The Dissertation Committee for David Seward Salisbury Certifies that this is the approved version of the following dissertation:

Overcoming Marginality on the Margins: Mapping, Logging, and Coca in the Amazon Borderlands

Committee:

Gregory W. Knapp, Supervisor

Karl W. Butzer

William E. Doolittle

Kenneth R. Young

Peter H. Dana

Overcoming Marginality on the Margins:
Mapping, Logging, and Coca in the Amazon Borderlands

by

David Seward Salisbury, B.A.; M.A.

Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May, 2007

Dedication

To the people, plants, animals, rivers, and landscapes of the Amazon borderlands.

Acknowledgements

This dissertation begins and ends with the wonderful people of the Tamaya, Abujao, Utiquinía, and Callería Rivers who shared their friendship, knowledge and *masato* with me. They are too numerous to name here, but without their enthusiastic participation this dissertation would not have been possible.

I am indebted to my wife, Leigh Gorman, and daughter, Ruby Brook Salisbury, who joined me in the highs and lows of the various stages of this manuscript and endured the periodic absences of their family geographer. In addition, I thank my parents, Bill and Shirley Salisbury, who instilled in me a love for travel and culture at a very early age. Finally, in regards to family, I thank my uncle, Foster Brown, whose wise counsel, caring philosophy, and intensely curious mind provided me with a model for responsible research in Amazonia.

In regards to the academy, I thank my advisor, Greg Knapp, and my committee members, Karl Butzer, Bill Doolittle, Ken Young, and Peter Dana for their support, friendship, and advice. Greg's sage advisory skills and enthusiasm, Karl's calm confidence, Bill's gruff guidance, Ken's attention to detail and knowledge of things *Peruanas*, and Peter's unconditional friendship, moral compass, and keen observations were particularly important on this long and complicated journey. I also thank the faculty, staff, and graduate students at the University of Texas for providing a stimulating

and supportive environment for research and personal growth. My own research was supported by grants from Fulbright-Hays, The Nature Conservancy, ProNaturaleza, and the Universidad Nacional de Ucayali. I am also indebted to Emory Richey, a UT undergraduate student, who followed in my footsteps and then some, braving the Tamaya River for 47 days and sharing his thoughts with me.

What you read here only came about through the friendship and support of an array of amazing people in Peru and Brazil. I will do my best to name them here. Beginning in at the Universidad Nacional de Ucayali: José Borgo López, Ronald Paredes del Águila, Carlos Pérez Alván, Wuild Parraga Pérez, and Euclides Ramírez Zumaeta are an exemplary group of young men whose courage, intelligence, determination, and adaptability allowed them to excel at participatory fieldwork in the contested borderlands. Augusto our motorista also deserves praise both for his skill with boats and his detailed knowledge of the rivers we traveled and the people who lived along their banks. The faculty at the Universidad Nacional de Ucayali (UNU), headed by David Lluncor, provided valuable support and insight with the advisory council of the Centro de Investigación de Fronteras Amazónicas (CIFA) being of particular importance to my work: Manuel Cuentas, Edgar Díaz, Giraldo Almeida and Aparicio Limache. Last but not least, in regards to UNU, I owe a great debt to Jorge Vela who, facilitated by his assistant Gloria González, took a risk in backing my research while providing an interdisciplinary vision, boundless energy, and unconditional support.

This work also benefited from the contributions and friendship of Dick Smith, Margarita Benavides, Renzo Piana, Pedro Tipula, Mario Osorio, Carla Soria, Margarita Vara, and Ermeto Tuesta at the Instituto del Bien Común who welcomed me as a Miembro Asociado. Others include Pancho Estremadoyro, Gustavo Delgado, Max Rivera, Lucas Benítez, and Raúl Vásquez at ProNaturaleza, Claudia Vega of The Nature

Conservancy Peru, Vicente Nuñez, Tedy Tuesta, Sydney Hoyle, Juan Blengeri, Luigi Vargas, Robin Najar, and José Llontop of the Gobierno Regional de Ucayali, Silvia Arispe and her wonderful parents Alberto and Queta, Hildegardo Córdoba of PUCP, Carlos Llerena of UNALM, Fernando Rodríguez of IIAP, Deby Moskovits and Alvaro del Campo of the Field Museum, Lily Rodríguez of APECO, Nigel Pitman of ACA, Humberto López and José Schunke of the James Graham Experience, Tony Hines of the Maple Companies, Kruger Pacaya (RIP) of ORAU, John Terborgh and Renata Leite-Pitman of Duke University, Lupe and Claudia Pinto, the enlightened caretakers at Hotel America, Juan Carlos Riveros and Mariana Montoya of WWF, and my good friend, Chris Fagan of Round River Conservation Studies.

In Brazil I am indebted to David Cleary and Marcio Sztutman at the Nature Conservancy, Foster Brown, Karla Rocha, and William Flores de Melo of the Universidade Federal do Acre (UFAC), Miguel Scarcelo, Silvia Brilhante and Leôncio of SOS Amazônia, Marcos Araujo and Magaly Medeiros of IMAC, Renato Gavazzi and Marcelo Iglesias Piedrafita of CPI, Benki Piyanko of APIWTXA, Vera Reis of Posada Tucumã, Kleber Ramos Alves and Francisco Lima of IBAMA, and Valério Gomes, Jacqueline Vadjunec and the excellent people of PESACRE. Finally, I thank my tia Brasileira, Verónica Passos, who also was instrumental in helping me become a geographer working in Amazonia and helped me understand the intricacies of Ecological Economic Zoning in an Amazonian context.

To all mentioned here, and to any others I forgot to include, my thanks.

Overcoming Marginality on the Margins:
Mapping, Logging, and Coca in the Amazon Borderlands

Publication No._____

David Seward Salisbury, Ph.D.
The University of Texas at Austin, 2007

Supervisor: Gregory W. Knapp

The ecologically and culturally rich Amazonian border zones are increasingly targeted for development and the exploitation of natural resources, even as these zones often double as existing or proposed sites for the conservation of biodiversity and protection of indigenous lands. Governmental and Non-Governmental Organizations alike project their goals from central offices onto borderland landscapes assumed to be empty of local people but full of valuable resources, biodiversity or development potential. Simultaneously, loggers, miners, drug traffickers, and others operate illegally or quasi-legally within these border zones and, in the absence of a strong governmental presence, cultivate the borderland's reputation as a violent hinterland. Within this complex borderland reality, the local people (indigenous and non-indigenous), largely invisible to authorities, struggle to survive with subsistence strategies while either negotiating with illegal interlopers to supplement their income or resisting them for their very survival. The resulting landscape is a tangle of overlapping and competing

concessions, conservation units, and indigenous territories whose contestation and resulting confusion advances the agenda of illegal extractivists and drug traffickers.

This study highlights the continued importance of fieldwork in geography. Here, field-based research provides insight into the poorly understood borderlands of Peru and Brazil. Research used a combination of participatory methods, Geographic Information Systems, ethnography, document research, and remote sensing to analyze mapping, logging, and coca cultivation within four borderland watersheds. These data were combined with regional data on coca eradication, resource concessions, conservation units, and indigenous territories from both Brazil and Peru. Field-based results demonstrate these borderlands to be highly contested and poorly mapped with an exploitative and poorly managed timber industry and a dynamic front of coca cultivation contributing to social disruption and environmental degradation. More fieldwork is needed to generate the geographic information necessary for sustainable development and conservation planning and to help local people defend their territory from illegal operators and the imposition of state resource concessions. Ecological Economic Zoning is recommended as a participatory policy framework to improve geographic information and long term planning.

Table of Contents

List of Tables

List of Figures

Chapter One: Introduction

I. INTRODUCTION

This dissertation focuses on contested resource management in the Amazon borderlands shared by Peru and Brazil. My three studies of resource mapping, logging, and coca demonstrate the surprisingly high level of resource extraction and conflict, and highlight the importance of improved geographic information for conservation, development, and the self determination efforts of local people. Local people are at the heart of this research as their detailed knowledge of place and resources stands in stark contrast to the limited geographic information available to decision makers in Lima and Brasilia. The local level focus also provides an opportunity to document how local people are coping with the challenges of competing resource extraction initiatives led by outsiders.

In this first chapter, I broadly situate the dissertation within theoretical, historical, and geographical space. The first section briefly describes my personal history with the Amazon borderlands and the discipline of geography. The following section introduces the dissertation's basis in empirical fieldwork, and cultural and political ecology with three brief sub-sections devoted to the chapter themes of mapping, timber, and coca. The third section underscores the importance of the Amazon borderlands and the relatively small amount of fieldwork that has been undertaken in these areas. The next section outlines the specific borderland research site, its inhabitants, and the methodologies used

in this dissertation. Finally, the introduction concludes with a recent history of the Brazil-Peru border, useful to identify historical antecedents to the current borderland situation.

II. BACKGROUND TO A FRONTIER FIELD STUDY

Since childhood I have been fascinated with exploration, discovery, and the frontier regions of the world. As a boy, I ate at a kitchen table surrounded by framed maps of the world. My best friend and I used to kneel on the kitchen chairs and point out all the places we were going to explore. My own favorites were the Northwest Territories of Canada, the Congo, Franz Josef Land, and the Amazon. Years later, in 1997, I finally saved enough money and traveled to the Amazon to visit my uncle, an ecologist in Rio Branco, Acre. Once there, I became interested in the cultural dynamics of resource management in this Brazilian frontier state bordering both Bolivia and Peru.

Three years later I returned to Acre to conduct fieldwork for my Master's thesis in a small rubber tapper community in the Brazilian Amazon borderlands. Borderlands are territorial regions surrounding state[1] boundaries with the Amazon borderlands including boundary regions of the nine nation states of Amazonia[2]. This fieldwork opened my eyes to both the dynamism of borderland livelihoods and the state's[3] inadequate geographic information (Salisbury 2002). One of my personal goals while in the area was to travel to the Peruvian border and explore the Serra do Divisor National Park. Unfortunately, time constraints prevented me from getting there. Two years later, in 2002, I did receive an opportunity to investigate the Peruvian side, although initially not along the Sierra del Divisor. My pre-dissertation fieldwork plans in Madre de Dios, Peru, were thwarted when loggers went on strike, blocking roads, burning the offices of Non-Governmental Organizations (NGOs) and making any sort of ethnographic fieldwork impossible. Giving up Madre de Dios, I traveled to the neighboring region of Ucayali

where I was able to join a scientific expedition headed by a cadre of conservation biologists. The next day we dropped into the Alto Purús watershed by propeller plane, and eventually boated into headwaters populated only by indigenous people in voluntary isolation and illegal loggers. This month long voyage retraced the boundary delimiting expedition of Euclides da Cunha (Comisión Mixta Purús y Yuruá 1906) complete with my own solo exit downriver into Brazil. On my return to the United States I wrote about the livelihood choices available to the local borderland inhabitants (Fagan and Salisbury 2003).

Based on my contributions on the Purús, I was asked by the Field Museum to join them in their October, 2002 helicopter overflights of the Sierra del Divisor. Their goal was to use the cartographic and ecological data generated by these overflights to influence the Peruvian state to declare a national park. While this was a rewarding experience, our methods were primarily remote sensing and not on-the-ground fieldwork. My bird's eye views left me hungering for the opportunity to walk the landscape and talk to the people in the forests below. To this end I began thinking about a longer term, field-based study of the Sierra del Divisor as my dissertation project.

III. FRAMEWORK TO A BORDERLAND FIELD STUDY

The goal of this dissertation is to improve our understanding of this poorly understood borderland and its people through inductive research and on-the-ground fieldwork. My twelve years of experience traveling and researching in Latin America taught me to be flexible in the field and wary of adhering too closely to overarching theories. Likewise, in Amazonia, plans can change quickly and often do, making a total commitment to the testing or proving of any one theory a risky proposition. This may be nowhere more true than the borderlands. Thus, my borderland research emphasizes cultural geography's long tradition of field-based inquiry (Sauer 1956), as well as cultural

ecology's reliance on progressive contextualization (Vayda 1983) and participatory mapping (Herlihy and Knapp 2003).

I understand human-environment relationships as a cultural ecology of three complementary forms: functional, behavioral, and structuralist (Butzer 1994, Butzer 2001). Each form interplays with the others with the latest form, structuralist cultural ecology, an alternate name for the more popular term, political ecology (Butzer 2001). I use behavioral cultural ecology's emphasis on person-to-person field investigation to discover explanations through progressive contextualization: an inductive approach prioritizing causal explanation of human-environment interaction and events[4]. Cultural ecology's emphasis on local knowledge allowed access to the community sphere where formerly hidden borderland narratives are heard, geographic knowledge is constructed and contested, and conflicts over resource access, property rights, and coca eradication are played out. The contributions of activist political ecology are also critical to the research, given my focus on counter maps and counter narratives. Counter maps are an alternative or protest to established notions or official representations of a landscape (Peluso 1995: 387).

My goal in this dissertation was to explore the Amazon borderlands and experience the most remote areas (perhaps the least understood) of the Amazon region through observation and ethnographic study of local resource users. I strongly agree with Sauer, Parsons, Butzer, Doolittle and other geographers on the importance of fieldwork to geographical research (Butzer 1989, DeLyser and Starrs 2001, Doolittle 2001, Parsons 1977, Sauer 1956, West 1979); indeed, fieldwork is why I became a geographer. Thus, I eagerly entered the Amazon borderlands to practice my geographical craft through exploration and discovery (Parsons 1977), direct observation (Sauer 1956), and interviews with local people (West 1979), all with maps and documents in hand (Sauer

1941). While I knew this fieldwork would contribute valuable baseline data currently unavailable, I continued to entertain multiple theories the data might inform (Chamberlin 1890). For example, Schmink and Wood's (1992: 19) study of the Southeastern Brazilian Amazon (Southern Pará) argues Amazonian frontiers to be contested among groups capable of assembling varying degrees of power while Santos-Granero and Barclay's (2000: 308, 321) study of the Northern Peruvian Amazon (greater Loreto) finds their Amazonian frontier tamed given state intervention has suppressed the negative traits characteristic of Amazonian frontier economies. In addition, McSweeney (2004: 638, 656) has shown how empirical research in remote locations, in her case the dynamic nature of rural trade networks, can provide insight into unanticipated processes at work in localities. Similar insight could prove useful in Amazonia, where development has more often been projected from the outside rather than informed from within the region (Bunker 1983, Hecht 2004, Schmink and Wood 1992). What is the dialectic between local borderlanders and the goals outsiders project? I was also curious how the existing maps of the areas might or might not reflect the physical and human landscapes of the borderlands. How does the geographic knowledge of borderlanders compare with the existing maps of their borderlands?

In seeking to answer these questions I talked to a borderland people whose local knowledge[5] of place and ecology has proved critical to detect and extract valuable natural resources such as rubber, mahogany, and cinchona (Coomes 1995), locate unique species and habitats (da Cunha and Almeida 2002), show colonists how to live in these new environments (Moran 1993), and demarcate political boundaries (López 1925, Tastevin 1926). Despite these contributions, I also found a people marginalized by state indifference[6]. Historically, nation state knowledge of the physical and human geography of the borderlands has been limited. This state indifference or even deliberate neglect

was acceptable to borderlanders fleeing from slave raids, debt peonage, and even genocide. More recently, however, both state and non-state interest in borderland resources and territory increased while state indifference or convenient neglect of local residents continued. The state's lack of geographic knowledge of, and interest in the borderlanders facilitated the projection of state resource concessions on local homelands and the arrival of illegal operators such as coca farmers and loggers seeking to exploit local resources and labor.

This is the latest chapter in a long history of Amazonian exploitation of resources ranging from drogas do sertão, brazilwood, spices, rosewood, cinchona, vegetable ivory, jute, petroleum, mahogany, gold, skins, aquarium fish, butterflies, and coca to even humans (Cleary 2001, Coomes 1995, Hemming 1978). This study follows a research tradition of cultural and political ecologists investigating the exploitation of Amazonian resources (Bunker 1985, Sweet 1974), the exploitation of Amazonian labor (Barham and Coomes 1996, Romanoff 1992), and local resistance to exploitation (Hecht and Cockburn 1990, Schmink and Wood 1992). In the following three sub-sections I will address previous contributions to this research tradition through the borderland study of mapping, timber, and coca. Mapping is a critical component of frontier resource exploitation and a logical subject for this field-based inquiry. Among the many Amazonian resources, I have chosen to focus on the cultural and political ecology of timber and coca due to their economic and ecological importance to both the borderlands and borderland livelihoods. While geographers have conducted research on both Amazonian timber (Arima et al. 2005, Asner et al. 2006, Hoy 1946, White 1978) and coca (Henkel 1971, 1995, Young 1996, 2004a, 2004b), the nature and degree of exploitation of these resources remains understudied in a borderland characterized by inadequate geographic information.

A. Mapping

Inadequate geographic information is not unique to this Amazonian research site. Brown et al. (1995) points out that the basic maps in many developing countries are out-of-date, inaccurate, inadequate in detail, or all three. Similarly, Herlihy and Knapp's (2003: 306) discussion of participatory mapping in Latin America found existing maps of indigenous lands in Latin America to have poor cartographic coverage. Small and medium scale maps lack detail while large scale topographic maps are outdated or incorrect (Herlihy and Knapp: 306). These findings echoed research in the Peruvian Amazonia where Smith et al. (1999) found the 1:250,000 scale official maps contained on-the-ground errors greater than 500 meters (1999: 12), with the majority of indigenous community land title maps difficult to find (1999: 16) and not georeferenced (1999: 12). Given the lack of an official digital map of the Peruvian Amazon, the Instituto del Bien Común[7] is currently digitizing Peru's higher quality 1:100,000 topographic sheets (*cartas nacionales*) in order to incorporate and update indigenous territories (Smith et al. 2003: 361). Despite the higher quality of the *cartas nacionales*, the Instituto del Bien Común's fieldwork has begun to find the location and name of settlements to be of dubious reliability on these large scale topographic maps (Smith et al. 2003: 362). While Herlihy and Knapp (2003: 306) declare Latin American government census maps more reliable than topographic maps for up-to-date settlement data, they also recognize census workers to be notoriously unreliable in remote areas often placing misinformation or blank spaces on census maps of these regions.

Herlihy and Knapp (2003: 306) propose that blank spaces on official maps could represent a state strategy of ignoring resident indigenous populations in order to maintain remote lands for national resource exploitation. If true, this cartographic strategy of imposing blankness repeats colonial efforts silencing native presence in the Americas

(Harley 1992: 531) and Africa (Bassett 1994: 324). The documentation of such a deliberate strategy would provide a cartographic manifestation of Hecht's Amazonian *tabula rasa* (2004). In a similar vein, Almeida's book, Carajás: a Guerra dos Mapas, contends that the Brazilian state's unwillingness to update base data, disinterest in local level studies, and corresponding disdain for their own official maps and inventories served as a deliberate strategy of marginalization and social control in Brazil's Legal Amazon (1993: 328-9). The confusion caused by this cartographic vacuum resulted in overlapping claims, territorial invasions, and resource exploitation favoring colonists and illegal operators over traditional populations (Almeida 1993: 328, Monteiro 1994: 6). While my field-based research lacks the institutional ethnographies necessary to uncover such a convoluted state strategy, the comparison of maps with field data can verify the maps' degree of accuracy in representing populations (both traditional and colonist), governmental and non-governmental projects, and the natural landscape. In the next chapter I analyze national topographic maps, national resource maps, national census maps, municipal maps, maps of the Instituto del Bien Común, and locally informed participatory maps to evaluate the accuracy of these cartographic representations of the landscape. Is the geographic information inadequate? If so, what might be some of the reasons and what are the consequences of inadequate information on the ground?

Participatory mapping is a term used to refer to a broad range of community-based research and development approaches that incorporate local people to map their own lands (Herlihy and Knapp 2003: 306). Other terms used are community mapping, and counter mapping when these participatory maps are created as an alternative or protest to established notions or official representations of a landscape (Peluso 1995: 387). Participatory mapping aligns closely with the concerns of cultural and political ecology through their shared goals of understanding complex and mutable human-

environment relationships (Herlihy and Knapp 2003: 308). The participatory mapping process can progressively contextualize and construct geographical knowledge at multiple scales (Herlihy and Knapp 2003: 308). This bottom up methodology favors behavioral cultural ecology more than a structuralist political ecology approach due to its emphasis on local empirical knowledge over deductivist approaches for explanation. Nevertheless, the results of counter mapping, namely empirically based counter narratives, have potential to be powerful weapons against the hegemonic discourses and structural constraints commonly addressed by activist political ecology.

Sletto (n.d.: 30) captured local counter narratives to the *tabula rasa* through Pemón counter maps. Antonio, a Pemón elder, recounted in 2003, "the e'ne (outsiders) have forced indigenous people to live in small sites, … when they see all that empty space (where indigenous people don't live), they say, 'Why do indigenous people need these lands, since they don't live in these empty spaces?" (Sletto n.d.: 30). Similary, Rafael, another Pemón elder said in 2002, "We need to put down everything, because in the future, if we leave spaces open, the people who work in tourism might take them from us." (Sletto n.d.: 29). Thus, Sletto (n.d.) has captured the dialectic between local geographic knowledge and the *tabula rasa* meta-narrative through a participatory mapping process. Indeed, ironically, he records the Pemón choosing to cartographically silence signs of state domination in their map through the non-representation of power plants, park structures, and military posts (Sletto n.d.: 46).

The power, popularity, and potential of participatory mapping is reflected in the number of participatory mapping endeavors extant and the growing body of literature analyzing its strengths and weaknesses. King's (2002) comparison of ten case studies in the developing world, Herlihy and Knapp's (2003) discussion of participatory mapping endeavors in Latin America, and Hodgson and Schroeder's (2002) review of four

counter-mapping projects in Tanzania are just a few recent examples. This introduction points out some of the major strengths and weaknesses of the participatory mapping genre.

Participatory mapping validates local geographical knowledge and potentially makes it accessible to everyone from the most marginalized local resident to the Presidents of nation-states. According to Smith et al. (2003: 341), these maps based on local knowledge have the potential to be some of this century's best research on both the cultural and natural landscape. The cartographic products can have "scientific value" (Chapin at al. 1995: 33), and are thus increasingly accepted by policy makers (Herlihy and Knapp 2003: 310), scientists (Herlihy 2003: 328, Saragoussi et al. 1999: 4; Stocks 2003: 354), and international courts (MacDonald 2002: 66). The map products serve to improve dialogue between communities and outsiders even as the process empowers communities and educates both researchers and community members (Herlihy and Knapp 2003: 309). Indeed, the mapping process can not only empower local communities (Nietschmann 1995: 37, Poole 1995), but also marginalized fractions within those communities (Dana 1998: 41, Rocheleau 1995).

Over the years, researchers (Herlihy and Knapp 2003, Hodgson and Schroeder 2002, King 2002, Poole 1995) have documented a variety of uses of the participatory mapping approach including, for example: 1) gaining recognition of land rights; 2) designing conservation plans; 3) gathering and guarding traditional knowledge; 4) surveying biodiversity; 5) protecting and managing conservation units and indigenous reserves; 6) building consensus and promoting conflict resolution; 7) providing baseline geographic data; 8) demarcating land claims and titles; 9) empowering and educating communities; and 9) promoting and protecting cultural diversity. Herlihy and Knapp recognize the range of uses for participatory mapping and divide it into two variants with

Participatory Action Research Mapping focusing on social action and the mapping process and Participatory Research Mapping focusing on research and the map product (2003: 307). The line separating these variants is a fuzzy one, if a boundary exists at all, given the inherently subjective nature of maps (Wright 1942) and the indivisibility of cultural context and cartographic technique (Harley 1988, Harley 1989) regardless of goals of "…Western-style accuracy, validity, and standardization…" (Herlihy and Knapp 2003: 307). Indeed, Fox (2002: 76) finds striking similarities in how indigenous perceptions of space in 19th century Siam and a late 20th century Cambodian village are altered by the Western spatial paradigm though modern mapping exercises. Regardless of goals, uses, or methodology, mapping is an inherently political and cultural process (Harley 1988, 1989, 1992). As such, the process should be weighed equally with the map product (Sletto n.d.: 48).

Given the complex nature of the mapping enterprise, it is not surprising that researchers have found a number of limitations and negative impacts associated with participatory mapping. Some of these critiques have centered on community reliance on external funding, "experts", agendas, and Western spatial paradigms, epistemologies, and worldviews (Dana 1998: 34, Fox 2002: 66, King 2002: 50, Kosek 1998: 5, Peluso 1995, 384, Poole 1995, Rundstrom 1995: 45, 1998: 7). The resulting maps can freeze indigenous conceptions of resource and land tenure, replacing open, inclusive, and dynamic systems with networks of static and divisive boundaries (Fox 2002: 66, Peluso 1995: 400, Rundstrom 1995: 52). These fixed and visible boundaries can stoke tensions previously mitigated by cognitive maps characterized by blurred and fuzzy boundaries (Dana 1998: 34, Fox 1998: 3, Peluso 1995: 401). In some cases, researchers have addressed this issue through cartographic representations of boundary uncertainty (Dana 1998: 40; Salisbury 2002: 114, 161) or the choice of low accuracy GPS technology (Dana

1998: 34). Place names, sacred sites, and even the physical geography of place, often fluid and ambiguous in indigenous conceptions of space, can also be frozen in the final product (Rundstrom 1995: 49, 52, Rundstrom 1998: 8).

While the map product can create friction among communities and community members, the process itself can also be divisive. The creation of a mapper class can upset the long standing social and political dynamics of communities as younger, more educated and, in some cases, urbanized community members gain power through the mapping process (Dana 1998: 41, Flavelle 1995: 73, Peluso 1995: 387, 399). Indeed, just as the mapping process can be a means to include, it can also consolidate power in the hands of the dominant members of a community (Kosek 1998: 5) and exacerbate power divisions by overlooking the claims of women, the elderly and other vulnerable members of society (Edmunds et al. 1995, Rocheleau and Edmunds 1997). A central question is who is engaged in the mapping process? Community participation does not necessarily equate to a participatory process (Chambers 1994) and availability of mapping technology to disempowered groups in a community does not necessarily equate to their utility by those groups (King 2002: 46). Both inter- and intra-community frictions brought about by the participatory mapping process are often a result of the mapping organization's simplistic notions of the community as a homogenous, bounded entity rather than a complex collection of individuals with ties to both each other and the outside world (Agrawal and Gibson 1999, Kosek 1998: 5). The community map, like all maps, also takes on a life of its own after its creation. The cultural relevance of the map decreases as it moves farther away, in both space and time, from the landscape mapped. "…when these maps enter the international flows of ideas and knowledges they have moved beyond the grasp of marginalized peoples…" (Sletto n.d.: 47). Gordon et al. (2003: 378-9) stress the fluid and constructed nature of identity that, while delicately

balanced with a particular participatory mapping process, will continue evolving as the static map remains the same. Who controls the map, the updating process, and the data within is thus, a critical factor in the balance of power of participatory mapping (Chapin 1998: 7, Fox 2002: 77). This can be particularly important if the local knowledge embedded in these maps is merely a "resource" for the global development project rather than a valued contribution from a long overlooked but now validated alternative information source (Sletto 2005: 90).

Despite these critiques, participatory mapping is here to stay as is its capacity to simultaneously empower and marginalize (Harris and Weiner 1998, 69). Both mapping process and map product are too powerful and accessible to be ignored in a world of inequality where the choice often comes down to whether to be recognized or obscured (Peluso 1995: 403), to map or be mapped (Stone 1998: 54). If then, as Fox (2002: 76) contends, there is no choice but to map, the mappers must face the responsibility that comes with an improved understanding of the inherently political and cultural nature of both the participatory mapping process and map product. One of these responsibilities is to maintain *in perpetuam* the participatory mapping project as these maps must be updated and dynamic to reflect the changing cultures, use, resources, and landscape. In Latin America, where mapping has usually been a state enterprise (Herlihy and Knapp 2003: 310) a carefully crafted participatory mapping process may be the only effective counter narrative to the "imagined countrysides" of the nation state (Orlove 1991: 31-2). Nevertheless, the process must address these structural forces specifically as the full emancipatory potential of participatory mapping can only be reached if the process is accompanied by legal and political strategies (Hodgson and Schroeder 2002: 96) capable of engaging policy makers (King 2002: 49). Without a larger political will, participatory

mapping may be of limited utility even in a remote borderlands characterized by inadequate geographic information, exploitation, and marginalization.

B. Timber

Scientists investigating the nature and impact of the Amazon timber industry are increasingly aware of the complex human-environment dynamics necessary for sustainable forest management (Blundell and Gullison 2003, Lima et al. 2006, Zarin et al. 2004). Researchers grapple with these dynamics through a wide range of debates including the appropriate methodologies for research (Peres et al. 2005), the role of indigenous reserves in halting deforestation (Nepstad et al. 2006), and the effectiveness of new legislation in slowing illegal logging (Blundell and Gullison 2003, Smith et al. 2006) among others. This study's analysis of the cultural ecology of the borderland timber industry informs these debates with empirically grounded data from one of the least studied portions of the Amazon basin.

Hoy's 1946 description of the mahogany industry of Peru's Iquitos region found the hardwood already extirpated from the most accessible rivers and the industry constrained both by a lack of shipping and a shortage of labor despite healthy wartime markets (Hoy 1946: 9, 13). Upriver, on the Ucayali, the timber industry boomed when the 1943 completion of the Pucallpa-Lima road improved access to international markets (Santos-Granero and Barclay 2000: 194). The Brazilian Amazon timber trade also responded favorably to improved infrastructure. In Brazil, extraction was largely limited to the banks of major rivers until the 1970s when improved roads and favorable governmental policies improved access to markets (Lima et al. 2006, Scholz 2001). Increased accessibility, access to labor and growing demand led to a surge in selective logging and logging associated deforestation in the Brazilian Amazon from the 1970s to the mid-1990s (Lima et al. 2006). This surge reached to the Brazilian border with Peru

where loggers illegally removed thousands of trees from the Asháninka[8] homelands of Apiwtxa between 1982 and 1990 (CEDI 1993). These invasions galvanized the Asháninka to obtain title to their lands to resist further incursions (Pimenta 2002). Since the mid-1990s, the Brazilian Amazon's timber frontier has consolidated along older fronts with some renewed expansion along younger more remote fronts where high value hardwoods such as mahogany and tropical cedar remain (Lima et al. 2006). The continued illegal logging of mahogany and other hardwoods led Brazil to ban the mahogany trade in 2001 (Kometter et al. 2004: 8), reject all forest management plans on lands without property rights in 2003 (Lima et al. 2006: 30), and create new forest legislation and concessions in 2005 (Asner et al. 2006, ITTO 2005). These measures and the dwindling stock of mahogany in both Brazil and Bolivia led Peru to become the world's largest exporter of mahogany (Kometter et al. 2004).

Despite being the largest exporter of mahogany, Peru's stock of commercially viable mahogany (trees > 60 cm diameter at breast height) was also in decline as of 2004 (Kometter et al. 2004). With commercially viable mahogany and other high value species largely inaccessible, loggers penetrated into the borderlands, indigenous reserves, and national parks for the last large trees. Due to the inaccessibility of these areas the loggers' methods remain remarkably similar to those observed in the mid-1970s (White 1978). White's (1978) study of cedar and mahogany extraction in Amazonian Peru revealed a rudimentary and selective logging system with minimal environmental impacts given the limited external demand at the time. With both external and internal demand for tropical timber now high, geographers and ecologists focused less on the cultural ecology of Amazonian timber extraction and more on the larger scale impacts of logging and logging associated practices (Arima et al. 2005, Asner et al. 2005, Asner et al. 2006, Nepstad et al. 1999). These large scale studies use GIS and remote sensing modeling

techniques to demonstrate the widespread degradation caused by logging (Asner et al. 2005, Nepstad et al. 1999) including the logging related expansion of road networks (Arima et al. 2005, Asner et al. 2006). Meanwhile, Peres et al. (2006: 229) warn that while improved techniques and imagery are producing quantifiable results of forest degradation, anthropogenic disturbance of Amazonian forests continues to be underestimated. Perhaps also underestimated are the impacts logging and other forms of forest degradation have on the indigenous inhabitants of the forest (Veríssimo et al. 1995, Watson 1996). What are the relationships between indigenous people, their homelands, and logging in the borderlands? Faced with continued forest degradation by loggers, some ecologists even argue that funding for ecological studies of timber and timber management should be refocused towards interdisciplinary studies that could improve the regulation of logging and forest use (Blundell and Gullison 2003: 402). This study's cultural ecology approach to Peru's tropical timber industry provides the grounded empirical information at the source of extraction that is necessary to complement large scale quantitative studies in poorly understood regions.

Arima et al. (2005) and Asner et al. (2006) among others find Amazonian logging to be positively correlated with road creation and deforestation. Meanwhile, Nepstad et al. (2006: 65) argue that indigenous reserves are "the most important barrier to Amazon deforestation. Studies of logging within indigenous reserves may then shed light on just how strong a barrier these reserves are. Chapter Two's analysis of the tropical timber industry's interface with the borderland Asháninka provides an opportunity to compare logging within an indigenous reserve and a neighboring untitled indigenous homeland. Is the indigenous reserve more effective than the untitled homeland in preventing logging and potentially logging related deforestation?

Both timber researchers and South American policy makers are trying to decide whether logging and conservation can be reconciled in Amazonia (Zarin et al. 2004). Despite continued disagreement between researchers over whether selective logging is simply forest degradation or a strategic means to protect standing forest (Putz 2004), Amazonian policy makers have largely opted for selective logging. This is reflected in recent forest legislation in Bolivia (1996 Forestry Law), Peru (2001 Forestry and Wildlife Law), and Brazil (2005 Law for the Sustainable Management and Production of Public Forests) (Putz et al. 2004, Paniagua 2001, ITTO 2005). Each of these laws designates large tracts of Amazonian forests as timber concessions and national forests, relying on historically weak government institutions for monitoring and enforcement of sustainable forest stewardship (Smith et al. 2006). Peru's previous forestry law failed to improve logging practices due in part to the disconnect between governance and norms (Smith et al. 2006). Can the new Peruvian forestry law overcome the existing history of governance failures or does the new legislation merely mask pervasive problems in Peruvian logging practices? This study's analysis of the logging practices at the source of production promises useful data to evaluate the long term potential of selective logging in remote Amazonian forests.

C. Coca

Extensive research exists on the global drug trade, drug use and drug eradication (Allen 2005, Menzel 1996, Thoumi 2003), but few studies analyze the social and environmental complexities taking place at the source of cultivation and production. Steinberg et al.'s (2004) edited volume, *Dangerous Harvest*, is a notable exception and examines the transformation of indigenous landscapes by the drug trade and the complex ties that exist between local farmers and their drug crops. My analysis of coca follows in this geographic tradition, seeking to provide insight into coca cultivation in Amazonia.

Young (2004b: 366) calls on geographers to join the search for explanation of the environmental degradation and social disruption caused by the cultivation and traffic of coca and coca derivatives. Allen (2005) notes the need for geographic analysis to overcome the scarcity of meaningful quantitative and qualitative data (117) and interpret the disparate facts and relationships influencing the cocaine trade (131). Here, I answer these calls for coca-related geographic research, using empirical data to examine the environmental and social impacts of coca cultivation in the Amazon borderlands.

This examination builds on the geographical research of Young (1995, 2004a, 2004b) and Henkel (1971, 1986, 1993) who have investigated the impacts of coca cultivation in two of the world's largest coca growing areas: Peru's Huallaga Valley and Bolivia's Chaparé province, repectively. In contrast, my fieldwork involved an area where coca cultivation was unrecognized by both historical ethnobotanical surveys (Plowman 1984) and recent maps by the United Nation's Office of Drug Control (2005c). Given the almost total absence of information, this study provides meaningful data concerning the characteristics, distribution, and impacts of borderland coca cultivation. For example, are the characteristics of borderland coca cultivation dissimilar from those documented in the Andean foothills of Peru? What is the distribution and chronology of coca cultivation in the borderlands?

The empirical nature of the data also allows a substantive treatment of the social and environmental impacts of coca cultivation. Understanding these impacts is of particular importance in an area of high cultural and ecological diversity where social and environmental conditions are distinct from those documented in Colombia (Fjeldsa et al. 2005), Peru (Young 2004a) and Bolivia (Henkel 1993). In addition to understanding social and environmental conditions, a cultural ecological analysis of coca cultivation must also include a treatment of larger political and economic forces. The political,

economic, and military forces supporting the war on drugs have enormous influence on the decisions of local coca farmers. Coca eradication is just one, albeit tangible, facet of these forces that cannot be disaggregated from the impacts of coca cultivation. My coca chapter's hypothesis is: coca eradication increases rather than mitigates the negative social and environmental impacts of coca cultivation in the Amazon borderlands.

IV. AMAZON BORDERLANDS: EXTENSIVE ENIGMAS

The Amazon borderlands are of increasing importance to national security, development, and conservation[9] efforts as agricultural, extractive, and settlement activities advance towards nation state boundaries. While Amazonian political boundaries[10], like the rivers and ridgelines that help define them, defy precise measurement[11], these borders extend for roughly 12,000 kilometers (as measured at 1:1 Million scale) (Figure 1). Since 1499, the desire for natural resources, and the associated ebb and flow of economic booms and busts, not only defined these lengthy borders, but also made their surrounding boundary lands[12] repositories of cultural and biological diversity, as indigenous groups sought refuge from *correrías* (slave raids) or were abandoned by *patrones* (exploitative bosses) and species avoided detection or had a chance to escape and recover from exploitation in these distant boundary havens. Figure 2 shows the extent of these remote borderlands[13]. This dissertation uses the 150 km wide Brazilian legal designation of *faixa de fronteira* (Direito & Justiça Informática Ltda 2006) to define the borderlands in Figure 2. This definition results in an estimate of 23 million square kilometers; a web of borderlands larger than the combined area of Germany, France, Spain, Italy, Norway, and the United Kingdom. The amount of these borderlands protected by indigenous territories and conservation units, as seen in Figure 2, underscores the region's rich cultural and biological diversity. While others may

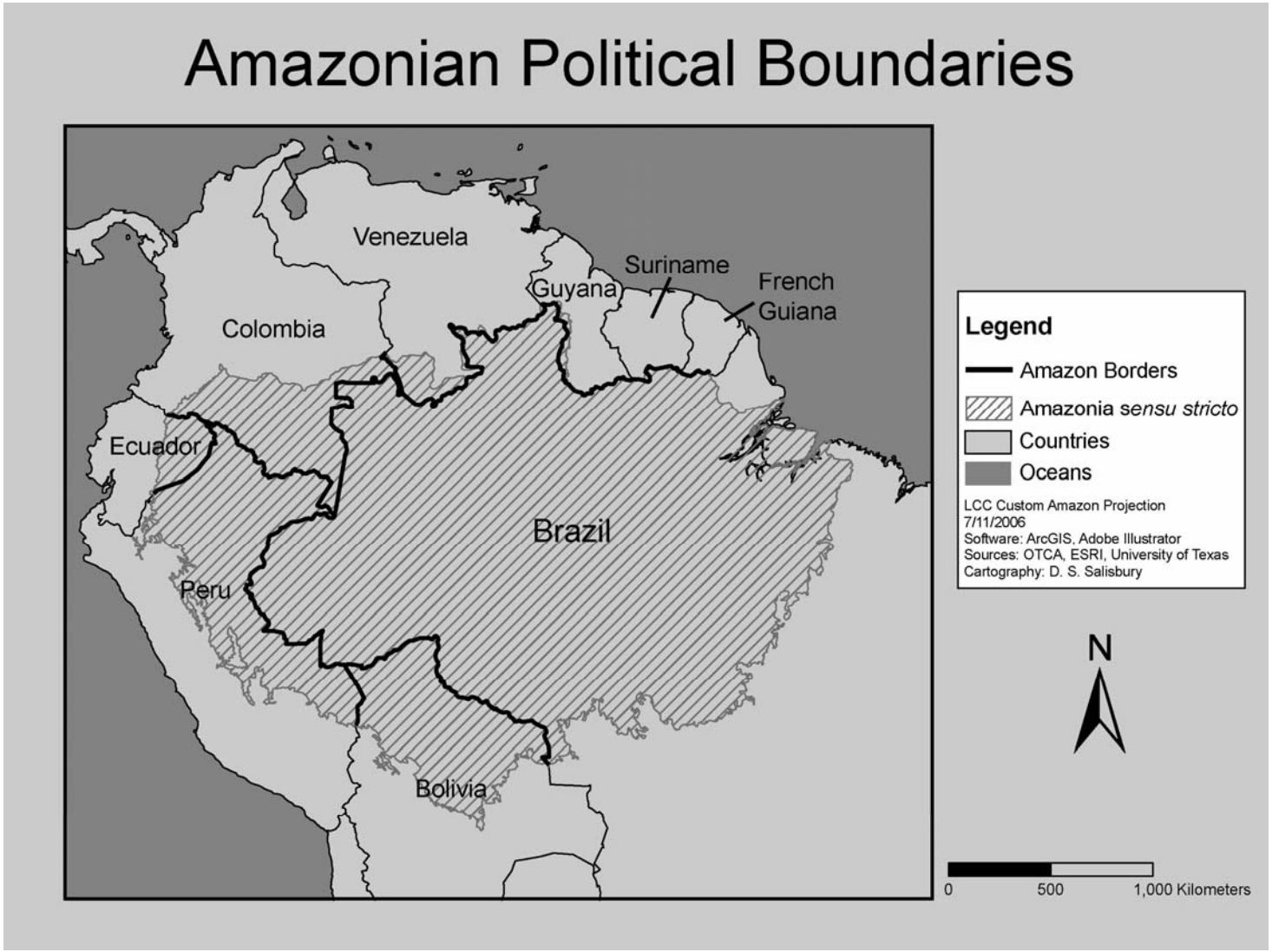

Figure 1. The Amazonian political boundaries cross 12,000 km of lowland Amazon rainforest.

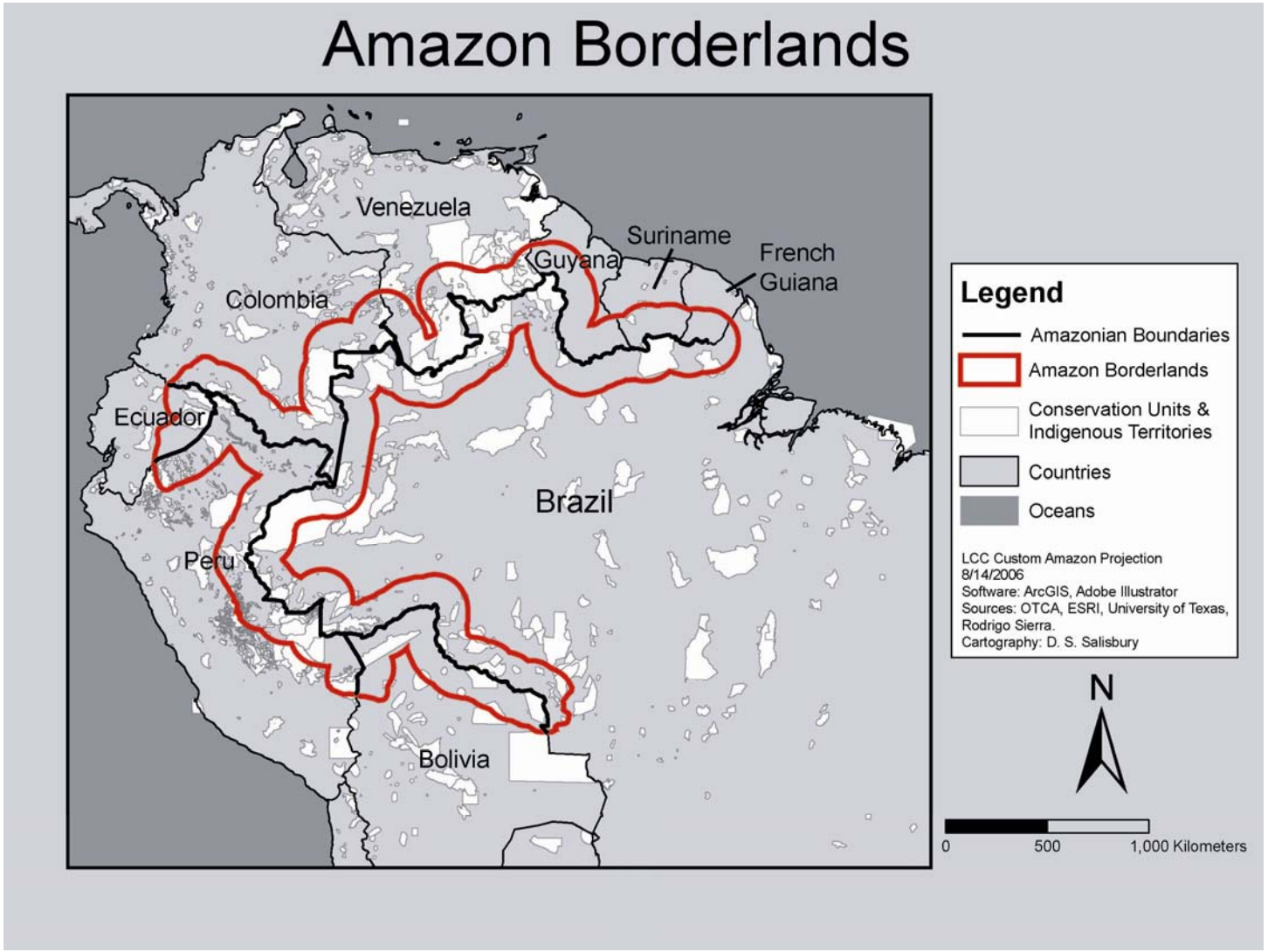

Figure 2. The 23 million km² Amazon Borderlands include some of the earth's areas richest in ecological and cultural diversity.

define borderlands differently, there is no denying the borderlands' wealth of cultural and biological diversity and their great importance to conservation.

In spite of this importance, and rapidly increasing interest in transboundary road building and development in Amazonia (Brown et al. 2002, Conover 2003, IIRSA 2006, Madre de Dios 2006), these borderlands remain enigmatic. While research abounds on Amazonian frontiers (Becker 1999, Hecht and Cockburn 1990, Santos-Granero and Barclay 2000, Schmink and Wood 1992) and Latin American borders (Augelli 1980, Arreola and Curtis 1993, Dana 1992, Girot and Nietschmann 1992, Herzog 1992, Herzog 2000, House 1982, Liverman et al. 1999), Amazonian borders themselves have received scant attention (Chaumeil 1992, Elbow 1996, Radcliffe 1998, Roux 2001, Seiler-Baldinger 1981, St. John 1999). This is likely, in part, due to their remote nature, lack of basic geographical information, challenging field conditions, and the difficulty ofconstructing a theoretical framework for their study. It was only as recently as 1978 that the Amazonian countries (Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, and Suriname) signed the Amazon Treaty of Cooperation to "undertake joint actions and efforts to promote the harmonious development of their respective Amazonian territories in such a way that these joint actions produce equitable and mutually beneficial results and also achieve the preservation of the environment, and the conservation and rational use of the natural resources of these territories." (TCA Secretaria 2002: 15). Following establishment, the Organization of the Amazon Treaty of Cooperation (OTCA) met frequently, but it is only since the twelve South American presidents met in 2000 and created the Initiative for the Integration of Regional Infrastructure in South America (IIRSA) that the OTCA gained weight within the central governments.

IIRSA's goal is to integrate the continent of South America with transportation, energy, and telecommunications networks in order to achieve sustainable development while establishing the continent as a geo-economic territory capable of competing within the new globalized economic order (IIRSA 2006). To reach these goals IIRSA prioritizes ten transboundary integration hubs, four of which include a portion of the Amazon basin. Work has moved quickly on these Amazonian hubs, in some cases with mixed reactions by borderland peoples unused to huge infrastructure projects in their homelands. The best example here is the tri-national/transboundary Madre de Dios, Acre, Pando (MAP) Initiative whose fifth MAP forum in 2004 registered 1,200 participants concerned about their rights of participation and equal access to information in IIRSA's road building, energy and telecommunications projects (Madre de Dios 2006). While the degree of participation and mobilization in the MAP region is impressive, participants in this relatively developed transboundary initiative declared the lack of information about neighboring countries of primary importance (Brown et al. 2002). However, the following chapters argue that there is also a lack of information within each nation about the nature of their own frontiers.

Through their book, *Fronteras Domesticadas*, Santos-Granero and Barclay (2000) have introduced a debate over Amazonian settlement frontiers as contested (Schmink and Wood 1992), or tamed (Santos-Granero and Barclay 2000). Based on their study of Peru's Loreto (and by extension Ucayali) region, they contend that Amazonian regional economies need not incessantly repeat a "violent and transient frontier character" (Santos-Granero and Barclay 2000: 5). They find scholars (Bunker 1985, Foweraker 1981, Ribeiro 1970, Schmink and Wood 1992) focusing on areas recently opened or reopened to colonization in the Brazilian Amazon to emphasize five features not present in the contemporary economies of Loreto and Ucayali (Santos-Granero and Barclay

2000: 4). Santos-Granero and Barclay (2000) argue the following five negative frontier traits to have been "tamed" in Loreto and Ucayali and thus potentially suppressed or contained[14] within other regions of the Amazon basin: 1) economies dependent on external capital and demand, 2) lack of local capital accumulation and emergence of a bourgeoisie, 3) presence of precapitalist social relations of production and exchange, 4) inability to generate permanent demographic fronts due to extractive character of economies, and 5) weak state presence or state subservience to private economic interests in frontier areas. While my study has neither the longitudinal depth nor the economic emphasis of *Fronteras Domesticadas* it does take place within the Santos-Granero and Barclay study region and promises contemporary insight[15] into the degree of domestication of four of the five traits above.

Even as I analyze the possibility of my borderland research site being "tamed" (Santos-Granero and Barclay 2000) so must I also entertain the possibility of a contested borderlands (Schmink and Wood 1992). Schmink and Wood (1992: 344) relied on field-based methods to analyze fifteen years of frontier change (1976-1991) in Southern Pará, Brazil before coming to the conclusion that these changes were the net result of a contest for resources between social groups capable of marshalling varying forms and degrees of power. Their multi-scalar analysis outlines the complexity of frontier power struggles contingent upon a dynamic alignment of economic, political, and social factors (Schmink and Wood: 344-5). Schmink and Wood (1992) find both natives and newcomers (rubber tappers, ranchers, miners, and others) in the maelstrom of the many contradictory agendas of both state and federal agencies. This vortex represents a multiplicity of simultaneous and overlapping contested frontiers with highly varied outcomes (Schmink and Wood 1992: 13, 19). Within this complex contest for resources, Schmink and Wood argue for cautious optimism given the very complexity offers not only surprising and

unintended consequences (1992: 345, 349) for the ill-conceived project or policy (1992: 346), but also opportunities for formerly marginalized groups to find common ground, mobilize power, and make strides towards the democratization of development and conservation (1992: 349, 353). My own research lacks the multi-scalar scope and repeated field observations of Schmink and Wood, but does provide an opportunity to investigate the possibility of multiple contested frontiers given the range of resources and resource users studied in the borderland research site.

V. THE CENTRAL BORDERLANDS OF PERU AND BRAZIL: RESEARCH SITE AND METHODOLOGY

The central borderland research site lies along the ridgeline dividing the Ucayali and Juruá Rivers. This ridge, called the Sierra del Divisor or Serra do Divisor is south of the geographically important and historically hard to locate origin of the Javarí River and north of the 09°24'42" geodesic parallel slicing off the headwaters of the Juruá River (Figure 3).

Peru's Ucayali region[16] (102,000 km)[17] contains an estimated 402,000 residents (INEI 2005) with over half living in the capital of Pucallpa. Created in 1980 from a portion of Loreto department, this Amazonian region shares over 1,000 kilometers of border with Brazil with about half of this political boundary formed by the watershed divide between the Ucayali and Juruá Rivers. Most of the Ucayali region lies east of the Ucayali River, and is the least understood portion. This borderland area, similar to other frontiers in Amazonian Peru, has experienced, and continues to experience, intermittent economic booms centered around products like Panama hats, rubber, vegetable ivory, rosewood and, more recently, timber, gold, and coca (Coomes 1995, Santos-Granero and Barclay 2000), but has a weak government presence. Violence is common with indigenous people, *ribereños* (riverside dwellers), colonists, coca farmers, loggers,

miners, drug traffickers, smugglers, and others largely following the frontier code observed by Colonel Portillo (1905a: 506) a century before: "there are no laws, there are no authorities…He who is strongest, who has the most rifles, is master of justice." Similarly, in 1884, the Franciscan explorer, José Samanez y Ocampo (1980 [1885]: 78) observed of the Ucayali River, "In this virgin and beautiful region, disorder, apathy, and disdain for the law, have already established their disgraceful dominion."

Within these violent borderlands lies the study site: four right bank Ucayali tributaries with headwaters along the Brazilian boundary and Sierra del Divisor: the Callería, Utiquinía, Abujao, and Tamaya Rivers (Figure 3). These rivers were chosen because they are neighbors, have their headwaters at the border, are poorly understood, are contained or adjacent to the Sierra del Divisor, and were of interest to a variety of institutions interested in the conservation and development of the area. The land cover of the area is dominated by a dense *terra firme* humid tropical forest with *várzea* (seasonal floodplains) being the other principal land-cover (ONERN 1978). The area's climate is hot and humid, with a mean temperature of 25º Celsius and precipitation ranging between 1,600 and 2,000 millimeters a year with a pronounced dry season falling between July and October. The geology of the four watersheds is primarily made up of sedimentary formations, including Quaternary deposits in the floodplains, and Cretaceous rocks in the low mountain ranges forming the political boundary with Brazil (ONERN 1978). However, several igneous cones rise out of these sedimentary deposits. These unusual and visually arresting volcanoes range in height from 500 meters to over 900 meters above sea level and date to about 5 million years ago (ONERN 1978) (Figure 4).

The cultural geography of the study region is also very unusual given the presence of a diversity of cultures with a high degree of mobility. The patchwork of ethnicities

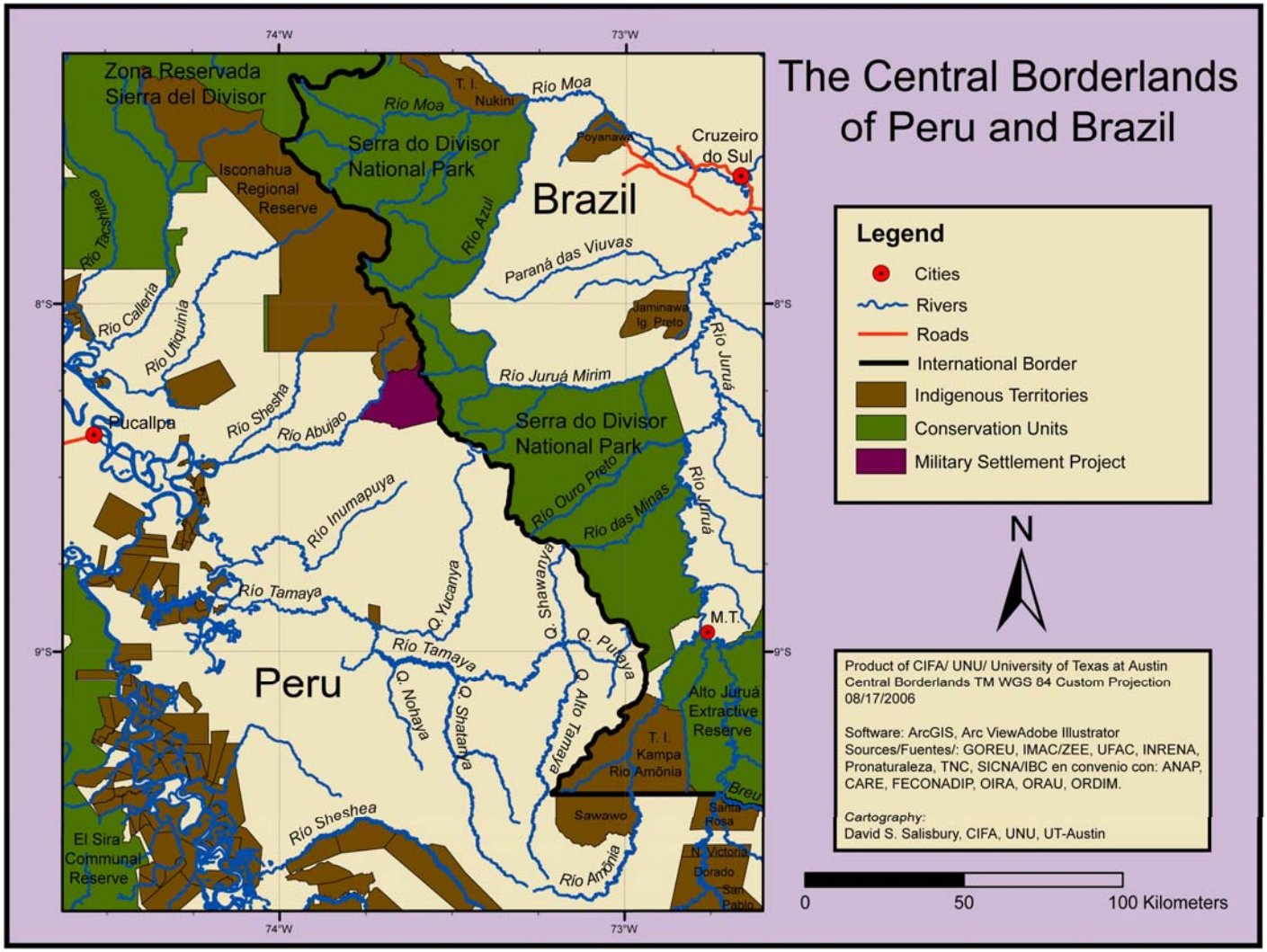

Figure 3. The Central Borderlands between Peru and Brazil contains a great deal of cultural and biological diversity both inside and outside its protected areas.

Figure 4. A rare lowland volcano rises out of the rainforest near the Sierra del Divisor. Photo: Pro Naturaleza.

impacted by a range of settlement frontiers and allochthonous peoples is a microcosm of the Peruvian cultural diversity encapsulated in Knapp's cultural map of Peru (Knapp 1988). In the borderlands, however, cultural influences cross international boundaries to blur and blend as Brazilians, Peruvians, and indigenous people penetrate the Sierra del Divisor and international boundary via *varaderos* (portage trails) bridging headwaters. Thus, as seen in Figure 3, the Kampa/Asháninka reside on both sides of the border. Less obvious are other transboundary cultural groups such as the nomadic Isconahua[18], an indigenous group in voluntary isolation, straddling the Sierra del Divisor. Further downstream, in the more accessible Ucayali floodplains, lie numerous indigenous territories, primarily of the Shipibo Conibo[19]. Brazilians are also well represented in towns along the middle and upper portions of the Tamaya, Abujao, Utiquinía, and Callería Rivers where they have worked for decades as loggers, hunters, miners, and farmers among other occupations. One example is the Tamaya River town of Puerto Alegre whose largely Brazilian population was critical in the expulsion of the *Sendero Luminoso*, Shining Path, from the Peruvian borderlands (Comisión de la Verdad 2004a). Another example is the Military Rural Settlement Project three (UMAR 3).[20] This small, extremely isolated frontier army post was established in the 1970s to expel Brazilian *seringueiros* (rubber tappers) tapping Peruvian trees and to bring Peruvians in as a *frontera viva*, or living border. In 2004, only sixteen colonist families were present and one was a Brazilian family being recruited to become Peruvian.

This is the only organized Military Settlement Project in the region, although the rivers are lightly populated with ribereños, indigenous people and colonists. Settlements are usually small linear villages or isolated homesteads along riverbank bluffs or floodplain levees, mimicking pre-contact habitation (Denevan 1996). Outside of the indigenous territories, inhabitants are a combination of longtime Amazonian residents

with a tradition of subsistence livelihoods, coca farmers who arrived since the 1970s, Brazilian settlers from Acre, and the occasional Asháninka or Shipibo household[21]. I talked to many people in this area as I traveled up and down these rivers with my field assistants, but our most intensive field work took place within nine communities: four Asháninka, two Shipibo, two coca farmer, and one military settlement.

The economy of the people living in the four watersheds is largely driven by extraction, particularly logging, with most agriculture devoted to subsistence with the notable, and lucrative, exception of coca cultivation. The main market for timber, fish, game meat, palm fibers, agriculture and other products is the regional capital of Pucallpa, a city of over 300,000 connected by road with Lima. Conservation, given the extremely high levels of biodiversity (Government of Acre 2000), is also of increasing interest, in part due to the nascent transboundary protected area mosaic formed by the Serra do Divisor National Park and the recently created Zona Reservada Sierra del Divisor[22]. These biodiversity conservation efforts complement the high levels of cultural and biological diversity represented in the indigenous territories of the Isconahua, Asháninka, and Shipibo Conibo peoples.

This dissertation's range of methodologies reflects the diversity present in the field site. Overall, methods were necessarily based on the principle of progressive contextualization (Vayda 1983). The initial funded proposal targeted a comparison of two Kaxinawá villages along the Purús River: one community in Brazil and one in Peru. This research was never realized as my application for research in Brazil was never fully processed. The application was accepted contingent on the approval of the Conselho de Defesa Nacional according to the terms of article 4º, item I, of Decreto nº 98.830/90. This Conselho's approval was required given that my research statement professed interest within Brazil's boundary zone, *faixa da fronteira*, defined as a 150 km zone next

to the border. However, only the President of the Republic can call the Conselho de Defesa Nacional, over which he presides, to session. It is unlikely that a research proposal would ever fit into the agenda of such a session, and to date there has been no progress on the approval of field research on the Brazilian frontier.

This research was initially funded with the Fulbright-Hays DDRA grant through both the offices of Brazil and Peru. Fortunately I was able to work in Peru when the Brazilian approval failed to materialize. Research consisted of ten months in the field between February and November of 2004. After spending the first month in Brazil, doing archival work, I returned to Peru to conduct fieldwork. Given the transboundary fieldwork was no longer possible, I redefined my research project in the field. Luckily, I had developed contacts in Peru from 2002 pre-dissertation fieldwork. My first action on returning to Peru[23], was to travel to Pucallpa to attend the First Bi-National Meeting between Ucayali and Acre. There, I was fortunate to informally[24] present a transboundary map to the Peruvian Minister of Foreign Relations. I never saw the map again, but later I found out it was used in a June, 2004, South American Regional Integration Initiative (IIRSA) presentation in Buenos Aires[25]. This First Bi-National Meeting between Peru and Brazil demonstrated the need for transboundary research on the border between Ucayali and Acre and particularly across the Sierra del Divisor given Pucallpa, the capital of Ucayali's, proximity to the Sierra del Divisor and desire to connect to Cruzeiro do Sul (Figure 3). In order to capitalize on the interest generated by this meeting, my knowledge of the Brazilian side[26], and my friend, Jorge Vela, Vice-President of the Universidad Nacional de Ucayali (UNU), I presented a talk at the University entitled "Acre: Who is our Neighbor?" This and other presentations in Pucallpa, Lima, and Brazil[27] generated attention to the research and eventually led to

additional financing from the Nature Conservancy, Pronaturaleza, and the Universidad Nacional de Ucayali[28].

This interest led to signed agreements with UNU, Instituto del Bien Común, and the Regional Government of Ucayali[29]. While, nothing came of the latter except strong friendships and useful contacts, Jorge Vela and I were able to found the Amazon Borderlands Research Center (CIFA) at the UNU, and the University provided me with four undergraduate research assistants, with me hiring one, to make five total. While these developments added greatly to the scope of the work they also presented some immediate challenges. Most significantly was how to transition the study from a community-level transboundary comparison with one investigator to a study encompassing four different Peruvian watersheds, six investigators, and the vested interests of four different institutions: the Nature Conservancy, Pronaturaleza, UNU, and the University of Texas-Austin.

Research questions were adapted to satisfy all of the constituents and the new study site. After some key informant interviews with government officials, conservation NGOs, and knowledgeable individuals, the most apparent problem concerning the central borderlands of Peru was the lack of geographical knowledge available to generate research topics and locally grounded conservation and development projects. Therefore, the central research goal was to generate basic geographic information on livelihoods, resource, and land use using participatory methods grounded in political/cultural ecology. This would identify the conservation threats to and status of selected species for the Nature Conservancy and Pronaturaleza, provide a basic first step for Economic and Ecological Zoning for UNU (giving five students the opportunity to conduct fieldwork for their undergraduate theses), while providing data to write a dissertation.

The greatest difficulty at the conclusion of the fieldwork was which dissertation to write given the abundance of data generated. Indeed, fieldwork provided so much data it was impossible to organize, catalog, and analyze all of it for one dissertation. Here, I will briefly describe the general methods used in the general fieldwork[30] before addressing the specific methods utilized primarily for the individual chapters of this dissertation. This includes methods used in Peru and Brazil, but also research conducted upon my return to the United States.

My initial research emphasis was on how livelihoods, land use, and resource use might be changing (from 1994 to 2014) and how this change might affect resources, landscape, and local people in the present and near future. The majority of field research was carried out in nine borderland communities. In order to capture changing land and resource use I studied each community in three rough periods of time: recalling the past 10 years before fieldwork, the year of the fieldwork (2004), and forecasting 10 years after fieldwork. These time horizons had proved useful for measuring change in my previous research (Salisbury 2002, Salisbury and Schmink n.d.), and the three day stay with each family allowed the researcher to gain the confidence of residents, and understand the respective households through their participation in household mapping, matrices of resources, historical timelines, and land use walks (Colfer et al. 1999; Salisbury 2002; Slocum et al. 1995). Research also included the measuring of fields and the identification of all the crops they grew or sold. The exception to this rule was coca, which was grown and sold in some communities, but never asked about directly to protect the safety of the investigators. Additional efforts were spent understanding the community's relation with other borderland residents or visitors, understanding the migratory history of residents, and understanding their income sources. The combination of these methods

with ethnography, key informant interviews, and point collection allowed the researcher to overcome instrumentation effects common to the application of just one methodology.

Each of the five research assistants was assigned one watershed with two assigned to the Abujao River. Within every watershed each research assistant was assigned an initial community to study. The first communities worked in were indigenous, given our strong contacts with the regional indigenous leaders and the fear, later well justified, that many of the non-indigenous communities were primarily dedicated to coca farming. After working in the first community, all but one assistant[31] was assigned a second community to live in and study based on the information they were able to gain from their first community and the goals of the overall project. Community choices were dictated by logistical concerns, such as accessibility and safety, but our goal was to research as close to the border as possible. Within communities, research primarily took place at the household level. Household selection was purposive rather than random, choosing specific households, in order to capture the diversity of geographical distribution, length of residence, gender and age of the community's residents and households. Most obviously research took place in households interested in opening up their homes to myself and my assistants. My role as project manager was to train each of the investigators in our methodology before accompanying them in the field as lead investigator and ethnographer. Before entering the field, I trained every assistant in ethnography, photography, point collection with a Global Positioning System (GPS), participant observation, and participatory methods: these included household mapping, matrices of resources, historical timelines, and land use walks[32]. In addition, before entering the field preliminary analyses were conducted using remote sensing, documentary research, archival research, key informant interviews, and Geographic Information Science (GIS) in the urban centers of Pucallpa, Lima and Rio Branco.

