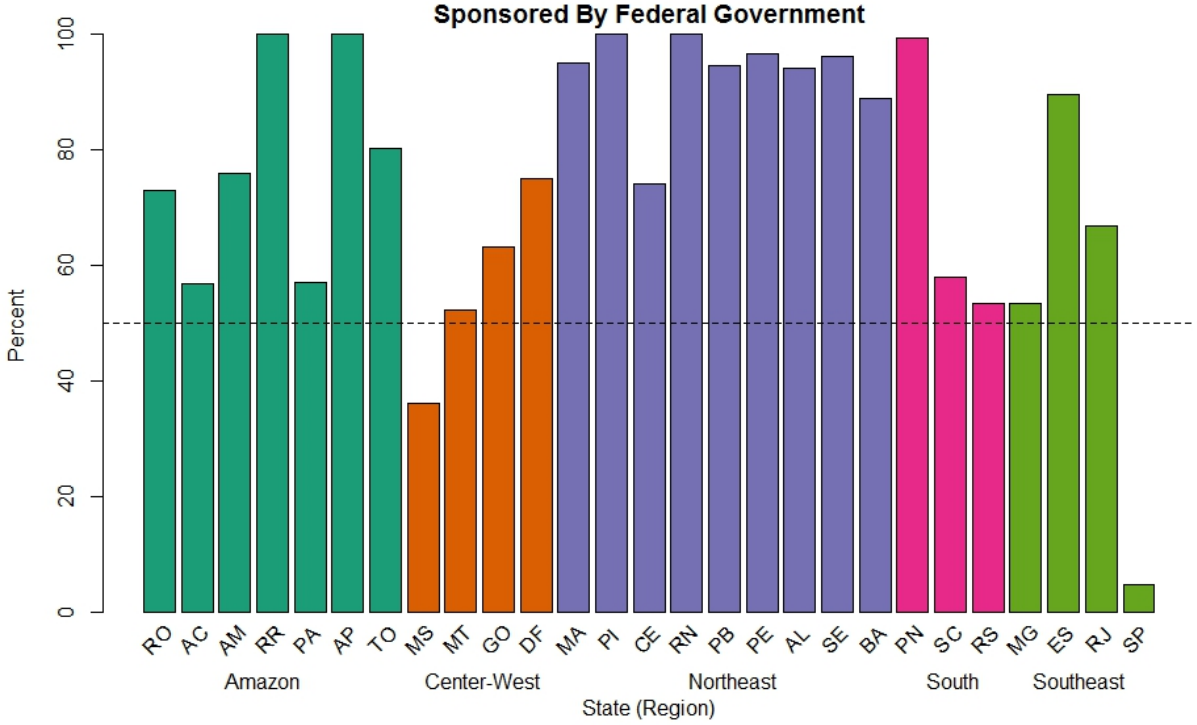
Mato Grosso do Sul. The difference is starkest in the Amazon, where the federal government has placed significantly more land under strict protection than states have, but considerable differences are evident also in Maranhão, Piauí, and Bahia. As with other indicators, São Paulo is the greatest exception here: Its state system of UCs is much larger than the federal system in the state, and this includes strict protection UCs. In 16 states, the proportion of strict protection to total UC area in the federal system is greater than it is in the state system. The relative areas of federal and state strict protection conservation units in each state is shown in Figure 2.5, below.

Figure 2.5
Area of Federal and State Strict Conservation Units



While area of conservation unit coverage across states is at least partially contingent on the size of a state's territory – that is, states that have less area should have smaller conservation unit systems, all else equal – percentage of strict protection units accounted for by the federal government is not. Figure 2.6, below, controls for state area by showing the percentage of *strict* – that is, all categories that fall into Brazilian *strict protection* categories – conservation unit area for each state in Brazil that is accounted for by the federal conservation unit system. In every state but Mato Grosso do Sul and São Paulo, the *federal* strict UCs account for more strict protection area than the *state* strict units do. In the Amazon, the federal conservation unit system accounts for 100% of the strict protection UCs in Roraima (RR) and Amapá (AP), over 70% in Rondônia (RO), Amazonas (AM), and Tocantins (TO), and just under 60% in Acre (AC) and Pará (PA). Meanwhile, in the Northeast, the federal system accounts for over 70% of the strict protection UC area across *all* of the states.

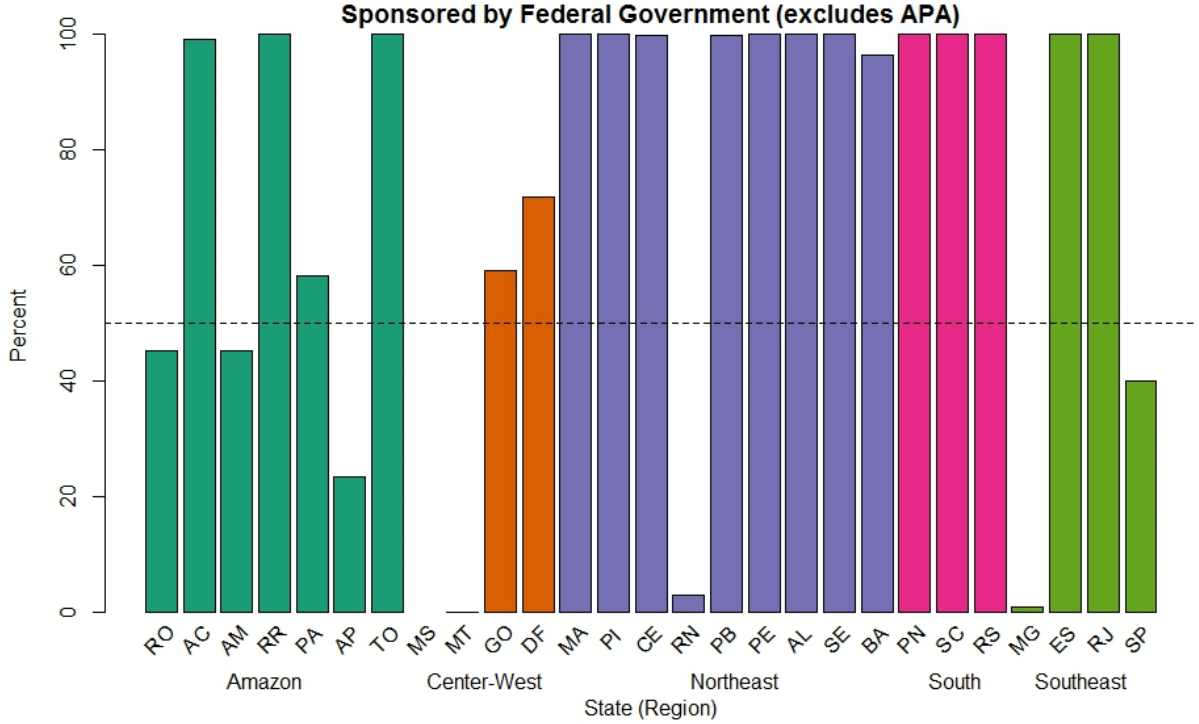
Figure 2.6
Percent Of Strict Conservation Unit Area
Sponsored By Federal Government



With respect to moderately strict and moderately permissive conservation units – that is, sustainable use conservation units excluding APAs – the federal government is also more aggressive. Figure 2.7, below, shows that in 19 states federal moderately strict and moderately permissive conservation units account for over half of total area of units of these types. In several of these state, federal non-APA sustainable use UCs account for *all* or *almost all* of the moderately strict and moderately permissive unit area in the state.[22]

[22] More details by state can be seen in the Appendix 2.1, Table A2.1.1.

Figure 2.7
Percent of Moderately Strict and Moderately Permissive Conservation Unit Area Sponsored by Federal Government (excludes APA)



This section has shown that the federal government is on average more aggressive in the establishment of strict protection conservation units in Brazil than the state governments are. I showed this first by using summary data on types of conservation units at the federal and state tiers of government (Table 2.2). I then disaggregated data on the areas of strict protection and sustainable use conservation units by state, to compare the balance of different types of units in federal and state systems by state, both with (Figure 2.1) and without (Figure 2.2) APAs. I then showed the percent of state area in federal and state conservation unit (Figure 2.3), as well as the percent of total conservation unit area in strict protection units (Figure 2.4). These figures demonstrated that the federal government has more area of conservation units in most states, as well as, on average, stricter conservation unit systems in each state. Finally, I showed that the federal government in most states in Brazil is responsible for the majority of protected area covered by strict units (Figure 2.6) and moderately strict and moderately permissive units (Figure 2.7). Below, I examine the relationship between different types of land use intensive industries and the character of the federal and state conservation unit systems in each state, to show that the federal government is generally more aggressive about placing conservation units in states with higher degrees of contention over land use than the state governments are.

Empirical Analysis 2: Economic geography and Conservation units

The previous, single variable graphs by state showed that, in most states in Brazil, the federal government imposes stricter conservation units than the states, on average. Here, I take these observations on step further, and show correlations to support my expectations that the federal government is more aggressive in establishing strict conservation units even in states that are more contentious, characterized by larger ecologically destructive economic sectors. In the

correlations below, I concentrate on the two most land intensive economic sectors: modern extensive agriculture and cattle ranching. These correlational analyses will illustrate different trends between tiers of government in different contexts, disaggregated by state. In the state cases presented in Chapters 3-5, I will evaluate how federal and state preferences differ *within* states, in areas characterized by different industries with different levels of land intensivity.

Scoring Industries by Land Use Need

When evaluating a state's performance in creating conservation units, the geographical distribution of economic activities, which may impose different land use demands on different territories, emerges as a better indicator than the economic value of that industry or its share in the state's economy alone would provide. In this section, I first array different relevant industries in Brazil along a spectrum from *least* to *most* land use intensive, and then I show data for land intensive industries across Brazilian states. Then, I turn to conservation unit summary statistics and bivariate correlations between land intensive industries and conservation unit coverage. Finally, I briefly reject alternative hypotheses to explain conservation unit coverage in the states, and conclude.

Some industries require more land conversion, defined here as the clearing of forests or other landscapes of their natural coverage, than others. In this study, I am particularly concerned with industries' varying requirement that land be cleared in order for the industries to function profitably. Below, I array retail/urban commerce, rubber tapping, timber, mining, and ranching, on a scale from *low* to *high*, and proceed to explain the logic of the scoring.

Figure 2.8. Arraying Industries by Land Conversion Need (Low to High)

LOW		HIGH
<----------	----------	---------->
Rubber tapping, Manufacturing	Timber, Real Estate, Mining, Small-scale Agriculture	Ranching Modern Agriculture

Rubber tapping: Rubber tapping as it is traditionally carried out in the Amazon does not require land conversion. Indeed, plantation-style rubber tree cultivation (which would require the clearing of native forests) does not thrive in Brazil due to rubber blight. As communities that are dependent on the survival of the forest for their livelihoods, rubber tappers are a constituency that is expected to – and indeed often does – support conservation. Principally through the Brazilian National Rubber Tappers' Council (*Conselho Nacional dos Seringueiros*), rubber tappers support the establishment of Extractive and Sustainable Development Reserves, as well as some National and State Forests that provide them with legal rights over territories for rubber extraction. However, many rubber tapping families, particularly in the Amazon, supplement the meager income from rubber tapping with somewhat more environmentally destructive activities, including small-scale cattle ranching that involves forest clearing. On the whole, however, rubber tappers can be expected to support sustainable use UC creation, and their presence in a state, all else equal, is expected to increase a state's federal and state UC system.

Manufacturing: In cities, most forests have already been cleared, but manufacturers based in cities generally do not require extensive further clearing of the forest in order to operate. Manufacturing and related urban commerce require only access to floor space in order to function effectively.

These vested interests can be expected either (1) to be indifferent to conservation policy outside of their cities, or (2) to support such measures, if sustainable use conservation units in rural forested regions can provide the urban constituencies with reliable or cost-effective supplies of inputs or goods. As residents of cities, manufacturers and retailers may even support urban conservation – in the form of city parks or restrictions on pollution – due to concerns over livability. Living and operating in cities, these actors may also be better exposed to environmental ideas than rural residents. With respect to conservation units established in rural parts of Brazilian states, these actors can be expected either to support the units or express no strong preferences.

Timber: Timber harvesting is a much more ecologically destructive activity to forests than rubber tapping or urban manufacturing, particularly when done illegally and without enforced sustainability rules – as is common in the Brazilian Amazon. When forestry is conducted illegally, or has been conducted for a long time in an area with little government presence or enforcement, timber firms and individual operators can be expected to resist government incursions, and will at least initially oppose the establishment even of National and State Forests – a UC category designed to promote both conservation and sustainable forestry. National/State Forest proposals and creation may, however, divide the forestry industry, as illegal operators are excluded and legal firms begin to adjust to a process of bidding for long-term concessions. In short, timber harvesting is an initially unsustainable industry that can be rendered more sustainable through public policy, and timber firms can change their preferences from opposition to conservation initiatives to support for the full implementation of conservation units in order to begin the concession bidding process. Legal timber firms may also, in some circumstances, support the creation of National and State Forests in order to secure legal title to tracts of land, so that they may operate without a constant threat of punitive enforcement by federal or state agencies.

Small-scale agriculture: Small-scale agriculture is responsible for quite a bit of deforestation in the Brazilian Amazon and elsewhere, as settlers move from more densely populated areas to less densely populated areas, and burn forest tracts to establish farms. However, with respect to settlers on land reform settlements and in and around conservation units, government agencies – which provide some financial support – have leverage in encouraging sustainable practices. In contrast, large-scale land grabbers may displace small-scale settlers violently, and are a bigger threat to the forest overall, as they aim to burn larger tracts of forest to graze cattle.

Real Estate: Linked to urbanization in both small and large cities, real estate – that is, the construction industry and associated land ownership – requires complete clearing of land that actors in this industry own in order to profit. Real estate is principally a threat in urban zones, particularly along the urban periphery, as actors encroach – often illegally – on protected or unprotected natural areas to build condominiums and commercial buildings and rent or sell space in them to new migrants – be the migrants wealthy, middle class, or poor. In cities, real estate moguls often broker alliances with – or themselves are – elected politicians. The politicians, in turn, may gain both elite support and popular votes by encouraging popular invasions of protected lands to establish working class neighborhoods or shantytowns on urban peripheries; and/or by turning a blind eye to new middle class neighborhoods constructed without adequate environmental studies. Both of these occur commonly in Brazilian cities, and will be seen to be important in Manaus, Amazonas, and Brasília.

Mining: Mining is a locally destructive activity that both clears forest lands in and around mines, and often produces local pollution. In Brazil, mining takes two principal forms: First, independent gold miners (*garimpeiros)* prospect for gold in the Amazon, using mercury to separate gold from other minerals (Hecht and Cockburn 2010), and polluting streams and rivers. Second, large-scale mining firms, which may be publicly owned – Companhia Vale do Rio Doce and subsidiaries prior to its 1997 privatization – or privately held – Vale after privatization, Mineração do Rio Norte, Rio Tinto, etc. – produce local deforestation and pollution, but have the resources to control pollution and are legally obliged to reforest their mines once the minerals are exhausted and the mines shuttered. The mining industry in Brazil can be found on both sides of the environmental debate: First, Vale and other major mining firms oppose restrictions on access to minerals, as evidenced by Vale's opposition to inclusion of its lands in the Serra da Gandarela National Park in Minas Gerais, which is located in a mineral-rich region. But these same firms may benefit from the legal security of possession and extraction rights that can be gained from the establishment of a National or State Forest around their mines. Indeed, these firms often take a leading role in managing conservation units that include their mines, including the Carajás and Saracá-Taquera National Forests in Pará, which surround mines owned by Vale and Mineração do Rio Norte (a Vale subsidiary), respectively. In short, while mining firms require local deforestation to operate, they may be open to compromises in the form of sustainable development UCs.

Ranching and Modern Agriculture: Finally, ranching and modern agriculture – particularly in the Amazon – require extensive forest clearing to operate effectively. In the Amazon, where investing in efficiency has long been more expensive than acquiring new lands through forest burning (Margulis 2003), and where many ranchers still operate illegally, ranchers and residents who work in the ranching industry may oppose all UCs except those that make explicit exceptions for their lands. Both industries are also represented in Congress by the Ruralist Caucus, which in 2012 succeeded in weakening the 1965 Forest Code, opposes conservation units generally – and whose leader, Tocantins Senator Kátia Abreu, has just been appointed Minister of Agriculture by PT President Dilma Rousseff.

Table 2.6. The Distribution of Land Intensive Industries across States in Brazil

State	Region	Percent of state territory devoted to Agriculture (2006)	Population Density (2000)	Percent Rural (2000)	Cattle heads (2000)	Cattle per Hectare (2000)	Tons of Soy (2000)	Cubic meters of Timber (2000)	Rubber 2000 (R$'000)
Rondônia	Amazon	30.22	5.81	35.89	5664320	23.84	36222	647515	163
Acre	Amazon	13.33	3.4	33.59	1033311	6.3	0	206961	3057
Amazonas	Amazon	1.18	1.8	25.08	843254	0.54	1428	803528	3613
Roraima	Amazon	5.84	1.45	23.85	480400	2.14	0	26760	0
Pará	Amazon	13.5	4.96	33.45	10271409	8.23	2602	10781501	150
Amapá	Amazon	3.54	3.34	10.97	82822	0.58	0	84410	66
Tocantins	Amazon	42.16	4.17	25.68	6142096	22.12	144362	88338	0
Maranhão	Northeast	24.35	17.03	40.47	4093563	12.33	454781	496821	0
Piauí	Northeast	21.43	11.3	37.09	1779456	7.07	100963	121575	0
Ceará	Northeast	31.9	49.9	28.47	2205954	14.81	0	66482	0
Rio Grande do Norte	Northeast	40.47	52.58	26.65	803948	15.22	0	17375	0
Paraíba	Northeast	46.32	60.99	28.94	952779	16.87	0	1673	0
Pernambuco	Northeast	29.96	80.68	23.49	1515712	15.44	0	144369	0
Alagoas	Northeast	33.76	101.61	31.99	778750	28.03	0	65	0
Sergipe	Northeast	46.43	81.43	28.65	879730	40.14	0	8188	0
Bahia	Northeast	31.46	23.14	32.88	9556752	16.92	1508115	1731600	0
Minas Gerais	Southeast	37.53	30.5	18	19975271	34.06	1438829	127329	193
Espírito Santo	Southeast	24.19	67.19	20.48	1825283	39.6	0	18557	0
Rio de Janeiro	Southeast	34.61	328.72	3.96	1959497	44.76	0	910	0
São Paulo	Southeast	31.4	149.19	6.59	13091946	52.74	1190110	5078	0
Paraná	South	30.01	47.98	18.59	9645866	48.4	7188386	3587266	0
Santa Catarina	South	26.67	55.95	21.25	3051104	31.87	524688	115684	0
Rio Grande do Sul	South	35.59	36.16	18.35	13601000	48.28	4783895	132119	0
Mato Grosso do Sul	Center-West	75.57	5.82	15.92	22205408	62.17	2486120	41110	0
Mato Grosso	Center-West	39.69	2.77	20.63	18924532	20.95	8774470	2600936	0
Goiás	Center-West	60.63	14.71	12.12	18399222	54.1	4092934	62377	43
Distrito Federal	Center-West	18.87	354.87	4.37	112139	19.4	92921	0	0

Sources: IBGE (2000a, 2000b, 2000c, 2006).

Like conservation units, land intensive industries are unevenly distributed across states. This can be seen in Table 2.6, which provides a snapshot of Brazil's economic geography. The table shows the distribution of land intensive industries across the states. Here, agriculture and

ranching are measured by the percent of the state's territory devoted to agriculture and the cattle heads and cattle heads per hectare, respectively. The year the IBGE took the Agriculture and Ranching Census was 2006, so I report the statistic from that year (IBGE 2006). Cattle heads and cattle heads per hectare are calculated for 2000 – roughly three years before the federal and state governments in the Amazon began establishing conservation units in earnest in the region. In addition, I measure the tons of soy produced by states, as soybean cultivation in the Cerrado and on the Amazon frontier is the second major driver (after cattle ranching) of Amazon deforestation. I measure the timber industry by the cubic meters of timber produced in each state in 2000, and rubber tapping by the value of rubber produced by state in the same year. Finally, urban and rural divides are measured by the population density and the percent of each state's population that is rural, measured in the 2000 census by IBGE.

Agriculture is present in all states, but the states with the most area devoted to it are Mato Grosso, which straddles the Cerrado and Amazon biomes, Goiás in the Cerrado, Sergipe and Paraíba in the Northeast, and Tocantins in the Center-West Cerrado (on the Amazon frontier). None of these states has aggressively pursued creation of conservation units. In contrast, the states with the least territory devoted to agriculture – Pará, Acre, Roraima, Amapá, and Amazonas – are Amazonian states with much larger areas protected by UCs in 2014. The Amazonian state of Rondônia, which also has a significant UC system, is in the middle of the distribution (30.22% of the state's territory is devoted to agriculture) – but was subject to the World Bank's Planafloro project in the 1990s, which encouraged UC creation.

I include a separate measure of soy bean production because it is produced using extensive, modern agricultural techniques – and it is responsible, along with cattle ranching, for much of the deforestation of the Amazon. Soy producers and their sympathizers are also politically active in the Congressional Ruralist Caucus, which opposes most conservation policy in the country. With respect to tons of soy produced in the year 2000, the states with the largest soy industry are generally also UC laggards (in terms of total area): Mato Grosso, Paraná, Rio Grande do Sul, Goiás, Mato Grosso do Sul, Bahia, and Minas Gerais. Of these, Bahia and Minas Gerais are the best performers, though Minas Gerais's UC system covers a small total territory, while Bahia's state system largely consists of coastal APAs, and very few strict protection areas.

The states with the largest number of cattle heads are Mato Grosso do Sul, Minas Gerais, Mato Grosso, Goiás, Rio Grande do Sul, São Paulo, and Pará, with over 10 million heads of cattle each in 2000. All but São Paulo and Pará have small UC systems as a share of total state territory (though São Paulo and Minas Gerais have large state systems by number of UCs), and all possess political representatives in the Congressional Ruralist Caucus. The states with the fewest heads of cattle – Amazonas, Rio Grande do Sul, Alagoas, Roraima, Brasília, and Amapá – have varying federal and state UC systems. Cattle heads per hectare produces a similar result: Mato Grosso do Sul, Goiás, São Paulo, Paraná, and Rio Grande do Sul have the largest number of cattle per hectare and relatively small UC systems. On the bottom end, Maranhão, Pará, Piauí, Acre, Roraima, Amapá, and Amazonas have varying UC systems. The UC systems for the Amazonian states (Pará, Acre, Roraima, Amapá, and Amazonas) are systematically larger than for the non-Amazonian states.

With respect to cubic meters of timber produced in 2000, the picture is a little blurred – consistent with the idea that timber interests can be convinced of the usefulness of CAs, and/or that timber harvesting is focused in states to which the federal government pays greater attention. The top timber producers are Pará, Paraná, Mato Grosso, Bahia, Amazonas, and Rondônia. Of

these, the Amazonian states of Pará, Amazonas, and Rondônia have sizeable federal and state UC systems, while Mato Grosso, Paraná, and Bahia do not.

Most Brazilian states do not produce rubber, but of the states that produced the most in 2000 a few have significant federal and state UC systems: Amazonas, Acre, Rondônia, and Pará. Minas Gerais was also a significant rubber producer in 2000, but has protected much less land using Extractive or Sustainable Development Reserves than the federal and state governments in the Amazon have.

Finally, I include a measure of population density because I expect population density to correlate negatively with conservation unit area by state. With respect to population density, the states with the highest density – the Federal District of Brasília, Rio de Janeiro, and São Paulo – have varying percentages of UC coverage. These states also have the smallest percentages of their populations in rural areas, which eases the difficulty of establishing conservation units. In contrast, the states with the lowest population density also have significant rural populations and are located in or border the Amazon – Pará, Tocantins, Acre, Amapá, Mato Grosso, Amazonas, and Roraima. Those low density states with the largest federal or state UC systems – Pará, Amazonas, Acre, Amapá – have a large proportion of sustainable use CAs, which accommodate certain rural needs.

Land Intensive Industries and Conservation Units: Correlational Analyses

To demonstrate differential effects of economic geography on conservation units at different tiers of government, in this section I provide three bivariate correlations. Figures 2.9-2.11, below, show the relationship between selected state economic geography indicators and the area covered by federal and state conservation units. I choose two industries that are high on the land intensivity scale – agriculture and cattle ranching. All figures to follow but the first exclude APAs, which I argue do not provide sufficient protection to be considered effective conservation units. These figures compare trends for the federal and state tiers of government.

In each figure, I present conservation unit data from the most recent year available at the time of writing – 2014 – and economic geography data from earlier years: agriculture from 2006, when the Brazilian IBGE conducted its Agriculture and Ranching Census, and cattle heads from 2000. I choose to measure cattle heads in 2000 because the National System of Conservation Units (SNUC) law was signed that year, and enough conservation units have been created since then that the year 2000 can be considered a "baseline" year.[23]

I have two complementary expectations in this analysis: First, that creating conservation units on lands that are contentious is hard, and second, that the federal government should place more restrictive conservation units on contentious lands than states do, all else equal. I therefore expect to see a negative relationship between the amount of land devoted to land intensive industries and the area covered by protected areas. Second, I expect the federal average (measured by a locally weighted regression line) to be greater at each level of land intensive economic activity than the state average. The plots to follow in this section show these expectations generally to be true.

Figures 2.9a and 2.9b, below, show a negative relationship between percent of a state's territory devoted to agriculture in 2006 and percent of a state protected by conservation units in 2014 for both the federal and state conservation unit systems. The black dotted line in each figure

[23] In addition, cattle head counts have not changed considerably in each state. While in some states the cattle industry has grown since 2000, and in others it has shrunk, over time states largely retain their ranking compared to other states in terms of the size of the cattle industry.

presents the locally weighted regression line (LOESS) for the federal UC system in each state, and the green solid line the LOESS for the state UC system in each state. Figure 2.9a shows the LOESS lines overlaid on a scatterplot of the states in Brazil. The states are color-coded by region: Amazon, Center-West, Northeast, South, and Southeast. For visual clarity, Figure 2.9b zooms in on the LOESS lines themselves, and removes the state scatterplot.

Figure 2.9a
Agriculture and Conservation Units by State

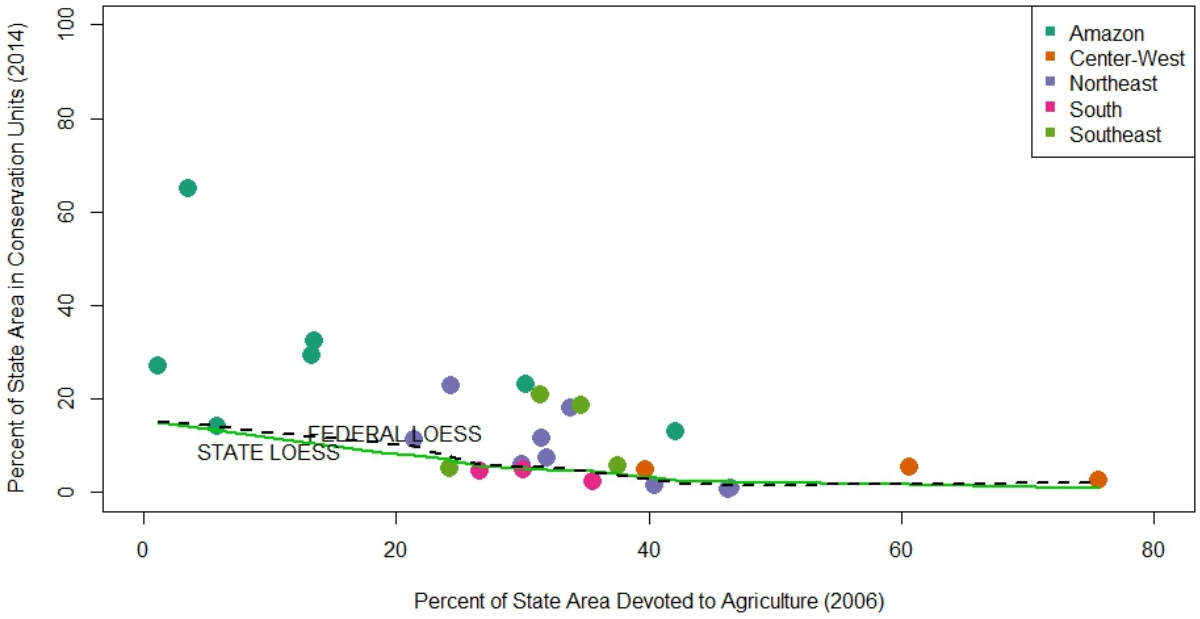
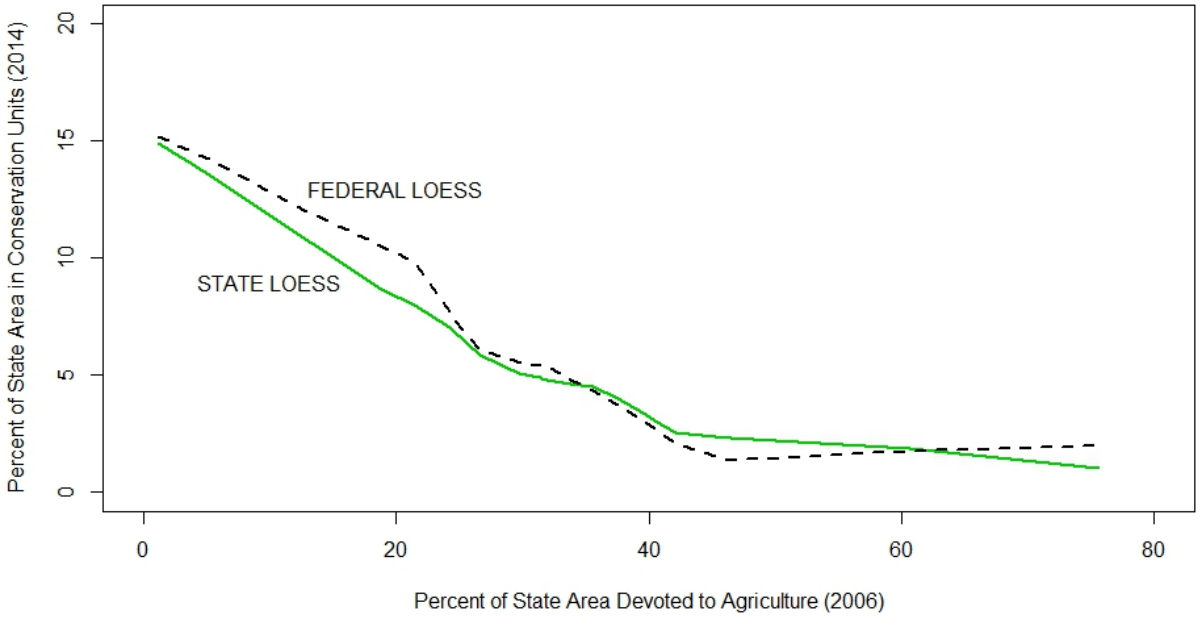


Figure 2.9b
Agriculture and Conservation Units by State



While these two lines overlap considerably, the relationship begins to change with the consideration that a good deal of state conservation unit area is in the APA category – the *permissive* category in my coding. Below, in Figures 2.10a and 2.10b, the state LOESS continues its gradual downward slope toward 0 on the Y-axis, while the federal LOESS begins higher, and remains higher until the 60% of state land devoted to agriculture mark. The X-axis outlier states, between 60% and 80% on the X-axis, are Goiás and Mato Grosso do Sul – two states with extensive modern agriculture, small conservation unit systems, and no Amazon biome in them.

Figure 2.10a
Agriculture and Conservation Units by State (APA excluded)

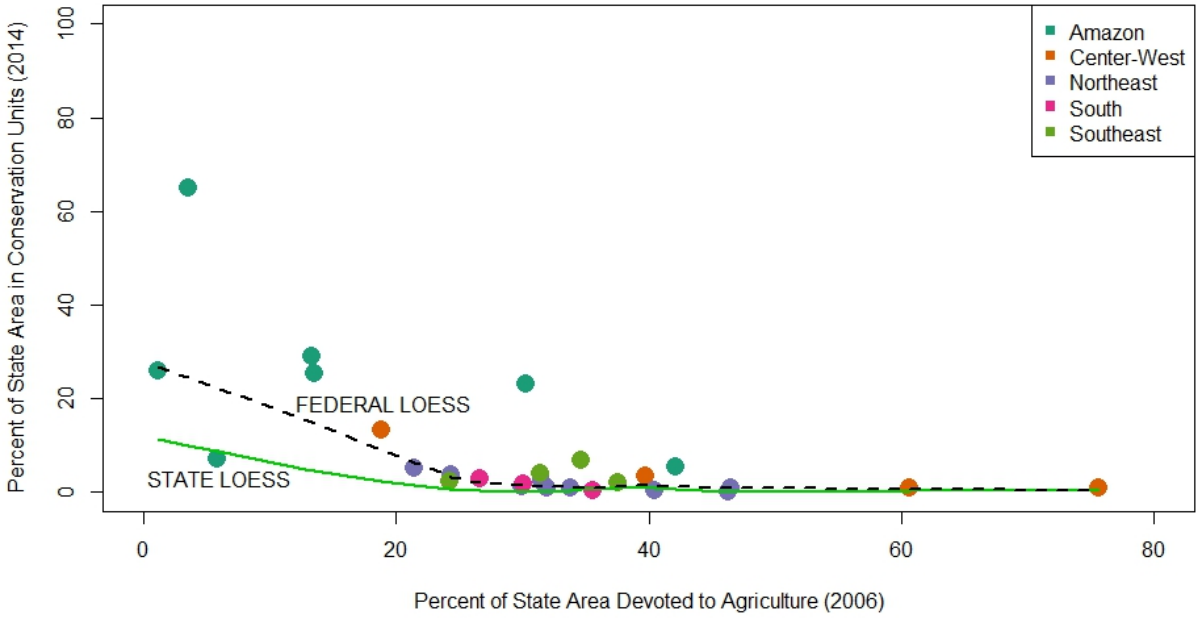
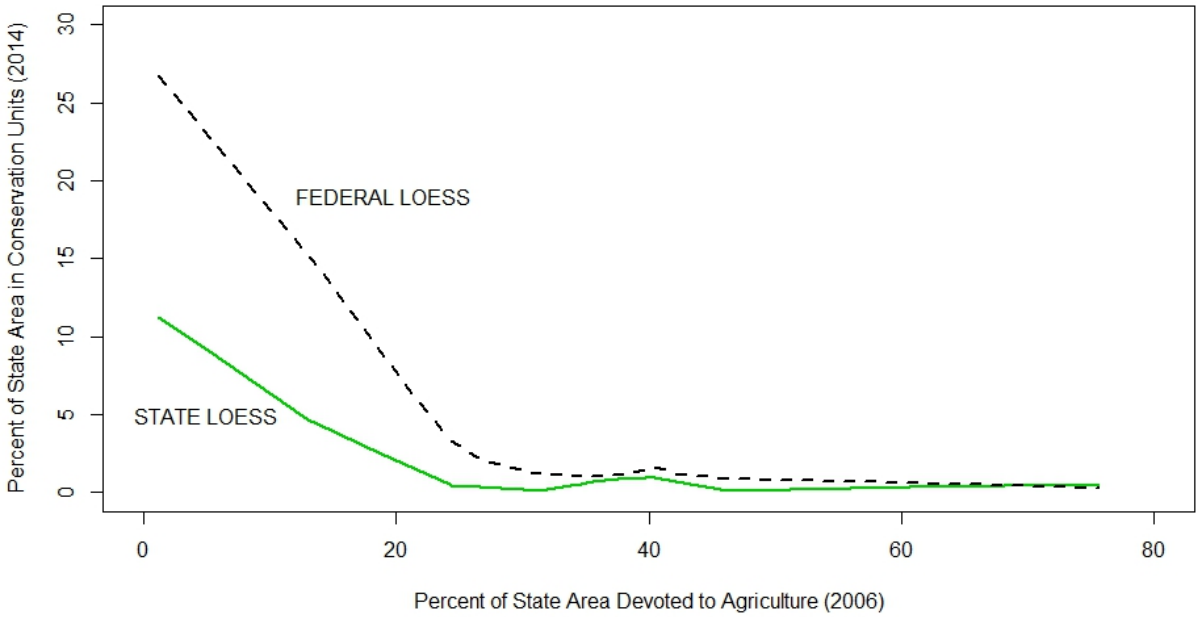


Figure 2.10b
Agriculture and Conservation Units by State (APA excluded)



Figures 2.9 and 2.10 show that overall the area of federal UCs is less strongly influenced by the area of each state devoted to agriculture than the state UC systems are. With respect to cattle density, in Figures 2.11a and 2.11b, below, we see a similar negative relationship, as well as similar LOESS slopes for the federal and state systems. In this figure, I measure the cattle heads per hectare in each state in 2000 by the percent of the state protected by conservation units in 2014. I would expect that the greater the density of cattle in a state, the less area will be protected by conservation units. Furthermore, I expect the federal government to account for more conservation unit area than the state at any level of cattle density, and this remains true until states surpass 50 heads of cattle per hectare.

Figure 2.11a
Cattle Density and Conservation Units (no APA)

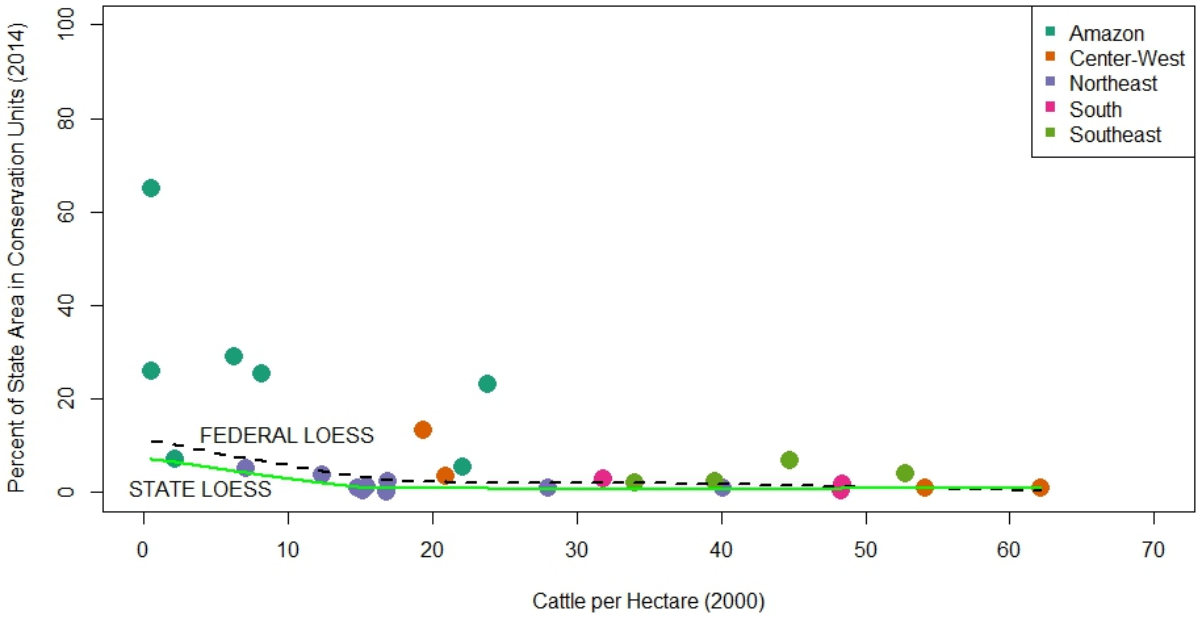
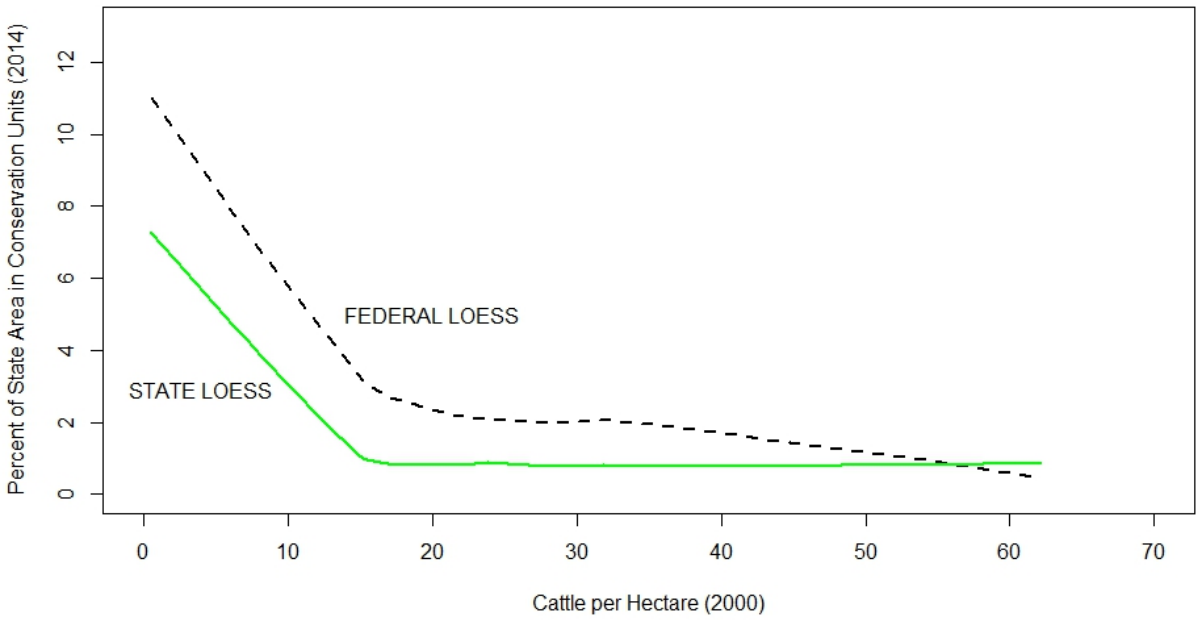


Figure 2.11b
Cattle Density and Conservation Units (no APA)



Alternative Hypotheses of Conservation Unit Variation across States

This section briefly evaluates and rejects two principal alternative explanations for the variation in area, type, and location of conservation units across tiers of government and states in Brazil. These explanations, respectively are party in power in the state and federal governments, and state capacity to create conservation units.

Party: Prior scholarship and lived experience in countries such as the United States would expect states governed by representatives of left-wing parties to be more aggressive about enacting environmental policies than states governed by right-wing parties. However, this explanation does not adequately explain federal or state conservation unit creation in Brazil. There are [X] reasons for this: First, the Brazilian party system is fractured, with the main parties – the left-wing Workers' Party (*Partido dos Trabalhadores*, PT), the centrist Brazilian Social Democratic Party (*Partido Social Democrata do Brasil*, PSDB), and the catch-all center-right Brazilian Democratic Movement Party (*Partido do Movimento Democrático do Brasil*, PMDB) – all enacting conservation units in their states at times, and embracing more developmentalist, less environmentalist agendas at other times.

At the federal tier, the PT Lula da Silva administration (2003-6, 2007-10) enacted the most aggressive conservation unit creation program in the Amazon, which would suggest support for a purely partisan explanation, at least for Amazonian states. However, the Dilma Rousseff administration (2011-14, 2015-Present) has prioritized development over conservation, and only created 10 UCs during her first term – 7 in October 2014, during her re-election campaign. At the same time, though President Fernando Henrique Cardoso (PSDB, 1995-98, 1999-2002) created fewer UCs in Brazil than his successor, his administration implemented the National Forests Program in 1998, and worked with Congress to pass the National System of Conservation Units law in 2000 (as well as its implementing legislation in 2002). This law codified conservation unit categories and streamlined official procedures for creating and implementing conservation units, setting the stage for Lula's more aggressive approach to saving the Amazon.

At the level of the states, states with consistent left wing government from 1998 to 2014 do not exhibit significantly higher areas dedicated to conservation units than do states governed only intermittently by the left, or consistently by the center or center-right. The Amazonian state of Acre, which has been governed consistently by the PT since 1998 and has a reputation for sustainability, has a state system of conservation units that does not surpass 4.6% of the state's territory (against 25% of the territory covered by federal UCs). The Northeastern state of Piauí, governed by the PT save for 2006-10 (when it was governed by the Brazilian Socialist Party, PSB), has created no state CAs, while only 11% of its territory is protected by federal UCs.

With respect to states governed intermittently by the center-right, 8% of Tocantins's territory, 19% of Maranhão's, and 16% of Pará's territories are protected by state UCs – though in the first two cases, much of the state UC territory is located in APAs. In the case of Pará, most of the state UCs were created by Governor Simão Jatene, of the PSDB – and none were created by the 2007-10 PT Governor, Ana Júlia Carepa. Finally, São Paulo – governed by the PSDB consistently from 1998 to 2014 – possesses 114 state CAs, including 62 strict protection and 52 sustainable use (of which 29 are APAs). Minas Gerais, governed by the PSDB from 1998 to 2014, similarly possesses 75 conservation units, including 60 strict protection and 14 sustainable use (11 of which are APAs).

These figures suggest that the dominant parties in Brazil's democratic system are not as divided with respect to creating conservation units as the parties in other democracies may appear to be. Indeed, coalition government confounds partisan explanations: The center-left Fernando Henrique Cardoso entered into coalition with the right-wing Liberal Front Party (*Partido da Frente Liberal*, PFL – now DEM). The PT has been in coalition with the PMDB since Lula's first term, and President Rousseff recently appointed the leader of the anti-environmental Ruralist Caucus, Kátia Abreu of Tocantins, Minister of Agriculture.

State Capacity: Another potential explanation for conservation unit variation across Brazilian states is state capacity. Perhaps wealthier states, which should have greater bureaucratic capacity in environmental agencies, protect more of their states with conservation units. However, conservation unit creation – measured by area – appears to be the province of middle-income states, rather than the wealthiest: São Paulo, Rio de Janeiro, Rio Grande do Sul and Brasília were the top four states by per capita GDP in 2000, but only São Paulo and Brasília's UC systems surpass 10% of the state's territory in 2014. Rio de Janeiro's state UC system hovers at just under 7% and Rio Grande do Sul's at just over 1%.

By contrast, middle income states such as Pará and Amazonas have much more extensive coverage, as do poorer states such as Bahia, Rondônia and Tocantins (though Bahia and Tocantins's state UC coverage is largely accounted for by APAs). Indeed, there does not appear to be a correlation between per capita GDP – used as a proxy for state capacity – and area of coverage by UCs.

If we change the operationalization of *state capacity* to the consolidation of state environmental institutions, the picture changes in terms of the number of UCs created, but not in terms of the area. Minas Gerais, a wealthy state that was a pioneer in the creation of state agencies that included environmental protection in their portfolios, possesses 75 state UCs that it has been establishing since as early as the 1940s; São Paulo, which created its Forestry Institute in 1970, possesses 114 state CAs, the first of which was established in the 1940s. In contrast, Amazonas and Pará, middle income states with much newer and less consolidated environmental agencies, have many fewer CAs, the first of which were created in the 1989 (in Pará) or the early 1990s. However, the UCs in the middle income Amazonian states are much more extensive than those protecting biodiversity in São Paulo and Minas Gerais – and a smaller proportion of the total area in the former is accounted for by APAs.

Finally, while a great deal of state capacity is necessary to implement and manage conservation units, very little is needed to create them. Socio-economic and environmental studies, and public hearings, have only been required under federal law since 2000, and NGOs and local universities can be contracted to carry out studies. Public hearings just require environmental bureaucrats to travel to relevant cities – an effort that is more expensive and time-consuming in the extensive Amazonian states than in the wealthier, more territorially consolidated southeast. Nevertheless, the states that I examine in depth in this study – two wealthy states, Brasília and Minas Gerais; and two middle-income states, Amazonas and Pará – did not begin to invest in governance and implementation until the middle of the 2000s. And while much attention has been paid to management of the enormous UCs in the Amazon, management suffers even in wealthy states such as São Paulo: In September 2013, the *Estado de São Paulo*, published an investigative report on incompetent management of parks in the state that led the regional Rede de ONGs da Mata Atlântica to publish an open letter "repudiating the neglect of the Secretariat of State of the Environment of São Paulo with conservation units" (Escobar, Girardi, and Deiro 2013). In short, even with sufficient funds to manage CAs, the state of São Paulo does little better than poorer states.

Partisanship and state capacity fail to explain variation across tiers and states in conservation unit systems in Brazil. With respect to partisanship, states governed by parties of the center-right and the center-left have similar outcomes on conservation unit creation. With respect to state capacity, wealthier states protect no more of their territory than middle-income states do. The failure of these alternative hypotheses to explain variation across tiers and states in conservation unit systems in Brazil means that economic geography remains the best explanation.

Conclusion

In this chapter, I have reviewed the history of conservation unit categories and creation in Brazil through the enacting of the National System of Conservation Units (SNUC). I showed how disparate protected area categories were later incorporated into the SNUC, which was a compromise bill to reconcile the interests of conservationists – who oppose human occupation of protected areas – and socio-environmentalists – who argue that local communities can sustainable manage natural resources. While the power to create conservation units was shared by federal, state, and municipal governments prior to SNUC, the SNUC established a framework for unit categories, and standardized official procedures for creating and implementing conservation units.

After reviewing the policy history, I proceeded to analyze observed federal and state conservation unit creation outcomes across states in Brazil. I first showed, through univariate descriptive analyses, that in most states the federal government is responsible for the majority of area protected by strict protection conservation units. I also showed that the federal government is responsible for the majority of non-APA sustainable use conservation unit area in most states. Finally, I conducted a series of bivariate analyses to show that there is a negative relationship between the presence of different types of land intensive industries in each state and the size of federal and state conservation unit systems. These analyses showed that, while the relationship between the size of land intensive industries and conservation unit systems is generally negative for both federal and state governments, on average state governments' systems are smaller than the federal even at lower levels of industry presence.

These analyses support the argument that the federal government is, on average, more aggressive in what types of conservation units it creates, and where it places them, than states are. These analyses are correlational, however, and do not tell a full political story about conservation unit creation. In the next three chapters, I examine the histories of federal and state conservation unit creation in depth in three states: Pará (Chapter 3), Amazonas (Chapter 4), and Minas Gerais (Chapter 5). These case studies elucidate the mechanisms by which the general trends identified in this chapter have been produced.

Chapter 3. Pará: Federal Pressure in a Difficult Environment Yields Accommodations with Ecologically Destructive Industries

Introduction

Pará is a state whose economy is dominated by land intensive industry, and as a result the state government has been responsive to the preferences of such industries in enacting its conservation unit system. The result is consistent with my prediction: The federal government's conservation unit system consists on average of stricter conservation units, located in more politically contentious deforestation frontier areas, than the state system. In contrast, the state system of conservation units is largely moderately permissive and permissive, and the majority of state units are designed to reconcile conservation with the interests of land intensive industry, particularly timber.

Pará's state politics are aligned with timber and ranching interests, and the state government has been reluctance to embrace sustainable development, including the creation of conservation units. The federal government, in contrast, overcame local resistance to conservation along Pará's southern deforestation frontier, and undertook police actions and enacted conservation units to suppress illegal forest clearing in the late 1990s to the late 2000s. Federal actions prompted Pará, which has challenging economic geography and little experience with environmental policy and governance prior to the 1990s, to participate in environmental programs and work intermittently to strengthen its environmental institutions. Given the state's challenging economic geography, we should expect that most of the area of state conservation units will be in permissive unit, while most of the area of federal units will be in moderately strict units. As I will show below, though there are a diversity of categories of federal and state conservation units in Pará, this expectation is largely supported. Observed trends in the locations and types of federal and state conservation units indicate that timber and ranching exercised more influence on state government decisions than on federal, and that mining firms influenced both tiers' conservation unit siting and type choices. In the 2000s, the state government established moderately permissive and permissive conservation units on deforestation frontiers largely to support timber interests, and strict units in remote, comparatively unpopulated areas; while the federal government created units along deforestation frontiers belonging to all four categories – permissive, moderately permissive, moderately strict, and strict – to reduce illegal deforestation.

Conservation unit creation in Pará is relatively new (relative to Minas Gerais and other southern states), occurring in earnest only since 1989. In the year 2000, neither the state nor the federal government in Pará had established significant conservation unit systems. By the end of 2006, however, the federal government had completed a major mosaic of conservation units along the BR-163 and Terra do Meio deforestation frontiers. The state government, meanwhile, had established the largest collection of adjoining state conservation units in the country in the backlands between the northern bank (*Calha Norte*) of the Amazon river and the countries of Guyana, French Guyana, and Suriname. With these actions, both the federal and state governments established commitments to preserving what remains of the Amazon forest in Pará – but they did so with different political motivations, and with different outcomes: While much of the area of the federal conservation units in the BR-163 and Terra do Meio mosaics lies within strict and moderately categories of conservation units (including an Ecological Station, National Parks, and Extractive Reserves), thus presenting a challenge to the expansion of ranching and logging

activities on the eastern deforestation frontier; the state of Pará's units in that mosaic, and in the Calha Norte area, are largely geared toward accommodating the needs of the logging and ranching industries by converting lands of uncertain title into public lands, capable of being exploited by private enterprise through state-issued concessions.

This chapter examines the roots of conservation unit creation programs in Pará's territory to explain the divergent trajectories taken by federal and state governments in the state. By tracing the policy story over time, comparing federal and state interventions and outcomes in different regions of the state, and taking into account the location and interests of different industries in Pará, this chapter makes the following observations and arguments: First, both the federal and state governments gradually moved from defense of environmental destruction for development, to protection for sustainable development over time – but the federal government was the first mover in Pará. Second, the risk of punishment at the polls due to decisions regarding protected areas was lower for the federal government than for the state government. The latter had to be more conscientious of the needs of local industry and find ways to appease both environmentalists and representatives of politically important but environmentally harmful industries, particularly timber. Finally, since 2006, the state of Pará has kept pace with the federal government in conservation unit implementation – but largely in the State Forests of Calha Norte, where the state government maintains an ongoing official collaboration with NGOs, and where both the state and industry have an interest in completing implementation to begin the process of auctioning forestry concessions.

The chapter proceeds as follows. First, I examine differences between the federal and state systems of conservation units in Pará, and relate these differences to the presence of ecologically destructive land intensive industries throughout the state's territory. Next, I examine the evolution the federal system of conservation units in Pará, from the first conservation unit decreed in 1961, to 2010. Here, I show how federal intervention in the state evolved from environmentally destructive migration and development programs to the first steps toward conservation under Presidents Sarney (1985-9) and Cardoso (1995-2002), which set the stage for President Lula da Silva's (2003-10) more aggressive policies. Finally, I detail the progress made under Lula, and show how the federal government's actions were cushioned by the peripheral location of southern Pará vis-à-vis more heavily populated regions of Brazil, which reduced the electoral risks of enacting federal conservation areas in the state, and thereby reducing the influence of local opponents, including economic and political actors vis-à-vis the federal government.

I then proceed to analyze the state government of Pará's conservation unit system, from its beginning in 1989 to 2010, and show that subnational concerns with economic growth initially prevented the state from adopting conservation units, and how later federal interventions prompted the state government to support the timber and ranching industries by establishing permissive conservation units that accommodated these interests' needs. In the chapter's conclusion, I evaluate the weaknesses of alternative explanations for divergent federal and state conservation unit system patterns in Pará.

Contrasting Federal and State Conservation Unit Systems

Although federal and state conservation unit systems in Pará cover similar total areas, they differ considerably in the average type of unit, as well as the location of units relative to Pará's principal deforestation frontiers. In this section I analyze in depth the differences between the federal and state conservation unit systems in Pará. In the following sections I explain the political roots of these differences.

Both tiers of government accelerated their conservation unit system growth in the 1990s and 2000s, but at different rates. In 1989, the federal government possessed only nine conservation areas in Pará, comprising 3,313,970 hectares, and that year the state government established its first unit, the APA Marajó, with 5,998,570 hectares.[1] By 2014, Pará possessed 68 conservation units, comprising 21 state (21,772,395.3 hectares) and 47 federal (20,200,181 hectares) units (ISA 2014c). The state system includes 8 APAs, 4 State Parks, 4 State Forests, 2 Sustainable Development Reserves, 1 Ecological Reserve, 1 Biological Reserve, and 1 Wildlife Refuge. The federal system possesses 2 APAs, 14 National Forests, 4 National Parks, 1 Sustainable Development Reserve, 3 Biological Reserves, and 20 Extractive Reserves. While at first blush there may not appear to be a significant difference between the state and federal governments' respective conservation unit systems – 31% and 36% of conservation unit area is in National and State Forests, respectively, and both the federal and state governments possess more sustainable use than strict protection units in the state – the federal government's system is on the whole more stringent than the state's: While 38% of state conservation units are contained in APAs, the most permissive category, only 10% of the federal government's conservation units are contained in the same. In total 77% of the area of state conservation units in Pará are *sustainable use*, compared to 64% of federal area.

