

Involuntary Displacement and the Belo Monte Dam: Changes in Self-Perception of the Volta Grande's Displaced Riverine Peasants

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Saudade: a feeling of longing, melancholy, or nostalgia that is supposedly characteristic of the Portuguese or Brazilian temperament

-Oxford English Dictionary

“Saudade” is one of the most salient terms in the Brazilian vocabulary. Beyond simple nostalgia, saudade refers to missing a person or place that has been a deep influence on one’s life and that will never be known again. Saudade is bittersweet; it is the loss of love, but being better for having been touched by it in the first place. It may be the passing of a family member or a friend, or the act of leaving home. It is the end of one chapter and the beginning of a new, whether for better or for worse.

The involuntarily displaced peasants of the Volta Grande know saudade all too well. They were once part of the various communities scattered around the Xingu watershed that depend mainly on subsistence and communal action for survival. These cultures rely on the preservation of the intricate Xingu ecosystems and serve as an important source of information about the functionality of the Xingu River. The demand for economic development encapsulated in the Belo Monte Hydroelectric Damming Project has drowned out the cries of thousands of angry *Ribeirinhos*, or riverine peoples, who are concerned for the loss of their land and lifestyle. Involuntary displacement may have severe consequences both for those displaced and for the places to which they migrate, but many of these impacts have been downplayed or overlooked by public and private players who have a hand in regional development.

The NorteEnergia Consortium developed a 4-volume set of plans to mitigate the impacts of the Belo Monte Dam. These plans will dictate

the future lives of involuntarily displaced community members by determining who may receive financial compensation for their displacement and where they must relocate. Unfortunately, they do not take into account the people these decisions affect. I argue that self-perception within a community setting is co-constructed by the individual in relation to their community as a whole and is based on a communal set of social norms and values. It relies in particular on the community as the major family unit, access to subsistence practices, economic and dietary sovereignty, a connection to the local environment, and a shared, culturally specific knowledge base. There are mitigation plans in place that attempt to alleviate the repercussions of community displacement to nearby cities, but I believe that these plans lack sufficient information about the lifestyle and values of the Ribeirinhos and therefore will not be effective.

This paper will explore differences in self-perception between community members who still remain in their native community and those who have already been displaced from the initial dam construction. It will then analyze the mitigation plans detailed in the Environmental Impact Assessment's Environmental Impact Report (EIARIMA) and discuss their perception of the involuntarily displaced persons. It draws on the assumption that ineffective policies are often so because they are based in misconceptions and do not take into account self-perceptions of

the individuals for whom they are written. This thesis attempts to educate policy makers through an analysis of misconceptions and self-perceptions of involuntarily displaced Ribeirinhos in hopes of developing more effective long-term policy solutions.

I. Introduction

The proposed Belo Monte Hydroelectric Dam located on the Volta Grande (or “Big Bend”) of the Xingu River in Altamira, Brazil is a prime example of the tension created by the swift and powerful development seen all over the Amazon region. Based on observation, it seems that this growth has been guided by three major concepts: economic development, sustainable development, and the reduction of social inequality. While ideally, Brazilian policies and its large-scale extractive projects attempt to account for each of these factors equally, there is often a struggle between economic growth, social rights, and environmental protection. The proposed Belo Monte Hydroelectric Dam is a prime example of the tension caused by the swift and powerful economic development seen all over the Amazon region.

While damming has been considered to be a relatively sustainable alternative to fossil fuels, it inflicts numerous environmental and social costs that mainly affect those who will benefit the least from energy development. These costs include loss of species diversity, irreversible alterations to the surrounding ecosystem, and social disarticulation and

urban strain associated with the displacement of the small subsistence communities that reside within the construction zone. Though energy security is an admirable goal, it is pertinent to delve into its implications for social welfare, especially for those who will be involuntarily displaced for the construction and operation of the hydroelectric dam.

The Volta Grande of the Lower Xingu watershed is known for its large concentration of indigenous populations living on its banks, but many more distinct social groups rely on access to its current aquatic environment to survive. The “invisible” residences of the non-indigenous *Ribeirinhos* communities that dot the Xingu may not be immediately apparent to those surveying the land; their homes are often physically hidden in the dense flora of the Amazon and their interests are not represented in the national or international realm. Richard Pace defines *Ribeirinhos* as those who “engage in extraction of forest goods for domestic and international markets, subsistence agriculture and small animal husbandry, [and] subsistence fishing.”¹ The traditional livelihoods of these communities that rely particularly on the ability to fish for subsistence are already changing drastically due to initial construction pollution and erosion run off. Water quality is quickly being reduced, particularly near communities close to and downstream from the initial

¹ Richard Pace, “Failed Guardianship or Failed Metaphors in the Brazilian Amazon?” *Journal of Anthropological Research* 60: 2 (2012): 234.

construction site, thereby reducing fish population and diversity and rendering their currently lifestyle impossible to maintain.

The Ribeirinhos come from a background of mixed European-indigenous descent and cannot be protected under the same human rights and land laws that protect indigenous groups in the region. Chapter VII Article 231 of the Brazilian Constitution states that indigenous peoples will have the original rights to the traditional lands they occupy on a permanent basis and the natural resources that are indispensable for their well-being. Hydraulic resources, especially for energy production, may only be exploited on indigenous territory with authorization from the National Congress after a hearing process.²

Though the Ribeirinhos have occupied their land for 6-7 generations, they are ethnically distinct from their nearby indigenous neighbors and must procure formal documentation of rent or ownership over their land if they hope to have claim over their land. Ribeirinhos populations in the dam region reside in small-scale subsistence communities of 25-50 families that border a river system and may be referred to as “agriculturalistas”, “pescadores”, or “riverine community members”. Ribeirinhos communities tend to participate in outside markets through selling extractive products such as Brazil nuts, but rely upon subsistence fishing and farming for basic survival.

² Federal Constitution of Brazil, art. 7, sec. 231.

Most social research in this area has focused on indigenous communities and their land rights, but I argue that due to their lack of institutional support from the Brazilian government as well as local non-governmental organizations (NGOs), Ribeirinhos communities are even more invisible and have the potential to suffer the most from the Belo Monte Dam's displacement policies. Grassroots campaigns and institutionalized laws focus on indigenous groups because they have recognized traditional rights to their territory, but the Ribeirinhos do not have the same formalized territorial rights so they are often not huge players for grassroots rhetoric and they are marginalized by the government and by large corporations.

Akin to large-scale damming projects worldwide, the Belo Monte is expected to play an integral role in the rapid distortion of its aquatic environment. This transformation and the resulting involuntary displacement will break up the Ribeirinhos communities and will severely impact self-perception of the riverine community members. The aforementioned values upon which the riverine communities rely are not present at all in the Belo Monte's mitigation plans. The economic value associated with preserving the Xingu watershed for its ecological services and habitat is much higher than the profit derived from hydroelectric energy production, but if damming must occur, the Belo Monte's mitigation efforts must attempt to preserve the community setting. Rural

to urban displacement will effectively extinguish the Ribeirinhos culture entirely in the Xingu region and will lead to social strain in the urban setting and the loss of a potentially useful traditional knowledge source.

The local knowledge provided by the Ribeirinhos could prove invaluable for preserving the Xingu River, an ecosystem already disturbed by development, as they rely upon a symbiotic relationship with a healthy river ecosystem. If the Xingu is no longer habitable, the exodus of Ribeirinhos and indigenous groups from their traditional lands to surrounding cities may further shock the delicate social balance of the Xingu. The rural to urban migration pattern is spurring an urban population growth with which infrastructure development cannot keep up. Involuntary displacement will only further stress urban resources, social relationships, and community order. The lifestyle changes that displaced Ribeirinhos will face are also manifold, making it imperative to assess the potential effects of this displacement in order to properly plan for them.

The Belo Monte Dam's highly publicized social and environmental costs, as well as the well-organized local responses to its construction, have the potential to set many precedents for future damming projects in the region. These precedents range from the protection of aquatic biodiversity to the protection of displaced peasants. These standards will

play a large role in the development of energy resources in Brazil and the future of hydroelectric power creation methods.

II. Background

Background on the Belo Monte Dam

The Xingu River, the eastern most tributary to the Amazon River system, spans 1,230 miles from the northern edge of Mato Grosso to the Amazon River in Pará. It is home to 37 distinct ethnicities³ and 800 known fish species (though the actual number is projected to be closer to 4,000).⁴ The Volta Grande (or “Big Bend”) of the Xingu River near Altamira, Brazil is already being altered from preliminary construction of the Belo Monte Dam. It is part of the Lower Xingu watershed and its location yields some of the highest fish species diversity, population, and endemic species estimates, which are mainly concentrated at and below the dam construction.⁵ It is a clear water system, with the downstream half greatly affected by human development and the upstream half relatively uninhabited.

³ F Pontes Júnior and J. F. “Beltrão, Xingu, Barragens e Nações Indígenas” *Núcleo de Altos Estudos Amazônicos (NAEA), Universidade Federal do Pará, Belém* (2004) 28.

⁴ Geraldo Mendes dos Santos, “Análise do EIARIMA - Ictiofauna,” *Painel De Especialistas Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidrelétrico de Belo Monte* (2009) 138-147.

⁵ “Prognóstico Ambiental Global,” *Estudo de Impacto Ambiental – Relatório de Impacto Ambiental* 1:1 (2008): 16-30.

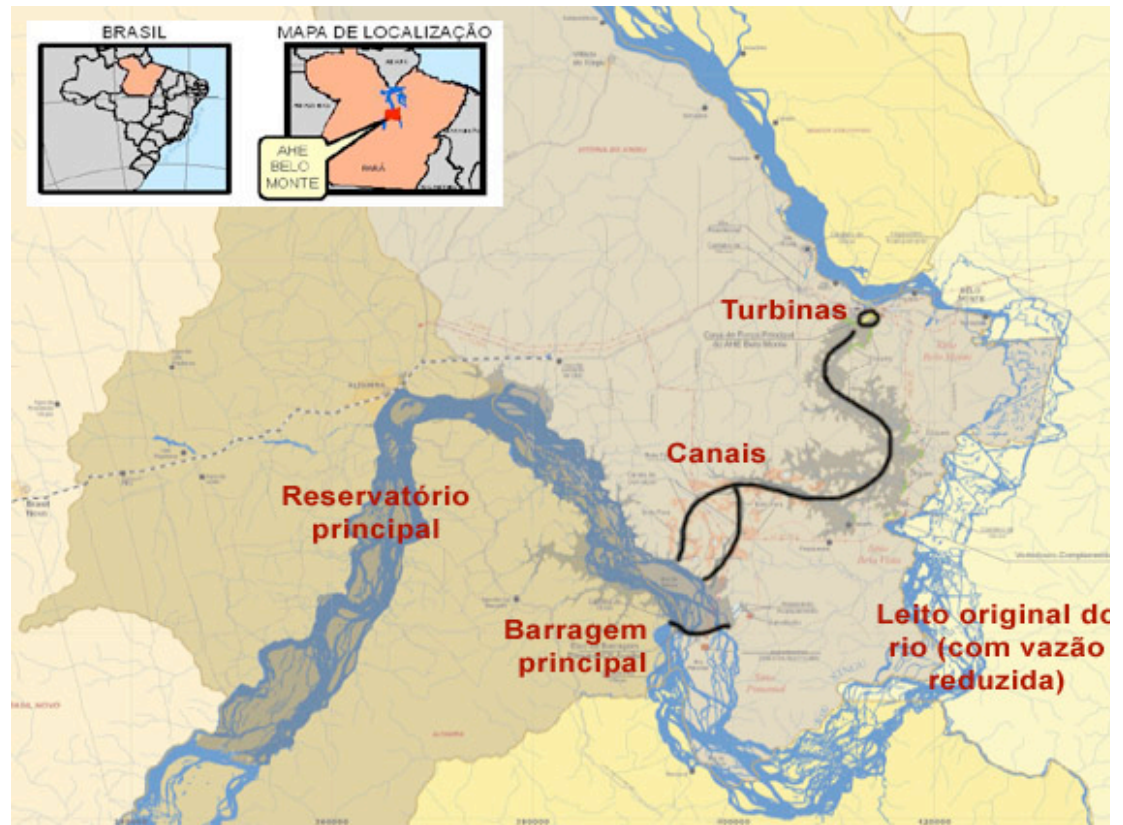


Figure 1. The Belo Monte Dam Construction Site, Flood Zone, and River Diversion.