This dissertation focuses on the three most provocative and important themes in this broad study of borderland livelihoods, land use, and resource use. These themes are the inadequacy of existing geographical information, the social and environmental impacts of coca cultivation, and the complex relationship between illegal logging, the borderland Asháninka, and the political boundary. The methods outlined in the previous paragraphs provided essential background information on these topics, but additional methods proved of even more importance. These include the field methods described below by chapter and the computer and archival-based methods used on my return to the University of Texas' Geography Department and Benson Latin American Collection. The Benson Latin American collection proved useful in tracking down historical records of explorers, anthropologists, indigenous groups, and boundary commissions. In addition, ESRI's ArcGIS 8.3 was used to analyze the length of Amazonian borders, the area of Amazon borderlands, logging, and coca cultivation.

Chapter Two's analysis of regional scale mapping and geographic information incorporated both field methods and documentary research conducted in Peru, and documentary research and cartography conducted on my return. The most common way to get to the research sites consisted of round trip boat travel with some one way legs taking as long as seven consecutive days on the river. During these boat trips, both upriver and downriver, the main course of each river, the mouths of important tributaries, and the larger population centers were mapped. Researchers used Garmin Etrex Legend Global Positioning System receivers to record coordinate data and notebooks to document attribute information. The team worked with community members in order to obtain local knowledge and cultural attribute information (such as logging sites, drug trafficking trails, population centers, and graveyards) to link to the GPS coordinates. Because of the small size of the boats and the time commitments needed for these

mapping expeditions, community participation was limited to just a few community representatives for each river. Longer term residents who actively traveled the rivers were selected whenever possible to take advantage of their greater knowledge. Despite this, the geographical data and maps in this dissertation are snapshots in time biased by the cartographers and fieldworkers involved. I look forward to returning this dissertation, and the latest incarnation of the maps within, to the communities to update the maps, correct any errors, and actualize the local ownership of this information.

In order to make the maps, researchers entered the locally informed data into an ArcGIS 8.3 Geographic Information System already containing unclassified 2002 ETM+ Landsat images, the digitized Peruvian national maps, digitized data on population centers, data on eradicated coca fields, data on indigenous territories, geographic data on forestry concessions, data on mining concessions, and data of conservation proposals. I then analyzed this geographic database in conjunction with paper documents, websites, and key informant interviews to understand the regional complexity of the four watershed borderland region. The result is Chapter Two's analysis of the existing geographic information for the four watersheds.

Chapter Three's investigation of the relationship between the tropical timber industry, the borderland Asháninka, and the international boundary required information from both Brazil and Peru. Fortunately, the ethnographic and participatory fieldwork with the borderland Asháninka in Peru was complemented with data provided by counterparts in Brazil. This was also enriched by interviews with Brazilian Asháninka, IBAMA, and IMAC in the urban center of Rio Branco. Finally, a close reading of Brazilian periodicals from Acre and regular consultation with contacts in Brazil corroborated the information on illegal logging from the Peruvian side. Of particular use to this chapter was fieldwork dedicated to mahogany, tropical cedar, copaiba, lupuna, and

bolaina. Also important were counter-mapping methods used to map the homelands of Alto Tamaya. Some ethnographic information was recorded using video cameras: transcripts of these interviews are available via the DVD *Interviews with the Asháninka*. Abbreviated versions of these interviews are available on the web in three languages (www.map-amazonia.net)[33]. Also useful were key informant interviews with members of the tropical timber industry and individuals working with the Asháninka. An understanding of the Asháninka people, the tropical timber industry, and their labor relations was enriched on my return with documentary research of the Peruvian forestry law, the international tropical timber industry, the history of the Asháninka, and the history of the Brazil-Peru boundary. The combination of all of these resulted in Chapter Three's analysis of the relationship of the borderland Asháninka, the tropical timber industry, and the political border.

While each of the aforementioned chapters presented unique methodological challenges, the most challenging by far was Chapter Four's analysis of the social and environmental impacts of coca cultivation. The challenges revolved around the illegal nature of coca cultivation, my status as a United States citizen[34], and the safety concerns related to asking direct questions about this borderland product. Key informant interviews conducted before entering the field revealed coca cultivation to be present in all four watersheds and Peruvian authorities to be actively eradicating the crop. For these reasons, and my own ties to the United States, the primary source of funding for coca eradication, direct investigation of coca created safety concerns for all researchers. My strategy was thus, to initially avoid pursuing research in communities cultivating coca. However, given the importance of the product to the borderland economy and culture, researchers recorded details about commercial coca cultivation and traditional coca use gained from direct observation and from informants offering unsolicited information

about this important regional crop. During the course of fieldwork it was determined that two of the nine community research sites were primarily dedicated to coca cultivation while two others had coca eradicated within their community limits and all communities had direct or indirect ties with the crop.

Detailed field observation and interviews were supplemented by a 2003-2004 eradication dataset of the four watershed study area from the special project Control and Reduction of Coca Cultivation in the Alto Huallaga (CORAH) of the Peruvian Ministry of the Interior. This dataset and key informant interviews with CORAH personnel confirmed the extent and impact of coca cultivation in the study area. The combination of this dataset with the fieldwork on livelihoods and land use provided a unique look at the real and potential social and environmental impacts of coca cultivation in this borderland site. This fieldwork was enhanced by archival and documentary research, and GIScience analysis on returning to the United States. While this review of the study site and methodologies is brief, each of the chapters will also contain a summarized version of the methods.

VI. A HISTORY OF BORDER CONFLICT, CREATION, AND CHARACTER: THE POLITICAL GEOGRAPHY-ECOLOGY OF THE JURUÁ-UCAYALI DIVIDE

Disputes over New World boundaries began only a year after the 1493 creation of a longitudinal boundary between Spanish and Portuguese territory (Porras and Wagner 1981). This boundary 100 leagues west of the Azores was set by Pope Alexander VI and frustrated Portuguese designs on the eastern coast of South America (Roux 2001). A year later, in response to Portuguese entreaties, the Pope facilitated the 1494 Treaty of Tordesillas between the two powers and adjusted the line of demarcation westward by 270 leagues (Porras and Wagner 1981: 22). However, the inaccuracy of existing maps and the imprecise language of the treaty allowed this meridian to be identified in a

number of different locations with Harrisse (1897: 152-4) finding six different interpretations between 1495 and 1545. Unsatisfied with even the most generous of these interpretations, the Portuguese expanded aggressively into the interior of the South American continent, notably with Captain Teixeira traveling up the Amazon River and over the Andes to reach Quito in 1639 (Smith 1990), while the Spanish expansion eastward was slowed in part by the Andes mountains[35].

In 1750, with the Treaty of Madrid, the two empires dissolved the Treaty of Tordesillas, replacing the various interpretations of the Tordesillas meridian with new complex boundaries ostensibly recognizing actual settlement and control through a *de facto (actual possession)* definition of *uti possidetis*[36]*:* "Each one of the parties shall keep the lands now possessed, with the exception of mutual agreements permitting an interchange of disputed territories" (Roux 2001: 515). The delimitation of the treaty's boundaries was impossible at the time given that the huge expanses of largely unexplored territory appeared as little more than an imaginative cartography on official maps. Nevertheless, the treaty floundered less on these cartographic challenges than the internal politics of Spain, as both the Jesuits and the Spanish public reacted strongly to provisions giving up control of missions and territory to the Portuguese (Ireland 1938).

The Jesuit mission issue and the entire Treaty of Madrid was amended by the Treaty of San Ildefonso in 1777 where the disputed missions and their territory remained Spanish (Prescott 1987, Roux 2001). This last treaty again recognized *uti possidetis de facto*, or the current settlement of the region, and more than doubled the South American territory under Portuguese control according to the Treaty of Tordesillas (Ireland 1938). The Treaty of San Ildefonso's approximately 7,000 kilometer boundary was largely accepted for some 150 years despite never being surveyed as stipulated in the treaty text (Ireland 1938). Due to the lack of surveying, later difficulties arose over river

identification, river source selection, and the determination of the correct watersheds, ridgelines, locations or names (Roux 2001). Not surprisingly, the resulting disputes often revolved around the right to exploit natural resources such as gold, timber, and spices.

The independence of Amazonian nations simply brought new names to the same tensions as the newly formed nation-states largely accepted the boundary line of the Treaty of San Ildefonso. The newly independent Spanish-speaking nations agreed to abide by the concept of the *uti possidetis de jure* of 1810, where the nations would take as their own boundaries the administrative divisions of the Spanish empire in 1810[37] (Porras and Wagner 1981). The *uti possidetis* of 1810[38] made the continent of South America appear wholly occupied thus reducing the amount of territory European states could aspire to. As Ireland (1938: 327) said, "the first juntas seemed to recognize the general frontiers[39] of their jurisdiction at the boundaries of the former governments in whose capitals they were functioning, and tacitly to recognize the mutual advantages of such limitations, which the vacant and usually non-vital border territory[40] made it easy to observe." Thus, it was relatively easy for the Spanish-speaking states to accept these well-defined[41] former divisions because of the large and uncontested borderlands perceived of as empty, although in reality inhabited by "unassigned" indigenous peoples, and to a lesser degree missionaries, and adventurers. Brazilian adventurers and entrepreneurs took advantage of the lack of state presence and accurate cartography to push into these border areas in search of resources (Hemming 1978). Indeed, many of these "empty" Amazonian borderlands would be found to be rich in *Hevea* rubber, a fact soon to increase tensions over boundary delimitations.

Also pushing into the Amazon were missionaries in search of souls to save. The central borderlands of this dissertation differ from some other Amazonian sites in the relative lack of a historical (or current) missionary presence. This appears to be in part

due to these borderlands serving as the slaving grounds of Shipibo and Conibo Indians seeking to satisfy the growing labor and slave markets of the region in order to satisfy their own thirst for European products. The missionaries struggled to establish missions in the face of repeated slave raids and interference by entrepreneurs. Despite this Padre Calvo founded San Miguel de Callaría in 1859 bringing twelve families from Sarayacu to help organize some fifty families of Shipibo and Remo Indians interested in settling in the mission (Pallares y Calvo 1907: 68, 93-95). However, San Miguel de Callaría was "born mortally wounded" (Pallares y Calvo 1907: 95) with Remo and Shipibo Indians already being seduced by patrones to fight and slave amongst themselves. In 1884 only 25 indigenous families remained in San Miguel de Callaría (Samanez y Ocampo 1980 [1885]: 77). This mission remained but became primarily the residence of Shipibo as by 1870 the Remo had almost been exterminated by Shipibo, Conibo and Cashibo Indians (Steward 1946: 583).

The missionary experience on the Tamaya was worse. Before Padre Calvo's chose Callaría, he failed to establish a mission among the Amahuaca of the Tamaya (Pallares y Calvo 1907: 93). In 1877 after twenty years of frustration and failure to convert the Remos of Callaría (Pallares y Calvo 1907: 189), the missionary prefect Hermoso sent emissaries to again try and convert and form a mission among the Amahuaca living on the Tamaya. Eight different voyages to create a permanent mission among the Tamaya Amahuaca ended in failure, and included the death of Father Tapia (Pallares y Calvo 1907: 195). Eventually repeated slave raids drove the Amahuaca to flee from their Tamaya headwater home for more remote lands farther south.

The flight and extermination of the Remo and Amahuaca has created a reduced interest by missionaries in the area up to the present, an exception being the South American Mission efforts with the Remo remnants, the Isco (Momsen 1964, Whiton et al.

1964). The region's relative lack of an Indigenous and mestizo population has since been filled by Shipibo-Conibo, Asháninka, colonists, and extractivists interested in the natural resources of the borderland region.

Not surprisingly, in the 1850s, the United States also had a strong interest in the natural resources of the Amazon: actively lobbying for international steamship navigation up the Amazon on the basis of a "policy of commerce" (Maury 1853: 5) and when Brazil rejected her interest, sending two reconnaissance missions over the Andes from Peru and Bolivia all the way down the river to the Atlantic (Herndon et al. 1853). The impetus behind these reconnaissance missions was the influential Oceanographer and United States Naval Officer, Matthew Fontaine Maury, whose obsession with the scientific, commercial, and political potential of the Amazon ran deep (Maury 1948 [1850]). Sternberg (1987: 27) has pointed out that Maury's ability to connect the Amazon River to the Mississippi River through rhetoric centered on oceanography, economic complementarity, and geographic predestination broadened an already existent "doctrine of the appendage" used by President Monroe and Secretary of State Adams to incorporate Cuba, Florida, and Puerto Rico within the mouth of the Mississippi, the North American continent, and the manifest destiny of the United States. While Maury's attempt to spark a chain of events resulting in the U.S. annexation of the Amazon failed, his political connections did get his brother-in-law, William Herndon, appointed to reconnoiter the basin (Herndon et al. 1853, Maury 1948 [1850]). In addition, as Sternberg (1987: 32) contends, Maury's published rhetoric may have helped kindle Brazil's growing number of conspiratorial theories[42] regarding foreign designs on, and the internationalization of, the Amazon basin.

The most pertinent historical and geographical precursor to the borderland threats and conflicts outlined in this dissertation revolves around the struggle for control of the

rubber rich territory of Acre by Brazil, Peru and Bolivia. According to the Treaty of San Ildefonso, the division between Portugal and Spain in the Acre region relied on a line drawn from a point on the Madeira River equidistant from the mouth of the Mamoré and the Amazon River and a point on the east bank of the Javarí[43] River (da Cunha 1907, Porras and Wagner 1981). Unfortunately, geographical knowledge of the area was uncertain with "Complete early ignorance of the course and source of one river (the Javarí) and the uppermost extent of the basins of two others (the Purús and the Juruá)" (Ireland 1938: 130), in addition to confusion surrounding the location of the border between Bolivia and Peru. Peru's scant knowledge of its Amazonian territory led to a diplomatic and geopolitical blunder made by acting Minister of Foreign Relations, Bartolomé Herrera in the 1851 Convention on Commerce and River Navigation with Brazil. Article seven of the signed document treated boundaries and, without reference to the Treaty of San Ildefonso, called the Javarí River the southern dividing line between the countries despite the north-south orientation of the river course (Porras and Wagner 1981: 119). In 1874 the two governments' joint commission failed to exactly locate the Javarí's origin, traveling only far enough up the headwaters of the Javarí to get an estimate (Black 1905). This estimate was then corrected in 1877 and finally rectified in 1898 by Cunha Gomes (da Cunha 1907, Ganzert 1934). A sampling of some of the competing claims and the mystery of the origins of the Javarí River are represented in Figures 5 and 6.

Unbeknownst to Peru, Brazil was simultaneously treating with Bolivia, finally arriving at the 1867 Treaty in La Paz which recognized the *uti possidetis de facto* as the rationality behind the new border. This treaty dissolved the Treaty of San Ildefonso and declared the new regional border between Brazil and Bolivia to be from the mouth of the Bení, where the Madeira River obstensibly begins, on the parallel 10° 20' S[44] to the headwaters of the Javarí (Figure 6) (Ganzert 1934, Ireland 1938, Roux 2001). Of course

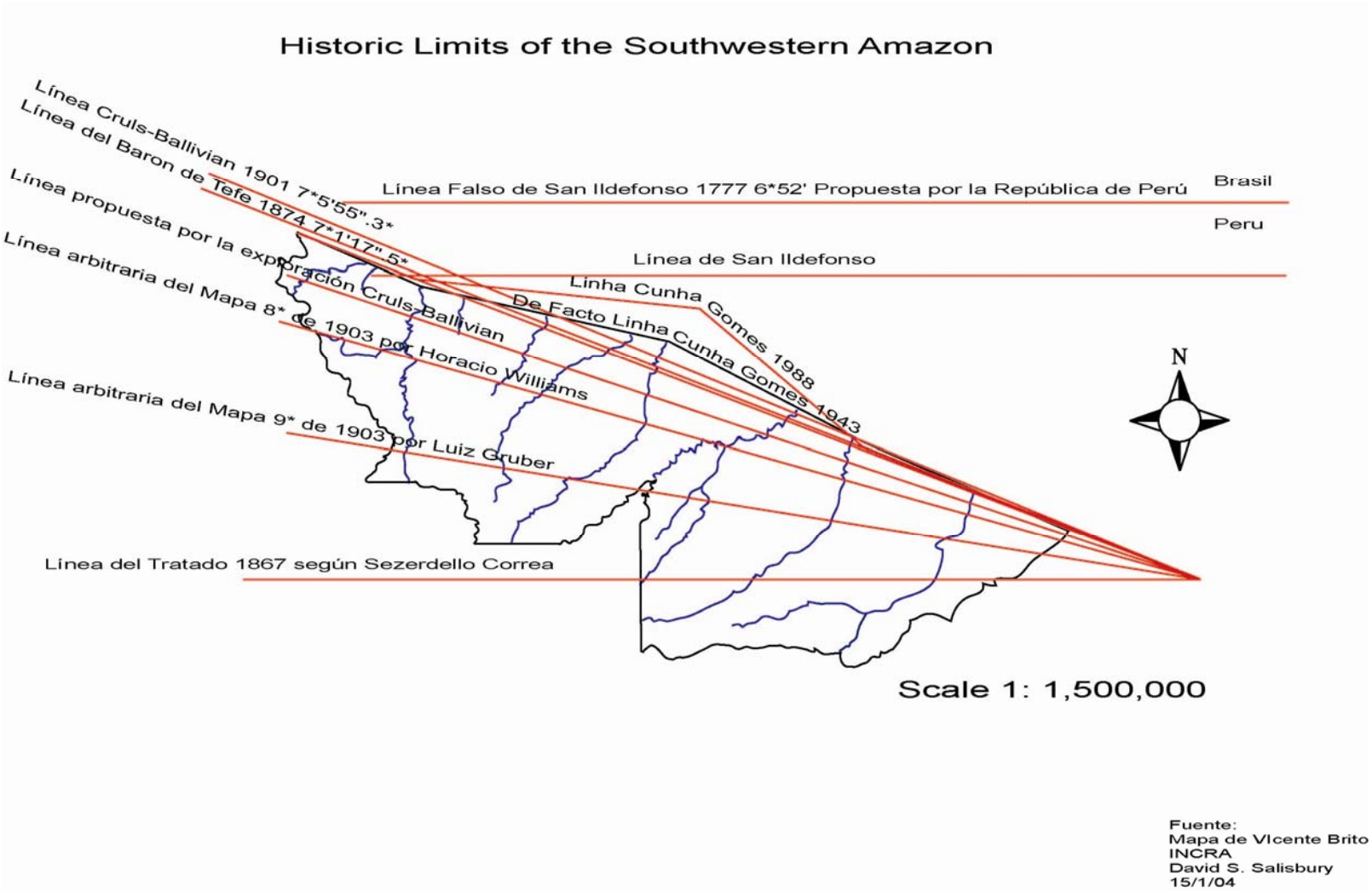

Figure 5. A historic map of the boundary confusion and disputes of the border between Brazil, Bolivia and Peru.

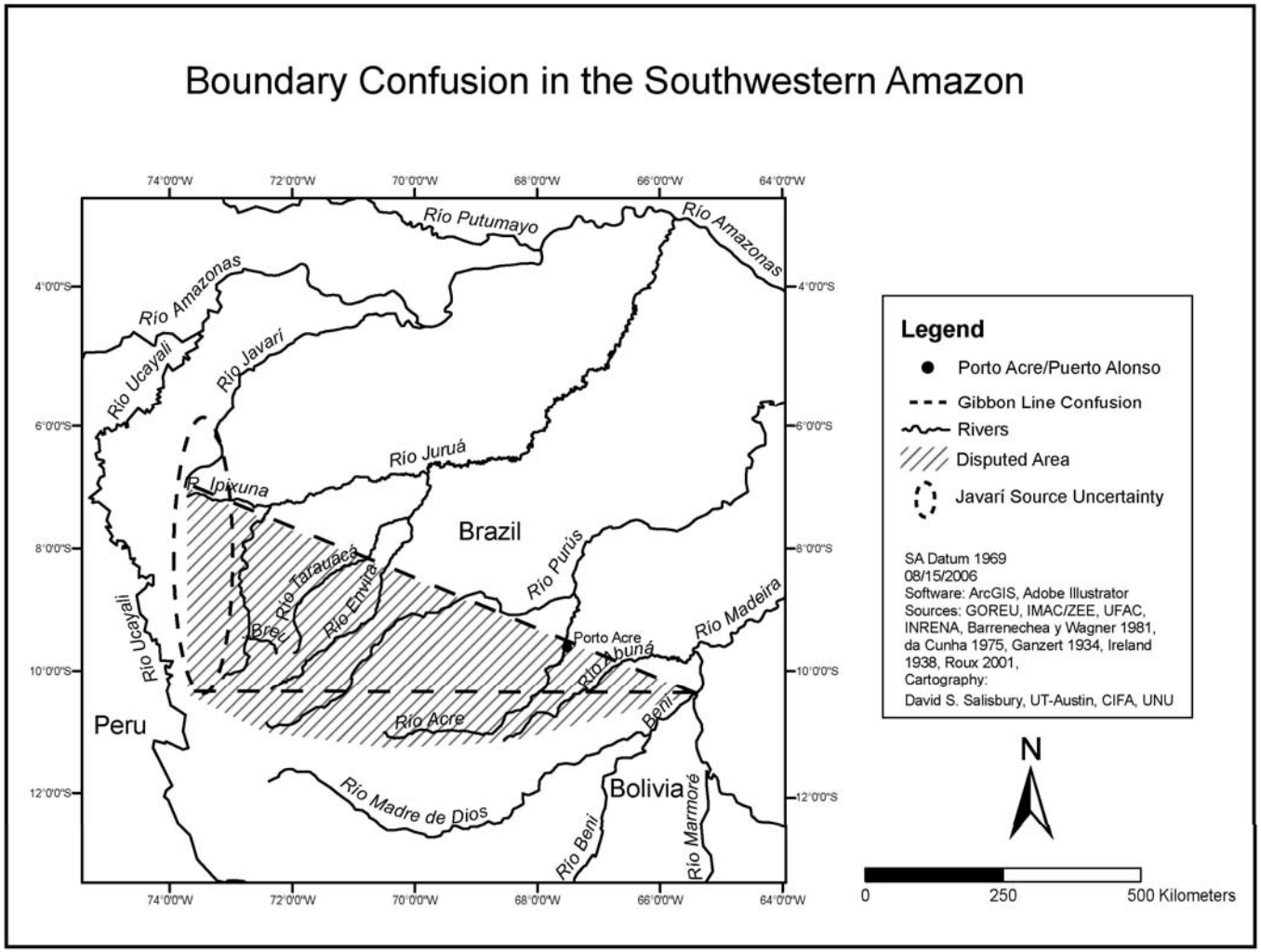

Figure 6. Poor geographic knowledge of the southwestern Amazon led to disputes between Brazil, Peru, and Bolivia in the 1800s and 1900s.

the headwaters of the Javarí River were still undetermined in 1867, in fact lying three degrees to the north, leading to conflict over the rubber rich territory located between the parallel and the headwaters (Roux 2001). Peru protested this 1867 treaty but was ignored by both Bolivia and Brazil (Ganzert 1934). While these treaties were being deliberated, Brazilian and foreign entrepeneurs penetrated up the Amazonian tributaries to harvest the increasingly valuable *Hevea* rubber latex. Much of the Brazilian labor force penetrating and occupying these territories were of Afro-Brazilian and indigenous origin. The importance of these marginal peoples in nation building cannot be overestimated. Those indigenous people not interested in joining the grueling working conditions of this economic (and political) project sought refuge along distant rivers and interfluvial zones where the *Hevea* stands thinned out along with economic interest. According to Tastevin, the Brazilian ascent up the Juruá was rapid with rubber tappers reaching the Tarauacá in 1880, the Ipixuna in 1888 (Tastevin 1920). By 1900 there was no part of the Juruá basin that had not been explored (Figure 6) (Tastevin 1920) although they did not stay upriver of the mouth of the Breu River because *Hevea* rubber stands were sparse (Tastevin 1926). The ascent up the Purús was equally rapid, but in 1898 Bolivia established a customs house on the Acre River, a tributary of the Purús, in Porto Alonso, now Porto Acre, to tax rubber revenue from Bolivian forests upriver (Figure 6).

The Brazilian and foreign rubber tappers who made up almost all of the non-indigenous population rejected Bolivian authorities and seized the area under the leadership of the Spaniard Luís Galvez, who subsequently proclaimed Acre an independent nation (Tocantins 1961). After much bloodshed the Bolivian army took back control and in 1901, following the fixing of the source of the Javarí (through the tributary Jaquerana) by the Cruls-Ballivián bi-national commission (Figure 5), agreed to sell part or all of the territory to a U.S. backed corporation called the Bolivian Syndicate.

Peru and Brazil protested this act and in 1903 Brazilian colonists in the territory took up arms under Plácido de Castro. The Bolivian President José Manuel Pando led the Bolivian army to quash the revolt but after failing to rout the rubber tappers agreed to have Brazilian forces pacify the region and buy out the Bolivian Syndicate. In 1903 Brazil and Bolivia signed the Treaty of Petrópolis giving the Acre territory to Brazil for two million pounds, a sliver of territory south of the Abuná River and a 200 mile railway from the Beni and Mamoré valleys to the cataract free lower Madeira River (Ireland 1938).

Peru protested the Treaty of Petrópolis as it ignored Peruvian claims to Acre territory and existing Peruvian disputes with both Brazil and Bolivia. In 1904 Brazil and Peru signed a *Modus Vivendi* to leave the disputed territories of the headwaters of the Javarí, Juruá and Purús Rivers neutral until a boundary could be decided through exploration and diplomacy. In order to investigate and delimit the boundaries, the two countries formed a bi-national commission to investigate the headwaters of the Purús and Juruá Rivers. The Brazilian side of the commission was led by two Brazilians of note. Euclides da Cunha, the famous writer, engineer, and proto-political ecologist (Hecht 2004), explored the Purús River (Comisión Mixta Purús y Yuruá 1906, da Cunha 1967) before becoming one of Brazilian literature's iconic figures. General Belarmino Mendonça, largely unknown outside of Brazil, also demonstrated a keen and sensitive eye in his observations of the physical and human geography of the Juruá River (Commissão Mixta and Mendonça 1907). The Peruvian counterparts for the Purús and Juruá Rivers, Captain Pedro Alexandre Buenaño and First Lieutenant Numa Pompilio León respectively, wrote less detailed descriptions, but showed equal courage in exploring the limits of the two watersheds (Comisión Mixta Purús y Yuruá 1906).

While Brazil's rubber tappers successfully repulsed the Bolivan army in the Acre River Valley (Tocantins 1961), Peruvian representatives attempted to lay claim to large portions of the upper Purús and Juruá watersheds. Peruvian *caucheros*[45] (rubber collectors) based on the Ucayali River used *varaderos* to access the headwaters of these rivers and fell the *Castilloa ulei* trees to extract their valuable *caucho* (latex). The *caucheros* did not come alone as the grueling work required labor best filled by Indian slaves and allies from the Ucayali basin (da Cunha 1967). Euclides da Cunha (1976: 264) observed, "In general there are five Peruvians…per 100 Piros, Campas[46], Amahuaca, Conibos, Shipibos, Samas, Coronahuas, and Yaminahuas, which one stumbles across in various states of bondage and indolence, all conquered by the shotgun, all deluded by extravagant contracts, all now yoked to the most complete slavery"[47]. Yet, da Cunha contradicts himself, also finding indigenous agency in the borderlands, particularly in his encounter on the Purús with the Asháninka leader Venancio (Santos-Granero and Barclay 2000), whom he calls, "the Curaca Vinésio or Vicenzio, who there dominates, his influence and empire radiating over all the other headmen of the region" (da Cunha 1976: 199). Da Cunha's Juruá counterpart Colonel Mendonça also finds agency among the indigenous people, but of a helpful rather than dominating or subservient nature, "They were the guides and helpers of the pioneers; those that were the first to use caucho…they taught the civilized medicinal and other virtues of many plants; on the Juruá they are multidimensional cultivators of both soils and fields having repeatedly given food to those who have come to usurp their lands, women and children" (Mendonça 1907: 141). To Mendonça these borderland people deserved, "humanitarian and sympathetic compensation" (Mendonça 1907: 141). Mendonça also realized their strategic importance for these remote frontiers and sought to incorporate them into his geopolitical project, "…the most efficient and perhaps least costly, to submit them to a

brand of military regime, administered without severity in villages alongside the boundary lines that so suit us to garrison, without destroying their family ties…" (Mendonça 1907: 142). While ultimately, these borderland people slipped into obscurity after the fall of rubber and the delimitation of the border and certainly were never given neither compensation nor military employment, they are still policing the border a hundred years after Mendonça's anticipatory comments.

The Campa, who call themselves the Asháninka, were one of many indigenous groups brought by *patrones* to work these resource frontiers (da Cunha 1967). Unlike some imported peoples, the Asháninka were feared and respected in the borderlands for their bellicose disposition and authoritative headmen. At the beginning of the 20th century Euclides da Cunha (da Cunha 1967: 58) recited a long list of indigenous peoples inhabiting the borderlands before ending with, "above all, supplanting the rest in fame and courage, the warlike Campa of the Urubamba". The Peruvian diplomat and spy Manuel Pablo Villanueva (Villanueva and Sociedad Geográfica de Lima 1902: 67) also extolled the Asháninka, but due to their superior economic value as slaves, "A boy of 10-12 years is worth, normally, 500 soles, unless he is a Campa, then they are worth much more". This stereotype continues more recently with Clark (1954: 101) comparing the Asháninka to other indigenous groups, "The Campas are superior fighters, utterly relentless….". The Asháninka's warlike ways are historically documented with Franciscans suffering heavy losses to establish missions in the Asháninka/Ashéninka homelands in the *selva central*[48] (Varese 1968, Weiss 1975). However this earlier resistance to the missionaries paled in comparison to their revolt in 1742, punctuated by the expulsion of all missionaries from their territory and the annihilation of two Spanish military companies, followed by over a century of resistance and independence despite Spanish and Peruvian attempts to reopen their homelands (Varese 1968; Weiss 1975).

Among those military men who failed to penetrate their territory numbers the intrepid Lieutenant Herndon of the United States (Herndon et al. 1853). Nevertheless, the Asháninka also turned their warlike ways on themselves, raiding and enslaving their cousins to sell as rubber tappers, servants and bodyguards to Brazilian and Peruvian alike (ACONADIYSH 2004, Bodley 1972, Clark 1954, Varese 1968, Weiss 1975).

During and after the rubber boom, rubber *patrones*, slavers, and others, scattered a portion of the Asháninka nation far and wide. Asháninka slaves and workers reached Madre de Dios, Loreto, Lima, Brazil, and Bolivia, and left their descendants (Figure 7) (Bodley 1972, Clark 1953, da Cunha 1976, Varese 1968, Von Hassel 1905, Weiss 1975). Sometimes traded by their parents for tools (Velarde 1905), sometimes enslaved by other Asháninka (Clark 1953, Fry 1907, Samanez y Ocampo 1980 [1885], Varese 1968), sometimes led by their own strong men (da Cunha 1976, Portillo 1905a, Santos-Granero and Barclay 2000), and sometimes enslaved or coerced by *patrones* (Bodley 1972, Clark 1953, Varese 1968), the borderland Asháninka addressed in this dissertation are likely remnants of these dispersed Asháninka. However, some confusion remains as to when they came to occupy the Brazilian and Peruvian borderlands.

The Asháninka are a highly mobile people (Denevan 1971, Varese 1968), which complicates defining their historical permanence in any place outside their long established homelands in the *selva central*. There is little published support for the assertion of Castello Branco (1950), based on traveler and explorer's accounts, that the Asháninka were present in the upper Juruá as early as the beginning of the 18th century. Castello Branco (1922: 597) himself says in an earlier writing:

> In summary, we have a total of around 1,000 indians inhabiting the federal zone of the Juruá, many residing between the Breu and Tarauacá and between the Amônia[49] and Tamaya, are in lands outside of the Juruá. Close to Brazil, in Peruvian territory wander a great number of Amahuacas and other groups,

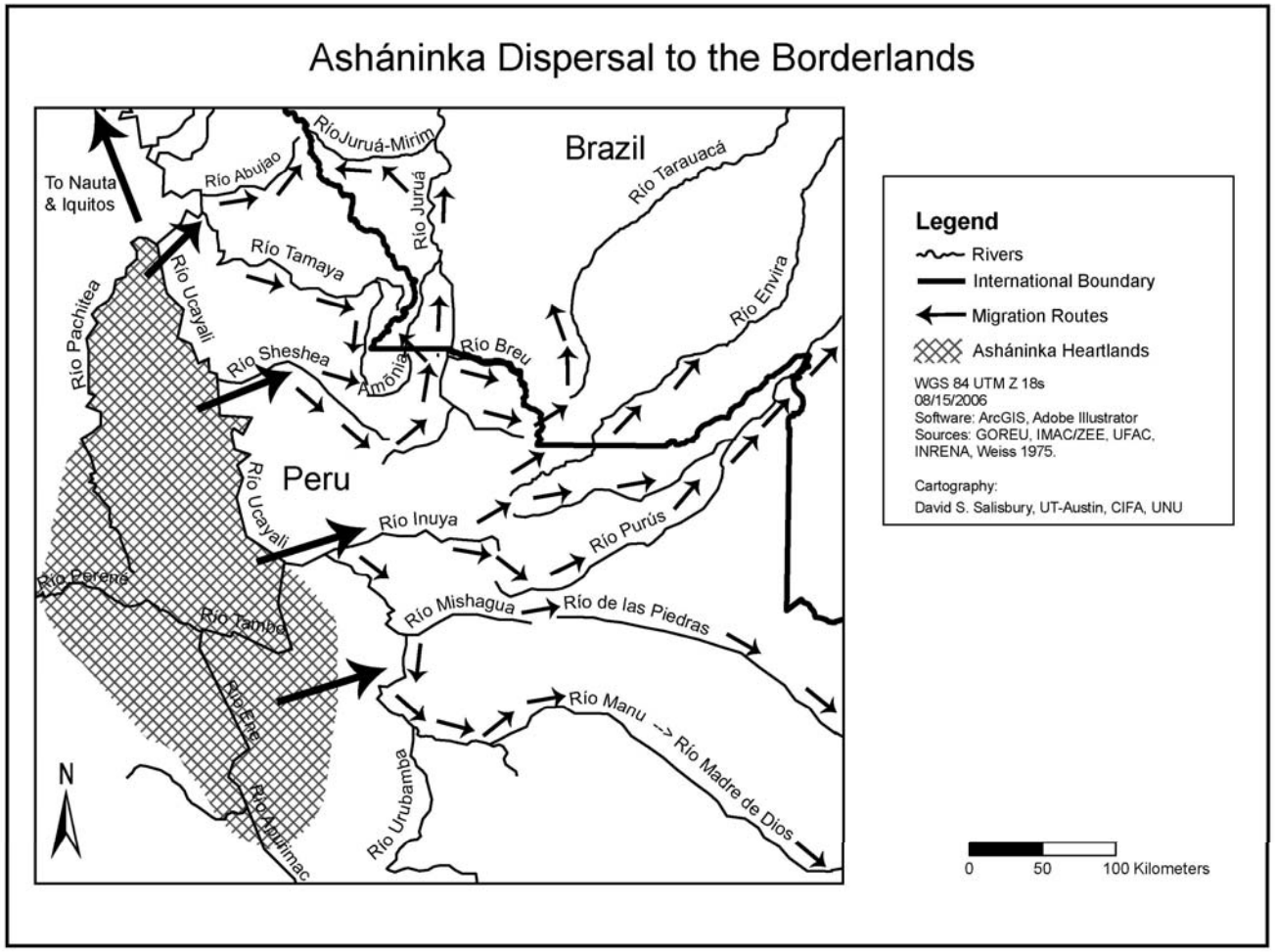

Figure 7. The Asháninka spread throughout the Peru/Brazil borderlands as laborers and protection during the rubber boom.

> appearing **accidentally** along the Brazilian boundary are the Campas (Asháninka)[50], Shamas (Chamas), and Remo. (emphasis added by author)

His meaning in using the term accidentally is unclear in this case, as is the relationship between this statement and his later declaration of an Asháninka presence 200 years earlier. Castello Branco's contemporary, the French geographer Tastevin recognizes the presence of the Campa in the foothills of the Sierra del Divisor and along the headwaters of the Juruá Mirim in 1920 (Tastevin 1920). This assertion along with Castello's 1922 reference make sense given their congruence with the rubber labor system's use of indigenous groups dispersed from the Ucayali basin to neighboring watersheds like the Juruá (Santos-Granero and Barclay 2000). Similarly, da Cunha encountered numerous Campa along the adjacent Purús watershed in 1904-5 (da Cunha 1967, da Cunha 1976). Other accounts also place the arrival of the Asháninka during the rubber period (ACONADIYSH 2004) or acknowledge their presence shortly thereafter (López 1925). Figure 7 shows the migratory routes and *varaderos* used by the Ashaáninka to access the borderlands during the rubber boom and later. Interestingly, both Peruvian and Brazilian sources cite the neighboring country's rubber patrones as responsible for bringing the Asháninka to the borderlands (ACONADIYSH 2004, da Cunha 1967, da Cunha 1976, Pimenta 2002). Following the collapse of the rubber boom in the early 20th century and the exit of the *patrones* some Asháninka returned to their homelands in the *selva central* while others remained in the borderlands (ACONADIYSH 2004, López 1925).

The arrival of the current borderland Asháninka populations along the central border of Brazil can be traced back to the 1930s through oral interviews (Figure 8) (Pimenta 2002). Figure 8 shows the location of the borderland Asháninka in 2004. In Brazil there were less than 900 Asháninka in five indigenous territories[51] diffused along

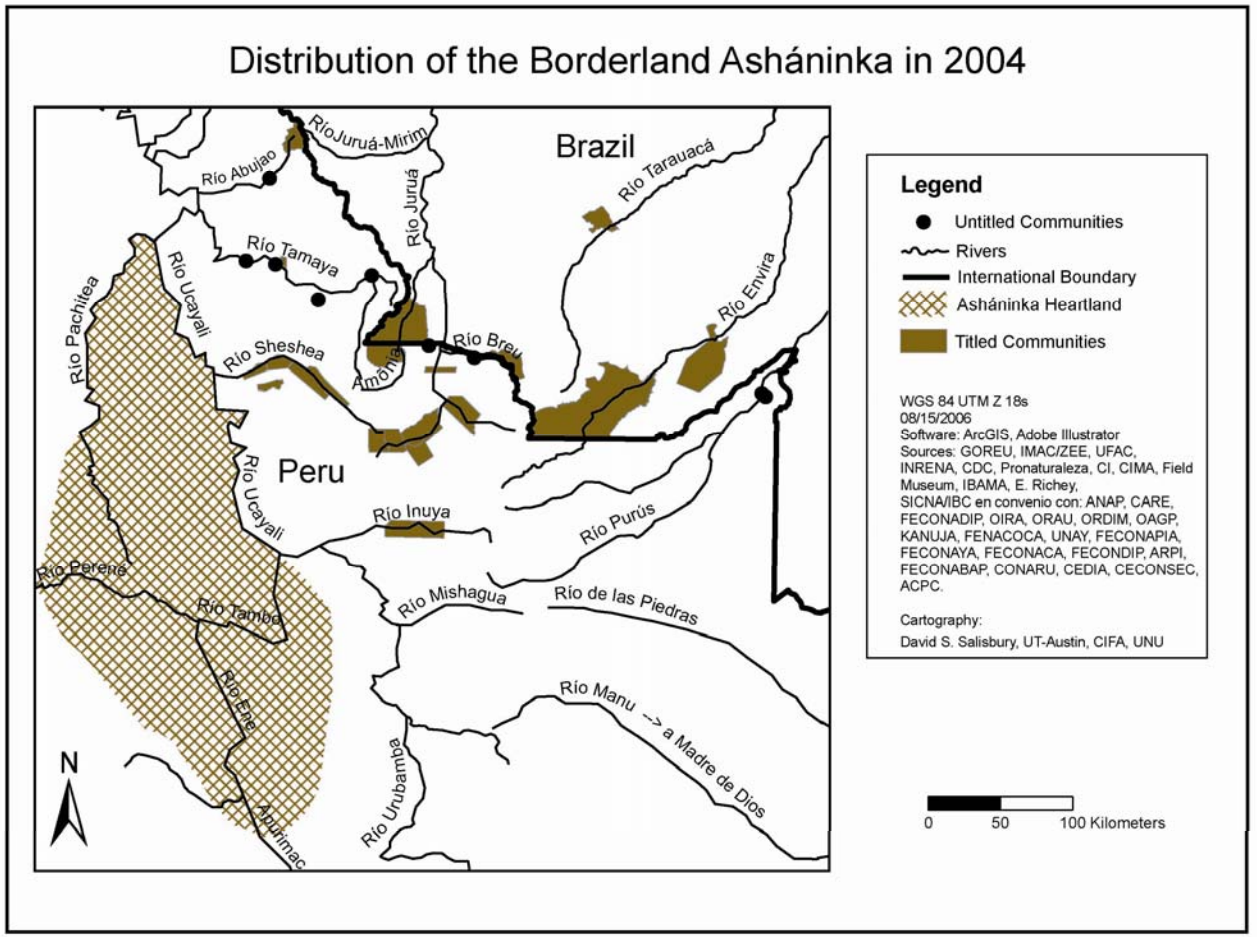

Figure 8. The borderland Asháninka now reside on both sides of the border in the Peruvian and Brazilian borderlands, although many communities still remain unrecognized and untitled by the Peruvian state.

the effluents of the Juruá River (Pimenta 2005). In Peru, along the Alto Juruá and its tributaries, 900 Asháninka lived in eight borderland communities, outnumbering the Amahuaca and Yaminahua native to the region in 2004 (ACONADIYSH 2004). The borderland Asháninka situation on the Tamaya and Abujao Rivers of the Peruvian borderlands is similar, as their residence can be traced back to the 1940s. While there are no published accounts of their location or population, fieldwork shows their numbers are also low with only 403 living along the Tamaya in four untitled communities and one titled community[52] (Richey 2005), and about 50 living along the Abujao in one titled and one untitled community. These Peruvian borderland groups are related to many of the Brazilian Asháninka, having passed through Brazil as either residents of the Juruá, Amônia, Envira or Purús Rivers (Figure 7). The Peruvian Asháninka of the central border of Brazil and Peru were unmapped until the twenty first century when the Instituto del Bien Común (IBC) and the Centro de Investigación de Fronteras Amazonicas (CIFA) first arrived on the Tamaya River. CIFA also mapped the Asháninka of the Alto Abujao River in 2004. Figure 8 represents the first attempt to map the borderland Asháninka, since the majority of the Asháninka of the Peruvian borderlands appear neither on the historical maps of Tessmann (1930) nor other maps of indigenous territories in Peru.[53]

These borderland Asháninka arrived from a variety of locations and through a succession of migrations (Figure 7). Many of those currently on the Alto Tamaya River passed through the Asháninka territories on the Amônia River in Brazil. The majority of these traveled up the Sheshea River, settled briefly on the Amônia, before crossing back into Peru to reside on the Tamaya River. Other Asháninka still living on the Amônia River crossed into Brazil using the *varaderos* linking the Sheshea or Tamaya Rivers to the Alto Juruá and Amônia Rivers. Finally, some Amônia Asháninka migrated from other Brazilian Asháninka populations on the Envira and Breu Rivers (Pimenta 2002).

These populations are likely remnants from the rubber tapping days of the late nineteenth and early twentieth century. Other borderland Asháninka populations may be descended from Asháninka who worked the borderlands during the rubber epoch as tappers, food producers, bodyguards, or slavers, and then returned to their homelands in the *selva central*. Their descendants may have taken advantage of this expanded geographic knowledge to return to the area in search of relief from slaving parties of the *selva central*, the violence of the *Sendero Luminoso*[54] or such mundane reasons as better hunting or more space. Those Tamaya Asháninka not related to the Brazilian populations on the Amônia were mostly either brought as slaves, by *patrones* to log the forests, or traveled with logging outfits as independent workers. Many of the Asháninka on the Alto Abujao River also originally worked in Brazil on the Envira, Breu, and Juruá Rivers but left that area with the *patrón* Cristóbal Fuchs Colón who according to one informant exclaimed one day, "we are Peruvian, we should live in Peru," and led them back to Peru and to the lower Abujao via the Sheshea River. From there they gradually migrated up the Abujao River with some even crossing back into Brazil via *varaderos* to work on the Juruá River as rubber tappers before returning to Peru. Regardless of their location or country of residence, the borderland Asháninka are aware of their origins in the *selva central,* have kinsmen both in the borderlands and the *selva central*, and still travel back and forth for reasons of family or commerce.

The Asháninka who lived along the border at the turn of twentieth century were seen by the Brazilian leaders of the Joint Reconnaissance Commission, Mendonça and da Cunha, as part of an invading force of *caucheros* and their indigenous allies and slaves that was threatening Brazilian territory with its mobility and avarice (Commissão Mixta and Mendonça 1907, da Cunha 1976, da Cunha 1967). The harvesting of *caucho* from *Castilloa* trees required "painful crossings by foot through the interior of the forest" and

"constant movement" to fell tree after tree and harvest the latex before moving on to the next stand (Commissão Mixta and Mendonça 1907: 24-5). This nomadic lifestyle, constant exploration, and requisite felling[55] of the *Castilloa* trees contrasted with the sedentary and sustainable harvesting of *Hevea* rubber characterized by an isolated tapper's cyclical tapping of a few rubber trails without killing the trees. Brazilian *seringueiros* continue to tap *Hevea* trees today albeit on a much more limited scale while *caucheros* and the felling of *Castilloa* trees is mostly a thing of the past. Nomadic *caucheros* forshadowed the illegal loggers of 2004 with their constant movement, the felling of trees, and the use of *varaderos* to access and remove their product. *Varaderos*, used for thousands of years by indigenous peoples before contact, became heavily trafficked by spies, smugglers, *caucheros*, and even soldiers from Peru during the rubber era and in 2004 continued to be used by drug traffickers, illegal loggers, smugglers, indigenous people, and a few adventurous travelers.

Of particular interest, given its importance to Chapter Three, is the history of the *varadero*[56] connecting the headwaters of the Tamaya River, a right bank tributary of the Ucayali, and the Amônia River, a left bank tributary of the Alto Juruá: a *varadero* much traveled at the turn of the last century and used by Peruvians to claim control of the upper Juruá River. Figure 9 shows the location of the main *varaderos* used historically and today in the central borderlands. According to the Brazilian Coronel Mendonça (Commissão Mixta and Mendonça 1907: 199), it was the Tamaya *varadero* that accidentally[57] brought the first Peruvian *caucheros* to Brazil in 1897. The same year, after his reconnaissance of the Juruá, Peruvian Captain Enrique Espinar returned to Peru by this *varadero*[58] "much used by *caucheros* and Peruvian businessmen…" (Espinar 1905: 415). At the headwaters of the Tamaya, he showed the awaiting Navy Colonel Vizcarra where his midshipmen should open up a more direct trail[59] to the Juruá. A few

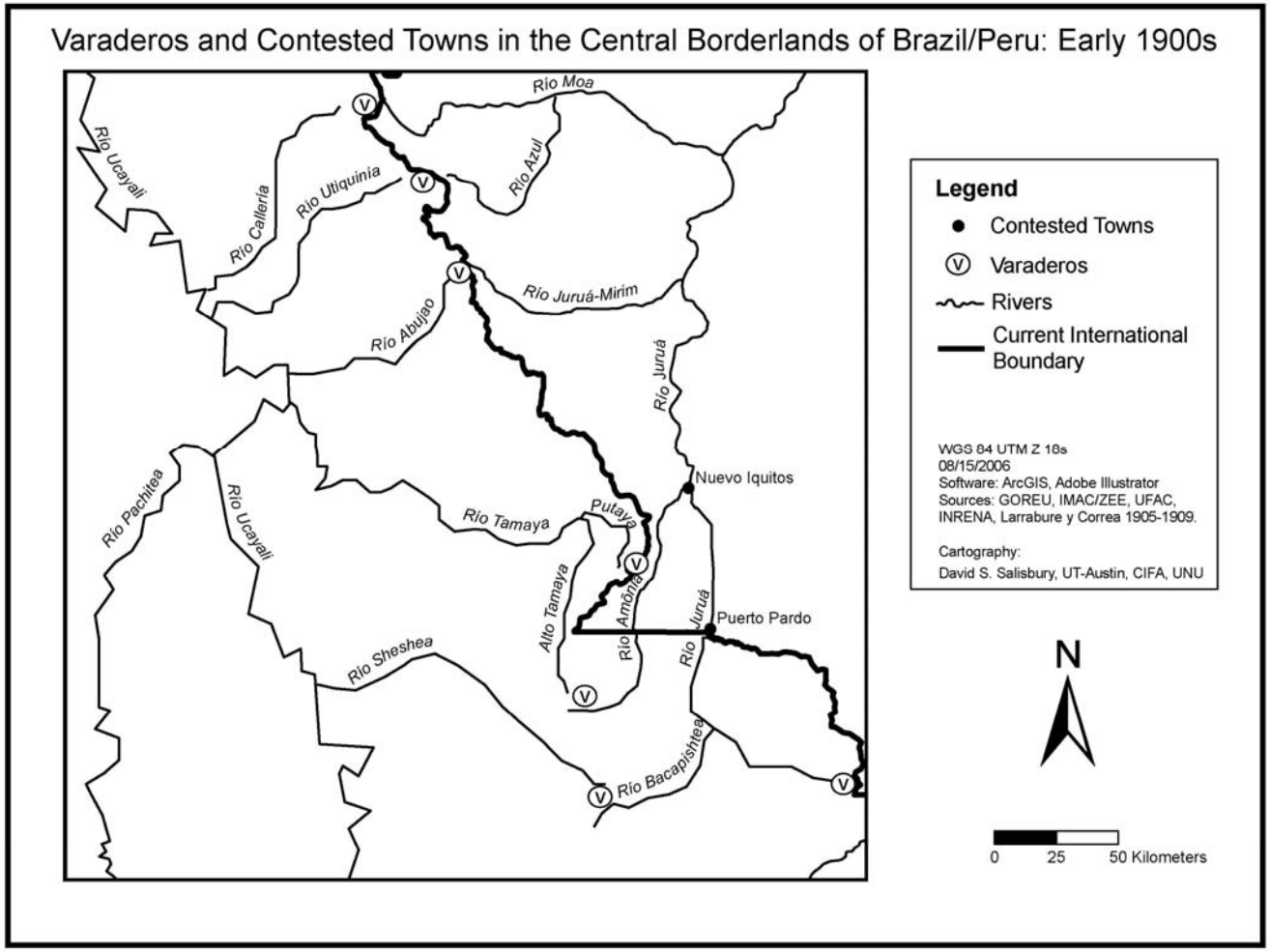

Figure 9. *Varaderos* served as crucial links between the Ucayali and Juruá basins in the early 1900s and continue to do so today.

years later, in 1902, Peruvian diplomat and spy Manuel Pablo Villanueva arrived via this varadero to investigate the degree of Brazilian influence along the upper Juruá before returning to Peru by the Juruá-Mirim-Abujao *varadero* (Villanueva and Sociedad Geográfica de Lima 1902). Other explorers such as Von Hassel and Stiglich underscored the importance of *varaderos* and the riches of the Juruá and Purús basins arguing for the establishment of ports, roads, and railroads (Stiglich 1905, Von Hassel 1905). Stiglich (1905: 298) argued, "We are obligated to defend our borders, later we can dedicate ourselves to less urgent tasks…" Based on these exploratory trips, the Peruvian army established a base, customs office, and town named Nuevo Iquitos at the mouth of the Amônia in 1902 exacting tribute from all river craft on the Upper Juruá, despite the protestations of the Brazilian government and local authorities (Commissão Mixta and Mendonça 1907: 122). In 1902 Coronel Pedro Portillo reinforced this base with twenty Peruvian soldiers brought in via the Tamaya *varadero* (Portillo 1905b). On the 12th of July, 1904 a *modus vivendi* was signed between Brazil and Peru neutralizing conflict in the disputed areas and creating a mixed commission to ascertain the boundaries.

However, with news traveling slowly, in November of 1904, a delegation of Brazilian soldiers and *seringueiro* volunteers attacked Nuevo Iquitos by foot. After 48 hours of battle, they forced the surrender of the Peruvian forces, who subsequently retreated up the Juruá to the Peruvian town of Puerto Pardo at the mouth of the Breu River (Commissão Mixta and Mendonça 1907). This was the last battle fought between Peruvian and Brazilian forces, unless one counts the 2006 skirmish between Peruvian loggers and the Brazilian navy described in Chapter Three.

In the two years following the 1904 conflict, the joint commissions of the Purús and Juruá explored their respective rivers to the headwaters with considerable help from the local residents and reported their findings (Comisión Mixta Purús y Yuruá 1906;

Commissão Mixta and Mendonça 1907). Finally, the controversy came to a close with the Peruvian minister Velarde and the Baron of Rio Branco signing a treaty of boundaries, commerce, and navigation in September of 1909, defining the boundary limit from the Bolivian border to the Javarí River.

The actual demarcation of the boundaries took fourteen years (1913-1927) due to bureaucratic delay, the remote nature of the border, the challenging terrain, and World War I (PCDL 2006). In 1924 Tastevin (1943: 92) found the commission working at the headwaters of the Tarauacá River and noted the importance of local knowledge in the process of boundary demarcation:

> the heavy work was done by the *seringueiros* who knew the region throroughly and had blazed four paths (1943: 87)… He (Felizardo) and his Indian comrades (Kaxinawá) did the work without incident and it is at present completed. This year he intends to open a path from between the mouth of the Breu and the Contamana mountains which form the frontier between Peru and Brazil. Next summer the commission will come to verify, complete and rectify his work, erect boundary posts and draw up a map" (Tastevin 1943: 92).

Similarly, Lieutanant Colonel Roberto López, chief of the Peruvian Boundary Commission, also noted the importance of local people in the demarcation efforts: "Cashinaguas (Kaxinawá) Indians helped the demarcation sub-commissions acting on the Jordán and Alto Tarahuacá Rivers in 1924, in exchange for glass beads, mirrors and scissors" (López 1925: 55). López's photographs and captions demonstrate the importance of the resident Kaxinawá[60] in opening trails, hunting for food, and hauling loads for the bi-national commission (López 1925).

The border largely followed lines of rivers, watershed divides and the less defined biogeographical line between where *Hevea* trees grew in numbers, thus occupied by *seringueiros* from downstream, and those areas where the trees were scarce, temporarily occupied by Peruvian *caucheros*. The Joint Reconaissance Commission of the Alto Juruá (Comisión Mixta Purús y Yuruá 1906: 274) noted this *Hevea* line in their observations of

the upper Juruá and the Breu river which eventually became part of the boundary line, "On both sides of the Breu they extract latex. From there to the headwaters the *Hevea* thins out until it disappears; leaving only *caucho* that is exploited exclusively by the Peruvians". The commissions relied heavily on the local knowledge of borderland residents to understand the physical and human geography around them and thus the whereabouts of the political boundary. Local knowledge played an even greater role in the demarcation phase where things would have proved impossible without the help of the indigenous and rubber tapping residents as sources of geographic information and labor.

In total the commission established 86 monuments on the 2,995 kilometer border, with 2,003 km defined by bodies of water, 283 km by geodesic lines, and 709 km in watershed divides (PCDL 2006). Although the commission formally terminated the demarcation process on the thirteenth of September, 1927, the crash of the rubber boom caused this borderland to be neglected by the two nation-states for about fifty years before the Peruvian and Brazilian governments agreed to inspect and update the monuments at a meeting in 1975 (PCDL 2006). Although the Mixed Commission for the Inspection of the Peru-Brazil Border Monuments has met at least five times between 1975 and 2006, it is unclear how much inspecting or updating actually took place on the border itself. In 2004, I attempted to locate three border monuments (60, 61 and 62) at the headwaters of the Abujao. With the help of the Peruvian military, I was able to locate only monuments 60 and 61, one of which, 60, had been lost to the Peruvian military for years (Figure 10). The two monuments were made of iron and cement with the date 1925 engraved in the concrete base (Figure 11). However, during our 2004 fieldwork, the missing monument, 62 (Figure 12) was placed on the border by Brazilian forces. The Brazilians arrived by helicopter and placed the monument only 360 meters from

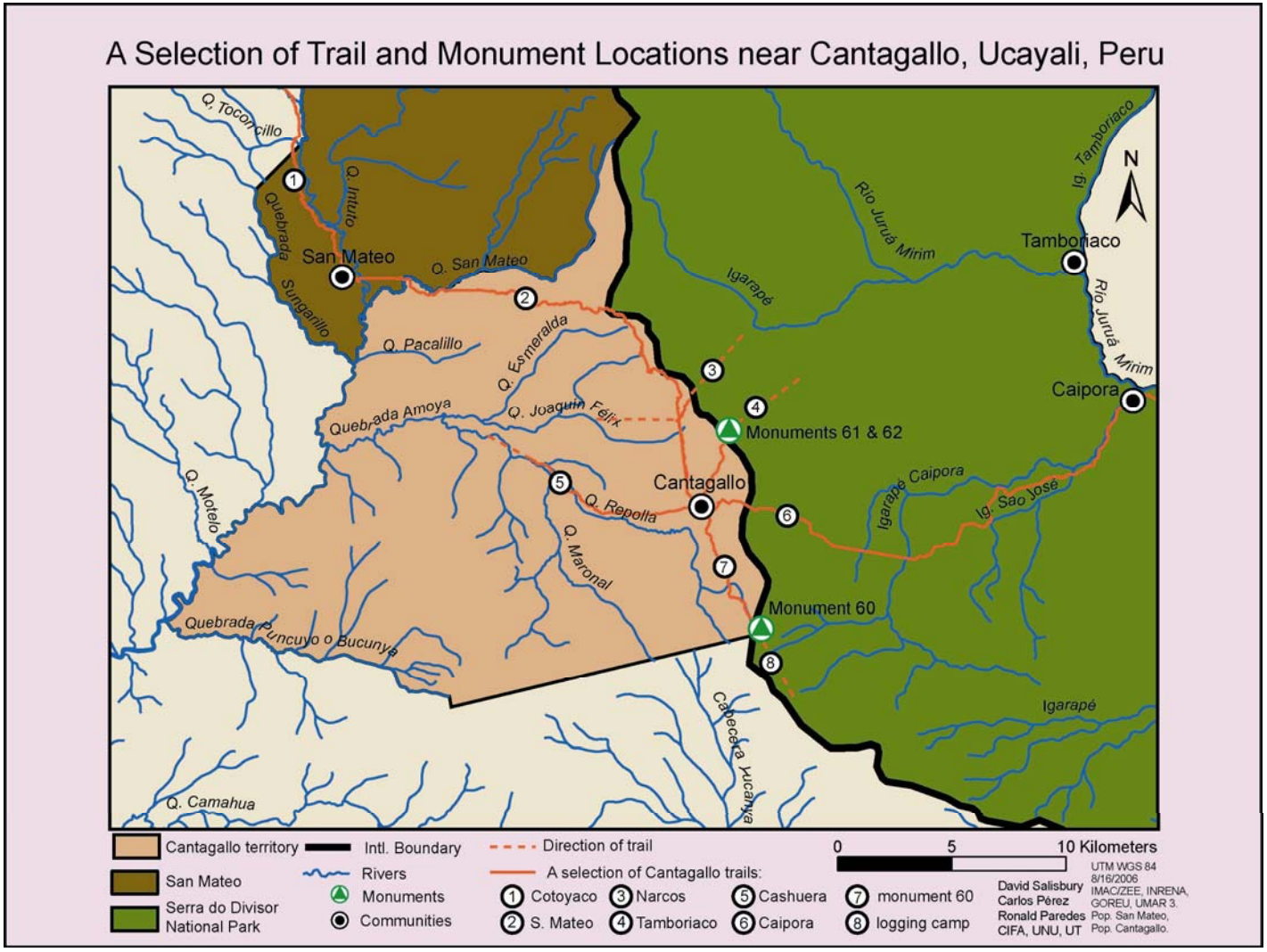

Figure 10. Like many borderland communities, Cantagallo is surrounded by a network of trails. Some of these are varaderos that lead to or pass by the monuments placed to demarcate the Brazil/Peru boundary.

Figure 11. Four Peruvian soldiers next to monument #61 along the divisor between Peru and Brazil. Photo by D.S. Salisbury[61]

Figure 12. Three soldiers and CIFA field assistant Carlos Lenin Pérez Alván pose next to the new monument #62 found on October 10, 2004. A few paces away is the clearing made by Brazilian soldiers to land their helicopter and construct the concrete monument. Photo: UMAR 3.

monument 61. This distance on the ground corresponds[62] closely to the distance between the official written coordinates for the monuments (PCDL 2006). This updating of the border reflected the increased presence and interest of Brazilian authorities in the borderlands following the continued trespassing of Peruvian loggers. The officers of the local Peruvian military base and the local Peruvians were surprised by the unannounced arrival of the monument. They had thought the 360 meters of territory between 61 and the new 62 to be Peruvian territory.

This brief account of the border history between Brazil and Peru is characterized primarily by the paucity of geographic information available to the respectivegovernments. The governments have traditionally seen the Amazon borderlands, like much of the Amazon rainforest, as an empty landscape devoid of people and importance, except when the quest for valuable natural resources captured the attention of the nation-state. The lack of commercial and strategic interest in the borderlands is reflected in part by the lack of geographic information and state indifference to the borderland region and people. With the end of the rubber boom and the demarcation phase the borderland people drifted out of the national consciousness until the border tensions and conflicts involving valuable timber and coca made them useful to the state again. Chapter Two describes how local people are silenced by inadequate geographic information and how this combines with state indifference to increase overlapping claims and resource conflicts in the borderlands. Chapter three discusses the relationship between the borderland Asháninka[63] indigenous people of Brazil and Peru and the tropical timber industry. Chapter Four describes how illicit coca farmers have taken advantage of the lack of geographic information and state indifference to expand coca cultivation and bring new social and environmental impacts to the borderlands. Lastly, the conclusion summarizes the contributions of each chapter before

discussing the implications of the research, and making recommendations for future study.

Chapter Two: Local People, Inadequate Maps, and Overlapping Claims in the "Empty" Amazon Borderlands of Peru

> *While in search of vital information on the regions ahead, I talked to Professor Cesar Garcia Rosell, head of… the Sociedad de Geografía. Together Rosell and I studied his mouldy old Jesuit maps of the tierra incognita, the unbroken jungle lying east of the Andean Cordilleras…*
>
> *"Then, what are all these names on the maps?" I asked.*
>
> *"Señor, please! They are only names! Sometimes an abandoned thatched hut on a main river bank…Only names, to fill the great white spaces.*
>
> Leonard Clark, from **The Rivers Ran East** (1954: 23)

Leonard Clark's embellished accounts of his numerous explorations (Clark 1954, 1955, 1959) should be read with some skepticism, but this 1946 conversation with the geographer García Rosell frames a geographic question of some importance. How valid is the existing cartographic information of Amazonia? Consequently, if of limited value, what ramifications does this have on the ground? Finally, if needed, how can information best be improved?

These are questions I have wrestled with since the summer of 2000, when as a Master's student conducting fieldwork in Brazil's western Amazon I found myself trying to explain to a creek side community why their creek was not on the map (Salisbury 2002). This phantom creek (Figure 13) and the mutable Acre state line threatened their

Figure 13. Three residents paddle along on the unmapped phantom creek in Brazil's borderlands.

inclusion on the map and thus their ability to gain a land title through a new sustainable settlement project (Salisbury 2002). Their interest in getting their creek and themselves on the map drove us through the rainforest to georeference their own locally grounded community limits. Eventually, the mapping of their local knowledge of place and environment not only improved existing official maps but found their settlement to be the largest community in the project.

Two years later I again found myself sitting in a small boat under the hot western Amazon sun with a map in my lap, a running GPS[64] in hand, and a local person telling me just how wrong I was (Figure 14)[65]. In this case, there was no land title to be gained, as I was merely a last minute addition to a scientific expedition evaluating the conservation status of Perú's remote Alto Purús River (Fagan and Salisbury 2003, Leite-Pitman et al. 2003). We spent day after day in the boat ascending the Alto Purús and its main arm, the Curanja, and I had ample time to compare the Peruvian National Geographic Institute's maps[66] with the local geographic knowledge of our Cashinahua, Sharanahua, and Asháninka guides (Figure 15). I witnessed their unabashed excitement when I placed a point on the map and wrote down their village name. In talking to them about their homes and the maps' toponyms, I came to understand the mobility of the Purús residents and how they could quickly make a good map obsolete with their migrations. When Alberto Sharanahua[67] told me we had just passed the last village and that ahead we would see only forest until the headwaters, I showed him the map that although dominated by white space, still had a village with the exciting name of Alerta. Alberto laughed and said, "I've been to the headwaters and beyond, there is nothing at Alerta but the meeting of the Cújar and the Curiuja Rivers." Years later, reading historical accounts, I learned Alerta had been a rubber tapping outpost of the patrón

Figure 14. The author, GPS in hand, heads down the Alto Purús into Brazil with two young Kulina men. Photo: Chris Fagan.

Figure 15. The expedition advanced up the Curanja and Alto Purús Rivers with difficulty, menaced by snags and a relentless tropical sun.

Carlos Sharff (Sharff 1907) and that in 1905 Euclides da Cunha had stayed with him there in his palm hut (da Cunha 1976: 200, 265). But what remains of Alerta now? No thatched hut can weather a century of abandonment in the rainforest. Is it only an isolated name to fill the map's great white spaces?

During my 2004 fieldwork these thoughts and experiences motivated me to unfurl the maps and run the GPS up and down the rivers of the central borderlands. With nine research sites on four rivers it took twenty-four days of travel just to visit all the sites by boat (Figure 16). This meant sitting in the blinding sun deafened by the roar of the peke peke[68] motor from dawn to dusk, only to sleep on the beach as the buzzing mosquitoes tried to burrow their way through the mosquito net. During these long days, my assistants and I would ask our local guides about the names of the villages and creeks that lined these rivers. Their answers I recorded with GPS points, and jotted down in my notebooks and along the margins of the rivers on our maps. This allowed me to simultaneously fill the great white spaces[69] and to erase the abandoned names of the central borderlands (Harley 1988a, 1988b, 1989). More often than not I found these maps in error, but what impact does this have on the local people and landscape?

I. INTRODUCTION

This chapter demonstrates how the lack or erroneous nature of existing geographic information creates conflict between different user groups and negatively impacts state[70] and NGO planning goals. Surveys of four Ucayali tributary watersheds along the Brazilian border show current maps to be contradictory, incorrect, and outdated, resulting in a tangle of overlapping and competing concessions, conservation units, and indigenous territories that facilitates the agenda of illegal extractivists and drug traffickers at the expense of traditional residents and governmental and non-governmental organizations. Conflict could be reduced by the creation of an actualized and dynamic

Figure 16. Traveling up the Tamaya with the borderland Asháninka, one of the CIFA field assistants watches from the roof for both landmarks and snags.

geographic information system informed by the local geographic knowledge of the current and traditional residents.