In addition to being stricter on average than state conservation units, many federal units – including National Forests and several Extractive Reserves – are located closer to significant deforestation frontiers than are most of the state units. In 2005 and 2006, the federal government decreed four National Forests, two National Parks, and an Ecological Station in a top-down fashion in the Terra do Meio and BR-163, to suppress illegal forestry – actions that threatened the PT's performance in the region's municipalities, but were possible because the peripheral location of the municipalities rendered the vote loss tolerable. In contrast, the state government under Governor Jatene limited itself to securing local support for State Forests along a secondary deforestation frontier, the Calha Norte, a permissive APA (Triunfo do Xingu) in the Terra do Meio, a remote State Forest buffered by federal conservation units and indigenous lands in the same region, and two strict protection units in the remote hinterlands of the Calha Norte. In short, while the federal government included in its system units (and accompanying policy and enforcement actions) that challenged prevailing economic practices – including logging and ranching – in areas on the deforestation frontier such as the Terra do Meio and BR-163 highway, and along the coast of Pará, the state of Pará's conservation unit system largely aimed to support logging by providing a legal outlet for it. Thus, we may consider the federal government's program of conservation unit creation in Pará more *aggressive* than the state's when viewed through the lens of *stringency* – that is, prevalence of institutional types of conservation units that prevent use entirely, or support small-scale, extractivist activities at the expense of larger-scale, more ecologically destructive commercial industries.

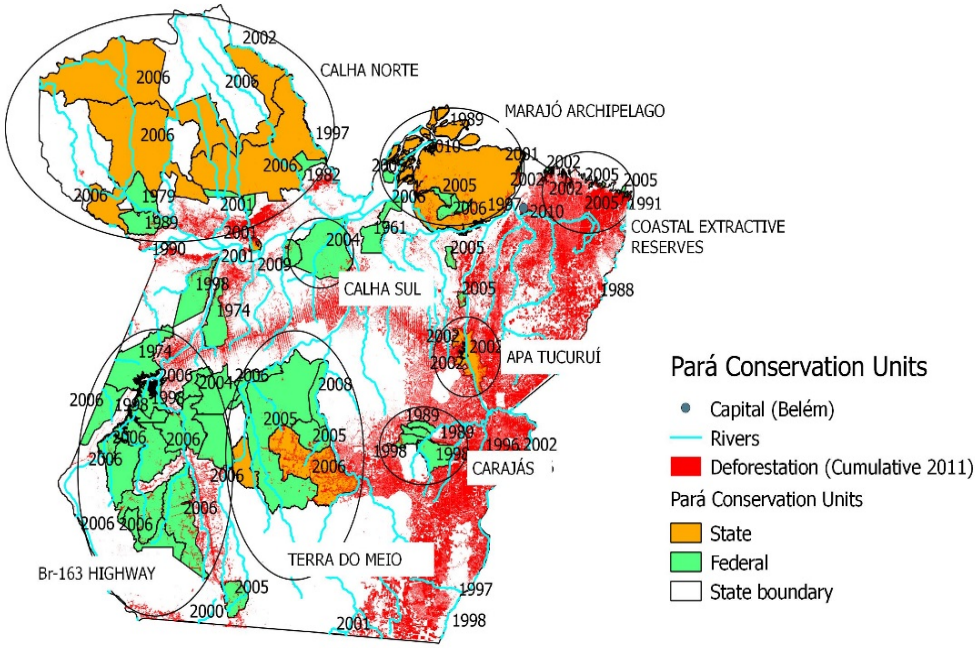
In Pará, federal strict and moderately strict conservation unit types include National Parks, Ecological Stations, and Extractive Reserves.[2] In Pará, Extractive Reserves created in contentious areas include the federal Verde Para Sempre and Renascer on the southern bank of the Amazon River, and the federal reserves in the Terra do Meio and BR-163 regions. In contrast, the state's conservation unit system is dominated by APAs – the most permissive category of conservation unit – and State Forests. The principal state strict protection units are located in a comparatively

[1] Author's calculations based on data provided by ICMBio and Instituto Socioambiental.
[2] For a discussion of my coding of conservation unit types, see Table 2.2, Chapter 2.

inaccessible – and so less immediately ecologically vulnerably – remote area of Calha Norte, buffered from significant human settlement and degradation by State Forests.

Map 3.1, below, shows the distribution of federal and state conservation units across Pará's territory. State units concentrate in the north – Calha Norte and Marajó Archipelago – but are also present in the Terra do Meio and the Tucuruí Mosaic. Federal units are more distributed, with older units toward the west of the state and along the Amazon river and the Carajás mountain range. Federal units created in the 2000s concentrate in the Terra do Meio, along the BR-163 highway, and on the northeastern coast. Red pixels in Map 3.1 show the location of cumulative deforestation in the state through 2011. Much of the white, forested area to the south and east of the Terra do Meio region, and in the empty spaces in the northern reaches of the Calha Norte region, is classified as federal indigenous lands.

Map 3.1. Regions and the Distribution of Federal and State Conservation Units in Pará



Sources: ICMBio (2012), INPE (2014).

Just as the state government favored less contentious areas than the federal government in which to place conservation units, so was it more reluctant to enact conservation policies than the federal government. Federal policy actions in Pará to preserve the forest, combined with a

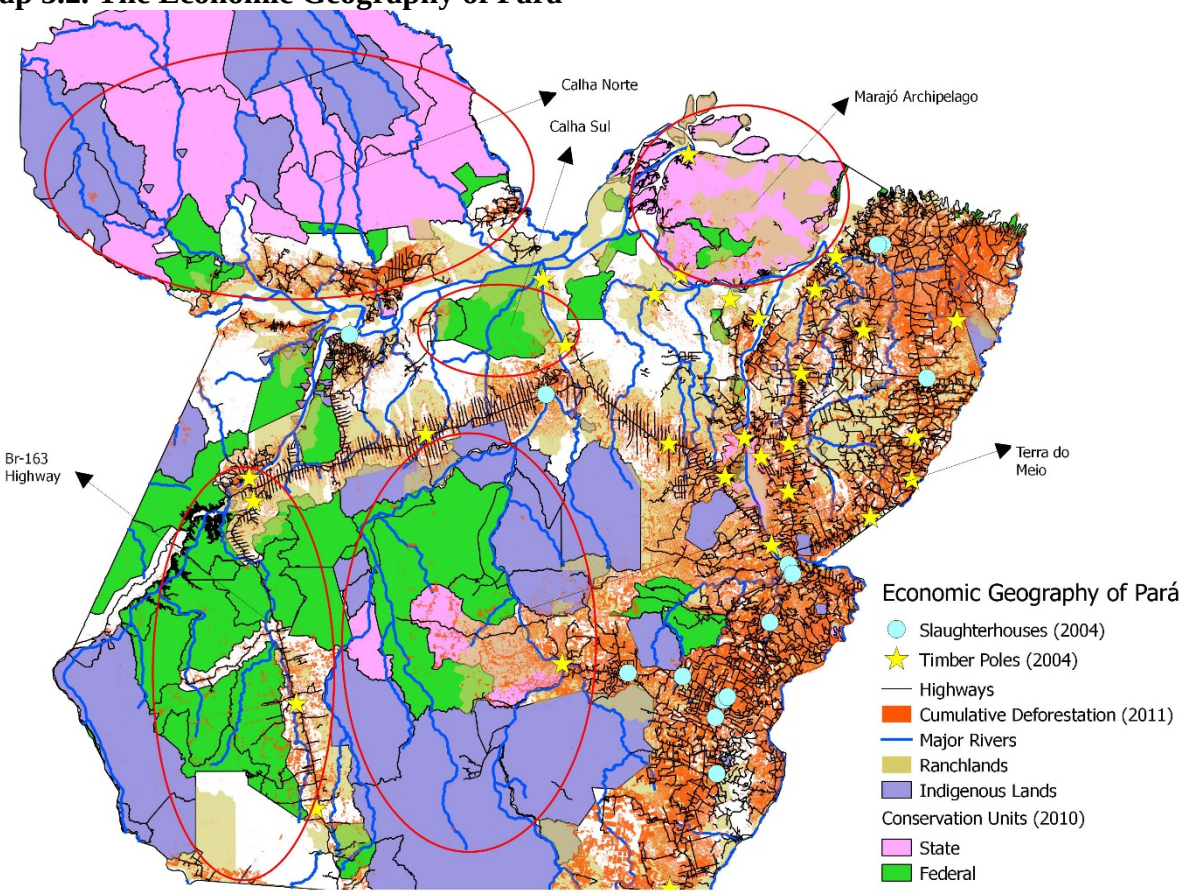
challenging economic geography and weak environmental institutions, prompted the state government to *react* to vertical pressures from above, rather than to proactively promote comprehensive sustainable development initiatives – which occurred in Amazonas (see Chapter 4). Like Amazonas, Pará has long been a target of federal interventions, but Pará's more heavily settled interior and the greater prevalence of ecologically destructive industries spread throughout much of the state's territory renders the state a politically more difficult context for conservation unit creation and implementation than Amazonas is.

With respect to implementation and governance of conservation units in the state, neither the federal nor state governments present satisfactory performance, as most state and federal conservation units in Pará possess management councils, several have management plans, but most lack sufficient personnel and institutional support to enforce rules effectively. Systematic data on broad management outcomes are sparse, but in a 2013 review of governance on Amazonian conservation units, the Union Accounting Tribunal (*Tribunal de Contas da União* – TCU), a federal agency, ranked 7 Pará state units as "Low," 12 as "Medium," and only 1 as "High." Of 32 federal units studied in Pará, the TCU ranked 10 as "Low," 18 as "Medium," and only 4 as "High" (TCU 2013; see Appendix 3.1).

Economic Geography of Pará

The purpose of this section is to show that the economic geography of Pará renders conservation in much of the state difficult – and where conservation has occurred, the state has accommodated the interests of large-scale extractive industries more than the federal government has.

Map 3.2. The Economic Geography of Pará



Sources: IBGE (2006), ICMBio (2012), IMAZON (2004).

Pará's economic geography is characterized by a strong presence of land intensive industries spread throughout much of the state, most of which are not easily conducive to conservation. These industries exert political pressure at all levels of government, but timber emerges as an important player in state environmental politics, while it is less influential at the federal level. Meanwhile, legal and illegal ranchers maintain formal and informal ties to politicians at all tiers of government, though their influence is felt more strongly at the state than at the federal level. Finally, small-scale extractive communities are scattered throughout the state, and find greater sympathy for their plight from the federal government than from the state. As Map 3.2, above, shows, there is often considerable overlap between economic centers and areas slated for protection, and both federal and state governments must consider the human consequences of environmental protection as they proceed with conservation plans. This section will review the economic geography of Pará, focusing on commercial and infrastructure activities.

Pará is the most populous Amazonian state, with 7.6 million people in 2010. It also has a territory spanning 1.2 million square kilometers, making Pará the second largest state in area after Amazonas (IBGE 2014a). Unlike its Amazonian neighbor, the state of Pará has a comparatively densely populated interior: While Amazonas's population density is only 2.23 people per km^2, Pará's is 6.07.

The population density of Pará's interior is accompanied by economic diversity. Pará exports a variety of raw materials, including mahogany and other species of hardwoods; iron, bauxite, nickel, gold, and other minerals; and beef and leather goods. Commercial-scale logging, ranching, and mining linked to global commodities markets take place in many parts of the state. Cities in the south of Pará, such as Itaituba, Marabá, and São Félix do Xingu, are economically important hubs for logging, ranching, and services. Santarém, at the confluence of the Tapajós and the Amazon rivers, at the northern end of the BR-163 highway, exports timber and soy. Barcarena, adjacent to the state capital, Belém – in northeastern Pará –, hosts a minerals export port. Remote towns north of the Amazon river – in Calha Norte – such as Óbidos and Monte Alegre, are smaller, poorer, and subsist on ranching, logging, small-scale extractivism, and services (Amorim et al. 2010, 26-32). Farther to the west, Oriximiná (also in the Calha Norte region), depends on the Mineração Rio Norte bauxite mine, which is located in the Saracá-Taquera National Forest (Ministério da Saúde 2009, 35-36).

Highways link Pará to markets in other regions of the country. Several significant secondary cities in the interior lie along highways and smaller roads between the state capital and the rest of Brazil: In the southeast of the state, Marabá, Redenção, Xinguara, and São Félix do Xingu benefited from the opening of timber frontiers following the construction of the Belém-Brasília highway in the 1960s and then state highways PA-150 and PA-279. (Schmink and Wood 1992, 145-146). Along the BR-163, in southwestern Pará, Itaituba and Novo Progresso constitute centers of the new timber and cattle ranching frontier. Finally, the larger rivers in the state provide convenient access to the sea for soybeans cultivated largely in Mato Grosso (but increasingly in Pará), and sufficient water flow for the hydroelectric dams from which the country obtains much of its domestic electricity.

The subsections below provide overviews of timber, cattle ranching, mining, and extractivist industries. I follow the analysis of the economic geography of Pará with discussions of the deforestation challenges posed by dams and highways.

Timber: High

I code timber industry importance in Pará as *high* because the industry in the state is large compared both to the other two state cases in this study – Amazonas and Minas Gerais – and because Pará is one of the largest timber producers in Brazil. The timber industry is also an important political interest group in Pará, with links both to the Workers' Party (PT) and the Brazilian Social Democratic Party (PSDB). Aimex (Associação das Indústrias Exportadoras de Madeira do Estado do Pará, founded in 1983), the main industry association, endorses gubernatorial candidates.

Before the 1970s, logging was largely restricted to floodplains along the principal rivers of the region. Later, however, the timber industry moved inland with the opening of new highways and roads, and Pará eventually became Brazil's largest exporter of hardwood. By 2009, timber production in the Legal Amazon[3] took place in 192 municipalities, 75 of which are considered "logging poles" – "that is, municipalities whose volume of timber extracted and consumed was equal to or greater than 100 thousand cubic meters" (SFB/Imazon 2010, 6). When Belém-based NGO IMAZON conducted a study of logging poles across the Amazon in 2004, the researchers found that Pará has 34 poles that produce varying quantities of timber, spread throughout the state.

[3] The Legal Amazon, a region defined legally in the 1950s, includes nine states: Acre, Amapá, Amazonas, Rondônia, Roraima, Pará, Mato Grosso, Maranhão, and Tocantins.

Most are in the east and southeast, but four are located along the BR-163, stretching south from Itaituba to Cuiabá, in Mato Grosso.

In 2009, of 2,226 timber companies in the Amazon, 1,067 (47.9%) were located in Pará, where they produced 2.6 million cubic meters of processed timber, provided 92,423 direct and indirect jobs, and earned R$2.2 billion (SFB and IMAZON 2010, 8). This is an order of magnitude greater than the timber industry in neighboring Amazonas. Much of the wood extraction takes place in Pará's eastern region: the logging poles of Paragominas, Tailândia, Tomé-Açú, and Ulianópolis, and other non-pole municipalities of the region, consumed 21% of the Amazon's extracted wood in 2009 (ibid., 11). Meanwhile, western Pará, from Santarém to the southern frontier of the state, consumed only 5% of the Amazon's timber. With the exception of some areas close to the Amazon river, just north of Santarém, Calha Norte was not a significant contributor to the logging industry as recently as 2009 (ibid., 12).

From 1998 to 2009, the Amazonian timber industry shrank overall, from 28.3 million cubic meters of logs in 1998 to 24.5 million in 2004, and 14.2 million in 2009. Technological changes in consumer markets, greater environmental law enforcement after 2004 (Plano de Combate ao Desmatamento), and the 2008-9 economic crisis reduced both demand and supply of Amazonian timber. Law enforcement affected the logging industry in Pará especially: In the wake of Dorothy Stang's murder in the Terra do Meio, and the ensuing international outrage, the federal government sent troops to Terra do Meio to establish law and order, froze Forestry Management Plans along the BR-163 highway for six months, and decreed a Forestry District, as well as the Terra do Meio Ecological Station and Serra do Pardo National Park (Markun 2005). State and federal enforcement of environmental laws also increased after 2007, when SEMA-PA (Secretariat of the Environment of Pará) and IBAMA began joint operations to confiscate illegal timber from producers in Tailândia – as opposed to just identifying the timber, issuing a fine, and then leaving it in place for timber firms to remove and sell clandestinely (Author interview with Valmir Ortega, ex-Secretary of the Environment of Pará, 2012).

In the Terra do Meio and BR-163 regions of Pará, much logging is accompanied by land conflicts, as small-scale settlers, loggers, and ranchers do battle for access to un-destined public lands (*terras devolutas*). There is also some evidence of the complicity of state and federal officials in illegal logging: Jáder Barbalho, ex-Governor and Senator of Pará (PMDB), was suspected in 2001 of having links to a major logging entrepreneur, Moisés Carvalho Pereira, who was illegally exploiting timber in the Kayapó indigenous land, and exporting much of it to the United Kingdom (Greenpeace 2001). In 2005, the federal government investigated then State Senator Ana Júlia Carepa for allegedly taking bribes from timber firms in exchange for her having her ex-husband, Marcílio Monteiro – then the director of IBAMA in Pará – ignore the transport of illegal logs ("Madeireiros Divergem..." 2010).[4] As she was running for re-election in 2010, Governor Carepa requested that the federal government remove the incumbent director of IBAMA in Pará, for enforcing environmental laws too strictly in the state, and thereby hurting Carepa's re-election chances (Magalhães 2010). The government of the city of Novo Progresso, along the BR-163, is widely believed to have strong ties to the logging industry ("Vereadores de Novo Progresso..." 2009).

The timber industry in Pará has political ties to state government that go beyond complicity in clandestine timber extraction: In 2006, timber firms gave donations to both Almir Gabriel

[4] Monteiro became the Secretary of Special Projects during Carepa's 2007-10 gubernatorial administration.

(PSDB) and Ana Júlia Carepa's (PT) gubernatorial campaigns (TSE 2014). During the brief conflict between the state and the federal government in 2006-2007 over whether to create a State Forest and state APA, or federal Resex, in an area of Calha Sul, both Jatene and Carepa supported the state's objectives – which were consistent with timber industry preferences (an APA and State Forest). Finally, in 2010 Aimex, the Pará state timber association, split internally over whether to support the re-election of Carepa (PT), or the return of Simão Jatene (PSDB) ("Madeireiros Divergem..." 2010), indicating that both parties in the state have ties to the timber industry.

Map 3.2 above shows the geographic distribution of timber poles across Pará. The largest are concentrated in the east and southeast, though the poles in expansion during the 2000s are located toward the west, which has more stands of virgin timber. Federal conservation units along the BR-163 highway were created to suppress illegal timber extraction – and associated illegal activities. Conflicts between smallholders and encroaching timber companies after the completion of the Tucuruí dam, in 1985, helped spark the creation of the Tucuruí state mosaic in 2002. Two timber poles encroach on the area of the federal Verde para Sempre Extractive Reserve. This reserve, and its neighbor, Renascer, were established to favor local extractive communities over commercial timber. Older timber poles concentrate in the northeast of the state, which is an area of older settlement.

Slaughterhouses and Cattle Grazing: High

Besides logging, ranching is the major driver of deforestation in the Amazon rainforest (Margulis 2003), and a growing industry in Pará and neighboring states. As Map 3.2, above, shows, much of Pará's land is occupied by cattle ranches, and the state contains 15 slaughterhouses distributed throughout its territory (Arima, Barreto, and Brito 2005; IMAZON 2004). The bulk of the slaughterhouses lie within the state's Macro-Ecological Economic Zoning (Macro-ZEE) plan's zones for consolidation and expansion of economic activities, rather than in zones slated for environmental protection. Most slaughterhouses concentrate in the southeastern region of the state, as well as south of the Amazon river (in Santarém) and on the bank of the Xingu river (in Altamira). Much beef is sent to southeastern Brazil to be consumed or exported to global markets (Greenpeace 2009). Much cattle ranching in the Amazon is inefficient, with on average fewer than one head of cattle per hectare of ranchland (Nepstad et al. 2008). This situation is exacerbated by land tenure insecurity in the state, which along speculative frontiers such as BR-163 and the Terra do Meio (Margulis 2004, 20) prompts ranchers to expand horizontally by appropriating and deforesting adjacent public lands, or purchasing cleared lands from timber companies, rather than investing in technologies to improve production efficiency.[5]

[5] Margulis (2004, 21-22) provides a fine description of the BR-163 and Terra do Meio deforestation frontiers in Pará, *circa* 2002, examining the interactions of loggers, ranchers, and other settlers in each area: "A major difference exists between [the BR-163 and Terra do Meio] frontiers.... Deforestation and the speed with which access... roads are built are considerably less in the case of highway BR-163. The whole process in the area is now the purview of loggers and small farmers, with a number of cattle ranchers purchasing land with a view to future production, laying the basis for consolidating their property rights, speculating on the frontier being 'opened up' (in other words, the paving of BR-163) and investing capital in more land to be eventually used for ranching. The arrival of sawmills is the harbinger of a process of major land appropriation devoted to cattle ranching and crop growing, as has already occurred in the states of Paraná and Mato Grosso.... In the case of São Félix [do Xingu], the agents of deforestation are mainly the large cattle ranchers. Given the proximity of the cities of southern Pará (Xinguara and Redenção), the existence of slaughterhouses in those cities and the well-developed road network constructed and maintained through the combined efforts of logging companies, cattle ranchers and the local authorities, the physical and temporal distance separating the 'speculative' and 'consolidated' [capital-intensive] frontiers is substantially less. Land speculators (people

Though slaughterhouses concentrate in more urbanized and longer-settled regions of the state, ranchlands have been expanding in the Calha Norte region, as well – though they remain less prevalent than in southern Pará. Federal conservation units, including the Mulata National Forest (2001), Saracá-Taquera National Forest (1989), and Jari Ecological Station (1982) provide institutional barriers to expansion of ranching, while the State Forests nearer to settled areas of Calha Norte – Paru and Trombetas (2006) –promote legal logging and aspire to render natural resource exploitation sustainable by restricting land grabbing north of the Amazon river.

Ranchers in the interior of Pará maintain informal political ties to state and national politics, as some state and federal politicians own land in Pará. Some land grabbers are allied with individuals in state government institutions, including the judiciary.[6]

Mining: High

Mining is a large industry in Brazil, and companies maintain professional ties to the federal government, which asserts dominion over the nation's subsoil. Today, mining is the largest industry in Pará by value, and politically powerful: according to some observers, elected politicians promote mining companies' interests over other socio-economic concerns (Author interview with journalist Lúcio Flávio Pinto, 2013). Vale S.A., the largest mining firm in the country, operated as a federal state-owned enterprise – the Companhia Vale do Rio Doce (CVRD) – between its founding in 1967 and its privatization by the Cardoso administration in 1997. Vale operates several mines in Pará, including the iron ore mine in the Carajás mountains and – through its subsidiary, Mineração Rio Norte (MRN) – a bauxite mine in the Calha Norte municipality of Oriximiná.[7] Other firms operating in Pará include Mineração Transamazônica and Rio Tinto. Smaller-scale mining activities, including gold mining, are often carried out by independent miners, called *garimpeiros*. Large mining firms exert political influence at all tiers of government through campaign donations, provision of expertise, and funding of social program. They favor secure property rights, which may at times involve resistance to conservation units, and at other times may include support for APAs and National or State forests: Vale's Carajás mine is embedded in the Carajás National Forest, MRN's Oriximiná mine is in the Saracá-Taquera National Forest, and Rio Tinto aided state representatives in establishing the Calha Norte conservation unit mosaic in hopes of securing mineral exploitation rights in the process.

Mining firms, in short, can reconcile their activities with conservation if the conservation unit serves to secure firms' mineral rights and to provide a legal buffer against incursions by illegal miners and settlers. In certain cases, mining firms themselves provide local environmental governance and investment: Vale, for instance, operates a socio-environmental fund (Fundo Vale) that finances conservation initiatives, including conservation areas (Fundo Vale 2012). In conservation units that possess mines, such as the Carajás National Forest, mining operators contribute to unit

specializing in selling land and consolidating titles) figuratively rub shoulders with rural smallholders, loggers (continually pressing further into the forest) and those agents more interested in production, in particular cattle ranchers with access to capital. In addition to timber extraction, local economies were initially boosted by mining activities (cassiterite and gold) and by *jaborandi* extraction."

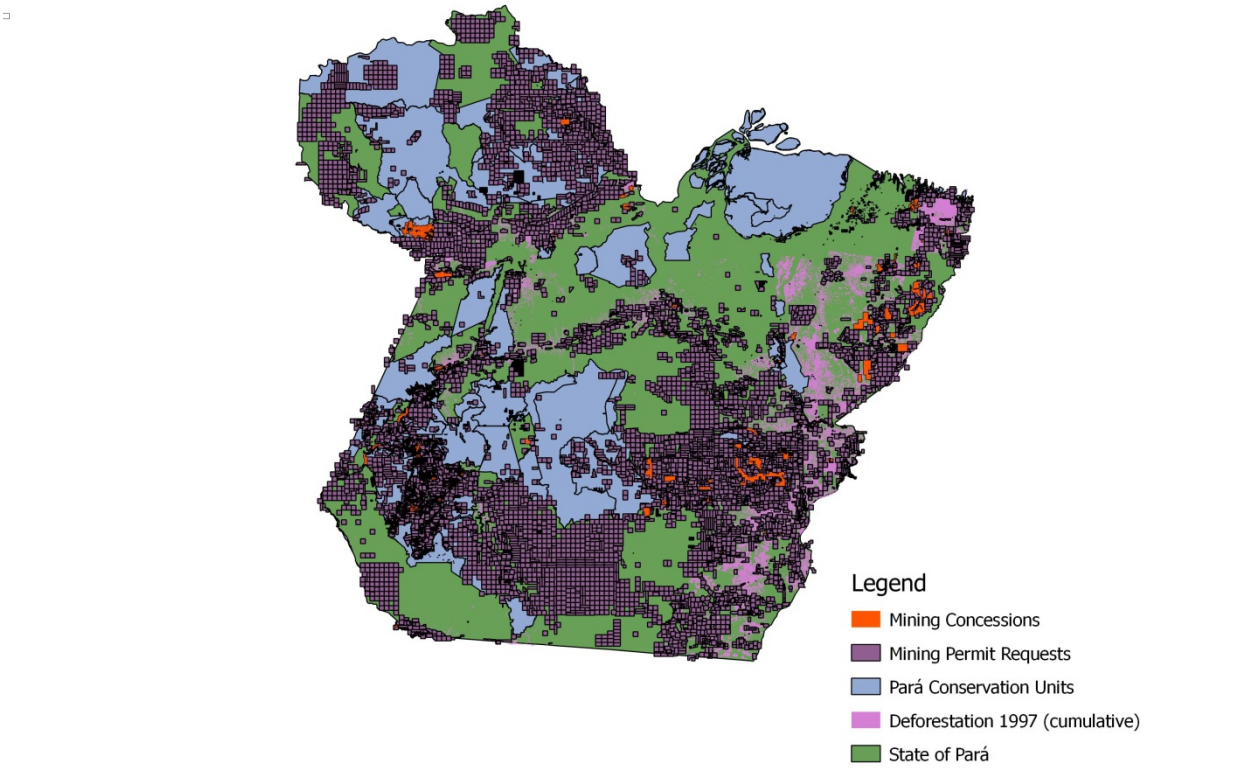
[6] This is evidenced by a state judge's decision to punish a local journalist, Lúcio Flávio Pinto, for libel – for having called a regional illegal land grabber, C.R. Almeida, a "*grileiro*" (land grabber). State courts upheld the judgment against Pinto even after federal courts had found Pinto's accusation to be true (Author interview with Lúcio Flávio Pinto, 2013). Further details can be found in Pinto (2012).

[7] Iron is a key ingredient in steel, while bauxite is a key ingredient in aluminum.

management.[8] In other cases – for example, in the ongoing dispute between ICMBio and Vale over the creation and borders of the proposed Serra da Gandarela National Park in Minas Gerais – mining and environmental interests clash.

Map 3.3, below, shows the distribution of mining license requests (purple rectangles), and approved concession licenses (red rectangles). The former include both requests for study and operating licenses. The northwestern quadrant of the map includes MRN's bauxite mine in the Saracá-Taquera National forest, and the southeastern quadrant features Vale's Carajás iron mine. Rio Tinto, meanwhile, possesses mineral research licenses in the Paru State Forest, in Calha Norte (northwestern quadrant). The considerable overlap between mining license requests and federal and state conservation units (and, though not visible on the map, indigenous lands) shows the mining industry's interest in exploring for and extracting minerals and ore in protected areas.

Map 3.3. Mining Permit Requests and Licenses Issued in Pará



Sources: DNPM (2012), ICMBio (2012), INPE (2014).

Rubber: Medium/Low

Compared to Amazonas and Acre, Pará's rubber tapping sector is rather small. In 2000, the rubber industry in Pará produced R$150,000 of rubber – a value comparable to Rondônia

[8] For instance, Vale representatives participate in the Carajás National Forest management council, created in 2003 (Ibama Portaria No. 81, 11 de Dezembro de 2003), and the company is involved in a Public-Private Partnership with ICMBio and INPA in the same conservation unit to protect gavião-real, an endangered bird (ICMBio 2010a).

(R$163,000) and Minas Gerais (R$193,000). These values make Pará's rubber tapping sector small in comparison several of its Amazonian neighbors, but medium in comparison to much of the rest of the states in the country (20 states produced no rubber in 2000) (IBGE 2000). Whether medium or low, rubber production in Pará is dwarfed by Amazonas' R$3.6 million and Acre's R$3.1 million in 2000. Production values have changed over time in all of the Amazonian states, but, but as recently as 2012 the industry in Pará remained smaller than in Rondônia, Acre, and Amazonas – and larger only than in Amapá, Bahia, and Mato Grosso (Minas Gerais reported no data on rubber production from 2001-2012). With cattle ranchers and timber and mining firms dominating the economy of the state, rubber tappers and other small extractive communities have considerably less influence over state environmental policy making in Pará than their counterparts do in Amazonas and Acre.

Infrastructure

Highways and Roads

Compared to Amazonas, Pará is highly integrated by roads, and better linked by highway to markets in southern Brazil. Unsurprisingly, given that roads bring people and settlements, deforestation tends to overlap with major highways and regions with dense road networks. Indeed, in the 2000s, federal plans to pave the BR-163, which runs from Santarém in Pará south to the capital of Mato Grosso, Cuiabá, sparked concern from local movements and interest among organized civil society groups in developing a sustainable development plan for the region, to offset predicted deforestation along the highway. As paving and sustainable development were being debated in the early 2000s, the governors of Amazonas and Mato Grosso supported paving only the stretch from Cuiabá to the southern border of Pará, which prompted Governor Jatene and PT Santarém Mayor Maria do Carmo (who had run against Jatene for the governorship in 2002) to ally to advocate that paving of the highway reach Santarém – a city with a major Cargill soy exporting port (Greenpeace 2006b, 37; Pereira 2008, 342).

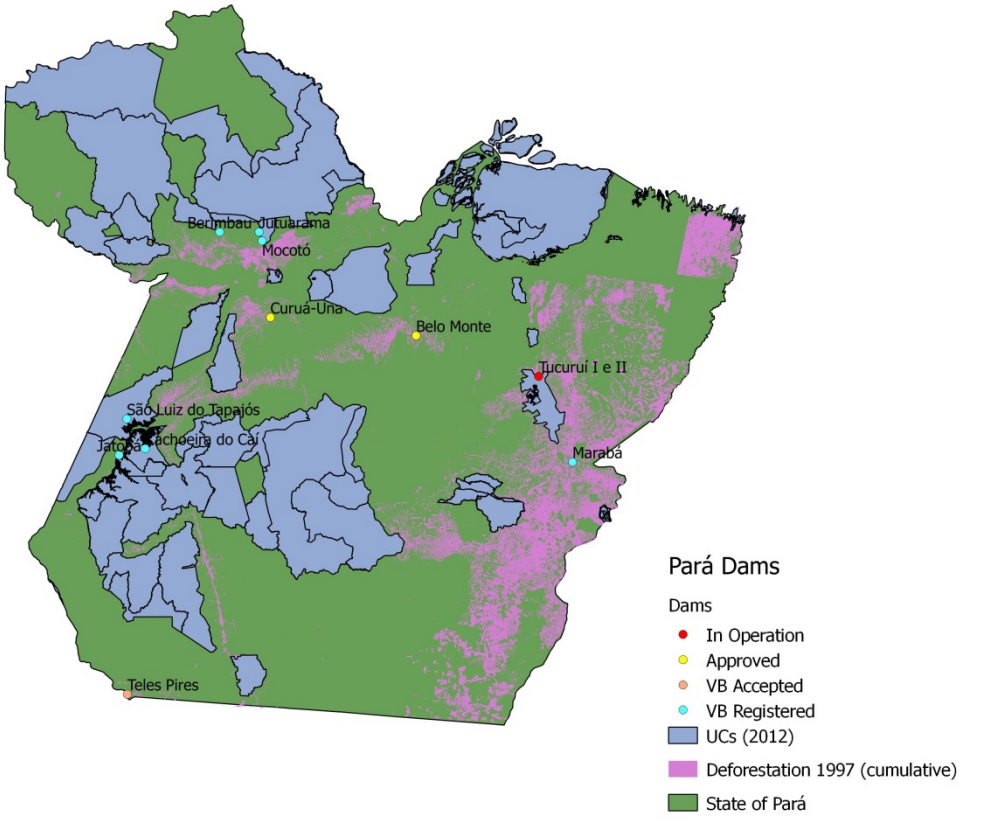
Dams

Pará also possesses major dams, and the federal government seeks to build more to expand electricity offerings to the country. The first dam was Tucuruí, completed in 1985, and embedded in a state APA in 2002. For two decades, environmentalists and developmentalists have debated plans to construct the Belo Monte dam, on the Xingu River, in an area that would flood surrounding forests and indigenous territories. Construction has begun, but is periodically interrupted by court battles ("Global Insider: Brazil's Belo Monte Dam" 2011).

While federal data show only two operating dams in Pará, the history of plans to build dams demonstrates considerable developmental ambition on the part of the federal government. Through the early 1990s, Eletronorte planned the construction of 32 hydroelectric dams throughout Pará – though by 1996 the company had limited its construction plans to Belo Monte, today's most nationally contentious dam project currently under construction on the Xingu river. The Lula administration's Growth Acceleration Plan, and a 2011 plan published by the Ministry of Mines and Energy proposed the construction of 24 new dams in the Amazon region by 2020, including at least 3 in western Pará (MME/EPE 2011). In anticipation of these investments in infrastructure, in 2012 President Dilma Rousseff reduced or altered seven federal conservation units in the Tapajós river basin, in Pará and Amazonas, to facilitate environmental licensing (Allen 2013, 223-224).

Map 3.4 below shows the location of existing and planned dams in the state of Pará. While only one dam – Tucuruí – is in operation, licenses for two more have been approved (Curuá-Una and Belo Monte), and six more lie adjacent to or within federal or state conservation units.

Map 3.4. Hydroelectric Dams in Pará



Sources: ICMBio (2012), IMAZON (2014), INPE (2014).

Federal Conservation Units in Pará, 1961-2002

The federal government has become over time more aggressive regarding what types of conservation units it creates in Pará, and where it locates them. From 1961 to 2002, the federal government's Amazon policy evolved from one of promoting ecologically destructive migration that produced land tenure insecurity, violence, and widespread forest burning; to a growing embrace of environmental governance. Environmental policy began in earnest in 1989 with President Sarney's *Nossa Natureza* and the creation of IBAMA, and continued in 1998 with President Cardoso's National Forests Program. Both of these programs contributed to the growth of the federal system of conservation units in Pará.

Federal conservation unit creation in Pará began with a set of National Forests imposed in remote regions in the 1960s to 1980s. Later, the federal government became more aggressive: Conservation units approached the deforestation frontier with the 1998 National Forest Program, and the Lula administration intervened militarily in the Terra do Meio in 2005. The latter effort culminated in the Terra do Meio conservation unit mosaic.

In this section, I trace the evolution of federal conservation units in Pará. I divide the narrative into three parts that correspond to different time periods: First, I examine federal policies prior to 1989, the year Sarney created IBAMA and launched *Nossa Natureza*. I then trace the building of institutional capacity and greater enforcement in the Amazon from 1989 to 2002. In so doing, I highlight *Nossa Natureza* and the National Forests Program for their importance in increasing environmental protection in Pará. I conclude by detailing the Lula and Rousseff administrations' strategic actions in the Amazon, including the creation of the Terra do Meio mosaic along the southern deforestation frontier in 2004-6.

Federal Intervention in Pará and the Amazon before 1989

Federal policy toward the Amazon was environmentally destructive in the 1960s, and in some ways remains so today. In the 1960s and 1970s, the military dictatorship promoted migration and settlement from the Northeast, which produced chaotic land grabbing and deforestation. In these decades, large scale land grabbers overran and replaced many small scale settlers in the interior. Loggers accompanied ranchers, and opened roads that migrants subsequently used to settle deeper in the forest – clearing the forest as they went. By the time of democratization in 1985, much of southern Pará was a lawless frontier zone, characterized by violent land conflicts and widespread burning of the forest.

Nevertheless, the federal government began creating conservation units in Pará earlier than the state government did. In 1988, when there were still no state UCs in Pará, the federal government had already established four: the Caxiuanã (1961) and Tapajós (1974) National Forests, Amazônia National Park (1974), and the Trombetas Biological Reserve (1979). All but the Caxiuanã National Forest were located in the western region of the state, and Tapajós and Amazônia straddled the BR-230 (Trans-Amazon) and BR-163 (Cuiabá-Santarém) highways.

The period from 1973 to 1981 produced innovations in conservation unit categories that affected Pará and the Amazon region as a whole: The federal Secretariat of the Environment (SEMA), founded in 1973, developed the concept of Ecological Stations, and President Figueiredo approved all tiers of government to establish them in 1981 (Hochstetler and Keck 2007, 32). That same year, Figueiredo also created the permissive APA category (Law 6902) (ibid.). Finally, Extractive Reserves emerged as a result of the Acrean rubber tappers' movement's efforts to secure land rights, and the first such reserves were created in Acre in 1990 (Hecht and Cockburn 2010, 208-209; Hochstetler and Keck 2007, 162). Nevertheless, the period of 1980-88 (during which time the military dictatorship transferred the state to civilian rule) saw no new UCs established in Pará.

The first civilian Amazon program enacted after the democratic transition was the *Calha Norte* project, a development plan elaborated in secret that involved cultivating bilateral relations with bordering countries, combating drug trafficking, increasing the military presence in the area between the northern bank of the Amazon river and the national border, and expanding highway infrastructure (Hecht and Cockburn 2010, 136-7). A concern with regional security carried over from the military dictatorship, and environmental sustainability was not yet a salient issue in the region during the first years of the new republic.

Toward the end of the 1980s, satellite images began documenting Amazon deforestation (ibid., 44) and attracted the attention of Brazilians and international organizations, which pressured

the Sarney administration to act to preserve the forest.[9] Environmental activism in the Amazon got another boost from the rise to prominence, and 22 December 1988 murder, of rubber tapper union leader Francisco "Chico" Mendes, who had cultivated an international audience with a social-environmentalist discourse that linked the plight of rubber tappers and other traditional extractivist communities in the Amazon to deforestation (Revkin 1990). President Sarney responded with *Nossa Natureza* (Our Nature), a program aimed both at enhancing conservation and emphasizing Brazilian national claims on the Amazon against an emerging global discourse that proposed that the Amazon be "internationalized" to protect it (Hecht and Cockburn 2010, 137).

Part of Nossa Natureza involved the creation of new UCs, and in 1989 Sarney established the Saracá-Taquera National Forest, Tapirapé Biological Reserve, Tapirapé-Aquiri National Forest, and APA Igarapé Gelado in Pará. This raised the presence of federal UCs in Pará to nine.[10] These new federal conservation units were modest in size and scope compared to many of those established later, in the 2000s, and they appealed as much to mining firms' needs as to environmental priorities. They were concentrated in mineral-rich areas in the Calha Norte and southeastern Pará. Saracá-Taquera buffered the bauxite mine in Oriximiná, while Tapirapé, Tapirapé-Aquiri, and Igarapé Gelado were located within the Carajás Mineral Province adjacent to Vale's Carajás mine, in the municipalities of São Félix do Xingu, Parauapebas, and Marabá. Vale supported the creation and management of Tapirapé and Tapirapé-Aquiri, to protect *castanhais* (Brazil-nut trees) in the case of the Biological Reserve, and to protect *castanhais* and natural resource use rights of Xicrin do Cateté indigenous groups – as well as provide a legal framework for mining – in the case of the Tapirapé-Aquiri National Forest. The APA Igarapé Gelado lies adjacent to the Tapirapé units, and constitutes a narrow sliver of low fertility soil (ISA 2014c). While these conservation units were timid compared to the federal government's actions in the 1990s and, especially, 2000s, they compare favorably to the actions taken by the state government of Pará, which that year established only one conservation unit, the APA Marajó – a unit that still awaited implementation in 2012 (Author interview with Crisomar Lobato, SEMA-PA, 2012).

Building Federal Environmental Institutional Capacity, 1989-2002

The year 1989 marked a watershed in federal policy toward the Amazon not only because of the new conservation units in Pará, but also because of institutional reforms that strengthened environmental governance. In 1989, the Sarney administration consolidated its four existing environmental agencies into one, IBAMA (Brazilian Institute for the Environment and Renewable

[9] "On September 28, 1987, a satellite of the National Oceanographic and Atmospheric Administration (NOAA) documented more than 5,000 individual fires in the Amazon. They stretched in an arc from southern Acre through Rondônia and Mato Grosso, up through the state of Pará to Belém, with sputterings along the road from Manaus up to the gold boom town of Boa Vista in the state of Roraima. Smoke and particles were so thick in the atmosphere that pilots could not land on the Amazon's radar-less airstrips. The images of these fires shocked the world, Brazilians included. President José Sarney was prompted to make his speech on the Amazon, in which he vowed to develop a coherent environmental policy for the forest. By presidential decree he prohibited burning in the entire region" (Hecht and Cockburn 2010, 44).

[10] The Sarney administration also established National Forests in Amapá and Amazonas, and National Parks in Acre and Mato Grosso (Hecht and Cockburn 2010, 139). In *Nossa Natureza*, the Brazilian federal government for the first time recognized distinct groups as beneficiaries of different types of reserves: "A possible government strategy gradually emerged: the creation of a number of reserves across the Amazon, allocated to groups such as gold miners, Indians and extractors. In these areas, presumably, property rights and community structures might differ from the corporate occupations outside. For good or for ill, *Nossa Natureza* was proposing an *ejido* system, a series of communal or non-privatized lands such as were distributed in Mexico after the Revolution" (ibid., 138).

Natural Resources), which centralized federal environmental policy implementation and law enforcement throughout the country.

However, frequent institutional reforms, budget cuts, and economic recession in the early 1990s caused interruptions in progress on environmental governance (see Chapter 2), and the federal government established no new units in Pará until 1998, when President Fernando Henrique Cardoso (PSDB, 1995-98, 1999-2002) enacted the National Forests Program, and created five new National Forests in the state, all either on lands owned by the military (and so already legally protected) or surrounding key mines in the state, to secure property rights and buffer zones for Vale and other mining firms.[11] In doing so, the Cardoso administration reconciled two key strategic objectives – forest protection and continuing mining operations – but it constituted only the first progressive environmental move undertaken by Cardoso. Beyond creating the National Forests, Cardoso increased IBAMA's enforcement, enacted moratoria on Forestry Management Plans (FMP) to stop fraudulent permissions from being issued, established several more conservation units in Pará and elsewhere, and signed the National System of Conservation Units (SNUC) bill into law, in 2000. These actions set the stage for the more aggressive environmental policy posture adopted by the Lula administration (2003-06, 2007-10).

The 1998 National Forests Program

Amazon deforestation spiked in the late 1990s, rising from 14,896 km^2 cut in 1994 to 29,059 km^2 in 1995. While the regional rate fell again in 1996 and 1997, in 1998 17,383 km^2 were lost. In response to a growing international outcry, and with economic recovery under way, President Cardoso responded to environmental demands with new measures, including increased IBAMA inspections and fines, and additional conservation units. He announced the National Forests Program in January, 1998, after which he decreed new national forests in Pará and Amazonas (ISA 1998). Despite the progress, environmental organizations accused Cardoso of greenwashing: Without social, economic or environmental studies, Cardoso had decreed new national forests on already protected lands, inflating conservation statistics to meet the government's commitment to WWF International to protect 10% of Amazônia (Furtado 1998). In this interpretation, the main beneficiaries of the program were logging companies, not biodiversity or traditional populations.

The five national forests in 1998 were, however, only the first move in a wider conservation program. From 1999 to 2002, the remaining years of Cardoso's presidency, the federal government established seven new UCs in Pará: five extractive reserves, one national forest, and one national park (ICMBio 2012). The extractive reserves were part of a national program, begun under Sarney with *Nossa Natureza*, that promoted sustainable development and protections of the rights of traditional populations in the Amazon. This agenda was implemented by anthropologist Mary Allegretti, who had been an ally of Acrean Rubber Tappers' Council leader Chico Mendes, and now worked in the Ministry of the Environment, as the Secretary for Amazônia (Hochstetler and Keck 2007, 168-169). Diverse NGOs supported the Extractive Reserve program, and beginning in the late 1980s, the World Bank began to condition loans on environmental governance, including the creation of new Extractive Reserves (Brown and Rosendo 2000, 208; Hecht and Cockburn

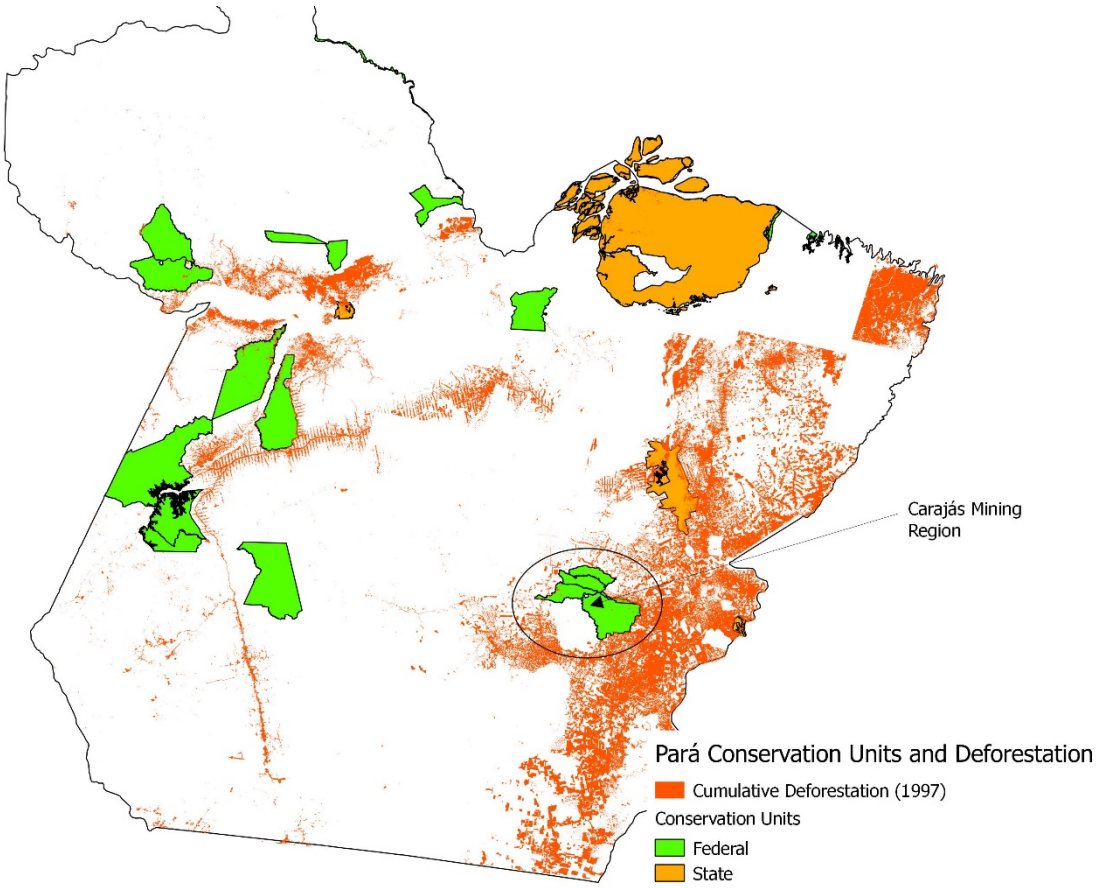
[11] The most famous example of the latter move is the Carajás National Forest, which entirely surrounds Vale's Carajás iron mine in southeastern Pará.

2010, 137). By providing use rights exclusively to traditional populations, such reserves limit the encroachment of larger-scale commercial enterprises.[12]

In addition to creating National Forests and Extractive Reserves, the federal government increased IBAMA's inspections and fines in the Amazon, including in Pará, where IBAMA began to crack down on fraudulent FMPs. A 1996 moratorium on new FMPs accompanied the enforcement effort, and Cardoso renewed this moratorium in 1998 and 2002, and added a moratorium on mahogany production in 2001 (Schulze, Grogan, and Vidal 2008, 167). In 2003, President Lula da Silva renewed the mahogany moratorium for another 150 days (MMA 2003).

[12] Unlike forests and parks, extractive reserves must be located where traditional populations need formalized rights to extract natural resources, and so respond as much to rural social needs as to environmental concerns.

Map 3.5. The Location of Pará's Federal Conservation Units in 2002



Sources: ICMBio (2012), INPE (2014).

By 2002, the federal government had established 22 conservation units in Pará. The majority by number were National Forests (10) and Extractive Reserves (6), most located along secondary deforestation frontiers in the western region of the state. (The exception, in the southeastern quadrant of the Map 3.5, above, is a mosaic of conservation units around the Carajás mine.) This progress in locating National Forests and other units along secondary deforestation frontiers indicates a growing federal ambition to employ conservation units as a tool to stem illegal deforestation, and begin to create a legal forestry industry in the Amazon. These new units, together with SNUC and greater IBAMA enforcement in the Amazon, set the stage for a more forceful environmental policy response by the incoming Lula (PT) administration in 2003 – including a rapid expansion of the federal conservation unit system.

The Federal Government Becomes more Aggressive in Pará, 2003-2014

The year 2003 is another watershed year, in which the left-wing PT entered the presidency for the first time, and began an aggressive program of Amazon protection. The PT entered government with promises of sustainable development in the Amazon (Coligação Lula Presidente 2002). In office in 2003, Lula signaled his commitment to conservation by appointing longtime socio-

environmental activist and Acrean Senator, Marina Silva, to the post of Minister of the Environment. Various observers would later refer to Marina Silva's MMA as "the Ministry of the NGOs" (Author interviews with ICMBio personnel, 2011-2012), since under her administration the MMA strengthened its relationships with domestic and international NGOs and promoted partnerships with them. The boost in institutional capacity that the partnerships provided; the inclusion of environmental NGOs among the PT's constituencies (Hochstetler 2008); increasing national and international attention to Amazon deforestation and the advent of new funding sources for environmental governance, including FUNBIO (Brazilian Biodiversity Fund) and ARPA (Amazon Protected Areas Program); and the geographically broader mandate that the federal government had compared to the state government of Pará, permitted the Lula administration to make the greatest progress of building sustainable governance in the Amazon of any federal administration.

The Lula administration's initial development plans for the Amazon fell short of the sustainability goals desired by the government's civil society and NGO allies (Dagnino et al. 2010). But the factors detailed above helped the administration to overcome local opposition to conservation units among ranchers and loggers in southern Pará and along the southern bank of the Amazon river. In the end, the Lula administration established National Forests and strict protection conservation units along contentious deforestation frontiers – actions that challenged prevailing patterns of production in those areas – as well as numerous Extractive Reserves that sought to prevent encroachments on traditional communities' territories by commercial interests (as well as several Extractive Reserves in less contentious areas).

The Lula administration's conservation unit and law enforcement actions in southern Pará had consequences at the ballot box in 2006: Lula lost in the majority of the municipalities in the Terra do Meio, and Ana Júlia Carepa, the PT gubernatorial candidate in Pará that year, also lost in those municipalities. However, perhaps because she maintained closer relations with the forestry industry in the state than Lula had cultivated, and secured the support of PMDB ex-Governor Jáder Barbalho, she garnered more votes than Lula in the south of the state (Pinto 2006, TSE 2006). Votes in Belém and other regions of Pará more than offset Carepa's losses in the Terra do Meio and BR-163, and she won the gubernatorial election. (Meanwhile, votes nationwide secured a resounding victory for Lula.)

Federal Conservation Unit System Growth, 2003-2014

The federal government increased the size of its conservation unit system in Pará considerably after 2003. In this section, I first detail the evolution of the federal conservation unit system in Pará during from 2003 to 2014, to quantify the progress made during the three PT administrations to 2014: Lula's two administrations (2003-6, 2007-10), and Dilma Rousseff's first administration (2011-2014). Then I explain the political process of implementing governance institutions on the federal conservation units in the state.

The federal government created conservation units in four regions of Pará during Lula's two administrations: the Amazon river, the Atlantic coast, the BR-163 highway, and the Terra do Meio. First, the Ministry of the Environment continued the Extractive Reserve program begun under President Cardoso. During 2003-10, the Lula administration established 16 new extractive reserves along the Amazon River and some of its tributaries (including in the BR-163 and Terra do Meio regions), and along the Atlantic coast of Pará. Second, in response to environmental organizations' opposition Lula's plan to pave the BR-163 highway, the federal government engaged with civil society to design a plan to establish a mosaic of conservation units along the

highway (Toni, Machado, and Pinto 2008).[13] Finally, in response to international outcry after the February, 2005, murder of American nun and socio-environmental activist, Dorothy Stang, the federal government occupied the Terra do Meio region of Pará with troops, and quickly implemented a 2003 plan proposed by São Paulo-based NGO Instituto Socioambiental (Socio-Environmental Institute, ISA) for a mosaic of conservation units in that region.

The Lula administration accompanied national conservation unit system expansion with institutional reforms – including creating ICMBio in 2007 to manage all federal UCs – and measures to punish environmental crimes and formalize property rights in the Amazon throughout the decade. While the state government of Pará concentrated environmental efforts on designing the Macro-ZEE and establishing a majority-State Forest mosaic in Calha Norte, the federal government took charge of environmental governance on the deforestation frontier in the state (as well as in Amazonas, Rondônia, and Acre), and blended National Forests with Ecological Stations, National Parks, and Extractive Reserves to block deforestation frontier expansion from the south and east.

Protecting the Terra do Meio and BR-163, 1990s-2006

Beginning in the 1990s, but increasing in the 2000s, federal attention turned to protecting forests in the Terra do Meio region of southern Pará, on the eastern deforestation frontier. Pará's state development agency, IDESP, had proposed Biological Reserves next to the towns of São Félix do Xingu and Altamira, as well as three Natural Monuments in the Altamira region and a State Park and Biological Reserve along the BR-163 on the southern frontier with Mato Grosso, but the state government did not act on the proposals in the 1990s. Instead, the federal government took action in the region in the 2000s, establishing four conservation units there. The state government under outgoing Governor Simão Jatene in 2006, meanwhile, limited its actions to creating an APA (Triunfo do Xingu) on the area slated in 1992 for the Xingu Biological Reserve in São Félix do Xingu, and Iriri State Forest, sandwiched between two federal UCs: Altamira National Forest and Terra do Meio Ecological Station.

The Terra do Meio (Middle Earth) is a frontier region of Pará that is characterized by rampant land grabbing, deforestation, violence, and a weak state presence. The eastern frontier of the region lies along the Xingu River, which overlaps with the western frontier of deforestation, dominated by ranching and logging. The northern frontier abuts the Iriri River, while the western frontier of the Terra do Meio stops just shy of the BR-163 (Cuiabá-Santarém) highway. The backlands of the municipalities of Altamira and São Félix do Xingu, whose extensive territories comprise a large portion of the region (245,658 km^2), are not heavily populated,[14] but the fertile lands and virgin hardwoods in the remaining forests have led the Terra do Meio to become one of

[13] Though the PT entered government with the support of environmentalists, the party also included developmental interests. In consequence, the 2004-2007 Pluri-Annual Plan (Ministério do Planejamento, Orçamento e Gestão 2004) included several potentially ecologically-destructive infrastructure projects in the Amazon, including the construction of the Belo Monte hydroelectric dam and the paving of BR-163 in Pará. The highway paving especially found support in state and municipal governments in Pará, Mato Grosso, and Amazonas, as representatives of these governments hoped to generate employment and facilitate the transport of products produced in the region to national and global markets. Even ostensibly environmentalist governor Eduardo Braga, of Amazonas, supported paving the highway, to bring Manaus Free Trade Zone consumer products more easily and cheaply to domestic markets in the south of the country. Thus, Amazonian governors, including Jatene, Blairo Maggi (Mato Grosso), and Braga lined up behind the proposal ("Governador do Pará..." 2005).

[14] In 2000, Altamira and São Félix do Xingu together had 0.46 people per square kilometer. (In contrast, in 2000, Belém, the state capital of Pará, had 1,196 people per square kilometer.)

the principal locations of illegal logging, land grabbing, and ranching in the Amazon. These activities have produced conflicts with small holders, traditional populations, and indigenous communities in the Terra do Meio.