The Belo Monte Dam is predicted to be one of the largest hydroelectric damming projects in the world, adding about 11,233 MW of installed capacity to Brazil's energy grid. It is made up of two dams, one that acts as a place to house turbines and one that restores the remaining flow to the lower Xingu. Due to the location of the two dams, it has an expected flood zone of 516 km² and an additional 150 km of river that will be dried as the dams divert the flow of the Xingu. It is expected to

yield an affected zone of 1,522 km² in total.⁶ According to researchers from Electrobras and NorteEnergia, though multiple rivers were surveyed, the Xingu River is found to be the prime location for the Belo Monte Dam. The 62-mile span of the Volta Grande naturally moves from high ground to low, allowing for a drop of 293 feet. This drop from one turbine to the next has been determined sufficient for a net capacity factor (or the total amount of energy the dam produces divided by the amount of energy that the plant would have produced at full capacity over a given period of time) of 39%.⁷

There are 18 shareholders in the project (see Table 1).⁸

Table 1. Belo Monte Dam Stakeholders (% Holdings)

| Company Name | % Shareholder |
|----------------------------------------|---------------|
| Electronorte | 19.98 |
| Electrobras | 15 |
| CHESF | 15 |
| Bolzano Participações investments fund | 10 |
| Gaia Energia e Participações | 10 |
| Caixa Fi Cevics investments fund | 5 |
| Construction firm OAS | 2.51 |
| Queiroz Galvão construction company | 2.51 |
| Funcef pension fund | 2.5 |
| Galvão Engenharia | 1.25 |

⁶ "Belo Monte Dam Hydroelectric Project Fact Sheet," *Governo Federal Ministry of Mines and Energy*, May 2011.

⁷ Carlos Alberto de Moya Figueira Netto, Hélio Costa de Barros Franco, and Paulo Fernando Vieira Souto Rezende, "AHE Belo Monte—Evolução Dos Estudos." *Comitê Brasileiro de Barragens*, (2007).

⁸ "Belo Monte Hydro Project Consortium to Include 18 Partners." *Renewable Energy World*, 16 July 2010.

| | |
|------------------------------------------|------|
| Contern Construções | 1.25 |
| Cetenco Engenharia | 1.25 |
| Mendes Junior construction company | 1.25 |
| Serveng-Civilsan construction company | 1.25 |
| J Malucelli construction company | 1 |
| Sinobras | 1 |
| J Malucelli Energia construction company | 0.25 |

The Norte Energia Consortium is a 49.98% stakeholder in the Belo Monte Project and is responsible for decisions related to the licensing, constructing, and operating processes. The consortium is controlled by Electrobras (15% stakeholder), with input from ElectroNorte (19.98% stakeholder) and CHESF (15% stakeholder). ARCADIS construction companies hold 35% of the total share, and the unaccounted 9% will be dispersed to various undisclosed engineering companies post completion of contract agreements.

The Belo Monte Project is an integral aspect of Brazil's clean energy plan, as "the decision to use hydroelectric power to expand the national energy grid was guided by Brazil's 2009 commitment to reduce CO2 emissions by 36.1% to 38.9% by 2020."⁹ The Brazilian government sees the Amazon and its tributaries as a local and sustainable energy source that will ensure Brazil's energy independence and continued

⁹ "Belo Monte Dam Hydroelectric Project Fact Sheet," *Governo Federal Ministry of Mines and Energy*, May 2011.

development. According to the 2004 World Energy Outlook (WEO) on Brazil, primary energy demand met by hydropower was 17.1 Mtoe (million tons of oil equivalent) in 1990 and is expected to rise to 50 Mtoe by 2050. This is projected to be behind only oil and biofuel production.

The WEO continues,

“Because of opposition from environmental groups and weak institutional capacity at the federal level, hydropower generation projects have been delayed, despite the benefits these projects can offer when designed properly such as multiple use of water and lower CO² emissions. If new dams are not constructed, the government may have no option but to invest in fossil fuel plants and CO emissions will rise.”¹⁰

Hydroelectric dams are painted as integral to sustainable economic development in Brazil, but they may also lead to severe environmental degradation. Though the reduction of fossil fuel use is an admirable goal, damming Amazonian tributaries will increase deforestation and may break the link between the Andes and the Amazon’s headwaters.¹¹ This may in turn have unknown consequences

¹⁰ International Energy Agency, *World Energy Outlook 2006* (Washington, DC: OECD/IEAE, 2006).

¹¹ Rhett A. Butler, "Will Mega-Dams Destroy The Amazon?" *Mongabay*, 18 April 2012, http://news.mongabay.com/2012/0418-amazon_mega-dams.html (accessed 22 April 2012).

for weather and hydrothermal cycling, which is already in jeopardy due to climate change.

Licensing Procedure Associated with the Belo Monte Project

Though the Belo Monte Project is expected to have numerous multifaceted effects on the Volta Grande, its impacts are merely a whisper compared to its original form proposed in 1976. The 1970s proved to be the era of environmental reform, not just in the United States but in Brazil as well. New international environmental initiatives spurred a growing concern for the environmental effects of large-scale energy projects, after which the World Bank and other international organizations demanded more stringent project proposals that took ecological concerns into account in addition to economic ones. Brazil saw an increase in “social mobilization against the social and ecological consequences of major development projects implemented by the military regime, the reaction to these projects constituting a focus of opposition to the regime itself.”¹² Opposition to the Belo Monte and other regional damming projects prompted a marked shift in ecological and social policies. New plans “call[ed] both for the preservation of the country’s cultural heritage

¹² Agnes Da Costa, "Sustainable Dam Development in Brazil: Between Global Norms and Local Practices." *Deutsches Institut für Entwicklungspolitik* (2010): 1-32.

(including those of indigenous origin) and for studies of harm done to the environment.”¹³

Born from this new concern for social and environmental stability, Brazil developed a three step licensing procedure before each energy project implementation. The first step is the preliminary license, which has already been procured by the NorteEnergia Consortium. The preliminary license requires a third party, in this case the Brazilian Institute of Environment and Renewable Natural Resources-Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (IBAMA), to complete an Environmental Impact Analysis (EIA) that details all of the potential social, ecological, and economic costs of the project. The EIA must have a corresponding Environmental Impact Report (RIMA) produced by the project developers that provides a “list of measures designed to mitigate negative impacts and an indication of survey and monitoring programmes,”¹⁴. The EIARIMA helps internalize costs that typically burden repressed social groups and the environment. Brazil has not developed laws and regulations to address those affected by involuntary displacement, so it is necessary to have a well-developed EIARIMA that takes into account impacts on displaced persons in order to provide even menial protection for social welfare.

¹³ Ibid.

¹⁴ Ibid.

The NorteEnergia Consortium is now looking into the next steps in the licensing procedure. The installation license requires NorteEnergia to demonstrate that they have the necessary funds for mitigating the impacts of these changes. After the installation license they will have to procure the operating license, which allows operation of the project.¹⁵ In 2008, NorteEnergia commissioned IBAMA to conduct a series of studies in order to revamp their EIA to include changes in the design of the dam in order to divert flow from some indigenous lands and to protect migratory fish. The 2008 EIA with the corresponding RIMA was accepted by IBAMA who granted the first of three necessary licenses in 2010. In September of 2011, however, construction on the dam was halted due to a court ruling that prohibited NorteEnergia from constructing anything that could interfere with the flow of the Xingu River due to the impact on local fishing cultures.¹⁶ In this sense, the construction of the Belo Monte Dam has both been justified and prohibited based on the potential impacts and mitigation methods of dam construction on fish population and biodiversity and the overarching social concerns associated with this change. Those representing the

¹⁵ "Environmental Licensing in Brazil," *Energia Sustentável do Brasil*, 2011, <http://www.energiasustentaveldobrasil.com.br/licenciamento-ambiental.asp?lg=2> (accessed 22 April 2012).

¹⁶ "Brazilian judge orders halt to work on Amazon dam: Brazil Dam," *EFE News Service*, 29 September 2011, <http://reference.sit.edu:2048/login?url=http://search.proquest.com/docview/894748477?accountid=45073> (accessed 19 April 2012).

interests of the dam continue to argue that the implementation of hydroelectric dams is necessary due to the increasing demand for energy in the region, but recent studies summarized in the Expert's Panel on the Belo Monte Dam¹⁷ question whether the short term economic benefits truly outweigh the project's social and environmental costs.

What is a "Subsistence Community"?

Before one may understand the extent to which self-perception shifts post-relocation, it is vital to develop a knowledge base about the communities the Ribeirinhos call home. They survive primarily through subsistence means and communal support, though their subsistence community does interact some with outside markets. In this case, a subsistence culture is defined as,

"An agrarian economy based on production for consumption rather than exchange. Such economies are characterized by low levels of production, yielding a surplus capable of meeting little more than the basic necessities of life."¹⁸

Nietschmann (1970) differentiates between subsistence and market-based economies by the magnitude of wants versus resources. He states that outsiders, or those who have traditionally lived in market-based economic systems, see small-scale subsistence based communities

¹⁷ "Experts Panel Assesses Belo Monte Dam Viability." (2009).

¹⁸ Gordon Marshall, "Subsistence Economy." *A Dictionary of Sociology Encyclopedia.com* (accessed November 17, 2012): 1.

as impoverished or lacking. However, Nietschmann argues that “for many primitive peoples wants are limited and means are great [...] market economies are based on inadequacy and deprivation while subsistence economies are based on adequacy and dispensation”¹⁹. Concepts of poverty and need are based on perspective and beliefs within our society tend to be skewed towards westernized ideals.

Subsistence groups differ radically from their market-based counterparts in their views of security and poverty. In order for a market-based economy to thrive, there has to be a consumer base to both produce and buy goods and services through selling their labor power. Economic security is a major concern within a market-based economy. This does not mean, however, that nature is not also a concern. Production relies on the availability of natural resources, so the creation of goods and services should be viewed as set within the ecosphere. Subsistence groups often do not trouble themselves with economic security; rather, they focus on social security, which they derive from their social network, and dietary security that stems from a healthy environment.²⁰ Though they contribute little to the GDP (gross domestic product) of a nation, they do not consider themselves to be

¹⁹ Bernard Nietschmann, "Pan American Institute of Geography and History," *Pan American Institute of Geography and History* 74 (1970): 83-99.