In order to support this argument I start by briefly introducing the methods in the first section of this chapter. Then, in section two, I use examples to demonstrate the dynamism of the physical environment of Amazonia and some of the challenges to mapping it. In the following section, I also find dynamism in the human geography of the region and critique the existing cartographic information of resident populations on a watershed by watershed basis. Section four demonstrates how plans have failed due to the lack of reliable and accurate geographic information and explores the consequences on the ground. Finally, I conclude with an argument to improve cartography and geographic information through the incorporation of local knowledge.

II. METHODS

Research for this chapter was conducted in four watersheds in the Peruvian borderland region of Ucayali over eight months in 2004 (Figure 3). The first step in fieldwork was obtaining published and unpublished geographic information of the four watershed study area through remotely sensed images, documents, maps, and informational interviews. A comparison of these data sources revealed a great deal of inconsistencies and unknowns, underscoring the need to collect base line geographic information during research.

Within the Callería, Utiquinía, Abujao and Tamaya Rivers I and five field assistants mapped the main course of each river, the mouths of important tributaries, and the larger population centers.[71] We used Garmin eTrex Legend Global Positioning System receivers to record coordinate data and notebooks to document attribute information. GPS points were usually taken from the boat although some were taken on shore. The team worked specifically with long time residents in order to obtain local

knowledge and cultural attribute information to link to the GPS coordinates. The most difficult aspect of the fieldwork was maintaining concentration in the boat during the long hours under the tropical sun. An additional challenge was communicating clearly with our guides and motorist over the roar of the *peke peke* (Figure 17). While repeated shouts and gestures allowed me to obtain basic attribute information, these difficult conditions made a more textured ethnography impossible (Figure 18). The recording of information was more successful going upriver rather than down as more time was available for both informants and researcher to engage approaching landmarks or points of interest (Figure 19).

On my return from the field, I used ArcGIS 8.3 to enter this locally informed data into a Geographic Information System already containing 2002 ETM+ unclassified Landsat images, the digitized Peruvian national maps from IGN[72], digitized data on population centers from INEI[73], data on eradicated coca fields from CORAH[74], data on indigenous territories from various sources[75], data on forestry concessions from the Peruvian Institute of Natural Resources (INRENA)[76], data on mining concessions digitized from the Ministerio de Energía y Minas (MINEM)[77] concession coordinates, and data of conservation proposals[78] from Non-Governmental Organizations and the regional government. I then analyzed this geographic database in conjunction with paper documents, websites, and key informant interviews to understand the regional complexity of the four watershed borderland region.

III. A CHANGING ENVIRONMENT

Amazonia's landscape poses considerable challenges to cartographers and planners interested in actualizing older maps, obtaining up-to-date geographic information, and representing seasonal variability. The two challenges outlined in this

Figure 17. Communicating with the motorista was difficult over the roar of the motor. Here, Pablito, an Asháninka, wears an application of achiote, *Bixa orellana*, on his face to protect his skin from the tropical sun.

Figure 18. Rodrigo makes an emphatic point, but he is drowned out by the motor and the giggles of the Asháninka children laughing at the gringo fumbling simultaneously with GPS, maps, and camera.

Figure 19. At times I was lucky enough to get the input of other informants such as this woman and child of the Shipibo Conibo, who shared their knowledge while getting a lift upstream.

section include the highly dynamic hydrological systems and the difficulty in obtaining and analyzing high quality satellite imagery.

The high levels of water volume and low gradient of most Amazonian rivers combine with an elevated sediment load and other suspended material to develop anextremely dynamic landscape characterized by the annual formation of new depressions, lakes, levees, beaches, islands, and river channels (Irion et al. 1995, Wittmann et al. 2004)(Figure 20). Each year human, plant, and animal populations are at the mercy of these mercurial Amazonian rivers whose changing courses routinely undercut slopes to wash out hectare sized chunks of forest or strand formerly riverine populations on newly formed oxbow lakes (Goulding et al. 2003, Kalliola et al. 1991)(Figure 21).

The Ucayali is considered among the most dynamic and actively meandering rivers in the Upper Amazon in part due to Andean tectonics and a particularly low gradient (Abizaid 2005, Pärssinen et al. 1996). This dynamism led Abizaid to find six meander cutoffs along the middle section of the Ucayali (Abizaid 2005) in the last ten years. In the most dramatic example, Ucayali River carved a new channel in 1997, captured the main course of the river, and stranded the district capital of Masisea[79] (Abizaid 2005). Figure 22 shows the Ucayali River from just upstream of the district capital of Masisea downriver to Pucallpa. This map is digitized from four of the National Geographic Institute's[80] (IGN) 1:100,000 official maps called *cartas nacionales*. The map delivers a somewhat antiquated view of the river as even though these *cartas* were printed in 1998 and 2000, the hydrography now looks much different (Figure 23).

Figure 23 overlays the Ucayali course represented in the cartas nacionales on a satellite image from 2004. Visual analysis clearly reveals the dynamism of the Ucayali River and the outdated nature of the cartas nacionales as the river has shifted with five

Figure 20. During the dry season, the low water levels on the Alto Purús expose alternate channels and significant deposits. This is a common feature of Amazonian white water rivers. The riverine forest is secondary floodplain forest growing where the main channel might once have been.

Figure 21. The Río Shesha, a tributary of the Abujao River, is a dynamic river with numerous oxbow lakes. As seen here, local people adjust their agriculture to the dynamic Amazonian rivers. This shot was possible because it was taken in the dry season through a break in the cloud cover.

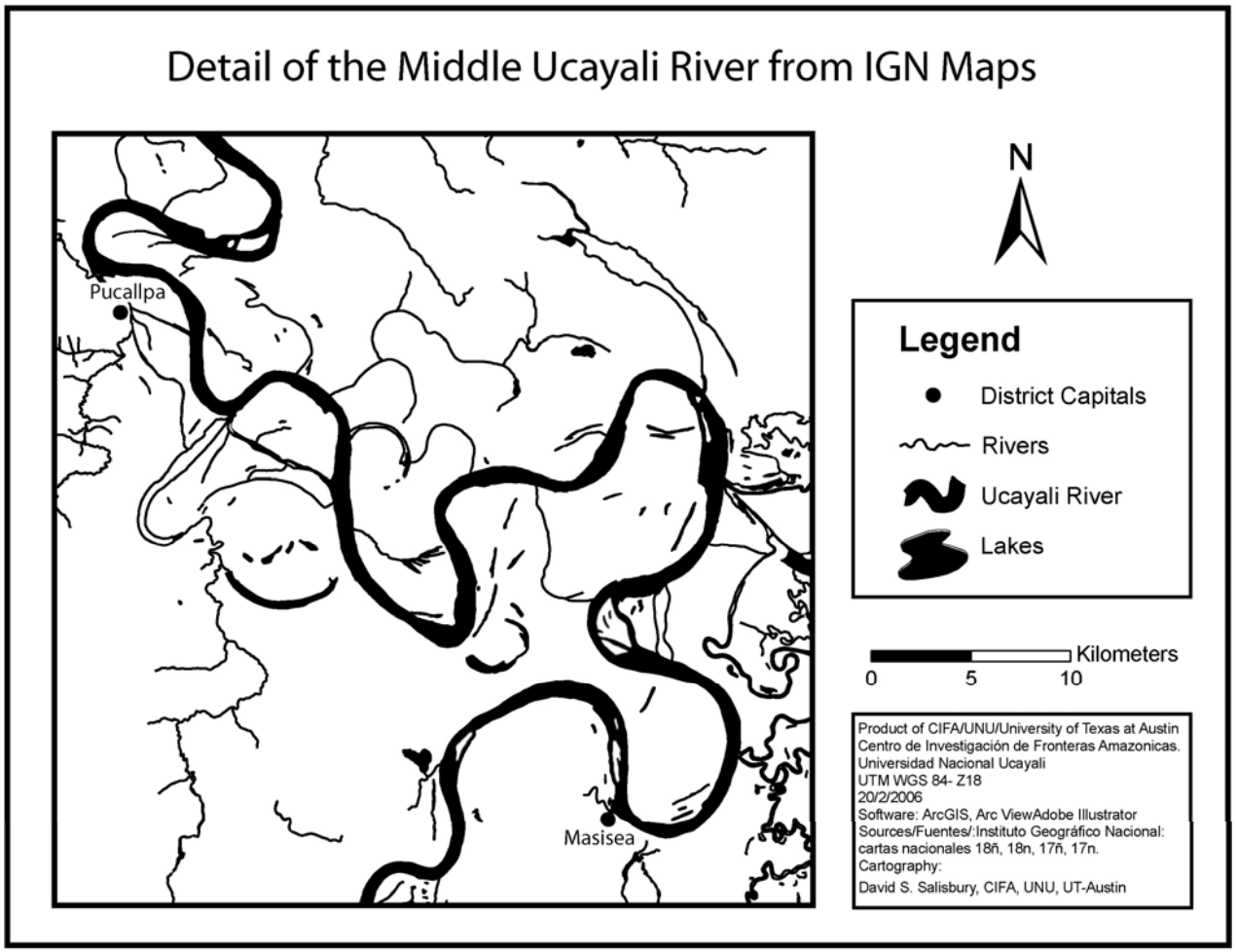

Figure 22. This detail of the Middle Ucayali River digitized from the *cartas nacionales* of the Instituto Geográfico Nacional is now a historical map due to the changing nature of this aggressively meandering river.

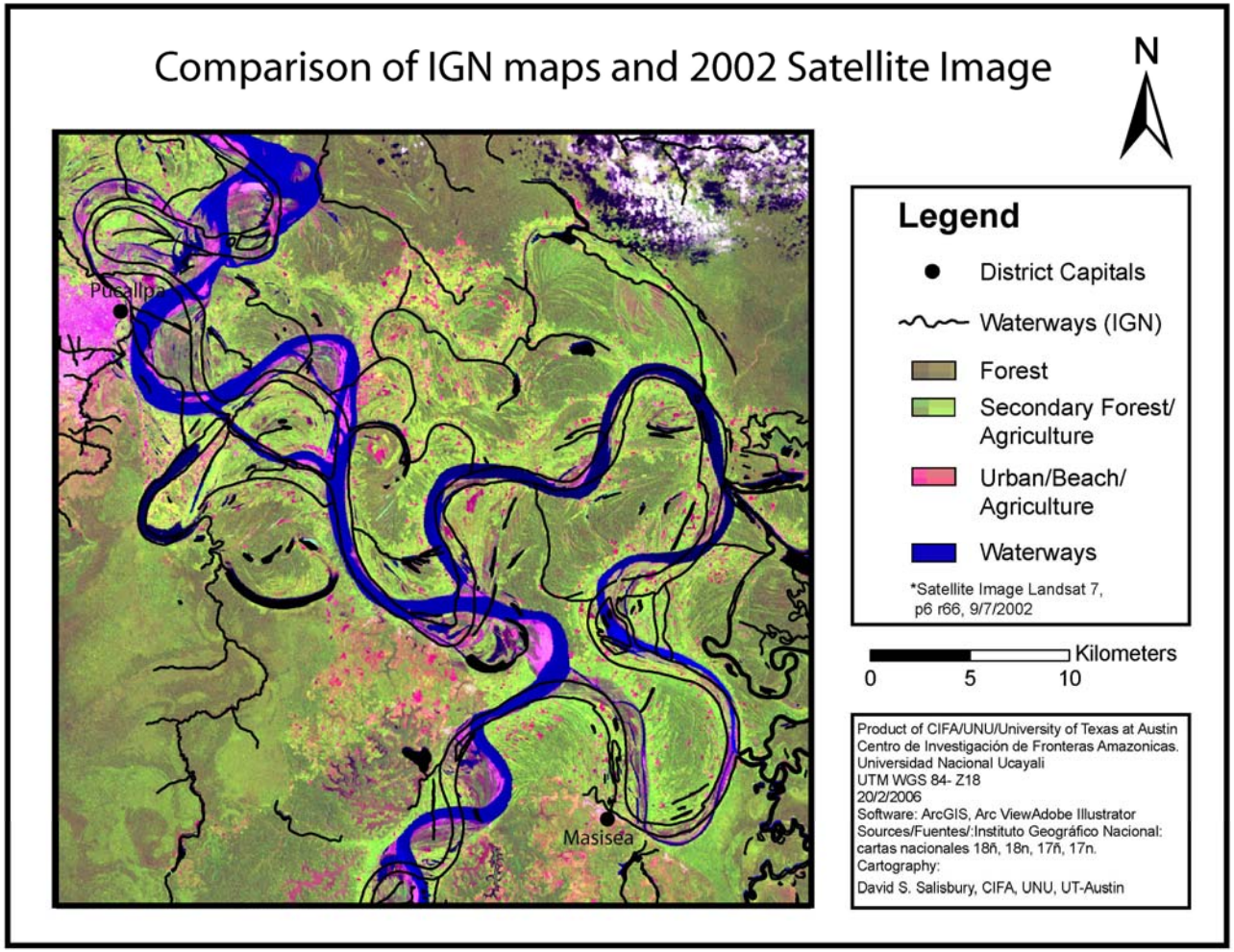

Figure 23. Overlaying the IGN maps (in black) on top of the Ucayali River reveals the degree of dynamism with multiple new meanders and the stranding of Masisea on a huge oxbow lake.

large new meanders in this short section of the river. One of these shifts is the new eight kilometer long channel which shortened the Ucayali River by over 60 km, marooning a number of communities and Masisea on a 68 kilometer long oxbow lake (Figure 23). These shifts are not unique to the Ucayali proper, but are also common among its tributaries, including the four watersheds in the study area.

While a shift of the magnitude described above is uncommon, the floodplain-dwelling Shipibo Conibo indigenous people are accustomed to relocating their villages according to the vicissitudes of the Ucayali. These moves are increasingly costly, however, with their entry into the market economy and a less flexible land tenure system (Bergman 1974, Pärssinen et al. 1996, Tournon 2002). These river shifts[81] frequently force a Shipibo Conibo village to transfer their valuable land title to an unflooded piece of land elsewhere, thus perhaps requiring a protracted negotiation process and another update to the map of indigenous territories (AIDESEP 1996)(Figure 24). Over time, lesser shifts already call for an extensive update to this map as the titled lands of the Shipibo Conibo, largely demarcated in accordance with river banks in the 1970s, no longer coincide with the modern river course. A quick look at remotely sensed images of the Ucayali floodplain show why this is the case with scars of former river channels, lakes, and newly formed beaches clearly visible ten kilometers away from the current river course (Figure 23).

Unfortunately, in order to get a quick look at a remotely sensed image in Amazonia, one is usually confined to the dry season, as pervasive humidity largely obscures images with dense cloud cover for 75% of the year[82] (Asner 2001)(Figure 21), and even cloudless dry season imagery is increasingly compromised by smoke from slash and burn agriculture (I. Foster Brown personal communication). While cloud and smoke free imagery provides valuable baseline information on larger physiographic features like

Figure 24. The Shipibo Conibo community of Nueva Esperanza is one such community forced to move from the floodplains of the Ucayali to an upland area on the lower Utiqunía River. Photo: Wuild Párraga Pérez.

rivers and floodplains, 10-30 meter resolution is still not good enough to identify locally important streams often obscured by canopy. In addition, although remote sensing analysis can differentiate pasture, agriculture, secondary forest, and to a lesser degree classes within upland and floodplain forest (Brondizio et al. 1996, Foody and Hill 1996, Hill 1999, Mausel et al. 1993, Moran et al. 1994, Moran et al. 1996), the determination of cultural boundaries and population centers usually requires ancillary data informed by local knowledge.

IV. THE INADEQUACY OF EXISTING CARTOGRAPHIC INFORMATION

While the dynamic physical landscape, and the difficulties of obtaining and analyzing clear imagery challenge map makers and census takers to render the geographic reality of a region, other factors also contribute. My focus in this section will be on the human geography of the region, particularly the cartographic representation of local populations. First I briefly introduce some of the challenges of mapping frontier communities before describing some of the efforts of national and regional organizations who have worked in the four watershed area. These organizations include the National Geographic Institute (IGN), The National Office of Natural Resource Evaluation (ONERN), the Rural Settlement Research Center of the National Agrarian University- La Molina, the District of Masisea's Strategic Development Planning Committee and the Instituto del Bien Comun's Native Communities Information System Team. The final portion of this section uses tables organized according to watershed to compare the population centers represented cartographically by these organizations. Findings demonstrate the current cartographic information available on human settlement to be either outdated, incorrectly georeferenced, or lacking representation of indigenous peoples.

Amazonian settlements in road-less forested frontier zones are characterized by households and fields dispersed linearly along floodplains and riverside bluffs[83] making it often difficult to determine cultural boundaries such as where one community might end and another begin, much less how to map the town with point data in these often contiguous linear communities (Figure 25). Once identified, these population centers must be constantly updated cartographically as boom towns centered on resources like rubber, logging, coca, and gold appear and disappear with startling suddenness. If abandoned, the villages are scavenged for useful and durable objects (e.g. zinc roofing) while the remainder is swallowed: quickly decomposing within the rapidly regenerating tropical forest (Figure 26). The ability of the tropical forest to disguise the trace of recent human occupation should come as no surprise given the hundreds of years researchers have severely underestimated both pre-Columbian population levels (Denevan 2003, Mann 2005), and the extent and degree of their landscape modification (Butzer 1992, Denevan 2001; Heckenberger et al. 2003; Mann 2005). However, the lack of information on current frontier populations is surprising given the increasing interest in these areas and the availability of advanced mapping technologies such as GPS receivers, geographic information systems (GIS), and satellite imagery.

A. The Organizations and Data Sources

1. The National Geographic Institute's Cartas Nacionales

The National Geographic Institute is the governmental organization in charge of constructing and updating the official maps of Peru. This was underscored in 2000 when President Fujimori signed the National Geographic Institute Law (Ley N° 27292)

Figure 25. A typical riverside village on the middle Tamaya River extends in a linear fashion along the banks and bluffs of the river.

Figure 26. This abandoned house on the Utiquinía River may soon be swallowed by secondary forest.

obligating public and private entities to provide cartographic and geographic information within 30 days of concluding any study generating geographic, remotely sensed, or cartographic information. Unfortunately, even with this law, such critical information is rarely shared and then usually through personal contacts or reciprocity rather than enforced policies. Despite this lack of sharing, the IGN and its partners have generated detailed paper maps of the country. Regrettably, for the modern interpreter, these cartographic instruments quickly become dated due to the dynamic nature of the Amazonian region's physical and human geography.

The official map of Peru consists of over 500 topographic maps[84] (*cartas nacionales*) produced at a scale of 1:100,000. These maps were not constructed systematically as data sources, time of data collection, and the lead institutions vary since 1970. The predecessor of the IGN, the Military Geographic Institute, used radar images, aerial photography and fieldwork to delineate the oldest maps (Smith et al. 2003). Maps produced after 1980 also used radar images and aerial photography but were compiled by the Defense Mapping Agency (DMA) of the U.S. Department of Defense in conjunction with the IGN. These partners completed the first nationwide topographic map in 1983. In 1996 the National Imagery and Mapping Agency (NIMA[85]) absorbed the DMA but continued working with the IGN to produce topographic maps of Peru with some of these newer maps now based on images from optical satellite sensors rather than aerial photographs.

An analysis of the 17 IGN maps[86] required to cover the four watershed study area show their data sources to be primarily aerial photographs as old as 1956 but not newer than 1984. The maps do not rely on photography from any one time period, with cartographers using photographs from multiple flight lines and time periods to compile the geographic information. Ten of the maps have detailed legends indicating they were

not checked in the field. In some cases, the legend indicates to the map reader that the IGN has updated the information, however the manner and extent of this updating is not specified. Several of these updated maps include toponyms written in a different font that are not easily cartographically referenced as they are associated neither with points nor buildings on the map. In short, the ten maps with detailed metadata are based on geographic information dated since at least 1984 and furthermore, lack ground truthing. This may in part explain the obsolete depiction of the Middle Ucayali river course described above and the outdated representation of settlements.

2. The National Institute of Statistics and Computing

The National Institute of Statistics and Informatics (INEI[87]) is the organization that plans, directs, coordinates, evaluates and supervises all official statistical and computing activities in Peru (INEI 2005b). The best known product of INEI is the national census. The last available official census of Peru was the 1993 National Census (9th Population and 4th Household Census). Fieldwork for the 2005 National Census (10th Population and 5th Household Census) was conducted in July and August of 2005 with preliminary results disseminated in November of the same year. However, results from the National Census at the sub departmental level were still unavailable at the time of this writing. One of INEI's objectives with the 2005 National Census was to include every community. In order to accomplish this objective INEI elaborated an exhaustive pre-census mapping exercise to obtain information on the total amount of households in the country (INEI 2005a). In the absence of new data at the local level of analysis I analyzed the Peruvian Map of Population Centers available through the INEI national cartography website (www.desa.inei.gob.pe).

The Peruvian map of population centers is a vector based digital map of population centers registered[88] in 2001 by INEI (INEI 2001). Each population center has

attribute information associated with it: a unique identifier, department, province, district, toponym/name, category, classification, and number of houses. This geographic information was created from the INEI Spatial Data Base whose population center information is the result of the 1999 Ministry of Education's Digital Cartography of Population Centers version 01, 2001 INEI fieldwork with GPS, and the 2001 Updated Cartography and Population Center Directory of the 1999-2000 Pre-Census. INEI lists various limitations of this database including the oral transmission of data, discrepancies between source data, and the logistical difficulties faced by official organizations attempting to update and verify the cartography (INEI 2001). These restrictions may explain in part the limitations of the cartographic data described below.

3. The National Office of Natural Resource Evaluation

The Peruvian National Office of Natural Resource Evaluation (ONERN[89]) conducted a series of natural resource inventories on different areas of the country in the 1960s, 70s and 80s. These studies primarily evaluated a region's potential and degree of natural resource use and proposed recommendations to improve their use and/or conservation. ONERN saw the need for integrated studies of natural resources to solve problems caused by the scarcity of agricultural land, the inadequate national policies of territorial occupation, and the uneven development in distinct regions. In their borderland studies, ONERN provided baseline information on natural resource use that policy makers could utilize to plan economic/social development and settlement policy.

ONERN justified their 1978 study of the region between the Ríos Callería and Tamaya because it "…constitutes the obligatory route of the Pucallpa-Brazilian border road, that will complete the Peruvian side of the great transcontinental highway between Lima and Brasilia…" (ONERN 1979: preface) and provided the information necessary to fulfill the *fronteras vivas*[90] policy of establishing border settlements to consolidate

national sovereignty (ONERN 1979). While the road construction has never been realized and planned frontier settlement has largely failed, the study did provide extensive information on physiography, ecology, geology, soils, forestry, transport, and agriculture. This continues to be the best regional data set available[91] on these topics and has subsequently been used again and again to support a variety of studies, including the recent creation of natural resource concessions in 2004.

Of less importance to ONERN was the demography of the region at the time of study: the volume contains only five paragraphs and a table dedicated to demography. The table, a representation of the region's population according to the 1972 census, contained 30 settlements, but half do not appear in ONERN's portfolio of maps (ONERN 1979). Furthermore, of the 28 total settlements on the ONERN maps, twelve of these do not appear in the census. This lack of continuity between data sources within one document demonstrates a fundamental weakness in the published cartography of the Peruvian Amazon: a lack of knowledge of the location and size of population centers[92].

4. Fronteras Vivas

In 1981, the Rural Settlement Research Center of the National Agrarian University- La Molina finished a first approximation of the Cantagallo Rural Settlement Project for the Ministry of War's National Development Office. The principal objective of the study was to reestablish regional sovereignty and national security through the promotion of development and the economic integration of the region (Centro de UNALM 1981). This classic *fronteras vivas* discourse reflected fears of Brazilian penetration in a region scarcely populated[93], rich in resources, and as yet untouched by an economic frontier ending at the western bank of the Río Ucayali (Centro de UNALM 1981). The researchers apparently did not conduct fieldwork, instead leaning heavily on the work of ONERN, demographic studies in 1976 and 1979 by the Ministry of

Agriculture, and forestry studies from the development committee of the Coronel Portillo province. The study area was confined only to the Abujao and Utiquinía Rivers with the detailed demographic data only available for the Abujao.

5. The Strategic Development Plan

In 2002, the Municipal District of Masisea's District Coordination and Fight against Poverty Group finished the 2006 Strategic Plan for the Coordinated Institutional Development of Masisea. This 62 page document included an excellent hand drawn map of the district in addition to a list of the 22 indigenous communities and the 69 caseríos[94] (Municipalidad Distrital de Masisea 2002). The district of Masisea includes only two rivers from the study area, the Tamaya and Abujao, and the document displays a greater knowledge of the Tamaya than the Abujao, perhaps due to the district capital's location at the mouth of the Tamaya and that only two of the 45 local authorities contributing were from the Abujao River. Also noticeably absent from the plan is an acknowledgement of the resident Asháninka and Isconahua indigenous people and the existence of an Isconahua reserve. The only indigenous group mentioned directly are the Shipibo Conibo whose more accessible titled lands lie along the floodplains of the Ucayali and its tributaries.

6. The Institute of the Common Good (IBC) and the Native Communities Information System (SICNA)

In 1996 the SICNA program began in Loreto, Peru's largest department, as an attempt to georeference Peru's indigenous communities and to clarify the confusion of related geographic data (Smith et al. 2003). As of December 2004, SICNA, now part of the Instituto del Bien Común[95], had georeferenced and gathered detailed tabular information on 933 native communities, 65% of the estimated 1,450 total communities (Instituto del Bien Común 2004). In addition to updating and improving information on

native communities, SICNA also collects GPS location points and basic information on settlements surrounding these communities. SICNA began this exercise once fieldwork showed location and place name data for Amazonian settlements to often be erroneous (Smith et al. 2003). Ultimately, SICNA has the best and most up-to-date settlement data in Amazonian Peru due to a team of expert fieldworkers, excellent laboratory facilities, and strong direction. However, as shown below, their task is enormously challenging and thus work is ongoing. Unfortunately, of the four watersheds in the study site, SICNA has only visited the Tamaya[96] where their study of non-native settlements lacks completion due to the hostility of illegal loggers and coca growers in the region. This hostility is not surprising given SICNA's objective of georeferencing untitled native communities threatens lands and resources already used by loggers and coca farmers.

B. The Watersheds

1. The Callería River

The name of this river, mission and district have fluctuated between Callaría, Cayaría, and Calléria for hundreds of years[97] (Larrabure y Correa 1905-1909, Ortiz 1962, Samanez and Palacios 1980). Indeed, this uncertainty still exists today with the local people calling the area Callaría, the district being named Callería, with two of the official IGN topographic sheets using Río Callería while a third uses Río Callaría[98]. Not surprisingly the confusion of place names continues when addressing population centers on the river. In 1967, Diamond and Terborgh (1967) found only three indigenous villages along the first 30 miles of what they called the Callaría River with informants denying the presence of settlements upriver except for ephemeral logging crews pursuing the extraction of tropical cedar (Figure 27). These villages were likely the precursors to the current indigenous communities of Nuevo Saposoa, Patria Nueva and Callería. In

Figure 27. The Shipibo Conibo village of Conta, formerly a mission, was first founded in 1859 (Pallarés and Calvo 1907: 68). The riverbank location provides easy access to transportation and water, while the rectilinear organization of the village may be a relic of its missionary past. The village women, like many indigenous women in Amazonian Peru, are enthusiastic soccer players.

1969, shortly after the fieldwork of Diamond and Terborgh, the first colonists formed the *caserío* of Pueblo Viejo upriver of these villages.

Table 1 compares four different data sources for the river basin: the 1978 ONERN studies map, the IGN's official national maps, the INEI's GIS website and our own fieldwork. Those population centers are organized geographically by data source with those at the top of the table proximate to the headwaters before descending in order to those closest to the river's mouth. The table makes immediately apparent the lack of cartographic information available for the middle and upper portion of the river: nine of the population centers found in 2004 are not represented in any way by the official sources. Confusing the issue are the multiple names for the current village of San Miguel de Callería (Pueblo Viejo, Contamanillo, San Miguel). If the ONERN study ignores the existence of indigenous communities entirely, the IGN and INEI maps do a better job although IGN does omit one while the INEI database locates another community incorrectly. The table makes clear the confusion between data sources concerning the amount, location, and names of population centers on the river.

2. The Utiquinía River

A look at Table 2 reveals improved correlation of the population centers between cartographic data sources on the Utiquinía River than from the Callería River. While the lack of ONERN toponyms likely reflect less settlement in the 1970s, the study also ignores the Utiquinía army fort founded in 1959 and burned in 1978 and the existence of the village of Contamanillo[99] (now called San José). The IGN data is better although lacking the population centers closest to the headwaters. However, the table finds serious flaws in the INEI database with all but two toponyms either incorrectly located or unknown. Indeed, although the known population centers are ordered correctly, their

Table 1. A Comparison of Population Centers on the Callería River by Data Source

Source	ONERN 1978	IGN 1990-1998	INEI 2001	Ramírez Zumaeta 2004
Type	Map	National Maps	Digital Map	Fieldwork w. GPS
				Lucasa/Sr. de los Milagros
				Colonia Sarita
				San Juan
				Esperanza
				Primavera
				Santa Fe
				Huacamayo
				Shiringal
				Pamaya
	Contamanillo°			Vista Alegre
	Pueblo Viejo°	Contamanillo°		San Miguel de Calleria°
		Calleria▪	Calleria#▪	Calleria▪
		Chiringote^	Mediacion Calleria^	
		Patria Nueva▪	Patria Nueva de Calleria▪	Patria Nueva▪
			Nuevo Saposoa▪	Nuevo Saposoa▪

* misspelled
# wrong location
^ unknown
° The village of Pueblo Viejo absorbed the farm of Contamanillo before changing the village name to San Miguel de Callería.
▪ 2004 Indigenous Community

Table 2. A Comparison of Population Centers on the Utiquinía River

Source	ONERN 1978	IGN 1990-2000	INEI 2001	Párraga Pérez 2004
Type	Map	National Maps	Digital Map	Fieldwork w. GPS
			Sarita Colonia^	
			7 de Junio*#	7 de Julio
				Jordán
		Gilgal	Gilgal#	Gilgal
		San José	San Jose Alto Utiquinia#	San José
	Santa Sofía	Santa Sofía	Santa Sofia#	Santa Sofía
		José Olaya	Jose Olaya#	José Olaya
	Nuevo Utiquinía	Nueva Utiquinía*	Nueva Utuquinia*#	Nuevo Utiquinía
		Flor de Ucayali▪	Flor de Ucayali#▪	Flor de Ucayali▪
		Ramal	Ramal	Ramal
	Jerusalén	Jerusalén	Nuevo Jerusalen	Nueva Jerusalén
			San Martin^	
			Shanabaquia^	
			Utuquinia^	
			Nuevo San Martin^	

* misspelled
# wrong location
^ unknown
▪ 2004 Indigenous Community

Figure 28. The villages of the Utiquinía River, like other riverine Amazonian settlements, are difficult to map due to their ephemeral and linear nature. This house, with its elevated floor, demonstrates the owner's respect for the variable levels of the river. Investments in the construction of many of these houses are minimal, in part so they can be abandoned at little cost if the river's floods or owner's fortune changes.

location in the map show not even an approximate knowledge of their location alongside the river (Figure 28). This may be due to this information being passed orally without georeferencing as referred to in the INEI metadata (INEI 2001). The unknowns could be entirely wrong or villages that have merely ceased to exist. This is not uncommon in these frontier settlements, however, Sarita Colonia could be placed on the wrong river as the headwaters of the Callería River has a hamlet by that same name (Table 1).

3. The Abujao River

Our analysis of the Abujao River starts with the middle portion as the river empties into an oxbow lake, dividing in two along its lower course. In addition, I add three regional level data sources to enrich the comparison. In 1976 a demographic study by the Ministry of Agriculture found 99 families of colonists living along the Río Abujao excluding the indigenous community of Santa Luz[100] and the garrisons of Repolla and Cantagallo (Centro de UNALM 1981). The majority of these families lived dispersed along the river with the only nucleated settlements occurring in the caseríos of Abujao (twelve families) and J.C. Mariátegui (four families). The Ministry of Agriculture's Pucallpa office undertook another settlement study of the lower Río Abujao in 1979 and added a newly formed caserío, San Martín, to Abujao and J.C. Mariátegui (Centro de UNALM 1981).

A look at Table 3 reveals a number of former population centers to no longer be in existence. The only surviving army or police outpost is Cantagallo (Figure 29) with Repolla abandoned and Nuevo Canaán burned by the *Sendero Luminoso*[101]. The studies from the 1970s appear sound with the oldest showing the *caserío* of Santa Luz to originally have been settled by indigenous people. Ethnographic fieldwork also revealed the village of Abujao to originally be settled by the Asháninka, although now it is thought of as a *caserío*.

Table 3. A Comparison of Population Centers on the middle and upper Abujao River by Data Source

Source	M. Agricultura 1976	ONERN 1978	M. Agricultura 1979	Masisea 2002	IGN 1995-1998	INEI 2001	Paredes y Pérez
Type	Map	Map	Map	Map	National Maps	Digital Map	Fieldwork w. GPS
	Cantagallo	Cantagallo		Cantagallo	Cantagallo	Canta gallo*#	Cantagallo
		Repolla°					
	PVA°	Abujao°			Nuevo Canaán°		
	(Guardia)	(Guardia)			(Guardia)		
				San Mateo▪		San Mateo#▪	San Mateo▪
					Nueva Galicia°		Camahua▪
			Study stopped at	28 de Julio	28 de Julio	veintiocho de Julio#	28 de Julio
			San Martin	24 de Setiembre			24 de Setiembre
					Lobo°		
				Santa Rosa	Santa Rosa	Santa Rosa#	Santa Rosa
				Sargento Lores^	Sargento Lores^	Sargento Lores^	
				Bello Horizonte^		Bello Horizonte^	
	C. N. Santa Luz&	Santa Luz		Santa Luz		Santa Luz#	Santa Luz
					Abujao Alto&		
			San Martin^	San Martin^		Ricardo Palma^	
				Ricardo Palma^		San Martin^	
			J.C. Mariategui	J.C. Mariategui		J. C. Mariategui#	J.C. Mariategui
	Caserio Abujao		Abujao	Abujao	Abujao	Abujao#	Abujao

* misspelled
# wrong location
^ unknown
° No longer exists
▪ 2004 Indigenous Community

Figure 29. Few visitors ever reach this isolated borderland military outpost and rural settlement project.

The IGN data appears reasonably accurate except for the need to verify some population centers and include the titled Asháninka village of San Mateo and the town of Santa Luz. The INEI data again reveals systematic inconsistencies as not a single known population center is correctly located in geographic space. The Masisea data resembles the INEI database in order and name but the georeferencing cannot be critiqued due to the lack of tributaries needed to accurately analyze the hand drawn map.

4. The Tamaya River

Analysis of the Tamaya is restricted to the middle and upper portions due to the length of the river, the amount of river and lakeside populations on the lower course, and the dangers presented by drug trafficking on the lower river. Table 4 shows IGN's national map data to reflect an older vision of riverine settlement with the name of one and two family farms (*fundos*[102]) appearing as population centers. The Tamaya, and the region, continues to change with some *fundos* disappearing, others maintaining themselves[103], and some even growing to become villages. Meanwhile, the resident Asháninka, whose labor (debt peonage and slave) supported many of these *fundos* are entirely absent from the IGN data and show up on the Masisea and INEI maps only at the titled community of San Miguel de Chambira. The SICNA data, on the other hand, represents the Asháninka accurately given they received an invitation by the Asháninka to map their presence on the river. While the Asháninka's traditional dispersed settlement style is a challenge to represent cartographically, the late 1990s saw them move downstream from the headwaters into riverside nucleated villages in order to be recognized by Peruvian authorities to obtain schools and titling. Indeed, University of Texas student Emory Richey[104] identified four untitled Asháninka villages in the Tamaya watershed in addition to the titled community of San Miguel de Chambira: Alto Tamaya

Table 4. A Comparison of Population Centers on the middle and upper Tamaya River by Data Source

Source	Masisea 2002	IGN 1995-1998	INEI 2001	IBC 2003	Borgo López 2004
Type	Map	Cartas Nacionales	Digital Map	GIS Shapefile	Fieldwork w. GPS
	Cayanya		Cayanya		Cayanya
	Putaya	Puerto Putaya	Puerto Putaya	Puerto Putaya	Puerto Putaya
				Alto Tamaya▪	Alto Tamaya▪
					Abraham Poza
					Amazonas
	Nuevo Cayanya			Santa Cruz de Capironal	Capironal
	Yucanillo	Yucanillo	Yucanillo#		Yucanillo
		Baldomero			
		López			
	Jacaya	Jacaya	Jacaya#	Jacaya	Jacaya
		Shatanya			
		Barión Poza			
	Nohaya	Noaya	Nohaya#	Noaya	Noaya
	San Miguel de Chambira▪		San Miguel de Chambira#▪	San Miguel de Chambira▪	San Miguel de Chambira▪
	Nuevo Paraiso				
			Suaya^	Nueva Amazonia de Tomajao▪	Nueva Amazonia de Tomajao▪
		Santa Rosa	Mahia#	Bahia*	Santa Rosa de Mahia
			Israelita^		
	Nueva Libertad"	Libertad°"	Nuevo Libertad"		
		Esperanza°			
	Nueva Esperanza	Huarimán	Nueva Esperanza (Huariman)		Nueva Esperanza
				Cametsa Quipasi▪	Cametsari Quepatsi▪
	Vinuncuro	Vinoncuro*	Vinoncuro*		Vinuncuro

* misspelled
# wrong location
^ unknown
° No location point
“ No longer exists
▪ 2004 Indigenous Community

(82 residents in 2005), Nueva California (55), Nueva Amazonia de Tomajao (57), and Cametsari Quepatsi (126) (Richey 2005). While these four populous Asháninka communities demonstrate the strength of their presence in the region, they are invisible on the official maps (Figure 30).

If Asháninka residents are largely invisible on the official maps, coca towns, commonly called *caseríos cocaleros*, are present despite their relatively recent formation in the last 20 years. Some of these towns continue to exist even after coca eradication efforts surged between 1999 and 2004 although out migration from coca cultivation centers is growing. Other towns, like Libertad (Table 4), formerly a vibrant coca *caserío* with bars and numerous houses, have disappeared entirely. We found Libertad completely swallowed in secondary growth, resembling nothing more than an abandoned logging camp. So much so, that the motorist, who had worked the middle Tamaya in the 1980s, simply did not recognize it.

The best of the four data sources for population centers, despite its lack of georeferencing, is that of Masisea. Population centers are readily identified as being in the correct location as tributaries are delineated and named. This map is clearly informed by local knowledge, correctly locating the distant and Brazilian settled towns of Cayanya (Figure 31), Puerto Putaya, and Nuevo Cayanya (also called Capironal). In comparison, the IGN maps are largely correct but outdated, the SICNA data remains incomplete until their subsequent visit while the INEI digital map continues to place towns incorrectly in geographic space.

C. A Confusion of Cartographic Data

This review of the cartographic representation of riverine settlement along these four rivers underscores the difficulties faced by policy makers seeking reliable

Figure 30. Some of the invisible borderland Asháninka in a Tamaya community.

Figure 31. This caserío, founded by Brazilians, is one of the closest to the Brazilian border. Residents are few, with only four occupied houses. This was once a Peruvian *fundo*, but became populated by Brazilians from the Amônia River in the 1980s. They left the Amônia River when the Brazilian Asháninka started organizing to title their lands. Locals said, "In Brazil all the land is claimed, but here in Peru there is free land." Photo José Borgo López.

geographic information of the area. Locally informed field work demonstrates the current cartographic information available on human settlement to be either outdated, incorrectly georeferenced, lacking representation of indigenous peoples, or in some cases all three. Therefore, the existing maps do not represent the current human geography of the region and are inadequate base maps for policy makers creating any conservation or development plan with goals to include or avoid conflict with local and traditional populations. What then are the consequences on the ground?

V. OVERLAPPING CLAIMS

Inadequate base maps do not stop individuals and organizations from claiming frontier land and resources, rather they facilitate claims as the emptiness and uncertainty encourages speculation in natural resources by risk-taking entrepreneurs operating both legally and illegally. In this section I map the overlapping claims of various stakeholders and organizations onto these flawed base maps to demonstrate the conflict resulting from both recent competing claims to territory and the imposition of these claims on the local people. I begin by focusing on the claims of the longest term residents, the indigenous peoples, including those titled, untitled, and in voluntary isolation. Then I briefly address the claims of the non-indigenous residents. Following this I introduce the national forests and forestry concessions projected on the landscape from central offices in Lima. I also include an analysis of mining concessions, increasingly prominent in the region, that often overlap other claims. Finally I conclude by projecting the conservation goals of both non-governmental and governmental organizations on this poorly understood landscape. Results demonstrate an impressive amount of claims on land and resources given the poorly understood nature of the region. Nevertheless, these claims overlap with both existing populations and each other due to the lack of geographic information,

dialogue between organizations, or interest in thinking beyond immediate needs, thus exacerbating conflict on the ground in an area already marked by a weak state presence.

A. Indigenous Territories

Amazonian indigenous groups are mobile populations who migrate for many reasons: opportunity, coercion, and evasion being a few examples. This mobility, in many cases, allowed groups to survive the invasion of their homelands by outsiders; however, the same trait can work against groups attempting to claim territory based on traditional occupation. Indeed, attempting to reconstruct the pre-Columbian mosaic of indigenous homelands is enormously difficult due to the relative absence of archeological or archival data (Mann 2005). It is also exceedingly difficult to identify the location of indigenous lands in the recent past for the same reason: an absence of reliable accounts. Here I briefly describe the current groups inhabiting the region.

The most well known indigenous group in the area is the floodplain dwelling Shipibo Conibo. Their lands are largely titled, in part due to the relative accessibility of their territories along the floodplains of the Ucayali Rivers and its tributaries, and their comparatively high level of organization and education. Although the Shipibo Conibo are relatively well off in terms of titled lands and education they continue to organize and expand their current territories based on growing populations, dwindling resources, and in reaction to their challenging and dynamic floodplain environment. The territories along the Ucayali floodplain near Pucallpa and at the mouths of the four study site rivers are largely Shipibo Conibo (Figure 32).

In contrast to the visibility of the Shipibo Conibo with their titled lands and high level of organization, the terra firme dwelling borderland Asháninka have until lately been largely invisible to both regional and national authorities with only two titled territories. This also differs considerably from their Asháninka cousins whose titled

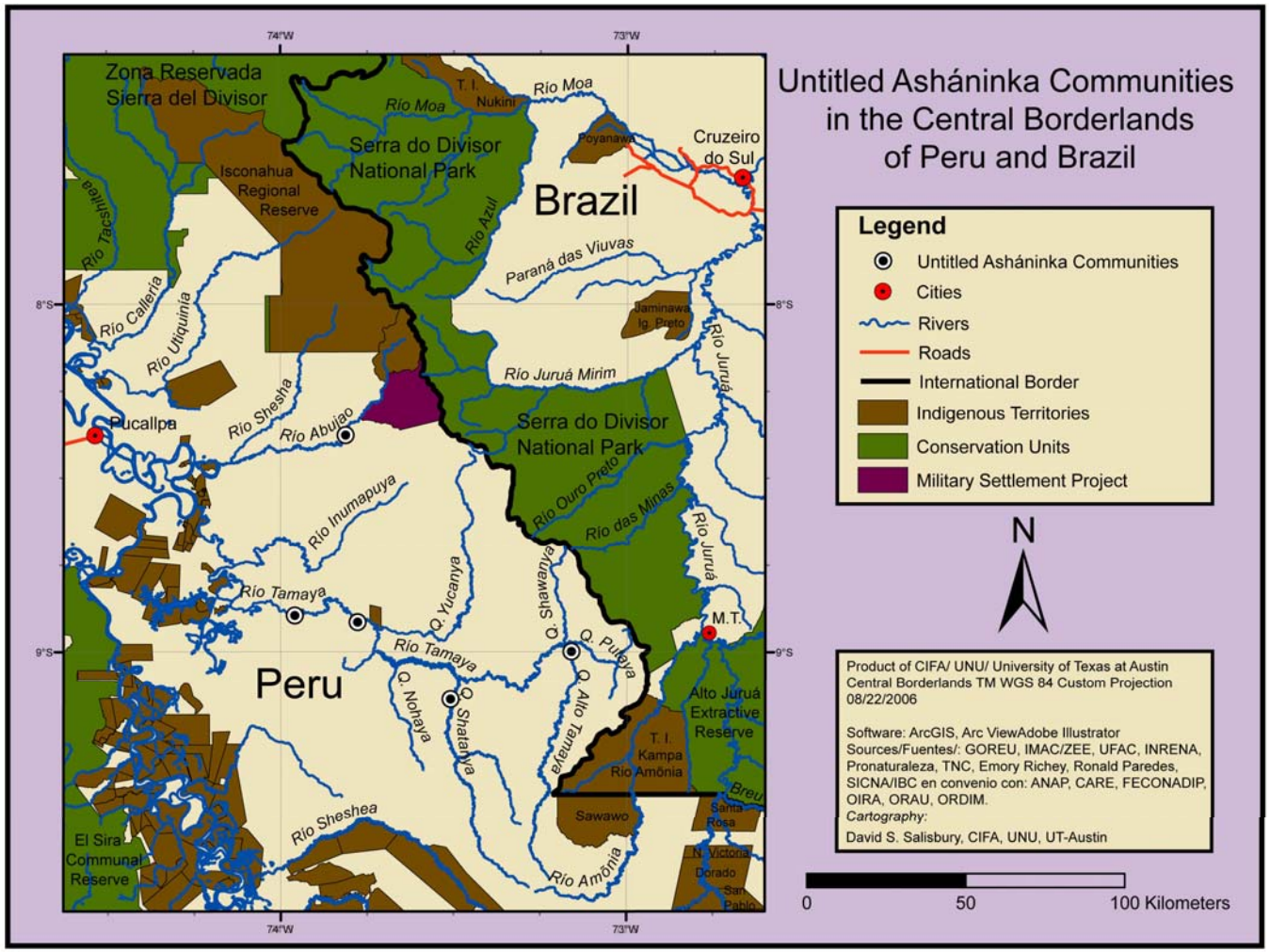

Figure 32. Within the four watershed study site lie territories of Shipibo Conibo, Asháninka, and Isconahua indigenous people. The Shipibo Conibo live near the Ucayali floodplain, while the Asháninka live closer to the border in untitled and titled territory with the Isconahua roaming a regional reserve.

territories number over 60 in the traditional Asháninka homelands of the Apurimac, Ene, Tambo, Urubamba and Upper Ucayali Rivers[105]. Even other borderland populations of Asháninka such as those along the Yuruá and Sheshea Rivers have received title to their lands. The Asháninka in the four watershed study site largely arrived in the region in the last 60 years. Since 2000, the creation of forestry concessions and the subsequent rush of loggers into their territory, forced these people to organize to ensure their right to territory, education, and natural resources. In the last five years, the majority of borderland Asháninka have formed nucleated villages contrary to their customary settlement pattern of impermanent and isolated family dwellings. They have clustered to obtain the schools and territorial rights they covet[106]. Figure 32 shows the four untitled Asháninka communities and one titled community along the Tamaya River, and the one titled and one untitled community on the Abujao River.

Even less visible than the Asháninka communities in these borderlands are the Isconahua: an indigenous group in voluntary isolation. The Isconahua, also known as the Iskobakebu or Isco (from now on referred to as the Isco), may still roam the reserve set aside for their use despite the increasing incursions of illegal loggers and drug traffickers. The anthropologist Manuel Cuentas estimates the Isco to number 240 persons (Arbaiza Guzmán et al. 1995) not including the descendants of the Isco described in Momsen (1964) and Whiton et al. (1964), now living in the Shipibo Conibo community of Callería. The Isco have been seen as recently as 2001 on the Peruvian side (Manuel Cuentas personal communication) and 1999 across the border in Brazil (Montagner 2002).

Their regional reserve parallels the Brazilian border (Figure 32), but perambulations of the Isco are unlikely to respect administrative or political lines. Momsen (1964) believes that the seventeen Isco who left the Sierra del Divisor in 1960

are the last descendents of a southern group of Remo. Whiton et al. (1964) agrees and argues that the ten groups the Isco acknowledged as relatives and allies in 1960 no longer exist. This view is heartily endorsed by certain sectors of the Ucayali government, whose President in 2004 (a sawmill owner) declared in a meeting in Acre with Brazilian governmental officials that there are no uncontacted people between Pucallpa and Cruzeiro do Sul, since everyone up there at least had shoes meaning they could not be uncontacted, and thus the reserve should not be a deterrent to the proposed Pucallpa-Cruzeiro do Sul road (Figure 33). Oral histories (Arbaiza Guzmán et al. 1995, Montagner 2002) confirm the continued existence of the Isco in the Sierra del Divisor. The Isconahua are of particular importance to this study as they represent some of the last groups living in voluntary isolation, not only in Peru and Amazonia, but around the world. The Amazon borderlands are one of the last regions where indigenous people can still roam in voluntary isolation.

B. Local People

The recent sightings of the Isco are by long time non-indigenous residents who live in the surrounding area. Without the local knowledge of these people even less would be known about this region, however, in some ways these residents are even more invisible than many of the indigenous residents. While the historically marginalized indigenous residents at least capture the imaginations of outsiders trying to envision Amazonia, other local people such as colonists or *ribereños*[107] are rarely described in an Amazonia imagined as an empty rainforest with a sprinkling of colorful native Amazonians (Slater 2002). The growing number of organizations supporting indigenous efforts of self determination means that indigenous people can now be better represented in centers of power than their neighbors. Representing non-Indians cartographically also presents challenges as unlike indigenous people who can have communal land, surveyed

Figure 33. The proposed Pucallpa-Cruzeiro do Sul road is of great interest to the businessmen of Ucayali, however, the Isco (among other forest dwelling people and fauna) appear to be missing from this schematic portrayal of the borderland forest bisected by the asphalted road to integration.

territories, and the associated polygons on the map, non-Indians are either represented poorly in population centers by largely outdated and erroneous official maps, or often not at all. Thematic maps exist of indigenous peoples and their territories, but are extremely rare for the territories, plots, and population centers of individual non-Indian farmers. Both Indian and non-Indian land and resource use is not restricted to a point or land title polygon on the map: they fish over large distances, and often travel kilometers into the forest to hunt, extract useful plants, or to harvest timber, among other activities (Figure 34). Figure 35 only represents those population centers researchers identified along the four major rivers: more *caseríos* (both mapped and unmapped) lie along tributaries.

Regardless of their extensive use of territory, even the minority with a legitimate land title will likely not be readily visible in any official database due to the Special Titling Program's (PETT[108]) lack of organization and modern technology. Although PETT received a 1995 loan from the Interamerican Development Bank to develop an agile and transparent rural land market by clarifying the state of existing rural parcels, modernizing the rural cadastral system, and creating a central computerized rural property registry, in the study area, PETT has struggled to accomplish these goals. The disarray of the Ministry of Agriculture archives (Figure 36), the logistical and financial challenges of getting to the borderland sites, and the landholders' disinterest in using scarce financial resources to formalize property claims are just a few of the reasons. Thus, frontier landholders have continued to transfer, subdivide, and establish properties without validation from governmental authorities. However, the recent superimposition of concessions onto these frontier lands has led residents to PETT in an attempt to justify their historical entitlement to territory.

One *ribereña's* story touches on many of these themes. I was lucky to give her and an Asháninka woman a ride to their *caserío* from a neighboring Asháninka

Figure 34. This colonist has collected palm fronds, animals, and skins for years in the borderland forests. He lives on a small property, but his intimate knowledge of place covers the many kilometers needed to harvest these rainforest products (peccary and ocelot skins and turtles are pictured).

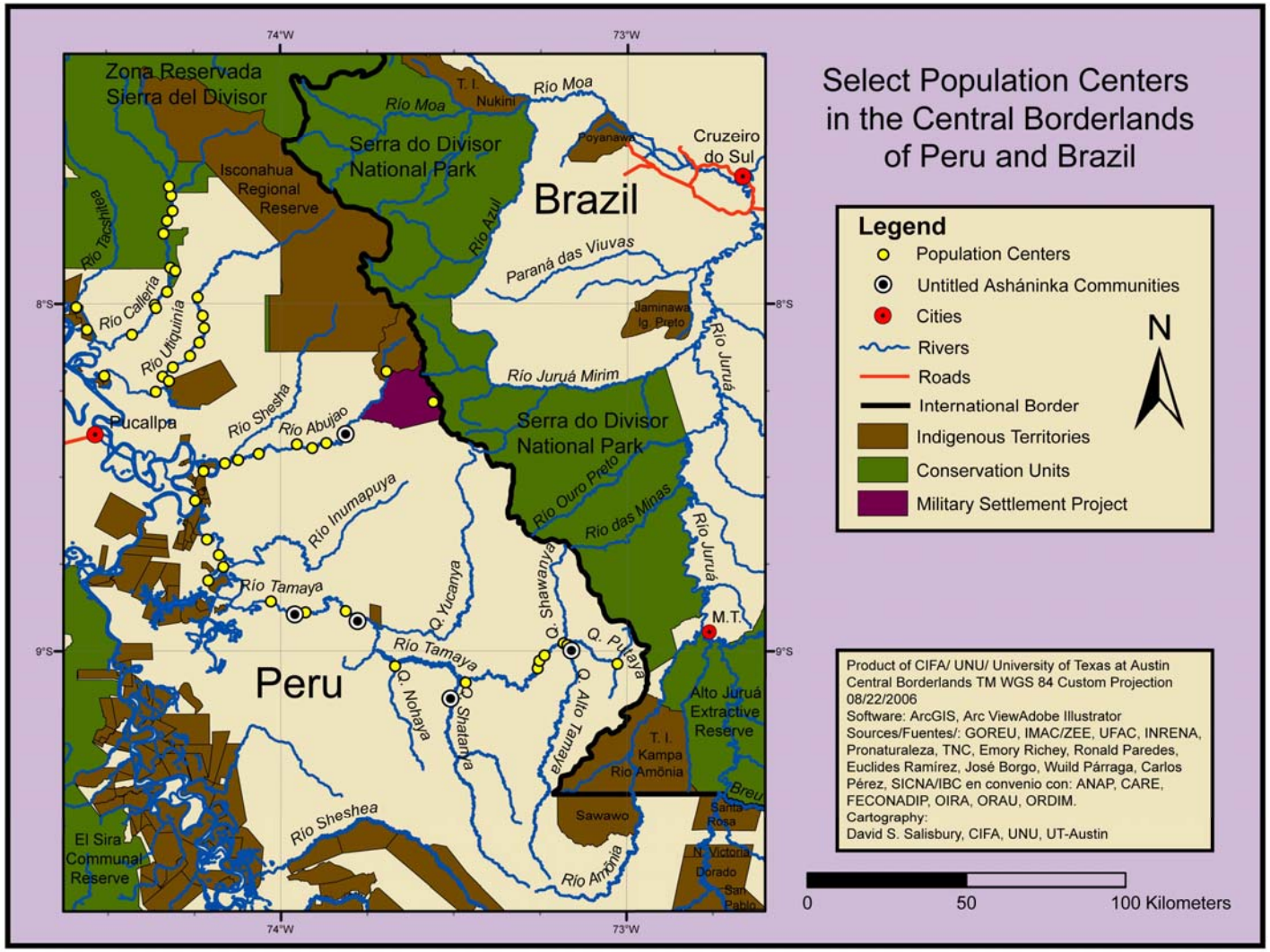

Figure 35. Population centers identified along the main rivers in the study site are shown in yellow. These centers might contain as few as 10 or as many as 300 people. Towns and hamlets along the tributaries are not represented.

Figure 36. The land tenure related archives in the Ministry of Agriculture in Pucallpa, Ucayali are several steps away from being in a form usable for updating in a GIS. Anything older than 1980 is likely warehoused in Iquitos further complicating long time residents' efforts to formalize their land holdings.

village (Figure 37). The *ribereña* was born in Atalaya but claimed to have lived along the Tamaya River in a *fundo* called *Fundo Samuela* for over 30 years. Her *fundo*, like many, had now become a *caserío*: this one with twenty-three houses. She and her family were very concerned about keeping their property because the Asháninka to the south were organizing to claim their land, while three forestry concessions had also been imposed by the nation state directly on top of both the *caserío* and their 30 year old *fundo*. According to her, years before, only three families of Asháninka lived on the nearby creek. She listed them by name and said the current Asháninka leader was not even from this stretch of the river, but from upriver on the Putaya. While she said this, the Asháninka woman sitting next to her, said nothing, even when I asked her. Later, she did speak, and I discovered that while she lived with her family in the *caserío*, her son lived in the nearby Asháninka community.

When we arrived at the *caserío*, the Asháninka left with her granddaughter, while my boat pilot and I were invited to sit out a sudden downpour over a couple coconuts of coconut water. As I sipped the water from the coconut by straw, I looked around and saw only a handful of houses rather than the twenty-three she had mentioned earlier. She explained, "There are nine houses united here, but there are twenty-three overall, with some nearby and others spread out up and down the riverside." She willingly shared her entire problem. Although she had lived there for thirty years her documents did not go back that far. Unfortunately, the guerillas[109] had burned their original documents in 1989. This loss was increasingly unfortunate because, in addition to the Asháninka dispute, three forestry concessions had been projected by the state on top of both the *caserío* and their 30 year old *fundo*. These forestry concessions had been superimposed on their lands and *caserío* even though their *caserío's* school was administered by Ucayali. In an ironic twist, she worried about the concessionaires claiming their land and

Figure 37. Two neighbors reflect the diversity and interconnection of the longtime residents of the borderlands: the *ribereña* woman who has lived on a riverside fundo for 30 years and the Asháninka woman taken from her Gran Pajonal home to become a slave in Iquitos at the age of 10 before eventually ending up on the Tamaya River.

resources even though she well knew their immediate timber prospects were limited: "Now there is no more timber. To work timber you've got to go oooohhhh far away." In retrospect, this is likely because she and her husband logged everything near their *fundo* over the last 30 years.

At this point, her husband arrived from the fields, and quickly went inside to get the paperwork they did have. One document was from the Peruvian National Institute of Natural Resources (INRENA) and was called a Certificate of Renewal[110]. This certificate dated the 22nd of July, 2003 stated that they possessed a 90 hectare property called *Fundo Samuela*. Another document, the Certificate of Special Possession of 1987[111] said they had possession of *Fundo Samuela* since 1983. The husband had gone recently to Pucallpa to declare their residency to precede 1983, but was told that all the documents to substantiate his case would be unavailable in Loreto. While their date of arrival was variable in our conversation, gradually receding from 1973 to 1969, I saw no reason not to believe them, but unfortunately I was in no position to help obtain their title. Indeed, my own presence there became a bit more precarious when she told me, "CORAH[112] came in July and August of last year and took out every bit of coca[113]. Now there's nothing." The rain stopped, I thanked them for the coconuts and the conversation, wished them good luck, and continued upriver.

This field account brings together dilemmas shared by many of the longtime residents of the borderlands. First, their documented claim to the land may not be strong despite years of permanence. This is critical as their former Asháninka slaves, allies, friends, or workers may be claiming the same land they have lived on for a generation. In addition, forestry concessions are being drawn on their lands because of either their lack of legitimate title or the indifference or inadequacies of the national forestry and land tenure apparatus. Finally, with markets for traditional crops distant and transportation

costs high, they may have joined the latest economic booms, coca cultivation or illegal logging, which while relatively lucrative, could complicate their economic and land tenure status further.

Title or no title, these frontier people are of a variety of origins. While some have ancestors from the region, a substantial number are Brazilian or of Brazilian descent who either came during the rubber tapper era or more recently by walking over the watershed divide on *varaderos*[114]. Whole towns in the headwaters speak primarily Portuguese, with some of these towns being the best organized in the region. Other residents have come from the eastern slopes of the Andes, with a particularly strong migration of coca farmers arriving in the region since the 1980s. These coca farmers dramatically changed the economic landscape by employing the current residents in coca cultivation, improving transportation networks and drastically increasing inflation in local economies[115]. The attractiveness of the region for coca farmers centered on well drained soils, the availability of unclaimed land, the absence of governmental authorities, and the proximity of the Brazilian market and transportation routes. Thus, the "emptiness" or apparent "emptiness" was a major attraction for illegal drug traffickers and coca cultivators. Figure 38 shows the areas where in 2003 and 2004, almost 3,000 coca fields were eradicated by Peruvian authorities. As can be surmised from the map, many of the villages along the middle and upper courses of these rivers were characterized by coca cultivation. Local people adapted to the new conditions, including the arrival of the Shining Path, with some becoming coca farmers and others resisting[116].

C. Forestry Concessions

Chapter three will focus in more ethnographic detail on the conflict caused by overlapping claims between local people and forestry concessions. However, these concessions and the national forests they belong to are key elements in the tangle of

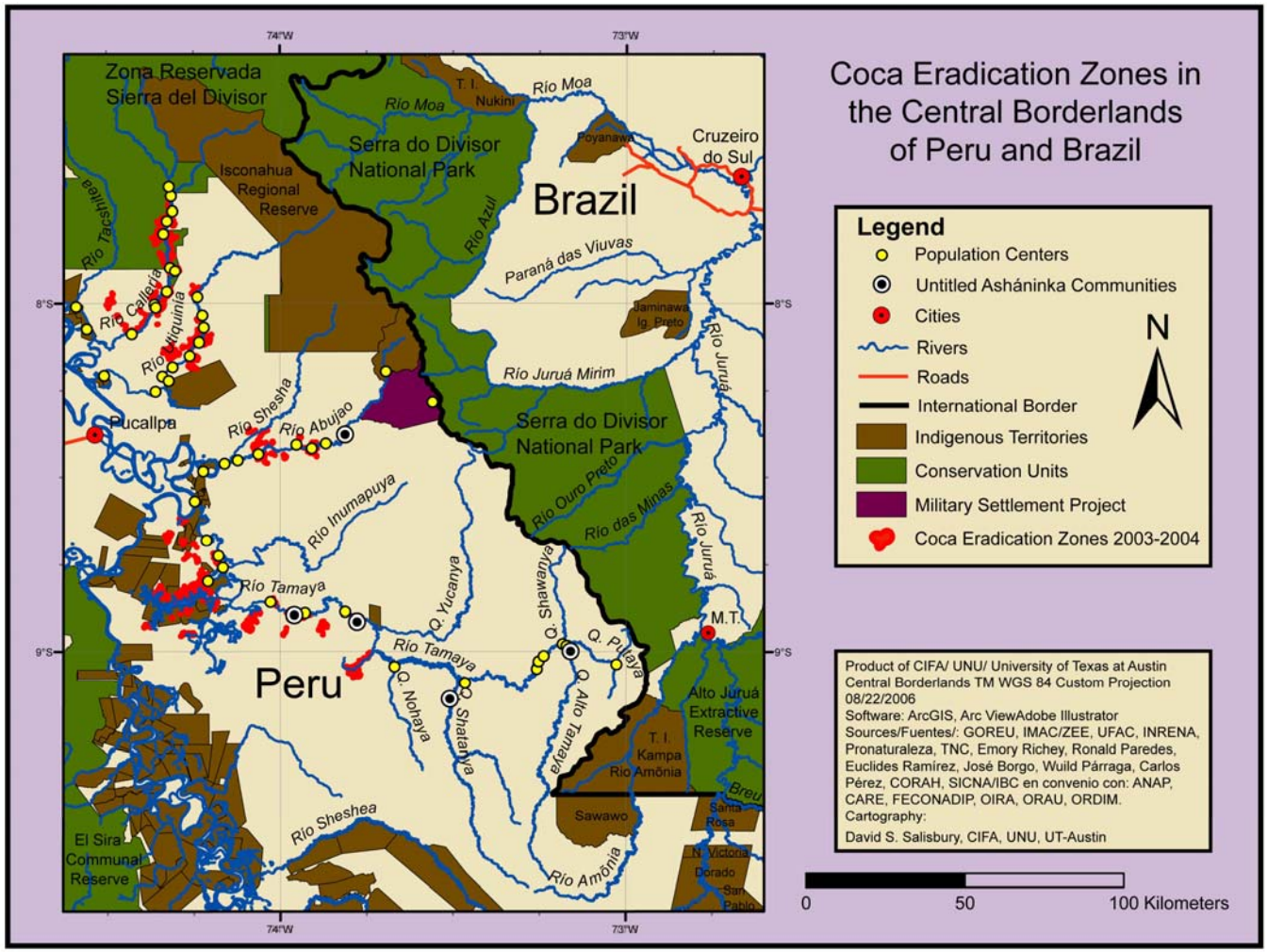

Figure 38. The arrival of the coca farmers from the eastern slopes of the Andes beginning in the mid-1980s brought economic opportunity to the borderlands, but also intensified violence in the region with the increase of drug traffickers, smugglers, and the arrival of the Shining Path.

competing interests in the borderlands and deserve a brief summary here. The creation of national forests[117] (also called Primary Production Forests) in the region also centered around the concept of "emptiness" as these territories were thought to lack people but contain stands of mahogany and other coveted hardwoods. The potential of these forests became increasingly important as the over harvest and increasing regulation of mahogany and other species in Brazil and Bolivia made Peru a leading exporter in Latin America (Kometter et al. 2004). The increase in timber exports[118] is a reflection of Peru's commitment to growing its forest sector through increased and improved logging in Amazonian regions such as Ucayali, Loreto and Madre de Dios.

INRENA ostensibly creates these Primary Production Forests on lands believed largely uninhabited and full of timber potential. However, determining population and timber potential requires resource and geographic information not easily accessible from planning offices. Loggers interviewed in the field found INRENA's to have greatly overestimated the amount of export quality timber given that INRENA's sources of information were outdated ONERN reports rather than field inventories. Since the latest ONERN studies of the 1980s a great deal of logging has taken place in the region, both illegal and legal, with a recent surge since 2000.

INRENA's lack of fieldwork also impacts local populations. There is no systematic attempt to detect the untitled populations in the area; technicians consult with PETT to identify the few titled lands in the targeted forests, but even this is hampered by PETT's lack of a digital database. INRENA and PETT must then locate the correct paper map in the archives (Figure 36) before digitizing. INRENA can also consult with other organizations attempting to update PETT files. Several organizations dedicated to the empowerment of indigenous peoples are working to advance titling efforts: the IBC, the Interethnic Association for the Development of the Peruvian Amazon (AIDESEP[119]),

Cutivereni Conservation Association (ACPC[120]), and The Center for the Development of Indigenous Amazon Peoples (CEDIA[121]). Unfortunately, although many of these organizations have valuable data, they are often in different formats due to the use of different software platforms, field methodologies, and criteria and thus require additional work to incorporate into INRENA's GIS. All of these efforts (national forests, indigenous lands, individual titles…) use the out of date *cartas nacionales* for reference due to their status as the official cartography of Peru (Smith et al. 2003). Despite the issues described earlier, there are few alternatives. Ultimately, INRENA's forestry department is undermanned and under pressure to follow through with its mandate of improving timber production and thus has created three primary production forests in the lowland Peruvian Amazon but with too little field reconnaissance of the area and the archival issues described above, geographic information is often lacking, erroneous, outdated, or contradictory.