The idea of protecting the Terra do Meio and BR-163 regions in central and southern Pará has its origin in a social movement that emerged from the Catholic Church's Ecclesiastical Base Communities along the Transamazon highway in the 1970s. Protection efforts gained strength in the 1990s with the formation of the Movement for the Development of the Transamazon and Xingu (MDTX), later renamed Fundação Viver, Produzir, e Preservar (Live, Produce, and Preserve Foundation – FVPP) (Author interview with Cássio Pereira, IPAM, 2013). Other NGOs began to work in the region in the 1990s and 2000s, including ISA, Environmental Defense Fund, IPAM, WWF Brasil, Conservation International, as well as the Catholic Church's Pastoral Land Commission (CPT). These groups formed the Action Network for the Defense of Terra do Meio (Dagnino et al. 2010, 5-6).

In the 1990s, during Cardoso's presidency, the Ministry of the Environment and environmental groups had proposed the creation of the Terra do Meio Ecological Station to protect the backlands between the Trans-Amazon (Br-230) and BR-163 highways, and the Xingu River. However, the proposal lacked foundation in socio-economic and ecological studies (a concern prior to the enacting of SNUC in 2000, but a requirement afterward). In 1999, the Macapá Priority Areas map – which resulted from a meeting of federal, state, and civil society environmental leaders in Macapá, Amapá, to identify ecologically vulnerable areas – set priorities for conservation of different areas of Brazil, and brought greater attention to the region; as did a Greenpeace campaign to expose the land-related violence and illegal extraction of mahogany taking place there and in surrounding regions (Greenpeace 2001). In 2001, IBAMA and IMAZON proposed blanketing much of the region with a National Forest (Dagnino et al. 2010, 6). In 2002, the Ministry of the Environment contracted ISA to conduct socio-economic studies and propose territorial management tools for the region, and in 2003 ISA recommended a mosaic of different types of conservation units, including both strict protection and sustainable use (ibid.). The Lula administration would later adopt a modified version of the ISA plan.

Environmental concerns combined with social preoccupations along the BR-163 highway in Pará. Local environmentalist NGOs and social movements, including FVPP, feared that paving the BR-163 would increase violent expropriations of smallholders along the highway. This was a reasonable fear, as paving threatened to exacerbate existing insecure property rights and lawlessness, which would likely empower wealthy landowners (or land grabbers, in the case of illegal occupations) at the expense of smallholders. Environmental NGOs in the region and across the country demonstrated, and raised the political salience of the plan's potential socio-environmental consequences (Toni, Machado, and Pinto 2008). The Ministry of the Environment and NGOs responded by holding a series of public consultations with local stakeholders. These discussions produced a regional sustainable development plan in 2005 that involved completing a version of the conservation unit mosaic ISA had proposed in 2003, and accompanied it with other social policies (ibid.).

Despite local social movements' advocacy, the federal government undertook little action until violence and international condemnation of the murder of an American nun in Pará prompted action in 2005 (Greenpeace 2003, Marquesini, Muggiati, and Adario 2005). The Lula administration created one conservation unit in the region in 2004 – the Riozinho do Anfrísio Extractive Reserve – but the government took few other actions in the region before American nun Dorothy Stang's murder in the municipality of Anapu, in the Terra do Meio, in February 2005. In fact,

Stang was just one of 37 union, social movement, and environmentalist leaders killed in the region in the early 2000s, but her murder captured international headlines because she was a foreigner. International headlines and outrage put pressure on the Lula administration to improve governance in the Terra do Meio (Velásquez, Villas Boas, and Schwartzman 2006, 1065) and comply with its Amazon Action Plan commitment (Marquesini, Muggiati, and Adario 2005, 4-5).

In response to Stang's death and the ensuing international outcry, the Lula administration sent troops to the region to suppress illegal logging and violence, and enforce a moratorium on forestry covering 8.3 million hectares in the region (Greenpeace 2006c). The administration also quickly decreed the Terra do Meio Ecological Station and Serra do Pardo National Park (both largely on state land) in the Terra do Meio, and the Nascentes da Serra do Cachimbo (on federal land) along BR-163 in the far south of Pará. At the same time, Lula fast-tracked a Forestry Management Law that was working its way through Congress at the time, to decentralize forestry concessions. One year later, around the anniversary of Stang's death, the federal government decreed nine more strict protection and sustainable use UCs in the BR-163 and Terra do Meio. These UCs completed the mosaic and included National Parks, National Forests, Extractive Reserves, and APAs.

In response to international, national, and local pressures to preserve the Amazon rainforest and suppress illegal activities in the Terra do Meio and BR-163 regions, the federal government enacted sustainable development plans in those regions consisting largely of mosaics of conservation units, and proved willing to impose such institutions on the region even in an election year (2006) – producing losses for the PT in the affected municipalities. In contrast, despite ambitious UC proposals dating to 1992, the state government limited its contribution to the Terra do Meio mosaic to a remote State Forest (Iriri) and permissive APA (Triunfo do Xingu).

Increasing Federal Institutional Capacity, with Interruptions, 2003-10

As the federal government expanded its system of conservation units throughout the country – emphasizing the Amazon – IBAMA became responsible for an increasing number of UCs. However, IBAMA continued to prioritize environmental licensing and law enforcement actions over conservation unit management. To address this challenge, in 2007 Lula, Minister of the Environment Marina Silva, and Sub-Secretary of the Environment João Paulo Capobianco negotiated a decree to separate the IBAMA directorates in charge of conservation unit governance from the rest of IBAMA's structure, and joined them into a new autarky, the Chico Mendes Institute (ICMBio). This was a first step in building conservation unit management capacity in the long run, but because the negotiations had been held secretly, its immediate effect was to induce IBAMA employees to strike for 63 days, in opposition to the severing of the institute.

According to interviewees in ICMBio, morale plummeted in 2007 and 2008, and the new institute struggled in its first years to design its institutional structure, including its structure of territorial representation. It was not until 2008 that ICMBio had its own budget, separate from IBAMA's, and only in 2009 did the institute secure a headquarters in Brasília, and hold a competitive exam (*concurso público*) to staff conservation units in the Amazon.

Over time, however, ICMBio fortified its presence in the Amazon, and established two of its eleven regional coordination centers (CR) in Pará: CR-3 in Itaituba, along the BR-163 (CR-3 relocated in 2011-12 to Santarém, farther north, along the Amazon river), and CR-4 in Belém.[15]

[15] There are four Regional Coordinations in the Amazon: In addition to Santarém and Belém, ICMBio has centers in Porto Velho, Rondônia (CR-1) and Manaus (CR-2).

From 2007 to the present, ICMBio officials have worked to establish management councils and publish management plans in conservation units throughout the Amazon, though much work remains to be done (TCU 2013). While staff remain insufficient to govern the massive federal UCs in the state, most ICMBio managers live in interior cities near to their UCs (Author interview with personnel at ICMBio CR-4, Belém, Pará, 2011).

These national institutional changes temporarily halted implementation and governance of the new conservation units in Pará. But after the strike IBAMA resumed police actions in the BR-163 and Terra do Meio, including Operation Boi Pirata I and II, in which IBAMA and federal environmental police removed cattle illegally grazing in conservation units in the state, including the Terra do Meio Ecological Station. ICMBio, meanwhile, continued implementation of management institutions begun by IBAMA on conservation units in Pará: Today, 43 federal units in Pará possess management councils, and 20 have published management plans. Of the councils established 14 were completed by 2007, by IBAMA, while the rest (29) have been created since then, by ICMBio. Of the management plans, in contrast, only three were completed by IBAMA, while the other 17 have been developed and approved since the creation of ICMBio.

Ambitious Plans and Minor Progress: State Conservation Units, 1989-2002

This and the following section trace the evolution of state environmental institutions and conservation unit policy from 1989 to 2002, and then from 2003 to the present. As the state of Pará is characterized by powerful land intensive industries, on average I expect the state to opt for moderately permissive types of conservation units in remote areas in which major industries do not have an interest, and permissive types where industries do have an interest in using natural resources. The sections to follow will show these expectations to be generally supported. Finally, I will examine in depth a conflict between the federal and state governments in the Calha Sul (southern bank of the Amazon river) region of the state, to illustrate divergent preferences by tier of government on the same area of land.

Like the federal tier, the state government of Pará from 1989 to 2002 enacted institutional reforms, including moderate steps toward consolidating environmental agencies. In contrast to federal actions in the Amazon, however, environmental governance reform was not a political priority during this period in Pará: In his memoirs, former Governor Almir Gabriel (PSDB), who governed Pará from 1995 to 2002, barely mentions environmental reforms, and instead focuses his attention on re-ordering the state apparatus to improve services and infrastructure in his first administration (1995-1998), and increasing economic production in his second (1999-2002) (Oliveira 2002, 265). In the absence of strong federal pressures to change state political incentives, the state government of Pará underinvested in its environmental institutions from 1989 to 2002, and did little to build out its state system of conservation units.

The upshot of underinvestment was that the state's environmental agency, SECTAM (Secretariat of Science, Technolgy, and the Environment), was born weak and remains weak today, despite ambitious reforms in 2007-09. The state government established SECTAM in 1988, but left its institutional structure undefined until 1993 (McAllister 2008, 30). By SECTAM's own account, the secretariat did little environmental monitoring or enforcement before 1995, when Pará enacted its State Environmental Policy (ibid., 31) – a broad statement of environmental governance principles that is short on implementation details (Governo do Estado do Pará 1996). As McAllister (2008, 36-37) argues, SECTAM remained weak throughout the 1990s: A 2002 study of the agency showed that while in 1991 SECTAM had a staff of 158, with 8 employees working in environmental enforcement, by 2002 the staff had increased to 255, but only 17 of those employees worked

in enforcement. In comparison to São Paulo's Secretariat of the Environment (SMA), SECTAM exhibited quite low capacity to manage Pará's immense territory:

> SECTAM's staff was less than one-tenth the size of the São Paulo SMA, while the state of Pará is five times as large as São Paulo. Moreover, SECTAM had only a single office in the capital city from which to administer its activities throughout the state. As a result, there were large areas in which the state agency, and the state government more generally, were essentially absent. (McAllister 2008, 37)

Despite its weakness, SECTAM's leadership dreamt big: As public and private organizations around Brazil prepared to send delegates to Rio de Janeiro for the 1992 UN Earth Summit, employees within SECTAM and the Pará Institute for Economic and Social Development (IDESP) proposed two ambitious state system of conservation units plans, involving the creation of 34 state conservation units in the 1988 proposal (Lobato 1988, 29-39) and 42 in the 1992 proposal (Lobato 1992, 31-37).[16] These plans constitute the earliest indication of concern for environmental governance within Pará's state agencies. But while some of the conservation unit proposals in the 1988 and 1992 plans overlap with currently existing federal and state units, the state government of Pará at the time did not act.

The few state units created from 1989 to 2002 did not match SECTAM and IDESP's ambitious: They involved areas with somewhat unique conditions, as well as circumstances propitious to territorial ordering – rather than a comprehensive system designed to preserve the state's forests. Discrete actions, rather than comprehensive planning, guided the state's hand in from 1989 to 2002: First, in 1989, the state decreed the entire Marajó archipelago (an area larger than Switzerland) to be an APA. According to Crisomar Lobato, the state did this to prevent the federal government from building a prison on Marajó island (Author interview with Crisomar Lobato, 2011).[17] Second, in 2001, to protect archeological treasures and boost the tourist economy in Monte Alegre (in the Calha Norte region), the state decreed the Monte Alegre State Park. The park is located in a mountainous region of the municipality adjacent to the northern bank of the Amazon river, where caverns and prehistoric art had been discovered.

Finally, induced by the federal Ministry of the Environment's intervention in response to local conflicts in the area around the Tucuruí dam reservoir (built on the Tocantins River in the 1980s) about property and fishing rights between Eletronorte, which built and manages the dam, and fishing communities on islands in the reservoir; the state of Pará decreed the APA Tucuruí and two Sustainable Development Reserves within it (MMA 21 September 2014). As conflicts ensued between local populations and Eletronorte, the federal Ministry of the Environment intervened in 1993 to support the creation of an Extractive Reserve (Itaipava) that had been proposed by local communities. In 1997, MMA and SECTAM carried out socio-ecological studies of the area, and in 1999, facing local protests, the agencies created a Parity Commission to discuss proposals for territorial ordering. These efforts culminated in the creation of the Tucuruí Mosaic. The mosaic includes an the APA Tucuruí, which surrounds the Tucuruí reservoir; and two Sustainable Development Reserves (RDS) embedded in the APA, on islands in the dam's reservoir in 2002. These RDS protect villages' fishing rights while providing Eletronorte legal tools to manage the territory (MMA 2014). Though management councils for all three conservation units were

[16] Crisomar Lobato, who has worked for SECTAM/SEMA since its inception, was instrumental in developing both of these proposals (Author interview with Crisomar Lobato, SEMA-PA, 2011).

[17] I have found no supporting documentation for this claim, but the APA has had little effect on the island's development: the APA Marajó still has no management council or plan, and ranchlands and buffalo herds that existed on the island prior to the APA remain.

established relatively quickly, in 2003, none of the units currently have management plans. Eletronorte contributes resources to managing the APA and hosts council meetings, thus reducing the burden on SEMA and other state organs (Rovere and Mendes 2000).

Having made limited progress on conservation units in the 1990s, the state government of Pará did not exhibit enthusiasm for undertaking more ambitious programs to save the forest. In 1999, PSDB Governor Almir Gabriel sought to block socio-environmentalist Mary Allegretti's appointment as Secretary of Amazônia of the Ministry of the Environment, signaling his opposition to the intensifying federal environmental agenda for the Amazon (Hochstetler and Keck 2007, 169). The following year, Gabriel adopted a nationalist discourse to reassure the Pará Industrial Federation (FIEPA) that he had little interest in interrupting economic growth to acquiesce to international demands to preserve the rainforest (Oliveira 2002, 460).[18] Only after Gabriel's departure, four years after IBAMA had begun to paralyze Forestry Management Plan (permissions to clear local forests) approvals in Pará did the state government, under Gabriel's successor, PSDB Governor Simão Jatene (2003-2006), respond with conservation plans. These included the state's Macro-Ecological Economic Zoning (Macro-ZEE) and then the December 2006 conservation unit decrees.

In sum, with less pressure for environmental action from the federal government during the 1989-2002 period than would be true later, in 2003-10, the state of Pará's conservation unit actions were limited. The state ignored two state conservation unit system plans, proposed in 1988 and 1992, and the discrete unit creation acts that it undertook were done for reasons other than forest protection along major deforestation frontiers.[19]

State Participation in Conservation Increases: Calha Norte, 2003-2006

Federal policy shifts in 2003 reverberated at the state level in Pará. First, IBAMA had begun to crack down on fraudulent Forestry Management Plans in 1998. This federal action hurt the local timber industry, whose representatives appealed to the state government to defend their interests against the federal government. Second, the new governor of Pará, Simão Jatene, sought a World Bank loan to address rural poverty. The loan conditions required that the state complete its Macro-ZEE. In short, the conservation units that Jatene decreed upon exiting office in December 2006 responded to federal and international pressures for conservation, and local pressures to reconcile conservation with the continued functioning of the state's timber industry.

The state of Pará's conservation unit system remained comparatively small from 1989 to early December 2006, and heavily weighted toward APAs. However, as federal and international attention focused on Pará in the 1990s and early 2000s – and especially once IBAMA had begun to freeze forestry management plans in the Amazon – the first administration of PSDB Governor

[18] Almir Gabriel on international preoccupation with Amazonia and its forests: "I cannot deny that I understand foreign countries' concern [with the Amazon]. But my first question is: What did they do in their own lands? How did they act? A second question is the following: Who is it that releases more carbon gas in the world? Is it us? It isn't. I don't want to say that, because of this, each side should debate from opposing camps. I want to say that if the indignation from their side is honest, if they're also being honest in their preoccupation with the Amazon, then it is absolutely indispensable that these countries, together with the BIRD, together with the World Bank, provide resources for the Amazon that are large scale, and long-term, so that we can really create a strong, intense program of reforestation or other transformations that the State needs to have for its development." (Almir Gabriel, speech to FIEP, Belém, 30 March 2000. Quoted in Oliveira 2002, 460; translation mine.)

[19] For a discussion of federal and state land ownership, and its influence over the state of Pará's conservation unit system, see Appendix 3.2.

Simão Jatene (2003-6) began to undertake a set of policy actions that culminated in the 2006 decrees that completed the Terra do Meio and Calha Norte conservation unit mosaics. First, to access a US$60 million loan from the World Bank[20] for rural development, Jatene restarted the process of Ecological-Economic Zoning (ZEE) of the state, which had stalled in 1999 under Gabriel. The state held a series of public hearings from 2003 to 2005, and the state assembly unanimously approved the Macro-ZEE of Pará in 2005.[21] Second, SECTAM began to work with several environmental organizations, including Conservation International, IMAZON, and Museu Goeldi, among others, to plan a conservation unit mosaic in the Calha Norte region.

From 2003 through 2007, federal actions led the state government to embrace environmental policy as a tool to support the logging industry, many of whose activities had been paralyzed by IBAMA's actions. The Calha Norte mosaic also served the purpose of asserting state dominion over the lands in the north – preempting a potential federal mosaic, which would have placed the lands under Union control (Author interview with former Secretary of the Environment of Pará, Valmir Ortega, 2012). Finally, compromises made in the Macro-ZEE established zones of conservation in the Terra do Meio and Calha Norte, while leaving the more densely populated and more economically substantial regions of eastern and southeastern Pará comparatively unprotected. In short, the vast, forested, and underpopulated region of Calha Norte was the easiest area to protect, the establishment of state forests secured support from Aimex, the state's forestry association, and areas of the state where conservation units might impede economic growth were zoned for economic expansion, rather than for conservation or forest recovery.

Federal Intervention Causes Stagnation in Pará's Forestry Sector

From 1998 through 2003, IBAMA imposed moratoria on mahogany and Forestry Management Plans in Pará. Doing so threatened the state's timber industry. Due to the absence of state institutions, and the low capacity and corruption of licensing agencies, much of the timber extracted from Pará's forests was – and still is – logged illegally. Timber companies in the state extract several species, but the most valuable is mahogany. Because mahogany trees often grow far apart from each other in the Amazon rainforest, loggers access isolated stands by clearing illegal roads through the jungle, facilitating later access by settlers and land grabbers. At the beginning of the 2000s, roughly 70% of mahogany extracted from the Amazon was exported, while only 30% was consumed domestically. Internationally, "market retailers [were] willing to pay up to US$1,600 per cubic meter of this precious and increasingly rare wood" (Greenpeace 2001, 4; translation mine). In response to the illegal deforestation and a Greenpeace campaign, in 1996 the federal government decreed a two-year moratorium on new Forestry Management Plans (FMP) for mahogany extraction. President Fernando Henrique Cardoso renewed the moratorium in 1998, 2000, and again in 2002. In addition, the federal government listed mahogany in Appendix III of the CITES accord in 1998, and set quotas for mahogany exports, "which are determined annually and have been progressively reduced" (Greenpeace 2001, 7).

The moratorium and quotas caused difficulties for Amazonian forestry, and over time timber receipts declined. Beginning in 2003 IBAMA also increased its law enforcement actions, from under twenty in 2003 to over 120 in 2007 – with corresponding increases in the values of fines for

[20] BR APL 1 Pará Integrated Rural Development Project, approved in 2005. The total estimated cost, according to the World Bank, was US$100 million, and the Bank committed US$60 million.

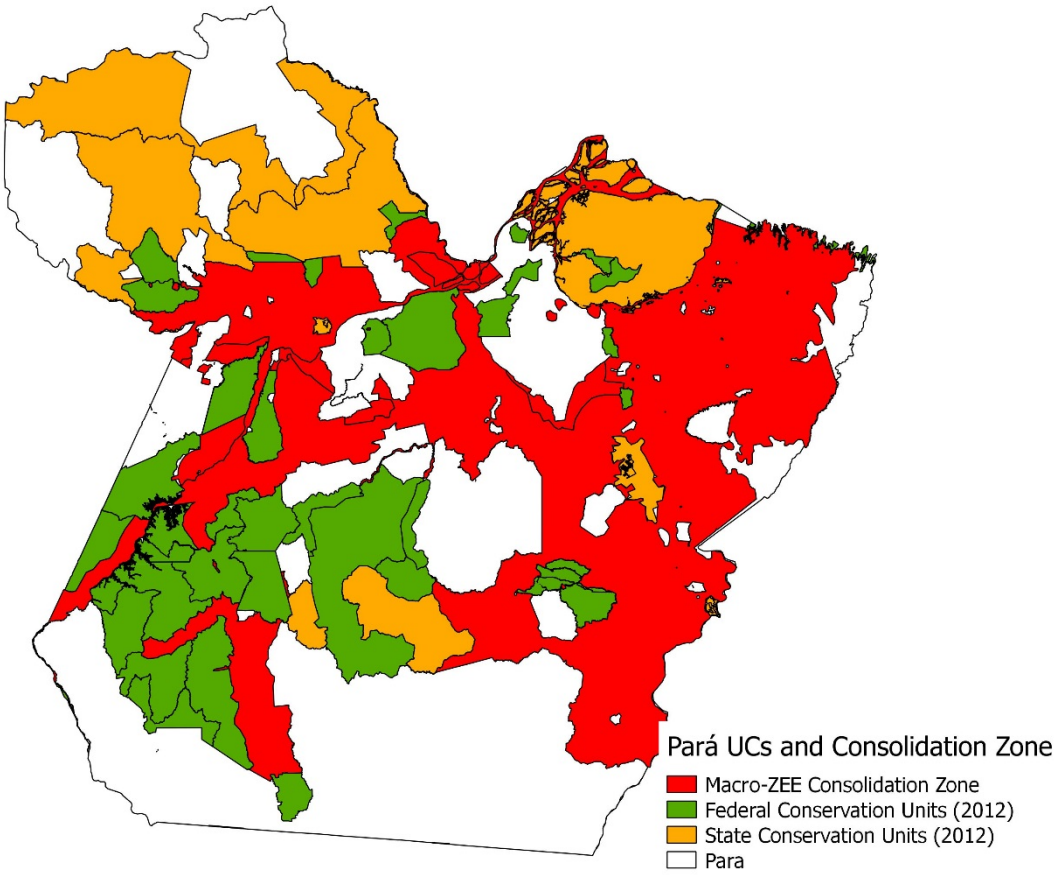
[21] The Macro-ZEE divides Pará into broad zones with different purposes: Consolidation, Expansion of Economic Activities, Strict Protection and Sustainable Use Conservation Units.

illegal trafficking in wood (SFB and IMAZON 2010, 14). Meanwhile, while the Amazonian forestry industry produced an estimated 28.3 million cubic meters of timber (of all commercial species) in 1998, production fell to 24.5 million in 2004 and 14.2 million in 2009 (ibid., 13) – an almost 50% decline in eleven years. In Pará, while the forestry industry's gross revenues rose from R$1.191 million in 1998 to R$3.252 million in 2004, revenues began to fall afterward, to R$2.178 million in 2009 – a decline of 33% in five years. Global commodities prices explain some over time variation, but much of the rest is explained by an increasingly heavy-handed federal approach to the sector: The mahogany moratorium and IBAMA enforcement were followed in 2005 by the Lula administration's decree of a Forestry District in the area surrounding the BR-163 highway, and a renewed freezing of all existing and new Forestry Management Plans while the government began to create the BR-163 and Terra do Meio mosaic of conservation units in the wake of increasing land violence and murder of prominent social and environmental activists in the region.

As federal law enforcement and restrictions on forestry increased, the Jatene administration collaborated with Belém-based NGO IMAZON to restart the Macro-ZEE process – a first step toward securing the legality of forestry, ranching, and other land use-intensive activities in the interior of the state – that had stalled under Governor Gabriel in 1999. The state held public hearings at the beginning of 2005, and in March the Pará Legislative Assembly unanimously approved the plan.

The Macro-ZEE of the state supports both conservation in remote areas, and the expansion of commercial extractive activities where timber and other land intensive interests are based. The plan sets aside 65% of the state territory – including federal land, much of which was already contained in indigenous lands and federal conservation units – for conservation and sustainable development (much of which had already been protected by then), and zones 35% for consolidation and expansion of economic activities. The consolidation and expansion zone *de facto* precludes the establishment of conservation units in its area. According to *O Estado de São Paulo* (5 December 2006, p. A17; translation mine), "in practice, [the Macro-ZEE] legitimizes forest clearing in the east, south, and center of the state, where there is a concentration of economic interests." The year Pará approved its Macro-ZEE, 2005, the state secured the World Bank loan, which provided financial support for rural development, as well as a more detailed ecological-economic zoning. (The state presented regional ZEEs in later years, under PT Governor Ana Júlia Carepa.)

Map 3.6. Protected Areas and the Macro-ZEE Consolidation Zone, Pará, 2010



Sources: ICMBio (2012), SEMA-PA (2013).

In 2004, the timber industry appealed to Governor Jatene to intervene on its behalf with the federal government, to convince the Lula administration to loosen forestry restrictions. Jatene agreed to propose a meeting with federal government representatives in Belém, and "to hold conversations with the Federal Government to present the demands of businessmen and *paraense* workers." On 24 August 2005, state and timber industry representatives met in Belém to discuss "the unfreezing of the Management Plans located in *paraense* territory, frozen by IBAMA since last year, with grave harm done to the regional timber sector" ("Pará busca..." 2005). While the federal government did not immediately lift its restrictions on forestry, the crisis in the industry helped to secure the support of Aimex for the state ZEE (to legalize timber in certain regions) and, later, for the establishment of State Forests in the Calha Norte and Terra do Meio. Aimex supported the initiatives because the Paraense timber industry needed new institutional supports for legal timber extraction, and the ZEE and State Forests served this purpose.

The forestry sector crisis provided one impetus to the declaration of State Forests in the Calha Norte, but Jatene had to placate other interests as well. These included ranchers and farmers along the banks of the Amazon river – in the southern stretch of the Calha Norte and northern stretch of Calha Sul (southern bank of the Amazon) – as well as *quilombolas* (traditional slave maroon communities) in the Calha Norte towns of Oriximiná and Faro whose occupation rights would be threatened if conservation units were superimposed on their lands. In the event, Jatene

appeased the southern Calha Norte ranchers and farmers by including the southern stretch of Calha Norte in the consolidation zone, as well as by proposing an APA and another State Forest on lands in Calha Sul (the southern bank of the Amazon river) where conflict had broken out between small-scale extractivists and loggers. The state placated *quilombolas* by legalizing their landholdings, and by designing the Calha Norte State Forests so as to exclude *quilombo* lands (Brito 2006b).

The mining sector joined timber firms in having an interest in using state conservation units in Calha Norte to secure access to valuable resources. Rio Tinto secured bauxite exploration rights in the region, and to fortify its right to exploit the minerals, the firm sought to have its mining rights included in the area of the Paru State Forest – a move that extended the proposed area of the Forest northward in the municipality of Alenquer. According to IMAZON researcher Adalberto Veríssimo, Rio Tinto had "various reasons to place the mine in a direct use [sustainable use] unit. First, it is not illegal to explore minerals in Forests. And Rio Tinto uses very little terrain to extract the bauxite. Under the jurisdiction of a State Forest, Rio Tinto's area gains a little more protection from external pressure" (Brito 2006a).[22] Indeed, to maintain its voice in decision making, Rio Tinto provided material support for socio-environmental studies undertaken by Conservation International, IMAZON, and SECTAM – including carrying researchers into remote areas of the forest in the company's helicopter (Author interview with Patrícia Baião, Conservation International, Brasília, 2012).

The Calha Norte conservation units also benefited from local residents' support, shown in the public hearings held in the towns along the Amazon river on whose rural, remote territories to the north the conservation units were to be decreed. In the town of Faro, the 80 people who attended the public hearing asked that the proposed unit's name be changed from "Nhamundá-Mapuera" to "Faro," but otherwise unanimously supported the State Forest. In Oriximiná and Óbidos, the majority of attendees favored the Trombetas State Forest. This widespread support, Veríssimo hypothesized, had to do with the relatively low human pressure on the areas slated for protection (Brito 2006a).

Indeed, few people live in or directly depend on the Calha Norte UCs. Though the Calha Norte exhibited the beginnings of the illegal logging, land grabbing, and accompanying violence that had already afflicted the Terra do Meio for years, the north of the state remained peaceful compared to the south.[23] In addition, the population living in and depending directly on the Calha Norte State Forests was and still is low: Socioeconomic studies carried out by IMAZON found 642 people in the 3.6 million hectares of the Paru Forest (SEMA-PA 2010a, 8), and 212 families in the 3.2 million hectares of the Trombetas Forest (SEMA-PA 2010b, 8). (IMAZON and the Government of Pará zoned the State Forests, once decreed, such that residents could continue to live and use natural resources in designated areas of the units.) The municipalities of the region are also poor (with the exception of Oriximiná, which has the MRN bauxite mine), and legal logging and other licensed forestry activities promises to bring local employment.

To summarize the state's conservation actions in Calha Norte, the Jatene administration reacted to increasing federal intervention in Pará by using conservation policy to support the state's timber industry, which was threatened by increasing federal enforcement of environmental laws. The Jatene administration, aided by IMAZON, established three sustainable use conservation units

[22] There is precedent for mining companies seeking protection for their mining pursuits in sustainable use conservation units in Pará: Both the iron mine run by Vale in the Serra dos Carajás, and the bauxite mine run by Mineração Rio do Norte (MRN, a Vale subsidiary), are buffered from population pressures and land conflicts by National Forests.

[23] One Faro community located on the border of the proposed Faro State Forest, fearing displacement from land grabbers, asked to be included in the conservation unit.

– comprising 7,421,827.72 hectares – and two strict protection units – comprising 5,397,580.06 hectares – that placated both environmentalists and the logging industry. (Jatene also proposed two units on the southern bank of the Amazon, the Calha Sul, that were later rejected in favor of a federal Extractive Reserve.) The effort rested on the legal foundation of the Macro-ZEE, which offset state conservation efforts with sizeable zones of consolidation and expansion of economic activities. The State Forests themselves also constitute expansions of the zones of legal economic activity, including forestry and mining. Indeed, Paulo Adario, Coordinator of the Greenpeace Amazon campaign, responded to the initiative with skepticism, arguing that the State Forests constituted massive end-of-mandate giveaways to the timber industry (Adario 2006).

Calha Norte: Federal-State Tensions in 2005-2006

Two moments of tension between the state of Pará and the federal government in the state illustrate the state's alignment with timber interests and the federal government's preference for conservation and sustainable development. Both moments relate to Governor Jatene's plans for Calha Norte. First, Jatene planned to create three State Forests in Calha Norte, and to have the federal government establish the Ecological Station and Biological Reserve. Second, on the southern bank of the Amazon, Jatene decreed a State Forest and an APA where the federal government was in the process of creating an Extractive Reserve.

As late as August 2006, well into the process of designing the Calha Norte conservation unit mosaic, Jatene hoped that the state's creation of State Forests would induce the federal government to establish and manage the two proposed strict protection units – Grão-Pará Ecological Station and Maicuru Biological Reserve – farther north, in a much less accessible region of Calha Norte. These strict protection units would be buffered between the State Forests, indigenous lands, and the northern border with the Guayana and Suriname. Such a move would have placed the onus for preventing any form of human occupation and land use in the hands of the federal government, and left the state with a conservation unit system almost entirely comprised of sustainable use units. Indeed, IBAMA had planned to create those units (Author interview with Valmir Ortega, 2012), but the electoral campaign between PT candidate, Ana Júlia Carepa, and PSDB candidate, Almir Gabriel, put the plans on hold.

> [...] the electoral campaign cooled the mood. Brasília did not get involved the way the governor would have liked, and the electoral dispute in the state between his party, the PSDB, and the PT caused it to sit on the proposal. Protected areas can enjoy prestige in the popular imagination, but they do not usually produce many local votes. The governor, however, didn't stop thinking about the issue and ended up going beyond what he wanted. The idea of the creation of strict protection units was consolidated in October [2006], when it became clear that the federal government didn't want to take the initiative, but was disposed to give discreet help with the process. (Brito 2006b; translation mine)

In other words, the state initially planned to pass the buck for creating the Grão-Pará Ecological Station and Maicuru Biological Reserve, both of the two strictest conservation unit categories, in the Calha Norte region to the federal government, but after having imposed the Terra do Meio mosaic in the south of the state, the PT federal government opted not to risk Carepa's electoral chances with further conservation initiatives. However, by 2006, the Macro-ZEE had been approved and the idea of protecting the remaining unprotected lands of Calha Norte (and in so doing, completing the Guyanas Shield Ecological Corridor, a set of adjacent, mostly federal conservation units and indigenous territories, stretching from Amazonas in the west to Amapá in the east) counted on the support of the Calha Norte Consortium, local residents in Calha Norte,

and even the Rio Tinto mining firm. With the federal government refusing to create the strict protection units in the region, Jatene decreed them while completing rest of the Calha Norte mosaic. To avoid potential electoral repercussions, and to commit his PT successor, Carepa, to conservation, Jatene did so only in December 2006, after the gubernatorial election and shortly before he left office.

The Power of Land Intensive Industry to Shape State Preferences: Timber Firms and Extractivists in Calha Sul, 2006-2007

The second point of tension between the state and the federal government occurred at the same time as the first, in December 2006: That month, while signing the Calha Norte and Terra do Meio conservation unit decrees, Jatene attempted to sign two decrees to establish to establish conservation units in the Calha Sul. These units would cover an area of the Calha Sul characterized by a conflict between encroaching timber firms operating illegally, and small-scale extractivist communities. Given that timber interests are *medium* on my scale of industry land intensivity (see Chapter 2) and that this industry is both large and politically powerful in Pará, my framework produces the expectation that the state government would prefer to enact a *permissive* conservation unit – to support land intensive industry – while the federal government would prefer to enact a *moderately strict* unit, to support the needs and interests of the more ecologically sustainable extractivist communities in the area. These expectations are summarized for the case of Calha Sul in Table 3.1, below.

Table 3.1. Expected Conservation Unit Outcomes in Calha Sul, Pará

		Land Intensive Industry	
		Dominant CALHA SUL, PARÁ	Weak
Tier of Government	Federal	**2. Moderately Strict**	**1. Strict**
	State	**4. Permissive**	**3. Moderately Permissive**

The outcomes in the Calha Sul region of Pará are indeed consistent with my average expected outcomes as summarized in Table 3.1, above: In December 2006, Jatene attempted to decree the *permissive* Santa Maria de Prainha APA and, adjacent to it, the *moderately permissive* Amazônia State Forest on the southern bank of the Amazon river. These units were to be located adjacent to the *moderately strict* federal Verde para Sempre Extractive Reserve (created in 2004) (Adario 2006). However, a federal judge in Altamira (PA) issued an injunction against the decrees, because the federal government was in the process of creating another *moderately strict* Extractive Reserve on the same land as Jatene's proposed State Forest and state APA. These divergent preferences show that the state government of Pará was attempting to aid timber firms, while the federal government was not.

Since 2004, when the federal government excluded the riverine populations of Uruará from the Verde para Sempre reserve due to the unwieldy size of such a reserve (almost 2 million

hectares), activists in the region had been advocating for the creation of the adjacent Renascer Extractive Reserve, to protect their communities and natural resources from timber companies invading the region and threatening residents' lives and livelihoods (Greenpeace 2003, 45-47). While federal authorities focused their conservation unit creation efforts on the Terra do Meio region beginning in 2005, the state SECTAM held public hearings and designed the two more permissive sustainable use units that would legitimize the presence of timber companies in the region (Faleiros 2006).[24]

Activists criticized SECTAM's public hearings in Calha Sul, arguing that they had been poorly advertised and dominated by loggers. On the other side, the President of the Union of Forestry Institutions of the State of Pará (an association representing nine timber associations in Pará), Wagner Kronbauer, argued that an extractive reserve in a conflict zone would be a mistake: "If the problem is illegality [of timber extraction], the best thing for us to do is create a State Forest to legalize the activity" (quoted in Faleiros 2006). Indeed, even the PT governor-elect, Carepa, was reticent to support the riverine populations over the timber companies, as she had committed to supporting forestry in the state. Indeed, Carepa did not drop her government's opposition to Renascer Extractive Reserve until March 2007 ("Briga Terminada" 2007).[25] Meanwhile, Vilmos Grunvald, the Pará Secretary of Production, defended the state's action, arguing that "To say that a public forest does not guarantee the rights of traditional communities is to be ignorant of the law" ("Juiz Suspende..." 2006). Indeed, while timber representatives approved the APA and State Forest in public hearings with SECTAM, protests in early 2007 against the Renascer Extractive Reserve were supported by the municipal government, and indicated fierce opposition among non-traditional residents of Santa Maria do Uruará to the reserve. In January, 2007, residents submitted a petition with 1,948 signatures to the Public Prosecutor's office in Prainha, opposing the creation of Renascer (IBAMA 2007). Local opposition, and analyses carried out by the federal Ministry of Mines and Energy to assess the mining potential of the area (Amorim 2009), delayed creation of the Renascer Extractive Reserve until June 2009 (Decreto s/n 05/06/2009).

The state government of Pará's creation of three State Forests and two strict protection conservation units in Calha Norte, its contribution of a State Forest and an APA to the mostly federal Terra do Meio Mosaic, and finally its failed attempt to establish a State Forest and an APA in the Calha Sul; indicate a state seeking to legalize a dominant local economic activity by responding to federal conservation policy with permissive and moderately permissive conservation units designed to meet the needs of timber companies. Governor Jatene built political support for conservation by completing the state's Macro-ZEE, which established a significant zone of consolidation and expansion of economic activities, and then by proposing State Forests and APAs, which would support economic growth even in conservation zones, while legalizing forestry (and small-scale extractivism) and reducing conflicts over land. Notably, the state's most restrictive conservation units – the strict protection units in Calha Norte, and, later, the stricter conservation zones of the Calha Norte State Forests – emerged in areas of very low population density and comparatively low pressures and degradation, while in areas of greater conflict – Prainha – the state supported the interests of the timber industry, non-traditional residents, and the municipal government.

[24] In contrast to the three State Forests in the Calha Norte, IMAZON was not involved in designing the Amazonia State Forest and Santa Maria de Parinha APA (Faleiros 2006).

[25] IMAZON's Adalberto Veríssimo also supported the state, arguing that the most important thing was to create *a* conservation unit in the area, whether APA, State Forest, or Extractive Reserve (Faleiros 2006).

Institutional Reforms and Implementation of Calha Norte UCs, 2006-2013

The period from the end of 2006 to 2013 represents a period of institutional reforms and continuing troubles in the state of Pará's environmental agency. It also comprises a period of implementation of management institutions on the Calha Norte conservation units established in December 2006. The incoming PT state governor, Ana Júlia Carepa, was, like her predecessor, sympathetic to timber interests in the state, but the Calha Norte Consortium put together during the previous administration, and a State Secretary of the Environment imposed by the national PT from 2007 to 2009, helped commit Carepa to implementing the Calha Norte units and continuing to build on the 2005 Marco-ZEE with regional ZEEs. Reforms to SEMA-PA (SECTAM's title since 2007) stalled in 2009 when a corruption scandal occurred.

After the 2006 election, Jatene signed the decrees creating the conservation units, and formalized the Calha Norte Consortium, to help commit his successor, Carepa, to implementing the State Forests. Indeed, most of Governor Carepa's environmental policy actions during her four years in office (2007-2010) constituted continuations of policies initiated by Jatene: First, Carepa supported the implementation of the new state conservation units, a process that continued to be led by the Calha Norte Consortium; second, employing the World Bank loan secured by Jatene in 2005, Carepa added detail to the state's Macro-ZEE with regional ZEEs; finally, with increasing state responsibility for conservation and environmental governance in the wake of Jatene's massive increase in the protected land in the state, and the federal government's March, 2006, approval of the Forestry Law, Carepa established the Pará State Forestry Institute to develop rules for and issue logging concessions on the State Forests and other state lands, and brought in – at the insistence of the national PT – a Secretary of the Environment, Valmir Ortega, from outside the state to reform SECTAM (renamed the Secretariat of the Environment of Pará, or SEMA-PA, in 2007). Ortega implemented several reforms to improve SEMA's performance, but a corruption scandal in the agency in 2009 and Carepa's attempt to replace IBAMA's director in Pará in 2010 to weaken environmental enforcement and secure re-election undercut her administration's environmental policy gains.

During Carepa's administration Pará began to invest in building conservation unit governance capacity. From 1988 to 2006, Pará's Secretariat of Science, Technology, and the Environment (SECTAM) possessed little law enforcement and governance capacity. Though established in 1988, SECTAM's institutional structure was only designed in 1993 (McAllister 2008, 30). By SECTAM's own account, the secretariat did little environmental monitoring or enforcement before 1995, when Pará enacted its State Environmental Policy (ibid., 31). As McAllister argues, SECTAM remained weak throughout the 1990s: A 2002 study of the agency showed that while in 1991 SECTAM had a staff of 158, with 8 working in environmental enforcement, by 2002 the staff had increased to 255, but with only 17 in enforcement. In contrast, São Paulo's Secretariat of the Environment had ten times the staff, overseeing only one-fifth the area (ibid., 36-37).

> Moreover, SECTAM had only a single office in the capital city from which to administer its activities throughout the state. As a result, there were large areas in which the state agency, and the state government more generally, were essentially absent. (Ibid., 37)

SECTAM remained a weak, bloated bureaucracy through the end of 2006, with informal employment contracts, patronage appointments, little or no presence in the interior of the state, and little law enforcement capability. Due to high employee turnover and a resulting short institutional memory, hard data on SECTAM's structure and operations in the early 2000s are difficult to find, but testimony by Valmir Ortega, an IBAMA director from Mato Grosso who, as a PT

partisan, was appointed as Pará's Secretary of the Environment in 2007, describes the institution's struggles for reform:

> The structure of the Secretariat still is [weak] today, but in [2007] it was absurdly weak, in that era we had 300 functionaries, and of these 300 functionaries, 100 with illegal contracts... so of course the first job I had to do in the Secretariat was to do a rapid diagnostic of the situation of SEMA; I hadn't had any knowledge of SEMA before the first day that I arrived in the Secretariat... We took practically twenty days to do that rapid diagnostic. In those twenty days we identified 100 functionaries, 100 illegal contracts, not a single regular service contract... there simply wasn't a single regular contract.... We were able to locate 78 of these people... I called the 78 functionaries that we located working, because a part of [the 100 illegal contracts] simply didn't work there, they just earned money or conducted other functions outside of SEMA that we weren't able to identify, we called all the functionaries to the SEMA auditorium and sent them home, telling them that the next month they didn't need to come to work anymore, and so in the first month [of my tenure] we lost 30% of the already weak operational capacity of the agency.... So, through this rapid diagnostic, I was able to perceive, I saw things in Pará that I thought didn't happen anymore in Brazilian public management. (Author interview with Valmir Ortega, 2012; translation mine)

After thinning SEMA-PA's ranks, Ortega managed to get state authorization to hold a competitive exam to hire new personnel in 2007, and hired approved candidates from a previous exam. From 2007 to 2009, the number of personnel in SEMA-PA rose from 200 to 400, and the total staffing of SEMA-PA rose to 600 personnel. "We practically doubled the operational capacity of SEMA," Ortega says, but at the same time the agency's responsibilities multiplied: with the enacting of the Public Forests Management Law in 2006, forest management "*de facto* migrated from the hand of IBAMA, which had previously licensed [forest] management plans, deforestation and such, exactly on the 18th of December, 2006. We took office on the 1st of January, 2007, so I arrived at SEMA-PA and the following month licensing process boxes began to arrive from IBAMA... So that first year, 2007, was a year where SEMA-PA in fact had to create minimal conditions to begin to do forest management, and it also hit us exactly during that period of transition" (Author interview with Valmir Ortega, 2012; translation mine).

Reforms were interrupted, however, in 2009, when a scandal broke in SEMA-PA relating to corruption in environmental licensing, and Ortega and several others left the agency – some in handcuffs, according to an employee I interviewed in SEMA-PA, in 2013, who had been hired in 2011 as the repercussions of the scandal continued to unfold.[26] Today, SEMA-PA has two principal offices in Belém: its headquarters, and a building in the Utinga State Park devoted to the Directorate of Protected Areas (DIAP). The secretariat has offices in the interior – in Santarém, Marabá, Paragominas, and Altamira – but is awaiting a legal reform to increase personnel, and to replace DIAP with an independent agency dedicated to conservation unit management, similar to ICMBio. As of 2014, the state assembly has still not approved the law.

There are two principal reasons why SEMA-PA underwent institutional reforms in 2007, but not before. First, mentioned by Ortega, above, is that in the wake of the 2005 Stang murder, the Lula administration fast-tracked the Public Forests Management Law, which included decentralization of environmental licensing activities to states – in particular, licensing and monitoring of state forests (both *destined* – established State Forest conservation units – and *un-destined*

[26] Ortega took a job with Conservation International in Brasília, where I interviewed him in his office in 2012.

– non-conservation unit forests on state lands). SEMA-PA took charge of licensing and conservation unit management, while a sister agency, the State Forestry Institute (IDEFLOR), created in 2007, inventories state forests and organizes forestry concessions.[27] Second, SEMA-PA invested in conservation unit governance capacity because in December, 2006, the state system of conservation units had increased by orders of magnitude with Jatene's December, 2006, decrees. According to Ortega,

> Before the creation of that block of UCs [in Calha Norte and Terra do Meio], Pará had very few, very small, conservation units. A small State Park in the south of the state, a small State Park in Calha Norte, an urban park in Belém, in the Belém urban area and a few APAs... [including] Marajó... result: When I arrived, SEMA had *three functionaries in the area of conservation units, three people and nothing else and so SEMA simply had no protected area management*, it had three people who took care of minimal processes, *not a single conservation unit manager*, no boss, so when we arrived at the Secretariat [we had the] challenge of managing those 12 million recently created hectares [in Calha Norte and Terra do Meio]. (Author interview with Valmir Ortega, 2012; translation mine, emphasis added)

In June and July of 2007, SEMA-PA included in its hiring of candidates from a previous competitive hiring exam 12 more people to work with conservation units. From there, Ortega and SEMA-PA continued building the team, to about 30 people. The DIAP team remains about the same size today. (However, as I myself saw during my visits to DIAP in 2011-2013, the bulk of the personnel live and work in Belém, far from the state's principal conservation units.)

DIAP formed in 2008, and occupied an office in Belém's Utinga State Park. In 2010, 16 DIAP employees formed the Nucleus of Conservation Unit Councils (Author's Interview with Márcia Sarges de Oliveira, SEMA-PA/DIAP employee, 2012), to work with the Calha Norte Consortium and other NGOs to create councils. At this time, the Calha Norte Consortium comprised IMAZON, IMAFLORA, Conservation International, and the state forestry institute, IDEFLOR. Calha Norte was the state's political priority, as its State Forests had great potential to generate revenue from forestry concessions. IMAZON spearheaded the studies for zoning within the Forests, and by 2011 all three had published management plans – a prerequisite for timber concession auctions. In 2011, after Jatene's return to the state governorship, IDEFLOR held concession auctions in the Paru State Forest, and conceded 326,000 hectares of the 1,898,370 hectares in the "Moderate Intervention Zone" for logging (IDEFLOR 2011). In 2013, IDEFLOR made available another 108,000 hectares of Paru for concession (Agência Pará de Notícias 2013).[28]

A 2013 analysis of conservation unit management carried out by the Union Accountability Tribunal (*Tribunal de Contas da União*, TCU), with Amazonian State Accountability Tribunals (TCE) and environmental agencies participating, concluded that the Calha Norte State Forests had achieved a "medium" level of implementation and management (TCU 2014). In contrast, the Iriri State Forest, and the APA Triunfo do Xingu, the two state conservation units in the Terra do Meio mosaic, still had "low" levels of management. Though SEMA-PA established a deliberative management council in APA Triunfo do Xingu in 2011, Iriri State Forest still lacks a council, and

[27] This dual system echoes the post-2006 federal system, in which the Brazilian Forest Servce (SFB) was created as an independent autarky of the Ministry of the Environment, to issue concessions in national forests; while the Chico Mendes Institute (ICMBio) manages federal conservation units, including National Forests.

[28] This was the third forestry concession issued in Pará: The first had been issued for undestined forests in the Lower Amazonas region, west of Santarém. As of this writing, IDEFLOR is still deciding the winners of the second concession auction in Paru.

to date the state has issued no calls for concession bids. In part, the conservation units in Terra do Meio are more conflict-ridden than their peers in Calha Norte: Even the federal strict protection units in the mosaic suffer invasions and illegal logging, and police actions and sorting out property rights uncertainties have taken priority over establishing conservation unit-specific management institutions. The Terra do Meio mosaic also does not count on the same degree of local political support that Calha Norte does: As IBAMA has continued to conduct operations to crack down on illegal logging and ranching in the mosaic, local political leaders have reacted angrily – as they did in Novo Progresso in 2009, when the city council declared Minister of the Environment Carlos Minc a *persona non grata* in the town ("Vereadores de Novo Progresso..." 2009). Given SEMA's already limited resources, and the ongoing conflicts in the region, the agency has understandably concentrated its efforts principally on implementing the Calha Norte State Forests, and secondarily on sorting out property rights and local economic development in the APA Triunfo do Xingu – which constitutes a buffer zone between the consolidation zone in Eastern Pará, and the federal Terra do Meio Ecological Station – while largely ignoring the Iriri State Forest.

Conclusion

This study argues that, in federal systems, federal governments are better able to enact more aggressive environmental policies than state governments because the former possess a broader geographical base of support and are less vulnerable to pressures from local economic interests than the latter are. This chapter has supported this contention employing evidence from federal and state conservation unit creation and implementation trends for the Brazilian state of Pará. Here, I will summarize the findings in this chapter, and discuss why alternative explanations of partisanship, state and federal bureaucratic capacity, and NGO and activist strategies provide inadequate explanations for the observed variations across the federal and state tiers in Pará.

First, I showed that ecologically destructive activities are widespread throughout the state, including logging, ranching, mining, and dams and highway infrastructure. This discussion highlighted the geographical difficulties that both the federal and state governments faced in creating conservation units in the state. Second, I showed how federal policy in the Amazon, including Pará, evolved from one of ecologically destructive settlements and exploitation under the 1964-85 military dictatorship and the first years of the Sarney administration, to conservative efforts under the Cardoso administration's 1998 National Forests Program and progressive institutional changes that culminated in the 2000 signing of the SNUC into law. Cardoso's actions late in his second administration set the stage for a more aggressive Amazon conservation policy under Lula da Silva, who acted to protect the Terra do Meio and BR-163 regions with mosaics of strict protection and sustainable use conservation units, accompanied by police actions to reduce regional violence. Lula's actions were spurred in part by focusing events, including the murder of Dorothy Stang, but his Minister of the Environment, Marina Silva, and civil society allies had already drawn up plans to offset ecologically destructive infrastructure policies with conservation units. Meanwhile, IBAMA began implementing the management requirements of SNUC, creating councils and drafting management plans on conservation units throughout the country, including in Pará. While the 2007 creation of ICMBio immediately led to a strike of IBAMA employees, once the new institute began operations it continued efforts to implement federal units in the state.

Third, I contrasted the state of Pará's actions beginning in 1988 to those of the federal government, and found a less aggressive approach, as well as much more limited investment in the state environmental agency, SECTAM (SEMA-PA after 2006). The state of Pará established the APA Marajó in 1989, and incorporated it into the state constitution, but did not follow through

on 1988 and 1992 IDESP/SECTAM plans for a wider state system of conservation units. Indeed, while Governor Almir Gabriel petitioned for the devolution of federalized lands to the state, he argued that the state could only invest in conservation and reforestation with significant funds from abroad, and established no state conservation units on state lands during his two administrations. In addition, Gabriel allowed the process of Ecological-Economic Zoning (ZEE) to stall, and it would only be restarted under Governor Simão Jatene, to qualify for a World Bank loan.

Fourth, I showed that federal intervention in Pará in the 2000s contributed to forestry sector stagnation in the state, and that Aimex, the industry association, had the ear of both Simão Jatene and his successor, Ana Júlia Carepa. Jatene petitioned the federal government to unfreeze FMPs to permit the state's timber companies to continue their work, and after the 2006 gubernatorial election, he followed through on a plan to expand the legal realm of logging in the Calha Norte region, by decreeing new State Forests in the region. His government's priorities clashed with those of the federal government in the Calha Sul, when he proposed an APA and State Forest – to support timber interests – where local traditional extractivist communities had been petitioning for the creation of an Extractive Reserve, which would have threatened timber interests in the area. In the event, a federal court froze Jatene's decrees. Upon inauguration as governor in 2007, Carepa initially supported Jatene's decrees, but later relented. Today the area is occupied by a federal Extractive Reserve, Renascer.

Carepa committed to continuity in Calha Norte, supporting the implementation of management structures on the Calha Norte units, as well as completing regional ZEEs. Because Carepa herself had a checkered past with respect to logging – she had been identified as a key player in a FMP fraud ring while serving as a Senator – the national PT nominated a former IBAMA director, Valmir Ortega, as Secretary of the Environment of Pará. Ortega reformed SEMA, but resigned amid yet another FMP fraud scandal, in 2009. As re-election approached, Carepa hoped not to alienate the timber industry, and pressured the federal government to weaken IBAMA's environmental enforcement efforts in the state, and to remove the director of IBAMA in the state. Jatene and her actions point to a consistency in supporting commercial interests across party lines in Pará, indicating that no single party can be said to be more supportive of environmental interests than another at the state tier in Pará.

Overall, the federal government in Pará established more strict, moderately strict, and moderately permissive conservation units closer to principal frontiers of deforestation than the state government did. After having been a principal driver of Amazon deforestation under the military regime, Sarney (PMDB) and Cardoso (PSDB) took the first steps toward environmental sustainability in Pará, and Lula (PT) blanketed southern and southwestern Pará with federal units – both strict protection and sustainable use – that contributed to suppressing illegal activities in the region, and sparked heated responses from local political officials. Federal extractive reserves elsewhere in the state favored small-scale extractivism over commercial timber and ranching, and this priority became evident in the debate between the federal and state governments in 2006-2007 in Calha Sul.

In contrast, the state government of Pará acted in response to federal intervention, and sought to support the local timber economy by establishing moderately permissive and permissive units along secondary deforestation frontiers, as well as the APA Triunfo do Xingu in the Terra do Meio mosaic. Governor Jatene took action on Calha Norte and the Terra do Meio only as he was leaving power, in December 2006, and Carepa, of the PT, created no new conservation units during her 2007-2010 administration.

Given these federal and state trends, it becomes clear that partisanship, bureaucratic capacity, and NGO and activist strategies do not adequately explain variation within Pará. First, Governors and Presidents from various parties took actions to protect the forests in Pará, and while the PT Lula administration enacted more aggressive policies in the state than the PMDB Sarney or PSDB Cardoso administrations had, the predecessor administrations had taken the first steps toward Lula's policies, by enacting legal and other institutional changes. Second, bureaucratic capacity building is as much an outcome of conservation unit system expansion as it is a contributor to environmental governance in Pará. Most federal conservation unit creation in Pará occurred in the 2004-2007 period, prior to the creation of ICMBio. It is true that IBAMA possessed capacity to implement conservation units, but capacity increased under ICMBio. State conservation unit creation, meanwhile, climaxed in 2006 – prior to Ortega's nomination and reforms to SEMA-PA. Finally, NGO and activist strategies in Pará are not irrelevant to federal and state action – indeed, they are crucial – but they provide unsatisfactory explanations for the differences in location and types of conservation units across tiers of government in the state. While ISA and IMAZON were key participants in designing a mosaic of conservation units in the BR-163 and Terra do Meio, and the Calha Norte Consortium members drove planning for the Calha Norte state mosaic, the differing balances between stringent and commercially permissive conservation units across tiers of government are best explained by economic interests' – particularly the timber industry's – stronger appeals to the state government than to the federal government.

Chapter 4. Amazonas: Federal and State Governments Cooperate to Foster Sustainable Development in a Rural Interior Characterized by Small Ranching and Timber Sectors

Introduction

Amazonas is a case of a state with a comparatively small land intensive industry, and whose economy is instead dominated by manufacturing based in the state capital, Manaus. As a result, the state government has been less responsive to land intensive industry, and has instead focused its conservation unit system on reconciling conservation with rural poverty reduction. The result is consistent with my prediction for states in which land intensive industries are not dominant: The federal government's conservation unit system consists on average of strict and moderately strict conservation units than the state system, but the difference in average conservation unit types and locations across tiers of government is not as stark as it is in Pará. In contrast to Pará, where the state government has designed its conservation units to appeal to timber interests, the state of Amazonas has enacted mainly moderately permissive units to reconcile conservation with the needs of small-scale rural extractive communities.