²⁰ Bernard Nietschmann, "The Study of Indigenous Food Production System: Mere Subsistence or Merrily Subsisting?" *Revista Geografica* 74 (1971): 83-99.

impoverished. They are able to meet all their needs for survival through their access to raw materials and their control over the production of goods such as food. Placing emphasis on the long-term ability to survive off the resource reduces the tendency for overexploitation.

Economic Theories

Conventional neoliberal economic discourse stems from the works of Adam Smith, who surmised in *Wealth of Nations* (1776) that the capitalist economic model developed due to the natural human tendency to be concerned with “only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention.”²¹ This aspect of his work remains pertinent in capitalist discourse, but fails to acknowledge potential for altruism. His argument is remarkably complex and often has portions that are disregarded by neoliberal economists, but the crux of this particular argument is used to justify the self-regulating market system. Workers produce based on their own self-interest, which benefits society as a whole. Laboring under the assumption that consumers are rational, the market will be able to effectively organize economic activity and will continue to function efficiently based on supply and demand at the lowest possible price, so that producers maximize their profit and consumers maximize their

²¹ Adam Smith, *Wealth of Nations* (London: Methuen & Co., Ltd., 1776), 456.

marginal utility. This concept is strongly embedded in how those who are part of the capitalist system view their place in society and their relationship with nature.

Karl Polanyi, a Hungarian philosopher and political economist, wrote *The Great Transformation* (1944) as an alternative explanation for development of economic systems. Polanyi promotes the concept that the market economy is born from the development of the modern state. He argues that economy is socially embedded, so in many small communities, such as that of the Ribeirinhos,

“The individual's economic interest is rarely paramount for the community keeps all its members from starving unless it is itself borne down by catastrophe, in which case interests are again threatened collectively, not individually. The maintenance of social ties, on the other hand, is crucial.”²²

In this setting, communities function under a system of reciprocity, exchange, and domesticity. Society acts as a buffer to the ills of capitalism. Personal relationships are more valuable than the ability to obtain goods and services. Polanyi elaborates,

“Reciprocity and redistribution are able to ensure the working of an economic system without the help of written records and

²² Karl Polanyi, *The Great Transformation* (New York: Rinehart & Company, Inc, 1944), 43-55.

elaborate administration only because the organization of the societies in question meets the requirements of such a solution with the help of patterns such as symmetry and centrality.”²³

The redistribution of goods and services in subsistence communities functions in such a way that compensation does not always need to occur directly after the good or service is offered. It is pertinent to note that the concept of the individual is specific to a particular economic system. When threat is felt collectively, the concept of self is tied directly to place within a community and the idea of an “individual” as separate or distinct from his kin seems to dissipate.

Ribeirinhos Economic System

The context of this paper focuses on the perceptions of subsistence-based riverine communities. However it also is vital to display the true complexities of the economic system employed by the nearly 2 million peasants (including *Ribeirinhos*, *caboclos*, rubber tappers, *quilombolos*, and subsistence farmers) who reside in Amazon region.²⁴ Polanyi’s theories on subsistence economic systems are not meant to romanticize the concept of the “subsistence communities” that are typical of the Amazon region. Subsistence communities may range from what is known as pure subsistence to interacting almost daily with market-based

²³ Ibid.

²⁴ A Hall, *Sustaining Amazonia: Grassroots action for productive conservation*. (Manchester: Manchester University Press, 1997), 70.

economies for goods and services. The lifestyle of the *Ribeirinhos* is much more complex than pure subsistence economies. It combines aspects of reciprocity on the local level with some commoditization of goods and resources in order to live both separately and symbiotically with surrounding market-based economies.

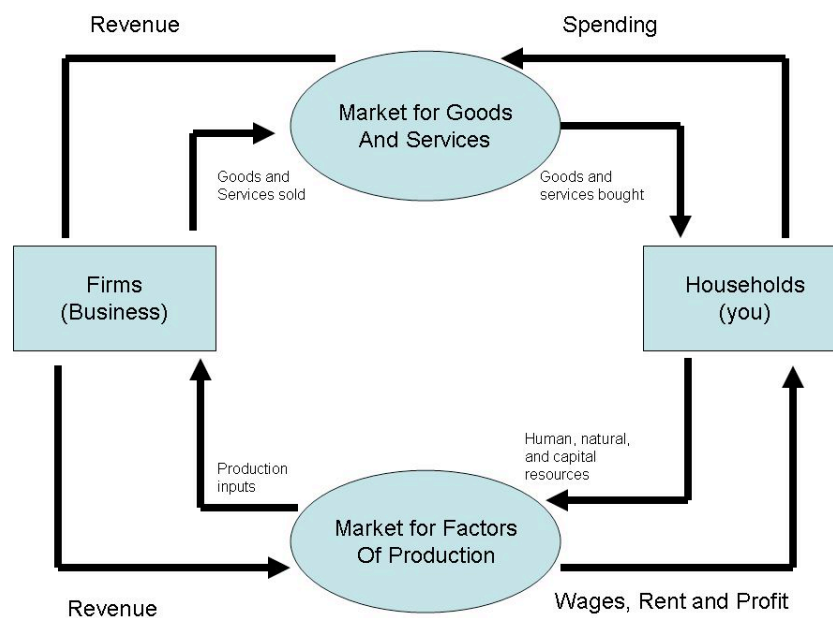


Figure 2. Circular Flow Model of the Economy²⁵

The circular flow model of the economy, a simplified yet remarkably relevant portrayal of how goods and services flow in a neoliberal economic system, excludes non-market goods and services typical of subsistence-based communities. Within the circular flow model,

²⁵ J. Chen, "Circular Flow Model of the Economy," <http://jchen3046.wordpress.com/what-is-economics/circular-flow-model/>

households and businesses interact through input and commodity markets. As the globalized market is based in a systems in which non-market goods and services tend to be disregarded. Subsistence-based communities, however, value non-market activities more than economic ones. This difference in value leads to an undervaluing of the Ribeirinhos and similar communities by outsiders. In addition, it is hard to conceptualize values associated with different economic systems, so when involuntary displacement occurs, differing value systems may make the transition from the community setting to the urban setting difficult.

Amazonian riverine communities play an integral role in resource management, especially in relation to fish and fisheries. While their economic integrity is often overlooked by large international business entities, their low cost and high productivity allows for these communities to sustain themselves and the river system.²⁶ Due to the inextricable link between fishing and the livelihoods of riverine community members, it is impossible to detach shifts in perceptions from the ability to perform and to maintain traditional fishing techniques. Through development projects such as the Belo Monte, fisheries that have been traditionally maintained in a small-scale fashion may be converted to a large-scale, industrial fishery.

²⁶ D. Thompson, "The world's two marine fishing industries: how they compare," *The Iclarm Quarterly* 11:17 (1988).

Perceptions and Misconceptions of Subsistence Communities

In the past 30 years, Amazonian riverine communities have experienced a dramatic increase in influence from the outside world. Academics interested in the concept of the “ecologically noble savage” argue that though outsiders may view these subsistence communities as the pinnacle of human-nature symbiosis, globalism and technology access have allowed for many of these communities to diverge from subsisting and move towards degradation.²⁷ Michael Alvard argues that resource depletion is a product of consumption patterns, demographics, and contact with market economic forces.²⁸ Flora Lu Holt points out that exploitation of natural resources develops “concurrent with population growth, adoption of western technologies, and market production”²⁹. Technology is inextricably linked to population growth, as new medicines and sanitary measures help to increase life expectancy and provide newborns with a greater chance of making it past their first year.

The misconception of the “ecologically noble savage” has led to a number of arguments in favor of moving and acclimating small

²⁷ Hames Raymond, “The Ecologically Noble Savage Debate,” *Annual Review of Anthropology* 36: 1 (September 2007): 177–190.

²⁸ Michael S Alvard, “Testing the ‘ecologically noble savage’ hypothesis: Interspecific prey choice by Piro hunters of Amazonian Peru.” *Human Ecology* 21:3 (1993): 55-387.

²⁹ Flora Lu Holt, “The Catch-22 of Conservation: Indigenous Peoples, Biologists, and Cultural Change,” *Human Ecology* 33 (April 2005):199–215.

communities into the market system so as to protect “pristine” landscapes. John Terborgh, a renowned conservation biologist argues that “indigenous people are perceived as having two states of being: pristine and untouched or contacted and corrupted”.³⁰ As such, he believes that if communities that are only partially subsisting, they no longer provide any of the argued environmental benefits and therefore should be voluntarily relocated to nearby cities. He does not argue that this land may then be used for development purposes; rather, he believes that ecosystem conservation will thrive if human impact is removed completely.

Non-market activities of contacted subsistence communities, particularly their agricultural production and their extractive processes, are detrimental to conservation goals. Terborg calls for the a voluntary relocation program of contacted subsistence groups in order to improve their lifestyles through access to commodities, education, and the ability to sell their labor power within a market-based economy.³¹ Rather than allowing for stewardship at the local level, Terborgh advocates for a governmental approach to environmental protection. Governments must be in charge of protecting pristine landscapes, particularly conservation

³⁰ J Terborgh, *Requiem for Nature* (Washington DC: Island Press, 1999).

³¹ Ibid.

reserves, by reducing human impacts on these areas, including displacing those who may traditionally reside on the land.³²

Forcing views into categories of “good” and bad” overlooks the intricacies of the relationship between self and nature that remain remarkably important in the *Ribeirinhos* concept of self. I argue that in the case of the Belo Monte Dam’s EIARIMA, ineffective mitigation policies are based on a disconnect between perception on the part of policy makers and outside observers and self-perception of riverine peoples.

Richard Pace, who claims that the concept of riverine and like communities as either pristine or corrupt stems from misconceptions of Amazonian peasants, promotes this theory. He breaks common misconceptions into five major categories: a space apart, dysfunctional moral model, subversive model, forest guardian model, and the self-interest model.

The Amazon is often thought of as a “space apart” from westernized civilization; therefore, it may be described as an “imaginary space onto which outsiders may project their desires, be they economic, imperialist, racist, scientific, aesthetic, or conservationist”.³³ Those who reside in the Amazon region are also othered, proliferating concepts of

³² J Terborgh, *Requiem for Nature* (Washington DC: Island Press, 1999) 161.

³³ Richard Pace, “Failed Guardianship or Failed Metaphors in the Brazilian Amazon?” *Journal of Anthropological Research* 60: 2 (2012): 239.

primitive needs and desires. The region is still viewed as primarily devoid of humans, but particularly since the 1970s, the Amazon has received an influx particularly of impoverished individuals looking for a new beginning. However, the view of the Amazon as peopled has become more prevalent over time.³⁴

Conversely, the dysfunctional moral model states that Amazonian peasants may be viewed as ignorant due to their inability to understand the environmental chaos surrounding them. They have not been able to adapt properly neither to their environment nor to the Amazon's development, leaving them both morally and economically impoverished.

The subversive model shows them as a conflicted minority fighting for resources while being repressed by stronger outside forces such as international development corporations, and the forest guardian model portrays them as the protectors of the environment, somehow naturally more knowledgeable about ecological processes and their place in nature. Much like the works of Adam Smith, the self-interest model states that their behavior is based in maximizing personal gain by following whatever path leads to security.