These production forests are projected onto the out of date hydrography of the *cartas nacionales* and divided into concessions for individual logging outfits. While this system and the associated 2000 forestry law (Ley 27308) are guided by the principle of sustainable use, their foundation is flawed due to a lack of detailed knowledge of the human and physical geography, adequate cadastral and public record systems, and accurate and up-to-date ecological data on targeted forests. In the absence of the above and of local knowledge from the forests, logging concessions are mapped *a priori* in Lima offices onto lands containing illegal loggers, drug traffickers, settlers, indigenous people, and forests that do not contain the high value hardwoods outlined in the outdated concession survey[122]. This has led to serious conflicts in the region between local populations (indigenous and non-indigenous) and concessionaires. A cartographic analysis of the overlap between concessions, population centers and indigenous territories

can be seen in Figure 39. This flawed geographic foundation undermines the entire system and coupled with extremely weak enforcement encourages loggers to practice illegal logging wherever high grade hardwoods remain[123]. Indeed, in 2005, the stimulating effect of forestry concessions on illegal logging rates led the Amazonian department of San Martín to reject new forestry concessions designed by INRENA and contributed to their declaration of a department wide state of environmental emergency. Some of the areas hit hardest are the "emptiest" of the "empty" landscapes, the territories for indigenous people in voluntary isolation. Reconnaissance of the Isconahua reserve found it full of illegal logging roads and camps (Figures 40-44) that extend to the Brazilian boundary and beyond (Figures 45-46). To the south of the central border on the affluents of the Juruá, similar illegal logging efforts are underway, as Brazilians have noted mahogany planks floating downriver from other Peruvian reserves for indigenous people in voluntary isolation after extreme flood events (Piedrafita Iglesias 2006).

D. Mining Concessions

The gold mining rush in Ucayali began in 2002, although local people mined on a small scale in the Abujao watershed before then. Between 2002 and 2004 the Peruvian Ministry of Energy and Mines (MEM) created over 140 gold mining concessions in Ucayali alone with the majority in the Abujao and Utiquinía watersheds. These concessions, unlike the forestry concessions, occasionally bounded by ecological limits like rivers, are purely cartographic constructs rectilinearly framed in geographic space by kilometer vertices in UTM coordinates[124] rounded to a thousand meters (Figure 47). The concessions' planners demonstrate a complete lack of or indifference to existing cartographic information as these concessions are superimposed on every other Peruvian claim represented in Figure 48: forestry concessions, indigenous territories, military bases, population centers, and, as seen in the next section, conservation proposals.

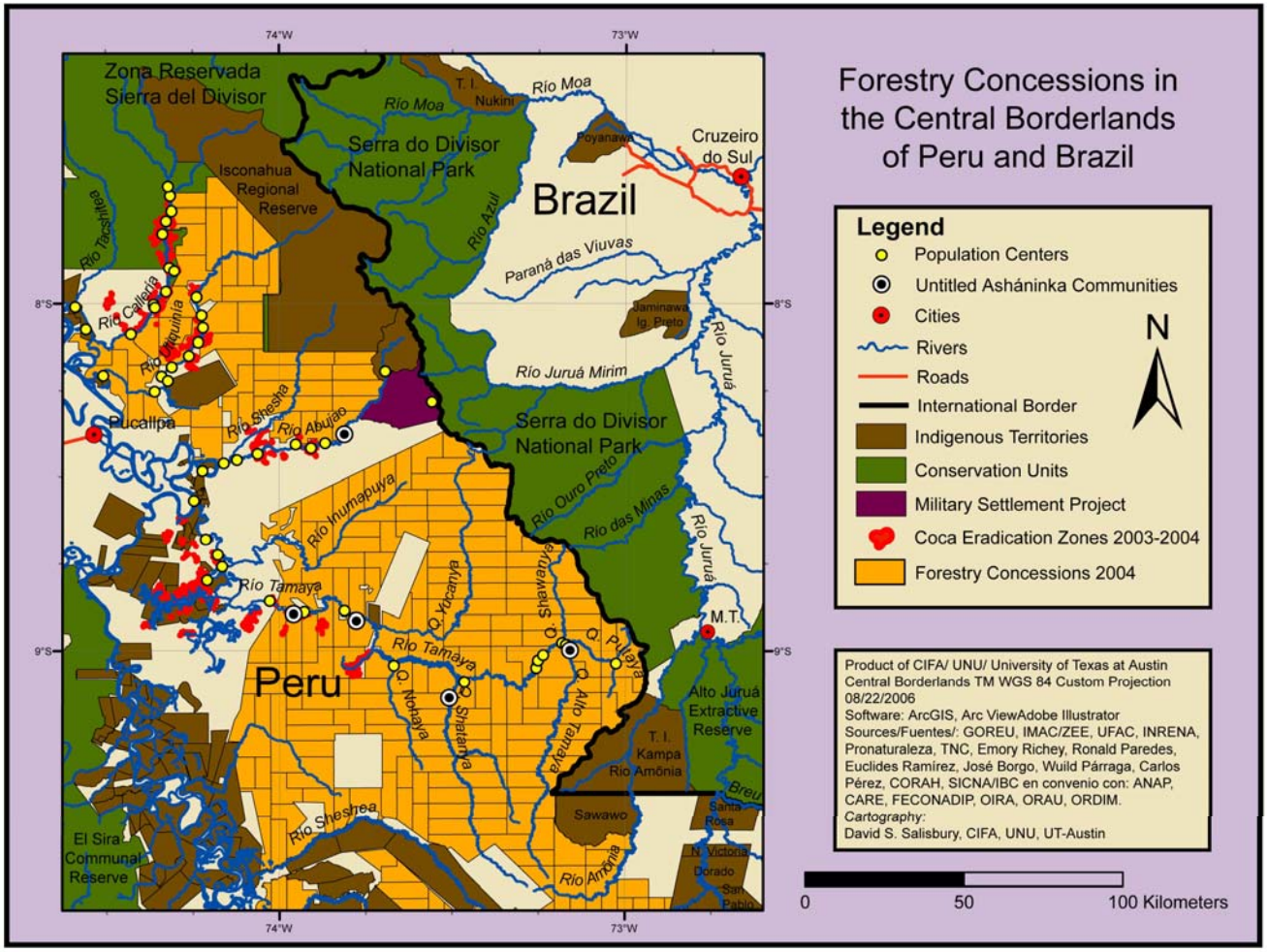

Figure 39. Forestry concessions projected from Lima offices on to outdated *cartas nacionales* superimpose indigenous and non-indigenous communities, as well as coca cultivation. Even those areas without concessions such as the Isconahua reserve and even the edge of the Serra do Divisor national park in Brazil are overrun by illegal loggers taking advantage of the lack of state presence.

Figure 40. The Isconahua Regional Reserve is not only transited by the Isco, but also by illegal loggers clearing ten meter wide paths such as these to roll valuable logs to creek-side staging areas.

Figure 41. Lined up next to a creek, forty illegally extracted tornillo, *Cedrelinga catenaeformis*, logs await the flood season for floating downriver to market. Note the identifying marks carved into the trunks and the man standing for scale.

Figure 42. A CIFA researcher stands on top of a giant Lupuna tree, *Chorisia integrifolia*, recently felled by illegal loggers in the Isconahua reserve. Lupuna is used exclusively for plywood manufacture and commands a ready domestic market. Photo: J. Fuchs.

Figure 43. Abandoned logging camps testify to the prolonged logging presence in the Isconahua Regional Reserve.

Figure 44. The storage houses of five different illegal logging outfits were clustered less than a kilometer apart within the Isconahua Regional Reserve.

Figure 45. A logging road leads from Monument 67 into Brazil. Loggers cut down timber in Brazil's Serra do Divisor National Park and then roll the logs or carry the planks over the international boundary into the Isconahua Regional Reserve. From there they are floated downriver to Pucallpa during high water season. Photo: Ronald Paredes del Águila.

Figure 46. These logging roads may penetrate kilometers into Brazil to extract the valuable hardwoods. Photo: Ronald Paredes del Águila.

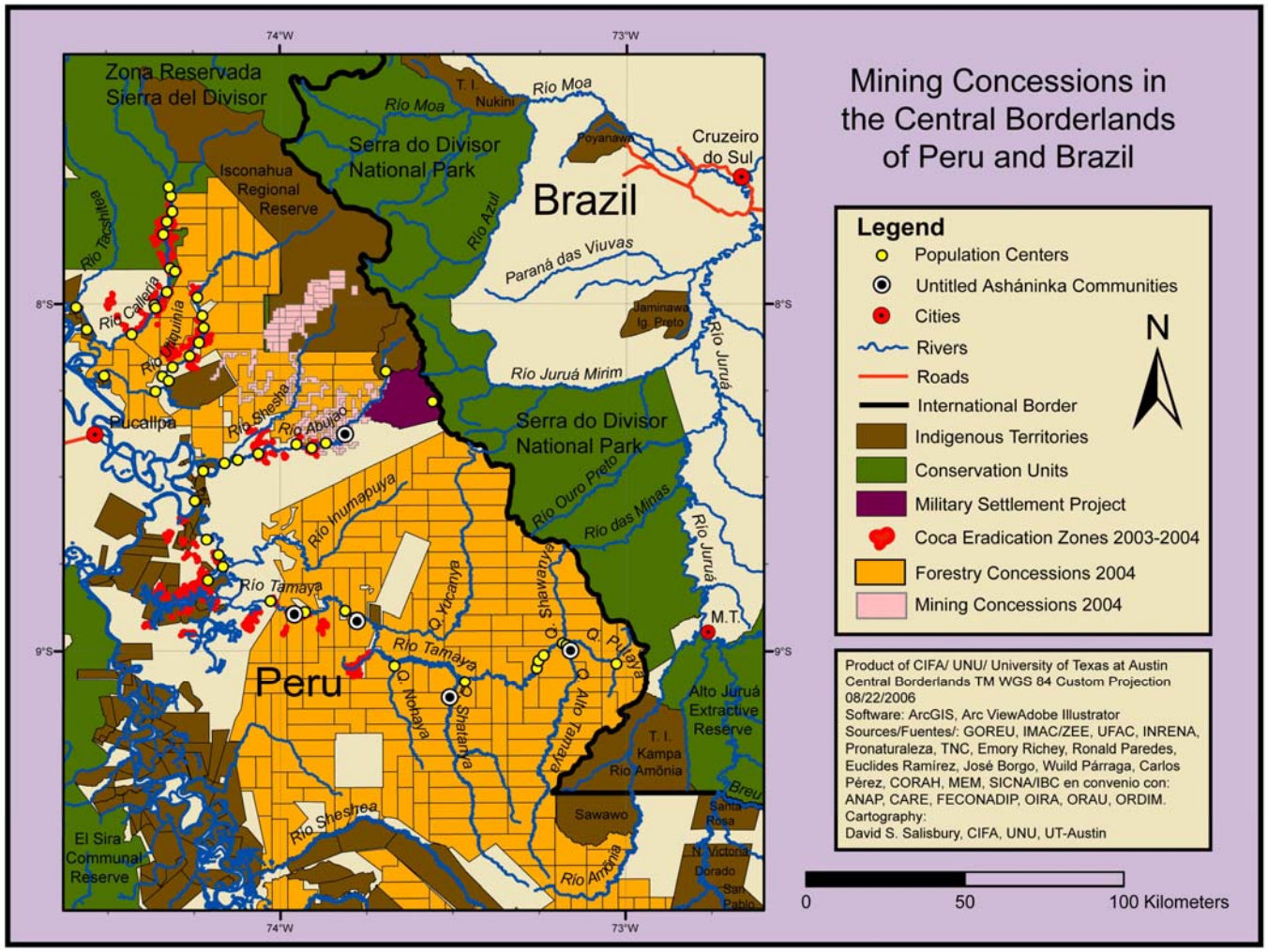

Figure 47. Mining concessions can create conflict when they overlap forestry concessions, indigenous territories, population centers, and even the military settlement unit. The degree of overlap leads one to wonder whether the Ministry of Mines and Energy officials even looked at existing maps.

Indeed, their only apparent agreement with existing geographic information is their clustering over the region's unique geological formations (Figure 4). These are the same conical formations revered by local indigenous people and earmarked for preservation by conservation biologists due to their unique habitats and rare species (Benites Elorreaga 2002, Stap 1990, Whitney et al. 2004).

While subsurface rights in Peru are vested in the national domain, mining activities can be carried out by individuals[125] and legal entities holding a concession granted by the Ministry of Energy and Mines (MEM) (Gasón Roe 1998, Gurmendi 2004). The concession grants the owner the right to perform mining activities in the area determined by their concession. The concession system includes mining concessions for exploration and exploitation, processing concessions, service concessions, and transportation concessions (Gasón Roe 1998). Concessionaires must comply with environmental laws as regulated by MEM: the only governmental body in charge of the environmental regulations of mining in Peru. Environmental regulations include environmental impact assessments (EIA) and controlling the environmental effects produced by activities on mining sites and their zone of influence[126] (Gurmendi 2004). Supreme Decree 016-93 EM requires concessionaires to submit environmental impact assessments (EIA) when applying for a mining or processing concession (Gasón Roe 1998). MEM's website provides detailed maps on territorial environmental evaluations[127], programs of environmental management[128] (PAMAs), and environmental impact assessments (EIAs)[129] (Ministerio de Energía y Minas 2006). However, an analysis of MEM's maps demonstrates none of these environmental assessments, programs, or evaluations to have been carried out in the borderlands despite the presence of over 140 concessions.

These mining concessions flooded the region with entrepreneurs and miners. Some of the miners came from nearby and distant parts of Peru; while others arrived from Brazil, and a few from other more distant countries. In one case over 22,000 hectares of concessions between the Utiquinía and Abujao Rivers were under the name of one man. Neither I nor my field assistants were able to confirm or deny rumors in the field that the company operating there was run by either South Africans or North Americans. The influx of miners to the region, similar to coca farmers, radically changed the local economy and demography. In the case of the village of 23 de Noviembre (Figure 48), all of the original residents except one abandoned the *caserío* in 2001 when threatened by a local mining company. The company was unhappy their village overlapped the mining company's concession. Miners tolerate this last resident only because he provides them with game and fish.

In 2004, the new mining town of 23 de Noviembre was made up of miners and merchants from elsewhere: most had lived there only two years. This new 23 de Noviembre is entirely focused on servicing the mining industry and the miners with their ready cash or gold. The price of a gram of gold during fieldwork in 2004 was eleven and a half U.S. dollars[130]. Two grams could purchase a crate of twelve beers while one gram could buy a session with a prostitute. Food was likewise expensive with a plate costing between a dollar and a half and three dollars. The daily wage for local mine workers not directly working in mineral exploitation (porters, cooks…) was six U.S. dollars a day. Those involved directly in exploitation split 20% of the mine's production. This influx of cash has transformed 23 de Noviembre into a large commercial center with electricity, bars, stores, restaurants, hostels, service stations, radios, brothels, and even a medical post with a nurse (Figure 49). However, there are no authorities: problems in town are settled there, often with violence.

Figure 48. The relatively high quality construction of fences and houses show 23 de Noviembre to be distinct from most villages in the area.

Figure 49. The row of restaurants and bars surrounding the main square demonstrate this to be a resource boom town. This gold mining town is characterized by a surplus of currency, and unlike the more typical subsistence village where cash is difficult to come by.

About eight companies work immediately around 23 de Noviembre using labor primarily drawn from Pucallpa and Brazil. Residents referred to many of the owners as Brazilian, although by law foreigners cannot hold property or resource rights within 50 kilometers of the border[131]. Miners operate out of camps: each has their own generator, a gas or wood stove, and is supplied with foodstuffs every 15 days. The local miners use hydraulic mining techniques (Figure 50) to excavate huge holes in the creeks in their search for gold (Figure 51). Water and mud accumulates at a pool in the bottom (Figure 52). This is then carried out and run through a filter with a special carpet-like fabric that catches the heavier deposits (Figure 53). The fabric is washed before mercury is added to form an amalgam with the gold. Finally, the gold is purified in small ovens. According to the locals, with a good site one can obtain between 300 and 400 grams of gold a day and a 30 meter diameter pool lasts a month. Similarly, if a 100 hectare concession had a good bit of gold it could be worked for two years.

However, this technique takes a heavy toll on the local hydrology and ecosystems as creeks become huge sandpits with slow moving muddy water (Figure 54). The mining operations working in the area import their own water since hydraulic mining and mercury make the creek water unfit for human consumption. The local hunter and fisherman, the only pre-boom resident, said that this section of the Abujao no longer has fish. Instead, he supplies the miners with the tiny fish he takes out of a lake 30 minutes upstream. According to him the miners don't care about the quality of the fish, since they're not from the area. Unfortunately, local people downriver are seeing their landscape, town, water, and protein sources altered by the imposition of mining concessions on the lands upriver (Figure 54). Elsewhere in Amazonia gold mining is associated with impacts to the atmosphere (Artaxo et al. 2000), fish communities (Mol and Ouboter 2004), water systems (Kuramoto 2001), forests (Fostier et al. 2000), children

Figure 50. Hydraulic pumps are used to blast water at great pressure and destabilize the earth thus freeing the gold to settle on the bottom. The holding pool and mud/sand bars have replaced a small rainforest creek. Photo: Ronald Paredes del Águila.

Figure 51. Gold miners near the Abujao River radically alter the geomorphology of the region using hydraulic excavators. A mining company drove away most of the local residents on receiving the concession while downstream residents continue to suffer the impact of these invasive mining techniques. Photo: Ronald Paredes del Águila.

Figure 52. This holding pond is strewn with mining machinery and ringed by wooden wall supports. Notice the mining camp to the right. Photo: Ronald Paredes del Águila.

Figure 53. This filter uses a carpet (not shown) to catch the gold as it comes through the sluice. Behind the filter, palm fronds are used to separate the different holding ponds. Photo: Ronald Paredes del Águila.

Figure 54. This creek, a few years ago almost invisible at this altitude, is now a bloated silt, and sand filled creek polluting portions of the Abujao, the Ucayali, and further downstream.

(Grandjean et al. 1999, Pinheiro et al. 2007), indigenous people (Bedoya 2004, Maurice-Bourgoin et al. 2000, Maurice-Bourgoin et al. 1999, Sing et al. 2003), and livelihoods (Bedoya 2004, Heemskerk 2002) in the Amazon basin and neighboring watersheds. Related studies focused on mining related mercury contamination reveal anthropogenically released mercury may be localized (Lechler et al. 2000, Wasserman, Hacon, and Wasserman 2003) given the mercury rich nature of the basin. While the immediate threats may be passing in this study site as miners appear to be exhausting their concessions, their potential relocation will only threaten the next "empty" lands and their residents.

E. Conservation Units

Local people rarely drive the creation of conservation units such as national parks and biosphere reserves[132]. While exceptions exist (i.e. Brazil's extractive reserves), most of these territories are created by national governments motivated in part by international pressure generated by conservation organizations. Nevertheless, if conservation goals are to be reached, these newly created conservation units must engage the local people whose resource and land use takes place in and around the proposed protected areas. This section will address the very real overlap of borderland protected area formation and local people.

On April 11th, 2006 the creation of the Zona Reservada[133] Sierra del Divisor along the border with Brazil was officially announced (Manrique Ugarte and Ministerio de Agricultura 2006). This conservation unit covers almost a million and a half hectares, an area larger than Connecticut, including the Isconahua Regional Reserve. The creation of the Sierra del Divisor reserve zone is of immediate benefit to the conservation of cultural and biological diversity. The territory of the Isco, as documented earlier, is currently under siege by illegal loggers and unregulated miners. If it is not too late, the

increased profile of the area, increased legal status of their reserve, and ideally, increased enforcement, might reduce the pressure on Isco resources and territory.

The biological diversity of the Sierra del Divisor range has long been recognized as one of the highest in the world (Scarcello et al. 1998) with a recent biological survey in the reserved zone finding eighteen different species of primates, the highest ever recorded in one place in South America (The Nature Conservancy 2006). Bird diversity is also unusually high with at least 300 species found in the Sierra del Divisor region (Scarcello et al. 1998) including a recently discovered new species of ant shrike (Whitney et al. 2004). The scenic beauty of the area is also highly unusual for the lowland Amazon with visually arresting extinct volcanoes rising out of the surrounding rainforest (Figure 4). The extraordinary and isolated igneous cones and ridgelines harbor rare ecosystems unique to the lowland Amazon region such as dwarf woodlands (Whitney et al. 2004). The landscape level importance of the new reserved zone is also critical as it provides a key link in an international conservation corridor of protected areas stretching hundreds of kilometers into both Peru and Brazil. More immediately, the reserved zone provides a large potential buffer to the Parque Nacional Serra do Divisor, although as I noted earlier in reference to logging, much damage has already been done.

What is interesting given the elevated conservation importance of the Sierra del Divisor is why it took so long to be created. Having been associated with efforts to protect the Sierra del Divisor since 2002, I can relate some of the challenges to its creation. Scientific interest in the Sierra del Divisor region can at least be traced back to the mid 1980s (Benites Elorreaga 2002; Stap 1990), but efforts to assign the Sierra del Divisor a conservation designation began only in the late 1990s with the labors of the Peruvian NGO Pro Naturaleza (Benites Elorreaga 2002). Pro Naturaleza conducted two biological studies in different parts of the Sierra del Divisor, but their proposal for national park

creation was rebuffed. In October of 2002, I joined the Field Museum of Chicago in their helicopter overflights of the region (Figure 55). At the conclusion of the overflights we submitted a proposal for the park's creation, including new ecologically grounded boundaries, to the Peruvian government. Again, the proposal was not embraced, probably for political reasons related to unrest incited by the creation of logging concessions. Continued efforts to advance the conservation of the region followed from 2003 to 2006 under the leadership of The Nature Conservancy[134] and Pro Naturaleza[135]. At the same time, the regional government of Ucayali[136] submitted a parallel set of proposals to the Ministry of Agriculture for two borderland conservation units to be administered at the regional level (GOREU 2004). This proposal was partly driven by the regional government's interest in mollifying the Acre government of Brazil in regards to repeated invasions of the Parque Nacional Serra do Divisor by Peruvian loggers. The regional government thought the creation of a boundary reserve would improve relations with Acre enough to build a road from Pucallpa to Cruzeiro do Sul. Ultimately, the Nature Conservancy proposal for a reserved zone[137] was accepted on April 3, 2006 and published in El Peruano on April 11 (Manrique Ugarte and Ministerio de Agricultura 2006). While this victory is due primarily to the hard work of conservationists who steadily built an impressive body of ecological and political evidence, the actual creation was likely sparked by the gunfight on April 2 between Peruvian loggers and the Brazilian military in Brazil's Serra do Divisor National Park (Brasileiro 2006). Chapter Three will describe in more detail how the political and economic goodwill between these Amazonian neighbors was being increasingly and negatively affected by the repeated trespassing of Peruvian loggers into Brazilian territory.

Figure 55. Taking coordinates with a handheld GPS in a military helicopter required hanging your arm out the door while you held on with the other as you screamed attribute information at your stenographer partner over the roar of the blades. Photo: Lily Rodríguez.

The Sierra del Divisor Reserved Zone's creation was delayed most likely due to the parallel creation of the highly contentious primary production forests and their concessions. As noted earlier, one of the great threats to the sustainability of these concessions is the lack of adequate geographic information. Similarly, this also holds true for the conservation of the Sierra del Divisor. While we carried remotely sensed images, *cartas nacionales*, and GPS on the Field Museum overflights in 2002, we had very little idea what was on the ground. This ignorance was particulary true with regards to the location of local populations, given that they can be difficult to find in imagery, and, as noted earlier, are often incorrectly located, absent, or outdated on official maps. Because of the lack of ground-truthed field knowledge, the Nature Conservancy and Pro Naturaleza contributed to my field-based research project in 2004.

Nonetheless, as Figure 56 demonstrates, some overlaps exist with both local people and competing administrative claims in the Sierra del Divisor Reserved Zone and in the Murunahua-Tamaya Ucayali government conservation proposal. First, the Zona Reservada Sierra del Divisor does include a number of *caserío cocaleros*[138] on the Callería River. This presents both opportunities and challenges. As described in the following chapter, many of these *cocaleros*[139] may be leaving the area, thus enabling a well organized and funded conservation project to influence land use change in the zona reservada and its buffer zone. However, any still present *cocaleros* not interested in environmental protection could present a localized challenge to the conservation of the headwaters of the Callería. This could arise through their coca cultivation, but more likely through the trafficking of drugs across this border. Continued drug trafficking across this border is inevitable given its rainforested expanse, accidental topography, and the presence of coca source (Peru) and coca derivative market (Brazil and beyond) on either side of the border. The regional government's proposal to the south faces similar

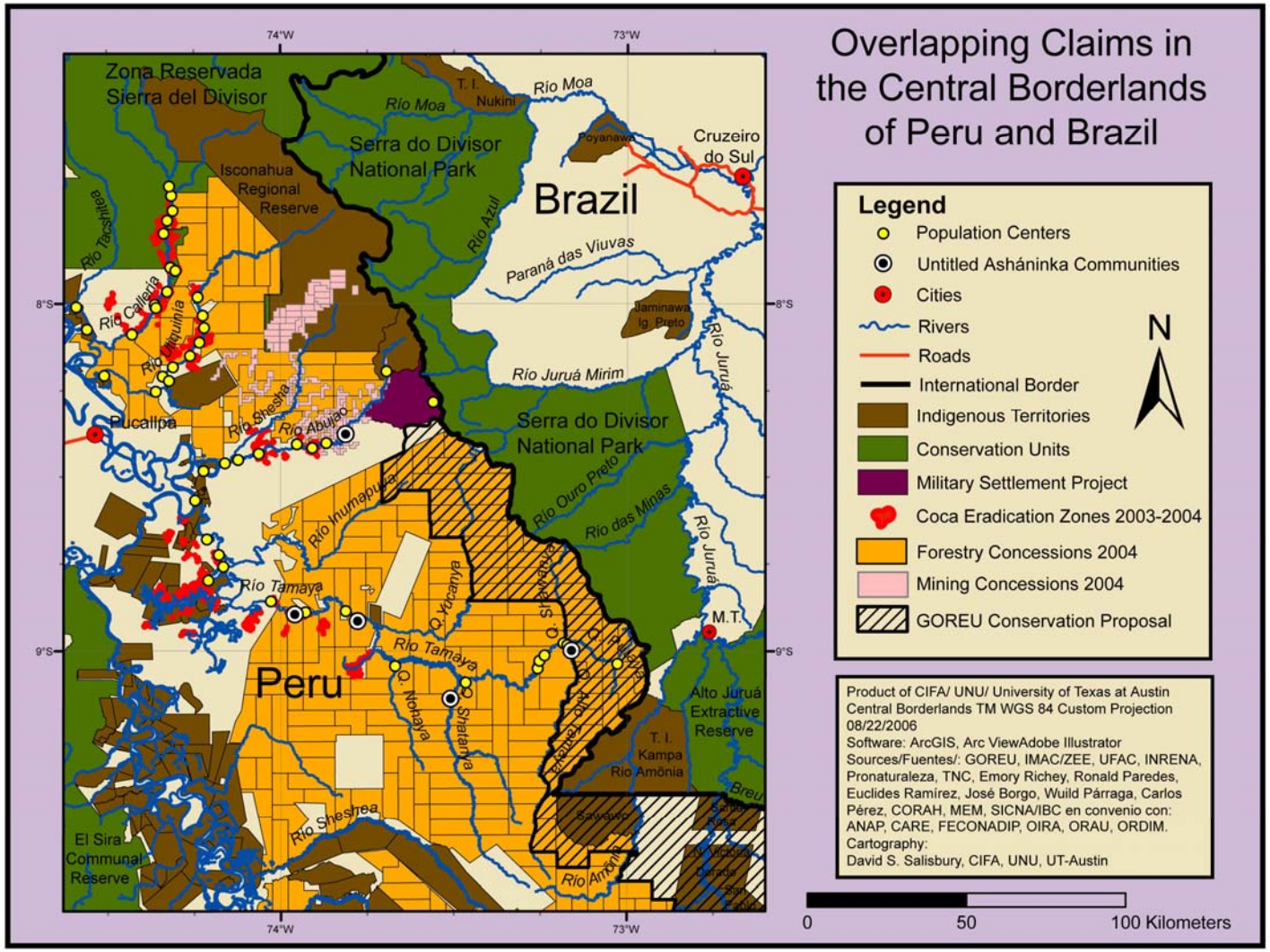

Figure 56. Conservation proposals provide another overlapping claim on the territory of the central borderlands of Peru and Brazil.

trafficking challenges at the headwaters of the Abujao and Tamaya although coca cultivation appears to not be recently active along the border[140]. These borderland conservation units must keep their primary objectives in mind if they are to succeed. Any concerted attempt to control drug trafficking with park ranger stations will only lead to dead rangers. It would be preferable for conservation organizations to turn a blind eye to limited trafficking of coca derivatives along the *varaderos* than to put the larger goal of cultural and biological conservation in jeopardy through confrontation. Brazil has had limited success in controlling the trafficking through their Serra do Divisor National Park despite much greater military and conservation resources than those presently on hand in the Peruvian borderlands.

The regional government's strategy of conservation unit creation is distinct from that of the Sierra del Divisor. Where the Sierra del Divisor tried to avoid overlap with recognized population centers, the regional government felt obligated to overlay their proposal on top of forestry concessions and local residents. Their analysis of the borderland forestry concessions within their proposal found revealed most borderland concessionaires to be behind in their mandatory concession payments, leaving their concessions vulnerable to appropriation by the nation (they hoped to buy out the remaining concesssions). As for the local people, they anticipated that the untitled Asháninka would want to be part of a conservation unit and had no detailed knowledge of *caseríos*, although at least one exists.

While, in the short term, the Iscos of the Sierra del Divisor and Asháninka of Alto Tamaya might welcome any measure able to stop the flood of illegal loggers into their territory, they and other residents will likely find any management plan a serious constraint in the long term. This will be particularly problematic if large numbers of Isco are found to inhabit the Sierra del Divisor. More immediately, the Zona Reservada Sierra

del Divisor, and potentially the Murunahua-Tamaya unit, will need to figure out how to expel the illegal loggers and then keep them out. Continued illegal logging would be disastrous to the cultural and biological conservation goals of these units, and could also increase coca trafficking[141]. Perhaps even more disastrous, given the legality of the concessions are the over 100 mining concessions within the Zona Reservada Sierra del Divisor. Their ecosystem altering extraction and processing methods are completely anathema to the conservation goals of the Sierra del Divisor, but their legal right to rent subsurface rights presents a legal challenge to overcome. Nevertheless, as identified in localized fieldwork in 23 de Noviembre, mining may already be exhausting accessible gold deposits in the area. If the most virulent forms of mining, logging, and coca cultivation can be prevented in the Sierra del Divisor, conservation goals may be attainable despite the continued presence of *varaderos* dedicated to coca trafficking. In addition, the neighboring communities at the headwaters of the Abujao may have long term potential as centers of cultural and ecological tourism. This could prove to be an economic boon given the current depressed economies of these isolated population centers. At the same time, resident's resource and land use could also challenge conservation goals. The Isco overlap remains a critical issue, however, that can only be solved with improved information concerning their numbers, location, and goals. Their evasive tactics are doomed to fail in face of the gradual reduction and parceling of the borderlands, so it is important to allocate them territory now.

VI. CONCLUSION

The borderlands of Amazonia present unique challenges to researchers and planners interested in understanding and mapping their varied physical and human geography. Those outlined here include dynamic fluvial systems, the ability of tropical forests to disguise current and recent settlement, and the migratory character of local

populations negotiating boom and bust frontier economies. Add to this the isolated nature of these borderlands and the financial and logistical challenges of obtaining and field checking remotely sensed data and existing cartography, and it is not surprising to find these maps wanting.

Results here show the existing maps of Amazonian Peru to be out of date and inadequate with a poor representation of local people. A tabular comparison of locally informed participatory maps with the official maps of governmental and non-governmental organizations (Tables 1-4) finds local geographic knowledge to be more accurate and up-to-date in regards to the human geography of the region. The lack of adequate base maps and reliable information on population centers and titled lands echoes the political ecology theme of the empty Amazonian landscape (the tropical tabula rasa) (Hecht 2004). Here, however, the slate is not entirely blank, but rather poorly drawn. Thus, desk bound planners knowingly project their external agenda on a scrawled slate, and thus the landscape, since "nobody knows what is really out there anyway." In those cases where planners put in a good faith effort to assemble existing information, the task often proves Herculean, leading to similar outcomes: the creation of resource concessions whose resources, inhabitants and limits are based on outdated studies, inadequate geographic data, and flawed hydrography respectively.

The social ramifications on the ground are serious as local residents now must contend with miners and loggers with official claims to their lands and resources. This takes place in an already contested landscape riddled with illegal extractors (loggers, fishermen…) and coca farmers. These findings echo the "multiplicity of simultaneous and overlapping contested frontiers" of Schmink and Wood (1992: 19). Local people fall within the vortex of contestation, and must negotiate to survive. Some, lacking alternatives, work for loggers, miners or drug traffickers, while others practice resistance,

seeking help from authorities despite the hurdles of bureaucratic inertia, corruption, and indifference. Officially sanctioned concessionaires are not much better off; their concessions often contain unexpected residents and lack valuable resources. In order to recoup costs they often must follow the resource and operate illegally, or sell their logging quotas to other loggers seeking to launder illegal timber. Ultimately, the only clear winners in the confusion created by inadequate geographical information and overlapping claims are the illegal resource extractors and drug traffickers who can thrive in a confusing and poorly understood frontier.

The key word is *understand*. The conservation of the cultural and ecological diversity and the promotion of social justice and sustainable development in these borderlands require an improved understanding of the region's geography. An improved understanding will involve exploration (Parsons 1977) and direct observation (Sauer 1956) to penetrate "…the great white spaces" (Clark 1954: 23) and update the deficient information present on existing maps. All parties need detailed, updated, and accessible geographic information. The information must be official to guarantee acceptance by all organizations, but dynamic to reflect the constantly changing frontier landscape and to incorporate feedback processes. Most importantly the information must be informed by local knowledge to ensure robust data at a variety of scales. While the logistical and financial obstacles to producing this information are formidable, they are likely less costly than failed projects based on flawed geographic information and the attendant loss of cultural and ecological riches. These issues will be discussed at greater length with additional insight from the other chapters in the conclusion.

Chapter Three: The Transboundary Cultural Ecology of Tropical Timber and Traditional Populations

I. INTRODUCTION

Peruvian timber exports grew 25% in 2004 (Peru Forestal 2005) even as accessible stocks of mahogany and tropical cedar dwindled in the Peruvian Amazon (Kometter et al. 2004) forcing Peruvian loggers to penetrate to the Brazilian border and beyond. In the Peruvian borderlands lived a displaced Asháninka people, who in 2000 witnessed their homelands transformed into forestry concessions and overrun by illegal loggers. Across the border, their Brazilian cousins also confronted Peruvian trespassers logging their titled lands. This study investigates how the borderland Asháninka emerged from the "empty" borderlands to grapple with the Peruvian tropical timber industry, its forced labor practices, and boundary transgressions. These people asserted themselves as both whistle blowers and exploiters of timber depending on their circumstances and location. Their agency contests the concept of empty Amazonian landscapes, instead shaping borderlands as homelands: inhabited by a people rooted in the political ecology and political geography of the boundary, capable of galvanizing the nation state to defend resources and territory or of entering into debt peonage relations with illegal loggers.

Other studies of indigenous resistance in Amazonia and the neotropics have demonstrated the agency of indigenous people and the complexities and contradictions inherent in their resistance (Garfield 2001, Hale 1994, Schmink and Wood 1992). Others

have dealt specifically with the complex relationships between revolutionaries (Brown and Fernández 1991), drug traffickers (Gagnon et al. 1993), slavers (García Hierro et al. 1998), and the Asháninka people in their homelands. This study steps outside the Asháninka homelands to investigate the borderland Asháninka's relationship to a logging industry that has been found oppressive to indigenous people elsewhere in Amazonia (CEDI 1993, Watson 1996). This study, like Watson's (1996) takes a field-based view from the forest floor to potentially inform geographers and ecologists of the sub-canopy social processes and impacts not captured in recent macro-level Amazonian research on logging and logging related impacts (Arima et al. 2005, Asner et al. 2005, Asner et al. 2006, Nepstad et al. 1999).

The chapter begins with a methodological discussion followed by four sections to analyze and link the tropical timber industry, debt peonage, and borderland resistance. In the first section I argue that the Peruvian logging industry remains tied to the debt-merchandise system, a few high value species, and primitive methods of extraction while government intervention has failed to stop illegal loggers from aggressively exploiting remote areas where geographic information and state presence is limited. In the second section I describe the debt peonage system loggers use to control labor in the borderlands and relate Asháninka accounts of their role in the system. The third section consists of a comparison of the borderland resistance pursued by both the Peruvian and Brazilian Asháninka in the face of illegal loggers. Finally, in the conclusion, I discuss the complex relationships between indigenous people, their homelands, and the tropical timber industry. This includes comparing how effectively titled and untitled homelands serve as barriers to deforestation and recommendations to improve the effectiveness of the new Peruvian forestry law.

The Asháninka people, who number around 80,000 (Veber 2003: 185), are one of the largest indigenous groups in the lowlands of South America (McSweeney and Arps 2005) and are well documented for their resistance against state, colonist, terrorist, and drug trafficker incursions into their homelands in the central jungles of Peru (Bodley 1972, Brown and Fernández 1991, Gagnon et al. 1993, Varese 2002). However, the Asháninka also endured the economic booms of Peruvian Amazonia, serving as both slave and slaver, often traveling beyond Peru's borders to avoid conflict or to harvest rubber or timber for their *patrones* (ACONADIYSH 2004, Bodley 1972, Clark 1954, da Cunha 1976, Fry 1907, Pimenta 2005, Samanez y Ocampo 1980 [1885] , Santos-Granero and Barclay 2000, Varese 1968, Velarde 1905, Von Hassel 1905, Weiss 1975)(Figures 7 and 8). These displaced borderland Asháninka are the subject of this study, a group whose extractivist and warlike presence helped define Peru's political border with Brazil in the early 1900s (da Cunha 1967, da Cunha 1976) before the collapse of the rubber boom and withdrawal of their rubber *patrones* rendered them an invisible people.

For almost a century the borderland Asháninka survived by combining subsistence livelihoods with patron-based economic relations centered on commercial hunting or timber harvesting (Pimenta 2002). In the 1980s the mahogany rush in the southwestern Brazilian Amazon forced the Brazilian Asháninka to organize against the increasingly exploitative patrones (CEDI 1993, Pimenta 2002). With the help of anthropologists and NGOs the Brazilian Asháninka were able to get their lands recognized and in most cases titled and demarcated. A few borderland Asháninka territories in Peru were also able to obtain title to their lands, but in some cases only by entering into pacts with logging companies who subsequently logged their forests (Aquino 2004). Other Asháninka peoples in the Peruvian borderlands are untitled, unmapped, and largely unknown (Figures 30, 32, and 57). Only since 1998 have they

Figure 57. This borderland Asháninka family lives in an untitled borderland Asháninka community. The father is carving out a new dugout canoe by axe.

emerged from the forests in an attempt to organize against the imposition of forestry concessions and the trespassing of illegal loggers on their homelands.

II. METHODS

Fieldwork was conducted over ten months in 2004 along four rivers in the Peruvian and Brazilian borderlands (Figure 3). Three research assistants and I spent a total of four months living, traveling and working with the borderland Asháninka of the Tamaya River, the primary focus of this chapter. The local area of inquiry consisted of the Asháninka homelands of Alto Tamaya and its environs on the Alto Tamaya River in Ucayali, Peru (Figure 58). José Borgo López and I combined to spend over three months in this remote community of 27 households and the surrounding logging camps and villages. As shown in Figure 58, the Alto Tamaya homelands are bounded by the Brazilian border to the west (Serra do Divisor National Park and Kampa do Rio Amônia Indigenous Territory), the town of Puerto Putaya and forestry concessions to the north, forestry concessions to the west, and an illegal logging road to the south. These contested homelands are also overlapped by two forestry concessions and one *fundo* in addition to the ubiquitous presence of illegal loggers both within and around Alto Tamaya territory (Figure 58). Alto Tamaya is distant from Pucallpa, the closest regional urban center and the capital of the region of Ucayali, with watercraft using the typical *peke peke* outboard motors reaching Alto Tamaya in seven days during the dry season (Figure 16).

The second area of inquiry was the Kampa do Rio Amônia Indigenous Territory in the state of Acre, Brazil and its central community of Apiwtxa[142] (Figure 59). Apiwtxa, as I will call this territory for the sake of brevity, contained over 472 Asháninka residents in 2002 with about 80% residing in the main village of Apiwtxa (Pimenta 2005) and has been titled since 1992. While Apiwtxa is only a day's journey from the village of

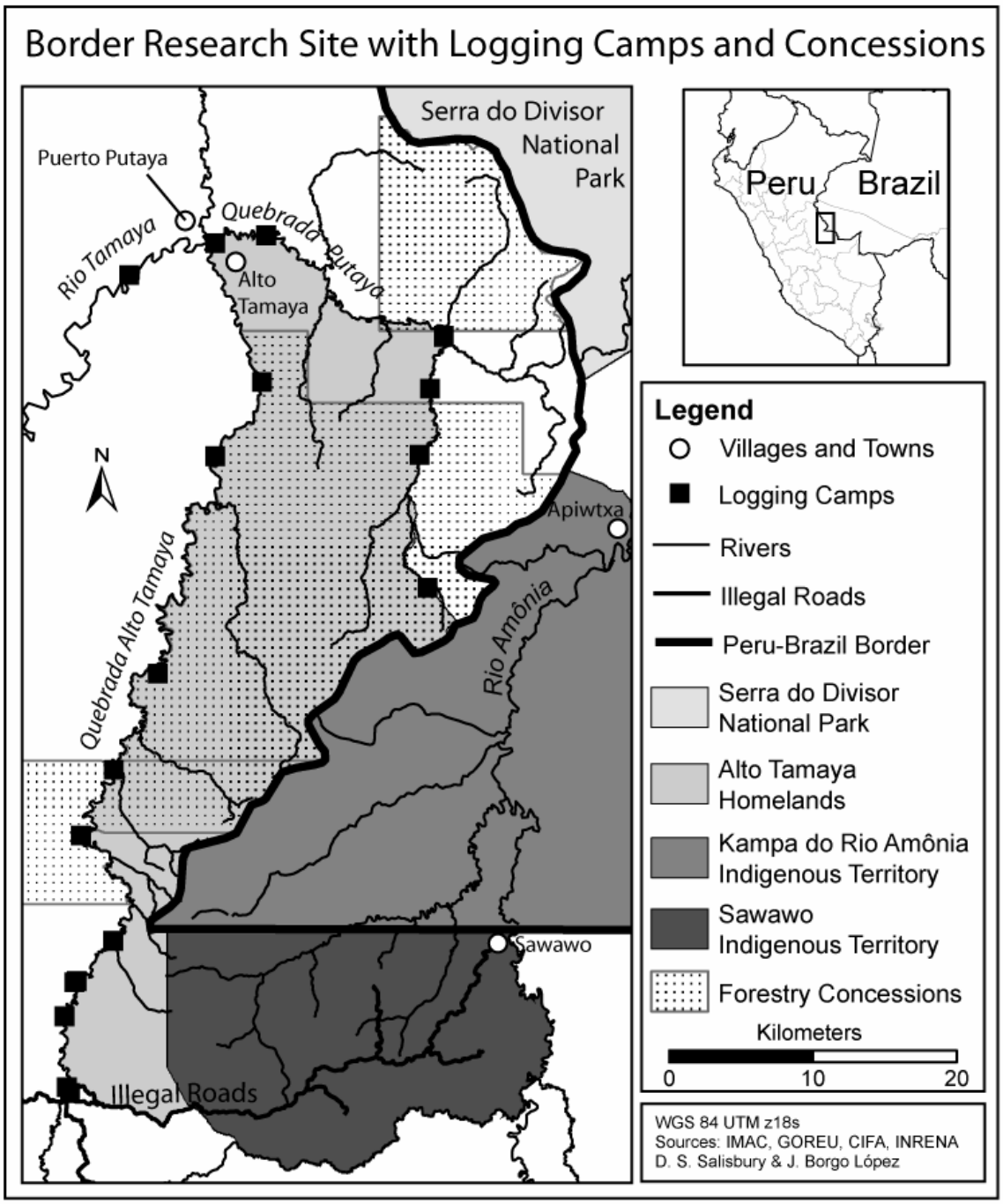

Figure 58: Map of the research site, logging threats, and the Asháninka homelands in this portion of the Peru/Brazil borderlands.

Marechal Thaumaturgo, it is four days journey from the city of Cruzeiro do Sul (Figure 32) and for ten months out of the year one can only reach the state capital of Rio Branco via airplane.

Field methods in Alto Tamaya consisted of a combination of participatory methods, key informant interviews, ethnography, participant observation, point collection and attribute collection with GPS, key informant interviews, and map analysis. Participatory methods included household mapping, matrices of resources, historical timelines, and land use walks[143]. Undertaking fieldwork on illegal logging required a great deal of patience, humor, and an awareness of one's own safety. In one case I spent two days in an illegal logging camp within the Isconahua Regional Reserve listening to the loggers describe their "concession" and the bureaucratic constraints preventing them from fulfilling their "contractual" obligations while making a profit. In another case I spent an hour hidden under a mattress in the bottom of a leaky boat to escape the prying eyes of river bandits. As in all my fieldwork to data, local people proved invaluable barometers of danger, key sources of information, and most importantly good friends. Together we mapped their ancestral homes, logging camps, community limits, and current households. They also proved critical in mapping the species, diameter, length, number, and ownership for each log of every *boya* (timber raft) lining the banks of the Putaya River. Mapping was accomplished by creating on demand shapefiles with a Garmin Etrex Legend receiver attached to a Hewlett-Packard Pocket PC running ArcPad software. While in Alto Tamaya, I also took video footage to record interview data and landscape images for future analysis. To complement this information I conducted key informant interviews, document research, GIS analysis, and remote sensing in the urban centers of Pucallpa, Lima, and Rio Branco, Acre, Brazil. Interviews were conducted with INRENA officials, NGO researchers, indigenous activists, anthropologists, ecologists,

and forestry professors among others. I obtained documents from AIDESEP, PETT, CPI Acre, in addition to the written paper trail of the Asháninka of Alto Tamaya. This was complemented with newspaper accounts from Ucayali, Acre, Lima and Brasilia. Finally, I compiled a GIS using ArcGIS 8.3 software with layers including not only the field-based information mentioned above but also political boundaries, indigenous reserves, forestry concessions, population centers. These were qualitatively analyzed in conjunction with remotely sensed Landsat 7 images from 2002. This suite of methods promised grounded sub-canopy data to complement recent macro-scale analysis of logging impact (Asner et al. 2006).

III. THE TROPICAL TIMBER INDUSTRY OF UCAYALI

The tropical timber industry drives the economy of Ucayali (Figure 59), however, here like elsewhere in Amazonian Peru, the industry continues to pursue antiquated forms of exploitation that contribute to both illegal logging and the unsustainable harvesting of timber. The economic system remains entrenched in debt-merchandise relations while extraction continues to focus on only a small percentage of potentially commercial species. To date Peruvian forestry laws have failed to modernize the debt-merchandise system, diversify production, or reach sustainable harvest goals in part due to the lack of reliable geographic and ecological information from and inadequate enforcement in targeted forests. This lack of information and enforcement leads to the exploitation of local communities and facilitates illegal logging. Estimates of illegal logging range from 70-80% in Peru (with the majority in the Amazon) (Ferrero 2005, Galarza and La Serna 2005, World Wildlife Fund 2005) and 80% in Ucayali (Ahora 2004b).

Tropical timber is a globally important economic commodity with 2003 imports earning more than 10 billion dollars U.S. worldwide (ITTO 2005). While Asia dominates the global production, consumption, import and export of tropical timber,

Figure 59. A barge laden with timber moves slowly up the Ucayali River towards Pucallpa, capital of the Ucayali region.

Latin America also plays an important role, particularly in regards to certain high grade timber species like mahogany and tropical cedar (ITTO 2005). Peru ranks 9th worldwide in percent forest coverage and is the second largest exporter of timber in Latin America[144] with exports growing over 25% from 2003 to 136 million dollars in 2004 (Perú Forestal 2005). Of particular importance to Peru is mahogany, the premier timber species of Latin America, and one in constant demand from the United States and Europe. With over harvest and increasing regulation of mahogany in Brazil and Bolivia, Peru became by 2004 the leading exporter in Latin America (Kometter et al. 2004) despite dwindling numbers of commercially sized mahogany and increased restrictions due to the species' inclusion in appendix II of CITES in 2003 (ITTO 2003). Highly coveted timber species of large diameter, such as mahogany and tropical cedar, were increasingly found in Peru only within areas of protection or difficult access like conservation units, indigenous territories, and remote borderlands. Approximately 49% of Peru's Ucayali region (102,000 km²) is made up of conservation units[145] and indigenous territories with the region sharing roughly 1,000 km of border with Brazil. These borderland protected areas contain some of the last stocks of commercially viable mahogany and tropical cedar in the world.

Although the first timber exports left the Peruvian Amazon for New York in 1912 (Santos-Granero and Barclay 2000), the Ucayali region's contribution to the Peruvian timber industry was limited until 1943 when the creation of the Lima-Pucallpa road (Figure 60) facilitated transport to urban markets and Pacific ports. From the start, the debt-merchandise system dominated the timber trade with timber companies controlling profits by advancing credit to loggers or *habilitadores* (middlemen[146]) who then repaid the company in timber to cancel their debts. Government regulation of this Amazonian logging system was sporadic in the first half of the 20th century

Figure 60. This giant statue of an Amazonian worker greets travelers entering Pucallpa on the Lima-Pucallpa road.

(Santos-Granero and Barclay 2000). Working in the field in 1974, White (1978: 395) found logging in Ucayali to be in "a primal state" dominated by a debt-merchandise system channeling profits towards capitalists in Lima. These capitalists backed lumber company owners advancing credit to regional *patrones*, who in turn passed it to local *patrones* exploiting an indigenous workforce for a few supplies valued at prices often 100% more than those in Pucallpa. One Shipibo informant recalled a *patrón* in 1973 obtaining two twelve foot logs of mahogany from an Asháninka on the Upper Ucayali River in return for 100 bars of soap. At each stage of the system, repayment consisted of under-priced lumber, thus minimizing costs in the field, maximizing profits, and keeping capital in Lima and to a lesser extent in Pucallpa (White 1978).

In 1975, a year after White's study, the military government introduced a law, Ley 21147, to stimulate the rural economy through the granting of small concessions for local logging outfits. Instead, Hidalgo (2003: 4) argues, the law contributed to "an almost feudal system" as logging elites merely adjusted their debt-merchandise system to the new rules with timber companies and *habilitadores* subcontracting local *patrones* who continued advancing merchandise on credit to peons (Hidalgo 2003) and then laundered the illegally harvested timber with permits purchased from concession owners (Norgrove and Barra 2005). In the 1990s the government suspended these concessions due to the rampant illegality, the inconstant supply of timber, the lack of efficiency and competitiveness, and the social abuses occurring in the field[147], however, the government then reopened the concessions under the condition that concession owners follow a management plan[148]. In 1996, logging on selected rivers, including the Tamaya, was banned entirely due to non-compliance with management plans[149].

Four years later the Peruvian government introduced a new law guided by the principle of sustainable use through long term investment in forestry concessions. Law

27308, created with input from the World Wildlife Fund and implemented with investment from USAID[150], is clearly oriented towards sustainable harvesting of timber but is fundamentally flawed due to a reliance on detailed knowledge of the human and physical geography, adequate cadastral and public record systems, and accurate and up-to-date ecological data on targeted forests. In the absence of good maps and local knowledge from the forests, logging concessions are mapped *a priori* in Lima offices onto lands containing illegal loggers, drug traffickers, settlers, indigenous people, and forests that do not contain the high value hardwoods outlined in the outdated concession survey[151]. This flawed geographic foundation coupled with extremely weak enforcement encourages loggers to elaborate bogus management plans and return to the exploitative debt-merchandise system of old: subcontracting local *patrones* to drive off, intimidate or co-opt local people into logging their homelands while using false documents and permits to launder timber extracted illegally from outside the concession or in amounts greater than allowed within the concession. One informant logger estimated 90% of loggers working in Ucayali to be illegal (Ahora 2004c).

Other aspects of the timber industry also remain entrenched in the past. The industry continues to struggling to diversify the number of species harvested. Some improvement has been made as in 1963 only five species made up 80% of the trees logged in Peru (FAO 1963) while Table 5 shows thirteen species to make up 80% and 84% of 2002 Ucayali production of sawnwood and roundwood respectively. Tropical cedar and mahogany are likely undercounted here due to illegal logging. One species, *Chorisia integrifolia* (Figure 42), dominates plywood production with 94% of the total. This lack of diversity in logged species encourages extensive logging practices rather than potentially more sustainable intensive harvesting (Fredericksen 2000) as commercially coveted species often stand hundreds of meters apart in the highly diverse

tropical forests of Ucayali. A similar lack of diversity was encountered in harvests measured in the study region: Table 6 lists by species the individual logs contained in all 77 *boyas* (log rafts) (Figure 61) on the Putaya River in August, 2004[152]. Half of the Putaya River lies in Alto Tamaya territory while the headwaters reach the Brazilian border (Figure 58). Thus many of the logs shown in Table 6 come from the Alto Tamaya homelands and perhaps, to a lesser degree, Brazil.

Methods of extraction have also changed little over time as White's (1978) observations in the field in1974 largely describe the same techniques used thirty years later. This is particularly true in the isolated border regions where tractors are only used at great trouble and expense. In 2004 human power remained the primary method of getting logs to the river for downstream transport (Figure 62). Primitive levers (Figure 63), rails, and pulleys (Figure 64) continued to be used in conjunction with brute human force although tree felling was facilitated by the wide spread use of chainsaws. Floating logs downstream (Figure 65) remained the most common method of timber transport in Ucayali due to low costs and a pronounced flood season that provided annual water access in distant streams[153]. In border locations where illegal operations abounded, chainsaws were used to cut rough planks[154] (Figure 66) that could then be carried to the river, floated downstream and then re-cut illegally with band saws at either mobile processing sites (Figure 67) or at sawmills in Pucallpa.

Despite these time and labor intensive harvesting methods with their climactic constraints, logging continued to be profitable. This was particularly true for high value species such as mahogany that exponentially increase in price the farther away they get from the forest. Table 7 illustrates how one board foot of mahogany increased in price from 60 cents at the point of extraction to over seven dollars in the United States.

Table 5. 2002 Ucayali timber production and principal species by cubic meter

Timber	Scientific name	Roundwood	Sawnwood
Caoba*	*Swietenia macrophylla*	5433	4541
Capirona	*Calycophyllum spruceanum*	20847	17601
Catahua*	*Hura crepitans*	22152	18291
Cedro*	*Cedrela odorata*	9810	7733
Copaiba*	*Copaifera sp.*	14364	12173
Cumala*	*Virola calophylla*	20174	18175
Ishpingo	*Amburana cearensis*	2474	1960
Lagarto Caspi*	*Calophyllum brasiliense*	491	462
Lupuna*	*Chorisia integrifolia*	35172	10480
Moena	*Ocotea sp.*	5164	4492
Quinilla	*Manilkara bidentata*	11324	4656
Shihuahuaco	*Dipteryx sp.*	13067	31320
Tornillo*	*Cedrelinga catenaeformis*	24969	22831
Total Production		221845	193621

* Denotes species mapped in Table 11 below.
Source: (INEI 2004)

Table 6. Putaya River logs waiting for flood season by species

Timber	Scientific name	# of Logs
Caoba	*Swietenia macrophylla*	125
Catahua	*Hura crepitans*	33
Cedro	*Cedrela odorata*	1042
Copaiba	*Copaifera sp.*	157
Cumala	*Virola calophylla*	134
Lagarto Caspi	*Calophyllum brasiliense*	36
Lupuna	*Chorisia integrifolia*	106
Tornillo	*Cedrelinga catenaeformis*	134
Total Logs		1767

Data: Fieldwork in August of 2004.

Figure 61: A small sample of the boyas (log rafts) measured along the Putaya River in August of 2004.

Figure 62. Paths are cut through the forest and the logs are pushed on tracks such as these. Photo by Ronald Paredes.

Figure 63. Logs await high water season to be levered into the Alto Tamaya River. Photo José Borgo López.

Figure 64. Loggers use a human powered pulley system to pull logs up the bank in borderland Ucayali.

Figure 65. Ucayali loggers sometimes float for weeks on these rafts of valuable roundwood through snag infested rivers. If the log is floated without a guard, local people will poach logs from the raft.

Figure 66: The sawing of planks by chainsaw for commercial sale is illegal but the primary means of extracting valuable hardwoods illegally from Brazil.

Figure 67. Mobile sawmills like this one are called *limpiadoras* (cleaners) in Amazonian Peru because they improve the cut of planks sawn illegally by chainsaw thus allowing the illegal timber to be sold "legally" (i.e. laundered) using falsified document

Table 7. Price in US dollars per Board Foot of Mahogany

Name	Species	Point of Extraction	Local Town	Pucallpa Sawmill	Lima	USA
Mahogany	*Swietenia macrophylla*	0.60	0.91	2.11	3.02	7+

Price in USdollars calculated using 2004 November exchange rate of 3.3 soles to the dollars U.S.
Sources: www.globalwood.com , SIPEC, fieldwork.

Thus, the high demand in the United States and other developed countries for mahogany and other valuable hardwoods motivated loggers to access the isolated borderlands which still contain some commercial stands of the desired species. The flawed forestry law and lack of geographic information allowed illegal loggers to continue pursuing the debt-merchandise and debt peonage systems while frustrating loggers seeking to log according to the law. Eventually, the most valuable timber was extracted illegally with falsified documents and debt peonage labor with residents of the unmapped and unknown borderlands receiving a pittance to topple and transport some of the world's most valuable hardwoods.

IV. DEBT PEONAGE

The patrones of the timber industry continue to practice debt peonage in the most isolated regions of the Peruvian Amazon (Ucayali, Madre de Dios and Loreto regions) much as it was practiced throughout the region 30 years ago and more (White 1978). This section underscores the continued prevalence of debt peonage within the forests of Amazonian Peru before describing in ethnographic detail how the system exploits laborers within the study area.

Bedoya and Bedoya (2005) estimate 33,000 laborers to be enmeshed in forced labor systems within the Peruvian timber industry. This number appears to have grown since 35 years ago when García Blásquez (1971: 59) estimated "…10,000 peons buried in

the most remote forest areas, all cruelly exploited and particularly the natives". In 2004, forced labor continued to thrive in the borderlands and other isolated areas as these distant zones had low population densities characterized by extreme poverty and a lack of education, had an almost complete absence of state or institutional presence, were labor scarce with no labor or credit markets, and contained populations unversed in standard economic practices, workers rights or the regional and international timber markets (Bedoya and Bedoya 2005).

The modern forced labor practices of the Peruvian tropical timber industry fell into two main systems in 2004: the logging camp and the *habilitación-enganche* system. The borderland Asháninka people engaged in both, with young men usually working in logging camps until they gained the expertise and trust of the *habilitadores* necessary to be advanced goods without supervision in the *habilitado-enganche* system. The relations between timber companies, sawmill operators, concessionaires, *habilitadores*, *enganchadores* (labor recruiters), *habilitados* (the boss of the logging camp or individual contracted to log), and laborers was complex. Here I will merely try and describe the workings of that part of the system closest to the forest as interpreted through key informants.

A. Logging Camps

Logging camps usually contained between five and thirty-five workers and could be located legally in forestry concessions, legally in indigenous territories with logging permits, illegally in Brazil, and illegally in indigenous territories (titled, untitled, or reserved for indigenous people in voluntary isolation), conservation units, or state lands (Figure 68). Schulte-Herbruggen and Rossiter (2003) interviewed loggers from 64 logging camps on tributaries within the Rio de las Piedras watershed in Madre de Dios and found 92% of these camps to be within zones inhabitated by isolated indigenous

Figure 68. An illegal logging camp in the borderlands with armed loggers. Note the incongruous lapdogs.

groups or recently contacted indigenous groups. The presence of camps within indigenous lands was also common in the other two major Amazonian regions of Loreto and Ucayali. Workers in logging camps in Amazonian Peru could be mestizo (80%) and/or indigenous (20%) (Bedoya and Bedoya n 2005) with most of the mestizo workers coming from urban areas with high unemployment such as Pucallpa and the majority of indigenous loggers coming from nearby indigenous communities.

An Asháninka named Berto[155] described the labor situation in logging camps as precarious "…the workers contracted from Pucallpa will abandon you, mostly because they are not accustomed to the work, but also because they want their payment in advance. The people from around here are busy, since they are also logging." The *enganchadores* (logging recruiters) lured young, uneducated, unemployed men with small advances in pay and promises of full payment at the conclusion of the logging season. Salaries were extremely low regardless of whether loggers were paid in full with most unskilled loggers making approximately 90 to 120 dollars U.S. a month[156]. Once at the logging site, the new workers were at themercy of the logging bosses who quickly introduced them to debt peonage by starting a balance against their earnings with elevated costs of transportation and food (Figures 69, 70). Workers who became dissatisfied with the brutal working conditions and mounting debt were often dissuaded from abandoning the camp by death threats, the holding of documents (although many laborers were undocumented), the threat of non-payment, and limits to their mobility through lack of transport and the extremely isolated nature of their camps. Desertion was also limited by the low probability of alternative employment on their return home.

Thus, once in a remote logging camp, laborers could be forced or encouraged to engage in illegal or subversive activities. One extreme example occurred in the late 1980's when a revolutionary group, the Movimiento Revolucionario Tupac Amaru

Figure 69. This abandoned logging *tambo* (hut) shows the simple quarters provided to logging laborers.

Figure 70. Beds are usually fashioned from palm slats to keep the owner away from the insect infested ground.

(MRTA), created a fake timber company and enticed young Shipibo Conibo men with advertisements for timber jobs along the headwaters of the Callería, Abujao and Tamaya Rivers (Comisión de la Verdad y Reconciliación 2004b: 349). The "loggers" took the young men to remote indoctrination camps rather than logging camps, and the subversives forced the Shipibo to become soldiers for their cause. Eventually, the majority of these young men died in a 1990 military ambush that decimated the MRTA in the region (Comisión de la Verdad y Reconciliación 2004b: 349). Similarly, the majority of the Peruvians loggers captured by Brazilian authorities along the Acre border in Brazil fit the description of uneducated loggers duped by their bosses. Anselmo Forneck, Director of the Acre office of the Brazilian Institute of the Environment, declared the 40 plus Peruvian loggers captured along the Ucayali-Juruá divide since 2004 to be uneducated, illiterate, "peons" under the control of timber barons who reap the benefits rather than brave the dangers of their transboundary timber poaching operations (Página 20 staff 2006). The timber companies used their economic power to hire unscrupulous *habilitados* to control an itinerant and disposable labor force.

Figures 71 and 72 show the hierarchy of economic relations of two different logging groups in the region. Figure 71 was a legal concessionaire with 40 years

Figure 71. Economic chain on Q. Putaya.

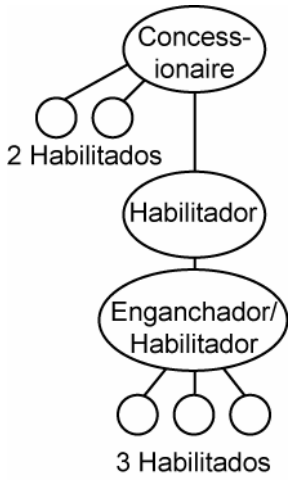

Figure 72. Economic chain on Q. Alto Tamaya

experience in the area who was subcontracting 5 *habilitados* who each ran a logging camp either within or outside the concession (Figure 58). While figure 58 shows only the main camps found along the Quebrada Putaya, the habilitados in Figure 71 each ran a camp at the headwaters of one of the tributary creeks off the Quebrada Putaya. At least two of these camps harvested timber illegally in Brazil. Figure 72 shows a concessionaire financially backing habilitados running legal logging camps within his concession in addition to a habilitador who is running illegal logging camps along the headwaters of the Quebrada Alto Tamaya through a habilitador/enganchador (Figure 58). Again, my field assistant and I were only able to safely geo-register the logging camps along Quebrada Alto Tamaya. However, each of the right bank tributaries entering the Alto Tamaya homelands contained a logging camp at its headwaters with several illegally extracting mahogany and cedar planks from Brazil.

Logging camps in the borderlands also contained *habilitados* and workers uninterested in returning to more central locations. According to the Major in charge of the Peruvian border post of Cantagallo, "Logging brings and protects people of dubious reputation: ex-convicts, refugees from drug trafficking, and foreigners… people from

urban centers come to the border to hide from the law." One of the local *patrones* in Alto Tamaya believed many of the loggers illegally harvesting timber in Brazil were deserters of the Shining Path. This belief was reiterated by the aforementioned Major, a veteran of the Shining Path conflict in the *selva alta* near Tingo María. In other cases the inhabitants of Peruvian border towns were refugees from Brazil. Frederico, a Brazilian accused of logging mahogany illegally in Brazil and wanted by Brazilian federal police for his connections to the narcotics trade, left his home in the Serra do Divisor National Park in Brazil and began working in a Peruvian logging camp in 2001 with his brother and nephew only to be cheated after 3 months of work: promised 300 dollars U.S. and a 50 gallon tank of gas, he received a radio and a hernia for his labor before his boss disappeared downriver with the timber and his promised wages (Figure 73). David, a young Peruvian, working with him was paid nothing at all and subsequently enlisted at the border military outpost for 2 years of service in order to obtain his identity card and thus improved prospects for future employment. In 2004 Frederico was again in a logging camp, but now working as a *matero*[157] (timber spotter) for Peruvian loggers working illegally in Brazil saying, "I want to pay for my childrens' shoes with Brazilian mahogany."

Indigenous people working in borderland logging camps often fulfilled specialty roles as hunters, chainsaw operators, cooks, or sex workers (Figure 74). One of the largest logging companies employed an Asháninka hunter, but he was only paid when he brought in game meat. The younger men often honed their logging skills and contacts in these camps and then used the same skills to enter into the more desirable *habilitado-enganche* system. Most loggers, indigenous or mestizo, were dissatisfied with logging: a 2002 survey of over 90 loggers on the remote Rio de las Piedras found only 37% to like their work and 84% to not want their children to be loggers (Schulte-Herbrüggen 2002).

Figure 73. Illegally extracted logs awaiting the flood season. Note the size of these lupuna logs (*Chorisia integrifolia*). Pushing these logs kilometers through the forest is a difficult and dangerous business that can end in injury or death. Two informants had hernias from working timber.

Figure 74. Illegal logging camps such as this one, were also gendered, with women working as cooks or sex workers. Brazilian authorities captured Peruvian women working in illegal logging camps inside Brazil territory.

However, the income producing alternatives for borderland residents were limited with options such as illegal commercial hunting, working in the drug trade as a farmer, processor, or transporter of coca or producing subsistence crops like plantains and manioc whose surplus could be sold to loggers for cash.

In 2004, the borderland daily wage for an unskilled indigenous worker was the equivalent of only three dollars US. Rodrigo, an Asháninka man of 55 years said, "All my life the daily wage has been ten soles (three dollars US). I don't know if I will ever be able to earn a wage of fifteen soles (four and a half dollars US)." His two sons were working as chainsaw operators in a logging camp and earning 120 dollars US a month. This was a low wage as skilled chainsaw operators could earn over fifteen dollars US a day. Their mother recounted her view on wage labor with the loggers:

> They pay you but they are tricking you. Because we don't know….We know how to talk but not how to read or write. That is the saddest thing here. The things they do to us. They have us work for months and they give you a little clothing. And that is it, you have worked. You have cancelled your bill.