The state of Amazonas' economy is largely oriented toward consumer goods manufacturing, based in the state capital of Manaus, and small-scale subsistence farming and extractivism in the interior. Timber and ranching are comparatively small industries in the state. They are politically marginal and largely limited to the far south. Limited land intensive industries and the prevalence of small-scale extractivism make much of the territory of the state comparatively non-contentious in regards to creating conservation units. The upshot of an economic geography that is conducive to conservation is that the state of Amazonas embraced sustainable development from 2003 to 2010, under Governor Eduardo Braga's flagship program, the Manaus Green Tax Free Zone (*Zona Franca Verde de Manaus*, or ZFV). This program involved the creation of 30 state conservation units in eight years.

While in Pará the federal and state governments periodically clashed over conservation priorities, in Amazonas the state and federal governments worked in tandem to protect forests and promote sustainable development. In this chapter, I argue that a comparatively *easy* economic geography in Amazonas – consisting of a capital city that produces approximately 80% of the state's gross domestic product (GDP) and a countryside characterized chiefly by small communities engaged in subsistence-level extractive activities, as well as a better-developed eco-tourism industry than Pará possesses, facilitated the state government's initiative. Like Pará, federal actions in the late 1990s and 2000s prompted Amazonas to participate in national environmental programs and to develop its environmental institutions. But in contrast to Pará, observed trends in Amazonas indicate a comparatively weak influence of timber and ranching on all tiers of government, and a more powerful influence by small-scale extractivists and subsistence farmers on both the state and federal governments.

Both Amazonas and the federal government began creating conservation units in the 1990s, and accelerated creation in 2003. Beginning with the Nhamundá State Park in 1989 (28,370 ha),[1] the state of Amazonas had created 11 conservation units by 1998. These units included four APAs

[1] Converted to APA Nhamundá in 2011.

(1.6 million ha), four strict protection units (2.1 million ha), and the first two Sustainable Development Reserves in the country, Mamirauá (1996, 1.1 million ha)[2] and Amanã (1998, 2.4 million ha). Both environmental activism and economic geography prompted these state initiatives in the 1990s: The two Sustainable Development Reserves are in the remote countryside, occupied mainly by subsistence farmers and fishing villages (and, today, an eco-lodge). The four APAs, created in response to international concern over the Amazon, are closer to the state's main population center – Manaus – but are highly permissive, and today suffer from comparatively high deforestation rates.

The economic geography of Amazonas is concentrated in manufacturing in Manaus – the city accounts for 80% of the state's GDP – is relatively conducive to conservation, as there are fewer organized interests in the rural interior whose activities and incomes are threatened by conservation units. Indeed, subsistence farmers and extractivists, and ecotourism establishments, benefit from conservation units that secure legal natural resource use rights for local communities and/or permit tourism. Because the state is concerned with reconciling conservation with rural economic development, however, the state government's conservation units are more heavily weighted toward sustainable use than are the federal system's units. Currently, the state of Amazonas possesses 41 conservation units (18.8 million ha), of which 33 are sustainable use (15.3 million ha). In contrast, the federal government possesses 34 conservation units (24.9 million ha) in the state, including some significant National Parks and Ecological Stations along the state's southern deforestation frontier, in the far north, and in the vicinity of Manaus. While approximately 81% of the area of Amazonas' state system is contained in sustainable use units – the more permissive categories – only 44% of the area of the federal system in the state is permissive, while 56% is contained in strict protection units – the more stringent categories. As it did in Pará during the Lula administration, the federal government also enacted a set of aggressive strict protection and sustainable use units along the southern deforestation frontier of Amazonas in the 2000s. With the exception of the Apuí Mosaic along the southern border with Mato Grosso, the state of Amazonas focused its conservation unit efforts in less ecologically vulnerable and contentious regions, farther from the main frontier.

In this chapter, I argue that the state of Amazonas enacted an ambitious, proactive sustainable development plan while Pará did not because the most important vested interests in the Amazonense economy could either benefit from conservation units, or were indifferent to them. Poor, rural residents of the interior of the state benefited from the Eduardo Braga (2003-10) administration's focus on using conservation units as one tool to build market links between rural areas and Manaus, residents of towns adjacent to the Apuí conservation unit mosaic in the south benefited from legal protections provided by conservation units from armed land grabbers from Rondônia and Mato Grosso, and firms in the consumer goods manufacturing sector in Manaus require little or no land outside of the city for productive purposes. In turn, pro-environmental or indifferent sectors in Amazonas are not counterbalanced by ranching or logging industries that are large enough to exercise the same degree of pressure over state policies that their counterparts do in Pará. Though the state government did encounter some local resistance to conservation units and other sustainable development initiatives during the 2003-10 period, the comparative absence of concentrated opposing interests facilitated the implementation of the state's conservation unit

[2] Created as an Ecological Station (strict protection) in 1990.

plans. Nevertheless, progress in implementing conservation units has been slowed by a state environmental agency that is weakly institutionalized, allegedly politicized after 2010, and dependent on foreign donations.

This chapter proceeds as follows: First, I will discuss the divergent characteristics of the state and federal conservation unit systems in Amazonas in greater detail. Then I will explain my coding of Amazonas' economic geography as "easy" compared to Pará, by examining in depth the timber, cattle ranching, rubber tapping, manufacturing, and ecotourism industries in the state. Third, I will turn to the trajectories of federal and state conservation unit creation, tracing each story from its beginnings to the present. Finally, I will show that implementation has been more consistent in the federal than the state system, and I will argue that state conservation unit implementation has stalled because of politicization of state agencies after 2010 – in at least some cases, to the detriment of environmental sustainability on state units.

Contrasting Federal and State Conservation Unit Systems

Federal and state conservation unit systems diverge by type and process in Amazonas, but they do so less sharply than in Pará. The state government of Amazonas strongly preferred to reconcile conservation with rural economic development by creating Sustainable Development Reserves (RDS) and State Forests in remote regions of the interior of the state. The federal government, meanwhile, established both varying degrees of strict, moderately strict, and moderately permissive conservation units along the BR-319 highway and the southern deforestation frontier during the 2000s. It did so in cooperation with the state government, which established more permissive conservation units adjacent to federal ones in the same regions. In this section I detail each tier of government's conservation unit system in terms of its size and geographical distribution, average type, and degree of implementation.

In 1989, the federal government possessed 13 conservation units in Amazonas, comprising 9,643,537 hectares. That year the state government created one unit, the Nhamundá State Park, in the far east of the state on the northern bank of the Amazon river, with 28,370 hectares. By 2014, Amazonas possessed 75 conservation units, of which 34 were federal and 41 state. The balance of strict and permissive types in each tier, however, is different: 81% of the area of the state system is in sustainable use, or moderately permissive and permissive, units; while only 44% of the federal system in Amazonas is in the same.

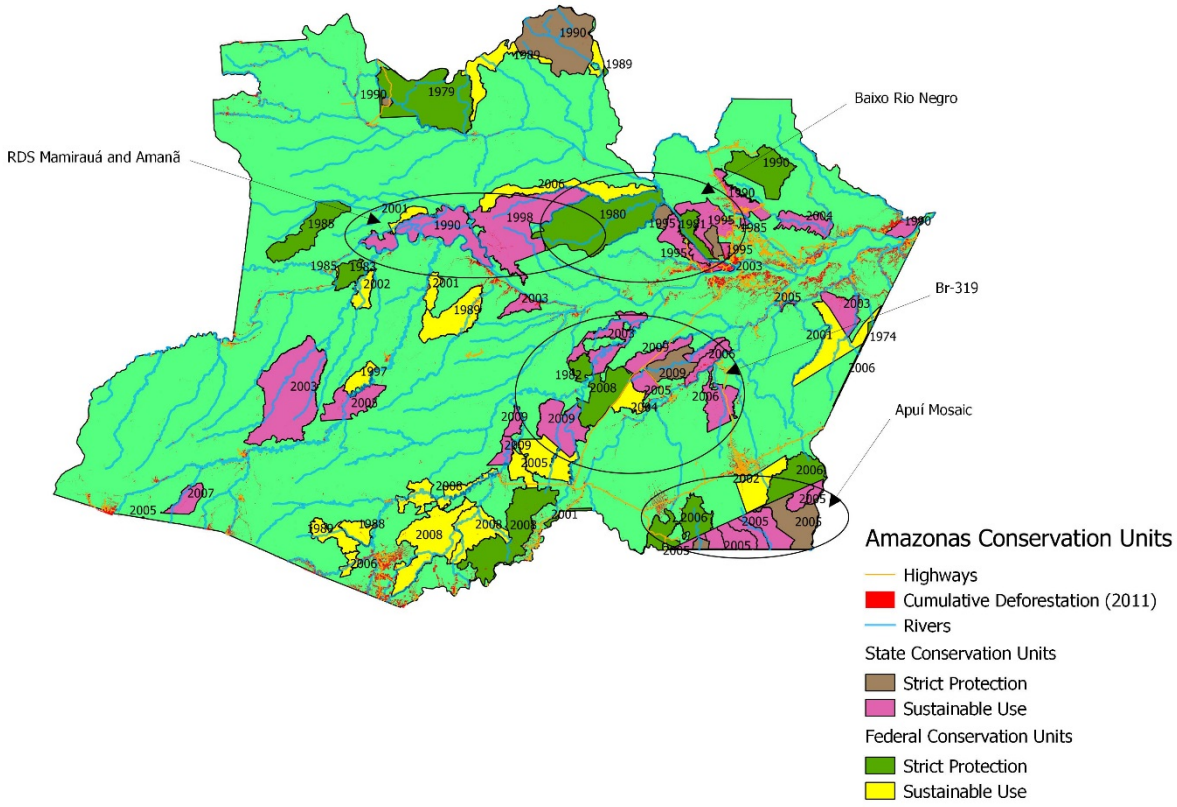
In Amazonas, federal strict conservation unit types include National Parks, Biological Reserves, and Ecological Stations, while its moderately permissive units include Areas of Relevant Ecological Interest, National Forests, and Extractive Reserves. The state's strict units include Biological Reserves, State Parks, and Extractive Reserves, while its moderately permissive and permissive units include State Forests, Sustainable Development Reserves, and APAs.[3]

Map 4.1, below, shows the distribution of federal and state conservation units across Amazonas' territory. State units concentrate in the remote western interior and along the BR-319, but are also present along the southern frontier, in the Apuí Mosaic (established in 2004). Federal units, meanwhile, spread out along the southern frontier, the Br-163, the Baixo (Lower) Rio Negro, and the north. For both geographical and political reasons, the contrast between federal and state initiatives in Amazonas is less stark than it is in Pará. Geographically, both the state and federal

[3] For an explanation of strict, moderately strict, moderately permissive, and permissive types of conservation units, see Chapter 2, Table 2.2.

governments worked with a less densely settled interior than in Pará, and politically the government of Amazonas was consistently aligned with the federal government's environmental and sustainable development priorities for the Amazon throughout the 2003-10 period – the period of greatest state progress in conservation unit creation.

Map 4.1. The Geographical Distribution of Conservation Units in Amazonas



Sources: INPE (2014), MMA (2012).

Map 4.1 explanation: *The map above shows the distribution of federal and state conservation units in Amazonas through 2014. Federal units (green and yellow) are more heavily concentrated along the southern frontier with Rondônia and Acre, while state units tend to concentrate in the more northerly and central areas of the state – along the BR-319, a potential future principal deforestation frontier – and in the center-west, where Mamirauá and Amanã Sustainable Development Reserves dominate the rural landscape. Vectors of deforestation (red) follow the main river –the Amazon – and the Transamazon highway (in the southeastern quadrant of the map). Deforestation along the BR-319, which has not yet been paved, is minor, and concentrated in the southern reaches of the state, along the frontier with Rondônia – where the federal government has established a large strict protection unit.*

Federal policy actions in the Amazon to preserve the forest affected Amazonas as they did Pará, but Amazonas embraced a proactive sustainable development program because such a program would help reduce rural poverty while presenting little or no challenge to the state's largest

industry, manufacturing. Rather than *reacting* to vertical pressures from above as state leaders in Pará did, from 2003-10 Amazonas' Governor Eduardo Braga enacted the Green Tax Free Zone (*Zona Franca Verde*, ZFV), which included creating mostly sustainable use conservation units and fostering markets for sustainably extracted forest products. Amazonas' greater distance by land from southern Brazil, its less heavily settled and largely subsistence-level extractivist interior, and the comparative lack of ecologically destructive commercial industries renders the state a geo-economically easier context for conservation unit creation and implementation than Pará is.

With respect to implementation and governance of conservation units in Amazonas, the federal government has been much more active than the state: Only 17 of 41 state conservation units possessed management councils by 2014 and 16 had approved management plans (10 had both); but 30 of 34 federal units possessed councils, while 24 had approved plans (24 had both). With respect to the TCU audit management index measured in 2013, federal and state management efforts appear more similar, however, when measured using the TCU (2013) audit management index: Only one federal unit (Uatumã Biological Reserve) earns a high rating, while another four units rate low, and the rest rate medium (see Appendix 4.1). No state conservation unit rates high, 11 rate low, and the rest rate medium. Management, therefore, remains a challenge in Amazonas for both tiers of government, but the federal government has been more active in establishing governance institutions on individual conservation units than the state has been.

Economic geography of Amazonas

Amazonas, like Pará, is a geographically extensive state located in the Brazilian Legal Amazon, and has a similar political history characterized by developmentalist ideology and elite politics, centered in Manaus. However, Amazonas presents a different economic geography from Pará: The former is characterized by weaker anti-environmental interests in the state, and a stronger presence of vested economic interests that are either indifferent to forest conservation in the interior – such as consumer manufacturing in Manaus – or stand to benefit from at least limited environmental protection – such as ecotourism, concentrated in the Lower Negro River region. Timber and ranching interests concentrate in the south of Amazonas, along the principal deforestation frontier, while much of the middle and northern rural reaches of the state is characterized by subsistence-level farming and extractivism. In general, Amazonas scores "low" on the presence of land intensive industries that are ecologically destructive, and "high" or "medium" on industries that are easier to reconcile with conservation. The relative weakness of anti-environmental interests in the state, combined with active environmental NGOs and organized rubber tappers has rendered the creation of conservation units easier than it has been in Pará.

As I will show below, I score the economic geography for conservation in Amazonas as relatively "easy" because the majority of economic activities spread throughout the state are either conducive to the establishment of conservation units, or present only low barriers to such initiatives. With respect to conducive activities, small-scale extractivism – including rubber, fishing, and small-scale timber harvesting – predominate in much of the state's interior, and can be reconciled with Sustainable Development Reserves, Extractive Reserves, and National and State Forests. Indeed, small-scale extractive communities can benefit from the legal land and natural resource use rights acquired from the establishment of Sustainable Development and Extractive Reserves, while opposition in distant towns is often limited to illegal incursions on the sustainable use conservation units, rather than organized resistance movements. Low barriers characterize the southern reaches of the state: residents engage in larger-scale timber harvesting and ranching, but the potential barriers to the state Apuí mosaic were lowered by current residents'

fears of violent land invasions by outsiders pushing north and east from Mato Grosso and Rondônia.

The first component of Amazonas' "easy" score on the economic geography measure is the concentration of its economy in Manaus: Over 80% of the state's GDP is generated there. The largest industry in Manaus is consumer goods manufacturing, located principally in the Manaus Tax Free Zone (*Zona Franca de Manaus*, or ZFM), a free trade zone in which firms receive a variety of federal incentives to produce goods there, rather than in cheaper, less isolated regions of the country. The ZFM has been instrumental to Amazonas' economic development since the incentives were first enacted in 1957 (Silva 2011, 408). Because the ZFM is a federal program, its existence and its importance to the Amazonense economy tightens the political relationship between the state and federal governments.

Few other municipalities contribute significantly to the state's economic production. Among the more important municipalities, Coari has a commercial timber pole and produces natural gas. (The town is located at the southwestern end of the Coari-Manaus gas pipeline.) Itacoatiara had a significant timber industry through the 1990s – though it produced less timber than most timber poles in Pará. Humaitá, in the south, also harvests timber and grazes cattle. Parintins, in the far east of the state, near the border with Pará, hosts an annual cultural festival to which regional and national tourists flock, and also produces timber commercially.

The imbalance in municipal economic importance in Amazonas contrasts sharply with Pará, where the capital city, Belém, generated under 30% of that state's GDP. While Pará's interior contains extensive ranchlands and a major timber industry, Amazonas possesses few land intensive industries in much of the state. Pará had 34 timber poles and 15 slaughterhouses by IMAZON's count in 2004, while Amazonas had only three significant timber poles (in Manaus, Itacoatiara, and Humaitá) and one slaughterhouse (in Boca do Acre). Although the IMAZON timber pole count understates timber production in Amazonas – a later state survey found that 43 of Amazonas' 62 municipalities produce timber – the timber industry in Amazonas is considerably smaller in volume and value than it is in Pará. Indeed, of the 13 million tons of wood produced in the Amazon in 2002, only 893,060 were produced in Amazonas.

Below, I score Amazonas on the most important industries in the state – timber, rubber, cattle ranching, manufacturing, and ecotourism – and show that its economic geography is more conducive to conservation efforts than Pará's. While extensive cattle ranching as practiced in the Amazon is generally incompatible with preservation of the forest, timber may under certain circumstances be reconciled with permissive conservation units. Rubber tapping, manufacturing, and ecotourism, in contrast, are relatively conducive to conservation.

Timber: Low

I score timber as "low" because it is a relatively small (if growing) industry in Amazonas. Timber production by volume and value is much smaller in Amazonas than in neighboring states. In 1992, Amazonas produced 162,011 cubic meters of logs, 28,616 of which were extracted in the fifteen municipalities along the Negro, Solimões, and Amazon rivers in the central region of the state, and 67,833 from the eleven municipalities proximate to the state's southern and southeastern frontiers with Acre, Rondônia, Mato Grosso, and Pará (IBGE 2014b).[4] A survey conducted by the

[4] Totals are based on author's calculations from IBGE municipal logging data. Central municipalities included in the calculation are Coari, Codajás, Iranduba, Manaus, Manacapuru, Caapiranga, Anori, Manaquiri, Autazes, Fonte Boa,

state government in 2005 found several timber poles in the state, comprising both commercial and small-scale extractivist types. Apuí, Manicoré, Humaitá, Lábrea, and Boca do Acre –in the south of the state – and Coari, Tefé, and Manaus – in the central region – were identified as municipalities possessing commercial timber poles. (Other municipalities identified include Parintins, Itacoatiara (both in the eastern region of the state), and Benjamin Constant (in the far west, on the border with Peru).) Smaller centers of timber production were identified all along the state's major rivers – the Negro, Solimões, and the Amazon, as well as other Amazon tributaries – but the cubic meter totals remain small. In 2003, the central municipalities produced 64,380 cubic meters of timber, while the southern municipalities had increased production to 359,780 cubic meters. The growth indicates greater ecological pressures on the south of the state than the central region, as timber harvesters and ranchers penetrate the forest from Acre, Rondônia, and Mato Grosso.

Nevertheless, the timber industry in southern Amazonas remains considerably smaller by volume, value, and total employment than in southern Pará. In 1992, Pará produced 31,734,992 cubic meters of timber. Production declined to 10,844,175 cubic meters in 2003, but remained well above the 881,975 cubic meters produced in Amazonas that same year. In Pará, frontier timber poles increased production through the 1990s, including in the main deforestation frontier municipalities along the BR-163 and in the Terra do Meio, which increased timber harvesting from 271,482 cubic meters of logs in 1992 to 806,877 in 2003 (IBGE 2014b).[5]

In terms of value and employment, the timber industry in Amazonas employed 6,525 people directly and indirectly in 2009, making it the fourth largest employer in the timber sector of the nine states of the Legal Amazon. Compared to other Amazonian states, however, Amazonas' total employment is closer to the smaller timber states of Acre, Amapá, Maranhão and Roraima; than it is to the top three of Pará, Mato Grosso, and Rondônia: Pará employed 92,423 people, Mato Grosso 56,932, and Rondônia 34,825. Amazonas' timber industry is similarly small by value: It produced only R$115.19 million in revenue in 2009, while Pará's generated R$2.1 billion, Mato Grosso's R$1.6 billion, and Rondônia's R$713.5 million. Indeed, Pará generated almost half of the Legal Amazon's R$4.94 billion in income from timber in 2009, while Amazonas accounted for only 2.3%.

Nevertheless, like in Pará, there are areas in Amazonas in which commercial logging concentrates. These municipalities are mostly in the south of the state – in Boca do Acre, Lábrea, Humaitá, Manicoré, and Apuí – and coincide with areas of extensive cattle ranching and accompanying land invasions and conflicts. As I will show below, the threat of well-organized, armed invasions of Amazonas' land by illegal land grabbers from neighboring states convinced residents of Manicoré and Apuí to support state government proposals for the Apuí mosaic, on the border with Mato Grosso, in 2004 – despite these residents' misgivings about restrictions on natural resource and land use for timber and ranching.

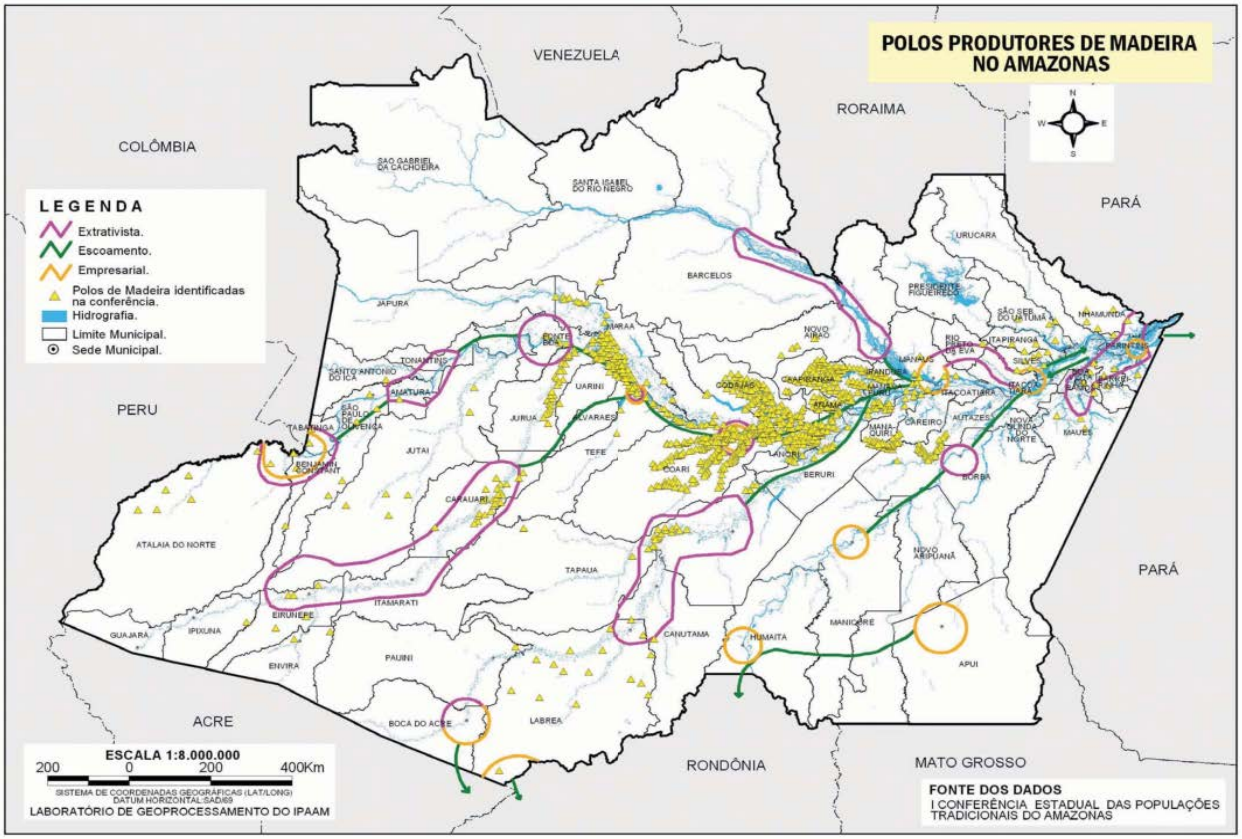
Spread throughout the rural interior of the state are small-scale extractivist timber poles, identified by the state government in 2005. The municipalities of Benjamin Constant, Eiruenepe, Itamarati, Carauari, Amatura, Tonantins, and Fonte Boa, in the west; Canutama, Tapauá, Coari, Barcelos, and Novo Airão in the center; and Manaus, Rio Preto da Eva, Borba, Maués, Boa Vista do Ramos, Parintins, and Nhamundá along the Amazon River to the east; all overlap with state-

Uarini, Alvarães, Tefé, Beruri, and Novo Airão. Southern municipalities included are Itamarati, Pauini, Boca do Acre, Lábrea, Canutama, Tapauá, Humaitá, Manicoré, Apuí, Novo Aripuanã, and Maués.

[5] Totals are based on author's calculations from IBGE municipal logging data. Pará deforestation frontier municipalities include those in Terra do Meio and along the BR-163, including Aveiro, Trairão, Itaituba, Rurópolis, São Félix do Xingu, Tucumã, Ourilândia do Norte, Cumaru do Norte, and Novo Progresso.

identified extractivist timber poles. These poles are shown in Map 4.2, reproduced from the State of Amazonas' 2005 study (Governo do Estado do Amazonas 2005b, 14-15).

Map 4.2. Timber Poles in the state of Amazonas



Source: Reproduced from Governo do Estado do Amazonas (2005b, 14-15).

Cattle Ranching: Low

Like timber, cattle ranching is a smaller industry in Amazonas than in Pará or Mato Grosso, measured by heads of cattle and area devoted to ranching. In 2002, Amazonas had a total of 2,303,371 heads of cattle – less than half of Pará's 5,070,452 heads. Mato Grosso had 5,075,920 heads of cattle that year (IBGE 2002). By 2012, Amazonas' cattle industry had *shrunk* to 2,152,845 heads, while Pará's increased to 5,149,701 and Mato Grosso's to 5,190,142.

From 2002 to 2012, the concentration of cattle ranching in Amazonas gradually moved southward. In 2002, the Centro Amazonense (Central Amazonas) region possessed the most cattle heads, with 597,814 against the Sul Amazonense's (Southern Amazonas) 215,674. However, by 2012, the Centro's cattle herds had shrunk mildly to 596,712, while the Sul's had multiplied to 734,999 heads. Similarly, the Sudoeste Amazonense's herd increased from 78,687 heads of cattle in 2002, to 111,192 in 2012 (IBGE 2012). This increase in cattle herds in the south (along the frontiers with Acre, Rondônia, Mato Grosso) and southwest (along the frontiers with Acre and Perú) is consistent with an encroaching deforestation frontier.[6]

[6] The Sul Amazonense includes ten municipalities: Apuí, Boca do Acre, Borba, Canutama, Humaitá, Lábrea, Manicoré, Novo Aripuanã, Pauini, and Tapauá, and jointly these municipalities have 313,343 inhabitants as of 2014. The Sudoeste Amazonense comprises the sixteen municipalities of Amaturá, Atalaia do Norte, Benjamin Constant,

With respect to area, in 2006 Amazonas devoted 1,835,577 hectares (1.2% of the state's total area) to cattle ranching and the raising of other animals. That same year, Pará devoted 16,842,952 hectares (13.5%), Mato Grosso 35,851,821 (40%), and Rondônia 7,179,803 (30.2%). Southern Amazonas (the Sul Amazonense mesoregion) accounts for over half of Amazonas' ranching area, with 965,562 hectares. In contrast, Southeastern Pará (Sudeste Paraense) has 10,287,435 hectares devoted to cattle (and other animal) ranching – and Southwestern Pará (Sudoeste Paraense) ranches on 3,187,800 hectares. Meanwhile, Norte (North) Mato Grossense and Nordeste (Northeast) Mato Grossense meso-regions – which include almost all of the land in Mato Grosso that lies within the Amazon biome – devote 14,707,695 and 8,905,987 hectares to cattle ranching, respectively (IBGE 2006).

The increasing concentration of cattle ranching in the south of Amazonas makes the region a harder context for conservation, all else equal, because cattle ranching in the Amazon is generally extensive, and requires the clearing of large tracts of forest in order to be profitable. In this area, we should expect the federal government to be more active and enact stricter conservation units than the state, and this is generally what we see. There is, however, one significant exception: the state Apuí Mosaic. As I will discuss below, the conservation and sustainable development interests in the first Braga administration (2003-2006) overcame local resistance to conservation by proposing mostly sustainable use conservation units as a solution to the threats posed by armed and organized land grabbers from neighboring states to the incumbent residents of Manicoré and Apuí – including local ranchers and loggers.[7]

Rubber: High

Amazonas shares distinction with Acre as being one of the largest producers of rubber in Brazil. Though rubber production is a relatively minor industry even in the rural Amazon, I score Amazonas "high" on rubber production because of the extensive tapping that occurs in the state, and the industry's size in the state compared to other Amazonian states.

Rubber production was the mainstay of the Amazonian economy prior to 1912, and had a brief resurgence during World War II. Plantation rubber in Southeast Asia extinguished the rubber boom in Amazônia because the main rubber species – *hevea brasiliensis* – cannot be grown in plantations in the Amazon due to a leaf blight that kills rubber trees (Lieberei 2007, Mann 2011). After failed government and foreign efforts throughout the twentieth century to cultivate rubber in large plantations in Brazil (Dean 1992, Grandin 2009), Amazonian rubber tapping remains chiefly done in the traditional way: tappers hike through the forest, open veins in rubber trees to drain the liquid rubber, and sell what they have collected. In the traditional business model, the tappers sell for low prices to local middlemen – often monopsonists – who then sell the rubber for a profit to Manaus and Belém. Tappers themselves generally earn very little – on average, families living in

Carauari, Eirunepé, Envira, Fonte Boa, Guajará, Ipixuna, Itamarati, Juruá, Jutaí, Santo Antônio do Içá, São Paulo de Olivença, Tabatinga, and Tonantins. The Sudoeste Amazonense has 385,213 inhabitants as of 2014.

[7] Manoel Cunha, CNS, on rubber and the previous government's policies: "Mistaken policies of the government was a hotly discussed point. The previous government did not incorporate well the question of extractivism, and ended up supporting agriculture more, through the Third Cycle project, which was a bomb for the municipalities. The rubber tappers left their extractive activities to become farmers, but the people of the riverbanks only knew how to tap rubber, they were dedicated to tapping rubber, they didn't know how to do farming. Today you still have rubber tappers in the Médio Juruá suffering the consequences of accidents from falling logs and chainsaws" (Governo do Estado do Amazonas 2005a, 26).

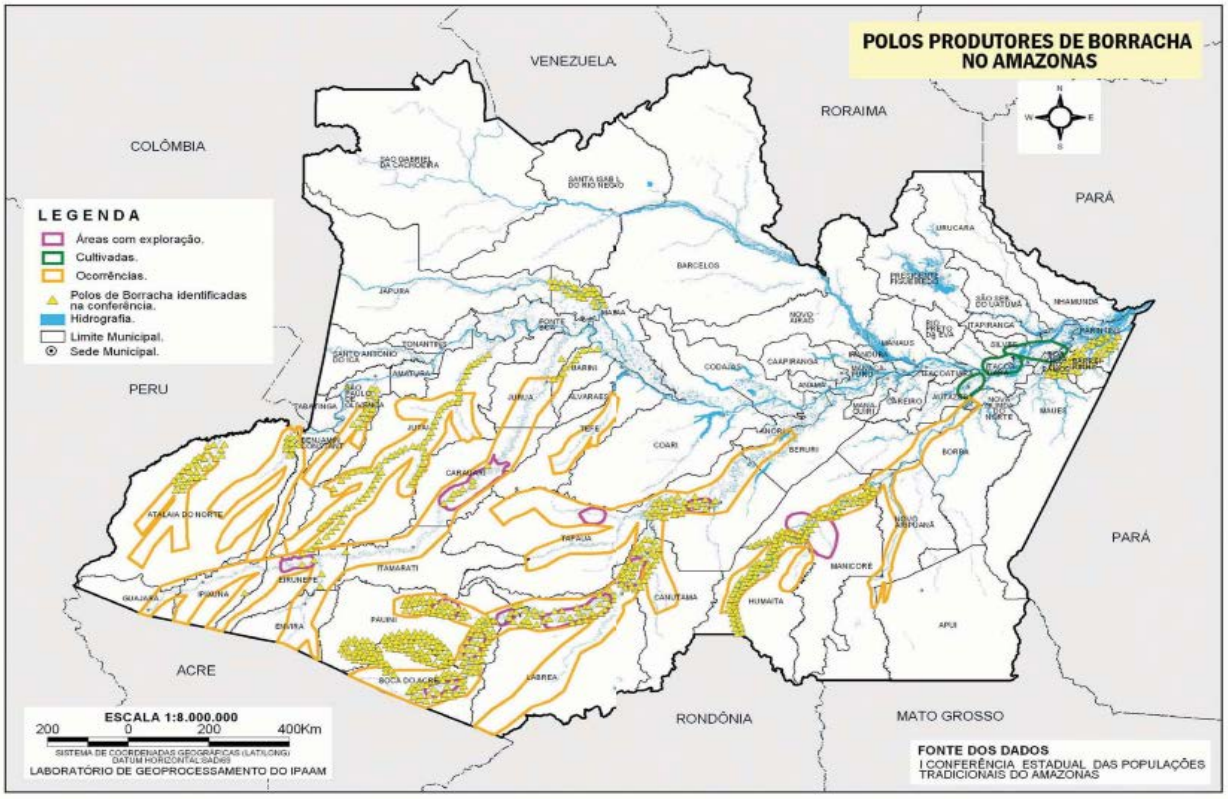
municipalities in Amazonas that produce rubber earn about R$73/month (Governo do Estado do Amazonas 2005a, 19). The struggle for rubber tappers in the Amazon has long been fought on two fronts: one against middlemen, who exploit the tappers; and another against incursions from cattle ranchers, who burn the forest to clear land for pasture (Author interview with Manoel Cunha, President of CNS, Manaus, 2012; Revkin 1990). The struggle against cattle ranchers has made organizations such as the Rubber Tappers' Council, founded in Acre in the 1980s, allies of global environmentalists. But while conservation-oriented NGOs want to preserve the forest for ecological purposes, rubber tappers want to preserve their rights to continue to practice their trade – and they need the forest in order to do that.

Amazonas produces more rubber than Pará: In 1994, Amazonas generated R$822,000 in rubber revenue – four times more than Pará's R$205,000 that year. By 2003, rubber production in Amazonas had risen to R$2.79 million, while in Pará production increased only to R$280,000. By 2005, Amazonas had become the largest producer of rubber in the Legal Amazon, out-producing Acre, while Pará remained the third largest producer. By 2012, Amazonas' production had risen to R$3.879 million, while Pará's stagnated at R$345,000 (IBGE 2014b).

Rubber tapping occurs to different degrees throughout Amazonas' territory. In 2005, Amazonas' state government identified eleven sites of constant rubber tapping in the state, in addition to extensive areas of periodic tapping along the southern tributaries of the Solimões and Amazonas rivers. Rubber tapping is heavily concentrated in the southern and central regions of the state, with little activity in the north. Of the twenty municipalities in which rubber tapping takes place, seven account for 85% of the state's rubber production: Novo Aripuanã, Lábrea, Boca do Acre, Humaitá, Manicoré, Autazes, and Envira. All but Autazes are located in the Sul (South) Amazonense. Boca do Acre, Lábrea, Manicoré and Humaitá are municipalities in which extensive rubber tapping coexists with commercial timber extraction. In such areas, we may expect divergent preferences with respect to conservation: Timber companies may prefer constant, even expanded access to valuable hardwoods, while rubber tappers may prefer to limit forest clearing in order to preserve rubber trees for their own uses.

In Map 4.3 below, reproduced from the State of Amazonas' 2005 report on rubber extraction in the state, the yellow triangles represent "poles" of rubber tapping identified in state-hosted public hearings. Orange polygons represent "occurrences" (*ocorrências*) or areas in which rubber tapping is known to occur. Purple polygons represent areas of constant rubber tapping. Finally, in the green polygons in the eastern region of the state of Amazonas, there are minor rubber tree cultivation efforts under way.

Map 4.3. Rubber Production Poles in Amazonas, 2005



Source: Reproduced from Governo do Estado do Amazonas (2005a, 16-17).

Rubber tapping is linked positively to conservation because rubber tappers in the Amazon need the forest in order to tap rubber trees. In the 1990s and 2000s, the National Rubber Tappers' Council linked rubber tapping to conservation with a two-pronged argument: First, rubber tappers, because they do not deforest when they are tapping, provide a barrier to the encroaching deforestation frontier if they have secure rights to swathes of forest. Second, as longtime CNS President Manoel Cunha argues, when rubber tappers do not receive sufficient state support – in the form of income or price support, or secure use rights that may come from sustainable use conservation units – they take to fishing and illegal logging, which provide a more secure income (Governo do Estado do Amazonas 2005a, 25).

Manufacturing: High

The comparative lack of significant land intensive industries in the interior of Amazonas helps give greater political influence to urban concerns in the state capital, and to organized movements of small-scale extractivists – and their allies in national movements such as the National Rubber Tappers' Council. Much of the GDP generated in Manaus is concentrated in the Manaus Tax Free Zone (*Zona Franca de Manaus*, or ZFM), a special economic zone that offers tax breaks and other benefits to manufacturing firms that decide to locate production in the city. Given the enormous distance and difficulties of transportation between Manaus and national and international consumer markets, and the fact that the ZFM is a federal, not a state, policy; state politicians have an incentive to cooperate with the federal government to ensure the permanence of

the ZFM. ZFM benefits were initially set to expire in 2013 (with potentially dire consequences for the Manaus economy) (Silva 2011, 673), and firms in Manaus had suffered from globalization and liberalizing reforms enacted by Presidents Collor and Cardoso (ibid.), so it is no accident that incoming Governor Eduardo Braga linked sustainable development of the interior with the ZFM in his flagship policy initiative, the Green Tax Free Zone (*Zona Franca Verde de Manaus,* or ZFV). Cultivating markets in the interior was an attempt to diversify the economy, while linking sustainable development to the ZFM helped reinforce the ZFM's legitimacy. Using the ZFV, Braga linked the ZFM to both the state and federal governments' broader policy concerns: rural development and forest conservation.

The ZFM also, according to some observers, has contained a "green" element from its inception. According to former Secretary of the Environment of Amazonas, Virgílio Viana,

> The Manaus Tax Free Zone has had an extraordinary impact, possibly beyond its original [economic development] intention: a rare combination of economic development with environmental conservation. By concentrating most economic activity in the capital, with considerable success, state and federal development policies in Amazonas did not need to focus on agricultural expansion. Between 1985 and 2002, Amazonas had experienced a huge accumulated economic growth of 502.4 per cent, but had lost only 2 per cent of its forest cover. Without intending to, the Manaus Tax Free Zone became a successful environmental policy in tackling deforestation. (Viana 2010, 14)

The "green" aspect of the ZFM cannot be ignored, as it has (Viana 2010 asserts) played a role in developing the Amazonense economy without promoting large-scale settlement and deforestation of the interior. The sparse settlement of the interior and subsistence economies that predominate there, in turn, have produced an easier economic geography for conservation than that seen in Pará. As seen above, there are fewer loggers and cattle ranchers, but more rubber tappers, than in Pará. The relative absence of potentially strong opponents of conservation, and the presence of groups that either can benefit from certain types of conservation units – small-scale extractivists, including rubber tappers – or may be indifferent to conservation of the interior – the manufacturing sector in Manaus – eased the state's transition from supporting development at any cost to embracing sustainable development as a flagship policy.

Ecotourism: Medium/High

Finally, Amazonas possesses a significant tourist industry, encompassing both business tourism centered in Manaus, and ecotourism concentrated in the region of conservation units surrounding Manaus, as well as in a few interior cities. (Tefé, for example, possesses the RDS Mamirauá, which has a jungle hotel in it.) Tour boats and guides depart with national and international tourists from Manaus, and carry them up the Negro River to the Anavilhanas National Park – the largest freshwater archipelago in the world – and beyond. Many tourists pay to spend nights in jungle lodges. In 1998, ecotourism brought 160 thousand visitors – 50 thousand of whom came from abroad – to Amazonas, and "since the middle of the 90s, the region [has] sought to invest in the tourism sector to diversify its economic activity...." (Cavalcante, Possamai, and Abreu 2003, 1). According to data published by Amazonastur, the state tourism agency, 283,018 tourists visited Amazonas in 2003. The number rose steadily to 2011, when 755,058 tourists from Brazil and abroad visited the state. Much of the tourism is urban, centered in Manaus, and includes business conventions. A small but growing proportion of tourists, however, take advantage of jungle hotels, river cruises, and sports fishing. From 2003 to 2011, of 3.8 million visitors to Amazonas, 278,775 overnighted in jungle hotels, 154,750 took river cruises, and 48,085 participated in sports

fishing. From 2003 to 2011, the number of tourists who stayed in jungle hotels rose from 16,452 to 50,585 – and posted an average annual growth of 16% (Amazonastur 2012).

Amazonastur does not report annual receipts, but from the predominance of Manaus in statewide municipal GDP data, one can surmise that the ecotourism industry, measured by tourists overnighting in jungle hotels outside of the city, remains relatively small. Nevertheless, the possibility of attracting more tourists by preserving scenic rainforest areas gives extra incentives to establish conservation units in areas that tourists might want to visit.

Currently, several local ecotourism projects are being implemented by the state, NGOs, and locals on existing federal and state conservation units in Amazonas. RDS Uatumã, northeast of Manaus, permits sports fishing; while RDS Mamirauá, in Tefé, has a jungle hotel. Novo Airão attracts tourists interested in exploring the Anavilhanas archipelago.

Because industries that can be reconciled with conservation efforts outweigh land intensive industries in Amazonas that are incompatible with conservation, I argue that Amazonas is a comparatively "easy" context for conservation unit creation. Spread throughout the state are small-scale rural extractivists, who tap rubber or fell individual trees on a small scale. Around Manaus, Tefé, and a few other cities of the interior of the state a small but growing ecotourism industry thrives. These industries comprise firms and/or families that can benefit from different types of conservation units. In contrast, the ranching and commercial timber industries concentrate in the southern regions of the state, along the frontier with Acre, Rondônia, Mato Grosso, and Pará. Here we observe more aggressive federal than state actions, and a greater divergence between average federal and state conservation unit types than in the easier regions of the state farther north.

Federal Conservation Unit Creation, 1979-2010

We would expect federal conservation units to be on average stricter than state, that is, more heavily weighted toward strict protection conservation units than the state system. Indeed, we do find this to be the case in Amazonas: While 81% of state conservation unit area in the state is sustainable use – or permissive – only 44% of federal conservation unit area in the state is permissive – and 56% is strict. We see such federal and state divergence despite the fact that the federal government had established only 15 strict protection units in Amazonas, compared to 21 sustainable use units by 2008. Furthermore, we would expect the federal government, being more insulated from the pressures of local economic interests – including timber and ranching – than the state government is in contentious areas, to be more aggressive about placing both strict and permissive conservation units on the principal deforestation frontier, where conflicts are expected to be greater. We see this, as well, especially in the 2000s: Cuniã Ecological Station (2001) Juruena National Park (2006), Campos Amazônicos National Park (2006), and Mapinguari National Park (2008) are all located along the southern deforestation frontier, helping to block land grabbing coming from Mato Grosso and Rondônia.

The federal government in Amazonas began its conservation unit creation program slowly, with large units established in remote regions of the state. Only after democratization, particularly in the late 1990s and 2000s, did the federal government take a more strategic approach to conservation unit creation to reduce deforestation in the region. This period culminated in efforts by Minister of the Environment Marina Silva and President Lula da Silva to block the encroaching deforestation frontier from Acre, Rondônia and Mato Grosso with a combination of strict and moderately permissive units in the southern region of Amazonas in the mid-2000s. In the sections that follow, I trace the evolution of federal conservation unit programs in Amazonas, beginning

with the creation of Pico da Neblina National Park in 1979. I divide the history of federal conservation unit system creation in Amazonas into three periods: The first period, 1979-1994, covers the period from the military dictatorship to the end of Itamar Franco's presidency, and shows a series of discrete conservation unit creation actions in specific years, interspersed with years during which no conservation unit was created. The second period, 1995-2002, covers the presidency of Fernando Henrique Cardoso, who enacted the National Forests Program and created several Extractive Reserves in the state. Finally, I discuss the Lula administration (2003-2010), during which time the federal government aggressively began to protect the southern deforestation frontier, in cooperation with the state government of Amazonas.

Beginnings, 1979-1994

The military dictatorship established the first federal conservation unit in Amazonas in 1974, the Amazônia National Park. Much of the park rests in Pará, but a sliver crosses into Amazonas. The next unit was Pico da Neblina National Park (1979), in the remote north of Amazonas, along the border with Venezuela. The next two federal actions were the Jaú National Park (1980), in the Lower Rio Negro region of Amazonas, and Anavilhanas Ecological Station (1981; converted to a National Park in 2008). The Parks and Forests at the time were considered "paper parks," "with boundaries drawn around private land whose ownership was often unclear...." (Hochstetler and Keck 2007, 29).

After SEMA's founding in 1973, Ecological Stations joined National Parks as major conservation units in Amazonas. Anavilhanas, on the lower Negro River, was one of the first eight Ecological Stations in the country.[8] While these steps were conservative compared to the 2000s, the advent of Ecological Stations – limited areas conserved principally for the purposes of scientific research – helped bolster the environmental cause by bringing research institutions and land reform agencies into the environmental conservation tent.

> The term "station" (*estação*) evoked experimentation and research rather than conservation per se, so when [SEMA] submitted a bill authorizing the creation of ecological stations, it passed unanimously. The law allowed 10 percent of the areas to be used or modified for research purposes. State governments ceded land, with permission for their universities to use it. INCRA, the federal land reform institute, allocated around 2 million hectares in the state of Amazonas... (Hochstetler and Keck 2007, 29)

Conservation units in Amazonas preceded, and later coincided with, a rise in environmental activism in southern Brazil, as the military regime eased repression of social movements in the 1970s and 1980s (Hochstetler and Keck 2007, 32). Having established four federal conservation units in Amazonas by 1981, from 1982-5 the regime decreed five more in the state: two more Ecological Stations (Jutaí-Solimões and Juami-Japurá) and ARIE Javari Buriti in the far western region of the state, Abufari Biological Reserve along the Purus river, and the diminutive ARIE Projeto Dinâmica Biológica de Fragmentos Florestais, north of Manaus. All of these conservation units were in relatively remote locations, far from principal centers of economic activity and deforestation.

As the country's political regime shifted from military authoritarianism to civilian rule in 1985-1988, the federal government created very few conservation units nationwide. In Amazonas,

[8] All of the first eight were established by Decree No. 86,061 of July 1981. The Ecological Station category was first established by SEMA in the 1970s, and codified in the National System for the Environment (SISNAMA) in 1981 (Hochstetler and Keck 2007, 32).

it created only one, in 1988: the Purus National Forest. In 1989, in the wake of the December 1988 murder of Rubber Tapper activist Francisco "Chico" Mendes, President Sarney decreed the Mapiá-Inauiní National Forest, adjacent to the Purus. These Forests, too, were placed in relatively remote areas of southwestern Amazonas, and had little population pressure: According to *Jornal do Brasil* at the time, "within these National Forests live only the Mapiá people and six more small non-religious communities that extract rubber and fish" (Fajardo 1991, 17).

International pressures to reduce Amazon deforestation emerged in the late 1980s, as images of the forest burning spread around the globe. In 1989, Sarney launched *Nossa Natureza* in response to this global concern, and decreed the Amazonas and Tefé National Forests in Amazonas. The first, decreed on 1 March, lies in the extreme north of the state, along the Venezuelan border, adjacent to Pico da Neblina National Park. The second is in Tefé, in the Middle Solimões region. According to *Correio Braziliense* at the time, Sarney decreed the Amazonas National Forest because Chico Mendes had requested it, and the federal government at the time intended to locate extractive reserves – a type of sustainable use conservation unit meant to support subsistence extractivist communities – within it ("Sarney cria..." 1989, 13). Neither National Forest experiences intense economic or population pressures: communities in both areas are largely subsistence-based.

After Sarney, President Fernando Collor's administration was short-lived, but involved conservation unit creation. Collor decreed the Uatumã Biological Reserve on 6 June 1990. He did so as part of a broader "Ecological Package" (*Pacote Ecológico*) of six conservation unit decrees ("Collor Cria..." 1990, 16) in Amazonas, Goiás, Maranhão, and São Paulo. Though Uatumã was one of the strictest categories of conservation units, and rather large for a 1990s Biological Reserve (it spanned over 560,000 hectares in 1990, and was amplified to 940,358 hectares in 2002), the unit served to reconcile regional economic development with protection of dense tropical forest: it compensated for the flooding of ecosystems in the area of the Balbina Hydroelectric Dam reservoir, north of Manaus.[9]

From the 1970s to the end of Collor's administration, conservation unit creation was sporadic, and largely done in remote areas of Amazonas – and sometimes only as environmental compensation for infrastructure projects. A more strategic approach to conservation unit creation began with President Cardoso's second administration, and reached fruition under President Lula. The strategic shift relates to changing societal and political priorities under Cardoso. Prior to Cardoso, Brazil suffered from several years of high inflation and economic stagnation (Baer 2008, 99-128) that coincided with lower Amazon deforestation rates. While the yearly deforestation average in the Legal Amazon was 22,228 square kilometers from 1978 to 1989, the average dropped to 11-15,000 square kilometers from 1990 to 1994. However, with economic recovery in 1995, deforestation spiked, reaching 29,059 square kilometers in 1994-95 (Baer 2008, 334). This increase brought the Amazon back onto the political agenda. Though deforestation rates in the late 1990s fell from the 1995 high, they began climbing again beginning in 1998, reaching 21,651 square kilometers by the end of Cardoso's second administration, and 27,772 square kilometers by 2004, well into Lula da Silva's first term.

[9] The Uatumã Reserve's council was only established in 2008, and the management plan published in 2002. Eletronorte finances and co-manages the reserve with IBAMA/ICMBio (ISA 2015; "Implantação da Reserva Uatumã..." 1996).

Creation during the Cardoso Presidency, 1997-2002

Cardoso became President in 1995, a year during which the Brazilian economy had begun to recover from years of high inflation, and Amazon deforestation spiked. Cardoso prioritized market reforms over environmental governance during his first few years in office, but in 1997, the Cardoso administration established the first Extractive Reserve in Amazonas, Médio Juruá, in the southwestern region of the state.

The Médio Juruá Extractive Reserve responded to two initiatives, one federal and one societal: First, the federal government had begun to establish Extractive Reserves in the Amazon in earnest in the early 1990s, and continued to do so throughout the rest of the decade and into the 2000s. Second, Manoel Cunha (currently the President of the National Rubber Tappers Council, or CNS) and an organized Rubber Tappers' movement in the area had advocated for land use rights and social justice. As is true of other Extractive Reserves in the Brazilian Amazon, residents of the Médio Juruá were *de facto* enslaved – especially rubber tappers – and forced to sell their produce to local monopsonists who paid low prices. The establishment of the Médio Juruá Extractive Reserve (and, in 2005, the state Uacari Sustainable Development Reserve next door) and complementary policies liberated local residents from oppressive local rubber barons and began to earn rubber tappers better prices for rubber (Author interview with Manoel Cunha, President of CNS, 2012). According to the Manaus-based newspaper, *A Crítica*,

> The extractive reserves that are being created by Ibama in Amazonas are beginning to present positive results: the Médio Juruá reserve is already producing a ton of andiroba oil and 500 liters of copaíba oil. All the production has a guaranteed market: the pharmacies of Manaus and the pharmaceutical industries of the exterior. The sales are maintaining hundreds of jobs in the reserve. ("Andiroba" 1998, A4; translation mine)

At the urging of Mary Allegretti, appointed Secretary of the Legal Amazon of the Ministry of the Environment in 1999, the Cardoso administration created three more Extractive Reserves in Amazonas in 2001 and 2002, including Baixo Juruá next to Tefé National Forest and Auatí-Paraná on the upper Solimões in 2001, and Rio Jutaí in 2002. All of these Extractive Reserves were located in remote areas and benefited local producers. The reserves also demonstrated a continuing commitment to a federal government land reform-cum-forest protection program begun under previous administrations.

Later in his presidency, Cardoso expanded his commitment to protecting the Amazon, including Amazonas, beyond Extractive Reserves. In 2001-2, his administration decreed two National Forests and an Ecological Station in Amazonas. These decrees included the Pau-Rosa National Forest, in Maués, Amazonas, on 7 August 2001, and the Cuniã Ecological Station (which straddles the border between Rondônia and Amazonas), decreed in addition to five non-Amazonian conservation units during a Tree Week (*Semana da Árvore*) ceremony on 28 September 2001 ("Ibama quer dividir..." 2001). While Pau-Rosa and the Extractive Reserves were largely located in remote regions of Amazonas, the Cuniã Ecological Station lies adjacent to the BR-319 highway, near Porto Velho – a logging-heavy region along the Amazon's southern deforestation frontier.

On 19 September 2002, Cardoso decreed the creation of the Jatuarana National Forest in the Apuí district of Amazonas and increased the area covered in northern Amazonas by the Uatumã Biological Reserve ("FHC cria novas áreas..." 2002, A14). All of these decrees were done with the idea of protecting virgin forests, both near to the deforestation frontier and farther from it. In decreeing the new units, Cardoso was careful to limit the lands protected to *terras devolutas* – or un-destined public lands – to avoid the costs of expropriating private lands.

Finally, during Cardoso's presidency, IBAMA began working on a proposal for Juruena National Park, which would encompass a large section of southeastern Amazonas (in the Apuí municipality) and Northern Mato Grosso. This proposal was shelved until 2004, when the federal and state governments worked together to create the park and the state Apuí Mosaic.

Cardoso's administration represented a step forward for the federal government in addressing the problem of deforestation in the Amazon strategically. First, Cardoso gave continuity to the Extractive Reserve program. Second, Cardoso supplemented the Extractive Reserves in Amazonas with conservation units of other types.

Creation during the Lula Presidency, 2003-2010

The Lula administration enacted a more interventionist policy in the Amazon than its predecessor (Cardoso). From 2004 to 2008 the administration created ten new conservation units in the state of Amazonas. All but one were in the southern region of the state – encompassing the Apuí Mosaic, the southern stretches of the BR-319 highway, and the frontier with Acre. In 2004, Lula decreed the Lago do Capanã Grande Extractive Reserve, along the BR-319. He did so as part of a larger package of environmental initiatives for National Environment Week: In addition to the Capanã Grande, Lula decreed four other conservation units, in Maranhão, Paraíba, Paraná, and Rondônia. Lula also signed cooperation agreements with Acre, Amazonas, Mato Grosso, Pará, Rondônia, and Tocantins to consolidate existing and create new units ("Governo cria novas áreas..." 2004, A14).

However, the administration's dedication to blocking the encroaching southern deforestation frontier was not immediately apparent. Though Lula and Minister of the Environment Marina Silva developed ambitious plans as early as 2002, the administration did not establish new conservation units in Amazonas until 17 February 2005 – after American nun Dorothy Stang had been murdered in the neighboring state of Pará. Stang's murder increased political will to create conservation units throughout the Amazon (Hochstetler and Keck 2007, 181),[10] and the administration decreed several of the conservation units proposed for the Terra do Meio and BR-163 mosaics in Pará, fast-tracked the Public Forest Management Law through Congress, and decreed the Balata-Tufari National Forest, adjacent to the BR-319 highway in Amazonas (MMA 2005).

The momentum given to environmental protection in the Amazon did not subside quickly. The following year, 2006, the Lula administration established two new National Parks and two Extractive Reserves in Amazonas. One extractive reserve, Arapixi, linked to the Mapiá-Inauiní and Purus National Forests, near the border with Acre. The second Extractive Reserve, Unini, was placed in the lower Negro River region to resolve longstanding land and resource use disputes between residents and the federal government in Jaú National Park (Author interview with Fafá Zingra Tinto, Manager of Rio Unini Extractive Reserve, 2012). Both of the new national parks decreed in 2006 surrounded the Amazonas state Apuí Mosaic, in the south of the state. Campos Amazônicos National Park, which straddles the border between Amazonas and Rondônia, preserves savannah-like open areas of the Amazon coveted by soy farmers and cattle ranchers – including land grabbers – alike. Juruena National Park, which straddles Amazonas and Mato Grosso,

[10] "That Stang was a nun would have mobilized a portion of the Catholic Church; that she was an American nun, despite having taken Brazilian nationality long ago, made international headlines. The resulting pressure allowed the immediate demarcation of protected areas proposed for the region, as well as the elimination of some of the dubious instruments traditionally used by land grabbers to sustain their land claims" (Hochstetler and Keck 2007, 181).

was meant to be much larger than the final proposal because a piece was carved out for the Apuí Mosaic. These two strict protection conservation units joined the Jatuarana National Forest in Amazonas, several state units in Mato Grosso (Igarapés de Juruena, Guariba-Roosevelt Extractive Reserve, Rio Roosevelt Ecological Station, and Tucumã State Park), and the Kawahiva do Rio Pardo Indigenous Land (MT) to form a buffer zone around the state of Amazonas' Apuí Mosaic.