What these five schools of thought lack are the nuances of the world, depleting the true worth and perceptions Ribeirinhos see in their

³⁴ Charles Zerner, *People, Plants, and Justice: The Politics of Nature Conservation* (New York: Columbia University Press, 2000).

own way of life. In order to challenge these assumptions, this research illustrates the Ribeirinhos community members' self-perceptions and their lifestyle needs.

Consequences of Displacement

When discussing the differences between subsistence communities and market-based ones, it is only natural to inquire what may happen if an individual or group of individuals is forced to move from one system to another. As the world becomes increasingly globalized, traditionally untouched societies are being influenced by, whether by their own choice or otherwise, aspects of westernized societies, allowing for social scientists to witness the effects displacement and cultural and economic change. Theodore E. Downing makes the argument that involuntary displacement of subsistence-based communities may lead to previously unknown social, cultural, and economic impoverishment. He argues that while the degrees to which displaced community members feel insecurity may vary, all displaced persons face the risks of landlessness, joblessness, homelessness, marginalization, increased morbidity, food insecurity, loss of access to common property, and social disarticulation.³⁵ Daily routines and sense of purpose are closely intertwined with cultural norms and ripping an

³⁵ Theodore E. Downing, *Understanding impoverishment: The consequences of development-induced displacement* (Providence: Berghahn Books, 1996), 33-48.

individual from their community means taking away a compass for why certain routines exist. The loss of this “social geometry” as Downing puts it creates existential questions and loss of identity and social disorder.

This is not to say, however, that the situation is hopeless. Michael Cernea points out that each of the aforementioned reoccurring risks may be mitigated;

“Landlessness risks should be met through land-based planned re-establishment; homelessness through sound shelter programs; joblessness through employment creation; inevitable disarticulation through purposive community reconstruction and host-resettler integrative strategies, while deliberately integrating inasmuch as is feasible those displaced to share in the specific benefits generated by the programme for which they had to relocate.”³⁶

These solutions, while seemingly simple, rely on poignant and deliberate policies aimed at protecting the welfare of displaced persons. I argue that solutions cannot be limited strictly to financial compensation; while money is necessary to avoid poverty in a new life, policies must create a social and cultural context in which displaced persons can maintain their livelihood.

³⁶ Michael Cernea, "Understanding and Preventing Impoverishment from Displacement," *Journal of Refugee Studies* 8 3 (1996): 13-33.

The traditional economic model of the Ribeirinhos community is very different from the market model employed and produced in the surrounding cities and this cultural and economic difference has developed from vastly different lifestyles. The switch from one model to another requires time to acclimate to an entirely new way of life and way of looking at and interacting with society, services, and commodities. Without proper policies in place to allow for a smooth acclimation process, community members may suffer from identity loss and social disarticulation.

III. Experimental Design

Introduction to my Case Study

While Belo Monte's project mitigation plans describe a relatively straightforward exodus and acclimation process of subsistence-based traditional communities to nearby cities, I tested the sufficiency of these mitigation plans by researching differences in self-perception between displaced community members and those who still remain in their original homes. I also analyzed the EIARIMA to determine how the NorteEnergia Consortium views the Ribeirinhos and if their mitigation plans understand the impacts of the Belo Monte Dam on the Ribeirinhos lifestyle.

Through the examination of past research and primary data collection using a variety of qualitative research methods, this paper

constructs a clearer picture of the most likely impacts of a large-scale damming project on the social spheres that surround it. It is concerned with:

1. What are the differences in self-perception between the community population and the displaced urban population?
2. How do the Belo Monte Dam's mitigation policies perceive and interact with riverine communities and involuntarily displaced community individuals?
3. What are some solutions to make mitigation plans more effective?

This paper will first discuss the differences in self-perception between the community and the urban setting. It will then delve into the mitigation projects associated with the Belo Monte Dam in order to supplement the theory that policy makers are developing insufficient policies due to a misunderstanding of the aforementioned self-perceptions. Finally, it will provide some potential solutions to make mitigation policies more effective for displaced communities.

Site Descriptions and Sampling

There are currently 8 Ribeirinhos communities located on the Volta Grande. In order from the furthest upstream to the furthest downstream, the names of these communities are Transassurini, Paratizão, Palhal, Santa Luzia, Cana Verde, São Pedro, Travessão do Bambu, and Auga Preta.



Figure 3. Locations of *Ribeirinhos* Communities on the Volta Grande

The first five of these communities are located upstream of the damming project, while the last three are located downstream.

Transassurini, Paratizão, Palhal, Santa Luzia, Travessão do Bambu, and Auga Preta will be flooded after the dam is closed and the communities Cana Verde and São Pedro will be dried. My sample areas are the 3

communities located nearest to the primary dam construction site. These communities are Santa Luzia, Cana Verde, and São Pedro, the first two of which are located upstream of the construction site and the latter which is located downstream. I selected these sample areas based on the assumption that their proximity to the primary dam construction site makes them most vulnerable to ecosystem alterations and most aware of its potential impacts on their current and future lives. In addition, they represent a sample of communities who reside in a subsistence-based economic model.

The basic layout of each community is a central *sede*, or headquarters, in which one family resides. This family is typically a fishing family and they act as the main communications officials between outsiders and the rest of the community. The *sedes* of the sampled communities are all located directly on the water with easy access by boat. Remaining members live in a semi-circle around the *sede* and typically partake in activities such as fishing and agricultural labor. The central headquarters area acts as a meeting place for the members of the community and also houses the church, sometimes a small market, and an open floor for community gatherings.

Santa Luzia is located about 400 m upstream from the primary construction of the Belo Monte dam and has the coordinates of 3°24'084"S 51°55'432"W. Twenty families are currently living in this

community, though this number may soon be dwindling. While Santa Luzia had about thirty families two years ago, most of the families who lived directly on the water have left their homes already. Santa Luzia is projected to be in the flood zone of the dam and because of this the community will receive financial compensation for their land.

The community of Cana Verde is located just above the damming construction at $3^{\circ}25'428''S$ $51^{\circ}57'438''W$. Most families have already vacated the area due to water quality issues associated with damming construction. While several years ago 40 families resided here, now only three remain.

As São Pedro is located about 700 m downstream of the primary dam sight with the coordinates of $3^{\circ}30'838''S$ $51^{\circ}54'104''W$, the livelihoods of the residents have already been impacted by the social and environmental changes seen in the preliminary construction phase. All that remains of the 50 families that used to inhabit the area just downstream of the Belo Monte construction site are the broken and decaying foundations of their headquarters, church, and homes.

I completed an Institutional Review Board (IRB) proposal prior to beginning on site research (see attachment). I selected interviewees based on two criteria: their self-identification as “Riberinhos” or any synonymous terms, such as Agriculturistas and Pescadores, and their identification as a member of one of the Volta Grande communities near

the Belo Monte dam construction site. I sampled 9 men and women from within this cohort who were above the age of 18 and involved in community politics and affairs in some capacity. These individuals included heads of households, elders that are held in esteem by community members, and regular attendants at community meetings. In addition, I interviewed 2 involuntarily displaced individuals who were previously members of the Cana Verde community.

Though it would have been interesting to incorporate a gender dynamic, I will not be exploring how displacement affects men and women differently. There is a lack of gender specified data, but there do seem to be several trends associated with gender roles. Though fishing may be practiced by both men and women, it tends to be a male dominated activity within the community and evolve into being evenly performed by both genders in the displaced urban environment.

I employed several qualitative research methods in order to determine difference in perceptions. These methods include interviews, participant observation, and document analysis. I interviewed 11 participants, 3 of whom are females and the rest males.

Interviews

Interviews were conducted with community members who currently live on the Volta Grande, families who have already been displaced from their homes on the Xingu and who have created new lives,

and a member of Xingu Vivo who is working with local and indigenous communities to halt the damming project. I chose to employ semi-structured interviews, using a combination of structured and unstructured interview questions. Semi-structured interviews are of particular importance in social research as they keep the interviewer separate from the natural setting while still allowing for an in-depth account of social phenomena.³⁷ The combination of structures and unstructured interview questions allowed for me to both situate myself within the community and get a grasp on everyday life while still being able to draw connections between complex concepts. I completed an Internal Review Board (IRB) and followed their procedures for working with human subjects in order to avoid bring harm to any interviewee. The interviews with all parties were recorded either using a device or through note taking based on the wishes of the participant and based upon a similar structure.

Due to the semi-structured nature of the interviews, some questions were improvised based on the answers of the interviewees, and some questions were altered in order to fit the scenario or those interviewed (see figure 2). All interviews have been coded using the computer

³⁷ Norman Blaikie, *Designing Social Research*, (Cambridge: Polity Press, 2009), 207.

program NVivo. For the purpose of this paper, all interviews have been translated to English and will be quoted as such.

Participant Observation

Long-term observation of a social group or community is necessary for recognizing particular customs and social norms. It helps to bring context to interviews and allows for a more informal account of daily life that is not biased by the rhetoric of the interviewee. According to H. Bernard (2006), participant observation is particularly integral to social research in that I as the researcher may both immerse myself within the culture and remove myself from it daily in order to analyze it critically.³⁸ While participant observation may range from total participation to strict observation³⁹, I chose to utilize a combination of these extremes to develop a comprehensive understanding of daily life. I was particularly interested in importance placed upon various activities, interactions between community members, fishing habits and methods, cultural norms and gestures, and signs of environmental degradation. Due to time constraints, I spent two weeks as a participant observer of the three main Ribeirinhos communities. I lived with a family that is part of the Santa Luzia community and they aided me in my travels to

³⁸ H. Russell Bernard, *Research Methods in Anthropology*, (Lanham: Altamira Press, 2006), 342-386.

³⁹ Norman Blaikie, *Designing Social Research*, (Cambridge: Polity Press, 2009), 206-207.

communities farther along the river. I spent the first day observing São Pedro, four days with the remaining families of the Cana Verde community, and the final nine days interacting with and observing families from Santa Luzia. I also spent two weeks living in Altamira, with day trips to Brasil Nova and Medicilândia to better understand the implications of community displacement in the diaspora.

Document Analysis

My document reviews and analysis supplemented in-depth case studies and participant observation by providing an overview of external perspectives on community members and their needs post dam construction. The mitigation projects associated with the EIA are divided into 5 topics: Land Acquisitions and Improvements in Rural Areas; Restoration Programs for Rural Productive Activities; Restoration of Rural Infrastructure; Land Acquisitions and Improvements of Urban Areas; and Social Monitoring Programs. I used both hand-coding methods and NVivo to monitor where outside perceptions overlapped with self-perceptions of community members and where they differ.

This research is concerned with the present, though some of the conclusions are predictive and concerned with future outcomes.

Ethics

Ethical issues are a serious concern in social research, especially when a study is focused on subsistence or indigenous communities. My

research is concerned with several sensitive topics, including the dissemination of information about community members that may not entirely understand the purpose of my research. Because of the nature of these communities, members are generally not educated in ways that are typical in the westernized world. Therefore, they may not have access to or knowledge of scientific journals and articles that are being written about them. In addition, I suppressed my own biases while conducting research and maintained my role as a learner and observer rather than an activist. While Alan Bryman (2001) uses extreme examples to drive in the importance of ethics in the research world⁴⁰, I believe that the true importance of ethics lies in the intricacies, understanding the line between cultural immersion for research purposes and actually influencing the way in which a culture functions or views the world.