Berto, another Asháninka man, said:

> I can say that timber earns cash for the patrones. But for the laborers, no, it is not like they say it is. They give you 150 soles (45 dollars US) but take you to work for months and months…and when the harvest comes… they say we have canceled the bill. I don't owe you and you don't owe me, but they know very well that they owe you. That is how they cheat you. It makes money for them but not for the laborer… you work and work and work. The timber comes out and they take off. They don't pay the bill.

Patrones also had little time for sickness or injury, telling the stricken Asháninka their condition was caused by drinking masato, their staple manioc beer (Figure 75). Despite the cheating, the borderland Asháninka continued to work for the same *patrones* because of the lack of alternatives to earn money or goods on the border. Indeed, the presence of the Asháninka was a boon for the local *patrones*, allowing them a ready and

Figure 75. The women of an Asháninka family prepare masato (manioc beer) in an old dugout canoe. Patrones blame injury on the masato, yet outsiders also visit the Asháninka communities to have a few free drinks.

experienced source of cheap labor to exploit either through the logging camp or the *habilitado-enganche* system.

B. *Habilitado-Enganche* System

Patrones trust *habilitados* as they assume risk by advancing them goods and equipment and leave them to work unsupervised. This is true of indigenous *habilitados* who are often the only *habilitado* option in remote areas. Indigenous *habilitados* are usually paid in merchandise for their extraction of valuable roundwood. The elevated prices of goods, equipment, and merchandise, the low border price of timber, the illiteracy of the indigenous people, and the unscrupulous *patrones* made *habilitación* almost as bad business as wage labor for these indigenous people. Nevertheless, there were few alternatives to gain merchandise in these borderlands and thus the Asháninka continued to enter debt peonage.

In Alto Tamaya the system played out as follows, a patrón would advance a coveted item such as an outboard motor to an Asháninka logger in exchange for the future harvest of 50 logs of tropical cedar (Gallegós Chamorro 2004). The Asháninka logger subcontracts a handful of his relatives to help harvest the timber. The Asháninka team works for about eight hours a day at ten soles (three dollars US) per person with this to be paid in merchandise by the *patrón* at the end of the harvest. The *patrón* also advances food to keep the team on task. As the team approaches harvest time, the *patrón* informs them the debt for motor, labor, and food now vastly exceeds the *patrón's* calculation of 50 logs of tropical cedar. In order to cancel their total debt, the team may have to extract as much 125 logs. In addition, it is almost certain that each member of the team adds to their debt by asking the *patrón* for goods specifically for their families. This additional debt must also be paid in timber. *Patrones* take advantage of the community members illiteracy, inability to weigh and measure, and lack of knowledge of

the timber and merchandise markets to under value the timber and over value the merchandise distributed. The system described above represented one of the seven *habilitados* contracted by the local *patrón* in Figure 76. This local *patrón* had over 40

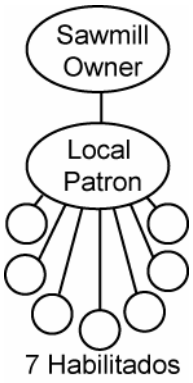

Figure 76. Economic relations on the Q. Alto Tamaya.

years experience working with the Asháninka in this area and was logging illegally with Asháninka labor. He was able to launder the lumber using falsified documents obtained by his financial backer, a highly influential sawmill owner.

Another case involved an illegal logger advancing José, an Asháninka man, a chainsaw for the equivalent of 3,500 soles (1,060 dollars US) worth of timber. José, anticipating a swindle, had the mahogany and cedar he harvested measured by another logger who found it be 3,000 and 2,500 board feet respectively. This high grade roundwood estimated at 14,000 soles (4,240 dollars US) by local rates (and three times that in Pucallpa) was anchored on the river bank when the river suddenly rose. The logger took advantage of the high water, and the absence of José, to take it downstream to Pucallpa to be measured, sawn, and sold. At the time of the interview José feared that when the logger returned to tell him the timber's worth, he would be told he still owed more timber for his saw. These stories were the rule: others recounted deals of 15,000 board feet of

lupuna[158] (about 1,500 soles at border rates) for an eight horsepower boat motor worth 2,500 soles (760 dollars US) (Figure 77), of harvesting timber and then being told by the patrón that they earned nothing because the logs were found to be rotted on the inside when they were sawn in the city sawmill. Not surprisingly, the *patrones* often refused to cancel accounts or advance money, however, their excuse was to cite their own poverty. Tanya remembered the *patrón* saying, "We are poor, we can never pay you" despite his having 150 head of cattle on his farm only 500 meters from the Asháninka village. Tanya concluded, "…he has made himself a millionaire with Asháninka labor." The borderland Asháninka enter the exploitative logging system because there were no alternative means to reliably obtain merchandise such as clothes, soap and medicine for their families. The latest timber boom had brought more unscrupulous loggers to Asháninka homelands where they abused both Asháninka and mestizo labor. The Asháninka and other border people's isolation, poverty, and lack of education and the state's lack of a borderland presence and geographic ignorance allowed loggers to rule the borderland region. This echoes accounts from a century before when Coronel Pedro Portillo (1905a: 506) observed of the upper Ucayali and surrounding region, "there are no laws, there are no authorities…He who is strongest, who has the most rifles, is master of justice".

V. RESISTANCE

The borderland Asháninka actively sought justice in 2004, and with guns scarce and ammunition scarcer, they discovered other means to combat injustice in the borderlands. They resisted the timber industry, the patrones and debt peonage not only by organizing and confronting trespassers in the borderlands but also through official channels in regional and national capitals. Nevertheless, not every Asháninka resisted. Many were co-opted by the patrones into logging the borderland forests, while others

Figure 77: Most borderland Asháninka such as this one were only able to purchase a boat or motor if they engaged in debt peonage with a local patrón.

appeared contradictory: simultaneously working as loggers while supporting efforts to wrest control of their territory from the concessionaires and logging patrones.

The greatest variance between means of resistance related to the country the Asháninka lived in. Here in this section I will detail and compare the resistance efforts of both the untitled Alto Tamaya Asháninka of the Peruvian border and the titled Apiwtxa Asháninka of the Brazilian border (Figure 58). The Apiwtxa Asháninka gained their title in the early 1990s in response to trespassing loggers from Brazil and in 2004 were considered one of the most organized indigenous groups in Brazil: using their contacts and charismatic leaders to influence government officials in both the regional capital of Rio Branco and also Brasilia. Their regional government was one of Amazonia's most progressive with a demonstrated interest in the welfare of traditional peoples (Kainer et al. 2003) and an ongoing economic and ecological zoning project that already contributed accurate geographic information to decision makers in urban centers. The Alto Tamaya Asháninka, on the other hand, had no title, few allies, and were still a largely unknown people living in an area very poorly understood by a regional government whose two most powerful political figures were a sawmill owner and an exporter of high grade hardwoods. This group, and a handful of other Asháninka communities were so invisible, as to be completely absent in all 62 pages, including the maps, of the Strategic Plan of Development for their municipality of Masisea (Municipalidad Distrital de Masisea 2002). These Asháninka were desperately seeking to title and map their territory, so as to defend it legally from the loggers and forestry concessions overlapping their lands (Figure 58). Although the Asháninka increasingly understood that more territory could be "defended by maps than by guns" (Nietschmann 1995: 37), violence remained part of their borderland struggle.

A. The Case of Alto Tamaya

When the Asháninka arrived in Alto Tamaya from the Amônia River in Brazil and the Sheshea River in Perú they followed the traditional Asháninka settlement pattern of isolated homesteads (Denevan 1971, Varese 2002) (Figure 78). While this settlement pattern and the associated Asháninka mobility helped the indigenous group resist the incursions of the missionaries, the Spanish, and the Peruvians in earlier times (Varese 2002), in the modern era isolated households of the borderland Asháninka created challenges for indigenous groups looking to gain titled land through the required demonstration of community organization and territorial occupation (Figure 79). Indeed, to outsiders, the borderland Asháninka remained largely invisible in the landscape: known only to each other and local loggers, skin hunters and patrones. The Asháninka of Alto Tamaya began organizing shortly before the new Forestry Law of 2000 imposed forestry concessions on the supposedly empty lands they resided in. Unknown and untitled, the Alto Tamaya Asháninka became trespassers on their own border homelands. As one informant said, "Before we lived as animals, houses over there, others over here, later we got together, organizing to educate our children" (Figure 80).

1. Resistance through Official Channels

The Asháninka began following an official Peruvian pattern of organization in early 2002, when 39 Asháninka of the Alto Tamaya community met, organized, and elected their community leaders in order to solicit title to their lands. Their President was the only literate pure blood Asháninka while the vice president was a mestizo who although claiming no Asháninka blood at all was adopted as a grown man by the community. These leaders spent many lean months in Pucallpa writing and carrying by hand at least eight letters in 2002 and 2003 to the Regional Director of Agriculture in Ucayali, the Defender of the People, the Municipal Mayor, the Admiral of the Pucallpa

Figure 78. Cabo Tornillo was the oldest of the Asháninka at Alto Tamaya and lived an itinerant life in the borderlands, regularly relocating every few years to a new place. He has lived in the borderlands of both Brazil and Peru.

Figure 79. This is the Asháninka family on the Putaya River that lived farthest away from the community center. These children walked an hour a day to attend school in the community.

Figure 80. A view of part of the Alto Tamaya community from the soccer field. Normally the Asháninka live in isolated family clusters, but here they have grouped their houses to organize the community and allow their children to attend school.

Naval base, INRENA (National Institute of Natural Resources), among others[159]. All these letters asked for community recognition, title, and demarcation in addition to help in dealing with illegal loggers and overlapping forestry concessions. The regional indigenous organization of AIDESEP[160] also wrote several letters on behalf of AltoTamaya in 2003. Living in the city and engaging the Peruvian bureaucracy was not easy for the cash poor and largely illiterate borderland Asháninka. As Tanya, one of their leaders said, "In the city, when you don't have *plata* (cash[161]) you don't drink even a drop of water. That's the way it is." Despite this, the borderland Asháninka continued to press for their rights.

Progress began to be made in 2003 when finally on the 22nd of April, Alto Tamaya was inscribed in to the National Registry of Native Communities and on the 28th of April 2003 the primary school was created and a teacher relocated to teach the Alto Tamaya children (Figures 81-84). A month later the first INRENA official visited the community to investigate the complaints on illegal logging and overlapping concessions. The INRENA forestry engineer observed concessionaires legally logging in concessions on lands claimed by the community but also community members logging illegally with support from a local *patrón*. While this contradiction did not greatly help their cause, the community remained dedicated to official channels. They wrote fifteen letters[162] from 2002 to 2004 asking to dissolve the overlapping concessions. Finally, frustrated by the lack of progress, they asked INRENA to apprehend the timber logged illegally in their homeland. The community found allies in the Defenders of the People and AIDESEP, but was discouraged by the bureaucracy endemic to INRENA and PETT (Proyecto Especial de Titulación de Tierras). The community also received a visit from the Instituto del Bien Común in 2003 to include them in the Peruvian Native

Figure 81. In 2004, the School of Alto Tamaya had a bilingual teacher and numerous students eager to learn. When the Asháninka told a local *patrón* they were organizing to get a school, the *patrón* said, "why do you want a school? To teach your children how to be thieves?"

Figure 82. The Asháninka continue to work hard to ensure the education of their children. Leonardo here helps build a house for the new school teacher.

Figure 83. Women contribute as well to the construction of the new house. Here Tamila clears the vegetation in the future yard of the house. In the background other women and children work.

Figure 84. The community organized to put up this house frame in just two days with women, men, and children participating.

Communities Information System (SICNA) and from an AIDESEP anthropologist in 2004 working for the commission to solve overlapping claims within native communities.

On October 18th, 2004, following a petition by the President of Alto Tamaya, INRENA seized 189 logs of mahogany, tropical cedar and tornillo[163] in the storage area of the sawmill. The timber totaled over 275 cubic meters of hardwood worth approximately 200,000 dollars US in Lima[164]. However, the timber was released to the owner, a local *patrón* operating in Alto Tamaya (Figure 76), when he coerced the illiterate Vice President of Alto Tamaya to place his thumbprint on a document stating the timber did not come from Alto Tamaya.

2. Resistance in the Borderlands

In 1998, an undocumented and illiterate Asháninka family journeyed to the union of the Alto Tamaya and Putaya Rivers with the intention of uniting all of the Asháninka inhabitants of these watercourses into one community. This family settled at the current site of the community of Alto Tamaya and began to convince their cousins to join them in forming a community and a school. While Asháninka had lived on the Putaya and Alto Tamaya Rivers for at least 40 years, they had always lived in isolated households alongside the rivers practicing subsistence agriculture and working in timber for the local *patrones*. The area was thinly settled with a few *patrones*, the local Asháninka, their cousins on the Amônia River in Brazil and Peru, and the mixed Brazilian-Peruvian population of Puerto Putaya on the Tamaya River (Figure 58). However, this changed in 2000 when the lifting of the ban on logging for the Tamaya watershed, the forestry law of 2000 and the nation state's creation of forestry concessions on the Alto Tamaya and Putaya Rivers, the growing scarcity of mahogany and tropical cedar elsewhere brought hundreds of loggers into the area. The new forestry system brought a new system of

ownership to the rich forests of Alto Tamaya and forced the Asháninka to band together to try and protect themselves and their territory.

The *patrones* who had enjoyed the exploitation of Asháninka labor for decades, quickly saw the threat implicit in the formation of a community and a school. The titling of Alto Tamaya would eliminate their concessions and possibly their ranches and farms, deny open access to Alto Tamaya forests outside of concessions, and threaten the current debt peonage system with a new generation of educated and empowered Asháninka. The two principal local *patrones* had lived or worked in the region and with the Asháninka for over 40 years and began using their considerable influence to disrupt the organizing efforts of the Asháninka. Simultaneously, the residents of Alto Tamaya asked one of these *patrones* to support their efforts at community formation, "what pleasure we had in inviting Don Pablo, that he come to our meeting, that he come hear so we can ask him his opinion, but he wanted nothing to do with it." Instead, this *patrón* spoke to the community and convinced several families to abandon the effort. According to community leaders, he said:

> Don't listen to Rodrigo and Tanya, if you follow them you will end up naked in the community… there will be no money… everything about the community is a lie… they will not get a teacher, they will not organize, they will never get titled, it is all a lie, work, work the timber… here you will see money. If not, in the community you will end up naked.

Berto relates that the other patrón also came to the community saying, "In the community you will have nothing. Come, work with me. I will pay you. I will give you everything". Berto finishes recalling this conversation with, "but it is not like that, it is not like how they promise."

Several families believed the promises and split from the community. The founder of the community was convinced by a *patrón* to move a few days journey down the Tamaya River to take a paid job caring for his farm. According to community

residents, the *patrón* thought the exit of the founder would persuade others to also abandon the community. Another *patrón*, Don Pablo, convinced a single mother and her two children to travel downriver with him to Pucallpa promising to provide her with work. Her cousin, Tanya, relates the story, "…and when they arrived in Pucallpa he did not even give her a sol. Instead he asked her to let him sleep with her daughter and then he would provide her with money and clothing." The woman's daughter was eleven years old. The mother refused and avoided hunger in the city only by joining the researcher and community leaders on the seven day boat journey upriver to the community. Nevertheless, a *patrón's* power cannot be underestimated, as Don Pablo convinced other families, such as the former nanny of his son, to split from the community and continue logging for him (Figure 85-6).

Thus, like all communities, the Asháninka who make up the community of Alto Tamaya were heterogenous, and did not agree on all things or speak in one voice (Agrawal and Gibson 1999). In particular, their relations with *patrones* and loggers were complex with some Asháninka siding with *patrones* instead of the community, at least until they get a title, and even the leaders of the community having sons working in logging camps or as *habilitados* to local *patrones*. One mestizo married to an Asháninka also asserted that the community titling efforts were being at least partially underwritten by another logging *patrón* pursuing future terms to log within community territory. This would hardly be surprising as there was a lack of funding options to support indigenous communities negotiating the bureaucratic hurdles and associated costs involved in gaining title. Indeed, logging companies helped title the nearby borderland Asháninka communities of Sawawo and San Mateo.

Nevertheless, in Alto Tamaya, the majority of the Asháninka and the majority of the patrones and loggers are in a contest for territory and natural resources. In August of

Figure 85. Doña Juana and her family did not live with the community. She had close ties to the local patrón and had a small herd of cattle in pasture. Here she stands behind a canoe-like container full of *masato* with her mestizo partner and child.

Figure 86. José and his family also did not live with the community. Instead they worked with patrones logging their homelands. Because they lived far away, their children did not attend school.

2003 delegations from Alto Tamaya blocked off three tributaries because the loggers did not give the community a percentage of the timber profits earned from territory the Asháninka considered theirs. The loggers asked for the Asháninka title and then continued to log when they were unable to produce any documentation. The community also attempted to barricade a tributary of the Putaya River but their chainsaw malfunctioned. The concessionaire, on hearing of their attempt, came and promised to leave a percentage of the timber extracted, but never did. In another case, the sub chief of Alto Tamaya confronted a patrona (female patrón) financially backing tabloneros (plank makers) sawing and removing mahogany planks from Alto Tamaya and Brazil (Figure 87). The patrona responded by saying the Asháninka had no title to the land. In addition she repeated over and over that she worked with Edgar Velásquez. While the sub chief did not know who Edgar Velásquez was, in 2004 he was the Governor of the entire region and a sawmill owner (Figure 88). In another case violence was narrowly avoided in July of 2004 when unknown people entered the community and fired guns. Luckily, nobody was injured. Five days later the community sent a letter to the Admiral of the Naval base in Pucallpa asking for the requirements to form a self defense committee as the frontier zone had no state presence and they feared for their lives[165].

3. Crossing the Line: Loggers Trespassing into Brazil

The Asháninka have lived and traveled along the international border between Peru and Brazil for over a hundred years (da Cunha 1967, da Cunha 1976). Even in 2004, the inhabitants of Alto Tamaya traveled regularly to visit their parents, in-laws, cousins and children in the Brazilian Asháninka village of Apiwtxa. However, since 1999 the trespassing of Peruvian loggers into the Brazilian homelands of Apiwtxa had strained relations between Asháninka families separated by the border. In 2004 the

Figure 87. *Tablones* (planks) such as these are cut by *tabloneros* in the headwaters with chainsaws and then re-sawn in *limpiadoras* (cleaners) for resale in Pucallpa and Lima.

Figure 88. Economic relations of illegal tabloneros operating in Brazil.

people of Apiwtxa feared the loggers working on the border and would not travel to Perú. In addition, the people of Apiwtxa speculated that their Peruvian brethren were facilitating the invasion of their homelands with labor and local knowledge. The people of Alto Tamaya disagreed, and had even lost lives trying to help their cousins across the political border.

On July 22, 2003, a young Asháninka man, the son of a resident of Alto Tamaya, died of gunshot wounds obtained near the border between Peru and Brazil. According to the President of the Apiwtxa cooperative, the deceased was one of two Asháninka from Alto Tamaya who warned Apiwtxa of incursions by Peruvian loggers into their territory. Shortly after returning to Peru they were killed by loggers, although only the one injured man was found. Another confrontation occurred on July 28, 2004 when, Mateo, the son of an Asháninka from Apiwtxa decided to visit Apiwtxa with three mestizo loggers he was working with in Peru. At the border, men from Apiwtxa stopped them, telling them they were Peruvians and should thus return to their country. The Apiwtxa Asháninka then began to hit the Peruvians causing serious injury to one of the loggers who was

taken to Cruzeiro do Sul for medical treatment[166]. According to Mateo, "With this action now the loggers for our *patrón* also control the border beating Brazilians trying to cross."

This local level border enforcement mushroomed following successful propaganda by the Apiwtxa Asháninka during their Asháninka Week presentations in the University of Brasilia (Figure 89). Three days later the Apiwtxa Asháninka helped the Brazilian Federal Police, army, and Ministry of Environment capture four Peruvian loggers sawing mahogany into planks a two hour walk inside Apiwtxa/Brazilian territory. Diablo, a Peruvian logger present during the bust described how a helicopter with 40 soldiers landed and captured four of the fifteen loggers working in the camp. The soldiers burned the camp, dynamited the timber, and took the prisoners with them[167] while the rest of the loggers fled through the forest back to Peru. This was merely the first of a series of arrests of Peruvian loggers by Brazilian officials.

B. The Case of Apiwtxa

The Brazilian Asháninka of Apiwtxa warned Brazilian authorities of Peruvian trespassers beginning in 1999. However, these trespassers were not the first loggers to invade this Asháninka homeland. The timber boom on the Brazilian side of the border began in 1970 before peaking in the late 1980s with the arrival of tractors floated up from Cruzeiro do Sul. During the boom, the Asháninka were enmeshed in a debt peonage system almost identical to that described for Alto Tamaya above. Similar to the trend in Peru documented here, over time the Brazilian *patrones* became more and more exploitative as the demand for high grade hardwood increased. The Asháninka organized in part to resist a series of invasions by Brazilian loggers who extracted more than 2,500 logs (CEDI 1993) and created over 80 kilometers of logging roads with their tractors (Pimenta 2002). In 1992, after much struggle, the Asháninka of Apiwtxa obtained their title with

Figure 89. The digital cover of the Asháninka week program. Universidade da Brasilia, CPI, APIWTXA.

the help of anthropologists and indigenistas. However, the contest for timber would continue, this time from the Peruvian side of the border.

1. The Apiwtxa Asháninka as Border Patrol

The residents of Apiwtxa began anticipating trouble on their southern border in 1999 when their Peruvian cousins in Sawawo agreed to a proposal from a logging company to establish a road from the Ucayali River and partner with them in the selective logging of their territory (Pimenta 2002). In December of 2000, the Asháninka of Apiwtxa alerted Brazilian authorities of trespassers. According to the press, army helicopters beat an Asháninka war party to the logging site in an attempt to prevent conflict, discovering eight clearings in Brazilian territory and a series of logging trails leading to a logging camp in Peru (Pimenta 2002). A month later, one of the Apiwtxa leaders was quoted in the Folha do Sao Paolo, "We are prepared to defend our people. We want everything resolved peacefully but if nature is at risk and nothing is done, we will kill and die fighting for our people." (Folha de Sao Paulo staff 2001: A2). While the attention from Brazilian authorities eliminated or at least slowed trespassing, the partnership between the logging company and the Sawawo Asháninka extracted over 4,000 m³ of mahogany and 2,500 m³ of tropical cedar in their first two harvests (2001-2003) of Sawawo territory[168] (Aquino 2004). In 2002, the logging company's road to the Ucayali River (and a handful of secondary roads) extended over 140 kilometers and was wide enough to map from satellite images with 30 meter resolution[169] (Figure 58 and 90). According to the President of Apiwtxa the road crossed the Amônia River in 2004 and is targeting other borderland indigenous territories for timber harvesting near the Juruá River. The Apiwtxa territory continued to be a target in the following years with the community discovering and burning a Peruvian camp a kilometer inside their land in November of 2002 (Martins 2003). A year later, in November of 2003, the President of

Figure 90. An illegal logging road cut by Peruvian loggers into Brazilian territory is clearly visible from this small plane. This is only a small portion of the illegal road network whose main trunk extends 140 kilometers from the Upper Ucayali River to the Brazilian border. Photo courtesy of Apiwtxa, the Commissão Pro Indio do Acre, and IBAMA.

Apiwtxa related to an Acre newspaper that the Asháninka had found 60 Peruvians logging mahogany and tropical cedar inside their territory with tractors and chainsaws under the guidance of Don Tomás and his brother in law (Schneider 2003). In January of 2004, the Asháninka convinced a team of army, federal police, IBAMA and IMAC to follow up this discovery with aerial and terrestrial reconnaissance. The reconnaissance documented logging roads shadowing the Brazilian border with harvested mahogany, artisanal winches and ten meter wide skid trails located inside Brazilian territory (Martins and Freddo 2004) (Figure 91). A month later the Brazilian army, federal police, FUNAI, and state police of Acre forced 30 Peruvian loggers out of Asháninka lands (FUNAI 2004).

Despite this action, trespassing continued, and in March of 2004 a federal judge of Acre held Brazil, IBAMA, and FUNAI responsible for non compliance of promises made to the Asháninka ordering the three institutions to update the border monuments, and set up FUNAI, federal police, and IBAMA outposts in the region (Instituto Socio-Ambiental 2004b). Four months later the General in charge of the Military Command of Amazonia and the Governor of Acre announced the forthcoming establishment of three new military bases in the border region with one planned for the mouth of the Amonia River (Maia 2004). This proceeded with the delays typical of the border region until September of 2004 when the University of Brasilia hosted a four day celebration of Asháninka culture in the Brazilian capital. This celebration gave the Asháninka a large stage to expound on the Peruvian loggers' continued trespassing into Brazilian and Asháninka territory (Amorim 2004) (Figure 89). While in Brasilia, the Asháninka personally denounced the logging activities to Marina Silva, the Brazilian Minister of Environment[170], FUNAI, a federal judge, a pop music star, a representative of the Protection System of Amazonia (SIPAM), and members of the Brazilian press in addition

Figure 91. The President of Apiwtxa and two soldiers surveying the logging roads cut by Peruvian loggers into Brazilian territory. Photo courtesy of Apiwtxa, the Commissão Pro Indio do Acre, and IBAMA.

to incorporating it into their planned expositions at the University (Instituto Socio Ambiental 2004a). The charismatic and eloquent leaders of Apiwtxa made an immediate impression, with Marina Silva saying, "In terms of organization, the Ashaninka are an example for all of Brazil," (Ministério do Meio Ambiente 2004), and a Professor of Anthropology at the University declaring them to be "… the most organized political actors in the region," (Amorim 2004). These strong impressions and their concurrent message of a threat to national security galvanized Brazil's security and environmental forces into immediate action (Figure 92).

On September 27, 2004 a joint operation including Brazilian army, federal police and IBAMA captured four Peruvian loggers, burned a logging camp, and dynamited 100 logs of mahogany (equivalent to 1,000 m^3) (Sales,V. 2004) (Figure 93). On October 12, 2004 the same operation captured 7 Peruvian loggers in Asháninka territory with 150 m^3 of mahogany inside the Serra do Divisor National Park (Campos 2004). Three days later the operation captured 216 logs of tropical cedar (estimated at 700 m^3) that Peruvian loggers had abandoned in the Serra do Divisor National Park (Sales, A. 2004). That weekend, IBAMA, the Federal Police, Army, FUNAI, Insitituto Socio Ambiental all met with the Asháninka in Apiwtxa and presented them with a GPS, radio, and satellite phone to alert them if the invasions continued (Sales, A. 2004). On October 22, operation Asháninka or operation PeBra (Perú Brasil) continued capturing 26 loggers in the Serra do Divisor National Park with 300 cubic meters of mahogany (Antunes 2004; O Rio Branco 2004).

This newly active border policing had impacts both positive and negative for the community and individuals of Apiwtxa. The President of Apiwtxa was twice threatened personally by Brazilians in league with the Peruvian loggers (Piedrafita 2004). Other threats also led the Asháninka and Brazilian delegation to cancel their participation in a

Figure 92. The President of Apiwtxa pointing out the Peruvian forestry concessions (in orange) that border his territory in Brazil. The projected map is one of a suite made by the author in conjunction with the Centro de Investigación de Fronteras Amazónicas, Universidad Nacional de Ucayali. Photo courtesy of Apiwtxa, Commissão Pro Indio do Acre, and The Nature Conservancy.

Figure 93. Brazilian authorities burning a Peruvian logging camp in Brazilian territory. Photo courtesy of IBAMA.

University of Ucayali led meeting in Pucallpa to address the border invasions. However, Asháninka access to and recognition by Acre and Brazilian institutions improved markedly with the President of Apiwtxa receiving the Brazilian Nation's human rights award in October of 2004 (Piedrafita 2004), and the unprecedented visit of the head of the Military Command of Amazonia and the Governor of Acre to Apiwtxa in February of 2005[171] (Maia 2005). When informed by the Asháninka of continued trespassing by Peruvian loggers, the head of the Amazonia command promised to mount a similar operation to the one made in September and October of 2004. In March of the same year, the Governor of Acre took the President of Apiwtxa with him to a meeting with President Toledo[172] in Lima, thus forcing the Peruvian head of state to recognize the borderland indigenous people to be affected by the planned increase in commerce and infrastructure between the two nations (La República 2005). Months later continued trespassing led to the operation promised in February. The Timbó III operation took place over a ten day period starting July 10, 2005. The Amazonia Military Command consisted of 7,000 men (6,230 Army, 917 Navy, and 387 Air Force) acting simultaneously across the entire border of the Brazilian states of Rondônia, Acre and part of Amazonas (Simonetti 2005). The operation netted 700 cubic meters of logs, 620 stakes and over 1,400 *tablones* along with capturing 40 Peruvians involved in the illegal transport of timber (Simonetti 2005). Despite these military operations, invasions continued with the Brazilian armed forces engaging in a gunfight with Peruvians in the Parque Nacional Serra do Divisor in 2006 (Página 20 2006).

VI. CONCLUSION

This chapter has investigated marginality on the margins through the study of the borderland Asháninka and their complex relationship with the tropical timber industry and the political boundary line. The suite of methodologies used in the study provided

the sub-canopy cultural ecology data to complement large scale modeling of logging related impacts of Amazonian forests (Asner et al. 2005, Asner et al. 2006). The contributions of this study to the literature on logging impacts and indigenous resistance will be covered in greater detail in the conclusion. In summary the results include several findings. First, this research finds the Peruvian logging industry's operations in Amazonia to be shackled to the debt-merchandise system, a few high value species, and primitive methods of extraction. This antiquated industry model, and the failures of the new forestry law allow illegal loggers to aggressively exploit remote areas where geographic information and state presence is limited. Second, this research finds exploitation to include not only timber species but also local people. The complex exploitative labor relations between the loggers (both illegal and quasi-legal) and the borderland Asháninka are here described in ethnographic detail. These details describe the presence of precapitalist social relations of production and exchange and a weak state, thus contradicting Santos-Granero and Barclay's (2000) argument that the Loreto-Ucayali frontier is tamed.

Finally, the chapter finds significant differences between the borderland resistance pursued by the Peruvian Asháninka and the Brazilian Asháninka in the face of illegal loggers. This comparison of resistance efforts by Alto Tamaya and Apiwtxa Asháninka demonstrate a large gap between their levels of organization and the amount of governmental support obtained for their efforts against Peruvian loggers. In this case, titled homelands (Apiwtxa) have proved superior barriers to logging related deforestation than untitled homelands (Alto Tamaya). Apiwtxa sounded the alarm to mobilize thousands of troops on the border even as Alto Tamaya struggled to obtain their first community school teacher. A number of variables contribute to Apiwtxa's improved organization and support: titled land, a progressive regional government, stronger ties

with NGOs, ability to use national security discourse as the trespassee, are just some examples. While these variables rely on the ability to mobilize power (Schmink and Wood 1992) and encourage political will in a contested frontier, I argue in this dissertation's conclusion that these also depend on the improved geographic knowledge available in the Brazilian borderland region. In the absence of this knowledge Apiwtxa lies in an unmapped borderland unable to obtain a title, invisible to the Acre government and interested NGOs, and easily dismissed by military leaders when residents attempt to alert authorities of Peruvian trespassers.

This is the situation of Alto Tamaya, a community desperately seeking to get on a borderland map currently dominated by forestry concessions and blank spaces (Figure 94). This lack of geographic knowledge and the associated absence of a state presence have allowed illegal loggers to rule the borderlands: building hundreds of kilometers of illegal roads, exploiting indigenous and urban labor through debt peonage, and trespassing into neighboring countries to harvest mahogany and cedar. To date, these loggers have been stopped only through the sounding of an alarm by an unanticipated Brazilian border patrol, the Apiwtxa Asháninka. Although not official, the Asháninka people have proved to be superior border guards because of their local knowledge and motivation to defend their land and resources. Their unofficial but highly effective boundary vigilance fulfills the national security goals of a Brazilian state preoccupied with their extensive Amazonian boundaries. They are the most charismatic, organized, and visible presence along a scarcely populated and vulnerable political boundary. Interestingly, the ongoing defense of their Asháninka territory reflects a role the Brazilian Coronel Mendonça (1907: 141) recommended for the indigenous border populations a century ago:

Figure 94. Pablito, sub-chief of the Alto Tamaya community, shares his geographic knowledge of the region. One outcome of this research has been the creation of both counter maps and a GIS shapefile showing the territorial homelands of the Asháninka of Alto Tamaya (Figure 58).

> "If it was up to me to suggest on behalf of these our noble compatriots…to submit them to a brand of military regime, administered without severity in villages alongside the boundary lines that so suit us to garrison without destroying their family ties….".

Borderlands throughout Amazonia are often sparsely populated with most residents being traditional peoples. Ultimately, these extensive borders are likely to be patrolled most effectively by the people who know them best: their traditional residents. However, this will only be the case if these populations are given a territory of their own that merits patrolling.

The alternative is to perpetuate a lawless border such as the one described in Alto Tamaya: a poorly mapped borderland where loggers or other illegal predators of natural resources are allowed to roam unchecked in areas that administrative centers know little if anything about. While a top down imposition of forestry concessions on these unknown lands may appear to simultaneously satisfy economic and territorial organization goals, in this case it merely perpetuated injustices and poor resource management in the inhabited borderlands. This signals the potential failure of the new forest law to substantively improve the governance of Peru's Amazonian forests (Smith et al. 2006). This study has pointed out examples of ineffective law enforcement, corruption, insecure property rights, and the lack of basic geographic information under the new forestry regime. These governance failures result in a continuation of the status quo, where the violation of timber laws is an accepted code of behavior (Smith et al. 2006:468). A more prudent measure to the top down imposition of new legislation and concessions is to obtain accurate geographic information from the ground up by taking advantage of the local knowledge from the traditional inhabitants of these political margins. While this alone will not solve the injustice in these remote areas, it is the first step in empowering formerly marginalized populations to obtain title to their territory and

allowing state and non-state organizations the opportunity to invest in the cultural and ecological diversity of these areas. In addition, as demonstrated here, the titling of land also can alert the administrative centers of the trespassing of foreigners on remote political boundaries that cannot otherwise be effectively patrolled.

Chapter Four: The Social and Environmental Impacts of Coca Cultivation in the Amazon Borderlands of Peru

I. INTRODUCTION

The world's demand[173] for coca derivatives is almost entirely supplied[174] by coca cultivated in the coca growing region of Colombia, Bolivia, and Peru (UNODC 2005a). While world demand cannot easily be measured, the United Nations Office of Drug Control (UNODC) estimates 687 metric tons of cocaine were produced from 158,000 hectares of coca leaf cultivated in the region in 2004 (UNODC 2005a). The sale of this coca leaf generated an estimated 860 million dollars for coca farmers (UNODC 2005b). The economic and political importance of coca cultivation in these countries is reflected at the macro scale by the recent election of the charismatic former coca farmer and organizer Evo Morales to the Bolivian presidency (Economist 2005). Despite this importance, local scale studies of coca cultivation are rare due to the difficult and dangerous nature of field research on the cultivation of illicit drugs[175] (Henkel 1971, Morales 1994). This lack of local level research leads to serious oversights such as the UNODC's 2005 Peru Coca Cultivation Survey (2005c: 10, 32) and others (Machado 2001: 388, Plowman 1984: 131) finding no cultivation in the central borderlands of Peru. Similar to the two previous chapters, I argue local level field research to be of critical importance to understand borderland resource dynamics. In this case, the focus is coca, and here I explore the importance, nature, and impact of coca cultivation in the central

borderlands of Peru. What are the characteristics of borderland coca cultivation? How widespread is it? And if widespread, what are its social and environmental impacts?

While Peruvian coca cultivation is primarily associated with the coca production zones of the eastern Andean slopes and valleys (Young 1996, 2004a), this research estimates borderland coca production to be worth hundreds of millions of dollars in the four watershed study site alone. Since borderland coca cultivation was established in the 1980s, farmers and traffickers alike have adjusted to the new constraints and opportunities present in the border region. This chapter describes how the introduction of this lucrative crop and the unique culture of its farmers fundamentally changed the demographic, economic, cultural, and social patterns of settlement in these borderlands. Here I describe the real and potential links of borderland inhabitants (indigenous and non-indigenous) and industry (logging and mining) in both Peru and Brazil to this transformative crop. In addition I explore the relationships between mapping, timber, and coca: the three main topics of this dissertation. This chapter also addresses the linkages between coca cultivation, processing, and trafficking and deforestation, forest fragmentation, biodiversity conservation, and contamination of soil and water. Moreover, this chapter contributes a detailed description and analysis of Peruvian eradication methods and measures to propose the hypothesis: coca eradication increases rather than mitigates the negative social and environmental impacts of coca cultivation.

The chapter begins with a brief description of the varieties of cultivated coca and their uses before introducing the methodologies and study site in the second section. The third section gives a recent history of coca eradication and eradication methodologies in Peru. The following section outlines how coca cultivation in the borderland study site may be distinct from coca cultivation described in published accounts elsewhere in Peru. Then, the fifth section describes real and potential social impacts of this borderland coca

cultivation through an analysis of coca boom towns, the ties of the coca industry with logging mining, and revolutionary groups, and the relationship between indigenous groups and commercial coca. The sixth section focuses on environmental impacts with specific attention to deforestation, threats to protected areas, and chemical inputs. Finally, the conclusion discusses the findings and offers some policy recommendations.

II. COCA

The sources of all cultivated coca are two closely related South American shrub species *Erythroxylum coca* and *Erythroxylum novogranatense* (Plowman 1984). Each species has an additional variety, *E. coca* var. *ipadu* and *E. novogranatense* var. *truxillense*, with the former known for its traditional use by lowland Amazonian groups (Plowman 1981) and the latter a drought-resistant variety grown largely for commercial purposes in arid to semi-arid interandean valleys (Young 1996). The most important variety for both traditional leaf chewing and the production of coca paste and cocaine in Andean Peru is *E. coca* var. *coca.* Although E. *coca* var. *ipadu* has been cultivated in lowland Amazonia for many centuries, historically, its low alkaloid content has made it a poor choice for cocaine production, indicating E. *coca* var. *coca* to be favored for cultivation in the expanding production areas of Amazonian Peru. Nevertheless, recent research on coca cultivated illegally in the Colombian Amazon indicates farmers to be increasingly cultivating high-producing hybrids of *E. coca* var. *ipadu* (Johnson et al. 2003). These hybrids would be well adapted and easily diffused across the Putumayo River to the Peruvian Amazon, and may well be increasingly planted in the study site.

While expanding production in Peru is driven by foreign demand for coca leaf derivatives like cocaine, over four million Peruvians continue to practice traditional use of the leaf (Rospigliosi et al. 2004) as they have done for perhaps as long as five thousand years (Piperno and Pearsall 1998). Coca leaf chewing can alleviate hunger, cold and

fatigue and is used both in traditional medicine and shamanic practices (Rospigliosi et al. 2004). Traditional use of the coca leaf appears to have no negative consequences (Duke et al. 1975, Morales 1994) while the sharing of leaves and participation in group sessions of coca chewing continues to create and strengthen ties between friends and family (Allen 2002, Andrews and Solomon 1975, Morales 1994,Young 2004a). Indeed, the economic interchange of coca leaf has also fortified ties between highland consumers and foothill producers for at least the last millennium (Morales 1994, Osborne 1952).

The eastern slopes and foothills of the Andes continue to be the principal source of Peruvian coca leaf with the valleys of Alto Huallaga, Apurimac-Ene, and La Convención-Lares containing 88% of the United Nations Office on Drugs and Crime (UNODC) estimated[176] 50,300 hectares of Peruvian coca surface in 2004 although production is growing rapidly in other areas (UNODC 2005c). These 50,300 hectares of coca represent a 14% growth in total area under cultivation and the fastest expansion of coca surface since 1994. This growth places Peru second to Colombia in coca leaf production among countries worldwide. The UNODC estimates these 50,300 hectares capable of producing 110,000 metric tons of coca leaf (UNODC 2005c), well over the approximately 7,500 metric tons used by Peru's four million traditional users (Rospigliosi et al. 2004: 14) and the small amounts needed for the pharmaceutical industry and as flavorants. Thus, the majority of coca leaf production is driven by the global demand for coca derivative drugs such as coca paste, cocaine, and crack. Coca leaf can be processed into coca paste after soaking, and trampling the leaves and their residues in treatments using acids, solvents, neutralizers (Morales 1994, Young 1996). Coca paste is a drug used locally by farmers and processors, or nationally and in neighboring countries by the rural and urban poor (Geffray 2001, Maia 2005, Rojas 2002, Schonenberg 2001). The distillation of coca paste into cocaine hydrochloride requires another step often

undertaken in laboratories that reduces the volume even as it increases significantly in value (Morales 1994). Once made into readily transportable cocaine, the drug can be moved at less cost and risk to North America and Western Europe, the two regions estimated to have consumed over 70% of global cocaine in 2001-3 (UNODC 2005a). Latin America is the safest target for cocaine exports due to proximity and a growing market with over 5% of global consumption in 2001-3 (UNODC 2005a). Regardless of the end market, *Veja* estimated 45% of cocaine produced in Colombia, Bolivia, and Peru to pass through the Brazilian Amazon (Peres and Coutinho 2004).

III. METHODS

Field research was conducted in the Peruvian region of Ucayali and the Brazilian state of Acre for 10 months in 2004. The primary region of inquiry consisted of four watersheds in Ucayali, Peru whose headwaters coincided with the Brazilian border in the state of Acre (Figure 3). I and my five research assistants conducted in depth field work in nine different communities (indigenous and non-indigenous) within these watersheds. Initial field research focused on such local use of land and natural resources as ranching, farming, logging, and hunting. Research soon confirmed coca cultivation to be present in the study site and coca to be the most important cash crop in the region. The question was how to go about studying the crop. Morales outlined the challenging nature of ethnographic field research on Peruvian coca cultivation (Morales 1994: 175-189) and he was a highland indigenous Peruvian working in his home community. My own status was quite different: an obvious outsider working in watersheds where U.S. financed coca eradication was actively taking place. In order to successfully study coca cultivation I combined ethnographic field research, GIS analysis of a coca eradication data set, and document research.

My field approach was to pursue an indirect progressive contextualization. Rather than ask the typically direct factual and counterfactual questions (Vayda 1983, 2004), I looked for causal explanation through indirect questions and direct observation. Similar to Morales (1994), I found patience, good humor, and a casual curiosity to encourage people to share their stories about the cultivation and trafficking of the crop. I trained my field assistants to pursue the same strategy, showing casual interest by day and then recording notes by night behind the relative obscurity of the mosquito net. Participatory methods and interest in all types of crops and livelihood pursuits often led to the subject of coca and allowed willing participants to talk unsolicited about their experiences with or knowledge of this important regional crop.

The initial communities chosen for fieldwork were indigenous as I had an invitation from the regional indigenous organization to help raise the visibility of borderland indigenous groups. These first villages gave me a platform to find out more information about other villages and select ones that might have coca cultivation but also be relatively safe and open to researchers from outside the region. This required a great deal of trust, later found well deserved, in local knowledge and the abilities and reasoning of my field assistants. Ultimately, two of the nine community research sites were primarily dedicated to coca cultivation while two others had coca eradicated within their community limits and all communities had direct or indirect ties with the crop.

The ethnographic information on coca cultivation was complemented in the final week of data collection with the reception of a 2003-2004 eradication dataset of the four watershed study area from the special project Control and Reduction of Coca Cultivation in the Alto Huallaga (CORAH)[177] of the Peruvian Ministry of the Interior. This dataset confirmed the extent and impact of coca cultivation in the study area, and was

supplemented further by two days of informational interviews with CORAH topographers, geographers, and administrative personnel.

On my return to the United States I conducted additional remote sensing, GIScience analysis, informational interviews, document research, and archival research to contextualize my fieldwork. Remote sensing consisted of qualitative analysis of unclassified Landsat images from 2002. Analyzing these images in conjunction with the location of eradicated coca fields and my own field-based data allowed me to better understand the land use and transportation dynamics of the coca crop. The spatial relationship of coca fields and hydrological systems was determined using vector files of the major rivers and coca fields and ArcGIS 8.3's buffer wizard to create a buffer 5 kilometers distant from the thalwegs of rivers and the centers of lakes and analyze the extent of overlap of this buffer with the coca fields. Elevation data was generated, using ArcGIS 8.3, by taking the coca field polygons, interpolating them to raster and running statistics on their overlap with 90 meter resolution Shuttle Radar Topography Mission (SRTM) elevation data[178]. Other GIS analysis included selection of coca fields by attributes and location and running descriptive statistics in ArcView 8.3. I also analyzed the spatial relationships between mining concessions, forestry concessions, indigenous territories, conservation units, and the eradicated coca fields using the same software.

Field data and geospatial analysis was supplemented by archival and document research in three languages (English, Spanish, and Portuguese). While in Peru and Brazil I was able to collect documents and newspaper clippings about the borderland peoples, indigenous territories, resource concessions, conservation units, drug trafficking, logging, and to a limited degree, coca eradication. On my return to the United States I did additional research using libraries and the internet. In some cases, my field-based knowledge of the region allowed me to incorporate references that would have been

meaningless beforehand. Newspaper accounts from Ucayali, Peru and Acre, Brazil proved particularly helpful in supplying useful context and related data. The Benson Latin American Collection also yielded good sources of secondary, and in some cases, primary material. The search function of the internet (in all three languages) also proved useful in providing leads to the electronic documents of the United Nations Office of Drug Control, the Drug Enforcement Agency, the Peruvian Ministry of the Interior, and a variety of international journals in Portuguese and Spanish among a host of other sources. The combination of the comprehensive fieldwork, an exceptional dataset, technical skills, and documentary research described above provided a unique and detailed look at the real and potential social and environmental impacts of coca cultivation in this borderland site.

IV. ERADICATION

This study analyzes a borderland data set on coca eradication in 2003 and 2004 from the special project Control and Reduction of Coca Cultivation in the Alto Huallaga (CORAH) of the Peruvian Ministry of the Interior. The Peruvian government reported the total eradication of 10,257 ha of coca fields in 2004 and 11,312 ha in 2003 with CORAH eradicating 7,022 ha in 2003 and 7,604 ha in 2004 (Ministerio del Interior 2003a, UNODC 2005c). In Amazonian Peru CORAH is synonymous with the forced eradication of coca fields as CORAH's central goal is to reduce the cultivation of coca to levels commensurate with the legal use of the plant for traditional consumption and pharmacological purposes. Eradication measures are not often well received: in 2004 San Gaban residents threatened to retaliate by seizing control of the local hydroelectric power station and in Alto Huallaga and Apurimac, the two most prolific production zones, CORAH did not even attempt to eradicate coca due to fear of reprisals (UNODC 2005c). CORAH's self defined objectives are threefold (Ministerio del Interior 2002).

First, to predict, destroy and control illegal adult, juvenile, and abandoned coca crops used by drug traffickers for the illicit production of cocaine paste and derivatives. Second, CORAH seeks to prevent the expansion of coca on the landscape by expanding programs to eliminate coca seed beds. Finally, CORAH supports policies oriented towards the protection of natural areas, eradicating existing plantings of coca within National Parks and other state protected areas.

CORAH was created in 1982 to work in the coca growing region of the Alto Huallaga Valley. In 1994 CORAH was granted the right to expand efforts across Peru and today is administered by the Office of Drug Control in the Peruvian Ministry of the Interior and entirely financed by the Narcotic Affairs Section (NAS) of the United States Embassy in Peru through two 1996 agreements between the two countries: the Agreement to Combat the Illicit Use, Production, and Illegal Traffic of Drugs and the Operative Agreement for the Drug Control Project (Ministerio del Interior 2002, Ministerio de Relaciones Exteriores 2005). Up until 1996 CORAH was only allowed to eradicate coca seed beds, not planted fields. The Peruvian Government allowed CORAH to eradicate coca fields in remote locations distant from population centers starting in 1997 and since 1999 CORAH eradicates coca fields throughout the country except in the areas of greatest potential conflict (e.g. Alto Huallaga and Apurimac/Ene). According to the Peruvian Ministry of Interior, the United States provided a nine million U.S. dollar budget for CORAH from September 2003 to October 2004 with 4.1 million destined for eradication efforts, 1.9 million to administrative concerns, and three million for monitoring and quantification of the plant[179] (Ministerio del Interior: Oficina de Comunicación Social 2004).

CORAH's eradication methodology initially relies on the remote sensing of coca fields, specifically spectral analysis of satellite images, performed in Peru by the Cuerpo

de Asistencia para el Desarrollo Alternativo (CADA) and in the United States by the Crime and Narcotics Center (CNC). These methods produce cartographic and quantitative data on coca field location and distribution that is then corroborated by overflights and on the ground intelligence. Once the coca field targets are identified, CORAH eradication teams are transported to the eradication site by 21 UH-1H and UH-II helicopters owned by the United States (Bureau for International Narcotics and Law Enforcement Affairs 2005) and supported logistically by MI-17 helicopters owned by the Peruvian government[180]. CORAH teams eradicating in the study site averaged 106.9 CORAH personnel and 13.8 Peruvian National Police over 162 trips from August 2003-November 2004. The majority of CORAH field personnel are laborers, as eradication methods are manual with team members using specialized hoes called *cocochos* (Figure 95) to pull up coca plants by the roots before burning them in the center of the eradicated field. These teams eradicated 4,446 hectares of coca in 2,915 fields with each coca field averaging just over 1.5 hectares in size. This effort took an estimated 1,152 hours with the CORAH teams eradicating an average of 3.85 hectares an hour.

CORAH teams often require more than one day for eradication and thus at times build their own temporary base camps to house their laborers. These areas require armed guards due to the hostile actions of both the local coca farmers and the river bandits. One informant recounted his own experience as a pilot for the boats bringing supplies to these camps:

> I only made two trips before quitting. In June of 2003 at about 8 PM I arrived at the mouth of the Tamaya with my bowman in a boat full of goods for the CORAH camp. The boat had a forty horsepower outboard motor and was fast even as full as it was. The mouth of the Tamaya was always the trickiest place as river bandits usually waited there for boats bringing coca and money down from the coca centers and airstrips or boats bringing supplies up river. In this case, as we entered the river we saw a boat with six bandits just as they began firing. I started to swerve the boat from side to side immediately because I knew I was the target. The bandits always shoot for the pilot because once they get him the boat is

Figure 95. CORAH personnel use *cocochos* to manually eradicate coca in the field. First, they clamp the coca bush at the base and then pull the plant out of the ground roots and all. Photo: CORAH.

> directionless. There were four shots but they all missed. When they missed me, we were safe because their peke peke motor was no match for our outboard. Once we delivered the supplies to the CORAH base, I saw that it was enormous with 6 tents, a helicopter pad, kitchen, and dining for one hundred men. I made one more trip to the base but quit after hearing of the murder of another boat pilot ferrying supplies.

Another facet of the eradication efforts is the compilation of geographical data on coca field location and contents. Each team counts among its members a topographer equipped with a GPS and laser range finder binoculars who measures the size and location of the field and compiles a short tabular description of its coca contents: age, density, degree of maintenance and in some cases associated crops and tree cover[181]. This data is then taken to the temporary operations center where the chief topographer enters information using geographic software (AutoCAD). On returning to Pucallpa, the location of the regional seat of CORAH, the information is added into a larger geographic database for geographic and statistical analysis using GIS (ArcGIS). The data is also shared with partners in Peru, the United States, and the United Nations for additional analysis and the production of status reports.

V. COCA IN THE BORDERLANDS

Traditionally coca has not been associated with the central borderlands of Peru (UNODC 2005c, Young 2004a). While the use of coca by the former indigenous inhabitants of these borderlands, the Remo and Amahuaca, is unknown, the current indigenous inhabitants, the Shipibo-Conibo, Asháninka and Isconahua, cultivate very little of the crop. The floodplain dwelling Shipibo-Conibo appear to have not traditionally used coca (Bergman 1974, Tournon 2002), the Isconahua, an indigenous group in voluntary isolation, concentrate on hunting and gathering rather than farming, while the small populations of borderland Asháninka appear to mainly produce coca for

their own consumption, and this, only since their arrival in the region the last hundred years.

Maps of coca distribution and cultivation also show no presence of the plant in these borderlands. Plowman's 1984 coca distribution map based on herbarium collections show none of the four cultivated varieties to be found between the Ucayali and Juruá Rivers[182] (Plowman 1984). More recently, the UNODC's 2005 Peru Coca Cultivation Survey shows no cultivation in the region although they have extensive data on production countrywide including just across the Ucayali River in Aguaytia and Pachitea (2005c). Despite this absence of published accounts, fieldwork found coca to have been an important and lucrative crop with a significant distribution in these borderlands since at least the mid 1980s while the Truth and Reconciliation Commission of Peru recently defined 1985 as the year when coca began to be openly traded and cultivated along the Tamaya and Abujao Rivers (Comisión de la Verdad y Reconciliación et al. 2004a). Since then coca cultivation has expanded, as in 2003 and 2004 alone, CORAH eradicated almost 3,000 fields containing over 4,000 hectares of coca plants in the four river basin study area (Table 8)(Figure 38).

Table 8. Number and size of coca fields eradicated in 2003 and 2004 within the four watershed study site.

Year	**2003**	Std Dev.	**2004**	Std Dev.
Total Fields	1,674		1,241	
Total Has	2,227		2,020	
Avg. Has per Field	1.45	0.95	1.63	0.87

My analysis of these eradicated fields reveals coca cultivation in these borderlands to be unlike the majority of Peruvian coca, as cultivation is neither associated with roads nor hillside agriculture (Young 2004b). The strong association between commercial coca cultivation, roads and hillside environments exists because roads and steep slopes overcome the two primary limiting factors of well drained soils and

transportation: both for processing chemicals and taking the product to markets (Ray Henkel personal communication). However, the Peruvian road network extends only to the west bank of the Ucayali River with the few roads on the other side being either logging tracks[183] or the rare town road (Figure 38). Without roads, borderland coca relies on waterways, the traditional transportation routes of the Amazonian lowlands, with 95% of the fields eradicated in 2003-4 falling within five kilometers of a major river or lake. In addition, these three thousand fields average only 177 meters in elevation above sea level, perhaps the lowest published elevation for commercial coca cultivation. Despite the low elevation, the fields are well drained with terra firme soils and a pronounced dry season between July and October. Although the lack of roads and hillside agriculture preclude impacts such as deforestation driven by an expanding road network or accelerated soil erosion due to steep gradients, the amount of coca coverage in this sample, over 4,000 hectares eradicated, suggests borderland coca cultivation may have other social and environmental impacts.

VI. SOCIAL IMPACTS

The social impacts of coca cultivation are vastly understudied when compared to the extensive literature on the social impacts of coca consumption (Fryer et al. 2005, Rospigliosi et al. 2004, Sterk 1999). Nevertheless, these impacts are both substantive, widespread, and varied in the source countries of Colombia, Bolivia, and Peru due to amount of coca cultivation, 158,000 hectares (UNODC 2005a), and the variance in the human and physical geography of these diverse nation states. This section attempts to elucidate some of the real and potential social impacts of coca cultivation, and to some extent coca eradication, in the Amazonian borderlands of Peru by focusing on the themes of drug trafficking, boom towns, the economics of cultivation, ghost towns, and the

existing and prospective connections of coca cultivation with loggers, miners, revolutionary groups, and indigenous peoples.

The borderlands felt the social impacts of coca production long before the arrival of regional commercial coca cultivation as the political boundary has historically served as a gateway for coca and other illegal goods smuggled to Brazil and beyond. While the air bridges connecting source countries to processing centers and international markets is the most widely known scale of international coca traffic, coca, largely in the form of coca paste, has also moved across the border by water, foot or a combination of the two (Bureau for International Narcotics and Law Enforcement Affairs 2000). In the central borderlands, local people on both sides of the border participated in the process, serving to guide or carry the paste across the *varaderos* connecting the Ucayali and Juruá watersheds and on to urban centers (Araujo 2001). Local people provided logistical support as guides, boatmen, builders of landing strips, and spies for complex operations involving caravans of porters and armed guards taking coca paste across the border to urban markets or to water and air transport destined for processing in Colombia (Araujo 2001). Brazil, originally a transit country for Andean coca products, now has trafficking of its own and the dealing of coca paste, *pasta básica*, in its towns and cities (Schonenberg 2001). Coca paste traffic is so prevalent along the border that Brazilian youths from nearby border towns are now recruited to process and carry paste into their country. These young men are paid in kind and thus their subsequent peddling of the paste has addicted a portion of the Brazilian border towns' population (Maia 2005).

Although well paid for their services relative to other options, coca transport increased the potential for violence as drug traffickers, *narcotraficantes,* are known to place little value on human life. Thus, coca transporters do not share with others their routes through the border region as they are suspicious of ambushes laid for the cash and

goods they bring back from Brazil. Violence, however, is nothing new to these borderlands whose residents have grown accustomed to danger in their occupations as skin hunters, loggers, rubber tappers, subsistence farmers and smugglers. Indeed, in some ways, this region has changed remarkably little from a century ago when he who had the most rifles ruled the frontier (Portillo 1905a: 506). The *narcotraficantes,* or *nachis* as they are known locally, have had the most weapons and the most money in this remote and thinly settled region since at least the mid-1980s. One informant, a former logger, now a private in the Peruvian army, was hunting on a trail near the border in June of 2004 when he bumped into three Peruvian *nachis* carrying guns and what he estimated to be 15-25 kilograms of cargo, likely coca paste. Later that day, on another section of the trail, he saw seven more *nachis* returning from Brazil, all armed with shotguns, but now without cargo. He also shared how he had discovered two skeletons tied to a tree when on another hunting trip. A Peruvian army major in charge of a military outpost adjacent to the Brazilian border underscored the dilemma of the under equipped and much maligned Peruvian armed forces by stating, "If I fight against the illegal logging or drug trafficking I would have an armed conflict in two weeks…why would I stop narcos if when I turn in the paste or money I will be accused of keeping half."

The isolation, absence of law, and proximate international transportation routes of the borderlands proved attractive to the coca farmers from Huánuco, Ayacucho, and San Martín who arrived in the region starting in the mid 1980s and were soon followed by drug traffickers from the Alto Huallaga region (Comisión de la Verdad y Reconciliación et al. 2004a). Table 9's data on eradicated coca fields corroborates the arrival of the farmers as it shows regional coca production to not be a recent phenomenon with fields averaging almost nine years of cultivation and 23% of the fields being cultivated for more than fifteen years. The influx of coca farmers from the eastern slopes of the Andes

changed demographics drastically. The Shipibo-Conibo who inhabit the floodplain region on the lower portion of these rivers describe boatloads of people, goods, and foodstuffs traveling upriver at regular intervals with an occasional stop at in their community to buy foods like plantains or fish. Shipibo-Conibo informants depicted the new settlements upriver as organized by individual coca bosses controlling 30-40 workers farming 20-30 hectares of coca fields. Existing settlements became transformed with one even renamed after a locally famous drug trafficker (Comisión de la Verdad y Reconciliación et al. 2004a: 386).

Table 9. Age of coca eradicated in 2003 and 2004 within the four watershed study site.

Year	**2003**	Std Dev.	**2004**	Std Dev.
Total Fields	1,674		1,241	
Avg. Age of coca crop in fields	8.79	5.6	8.66	5.7
# of fields wth coca >= 1 yr	1511		972	
# of hectares with coca >= 1 yr	2182		1669	
# of fields wth coca >= 2 yr	1443		939	
# of hectares with coca >= 2 yr	2095		1631	
% of fields with coca >= 15 yrs	23%		22%	

These formerly isolated one and two family homesteads carved out of the upland rainforest exploded into coca hamlets, *caserío cocaleros*, replete with coca cultivating colonists, bars, discos, brothels, alcohol, weapons, and associated drug use, alcoholism, prostitution, and violence. One informant who worked as a boat pilot for a Colombian trafficker on the Tamaya from 1986 to 1987 recounted how the area changed almost overnight in 1986: "There was constant boat traffic, big yachts with 55 horsepower Evinrude outboard motors, between the coca fields of Borges and the landing strip of Noche Buena. Flights took off daily from Noche Buena." Violence increased as a result. In 2003 and 2004, in the Abujao, Callería and Utiquinía watersheds alone, researchers heard of coca farmers killing four coca buyers (*traqueteros*), two miners, and a Piassaba palm frond harvester while three *narcotraficantes* died fighting amongst themselves.

Nonetheless, violence was likely more common before eradication, as one informant in one of the Callería field sites stated, "Two years ago there were a lot of bad people here and they would kill anyone who appeared the least bit strange."

However, even this level of violence pales in comparison to the dark years in the late 1980s and early to mid 1990s. During this period the Shining Path and MRTA (Movimiento Revolucionario Tupac Amaru) followed the drug traffickers into the borderlands and began to impose their doctrine on local residents while inserting themselves into the coca business. The lack of state presence and education, the isolation of the area and residents, and the poverty and recent growth of the coca business provided opportunities for these revolutionary groups to establish an alternative political structure. While the remote area and lack of geographic information worked against authorities seeking to locate and destroy these groups, the revolutionaries' dependence on river transportation also made them vulnerable to attacks from the air and water. Despite this limitation, the Shining Path established committees along the Tamaya, Abujao, and Utiquinía River and kept an armed company (Frente Popular de Alto Huallaga) near Lago Inés (Comisión de la Verdad y Reconciliación et al. 2004a, Comisión de la Verdad y Reconciliación et al. 2004b). The MRTA arrived later along the Callería River. While theft and murder was already common between the coca farmers and drug traffickers, the entry of the Shining Path did little to lessen the violence. The Shining Path initially inserted themselves as a buffer between the coca farmers and the drug traffickers by controlling the weighing of coca leaf and paste. However, they soon asserted control over the drug trade and the population through public trials, firing squads, and the appropriation of coca fields. Before long the Shining Path controlled both river transportation and agricultural production along the Tamaya River, forcing farmers to plant one hectare of coca along with one hectare of their own choosing (Frente Popular

de Alto Huallaga) near Lago Inés (Comisión de la Verdad y Reconciliación et al. 2004a, Comisión de la Verdad y Reconciliación et al. 2004b).

While the Shining Path may have established relations with the borderland Asháninka, they appear never to have infiltrated the area's Shipibo residents. Indeed, some groups of Shipibo and other residents began to form self defense committees to combat the Shining Path directly. Along the Tamaya, the most famous of these committees were the Shipibo committee of Cucharita and the largely Brazilian committee of Puesto Alfredo (Frente Popular de Alto Huallaga) near Lago Inés (Comisión de la Verdad y Reconciliación et al. 2004a, Comisión de la Verdad y Reconciliación et al. 2004b). Both of these committees used their local knowledge of the landscape to not only ambush the Shining Path but also to provide critical information to an increasingly aggressive Peruvian navy. This local geographic knowledge led to the bombing of key Shining Path outposts and effectively broke Shining Path control of the Tamaya River in 1994 (Frente Popular de Alto Huallaga) near Lago Inés, (Comisión de la Verdad y Reconciliación et al. 2004a, Comisión de la Verdad y Reconciliación et al. 2004b). Similar confrontations occurred along the Callería River where residents recounted a 1996 gunfight between the MRTA and the Peruvian navy that left 5 revolutionaries and three soldiers dead. However, in the 1990s some of these borderland groups had already traded their political ideology for coca capitalism, and the destruction of the last revolutionaries merely meant a return to power of the traditional drug trafficking structure and a continuation of the coca boomtowns with their violence, dollarization, and *cocalero* culture.

Coca boomtowns and the transformation of livelihoods has been documented elsewhere in Peru (Rojas 2002), and Colombia (González Posso 2000, Muse 2005), although the transformation described here may be particularly acute due to the extremely

isolated nature of these borderlands. While increases in drug use, alcoholism, prostitution, and violence are negative, not all of the changes to these hinterlands were negative, as laborers could now earn a high daily wage working in the coca fields and access and afford better food, clothes, and medicine. The quality and quantity of river transportation also increased dramatically and the formerly isolated residents could now send their children to the new schools created to educate the children of the coca farmers. However, the influx of coca dollars also caused inflation in these weak backwater economies and may have undermined local livelihoods formerly rooted in cooperation.

Rojas argues that coca boom town residents fail to assemble with their neighbors for cooperative agricultural activity, *minga*, like harvesting or planting, as labor now cost money, and residents had developed the short term view of the ephemeral coca farmer (Rojas 2002). Despite the apparent logic of this argument, this study found residents participating in *mingas* for food production in former boomtowns where eradication recently took place. Whether *minga* was restricted during the coca years to food production or to non-coca cultivating families, returned only after coca eradication, or was common throughout remains unknown. Even if current residents demonstrate traditional communal and sustainable practices in their place of residence, the more recently arrived *cocaleros* can commit neither to sustainability nor to forming an attachment to place as they are constantly preoccupied with the eradication of their fields.

Their preoccupation stems from the lucrative nature of their crop and their reluctance to desist despite eradication. This reluctance is understandable when one takes into account just how much a coca farmer can earn from the coca leaf produced by one hectare of land. Although I cannot reliably estimate coca leaf production in the study site directly, production can be extrapolated using published United Nations data from coca cultivation in Aguaytia, Ucayali (just across the Ucayali River) or in the

Putumayo/Marañon area in Loreto where low elevation production also takes place. The UNODC estimates sun-dried coca leaf production in Aguaytia and Putumayo/Marañon to be 1,376 kg per hectare and 860 kg per hectare respectively (2005c). Although Tobler's law would dictate choosing Aguaytia due to proximity, here I use the Putumayo/Marañon estimate because it is both more conservative[184] and based on coca grown away from the higher elevation Andean foothills. Thus, one hectare in the study site could conservatively produce approximately 860 kg of sun dried coca leaf at an average farm gate price of 2.8 US $ per kg in 2004 (UNODC 2005c) or 2,350 US $[185] without the farmer even having to leave the *caserío*.

While conservative, this estimate dwarfs the income potential of alternative crops farmed close to the regional market city of Pucallpa (Table 10). This table reflects the riverine and agricultural fields in the immediate vicinity of Pucallpa and does not incorporate transportation in the production costs. Table 10 shows a hectare of corn, rice, beans, or peanuts, the most marketable crops in the region, to earn much less than this extremely conservative estimate for coca. Corn, rice, and beans produce marginal returns while a hectare of peanuts approaches 400 dollars in earnings (Figure 96).

Estimating the total worth of the coca production eradicated in the fields provides a window to the regional importance of coca cultivation to these borderlands. Since the coca plant does not reach full maturity until 18 months[186] (Morales 1994), I estimate borderland production using only those fields of at least 2 years in 2004, or 3,183 hectares[187] according to Table 9. To be conservative I deduct from this total the un-weeded coca fields eradicated in both 2003 and 2004 (1,660 hectares according to Table 9) to arrive at a total of 1,523 coca hectares with plants over 2 years old that are weeded or semi-weeded. Using the conservative UNODC Putumayo/Marañon estimate, 2004 annual production of sun dried coca leaf would be approximately 1,310,000 kg for these

Table 10. Earnings generated by some of the most common crops in areas near Pucallpa.