Finally, in 2008, the Lula administration decreed Mapinguari and Nascentes do Lago Jari National Parks, as well as two Extractive Reserves – Médio Purus and Ituxi – and Iquiri National Forest. Nascentes, Médio Purus, and Iquiri were decreed on 8 May 2008, and Mapinguari and Ituxi one month later, on 5 June. According to national media, the 8 May decrees responded to international pressures to reduce Amazon deforestation and the 5 June decrees constituted part of the Lula administration's annual "big package of good intentions for Amazônia" on the International Day of the Environment ("Pacotão amazônico" 2008). (The same day, the Lula administration sent its National Climate Change Policy proposal to Congress.) However, these five units also lie either along the BR-319 highway, or in its vicinity on the southwestern frontier of Amazonas. The Lula administration had developed plans to rebuild and pave the BR-319, which runs from Manaus to Porto Velho, and to do so would threaten to exacerbate deforestation in the region. Along the BR-319, the federal government worked with the friendly state government of Eduardo Braga to design a collection of conservation units along the highway to prevent or offset environmental devastation from the paving plan. However, the process of creating these units stalled in 2007, and only restarted when representatives of the state government of Amazonas, which supported both paving the highway and creating the units, expressed concern about the delay. The state was concerned because the units, lying adjacent to the highway, were in "regions [that are] strategic and important [for sustainability in the] region" ("Estado vai de encontro..." 2007; translation mine).

Several of the conservation units created by the Lula administration between 2003 and 2008 were located closer to the principal deforestation frontiers in Amazonas than those units created by Cardoso had been. The Lula administration was able to use conservation units to impose barriers to encroaching deforestation for X reasons: First, Lula had been elected on a platform that included plans for sustainable development in the Amazon. Second, the death of Dorothy Stang raised the political salience of disordered occupation and deforestation of the Amazon, and induced the Lula administration to act. Finally, plans to improve infrastructure in Amazonas by paving the BR-319 highway prompted environmental groups, the state of Amazonas, and the federal government to take measures to prevent the likely devastation of the forest along the highway by lining much of the highways length with conservation units.

Federal Conservation Unit Creation in Amazonas: Conclusion

The federal government began its conservation unit creation in Amazonas in 1979 and 1980, with the creation of major National Parks in remote reaches of the state: Pico da Neblina and Jaú. Though both parks cover immense territories, their remoteness and the authoritarian regime in place at the time reduced the potential for conflicts to erupt. The government continued to establish both strict protection units and comparatively permissive National Forests through the end of the military regime and the administrations of Sarney and Collor. Cardoso, from 1997 to 2002, established ten new federal units in the state, including one National Park, two Ecological Stations, three National Forests, and three Extractive Reserves. While most of these were still located in remote regions of the state, Humaitá and Jatuarana National Forests began the federal

government's shift toward blocking the arc of deforestation – a set of actions that would accelerate under President Lula, from 2003 to 2008.

Amazonas' relatively sparsely-populated and subsistence-based interior made the federal government's conservation unit creation program there easier than the comparable program was in Pará in the 2000s. While the government encountered resistance from loggers and ranchers to both strict and permissive conservation units along the BR-163 in Pará, in Amazonas the government faced less local resistance and worked with the state government to establish new units. Finally, with the National Forests and Extractive Reserves the federal government took advantage of the support given by local communities as they gained legal rights to exploit their local natural resources.

Although the national political shift to the left in 2002-3 – when center-right Cardoso (PSDB) exited the presidency and center-left Lula (PT) was inaugurated – accelerated actions to protect the Amazon and shield the frontier between Amazonas and its southern neighbors, not all progress can be attributed to this federal partisan change. Cardoso decreed ten conservation units in the state, and Lula decreed eleven. Both presidents decreed both strict and permissive units, including Extractive Reserves (Cardoso: 4, Lula: 5), National Forests (Cardoso: 3, Lula: 2), and National Parks (Cardoso: 1, Lula: 4). Indeed, broadly speaking, both presidents benefited from the counsel of major environmentalists: José Sarney Filho (an environmentalist and son of ex-President José Sarney) and José Carlos Carvalho (former Secretary of the Environment of Minas Gerais) both served as Minister of the Environment under Cardoso, Marina Silva (environmentalist politician from Acre and former Chico Mendes ally) and Carlos Minc served under Lula. All four are respected by Brazilian environmental scholars and activists.

From "Chainsaw Populism" to Modernization: State Conservation Units, 1989-2002

The state of Amazonas has a history of embracing developmentalism in politics, and this changed only slowly with the advent of environmental policy and governance in Brazil in the late 1980s and 1990s. The period from 1989 to 2002 in Amazonas saw the birth of environmental governance, though timid steps toward conservation were still tempered by political concerns with modernization and development. As was true in Pará, environmental governance was not a policy priority in Amazonas during this period, though the state did create 11 conservation units, while its neighbor created only 5 (three of which are in the Tucuruí Mosaic). In this section I trace the gradual process by which the principal Amazonense politicians began to embrace sustainable development, culminating in Eduardo Braga's Green Tax Free Zone.

Two factors drove state environmental action in Amazonas between 1989 and 2002: First, World Bank funding for development projects induced Governor Amazonino Mendes to decree six conservation units in 1990. Second, biologist Márcio Ayres secured national and international support and resources to establish a large state Ecological Station, Mamirauá, to protect the habitat of the species of monkey he was studying, in the municipality of Tefé in 1992.[11]

Electoral politics in Amazonas through 2002 focused on development and modernization, and shifted toward sustainable development only in 2003. Since the early 1980s, state elections have mainly involved an elite circle of politicians based in Manaus and cultivated by Gilberto

[11] In 1996, Mamirauá became the country's first Sustainable Development Reserve (RDS). Mamirauá and an adjacent RDS, Amanã (1999), were established with little cost to the state government, and are both still managed by an NGO – the Instituto Mamirauá – under formal agreement with the federal Ministry of Science and Technology (*Ministério de Ciência e Tecnologia*, MCT).

Mestrinho, who served three times as Governor of Amazonas (1959-63, 1983-87, and 1991-95). Mestrinho was later elected to the Senate, and served from 1999 to 2007.[12] Amazonas' other two governors of the 1980-2010 period, Amazonino Mendes and Eduardo Braga, both began as Mestrinho's political protégés. Mendes served three times as Mayor of Manaus (1983-86, 1993-94, and 2009-12), and twice as Governor of Amazonas (1987-90, 1995-98, 1999-2002). Eduardo Braga, in turn, served as City Councilman of Manaus (1983-87), State Deputy of Amazonas (1991-92), Federal Deputy of Amazonas (1991-92), Vice-Mayor of Manaus (1993-94), Mayor of Manaus (1994-1996), Governor of Amazonas (2003-2010), and finally Federal Senator from Amazonas (2011-Present). Though elections for statewide office became more competitive in the 1998 and 2002 elections than they had been previously, gubernatorial competition remained limited to this elite circle: Braga broke with Mendes and the two ran against each other for Governor in 1998. Mendes won, and Braga mended relations with Mendes to beat Mestrinho in the gubernatorial election in 2002. In 2006, Braga beat Mendes to secure re-election. While the power brokers in Amazonas remain the members of the elite circle established by Mestrinho, party-switching is common: To take one example, Eduardo Braga became Governor of Amazonas in 2003 as a member of the PPS, but contested re-election as a member of the PMDB 2006. (He remains a member of the PMDB as a Senator.) Here I trace the evolution of environmental politics by examining the attitudes and actions of the Amazonense power elite, centering on Gilberto Mestrinho, Amazonino Mendes, and Eduardo Braga.

Gilberto Mestrinho was an icon of Amazonian populism (Villarroel 2012, 98), at times at the expense of the environment. He sought to develop Amazonas through tax reform, intensification of extractive activities, and strengthening the state political machine. As poverty was (and still is) a major problem in Amazonas, Mestrinho prioritized the social agenda over the environmental, even in the face of rising international concern over the fate of the Amazon. For Mestrinho, the environment was there for the population and should be used to promote growth. "Mestrinho spread in Amazonas the interpretation that concerns such as the Amazon forest were actually a pretext of international groups who were keen to stop the region's economic development" (ibid.; translation mine). In the words of former Secretary of the Environment and Sustainable Development of Amazonas, Virgílio Viana (2010, 20):

> Until 2002, Amazonas was subject to a mainstream Brazilian paradigm, which I call "mato (weed/woods/forests) paradigm". Not so much a formal policy, it takes the form of a deep assumption that forests are inherently bad – a symbol of underdevelopment – and should thus be mined for their resources, for example timber or game, and substituted by more 'productive' land uses, such as agriculture and cattle farming.... At the state level, an iconic policy was the governmental programme [carried out by Amazonino Mendes] to give rural populations chainsaws at no cost, as a form of support to get rid of the persistent obstacle to development – the forest.

For the 1980s and much of the 1990s, the social agenda in Amazonas trumped the environmental both at the state and local level – and sometimes the two priorities clashed. For instance, while campaigning for governor in 1986, Amazonino Mendes announced that all rural residents of Amazonas should be given chainsaws,[13] and he proceeded to distribute 2000 chainsaws to voters on the campaign trail before the Brazilian Institute for Forestry Development

[12] He died in 2009.

[13] "To distribute chainsaws to destroyers of the forest is one thing. To give a chainsaw for a caboclo's survival is another. It's an act of dignity."

(IBDF) threatened to prosecute him. In 1987, Mendes took over from Mestrinho as Governor, and intensified the creation of *bairros populares* (popular housing) and the distribution of *cestas básicas* (basic necessities) to poor families to fight hunger. Mendes also promoted urban growth in Manaus, allowing the invasion of green areas of the city, and expropriated lands in favor of *posseiros* and *invasores* who went to work in the Tax Free Zone.

Nevertheless, Mendes embraced an environmental agenda when he needed to do so to win re-election. In 1989-90, fearing electoral repercussions from researchers and environmental activists, Mendes decreed the first six state conservation units (ibid., 100). Mendes did this partly to promote research in anticipation of founding the Universidade do Trópico Úmido, a state government project. But he also sought to fortify his government's development projects with an increasingly environmentally-concerned World Bank (Lima 1990, 15), and to prepare for the U.N. Earth Summit in 1992 and an Amazonian Cooperation Treaty summit meeting (Lima 1990). "So, for 'political reasons,' [Mendes] felt an obligation to 'do something.' He decided to create conservation units and, for that, he considered [approved] all of the existing proposals...." (Cristina Inoue interview with Márcio Ayres, cited in Inoue 2007, 174).

Though the six 1990 conservation units decreed by Mendes appear to be a progressive response to Amazonian deforestation, they included permissive APAs and were mostly placed in remote, pristine areas far from the expanding southern deforestation frontier: Serra do Araçá State Park and Morro dos Seis Lagos Biological Reserve near the border with Venezuela; APA Nhamundá along the Amazon river near the border with Pará; APA Presidente Figueiredo – Caverna do Maroaga, which protects caverns with ecotourism potential north of Manaus; and Mamirauá Ecological Station, which in 1996 would be converted to a less restrictive Sustainable Development Reserve. Morro do Seis Lagos Biological Reserve, meanwhile, has extensive deposits of niobium, a rare earth metal, and its existence and rules of use have been disputed. Moreover, the state government of Amazonas had hoped to offload management costs for these units onto NGOs (Lima 1990, 15). Today, Morro dos Seis Lagos and Serra do Araça have no council or management plan, and are ranked Low on management indices by the TCU (ISA 2014c, TCU 2013). Caverna do Maroaga, Mamirauá, and Nhamundá are all ranked medium. Of these, only Mamirauá – which is managed by an NGO and supported by the federal government – had both a council and management plan in place at the time of writing.

Political conflicts within the Mestrinho inner circle eventually led to the state's embrace of sustainable development in 2003. In 1990, Mestrinho and Mendes fell out with each other, and in 1992, Mendes displaced a Mestrinho ally as Mayor of Manaus (with Eduardo Braga as his Vice-Mayor). To differentiate himself from his former mentor, and in response to growing environmentalist pressures in the wake of the 1992 U.N. Earth Summit in Rio de Janeiro, Mendes introduced an environmentalist discourse and some policy actions to modernize his mandate. He created Mindu Municipal Park and a municipal Council of Development and the Environment (COMDEMA) in 1993. But while Mendes was beginning to embrace an environmental agenda in Manaus, Governor Mestrinho was taking a different approach to the state: From 1991 to 1992, Mestrinho promoted the paving of the BR-174 highway from Manaus to Boa Vista, Roraima, which would give Amazonas direct access to neighboring countries. He also sought agricultural modernization in the south to spur development. Diversification of the state's economy responded to threats to the ZFM from globalization and structural reforms in Brazil: From 1990 to 1992, during the Presidency of Fernando Collor, employment in the zone halved from 70,000 to 35,000 (Farias 2010, 99). Mestrinho's programs were attempts to offset the shrinking economy in the ZFM with growth in other sectors.

Elected Governor again in 1995, Mendes gradually greened his policies for the state. At first he continued Mestrinho's policy of agricultural development in the south, and sought to insert the state's population into agriculture and manufacturing. The program failed due to weak planning and a lack of resources (Villarroel 2012, 101). Mendes also attempted to cultivate a larger timber sector: In January, 1995, his administration sent representatives to Paragominas and other timber-producing municipalities in Pará to convince timber companies to move to Itacoatiara. In the face of criticism from environmentalists, Mendes tried to soften the potential environmental impact, telling interested timber companies that "the state offers incentives, but demands the preservation of the forest with sustainable management" ("Inferno..." 1995). That same year, he founded IPAAM (*Instituto de Proteção Ambiental do Amazonas*)[14] – the first state environmental agency – and his state participated in the PPG-7 Subprogram on Natural Resources Policy, supported by KfW (the German Development Bank), GTZ (German technical assistance provider), and the federal Secretariat of Coordination of Amazonia of the Ministry of the Environment. In 1997, Mendes enacted a coordinated environmental management program, the Integrated Management Project of Amazonas (*Projeto de Gestão Integrada do Amazonas*, PGAI-AM), to bring order to the state's territory, increase law enforcement and environmental monitoring, and produce knowledge to support environmental policy decentralization. This program fortified IPAAM, and began the process of institutionalizing environmental governance in the state. Finally, the Agriculture, Ranching, and Sustainable Forest Development Institute of Amazonas (*Instituto de Desenvolvimento Agropecuário e Florestal Sustentável do Amazonas*, IDAM), founded in 1996, provided technical assistance and rural extension in the state. However, according to informed observers, prior to 2003 environmental policy implementation in Amazonas "still did not have well established political and institutional spaces for the directing of specific agendas: creation of UCs, territorial ordering, [and] forestry management, among others. All of these policies, in one form or another, still had their management dispersed across the diverse Secretariats of the State and IPAAM" (Villarroel 2012, 108-109).

Despite the lack of focused political and institutional spaces for a conservation agenda in the 1990s, Governor Mendes did make some progress on conservation unit creation: From 1995 to 2002, Mendes established six new units, largely in areas surrounding Manaus: three APAs and two State Parks along the Negro River. He also approved the alteration of Mamirauá's category from Ecological Station to Sustainable Development Reserve in 1996, and approved the establishment of RDS Amanã, located between Mamirauá and Jaú National Park, in 1998. The APAs and State Parks sought to support the nascent ecotourism industry, centered in Manaus, while the RDS Amanã completed an ecological corridor starting in the Lower Negro River and Solimões region, which stretched from Amanã and Mamirauá to the west to Jaú National Park to the east, and protected an immense floodplain system of waterways and lakes (Cavalcanti 1998, 86). Though residents of Amanã – who numbered 2,000 in 1998 – were permitted to stay, the low population density in the UC, the absence of competing interests in the use of the floodplain, and the advocacy of Márcio Ayres and domestic and international allies made the decree a relatively easy choice for Mendes. While Mendes' creation of conservation units in 1990 and 1995-98 expressed a moderate commitment to environmental conservation, however, both state and federal units in Amazonas lacked management. As Viana (2010, 15) states, "Until 2003... with the exception of part of Mamirauá Reserve, practically all protected areas fitted the category of 'paper

[14] Lei Estadual No. 2,367/95.

parks', that is, existing legally on paper but with little active protection on the ground. None of these even had a manager."

That same year, 1998, witnessed a break between Mendes and his protégé, Eduardo Braga, that over time led Braga to embrace a socio-environmentalist agenda: Mendes accused Braga, then Mayor of Manaus, of corruption. The accusation prompted Braga to break with Mendes and contest the next gubernatorial election. Mendes prevailed, despite losing Manaus to Braga. After the defeat, Braga realized that he needed to differentiate himself from his erstwhile mentor, and he embraced a more leftist discourse, incorporating both social and environmental issues into his platform (Villarroel 2012, 104). As he shifted his discourse, Braga also used his time out of office from 1999 to 2002 to fortify his ties with the with the business communities in Amazonas and nationwide. In 2000 Braga affiliated himself with the PPS party and ran for Mayor of Manaus again, losing by 1%. That election was significant because two opposing candidates, Serafim Corrêa and Marcus Barros, had promoted a "Water March" to protest the lack of water and sanitation in Manaus, which placed environmental issues on the local political agenda. From 2000 to 2002, Braga networked in Brasília, trying to secure federal resources for development and political allies in Amazonas. Finally, in 2002, Braga made peace with Mendes, and began to campaign for governor.[15]

From 1989 to 2002, Amazonas' political elites gradually evolved from an anti-environmentalist rhetoric captured by Amazonino Mendes' "Chainsaw Populism," to the beginnings of green rhetoric and institution-building. A shifting national agenda for the Amazon over the course of the 1990s, and political conflicts within the elite circle established by Gilberto Mestrinho facilitated rhetorical and political changes in favor of sustainable development. These changes set the stage for Eduardo Braga's ambitious sustainable development program, the Green Tax Free Zone of Manaus. Using this program, Braga oversaw a rapid expansion of the state conservation unit system (among other initiatives) from 2003 to 2010.

Green Tax Free Zone of Manaus and Rapid State Conservation Unit Creation, 2003-2010

The period beginning in 2003 and ending in 2010 represented a sea change in environmental politics in Amazonas. This period covers Governor Eduardo Braga's two administrations (2003-6, 2007-10), and saw the implementation of the Green Tax Free Zone of Manaus (*Zona Franca Verde,* ZFV), the sustainable development program that was Braga's flagship program. Under the umbrella of the ZFV, Braga and his Environmental Secretary, Virgílio Viana, rapidly expanded the state's system of conservation units and institutionalized environmental management in the state by creating the Secretariat of Sustainable Development and the State Center for Conservation Units. Key informants in Amazonas in 2012 characterized this period as a "dream" period, or golden era, that came to an end after Braga stepped down as Governor, and Omar Aziz was inaugurated with a platform emphasizing security, education, and mining.

To differentiate himself from his predecessors (Mendes and Mestrinho) in 2003, Governor Braga embraced socio-environmentalism and brought in a university professor, Virgílio Viana, to outline his government's platform. At the time, the Manaus Tax Free Zone (ZFM) was set to expire in 2013, which would threaten Amazonas' manufacturing-oriented economy. Braga and Viana saw an opportunity: Viana had long argued that the best way to save the Amazon rainforest was to

[15] Amazonino Mendes did not retire at this point. Instead he ran for Mayor of Manaus and lost to Serafim Corrêa. He then ran for Governor against Braga in 2006 and lost.

make the trees more valuable standing than cut, which in turn would involve changing people's perceptions of the trade-offs between development and conservation (Viana 2007, Viana 2010). At the same time, the incoming Governor would need to craft a compelling case for the extension of the ZFM's life, to preserve Amazonas' viability as a manufacturing center. Adding to the challenge – and to the opportunity – was the fact that the ZFM had become less competitive in the 1990s, and so there was political space to make changes to the model and diversify the state's economy. The result was the Green Tax Free Zone of Manaus (ZFV), a program to revitalize the ZFM with a new statewide socio-environmental agenda.

ZFV became Braga's flagship program during both of his administrations (2003-06, 2007-10). On the environmental side, Viana sought to make the trees more valuable standing than cut, and did so by investing in forestry and fisheries, and by establishing a more comprehensive state system of environmental governance under the umbrella of the Secretariat of Sustainable Development (SDS), created in 2003 and institutionalized in 2008. Braga and Viana also crafted a message that would appeal to the people of Amazonas, by linking forest preservation explicitly to the Manaus Tax Free Zone by name:

> For the majority of people in Amazonas, the phrase "tax free zone" has come to mean economic development and jobs (in the Manaus industrial complex). "Green" is associated with natural resources: forests, rivers and lakes. "Green Tax Free Zone" thus means, in simple terms, economic development and job creation on the basis of natural ecosystem management and protection. Communication of this simple message was an essential component of our strategy to gain political support for policy change. (Viana 2010, 23)

The ZFV program promoted sustainable development across sectors in the state, including forestry and fisheries value chains, and beginning in 2005 included "a tax-free policy for all non-timber forest products of Amazonas" (ibid.). In the first years of the program, state representatives held public hearings with stakeholders throughout the state to map economic activities and identify bottlenecks in supply chains. The state began to promote land tenure legalization to ensure that rural residents could benefit from programs aimed to pay them to keep the trees standing on their lands; change laws to legalize sustainable approaches to forestry and fisheries; provide credit for sustainable forestry and fisheries management through the Amazonas State Agency for Economic Development (AFEAM); promote research on sustainable activities; provide technical assistance for sustainable forestry and fisheries management and value chains; reduce or eliminate taxes on non-timber forest products; make public procurement sustainable; provide access to markets to producers of forest and fisheries goods; implement health and education programs in the countryside; expand the state's network of conservation units; and finally, in 2007, enact an innovative system of payments-for-environmental-services, the *Bolsa Floresta* Program (Viana 2010, 29-30).

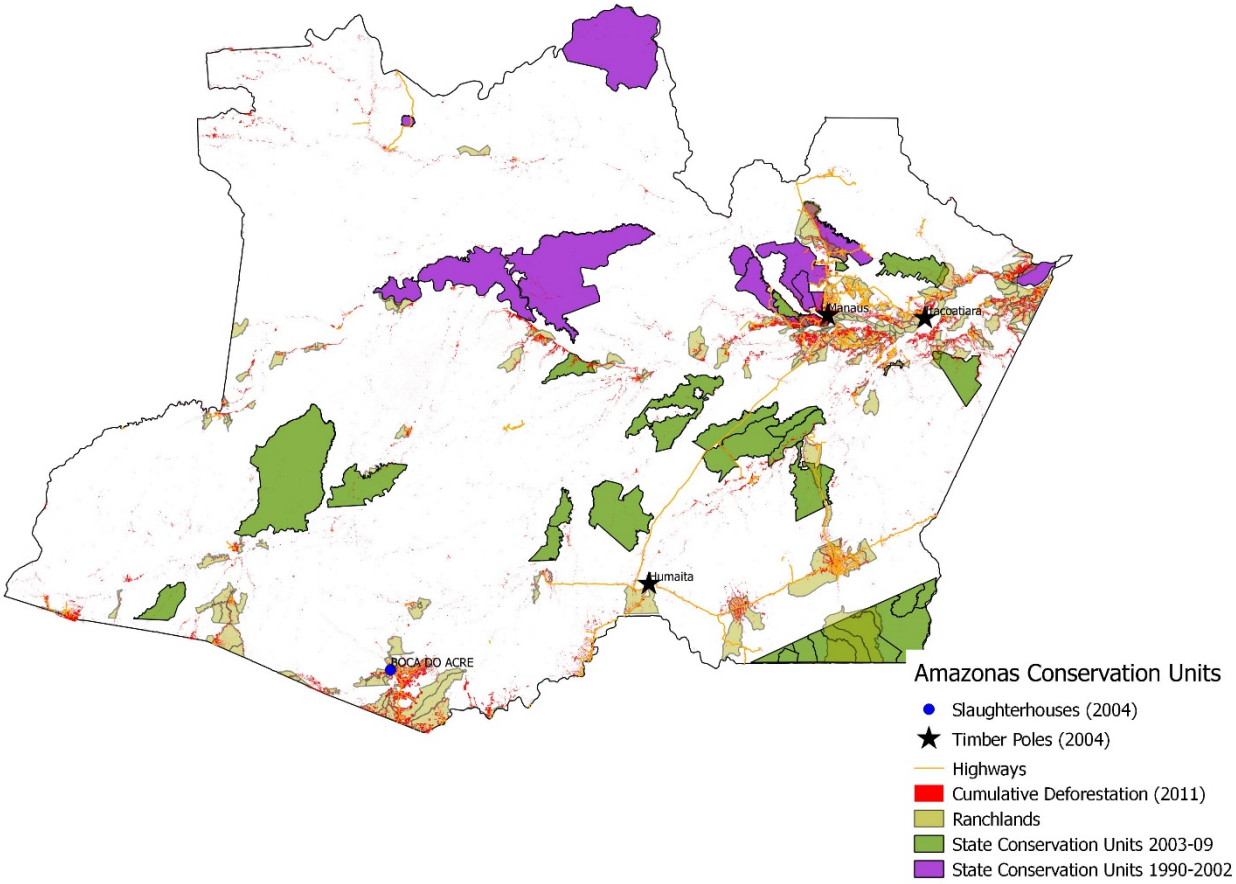
Conservation Unit Creation under ZFV

While prior monographs have evaluated the various components of the ZFV (see, for example, CEPAL, Governo do Amazonas, and GTZ 2007; and Viana 2010), this section will focus on the program's conservation unit creation initiatives and the institutional development that accompanied them. It will then examine the processes of creating conservation units in specific regions of the state: First, the Apuí Mosaic, comprising nine units on the southeastern frontier of Amazonas with Pará and Mato Grosso, which replaced a federal proposal for an extensive National Park in the area. Establishing the mosaic enabled the state to maintain much of the region of Apuí open to natural resource extraction by loggers and ranchers, and represents the only significant

moment of (muted) conflict between the state and federal plans on conservation unit policy in the 2003-10 period. Second, the collection of conservation units established along the BR-319 highway, which runs southwest from Manaus to Humaitá, and then to Porto Velho, Rondônia, illustrates a cooperative approach to conservation between the federal and state tiers of government in Amazonas (CEPAL, Governo do Amazonas, and GTZ 2007, 91; Viana 2010). The BR-319 experience contrasts sharply with the federal initiative in the BR-163 region of Pará, which involved little participation by the state government of Pará. Partisan alignment between the federal and state governments during the period help explain cooperation. An ideological paradigm of promoting economic growth by finding ways to help poor, rural residents earn money sustainably combined with a relative absence of land intensive industries in the Amazonense countryside, explain the assertiveness with which the state of Amazonas established new conservation units in the 2003-10 period.

Map 4.4, below, shows the distribution of state conservation units created in 2003-09, the period of greatest activity. During this time, the state government established 30 new conservation units, including eight State Forests, four State Parks, fourteen Sustainable Development Reserves, and four Extractive Reserves. As was true in the 1990-2002 period, the number and area are heavily weighted toward sustainable use, or more permissive types of conservation units – a finding consistent with the expressed ideological preference of Braga and Viana to reconcile rural development with conservation. However, the character of the permissive units differs across time periods: While Mendes, in the 1990s, created several APAs, Braga created a large number of Sustainable Development Reserves and State Forests. These latter two types of units are more restrictive than APAs, and so represent a stronger commitment to conservation than Mendes' APAs do. Nevertheless, the federal government's balance of sustainable use versus strict protection units remained more stringent than the state's throughout this period.

Map 4.4. Amazonas State Conservation Units, 2010



Sources: IMAZON (2004), INPE (2014), MMA (2012).

BR-319: Federal and State Governments Cooperate to Protect Forests Along a Highway

I begin the evaluation of Amazonas' state conservation unit creation efforts with the BR-319 highway. BR-319 runs southwest from Manaus in Central Amazonas to Porto Velho, Rondônia. Deforestation models run by the state government in the 2000s showed that, once paved, the highway would become one of the principal vectors of deforestation in the next decades (Soares-Filho et al. 2006), and the federal and state governments worked in tandem from 2006 to 2010 to offset increased deforestation from the paving plan with actions to protect the forest along the road, including the creation of new conservation units.

In 2005, President Lula inserted plans for revitalization (reconstruction and paving) into his Growth Acceleration Plan (*Plano de Aceleração do Crescimento*), and on 2 January 2006, he issued a decree provisionally limiting development along the highway (ALAP 319, or Area of Provisional Administrative Limitation 319, covering 15,393,453 hectares, excluding Indigenous Lands and existing conservation units) for seven months to develop both the paving and sustainable development plans. The decision to reconstruct and pave the highway, taken in 2007, "led to an intense political debate" (Viana 2010, 20).[16]

[16] The power to decree ALAPs is established in Article 22-A of SNUC.

> Environmentalists and researchers pointed to the threats of deforestation and its social impacts, while political leaders argued in favour of its potential economic benefits... The choice became a hot political issue and the federal environmental agency (IBAMA) had not issued an environmental license for the road as of February 2010. (Viana 2010, 20)

During this time, the state of Amazonas and federal ministries formed a group to design a sustainable development plan, including several conservation unit proposals along the length of the highway. This group's goals were supported legally by the state of Amazonas' Macro-ZEE, which delimited lands adjacent to BR-319 for "special uses," including protected areas, and "controlled uses," comprising ecologically fragile areas to be managed sustainably, but not demarcated as conservation units. The group's proposal for the ALAP included the creation or expansion of 9,414,486 hectares of conservation units, 29% of which would be in strict protection units (and the rest in sustainable use).

In October 2008, Minister of the Environment Carlos Minc reinforced development restrictions along the BR-319. He "suspend[ed] for two months the [environmental] licensing to pave the BR-319, arguing that he feared that the [forest] destruction along the highway would be similar to that registered in the BR-163 [in Pará], where forest clearing increased 500% after the announcement of its paving, five years ago" ("Campos Amazônicos..." 2008). On 14 November, Minister of Transport Alfredo Nascimento "guaranteed that the work would be complete by 2011, thanks to the 'agility' of Minc" (ibid.).

From 2005 to 2009, the federal and state governments created twelve conservation units along the length of BR-319, including three strict protection units (Matupiri State Park, Nascentes do Lago Jari National Park, and Mapinguari National Park), four Extractive Reserves (Canutama by the state, and Capanã Grande, Ituxi, and Médio Purus by the federal government), two state Sustainable Development Reserves (Rio Amapá and Igapó-Açu), and three Forests (Tapauá State Forest, and Balata-Tufari and Iquiri National Forests).

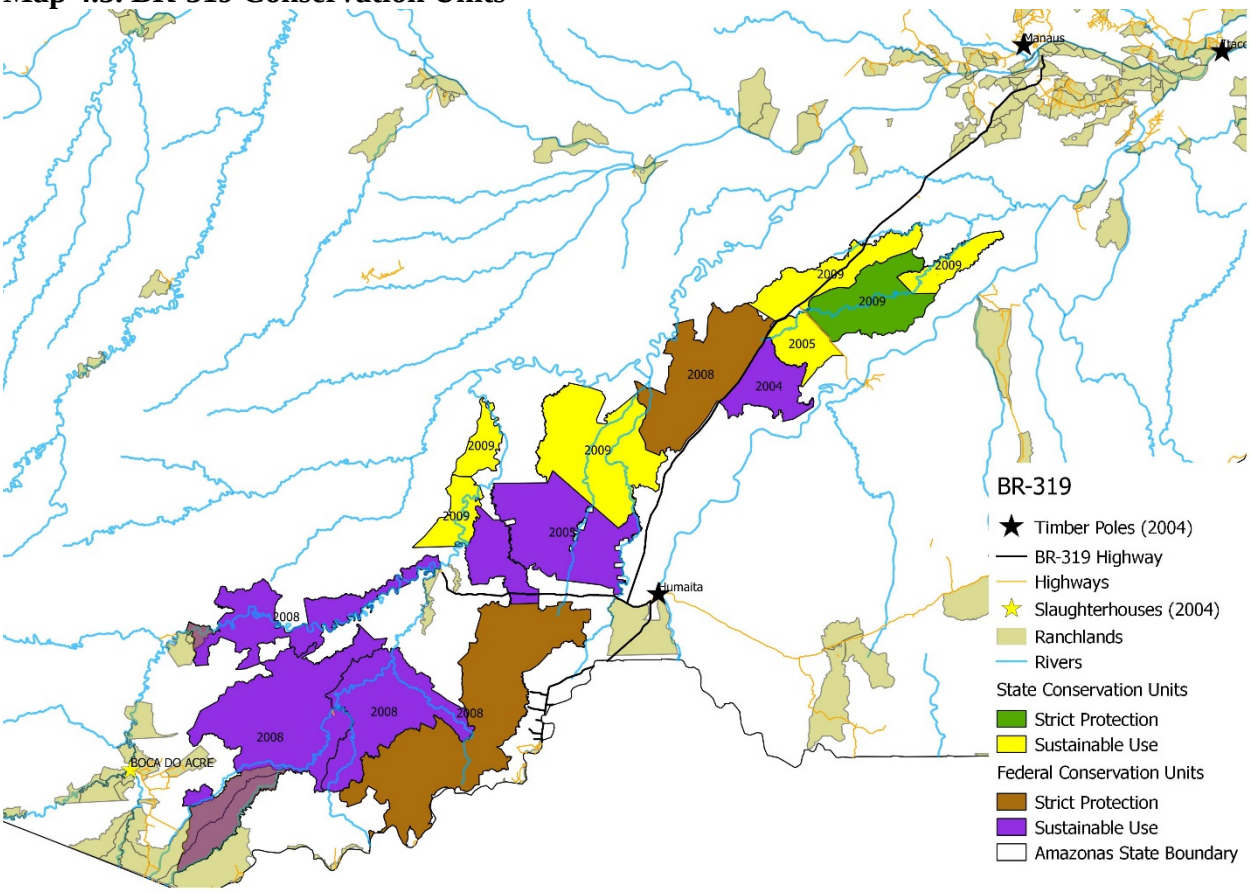
The federal and state governments of Amazonas worked in tandem to design the BR-319 sustainable development plan. In 2007 and 2008, the state took the lead in completing an Ecological-Economic Zoning of the municipalities influenced by the BR-319 (Canutama, Humaitá, Manicoré, Novo Aripuanã, Apuí, and Borba) and began designing seven conservation units for the region (PES Matupiri, RDS Canutama and Igapó-Açu and Matupiri, FES Canutama and Tapauã and Beruri). In 2008, ICMBio hosted a series of meetings in Manaus to develop the federal and state conservation unit creation and implementation plan. At this time, seven state units were already in the process of creation, and the Ministry of the Environment gave the state until the end of November, 2008, to create all seven (ICMBio 2008b). (Six of the seven were decreed on 30 March 2009.)

The federal government initially moved slowly, dragging its feet in the process of creating the Mapinguari and Lago Jari National Parks, as well as four planned Extractive Reserves. This led state politicians to complain that the Lula administration was against the state's environmental agenda ("Estado vai de encontro...," 2007). State pressure induced the federal government to decree five federal units along the highway between May and June 2008: Nascentes do Lago Jari and Mapinguari National Parks, Ituxi and Médio Purus Extractive Reserves, and Iquiri National Forest.

Key to the success of the BR-319 conservation unit mosaic (pictured in the map below) was ongoing cooperation and planning between environmental agencies of the federal and state governments involved, as well as the participation in the planning of National Department of Infrastructure and Transort (*Departamento Nacional de Infraestrutura e Trasnportes*, DNIT), an agency of the Ministry of Transport, which was tasked with paving the highway. ICMBio, the

Government of Amazonas, and the Government of Rondônia signed several cooperation agreements (*Termos de Cooperação*) to secure funds for conservation unit creation and management (Soavinski 2009). On 12 December 2009, the Amazonas state SDS signed an agreement (*convênio*) with DNIT to implement the Amazonas State Conservation Unit Program in the Area of Influence of the BR-319 (*Programa das Unidades de Conservação Estaduais do Amazonas na Área de Influência da BR-319*).

Map 4.5. BR-319 Conservation Units



Sources: IBGE (2006), IMAZON (2004), MMA (2012).

Map 4.5, above, shows the federal and state conservation units created along the BR-319 highway in Amazonas from 2005 to 2009. While both state and federal governments observed increases in destructive land speculation along the highway after President Lula's 2005 announcement that the highway was to be paved, there were few significant existing ecologically destructive economic pressures along the highway compared to the BR-163 in Pará, so conservation unit creation along the highway was relatively peaceful and straightforward for both the federal and state governments compared to the conflicts in Pará. Nevertheless, the federal government established a firmer barrier along stretches of the highway, with the Nascentes do Lago Jari (2008) National Park in the north and the Mapinguari National Park to the south, along the state border with Rondônia.

Apuí, 2004-2005: Federal and State UC Preferences Diverge on the Same Land

The creation of a mosaic of conservation units in the municipality of Apuí represents a second instance of cooperation between the state of Amazonas and the federal government. The debate over what categories of conservation units should protect the forests of Apuí, however, show divergent interests between the federal and state governments. The conservation units proposed in 2002-2004 were meant to protect a largely uninhabited area in the southeastern corner of the state. Timber and cattle ranching exist in the Apuí region, but at the state level they are small (compared to their counterparts in Pará) and politically weak. Given the weakness of land intensive interests in the state, my framework produces the average expectation that the state government would prefer to enact a *moderately permissive* conservation unit – to support local livelihoods while also protecting the forest – while the federal government would prefer to enact a *strict* conservation unit in the area. These expectations are summarized for the case of Apuí in Table 4.1, below.

Table 4.1. Expected Conservation Unit Outcomes in Apuí, Amazonas

		Land Intensive Industry	
		Dominant	Weak APUÍ, AMAZONAS
Tier of Government	Federal	**2. Moderately Strict**	**1. Strict**
	State	**4. Permissive**	**3. Moderately Permissive**

The outcomes for the Apuí region of Amazonas are indeed consistent with my average expected outcomes as summarized in Table 4.1, above. In this case, federal government acted first to protect Amazonas' southern frontier from land grabbers by proposing a major National Park, and the state responded with a proposal for a mosaic of both sustainable use and strict protection conservation units. In the end, the federal and state governments reached an agreement that satisfied both parties – but left some lands open to continued exploitation and degradation.

The Apuí Mosaic occupies the municipalities of Apuí and Manicoré, in a region along Amazonas' southern frontier with Mato Grosso that is immense and sparsely populated. Populations in these municipalities harvest timber and graze cattle, but do not currently contribute significantly to the expanding deforestation frontier. Residents of Apuí are largely migrants from other regions of Brazil, including the South and Northeast, who arrived at the end of the 1970s. Apuí is a relatively new municipality, created in 1987, and has 18,000 inhabitants, with only a few paved roads, houses mostly made of wood, and ranchers and farmers who occupy the land illegally. Manicoré, in contrast, is older, founded 135 years ago, and has 40,000 people. The economy depends on ranching and watermelons, and the residents are native Amazonenses, who see Southerners and Northeasterners as invaders. Ranching is expanding in Apuí, though it remains small in comparison to other southern Amazonian municipalities, and the land is poor for extensive agriculture (Governo do Estado do Amazonas 2010, 122). Apuí produces manioc, coffee, corn, and rice (ibid., 127) and possesses resources for timber companies, which log 345 hectares per year (ibid., 125).

In the 2000s, land grabbers began to move into the region from Mato Grosso to the south and Rondônia to the west, threatening smallholders and forests in the peripheral areas of Apuí and Manicoré. According to then Director of Special Projects for the SDS, Rita Mesquita, people arriving in the forested regions of Apuí and Manicoré from Rondônia and Mato Grosso were better organized and armed than older residents, and were investing R$2-3 million to grab land by force. In 2004, IMAZON satellite image analyses showed that 8% of the area around the Apuí "triangle" was already occupied, and 30% of the images showed fires, indicating forest clearing. Near the Rondônia and Mato Grosso border, the satellite images indicated that there were 5,735 km of clandestine highways penetrating the forest, the majority of which served loggers and ranchers (Brito 2004).

In response to illegal encroachments, in 2002 the federal Ministry of the Environment proposed the creation of a single, large strict protection conservation unit: the 3 million hectare Juruena National Park. This park would provide a blanket of prohibition on natural resource exploitation in the Apuí region. Soon afterward, the federal government put Juruena on hold, but renewed the proposal in November 2004. However, by 2004 the state government of Amazonas had already begun to design a state mosaic with the majority of its lands contained in sustainable use units. A brief clash ensued, in which Viana argued that the federal government did not have sound socio-environmental studies on which to base the creation of a 3 million hectare park. Minister of the Environment Marina Silva soon relented, and ceded part of Juruena's area to the state. Soon afterward, with the murder of Dorothy Stang in February 2005 diverting federal attention to problems in Pará, Amazonas established the state Apuí Mosaic, to reconcile continuing economic activities in the region with conservation using a combination of strict and moderately permissive conservation units.

The state government of Amazonas used planning and the building of local support to bolster its argument against the Juruena National Park, and in favor of its proposed mosaic. In 2004, the state of Amazonas completed its Ecological-Economic Zoning (ZEE) of the southern municipalities of Humaitá, Apuí, and Manicoré; and established a working group for Apuí. October 2004, Secretary of Sustainable Development of Amazonas Viana brought a draft Apuí reserve proposal to his working group, which included his staff and representatives from the Worldwide Fund for Nature (WWF), Conservation International, the Amazonas Land Institute (*Instituto de Terras de Amazonas*, ITEAM), and the Ministry of the Environment. While Viana and the Amazonas state government, consistent with his and Braga's socio-environmental ideology, strongly preferred protecting the state's forests with sustainable use conservation units, the NGO representatives argued that the relative balance of strict and permissive units should lean more heavily toward strict. Claudio Maretti, the WWF representative, found Viana's proposal "timid," and Enrico Bernardi of Conservation International insisted on increasing the size of one of the proposed state parks. Viana defended his proposal, arguing that in his experience extensive strict protection units engender enormous resistance where human occupation already exists. For Viana, "Our proposal is digestible (*pautável*) to all of the interests involved" – including local residents, who graze cattle and harvest timber in Apuí and Manicoré. Viana "guarantee[d] that economic, environmental, and social interests were reconciled and incorporated..." In the end, Viana did increase the size of one of the State Parks, but he also heeded suggestions arising from public hearings with residents of Apuí and Manicoré by including Guariba and Aripuanã Sustainable Development Reserves (Guariba was, in the end, created as a state Extractive Reserve in December 2004) (Brito 2004). Of nine conservation units in the Apuí Mosaic, only two are strict

protection: Sucunduri and Guariba State Parks. Of these, Guariba overlaps with a portion of the original proposed area of Juruena National Park.

In public hearings in Apuí and Manicoré in 2004, Viana secured local support for the mosaic not by selling its environmental virtues, but by arguing that the mosaic would help to secure property rights and prevent violent incursions by land grabbers from neighboring states. In Manicoré, nativist sentiment prevailed:

> If the parks, the state forest, and the reserves help to push [land grabbers] away, better. That is the origin of the popular support for the idea of the conservation units in the south of the state. "This helps to keep our lands in the hands of Amazonense *caboclos*," says a logger who does forestry management in the region. Even with a distant threat, the sensation that conservation units help to organize land possession and property is evident... [In the Manicoré public hearing,] Viana and his team received, like in Apuí, a proposal to restrict even more the access to forest resources [to outsiders]. Those present recommended the creation of a third Sustainable Development Reserve, in the extreme west, close to the Guariba Park. They also had to debate the implantation of Extractive Reserves on federal government lands in the municipality, to help legalize their landholdings. (Brito 2004)

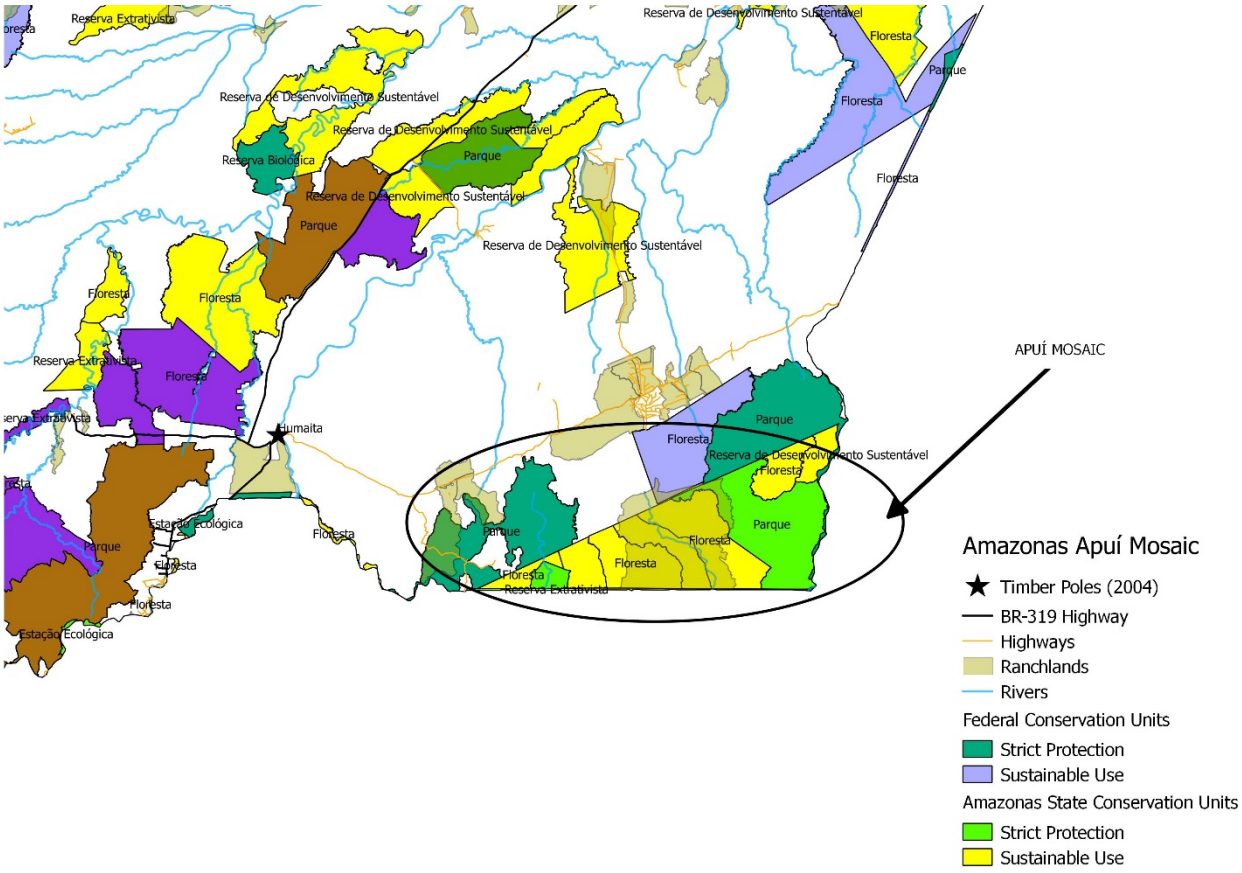
The Apuí Mosaic, like BR-319, illustrates a more cooperative relationship between the state and federal governments than the process of establishing the BR-163 and Terra do Meio mosaics in Pará do. Even with remote lands, however, the state of Amazonas, driven by Viana's socio-environmental ideology of reconciling conservation with economic growth, strongly favored continuing to permit local residents of Apuí and Manicoré to access natural resources. The state's position stood in contrast to the federal government's earlier proposal for a colossal National Park.

The state opted for sustainable use units in the Apuí Mosaic despite the fact that "currently, no communities or traditional populations exist in the interior of the Apuí Mosaic conservation units" (*Plano de Gestão...*, p. 129). The only identified residents inside the mosaic were *garimpeiros* (independent gold miners) and hired hands working for illegal land grabbers – though some small local communities do extract latex or copaíba oil, and collect nuts, from the Guariba Extractive Reserve, Aripuanã and Bararati Sustainable Development Reserves, and the Apuí State Forest (p. 129). Of the mosaic's 3,070,058 hectares, only 35% (1,078,337.33 hectares) are in strict protection units. Here, the state of Amazonas heeded the demands not only of local extractivist populations, but also of residents engaged in timber and ranching who did not want permanent restrictions imposed on their local supplies of timber and potential grazing lands.[17]

In sum, while the federal government had proposed a large strict protection conservation unit for the Apuí region, which would have imposed restrictions on resource use over an almost uninhabited area of southern Amazonas, the state government's counterproposal established a mosaic of sustainable use and strict protection conservation units, to preserve local access to natural resources. Map 4.6, below, shows the location of the Apuí Mosaic in southern Amazonas.

[17] In addition to being heavily sustainable use, the state Apuí Mosaic benefits from being buffered on all sides by federal conservation units and indigenous lands, and state conservation units in Mato Grosso. After the federal government finally decreed Juruena in 2006, in the area surrounding the Apuí Mosaic to the north, south, and east, the Apuí Mosaic found itself completely buffered from encroaching land grabbers by the Guariba Roosevelt Extractive Reserve, Rio Madeirinha and Rio Roosevelt Ecological Stations, and Tucumã and Igarapés do Juruena State Parks in Mato Grosso; and the federal Jatuarana National Forest, Campos Amazônicos National Park, and Juruena National Park in Amazonas.

Map 4.6. Apuí Mosaic, Amazonas



Sources: IBGE (2006), INPE (2014), MMA (2012).

Conclusion: 2005-12

The state of Amazonas continued to create conservation units rapidly through 2008, but creation slowed afterward and the state Center for Conservation Units (*Centro Estadual de Unidades de Conservação*, CEUC), a department of SDS, began to focus on implementation thereafter. In 2007, Amazonas enacted the State System of Conservation Units (SEUC), which consolidated its nascent institutions in the CEUC, a department of the SDS. As the state system of conservation units expanded, the state's actions began to serve as regional and national models, garnering Braga and Viana publicity in national and international conferences (Author interview with Caê Marinelli, ex-CEUC, 2012), and earning Braga the nickname of "Carbon Neutral Governor" (Author interview with Wilde Itaborahy, ex-CEUC, 2012). In 2008, Virgílio Viana departed SDS to found a public-private sustainable development foundation, the Sustainable Amazonas Foundation (*Fundação Amazonas Sustentável*, FAS). Today, the FAS solicits donations from international sources and spends them on projects in state conservation units. The FAS also manages the distribution of *Bolsa Floresta* payments to families residing on state conservation units.

In 2010, Braga resigned as Governor and was elected a federal Senator. His Vice-Governor, Omar Aziz, was elected Governor, and under Aziz education and public security became policy priorities, as did mining and rural development. Aziz's tenure was characterized by the creation of no new conservation units in Amazonas, and by the conversion of one significant unit, the Nhamundá State Park, into an APA – implying a considerable loosening of human occupation and development restrictions in the area. According to a key informant who worked for CEUC under Braga, "[Nhamundá] in fact was meant to be turned into a mosaic of conservation units, with the preserved area continuing to be a park, and the deforested area becoming an APA. This was approved by all the communities after public consultations. But behind the scenes ranching advocated for a complete transformation, and [the state] transformed *all* of it into an APA, and none of the other proposed conservation units were created. Even the *Espelho da Lua* [an important scenic area in Nhamundá] became an APA, because there were mining interests. In June (2011), the APA was created, and in July there was a mining proposal in the APA" (Author interview with Wilde Itaborahy, ex-CEUC, 2012). The "golden period" of sustainable development was over, and a period of piecemeal implementation of state conservation units had begun.

Implementation in Amazonas

During the 2003-10 "golden period" of sustainable development in Amazonas, both state and federal governments put greater effort into expanding the network of protection along the BR-319 highway, on the frontier with Mato Grosso, and in the northern and western interior of Amazonas than in implementing governance institutions on the existing conservation units in the state. But to the degree that each tier of government did focus on implementation, the federal government started earlier, and made faster progress, than the state government did. This section traces federal and state implementation of conservation units in Amazonas.

While by 2002 only one federal conservation unit had a participatory management council (Amazônia National Park, bulk of which is located in Pará) and five had approved management plans (Amazônia, Jaú, and Anavilhanas National Parks; Uatumã Biological Reserve, and Juamí-Japurá Ecological Station), by 2013 the federal government had established councils on 26 units and published management plans for 24 units in Amazonas. The state of Amazonas, meanwhile, made slightly slower progress, as its efforts were more heavily focused on conservation unit creation. The state established its first two management councils in 2007 (on Sumaúma State Park and Rio Amapá Sustainable Development Reserve), and added 4 more in 2008, and 5 more each in 2009 and 2010, for a total of 16. With respect to management plans, the state of Amazonas approved the first in 1998, for Mamirauá Sustainable Development Reserve (a reserve managed by the NGO Instituto Mamirauá in agreement with the federal Ministry of Science and Technology – rather than by state institutions). The next management plan was approved in 2008, and by 2014 Amazonas had approved 17 plans (41% of the state system total).

State Capacity Development for Implementation of Conservation Units

State capacity and institutional priorities explain these differing trajectories of conservation unit implementation in Amazonas: The federal government had greater institutional capacity overall, as IBAMA had been established in 1989 and had representation in Manaus throughout the 1990s. From its inception in 1992, the Ministry of the Environment (MMA) had prioritized conservation in the Amazon over other regions of the country, and as Secretary of the Amazon for the MMA, Mary Allegretti had worked for sustainable development and the expansion of

Extractive Reserves from 1999 to 2002. When ICMBio was created in 2007, it was severed from IBAMA, so the Chico Mendes Institute's directors did not have to design the new agency from scratch. Finally, ICMBio designed its Regional Coordination (*Coordenações Regionais*, or CR) jurisdictions to cross state lines in order to minimize state and local political influence over the institute's actions. In Amazonas, federal units are coordinated by three CRs: CR-1, based in Porto Velho, Rondônia (which covers Rondônia, Acre, northwestern Mato Grosso, and southern Amazonas), CR-2, based in Manaus (which covers Central and Northern Amazonas, as well as Roraima and a small piece of the Calha Norte in Pará), and CR-3, based initially in Itaituba (and since 2012, in Santarém), Pará (which coordinates management on conservation units in northern and western Pará, as well as northern Mato Grosso).

In contrast to steady federal capacity-building through the 1990s and 2000s, but consistent with patterns observed in other states, Amazonas possessed only a relatively weak environmental enforcement agency in the 1990s, IPAAM. The state also had little technical expertise to establish and manage conservation units through 2002. This changed only in 2003, when state Secretary Viana established the SDS.

State Conservation Unit Implementation begins in earnest in 2007, and stalls in 2010

During Braga's first term, most conservation unit effort focused on creation, and Viana and Secretary of Special Projects Rita Mesquita began building the institutional foundations of conservation in the state. The story is best told from the perspective of those who participated, and what follows are excerpts from my interviews with two former employees of the state Secretariat of the Environment and Sustainable Development (SDS).

According to biologist Carlos Eduardo ("Caê") Marinelli, who worked for the state from 2004 to 2008,

> Virgílio resolved to set up a special team [to establish conservation units]... and called Professor Rita Mesquita, of INPA [Instituto Nacional de Pesquisa da Amazônia] to coordinate what at that time began to be called the Secretariat of Special Projects. It had that name in order to embrace a series of strategic issues in regards to environmental questions within the Secretariat, principally those involving conservation... Rita, as an experienced person who did not until then have that type of experience in governmental posts, management agencies, etc., but who was very experienced as a director and coordinator of more academic things, accepted the position. From then on begins a history that lasted 8 years, and that was very successful and serves as a model not only for the Amazon, but also for Brazil, in relation to environmental policy and management – creation first, and management of protected areas. Anyway, Rita began to work knowing of the state governments financial limitations, and she began to pursue projects, and three big projects cam to aid [the Secretariat's] activities – WWF, CI, and a Moore Foundation Project, in addition to the Ecological Corridors Project. (Author interview with Caê Marinelli, 2012)

With broad funding from the Moore Foundation, and more targeted financial support from WWF and Conservation International, Mesquita began to set up her team:

> [Rita] needed to set up a team, so during 2004, with the projects occurring and approved, she began to set up a team... from 2004 to 2007, the principal focus of SEAP was the creation of protected areas, so you needed a team that was strong in carrying out diagnostics and creation reports, and she created a team with this profile. When I arrived in the Secretariat, another 3 people were already there – one who worked with Remote Sensing..., a person who worked with terrestrial vertebrates, and I... who had experience with fish but

> also... with other groups, like *botos*, jacarés, turtles, etc. Starting in 2006, I began to coordinate expeditions [to the interior to propose conservation units]. Parallel to that the team began growing, so that in 2007, when it ceased to be SEAP and became SEAGA, the Executive Adjunct Secretariat of Environmental Management, the space that Rita had created had begun to be responsible for other things – zoning of the state, and in that era the team had some 30 people, in that interval. I think so, perhaps there were 35... in addition to those contracted for temporary work, the expeditions that I organized were expeditions with a minimum of 8 and a maximum of 20 researchers, plus all the support team, on large expeditions – I ended up organizing expeditions of up to 80 people, half traveling by river boat, the other half in helicopter. (Ibid.)