IV. Data Analysis and Results

Self-Perception of Intact Riverine Communities

Self-perception of individuals within the Volta Grande's riverine communities links the individual to the community as a whole. Individuals tend to create their concept of "self" as integrated within a shared culture, especially shared cultural activities and cultural understandings of events and ideas. This indicates a construction of self

⁴⁰ Alan Bryman, *Social Research Methods*, (Oxford: Oxford University Press, 2001), 474-486.

that develops along side others.⁴¹ According to Jerome Bruner (1993), culture is “a way of knowing, of construing the world and others.”⁴² In humans raised within a culture, it is impossible to separate an individual from their environment and cultural norms. Bear in mind that subsistence-based riverine communities such as those of the Volta Grande have less interaction with outside cultures and communities, making their cultural borders much more clearly defined. In this sense, culture as a whole “represents the legacy of preceding generations as expressed in the dispositions, the consciousness, and the psychology of each living individual” and cultural communities “coconstruct a shared reality in different domains of life.”⁴³ Factors that determine perception of self within a community are deeply engrained in the shared cultural views and values of the community as a whole, and disseverment from this community will impact self-perception. While there may be a difference between the self on an individual level and the collective self, I argue that in a community setting in which the ability to survive is communal rather than individual, the perception of self cannot easily be severed from the perception of the self within the community.

⁴¹ Patricia Greenfield and Keidi Keller "Cultural Psychology." *Encyclopedia of Applied Psychology* 1 (2004).

⁴² Jerome Bruner, "Do we “acquire” culture or vice versa?" *Behavioral and Brain Sciences* 16.03 (1993): 515-516.

⁴³ Patricia Greenfield and Keidi Keller, "Cultural Psychology," *Encyclopedia of Applied Psychology* 1 (2004).

Based on interviews and participant observation, the overarching factors that tend to dictate self-perception within the Ribeirinhos communities of the Volta Grande are the community as the major family unit, control over diet and non-market mechanisms, economic sovereignty and the ability to subsist, connection to the environment, and the way in which an individual derives knowledge. I will first demonstrate how coconstruction is evident in the interviews conducted with residents of the riverine and then go through each of the aforementioned factors and demonstrate their importance within the communities.

Community as a Family Unit

There are two distinct ways in which humans categorize “self”: the personal identity and the social identity. While personal identity emphasizes differences between the individual and the group, social identity focuses on the shared collective self. According to self-categorization theory, if an individual perceives themselves in terms of “us” or “we”, “the self is defined in terms of others who exist outside of the individual person doing the experiencing and therefore cannot be reduced to personal identity.”⁴⁴

⁴⁴ JC Turner and PJ Oakes, “Self and Collective: Cognition and Social Context.” *Personality and Social Psychology Bulletin* 20 (1994): 454–463.

The participants describe a family unit as extending beyond the traditional concepts of a nuclear family. Within the American system, a nuclear family may be described as a mother, father, and children who tend to live together and move together. The extended family tends to consist of three interlocking nuclear families, all of which are considered as separate or distinct.⁴⁵ Familial exchange and support is generally related to help and services, especially in relation to mutual assistance and kin ties. Families are not completely intertwined, usually due to geographic location and isolationism.

The community setting lends to a very different view of family as extending beyond genetic links. When asked how participants relate to their communities, they describe the community in full as their family. While they are able to differentiate between the number of families within the community and who is a part of their own nuclear family, most participants explained that these numbers are only calculated out of necessity. The important unit is their community as a whole, but in order to receive compensation for displacement, they must have data on the amount of families and individuals in the community.

The community depends on a system of reciprocity that functions under a set of shared values and social norms. Several narratives describe

⁴⁵ MB Sussman, "The Isolated Nuclear Family: Fact or Fiction?" *Social Problems* 6 (1959): 333–340.

the relationship between parents and children as not distinct within families. Rather, elders may be considered as parents for all of the children, and the children are a collective responsibility for the elders. According to Interviewee A, prior to displacement, “children played together, you forgot which children were yours.” Communities that have already seen a high level of displacement describe the exodus of community members as losing their own family and support system.

Control Over Diet and Non-Market Activities

Subsistence and dietary control are vital in terms of self-perception for riverine community members. Subsistence techniques are highly integrated in a shared value system; control over diet dictates purpose. The major dietary components for survival include protein and carbohydrates, so the typical Ribeirinhos diet includes fish and farinha. Community members fish daily and cultivate manioca on the adjacent land, which allows the Ribeirinhos to have control over their food security rather than depending on access to capital for consumption. Their small-scale economic model allows for them to have control over their economy rather than having the market control their way of life and production. Unless there is some sort of natural disaster that impedes access to fish or manioca, Ribeirinhos always have access to their basic diet staples.

Fish are particularly integral to the riverine communities as they have economic and dietary value. Fishing is a major component to maintaining the integrity of their cultural values, and it tends to be the activity that is the most important to the survival of these communities. As most of the residents of the communities spend their mornings fishing on the water, decreasing access to healthy fish will completely shift the low-impact lifestyles of these Ribeirinhos and shift their current system from one of reciprocity and exchange to relying more upon capital generation to pay for oil and boat repairs to meet basic dietary needs.

During interview sessions, all but one Ribeirinhos community members stated that they do not consider themselves to be Pescadores (fishermen). Considering oneself a fisherman indicates that the act of fishing is one that relates to capital gain. Instead, the Ribeirinhos view fishing as an integral part of their lifestyle rather than a way to make a living. They generally spend 6 hours a day working with fish and the rest of their day consists of other concerns such as agricultural labor. When asked about the importance of fishing in their every day lives, all those interviewed used the terms “survival” and “food” to describe why they need to fish. While some also went on to elaborate that fishing can be done for sport, they mainly use fishing as a means for subsistence.

As those who fish in Ribeirinhos communities usually do not do so commercially, their typical fishing habits are much less intrusive on the

aquatic ecosystem than commercial fishing methods. Most community members catch between 5-35 kilos per week depending on the size of the family and how many community members rely on them for sustenance. According to Interviewee C, due to their relatively self-sustaining lifestyle, they do not need to rely on intrusive fishing methods because they are able to live off less money per day than the typical residents of the surrounding cities. Therefore, they predict that displacement will lead to more resource consumption.

Connection to the Environment

When asked how subsistence practices influence views of the environment, most participants responded that their health and the health of the environment are tied together. They see themselves as part of the ecosphere rather than viewing the ecosphere as a separate entity.

All those interviewed stated that fish population has significantly changed in the past 10 years. The main phrases used to describe the current fish make up of the Volta Grande were “less”, “smaller”, and “difficult to fish”. All interviewed also stated that they were planning on leaving their homes for one of three cities once they are no longer able to drink the water and fish: Altamira, Brasil Nova, or Medicilândia. This is simply because Altamira is the nearest city and it resides on the water. Brasil Nova and Medicilândia are the next two cities closest to the dam construction site, but they are farther inland.

Table 2. Common Fish Catch for Ribeirinhos

| Common Fish Name | Accepted Scientific Name |
|------------------|------------------------------------|
| Aratu-Caneta | <i>Laemolyta próxima</i> |
| Branquinha | <i>Curimata cyprinoides</i> |
| Jaraqui | <i>Semaprochilodus brama</i> |
| Pacu | <i>Myleus pacu</i> |
| Piaus | <i>Leporinus friderici</i> |
| Surubim | <i>Pseudoplatystoma corruscans</i> |
| Tucunaré | <i>Cichla piquiti</i> |

The list of fish that are usually caught and consumed by the Ribeirinhos communities in the Volta Grande include aratu-caneta, branquinha, jaraqui, pacu, piaus, piranhas, surubim, and tucunaré. As these fish vary in size, various fishing instruments and techniques are used in order to catch them.

Table 3. Common Equipment Used for Ribeirinhos Fishing Practices

| Fishing Equipment | Definition |
|-------------------|-----------------------------------------|
| Anzol | Hook |
| Espinhel | A long fishing line with multiple hooks |
| Line | Fishing line |
| Malhadeira | Large drag net used to sweep up fish |
| Rede | Large drag net used to sweep up fish |
| Ruçá | Small handheld net used to catch fish |
| Tarrafu | Large drag net used to sweep up fish |
| Tela | Small handheld net used to catch fish |

The fishing instruments most commonly used by Ribeirinhos communities in the Volta Grande include an anzol, an espinhel, line, a rede, a puçá, a tarrafu, and a tela. The most common technique used by members of the Ribeirinhos communities is creating a simple device using fishing line and an anzol (hook). One simply adds bait (usually cut up pieces of fish) to the end of the anzol that is attached to the line and throws the line about 20 feet from the fishing boat. This technique is effective in catching smaller predatory fish such as pacus as the boat

generally must be stopped near the side of the water. Regardless of other techniques fishing families may use in order to catch larger quantities of fish, all interviewees stated that this method was one that they used often.

Knowledgeable hands can create a 20-50 feet long rede in 2 hours. This device is used as a net to scoop up large quantities of fish at once, and is generally most effective for the fishermen in the community that need to sell some of their catch in nearby cities. Similarly, espinhels are used as simple fishing line with hooks attached to try to catch multiple fish at once. Most community members equip their boats with a tarrafu and a puçá in order to catch nearby fish and aid them in bringing the fish into the boat after they have been caught. Fish are generally killed using the back of an oar and are kept in coolers with ice until they are ready to be eaten or used as bait. These fishing techniques are relatively low cost pending access to local healthy water sources, so the only costs related are that of oil and the initial costs of a boat and fishing equipment.

Economic Sovereignty

Due to the lack of integration into nearby market-based economies, the riverine communities of the Volta Grande enjoy increased economic sovereignty. The major dietary components are secured through subsistence means, but riverine communities do have a small-scale economy of their own through which they procure goods such as

coffee and rice. Though not all community members interact with outside markets, several do sell fish in Altamira. They bring about 50-100 kilos of fish with them every time they need to sell. This generates enough income to contribute to a small-scale local economy, as they are then able to buy goods from the local market rather than buying goods in Altamira or other surrounding towns. There is only one shop that provides the three surveyed communities with goods imported from Altamira, which typically are coffee, bagged rice, and alcoholic beverages.

By cutting off a necessity for outside markets, the riverine communities ensure their economic security by living within their means. They do not self identify as impoverished despite their relatively low addition to Brazil's GDP. Rather, they value their non-market activities over their economic activities and function in a system of haves rather than needs.

How Knowledge is Derived

Knowledge development in a community setting tends to be far different from the westernized ideal. Unlike the western educational systems, there is no formalized education system that takes place within a school settings. Therefore, knowledge is derived in alternative fashions. Knowledge tends to be much more specialized and developed through practical experience. Several participants referred to the passing down of knowledge from elder to child through multiple generations, with this

knowledge transfer being referred to with words such as “relic”. This concept of knowledge as a relic seems particularly salient, as describes knowledge as a venerated object. Fishing is almost exclusively described as the most important community activity and knowledge of this activity is passed down through generations.

Fishing techniques, ranging from methodology to knowledge of species attributes, are cultivated over many generations and tend to be family or community specific. Teachings tend to hold moral importance for the community; the derivation of knowledge is generally linked to survival, which in turn ties community members closely to their environment. Rather than textbook or exact definitions of specific terms, knowledge is often set within stories and narratives. These stories may or may not be scientifically accurate, but the importance the narrative lies within the conclusion rather than the specifics. Knowledge within individuals is no longer globalized; it is a direct linkage to ancestors and fellow community members.