Product	Scientific Name, Variety	Area	Production Costs* ($**) (a)	Annual Production (Kg) (b)	2004 Price ($**) (c)	Income($**) (d) = b x c	Earnings ($**) d - a
Corn	*Zea mays* L. Var. Marginal 28 Tropical	1 ha	560	4,000	.15 per Kg	600	40
Rice	*Oryza sativa* L. Var Maravilla	1 ha	480	4,000	.15 per Kg	600	120
Beans	*Vigna sinensis* Var. Caupí regional	1 ha	290	1,200	.36 per Kg	430	140
Peanuts	*Arachis hypogea* Var. Rojo Masisea	1 ha	520	1,500.00	.61 per Kg	910	390

Data: Jorge Vela and Noel Ramírez, Universidad Nacional de Ucayali

* Production costs include soil preparation, seeds, equipment (e.g. bags for packing), labor for planting, weeding, harvesting, and post harvest processing. Costs do not include risks associated with pests, disease, flooding, or drought. Transportation costs vary widely and thus are also ommitted.

** Price in US$ calculated using 2004 November exchange rate of 3.3 Peruvian soles to the U.S. dollar.

Figure 96. Residents of a former caserío cocalero now look to beans for income. Photo: Ramírez Zumaeta.

fields with an estimated worth of 3,667,000 US $ at the 2004 farmgate average price. However, this is just a fraction of the potential profits the *narcotraficantes* realize from these fields in coca paste or cocaine.

Since UNODC data on the cocaine/leaf ratios are derived from oven dried rather than sun dried leaf estimates, I reduce the 1,309,780 kg of sun dried leaf by 70%[188] to 916,846 kg of annual oven dried leaf. According to the UNODC, one kilogram ofcocaine can be processed from 375 kg of oven dried leaf (UNODC 2005c) allowing me to grossly estimate 2,445 kg of potential annual cocaine production from these borderland watersheds. This amount of cocaine would be worth approximately 53,988,045 $ US[189] in the United States and 111,809,850 $ US in Europe[190] at wholesale prices (UNODC 2005d). Wholesale prices are of course just a fraction of the estimated street prices: 188,265,000 $ US in the United States and 215,160,000 $ US in Europe[191] (UNODC 2005d). Thus, although the coca leaf significantly improves the local farmer incomes, their potential earnings are less than 2% of the street value of the coca leaf product, cocaine.

While these conservative estimates underscore the economic importance of regional coca cultivation and the potential local impacts in terms of inflation and dollarization, the reality is these fields were eradicated in 2003 and 2004. Therefore, the regional coca boom must also be analyzed in terms of the subsequent bust. Forced eradication changed these boom towns to ghost towns. CORAH began systematic eradication efforts in the region in 1999 and their successfully repeated efforts in 2003 and 2004 drove many coca farmers from the region. CORAH eradicated all of the coca fields in one of the field sites only five months previous to fieldwork. The people of this village were leaving town for good. One of the informants there stated, “This is a disorganized place. Five years ago there was a lot commerce here, but now it is getting

Figure 97. A largely deserted village on the upper Callería River. Photo: Ramírez Zumaeta.

lonely… All of the towns upriver are losing people just like here." Travel upriver confirmed this statement with villages characterized by a lack of people and a number of deserted houses (Figure 97).

Table 11 shows the population for the middle and upper Callería River, where the inhabitants reside almost exclusively in *caseríos cocaleros*, in 1999 and in 2004. Over this five year period population declined over 67%. However, data from a 2004 census by a key informant, the local health official, state the numbers to be even lower, at 416 people, an 81% decline from 1999 (Table 11). This demographic change transformed the

Table 11. Population change after repeated eradication for the 13 coca farming towns on the Callería River.

Year	**1999**	**2004**	**2004***
Population	2,228	773	416

Sources: Center of Epidemiology, Ucayali, Peru
* Key Informant: The health official for all 13 towns took a 2004 census..

caseríos cocaleros into ghost towns, *pueblos fantásmas*, with abandoned houses (Figure 98), under attended schools, and the remaining residents contemplating moving on, pursuing alternative livelihoods, or in some cases gambling on discontinued eradication and replanting their coca. Eradication impacts both the professional coca farmers and the original residents of these *pueblos fantasmas* who now must adapt to life without coca. Life without coca equates to a depressed economy, a reduction of transportation options, the flight of many of the school teachers, and a return to a largely subsistence livelihood (Figure 99). One farmer on the Callería recounted, "five years ago there were a lot more people here in town, we had a bar, discotheques, a video pub and all of the entertainment available in Pucallpa (the regional capital), but now nothing, because all of this business has fallen since CORAH came. The people are leaving…" At one point when traveling up the Tamaya we stopped at a deserted riverside clearing with a few ruined tambos. The boat pilot, a former boat pilot to a Colombian drug trafficker on the Tamaya, was stunned

Figure 98. Disintegrating palm thatched roofs attest to the out-migration experienced post-eradication by this caserío cocalero. Photo: Ramírez Zumaeta

Figure 99. Residents of a former coca boom town ponder life after coca while collecting tobacco seeds.

when he learned this was formerly the village of Libertad: "When we used to stop here in 1986 it already had seven or eight houses, there was lots of money and plenty of stores, now there is just a ruined hut." Coca farmers, familiar with this boom and bust dynamic, and invested in the lucrative coca crop and the coca farming lifestyle, will likely move on to the next coca farming frontier. With approximately twenty years in the region, an entire new generation of coca farmers has been raised within a new borderland *cocalero* culture. Included in this group are necessarily the offspring of the original inhabitants who have also grown up surrounded by coca farmers and coca dollars. Some of these younger inhabitants will also likely move to either established or new coca cultivation centers to maintain a familiar lifestyle. On the Callería River the majority of inhabitants have already left despite the 2003 CORAH donations: a grain mill (Figure 100), a rice husker, three boat motors, five chainsaws, seven first aid kits, and 780 zinc laminate sheets.

While CORAH believes "these donations win over the population and improve the image of CORAH" (Ministerio de Interior 2003b), fieldwork and local media coverage (Ahora 2004a) revealed a great deal of dislike for the institution. Although several of the *caseríos* communally used the grain mill and rice husker in 2004 (Figure 100), many of the remaining residents hoped to continue farming coca, desiring to work with the Peruvian National Coca Enterprise, ENACO[192], to legally sell coca rather than switch to alternative crops.

The donation of chainsaws is particularly interesting given the numerous forestry concessions in the four watersheds (Figure 40) and the existing connection between loggers and narcotraficantes. While CORAH's hope would be for the chainsaws to be used to harvest tropical hardwoods rather than clear forest for coca fields, the relationship between loggers and coca farmers may currently revolve around the trafficking and

Figure 100. This grain mill and rice husker donated by CORAH are underused by the caserío due to the emigration of the majority of inhabitants after the eradication of their coca fields. Will these youngsters raised in a cocalero culture adapt easily to the post boom era or follow the coca to a new boom town? Photo: Ramírez Zumaeta.

laundering of coca paste[193]. Araujo (2001) contends some former rubber patrons in Brazil transitioned into the coca business either after an intermediate stop in or while simultaneously working in the illegal logging trade. Loggers possess the means of transport (barges etc.), geographic knowledge, and commercial and personal contacts that facilitate movement of goods in remote areas[194] (Araujo 2001). Indeed, a logging outfit in Peru has built a 140 kilometer illegal road from the Ucayali River to the Brazilian border in order to extract high grade hardwoods. However, this road could serve equally well to move coca derivatives to the Brazilian border, especially since, as an unsanctioned road, it is not monitored by Peruvian authorities. Obviously these traditional patrons wield enormous power in these isolated regions and have ample opportunity to get involved in the trafficking or laundering of coca and coca dollars. Two examples might include a former Governor of the State of Acre, Brazil and a former Mayor of Coronel Portillo, Ucayali, Peru since these immensely powerful and wealthy men made their fortunes harvesting borderland natural resources, particularly timber, and have been accused of both illegal logging and trafficking cocaine (Araujo 2001, Cruz 2003, Yovera and Cisneros 2004). Influential patrons such as these use their status as public officials and wealthy businessmen to maintain a political and economic clientele through their appointment of civil servants and their employment of hundreds of individuals in their stores and businesses (Araujo 2001). On the other hand, coca trafficking and illegal logging can also attract undue attention to each other's illegal activities as one Asháninka informant noted: "on the Upper Tamaya the narcos demanded the illegal logger stop logging along and across the Brazilian border because it was attracting too much attention to the region.

Another potential source of laundering in the area is the borderland gold mines in the Abujao and Utiquinia watersheds. Coca paste has a history of being laundered

through gold mining operations in the Amazonian borderlands (Brazil/Bolivia) with Brazilian gold miners or *garimpeiros* on the Mamoré and Guaporé Rivers also contributing to the growth of the Brazilian national coca market through their consumption of coca derivatives (Geffray 2001). Gold mining is relatively new to these Peruvian borderlands but is growing rapidly with more than 140 new concessions in the region since 2001 covering over 68,000 hectares (Figure 47). While my GIS analysis shows only six of these mining concessions to directly overlap with eradicated coca fields, the presence of mining boom towns between coca fields and the Brazilian border indicates a potential relationship given the regional history between miners and coca. Many of these mine workers are Brazilian *garimpeiros* although by law the holders of any concession title within fifty kilometers of the international border must be Peruvian.

While loggers, miners, and coca farmers live near the international border, the longest residents of the borderlands and the people who physically demarcated much of the regional boundary line (López 1925, Tastevin 1926) are the longtime indigenous residents. Commercial coca cultivation can pose a cultural threat to indigenous people as González Posso (2000) found indigenous people in the Colombian Amazon to have been "decultured" through their assimilation of the productive practices of the coca farmers to the point of preferring canned sardines over fresh fish. The two ethnic groups most prevalent in the study site are the Shipibo Conibo[195] and Asháninka peoples: the former live largely in the floodplain regions of the Ucayali River while the Asháninka tend to settle on higher ground. As can be seen in Figure 38, the majority of the eradicated coca fields in the four watersheds lie upriver of the Shipibo territories located near the Ucayali River but downriver of the borderland Ashaninka territories nearest the border. Although there is some overlap of coca fields with Shipibo territories, particularly near Lago Inés, the vast majority of coca fields in the area fall outside of the

Asháninka and Shipibo territories as most commercial coca farmers are colonists from outside the region.

Despite this, both the borderland Asháninka and Shipibo have had contact with drug traffickers and coca cultivation in the last twenty years. The borderland Shipibo Conibo's relationship with drug traffickers in the years between 1985 and 2000 demonstrates indigenous agency as they chose to resist and then expel the Shining Path, but also selectively invested in the lucrative business of coca cultivation. The Shipibo successfully repulsed the repeated indoctrination efforts of the Shining Path with one Shipibo recounting, "They did not have to impose their laws because we know how to act. We have one woman and we don't steal. Here the thieves and people with bad manners are the *mestizos*" (Comisión de la Verdad y Reconciliación et al. 2004b: 357). The Shipibo Conibo's existing communal organization, distinct culture, and disinterest in Shining Path discourse stonewalled the revolutionaries.

If the Shipibo demonstrated resistance to the Shining Path they also displayed a commercial interest in coca cultivation and drug trafficking. The Shipibo began working as well paid field hands in coca fields, but with the dollarization of the economy soon found selling food crops more lucrative: "There came a time when a bunch, five units, of bananas cost 10 soles and a chicken cost 40 soles. Everything had a high price and they paid in dollars" (Comisión de la Verdad y Reconciliación et al. 2004b: 371). The Shipibo also rented landing strips to drug traffickers until the navy threatened to bomb the landing strips if the Shipibo did not desist. One threat to the commercial interests and culture of the Shipibo were the Shining Path revolutionaries and their desire to control all aspects of the local population, coca cultivation, drug trafficking, and the related commerce.

Thus, some Shipibo attacked the revolutionaries directly, in the case of the self defense committee of Cucharita community, or provided the Peruvian navy with valuable

reconnaissance informed by local knowledge: "I have served my country and I would do it again to defeat the Shining Path… Our work was difficult because we had to disguise ourselves as civilians and then watch them kill innocent people while we stood silent and helpless" (Comisión de la Verdad y Reconciliación et al. 2004b: 365). The self defense committee of Cucharita helped hasten the demise of the Shining Path in the Lago Inés region, and then supplied drug traffickers with local protection after the Shining Path collapsed. The drug traffickers gave the Cucharita committee a boat and ammunition to patrol Lago Inés and protect the coca business from bandits and delinquents (Comisión de la Verdad y Reconciliación et al. 2004b).

The Lago Inés area of Ucayali bears continued analysis to determine the current involvement of Shipibo and coca as it is both a center for coca cultivation and the location of five Shipibo titled indigenous territories. Despite the Shipibo's control of most of this area and the proliferation of coca fields it is the non-indigenous residents who appear to dominate coca cultivation around the lake. According to my analysis, in 2003 and 2004 CORAH eradicated 676 coca fields, 980 hectares, within five kilometers of the lake shore. Within this same area are five Shipibo communities and nine *caseríos* with 2003 population totals of 1514 and 1184 respectively (SICNA: IBC 2004). These Shipibo indigenous territories cover over 56% of the land within five kilometers of the lake shore with the rest of the territory owned by the state or individuals. Despite the Shipibo dominance in the lake area of both population and territory, 92% of the coca fields are located on non-indigenous lands. Of the 8%, 57 coca fields, located within indigenous territory, the majority predate the titling of the indigenous territory, are located in remote areas closer to caseríos than the indigenous population centers, or both, thus demonstrating the possibility that the fields may not be farmed by the local indigenous people. However, this study conducted no fieldwork near Lago Inés and thus

I have no ethnographic data to clarify why these overlaps exist and who specifically is farming the coca. The area is of particular cultural importance as archeologist Donald Lathrap used analysis of the Cucharita dig to suggest the lake region to have had the "…densest concentration of Pre-Columbian population in the Central Ucayali Basin" (Lathrap 1970: 145). Interestingly, the Regional Government of Ucayali has declared the lake region one of two priority areas for regional conservation units (Tedy Tuesta personal communication). A well enforced conservation unit would likely decrease coca farming in the region, but the typically under funded and poorly protected conservation unit might give existing coca farmers greater leeway to expand their operations.

Another example of a Shipibo territory overlapping eradicated coca fields occurs on the Utiquinía River. The residents of Fuente Rica lived along the Ucayali River until 1986 when two consecutive years of flooding and the erosion of their lands forced them to seek refuge on the left bank of the Utiquinia River where they obtained title to 534 hectares of land. After a few years these relocated Shipibo families had exhausted their small quantity of land, and thus, in 1992, solicited an amplification of their territory to a total of 29,162 hectares. However, this attempt to amplify their land met with immediate resistance from the neighboring *caseríos*. Resistance came from four *caseríos* who protested in writing to the Ministry of Agriculture of losing land necessary for their crops (AIDESEP 1996). The families of Fuente Rica argued against favoring the *caseríos* as such a stance would only favor "predatory loggers and give rise to coca fields within community territory" (AIDESEP 1996: 96) beyond the 4.5 hectares of coca the caseríos already cultivated in the area solicited.

While the Ministry of Agriculture did award Fuente Rica the majority of the land they asked for, my analysis shows that coca cultivation grew tenfold from 4.5 hectares to 41 hectares in a little over a decade. In May of 2004, CORAH eradicated 27 fields along

the northern perimeter of the Fuente Rica territory[196]. These fields averaged thirteen years in age and totaled 41 hectares with each field averaging roughly 1.5 hectares a piece. The majority of these fields (78%) were in active cultivation with 18 of the fields covered by tree canopy to disguise the crops from remote sensors. All of the fields appear to belong to neighboring *caserío*s on the northern border of the community of Fuente Rica. Indeed accessing the fields from Fuente Rica would entail traveling upriver by *peke peke*[197] at least three hours before hiking into the fields while they were only a short walk from the neighboring *caserío*. These results from Lago Inés and Fuente Rica illustrate the increasing danger coca cultivation poses to indigenous communities. Indigenous communities struggle to control their land from well funded and well armed coca farmers, especially given the lack of investment in their territory and support by governmental and non governmental organizations in their borderland communities. Further research needs to be undertaken to determine the degree of involvement of the communities in coca cultivation near and within their communities.

The borderland Asháninka are much less numerous and control much less land than the floodplain dwelling Shipibo Conibo, nevertheless, both their upland territories and labor appeared to have been coveted by drug traffickers eager to expand their coca cultivation. Unlike the Shipibo, the Asháninka have a strong history with coca, having grown and consumed it for centuries in their homelands in the Selva Central (Fry 1907, Sotomayor 1908, Tessmann 1930). Residents of San Marcos recounted how narcos came into their village and told them they needed to plant coca or they would be punished. The village chief declined, saying that they had title to their land and did not have to listen to the narcos. The residents of San Marcos were never punished and claim to not cultivate coca although they do obtain it from downriver and use it for traditional use: chewing and shamanic practices. During borderland fieldwork, an Asháninka shaman read my fortune

using crushed coca leaves. Along the Tamaya at least one resident remembered being paid to carry what he called *harina,* flour, across the border into Brazil more than a decade ago. Residents have also been offered large sums of money to build an airstrip for the narcos. Now these people are in a struggle to title their land and claim to not plant coca for commercial purposes. Another Asháninka community of the Upper Tamaya was invaded by Columbian drug traffickers around 1990 (Richey 2005). They killed a number of Asháninka before they eventually killed each other due to a dispute over money. According to residents, some of the Asháninka worked for them during this period. Downriver other Asháninka villages are surrounded by recently eradicated coca fields.

CORAH arrived in one untitled indigenous community along the middle Tamaya in 2003, camped in the community, and eradicated the coca fields in the surrounding region. The majority of the coca farmers were outsiders from the Andes who left after CORAH uprooted their coca plants. Nevertheless some of the coca farmers were Asháninka who have traditionally used the coca plant for many generations. These and other area Asháninka on the Tamaya River continue to work towards gaining title to the area. On the Brazilian side, the Asháninka of the indigenous territory Kampa do Alto Rio Amonia are unhappy with how the commercial coca is threatening their cousins in Peru and how it is being transported through their boundary territory to Brazilian markets. However, even the Brazilian Asháninka have been offered money, 30,000 U.S. dollars, by *narcotraficantes* to construct a landing strip in their territory (Aquino 2004). They have repeatedly declined to accept bribes.

The final indigenous residents in this borderland region are the Isconahua, an indigenous group in voluntary isolation, who apparently still roam the reserve set aside for their use despite the increasing incursions of illegal loggers and drug traffickers. In

1960 two missionaries from the South American Mission (SAM) convinced seventeen of the Isconahua to relocate downriver and live with the Shipibo Conibo in the community of Conta (Arbaiza Guzmán et al. 1995, Momsen Jr. 1964, Whiton et al. 1964). This group of Isconahua then split off from Conta to live on their own, but in 1993 returned to Conta because of fear of drug traffickers and terrorists threatening their small village. The anthropologist Manuel Cuentas estimates the Isconahua in voluntary isolation to number 240 persons (Arbaiza Guzmán et al. 1995). Seen as recently as 2001 on the Peruvian side (Manuel Cuentas personal communication) and 1999 across the border in Brazil (Montagner 2002), these nomadic indigenous people must avoid the established drug trafficking trails crisscrossing their homelands for their own safety. While the impact of the repeated smuggling of coca derivatives and the established drug trafficking routes on these elusive people and their territory is unknown, there can be little doubt they bring negative consequences.

VI. ENVIRONMENTAL IMPACTS

The environmental impacts of coca cultivation remain uncertain in part due to the paucity of field research and data on the subject (Dourojeanni 1989, Henkel 1995, Salm and Liberman 1997, Young 1996, Young 2004a). This is particularly true of the borderlands where few human-environment studies of any sort have been carried out. Not surprisingly, the environmental impacts of coca cultivation are likely to vary widely throughout the regions where the plant is cultivated. For example, Henkel argues against the elimination of coca in the Bolivian Chaparé from an ecological standpoint as the hardy coca plant is capable of growing on impoverished soils and its substitution by an alternative cash crop would force farmers to penetrate into forested lands to find sufficiently fertile soils for a new economically viable agricultural system (Henkel 1995). On the other hand, Young found 3,375 plant species to be potentially negatively

affected by the clearing of forests to establish coca fields in Peru's San Martín department (Young 1996). Here I focus on some preliminary observations regarding the relationship between coca cultivation and the environment by looking specifically at deforestation/forest fragmentation, protected areas, and chemical inputs.

There is no question that coca cultivation has a severe negative impact on the primary forests of remote areas such as the borderlands. These areas would likely still be forested if not for the world's demand for coca derivatives. This demand and eradication elsewhere drives *cocaleros* to search for new cultivation sites. However, once coca cultivation has begun the deforestation impacts are somewhat mitigated by the long growing cycle of the perennial plant and the spatial clustering of coca fields. These attributes may make the deforestation impacts of a fixed number of *cocaleros* less than that of the colonists practicing legal agriculture (Salm and Liberman 1997). In addition, other agricultural options would require more land to make production commercially viable and would require more fertile soils than the hardy coca bush.

Soil erosion is a negative environmental impact often associated with coca cultivation (Dourojeanni 1989). However, erosion is spatially dependent given variables such as soil type, topography, elevation, rainfall, soil preparation, and defoliation to name a few. While primary forest is recognized as a better preserver of soil than coca, experts disagree on whether coca cultivation is more or less detrimental to soils than other crops. Dourojeanni's research in Peru found, "… there is no other crop that, in a generalized way, provokes similar levels of erosion" (1989: 288). On the other hand, in Bolivia, Salm and Liberman argue that coca requires low nutrient needs compared to other crops and can retain soil better than most due to its long growing cycle (1997). The erosive properties of coca cultivation in the borderlands remains inconclusive due to the inability

to conduct research within coca fields in the study site, and thus deserves further study to contribute to the debate.

The location of the 2,915 fields of coca eradicated in the study site demonstrate coca cultivation to be taking place in upland forest proximate to waterways. The need for riverine transport due to lack of roads and the ready availability of arable land encouraged coca cultivation close to rivers and lakes. Indeed 77% of the eradicated coca fields were within two kilometers of a major river or lake and 95% within five kilometers. Coca cultivation was not unique in this regard as almost all agricultural activity in the area occurs close to waterways to facilitate transport to market and because that is where local people live. The clustering of coca fields seen in Figure 101 is not unusual in the region and demonstrates the relative low level of deforestation impact *in situ*. These coca field clusters often surround the *caserío* centers and their individual fields are usually either adjacent to the next coca field or separated by another crop field or a band of secondary or primary forest. While both the intervening and surrounding forest likely lose species diversity due to edge and fragmentation effects, in addition to negative effects related to the extraction of timber, game and non-timber forest products (NTFPs) (Cochrane and Laurance 2002, Laurance et al. 2002, Nepstad et al. 1999, Peres 2001), the biodiversity impact of coca cultivation appears relatively localized due to this clustered and localized spatial pattern.

The coca plant can also be harvested for twenty years after planting and does not need particularly fertile soil making it a much more spatially stable crop than traditional upland crops requiring the slash and burn of primary and advanced secondary growth. While coca fields tend to multiply when prices rise, the low population levels and isolated nature of the study site ensure limited expansion. Manual eradication measures obviously remove coca fields but some coca farmers continue planting as evidenced by

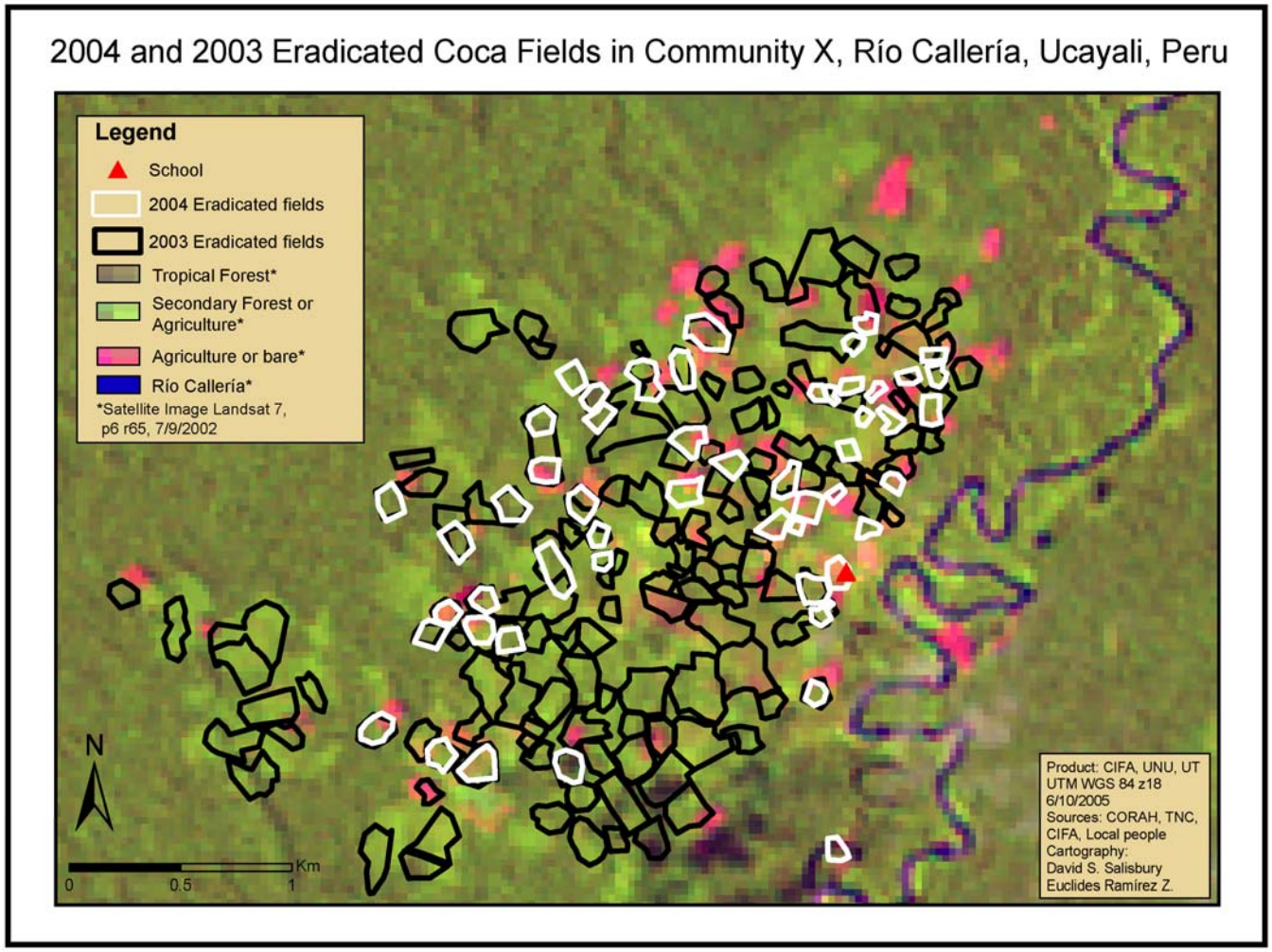

Figure 101. Coca cultivation causes deforestation and forest fragmentation but the clustering of coca fields and the repeated replanting of the same fields lessens the negative environmental impacts.

12% of the fields eradicated in 2004 being newly planted within fields eradicated in 2003 (Figure 101). Repeated eradication may not discourage all farmers from replanting but, interestingly, coca cultivation is most threatening to terrestrial biodiversity immediately after repeated eradication as coca farmers now must relocate to an even more isolated region to continue their relatively lucrative livelihood. The borderland coca farmers arrived in this remote region after eradication efforts and drug related violence forced them out of the Andean foothills in the mid-1980s. So now they may very well take their coca cultivation and the associated deforestation front to a new and more inaccessible region where biodiversity levels may be even higher. Few areas in Amazonian Peru are more remote than these borderlands, some exceptions being conservation units, protected forests, and indigenous territories.

Protected areas are obvious targets for migratory coca farmers for this very reason and coca cultivation is threatening the national parks in Peru even as it continues to expand inside the boundaries of parks in Colombia and Bolivia (UNODC 2005e; UNODC 2005f). My 2004 analysis of the overlap of coca cultivation and Peru's National System of Natural Protected Areas (SINANPE) reveals cultivation to be immediately adjacent if not within the limits of the Peruvian national parks of Tingo María, Cordillera Azul, Bahuaja-Sonene and Bolivia's Madidi National Park. The recent exodus of the coca farmers in the four watershed study region could lead them to continue up the Ucayali to infiltrate isolated and poorly protected conservation units like the Alto Purús National Park. Indeed fieldwork in 2002 revealed coca has been transported by raft from the headwaters of the Purús through the park and on to Brazil since 1995. In addition, coca cultivation and processing has recently been confirmed along the border of the Alto Purús National Park (Chris Fagan personal communication).

Trafficking is also extremely problematic for Brazil's borderland Serra do Divisor National Park as the *narcos* constantly move coca paste through the park and into Brazil.

In April of 2006, the Peruvian government created the Zona Reservada Sierra del Divisor to protect the biologically diverse zone along the Brazilian border. The Zona Reservada designation is a transitional category that could become a national park, communal reserve, or another definitive conservation category depending on the conservation threats and opportunities of various human and non-human stakeholders. This borderland zone, which includes the Isconahua Regional Reserve, is crossed by numerous drug trafficking trails leading through the Sierra del Divisor mountain range and into Brazil. However, the area also contains former, and perhaps current, coca cultivation along the Callería River while coca cultivation has also been practiced downriver from the Zona Reservada along the Utiquinia and Abujao Rivers. Table 12 reveals extensive coca eradication within the Zona Reservada along the Callería River with 422 fields eradicated in 2003 and 91 in 2004. Over 56% of the 2004 fields eradicated had been replanted in fields eradicated in 2003. While the area's status as a

Table 12. Callería watershed coca fields eradicated in 2003 and 2004 falling completely within the Zona Reservada Sierra del Divisor.

Year	**2003**	Std Dev.	**2004**	Std Dev.
Total Fields	422		91	
Total Has	672		105	
Avg. Has per Field	1.59	1.02	1.16	0.56
Avg. Age of coca crop in fields	8.26	5.99	2.7	5.15
# of fields wth coca <= 1 yr	80		71	
# of fields replanted	No Data		51	
# of fields with coca >= 10 yrs	204		14	

coca cultivation and drug trafficking zone is a serious threat to the conservation of the area, the successful, repeated eradication described here and the subsequent migration described along the Callería River in the previous section may provide an opportunity to

invest in conservation projects in the area. A substantive and timely investment in the area's development by conservation organizations could provide a conservation incentive for local people looking for economic opportunities following the coca boom. Without alternative products or opportunities, coca could return rapidly to this biologically critical area and foreshadow future conflicts between coca and conservation.

UNODC data on Bolivia and Colombia relate a cautionary tale of territorial conflict between coca cultivation and biodiversity protection as coca within their national parks continues to grow despite eradication measures in both countries (UNODC 2005e; UNODC 2005f). Bolivia's Chaparé region has been a major center of coca cultivation for decades (Henkel 1971) but new fields are increasingly established within nearby national parks: "between 2003 and 2004 coca cultivation increased by 71% in the national parks of Chaparé, as opposed to increasing only 22% outside national park boundaries. In fact, coca cultivation within two parks (Isiboro Secure and Carrasco) represented 40% of the Chaparé's total coca cultivation" (UNODC 2005e: 48). In addition, in 2004, coca cultivation also appeared for the first time inside the Madidi National Park, which shares hundreds of kilometers of border with Peru and is already threatened on the Peruvian side by coca farmers (UNODC 2005e).

Coca cultivation also overlaps with protected areas in Colombia where 7% of Colombia's coca cultivation takes place within national parks (UNODC 2005f). Thirteen of Colombia's 50 National Parks contain commercial coca cultivation for a total of over 5,000 hectares of coca fields (UNODC 2005f). Overlap of coca and national parks is particularly problematic in Colombia where aerial spraying is a common means of eradication and a significant threat to conservation (Fjeldsa et al. 2005).

While manual eradication not aerial spraying is the primary eradication method used in Peru, coca related chemical inputs do exist in the study area. Given that

fieldwork did not record the use of herbicides or pesticides for borderland coca cultivation, and coca farmers in the nearby and more established cultivation region of Aguaytia do not use chemicals, it seems likely they are not present in the study site (UNODC 2005c). However, chemicals do enter the air, soil, and water system through the processing of coca on farm sites. While not every farmer processes coca leaf into coca paste, borderland coca is often processed right there in the borderlands, most likely because much of it is sent directly over the border into Brazil. One informant recounted a battle between CORAH and coca farmers in one of my study sites on the Callería River that resulted in the capture of two coca chemists.

CORAH destroyed 21 processing pits in eight locations across all four watersheds in the two year period of 2003-4. Processing pits are easily relocated or rebuilt since they are usually nothing more than holes in the ground lined with either concrete or plastic. The holes vary in size but are usually about eight meters long, five meters wide and one and a half meters deep (Morales 1994). Processors fill the holes with coca leaves before soaking and trampling them and their residues in a series of treatments using sodium carbonate, sulphuric acid, solvents (e.g. kerosene), and neutralizers (e.g. lime) (Morales 1994, Young 1996)[198]. The amount of chemical inputs per kilo of coca paste is impressive: roughly 115 kg of coca leaves, 1 kilo of sodium carbonate, 5 kilos of sulphuric acid, 7 gallons of kerosene, and 8 kilos of lime (Morales 1994). Thus 11,390 kg of coca paste could be created from the estimated 1,309,780 kg of sun dried leaf produced in the study site. At 640 $ US per kg this amount of paste would be equal to 7,289,600 $ US. But this amount of coca paste could require[199] as much as 11,390 kg of sodium carbonate, 56,950 kg of sulphuric acid, 79,730 gallons of kerosene, and 91,120 kg of lime. All of these chemicals then find their way into the environment through the processing pits.

Researchers in the Bolivian Chaparé have argued that the immediate environmental impact of these processing chemicals could be less than anticipated[200] as the existence of holding ponds, the concentration of pollution at the processing site, the scattered distribution of these sites across the landscape, and the diluting effect of high levels of rainfall restricted biodiversity loss to soil microorganisms in the immediate vicinity of processing sites (Henkel 1995, Southwest Research Associates 1993 cited in Henkel 1995). While I am aware of no holding ponds in the study site other than the processing pits themselves, the pollution concentration in scattered sites with high rainfall does hold true for the borderland region. However, the long term effects of the chemicals on biological populations following chemical filtration into the groundwater and fluvial system are unknown. Kerosene is recognized to severely affect flora, fauna, and particularly plankton, in addition to reducing oxygen level in water while sodium carbonate and sulfuric acid are toxic substances (Dourojeanni 1989). Given the presence of these processing chemicals, the clustering of coca fields near waterways threatens the highly biodiverse floodplain forests essential to aquatic life (Goulding et al. 1996, Smith 1999). This study is sorely needed as chemical residue threatens not only plant and animal biodiversity but also human populations, both rural and urban (e.g. Pucallpa and Iquitos), downstream of coca processing sites. Long term effects could follow these Amazonian tributaries as far as Brazil and beyond.

Another environmental impact relates directly to the human biological system as drug traffickers often employ local people, including children, to trample the leaves in the processing pits. The acidic solution can burn the feet of the laborers (Rojas 2002) and irritates the throat and eyes (Impetu 2004): to my knowledge a thorough study of the side effects of processing remains to be done.

VII. CONCLUSION

This analysis of the social and environmental impacts of coca cultivation in the borderlands of Peru provides new insight into a topic poorly explored by geographers despite its real and potential influence on the landscapes and peoples of the Andes and the Amazon (Young 2004b: 366). The chapter's first conclusion is to declare coca cultivation to be present in the Amazon borderland study region despite the lack of documentation from both the recent research of the United Nations Office on Drugs and Crime (UNODC 2005c) and the extensive historical work of Plowman, the foremost ethnobotanist specializing in *Erythroxylum* (Plowman 1981, Plowman 1984, Plowman and Hensold 2004). Figure 38 is the first detailed map of coca cultivation in the central borderlands of Peru. Although coca has traditionally been associated with roads and hillside agriculture in Peru (Young 2004a, 2004b), this study demonstrates commercial coca cultivation to be present in the low lying and roadless borderlands since the mid 1980s. Indeed with these fields averaging 177 meters in elevation, this may be the lowest elevation recorded for commercial coca cultivation. This study also updates the literature on social impacts, contradicting Rojas (2002) in finding coca cultivators still practicing cooperative agricultural activity, *minga*, despite the influx of a dollar driven coca economy. This research Coca cultivators likely descended into these lowlands following increased eradication in the Upper Huallaga valley (Bedoya and Klein 1996: 180).

The influx of outside coca farmers and the rapid growth of the coca boom towns changed the economy, demography, and culture of the region's formerly isolated riverside hamlets. This was exacerbated in the late 1980s and early 1990s by revolutionary/drug trafficking groups such as the Shining Path and MRTA. However, repeated eradication and associated out migration such as seen here transformed the boom towns into economically depressed ghost towns. The vast majority of indigenous

people in the region are likely not coca cultivators despite the promotional and threatening efforts of drug traffickers and revolutionary groups, although some have participated as laborers, and consumers, and many benefit from the dollarization of their formerly subsistence goods. Further research is needed to understand the complex relationship between the borderland indigenous peoples and coca cultivation, but this research is problematic given the extraordinary demands on both the researcher and the communities worked with in terms of trust, participation, patience, and safety. Nevertheless, successful conservation and development projects hoping to preserve the cultural and biological diversity of the region will need a detailed understanding of the present and potential economic activities pursued both within and outside the borderland indigenous reserves.

This analysis of the environmental impacts of commercial coca cultivation proposes a strong link between the cultivation and increased deforestation and forest fragmentation due to the in migration of coca farming populations and the resulting expansion of coca fields. These findings support literature linking tropical deforestation to coca cultivation (Bedoya and Klein 1996, Dourojeanni 1989, Young 1996, 2004a, 2004b). Nevertheless, this study agrees with others arguing that the localized impacts of coca cultivation are somewhat less than other more common forms of extensive agriculture in the tropics (Henkel 1995, Salm and Liberman 1997) given deforestation and fragmentation is mitigated in part by the spatial clustering of coca fields, the twenty year productive crop life of the perennial plant, and the ability to replant coca on the same fields due to the plant's tolerance for poor soil conditions. Chemical inputs in the biophysical environment are difficult to quantify as the use of pesticides and fertilizers is unknown and field analysis of processing chemicals a dangerous proposition. Regardless, processing of coca leaf to coca paste is taking place in the study site and the

chemicals do make their way into the natural environment. While soil contamination is likely localized and diluted by the high levels of precipitation, long term contamination of water poses a risk to the biodiversity in the floodplains and the organisms downstream, including the residents of Pucallpa and Iquitos, who consume aquatic resources.

Eradication of coca in the region appears to be largely successful by CORAH criteria due to the reduction in coca coverage and the out migration of coca farmers. However, post eradication effects require continued investigation as the exodus of the coca farmers and the reduction of associated dangers presents the opportunity for policy makers to invest in conservation and sustainable development projects among both indigenous and *ribereño* communities. Well designed projects could decrease the likelihood of a return to coca cultivation. Drug trafficking will surely continue in the borderlands due to the geographic proximity of Brazil as a market and intermediate destination, and the inability of authorities to adequately patrol by foot the lengthy, forested boundary. With trafficking assured, if governmental and/or non governmental organizations do not invest in the borderlands, coca cultivation will likely return due to the comparative advantage of production close to the border and the lack of other income generating opportunities.

Eradication has also brought upon the greatest social and environmental impact of all in the likely relocation of the majority of the coca farmers to a new coca cultivation front. The new site will likely be to an ever more remote location, and thus perhaps more sensitive ecologically and culturally. This pressure on critical ecosystems and natural areas creates a contradiction in CORAH's mandate where their first goal to control the reduction of illegal coca cultivation potentially contradicts their third goal of supporting policies oriented towards the protection of natural areas. Instead, eradication may directly endanger the protection of natural areas. While I cannot prove that coca

eradication increases rather than mitigates the negative social and environmental impacts of coca cultivation, the issue deserves further research. This is particularly true since likely targets for the relocation of the coca front are borderland conservation units and indigenous territories. Given the ecological and cultural patrimony contained in these remote protected areas and the itinerant threat of coca cultivation menaced by eradication, the redirection of some eradication funds to these borderland protected areas may prove a more cost effective means of combating the establishment of coca cultivation than eradication after establishment. Another useful use of eradication funds would be the improved mapping of the borderland sites likely to be the next destination for coca farmers.

Any conservation or development investments in the borderland region must be integrated with the human and physical geography of the region if they are to be successful. The current absence of adequate geographic information has allowed drug traffickers, *cocaleros*, and formerly revolutionaries to proliferate in the borderlands. Just as the borderland defeat of the Shining Path required local knowledge and support so to do successful conservation or development projects in this poorly understood area. Top down projects seeking to provide alternatives to coca cultivation will certainly fail in part due to the lack of geographic information. Cabieses (2004: 16) criticized similar initiatives in the coca growing regions of Huallaga, "A serious flaw in alternative development projects has been their tendency to consider the high jungle as an empty space where a social fabric barely exists…". This flaw may already be replicated in the borderlands. This research has revealed the presence of borderland coca cultivation, and conducted a preliminary analysis of its social and environmental impacts, and the impacts following eradication. While eradication has likely merely relocated cultivation to even more remote areas, it remains to be seen whether any enlightened policy makers can take

advantage of the diminished coca cultivation here to invest in this oft ignored region. A bottom up conservation and development project might succeed if based on geographic information informed by local knowledge and participation.

Chapter Five: Conclusion

I. SUMMARY

This study underscores the continued importance of fieldwork in geography. Despite our advanced technological capacity, growing digital libraries, and plethora of critical theories, fieldwork remains central to our understanding of a complex world. This dissertation's approach builds on the field-based tradition of Sauer, Parsons, and others (Butzer 1989, DeLyser and Starrs 2001, Doolittle 2001, Parsons 1977, Sauer 1956, West 1979) to shed light on the surprisingly complex and unpredictable processes at work in the Amazon borderlands. The general public envisions the far reaches of Amazonia as an endangered "exotic realm of nature" blanketed by forests full of ecological riches with a sprinkling of native peoples (Slater 2002: 3). In contrast, this field-based inquiry of resource mapping, timber, and coca highlights the presence of local people, dynamic extractive and illegal economies, and high levels of resource related conflict. These findings can inform not only debates in the geographical and Amazonian literature, but also Amazonian policy makers, often lacking in reliable information about their region. This conclusion summarizes each chapter's findings and contributions before tackling larger questions related to Amazonian frontiers, participatory mapping, and policy recommendations.

Chapter Two documents a central problem in these borderlands: a lack of adequate geographic information. In this chapter I presented some of the challenges of

mapping the physical and human geography of these borderlands while demonstrating some of the flaws in the existing maps. Chapter Two's comparison of local and state geographic knowledge found local knowledge to be more accurate and up-to-date, but accessing this knowledge entails participatory, field-based research, something few frontier state agencies and NGOs have pursued.[201] Instead, State and NGO planners use flawed maps to project resource concessions and conservation goals on the landscape. The results marginalize local people, complicate planning and create confusion and conflict on the ground. The flawed cartography, lack of state presence, and confusion does benefit the illegal operators and resource extractors of the borderlands. Illegal operators such as loggers and drug traffickers build field-based geographic knowledge in order to successfully operate their business and avoid law enforcement (Araujo 2001, Archibald 2007).

Political will, governance, social and environmental justice need to be improved if the Amazon borderlands are to be better and more equitably managed. These topics, however, cannot be fully addressed by this dissertation's field-based rather than institutional emphasis. What Chapter Two's emphasis on mapping does contribute is to underscore the link between inadequate geographic information and the multiple, concurrent, and intersecting claims on these borderlands. Schmink and Wood (1992) described similar overlaps and power struggles in their study of contested frontiers in the Brazilian Amazon. Their field-based analysis saw frontier change as the net outcome of a contest for resources between social groups capable of mobilizing varying degrees of power (Schmink and Wood 1992: 344). I argue in this conclusion that participatory field-based inquiry can generate and improve geographic information, an important base from which historically marginalized groups can mobilize and consolidate power. While there is no guarantee that indigenous groups, traditional populations, or local people will

manage their resources well in the long or short run (Salisbury and Schmink n.d.), their investment in their homelands and environment serves as a potential counterpoint (Nepstad et al. 2006) to a state concerned primarily with resource extraction and to illegal operators currently working unchecked in the borderlands.

It is my argument that the occupation of "Amazonia's empty spaces" (Schmink and Wood 1992: 345) and the harvesting of Amazonian resources should take place after field-based participatory research provides baseline geographic information on the human and physical geography of the region. Local people who are obscured by emptiness or otherwise cartographically misrepresented on official maps cannot easily contend against the map wielder. Chapter Two's research updates other literature on the power of silent and empty spaces in maps and the imagined landscape. Harley's research on mapping the colonial Americas found evidence of indigenous geographic knowledge in European map construction even as European maps "…served to dispossess the Indians by engulfing them with blank spaces" (Harley 1992: 531). Bassett's analysis of blank spaces in 19th century European maps of West Africa led him to assert these null spaces to be evidence of a "disregard for indigenous geographical knowledge" by European explorers (1994: 322). These spaces also incited exploration and colonization as imperialists used blankness to justify appropriation and control (Bassett 1994: 324). Harley contends these empty spaces or cartographic silences are active rather than passive constructs and as such, actively desocialize the landscape (Harley 1988b: 66, 70). The landscape contains no blank spaces and thus, Harley contends metaphorically, "there is no such thing as an empty space on a map (1988b: 71). Harley urges us to make these silences speak, to uncover the agenda hidden in the emptiness, to investigate the absence (1988b: 58, 71, 70). Hecht (2004) finds agendas in an invented empty Amazon, what she calls the *tabula rasa,* that permits the projection of desires (development, conservation,

and others) onto a landscape imagined devoid of local people and full of natural resources. Chapter Two informs both Harley and Hecht by providing examples of how the projection of goals into an Amazonian landscape assumed empty creates contestation while field-based methods can generate geographic information that potentially helps the marginalized borderlanders speak through their cartographically imposed silences.

Chapter Three takes a close look at the operations of both the illegal and legal tropical timber industries through a comparison of logging in two of the most isolated borderland communities in Brazil and Peru. Results demonstrate the complex and contradictory relationships of indigenous people, the timber industry, and their border homelands. Indigenous people are both the exploited and the exploiter, with their homelands both barrier and site of deforestation. This supplements another Amazonian example to a rich and growing literature of the complex agency of historically marginalized indigenous people in the neotropics who embody both resistance and contradiction (Brown and Fernández 1991, Gagnon et al. 1993, Garfield 2001, Hale 1994, Schmink and Wood 1992). In Chapter Three, however, my scholarly emphasis is on understanding the social impacts of selective logging, the primary source of tropical forest degradation worldwide (Curran and Trigg 2006).

The rapid advancement of tropical deforestation and remote sensing technology have fueled a recent trend of macro-scale research documenting region or country-wide impacts of Amazonian logging using remote sensing and GIS modeling (Asner et al. 2005, Asner et al. 2006, Arima et al. 2005, Nepstad et al. 2006). These studies are capable of estimating the extent of logging-related impact on the forest cover and thus catching the attention of policy makers, but cannot capture the sub-canopy intricacies and impacts of the timber industry that need to be solved to improve policy. Curran and Trigg (2006) see Asner et al.'s (2005, 2006) work as an example of interdisciplinary

sustainability science's potential to improve monitoring, governance capabilities and an understanding of the drivers of deforestation. Meanwhile, other studies rely on key informant interviews and surveys in regional capitals (Kommetter et al. 2004, Smith et al. 2006) to identify problems associated with the enforcement or governance of logging legislation (Kommetter et al. 2004, Smith et al. 2006). While I see both remote sensing and survey driven studies as necessary and useful for monitoring and governance at the regional level, I believe neither can provide the field-based sub-canopy information necessary to fully understand social and environmental impacts and the reality at the source of extraction. Chapter Three documents the local complexities of a transboundary, debt-peonage driven, primitive, selective logging industry working with inadequate geographic information. Interviews with illegal loggers in their camp, and indigenous people rolling timber through their homelands provide the resolution missing in the remotely sensed and survey methodologies and inform sustainability science initiatives.

This is not a new finding as Sussman et al.'s (1996: 309) remotely sensed and ethnographic study of deforestation in Madagascar primary recommendation was that detailed ethnographic studies on resources, resource use, and resource needs are necessary precursors to any meaningful conservation or development project (Sussman et al. 1996: 309). Similarly, Chowdhury (2006: 96) argues for multiple methodologies and interdisciplinarity as enhancing spatial driving force models ability to not only better understand the processes, causes, and agents of tropical deforestation, but also inform policy to effectively protect tropical forests and livelihoods. Thus, sub-canopy studies can demonstrate the degree of impact not only on the forest and its fauna and flora (Peres et al. 2006) but also on its indigenous inhabitants (Veríssimo et al. 1995, Watson 1996).

This is relected in this study's finding of the timber *patrones* endeavors to destabilize indigenous self determination efforts in the borderlands.

These self determination efforts are important not only to the people but also to the forest given Nepstad et al.'s (2006: 65) argument that indigenous reserves are "the most important barrier to Amazon deforestation." Chapter Three's comparison of a titled and untitled indigenous homeland demonstrates the superiority of the titled reserve in preventing logging related deforestation. The Brazilian Asháninka community of Apiwtxa is much better off than their Peruvian cousins in Alto Tamaya given the improved geographic information, increased government presence, and stronger ties to NGOs in Brazil. Alto Tamaya, on the other hand, despite being a large and growing indigenous community, did not even appear on maps previous to this counter-mapping research, were marginalized by the state and subject to the illegal loggers' continued invasion of their territory. Despite these challenges, the agency and ability of borderland indigenous peoples, here documented in Alto Tamaya, to organize, resist and even serve as an effective if unofficial border patrol make a case that titling indigenous territories could help slow illegal logging and logging-related deforestation. Indeed, the official sanctioning of indigenous border communities as recommended over a hundred years ago (Mendonça 1907: 142) may have mitigated some of the current transboundary tensions Brook (2005: 452) also found tenure insecurity to limit indigenous agency regarding logging and forestry policy in Mosquitia. On the other hand, the creation of titled indigenous reserves has considerably reduced indigenous human rights violations in Ucayali (Gray 1998: 217), provided a platform to protest trespassing by miners, loggers, and colonists in Pará (Simmons 2002: 254-5), and likely helped indigenous people maintain a better record of sustaining the forest than other populations in the Brazilian Amazon (Fearnside 2003: 774).

Forest policies are currently undergoing change in Amazonia (Putz et al. 2004, Paniagua 2001, ITTO 2005). Smith et al. (2006: 468) argue that radical changes in forestry laws may merely mask governance failures rather than improve logging practices. They saw the implementation of new Peruvian forestry law at a critical stage in 2006 (Smith et al. 2006). This dissertation's 2004 fieldwork documented that breaking this new law was already an accepted code of behavior among many borderland loggers given their inability and unwillingness to comply with rules that are ineffectively enforced. While this study supports Smith et al.'s (2006) thesis and acknowledges their concerns about existing and potential governance failures such as corruption, insecurity of property rights, and ineffective law enforcement, it also shows how the legislation was built on an assumption of adequate geographic information regarding the existing timber, human populations, and river courses present in the newly created production forests. These field-won findings demonstrate how inadequate geographic information contributed to the undermining of the new forestry law. More interdisciplinary field-based research is needed to help improve the current understanding and regulation of forest use (Blundell and Gullison 2003). An ideal research project would include macro level remote sensing (Asner et al. 2005), an investigation into governance (Smith et al. 2006), field-based studies of forest ecology, and field-based cultural ecology studies such as this one.

Chapter Four's contributions to the study of coca are many, given the dearth of local level fieldwork on the plant's cultivation in the lowlands. This study not only maps 3,000 fields in a borderlands declared empty of cultivation by the UNODC (2005c), Machado (2001), and Plowman (1984), but also details characteristics of the illegal crop and its cultivators. Unexpected findings include the low elevations (180 meters) and long term presence (20% over 15 years) of the coca fields, and their location on riverside

uplands distant from roads. Coca farmers arrived in the region in the mid 1980s and quickly transformed the economic, social, and physical landscape with their illegal cash crop, coca boom towns, and farming methods. Coca cultivation relied on external demand from developed nations and capital brought in by drug traffickers. Both traffickers and cultivators developed complex relationships with indigenous groups and revolutionary forces alike before the latest round of eradication in 2003-4 forced the majority of the coca driven demographic front to relocate elsewhere. This chapter describes how hundred men crews of eradicators were flown in by Vietnam era U.S. owned helicopters to manually uproot hectares of coca bushes.

The sudden withdrawal of coca cultivation following eradication meant the loss of a multi-million dollar business in an economic backwater. This withdrawal reduced local impacts on the environment such as deforestation and chemical dumping. Violence also decreased, but so did positive aspects like opportunities for employment, education, and improved transportation. There appears little cause to celebrate the eradication of coca in the borderlands given this will likely only drive the cultivators and traffickers to other more distant lands, such as borderland national parks and indigenous lands. Once coca cultivation becomes untenable in one borderland location, coca cultivators move on, potentially relocating to even more isolated and poorly understood areas, thus, putting additional culturally and ecologically critical landscapes at risk. There similar social and environmental impacts would likely be repeated until the next wave of eradication forced the cycle to continue.

This field-based research responds to the research of a variety of geographers and ecologists working in remote Latin American frontiers on resource related topics. The detailed investigation of coca answers Young's call (2004b: 366) for more geographical research on the social disruption and environmental degradation caused by the cultivation

and traffic of coca and coca derivatives. The investigation into the networks of loggers and coca growers also demonstrates how local level fieldwork in remote locations provides valuable insight into poorly understood and complex processes (Brook 2005: 493-4, McSweeney 2004: 638, 656): such as the strong ties between illicit economies and borderland peoples and the transboundary nature of extraction and production to name a few. This research also supports Herlihy and Knapp's (2003) assertion that Latin American regions characterized by large indigenous populations often have inadequate cartographic coverage.

II. BORDERLANDS: CONTESTED OR TAMED?

The synopsis of the three chapters above describes a borderland of a violent and transient character (Scmink and Wood 1992) rather than a domesticated and stable frontier character as described by Santos-Granero and Barclay (2000). Schmink and Wood (1992) documented the high cost of inadequate geographic information along Amazonian frontiers in their study of colonization in southern Pará. Their research found that "fleets of yellow construction machines pushed roads into places that until then had rarely seen a surveyor's rod" (Schmink and Wood 1992: 345) and "draftsmen in Brasília planning offices envisioned a grid-square system of land distribution that bore little relationship to the hydraulic and topographic reality of the undulated and highly varied Amazonian terrains" (Schmink and Wood 1992: 346). The victims of pursuing development before building adequate geographic information were not only the poor colonists, but also the agencies themselves given crisis colonization policies ended up intensifying rather than dampening rural violence (Schmink and Wood 1992: 349). While my borderland site lags behind Pará in terms of the degree of infrastructure and colonization pressures, the priorities of forestry and mining concessions appear to mirror the quotes above. The new forestry law has allowed loggers to bring bulldozers and

skidders in advance of adequate surveying and the projection of mining concessions from Lima planning offices allows miners to lord over rectilinearly framed fiefdoms at the expense of both the local residents and the environment. However, just as Schmink and Wood, the contest documented in this chapter goes beyond a simplistic state versus local people confrontation brought upon by the state's desire to settle empty lands and control its resources at the expense of local people. Here in the borderlands, concessions, conservation units, coca farmers, local people, indigenous groups, and national and regional entities have opposing goals leading to a "multiplicity of simultaneous and overlapping contested frontiers" (Schmink and Wood 1992: 19). In these contested borderlands, as documented in the Brazilian Amazon (Schmink and Wood 1992, Simmons 2004, 2002), the contest for resources among different groups has led to overlapping claims, confrontation, violence and fatalities.

Santos-Granero and Barclay's (2000) book, *Fronteras Domesticadas*, portrays a different vision of the Peruvian Amazon through its rich historical analysis of the key economic indicators of the greater Loreto region (Loreto and Ucayali regions) from 1851 to 1990. They use historical documents to reconstruct the trajectories of key institutions and individuals during this time period and compile valuable historical data about the Peruvian Amazon. Their thesis is that the last 150 years of radical change in Loreto has led to the taming of the frontier: "the suppression of the negative economic, social, and political traits characteristic of frontier economies" (Santos-Granero and Barclay 2000: 308). According to their analysis, these traits "have disappeared or are confined to the region's remotest areas" (Santos-Granero and Barclay 2000: 299).[202]

My recently conducted (2004) field-based analysis of mapping, timber and coca in the remote borderlands contrasts with their holistic historical (1850-1990) and economic focus, archival methodology and necessary concentration on merchant houses

and large landholdings[203]. This variance helps inform their study by providing recent data about the region's remotest areas to ascertain if greater Loreto is in fact "no longer a frontier" (Santos-Granero and Barclay 2000: 321). My results argue against Santos-Granero and Barclay's assertion that the Loreto and Ucayali region has been "tamed", particularly in the remote borderlands. In making this argument I address, in sequential order, the five traits that Santos-Granero and Barclay argue to be true of their study region. While I cannot address these traits for their entire study region, given that it includes all of historical Loreto, I can provide insight into how well their theory works in this dissertation's four watershed borderland study site.

First, they argue that the region's economies are no longer dependent on external capital and demand[204]. My research focuses on the two most lucrative resources in the borderlands: timber and coca. Both of these are almost entirely driven by external demand and financed by external capital. The borderland timber species harvested specifically for regional markets are lupuna, *Chorisia integrifolia,* and bolaina, *Guazama rosea*, both of which make up only a small portion of the timber market when compared to higher value exported species. Table 5 does not even list bolaina while lupuna made up only 16% of Ucayali roundwood production in 2002. According to key informants, the majority of investors in the timber sector include international and Lima-based companies given the amount of capital needed to finance these operations. Another source of capital for timber operation allegedly comes from coca money. In the case of coca, the business is based on external demand from developed countries and external capital from international drug traffickers. I find the borderland timber and coca economies very much dependent on external demand and capital.

Second, Santos-Granero and Barclay argue that there is now local capital accumulation and the emergence of a bourgeoisie. This argument is not easily addressed

by the rural nature of my fieldwork given local capital accumulation and bourgeoisie are usually headquartered in regional cities and towns. However, I can attest to the lack of capital accumulation among local people working in the debt peonage based timber system. My analysis of local capital and the bourgeoisie is necessarily inconclusive.

Third, they argue that precapitalist social relations of production and exchange are no longer present. However, I did find precapitalist relations common in the borderland timber industry. Timber harvesting in the borderlands remains largely illegal or quasi-legal and is still broadly characterized by debt peonage rather than capitalist relations. This system harks back to a bygone era of exploitation and represents the pervasive nature of the extractive economy in the borderlands. My fieldwork and the work of Bedoya and Bedoya (2005) also indicate that the presence of debt peonage in the timber industry is not unique to the borderlands in the Peruvian Amazon.

Fourth, they argue that Loreto is no longer dependent on itinerant extractive economies such as rubber, timber, and rosewood oil and thus has generated permanent demographic fronts. The primary economies I researched in this dissertation are extractive and/or illegal. Timber harvesting has certainly not established any significant permanent demographic fronts in the borderlands unless one counts the invisible Asháninka who have been present if ignored for over 100 years. As shown in Chapter Three, the people attracted to these regions to harvest timber are poor young urban men (Bedoya and Bedoya 2005) or the men of dubious reputation described by the Major. Coca, while not extractive, can generate an extremely impermanent demographic front as shown by demographic field data of the Callería River and certainly does not fit into any definition of "tamed" given the violence associated with the business. Here again I find one of their negative frontier traits to be very much present in the borderlands.

Finally, they argue that Loreto no longer has a weak state presence or state subservience to private economic interests. There can be little doubt that a weak state presence continues to exist given it is a central argument of this dissertation. The state has been unable to impose its will on a poorly understood border area. The issue of state subservience cannot be adequately addressed here, but the continued existence of illegal loggers and the long time presence of coca farmers speak to a state perhaps not interested in or capable of policing its frontiers. This rings particularly true when one takes into account the timber backgrounds of the most powerful officials in Ucayali and their alleged ties to drug traffickers as detailed in the previous chapters.

Thus, my field-based inquiry argues against the presence of four of the five traits of tamed frontiers. This argues against a "tamed" borderland and questions the universality of the tamed frontier theory of Santos-Granero and Barclay given that so much of Loreto and Ucayali fall within either the borderlands or areas considered remote. Despite my criticism of their overarching assertion, I find their book a useful analysis and compilation of difficult to obtain Amazonian data. The strength of the study is in their archival work, and therein also lies the weakness. It is difficult to support a theory on modern Amazonian frontiers using archival materials alone, given the paucity of accurate written accounts about these extensive lands. There is no theorization or methodology that can substitute for empirical field-based research in frontier environments. There simply is not enough data to support arguments about the current or recent state of these frontiers without experiencing the people, flora, and fauna through direct observation. Archival maps and documents are certainly extremely useful and informative, particularly if carried into the field, but cannot on their own support theoretical arguments in these poorly understood environments.

III. POLICY RECOMMENDATIONS

This argument for more field-based research is applicable not only to academic inquiry but also to policy making. Effective policy making requires field-based research to improve the currently inadequate geographic information. As I have demonstrated in the previous chapters, the lack of field-based information facilitates the illegal exploitation of borderland resources and residents. The remote nature of these borderlands combines with poor surveying, communications, land titling, and land tenure systems and the dynamic Amazonian landscape and people to create the illusion of an "empty" Amazon borderland. While this emptiness is belied by local populations, the associated lack of state presence allows illegal exploitation of these borderland populations and their natural resources. Where the nation state has become more interested in the borderlands it appears centered on a desire to control and tax resources like high value hardwoods and gold through mining and forestry concessions. Interest in the borderland peoples continues to be minimal.

Historically the isolation, geographic ignorance, and perceived emptiness of these borderlands made them havens for indigenous people and fauna seeking to avoid exploitation. Recently, however, advancing settlement, agricultural, and resource frontiers have increased both state and illegal interest in the dwindling lands and resources of the local inhabitants. With their refuges disappearing in the face of coca cultivators, illegal loggers, and the resource claims of the state, the borderland residents are now best served by being recognized by the national and regional state. However, state ignorance and indifference combined with the violent and abusive tactics of illegals, such as loggers and drug traffickers, threaten to erase these residents from the "empty" landscape just when they seek recognition.

This dissertation demonstrates integration, development, and conservation initiatives to be increasing in these borderlands despite the lack of adequate geographic information and the associated presence of illegal operators putting these projects (including foreign policy) at risk. All of these projects require basic information currently unavailable, inadequate, or outdated. Although the generation of geographic information is a critical first step, this process must also include local participation and a supportive state (among other factors) if this information is to lead to positive results. In the absence of a supportive state and local mobilization, such information is likely to be underutilized and perhaps even harmful to local interests. Given this dissertation's focus, the recommendations made here will center on how to improve geographic information through local knowledge rather than the larger and more elusive questions of how to strengthen political will and governance to ensure the positive implementation of this improved information over time.

While this research successfully combined local knowledge and geographic field methods to document flawed maps, contested resources, marginalized local people, the negative impacts of coca cultivation, and abuses related to the tropical timber industry, the same combination has great potential to not only improve existing knowledge of the region but also to help reconcile conservation, development, and social justice in these borderlands. The geocoding of local knowledge will provide the best baseline information available for improved mapping and planning even as it empowers local populations and mitigates future conflict over declining borderland resources and territory. Schmink and Wood (1992: 344) found Amazonian frontiers locked in a contest for resources between groups capable of mobilizing varying degrees of power. Geographic information and maps can provide a platform for local people to increase and mobilize power (Dana 1998, Herlihy and Knapp 2002, Nietschman 1995). The

incorporation of geographic information in an official geographic information system would allow for detailed, updated, accessible, and dynamic information that not only reflects the constantly changing frontier landscape and peoples but could also incorporate feedback processes from interested stakeholders. While the logistical and financial obstacles[205] to producing this information are formidable, they are likely less costly than failed projects based on flawed geographic information.

Without improved geographic information and planning, initiatives such as the potential Pucallpa-Cruzeiro do Sul road, the Zona Reservada Sierra del Divisor, and the titling of the borderland Asháninka could fail just when the exodus of the coca cultivators provides increased opportunities for borderland investment. Without, a basic geographic foundation such initiatives are likely to be fundamentally flawed in a similar fashion to the Peruvian forestry law documented in Chapter Three.

One possibility is to pursue a dynamic Ecological Economic Zoning (EEZ) of the borderlands using a geographic information system informed by local knowledge. EEZ is not new to the region, having been analyzed by members of the Amazonian Cooperation Treaty in 1994 who defined Ecological-Economic Zoning as "a dynamic process permitting a spatial ordering of areas characterized by physical, biotic, and socio-economic factors evaluated in relation to their sustainable use by or tolerance of human intervention" (Tratado de Cooperación Amazónica 1994). This analysis was followed in 1996 by an agreement among seven Amazonian countries, including Peru, on a common methodological approach to EEZ (Tratado de Cooperación Amazónica 1996). Since that time several other countries have pursued EEZ, including Rondônia, Mato Grosso, and Acre in Brazil

The largest example of EEZ on tropical frontiers is underway in the neighboring Brazilian state of Rondônia (Mahar 2000). This Agricultural and Forestry Plan for

Rondônia (Planoforo), is a US$229 million project that began in 1993 as an alternative to the typically unconstrained frontier-type development and settlement present in Amazonia. Zoning consisted of state-wide mapping at 1:250,000 scale based on satellite imagery, soil samples, and a range of economic and social data (Mahar 2000: 121). The principal opponents to Planoforo have been the logging and ranching interests who see zoning as a straight jacket preventing their exploitation and expansion goals (Mahar 2000: 120). While international environmental communities, indigenous people, rubber tappers and some small farmers have been largely for zoning, there has also been criticism of a lack of local participation (Perz 2002: 46). Based on his analysis, Mahar (2000: 126) argues EEZ to be a sound instrument, although not a panacea, for guiding land use on tropical frontiers. Critical lessons learned from Rondônia are that EEZ is a political process that requires broad public support and a continuous participatory planning process including the entire spectrum of stakeholders at the earliest stages of study and implementation (Mahar 2000: 126-127). This support is critical as powerful interests restricted by zoning laws such as loggers, ranchers, and municipal governments will repeatedly challenge zoning legislation. Unfortunately in 2000, Planoforo's continued to rely on external funding to finance state bureaucracy and infrastructure, and thus mollify the powerful anti-zoning interests (Mahar 2000: 128). The results of Planoforo are mixed, with the greatest beneficiaries appearing to be indigenous groups, extractivists, and conservationists given the process included the creation and demarcation of indigenous reserves, extractive reserves, and conservation units (Mahar 2000: 125). On the other side, are the powerful logging, ranching, and urban elite interests who appear to gain little from the process and continue to challenge the government's ability to enforce and maintain zoning laws (Mahar 2000: 126-7). Long term success relies on the government's commitment to zoning with this still contingent

(in 2000) on capital from international donors. Ultimately, as an existing project, it is easy to critique Rondônia's EEZ efforts, however, one must keep in mind what the state would look like without EEZ. Now, at the very least, historically marginalized and culturally diverse groups such as indigenous peoples and rubber tappers have a legal basis, and demarcated territory, to strengthen their hand in the contest for resources (Schmink and Wood 1992). These areas, along with demarcated parks, also function as warehouses of biodiversity and barriers to deforestation in a state increasingly losing its forest cover (Nepstad et al. 2006, Pedlowski et al. 2005).