Conservation unit creation was rapid during this period. According to another former CEUC employee, Wilde Itaborahy,

> Our work in 2005 and 2006 was to go to the countryside. We had a strong, multidisciplinary team, with forestry engineers, biologists, geologists, and we did big studies to create conservation units – one on one day, another the following day. We held public hearings, we flew in planes up the Madeira, Juruá, and Purús [rivers], etc., and one week we held six public hearings. It worked like this: We would travel to the Madeira River, for example... we proposed a conservation unit, a team did a survey of how the communities used resources; we held a meeting in each community, 15 days holding meetings, explaining what a conservation unit was, the commitments, benefits and restrictions, etc. We organized the meetings, held talks, conversed, presented legislation. Then we all asked the communities what areas they used, and how. All the methodology was done in the research process, and we divided the work between us. We had a large boat with a support team, sometimes 10 people, sometimes 5, each one studying something different. All within the state government. All the researchers were state employees – the state government had 5 people – me, Caê [Marinelli], Fafá – who is currently the Manager of the Unini Extractive Reserve, in the Lower Negro River. (Author interview with Wilde Itaborahy, 2012)

The Palo Alto, CA-based Moore Foundation provided the bulk of funding for these expeditions and conservation unit creation in the state, and very little came from the state of Amazonas itself. As the Moore Project moved into its second phase in 2007-2008, the Special Projects team increased:

> With Phase II of the Moore Project, the CEUC [State Center for Conservation Units] got financing and its team continued to grow, such that in 2008, when I left CEUC and came to ISA [Instituto Socio-Ambiental], there were already 50-60 people, and from then on, [the CEUC] gained musculature, the team grew to 90 when I left in 2008... you already started having structured teams in the conservation units, the UCs had bases, minimal infrastructure, a car, a boat, a motor for traveling in the units, and at this point the creation part began diminishing, and the implementation part began strengthening, and you already had almost three years of Management Plans being constructed.... Starting in 2008, [CEUC was] structured with three teams, with principal support from the Moore Project, strategic support from WWF for some UCS – more regional for the WWF – and a team of more or less 90 people, and with respect to human resources, you had CEUC structured into 4 departments, and counting the people in the countryside [in the UCs], the human resource structure summed to 90 people. (Author interview with Caê Marinelli, 2012)

By 2007-8, however, conservation unit creation began to slow, and implementation gradually took priority:

> In 2006 and 2007, creation continued to be important, but it began to lose a bit of force, because by then the quantity of UCs had increased 7 times in area, and [CEUC] worked on implementation policies for these areas. This occurred on two, three principal fronts: The structuring of management UC management councils... [and] elaboration of management plans. I coordinated some of those. And, the implementation of systems for monitoring and gathering information about the ongoing activities in these UCs, with the objective of informing the Secretariat about the situation [in UCs]. (Ibid.)

By 2009, Amazonas had stopped creating new conservation units, and was devoting resources almost entirely to implementation. That year, CEUC had around 90 employees – most of whom were paid by Moore or CI grants, and only a few of whom were full-time staff (*concursados*).

> When [SEAGA] changed to CEUC [in 2007]... the team counted 90, there were 5 [full-time appointments] – the Coordinator of the Center, and the 4 Sector Coordinators. The rest were all *bolsistas* (TRANSLATE: fellows, fellowship employees, interns perhaps), there was no more CI [Conservation International] project in that epoch, it was all from Moore, which paid for 60 or 70 people. It was in that phase that the *técnicos* that are in the field now came about. That last phase when I left, there were 6 [full-time appointments], 60 *bolsistas* of Moore, and I think they began with 15 or 20 *técnicos* in the countryside. These were *concursados*, employees of the state. (Ibid.)

Implementation moved forward during the 2007-9 period, with CEUC creating councils on conservation units, drafting and approving management plans, and placing staff on conservation units as managers.

> In the best phase, you had 3 people to take care of one collection of UCs. In the Lower Negro River [region], [CEUC] had 3 people there, 3 UC managers, plus 2 support staff, so we got to 5. That region was one case, a case in which you had the largest number. In the majority of UCs, [there was only] one person, but you had the opposite too, for example, in Apuí, you had 4 managers for 9 UCs. But on average, 80% of the cases had one person per UC, [maybe] 70% one person per UC. (Ibid.)

This progress from 2007 to 2009 is reflected in council and management plan data, which show slow progress prior to 2007, then more rapid progress afterward. In 2007, for instance, the state of Amazonas established its first two conservation unit councils, on the Sumaúma State Park and Rio Amapá Sustainable Development Reserve. In 2008, the state created 4 more councils, then 5 more in 2009, and 5 in 2010.

However, with the change in governor and the end of the Phase II of the Moore Project, the CEUC staff plummeted from over 90 staff to under 30, conservation unit manager appointments (allegedly) became politicized (with PT partisans, and other allies of the Governor being appointed as UC managers, irrespective of their qualifications) (Author interview with former CEUC employee, Manaus, 2012), and at the time of writing the state of Amazonas had not created another management council in four years. But the state had made steady progress in drafting management plans, completing 1 each year in 2012 and 2013, and then 6 in 2014 (ISA 2015). According to another key informant:

> Braga left [the Governor's mansion to be elected] Senator in 2010, and passed the government to his vice-governor [Omar Aziz]. [Aziz] has zero of environmental policy in his government, in his discourse. To me, the environment is important, but to the majority of the population, what is important is education and security – police on the street, teacher in the school. The government doesn't even rightly know what the environment is. The

> Governor values mining and ranching, police, and populism, distribution of resources. (Not-for-attribution interview, 2012)

Throughout the period from 2003 to 2010, the state of Amazonas invested very little budget in the environmental institutions, so when international financing ended, CEUC (and the SDS generally) lost personnel and capacity to carry out its responsibilities. According to Marinelli (Interview with the author, 2012), the state's contribution to CEUC's budget was no more than 7-10% of the Center's total annual budget.

After the 2003-6 period, in which the new and growing state environmental institutions rapidly expanded the state of Amazonas' network of conservation units, the CEUC in 2007-10 reoriented its priorities toward implementing existing units, and made considerable progress in assigning managers to collections of units, creating management councils, and publishing management plans. However, the 2010-11 gubernatorial transition shifted the state government's priorities, and the state did not step in to plug the budget hole created by the termination of Phase II of the Moore Foundation Project. This stalled implementation for several years, as much of CEUC's personnel had been paid by project funds, rather than by the state. Today, most regions of conservation units remain staffed, but it is unclear how active the management councils are – and it is even less clear if the management plans have made any difference to management and planning in practice in state conservation units.

Some activities do take place on state conservation units, however: In 2008, Amazonas enacted a conditional cash transfer program for families living in state conservation units, called *Bolsa Floresta*. Modeled on the federal government's *Bolsa Família* program, Bolsa Floresta provides minimum income payments in exchange for residents not cutting timber where forestry is prohibited. However, this program is not primarily administered by CEUC or SDS, but rather by Virgílio Viana's public-private foundation, the Sustainable Amazonas Foundation (*Fundação Amazonas Sustentável*, or FAS), which seeks donations from international foundations and corporations, and disbursed the money to families and carries out sustainable development projects on state conservation units. My informants indicated that the FAS has a great deal of flexibility that state institutions such as CEUC lack, but that Viana and his colleagues have excluded the state institutions, as well as environmental NGOs working in the state, from the FAS' initiatives, with the upshot that FAS and other NGOs sometimes work at cross-purposes (Not-for-attribution interview, 2012). Not enough data are available to evaluate this claim, but Braga and Viana may have found a way to maintain certain continuities in sustainable development activities on state conservation units by partially privatizing implementation and management.

Conclusion

Amazonas has an easier economic geography with which to work than its neighbor, Pará, and so has fewer major veto players in the interior of the state to resist conservation unit initiatives. In this chapter I have shown that while Amazonas scores high on the presence of industries that either may support conservation (such as ecotourism and rubber tapping) or be expected to be indifferent to it (such as manufacturing in Manaus), the state scores low on industries expected to resist conservation units (such as timber, extensive modern agriculture, and cattle ranching). Because of its unique path of economic development – the ZFM enabled the state to industrialize without promoting large-scale migrations to the interior – the state has both the lowest total and rate of deforestation in the Brazilian Amazon.

Nevertheless, like Pará, the state of Amazonas has responded more positively to local economic interests than the federal government, and so its balance of conservation units is

weighted heavily toward sustainable use, or permissive, units, which account for 81% of the state's system of conservation units. The federal government, which is more shielded from local resistance than the state, has a more balanced system, with only 44% of its area in permissive units. Furthermore, while (in contrast to Pará) the state government took a pro-active approach to protecting the southern frontier with the Apuí mosaic, the federal government would have blanketed the region with at strict protection National Park. Instead, the state created a mosaic of nine units, only two of which are strict protection (State Parks). This move provided residents with the ability to continue to exploit natural resources from within the conservation units, albeit with some sustainability restrictions. (That most of these units in Apuí are scored "Low" on the TCU's 2013 evaluation of management indicates that the state has little interest in imposing rigid restrictions on residents' access to timber and other resources.)

Overall, the contrast between state and federal conservation unit systems is less stark in Amazonas than in Pará, but it still exists. The state, like in Pará, is more responsive to local economic development needs and private sector demands than the federal government, but different economic geography facilitated an easier compromise between growth and conservation than in Pará.

Chapter 5. Minas Gerais: Timber Scarcity and Industrial Promotion Lead to Environmental Institution Building.

Introduction

Minas Gerais is a state that is historically, politically, and geographically distinct from the Amazonian states of Pará (Chapter 3) and Amazonas (Chapter 4). Minas Gerais is an industrialized state with large land intensive industries that is wealthier and more densely populated than Pará and Amazonas. Much of the state's native forests were decimated by the 1950s to produce charcoal to power steel mills, and to ensure industrial sustainability, Minas Gerais invested early in environmental institutions. Over the five decades from 1960 has created numerous conservation units – many more than the federal government has created in the state. Nevertheless, Minas Gerais' conservation unit system outcomes are consistent with my prediction: The federal conservation unit system in the state, though smaller in number and area than the state system, has a higher proportion of strict and moderately strict units in it than the state system does. In contrast, the state system of conservation units, though it includes strict units, protects a much greater share of area in moderately permissive and, especially, permissive units.

In the 1960s and 1970s, conservation of biodiversity in Minas Gerais piggy-backed on state reforestation policies whose principal goal was to sustain industrial growth. The state's early concern with forests produced one of the first state forestry agencies in Brazil, in 1962. The emergence of environmental organizations shortly afterward combined with a forest-oriented industrial policy to produce an early form of participatory environmental governance in 1979, followed by a shift in the state forestry institute's policy orientation toward conservation of biodiversity in the 1980s. Despite this early start in environmental policy compared to less wealthy states, however, Minas Gerais currently possesses a very limited area of federal and state conservation units – about 5% of the state's territory (MMA 2012) – due to the widespread presence of land intensive industries in the state – including mining, ranching, and eucalyptus plantations.

In contrast to the Amazon, in Minas Gerais the federal government has not developed ambitious conservation plans that take a broad view of environmental protection. Rather, the federal government's UC creation has constituted a set of discrete actions, with no discernible overall goal. This is due, first, to the federal government's greater policy concern from 1979 on with the Amazon; and second, to the political and economic importance of the state as a producer of minerals, eucalyptus, and agriculture. Despite facing stronger political and economic obstacles to instituting aggressive UC creation programs in Minas Gerais, the federal government has a proportionally more stringent UC system in the state than the state does, and has on discrete occasions overcome resistance from powerful economic interests to establish UCs in contentious locales – embodied most recently in President Dilma Rousseff's October 2014 decree creating the Serra do Gandarela National Park on forested lands coveted by the country's largest mining firm, Vale.

In contrast to the federal system of conservation units in the state, the state of Minas Gerais has a larger, more numerous, but overall less stringent UC system than the federal government. Because conservation in the state has been driven by concerns for economic growth, the few UCs created in the 1970s were established to protect virgin forests and direct consumers of charcoal – mainly the steel industry – to purchase from eucalyptus plantations. More recent UCs have either provided little effective protection (embodied by the APA Sul-RMBH, which is located on

mineral-rich lands), protect less potentially productive mountainous terrains to promote ecotourism (embodied by state parks), or compensate for environmental destruction wrought by state or federal regional development initiatives (embodied by the Jaíba agricultural irrigation project in northern Minas Gerais and southern Bahia, and the recent state Vetor Norte regional development plan).

I begin this chapter with a description of the federal and state UC systems in Minas Gerais, focusing on the area each covers, as well as scoring each on its stringency. I then trace the evolution of the federal and state UC systems in the state. Third, I evaluate how well the stylized average conservation unit type expectations from the theory I presented in Chapter 1 apply to the processes of creating three conservation units in the contentious Iron Quadrilateral area of the state, south of the state capital, Belo Horizonte: the state APA Sul-RMBH, and the federal Serra do Gandarela National Park and Nascentes Geraizeiras Sustainable Development Reserve. I conclude with a discussion that compares Minas Gerais to Amazonas and Pará. I argue throughout that the state of Minas Gerais, like Amazonas and Pará, responds more than the federal government to local economic concerns in creating conservation units, but that the centrality of forests to economic development in the state has produced a more progressive state conservation system than in the other states examined in this study.

Contrasting the Federal and State Conservation Unit Systems

Table 5.1. Federal and State Conservation Units by Decade of Creation

Decade	Federal Strict Protection	Federal Sustainable Use	State Strict Protection	State Sustainable Use
1930	1			
1940			1	
1950				
1960	1	1	1	
1970	1		6	
1980	3	2	3	1
1990	1	3	17	8
2000	2	1	19	4
2010	1	1	13	1
Total	**10**	**8**	**60**	**14**
Total Area (ha)	**592,877**	**595,448**	**518,014**	**1,715,538**

Sources: ISA 2015 (federal), MMA 2012 (state).

Federal

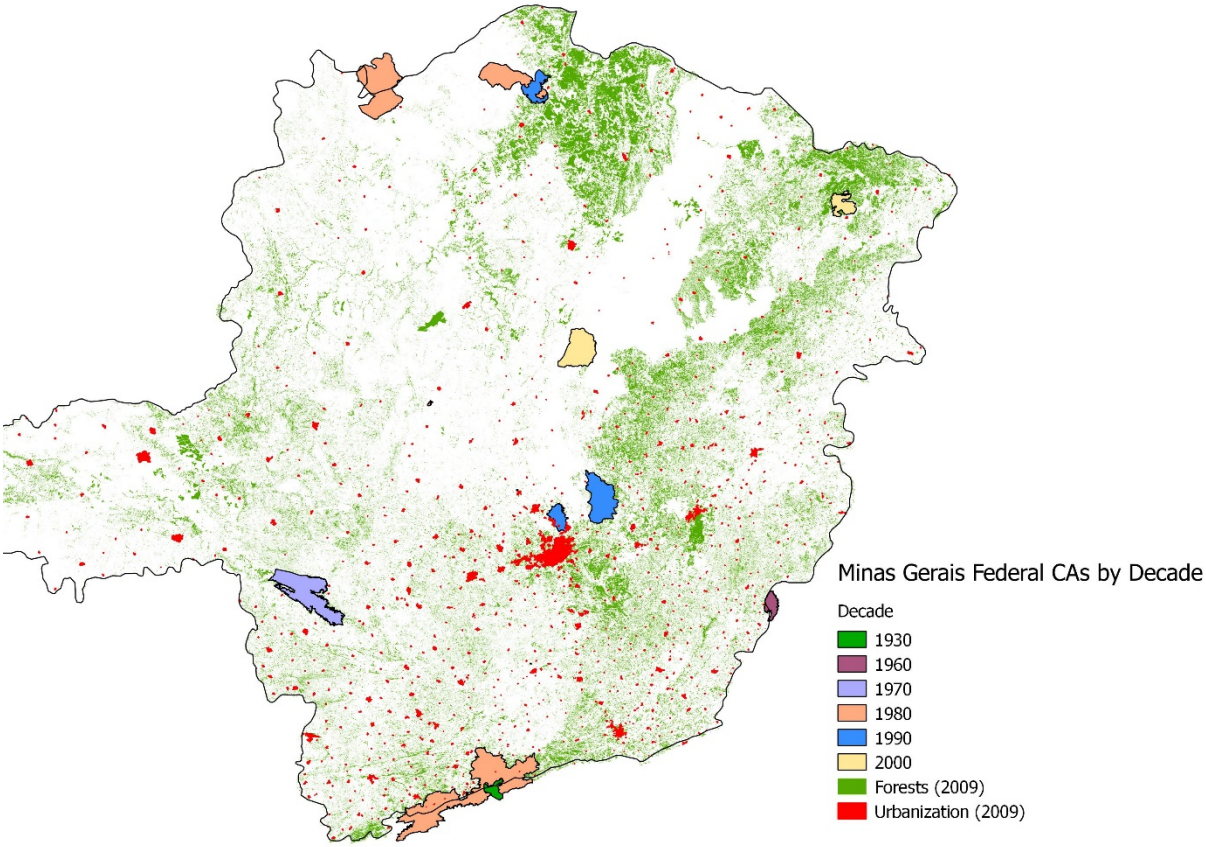
The federal conservation unit system in Minas Gerais is limited in size and number, but remains on average stricter than the state system. Minas Gerais has not been a priority state for the federal government's conservation policies, which since 1979 – but especially beginning in the late 1980s – have been targeted toward the Amazon. Nevertheless, the federal system of UCs in Minas Gerais is more proportionally stringent than the state system, and from 2009 to 2014 federal environmental institutions confronted entrenched economic interests in the state to establish a strict protection conservation unit, the Serra do Gandarela National Park.

Minas Gerais' federal UC system consists of 592,877 hectares of strict protection UCs, and 595,448 hectares of sustainable use UCs – totaling 1,188,325 hectares. 99% of the sustainable use hectares are in APAs, or 50% of the total federal UC area. There are four federal APAs in Minas Gerais – APA Cavernas do Peruaçu in the north, APA Morro da Pedreira to the northeast of the state capital, Belo Horizonte; APA Serra da Mantiqueira that straddles the southern border with Rio de Janeiro and São Paulo; and APA Carste de Lagoa Santa, which protects caverns of archaeological and paleontological interest north of Belo Horizonte. Excluding APAs, strict protection UCS account for 99% of UC area in the state. Major strict protection UCs include the Serra da Canastra, Itatiaia, Sempre-Vivas, Cavernas do Peruaçu, Caparaó, and Serra do Cipó National Parks; Pirapitinga Ecological Station, and Mata Escura Biological Reserve. The federal government has also created small National Forests in the state, including Paraopeba, Passa Quatro, and Ritápolis. Finally, in October 2014 the federal government decreed the Nascentes Geraizeiras Sustainable Development Reserve and the Serra do Gandarela National Park.

The federal government's first conservation unit in Minas Gerais was also the country's first: Itatiaia National Park, decreed by President Getúlio Vargas on the state's border with Rio de Janeiro in 1937. But creation activity was only sporadic in the first half of the twentieth century: Paraopeba National Forest created in 1950, was the second federal UC in Minas Gerais, and Caparaó National Park, in 1961, the third. By 1970, the federal government had only established four UCs in Minas Gerais – and 5 by 1980. By 1990 the number of federal UCs in the state had risen to 13, by 2000 15, and by 2010 18.

Despite the small numbers through the 1980s, the federal pace in Minas Gerais was comparable to Pará and Amazonas: By 1980 Pará had four and Amazons three federal UCs. By 1990, Pará had seven and Amazonas thirteen. Federal and state UC creation in Minas Gerais through the 1980s can be explained by the plethora of scenic mountains in the state and emerging environmental activism in Southeastern Brazil that pressured a liberalizing and democratizing government to incorporate environmental concerns into economic development (Hochstetler and Keck 2007, 65).

Map 5.1. Federal UCs in Minas Gerais by Decade of Creation



Sources: MG ZEE (2012); MMA (2012).

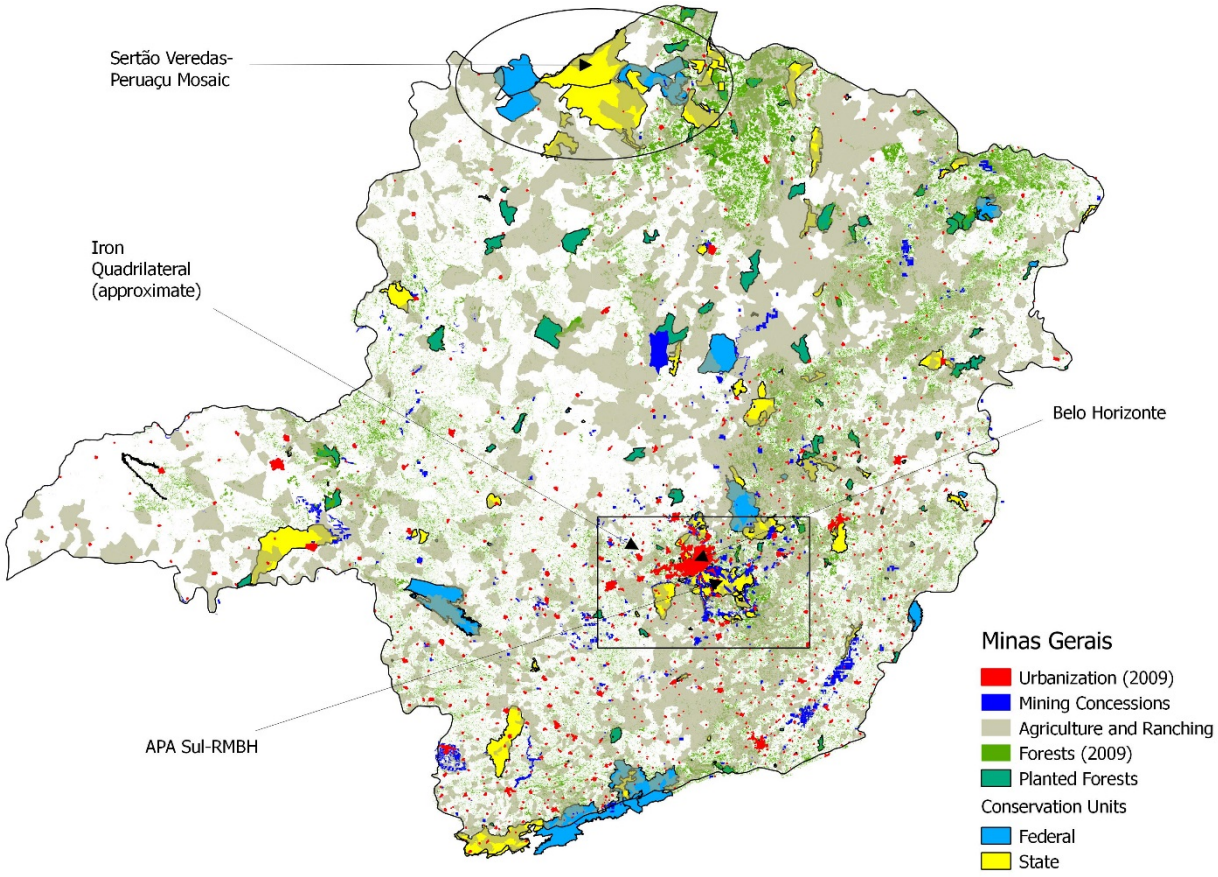
State

The state system of conservation units in Minas Gerais is both larger and more numerous than the federal system, and has evolved over time in response to the state's changing economic needs. The state established State Parks for ecotourism and leisure as early as the 1940s, but did very little in the 1950s and 1960s. State conservation unit creation picked up the pace in the 1970s. They were accompanied by other environmental set-asides that were not formally conservation units, but were rather designated "prohibited areas" (*áreas de vedação*). The state government of Minas Gerais established prohibited areas in response to a growing eucalyptus plantation sector, to encourage steel mills and other charcoal consumers to purchase eucalyptus rather than exploit native vegetation.

The state system in Minas Gerais is larger than the federal system in both number and area: Currently, the state government manages 75 conservation units spanning over 2.2 million hectares. Sixty state UCs are strict protection and 14 sustainable use, of which 11 are APAs (1.65 million hectares). APAs account for 96% of state sustainable use UC area, and 73% of *total* state UC area. In contrast, there are 518,014 hectares of strict protection areas in the state – fewer than in the federal system, despite the state system's greater size. There is considerable overlap between APAs and strict protection UCs: Nine strict protection UCs, including State Parks, Ecological Stations,

and Wildlife Refuges lie within APAs. Fechos Ecological Station and Serra da Rola-Moça State Park, for instance, both lie completely within the APA Sul-RMBH, south of Belo Horizonte. However, the total area of strict protection areas that lie within APAs amounts to just 1.1% of the state UC area.

Map 5.2. Conservation Units and Economic Geography in Minas Gerais



Sources: DNPM (2012); IBGE (2006); MG ZEE (2012); MMA (2012).

Minas Gerais has been creating UCs for much longer than the Amazonian states studied in chapters 3 and 4, and it has a correspondingly longer history of environmental institution building. The state created its first UC, Rio Doce State Park, in 1944, its second, Corumbá Ecological Station, in 1964, and its third, Itacolomi State Park, in 1967. By 1980, the state had 10 UCs, by 1990 14, by 2000 40, and by 2010 71. Consistent with much of the rest of the country, the periods of fastest state UC system expansion are the 1990s and 2000s.

With the exception of the State Parks and APAs, most state UCs in Minas Gerais are minor affairs, protecting local scenic beauty or rare species. The larger strict protection UCs – State Parks – support local tourism. The largest state UCs by area are APAs, of which the APA Sul-RMBH (South-Metropolitan Region of Belo Horizonte Environmental Protection Area) is the most significant: It straddles thirteen municipalities south of the state capital, in the middle of the *quadrilátero ferrífero* (iron quadrilateral), a mineral rich region actively mined by Vale and other mining

firms. Other significant APAs include those in the Sertão-Veredas Peruaçu Mosaic in the far north (see Map 5.2, above).

Economic Geography of Minas Gerais

Land intensive industries extend throughout the state of Minas Gerais. These include agriculture, ranching, mining, and forestry. Map 5.2, above, shows the distribution of selected land intensive economic activities across the territory of Minas Gerais. Ranching and agriculture spread throughout the state, including its forested regions. Urbanization, in red, concentrates in the central and southern regions of the state, while planted forests (pink) are concentrated in the more rural north. Finally, mining (shown on Map 1, above) is present throughout the state's territory, but concentrates in the central and southern regions.

Agriculture and Ranching: High

Minas Gerais' economy has long depended heavily on land intensive activities, including ranching, agriculture, mining, and forest clearing for charcoal for steel. In 2006, 37.53% of the state's land (22,011,864 ha) was dedicated to agriculture (compared to 13.5% of Pará and 1.18% of Amazonas), and in 2000 the state boasted 34 heads of cattle per hectare (19,975,271 heads of cattle) – orders of magnitude greater than Pará's 8.23 and Amazonas' 0.54. With respect to Brazil as a whole, Minas Gerais ranked second in cattle head density in 2000, after Mato Grosso do Sul, and eighth in the percent of state land devoted to agriculture. Moreover, Minas Gerais produces more soy (1,438,829 tons in 2000) than Pará (2602 tons) and Amazonas (1428 tons) together – and was the seventh largest producer of soy beans in the country in 2000 (IBGE 2000b).

Finally, the state has a much greater population density (30.5 people per square kilometer) than either Pará (4.96) or Amazonas (1.8), and its population is less rural: 18%, versus 25% in Amazonas and 33% in Pará. However, the rural population of Minas Gerais is much larger: 3,219,666 in 2000, versus 705,335 in Amazonas, and 2,071,614 in Pará – in a state with less territory than either of the Amazonian states studied here (IBGE 2000a).

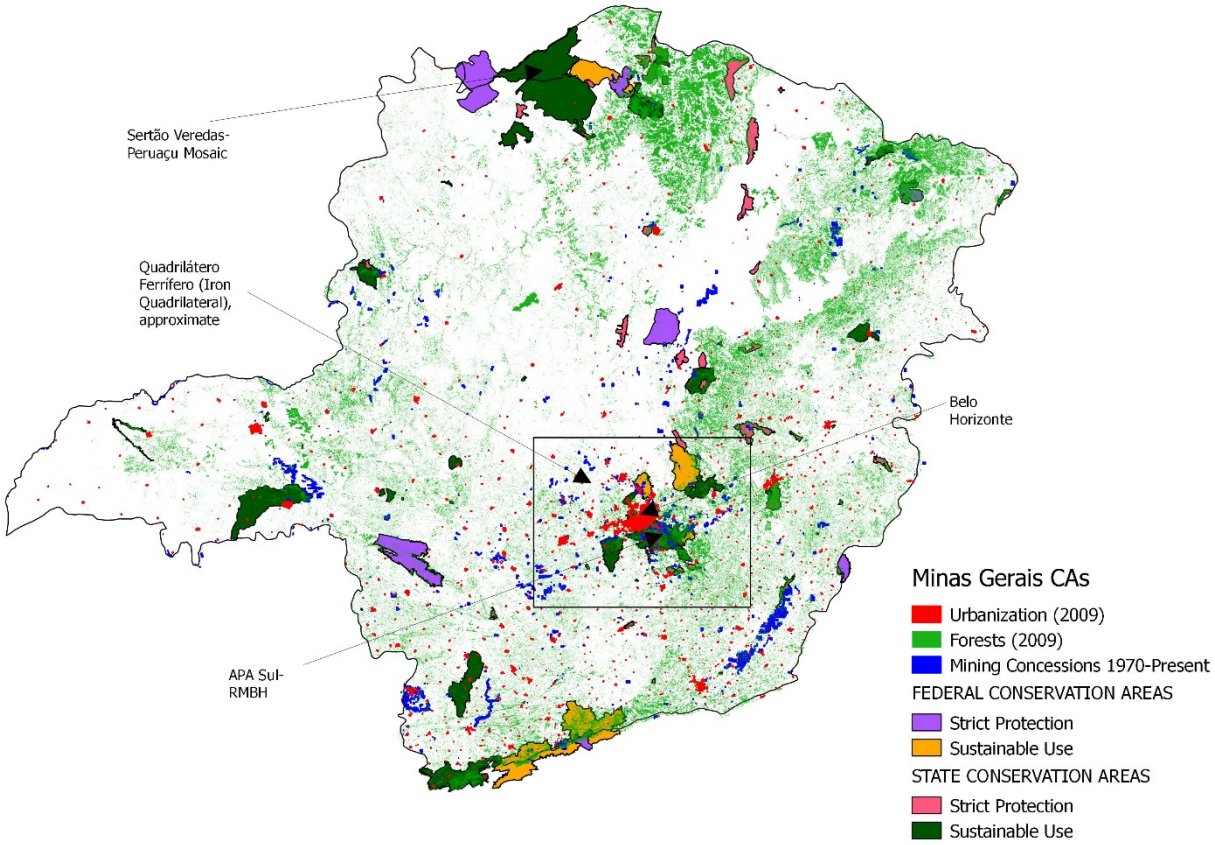
Mining: High

Mining has a long history in Minas Gerais, and is a dominant industry in the state. According to the Sindicato da Indústria Mineral de Minas Gerais (SINDIEXTRA), from 1981 to 1998 the state produced roughly one third of the total mineral production by value in Brazil (SINDIEXTRA 9 April 2015), spread across 250 municipalities (in 1998), and creating 30,000 direct jobs. The predominance of this sector continues to this day: In 2012, Minas Gerais produced 39.2% of Brazil's pig iron, 34.1% of its steel, and in 2011 the state extracted 68.7% of the country's iron, 100% of its lead, 80% of its niobium (*nióbio*), 83% of its graphite, 63% of its sulfur, and 55% of its phosphate (CBMM and FJP 2012, 25).

In 1995, Minas Gerais led the country in the total value of mineral production, with just under R$1.3 billion. Rio de Janeiro, Espírito Santo, and Pará followed close behind (IBGE 1995), while at the time Amazonas possessed little mining.

From 1970 to the present, the federal mining bureaucracy issued 1,282 mining concessions in Minas Gerais, including 560 in the 1970s, 377 in the 1980s, 222 in the 1990s, 113 in the 2000s, and 10 in 2010-2011 (DNPM 2012). There are many mining firms in the state, including Vale S.A., Companhia Brasileira de Alumínio, Usiminas, and a plethora of smaller firms – as well as mining by independent entrepreneurs (*garimpeiros*).

Map 5.3. Urbanization, Mining, and Conservation Units in Minas Gerais



Sources: DNPM (2014), MMA (2012), MG ZEE (2012).

Forestry: High

Forests in Minas Gerais have been exploited for centuries, but clearing increased in the early twentieth century as a growing steel sector acquired its energy from wood-based charcoal. By the early 1960s, both conservationists and observers concerned with the state's continued economic development worried that Minas Gerais was running out of forests to supply industry. With the advent of the State Forestry Institute (IEF) in 1962, the state government began to invest in reforestation, principally in the form of homogeneous eucalyptus plantations. Over time, Minas Gerais became a major locus of silviculture plantations. In 2000, the state ranked seventh in the country – after São Paulo, Santa Catarina, Paraná, Bahia, Espírito Santo, and Rio Grande do Sul – in silviculture production, measured in cubic meters of wood.

Minas Gerais produces less timber (127,329 cubic meters in 2000) than Pará (10,781,501) or Amazonas (803,528). The low timber production results from the exhaustion of the state's virgin forests by the middle of the twentieth century and the state's subsequent investment in the 1960s and 1970s in eucalyptus plantations: Minas Gerais' silviculture industry is considerably larger (4,161,343 cubic meters of timber in 2000) than Pará's (1,654,240) or Amazonas' (32) (IBGE 2014a).

The concentration of the forestry industry in cultivated plantations in Minas Gerais renders the forestry industry less of a threat to environmental conservation efforts than it is in Pará. Indeed,

vested interests in eucalyptus plantations may support the creation and maintenance of conservation units elsewhere in the state, in order to restrict the legal supply of virgin timber, and maintain demand for charcoal that originates on plantations.

In the following sections, I analyze the intersection between major economic interests in Minas Gerais and the evolution of the federal and state conservation unit systems in the state. I find that a policy focus on the Amazon has led the federal government to make only limited interventions in the state to create conservation units. In general, federal conservation units in the state were created in response to local demands, but a few conservation units directly challenged local economic activities. In contrast, the state's system of conservation units has responded directly and indirectly to local economic interests, and the state has worked to accommodate the interests of, principally, eucalyptus plantation owners and mining firms.

Federal Environmental and Conservation Unit Policy, 1937-2010

Minas Gerais has not been a central, strategic priority for the federal government, but federal conservation unit creation in the state has rather been driven by a combination of local demands made by social movements and residents' organizations, negotiations with the state government, and environmental compensation for economic development projects in the state. The federal government established the first conservation unit in the state – Itatiaia National Park – in 1937, on the state border with São Paulo. It then took no further action on this front until the 1960s, when it established the Caparaó National Park (1961) on the border with Espírito Santo, and Passa Quatro National Forest (1968) in southern Minas Gerais.

The federal government established the Caparaó National Park in 1961 in an area that was economically dependent on logging, cattle ranching, and coffee cultivation. In creating Caparaó National Park, the federal government responded to the interests of environmental activists who promoted a broader system of national parks. Scientists had been exploring the Caparaó area for decades. In 1922, a Belgian-Brazilian expedition explored the Itatiaia and Caparaó areas, and proposed that they both be protected. Later, at the beginning of the 1940s, Brazil's Forest Service launched an expedition to map the Caparaó mountain range, and found that much of the forested area of the range had been cleared. The expedition published a report that, a few years later, induced the Forest Service to appoint the Serra dos Órgãos National Park administrator to oversee plans and negotiations to decree a National Park in the Caparaó mountain range. At the beginning of the 1950s, the park proposal gained the support lof local movements in the region, including a city councillor of Espera Feliz (the municipality in which the Caparaó National Park is located), and a student movement. The goals of the local movement were to create a protected area in the Caparaó mountain range in order to attract visitors and reduce the region's dependence on coffee cultivation (Santos 2013, 127).

Importantly, ecologically destructive activities in the Caparaó region were in decline by the time the federal government decreed the park. Timber extraction lasted from the early 20th century until the 1970s, but declined in the 1950s. While the National Park limited further timber extraction once it had been created, "...a large part of the trees considered *nobres* had already been removed before [the park's] creation" (ibid., 133; translation mine). Ranching, however, remained present in and around the park until 1979, when the Caparaó National Park was effectively implemented and ranchers had to remove their cattle from the park.

The battles fought for Caparaó were intense. In 1960, the local student movement denounced the devastation of the Caparáo mountain range. They accused local residents of destroying the scenic nature, and feared that such actions put at risk the future of a local tourist economy.

On the other side, local residents argued that they were not responsible for the environmental degradation, but instead that they maintained everything clean and organized. The local movement also fought a reluctant federal government. But the most intense battles occurred between the representatives of the federal government and the local population. Federal representatives saw local residents as responsible for environmental destruction in the region, and sought to remove them from the territory of the park. Efforts to clear the Caparaó National Park of residents lasted from the creation of the park in 1961 to 1979.[1] Conflicts over property rights continued into the 1990s, when the federal government altered its tactics and sought partnerships with the residents to prove transport for tourists, and to help federal representatives to manage the park and its surroundings. "Little by little, a more severe legislation, a better use of tourism, and the formation of partnerships made contact between government employees and residents friendlier" (ibid., 142; translation mine).

The federal government's next action in Minas Gerais culminated in 1972 with the creation of the Serra da Canastra National Park. The park, which had the goal of protecting tributaries of the São Francisco river (Brazil's most economically important river), generated a great degree of local anger.

> The implantation of the Park was traumatic for the region, because the expropriated area contained dozens of farms [*fazendas*].... The *fazendeiros* resisted and delayed leaving until they were forcibly removed by the Federal Police, ten years [after the Park's establishment]. Some *fazendeiros* fight in court to this day the value of the indemnity [paid to them for their land]. (Tamanduá Ecoturismo 2011)

But the federal government did make some temporary concessions to local interests in creating the park: When the IBDF published the park's first management plan in 1981, it shrunk the park's size from 200,000 hectares to 71,500 – a move that excluded some property owners from forced expropriation. However, in 2005 IBAMA published a new management plan that encompassed all of the park's original area (Barros 2008).

While the federal government was creating the Serra da Canastra National Park, proposals arose to create the Serra do Cipó National Park. Initially, residents of the Serra do Cipó appealed to the state government of Minas Gerais, which conducted a set of environmental studies and created the State Park in 1978. However, the state government did not at the time have sufficient resources to expropriate the private lands in the park, and so state conservationists with the support of the Brazilian Society for the Progress of Science (*Sociedade Brasileira para o Progresso da Ciência*) advocated for the transference of the park to the federal government. The IBDF responded to this appeal by acquiring private lands amounting to 40% of the park's area, and on 25 September 1984 decreed Serra do Cipó a National Park (Decree 90,223).

That same decade, between 1982 and 1985, the federal government decreed the APA da Serra da Mantiqueira in the Mantiqueira mountain range on the southern border of Minas Gerais with the state of Rio de Janeiro and São Paulo. This action responded to demands by local movements of middle class residents who had begun to move to the Mantiqueira region in the 1970s, and were upset by the deforestation and degradation taking place in the mountains (Matutu.org 13 March 2015). First (military) President Figueiredo laid the foundation for the APA

[1] The federal government decreed the Caparaó National Park on 24 May 1961, but did not assign a budget for management until the following decade (Santos 2013, 128). Implementation, however, did not begin until 1978, and it was not until IBAMA was created in 1989 that management became structured (Santos 2013).

in 1982, with a decree (87,561) providing limited protection to the mountain range. In 1985, (civilian) President Sarney reinforced this decree with his own (91,304). Unlike the Serra da Canastra and Caparaó, the decrees issued by Figueiredo and Sarney were not politically contentious, as APAs do not require expropriation of lands – and neither the federal nor the state governments established zoning rules immediately.

In 1987, Sarney burnished his green credentials further by decreeing the creation of three new Ecological Stations on federal lands – Carijós (in Santa Catarina), Tupinambás (in São Paulo), and Pirapitinga, in Minas Gerais. Situated in the municipality of Morada Nova de Minas, in the Cerrado, 271 kilometers northwest of Belo Horizonte, the Pirapitinga Ecological Station spans 1,090 hectares and is located in the Três Marias hydroelectric dam reservoir. SEMA gained title to the land in 1986, and in 1987 Sarney decreed the Ecological Station (ICMBio 2013). Sarney followed this decree in 1989 with the creation of the APA Cavernas do Peruaçu (Peruaçu caverns), an extensive area in the far north of the state meant to protect caverns and promote ecotourism. The following year, while celebrating the first anniversary of IBAMA, Sarney signed four more conservation unit decrees, including the Alto Juruá Extractive Reserve in Acre, the Guaribas Biological Reserve in Paraíba, and two APAs in Minas Gerais: Carste de Lagoa Santa and Morro da Pedreira. Carste de Lagoa Santa imposed a permissive federal unit on an area decreed as a permanent preservation area by the state of Minas Gerais in 1980 (ICMBio 2008a), while Morro da Pedreira provided a buffer zone around the Serra do Cipó National Park, northeast of Belo Horizonte.

Though federal actions in the 1970s and 1980s increased the area of federal conservation units in Minas Gerais, federal attention began to turn to the Amazon in the late 1980s. As discussed in Chapter 3, in 1989 Sarney launched *Nossa Natureza*, through which he created several UCs in the Amazon. Presidents Collor, Franco, and Cardoso also focused much of their conservation unit creation efforts outside of Minas Gerais, largely in the Amazon. In 1994, Franco's administration created the Grande Sertão-Veredas National Park on the northern border of Minas Gerais with Bahia, to protect landscapes described in one of Brazil's classic novels, *Grande Sertão-Veredas* (by João Guimarães Rosa). The next federal conservation unit to be decreed in Minas Gerais was four years later, in 1998, when Cardoso decreed the Cavernas do Peruaçu National Park, overlapping in territory with the Cavernas do Peruaçu APA. Cardoso did so using environmental compensation funds from the Fiat automobile firm, which had been fined for selling cars in the Brazilian market that emitted high levels of pollution (Edward 1998).

In 1999, Cardoso created the Ritápolis National Forest, on 90 hectares of land with unique historical value: They coincide with the area of the historical Fazenda do Pombal, where Joaquim José da Silva Xavier – "Tiradentes" – was born. In 2001, Cardoso decreed the Paraopeba National Forest, on land that until 2001 had been a forest garden. In 2002, his administration doubled the size of Grande Sertão-Veredas National Park by incorporating land in Bahia. Finally, on 13 December 2002, as part of a series of decrees creating twelve new conservation units as he was leaving office, Cardoso decreed the Sempre-Vivas National Park in Minas Gerais – part of a broad state-society effort to protect the Serra do Espinhaço mountain range.

The Lula administrations (2003-6, 2007-10) were even more focused on preserving the Amazon than Cardoso, and took comparatively little action to protect biodiversity in Minas Gerais: Lula decreed the Mata Escura Biological Reserve in 2003, and then created no more UCs in the state for the rest of his time in office. The Mata Escura Biological Reserve had been proposed initially by Minas Gerais State Forestry Institute personnel and Federal University of Minas Gerais researchers who visited the region in 1999. The Wildlife Protection Coordinating Body of the

Directorate of Fishing and Biodiversity in the State Forestry Institute drafted a proposal for a 20,500 hectare strict protection UC, but the Forestry Institute's directors took no action. In 2002, funded by environmental compensation paid to IBAMA by the consortium building the Itapebi hydroelectric complex in Bahia, consultants returned to the Mata Escura region, conducted a second study, and proposed a National Park. The UC decree was published in 2003, but categorized the Mata Escura as a Biological Reserve, with twice as much land protected as had been proposed by the original State Forestry Institute proposal. The Mata Escura Biological Reserve was celebrated by the Brazilian scientific community, which sought to protect biodiversity, but opposed by the local population:

> ...the local population rebelled and filed diverse petitions in the courts, and ended up mobilizing the Ministry of the Environment, which [as of 2010] is studying ways to revoke the decree. The situation and future of the REBIO are still uncertain, however, recent studies done in the region have emphasized the crucial importance that the area has for fauna, especially primates. (Melo 2010; translation mine)

From 1937 to 2010, the federal government in Minas Gerais only took periodic actions to create conservation units, and in doing so responded to specific local demands. Unlike the situation in the Amazon region, from 2003 to 2010, the federal government did not adopt a strategic vision of conservation in Minas Gerais. After the Mata Escura Biological Reserve, in 2003, neither the Lula nor the Rousseff administration established a single conservation unit in the state until October 2014, when Rousseff decreed the Serra do Gandarela National Park and Nascentes Geraizeiras Sustainable Development Reserve.

Nevertheless, over the course of the decades we do observe the federal government confronting local economic interests to protect important scenic areas and biodiversity. The Caparaó and Serra da Canastra National Parks forced the federal government to confront local timber firms and ranchers, while the Mata Escura Biological Reserve provoked the ire of local residents, as the federal decree was twice the size of the state proposal, and of a stricter conservation unit category. Finally, in 2014, after five years of debate between environmentalists, the state government, and mining interests, the Rousseff administration decreed the Serra do Gandarela National Park and Nascentes Geraizeiras Sustainable Development Reserve in the heart of a mining region in the state. I will develop this story in greater depth below. First, however, I will trace the evolution of conservation units and environmental institutions in the state of Minas Gerais, from 1962 to 2010, to show how economic development imperatives produced, over time, a state environmental agency capable of taking a leadership role in creating and managing state conservation units.

State Environmental Policy, 1962-2012: Industrial Needs Prompt Institution Building

Institutional Evolution, 1962-1973: A Toothless Forestry Institute to Promote Steel

Minas Gerais's first environmental agency, the State Forestry Institute (*Instituto Estadual de Florestas*, or IEF), was created with an explicitly economic motivation: to carry out reforestation initially in support of the steel industry (1960s) and later to attract the paper cellulose industry to the state (1970s) (Gonçalves 1990). Only after the state had failed to become a major center of paper cellulose production did conservation, including creation and management of conservation units, become central to the IEF's portfolio.

Minas Gerais decimated much of its virgin Atlantic and Cerrado forests over centuries of settlement, and in the twentieth century to provide charcoal to steel mills. As early as the 1950s, the state Assembly began advocating for the establishment of a state agency to incentivize reforestation. In 1951, the federal Ministry of Agriculture published a draft plan for reforestation to support steel mills in Minas Gerais, but while the steel companies in the state agreed with the conclusions, they were reluctant to invest in such initiatives because they believed that the forests they had already cut would grow back in 20-25 years. Importantly for the future of environmental policy in the state, the report proposed planting eucalyptus trees in deforested areas, as eucalyptus would be able to be harvested up to four times in 25 years (IEF 2009, 16-17). In 1956, the question of acquiring a sufficient supply of wood for the construction of the new national capital, Brasília, haunted President Juscelino Kubitschek (a former Governor of Minas Gerais), who commissioned a report from the Ministry of Agriculture's Forestry Service in 1954. This report, drafted by a team of experts that included agronomist Dirceu Duarte Braga – to become in 1963 the first President of Minas Gerais's State Forestry Institute – recommended institutionalization of forestry management at the federal and state tiers (ibid., 18).

These early proposals were supported by the press in 1961, when journalists José Franco and José Nicolau published an alarming article in *O Cruzeiro* magazine. The article showed that even as the forests were being decimated, deforestation continued without slowing – and that the steel industry would collapse should the forests disappear.

> Minas Gerais is already a desert. The area of the state is 592,112 km^2. In 1911, the area [of forest cover] was 278,619 km^2, a statistic that fell to 67,156 in the year 1955. So, in 1960, according to official data, the covered area in the territory [of the state] was just 44,656 km^2, which demonstrates that the annual velocity of deforestation, on average, in the last five years, reached 4,600 km^2. It's a classic principal of silviculture worldwide that each region should have a minimum of 25% of its area covered by forest. Minas [Gerais] has just 9%, with a necessary minimum deficit of 16%. It's reached a point where we are faced with the threat of a collapse, in consequence of which, in the future, [the state] will have to import not just charcoal for steel mills (around 50, counting both large and small ones that exist in the state), but also wood for other uses. (Franco and Nicolau, 18 November 1961, quoted in IEF (2009, 17); translation mine.)

While the situation was visibly grave in the 1950s, conservationists in Minas Gerais had been monitoring environmental issues, including pollution and forest loss, since the 1930s. A pair of institutions planted the seeds of future environmental agencies, including the Forest Service and Federal Forestry Council, established in 1933, and the Department of Lands, Woods, and Colonization, linked to the Secretariat of Agriculture, Industry, Commerce and Labor, founded in 1934 (Gonçalves 1990, 17). These institutions monitored and attempted to enforce restrictions on forest predation, but were ultimately toothless because of the greater power of developmentalist interests in the state compared to conservationist (Gonçalves 1990, 17-18). Conservationists in that decade, inspired by park creation in the United States and Europe, sought to slow the process of forest clearing for charcoal and ranching in Minas Gerais and elsewhere. In this and the following decades, conservationists were few and politically disorganized, incapable of effectively challenging the state's steel industry-driven economic expansion. Against the conservationists, the steel industry's interests in exploiting virgin forests for energy aligned with those of ranchers, who earned money selling forest products from trees harvested on their lands (ibid., 15). Together, these two economic groups dominated state institutions.

In the 1930s and 1940s, it remained more efficient for firms to clear native forests than to invest in forest plantations. But as steel production in Minas Gerais grew in the 1950s and virgin wood for charcoal gradually moved farther from steel mills as more proximate forests were used up, economic and environmental concerns began to align in a growing concern for forests. Until the 1960s, all charcoal used in the steel industry came from native forests. Pig iron manufacturing in the 1950s increased pressure on forest resources, and large steel firms such as Belgo-Mineira and ACESITA began in 1948 to operate their own forest services and to develop plans for planted forests. "Their plans for the expansion of the reforested area with rapidly growing forest species would cover, in total, more than 1900 hectares annually for a period of more than 10 years, for the generation of raw material for energy" (ibid., 16). Other companies followed suit in the 1950s.

Over the course of the 1950s, the state government grew increasingly concerned with preventing a collapse of the state economy from exhaustion of wood-based charcoal. At the same time, the steel industry wanted the state to create an agency charged with helping institute silviculture plantations and impeding unproductive deforestation carried out by urban and agricultural frontier expansion. The first proposals for a forestry institution responded to these industrial concerns, rather than conservationist (ibid., 19).

> In truth, the action of the productive classes of Minas Gerais, beginning in the 1930s, processed itself as much by the successful practice of pressure and campaigns linked to specific and conjunctural demands, as by its direct presence in the decision making system, through its recruiting of business leaders for the government. Beyond this type of direct participation in the decision making process, indirect links with the governmental technocracy were also important, as the technocrats identified with the demands and needs of the state's business community. (ibid., 19-20; translation mine)

These powerful industrial interests were the first to call attention to the forest challenge in Minas Gerais. In 1947, the *Plano de Recuperação Econômica e Fomento da Produção*, authored by Secretary and Steel magnate Américo R. Gianetti, "already signaled that the forest problem in the state could be solved through the equipping of a Division of Reforestation in the Secretariat of Agriculture" (ibid., 20; translation mine). In 1950, a survey conducted to develop rural electrification plans recommended electrical energy as a substitute for wood-based energy among rural residents, and proposed that the state undertake "intensive reforestation" (ibid., 20; translation mine). In 1959, the State Council of Economy and Administration proposed the creation of a State Forestry Department "as a way to solve the grave problems of deforestation" (ibid.). These concerns were echoed throughout the 1940s by another powerful economic interest group with representation in the state apparatus, the Sociedade Mineira de Agricultura: "In diverse meeting and through itis representatives in the state, [the Sociedade Mineira de Agricultura] gave chorus to the necessity of reforestation and of more decided government action to implement it, or, then, through financing [and] allowing private groups to do it" (ibid.).

The state government responded in the 1950s to these pleas from industrial elites with legislative proposals. In 1950, State Deputy Cornélio Dias de Castro (who was also a rancher) proposed the creation of a Forestry Department, and at the end of the decade, State Deputy Dirceu Duarte Braga began to write the legislation that would create the IEF in 1962. He did so with a concern for industrial development that was consistent with the dominant arguments of the age: "According to [Duarte Braga], Minas Gerais, because it possessed abundant renewable and non-renewable natural resources and an industrial development based on their exploitation, particularly of metallic minerals and forests.... Forest protection, therefore, according to Deputy Duarte Braga, should be a necessary actions from the point of view of regional development" (ibid., 21). In a

1960 speech to the state Legislative Assembly, Duarte Braga argued for forest protection explicitly to support the production of pig iron, the key ingredient in steel (ibid., 22). At the end of 1961, Duarte Braga presented the bill to establish the IEF.

The decision to create the IEF in 1962 resulted from the confluence of diverse interests: Principally, industrialists and rural producers agreed – for economic reasons – with conservationists on the necessity of rationalizing the use of the state's forests. In fact, there were no significant opponents to the bill, and it was approved with the support of then Governor Magalhães Pinto. Duarte Braga's project, however, also lacked a solid base of support from a constituency that would stand to benefit. Instead, it garnered diffuse support from social sectors, while large steel firms that had already planted eucalyptus forests neither opposed nor sought direct involvement with the IEF. The lack of concentrated support for a competent IEF enabled Magalhães Pinto to veto key provisions in the bill, including the IEF's function as a provider of credit to the forestry sector – which would become the purview of the new state Development Bank – and its power to expropriate private lands in order to reforest them (ibid., 23-24).

In consequence, the IEF was born and remained weak from 1962 to 1973. Lacking political resources and capacities to enforce a coherent reforestation program in the state, the IEF's purpose was undefined, and the agency became over the years simply a source of patronage-based employment for government allies. Conservationists gave the IEF only tepid support, as they believed the institute should primarily protect nature. For professional reforesters and industrialists, including steel industry representatives, the IEF became viewed as a charcoal tax collector, cracking down on the industry's historical freedom to maneuver. Finally, rural agriculturalists wanted continued freedom to sell wood and wood-based charcoal from their lands without restrictions (ibid., 25).

> So, in that period the IEF was not able to awaken any interest capable of sustaining it as an agent of state policy, exactly because it did not offer advantages to anyone. In this way, its evolution throughout this period would be marked by the safety of its actions, which were sufficiently timid to dissatisfy the conservationists and not attract the attention of steel manufacturers, unless [the IEF's decisions] constituted a factor of cost for the latter. (Ibid.)

The lack of support from social and economic sectors in the state led to undermining of the IEF's mission and capacities. The IEF was to be primarily funded by a *taxa florestal* (forestry rate, or fee) levied on economic sectors and for which collection was split between the IEF and the Secretariat of Finance. But the fee did not begin to be collected until 1963, and in 1965 the IEF leadership complained that the Secretariat of Finance was not charging the full fee. With few financial resources, the IEF had few employees, almost all of whom were tasked with administrative functions. The first contracting of technical-agricultural (*técnico-agrícola*) staff was carried out in 1966 – four years after the IEF's foundation – with the goal of finally implementing some control over deforestation, but this capacity-building proved ephemeral: That same year forest surveillance power was transferred to the state Military Police. Though the IEF had by this time established some greenhouses with seedling trees in cooperation with some municipalities (14 in 1965 and 120 by 1969), and had signed reforestation agreements with some steel companies that did not have their own eucalyptus plantations, its limited capacity prevented the IEF from establishing a reputation as a competent reforester. In 1972, the state dealt the IEF another blow, placing authority to collect the forestry fee under the exclusive purview of the Secretariat of Finance. This action eliminated all of the IEF's decision making power by removing its access to resources (ibid., 26).

Nevertheless, the IEF undertook some limited reforestation-oriented actions in the 1960s. By 1965 it had created 14 greenhouses in cooperation with municipalities, and that number rose to 120 by 1969. During those years, the IEF also signed agreements with some steel companies that did not have their own eucalyptus plantations. In 1965, the institute proposed a five-year reforestation plan in response to the observation that, because of the lack of specific state financing and the existence of other potentially lucrative uses for land, most private steel firms – with the exception of ACESITA and Belgo-Mineira, two of the largest firms in the state – were not investing enough in reforestation on their own. The five-year plan set a goal of reforesting 330,000 hectares of forest, financed by the forestry fee and grants to private reforesters involved in the project. However, the plan was never implemented because it did not offer sufficient advantages to large-scale reforesters and was too costly for small rural property owners (ibid., 27-28). Finally, in 1970, the IEF proposed a Special Program for Financing Reforestation in Minas Gerais (*Programa Especial para Financiamento ao Reflorestamento em Minas Gerais*), which would offer income tax breaks to firms or people for reforestation. However, large firms preferred simply to work within the framework of federal Law 5,106 of 1966 – which instituted federal fiscal incentives for reforestation – and dispense with intermediaries such as the IEF (ibid.).[2]

The IEF did not become a leader in reforestation in Minas Gerais until it was invited to join the Integrated Reforestation Campaign (*Campanha Integrada de Reflorestamento*, CIR), launched in 1966 by the state Rural Association for Credit and Assistance (*Associação de Crédito e Assistência Rural*, ACAR) and the Rural State University of Minas Gerais (*Universidade Rural do Estado de Minas Gerais*, UREMG – currently Universidade Estadual de Viçosa), sponsored by the state government. The CIR leadership invited the IEF to join because the IEF, though resource-poor, had sufficient resources and experience to install tree seedling greenhouses, hire technical experts, and finance part of the CIR administration. "In little time, the [IEF] had become the principal organ of the Executive Council of the CIR, alongside ACAR" (ibid., 29).