I learned traditional fishing methods from Interviewee E “in the same way I taught my son to fish.” I watched patiently as he carefully set his hook with bait and tossed it into the river. “I am part of the river,” he explained, “I know how he flows. I know where there will be fish and what time of the day they will be there. I understand this place and he is part of me.” He describes his relationship with the river as that of one

between a mother and her child. The river provides him with sustenance and he in turn cherishes it unconditionally. He is able to coexist with the river rather than attempting to control it and he reaps the benefits from this reverence. He personifies the river and explains that it, too, is full of life. This personification is a double edge sword for traditional knowledge.

In western society, personification of natural resources is often construed as a metaphor; while it may hold some value for understanding the world, western cultures concede that it is not scientifically accurate. Within riverine discourse, however, knowledge is not only venerated if it is empirical. Rather, metaphors and narratives fuse with the literal to add context and increase relatedness with the surrounding environment.

Atran and Medin (2008) explain that in western society,

“natural resources are assumed not to have motives, desires, beliefs, or strategies for cooperation or deception that would be sensitive, and systematically responsive to corresponding aspects of human intention [...] People's conceptualization of resources may make a difference in how they play the game. For example, people's agroforestry behavior may differ as a function of whether

they consider the forest to be an inert object or an actor that intentionally responds to their actions.”⁴⁶

Despite the benefits that accompany veneration and personification of natural resources, westerners often think of traditional knowledge as unscientific and therefore inaccurate or of diminished importance.

Impact of Displacement on Self-Perception

In order to best demonstrate the impacts of displacement on self-perception, I will express how the following factors shift within discourse: community as the major family unit, control over diet, control over non-market mechanisms, economic sovereignty and the ability to subsist, connection to the environment, and the way in which an individual derives knowledge.

Community as a Family Unit

The communities of Cana Verde and São Pedro have already seen a large number of displaced families, and it can be assumed that very soon Santa Luzia will follow in their footsteps. Though they are located farther from the initial dam construction, Transassurini, Paratizão, and Palhal are located within the reservoir flood zone and will also be expected to relocate. Based on the experiences from past damming projects and from the current rural to urban migration seen in this region, these traditional

⁴⁶ Scott Atran and Douglas Medin, *The Native Mind and the Cultural Construction of Nature* (Massachusetts Institute of Technology, 2008).

Ribeirinhos communities will no longer be able to practice their traditional fishing methods or partake in their traditional lifestyle due to declining river health, a shift to fishing for economic purposes, and their shift from dietary and non-market control to impoverishment.

As previously mentioned, communities view family as extending beyond their nuclear family; children are not associated with specific parents, but are viewed as a communal charge. Community dissection splits a singular community into multiple nuclear families and these individual families relocate separately. The support system upon which communities rely is broken.

The interviews conducted with displaced community members show a marked difference in discourse in terms of views of “I” and “we”. There is virtually no concept of “we” beyond the nuclear family. The concept of community is lost as families reside individually. Because compensation is often inadequate to build a new life that is not already rooted in poverty, Interviewee E states that it is difficult to reestablish a new community in their new environment. She notes that established families hold contempt for displaced community members, who inevitably increase competition for jobs, space, and resources. This lack of community means that coconstruction of self is no longer relevant, which particularly affects adults who have not had the ability to develop self as separate from community. Community relationships have been shown to

be important for many factors, including psychological and physical health, personal empowerment, and the ability to create and maintain substantial relationships.⁴⁷ Displaced community members stated that they have much higher levels of stress in their new environment, along with a feeling of not being in control and uncertainty of the future due to community loss.

Control Over Diet and Non-Market Activities

It is important to take into account the new costs associated with primary activities (namely fishing and farming) that the Ribeirinhos must cope with after they create their new lives in the surrounding cities. Due to new economic concerns such as rent, riverine community members must use the skills they have developed within their community and turn these skills into occupations. Fishing and farming, therefore, remain the major activities, but rather than being used for subsistence, they become ways in which displaced community members gain capital. Dietary control, therefore, shifts from the individual to the market.

Connection to the Environment

Dam construction has shown to provide substantial barriers for riverine members who wish to utilize their skills for monetary gain.

⁴⁷ Pamela Attree, Beverley French, Beth Milton, Susan Povall, Margaret Whitehead Ffph, Jennie Popay, and B A Hons, "Review The Experience of Community Engagement for Individuals: a Rapid Review of Evidence" *Health Soc Care Community* 19 (May 2011): 250–260.

When interviewed about the changes already occurring with the preliminary construction of the dam, one recently displaced fisherman (Interviewee F) stated,

“there has been a decrease in the amount of fish; people used to be able to fish 120-200 kilos of fish a week but today, since there is a lower quantity, it is not enough to make money. The money that we make is not enough to buy the oil that we need to go farther to catch more fish because of the bad water quality here. When Belo Monte is finished, it is just going to get worse. There will be more problems with the fish dying, I will have to go farther to fish more and my boat is small and cannot cope with this travel”.

Not only are the Ribeirinhos not be able to maintain their traditional fishing practices, they also have trouble generating enough income to maintain a comfortable lifestyle in their new residence.

Community members lose control over various additional non-market activities such as education and household work in order to derive enough money to survive within a new economic system.

Interviewees cite that work typically performed by parents such as teaching their children and maintaining the household become secondary to economic gain, so they must export this work. Adolescents typically take control over cleaning and cooking and act as guardians for younger

siblings. Education no longer remains within the household, but shifts to local school establishments.

Economic Sovereignty

Displaced community members enter an entirely new economic model of living without time to adapt to this new way of life. They no longer live in a small community setting in which goods and services are reciprocated rather than bought and have to adapt to a new psychological view of the self as an individual rather than a part of the community as a whole. While monetary compensation is beneficial first step in helping community members adapt to their new life, it is not enough to ensure their psychological or long-term well-being.

It is important to bear in mind that the Belo Monte Damming Project is attracting thousands of construction workers to Altamira as it is promising about 19,000 temporary jobs at the peak of the construction and 2,000 permanent ones.⁴⁸ This means that Altamira is already dealing with social problems associated with the rapid population increase, including an increase in violence, alcohol and drug use, car accidents, and rape.⁴⁹ The mass movement of Ribeirinhos community members to a new

⁴⁸ "Tug of War Over Belo Monte Dam," *Latin Business Chronicle* (28 February 2011).

⁴⁹ Mario Osavo, "Brazil: Belo Monte Dam Faces Endless Hurdles and Controversies," *Global Issues.org*, 09 April 2011, <http://www.globalissues.org/news/2011/04/09/9218> (accessed 23 May 2012).

unknown life without proper compensation or psychological training for the culture shock will only add to the strain already felt in Altamira and the surrounding cities that community members are planning on moving to.

It is important to bear in mind that those interviewed within the community had no true concept of how much they will be compensated or for their loss of land. Interviewee H from Santa Luzia stated, “It depends on how many people there are. If there are only a little bit of people, we will only receive a little money, but if there are a lot of people, we will receive a lot of money. I cannot receive a lot because there are not a lot of people still living here. Because of this, I will receive almost nothing”. Because of the lack of communication and information transfer present from Norte Energia and the local government, many of those who had lived in Ribeirinhos communities left without receiving any sort of compensation. They are not listed as individuals who must be monitored and do not receive social aid. None of those interviewed who still live in Ribeirinhos communities have received contact from either a government official or a member of Norte Energia and none know whom they can contact in the government if they have a problem receiving the compensation they are owed.

The concern over lack of compensation proves to be overwhelmingly accurate for displaced community members. Interviewee

D states “no one has talked to me from the government (post-displacement). Some people from Norte Energia have come every once in a while to look for our citizenship documents but have not talked to us. We are no longer considered Pescadores, we are considered colonizers”. She believes that this designation as a colonizer makes her feel as though she is an outsider in her own home.

According to Interviewee F, cities near the dam have grown enormously in the past 10 years. Observation of the land shows that in Medicilândia and Brasil Nova, it is possible to see many new neighborhoods along the hillside that did not exist several years ago but now are being developed to support the increasing population. Medicilândia and Brasil Nova are cities in which most of the inhabitants are colonos. Those who live there today came in order to get land through the Plan for National Integration (PIN) and now have large farms that typically grow cacao, but due to recently developed deforestation laws, the rest of the land in the area needs to be conserved rather than cultivated.

If they do move to a city near the Xingu River, such as Altamira, they may be able to continue fishing in the newly created reservoir zone, but due to the increase in competition to sell fish on the market along with the control of market mechanisms over food distribution, they will no longer be able to fish using small scale methods traditionally used to

sustain their smaller families and communities. In addition, they will need to find and buy new equipment to keep up with the market mechanisms that determine the amount of fish they need to catch in order to survive in a market-based economic system. This again leads to more energy and resource use per person.

Altamira has also seen a large influx of people looking for jobs with the dam and it has had to grow so quickly that it has not had time to develop the infrastructure to support this growth. Once the damming project is completed, many more Ribeirinhos and indigenous community members will have to migrate to the already stressed cities looking for new homes.

How Knowledge is Derived

With the parents shift in focus from subsistence to labor productivity, there is an inevitable change in how knowledge is derived. Parents no longer have a full hand in cultural preservation through passing on knowledge. Rather, children are sent to city schools. While this method of deriving knowledge may be no less legitimate, it does cause concern in regards to preserving traditional knowledge. Traditional knowledge provides insight into sustainable ecosystem practices, agricultural practices, educational practices, and much more, but it is typically viewed as being secondary to a more formalized education system. It is derived at the local level, based in cultural importance and

necessity, so the loss of community leads to a loss of a vital knowledge source passed down through generations.

Comparison of Belo Monte Dam Views

Belo Monte's Environmental Impact Report attachment to the Environmental Impact Analysis (EIARIMA) is a comprehensive 4-volume report that details the potential ecological, social, and economic impacts of the proposed hydroelectric dam. The EIARIMA includes 18 projects that aim at mitigating impacts for displaced populations and urban resettlement that range in subject from small craft gateways to monitoring programs. The EIARIMA sifts these projects into 4 overarching categories: Land Acquisition and Improvements in Rural Areas, Restoration of Rural Productive Activities, Infrastructure Restoration, and Social Monitoring. The EIARIMA projects the main social impacts on the region to be: the attraction of large number of workers to the region, the installation and operation of construction sites and housing for workers, the change in the economic dynamics of the municipalities, the process of compulsory displacement and resettlement of families in rural and urban; changes in the natural environment. Their main goals to deal with these impacts include monitoring and tracking changes, increasing transparency, facilitating links between the displaced and local governmental programs, and providing compensation for displacement.

In order to normalize the data, I will describe if and how each of the previously explored variables for self-perception are addressed in Belo Monte's EIARIMA and whether or not the proposed mitigation plans align with riverine self-perception. I will examine the following projects that link directly to social change and distress: System Implementation for Small Crafts, Work for Locals and Migrants, Land Acquisition and Compensation, Rural Resettlement Projects, Restoration of Productive Activities, Compensation for Commercial Activities, Monitoring and Tracking of Social Communities, Adequacy of Social Services and Equipment, Social Care for Affected Populations, Urban Restructuring, Orientation and Monitoring of Migrant Populations, Program for Social Interaction and Communication, and Monitoring for Living Populations of the Volta Grande.