Another example of EEZ is in the neighboring state of Acre, who finished their first approximation of 1:1,000,000 scale EEZ in 2000 and continue refining the process to the 1:250,000 scale (Government of Acre 2000). The EEZ in Acre has been held up as a model for other Amazonian zoning initiatives given its quality and incorporation of historical process, local knowledge, and dialogue. Directed by four geographers and an agronomist, Acre defines its EEZ as "a strategic tool of regional planning and territorial administration involving studies of the environment, natural resources, and human-environment relations that inform democratic negotiations between governmental institutions, the private sector, and civil society concerning a collection of public policies oriented towards sustainable development" (Government of Acre 2000: 1). By state law, researchers working on Acre's EEZ were guided by participatory, equitable, sustainable, holistic and systematic principles in their elaboration of a comprehensive three volume EEZ work with chapters ranging from geomorphology to biodiversity to indigenous peoples to socio-economic infrastructure[206]. While this compendium contains a great deal of geographic information,[207] Governor Viana recognized in his foreword that this "dream map" was merely recognizing the zoning already formed by the region's natural and human history and that these three volumes were but a modest beginning to a

continuous process (Government of Acre 2000). Viana, a forester using the rhetoric of sustainable development (Kainer et al. 2003), demonstrated the leadership, longevity and political will to see this first phase through, but the EEZ requires continued updating, scaling down, community involvement, governmental support, and legal enforcement if it is to be truly successful.

Indeed, despite the rhetoric and propaganda, some questions exist as to whether Acre has taken the fullest advantage of the EEZ initiative as not all of the zoning recommendations have been incorporated into public policy. While the government established several ecologically important conservation units based on the recommendations of the EEZ[208], there is no published data describing the degree of implementation of other recommendations, nor of the status of the second EEZ phase at 1:250,000 scale. For example, prior to the start of the second phase, the government never consulted the participatory state EEZ commission[209] to identify what aspects of the first phase should be prioritized. Despite these concerns, the published 1:1,000,000 scale EEZ project has been a substantive contribution to the geographic knowledge of the Brazilian borderlands. This experimental effort not only produced geographic information of varying types, but also systematically organized and interpreted the data to make it available to local people, NGOs, universities, researchers, governmental offices and other interested parties. But can this success continue through time and new administrations, and can it be implemented successfully in other borderlands where institutions may be less committed to sustainability principles?

While ecological-economic zoning is promoted by a Peruvian supreme decree[210] as the means of organizing national territory for sustainable development, zoning has never moved beyond the proposal stage in the Peruvian Amazon. The Peruvian Amazon Research Insititute (IIAP[211]) with financing from various international funding agencies

and national and regional organizations completed initial ecological economic zoning proposals at the macro scale (1:250,000) for the regions of Madre de Dios and San Martín, and at the meso scale for the Aguaytía watershed of Ucayali (IIAP 2001, IIAP 2003). Despite their thought provoking cartographic, tabular and textual contents these proposals and their geographic information have not been used systematically by governmental authorities. This is likely due to an absence of political will at both the national and regional level, hardly surprising given the restrictions that might be placed on powerful logging interests and the complications that would ensue from trying to deal legally with coca cultivation in Madre de Dios, San Martín, and Aguaytía.

In 2006, the Regional Government of Ucayali signed an agreement with the World Wide Fund for Nature (WWF) to create an EEZ based on the Acre model for the borderland provinces of Purús and Atalaya (Tedy Tuesta personal communication). This would seem a perfect opportunity to continue north and incorporate the borderlands researched here in an EEZ. The incorporation of the Acre model could be critical given it potentially allows informed dialogue of transboundary initiatives and transgressions. However, EEZ requires an enormous investment as success relies on human resources, the institutionalization of the process, transparency, appropriate scaling, financing, the political will for implementation, mechanisms for enforcement, and the participation of local people. If local participation is ensured, the most likely failure of an EEZ would be political will for enforcement and follow through. Nevertheless, even the creation of a participatory, updated, unenforceable, static map would be a significant improvement over the inadequate geographic information currently on hand given it would provide an information platform from which local people could mobilize against illegal activity and state indifference in these contested frontiers. Illegal logging, coca cultivation, and

contested resource concessions would be exposed even as local people were demonstrated to be present in the borderlands.

This EEZ would be best elaborated by a committee of institutions including state (federal and regional), non-state organizations, and Universities. This would ensure that the information be official, while holding the state accountable. Once field-based research generated the information, the spatial database would be made public so that a wide range of stakeholders could approach the decision making table and participate in informed, participatory land-use decisions. While a well-mapped region does not ensure that it will be well-managed, improving information in a participatory manner through EEZ does serve to potentially democratize development and conservation where it has formerly been imposed.

As reviewed in the introduction, the participation of local people in mapping endeavors can be particularly problematic given a reliance on external funding, "experts", agendas, and Western spatial paradigms, epistemologies, and worldviews (Dana 1998: 34, Fox 2002: 66, King 2002: 50, Kosek 1998: 5, Peluso 1995, 384, Poole 1995, Robbins 2003: 250, Rundstrom 1995: 45, 1998: 7). Specific negatives include the freezing of a fluid culture and boundaries (Dana 1998: 34, Fox 1998: 3, Fox 2002: 66, Peluso 1995: 400-1, Rundstrom 1995, 52), the alteration of local politics (Dana 1998: 41, Flavelle 1995: 73, Peluso 1995: 387, 399), and control of the map and data after the participatory fieldwork (Chapin 1998: 7, Fox 2002: 77). These questions and concerns also made the participatory fieldwork used here a difficult proposition both practically and morally. This became particularly clear when technical expertise required that I be the primary cartographer and holder of the data. Now, however with the conclusion of this dissertation, I will return the latest iteration of their maps back to the community and continue the participatory project through a new round of actualization. In returning to

the field I will not only be fulfilling my obligations as a responsible participatory map maker but also following the footsteps of a long line of field geographers (Butzer 1990, Dana 1998, Doolittle 2001, Sauer 1941: 10, Knapp 1991,Young and Leon 2000) who to quote Parsons (1977: 3, 14) understand the advantages of viewing a particular area over time.

Ultimately, I feel the potential drawbacks of local participation, both in my borderland research and the EEZ, are less damaging than the loss of life, livelihood, biodiversity, and culture now arising from the anonymity and misrepresentation of these same people and their surroundings on flawed maps. This situation allows illegal loggers, coca cultivators and other outsiders to rule a contested borderland "empty" of governmental authority. Thus, anonymity, misrepresentation, and the proliferation of illegality contribute to this marginalization of Amazonian borders or margins. In my opinion, the dissemination of local geographical knowledge is a first step towards overcoming marginality on the margins. In short, these borderlands need be better mapped, preferably using the expert local knowledge already available. Unless field-based inquiry improves geographic information, the blank or scrawled slate of the Amazonian borderlands will continue to serve as the planner's canvas until the cultural and ecological diversity we currently associate with Amazonia is gone.

Endnotes

[1] See glossary.
[2] See glossary.
[3] Both the nation state and sub-nation state have inadequate geographic information. See glossary.
[4] See glossary for more explanation.
[5] Local knowledge refers to the knowledge local people gain from living in a place and environment for years at a time. This might include knowledge of the curative properties of the area's plants, knowledge of the courses and headwaters of rivers, or knowledge of the cultures of neighboring peoples to just name a few examples.
[6] State indifference refers to indifference from both the national and regional governments although national indifference tends to be greater due to distance. I also refer to both when I use the phrase state presence.
[7] In 2004 I was fortunate to be an Associated Member of this Non-Governmental Organization dedicated to the protection of indigenous people, their homelands, and resources. Instituto del Bien Común translates as Institute of the Common Good.
[8] The Asháninka and Ashéninka are closely related groups with origins in the eastern slopes of the Andes. The borderland Asháninka/Ashéninka communities often have both ethnicities present. From this point on I will refer to these related groups as the Asháninka to save word space although I acknowledge the presence of both groups in the borderlands. Please see the glossary for a more in depth explanation.
[9] Conservationists in particular are actively identifying and prioritizing the protection of the last tropical wilderness frontiers (Fagan et al. 2006: 433, Laurance et al. 2006: 462).
[10] See Amazonian boundaries in glossary for more explanation.
[11] Treaties define political boundaries, but coastlines, river banks, ridgelines, and other natural features change in the best of circumstances, making boundaries difficult to measure.
[12] Here boundary lands is synonymous with borderlands.
[13] In defining a broad Amazon borderlands, I begin with the nation state of Brazil that makes up the majority of both the Amazon basin (68%) and the Amazon borders (62%). This dominance combined with the legal and political importance and the specificity of Brazil's 150 km faixa de fronteira allow the consideration of this 150 kilometer swath as a basis for defining the Amazon borderlands. However, a 150 kilometer buffer around the Amazon borders is too general a territorial definition of Amazon borderlands at even a 1:1 Million scale due to inclusion of highland regions. Clipping the 150 kilometer buffered zone with the limits of the lowland rainforest provides a more useful if still general Amazon borderlands. This definition excludes the Andean regions over 700 meters in elevation, but includes areas in Venezuela and the Guianas containing the familiar lowland rainforest biota.
[14] Santos-Granero and Barclay (2000: 5) define the taming of the frontier as the "suppression or containment of the worse traits identified with frontier economies."
[15] An important caveat is Santos-Granero and Barclay's (2000: 299) statement that "at present most of the traits characteristic of frontier economies have disappeared or are confined to the region's remotest areas."
[16] A region is Peruvian political unit similar to a department.
[17] An area larger than the country of Hungary
[18] All the indigenous territories shown are titled. Later in the dissertation I will present maps of the untitled homelands of the Asháninka/Ashéninka of Alto Tamaya.
[19] For the sake of simplicity, from here on I will refer to the Shipibo Conibo group simply as the Shipibo.
[20] *Unidad Militar de Asentamiento Rural* (UMAR)
[21] An interesting group that bears more analysis is the religious sect Israelitas (called Chunchi's by the locals for their facial hair) who have several state supported settlements in the region.

[22] The Zona Reservada Sierra del Divisor was created on April 5, 2006 by Ministerial Resolution #0283-2006-AG. The Regional Government of Ucayali also has submitted a conservation proposal to protect the entire border between the Zona Reservada Sierra del Divisor and the Alto Purus National Park.
[23] Coming from Texas, Acre is cheaper (but not easier) to get to via Peru than via Brazil,
[24] I was eating breakfast and reading the paper at the hotel restaurant when I saw a man enter who looked exactly like the photograph of the Minister on the front page. I had my maps with me, walked up, introduced myself, and gave him one.
[25] Pg. 36 at http://iirsa.mediawebsa.com/BancoMedios/Documentos%20PDF/mer_baires04_presentacion_eje_peru_brasil_bolivia.pdf .
[26] My Master's research took place in Acre, Brazil (Salisbury 2002).
[27] These four presentations include: "Geografía en la Selva," presentation at la Pontífica Universidad Católica de Perú, Lima. Peru,. "Dinámicas Fronterizas entre Acre y Ucayali: Un análisis geográfico," Presentation for the Ministry of Foreign Relations, Lima, Peru. "Geografía en la Selva," presentation at la Universidad Nacional Agraria La Molina, Lima. Peru. "Geografia do Século XXI: um análisis geográfico da fronteira Acre-Peru," Presentation at the Universidade Federale do Acre, Rio Branco, Brasil. "Dinámicas Fronterizas: Un análisis geográfico de los beneficios y desafios de la integración Pucallpa-Cruzeiro do Sul," Exposition for the state government of Ucayali, in the Cámara de Comércio, Pucallpa, Ucayali, Peru.
[28] The combined investment almost equaled initial funding from Fulbright-Hays.
[29] An agreement of Mutual Cooperation with the Regional Government of Ucayali, Peru. Status as an Associated member of the Instituto del Bien Común. A letter of understanding with Universidad Nacional de Ucayali (UNU), Peru.
[30] Additional data is still being processed for future publications.
[31] This investigator worked in the most distant community which required a week to get to. Given the size, importance, and particular needs of this Asháninka community the researcher stayed on to help the Asháninka map their land for self determination and titling purposes.
[32] A more detailed description of these methods can be found in Salisbury 2002.
[33] http://www.map-amazonia.net/index.php?lang=en&page=video&item_id=2
[34] The United States provides economic, political, and logistical support to coca eradication efforts in Peru.
[35] Spanish and Portuguese exploration and expansion into these the Amazon brought death, disease, and landscape change to the region. While I do not address this historical topic specifically in this dissertation, the impact of contact on the landscape and demography of the Amazon has been addressed by Denevan (1992, 2001) and Mann (2005) among others.
[36] *Uti possidetis* is a concept derived from Roman Law giving territory to the possessor, by law (*de jure*) and by fact (*de facto*). In the case of the Treaty of Madrid, the concept used was de facto.
[37] 1810 was selected as it was when the Latin American states began revolting against the Spanish crown.
[38] The *uti possidetis* of 1810 relied initially on a de jure definition of *uti possidetis* where the rule applied to the limits legally in force when the act of decolonization occurred. However, these lines did not necessarily coincide with the boundaries observed for practical administration by colonial authorities: the Spanish sometimes governed beyond their legal limit. This second, de facto, interpretation was then accepted by the state as it gave them access to more territory. An example would be Venezuela (Prescott 1987: 105-6).
[39] Here Ireland uses the term frontier when referring to a boundary.
[40] Here Ireland uses the term border territory when referring to a what I call borderlands.
[41] These boundaries were well defined on the map, but the lack of geographic knowledge of the area made defining these boundaries very imprecise.
[42] Ironically, Sternberg's connection of Maury's obsessions and Brazilian defensiveness of the Amazon may be a precursor to the freezing of my Brazilian research permit for the research of Amazonian borderlands.
[43] This dissertation uses the Brazilian spelling of Javarí rather than the Peruvian Yavarí.
[44] This line was called the Gibbon Line, apparently because it took advantage of the U.S. reconnaissance of Amazonia and U.S. Lieutenant Gibbon's coordinates for the mouth of the Beni River.

[45] Spanish and Portuguese terns are defined in the glossary.
[46] Euclides da Cunha recognizes the Campa, "to preserve a primitive freedom, thanks to their ferocity, within the tortuous contracts they accept" (da Cunha 1976: 264). These fierce Campa, now called Asháninka or Ashéninka are the borderland indigenous people analyzed in chapter 4.
[47] All translations from the Spanish and Portuguese, unless otherwise noted, are made by the author.
[48] Santos-Granero and Barclay define the *selva central* as the "central jungle", "central *montaña*", or central portion of the Peruvian *selva alta* or high jungle (Santos-Granero and Barclay 1998: 1). This area lies along the eastern slopes of the Andes. Within this *selva central* region lie the historical and current core homelands of the Asháninka/Ashéninka peoples in the Pajonal, and along the Perené, Ené, Tambo, Upper Ucayali and Urubamba Rivers.
[49] Amônia is used in this dissertation rather than Amônea, Amonia, or Amonea given Amônia is the spelling used by the Brazilian state for the Asháninka indigenous territory located along the banks of this river bisected by the Brazil/Peru border.
[50] Current ethnic names placed in parenthesis by the author.
[51] Terra Indígena Kampa e isolados do rio Envira (262 Asháninka residents). Terra Indígena Kampa do igarapé Primavera (21 Asháninka), Kampa do rio Amônia (472 Asháninka), and Terra Indígena Kaxinawá/Ashaninka do rio Breu (114 Asháninka) (Pimenta 2005). In 2002 there were 52 Asháninka living in the Terra Indígena Jaminawá do rio Envira (dos Santos de Almeida 2002).
[52] Emory Richey's census of the 4 untitled Asháninka villages in the Tamaya watershed in 2005 showed the following numbers: San Miguel de Chambira (83 residents in 2005), Alto Tamaya (82), Nueva California (55), Nueva Amazonia de Tomajao (57), and Cametsari Quipatsi (126). Emory Richey is a University of Texas at Austin undergraduate who kept a journal called **47 days on the Tamaya River** in October and November of 2005 (Richey 2005). He also took thousands of photographs, hundreds of GPS points, and carried out a census.
[53] Exceptions are the titled communities of San Mateo on the Alto Abujao River and San Miguel de Chambira on the Tamaya River. The Instituto del Bien Común has also begun mapping the borderland Asháninka of Perú while the Government of Acre has maps of the Brazilian Asháninka's titled territories.
[54] The *Sendero Luminoso,* or Shining Path, was a revolutionary Marxist group fighting in the countryside in the 1980s and 1990s. Chapter 4 will address their presence in the borderlands in limited detail.
[55] See glossary for more details on Castilloa.
[56] See glossary for more details on varaderos.
[57] Mendonça claims these caucheros fled from an exploitative Peruvian patrón (Mendonça 1989).
[58] Espinar also sent men to explore and return to Peru by two Abujao-Juruá Mirím varaderos (Rosas 1905).
[59] Mendonça relates the predictable demise of a trail made by outsiders lacking in local knowledge of terrain, "This (trail) was effectively opened from the mouth of the Putaya directly to the Juruá in 1898, but never being used by the caucheros, who thought it too long and with too many hills, now it lies abandoned and partly overgrown with forest" (Commissão Mixta Brasileira-Peruana e Mendonça 1907: 114).
[60] López dedicates one chapter to necrophagy practiced by the Kaxinawá. He also notes the presence of the arrogant Campa of *Huaca Pistac* (probably the Bacapishtea River, an affluent of the Juruá) along the border (López 1925: 102) and the presence of Ticuna Indians brought to the mouth of the Breu River by an Ecuadoran rubber patrón all the way from the Napo River before being abandoned there to their own devices (López 1925: 101).
[61] All photos are taken by the author unless otherwise indicated in the caption.
62 Official coordinates for #61 (WGS 84): 8° 15' 19.101" Latitude, 73° 32' 38.942" Longitude, Elevation 268.26 (PCDL 2006). Official coordinates for #62 (WGS 84): 8° 15' 12.212" Latitude, 73° 32' 48.207" Longitude, Elevation 239.37 (PCDL 2006). Our CIFA coordinates for # 61 (WGS 84): 8° 15' 19.0224" Latitude , 73° 32' 38.8355" Longitude, Elevation 265. Informatiao on etched into concrete base of monument # 61: VIII-1925, Y=8° 15' 20.73" S, L=73° 33' 02.54" W. CIFA coordinates for #62 (WGS 84): 8° 15' 12.0276" Latitude, 73° 32' 48.3539" Longitude, Elevation 242.
[63] The Asháninka and Ashéninka are closely related groups with origins in the eastern slopes of the Andes. The borderland Asháninka/Ashéninka communities often have both ethnicities present. From this point on I will refer to these related groups as the Asháninka to save word space although I acknowledge the presence of both groups in the borderlands. Please see the glossary for a more in depth explanation.

[64] While nobody is capable of holding a Global Positioning System in hand, the term GPS is also commonly used to refer to the handheld GPS receiver used for commercial, recreational and research purposes. I am using GPS in this colloquial sense here.
[65] Chris Fagan was instrumental in finding me a place on this expedition and we happily assumed our roles as the map wielding geographically ignorant outsiders we were.
[66] Commonly called a *carta nacional*. These maps, or *cartas nacionales*, are explained in detail later in the chapter. Also see glossary.
[67] Names of borderland residents are substituted with pseudonyms to protect their anonymity in both the text and figure captions.
[68] *Peke peke* is the local name for the ubiquitous and inexpensive outboard motors with the long shaft needed to operate in both low and high water seasons.
[69] Harley (1988a, 1988b, 1989) has deconstructed the textual, rhetorical, political, and powerful nature of maps. His deconstruction has extended to the colonial Americas where he has found evidence of indigenous geographic knowledge in European map construction even as European maps "…served to dispossess the Indians by engulfing them with blank spaces" (Harley 1992: 531). Bassett's analysis of blank spaces in 19th century European maps of West Africa led him to assert these null spaces to be evidence of a "disregard for indigenous geographical knowledge" by European explorers (1994: 322). These spaces also incited exploration and colonization as imperialists used blankness to justify appropriation and control (Bassett 1994: 324). These empty spaces or cartographic silences are active rather than passive constructs and as such, actively desocialize the landscape (Harley 1988b: 66, 70). The landscape contains no blank spaces and thus, Harley contends metaphorically, "there is no such thing as an empty space on a map (1988b: 71). Harley urges us to make these silences speak, to uncover the agenda hidden in the emptiness, to investigate the absence (1988b: 58, 71, 70).
[70] Both Peruvian nation state and Ucayali region goals are affected.
[71] Pseudonyms for these population centers are used in the figure headings to protect local inhabitants. Names in tables are correct for comparison to other cartographic sources.
[72] Paper maps are available for purchase through el Instituto Geográfico Nacional (IGN) < http://www.ignperu.gob.pe/web_espanol/portal.htm >.
[73] Cartographic information is available from the Instituto Nacional de Estadística e Informática (INEI) at < http://desa.inei.gob.pe/mapas/bid/ >. The INEI location information for population centers can also be obtained through personal contacts in Peruvian institutions.
[74] This data set is not publically available and is described in more detail in Chapter Four.
[75] There is no official database for Peruvian indigenous territories and datasets of various qualities are available from personal contacts and institutions. I used datasets from Instituto del Bien Común (IBC), Instituto Nacional de Recursos Naturales (INRENA), and Gobierno Regional de Ucayali (GOREU).
[76] INRENA's website is < http://www.inrena.gob.pe/ >.
[77] Coordinates can be purchased at the MINEM website < http://www.minem.gob.pe/ > although I obtained them through other personal contacts.
[78] These data are not publically available.
[79] Abizaid found this new channel formation to have been hastened by local people using hand tools and bulldozers (Abizaid 2005).
[80] El Instituto Geográfico Nacional (IGN). Metadata is not complete for these four maps (17n, 17ñ, 18n, 18ñ) although 17ñ and 18ñ do state that they were compiled by the DMAHTC in 1990. Based on my analysis of other IGN maps "compiled" refers to compilations of aerial photos taken in the 1950s, 1960s, 1970s, and 1980s.
[81] Winklerprins (2002), Sheikh et al. (2006), and Smith (1999) among others have addressed the impacts of a dynamic floodplain on livelihoods in the Brazilian Amazon.
[82] In figure 24 note the clouds in the northeast corner of the satellite image despite this being a September image (the driest portion of the dry season).
[83] This settlement pattern, like many modern Amazonian models, has a precedent in pre-Columbian times (Denevan 1996).
[84] 320 of these maps cover the entire area of the Peruvian Amazon (Smith et al. 2003).

[85] In November 24, 2003, NIMA changed its name to the National Geospatial-Intelligence Agency (NGA) < http://www.nga.mil/StaticFiles/OCR/nga_history.pdf >.
[86] These maps were purchased in 2004 at the National Geographic Institute.
[87] Instituto Nacional de Estadística e Informática (INEI)
[88] The geographic methods used by INEI to georeference the data are unclear.
[89] Oficina Nacional de Evaluación de Recursos Naturales (ONERN)
[90] See glossary.
[91] ONERN was abolished in the early 1990's by the Fujimori administration and replaced by INRENA. INRENA has never reached the comprehensive research capacity of ONERN.
[92] To compound matters, ONERN neither studied the entire borderlands nor consistently used ecologically grounded boundaries (e.g. their study of the area is partially framed by lines of latitude) making spatial comparisons over time difficult.
[93] "The zone is scarcely populated with people dispersed alongside the Abujao and Utiquinía Rivers and totally uninhabited in between" translated from (Centro de UNALM 1981: 1-2). Later the same study says, "The reconnaissance undertaken in this study confirms the colonist occupation of the Río Abujao and also along the middle and upper portions of the Río Utiquinía, since the lower portion is subject to flooding. Native populations were not found given that they dwell along the bank of the Ucayali Rivers." (Centro de UNALM 1981: 10). An analysis of names of the 77 residents of agricultural lots along the Abujao in 1979 reveals more than a few residents to be Asháninka/Ashéninka. This is confirmed by our own fieldwork in the titled Asháninka/Ashéninka community of San Mateo Alto Abujao, many of whose residents were born on the lower Abujao.
[94] Hamlet in Spanish. *Caserío* is the common name for all of the towns in the study site whose population is mostly not indigenous.
[95] According to their website, The Instituto del Bien Común is a Peruvian not-for-profit civil association, whose principal concern is a deep caring for the many resources held in common with additional foci on rural peoples and ecological services (Instituto del Bien Común 2004).
[96] This was true at the time of our fieldwork in 2004.
[97] Again, for the purposes of this study we have elected to use the most common usage today: Callería.
[98] I thank anthropologist Manuel Cuentas for first bringing this to my attention.
[99] Distinct from the Contamanillo farm, *fundo,* on the Callería although settlers of both had roots in the Río Ucayali town of Contamana. In 1970 the Utiquinía River's Contamanillo had five families.
[100] It appears that this indigenous community never received legal status as there is now no indigenous community by that name.
[101] The Sendero Luminoso, or Shining Path, is a Marxist based revolutionary organization with a history of violence in the region.
[102] See glossary.
[103] For example, our stop at Barión Poza, one of the *fundos* along the Tamaya present in the IGN data sources, found only a small ranch worked by two men for an absentee landlord.
[104] University of Texas student Emory Richey took an informal census of the borderland Asháninka on the Tamaya in 2005 (Richey 2005).
[105] These territories surround El Sira Communal Reserve.
[106] The Asháninka will be explained in much more detail in chapter 4.
[107] Riverside dwellers, often agriculturalists and extractivists pursuing near subsistence livelihoods.
[108] Proyecto Especial de Titulación de Tierras y Catastro Rural.
[109] Probably the Sendero Luminoso who was active along the Tamaya in the late 80s and early 90s (Comisión de la Verdad y Reconciliación 2004a; Comisión de la Verdad y Reconciliación 2004b).
[110] Renovación de Certificado.
[111] Certificado de Posesión Especial de 1987.
[112] The special project Control and Reduction of Coca Cultivation in the Alto Huallaga (CORAH) of the Peruvian Ministry of the Interior is in charge of eradicating coca in Peru. This organization will be described in detail in the fourth chapter.

[113] Analysis of CORAH data later showed that coca had indeed been eradicated nearby, but in November not July or August. Within 2 kilometers of the *caserío* 19 fields had been eradicated for a total of 33 hectares of coca.
[114] *Varaderos,* or portage trails, are called *varadouros* in Brazil.
[115] An analysis of the social and environmental impact of coca cultivation in these borderlands is included in chapter four of this dissertation.
[116] Drug traffickers and Shining Path members repeatedly tried to motivate local people (indigenous and non-indigenous) to plant coca. The headman of the indigenous community of San Mateo recounted how he refused just such a forceful request/threat by saying they had title to their lands and nobody could force them to do anything. In another case, a village of predominantly Brazilian origin formed a citizen's militia and proved critical in defeating the Shining Path in the region (Comisión de la Verdad y Reconciliación 2004a; Comisión de la Verdad y Reconciliación 2004b).
[117] The State Forestry Patrimony (Patrimonio Forestal del Estado) includes all forest resources and wildlife not part of private property (Paniagua 2001: 201105).
[118] Ken Young (personal communication) points out this is also a sign of corruption.
[119] Asociación Interetnica de Dessarrollo de la Selva Peruana
[120] Asociación para la Conservación del Patrimonio del Cutivireni
[121] Centro del Desarrollo del Indígena Amazónico
[122] In the borderlands, the basis for these surveys are natural resource inventories conducted in the late 1970s by Peru's national office of natural resource evaluation (ONERN) and while these are excellent studies of largely unknown areas, they simply do not represent the current state of these forests.
[123] The link between forestry concessions, illegal logging, the international border, and indigenous people is explored in detail in Chapter Two of this dissertation. Other factors also encourage illegal logging (Smith et al. 2006), but these basic issues will be the focus here.
[124] The Peruvian Ministry of Energy and Mines uses the Provisional South American Datum 1956 (PSAD 56) for their National Cadastral Map of Mines, but recognizes GPS to be the most efficient way of determining position for mining rights. However, for taxation purposes, points are collected in WGS 84 and then transformed into PSAD 56 through transformations now published in Supreme Decree # 001-2002-EM (Toledo et al. 2002).
[125] Both foreigners and nationals are allowed to hold a concession but article 71 of the 1993 Peruvian constitution bans foreigners from holding (directly or indirectly) property rights in areas located within 50 kilometers of the nation's boundaries, except in cases of public need declared by Supreme Decree and approved by the ministries council in accordance with Peruvian law.
[126] These are only two of the regulations.
[127] Evaluaciones Ambientales Territoriales
[128] Programas de Adecuación y Manejo Ambiental (PAMA)
[129] Estudios de Impacto Ambiental (EIA)
[130] 38 soles. The price for a gram in Pucallpa was 15.15 $ U.S. (50 soles). Prices in US$ were calculated using 2004 November exchange rate of 3.3 soles to the $ U.S.
[131] Article 71, Chapter 3, Title 3, 1993 Constitution of Peru.
[132] Although local people are increasingly solicited for feedback during the conservation planning stages by NGOs, their decision making power at the creation stage is limited.
[133] Zona Reservada is a transitional designation that may soon be upgraded to national park or biological reserve status.
[134] David Cleary Director of the Conservancy's Amazon program, led the greater transboundary effort with Claudia Vega of the Conservancy's Peru program lobbying in Lima.
[135] Francisco Estremadoyro headed the Sierra del Divisor initiative for Pro Naturaleza.
[136] Tedy Tuesta, Gerente Gerencia Regional de Recursos Naturales y Gestión del Medio Ambiente, Gobierno Regional de Ucayali, led this effort despite starting his job "without even a chair" just a few years earlier.
[137] As described in the previous page many different conservation organizations were involved in the proposal. The proposal was first tendered to INRENA and stayed there for many months before being accepted.

[138] See glossary. A caserío primarily dedicated to coca cultivation.
[139] See glossary. Here used primarily in reference to coca farmers.
[140] We were unable to confirm the presence of a coca cultivating region nicknamed narcolandía by the Brazilian Asháninka.
[141] See next chapter for more details on the links between illegal logging and drug trafficking.
[142] Apiwtxa actually stands for *Associação Ashaninka do rio Amônia* (Asháninka Association of the Amônia River), but is also used interchangeably by the Asháninka as the name for their village. The normally dispersed Amônia Asháninka organized in this village to advance their goals of self-determination and territorial control. Thus, the name fittingly serves dual functions as both a community organization or *associação* (association) and as community place name for their centralized *aldeia* (village).
[143] A detailed description of these general methods can be found in Salisbury 2002.
[144] Brazil remains the largest exporter in Latin America.
[145] This approximate percentage was arrived at using ArcGIS area calculations for the associated polygons within an Ucayali specific Lambert Conformal Conic Projection. The region of Ucayali contains portions of two National Parks (Cordillera Azul and Alto Purús), two Communal Reserves (El Sira and Alto Purús), and one Reserved Zone (Sierra del Divisor) for approximately 22% in conservation units. The department also contains four Territorial Reserves for Indigenous People in Voluntary Isolation (Isconahua, Murunahua, Mashco Piro, and Kugapakori y Nahua) or 15% of Ucayali's area, however, only two (Murunahua and Kugapakori y Nahua) exist outside of existing conservation units for 5% of the department's area. Indigenous territories are the hardest to quantify given the number and area of these units change rapidly and geographic databases are still incomplete and largely erroneous (although the SICNA department of the Instituto del Bien Común has made great strides here) {Smith, Benavides, et al. 2003 #2920}. Using the Regional Government of Ucayali's 2004 database of 309 Indigenous Territories (Both titled and recognized) and their amplifications, I was able to roughly estimate these to cover approximately 21% of the Ucayali region. Thus, 49% of the Ucayali region falls within an indigenous territory or conservation unit.
[146] See glossary for further elaboration.
[147] Supreme Decree 051-92-AG, *El Peruano, Diario Oficial* 12/22/92.
[148] Supreme Decree 10-95-AG, *El Peruano, Diario Oficial* 4/30/95.
[149] Supreme Decree 013-96-AG, *El Peruano, Diario Oficial* 8/23/96, p. 141996-7, #5896.
[150] The World Wildlife Fund was instrumental in lobbying for and writing the new sustainably oriented law and solicited feedback from a variety of forestry communities through a participatory process. Despite this, the final written law did not exactly match their draft. Once the law was in place in 2001, USAID provided funds through CEDEFOR (Centro de Desarrollo Forestal), a WWF project, to implement the law and improve forestry practices via INRENA, other institutions, or by working directly with concessionaires. These investments in the forest sector were not always used wisely or successfully by institutions, NGOs, and concessionaires. USAID also provided funds and resources through WWF and IRG (International Resources Group) to combat illegal logging through working groups and commissions (USAID 2005: 49). Peruvian organizations labored to satisfy USAID's detailed, and at times unrealistic, accounting process and suffered sudden and unpredictable withdrawals of funds (Mariana Montoya personal communication). For example, USAID cut forestry funding to Peru by 1.4 million dollars (almost 50%) from 2003 to 2004 (USAID 2005: 18). In 2004, there were over 500 forest concessions covering over seven million hectares in five Peruvian departments (USAID 2005: 49).
[151] In the borderlands, the basis for these surveys are natural resource inventories conducted in the late 1970s by Peru's national office of natural resource evaluation (ONERN) and while these are excellent studies of largely unknown areas, they simply do not represent the current state of these forests.
[152] Caoba, Catahua, Cedro, Copaiba, Cumala, Lagarto Caspi, Lupuna, and Tornillo.
[153] The floods are not always predictable however and can leave logs stranded until the following year.
[154] The cutting of planks by chainsaw is illegal according to the new forestry law of 2000.
[155] All names used in this dissertation are pseudonyms.
[156] 300 to 400 soles adjusted for November 2004 exchange rate of 3.3 soles to the dollars US.
[157] *Mateiro* in Portuguese.
[158] *Chorisia integrifolia*

[159] The community shared with the researcher all of the documents they had compiled since they began their organizing efforts. These consisted of 63 documents from March of 2002 to November of 2004.
[160] Asociación Interétnica de Desarrollo de la Selva Peruana.
[161] *Plata*, literally silver, is slang for cash.
[162] The letters were sent to the Defender of the People, the Mayor of the municipality, INRENA, the Regional director of Agriculture, CONAPAA and AIDESEP.
[163] *Cedrelinga catenaeformis*
[164] This sum was arrived at looking at domestic market prices on www.globalwood.com for November of 2004. Timber priced as machine dried at international specifications for length and quality.
[165] Self defense committees have a violent history in the region given these committees played key roles in defeating the Shining Path in the early 1990s (see chapter on coca).
[166] This same confrontation was also detailed in an open letter to the public from the Apiwtxa leadership in August of 2004 (Instituto Socio-Ambiental 2004b).
[167] This capture was documented by the press in Brazil (Sales,V. 2004), but not in Peru. Ethnographic research later proved that one of those captured was a woman.
[168] At 2004 prices and depending on quality these harvests of mahogany and cedar could be worth over 7 million dollars in Lima.
[169] Images used were both Landsat 7 ETM+: Path 5 Row 66 September 16, 2002, Path 5 Row 67 September 16. 2002.
[170] Marina Silva is a native of Acre and the daughter of rubber tappers.
[171] Página 20's article about this landmark event contains a wonderfully illustrative photo of army personnel, Governor Viana and Asháninka leaders talking in the Asháninka village of Apiwtxa. Available through Página 20 at http://www2.uol.com.br/pagina20/22022005/especial.htm
[172] A fascinating photograph of the President of Peru shaking hands with the President of Apiwtxa while the Governor of Acre, Brazil looks on is available for viewing through La República (La Republica 2005) at http://www.larepublica.com.pe/component/option,com_contentant/task,view/id,70294/Itemid,0/
[173] In 2005, the UNODC estimated 14 million cocaine users worldwide with two thirds residing in the Americas (UNODC 2005b).
[174] 97% according to the UNODC's 2005 report (UNODC 2005b).
[175] Morales is particularly informative on this subject, dedicating an appendix to the topic based on his own experience.
[176] UNODC uses remote sensing to estimate coca coverage (UNODC 2005c: 65).
[177] See glossary and section four of this chapter for more details about this organization.
[178] Jen Lipton was instrumental in helping me conduct this specific analysis. SRTM data is available at < http://srtm.usgs.gov/ >.
[179] These millions of dollars are of course relative, given they are a pittance in comparison to the value of the coca products they are seeking to control and monitor.
[180] These are police helicopters (Ken Young personal communication).
[181] My thanks to Peter Dana for pointing out to me the irony that the only people in the borderland region with the training and resources to build a strong data base of geographic knowledge are the eradicators of the coca plant.
[182] Although the lack of collections could be in part due to the inaccessibility of this region. A region rather than point adaptation of this map can be found in Young 1996.
[183] An illegal logging road of at least 140 km does exist from Nueva Italia on the Upper Ucayali to the Brazilian border at the Amonia River.
[184] This is by far the lowest estimate of sun dried coca leaf production of all of the coca producing regions surveyed in Peru by the UNODC's Coca Cultivation Survey of Peru (UNODC 2005c).
[185] While this estimate is extremely conservative it also does not incorporate production costs associated with weeding or harvesting at approximately 2.1 $ US a day during those work periods. This daily wage also usually includes breakfast and lunch for the laborer.
[186] Coca can be harvested as young as 11 months (Morales 1994).
[187] If these fields had not been eradicated in 2003 and 2004 production of coca leaf in 2004 would come from fields over 1 year old in 2003 and over 2 years old in 2004.

[188] Oven dried leaf is estimated to weigh 70% as much as the same amount sun dried (UNODC 2005c).
[189] 2004 wholesale prices are 22,081 US $ per kg in USA (adjusted for inflation) (UNODC 2005a).
[190] 2004 wholesale prices are 45,730 US $ per kg in Europe (adjusted for inflation) (UNODC 2005a).
[191] For 2004, UNODC world drug report 2005 states that an inflation adjusted average street price in Europe would be US $88 per gram and in USA US$ 77 per gram (UNODC 2005a).
[192] ENACO or the Empresa Nacional de la Coca S.A. was created in 1949 and is a state company authorized to commercialize coca leaf and its derivatives. www.enaco.com.pe
[193] The cocaine smuggling Rodríguez Orejuela brothers listed sixteen ways they moved their illegal product into the United States. Number one on the list was hiding the cocaine in hollowed out planksof mahogany (Rodríguez Orejuela 2005:25).
[194] The Amazon is not the only remote Latin American frontier to have demonstrated linkages between loggers and the drug trade. An example that also includes indigenous people is Shoumatoff's (1997: 206) description of the nexus of logging, poppy and marijuana cultivation, and the Tarahumara in the Sierra Madre Occidental of Mexico.
[195] I will shorten Shipibo Conibo to the more commonly used Shipibo for the rest of this chapter.
[196] It should be noted that the real overlap of these fields with the indigenous territory should be questioned given the poor georeferencing of indigenous communities in the Peruvian Amazon. The Instituto del Bien Comun had not worked on the Utiquinía as of this writing. For more information on these issues see chapter two and also Smith et al. 2003.
[197] This of course would take much longer to reach by paddling.
[198] Two short films exist on the processing of coca leaf to paste < http://colombia-reports.blogspot.com/2006/09/how-coca-base-is-made.html> and coca paste to cocaine <http://www.youtube.com/watch?v=MSOGjQBHa5Y> are available.
[199] Of course a challenge to processing the coca leaf in these remote locations is hauling in the chemicals by boat (Ken Young personal communication). Theoretically, these waterways could be easily controlled by the police given the relatively small size of the rivers and the watercraft.
[200] My thanks to Bill Woods for his insight on soil contamination in tropical areas with intense rainfall.
[201] An exception is the important cartographic work of the Instituto del Bien Común.
[202] Santos-Granero and Barclay (2000) do not define remote or the remotest areas in their study. This is an important absence given most of Loreto and Ucayali can be defined as remote due to the absence of infrastructure and the size of these regions.
[203] Their archival methodology makes a focus on smaller farms and population centers problematic given less documentation exists.
[204] Even Iquitos, the largest city in Loreto, and the center of their research is dependent on externalities such as fishmeal from Lima for chicken feed (Ken Young personal communication). These items must be flown in from outside the region given Iquitos has no road connection to Peru.
[205] Other obstacles also exist, most importantly those of political will and governance, but these are beyond the scope of this dissertation.
[206] The total list of chapters is geology, geomorphology, climate, hydrography, soils and agroforesty aptitude, vegetation, biodiversity, biophysical landscapes, history, land tenure, demography, rural natural resource use, indigenous peoples and lands, forestry policy, deforestation, hunting and fishing, social indicators, economic indicators, socio-economic infrastructure, conservation units, urbanization, human-environment conflicts, society and the environment, timber industry indicators, indicators for extractive reserves, indicators for indigenous territories, indicators for conservation, indicators for agriculture and livestock raising, and tourism.
[207] The work includes over 30 high quality thematic maps of Acre state.
[208] The EEZ combined layers of information focused on the physical geography (vegetation, relief, soils, geology, land cover, distribution of ecologically critical species) with layers addressing human geography (deforestation, settlement types, economic potential, social demands, threats among others) to identify areas suitable for the establishment of conservation units (both centered on protection and sustainable use) (personal communication Veronica Rocha de Passos).

[209] The Comissão Estadual do Zoneamento Ecológico Económico (CEZEE) with its stakeholder representatives (indigenous people, rubber tappers, researchers, businessmen etc…) represents the concerns of Acre society in relation to the EEZ.
[210] Decreto Supremo N° 045-2001-PCM. Article 1 Declares of national interest the organization of environmental territory throughout all of Peru, and constitutes the National Commission for Organizing Environmental Territory to propose iii) the mechanisms to begin strategies for territorial organization and ecological-economic zoning. Article 3 then declares ecological-economic zoning to serve as the spatial reference point for regional and sectional planning, as well as to promote and orient private investment. Pgs. 201956-8, El Peruano (Normas Legales) Lima, Viernes 27 de Abril de 2001.
[211] Instituto de Investigaciones de la Amazonia Peruana.

Glossary

Amazon: See Amazonia

Amazon borderlands: (Also see Borderlands). This dissertation initially defines these borderlands as a 150 km zone parallel to either side of the international boundaries contained within the Amazonia *sensu stricto* subregion (see Amazonia). This is merely a first approximation of the dynamic Amazon borderland region and will surely be refined with further research informed by local knowledge. See for example Central Borderlands of Peru and Brazil.

Amazonia: This dissertation uses Amazon and Amazonia interchangeably unless referring directly to the Amazon River. The Amazon and Amazonia are many things to many people and accordingly there are multiple Amazons and Amazonias. This issue is dealt with at length by the Amazon Cooperation Treaty Organization in their book Amazonia without Myths (Inter-American Development Bank and Commission on Development and Environment for Amazonia 1992). This dissertation defines Amazonia as the Amazonia *sensu stricto* subregion "representing the area of the Amazon and Tocantins river basins dominated by the Amazon lowland rainforest biome (including also minor other, forest and non-forest vegetation types and their associated fauna)" (Eva and Huber 2005: 10).

Amazonian boundaries: Also Amazonian borders. The international boundaries encapsulated by the Amazonia *sensu stricto* subregion. At 1:1 M scale these boundaries are approximately 12,000 km in length.

***Asháninka*:** Also called by the name of a closely related group, the *Ashéninka* (Santos-Granero and Barclay 2005). Historically called *Campa* in Peru and *Kampa* in Brazil . Weiss divides and maps the *Campa* into the *Pajonal Campa* of the uplands and the *River Campa* of the Apurímac, Tambo, Ené, and Perené Rivers (Weiss 1975). While both groups are usually lumped under the term *Asháninka* or more rarely *Ashéninka*, according to Veber there are at least six groups including the *Asháninka* of the rivers Ené, Perené and Tambo, the Pichis *Ashéninka*, the Pajonal *Ashéninka*, and the *Ashéninka* of the Ucayali (Veber 2003). Dialects vary between groups but communication is readily possible between them (Veber 1998). While wars and slaving raids between these groups were common in the distant (Fry 1907) and recent (Clark 1954) past, their collusion is also very present in the borderlands. Isolated together in these boundary lands, the *Asháninka* and *Ashéninka* live together to form the borderland *Asháninka* treated in this dissertation. Here I use the term *Asháninka* to refer to both groups.

Borderlands: (Also Boundary Lands) The term borderlands shares as many territorial meanings as there are purposes for its definition (House 1982). While the metaphorical, figurative, and conceptual borderlands of a globalizing world are increasingly studied from a postmodern vantage point, this research loosely defines borderlands as the territorial regions surrounding nation state boundaries. These regions vary widely between narrow bands of territory along nation state boundaries to whole hybrid cultural borderlands with complex histories (Kaplan and Häkli 2002).

Boundary Lands: See Borderlands.

***Cartas Nacionales*:** Cartas nacionales is the common Peruvian term used to refer to the Peruvian state's official maps produced by the National Geographic Institute (*Instituto Geográfico Nacional*) at 1:100,000 scale.

***Caserío*:** The direct translation is hamlet in English. *Caserío* is the common name used by locals for villages or small towns settled primarily by non-indigenous people. The term for indigenous areas is *comunidad* or community.

***Caserío Cocalero*:** A *caserío* whose primary agricultural and economic activity is the cultivation and sale of coca leaves.

***Castilloa ulei*:** Also *Castilloa elastica* often commonly called *caucho*. *Caucho* refers both to the rubber tree species found in Amazonia and the rubber itself. *Castilloa* trees could not be sustainably harvested as rubber extraction required the death of the tree. *Cauchero* refers to the nomadic harvester of these trees who would search, find, and fell them before extracting the rubber and moving on in search of more of these trees.

***Caucho*:** The rubber or latex of the *Castilloa ulei* (see glossary) trees. Sometimes also used to refer to the rubber of *Hevea brasiliensis* (see glossary) although *jebe* would be the correct term. See related term *cauchero*.

***Cauchero*:** *Cauchero* refers to the nomadic harvester of *Castilloa ulei* (see glossary) trees. *Caucheros* would search, find, and fell *castilloa* trees before extracting the rubber and moving on in search of more of these trees. Caucheros were integral components in the Peruvian state's quest to claim the Alto Juruá and Alto Purús River regions.

Central Border of Brazil and Peru: The central border of Brazil and Peru refers to the central portion of the Brazil-Peru border, specifically this includes the boundary along the ridge of the Sierra del Divisor/Serra do Divisor between the headwaters of the Javarí (Yavarí in Peru) and the headwaters of the Juruá (Yurua in Peru).

Central Borderlands of Brazil and Peru: The central borderlands of Brazil and Peru refers to the borderlands surrounding the central portion of the Brazil-Peru border, specifically this includes the Sierra del Divisor/Serra do Divisor area between the headwaters of the Javarí (Yavarí in Peru) and the headwaters of the Juruá (Yurua in Peru). These borderlands can be approximated to extend 150 km into Brazil based on their legal principle of *faixa de fronteira* (see below). On the Peruvian side fieldwork defines the borderlands as extending from the right bank of the Ucayali River, a physical line roughly equivalent to the secondary frontier, to the border with Brazil.

***Centro de Investigación de Fronteras Amazonicas* (CIFA):** The Amazon Borderlands Research Center was established in 2004 at the Universidad Nacional de Ucayali (UNU), Pucallpa, Peru. UNU initially founded CIFA around the author's borderland research after investing thousands of dollars in the project and providing four university undergraduates as research assistants. More information about CIFA is available at http://www.unu.edu.pe/cifa/index.html .

***Cocalero*:** A coca farmer or someone generally involved in coca cultivation, consumption, or trafficking. Here used primarily in reference to coca farmers.

Ecological and Economic Zoning (EEZ): defined as "a dynamic process permitting a spatial ordering of areas characterized by physical, biotic, and socio-economic factors evaluated in relation to their sustainable use by or tolerance of human intervention" (Tratado de Cooperación Amazónica 1994), EEZ shows promise as a geographic information tool contributing to the reconciling of conservation, development, and social justice in the Amazon borderlands.

Enganche: The hook. A term to describe the recruitment of labor in the habilitación-enganche system.

Enganchador: The patrón, habilitador, or habilitado who recruits labor for resource extraction.

***Faixa de fronteira*:** In the 1979 Law #6,634, Brazil declared all of the territory within 150 kilometers of its terrestrial nation state boundaries to be a frontier zone indispensable to the national security of the country (Direito and Justiça Informática Ltda 2006). This 150 km wide zone, called the *faixa de fronteira*, has unique restrictions on industry, infrastructure, and titling among other initiatives, requiring approval of the National Security Council (Direito and Justiça Informática Ltda 2006).

***Fronteras vivas*:** Roughly translated as living borders, this term refers to the Peruvian government's policy of encouraging colonists to settle in the borderlands as a means of protecting national sovereignty along the most remote political boundaries. One manifestation of this policy is the UMARs (*Unidades Militares de Asentamiento Rural*) or military settlement projects.

Frontier: This dissertation's definition for a frontier is that of a zone of transition distant from the center of a (post) colonizing nation (Wendl and Rösler 1999). This zone of transition represents the gap that still exists between the line one can loosely define as the settlement frontier, where allochthonous peoples from elsewhere (often the center) have become dominant, and the political boundary. However, sources quoted in this dissertation may use the term frontier as a synonym for border or boundary.

Fourth world: Here, this term refers to Nietschmann's view (Nietschmann 1994) of a fourth world made up of indigenous nations disenfranchised and unrecognized by the nation states in which they live and the international community of nation states.

***Fundo*:** Fundos are family farms, often outposts in the frontier, usually located along major rivers (in contrast to the rubber tapping outposts in the interfluvial zones). Patrones often used indigenous labor to harvest crops in their fields or harvest natural resource both near and far afield. The fundo owners, or patrones, controlled local labor and established enduring links between the frontier and the marketplace (Santos-Granero and Barclay 2000).

***Habilitación-enganche* system:** This is a debt peonage system where patrones or habilitadores advance financial and logistical support to laborers who then must pay back these debts in labor or products (latex or timber being two common examples). The system was common during the rubber boom and has since been adapted to the timber trade.

Habilitado: Someone who has been advanced credit, goods, and equipment by a patrón or habilitador to harvest timber, latex, or another product.

***Habilitadores*:** Habilitadores are middlemen. Habilitadores work between sawmill owners, concessionaires, *patrones*, and the laborers. They provide technical and financial support to the laborers in return for tropical timber. In certain instances they will also employ local *patrones* who serve as another layer of *habilitador*.

***Hevea brasiliensis*:** The species of rubber tree most coveted by both rubber tappers and rubber bosses given its fine quality and the quanitity of rubber that could be extracted sustainably. These trees could be tapped continuously during large portions of the year and the search for and control of this economically lucrative plant was at the heart of the rubber boom and the political aspirations associated with it. In Peru the species and rubber were called *jebe* and the rubber tapper a *xiringero/shiringero*. In Brazil the rubber tree was also called a *seringueira* and the rubber tapper a *seringueiro.* The borderland region between Bolivia, Peru and Brazil was historically rich in *Hevea brasiliensis*.

Instituto del Bien Común (IBC): IBC is a Peruvian non-governmental organization (NGO) focused on caring for the ecological and cultural resources held in common by

humanity. One of their central interests involves the accurate mapping of indigenous populations. The author was an associate member of IBC during fieldwork in 2004. More information about IBC is available at http://www.ibcperu.org/index.php?lg=EN .

Isconahua: Also Isco or Iskobakebu are an indigenous group in voluntary isolation apparently still roaming the Sierra del Divisor between Peru and Brazil. They have a territorial reserve, Reserva Regional Isconahua, set aside for their protection, although this reserve has recently been included in the Zona Reservada Sierra del Divisor conservation unit. More on the Isconahua can be learned in Arbaiza-Guzman et al. 1995, Momsen Jr. 1964, Whiton et al. 1964).

Local Knowledge: Local knowledge refers to the knowledge local people gain from living in a place and environment for years at a time. This might include knowledge of the curative properties of the area's plants, knowledge of the courses and headwaters of rivers, or knowledge of the cultures of neighboring peoples to just name a few examples.

Local Inhabitants: (See Local People)

Local People: Amazonia, and in particular, the borderlands, are regions of transitive peoples and cultures, making the definition of local people problematic. Even the indigenous residents of the borderlands may have arrived only a year, a decade or a century before. Here, local inhabitants refer to people with at least a handful of years in the area and an interest in the long term future of their local place or region. Local inhabitants are not nomadic loggers, moving from river to river, but they can be loggers and skin hunters who work from a borderland home.

***Kaxinawá*:** An indigenous group called *Cashinahua* in Peru. These indigenous peoples live bisected by the Peru/Brazilian border along the Juruá/Yuruá and Purús watersheds.

Patrón: A boss or patron who controls rural labor with financial backing, personal magnetism, and often the lack of alternative options for laborers. Logging patrons often use debt peonage as a means to control scarce labor along Amazonian resource frontiers.

Progressive Contextualization: A methodology prioritizing causal explanation of human-environment interaction and events through the construction (event by event) of causal chains by means of asking and answering factual and counterfactual questions of environmental events or human actions. This process begins by identifying possible proximate causes of each event and then eliminating possibilities through empirical investigation. One can then work backward in time and outward in space to construct causal explanation. This inductive method seeks to understand the complexity, heterogeneity, and diversity present within human-environment interaction rather than test simplified and deductive generalizations or theories (Vayda 1983, 2004).

***Selva Central*:** Santos-Granero and Barclay define the *selva central* as the "central jungle", "central *montaña*", or central portion of the Peruvian *selva alta* or high jungle (Santos-Granero and Barclay 1998). This area lies along the eastern slopes of the Andes. Within this *selva central* region lie the historical and current core homelands of the Asháninka/Ashéninka peoples in the Pajonal, and along the Perené, Ené, Tambo, Upper Ucayali and Urubamba Rivers.

Seringueiros: Rubber tappers who collected the latex of the *Hevea brasiliensis* trees (these trees commonly called *seringueiras*). *Seringueiros* were not nomadic but sedentary due to the sustainability of tapping *Hevea brasiliensis* for much of the year. This contrasted with *caucheros* nomadic harvesting of *Castilloa ulei*.

State: State is a problematic term given it can be used to refer to both nation-state or sub-national state, or both. In this dissertation I differentiate where possible between nation state, region (the Peruvian term for a sub-national political/administrative unit), and the state of Acre, Brazil. However, I also use the term generally to refer to both the national and sub-national state's relationship with the borderlands. When I use the following general terms I am referring to both national and sub-national states: a weak state presence, a weak state, state indifference, state ignorance, and state claims among others.

***Tabula Rasa*:** I use this concept in the sense of Susanna Hecht who defines a tabula rasa as a blank slate, "a place that is immanent, undefined, and available for the transformative civilizing mission…" (Hecht 2004: 45). This topic has also been reviewed by Neumann (Neumann 1998) among others.

***Varaderos*:** Also *varadouros* (Portuguese) these are portage trails linking the headwaters of one watershed to another. Similar to a crossroads in an Amazonia without roads, control of these strategic spots could impact large areas both economically and politically.

References

Abizaid, C. 2005. An Anthropogenic Meander Cutoff Along the Ucayali River, Peruvian Amazon. *Geographical Review* 95, no. 1: 122-35.

ACONADIYSH (Asociación de comunidades nativas para el desarrollo integral de Yurua Yono Sharakoiai). 2004. *Plan de vida de los pueblos indígenas de Yurua, 2004-2009*. Pucallpa, Ucayali, Peru: ACONADIYSH .

Agrawal, Arun, and Clark C. Gibson. 1999. Enchantment and Disenchantment: The Role of Community in Natural Resource Conservation. *World Development* 27, no. 4: 629-49.

Ahora Staff. 6 July 2004a. Protestas por erradicación de la coca incluyendo sembríos de pan llevar. *Ahora,* sec. Regional, p. 12. 281

———. 23 August 2004b. Según Cámara Nacional Forestal el 80% de la madera extraída en Ucayali proviene de la tala ilegal. *Ahora,* sec. Local, p. 4.

———. 2 November 2004c. El 90% de madereros en Ucayali son ilegales. *Ahora,* sec. Página Principal, p. 1.

Allen, Catherine J. 2002. *The hold life has: coca and cultural identity in an Andean community*. 2nd ed. Washington D.C.: Smithsonian Institution Press.

Allen, Christian Michael. 2005. *An industrial geography of cocaine*. New York: Routledge.

Almeida, Alfredo Wagner Berno de. 1993. *Carajás a guerra dos mapas*. Belém, Brazil: Falangola Editora.

Amorim, Diego. 21 September 2004. Dentro dos costumes indígenas. *Web PageUniversidade De Brasilia*. [Accessed 13 March 2007], Available at < http://www.unb.br/acs/unbagencia/ag0904-45.htm >.

Antunes, Freud. 23 October 2004. Peruanos são presos tirando madeira nobre em Thaumaturgo. *A Tribuna*. Available at < http://www.jornalatribuna.com.br/w827.htm >.

Aquino, Romerito. 27 February 2004. Floresta amazônica está sendo destruída pelas bordas. *Pagina 20,* sec. Cotidiano, col. 1. Available at < http://www2.uol.com.br/pagina20/ >.

Aquino, Txai Terri. 21 November 2004. No tempo das Invasões Peruanas. *Pagina 20,* sec. Papo de Indio, col. 1. Available at < http://www2.uol.com.br/pagina20/ >.

Andrews, George, and David Solomon. 1975. *The Coca leaf and cocaine papers*. New York: Harcourt Brace Jovanovich.

Araujo, R. 2001. The Drug Trade, the Black Economy, and Society in Western Amazonia. *International Social Science Journal* 53, no. 3: 451-457.

Arbaiza Guzmán, Sergio, Manuel Damaso Cuentas Robles, and Carlos Bravo Chelin. 1995. *Establecimiento y delimitación territorial para el grupo indígena no contactado Isconahua*. Pucallpa: Unpublished Report of the Dirección Regional Agraria-Ucayali.

Archibald, R. C. 7 March 2007. In Arizona desert, Indian trackers vs. smugglers. *New York Times,* sec. U.S.,< http://www.nytimes.com/2007-03/07/washington/07wolves.html >.

Arima, E. Y., R. T. Walker, S. G. Perz, and M. Caldas. 2005. Loggers and Forest Fragmentation: Behavioral Models of Road Building in the Amazon Basin. *Annals of the Association of American Geographers* 95, no. 3: 525-41.

Arreola, Daniel D, and James R Curtis. 1993. *The Mexican border cities: landscape anatomy and place personality*. Tucson: University of Arizona Press.

Artaxo, P., R. C. De Campos, E. T. Fernandes, J. V. Martins, Z. F. Xiao, O. Lindqvist, M. T. Fernandez-Jimenez, and W. Maenhaut. 2000. Large Scale Mercury and Trace Element Measurements in the Amazon Basin. *Atmospheric Environment* 34, no. 24: 4085-96.

Asociación Interétnica de Desarrollo de la Selva Peruana (AIDESEP). 1996. *Expediente técnico: Flor de Ucayali*. Pucallpa: Unpublished Document.

Asner, G. P. 2001. Cloud Cover in Landsat Observations of the Brazilian Amazon. *International Journal of Remote Sensing* 22, no. 18: 3855-62.

Asner, G. P., D. E. Knapp, E. N. Broadbent, P. J. C. Oliveira, M. Keller, and J. N. Silva. 2005. Selective Logging in the Brazilian Amazon. *Science* 310, no. 5747: 480-482.

Asner, G. P., E. N. Broadbent, P. J. C. Oliveira, M. Keller, D. E. Knapp, and J. N. M. Silva. 2006. Condition and Fate of Logged Forests in the Brazilian Amazon. *Proceedings of the National Academy of Sciences of the United States of America* 103, no. 34: 12947-50.

Augelli, J. P. 1980. Nationalization of Dominican borderlands. *Geographical Review* 70, no. 1: 19-35.

Barham, Brad, and O. T Coomes. 1996. *Prosperity's promise the Amazon rubber boom and distorted economic development*. Dellplain Latin American Studies, no. 34. Boulder, Colo: Westview Press.

Bassett, T. J. 1994. Cartography and Empire Building in 19th-Century West-Africa. *Geographical Review* 84, no. 3: 316-35.

Becker, Bertha K. 1999. Amazonia, fronteira experimental para o seculo XXI. In *Bioetica no Brasil.* Edited by Bertha K Becker. Rio de Janeiro: Espaco e Tempo.

Bedoya Garland, Eduardo, and Alvaro Bedoya Silva-Santisteban. 2005. *El trabajo forzoso en la extracción de la madera en la Amazonía Peruana*. Geneva: Oficina Internacional de Trabajo.

Bedoya, Eduardo, and Lorien Klein. 1996. Forty years of ecology in the Peruvian upper forest. In *Tropical deforestation the human dimension.* Eds.: Leslie E Sponsel, Thomas N Headland, and Robert Converse Bailey, 165-86. New York: Columbia University Press.

Bedoya, Maria. 2004. Gold mining and indigenous conflict in Peru. In *Beyond the silencing of the guns.* Eds., Chandra Roy, Victoria Tauli-Corpuz, and Amanda Romero Medina, 184-209. Baguio City, Philippines: Tebtebba.

Benites Elorreaga, Lucas. 2002. *Expediente técnico sustentatorio para la creación del Parque Nacional Sierra del Divisor*. Lima: Unpublished report of Pro Naturaleza.

Bergman, Roland W. 1974. Shipibo subsistence in the upper Amazon rainforest. Ann Arbor, Michigan: Unpublished University of Michigan Dissertation.

Black, Guillermo. 1905. Informe del Comisario del Perú Don Guillermo Black: Trabajos efectuados por la comisión mixta de límites Peruano-Brasilera en el Río Yavarí. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, Pgs. 135-59. Vol. 3. Lima: Imp. de "La Opinión nacional,".

Blundell, A. G., and R. E. Gullison. 2003. Poor Regulatory Capacity Limits the Ability of Science to Influence the Management of Mahogany. *Forest Policy and Economics* 5, no. 4: 395-405.

Bodley, John H. 1972. *Tribal survival in the Amazon: The Campa case*. IWGIA Document, 5. Copenhagen: IWGIA.

Brasileiro, Renata. 5 April 2006. Peruanos depőem na delegacia de Cruzeiro: Eles foram indiciados por invasão a território estrangeiro, crime ambiental e porte ilegal de arma. *Página 20,* sec. Especial, p. Available at < http://www2.uol.com.br/pagina20/05042006/especial1.htm >.

Brondizio, E., E. Moran, P. Mausel, and Y. Wu. 1996. Land Cover in the Amazon Estuary: Linking of the Thematic Mapper With Botanical and Historical Data. *Photogrammetric Engineering and Remote Sensing* 62, no. 8: 921-29.

Brook, Mary Munro. 2005. *Re-scaling the Commons: Miskitu Indians, forest commodities, and transnational development networks*. Unpublished dissertation. Austin, TX: University of Texas at Austin.

Brown, I. Foster, Andrea S. Alechandre, Hiromi S. Y. Sassagawa, and Maria A. da Aquino. 1995. Empowering Local Communities in Land-Use Management: The Chico Mendes Extractive Reserve, Acre, Brazil . *Cultural Survival Quarterly* 18, no. 4: 54-57.

Brown, I. Foster, Silvia H C Brilhante, Elsa Mendoza, and Ivanir Ribeiro de Oliveira. 2002. Estrada de Rio Branco, Acre, Brasil aos Portos do Pacífico: Como maximizar os benefícios e minimizar os prejuízos para o desenvolvimento sustentável da Amazônia Sul-Ocidental. In La Integración Regional entre Bolivia y Peru. Eds., Allan *Encuentro Internacional de Intergracion Regional - Bolívia, Brasil y Peru.* Eds., Allan Wagner Tizón y Rosario Santa Gadea Duarte, 281-296. Lima: Editora CEPEI (Centro Peruano de Estudios Internacionales).

Brown, Michael F, and Eduardo Fernández. 1991. *War of shadows: the struggle for utopia in the Peruvian Amazon*. Berkeley: University of California Press.

Bunker, Stephen G. 1985. *Underdeveloping the Amazon: extraction, unequal exchange, and the failure of the modern state*. Urbana: University of Illinois Press.

Bureau for International Narcotics and Law Enforcement Affairs. 2000. *International Narcotics Control Strategy Report 1999*. Washington, D.C.: Bureau for International Narcotics and Law Enforcement Affairs.

———. 2005. *End-Use Monitoring Report 2004*. Washington, D.C.: Bureau for International Narcotics and Law Enforcement Affairs.

Butzer, Karl W. 1989. Cultural Ecology. In *Geography in America.* Eds.,Gary L. Gaile, and Cort J. Willmott, 192-208. Columbus: Merrill Pub. Co.

———. 1990. The realm of Cultural-Human Ecology: adaptation and change in historical perspective. In *The Earth as transformed by human action: global and regional changes in the biosphere over the past 300 years.* Eds., B. L. Turner, William C. Clark, Robert W. Kates, John F. Richards, Jessica T. Mathews , and William B. Meyer, 685-701. Cambridge, New York: Cambridge University Press with Clark University.

———. 1992. The Americas Before and After 1492 - an Introduction to Current Geographical Research. *Annals of the Association of American Geographers* 82, no. 3: 345-68.

———. 1994. Toward a cultural curriculum for the future. In *Re-reading cultural geography.* 1st ed., Ed., Kenneth E Foote, 409-28. Austin: University of Texas Press.

———. 2001. On Cultural, Political, and Liberation Ecology: A Critique of Peet and Watts. Unpublished manuscript.

Cabieses, Hugo. 2004. Peru: The cocalero struggles and good governance. *Transnational Institute Briefing Series* 4: 16-27.

Campos, Tatiana. 14 October 2004. Sete madeireiros peruanos são presos em flagrante na Serra do Divisor. *A Gazeta*. Available at < http://www.agazeta-acre.com.br/Web/Principal.jsp >.

Castello Branco, José Moreira Brandão. 1922. O Juruá Federal. *Congreso Internacional De Historia De América: Annaes Do Congresso Internacional De Historia Da America* 9: 587-722.

———. 1950. O gentio Acreano. *Revista Do Instituto Histórico e Geográfico Brasileiro* 207: 3-78.

Centro de investigaciones en asentamientos rurales de la Universidad Nacional Agraria - La Molina (UNALM). 1981. *Proyecto de Asentamiento Rural "Cantagallo": Zona Pucallpa-Abujao, primera aproximación Vol. I*. unpublished document: Ministerio de Guerra, Oficina de Desarrollo Nacional, COCOMAR.

Centro Ecuménico de Documentação e Informação (CEDI). 1993. *"Green gold" on Indian land : logging company activities on indigenous land in the Brazilian Amazon*. São Paulo, Brazil: CEDI.

Chamberlin, T. C. 1890. The method of multiple working hypotheses. *Science* 15: 92-96.