The IEF consolidated its position in CIR during the presidency of a Ruralist, Carlos Eugênio Thibau (1967-71), who purged the last remaining representatives of conservationist interests from the institute and focused the IEF's mission exclusively on reforestation and silviculture to the benefit of the private sector. Thibau also reorganized the IEF to complement the mission of the newly established federal Brazilian Forestry Development Institute (*Instituto Brasileiro de Desenvolvimento Florestal*, IBDF – 1967). Thibau's goal was to stimulate private reforestation and to support growth in the planted forests sector by "substituting exploitation": By creating a system of "sealed areas" (*áreas de vedação*) – "forested areas for permanent preservation, untouchable, located in geographic points defined according to the representativeness of ecosystems to protect. In regions of *cerrado*, principally, into these [sealed areas] techniques of rational exploitation of residual native [vegetation] would be introduced" (ibid., 30; translation mine). By excluding conservationists from the IEF and promoting a policy explicitly oriented toward promoting a private forestry industry and sustaining the steel sector, Thibau ironically pushed forward an agenda that involved the creation of protected natural areas – even as he weakened the IEF's role in forestry management.

[2] "At the federal level, the Brazilian Institute for Forestry Development (IBDF), was created by Decree-Law No. 285, of 28 February 1967. Its goal was forestry promotion, having created a directorate of national parks, responsible for the National Parks Plan. In opposition to the creation of conservation units and to the decree of regulatory measures over the use of natural resources, the Decree-Law No. 1,134, of 1970, stimulated, through fiscal incentives, the forestry enterprises approved by the IBDF, conceding a discount of 50% on the income tax. This measure gave birth to a broad process of creating homogeneous forests in all of the national territory." (FJP 1998, 47; translation mine)

> Along with adapting itself to the policy of fiscal incentives for reforestation, promoted by the IBDF, in this period the IEF had its objectives altered. The defense of the state's forest patrimony, by controlling deforestation, was no longer its principal function. Now, the conservation of these [forest] resources would be done by stimulating the incorporation of a numerous contingent of planted trees (by private initiative) to the structure of consumption, on technical bases that optimized their utilization, reducing costs and, additionally, but not as a necessary premise – reducing pressure on native forests. (Gonçalves 1990, 31; translation mine)

However, the IEF's decline in relevance continued under Thibau's successor, Edson Potsch Magalhães: Steel firm ACESITA opened a highway through Rio Doce State Park, and Magalhães' failure to prevent this robbed the IEF of any conservationist support it still had (ibid., 31). Furthermore, since the IBDF had begun to centralize forestry management and provide federal incentives for reforestation in 1967, the steel industry had no need for IEF incentives. By 1973, following this "gradual deterioration of its functions," the IEF faced possible extinction (ibid., 32; translation mine).

Though its powers and functions failed to consolidate, and were curtailed from 1965 to 1973, the institute itself became a source of patronage hiring, growing from 11 to 126 employees in the ten years to 1973. The IEF indeed became useful to both the UDN and PSD – the two major parties in Minas Gerais at the time – and this usefulness to political parties helps explain why the "IEF expanded its staff basically in Belo Horizonte and, even so, had fewer than ten professionals with superior level training, while the number of offices of monitoring and enforcement in the interior [of the state] did not surpass, in 1973, the total of fifteen units" (Gonçalves 1990, 33; translation mine). Only after 1973, when a new president reformed the IEF's administration, would employment growth in the institute reflect growing capacity to implement programs and policies, rather than political patronage.

Agriculture, Forestry, and Conservation in the IEF, 1973-1979

In 1974, ex-ACAR director José do Carmo Neves became President of the IEF and enacted an administrative reform that would begin to sever employment and political parties. This initiative would lead to a doubling of the 1973 employment level by 1977, and a tripling of it by 1980, that corresponded to growing capacity within the IEF. Over the course of the decade, conservation of biodiversity – particularly creation and management of conservation units – began to take a more central role in the IEF's portfolio, and by 1984 the IEF had established a Directorate to manage conservation units.

Several trends and events, both within the IEF and parallel to the institute's trajectory, brought environmental conservation greater attention in the 1970s than had been the case in the previous decade. First, as industrial growth in Minas Gerais, São Paulo, and Rio de Janeiro continued apace, urban residents began to become concerned about pollution, as well as forests. Over the course of the 1970s, the state economy evolved from one dependent on ranching, mining, and steel, to an expanding and diversifying industrial sector that included production of paper and cellulose, chemicals and petroleum derivatives, rubber, non-metallic minerals, and metallurgy (FJP 1998, 63). The increase in pollution that accompanied the growth of heavy industry in the state planted the seeds for environmental activism:

> The strongly polluting characteristics of the expanding industrial sectors led to the degradation of the environmental framework, principally in the Metropolitan Region of Belo Horizonte (RMBH) and in the Steel Valley [*Vale do Aço*]. The principal consequences

> of that process, in environmental terms, would be observed in the urban environment, which would absorb the bulk of impacts from industrial growth, with the increase in demand for habitation for the low income population, basic sanitation, education, transport, and supply..... The growth of the mineral extraction sector – 18% on average between 1970 and 1974 – generated a very negative impact on the environment, especially in the form of erosion, water pollution, and disfigurement of the landscape. With respect to the vegetal extraction industry, reforestation should be cited as a cause of grave environmental and social damages.... Though centered in the most intellectualized segments [of society], from the University, and supported by demands and popular mobilizations around large steel, mining, and cement firms of the metropolitan region [of Belo Horizonte], the rise of environmental consciousness, which has its start in this period, appears to constitute a relevant triggering factor for the process of institutionalizing a state system of environmental management. (FJP 1998, 64; translation mine)

In 1973, environmental activist Hugo Werneck founded the Center for the Conservation of Nature (*Centro de Conservação da Natureza*, CCN) in Belo Horizonte – the state's first major environmental NGO. During its first decade, the CCN took a radical position in defense of a conservationist view of environmental protection. The NGO mixed strategies, including denouncing activities that caused environmental degradation and advocating for conservation units and other forms of nature protection. The CCN both worked with governors, and adopted outsider strategies, including protests and denunciations to the press (FJP 1998, 65). During this period, the CCN's actions produced a few important victories, including Mangabeiras State Park, Tripuí Ecological Station, and Serra do Cipó State Park (now a National Park), and the preservation of Rio Doce State Park (ibid.). The CCN was joined in 1978 by the Mineira Association for the Defense of the Environment (*Associação Mineira de Defesa do Ambiente*, AMDA), an NGO that remains active to this day in state environmental politics (Ribeiro 2009, 88-90; Author interview with Francisco Mourão, AMDA, 2012). These NGOs advocated for both "green" – nature protection – and "brown" – pollution – environmental agendas, and found support in a state that was increasingly embracing planning and reforestation. According to José Carlos Carvalho, former President of the IEF, Secretary of the Environment of Minas Gerais, and Minister of the Environment under President Fernando Henrique Cardoso:

> [The reform of Minas Gerais state environmental institutions in the 1970s and 1980s] was not a spontaneous decision of ours as State employees. It had a lot to do with demands of the conservationist movement and later with the environmentalist movement in the state. The CCN played a decisive role in those demands, and later the Biodiversitas Foundation, and the Mineira Association for the Defense of the Environment. So these entities representing civil society will exercise a political role that is very important so that those demands [for environmental governance in the state] were institutionalized within the scope of government. (Author interview with José Carlos Carvalho, 2012; translation mine)

Institutional developments in the state government responded to increasing concerns with environmental problems in Minas Gerais and in the rest of Brazil. Governor Israel Pinheiro (1966-71) founded the João Pinheiro Foundation (*Fundação João Pinheiro*, FJP), a planning and management agency tasked with promoting economic development in the state (Ribeiro 2009, 95). In 1975, the FJP created a Directorate of Technology and Environment (*Diretoria de Tecnologia e Meio Ambiente*, DTMA) to "coordinate the formulation of state programs of technological research and environmental protection" (FJP 1998, 59). That year, DTMA published a report on environmental challenges caused by industrial pollution in the Belo Horizonte metropolitan region,

and developed regional plans that "incorporated the question of the environment and the use of natural resources" (Ribeiro 2009, 95; translation mine). This report also laid the institutional foundations for a State Environmental System (*Sistema Estadual de Meio Ambiente*) (FJP 1998, 67-68).[3]

In this changing national and state context, the IEF, under President José do Carmo Neves, reorganized administratively and launched new programs designed to rescue the institute from the irrelevance into which it had sunk. First, in 1974, Neves revamped the IEF's administration and sought to place more technical employees in the field. Among other actions, Neves began to open new IEF field offices: "If in 1970 there were just five Forestry Offices in the state (in Curvelo, Divinópolis, Juiz de Fora, Governador Valadares and Varginha), in 1975 this number had reached about 27, the majority created after 1973" (Gonçalves 1990, 61; translation mine).

Second, in 1975-76, the IEF launched the Environmental and Forestry Education Campaign, which included the publication of educational fliers about the importance of conservation. Second, in 1976 the IEF inaugurated the Program of Reforestation on Small- and Medium-Sized Rural Properties (REPEMIR) in cooperation with the federal IBDF, the Government of Minas Gerais, and the Minas Gerais Development Bank. The same year the IEF entered into a partnership with the state Secretariat of Education to publish environmental educational materials. Finally, the IEF signed an accord with the IBDF to supply the IEF with funds to purchase equipment for the Center for Forestry Research and Training in Rio Doce State Park (IEF 2009, 37-38). Finally, in 1978, the state decreed the Serra do Cipó State Park, to be managed by the IEF (ibid.).

Revitalization of the institute was not solely based on administration reorganizations and new reforestation initiatives, however. The IEF also secured an alignment with the growing paper and cellulose industry – at the time a strategic industry for the state – and took advantage of evolving federal policies to privilege domestic over imported energy sources. After the 1973 oil shock the federal government sought to promote industrial use of domestically available energy sources, including wood and sugar cane-based ethanol. In Minas Gerais, those industries that were most representative of the state's economy – including cement, lime, steel products, textiles, ceramics, and paper and cellulose – were those that most easily entered into energy substitution programs. (After all, industry was already largely driven by wood-based charcoal in Minas Gerais.) In the mid-1970s the federal government began to promote large-scale eucalyptus plantations, which led to rampant land speculation in the distant north of Minas Gerais – far from the state's industrial centers – which reinforced the state's industry's dependence on energy from virgin forests nearer to production sites. Indeed, the federal government encouraged eucalyptus plantations in the poorer north of the state and in the south of its neighbor, Bahia, to promote rural development. By 1982, federal regional development programs prioritized agro-industrial interests in the Northeast over steel interests (Gonçalves 1990, 42-47).

[3] DTMA and CETEC were not the only state agencies involved in environmental issues. In the 1976 DTMA report, included are: UFMG (Departments of Sanitary and Chemical Engineering) measured air and water quality; COPASA (Companhia de Saneamento de Minas Gerais) and DAE (Deptamento de Água e Energia) worked with water pollution and basic sanitation; IEF's Section of Parks and Reserves; FIEMG (Federação das Indústrias do Estado de Minas Gerais), studying industrial pollution; IEPHA (Instituto Estadual do Patrimônio Histórico e Artístico); Conselho de Controle da Poluição Ambiental da Contagem. "The report signaled, also, its preoccupation with respect to environmental protection, the Permanent Commission of Defense of the Environment of the State Legislative Assembly, the Center for the Conservation of Nature (CCN0, the Mineira Ornithological Society (SOM) and environmental sectors in private companies (MBR, Mannesmann and USIMINAS." (FJP 1998, 69; translation mine)

Beginning in 1974, the IEF finally found a solid base of political support by aligning itself with the growing paper and cellulose agroindustry in the state, which stood to benefit from the IEF's reforestation initiatives (ibid., 36). As the federal government provided incentives for large-scale eucalyptus plantations – the majority of which ended up being created in the distant north – the state government and IEF worked within the framework of President Geisel's National Steel from Vegetal Charcoal Plan (*Plano Siderúrgico Nacional a Carvão Vegetal*, 1974) to fortify the state's industrial economy through Forest Districts (*Distritos Florestais*), which would be extensive and located near to industrial centers. The IEF carried out preliminary studies for Forest Districts in 1975, and strategically distributed them to privilege the paper and cellulose industry, but secondarily to meet the needs of producers of steel, wood products, sheet metal, resins, and lumber (ibid., 52).

During this period, the IEF directed the creation of Forest Districts in the Triângulo Mineiro, São Francisco river valley, Jequitinhonha valley, Rio Doce, and the Center-West metallurgical region, for a total of 2 million hectares in 172 municipalities. The majority of Districts were oriented toward paper and cellulose production because the IEF believed that Minas Gerais could come to produce 20-25% of the federal government's national paper and cellulose production goals. The Districts were placed in municipalities with cheaper land to increase the productivity of marginal areas of the state, but this came at the cost of creating Districts with lower soil fertility than those in São Paulo, Paraná, and Rio Grande do Sul – where the national cellulose industry was concentrated (ibid., 52-54).

Unfortunately, the Forest Districts did not achieve their goals, and the IEF once again found itself facing irrelevance. First, the Industrial Development Institute (*Instituto de Desenvolvimento Industrial*, INDI) preferred to set up a public-private partnership (*empresa de economia mista*) to receive investment funds from paper and cellulose firms relocating to the state, and to manage the Forest Districts. Second, only one firm from outside the state expanded its production to Minas Gerais, and so the state's initiatives fell short of its hopes of becoming a center of paper and cellulose production. Finally, the IEF had not identified and secured enough lands for Forest Districts, which combined with firms' reluctance to relocate to lead to failure in the state's efforts to integrate reforestation and industry (ibid., 54). By the late 1970s, the dream of turning Minas Gerais into a national cellulose pole had begun to die (ibid., 55).

Nevertheless, the IEF continued to expand throughout the decade by focusing on reforestation on rural properties, environmental education, and its survey work for Forest Districts. By 1979, when Neves stepped down as IEF President, the institute ran 57 Forestry Offices throughout the state, and that year it regained control over deforestation and environmental licensing in the state (IEF 2009, 38-39). That same year, the IEF became involved in federal and state programs to reforest and protect the São Francisco river water basin and to control soil erosion in communities in the north of the state. Finally, in 1979 the IEF won a Supreme court battle to regain control over the collection of the forestry fee (*taxa florestal*). The STF decision not only returned collection rights to the IEF, but also endowed the institute with police powers to enforce environmental laws (ibid.). These reforms empowered the IEF to license deforestation in the state and punish environmental crimes – the IEF finally had teeth. The following year, the IEF made a significant investment in conservation by creating the Sumidouro State Park (ibid.).

The IEF Moves Toward Conservation, 1981-1995

In 1981, José Carlos Carvalho – who had been a rising star in the IEF since 1975 – became IEF General Director, and he consolidated Neves' reforms and focus on reforestation of rural properties. The capacity and reputation of the institute were boosted that year when the state-owned mining firm, Companhia Vale do Rio Doce (CVRD, now Vale), contracted the IEF to develop plantation in the company's region of influence. The IEF was further fortified by the problems for industry from the accumulation of eucalyptus plantations far from industrial centers and the high cost of lands close to those industries, which led the IEF to become involved in helping firms design forestry production strategies (Gonçalves 1990, 71). By 1982, reflecting the IEF's growing activity and reputation, the institute had 102 Forestry Offices (ibid., 63).

In this period, despite efforts to foment eucalyptus plantations as an alternative to virgin forests to power industry, deforestation control was still not a major state government policy goal. Indeed, enforcement of laws restricting deforestation elicited opposition from private landowners, who viewed such restrictions as violations of private property rights. "Therefore, one cannot expect that such an activity, even if tolerated, would become the principal policy line of the Institute" (ibid., 73; translation mine). But the IEF's definition of its programs in terms of reforestation had led over time to an institutional concern with conservation – first through Thibau's substitution paradigm, and later through a greater focus on saving remaining virgin forest lands.

This growing concern within the IEF with conservation was bolstered by conditions placed on new World Bank-funded projects. The first project, vetoed by federal Minister of Planning Delfim Netto in 1982 but re-launched in 1986, sought to expand eucalyptus plantations and reforest over 41,000 hectares on rural properties – but also provided funding for forest monitoring, conservation education, and infrastructure and research on state forest parks and biological reserves (ibid., 74). A second project, the Rodovia do Carvão (Charcoal Highway), funded by the Inter-American Development Bank, had the IEF carry out an environmental preservation pilot program. According to Gonçalves (1990, 75; translation mine), "It was exactly the presence of this other international agency that ended up guaranteeing the participation of the IEF in the project, since one of the demands in order to free financing for the state government was the presence of an environmental degradation control component [in the project], given the nature and magnitude of the project."

With growing societal and political concern with environmental conservation and pollution issues throughout Brazil in the 1980s (Hochstetler and Keck 2007), and the seeds of an environmental management system in Minas Gerais having been planted in 1979 with the foundation of COPAM (State Environmental Commission), gubernatorial candidate Tancredo Neves floated in 1983-84 the idea of creating an Institute of Nature Conservation in the state. Neves found support for this idea in meetings with key environmental activists (including Hugo Werneck, Ângelo Machado, Amílcar Martins, Célio Valle, Henrique Porto, and Henrique Alves) on the campaign trail. Once elected, Neves consulted with José Carlos Carvalho (now President of the IEF), who suggested that "instead of creating a new organ, [the governor] should do a reform of the IEF, expanding the scope and focus of the Institution" (IEF 2009, 41). Neves agreed and sent legislation to the state Legislative Assembly to restructure the IEF. The bill was approved as State Law No. 8,666 in September 1984.

> With this, a fundamental change occurred in the directives of the Institute, which began to direct the focus of its activities toward the rationalization of forest exploitation and the preservation of nature. According to the law, the IEF could propose a forest policy, rather than just coordinating and executing it. Among its new attributions, what stand out are [that

the IEF could] "direct, orient, promote, and monitor and enforce activities [including] exploitation of forests, land and aquatic wildlife, aiming toward their conservation, protection, and development"; and "administer and conserve the state parks, the equivalent reserves and the forests under State domain". (ibid.; translation mine)

The same year, the IEF created the Directorate of Parks and Equivalent Reserves – the institute's first reform that would establish an explicit policy goal involving the creation and management of conservation units.[4] In 1984, the IEF signed an accord with SEMA to transfer management of Permanent Protection Areas (*Áreas de Proteção Permanente*, APP) – a protected area established along riverbanks and on private properties, but that is institutionally separate from conservation units examined in this study – to the state (ibid., 41-42). Several more accords followed in 1986 to reforest and protect water basins, as well as expand the supply of commercial timber and provide environmental education to rural and urban populations (ibid.). Finally, in 1986-87 Carvalho negotiated a major project, Pró-Floresta, with the World Bank, which established a forest fund and tightened IEF's partnerships with international institutions (ibid., 44).

However, the IEF's growing prestige and growing capacity to engage with environmental protection would be temporarily interrupted by Governor Newton Cardoso (1987-91), who enacted austerity measures that threatened all state institutions. Austerity hit the IEF especially hard, and threatened it with dismantling: "Rapidly, the Institute loses its employees, stops receiving sufficient resources from the State Treasury for necessary expenses, and loses its autonomy in terms of the decision making process vis-à-vis the Governor" (Gonçalves 1990, 76; translation mine). Carvalho stepped down from the Presidency in 1987, and the IEF endured three short presidencies from 1987 to 1991, exacerbating its institutional instability. During this time, Pró-Floresta stagnated, but the IEF gained responsibility for fire prevention and benefited from early decentralization policies: In 1991, the State Forestry Law transferred federal environmental attributions to the state in a co-management arrangement between IBAMA and the IEF, and embedded ecological sustainability principles in forest management (IEF 2009, 44).

When Hélio Garcia replaced Newton Cardoso as Governor in 1991, Carvalho returned as IEF director, and reactivated Pró-Floresta, leading to more reforestation. At the same time, Carvalho promoted another round of reorganization of the IEF, incorporating conservation unit creation and management as one of the institute's core responsibilities, and increasing the institute's operational transparency. In 1992, the year of United Nations summit in Rio de Janeiro, Governor Garcia signed a contract with a private consortium to improve forest monitoring and environmental education in the state, and in 1993 IBAMA decentralized some of its functions, placing the IEF in charge of registering forestry projects, licensing forest clearing, establishing reforestation requirements, analyzing supply plans for firms that consumed forest products, and policing illegal forest clearing through fines, interdictions, and embargoes (ibid., 45). As these changes took place, the planting of eucalyptus gradually became a lower priority for the IEF, and environmental management and planting of native species became more important.

The enacting of the State Forestry Law and decentralization of IBAMA's competencies to the IEF engendered a reaction from the private sector, including forestry, that became muted over

[4] According to José Carlos Carvalho, "In 1982, with the election of Governor Tancredo Neves, this [reform] occurred approximately in 1985, I don't have the precise date, there was another administrative reform of the institute that I directed as President, and we created the first Directorate of Parks and Equivalent Reserves" (Author interview with José Carlos Carvalho, 2012; translation mine).

the following years as eucalyptus plantation owners relocated operations to states with weaker environmental laws. According to Carvalho (Interview with the author, 2012; translation mine):

> I think that it was the fact that Minas Gerais had a specific law since 1991, Minas was the first state that used its concurrent jurisdiction [*competência concorrente*] from the Constitution of 1988 to create a forestry law that began to create hitches, that is, the first reaction of the sector in relation to the forestry law [was that] a good part [of the forestry industry] went to the North of Brazil [the Amazon] – today they're in Pará and Maranhão. Minas Gerais today is the state that has the largest reforested area in Brazil, a leading state in reforestation and in scarcity as well. There was a scarcity imposed by the [forestry] law, but what happened was an exporting of environmental harm from Minas to Goiás, Bahia, Mato Grosso and Tocantins, from where a majority of vegetal charcoal comes that is used today. So, that which was done in Minas, since it wasn't done more broadly, ended up transporting the predatory use [of forests] to Pará and Maranhão by steel firms that perceived that they weren't going to have a life based on a predatory model [in Minas] – and others stayed here but opted to bring in the charcoal from other states, in which the IEF does not have jurisdiction to exercise its police power.

Management and preservation of conservation units also emerged as a new priority in the early 1990s. In 1993, the IEF partnered with UNICEF to educate communities located near conservation units in the Jequitinhonha valley (in the north of the state) about the environment. For this effort, the IEF was awarded the state's Environmental Citizen prize. From 1991 to 1994, the IEF developed 17 ecological research projects related to preservation and "perfection" of conservation unit administration.

> In the Ibitipoca State Park, for example, studies on flora, fauna, and historical and cultural aspects were promoted; and in the Itacolomi State Park, [studies were conducted] on avi-fauna, flora, the distribution of endemic species, geology, geomorphology, animal health, and historical and cultural aspects. (IEF 2009, 47; translation mine)

The IEF's increasing focus on environmental management represented changing priorities in society that were reflected in state and federal institutional changes over the course of the 1980s. According to José Carlos Carvalho (Interview with the author, 2012; translation mine):

> I think there was a natural expansion of the powers of the institution and also of its political role, as society got organized and started demanding more, that's the difference. In my first term, there were very few demands from society, so we had a greater policy freedom, but happily with the mobilization of society this began increasing. You also see a management model in Minas Gerais that we always bet on – a participatory and collegial model. So, from the first reform of the IEF we created an administrative council, to which civil society and the productive sector had access, to create a huge space of conflict management. This also helped a lot in that process, but the big difference between one style of management and another, was the strengthening of civil society and the improvement in the private sector's demands.

Nevertheless, management of conservation units remained a low priority within the IEF, because of a lack of societal pressure to improve. What improvements were made stemmed from the professional training of IEF employees, but found little support in Mineiro society:

> I would say to you that in the first moment that preoccupation accrued much from the professional vision of those who were administering. There was no demand, properly speaking, from society to induce the government to do that. There was a group of people in charge who had training and vision that that was necessary, and in a second moment you

didn't, that became a societal demand. The government received pressure to administer the parks and protected areas. (Ibid.)

However, UC management became a higher priority within the IEF than it was in IBAMA, because IBAMA had multiple priorities that superseded conservation unit management. Carvalho again:

> Under the IEF, the priority for protected areas was greater than in IBAMA, because as the agency that manages environmental licensing in Brazil, [IBAMA] has practically all of its energy channeled to environmental licensing due to the demands and what that represents for the economy, for protection of the environment. While in the states, and Minas is one of them, the agenda of the IEF was just fauna, flora, and protected areas. (Ibid.)

In 1995, the state of Minas Gerais took a major step forward in institutionalizing environmental management with the creation of the Secretariat of the Environment and Sustainable Development (*Secretaria de Meio Ambiente e Desenvolvimento Sustentável*, SEMAD), pioneered and headed by Carvalho, who became the first Secretary of the Environment of Minas Gerais under Governor Eduardo Azeredo. SEMAD combined agencies that worked with environmental issues but were then institutionally fragmented into one single bureaucracy – a reform that paralleled the creation of the Ministry of the Environment from 1992 to 1994 at the federal tier. According to Carvalho, SEMAD was necessary to coordinate environmental management across agencies:

> Fragmentation, lack of coordination, and disarticulation. These were the problems prior to SEMAD. There was the IEF in the Secretariat of Agriculture, and even though it had a clear institutional mandate, it suffered from the influence of agricultural interests that didn't always coincide with the interests of conservation of forests. There was also the State Environmental Foundation [*Fundação Estadual do Meio Ambiente*, FEAM] linked to the Secretariat of Science and Technology, without any practical links with the results of pollution control, without connection to the productive sector. And we had the management of water in the Secretariat of Mines and Energy, which was entirely subordinated to the interests of the energy sector, so we didn't have any oneness ["*unicidade*"] in environmental policy in the state. (Ibid.)

Bringing the dispersed agencies into a new Secretariat of the Environment was a difficult process that involved political maneuvering. The process began under the second administration of Governor Hélio Garcia (1991-5), but completed under Governor Eduardo Azeredo (1995-8):

> It was really difficult!... There already was, in the Hélio Garcia administration, before the inauguration of Governor Eduardo Azeredo, a period of a lot of discussion and debate about the convenience for the state of having a Secretariat of the Environment. So this was already being discussed, on the other hand, in other states like Rio and São Paulo. They had a Secretariat of the Environment, but they didn't properly have a Secretariat with a robust institutional mandate to implant an integral environmental policy. So, we didn't want that model in Minas Gerais, and for that reason the Secretariat was not born earlier, because in the epoch of the Hélio Garcia administration, we worked with the then Adjunct Secretary, Anastasia, who was the big man of government planning, together with the ex-Minister Paulo Paiva... Anastasia and I envisioned, we carried out the first conversations inside and outside the state government to create a Secretariat, but the idea matured the way we wanted it to at the beginning of the [Azeredo] administration....
>
> The political commitment [from Azeredo] facilitated [the process], since it wasn't easy to take the IEF out of Agriculture, because we had to confront the resistance of Ruralist leaderships, from the agricultural sector... The conflict [regarding moving IEF to

> SEMAD] was more political than partisan, because in that moment the Secretary of Agriculture was the ex-Minister of Agriculture, Alisson Paulinelli, and in the moment of the creation of SEMAD, he had a very personalist political leadership that was above the parties. But we reached an agreement with him, and this facilitated [our efforts], since from the moment we reached agreement with him, all political resistance [to SEMAD] was reduced....
>
> In relation to FEAM it was easy, we didn't have problems, because this was already well designed and the old DRH [Directorate of Water Resources] that became IGAM [Mineiro Institute of Water Management], it came afterward, in a second moment. So, in the first moment we brought in FEAM and did the political articulations to bring in the IEF, which was fundamental, so that the Secretariat would have [a robust] structure, because it was an agency implanted throughout the entire state, it had operational capacity, it already administered all of the parks, it already had [an environmental] vision. FEAM brought in more personnel from the academic area, and we opted not to bring in water also, since we couldn't confront all of our adversaries at the same time. So we left it and only two years later, in 1997, we created IGAM, with an absolutely modern vision, anticipating the creation of the National Water Agency (ANA). (Coincidentally, I also created ANA when I was Executive Secretary and Minister of the Environment.) (Ibid.)

With the creation of SEMAD, all state UC management was transferred to the IEF:

> When SEMAD was created in 1995 and [Brazil] didn't have SNUC yet, Brazil had more or less a double system of conservation units – you had a first inherited from the old IBDF and another inherited from the old SEMA. The Ecological Stations that were linked to SEMA, in Minas were linked to the State Environment Foundation. With the creation of SEMAD in 1995, the IEF became the only management agency of the protected areas of the state, and FEAM transferred to the IEF all of the Ecological Stations that it possessed – which were minimal in number, two or three. (Ibid.)

Having acquired management of all of the state's system of protected areas with the creation of SEMAD, the IEF deepened its engagement with conservation issues, rendering its concern with planting eucalyptus secondary. According to Carvalho, both consistent pressure from civil society organization such as the CCN, Fundação Biodiversitas, and AMDA, and internationally-funded projects helped the institute to focus its efforts on improving environmental management. According to Carvalho (ibid.):

> [In the late 1990s and 2000s] we had the opportunity to professionalize management, and to have career technicians ["*técnicos*"] – people with master's degrees, doctorates. This for me was fundamental. In 1997 we got help from the World Bank with PROFLORESTA and in 2003 with PROMATA by the KfW. Here it's necessary to recognize that more important than the money that comes from outside is the commitment that it brings in relation to management, since it comes with a demand for quality, that money is good because it brings the obligation to plan, to publish annual operational plans, which help the institution to grow from the point of view of management. So with all due respect the money from PROMATA was important, but the state would have had this money – we're talking of 7 million Euros, which is not a huge amount of money compared to the budget of Minas Gerais – but it served as a seed to improve management, which was fantastic.

The same year that Carvalho and Governor Azeredo created SEMAD, 1995, the state enacted a fiscal incentives law to encourage municipalities to create conservation units. This law, known informally as the "Robin Hood Law" (Law No. 12,040 of December 1995), distributed

portions of the state ICMS[5] to municipalities that invested in conservation units and basic sanitation (Author interview with Mônica Starling, of FJP, 2012). This law, which is still in effect in the state, has led to an extensive municipal system of conservation units – which, nevertheless, is in its majority accounted for by APAs.

The IEF in SEMAD, 1995-2012: A Renewed Focus on Conservation Units, and Institutional Challenges

After the creation of SEMAD and the transferring of IEF from the Secretariat of Agriculture to the new Secretariat, Minas Gerais entered its most active period in terms of conservation unit creation. In the decade of the 1990s, the state established 25 new conservation units, 16 of which were strict protection, and 8 of which were sustainable use. All 8 of the sustainable use UCs are APAs, and include the APA Sul-RMBH, in the Iron Quadrilateral region south of Belo Horizonte, and one of the two state APAs (Bacia do Rio Pandeiros) in the distant northwest, the Sertão Veredas-Peruaçu conservation unit mosaic. Among the strict protection units, the state created two Ecological Stations (Água Limpa and Fechos), one Biological Reserve (Serra Azul) and 14 State Parks. Of these units, 18 were created between 1995 and 1999. The state kept up the pace through the 2000s, when it established 19 strict protection and 4 sustainable use UCs (two State Forests, one Sustainable Development Reserve, and an APA); and in the first two years of the 2010s, when it created 13 new strict protection and one sustainable use UC (the APA do Alto do Muruci in 2011). Included among the UCs created in the 2000s are seven UCs in the northern Jaíba region, which were established as compensation for the Jaíba irrigation project. Approximately twenty more UCs have been proposed as compensation for urbanization of the Northern Vector of Belo Horizonte, an ecologically fragile region where Governor Aécio Neves (PSDB) in 2009 proposed to locate the new offices of the state government. (The offices of the state government have since relocated to the Northern Vector.)

The quickened pace of conservation unit creation in the 1995-2011 period indicates a renewed focus of the IEF on biodiversity conservation, as the agency was now housed in the Secretariat of the Environment – rather than Agriculture – and had exclusive authority over the creation and management of all categories of conservation units. Outside funding for conservation units, through PROMATA and KfW financing, also helped to improve management in the IEF, and to concentrate its goals and efforts throughout the 2000s (Author interview with José Carlos Carvalho, 2012). The renewed commitment of the IEF to conservation is evident not only in the pace of conservation unit creation, but also in related actions: In 2005, the IEF and technicians from the Federal University of Lavras launched a map of vegetation coverage in Minas Gerais, part of the state's forest inventory. That same year, the IEF organized the state's first Mineiro Biodiversity Congress (*Congresso Mineiro de Biodiversidade*, Combio). In 2007, the IEF created a new Directorate of Protected Areas, "reinforcing the institution's role in that area" (IEF 2009, 51).

> The Directorate of Conservation and Biodiversity was maintained, and a Directorate of Forestry Development was instituted, with a modern vision that reconciled production with preservation and recovery of degraded areas. (Ibid.)

Reforms and renewed commitment to biodiversity conservation, however, did not produce a consistent period of stability. After serving as Secretary of the Environment and Sustainable

[5] A tax on merchandise collected by states and distributed to municipalities under conditions that vary by state. To date, 17 states have enacted what is known as a "Green" ICMS, through which some money is distributed to municipalities that enact environmental management measures (Nature Conservancy 2008).

Development of Minas Gerais from 1995 to 1998, in 1999 José Carlos Carvalho, the architect of most of the state environmental institutional reforms in the 1980s and 1990s, left SEMAD and the IEF to become Executive Secretary of the Ministry of the Environment, and then, in 2002, Minister of the Environment – a post he held until the end of President Fernando Henrique Cardoso's term in 2002. Carvalho returned as Secretary of the Environment and Sustainable Development of Minas Gerais in 2007-10, but resigned in the wake of a scandal involving the Director of the IEF, Humberto Candeias Cavalcanti (2007-10).

The 2003 to 2007 period saw further reforms to SEMAD and IEF. In that period, Carvalho, who had returned to the IEF, and collaborators created a Superintendence and transferred licensing authority to it. The challenge reformers in the state government faced was that the IEF had gained both licensing power for local deforestation, and was in charge of enforcing the licenses. For Carvalho and others, this created conflicting incentives as the agency would benefit both from licensing fees and fines for non-compliance. So, in 2006-7, Carvalho and other reformers proposed centralizing monitoring and enforcement into a specific Secretariat, and to remove that authority from FEAM, IEF, and IGAM. Under the new plan, agencies under SEMAD would specialize – FEAM in waste management, IGAM in water, and IEF in management of forests and biodiversity, including protected areas (Author interview with José Carlos Carvalho, 2012).

The importance of these and other reforms in the IEF became apparent in 2010-11, when Candeias Cavalcanti was arrested for corruption[6] in an illegal deforestation scheme in which he and allies in the IEF allegedly issued fraudulent environmental licenses for the production of wood-based charcoal (Lara 2010). The arrest paralyzed the IEF temporarily: "The MP is still investigating, the denunciations are still not proven, but we acted politically, removing people without value judgment... but there was a problem, a political problem existed" (Author interview with José Carlos Carvalho, 2012; translation mine).

When I visited the IEF in March of 2012, the agency was still recovering from the scandal and other problems that coincided chronologically with it. One technician in the IEF, commenting on the restructuring that took place after Candeias and his allies were removed, told me

> A lot of the restructuring of the agency was after that scandal. A lot of employees fell. The agency had to be restructured, because new employees arrived. Leonardo [Ivo, Director of Protected Areas in 2012], Marcos [Affonso, Interim Director of the IEF], came from outside, and others. Until Marcos arrived, we went through several Directors – one was a Director of SUPRAM, then José Cláudio of FEAM, then Marcos Affonso. I understand that this changing of managers was to change the agency, to change the people, the face of the agency. In the interior [of the state] there were also changes. The IEF is the most decentralized agency of Minas, we have offices in small cities [of the interior]. We have representation in the interior, and when the scandal occurred, changes happened throughout the state. I think the change is good, but it occurred together with the scandal, so I think the scandal was a motivating factor....
>
> In terms of budget and personnel, [the scandal] weakened [the IEF], but I don't see it as a [permanent] weakening. We got to hire new personnel immediately. Now, in DIAP, we're going to receive 29 new employees, in addition to the competitive exam that'll take place at the end of this year [2012]. We expect things to improve. (Not-for-attribution interview, 2012; translation mine)

[6] Candeias was arrested in 2010, in the city of Teófilo Otoni, while campaigning for State Deputy for the PSL party.

Despite the employee's expectations of improvement, the IEF remains an agency vulnerable to political changes: According to my informant, about 50% of the IEF's employees are contracted, and so do not have career stability. As recently as July 2011, a significant proportion of the personnel in the IEF were paid by outside funding, rather than by the state's budget:

> Our department [in the IEF], until July of last year [2011], everyone, except one or two employees, everyone was [paid by] an agreement [*convênio*] with UNESCO, there wasn't a single [career technician] in the department. [UNESCO] left, we perceived this, it was announced and we got worried.... [The scandal erupted, the directors of the IEF were removed,] Leo [Ivo] arrived, two days went by, and the whole world left [due to the exit of UNESCO]. We had to start over practically from zero. We have that weakness, yes. (Not-for-attribution interview, 2012)

Around the same time, the IEF had trouble staffing conservation units with park guards. According to an IEF staff member:

> All of our park guards are contracted from around each UC. They are the most motivated, and the population says "Wow, the IEF gives us jobs...," which changes their conception [of the UC]. Last year [2011] we had a crisis in which we had to let all of our park guards go – the concessionaire failed, and now we're working with a public firm, which means we have to hold a competitive exam. Many of our park guards can't pass an exam. They have very little education. And that was the year of the worst fires in Minas. This year we were able to undertake a mass hiring, with two big firms, that hired the employees indicated by us – each manager of each UC indicates who they want to hire. With this hiring our personnel are considerably happier. (Not-for-attribution interview, 2012; translation mine)

The IEF has worked through this institutional instability to gradually implement management institutions on its conservation units. Beginning in 2008 – the first year the IEF dedicated a share of its budget specifically for management of UCs, rather than exclusively for monitoring and enforcement – the IEF started dedicating personnel to creating management councils and writing management plans for its conservation units. As of 2012, roughly 88% of the state's conservation units possessed councils. However, this figure was reached by creating one council for several conservation units that are near or adjacent to each other in the same region – so not all of the state's units have their own council (Author interview with Infaide Patrícia, IEF, 2012). Though implementation is done with only 5 IEF technicians (plus conservation unit managers), the IEF receives support from environmental compensation payments from steel and mining firms, including Vale. According to Infaide Patrícia (Interview with the author, 2012), who directs implementation of UCs in the IEF, environmental compensation can take the form of a polluting firm's financial and/or technical support for the creation or implementation of a UC.

Beginning in 1962, the state of Minas Gerais sought to manage exploitation of its natural forests in order to ensure the long-run sustainability of its steel industry, which was dependent on wood-based charcoal. The state agency, the IEF, was born and remained institutionally weak and subordinate to the interests of steel, agriculture, and the new eucalyptus plantation industry until the 1980s, when it began to shift its priorities toward conservation. The shift was gradual at first, and coincided with the declining importance of the eucalyptus industry, and the exit of steel firms and eucalyptus plantations from the state to less environmentally restrictive states to the north, including Pará and Maranhão. As pressures to provide charcoal in-state subsided, and grassroots environmental movements became more active in the 1980s and 1990s, the IEF turned its attention toward preserving biodiversity, and established a large number of conservation units in the 1990-2011 period. Nevertheless, the stringent conservation units the IEF established cover little territory,

and are largely located in mountainous regions where opposing interests are weak or absent. The larger units, which cover broader regions and include land intensive industries within them, are APAs. To this day, the IEF remains institutionally fragile, subject to politically-motivated changes, and in contentious areas supports less restrictive conservation units than the federal government does. In the next section, I illustrate the continuing developmental focus of the state government and the IEF through a comparison of two conservation unit creation processes: The 1992-4 debate over the APA Sul-RMBH, and the 2009-14 debate that led to the creation of the Serra do Gandarela National Park.

The Power of Mining to Influence Conservation: APA Sul-RMBH vs. Serra do Gandarela National Park and RDS Nascentes Geraizeiras (1992-2014)

I argue in this study that vested economic interests exercise greater power over subnational than national governments, and so subnational governments are likely to establish more permissive types of conservation units than national governments are, all else equal. In this section, I will support this claim by evaluating the contentious processes of creating the state APA Sul-RMBH (1994) and the federal Serra da Gandarela National Park and Nascentes Geraizeiras Sustainable Development Reserve (2014).

All three of these UCs are located in the Iron Quadrilateral region of Minas Gerais (see Map 5.1), which encompasses a broad region surrounding Belo Horizonte. These three UCs were established during two creation processes: from 1990 to 1994 for the APA Sul-RMBH, and from 2009 to 2014 for Serra do Gandarela National Park and Nascentes Geraizeiras Sustainable Development Reserve. Because the latter two conservation units were established during the same process, and are adjacent to each other, I will consider these three conservation units as *two* creation *processes*. Both processes involved powerful mining interests, including Vale S.A., and so they illustrate the power of mining firms to shape conservation unit outcomes. With respect to my framework, I expect that in areas in which land intensive interests are dominant – in this case, mining – the federal government will opt for a *moderately strict* type of conservation unit, while the state government will opt for a *permissive* unit. These expectations are summarized below, in Table 5.2.

Table 5.2. Expected Conservation Unit Outcomes in the Iron Quadrilateral, Minas Gerais

		Land Intensive Industry	
		Dominant IRON QUADRILATERAL, MINAS GERAIS	Weak
Tier of Government	Federal	**2. Moderately Strict**	**1. Strict**
	State	**4. Permissive**	**3. Moderately Permissive**

In both cases, the state of Minas Gerais had strong ties to the mining industry. In the latter case, the Serra do Gandarela National Park and Nascentes Geraizeiras Sustainable Development Reserve, the federal government felt pressure from Vale S.A., but the state remained a closer ally of Vale than the federal government was. While in both cases UCs were established, in the case of

APA Sul-RMBH, in 1994, mining firms operating in the region were able to ensure that the type of environmental protection would be weak. The APA ensured that mining would continue in the *Quadrilátero Ferrífero*, or Iron Quadrilateral. In contrast, twenty years later Vale was unsuccessful in preventing the federal government from creating a National Park, though it did influence the park's boundaries in its own favor. The federal government also responded to local residents' concerns about both the National Park and Vale, and ceded a portion of the original proposed boundaries of the National Park for a federal Sustainable Development Reserve, Nascentes Geraizeiras, which is a *moderately permissive* category of conservation unit (see Chapter 2, Table 2.2).

While conservation unit preferences and outcomes in the Iron Quadrilateral by tier of government do not strictly match my stylized expectations, the implications are similar: The federal government preferred a strict unit in 2009-2014, while the state government supported a permissive unit in 1994, and sought at different points in the 2009-2014 Serra do Gandarela debate to propose more permissive categories of conservation unit, to reduce the size of the National Park to open more land for mining, and at times to undermine the conservation unit debate altogether. In the end, the state government in 1994 decreed a permissive APA, while in 2014 the federal government reached a compromise with Vale and local residents that resulted in both a strict and a moderately permissive unit.

I begin the discussion of these cases by tracing the debates over the creation and then the implementation of APA Sul-RMBH, a major APA encompassing all or parts of thirteen municipalities south of the capital of Minas Gerais, Belo Horizonte. I show that the negotiations between local movements, mining firms, and the state institutions led to a conservation unit that only weakly protects natural lands. I will then trace the more recent debates and outcomes pertaining to the Serra do Gandarela National Park, located in an ecologically fragile area within the APA Sul-RMBH.

APA Sul-Região Metropolitana de Belo Horizonte (APA Sul-RMBH) – 1992-2012

The creation of the APA Sul-RMBH was driven by a movement of elite weekenders who in 1992 grew concerned about the environmental degradation caused by mining firms in the vicinity of their residences. Early arguments centered on the loss of scenic nature in the region that would later become the APA. Such arguments are embodied in passages such as this one:

> ..At the Morro [do Chapéu], we went to the Head Social Office incrusted into the highest point of the allotment. The scene we saw was unbelievable: the Southern Region of Greater Belo Horizonte is filled with more and more holes. The sensation is that all of the valley, which includes principally São Sebastião de Águas Claras (Macacos) could be transformed into a set of craters and a privileged scene for science fiction films of trips to Mars, Venus, or the Moon.
>
> We were facing the hard reality of the ADA-Sul, or Area of Environmental Degradation Sul!.... [The] most important conclusion at which we arrived until now: the permanent and causal residents of Casa Branca should make all efforts to avoid the actions of mining firms like Extrativa Paraopeba, which started mining [here] again and is breaking all speed records, having already irreversibly put holes in a good part of the Rola Moça mountain range in less than two months.
>
> And what is worse is that degrading activities are much closer to the Casa Branca Estates [*Quintas*] than we imagined. ("Na Região Sul de BH..." 1992, 1; translation mine)

This passage makes an argument regarding (primarily) the aesthetic ugliness of the mining operations, and then relates it to quality of life issues – the increasing proximity of mining sites to where the author lives, in the Casa Branca Estates.

Concerns such as these for quality of life where mining takes place drove residents of the Macacos region to form associations to denounce the ecological degradation caused by mining and real estate operations. The associations began a dialogue with state environmental agencies and mining firms, and later formed the São Sebastião das Águas Claras Community Council. The council sent the first APA proposal – APA Macacos – to state environmental organs FEAM and COPAM in 1992. Mining firms and municipal mayors expressed concerns about a new protected area imposing restrictions on economic growth, and to reduce tensions between them and environmental advocates, in 1993 the state sponsored a seminar to encourage dialogue between the private sector, NGOs, and state and municipal institutions (Laschefski and Costa 2008, 314-315). Foundational environmental NGOs from Minas Gerais, including Fundação Biodiversitas – which carried out environmental studies for the APA – and AMDA, participated.

All participants evaluated the seminar positively, but it failed to reconcile development and environmental interests. The private sector, including the Brazilian Mining Institute (*Instituto Brasileiro de Mineração*, IBRAM), wanted the state to finish its Ecological-Economic Zoning (ZEE) before establishing the APA, in the hope that doing so would reduce the restrictions placed on mining in the APA. On the other side, FEAM and most environmental groups involved in the discussions favored creating the APA before completing the ZEE, to stem degradation in the region and potentially fearing that the ZEE would open the APA's land to further exploitation. (AMDA, a major environmental NGO that still operates in the state, broke with the environmentalist side and supported completing the ZEE prior to decreeing the APA.) (Ibid., 315). During 1993 and part of 1994, the creation process stalled, as mining representatives sought to protect their potential earnings and find a way possibly to prevent the APA's creation (Freitas 2005, 5534).

Dialogue continued through June 1994, when COPAM approved the APA Sul-RMBH (State Decree 35,264), but left zoning and restrictions vague enough (and possibly, though not explicitly, subject to changes imposed by the APA's ZEE once it was published) that both sides of the debate could use the decree to support their own positions. "In this way, there was a *strategic freezing* in the implementation of the APA-Sul, while mining and real estate activities continued" (Laschefski and Costa 2008, 317; translation mine). Indeed, though an intergovernmental commissions was formed in 1994 to elaborate a management plan and a ZEE for the APA Sul, it did little prior to 1996 – due, according to representatives from environmental groups involved, to "a strategy of freezing debates and resolutions about APA Sul and its zoning... expressed in an extremely bureaucratized process that was not very permeable to participation from other entities, and centralized, since the principal deliberations remained under the purview of a commission that did not present effective possibilities for implementing the APA Sul in the determined period" (Freitas 2005, 5534; translation mine).

The impasse broke in 1996 in favor of the mining sector: That year, the IEF requested that Minerações Brasileiras Reunidas (MBR) donate 800 hectares of its property to create the Rola Moça State Park and Fechos Ecological Station. MBR donated the land, but in exchange, the IEF agreed to "adapt the ZEE [of the APA] to the mineral extraction needs of the firm ceding its land for the creation of the state park, in a clear expression that the state organ was subordinating itself to the mining firm's interests" (ibid.). The discovery of the agreement between the IEF and MBR galvanized the environmental interests, who denounced it and tried to get it revoked. In 1999, the

text of the agreement was corrected, and the management of APA Sul was transferred from the IEF to SEMAD (ibid., 5535).

In 1997, the APA's Consultative Council formed, and SEMAD began discussions with the World Bank for a loan of US$1 million to carry out the zoning. The state Technological Center Foundation of Minas Gerais (*Fundação Centro Tecnológico de Minas Gerais*, CETEC) developed a progressive proposal that took into account both ecological and economic concerns, and in September 1997 the APA Sul council approved it (ibid., 5536). However, due to turnover and shifting perspectives in the World Bank, as well as alleged foot-dragging by state elites, the loan never came through. Zoning stalled, and was restarted only in 2001 – after a high profile mining accident in the APA (ibid., 5537). The Mineral Resources Research Company (*Companhia de Pesquisa de Recursos Minerais*, CPRM), with funds from the federal Ministries of the Environment and Minerals and Energy, coordinated the ZEE – but the process stalled again (ibid.). In the end, the APA's first zoning plan was not completed until 2004, expired in 2007, and has not been revised since (Author interview with Luiz Roberto Bendia, IEF, Manager of APA Sul-RMBH, 2012).

The slow zoning process, and the placing of CPRM in charge of the ZEE, was viewed by environmental groups as a hand-out to the mining sector:

> In this way, we can infer that the recurring slowness imposed on the attainment of zoning, considered especially by the environmentalist entities and by some government technicians as an instrument to regulate economic activities in the Environmental Protection Area [APA], and the later assignment of leadership to a firm whose objectives are studies about mineral resources, aimed to meet, above all, the interests of the mining industry. In other words, there was a reading [of the situation] that [said that] the non-completion of the zoning was a strategy to stimulate a "planned depredation of the region" attending to the interests secularly inlaid there. (Freitas 2005, 5538; translation mine)

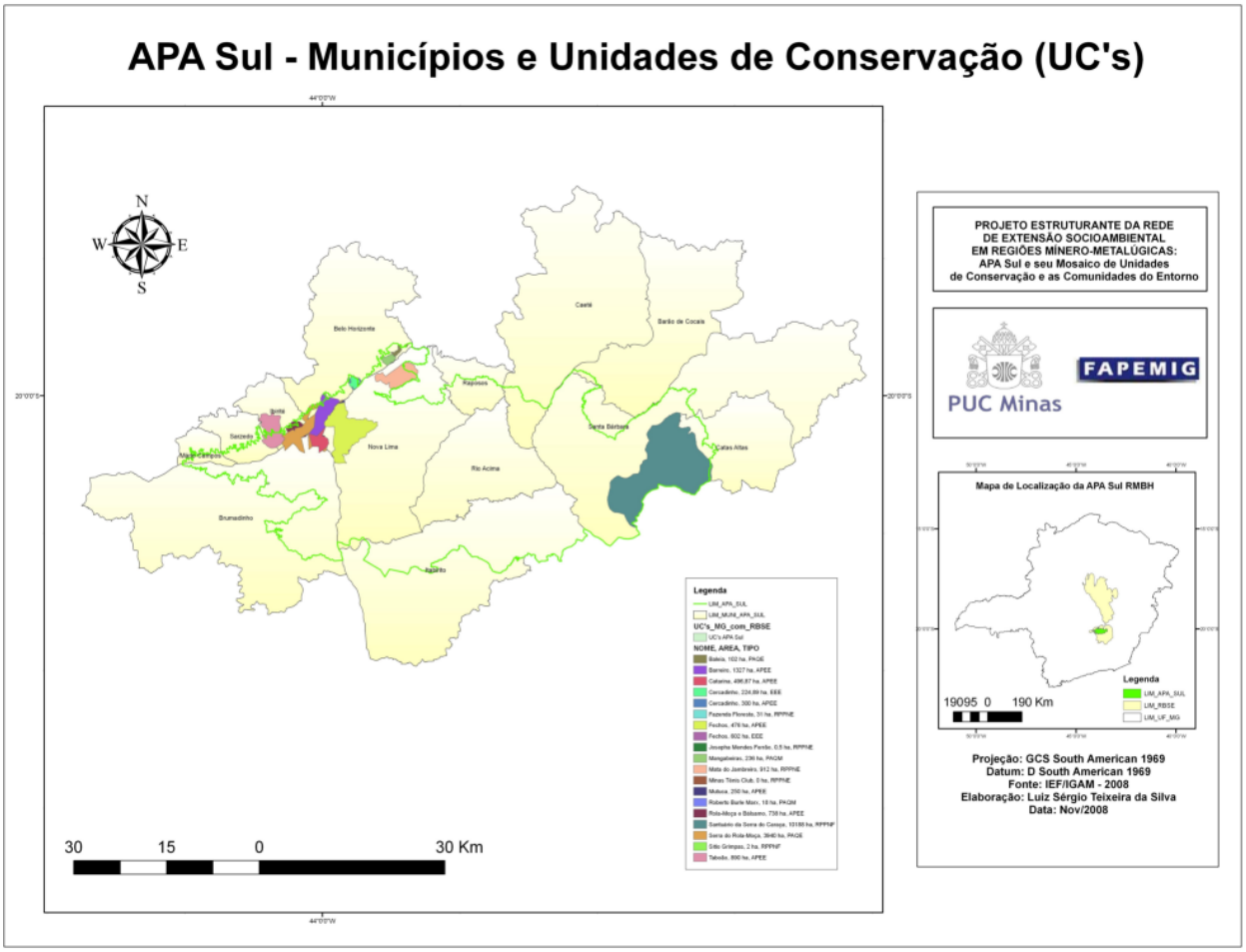
In the year since 2004, the state, private entities, and the federal government have established some strict protection conservation units within the APA Sul-RMBH. In 2007, as the IEF and other institutions within SEMAD underwent another series of reforms, SEMAD returned management of the APA to the IEF. When I visited the APA Sul-RMBH in 2012, it had a staff of three and operated in the Rola Moça State Park headquarters. Luiz Roberto Bendia, the APA Sul manager, explained to me that when necessary, he was able to borrow park staff for APA operations, but that his primary task was to oversee consultative council meetings and push forward the process of finalizing a new zoning and management plan.

In the early 1990s, local environmental activists petitioned the state of Minas Gerais to create an APA that would impose restrictions on mining operations near to residents' homes. Throughout the debates leading to the creation of the APA Sul-RMBH, mining firms resisted environmental groups' attempts to restrict mining in the conservation unit. They weakened the APA proposal by stoking local mayors' fears of economic stagnation, and withheld support for environmental studies. Once the APA had been established, the IEF – a state institution – made a bargain that infuriated environmental groups, but did not lead to significant changes in restrictions on mining. Rather, the CPRM was placed in charge of zoning, and another round of foot dragging helped cause a World Bank loan for APA management to fall through. In 2012, when I asked former IEF Director and State Secretary of the Environment and Sustainable Development, José Carlos Carvalho, whether the APA had at least made mining more sustainable, his answer was an equivocal yes:

> I think that the creation of the APA magnified the responsibility of the mineral sector. They perceived that now they were in a protected area, and so our [environmentalists' and the

state's] actions could no longer by lax actions, like was done in the past. [The APA] made environmental licensing more rigorous, it obliged the firms to make larger investments in infrastructure, but I also think that in the last decade, this was helped by the high prices of minerals in the international markets. Therefore, on the one hand the locational factor through the creation of the APA helped a lot, but I also think that the good minerals prices, which more than quintupled, helped the firms to have more capital to invest in environmental protection. (Author interview with José Carlos Carvalho, 2012; translation mine)

Map 5.4. APA Sul – Municipalities and Conservation Units



Source: Reproduced from PUC Minas and FAPEMIG (2008).

Serra do Gandarela National Park, 2009-2014

In October 2014, roughly twenty years after COPAM approved the creation of the APA Sul-RMBH, President Dilma Rousseff decreed six new UCs in Brazil, including two within the APA Sul itself: Serra do Gandarela National Park and Nascentes Geraizeiros Sustainable Development Reserve (RDS). She did so to win votes from environmentalist supporters of Marina Silva, who had just lost the first round of the 2014 presidential election. The decree threaded a needle between the demands of local environmental groups for a strict protection area to protect water basins and vulnerable soils known as *cangas*, and the intense resistance of Vale S.A., the country's

largest mining firm, which was trying to license an open-air mine known as Apolo, which would be located in the proposed area of the park. The debate over Gandarela Park pitted the federal environmental agencies – partisans of a strict policy that would limit Vale's access to minerals in Apolo – against the state – partisans of a more permissive approach that would establish a smaller park to permit Vale to operate – and Vale – which opposed the park, and instead favored sustainable use areas that would permit mining, such as an APA or a National Forest.