Table 4. EIARIMA Projects Related to Involuntarily Displaced Persons

| Project Title | Purpose |
|------------------------------------------------|---------------------------------------------------------------------------|
| System Implementation Small Craft | Discussing how small crafts may move through the dam site |
| Offer Work: Local and Migrant | Aiding locals and migrants in finding work |
| Land Acquisition and Improvements: Rural Areas | Identify affected land and property values; Identify impacted individuals |
| Land Acquisition and Improvements: Rural Areas | Negotiate land acquisition; Expedite land acquisition process |
| Rural Resettlement Project | Ensure the quality of resettled |

| | |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | land and housing for affected individuals |
| Restoration of Productive Activities | Providing resources focused on recovery of productive activities and/or the induction of new activities identified as viable for affected populations; offering alternatives for the recovery and reintegration of producers in regional economic dynamics |
| Restoration of Productive Activities | Encouraging the adoption of alternative technologies that contribute to increased crop productivity; identifying the emergence of demands arising from the implementation of project; contributing to local economic and social development, investing in productive alternatives to adopt the principles of economic sustainability, social and environmental development for the area of influence of the Belo Monte |
| Restoration of Productive Activities | Facilitating partnerships to participate in activities related to the program, such as public and private companies for technical, social and environmental financial institutions, etc.; facilitating access to the affected population and environmental and non-governmental socioeconomic programs |
| Recompensation of Commercial Rural Activities | Valuation of commercial activities that will be lost |
| Social Care Project of Affect Populations | Monitoring affected populations |
| Project Monitoring and Tracking of Social Communities | Identification of displaced individuals; Monitor |

| | |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| | developments in economic and social conditions; Monitor social and psychological needs |
| Adequacy of Social Services and Equipment | Monitor effectiveness of social services programs |
| Resettlement Project | Set up boundaries of affected area; ensure housing for affected individuals |
| Urban Restructuring Project | Generate space and housing in Urban areas |
| Orientation and Monitoring of Migrant Populations | Orient migrants to new homes; track integration process |
| Program of Social Interaction and Communication | Develop community for affected individuals in displaced setting |
| Monitoring Project of Living Populations of the Volta Grande | Monitor number of affected individuals and communities; track migration of affected individuals |

Community as a Family Unit

While the EIARIMA does concede that the Belo Monte project will cause social discomfort, conflict, and insecurity for displaced community members, their project to monitor and track displaced and host communities does not have practical solutions for when problems do arise. It focuses only on short-term discomfort rather than long-term impacts and relies on the state implementation of public health and welfare programs.

The EIARIMA's monitoring program lasts from the initiation of the dam until 2 years after operation with the objective of identifying affected persons and examining families and individuals that have been deemed at

risk, including persons with disabilities, elders, children, and adolescents. NorteEnergia representatives will monitor feelings of loss (including spatial, personal relationships, and work), social harmony, conflicts between local people and migrants, and population change, but as the program is directed towards monitoring and tracking, no direct action will be provided for assistance. All social assistance will be delegated to local governments. This project also only covers those displaced community members who are considered to be directly affected by dam construction and who have received compensation and are recorded as having been displaced.⁵⁰

The EIARIMA makes it clear that in Brazil, social assistance tends to be implemented at the state level rather than by private companies. While it does provide a Social Care project that acts as a liaison between displaced persons and public aid programs, this program is voluntary. The main purpose of the Social Care program is to refer affected persons to health care facilities for psychological and physical care. This program does take into account impacts from lifestyle shift, especially those related to loss of fishing or river access. Its steps include identifying the target audience, making partnerships with public agencies responsible for social care, planning joint activities for migrants, and monitoring

⁵⁰ "Programa e Projetos." *Estudo de Impacto Ambiental – Relatório de Impacto Ambiental 1.1* (2008): 1-592.

changes. While this program emphasizes recreating community through monthly meetings, community members who are displaced prior to compensation are not monitored and therefore do not benefit from any of the detailed mitigation efforts. Adverse environmental conditions, particularly water quality degradation associated with preliminary construction and erosion and a misunderstanding or lack of knowledge regarding compensation potential force displacement prior to monetary compensation, which leaves many Ribeirinhos out of monitoring programs that may help to recreate the community setting.

Control Over Diet and Non-Market Activities

The various Restoration of Rural Productive Activities programs attempt to mitigate socioeconomic costs associated with land loss. NorteEnergia representative carrying out these projects provide a connection between displaced persons and state implemented social programs. The objectives of these programs include: providing resources focused on recovery of productive activities and/or the induction of new activities identified as viable for affected populations; offering alternatives for the recovery and reintegration of producers in regional economic dynamics; encouraging the adoption of alternative technologies that contribute to increased crop productivity; identifying the emergence of demands arising from the implementation of project; contributing to local economic and social development, investing in productive

alternatives to adopt the principles of economic sustainability, social and environmental development for the area of influence of the Belo Monte; facilitating partnerships to participate in activities related to the program, such as public and private companies for technical, social and environmental financial institutions, etc.; facilitating access to the affected population and environmental and non-governmental socioeconomic programs.

However, while these may aid families in terms of economic gain, they do not extend to most families in riverine communities because they lack proper land documentation. Their land is not viewed as economically productive since they do not hire workers to develop the land and therefore they will not receive compensation as such. Their non-market activities are not quantified within the EIARIMA and, though they may be alluded to, there are no programs aimed at mitigating the effects of dietary and non-market activity loss.

Connection to the Environment

While the latest EIARIMA and subsequent projects pay quite a bit of attention to the impacts of the dam on fish and aquatic mammal population, the mitigation methods will probably not be enough to maintain the aquatic environment, species diversity, or fish population levels, consequently altering how riverine community members are able

to relate to their environment. The initial closing of the dam will dramatically reduce the population of fish seen in the Volta Grande.

The new aquatic environment that will exist post dam construction will consist of areas of reduced flow and low oxygen, rivers with low oxygen and high turbidity, and possible rapids. The water will hold a great deal more sediment, which could cause problems for most species that live in this region, especially fish species that filter feed. This new environment will be difficult for plants and algae to grow, so non-carnivorous fish populations will decline. Migratory fish that travel from upstream to downstream and vice versa will have difficulty completing their life cycle regardless of fish elevators in place due to the change in their natural environment where they spawn and mature. Diminishing populations of such fish will have continual negative implications for the rest of the food chain and will result in mass species loss. Increase in fish population in the reservoir zone corresponds with depletion of fish diversity, which may make long-term sustainability impossible.

While eventually the reservoir area will probably support a high population of fish, this population will have lower species diversity. In addition, the types of fish that generally inhabit a lake ecosystem with lower oxygen levels tend to be smaller fish that are usually not endemic species. This initial impact of the dam on the aquatic habitat is supported by previous research done on the Balbina and Tucuruí dams. He comes to

the conclusion that the Tucuruí Dam created an anoxic environment that many fish species could not live in due to decomposing deforested areas compounded by the slowed water flow. He also came to this same conclusion with his analysis of the Balbina Dam in which he could determine an anoxic environment associated with oxidation of hydrogen sulfide. According to Fearnside, "Fish mortality occurred downstream of Balbina. [...] Fish mortality in Tucuruí occurred when water was first allowed to pass through the turbines in a test prior to the dedication ceremony. The blast of anoxic water killed many fish in the area immediately below the dam".

The Belo Monte has included within its mitigation plans a fish elevator that could help reduce the impacts of the dam on migratory fish patterns. As the aquatic environment becomes anoxic, fish population will decrease regardless. Fish have stress hormones that can inhibit growth, metabolism, and ability to spawn. Fish elevators can elevate the level of stress hormones, which will, in turn, inhibit their ability to spawn effectively. The social impact of species loss will be particularly felt by the Ribeirinhos, whose knowledge and way of life is directly related to the types of fish that inhabit the Xingu. Biologists are concerned with loss of endemic species, of which little is known in regards to their feeding habits, reproductive cycles, and life cycles. While there may not be a great deal of formal research, much of the knowledge about these species is

understood in informal terms by those who live symbiotically with the river.

In the new reservoir areas, the fish species that will be the most adversely affected are pacus, aracus, jaraqui, surubim, peixes-cachorro and piabas. The piau has been known to gradually adapt to a reservoir setting. However, fish species that will thrive in the new environment include fish that are able to live in the slower current and anoxic environment, such as the tucunarés, oranas, pescadas, maparás and piranhas.

The building and closing of the Belo Monte Dam will severely alter the current aquatic habitat of the Xingu. Downstream water quality issues will create inhospitable environments for most fish species. As the river's characteristics change and access to fishing becomes more pronounced,

“The Xingu River basin will be surrounded by access roads, speciality roads, and better traffic conditions that will facilitate the access of people and freight. The development of economic activities in the region, therefore, will be a leveraged, shaping factor attracting migration and strengthening the current conditions of polarization of nuclei cities such as Altamira and São Félix do Xingu Sinop. As a result, there will be a boost to the

advancing deforestation fronts today and, consequently, the expansion of deforested areas listed for the current scenario".⁵¹

Economic Sovereignty

Traditional fishing methods related to sustainable fishing practices will inevitably have to shift as the displaced Ribeirinhos begin to utilize the reservoir for economic purposes. Species diversity is expected to decrease, so Ribeirinhos will have to fish pacu and aracus for food and catfish or plecos as ornamental fish. By relying on these species, the riverine community members will have to reevaluate the gear they use to catch fish and will have to be concerned with how much they must fish for it to be economically viable rather than just enough for subsistence. While the EIARIMA does address the potential for displaced community members to continue fishing activities for market value, it does not address the potential social costs associated with fishing competition, including disagreements, riots, and environmental damage from overfishing.

The EIARIMA determines land compensation by determining value of the land and any improvements made to the land by allotting specific values to productive land per hectare. However, the majority of riverine community members do not have proper documentation for land rights

⁵¹ S. B. Magalhães and F. Hernandez. "Experts Panel Assesses Belo Monte Dam Viability." (2009).

and therefore are not eligible to receive full compensation. They may be eligible to receive compensation for their land and for lost economic activities, but as previously demonstrated, many riverine community members do not view their primary activities (such as fishing and agriculture) in terms of their economic value. It is clear that an imposing obstacle is education and communication, so the Land Acquisition and Compensation program adopts several strategies to educate displaced populations, including: booklets, organized discussion groups, and individual visits. This program works in tandem with the Rural Resettlement Project for displaced persons who opt for assistance. However, only 824 households hold sufficient documentation for their land and have enough hired farm hands to be eligible for rural resettlement. These households must use their land for economic purposes and must have hired workers that depend upon the land's income. Therefore, the only option for those who are considered non-owners of land who have not exploited their property is urban resettlement.

How Knowledge is Derived

The EIARIMA has no discussion of preserving and maintaining traditional knowledge sources, nor does it discuss the education of children. This may be due to two issues: the unquantifiable nature of

valuing traditional knowledge and the lack of understanding on the part of policy makers in regards to Ribeirinhos values.

What Happens in a New Cultural Context?

Those who are in charge of developing mitigation plans come from a culture that shares different values and views than those of the Ribeirinhos. Typically, they are outsiders native to southern Brazilian cities like Brasilia and Sao Paulo. As such, the majority of data collection and policy development in relation to these communities is based on false or misperceptions of individuals as well as imprecise data collection techniques.