Chambers, Robert. 1994. Participatory Rural Appraisal (PRA): Challenges, Potentials and Paradigm. *World Development* 22: 1437-54.

Chapin, Mac. 1998. Mapping and the Ownership of Information. *The Common Property Resource Digest* 45: 6-7.

Chapin, Mac, Francisco Herrera, and Nicanor Gonzalez. 1995. Ethnocartography in the Darien. *Cultural Survival Quarterly* 18, no. 4: 31-33.

Chaumeil, J. P. 1992. From Loreto to Tabatinga - From Border to Border - Antagonism on the Amazon in the 19th-Century and Afterwards. *Homme* 32, no. 2-4: 355-75.

Clark, Leonard Francis. 1954. *The rivers ran east*. London: Hutchinson.

———. 1955. *The marching wind*. London, Hutchinson.

———. 1959. *Yucatan adventure*. London, Hutchinson.

Cleary, D. 2001. Towards an Environmental History of the Amazon: From Prehistory to the Nineteenth Century. *Latin American Research Review* 36, no. 2: 65-96.

Cochrane, M. A., and W. F. Laurance. 2002. Fire as a Large-Scale Edge Effect in Amazonian Forests. *Journal of Tropical Ecology* 18: 311-25.

Colfer, Carol J. Pierce, Mary Ann Brocklesby, Chimere Diaw, Priscilia Etuge, Mario Gunter, Emily Harwell, Cynthia McDougall, Noemi Miyasaka Porro, Roberto Porro, Ravi Prabhu, Agus Salim, Mustofa Agung Sardjono, Bertin Tchikangwa, Anne Marie Tiani, Reed Wadley, Joe Woelfel, and Eva Wollenberg. 1999. *The BAG Basic Assessment Guide for Human Well-Being*. The Criteria & Indicators Toolbox Series. Jakarta, Indonesia: CIFOR.

Comisión de la Verdad y Reconciliación , Carlos Iván Degregori, and Félix Reátegui Carrillo. 2004a. *Informe final (Perú, 1980-2000)*, Vol. IV. Lima, Perú: Universidad Nacional Mayor de San Marcos. Pontificia Universidad Católica del Perú.

Comisión de la Verdad y Reconciliación , Carlos Iván Degregori, and Félix Reátegui Carrillo. 2004b. *Informe final (Perú, 1980-2000)*, Vol. V. Lima, Perú: Universidad Nacional Mayor de San Marcos. Pontificia Universidad Católica del Perú.

Comisión Mixta Peruano-Brasilera de Reconocimiento del Alto Purús, and Euclides da Cunha. 1960. *O Rio Purús*. Reeditado ed. Coleção Pedro Teixeira. Rio de Janeiro: SPVEA.

Comisión Mixta Peruano-Brasilera de Reconocimiento del Alto Purús y Alto Yuruá. 1906. *Informes de las Comisiones Mixtas Peruano-Brasileras Encargadas del Reconocimiento de los Ríos Alto Purús i Alto Yuruá de conformidad con el acuerdo provisional de Rio Janeiro de 12 de julio de 1904*. Lima: Oficina Tip. de "La Opinion nacional,".

Commissão Mixta Brasileiro-Peruana, and Belarmino Mendonça. 1907. *Memoria da Commissão Mixta Brasileiro-Peruana de reconhecimento do Rio Juruá e relatorio do Commissario Brasileiro 1904-1906*. Rio de Janeiro: Imprensa Nacional.

Conover, Ted. 2003. Peru's long haul: Highway to riches or ruin? *National Geographic Magazine* June: 80-99.

Coomes, Oliver T. 1995. A century of rain forest use in Western Amazonia: Lessons for extraction-based conservation of tropical forest resources. *Forest and Conservation History* 39: 108-20.

Cruz, Leonardo. 2003. Zarpazo a la Pantera: Con buen olfato y sentido común se incautó media tonelada de cocaína. *Caretas: Ilustración Peruana* 1795: 78-9.

Curran, L. M., and S. N. Trigg. 2006. Sustainability Science From Space: Quantifying Forest Disturbance and Land-Use Dynamics in the Amazon. *Proceedings of the National Academy of Sciences of the United States of America* 103, no. 34: 12663-64.

da Cunha, Euclides. 1907. *Perú versus Bolivia*. Rio de Janeiro: Libraria Francisco Alves, Typ. do "Jornal do commercio," de Rodrigues & c.

———. 1967. *Á margem da história*. 1. ed. brasileira ed. São Paulo: Editôra Lello Brasileira.

———. 1976. *Um paraíso perdido: Reunião dos ensaios amazônicos*. Dimensões Do Brasil ; V. 1. Petrópolis: Editora Vozes.

da Cunha, Manuela Carneiro, and Mauro Barbosa de Almeida. 2002. *Enciclopédia da floresta: o Alto Juruá: práticas e conhecimentos das populações*. São Paulo: Companhia das letras.

Dana, Peter H. 1992. *Si-A-Paz: The prospect for conservation in a place with diverse identities*. Unpublished paper: University of Texas-Austin.

Dana, Peter H. 1998. Nicaragua's "GPSistas" mapping their lands on the Caribbean coast. *GPS World* September: 32-41.

Delyser, D., and P. F. Starrs, Eds. 2001. Doing Fieldwork. *Geographical Review* 91, no. 1-2.

Denevan, William M. 1971. Campa subsistence in the Gran Pajonal, eastern Peru. *Geographical Review* 61: 496-518.

———. 1992. The Pristine Myth - the Landscape of the Americas in 1492. *Annals of the Association of American Geographers* 82, no. 3: 369-85.

———. 1996. A Bluff Model of Riverine Settlement in Prehistoric Amazonia. *Annals of the Association of American Geographers* 86, no. 4: 654-81.

———. 2001. *Cultivated landscapes of Native Amazonia and the Andes: Triumph over the Soil*. Oxford Geographical and Environmental Studies. Oxford, UK, New York: Oxford University Press.

———. 2003. The Native Population of Amazonia in 1492 Reconsidered. *Revista De Indias* 62, no. 227: 175-88.

Diamond, J. M, and Terborgh J. W. 1967. Observations on bird distribution and feeding assemblages along the Rio Callaria, Department of Loreto, Peru. *The Wilson Bulletin* 79, no. 3: 273-82.

Direito & Justiça Informática Ltda. 2006. "Índice Fundamental do Direito." Web page, [accessed 28 July 2006]. Available at < http://www.dji.com.br/leis_ordinarias/1979-006634-ff/6634-79.htm >.

Doolittle, William Emery. 2000. *Cultivated landscapes of native North America*. Oxford Geographical and Environmental Studies. Oxford, New York: Oxford University Press.

———. 2001. Learning to See the Impacts of Individuals. *Geographical Review* 91, no. 1-2: 423-29.

dos Santos de Almeida, Líbia Luiza. 2002. "Asháninka: Povo austero e festivo." Amazon Link Web page, [accessed 11 August 2006]. Available at < http://www.amazonlink.org/amazonia/culturas_indigenas/povos/ashaninka.html >.

Dourojeanni, Marc J. 1989. Impactos ambientales del cultivo de la coca la producción de cocaína en la Amazonía Peruana. In *Pasta básica de cocaína un estudio multidisciplinario*. Eds., Federico R León, and Ramiro Castro de la Mata, 281-99. Lima, Perú: Centro de Información y Educación para la Prevención del Abuso de Drogas.

Duke, J. A., D. Aulik, and T. Plowman. 1975. Nutritional value of coca. *Botanical Museum Leaflets, Harvard University* 24: 113-19.

Economist Staff. 2005. A leftist landslide in the Andes. *Economist* 377, no. 8458: 50.

Edmunds, David, Barbara Thomas-Slayter, and Dianne Rocheleau. 1995. Gendered Resource Mapping: Focusing on Women's Spaces in the Landscape. *Cultural Survival Quarterly* 18, no. 4: 62-68.

Elbow, Gary S. 1996. Territorial loss and national image: The case of Ecuador. *Conference of Latin Americanist Geographers Yearbook* 22: 93-105.

Espinar, Fernando Enrique. 1905. Comisión Científica al Río Yuruá: Informe del Capitán de Navío Espinar. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, Pgs. 410-418. Vol. 3. Lima: Imp. de "La Opinión nacional,".

Eva, H. D., and O. Huber, Eds. 2005. *A proposal for defining the geographical boundaries of Amazonia (EUR 21808)*. Luxembourg: Office for Official Publications for the European Communities.

Fagan, Chris T., and David S. Salisbury. 2003. Uso de la tierra en la zona de influencia de la Provincia de Purús. In *Alto Purus: Biodiversidad, Conservación y Manejo*. Eds., Renata Leite-Pitman, Nigel Pitman, and Patricia Alvarez, 177-89. Lima: Center for Tropical Conservation.

Fagan, Chris, Carlos A Peres, and John Terborgh. 2006. Tropical forests: a protected-area strategy for the twenty-first century. In *Emerging threats to tropical forests*. William F Laurance, and Carlos A Peres, 417-34. Chicago: University of Chicago Press.

Fearnside, P. M. 2003. Conservation Policy in Brazilian Amazonia: Understanding the Dilemmas. *World Development* 31, no. 5: 757-79.

Ferrero, Carlos. Palabras del Presidente del Consejo de Ministros para la Instalación de la comisión multisectorial de lucha contra la tala ilegal. Presidencia del Consejo de Ministros. Unpublished document available at http://www.pcm.gob.pe/Actualidad-Prensa/DISCURSOS/2005/Ferrero-Marzo05/150305-274.htm

Fjeldsa, J., M. D. Alvarez, J. M. Lazcano, and B. Leon. 2005. Illicit Crops and Armed Conflict as Constraints on Biodiversity Conservation in the Andes Region. *Ambio* 34, no. 3: 205-11.

Flavelle, Alix. 1995 . Community-Based Mapping in Southeast Asia. *Cultural Survival Quarterly* 18, no. 4: p. 72.

Folha de Sao Paulo staff. 3 January 2001. Frases Ashaninka. *Folha De Sao Paulo,* sec. Opinião, p. A2. Available at < http://www.folha.uol.com.br/ >.

Food and Agriculture Organization of the United Nations, United Nations, and Economic Commission for Latin America. 1963. *Latin America timber trends and prospects*. New York: United Nations.

Foody, G. M., and R. A. Hill. 1996. Classification of Tropical Forest Classes From Landsat Tm Data. *International Journal of Remote Sensing* 17, no. 12: 2353-67.

Fostier, A. H., M. C. Forti, J. R. D. Guimaraes, A. J. Melfi, R. Boulet, C. M. E. Santo, and F. J. Krug. 2000. Mercury Fluxes in a Natural Forested Amazonian Catchment (Serra Do Navio, Amapa State, Brazil). *Science of the Total Environment* 260, no. 1-3: 201-11.

Foweraker, Joe. 1981. *The struggle for land: a political economy of the pioneer frontier in Brazil from 1930 to the present day*. Cambridge Latin American Studies, 39. Cambridge Eng., New York: Cambridge University Press.

Fredericksen, Todd S. 2000. Logging and conservation of tropical forests in Bolivia. *International Forestry Review* 2, no. 4: 271-78.

Fry, Carlos. 1907. Diario de los viajes i exploracion los ríos Urubamba, Ucayali, Amazonas, Pachitea i Palcazu por don Carlos Fry. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa , 369-586. Vol. 11. Lima: Imp. de "La Opinión nacional,".

Fryer, Roland G., Heaton, Paul S., Levitt, Steven D. and Murphy, Kevin M., 2005. "Measuring the Impact of Crack Cocaine" (May). NBER Working Paper No. W11318. Available at SSRN: < http://ssrn.com/abstract=720405 >.

FUNAI. 10 March 2004. Funai, Exército e PF expulsam madeireiros peruanos do Acre. Available at < http://www.funai.gov.br/ultimas/noticias/1_semestre_2004/Mar/un0310_001.htm >.

Gade, Daniel W. 2006. Paraguay 1975: Thinking back on the fieldwork moment. *Journal of Latin American Geography* 5, no. 1: 31-49.

Gagnon, Mariano, William Hoffer, and Marilyn Mona Hoffer. 1993. *Warriors in Eden*. 1st ed. New York: William Morrow and Co.

Galarza, Elsa, and Karlos La Serna. 2005. Son sostenibles las concesiones forestales en el Perú? *Economía y Sociedad* 56: 34-41.

Gallegós Chamorro, Giovanna. 2004. *Informe etno-histórico levantado como parte del trabajo realizado por la ¨comisión de trabajo para solución de los problemas de superposición de las comunidades nativas¨*. Unpublished Document. Lima: AIDESEP

Ganzert, Frederick William. 1934. The boundary controversy in the upper Amazon between Brazil, Bolivia, and Peru, 1903-1909. *The Hispanic American Historical Review* XIV, no. 4: Pgs. 427-49.

García Blásquez Canales, Raúl. 1971. *Aspectos sociales y económicos del area de Pucallpa*. Lima, Perú, Ministerio de Trabajo.

García Hierro, Pedro, Søren Hvalkof, Andrew Gray, and Alejandro Parellada. 1998. *Liberación y derechos territoriales en Ucayali-Perú*. Documento IWGIA: Documento IWGIA, 24. Copenhague: IWGIA, Grupo Internacional de Trabajo sobre Asuntos Indígenas.

Garfield, Seth. 2001. *Indigenous struggle at the heart of Brazil state policy, frontier expansion, and the Xavante Indians, 1937-1988*. Durham N.C.: Duke University Press.

Gasón Roe, José Ramírez. 1998. General legal aspects of mining activities in Peru. *The Bomchil Group's Newsletter* 5. Available at < http://www.bomchilgroup.org/persep98.html >

Geffray, C. 2001. Brazil: Drug Trafficking in the Federal State of Rondonia. *International Social Science Journal* 53, no. 3: 443-450.

Gerencia regional de recursos naturales y gestión del medio ambiente del Gobierno Regional de Ucayali (GOREU). 2004. *Propuesta para la creación de Áreas de Conservación Regional Isconahua y Murunahua-Tamaya (consideraciones generales)*. Pucallpa: Unpublished Ucayali Government Document.

Girot, P. O., and B. Q. Nietschmann. 1992. The Rio San-Juan. *Research & Exploration* 8, no. 1: 52-63.

González Posso, Dario. 2000. Coca, deforestation and food security in the Colombian Amazon region. *Unasylva* 51, no. 3.

Gordon, E. T., G. C. Gurdian, and C. R. Hale. 2003. Rights, Resources, and the Social Memory of Struggle: Reflections on a Study of Indigenous and Black Community Land Rights on Nicaragua's Atlantic Coast. *Human Organization* 62, no. 4: 369-81.

Goulding, Michael, Ronaldo Barthem, and Efrem Jorge Gondim. Ferreira. 2003. *The Smithsonian atlas of the Amazon*. Washington, D.C.: Smithsonian Books.

Goulding, Michael, Nigel J. H Smith, and Dennis J Mahar. 1996. *Floods of Fortune: Ecology and Economy along the Amazon*. New York: Columbia University Press.

Government of Acre. 2000. *Zoneamento Ecológico-Econômico do Acre. Recursos naturais e meio ambiente, Volume I*. Rio Branco, Acre, Brazil: Secretaria de Estado de Ciencia, Tecnologia e Meio Ambiente.

Grandjean, P., R. F. White, A. Nielsen, D. Cleary, and E. C. D. Santos. 1999. Methylmercury Neurotoxicity in Amazonian Children Downstream From Gold Mining. *Environmental Health Perspectives* 107, no. 7: 587-91.

Gray, Andrew. 1998. Demarcando el desarrollo: Titulación de territorios en Ucayali, Perú. *Liberación y derechos territoriales en Ucayali-Perú.* Pedro García Hierro, Sřren Hvalkof, Andrew Gray, and Alejandro Parellada, 169-221. Copenhague: IWGIA, Grupo Internacional de Trabajo sobre Asuntos Indígenas.

Gurmendi, Alfredo C. 2004. The mineral industry in Peru. In *Minerals yearbook.* United States Geological Survey, 15.1-15.9. Washington: The Bureau Supt. of Docs.

Häkli, Jouni, and David H Kaplan. 2002. Learning from Europe? Borderlands in social and geographical context. In *Boundaries and place European borderlands in geographical context.* Eds., David H Kaplan, and Jouni Häkli, 1-17. Lanham, Md : Rowman & Littlefield.

Harley, J. B. 1988a. Maps, knowledge, and power. In *The Iconography of landscape: essays on the symbolic representation, design, and use of past environments.* Eds., Denis E Cosgrove, and Stephen Daniels, 277-312. Cambridge, New York: Cambridge University Press.

———. 1988b. Silences and secrecy: the hidden agenda of cartography in early modern Europe. *Imago Mundi* 40: 57-76.

———. 1989. Deconstructing the map. *Cartographica* 26: 1-20.

———. 1992. Rereading the Maps of the Columbian Encounter. *Annals of the Association of American Geographers* 82, no. 3: 522-42.

Harris, Trevor, and Daniel Weiner. 1998. Empowerment, Marginalization and "Community-integrated" GIS. *Cartography and Geographic Information Systems* 25, no. 2: 67-76.

Harrisse, Henry. 1897. *The diplomatic history of America its first chapter 1452-1493-1494*. London: B.F. Stevens.

Hecht, Susanna B. 2004. The last unfinished page of genesis: Euclides da Cunha and the Amazon. *Historical Geography* 32: 43-69.

Hecht, Susanna B, and Alexander Cockburn. 1990. *The fate of the forest developers, destroyers and defenders of the Amazon*. 1st U.S. ed. New York: HarperPerennial.

Heckenberger, M. J., A. Kuikuro, U. T. Kuikuro, J. C. Russell, M. Schmidt, C. Fausto, and B. Franchetto. 2003. Amazonia 1492: Pristine Forest or Cultural Parkland? *Science* 301, no. 5640: 1710-1714.

Heemskerk, M. 2002. Livelihood Decision Making and Environmental Degradation: Small-Scale Gold Mining in the Suriname Amazon. *Society & Natural Resources* 15, no. 4: 327-44.

Hemming, John. 1978. *Red gold the conquest of the Brazilian Indians*. Cambridge, Mass: Harvard University Press.

Henkel, Ray. 1971. *The Chapare of Bolivia: a study of tropical agriculture in transition*. University of Wisconsin-Madison: Unpublished Dissertation.

———. 1986. The Bolivian cocaine industry. In *Drugs in Latin America.* Ed., Edmundo Morales, 53-80. Williamsburg, VA: Dept. of Anthropology, College of William and Mary.

———. 1995. Coca (Erythroxylum coca) cultivation, cocaine production, and biodiversity loss in the Chapare region of Bolivia. In *Biodiversity and conservation of neotropical montane forests proceedings of the Neotropical Montane Forest Biodiversity and Conservation Symposium, the New York Botanical Garden, 21-26 June 1993.* Ed., Steven P Churchill, Pgs. 551-60. Bronx, N.Y.: New York Botanical Garden.

Herlihy, P. H., and G. W. Knapp. 2003. Maps of, by, and for the Peoples of Latin America. *Human Organization* 62, no. 4: 303-14.

Herndon, William Lewis, Lardner Gibbon, United States, and Navy Dept. 1853. *Exploration of the valley of the Amazon*. Washington: R. Armstrong. Public Printer.

Herzog, Lawrence A. 1992. *Changing boundaries in the Americas: New perspectives on the U.S.-Mexican, Central American, and South American borders*. U.S.-Mexico Contemporary Perspectives Series, 3. La Jolla, CA: Center for U.S.-Mexican Studies, UCSD.

———. 2000. *Shared space: rethinking the U.S.-Mexico border environment*. U.S.-Mexico Contemporary Perspectives Series, 16. La Jolla, Calif: Center for U.S.-Mexican Studies, University of California, San Diego.

Hidalgo, Jessica. 2003. *Estado de la situación forestal en el Perú*. Pucallpa, Ucayali, Peru: SEPIA X.

Hill, R. A. 1999. Image Segmentation for Humid Tropical Forest Classification in Landsat TM Data. *International Journal of Remote Sensing* 20, no. 5: 1039-44.

Hodgson, D. L., and R. A. Schroeder. 2002. Dilemmas of Counter-Mapping Community Resources in Tanzania. *Development and Change* 33, no. 1: 79-100.

House, John William. 1982. *Frontier on the Rio Grande: a political geography of development and social deprivation*. Oxford Research Studies in Geography. New York: Clarendon Press.

Hoy, Harry E. 1946. Mahogany industry of Peru. *Economic Geography* 22, no. 1: 1-13.

Ímpetu Staff. 20 August 2004. Narcotraficantes esclavizan niños: Son cinco mil en selva peruana denuncia DEVIDA. *Impetu,* sec. Regional, p. 9.

Iniciativa para la Integración de la Región Sudeamericana (IIRSA). 2006. "Iniciativa para la Integración de la Región Sudeamericana Website." Web page, [accessed 21 April 2006]. Available at < http://www.iirsa.org >.

Instituto de investigaciones de la Amazonía Peruana (IIAP). 2001. *Madre de Dios: Propuesta de zonificación ecológica económica como base para el ordenamiento territorial*. Puerto Maldonado: Consejo Transitorio de Administración Regional de Madre de Dios.

———. 2003. *Propuesta de zonificación ecológica económica de la cuenca del Río Aguaytía*. Pucallpa: Gobierno Regional de Ucayali.

Instituto del Bien Común (IBC). 2004. "Instituto del Bien Común Home Page." Web page, [accessed 21 February 2006]. Available at < http://www.ibcperu.org >.

Instituto Nacional de Estadística e Informática (INEI). 2001. "Cartografia Nacional Ficha Técnica." Web page, [accessed 14 February 2005]. Available at www.inei.gob.pe/mapas/peru/fichatecnica.pdf.

———. 2005a. Actualizaión cartográfica permitió efectivizar el recojo de la información de la población. Lima: INEI.

———. 2005b. "Instituto Nacional de Estadística e Informática Home Page." Web page, [accessed 4 February 2005b]. Available at www.inei.gob.pe.

Instituto Socio Ambiental. 17 September 2004a. A arte, a sabedoria, o pioneirismo e as dificuldades vividas pelos ashaninka. *Noticias SocioAmbientais*. Available at < http://www.socioambiental.org/nsa/detalhe?id=1824 >.

———. 6 October 2004b. Índios Ashaninka querem garantir seu território e a segurança de suas famílias . *Instituto Socio Ambiental*. Available at < http://www.socioambiental.org/nsa/detalhe?id=1831 >.

Inter-American Development Bank, and Commission on Development and Environment for Amazonia. 1992. *Amazonia without myths*. Washington, D.C: Inter-American Development Bank.

Ireland, Gordon. 1938. *Boundaries, possessions, and conflicts in South America*. Cambridge, Mass: Harvard University Press.

Irion, G., J. Muller, J. N. Demello, and W. J. Junk. 1995. Quaternary Geology of the Amazonian Lowland. *Geo-Marine Letters* 15, no. 3-4: 172-78.

ITTO (International Tropical Timber Organization). 2005. Brazil gets new forest law. *ITTO Tropical Forest Update* 15, no. 4: 7

Johnson, E. L., J. A. Saunders, S. Mischke, C. S. Helling, and S. D. Emche. 2003. Identification of Erythroxylum Taxa by Aflp Dna Analysis. *Phytochemistry* 64, no. 1: 187-97.

Kainer, K. A., M. Schmink, A. C. P. Leite, and M. J. D. Fadell. 2003. Experiments in forest-based development in western Amazonia. *Society & Natural Resources* 16, no. 10: 869-86.

Kalliola, R., J. Salo, M. Puhakka, and M. Rajasilta. 1991. New Site Formation and Colonizing Vegetation in Primary Succession on the Western Amazon Floodplains. *Journal of Ecology* 79, no. 4: 877-901.

Kaplan, David H, and Jouni Häkli. 2002. *Boundaries and place: European borderlands in geographical context*. Lanham, Md: Rowman & Littlefield.

King, Brian H. 2002. Towards a participatory GIS: evaluating case studies of Participatory Rural Appraisal and GIS in the developing world. *Cartography and Geographic Information Science* 29, no. 1: 43-52.

Knapp, Gregory W. 1988. Geografía linguística y cultural del Peru contemporaneo. *Anthropológica* 6: 285-308.

———. 1991. *Andean ecology: adaptive dynamics in Ecuador*. Dellplain Latin American Studies, no. 27. Boulder: Westview Press.

Kometter, R. F., M. Martinez, A. G. Blundell, R. E. Gullison, M. K. Steininger, and R. E. Rice. 2004. Impacts of Unsustainable Mahogany Logging in Bolivia and Peru. *Ecology and Society* 9, no. 1.

Kosek, Jake. 1998. Mapping Politics. *The Common Property Resource Digest* 45: 4-6.

Kuramoto, Juana. 2001. Artisinal and informal mining in Peru. *Mining, Minerals and Sustainable Development* , no. 82: 1-53. Available at: http://www.iied.org/mmsd/mmsd_pdfs/asm_peru_eng.pdf

La República Staff. 8 March 2005. Interoceánica estará lista a más tardar en junio: Presidente Toledo recibe en Palacio de Gobierno a gobernador del Estado brasileño de Acre. *La República*. Avaliable at < http://www.larepublica.com.pe/component/option,com_contentant/task,view/id,70294/Itemid,0/ >.

Larrabure y Correa, Carlos, Ed. 1905-1909. *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto* [1777-1908]. Ed., Carlos Larrabure i Correa.. Lima, Imp. de "La Opinión nacional,".

Lathrap, Donald Ward. 1970. *The upper Amazon*. New York: Praeger.

Laurance, W. F., T. E. Lovejoy, H. L. Vasconcelos, E. M. Bruna, R. K. Didham, P. C. Stouffer, C. Gascon, R. O. Bierregaard, S. G. Laurance, and E. Sampaio. 2002. Ecosystem Decay of Amazonian Forest Fragments: a 22-Year Investigation. *Conservation Biology* 16, no. 3: 605-18.

Laurance, William F, Carlos A Peres, Patrick A Jansen, and Luis D'Croz. 2006. Emerging threats to tropical forests: what we know and what we don't know. In *Emerging threats to tropical forests*. Eds William F Laurance, and Carlos A Peres, 437-62. Chicago: University of Chicago Press.

Lechler, P. J., J. R. Miller, L. D. Lacerda, D. Vinson, J. C. Bonzongo, W. B. Lyons, and J. J. Warwick. 2000. Elevated Mercury Concentrations in Soils, Sediments, Water, and Fish of the Madeira River Basin, Brazilian Amazon: a Function of Natural Enrichments? *Science of the Total Environment* 260, no. 1-3: 87-96.

Leite-Pitman, Renata, Nigel Pitman, and Patricia Alvarez, Eds. 2003. *Alto Purús: Biodiversidad, Conservación y Manejo*. Lima: Center for Tropical Conservation.

Lima, E., F. Merry, D. Nepstad, G. Amacher, C. Azevedo-Ramos, P. Lefebvre, and F. Resque. 2006. Searching for Sustainability. *Environment* 48, no. 1: 26-38.

Liverman, D. M., R. G. Varady, O. Chavez, and R. Sanchez. 1999. Environmental Issues Along the United States-Mexico Border: Drivers of Change and Responses of Citizens and Institutions. *Annual Review of Energy and the Environment* 24: 607-643.

López, Teniente Coronel Roberto. 1925. *En la frontera oriental del Perú*. Belem do Pará, Brasil: Unpublished book.

Macdonald, Theodore. 2002. Inter-American Court of Human Rights Rules in Favor of Nicaraguan Indians. *Cultural Survival Quarterly* 25, no. 4: 66-68.

Machado, Lia Osorio. 2001. The Eastern Amazon basin and the coca-cocaine complex. *International Social Science Journal* 53, no. 3: 387-395.

Madre de Dios, Acre Pando MAP Initiative. 2006. "Madre de Dios, Acre, Pando (MAP) Initiative Website." Web page, [accessed 20 April 2006]. Available at < http://www.map-amazonia.net/ >.

Mahar, Dennis J. 2000. Agro-Ecological zoning in Rondônia, Brazil: what are the lessons? In *Amazonia at the crossroads the challenge of sustainable development.* Ed Anthony L H Hall, 115-28. London: Institute of Latin American Studies.

Maia, Tião. 29 July 2004. Exército começa a se instalar em áreas isoladas da fronteira . *Pagina 20,* sec. Politica, col. 1. Available at < http://www2.uol.com.br/pagina20/ >.

———. 22 February 2005. A presença definitiva do estado Brasileiro na fronteira. *Pagina 20,* sec. Enviado Especial. Available at < http://www2.uol.com.br/pagina20/22022005/especial.htm >.

Mann, Charles C. 2005. *149: new revelations of the Americas before Columbus*. 1st ed. New York: Knopf.

Manrique Ugarte, Manuel, and Ministerio de Agricultura. 2006. Establecen la Zona Reservada Sierra del Divisor, Resolución Ministerial #0283-2006-AG. *El Peruano, Diario Oficial* 9433: 316542-6.

Martins, Marcos H. Brainer. 2003. *Relatório IBAMA Invasao da Terra Indigena Ashaninka*. Cruzeiro do Sul, Acre, Brasil : Unpublished IBAMA report.

Martins, Marcos Henrique Brainer, and André Freddo. 2004. *Denúncia de desmate ilegal em terra indígena Ashaninka por parte de Peruanos*. Cruzeiro do Sul, Acre, Brazil: IBAMA, IMAC Unpublished IBAMA report.

Maurice-Bourgoin, L., I. Quiroga, J. L. Guyot, and O. Malm. 1999. Mercury Pollution in the Upper Beni River, Amazonian Basin: Bolivia. *Ambio* 28, no. 4: 302-6.

Maurice-Bourgoin, L., I. Quiroga, J. Chincheros, and P. Courau. 2000. Mercury Distribution in Waters and Fishes of the Upper Madeira Rivers and Mercury Exposure in Riparian Amazonian Populations. *Science of the Total Environment* 260, no. 1-3: 73-86.

Maury, Matthew Fontaine. 1853. *The Amazon, and the Atlantic Slopes of South America: A series of letters published in the National intelligencer and Union newspapers, under the signature of "Inca,".* Rev. and cor. by the author ed. Washington: F. Taylor.

———. 1948 [1850]. Letter to William Lewis Herndon, Washington, April 20th, 1850. Reprinted in the *Hispanic American Historical Review.* Ed. Donald Marquand Dozer, 212-28. Vol. 28.

Mausel, P, Y. Wu, Y Li, E. F Moran, and E. S Brondizio. 1993. Spectral Identification of Successional Stages Following Deforestation in the Amazon. *Geocarto International* , no. 4: 61-71.

Mcsweeney, K. 2004. The Dugout Canoe Trade in Central America's Mosquitia: Approaching Rural Livelihoods Through Systems of Exchange. *Annals of the Association of American Geographers* 94, no. 3: 638-61.

Mcsweeney, K., and S. Arps. 2005. A "Demographic Turnaround" - the Rapid Growth of Indigenous Populations in Lowland Latin America. *Latin American Research Review* 40, no. 1: 3-29.

Mendonça, Belarmino. 1907. Relatorio do Commissario Brasileiro. In *Memoria da Commissão Mixta Brasileiro-Peruana de reconhecimento do Rio Juruá e relatorio do Commissario Brasileiro 1904-1906.* Commissão Mixta Brasileiro-Peruana, and Belarmino Mendonça, 3-212. Rio de Janeiro: Imprensa Nacional.

Menzel, Sewall H. 1996. *Fire in the Andes: U.S. foreign policy and cocaine politics in Bolivia and Peru*. Lanham, Md: University Press of America.

Ministerio de Energía y Minas, Peru MEM. 2006. "Asuntos Ambientales Mineros: Mapas asuntos ambientales." Web page, [accessed 29 August 2006]. Available at < http://www.minem.gob.pe/dgaam/mapas_inicio.asp >.

Ministerio del Interior: Oficina de Comunicación Social. 2004. *Política del Minsterio del Interior es controlar cultivos ilíctos de hoja de coca*. Lima: Unpublished Ministerio del Interior document.

Ministerio del Interior, Proyecto Especial CORAH. 2002. *Reducción de áreas cocaleras en el Peru: Boletín informativo*. Pucallpa, Peru: Unpublished Ministerio del Interior document.

———. 2003a. *Resumen Ejecutivo: Diciembre, 2003*. Pucallpa, Peru: Unpublished Ministerio del Interior document.

———. 2003b. *Resumen Ejecutivo: Septiembre, 2003*. Pucallpa, Peru: Unpublished Ministerio del Interior document.

Ministerio de Relaciones Exteriores, Peru. 2005. "Principales Acuerdos suscritos por el Perú en materia de drogas." Web page, [accessed 29 September 2005]. Available at < http://www.rree.gob.pe/portal/Multi.nsf/0/3eb27f1b35c1b9c705256e5200254222?OpenDocument >.

Ministério do Meio Ambiente . 20 September 2004. Madeireiros peruanos invadem o Brasil atrás de madeiras nobres . *Website of Ministério Do Meio Ambiente* . [Accessed 3/14/2007], Archived at < http://www.ecoagencia.com.br/a2/_a2/000001a9.htm >.

Mol, J. H., and P. E. Ouboter. 2004. Downstream Effects of Erosion From Small-Scale Gold Mining on the Instream Habitat and Fish Community of a Small Neotropical Rainforest Stream. *Conservation Biology* 18, no. 1: 201-14.

Momsen Jr., Richard P. 1964. The Isconahua Indians: A study of change and diversity in the Peruvian Amazon. *Revista Geográfica Del Instituto Panamericano De Geografía e Historia* 60, no. XXXII: 59-82.

Montagner, Delvair. 2002. *Construção da etnia Náwa*. Brasilia: Unpublished Anthropological Study.

Monteiro, Marcelo. 1994. A guerra dos mapas. *Ecologia e Desenvolvimento* 3, no. 44 supplemento: 6-7.

Morales, Edmundo. 1994. *Cocaína fiebre del oro blanco en el Perú*. Colección "Biblioteca Abya-Yala", 7. Quito: Ediciones Abya-Yala.

Moran, Emilio F. 1993. *Through Amazonian eyes the human ecology of Amazonian populations*. Iowa City: University of Iowa Press.

Moran, E. F., E. Brondizio, and P. Mausel. 1994. Secondary Succession. *Research & Exploration* 10, no. 4: 458-76.

Moran, E. F., A. Packer, E. Brondizio, and J. Tucker. 1996. Restoration of Vegetation Cover in the Eastern Amazon. *Ecological Economics* 18, no. 1: 41-54.

Municipalidad Distrital de Masisea, Mesa de concertación distrital de la lucha contral la pobreza. 2002. *Plan estratégico de desarrollo institucional concertado Masisea 2002-2006*. Masisea: Unpublished document of the Municipalidad Distrital de Masisea.

Muse, Toby. 16 September 2005. Sex, drink and the coca boomtown blues: The drugs trade brings the violence of the old wild west to Colombia's towns. *The Guardian,* sec. International, Pg. 23. Available at < http://www.guardian.co.uk/colombia/story/0,11502,1571461,00.html >.

Nepstad, D. C., A. Verissimo, A. Alencar, C. Nobre, E. Lima, P. Lefebvre, P. Schlesinger, C. Potter, P. Moutinho, E. Mendoza, M. Cochrane, and V. Brooks. 1999. Large-Scale Impoverishment of Amazonian Forests by Logging and Fire. *Nature* 398, no. 6727: 505-8.

Nepstad, D., S. Schwartzman, B. Bamberger, M. Santilli, D. Ray, P. Schlesinger, P. Lefebvre, A. Alencar, E. Prinz, G. Fiske, and A. Rolla. 2006. Inhibition of Amazon Deforestation and Fire by Parks and Indigenous Lands. *Conservation Biology* 20, no. 1: 65-73.

Neumann, Roderick P. 1998. *Imposing wilderness: struggles over livelihood and nature preservation in Africa* . California Studies in Critical Human Geography, 4. Berkeley: University of California Press.

Nietschmann, Bernard. 1995. Defending the Miskito Reefs with Maps and GPS: Mapping With Sail, Scuba, and Satellite. *Cultural Survival Quarterly* 18, no. 4: 34-7.

———. 1994. The "Fourth World': Nations Versus States. In *Reordering the World: Geopolitical Perspectives on the Twenty-First Century.* Eds., George J. Demko, and William B. Wood, 225-42. Boulder, CO: Westview.

Norgrove, Linda, and Narda de la Barra. 2005. *Engaging local stakeholders in forest management in the Peruvian Amazon*. Internet Publication: IUCN. [Accessed 3/14/2007]. Available at < http://www.iucn.org/themes/ssc/susg/resources/aapg_norgrove.htm >.

O Rio Branco Staff. 24 October 2004. Operação Pebra prende mais 26 peruanos no Juruá. *O Rio Branco*. Available at < http://www.oriobranco.com.br/ >.

Oficina Nacional de Evaluación de Recursos Naturales (ONERN). 1978. *Inventario, evaluación e integración de los recursos naturales de la zona Pucallpa-Abujao*. Lima, Perú: ONERN.

Orlove, B. S. 1991. Mapping Reeds and Reading Maps: the Politics of Representation in Lake Titicaca. *American Ethnologist* 18, no. 1: 3-38.

Ortiz, Dionisio. 1962. *Los forjadores de Pucallpa*. Lima: Imprenta Editorial "San Antonio".

Osborne, Harold. 1952. *Indians of the Andes: Aymaras and Quechuas*. International Library of Sociology and Social Reconstruction (London). London: Routledge & Paul.

Padoch, Christine. 1999. *Várzea diversity, development, and conservation of Amazonia's whitewater floodplains*. Advances in Economic Botany, v. 13. Bronx, N.Y: New York Botanical Garden Press.

Página 20 Staff. 5 April 2006. Peruanos trocam tiros com a PF na Serra do Divisor. *Página 20,* sec. Cotidiano, Available at < http://www2.uol.com.br/pagina20/04042006/c_0304042006.htm >.

Pallares, Padre, and Padre Calvo. 1907. Relación histórica de las misiones de fieles e infieles del colegio de Santa Rosa de Ocopa escrita por los PP. Pallares i Calvo. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, V. 9, 3-205. Lima, Imp. de "La Opinión nacional,".

Paniagua Corazao, Valentin. 2001. Aprueban el reglamento de la Ley Forestal y de Fauna Silvestre: Decreto Supremo #014-2001-AG. *El Peruano* 7595: 201105-46.

Parsons, J. J. 1977. Geography as Exploration and Discovery. *Annals of the Association of American Geographers* 67, no. 1: 1-16.

Pärssinen, M. H, J. S Salo, and M. E Räsänen. 1996. River floodplain relocations and the abandonment of Aborigine settlements in the Upper Amazon Basin: A historical case study of San Miguel de Cunibos at the Middle Ucayali River. 11, no. 4: 345-59.

Pedlowski, M. A., E. A. T. Matricardi, D. Skole, S. R. Cameron, W. Chomentowski, C. Fernandes, and A. Lisboa. 2005. Conservation Units: a New Deforestation Frontier in the Amazonian State of Rondonia, Brazil. *Environmental Conservation* 32, no. 2: 149-55.

Peluso, N. L. 1995. Whose Woods Are These - Counter-Mapping Forest Territories in Kalimantan, Indonesia. *Antipode* 27, no. 4: 383-406.

Peres, C. A. 2001. Synergistic Effects of Subsistence Hunting and Habitat Fragmentation on Amazonian Forest Vertebrates. *Conservation Biology* 15, no. 6: 1490-1505.

Peres, C. A., J. Barlow, and W. F. Laurance. 2006. Detecting Anthropogenic Disturbance in Tropical Forests. *Trends in Ecology & Evolution* 21, no. 5: 227-29.

Peres, Leandro, and Leonardo Coutinho. 25 February 2004. O Paraiso Cercado e Ameacado. *Veja*. Edicao 1842. 64-71. Sao Paulo, Brazil: Editora Abril. Available at < http://www.projetoterrazul.hpg.ig.com.br/paraiso_cercado_e_ameacado.htm >.

Perú Forestal. 2005. Crecen exportaciones forestales al 2004: 136 millones USdollars. *Perú Forestal Red De Noticias*. Available at < http://www.peruforestal.com/mercados_y_exportaciones.htm >.

Perz, S. G. 2002. The Changing Social Contexts of Deforestation in the Brazilian Amazon. *Social Science Quarterly* 83, no. 1: 35-52.

Piedrafita Iglesias, Marcelo. 23 December 2004. Direitos Humanos: e os dos Ashaninka? *Pagina 20,* sec. Via Publica, col. 1. Available at < http://www2.uol.com.br/pagina20/ >.

———. 19 February 2006. Invasão de madeireiros peruanos no alto rio Envira: um chamado á atenção. *Página 20,* sec. Papo de Índio, col. 1 p. Available at < http://www2.uol.com.br/pagina20/19022006/papo_de_indio.htm >.

Pimenta, José. 2002. *"Índio não é todo igual": A construção Ashaninka da história da política interétnica*. Brasília, Brazil: Unpublished Universidade de Brasília dissertation.

———. 2005. "Instituto Socioambiental, Povos Indígenas do Brasil Asháninka." Web page, [accessed 11 August 2004]. Available at < http://www.socioambiental.org/pib/epi/ashaninka/loc.shtm >.

Pinheiro, M. C. N., M. E. Crespo-Lopez, J. L. F. Vieira, T. Oikawa, G. A. Guimaraes, C. C. Araujo, W. W. Amoras, D. R. Ribeiro, A. M. Herculano, J. L. M. Do Nascimento, and L. C. L. Silveira. 2007. Mercury Pollution and Childhood in Amazon Riverside Villages. *Environment International* 33, no. 1: 56-61.

Piperno, Dolores R, and Deborah M Pearsall. 1998. *The origins of agriculture in the lowland Neotropics*. San Diego: Academic Press.

Plowman, T. 1981. Amazonian Coca. *Journal of Ethnopharmacology* 3, no. 2-3: 195-225.

———. 1984. The origin, evolution, and diffusion of coca, Erythroxylum spp. In South and Central America. *Pre-Columbian Plant Migration Symposium: Pre-Columbian plant migrations papers presented at the Pre-Columbian Plant Migrations Symposium, 44th International Congress of Americanists, Manchester, England.* Ed., Doris Stone, 125-63. Cambridge, Mass: Peabody Museum of Archaeology and Ethnology.

Plowman, T., and N. Hensold. 2004. Names, Types, and Distribution of Neotropical Species of Erythroxylum (Erythroxylaceae). *Brittonia* 56, no. 1: 1-53.

Poole, Peter. 1995. "Indigenous Peoples, Mapping and Biodiversity Conservation: An Analysis of Current Activities and Opportunities for Applying Geomatics Technologies." Web page, [accessed July, 2001]. Available at < http://www.bsponline.org/publications/showhtml.php3?15 >.

Porras Barrenechea, Raúl, and Alberto Wagner de Reyna. 1981. *Historia de los límites del Perú*. Lima: Editorial Universitaria.

Portillo, Pedro. 1905a. Exploración de los ríos Apurímac, Ene, Tambo, Ucayali, Pachitea i Pichis por el prefecto de Ayacucho, coronel Pedro Portillo- Diario de la Expedición- 31 de Diciembre 1900. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, 463-550. Vol. 3. Lima: Imp. de "La Opinión nacional,".

———. 1905b. Viaje del prefecto de Loreto, Coronel Pedro Portillo, al río Yuruá-20 Mayo de 1903. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, 224-25. Vol. 4. Lima: Imp. de "La Opinión nacional,".

Prescott, J. R. V. 1987. *Political frontiers and boundaries*. London, Boston: Allen & Unwin.

Primeira Comissão Brasileira Demarcadora de Limites (PCDL). 2006. "Primeira Comissão Brasileira Demarcadora de Limites Home." Web page, [accessed 10 July 2006]. Available at < http://www.pcdl.gov.br/home.asp?lng=1 >.

Putz, Francis E. 2004. Are you a conservationist or a logging advocate? In *Working forests in the neotropics: Conservation through sustainable management?* Eds., Daniel Zarin, Janaki R. R. Alavalapati, Francis E. Putz, and Marianne Schmink, 15-30. New York: Columbia University Press.

Putz, Francis E., Michelle A. Pinard, Todd S. Fredericksen, and Marielos Peña-Claros. 2004. Forest science and the BOLFOR experience. In *Working forests in the neotropics: Conservation through sustainable management?* Eds., Daniel Zarin, Janaki R. R. Alavalapati, Francis E. Putz, and Marianne Schmink, 64-96. New York: Columbia University Press.

Radcliffe, S. A. 1998. Frontiers and Popular Nationhood: Geographies of Identity in the 1995 Ecuador-Peru Border Dispute. *Political Geography* 17, no. 3: 273-93.

Ribeiro, Darcy. 1970. *Os índios e a civilizacão a integracão das populacões indígenas no Brazil moderno*. Colecão Retratos Do Brazil, V.77. Rio de Janeiro: Civilizacão Brazileira.

Richey, Emory. 2005. *47 days on the Tamaya River: October-November, 2005*. Austin, TX: Unpublished manuscript.

Robbins, P. 2003. Beyond Ground Truth: Gis and the Environmental Knowledge of Herders, Professional Foresters, and Other Traditional Communities. *Human Ecology* 31, no. 2: 233-53.

Rocheleau, Dianne. 1995. Maps, numbers, text and context: mixing methods in feminist political ecology. *Professional Geographer* 47, no. 4: 458-66.

Rocheleau, D., and D. Edmunds. 1997. Women, Men and Trees: Gender, Power and Property in Forest and Agrarian Landscapes. *World Development* 25, no. 8: 1351-71.

Rodríguez Orejuela, Gilberto, and Miguel Ángel Rodríguez Orejuela. 2005. *Las confesiones secretas de Gilberto y Miguel Rodríguez Orejuela documentos secretos desclasificados*. 2a.ed. Bogotá: Quintero. Oveja Negra.

Rojas, M. R. 2002. Attitudes and Values of Peruvian Coca Growers. *Substance Use & Misuse* 37, no. 5-7: 687-713.

Romanoff, S. 1992. Food and debt among rubber tappers in the Bolivian Amazon. *Human Organization* 51, no. 2: 122-35.

Rosas, Belisario. 1905. Exploración del Yuruá-Mirim por don Ignacio Espinar Meza i Don Belisario Rosas: Diario del viaje llevado por Don Belisario Rosas- Enero de 1898. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, Pgs. 426-30. Vol. 3. Lima: Imp. de "La Opinión nacional,".

Rospigliosi, Fernando, Cecilia Blondet, and José Antonio Lloréns. 2004. *El consumo tradicional de la hoja de coca en el Perú*. Lima: IEP.

Roux, J. C. 2001. From the Limits of the Frontier: or the Misunderstandings of Amazonian Geo-Politics. *Revista De Indias* 61, no. 223: 513-39.

Rundstrom, Robert. 1995. GIS, Indigenous Peoples, and Epistemological Diversity. *Cartography and Geographic Information Systems* 22, no. 1: 45-57.

———. 1998. Mapping, The White Man's Burden. *Common Property Resource Digest* 45: 7-9.

Sales, Ana. 24 October 2004a. Exército e Ibama apreendem 700 m3 de madeira no PNSD. *O Rio Branco*. Available at < http://www.oriobranco.com.br/ >.

Sales, Val. 28 September 2004b. Polícia Federal prende madeireiros peruanos na reserva dos Ashaninka. *Pagina 20,* sec. Especial, col. 1. Available at < http://www2.uol.com.br/pagina20/ >.

Salisbury, David Seward. 2002. *Geography in the jungle: Investigating the utility of local knowledge for natural resource management in the western Amazon*. Unpublished Master´s Thesis. Gainesville: University of Florida.

Salisbury, D. S. and Schmink, M. (Forthcoming). Cows versus rubber: Changing livelihoods among Amazonian extractivists. *Geoforum*. Accepted with minor revisions March, 2007.

Salm, Hans, and Máximo Liberman. 1997. Environmental problems of coca cultivation. In *Coca, cocaine, and the Bolivian reality* . Eds., Madeline Barbara Léons, and Harry Sanabria, 211-26. Albany: State University of New York Press.

Samanez y Ocampo, José Benigno. 1980 [1885]. *Exploración de los ríos peruanos Apurimac, Eni, Tambo, Ucayali y Urubamba, hecha por José B. Samanez y Ocampo, en 1883 y 1884 diario de la expedición y anexos*. Lima, Perú: Consuelo Sámanez Ocampo e Sámanez e hijas.

Santos-Granero, Fernando, and Frederica Barclay. 1998. *Selva central history, economy, and land use in Peruvian Amazonia*. Washington, DC: Smithsonian Institution Press.

———. 2000. *Tamed Frontiers: Economy, Society, and Civil Rights in Upper Amazonia*. Boulder, CO: Westview Press.

———. Ed. 2005. *Guía etnográfica de la Alta Amazonía*. 1. ed. Lima: The Smithsonian Tropical Research Institute, Panama, and the Instituto Francés de Estudios Andinos - IFEA.

Saragoussi, Muriel, Marcos Roberto Pinheiro, Maria do Perpetuo Socorro R. Chaves, Andrew Willian Murchie, and Sergio Henrique Borges. 1999. Mapeamento Participativo: Realidade ou Ficcao? A Experiencia do Parque Nacional Jau. *Patterns and Processes of Land Use and Forest Change in the Amazon, 48th Annual Conference Sponsored by the Center for Latin American Studies*. University of Florida, Gainesville. Conference paper: 1-12.

Sauer, C. O. 1941. Foreword to historical geography. *Annals of the Association of American Geographers* 31: 1-24.

_____. 1956. Education of a geographer. *Annals of the Association of American Geographers* 46: 287-299.

Scarcello, Miguel, Veronica T. da Rocha Passos, S.O.S. Amazonia, The Nature Conservancy, and IBAMA. 1998. *Plano de Manejo Parque Nacional da Sierra do Divisor*. Rio Branco: Unpublished S.O.S. Amazonia Management Plan.

Schmink, Marianne, and Charles H Wood. 1992. *Contested frontiers in Amazonia*. New York: Columbia University Press.

Schneider, Flaviano. 21 November 2003. Peruanos invadem área indígena no Acre. *Pagina 20,* sec. Enviado Especial. Available at < http://www2.uol.com.br/pagina20/ >.

Scholz, Imme. 2001. *Overexploitation or sustainable management action patterns of the tropical timber industry : the case of Pará (Brazil), 1960-1997*. GDI Book Series, no. 15. London, Portland, OR: Frank Cass.

Schonenberg, R. 2001. New Criminal Domains in the Brazilian Amazon. *International Social Science Journal* 53, no. 3: 397-406.

Schulte-Herbrüggen, Björn. 2003. Tala ilegal en la zona reservada del Alto Purús,a lo largo del Río de las Piedras, Madre de Dios. In *Alto Purus: Biodiversidad, Conservación y Manejo*. Eds Renata Leite-Pitman, Nigel Pitman, and Patricia Alvarez, 191-205. Lima: Center for Tropical Conservation.

Schulte-Herbrüggen, Björn, and Helfrid Rossiter. 2003. *Project las Piedras: A socio-ecological investigation in to the impact of illegal logging activity in Las Piedras, Madre de Dios, Peru*. Edinburgh, Great Britain: University of Edinburgh.

Seiler-Baldinger, Annemarie. 1981. Boundaries, poeples and the cultural landscape on the upper Amazon. *Regio Basiliensis: Basler Zeitschriftfur Geographie* 22, no. 2-3: 277-90.

Sharff, Carlos. 1907. Varadero del Inuya al Curiuja. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed Carlos Larrabure y Correa, 561-2. Lima, Imp. de "La Opinión nacional,".

Sheikh, P. A., F. D. Merry, and D. G. Mcgrath. 2006. Water Buffalo and Cattle Ranching in the Lower Amazon Basin: Comparisons and Conflicts. *Agricultural Systems* 87, no. 3: 313-30.

Shoumatoff, Alex. 1997. *Legends of the American desert: Sojourns in the greater Southwest*. 1st ed. New York: A.A. Knopf.

Simmons, C. S. 2002. The Local Articulation of Policy Conflict: Land Use, Environment, and Amerindian Rights in Eastern Amazonia. *Professional Geographer* 54, no. 2: 241-58.

———. 2004. The Political Economy of Land Conflict in the Eastern Brazilian Amazon. *Annals of the Association of American Geographers* 94, no. 1: 183-206.

Simonetti, Andréia. 21 July 2005. A Amazônia sob vigilância. *Amazonas Em Tempo*. Available at < http://www.emtempo.com.br/ >.

Sing, K. A., D. Hryhorczuk, G. Saffirio, T. Sinks, D. C. Paschal, J. Sorensen, and E. H. Chen. 2003. Organic Mercury Levels Among the Yanomama of the Brazilian Amazon Basin. *Ambio* 32, no. 7: 434-39.

Sistema de información sobre comunidades nativas del Perú, Instituto del Bien Común SICNA IBC. 2004. *Información Tabular Ucayali*. Lima, Peru: Unpublished georeferenced data set.

Slater, Candace. 2002. *Entangled Edens: Visions of the Amazon*. Berkeley: University of California Press.

Sletto, B. I. 2005. A Swamp and Its Subjects: Conservation Politics, Surveillance and Resistance in Trinidad, the West Indies. *Geoforum* 36, no. 1: 77-93.

———. No Date. "We drew what we imagined:" Participatory mapping, performance and the politics of authenticity in post-colonial landscapes. Unpublished Manuscript Draft: 1-88.

Slocum, Rachel, Lori Wichhart, Dianne Rocheleau, and Barbara Thomas-Slayter, eds. 1995. *Power, process and participation tools for change*. London: Intermediate Technology Publications.

Smith, Anthony. 1990. *Explorers of the Amazon*. London, England, New York, N.Y: Viking.

Smith, J., V. Colan, C. Sabogal, and L. Snook. 2006. Why Policy Reforms Fail to Improve Logging Practices: the Role of Governance and Norms in Peru. *Forest Policy and Economics* 8, no. 4: 458-69.

Smith, Nigel J. H. 1999. *The Amazon River Forest: A Natural History of Plants, Animals, and People*. New York: Oxford University Press.

Smith, Richard Chase, Mario Pariona, and Ermeto Tuesta. 1999. Land use planning for indigenous territories: Building a native communities information system for the Peruvian Amazon. *Patterns and Processes of Land Use and Forest Change in the Amazon Conference Procedings*. Gainesville, FL: 1-26.

Smith, R. C., M. Benavides, M. Pariona, and E. Tuesta. 2003. Mapping the Past and the Future: Geomatics and Indigenous Territories in the Peruvian Amazon. *Human Organization* 62, no. 4: 357-68.

Sotomayor, José Antonio. 1908. Relación de los infieles de Ucayali, el Marañon i el Amazonas por don José Antonio Sotomayor. *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, 353-60. Lima, Imp. de "La Opinión nacional,".

Southwest Research Associates, Inc. 1993. *Environmental and ecological effects of the coca conversion industry*. Carlsbad, CA: USAID Contract No. 511-000-C-00-441.

Stap, Don. 1990. *A parrot without a name*. New York: Knopf, Random House.

St. John, Ronald Bruce. 1999. Ecuador-Peru endgame. *Boundary & Security Bulletin* 6, no. 4: 79-85.

Steinberg, Michael K, Joseph J Hobbs, and Kent Mathewson. 2004. *Dangerous harvest: Drug plants and the transformation of indigenous landscapes*. Oxford, New York: Oxford University Press.

Sterk, Claire E. 1999. *Fast lives: Women who use crack cocaine*. Philadelphia: Temple University Press.

Sternberg, Hilgard O' Reilly. 1987. Manifest destiny and the Brazilian Amazon: A backdrop to contemporary security and development issues. *Conference of Latin Americanist Geographers: Yearbook* 13: 25-35.

Steward, Julian Haynes. 1946-1959. *Handbook of South American Indians*. V. 3. Washington: U.S. Govt. Print Off.

Stiglich, Germán. 1905. Viaje que por el encargo de la Junta de vías fluviales practicó en los ríos Pachitea, Bajo Ucayali, Amazonas, Alto Ucayali i Urubamba el alférez de fragata don Germán Stiglich- Informe del Alfárez Stiglich. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, Pgs. 272-366. Vol. 4. Lima: Imp. de "La Opinión nacional,".

Stone, Michael. 1998. Map or be mapped. *Whole Earth* no. 94: 54-55.

Sweet, David G. 1974. *A rich realm of nature destroyed: the middle Amazon valley, 1640-1750*. Unpublished Dissertation. Madison: University of Wisconsin- Madison.

Tastevin, Constant P. 1920. Le fleuve Juruá (Amazonie). *La Géographie* XXXIII: 11-34.

———. 1926. Le haut Tarauacá. *La Géographie* 45: 34-54.

———. 1943. *The middle Amazon: It's people and geography, eleven articles*. Washington, D.C.: Coordinator of Inter-American affairs.

Tessmann, Günter. 1930. *Die Indianer nordost-Perus grundlegende forschungen für eine sytematische kulturkunde*. Veröffentlichung Der Harvey-Basslerstiftung. Hamburg: Friedrichsen, de Gruyter & Co. m.b.h.

The Nature Conservancy. New protected area furthers conservation of 4 million acres of the Amazon rainforest between Peru and Brazil. 1. [Accessed 3/14/2007]. The Nature Conservancy. Available at < http://www.nature.org/success/art17761.html >.

Thoumi, F. E. 2002. Illegal Drugs in Colombia: From Illegal Economic Boom to Social Crisis. *Annals of the American Academy of Political and Social Science* 582: 102-16.

Tocantins, Leandro. 1961. *Formação histórica do Acre*. Temas Brasileiros. Rio de Janeiro: Conquista.

Toledo, Alejandro, Jaime Quijandria Salmon, and David Waisman Rjavinsthi. 2002. Oficializan fórmulas de transformación para la conversión de coordenadas UTM del Sistema WGS al PSAD 56, establecidas para las 3 zonas catastrales mineras, Decreto Supremo #001-2002-EM. *El Peruano, Diario Oficial* 7872: 215410-1.

Tournon, Jacques. 2002. *La merma mágica*. Lima, Perú : Centro Amazónico de Antropología y Aplicación Práctica (CAAAP).

Tratado de Cooperación Amazónica, Secretário Pro-Tempore TCA-SPT. 1994. *Zonificación Ecológica-Económica: Instrumento para la Conservación y el Desarrollo Sostenible de los Recursos de la Amazonía. - Memorias del Seminario-Taller*. Manaus, Brasil: Tratado de Cooperación Amazónica. Document #26.

———. 1996. *Propuesta Metodológica para la Zonificación Ecológica-Económica de la Amazonia*. Santa Fé de Bogotá, Colombia: Tratado de Cooperación Amazónica. Document #56.

———. 2002. "Base Jurídica del Tratado de Cooperación Amazónica." Web page, [accessed 21 April 2006]. Available at http://www.otca.org.br/publicacao/Base%20Juridica%20del%20Tratado.pdf.

United Nations Office on Drugs and Crime. 2005a. *World Drug Report 2005, Volume I: Analysis*., Vol. I: Analysis. NY, NY, USA: United Nations.

———. 2005b. *World Drug Report 2005, Executive Summary*, NY, NY, USA: United Nations.

———. 2005c. *Peru coca cultivation survey for 2004*. NY, NY, USA: United Nations.

———. 2005d. *World Drug Report 2005, Volume II: Statistics*., Vol. II: Statistics. NY, NY, USA: United Nations.

———. 2005e. *Bolivia coca cultivation survey for 2004*. NY, NY, USA: United Nations.

———. 2005f. *Colombia coca cultivation survey for 2004*. NY, NY, USA: United Nations.

Varese, Stefano. 1968. *La sal de los cerros: notas etnográficas e históricas sobre los campa de la selva del Perú*. Universidad Peruana De Ciencias y Tecnología. Departamento De Publicaciones. Antropología. Lima: Universidad Peruana de Ciencias y Tecnología.

———. 2002. *Salt of the mountain: Campa Asháninka history and resistance in the Peruvian jungle*. Norman: University of Oklahoma Press.

Vayda, A. P. 1983. Progressive Contextualization - Methods for Research in Human-Ecology. *Human Ecology* 11, no. 3: 265-81.

———. 2004, March 16th. *Cultural and Political Ecology at the AAG century mark: Session II.* Philadelphia, PA: Proceedings of the Centennial Meeting of the Association of American Geographers. Available at < http://www.stetson.edu/artsci/cape/Features/capecentury/vayda.htm >.

Veber, H. 1998. The Salt of the Montana: Interpreting Indigenous Activism in the Rain Forest. *Cultural Anthropology* 13, no. 3: 382-413.

———. 2003. Ashaninka Messianism - the Production of a "Black Hole" in Western Amazonian Ethnography. *Current Anthropology* 44, no. 2: 183-211.

Velarde, Rafael. 1905. Disponiendo se inverta la suma de 2,000 pesos en la compra de herramientas de labranza para distribuirlas entre los indígenas de la tribu Campa. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, 144'145. Vol. 5. Lima: Imp. de "La Opinión nacional,".

Verissimo, A., P. Barreto, R. Tarifa, and C. Uhl. 1995. Extraction of a High-Value Natural-Resource in Amazonia - the Case of Mahogany. *Forest Ecology and Management* 72, no. 1: 39-60.

Villanueva, Manuel Pablo, and Sociedad Geográfica de Lima. 1902. *Fronteras de Loreto conferencia publica dada en la noche del 27 de diciembre de 1902*. Lima: Imprenta y Libreria de San Pedro.

Von Hassel, Jorge M. 1905. Estudio de los varaderos del Purús, Yuruá i Manu por el ingeniero Jorge M. Von Hassel. In *Colección de leyes, decretos, resoluciones i otros documentos oficiales referentes al departamento de Loreto [1777-1908]*. Ed., Carlos Larrabure y Correa, Pgs. 209-13. Vol. 4. Lima: Imp. de "La Opinión nacional,".

Wasserman, J. C., S. Hacon, and M. A. Wasserman. 2003. Biogeochemistry of Mercury in the Amazonian Environment. *Ambio* 32, no. 5: 336-42.

Watson, F. 1996. A View From the Forest Floor: the Impact of Logging on Indigenous Peoples in Brazil. *Botanical Journal of the Linnean Society* 122, no. 1: 75-82.

Weiss, Gerald. 1975. *Campa cosmology: the world of a forest tribe in South America*. Anthropological Papers of the American Museum of Natural History, v.52, pt.5. New York: American Museum of Natural History.

Wendl, Tobias, and Michael Rösler. 1999. Frontiers and borderlands: The rise and relevance of an anthropological research genre. In *Frontiers and borderlands anthropological perspectives.* Eds Michael Rösler, and Tobias Wendl, 1-27. Frankfurt am Main, New York: Peter Lang.

West, Robert Cooper. 1979. *Carl O. Sauer's fieldwork in Latin America*. Dellplain Latin American Studies: Ann Arbor, Mich: University Microfilms International.

White, S. 1978. Cedar and Mahogany Logging in Eastern Peru. *Geographical Review* 68, no. 4: 394-416.

Whitney, B. M., D. C. Oren, and R. T. Brumfield. 2004. A New Species of Thamnophilus Antshrike (Aves : Thamnophilidae) from the Serra Do Divisor, Acre, Brazil. *Auk* 121, no. 4: 1031-39.

Whiton, Louis C Greene H. Bruce, and Richard P Momsen Jr. 1964. The Isconahua of the Remo. *Journal De La Société Des Américanistes* 53: 85-124.

Winklerprins Amga. 2002. Seasonal Floodplain-Upland Migration Along the Lower Amazon River. *Geographical Review* 92, no. 3: 415-31.

Wittmann, F., W. J. Junk, and M. T. F. Piedade. 2004. The Varzea Forests in Amazonia: Flooding and the Highly Dynamic Geomorphology Interact With Natural Forest Succession. *Forest Ecology and Management* 196, no. 2-3: 199-212.

Wolff, Cristina Scheibe. 1999. *Mulheres da floresta: uma historia : Alto Jurua, Acre (1890-1945)*. Sao Paulo, Brazil: Hucitec.

World Wildlife Fund. 2005. "Illegal logging and forest crime: Estimated rates of illegal logging around the world." Web page, [accessed 15 September 2005]. Available at < http://www.panda.org/about_wwf/where_we_work/europe/problems/illegal_logging/illegal_logging_country_list.cfm >.

Wright, John K. 1942. Map makers are human: Comments on the subjective in maps. *The Geographical Review* 32, no. 4: 527-44.

Young, Kenneth R. 1996. Threats to Biological Diversity Caused by Coca/Cocaine Deforestation in Peru. *Environmental Conservation* 23, no. 1: 7-15.

———. 2004a. Environmental and social consequences of coca/cocaine in Peru: Policy alternatives and a research agenda. In *Dangerous harvest drug plants and the transformation of indigenous landscapes.* Eds., Michael K Steinberg, Joseph J Hobbs, and Kent Mathewson, 249-73. Oxford, New York: Oxford University Press.

———. 2004b. A geographical perspective on coca/cocaine impacts in South America. In *WorldMinds geographical perspectives on 100 problems : commemorating the 100th anniversary of the Association of American Geographers 1904-2004 : celebrating geography - the next 100 years.* Eds., Donald G Janelle, Barney Warf, and Kathy Hansen, 363-67. Dordrecht, Boston: Kluwer Academic.

Young, K. R., and B. Leon. 2000. Biodiversity Conservation in Peru's Eastern Montane Forests. *Mountain Research and Development* 20, no. 3: 208-11.

Yovera, Daniel, and Luis Eduardo Cisneros. 25 April 2004. ¿Quién mató a Alberto Rivera?: Crimen de Pucallpa. *Agencia Perú*. Available at < http://www.agenciaperu.com/reportes/2004/abr/rivera.htm >.

Zarin, Daniel, Janaki R. R. Alavalapati, Francis E. Putz, and Marianne Schmink, Eds. 2004. *Working forests in the neotropics: Conservation through sustainable management?* Biology and Resource Management in the Tropics Series. New York: Columbia University Press.

Vita

David Seward Salisbury was born in Pottsdam, NY to William Salisbury and Ruth Brown, and raised in Columbia, SC. He attended high school at The Hill School in Pottstown, PA, graduating in 1989. In 1993 he graduated from Middlebury College in Middlebury, VT, with a Bachelor of Arts degree. He majored in Spanish and minored in sculpture. His third year of college was spent studying Spanish politics, history, art and literature in Madrid, Spain. He entered the U.S. Peace Corps in 1993 and spent over two years working on reforestation and organic gardening projects in Guatemala. Following Peace Corps, he taught Spanish and sculpture and coached soccer and basketball at Gilman School in Baltimore, MD. In 1999 he entered the Tropical Conservation and Development Program of the University of Florida's Center for Latin American Studies. His M.A. thesis examined livelihood change and inadequate mapping in a community of former rubber tappers in the Southwestern Brazilian Amazon. David began the doctoral program in the department of Geography and the Environment in 2001 and conducted ten months of fieldwork in 2004. During a break in fieldwork, David married Leigh Anne Gorman in May of 2004 and in August of 2005 welcomed his daughter, Ruby Brook Salisbury. David will start as an Assistant Professor of Geography at the University of Richmond in the fall of 2007.

Permanent address: 3009 French Place, Austin, TX, 78722

This dissertation was typed by the author.