The proposal for a National Park originated with an environmental project hosted by the Federal University of Minas Gerais (UFMG), the Projeto Manuelzão, which studied the area and concluded that it protected key water resources that supply part of the Belo Horizonte metropolitan region, that it had few residents, and that the area – rich in iron – was increasingly threatened by mining operations from small mining firms and Vale. The state ZEE, carried out by SEMAD, IEF, and the Federal University of Lavras (MG) had concluded the same, and pinned the blame primarily on mining operations. The Manuelzão staff filed a proposal with ICMBio in 2010, and ICMBio began to conduct technical studies that concluded that a strict protection conservation unit was justified. The institute published its first proposal in September 2010 (ICMBio 2010b). In response to the study, federal and state attorneys general (Ministério Público Federal and MP Estadual) recommended that SEMAD and the federal Institute of National Historical and Artistic Heritage (*Instituto do Patrimônio Histórico e Artístico Nacional*, IPHAN) impose administrative limitations on mining environmental licenses, which they did. Environmentalists had hoped that a National Park decree would follow soon after, but ICMBio found itself under political pressure to reconcile competing interests in the area, and formed a working group with SEMAD, civil society groups, and mining sector representatives ("MPF/MG quer agilizar criação..." 2011).

The creation process was contentious from the start. While Projeto Manuelzão and ICMBio proposed an ambitious strict protection area, the state government and Vale stood in opposition. In 2009, Vale projected an investment of R$4 billion in Apolo, and counted on the support of then Governor Aécio Neves (PSDB) ("A Serra do Gandarela..." 2014).[7] The Apolo Project would cost a total of R$9.4 billion, and involve three mines: Apolo, Conceição-Itabiritos and Vargem Grande-Itabiritos. In 2009, the mining companies involved signed a protocol of investment intentions (*protocolo de intenções de investimento*) to install and expand the iron mines. ICMBio's National Park proposal threatened to derail these investments (Ortiz 2013).

On 30 June 2011, the working group met and debated competing proposals from ICMBio and SEMAD. ICMBio aimed to defend its proposal based on technical criteria. Vale sought to keep its claim on Apolo, including rights to build a dam to collect waste from its mining operation. SEMAD, representing the interests of the state, floated seven proposals, all of which reduced in some way the size of the park to accommodate mining and related interests. In the first proposal, SEMAD reduced Gandarela's size by about half, to accommodate all mining claims, including Vale's Apolo. In the second, the state made some concessions, but left Apolo intact. In the third, SEMAD finally permitted part of the Apolo claim to remain in the park, but compensated by reducing the park elsewhere to grant more unprotected lands to another mining operation. In the fourth proposal, the state's proposed area finally equaled the size of ICMBio's, but with some lands outside of the ICMBio proposal included to compensate for mining claims within it. In the fifth proposal, SEMAD kept its exclusions for mining, and added an exclusion for state-sponsored silviculture and fish farming activities that were in the process of licensing. In the sixth, SEMAD

[7] Vale later found support from Governor Antônio Anastasia (2011-14, PSDB) and Carlos Alberto Pinto Coelho (2015-Present, PP).

reduced the Apolo claim, but kept exclusions for mining claims that were currently in the process of acquiring licenses, as well as the silviculture and fish farming claims. At the end of the meeting, ICMBio and SEMAD had reached an agreement that allowed for exclusions for Apolo and other mining, silviculture, and fish farming claims that were smaller than those earlier requested by SEMAD, but ensured protection of key areas of *canga*. Throughout the process, SEMAD sought to weaken the park's potential to protect local ecology, and to advocate for the interests of the mining sector. In the key decision, ICMBio accepted some exclusions, but insisted that Vale would not be permitted to build the dam on its Apolo claim (Ata de Reunião, GT 1, 30 June 2011).

ICMBio's conciliatory posture, and the attempts by state representatives to weaken Gandarela, infuriated the environmental community, including a local movement, Águas do Gandarela, which rejected any compromise with mining firms as a threat to the ecological sustainability of the National Park. Meanwhile, through 2011 and 2012, Vale continued to pressure ICMBio to reduce further the boundaries of the park. According to local environmental NGO, Águas do Gandarela (2012; translation mine):

> Despite all of the manifestations of civil society for the preservation of the Serra do Gandarela and of the recognition of its importance by diverse social organizations, citizens, federative entities and also the Federal and State Courts, Vale S.A. does not desist in its pretensions to mine and destroy the region. The firm has in the last four months made successive onslaughts against the Chico Mendes Institute for the Conservation of Biodiversity (ICMBio), the Ministry of the Environment (MMA), IBAMA, and the State Secretariat of the Environment and Sustainable Development (SEMAD), to alter even more the proposed limits for the Serra do Gandarela National Park, diminishing its area of protection and significantly compromising the preservation of is socio-environmental and hydric heritage. The president of Vale S.A., Mr. Murilo Ferreira, was very clear about the interest of the firm, in a speech to the Legislative Assembly of Minas Gerais on 20th of August last, when he affirmed that "the Apolo [project], [...] very important for increasing the production of high quality iron, has not yet been executed – but we are persevering in the quest for an environmental license...".
>
> The projected Apolo mine will bring, if it is licensed, in addition to direct impacts on the aquifer of more than one billion cubic meters of precious water, irreversible destructions to the landscape, with the definitive loss of exquisite waterfalls, of dozens of rare caves, including some of maximum relevance, and of the most significant and singular remaining ferruginous *cangas*, in process of extinction, in the Iron Quadrilateral and Minas Gerais Aquifer. The endemic biodiversity, associated with *cangas* and the most expressive stretches of the Atlantic Forest biome around BH, completes the picture that convers national and international importance to this area that Vale insists on destroying... The full preservation of this region should be treated as part of environmental compensation due society by the mining firms for all of the other enterprises that they are destroying, including other mountains and water sources of Minas Gerais – and very particularly in the APA Sul-RMBH.

ICMBio hosted public hearings in the potentially affected areas throughout 2012, which hundreds of people attended. Nevertheless, it delayed a final proposal, and the state and Vale began to take actions that would undercut the eventual park. In November 2012, Vale requested an Operating License for Mineral Exploration (LOP) to conduct 227 seismic studies and clear 26.2 kilometers of complementary accesses to its claims inside the proposed limits of the Serra do Gandarela National Park (Defender 2012). In December 2012, the state of Minas Gerais, through

SEMAD, restarted mining license processes for claims close to Gandarela – allegedly without environmental studies to support the necessity for such licenses ("Parque Nacional..." 2012). These actions by Vale, and a court order, finally induced ICMBio to present its final proposal, which it sent to the MMA in February 2013.

During public hearings in 2012, local communities in the APA Sul began advocating for a Sustainable Development Reserve that would overlap with the park. Because the RDS counted on popular support, ICMBio's final proposal included the RDS. Nevertheless, the Rousseff administration refused to decree the park throughout 2013 and most of 2014, leading environmental groups to accuse her administration of "locking up" Gandarela and other UC proposals in a wider effort to undo environmental protections in order to stimulate economic growth ("Dilma trava..." 2013). Finally, in October 2014, to secure votes from Marina Silva's supporters, Rousseff decreed seven new UCs, including Gandarela and its adjoining RDS. This action did not placate all environmental activists, however: The final design of Gandarela National Park excludes Vale's Apolo claim, and places a major portion of the original National Park proposal in the RDS Nascentes Geraizeiras.

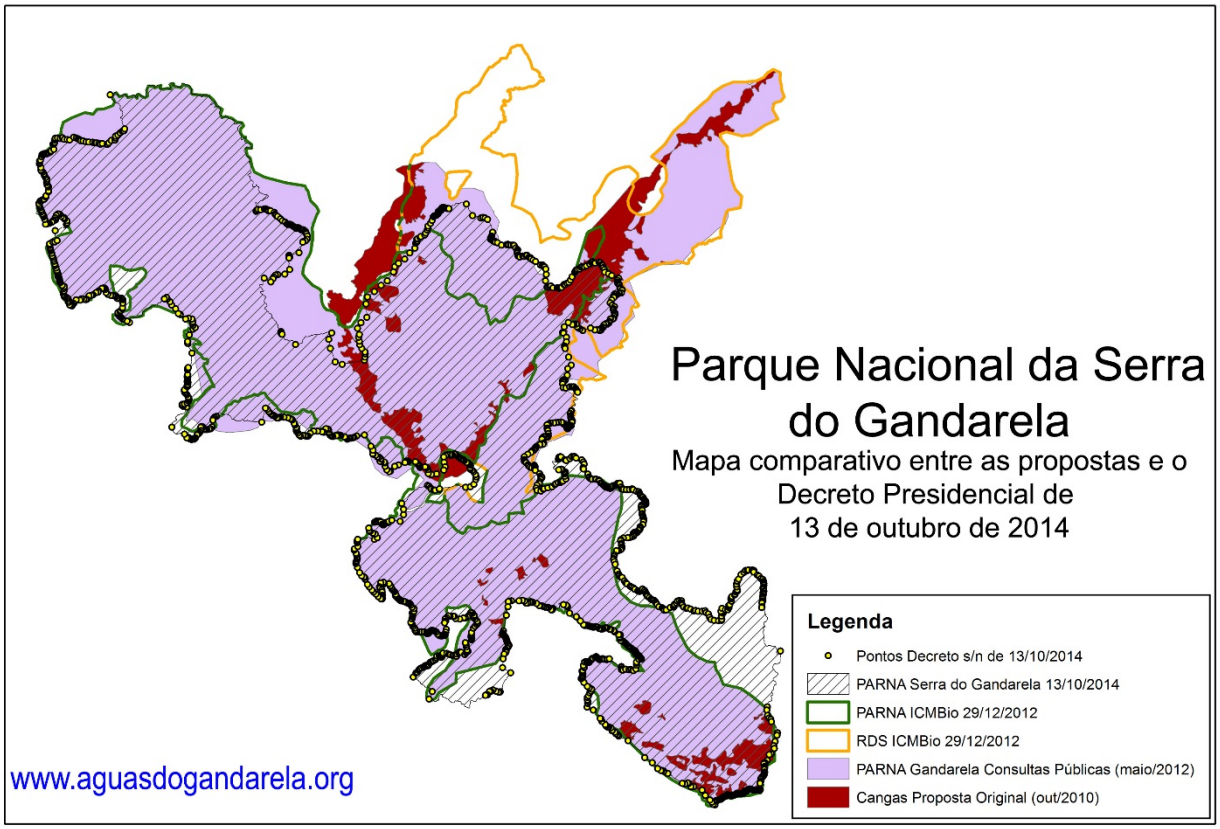
> ICMBio, a federal agency, celebrated the decree. According to an ICMBio press release:
>
> "With the creation of the National Park, the Serra do Gandarela will continue contributing to the supply of water for the region," explained the president of ICMBio, Roberto Vizentin.
>
> The creation of the Nascentes Geraizeiras Sustainable Development Reserve was born of claims by social movements of the region. "It will fully meet the expectations of local communities. The struggle of the Geraizeiro Movement, which represents and organizes that population, was for the creation of the RDS in one of the few areas of the north of Minas Gerais that presents well preserved forest cover." (ICMBio 2014; translation mine)

Environmental groups, however, took a dimmer view of the outcome than did the government:

> The park, initially projected to have 38,200 hectares, got 31,200. Excluded [from the park was] the area destined for the extraction of iron, Vale's Apollo project, which is budgeted at R$4 billion. If, on one hand, the creation of the park impedes the expansion of mining into the area [of the park], on the other the conservation unit is born knowing that it will be impacted by a highly polluting activity. It was everything that the environmentalists feared. ("Gandarela..." 2014)

Despite the furor that continues to the present day over the final design of the park, it remains the case that while the mining industry was able to control the process of creation and implementation of the state APA Sul-RMBH, it had less control over the federal Gandarela National Park negotiations. Indeed, rather than fearing punishment at the ballot box from clamping down on local economic activity, Rousseff finally increased the size of two conservation units, and decreed six new ones, including Gandarela, *to win national votes* (ISA 2014b). She awarded Vale its Apolo claim, but (assuming Gandarela is not weakened or repealed) she compensated by expanding the southern flank of the park beyond the boundaries negotiated by ICMBio in 2012 and creating the moderately permissive RDS, which extends protection well beyond the northeastern frontiers proposed by ICMBio for the park from 2010 to 2012. While the state government in 1992-4 had acceded to demands made by Vale and other mining firms to establish a conservation unit of the weakest category, the federal government in 2009-14 resisted local economic pressures in order to create a National Park and a Sustainable Development Reserve that, while they have completely placated neither environmental groups nor mining interests, have imposed strict protection in a highly ecologically vulnerable and contentious area.

Map 5.5. Serra do Gandarela National Park



Source: Reproduced from Águas do Gandarela (2014).
Map explanation: *Map 5.5, above, shows the design of the Serra do Gandarela National Park and Nascentes Geraizeiras Sustainable Development Reserve (RDS), decreed by President Dilma Rousseff in October 2014. The purple area shows the Serra do Gandarela Park proposal as of the May 2012 public hearings, while the gray striped area represents the final design of the park. The orange outlined area is the RDS Nascentes Geraizeiras, while the red areas are areas of a fragile soil called canga.*

Conclusion

Minas Gerais is a wealthy, industrialized, and densely populated state in which it is more difficult to enact systems of conservation units, for either tier of government, than it is in the less densely populated Amazon states of Pará (Chapter 3) and Amazonas (Chapter 4). Nevertheless, both the federal and the state governments in Minas Gerais have established conservation units to preserve forests and waterways. Both systems of conservation units are small in area compared to federal and state systems in Pará and Amazonas, and in area both are more heavily weighted toward sustainable use than strict protection unit types.

However, in the more economically and politically complex context presented by Minas Gerais, the federal government's conservation unit system – though smaller in number and area than the state system – is still more heavily weighted toward strict protection than the state system is. In addition, on diverse occasions the federal government has either directly challenged local

economic interests by imposing conservation units on private lands, or reached limited compromises with large-scale land intensive industrial interests. The Serra do Gandarela exemplifies such compromises, as the Rousseff administration established a strict protection National Park next to a mining project owned by Vale S.A., the country's largest mining firm.

The state, in contrast, established the IEF in order to promote the economic sustainability of the steel industry, and for decades embraced a type of conservation geared toward promoting economic development. The IEF took a long time to acquire environmental law enforcement powers, and its most significant conservation actions in the 1970s – a decade after its founding – were "prohibited areas" meant to induce steel firms and other consumers of wood-based charcoal to buy charcoal from planted eucalyptus plantations. Even after the IEF acquired a more conservation-oriented focus, beginning in the 1980s, the agency remained developmental in comparison to the federal agencies, IBAMA and ICMBio: In 1996, the IEF struck a deal with the mining sector to loosen zoning restrictions on the APA Sul-RMBH in favor of mining interests, and in 2009-14, SEMAD and IEF sought to limit the size of the Gandarela National Park in order to facilitate continued mining in the region. At various points in the lengthy debate, the state of Minas Gerais, with SEMAD its representative, attempted to undercut the process of creating the park, in order to cater to the mining sector. While the federal government promoted a *strict* conservation unit, the state government sought to promote a *moderately permissive* alternative. In the end, the federal government created both a *strict* and a *moderately permissive* unit in the Iron Quadrilateral.

Chapter 6. Conclusion

Introduction: States Eliminate Conservation Units

In 2010, the Belém, Pará, -based environmental NGO, IMAZON, conducted a study of 37 formal proposals to alter 48 protected areas in the Amazon: 25 state conservation units, 16 federal conservation units, and 7 indigenous lands. The majority, or 68% of the processes, were initiated between 2005 and 2010. The state of Rondônia alone reduced the size of 7 of its state conservation units, and eliminated 14 more altogether (Araújo and Barreto 2011, 76). A few of the state UCs in Rondônia were absorbed by adjacent federal UCs such as the Mapinguari National Park and the federal Cuniã Ecological Station. The state government revoked another six UCs, including 4 State Forests, two State Parks, and one State Reserve – all of which had been created in 1990 as part of the World Bank-funded Agriculture and Forestry Plan of Rondônia (PLANAFLORO). Once created, the territories covered by the UCs were never incorporated into Rondônia's 2000 state Ecological-Economic Zoning (ZEE) plan, and so the elimination of these protected areas "just crystalized a process installed *de facto* years ago" (Futada 2011, 79).

This was not Rondônia's last action to free up territory for ranching and infrastructure at the expense of the state's forests: In 2013 an *O Eco* report found that deforestation in state conservation units in Rondônia had increased significantly, as the Governor, Confúcio Moura (PMDB) embraced a Ruralist agenda by signing a partnership with the Banco do Brasil to finance agriculture and ranching projects in the state, and announcing the rebuilding and recovery of state highways (Santini 2013). The following year, 2014, the state Legislative Assembly of Rondônia annulled the decree that had created the Jaci-Paraná Extractive Reserve 18 years earlier. The Legislative Decree 142/14 was approved by 15 of 16 state Deputies, and was accompanied by arguments in favor of extensive agriculture and ranching. "The Deputy Ribamar Araújo (PT) even affirmed that the only model of development that had worked in practice till today was the forest ceding ground to agriculture and ranching. 'This was the system that elevated the state during these 34 years that I have lived here,' he affirmed. 'It doesn't matter if they're small or large agriculturalists, what matters is that they're workers that helped and still help with the growth of Rondônia'" (Bragança 2014b; translation mine).

In another state on the edge of the Amazon (but largely situated in the Cerrado biome), Tocantins, conservation units face similar challenges: In 2012, Ruralist Caucus leader from Tocantins, Senator Kátia Abreu, and her son, Irajéu de Abreu, put pressure on Governor Siqueira Campos to stall a Global Environment Facility-funded R$9 million project to establish new conservation units on three priority areas identified in 2004 for protection. While the pressure originated from representatives of the federal government, Siqueira Campos was already indifferent to the project: "Knowledgeable about the areas [slated for protection], the ornithologist Túlio Dornas is worried about the time frame and the political context. He says that the lack of agility is fruit of the disinterest of the public power. 'The people who are working on the process complain about the lack of support from the state government,' relates Dornas" (Marinho 2012; translation mine).

Summary: Argument of the Study and Key Findings

These anecdotes illustrate a phenomenon that touches on the central tension at the heart of this study: that state governments are on average less committed to the creation and the management of environmentally protected areas – a system labeled in Brazilian law "conservation units"

– than the central government tends to be. In this study, I have argued that subnational governments are generally more vulnerable to the structural and instrumental powers of businesses in their jurisdictions, particularly land intensive industries, than the federal government is (Chapter 1). I showed this to be true, with only a few exceptions, across Brazil's 26 states and Federal District of Brasília, using univariate descriptive and bivariate correlational analyses (Chapter 2). I then traced the processes of creating federal and state conservation unit systems in three states – Pará, Amazonas, and Minas Gerais – and showed that in states and in regions of states where land intensive industries are dominant, states on average opt for more permissive conservation units than the federal government does.

In each state, I showed how major land intensive industries influenced the development of the state conservation unit system more than they did the federal system. In Pará (Chapter 3), timber shaped governors' policy responses to deforestation, leading to conservation units that provide legal outlets for hardwood extraction. In Amazonas (Chapter 4), manufacturing played neither an explicitly supportive nor an oppositional role in the Green Tax Free Zone of Manaus program, and the subsistence farmers and small-scale extractive communities stood to benefit from the state's focus on creating Sustainable Development Reserves, Extractive Reserves, and State Forests that provide resource use rights and other benefits to forest communities. Finally, in Minas Gerais (Chapter 5) an evident timber shortage in the 1950s prompted the state to invest in a forestry agency that promoted eucalyptus plantations (to provide charcoal to steel mills) and limited protections for native vegetation through the 1970s. Only with financial and organizational support from internationally-funded projects, including PROMATA; and after much of the charcoal industry had exited the state and settled in the less environmentally well-governed states of Pará, Maranhão, Goiás, and Tocantins; did the IEF's priorities shift in a clearly environmental direction, and the majority of the state's conservation units get established.

In contrast, the federal government institutions were better buffered from local vested economic interests, and on average opted for stricter units than the states. I showed this first using summary statistics (Chapter 2) that demonstrated that 46% of the area of the federal conservation unit system across Brazil is in *strict* conservation units, while only 20.4% of the total area of state systems is in the same. On the opposite end of the spectrum, only 12.57% of the federal system's area is contained in the most permissive category of units, APA, while just shy of 44% of the state system is contained in the same. I then showed that across Brazil's 26 states and the Federal District of Brasília, the federal government accounts for over half of the area of conservation units contained in *strict* categories in 25 states. I also showed that the federal government accounts for over half of the total area of *moderately strict and moderately permissive* units in 19 states (and in 15 of these states, the federal government's conservation unit system accounts for 100% — or close to it — of the area contained in these categories of units). To show how federal and state trends differ as the importance of key land intensive industries rises, I then ran locally weighted regressions that showed that the federal conservation unit system remains larger than the state system even as the amount of land devoted to agriculture and the density of cattle in states increase. Finally, I evaluated the preferences of federal and state governments in the processes of creating conservation units on the same land, across three local economic contexts: an Amazonian region where land intensive interests dominate (Calha Sul, Pará; Chapter 3), an Amazonian region where land intensive interests are weak (Apuí, Amazonas; Chapter 4), and a region outside of the Amazon dominated by the mining industry (Iron Quadrilateral, Minas Gerais; Chapter 5). In each case, I found my stylized expectations, presented in Chapter 1, Table 1.2, supported, as in each case the

federal government advocated for a stricter type of conservation unit than the state government did.

In each of the state cases, private sector interests loom large, but they are not always explicitly in support or opposition to the establishment of conservation units. Rather, state governments tailor proposals to appeal to, or reduce opposition from, vested interests such as timber, ranching, mining, or steel manufacturing. Where environmental and industrial interests conflict, state governments in Brazil make compromises that favor industrial interests more heavily than the federal government would. I showed this to be true in each of the state cases analyzed in this study.

In Pará, the federal government imposed both strict protection and restrictive types of sustainable use conservation units along the BR-163 highway, and established Extractive Reserves in forested regions along the Amazon River, and in the Terra do Meio and BR-163 regions. The state government, in contrast, limited its participation in the Terra do Meio conservation unit mosaic by creating a highly permissive unit along the frontier – the APA Triunfo do Xingu – and a State Forest (Iriri) in a remote corner of the mosaic, buffered on all sides by federal protected areas. In 2006 in the Calha Norte, the state government created major State Forests to secure access to hardwoods for the timber industry, and tried to encourage the federal government to create and manage the region's two proposed strict protection units. I supported the evidence for divergent preferences between the federal and state governments by examining the case of Calha Sul in depth. There, the state government aligned with timber interests against local extractivist communities to propose one moderately permissive State Forest and a permissive APA on land already being studied for a moderately strict federal Extractive Reserve. During the ensuing debate, a governor of the party in power at the federal tier entered office in Pará, but continued to support the state's preferences for an APA and State Forest over a federal Extractive Reserve. This governor did so because she, like her predecessor, needed the continued support of the state's timber industry. Only in mid-2007 did the governor accede to the federal government's preferences, and in 2009 the federal government decreed the moderately strict Renascer Extractive Reserve – a type of unit that permits resource use by traditional communities, but forbids commercial timber extraction.

In Amazonas, the dominance of manufacturing centered in Manaus, and the comparatively small size and political weakness of ecologically destructive land intensive industries facilitated greater cooperation between the federal and state governments on conservation unit creation and other issues of sustainable development throughout the 2000s. This cooperation included the establishment of a collection of conservation units along the BR-319 (Manaus-Porto Velho) highway, in the Lower Negro River, and in other remote reaches of the state. But in the Apuí region of southeastern Amazonas, the federal and state governments had a brief disagreement over priorities: The area of the region slated for protection is largely uninhabited, but is vulnerable to violent land grabbers and illegal loggers from Mato Grosso and Rondônia, and the federal government proposed to blanket the region with a massive *strict* National Park. The state government responded by requesting that the federal government cede land to the state, for the state to establish a largely *moderately permissive* mosaic. This mosaic would preserve local residents' rights to log and graze cattle on sustainable use conservation units, while prohibiting the same use by outsiders. After a brief argument, the federal government ceded the land to the state, and the state created the Apuí Mosaic, which included three moderately permissive State Forests, two moderately permissive Sustainable Development Reserves, a moderately strict Extractive Reserve, in addition to two strict State Parks.

Finally, the Iron Quadrilateral region of Minas Gerais presents two more conservation unit creation processes that illustrate how states cater to local vested economic interests more than the federal government does: First, in the 1992-4 APA Sul-RMBH debate, the state government, facing strong opposition from mining concerns and municipal politicians in the Iron Quadrilateral – a mining rich region in which residents had proposed the APA – reached compromises to weaken the APA, and then dragged its feet after establishing the unit, allowing mining firms to control the zoning and implementation process. When I visited the APA Sul-RMBH in 2012, its manager told me that mining and urbanization interests still dominate the APA's operations: The management plan, which was at the time several years out of date, had not been renewed because mining and construction/real estate firms feared that zoning would reduce their freedom of action in the APA. "After all," he told me, "in an APA, where there are no set rules, everything is permitted." Second, in 2014, while seeking re-election, President Dilma Rousseff decreed seven conservation units to appeal to the environmentalist voters of her erstwhile opponent, Marina Silva, and included in the decrees the Serra do Gandarela National Park and the Nascentes Geraizeiras Sustainable Development Reserve, both adjacent to the Apolo mine, owned by Vale, S.A. The state environmental agencies, including IEF and SEMAD, sought at various points in the 2009-2014 debate to reduce the size of the park to serve the interests of mining in the region. The state and Vale also sought to alter the category of the proposed conservation unit, to make the Serra do Gandarela less strict. During the debate, local residents who stood against both Vale and the original boundaries of the proposed National Park appealed to the federal government for a Sustainable Development Reserve. In the end, the final decree maintained the Serra do Gandarela as a strict protection National Park, and ceded part of the originally proposed area of the park to local residents in the Nascentes Geraizeiras Sustainable Development Reserve. While the Serra do Gandarela's design does not please environmental activists, it and the Nascentes Geraizeiras Reserve do establish a hard barrier that restricts the expansion of Vale's Apolo mine beyond its current limits. This outcome, then, indicates a greater willingness on the part of the federal government to impose strict limitations on the expansion of local ecologically destructive economic activities than that seen on the part of the state government.

The findings of this study with respect to conservation unit creation are echoed by the evidence presented in each state case study chapter with respect to *implementation*. State paces vary with respect to implementing governance institutions on conservation units, including with respect to budgeting, personnel, management councils, and management plans; but overall state-level governance is weaker and more inconsistent than federal governance. Both tiers of government only weakly govern and manage conservation units, especially in comparison to countries such as the United States, New Zealand, South Africa, and Australia (Medeiros et al. 2011, 10), but the federal government has put more consistent effort since 2000 into staffing conservation units in remote regions of the Amazon, and into establishing management councils and publishing management plans, than the states have. In addition, federal institutions such as ICMBio – though underfunded and understaffed like state institutions – have been less vulnerable to corruption scandals and political manipulation than state institutions. In contrast, SEMA-PA in Pará has suffered from institutional weakness and repeated corruption scandals; CEUC-SDS in Amazonas lost the majority of its personnel after 2010; and even the relatively stable IEF in Minas Gerais has suffered from a corruption scandal and personnel instability in recent years. Even as the number of councils and management plans on state conservation units increases and converges with federal implementation outcomes, political and corresponding institutional instability threaten future management of state conservation units more than they do management of federal units.

Implications

Proponents of policy decentralization, and of investing in local environmental governance, argue that local populations are capable of managing their own natural resources in a sustainable way. These scholars and activists are not wrong, but in celebrating local councils and discursive, dialogue-based governance, they miss a point that I bring to the fore in this study: that the sustainability resulting from local participatory governance is contingent on the interests of the participants, and on the interests of the government that provides the necessary institutional support for participatory governance efforts. Agrawal and Ostrom (2006, 682) state that

> Without the involvement of local actors in the definition of boundaries [of protected areas], a clear understanding of which resources can be harvested and by whom, and monitoring of biodiversity conservation processes, protected areas are likely to be little more than paper parks. Worse, as just a region demarcated on a map, a protected area may make things worse by generating disrespect for established boundaries among local peoples and accelerated harvesting pressures because of local beliefs that an important resource has been alienated. Without substantial local efforts in favor of conservation, formal protection efforts for biodiversity are always likely to remain inadequate.

While such local governance views are supported by a wealth of empirical research (see, for example, Agrawal 2004, Hayes and Ostrom 2005, Ostrom 1990), the microscope-like focus on the interests and actions of local communities ignores the interests of state and commercial actors with investments in a region slated for a protected area. This myopia, then, leads to an implicit assumption that, with the right incentives, local communities can and want to sustainably manage natural resources.

Built on observations of traditional or indigenous communities, these studies are correct only under *both* of two conditions: First, that the local communities have an economic model that does not exploit natural resources beyond those resources' replacement capacity. And second, that there are no commercial interests that covet access to the protected area's resources, and could change local communities' incentives with respect to local natural resource use. I argue, in short, that by narrowing the empirical focus of local governance studies, including common-property institutions (CPR, e.g. Ostrom 1990), to identifying and analyzing the functioning of local institutions limits the empirical applicability of such studies to protected areas and CPRs in which potentially ecologically destructive commercial enterprises have no vested interest. This line of thinking, then, ignores the fact that commercial enterprises, including modern agriculture, extensive cattle ranching, commercial timber extraction, and mining – and not small-scale farmers or rubber tappers – are responsible for the majority of tropical and sub-tropical forest deforestation.

Indeed, my findings regarding trends in subnational environmental policy in Brazil are consistent with similar findings in other countries that have undertaken decentralization of forest policy. Indonesia has the third largest reserve of tropical forests in the world – after Brazil and the Democratic Republic of Congo – and decentralization since 1999 of forest policy has exacerbated deforestation (Arnold 2008, 75). Prior to 1999, forest resources were managed, and timber permits issued, by the central government. After decentralization, subnational governments began issuing timber permits, and both legal and illegal deforestation rose. Cabello and Farhat (2013, ii) attribute this rise to a combination of ambiguous regulations, corrupt local officials – and the fact that timber permitting is "one of the most important sources of revenues for local authorities." Devolution to subnational authorities in Indonesia was accompanied by land claims by local communities, which later leased their claims to logging companies in exchange for cash payments (Barr et al. 2006,

13). Meanwhile, distribution of cash benefits has largely been concentrated among local elites, rather than non-elite residents of local communities:

> In many forest-rich regions, district officials, timber brokers, and logging companies have obtained a significantly greater share of the benefits generated from such operations than the communities whose forests are being harvested. Even within participating communities, it has often been the case that village elites have secured a disproportionate share of the benefits, all too frequently through surreptitious agreements with district officials and/or external investors. In this way, many of the benefits of decentralization have been captured by elites, albeit at the district and local levels. (Ibid.)

The Suharto regime that preceded decentralization in Indonesia was hardly a "green" state, and local elites after decentralization have reacted to the previous era's extreme centralization of timber rents by trying to capture natural resource rents that they were previously denied. But the Indonesian case is nevertheless illustrative of the challenges that decentralization of natural resources poses to conservation. In Indonesia, like in Brazil, subnational political elites respond more than the national government did before decentralization to the preferences and demands of timber firms, which generate employment, wealth, and tax revenues in their jurisdictions.

These land use intensive, commercial firms in Indonesia, Brazil, and elsewhere often engage directly with state and national policy makers, and more often than not exercise greater influence on political choices than residents of local communities do. As my study shows, however, such influence over conservation policy choice is contingent on the relevant level of government: Commercial interests, consistent with extant analyses of the structural and instrumental power of business, exercise greater influence over conservation unit choices at the state than at the national tier of government. At the national tier, international pressures and environmental organizations supply stronger offsets to the interests of land intensive industries than they do at the state level. These political offsets lead to the situation that we observe in Brazil: that the federal system of conservation units is comprised of a greater area categorized as strict protection than the state systems are.

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Appendices

Appendix 2.1

Table A2.1.1. Federal and State Strict Protection and Sustainable Use Relationship by State, 2014

State	Area of Fed PI > Area of State PI	(Fed PI/Fed Total) > (State PI/State Total) [Area]	Fed US (no APA) > State US (no APA) [Area]
11 – Rondônia	TRUE	TRUE	FALSE
12 - Acre	TRUE	FALSE	TRUE
13 - Amazonas	TRUE	TRUE	FALSE
14 - Roraima	TRUE	TRUE	TRUE
15 – Pará	TRUE	TRUE	TRUE
16 – Amapá	TRUE	TRUE	FALSE
17 - Tocantins	TRUE	TRUE	TRUE
21 – Maranhão	TRUE	TRUE	TRUE
22 – Piauí	TRUE	NA	TRUE
23 – Ceará	TRUE	FALSE	TRUE
24 - Rio Grande do Norte	TRUE	TRUE	FALSE
25 – Paraíba	TRUE	TRUE	TRUE
26 - Pernambuco	TRUE	FALSE	TRUE
27 - Alagoas	TRUE	TRUE	TRUE
28 - Sergipe	TRUE	FALSE	TRUE
29 - Bahia	TRUE	TRUE	TRUE
31 - Minas Gerais	TRUE	TRUE	FALSE
32 – Espírito Santo	TRUE	FALSE	TRUE
33 - Rio de Janeiro	TRUE	TRUE	TRUE
35 – São Paulo	FALSE	FALSE	FALSE
41 – Paraná	TRUE	FALSE	TRUE
42 - Santa Catarina	TRUE	FALSE	TRUE
43 - Rio Grande do Sul	TRUE	FALSE	TRUE
50 - Mato Grosso do Sul	FALSE	FALSE	FALSE
51 - Mato Grosso	TRUE	TRUE	FALSE
52 – Goiás	TRUE	TRUE	TRUE
53 - Distrito Federal	TRUE	FALSE	TRUE

Appendix 3.1. Federal and State Conservation Units in Pará

Table A3.1.1. Federal Conservation Units in Pará, 1961-2010

Category	Type	Name	Tier	Area (ha)	Year Created	TCU Governance Index	Management Council	Management Plan
National Forest	Sustainable Use	Altamira	Federal	689012	1998	Medium	2009	2012
National Forest	Sustainable Use	Amanã	Federal	540417	2006	Medium	2009	2010
National Park	Strict Protection	Amazônia	Federal	1070737	1974	Medium	2004	1988 (not officially approved, but ICMBio recognizes it)
Extractive Reserve	Sustainable Use	Arióca Pruanã	Federal	83445	2005		2012	
National Forest	Sustainable Use	Carajás	Federal	411949	1998	High	2004	2004
National Forest	Sustainable Use	Caxiuanã	Federal	200000	1961	Medium	2009	2013
Extractive Reserve	Sustainable Use	Chocoaré - Mato Grosso	Federal	2786	2002		2007	
National Forest	Sustainable Use	Crepori	Federal	739806	2006	Low	2009	2010
Extractive Reserve	Sustainable Use	Gurupá-Melgaço	Federal	145298	2006		2011	
Environmental Protection Area	Sustainable Use	Igarapé Gelado	Federal	21600	1989	Medium	2014	
Extractive Reserve	Sustainable Use	Ipaú-Anilzinho	Federal	55816	2005		2010	
National Forest	Sustainable Use	Itacaiúnas	Federal	141400	1998	Low		
National Forest	Sustainable Use	Itaituba I	Federal	212329	1998	Low	2009	2014
National Forest	Sustainable Use	Itaituba II	Federal	405701	1998	Low	2009	2014
Sustainable Development Reserve	Sustainable Use	Itatupã-Baquiá	Federal	64735	2005		2009	2012
National Park	Strict Protection	Jamanxim	Federal	859722	2006	Low	2009	2011
National Forest	Sustainable Use	Jamanxim	Federal	1301120	2006	Low		
Ecological Station	Strict Protection	Jari	Federal	227126	1982	Low	2014	
Extractive Reserve	Sustainable Use	Mãe Grande de Curuçá	Federal	37062	2002	Medium	2006	
Extractive Reserve	Sustainable Use	Mapuá	Federal	94464	2005	High	2008	
Extractive Reserve	Sustainable Use	Marinha de Araí-Peroba	Federal	11480	2005		2007	
Extractive Reserve	Sustainable Use	Marinha de Caeté-Taperaçu	Federal	42069	2005		2007	2013
Extractive Reserve	Sustainable Use	Marinha de Gurupi-Piriá	Federal	74081	2005		2008	
Extractive Reserve	Sustainable Use	Marinha de Soure	Federal	27464	2001		2009	
Extractive Reserve	Sustainable Use	Marinha de Tracuateua	Federal	27154	2005		2003	

Extractive Reserve	Sustainable Use	Marinha do Maracanã	Federal	30019	2002		2007	
National Forest	Sustainable Use	Mulata	Federal	212751	2001		2011	
Biological Reserve	Strict Protection	Nascentes da Serra do Cachimbo	Federal	342478	2005	Medium		2009
Extractive Reserve	Sustainable Use	Renascer	Federal	211741	2009	Medium	2013	
Extractive Reserve	Sustainable Use	Rio Iriri	Federal	398938	2006	Medium	2008	2011
National Park	Strict Protection	Rio Novo	Federal	537757	2006	Low	2011	
Biological Reserve	Strict Protection	Rio Trombetas	Federal	385000	1979	High	2006	2004
Extractive Reserve	Sustainable Use	Rio Xingu	Federal	303841	2008	Medium	2010	2012
Extractive Reserve	Sustainable Use	Riozinho do Anfrísio	Federal	736340	2004	Medium	2008	2011
Extractive Reserve	Sustainable Use	São João da Ponta	Federal	3203	2002		2007	
National Forest	Sustainable Use	Saracá-Taquera	Federal	429600	1989	Medium (1.9 – close to high)	2002	2011
National Park	Strict Protection	Serra do Pardo	Federal	445392	2005	Medium	2012	
Environmental Protection Area	Sustainable Use	Tapajós	Federal	2039581	2006	Low	2011	
National Forest	Sustainable Use	Tapajós	Federal	582149	1974	Medium	2001	
Extractive Reserve	Sustainable Use	Tapajós-Arapiuns	Federal	647611	1998		2004	
Biological Reserve	Strict Protection	Tapirapé	Federal	103000	1989	Medium	2008	2010
National Forest	Sustainable Use	Tapirapé-Aquiri	Federal	190000	1989	High	2005	2006
Ecological Station	Strict Protection	Terra do Meio	Federal	3373110	2005	Low	2012	
Extractive Reserve	Sustainable Use	Terra Grande-Pracuúba	Federal	194695	2006	Medium	2012	
National Forest	Sustainable Use	Trairão	Federal	257482	2006	Medium	2009	2011
Extractive Reserve	Sustainable Use	Verde para Sempre	Federal	1288720	2004	Medium	2008	

Table A3.1.2. State Conservation Units in Pará, 1989-2010

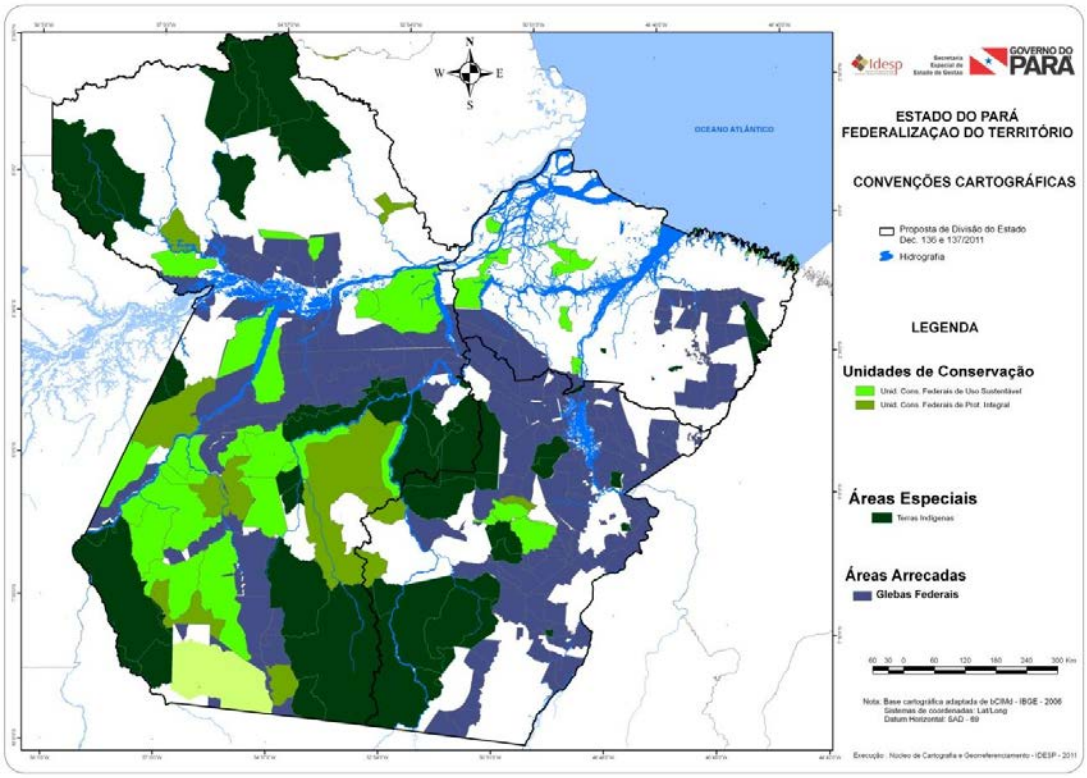
Category	Type	Name	Instância responsável	Area (ha)	Year Created	TCU Governance Index	Management Council	Management Plan
Sustainable Development Reserve	Sustainable Use	Alcobaça	State	36128	2002	Medium	2003	
Environmental Protection Area	Sustainable Use	Algodoal-Maiandeua	State	2378	1990	Medium	2006	2011
Environmental Protection Area	Sustainable Use	Arquipélago do Marajó	State	5998570	1989	Low		
State Park	Strict Protection	Charapucu	State	65181	2010	Medium	2013	2013
State Forest	Sustainable Use	Faro	State	635935.72	2006	Medium	2010	2011
Ecological Reserve	Strict Protection	Grão-Pará	State	4245819.11	2006	Low	2013	2011
Environmental Protection Area	Sustainable Use	Ilha do Combu	State	1500	1997	Low	2008	
State Forest	Sustainable Use	Iriri	State	440493	2006	Low		
Environmental Protection Area	Sustainable Use	Lago de Tucuruí	State	568667	2002	Medium	2003	
Biological Reserve	Strict Protection	Maicuru	State	1151760.95	2006	Low	2013	2011
Wildlife Refuge	Strict Protection	Metrópole da Amazônia	State	6367	2010	Low		
Environmental Protection Area	Sustainable Use	Metropolitana de Belém	State	7500	1993	Medium	2008	
State Park	Strict Protection	Monte Alegre	State	3678	2001	Medium	2010	2010
State Forest	Sustainable Use	Paru	State	3612914	2006	Medium	2010	2010
Environmental Protection Area	Sustainable Use	Paytuna	State	58251	2001	Medium	2010	
Sustainable Development Reserve	Sustainable Use	Pucuruí-Ararão	State	29049	2002	Medium	2003	
Environmental Protection Area	Sustainable Use	São Geraldo do Araguaia	State	29655	1996	Medium	2010	
State Park	Strict Protection	Serra dos Martírios/Andorinhas	State	24897	1996	Medium	2010	2006
Environmental Protection Area	Sustainable Use	Triunfo do Xingu	State	1679280.52	2006	Low	2011	
State Forest	Sustainable Use	Trombetas	State	3172978	2006	Medium	2009	2011
Mosaic	Sustainable Use	Tucuruí	State	568667	2002		2008	2013
State Park	Strict Protection	Utinga	State	1393	1993	High	2008	2013

Appendix 3.2. Federal Lands and Conservation Units in Pará

A complete examination of the state government of Pará's actions during the 2003-10 period, necessitates a discussion and rejection of a potential alternative explanation of the state of Pará's relative inaction in the south of the state: that many lands in Pará are property of the federal government. In 1971, the military regime federalized many of the state lands, and in so doing removed state control from these lands. The decree was revoked after democratization, but the federal government failed to return most of the federalized lands to the state. Governor Gabriel petitioned the PSDB federal government for a devolution of the federalized lands in 1995 (Éleres 2002, 132), and ITERPA, the Pará State Land Institute, requested that 4.5 million hectares of the southern Serra do Cachimbo be returned to the state in 1998, but the transfers were never made (Estado do Pará 2011, 23-24). The reasons relate to bureaucratic politics – the federal land reform and colonization agency, INCRA, distrusted ITERPA (Éleres 2002, 132) – and to the federal government's continuing plans for colonization and economic development of the region. Indeed, in the 1990s FUNAI (National Indigenous Peoples Foundation) expanded the federal government's dominion even over state lands in Terra do Meio that had not been federalized in 1971, by establishing indigenous lands along the southern border with Mato Grosso. The state of Pará opposed the creation and expansion of indigenous lands, as well as the continuing existence of certain indigenous lands established as early as the 1940s, arguing that they "interfered too much in the *paraense* territory, rendering it in-administrable at certain points" (Éleres 2002, 90).

Map A3.2.1 below (reproduced from Estado do Pará 2011, 22) shows the distribution of federal lands (blue), federal protected areas (light green), and indigenous lands (dark green) in Pará in 2011. It is evident that the federal government still owns much of the state. A comparison of this map to maps without federal and state conservation units and indigenous lands overlaid, drawn by Paraense scholar and politician Paraguassú Éleres (2002), indicates that most of the federal conservation units surrounding the BR-163 highway overlap with federal lands – but that the main federal conservation units in the Terra do Meio mosaic, including the Terra do Meio Ecological Station, lie partially on state lands.

Map A3.2.1. Federalized Lands in Pará



Source: Reproduced from Estado do Pará 2011, 22.

Federalization of lands engenders an alternative theory to explain Pará state's inaction with respect to conservation units in the Terra do Meio and BR-163: that the state government's reluctance to create conservation units in the 1989-2002 period is due to lack of control over lands in the interior, rather than lack of political interest in conservation. However, three pieces of evidence should suffice to dismiss this argument:

First, at least three state UCs lie on federal lands – the Tucuruí Mosaic – according to Éleres's (2002, 177) mapping of the federalized lands of Pará. In the years following the Tucuruí dam's construction, social conflicts and federal intervention prompted the federal government to cede land to the state for the purposes of creating the APA (MMA 2014).[1] If the federal government ceded land in 2002 to permit the creation of a state conservation unit, it might also have done so elsewhere to support other state conservation initiatives, had the state government taken a pro-active stance on environmental governance.

Second, a large area of land that remained in state hands and unprotected in the Terra do Meio presents evidence against the argument that federal lands alone prevented Pará from establishing state conservation units in the south of the state: Remote lands bracketed by BR-163 to the west, BR-230 to the north, and BR-158 to the east, and the state border to the south, remained

[1] This is not the only example of the federal government ceding lands to states to establish conservation units: The same occurred in Amapá, which created the Amapá State Forest in 2006 on land ceded from the Union. The State Forest is now under threat from the opposition in the state Assembly, as the party that created the forest is now out of power and seeks to extinguish it to make way for allied land grabbers (Bragança 2014a).

state land throughout the period of the military dictatorship. Rather than seeking to protect these lands, however, the state government fought FUNAI's 1990s land appropriations to create new indigenous territories along the southern frontier with Mato Grosso, and at the same time left the northern half of state lands in the Terra do Meio unprotected. Further, political elites in the state had little interest in bolstering SECTAM's or ITERPA's capacities to study and manage these areas – and in certain cases, colluded with land grabbers and loggers to continue illegal exploitation of timber.[2] Politics and related state capacity limitations, in fact, provide better explanations than federalization alone for Pará's lack of concern for this region, given that these lands were exempted from the 1971 federalization.

Finally, the state of Pará did little to expand its conservation unit system before 2006 even in areas not arrogated by the federal government in 1971. Despite retaining much of the coast, portions of the Calha Norte, and the vast swathe of forest distant from federal highways in the Terra do Meio identified above, there is little indication beyond the 1988 and 1992 SECTAM proposals that the state government had any interest in preserving the state's forests prior to 2003.

Despite two IDESP and SECTAM state conservation unit system proposals in 1988 and 1992, from 1989 to 2002 the state government of Pará failed to fortify its environmental agency or protect threatened forests in the south of the state. The state's two major exceptions – APA Marajó and APA Tucuruí – did not respond specifically to deforestation concerns along the principal frontiers. While Tucuruí residents mobilized partially against predatory timber practices, three timber poles – Tucuruí, Breu Branco, and Novo Repartimento – along the edges of the APA continue to operate (IMAZON 2004). As APAs, both units are the most permissive category of conservation unit, and creating Tucuruí involved a federal intervention to produce a state unit (MMA 2014). Overall, the state conservation unit system of Pará remained small in area and number until December, 2006. SECTAM also remained institutionally weak and a source of patronage hiring, with little presence in the interior of the state, through 2007.

[2] In an interview in *Jornal do Brasil*, Pará independent journalist Lúcio Flávio Pinto stated, "You get the idea here that *poder público* [government] is just a front for groups to set up to loot the public purse and use state power as a tool for exploiting Amazonia's natural resources. These days, most of the Amazonian elite is a byproduct of organized crime. There is a vast power structure. The groups which grew out of land grabbing and clandestine exploitation of natural resources have much more power than the state does" (quoted in Hochstetler and Keck 2007, 151). In support of Pinto's allegations, *Época*, a national Brazilian magazine, in 2001 accused former Paraense governor, Jáder Barbalho (PMDB), of being linked to illegal mahogany extraction (Greenpeace 2001, 9). In February, 2006, a Parliamentary Inquiry Commission found that PT Senator Ana Júlia Carepa's husband and director of IBAMA in Pará, Marcílio Monteiro, had benefited from a scheme to export illegal mahogany in exchange for contributions to the PT (Coutinho 2006). Carepa later served as Governor of Pará.

Appendix 4.1

Table A4.1.1. State and Federal Conservation Unit System and Implementation Indicators

Category	Type	Protected Area	Tier	Area (ha)	Year UC created	Council	Management Plan	TCU Indimapa Score (2013)
FES	Sustainable Use	Canutama	State	150588	2009		2014	LOW
FES	Sustainable Use	Tapauá	State	881704	2009		2014	LOW
PES	Strict Protection	Matupiri	State	513747	2009		2014	LOW
RDS	Sustainable Use	Igapó-Açu	State	397557.32	2009		2014	LOW
RDS	Sustainable Use	Matupiri	State	179083	2009		2014	LOW
RESEX	Sustainable Use	Canutama	State	197986	2009		2014	LOW
PES	Strict Protection	Serra do Aracá	State	1818700	1990			LOW
REBIO	Strict Protection	Morro dos Seis Lagos	State	36900	1990			LOW
APA	Sustainable Use	Margem Esquerda do Rio Negro	State	611008	1995			LOW
FES	Sustainable Use	Rio Urubu	State	27342	2003			LOW
RDS	Sustainable Use	Canumã	State	22354.9	2005			LOW
RDS	Sustainable Use	Mamirauá	State	1124000	1990	2010	1998	MEDIUM
RDS	Sustainable Use	Uacari	State	632949	2005	2008	2008	MEDIUM
PES	Strict Protection	Rio Negro Setor Norte	State	146028	1995	2008	2009	MEDIUM
PES	Strict Protection	Sumaúma	State	53	2003	2007	2009	MEDIUM
RDS	Sustainable Use	Cujubim	State	2450380	2003	2008	2009	MEDIUM
RDS	Sustainable Use	Uatumã	State	424430	2004	2009	2010	MEDIUM
RDS	Sustainable Use	Rio Amapá	State	216109	2005	2007	2010	MEDIUM
RDS	Sustainable Use	Juma	State	589611.28	2006	2009	2010	MEDIUM
FES	Sustainable Use	Maués	State	438440	2003	2010	2012	MEDIUM
RDS	Sustainable Use	Rio Madeira	State	283117	2006	2010	2013	MEDIUM
APA	Sustainable Use	Caverna do Maroaga (Presidente Figueiredo)	State	374700	1990	2009		MEDIUM
APA	Sustainable Use	Nhamundá	State	195900	1990			MEDIUM
APA	Sustainable Use	Margem Direita do Rio Negro	State	461741	1995			MEDIUM
PES	Strict Protection	Rio Negro Setor Sul	State	86601	1995	2010		MEDIUM
RDS	Sustainable Use	Amanã	State	2350000	1998	1998		MEDIUM
RDS	Sustainable Use	Piagaçu-Purus	State	1008167	2003	2009		MEDIUM

RESEX	Sustainable Use	Catuá-Ipixuna	State	217486	2003	2008		MEDIUM
FES	Sustainable Use	Apuí	State	185946	2005			MEDIUM
FES	Sustainable Use	Aripuanã	State	336040	2005			MEDIUM
FES	Sustainable Use	Manicoré	State	83381	2005			MEDIUM
FES	Sustainable Use	Sucunduri	State	492905	2005			MEDIUM
PES	Strict Protection	Guariba	State	72296	2005			MEDIUM
PES	Strict Protection	Sucunduri	State	808312	2005			MEDIUM
RDS	Sustainable Use	Aripuanã	State	224291	2005			MEDIUM
RDS	Sustainable Use	Bararati	State	113606	2005			MEDIUM
RESEX	Sustainable Use	Guariba	State	150465	2005			MEDIUM
RESEX	Sustainable Use	Rio Gregório	State	308859	2007	2009		MEDIUM
RDS	Sustainable Use	Rio Negro	State	103086	2008	2010		MEDIUM
MOS	NA	Apuí	State	2467244	2010	2010	2010	
APA	Sustainable Use	Guajuma	State	28370	1989			
RDS	Sustainable Use	Puranga Conquista	State	76936	2014			
REBIO	Strict Protection	Uatumã	Federal	940358	1990	2008	2002	HIGH
PARNA	Strict Protection	Pico da Neblina	Federal	2200000	1979	2012		LOW
ARIE	Sustainable Use	Javari-Buriti	Federal	15000	1985			LOW
FLONA	Sustainable Use	Amazonas	Federal	1573100	1989			LOW
FLONA	Sustainable Use	Pau-Rosa	Federal	827877	2001	2012		LOW
PARNA	Strict Protection	Amazônia	Federal	1070737	1974	2004	1988	MEDIUM
PARNA	Strict Protection	Jaú	Federal	2272000	1980	2008	2002	MEDIUM
PARNA	Strict Protection	Anavilhanas	Federal	350018	1981	2006	2002	MEDIUM
ESEC	Strict Protection	Juami-Japurá	Federal	745830	2001	2009	2002	MEDIUM
FLONA	Sustainable Use	Purus	Federal	256000	1988	2010	2009	MEDIUM
FLONA	Sustainable Use	Mapiá-Inauini	Federal	311000	1989	2010	2009	MEDIUM
RESEX	Sustainable Use	Baixo Juruá	Federal	187982	2001	2008	2009	MEDIUM
RESEX	Sustainable Use	Arapixi	Federal	133637	2006	2009	2010	MEDIUM
PARNA	Strict Protection	Campos Amazônicos	Federal	961320	2006	2012	2011	MEDIUM
PARNA	Strict Protection	Juruena	Federal	1957000	2006	2011	2011	MEDIUM

REBIO	Strict Protection	Abufari	Federal	288000	1982	2011	2012	MEDIUM
RESEX	Sustainable Use	Médio Juruá	Federal	253227	1997	2007	2012	MEDIUM
FLONA	Sustainable Use	Humaitá	Federal	468790	1998	2010	2012	MEDIUM
ESEC	Strict Protection	Cuniã	Federal	189661	2001	2006	2012	MEDIUM
RESEX	Sustainable Use	Auatí-Paraná	Federal	146950	2001	2008	2012	MEDIUM
RESEX	Sustainable Use	Rio Jutaí	Federal	275533	2002	2006	2012	MEDIUM
FLONA	Sustainable Use	Balata-Tufari	Federal	1077859	2005	2010	2012	MEDIUM
FLONA	Sustainable Use	Iquiri	Federal	1476073	2008	2012	2012	MEDIUM
PARNA	Strict Protection	Mapinguari	Federal	1744852	2008	2013	2012	MEDIUM
PARNA	Strict Protection	Nascentes do Lago Jari	Federal	812141	2008	2012	2012	MEDIUM
RESEX	Sustainable Use	Ituxi	Federal	776940	2008	2010	2012	MEDIUM
RESEX	Sustainable Use	Médio Purus	Federal	604209	2008	2010	2012	MEDIUM
RESEX	Sustainable Use	Lago do Capanã Grande	Federal	304146	2004	2007	2013	MEDIUM
ESEC	Strict Protection	Jutaí-Solimões	Federal	284285	1983	2011		MEDIUM
FLONA	Sustainable Use	Tefé	Federal	1020000	1989	2011		MEDIUM
FLONA	Sustainable Use	Jatuarana	Federal	580201	2002	2011		MEDIUM
RESEX	Sustainable Use	Rio Unini	Federal	833352	2006	2009		MEDIUM
RESEC	Strict Protection	Sauim-Castanheira	Federal	109	1982			
ARIE	Sustainable Use	Proj. Dinâmica B. de Fragmentos Florestais	Federal	3288	1985			
GI	NA	Gestao Integrada Cuniã-Jacundá	Federal	466000	2010			
MOS	NA	Baixo Rio Negro	Federal	7329220	2010			