While Norte Energia attempts to mitigate these issues through several its social mitigation projects, the rhetoric associated with these projects makes it clear that the company believes that it is the job of the state to provide support for the affected populations and these mitigation measures are just there to monitor change and supplement what the state should be doing.⁵²

Directly Affected Vs. Non-Affected Populations

The RIMA defines “affected” populations as only those who are directly impacted by construction through flooding of their land, but any communities that reside on land that will be dried are considered

⁵² "Programa e Projetos." *Estudo de Impacto Ambiental – Relatório de Impacto Ambiental 1.1* (2008): 167-177.

unaffected. Professor Oswaldo Seva argues that, “Logic dictates that those affected by the ‘drying’ of the river and the water table should be considered just as affected as those whose land and belongings are flooded. Ethics demands that all those who would suffer losses as a result of dam construction be considered as affected.”⁵³ Though the RIMA states that there are about 19,000 affected⁵⁴ in the region, the number is realistically much higher. Those considered unaffected, however, have demonstrated within the interviews that they will have to suffer the same aforementioned consequences without any financial compensation at all. The community of São Pedro has already been entirely displaced due to upstream dam pollution and evidence from a conversation with Interviewee F proves that these community members have been dealing with financial troubles and social disarticulation since their displacement. Though they were not forced to relocate like the communities in the flood zone, “we had no choice but to leave; the water is dirty and unhealthy, and after the dam is finished, we will not have access to the water anymore, so we will not be able to live here.” These concerns are echoed by thousands of Ribeirinhos, but they remain unaccounted for in the EIARIMA.

⁵³ S. B. Magalhães and F. Hernandez. "Experts Panel Assesses Belo Monte Dam Viability." (2009).

⁵⁴ "Programa e Projetos." *Estudo de Impacto Ambiental – Relatório de Impacto Ambiental 1.1* (2008).

Table 5. Presence of Explored Variables Within Community Self-Perception, Displaced Self Perception, and Belo Monte Projects.

| Variable | Within Community | Displaced | Belo Monte Recommendations |
|---------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Community as Family Unit | Present | Absent: broken into nuclear family units | Absent: displaced by nuclear family units |
| Control Over Diet and Non-Market Activities | Present | Absent: rely on market for diet, export control of non-market activities to different family members/ outsiders | Absent: shift displaced individuals into job market |
| Connection to Environment | Present | Present: Still have psychological connection to environment | Absent: Not discussed within EIARIMA |
| Economic Sovereignty | Present | Absent: shift into poverty, control over money shifted to employers | Absent: shift into poverty due to lack of institutional support/job skills/knowledge of job market |
| Traditional Knowledge | Present | Absent: knowledge acquisition exported to school system; cultural knowledge no longer relevant in new home | Absent: Not discussed within EIARIMA |

V. Potential Solutions and Policy Recommendations

The EIARIMA clearly downplays the social, environmental, and economic effects of the Belo Monte Dam on the region through skewed methodology and variable omissions. By rewriting the EIARIMA, it is possible to create efficient solutions that will help create a more harmonious transition if damming must take place.

I do believe that the opportunity cost (or the value associated with the best alternative activity lost)⁵⁵ associated with not building the dam is much more higher than the profit derived from building the dam. The Belo Monte Dam may very well be detrimental economically, especially in terms of long-term fisheries sustainability and the preservation of the invaluable ecological processes the Xingu provides. It will also extinguish many riverine cultures that have site-specific knowledge that may help to inform related research on the Xingu watershed. However, if damming must occur, it is necessary for more research to be done by NorteEnergia to understand how the riverine communities function and the true costs associated with cultural dissection and displacing families into a system in which they are impoverished.

As previously stated, the Lower Xingu region has vast expanses of uninhabited land upstream of the dam construction. Mitigation efforts

⁵⁵ James M. Buchanan "Opportunity cost," *The New Palgrave Dictionary of Economics Online*, 2008, http://www.dictionaryofeconomics.com/search_results?q=opportunity+cost&edition=current&button_search=GO (accessed April 15, 2013).

should to strive to emphasize community preservation, as dissolving communities will effectively extinguish an entire culture. If communities must be displaced from their traditionally occupied land, they should be kept intact and displaced upstream of dam construction to uninhabited areas rather than displacing all community members individually to urban areas. They should be provided with land on which they can continue their traditional subsistence lifestyle. This will decrease social stress both for community members and urban populations by allowing the Ribeirinhos to continue with their typical lifestyle and by not adding to the infrastructure strain that is already impacting nearby urban centers.

Another urgent matter is transparency; it is clear that the representatives from NorteEnergia who have developed the EIARIMA have not taken the time to understand impacted communities or their functioning, and proper research must be done before developing mitigation plans. The majority of knowledge is derived through oral traditions, so many riverine community members are illiterate. Therefore, brochures, pamphlets, and formal meetings will neither benefit nor educate community members. There is a hierarchy within riverine communities, so it may be necessary for NorteEnergia representatives to meet and discuss compensation and displacement methods with the head of the community and then facilitate community

meetings so that this information may be passed along to community members. It is imperative to begin these conversations as soon as possible, as pollution from dam building is rendering portions of the Xingu River unlivable. Information about compensation, displacement, and aid must be distributed prior to environmental impacts to ensure proper monitoring and help for displaced community members.

Riverine communities throughout the Amazon are all remarkably different in terms of development. In this particular case, the riverine communities have been in place for 6-7 generations and developed before the formalization of land rights in Brazil. It is not uncommon for there to be a lack of formal documentation for land in this region, and therefore it is unfair to reduce or eliminate compensation and displacement aid in this context.

Monitoring programs should extend beyond their 2-year limit and incorporate long term monitoring of affected populations. Biyearly monitoring may be sufficient after the first 2 years in order to gauge any serious long-term impacts of displacement.

Replicating community structure upstream of the dam may help to preserve traditional knowledge and culture. While this knowledge has merit to the community on its own, it may also be utilized by building partnerships between communities and scientific organizations. Though often disregarded as unscientific, “local knowledge—suitably recorded

and validated—will be crucial in complimenting scientific knowledge of endangered species or of unique events or processes, such as spawning aggregations, an area of fisheries biology largely driven by local knowledge.”⁵⁶

VI. Conclusion

The construction of the Belo Monte Dam will have numerous repercussions for the Affected Ribeirinhos communities of the Volta Grande, several of which as possible to predict and many that are unforeseen. The Volta Grande’s Ribeirinhos will not be able to maintain their traditional fishing habits or lifestyles post dam construction due to the new aquatic and social habitat. Self-perception within these individuals will inevitably change as it may no longer be co-constructed, which has the potential to take a psychological toll on displaced individuals. Non-market activities, particularly those related to cultural preservation and child rearing, will no longer be performed collectively, proliferating the feelings of “saudade” associated with the loss of home.

As the traditional communities are flooded or dried, there will be a rural to urban migration pattern. The majority of those who move away from their homes on the Volta Grande will move to Altamira, Brasil Nova,

⁵⁶⁵⁶ D Paul, “Small-scale Fisheries in the Tropics: Marginality, Marginalization and Some Implications for Fisheries Management,” *Global Trends: fisheries management* (1997): 40-49.

or Medicilândia. Due to the lack of transparency and public or private support for invisible populations, displaced individuals will be forced into poverty with little hope of aid. Nearby urban areas are suffering infrastructure strain due to the influx of construction workers and displaced community members from other development projects. The migration of the Ribeirinhos communities will only contribute to the strain on infrastructure and to the social issues seen in these areas such as increased alcohol and drug use, violence, car accidents, and rape.

The traditional fishing habits will no longer be applicable in the new aquatic habitat and social circumstances of the Ribeirinhos post dam construction. From this change, the Ribeirinhos will lose their traditional economic system will lose control of their food security to the market mechanisms that will control them. In this different economic model, they will have to quickly adapt to new cultural norms without sufficient aid to acclimate to the new climate. The new aquatic environment will allow for an increase in commercial fishing, so the displaced Ribeirinhos will have to learn new fishing techniques to be at a competitive advantage in the market system in order to maintain a home and life in the nearby cities.

Figure 4. Summary of Policy Recommendations

- Do not build the Belo Monte Dam. Rather, focus on less intrusive energy alternatives, such as underwater hydro

turbines, wind power, solar power, and increasing energy efficiency programs

If it must be built, then:

- Allot land for community displacement in an area upstream of the damming project with a similar environment
- Increase transparency by transferring information regarding the damming project through oral presentations rather than by pamphlets
- Monitor long-term impacts of displacement on individuals and develop inclusive documentation of affected individuals through earlier population monitoring
- Develop strategic plans between the public and private sector for social monitoring
- Provide compensation for land and productive activities to riverine communities despite their lack of formal documentation and account for non-market activities
- Initiate strategy meetings with riverine communities about compensation and future changes prior to more construction
- Include communities that live along the dried section of the Xingu River in the concept of affected populations

VI. Conclusion

The impacts of the Ribeirinhos lifestyle changes that will occur post dam construction cannot be fully realized until Belo Monte is complete, but it is safe to predict that change will not be beneficial. Without the support from the local and nation government and from Norte Energia, displaced Ribeirinhos will more than likely struggle to adapt to their new social situation and economic structure.

The public and private sectors should work to create stronger mitigation methods to aid displaced communities if the dam is to be built, but these measures will not be able to ensure the protection of the traditional livelihoods of the Ribeirinhos on the Volta Grande. Most importantly, the Belo Monte Dam will not only force displaced peoples into a system of impoverishment; it will effectively wipe out a culture that has been supporting sustainable ecosystem practices for many years. The concept of the Ribeirinhos will become antiquated as NorteEnergia strives for development at the cost of people's lives.

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Appendix

Semi-Structured Interview with local fishing communities

- How many families live in your community
- Tell me about your daily routine
- What do you think are the most important daily activities in your community?
- What role does fishing play in your local community? What fishing methods and techniques do you use? Can you show me how it is done?
- What species of fish do you generally catch?
- What kinds of fish and how many of these fish do you and your family/community consume?
- How many of these fish do you sell? Where do you sell them?
- What do you know about the Belo Monte Dam Project?
- What have you heard about displacement caused by the project?
- Are you projected by the (EIA) to be affected by the building of the Belo Monte Dam? If you are projected to be an affected community, where do you plan to move post construction of the dam?
- Has the number of families in your community changed recently? If so, why do you think?

- How do you think your relationship with the environment will change after the construction of the Belo Monte Dam?
- Do you know what governmental agencies you can contact if you have any problems maintaining your traditional fishing habits?
- Has a government representative contacted you about this change or included you in the mitigation plans?
- How do you interact with nearby cities like Altamira?
- What do you think are the most common misconceptions outsiders have about your life?

Profile of Interviewees

- Interviewee A- member of the Santa Luzia Community, male
- Interviewee B- member of the Cana Verde Community, male
- Interviewee C- Pescadore living on Volta Grande/guide
- Interviewee D- member of the Cana Verde Community, female
- Interviewee E- displaced Cana Verde community member living in Altamira, female
- Interviewee F- displaced São Pedro community member living in Altamira, male
- Interviewee G- member of the Santa Luzia Community, male, demonstrated main fishing techniques
- Interviewee H- member of the Santa Luzia Community, male
- Interviewee I- member of the Santa Luzia Community, male
- Interviewee J- member of the Cana Verde Community, female
- Interviewee K- member of the Santa Luzia Community and homestay guide, female

Institutional Review Board Report

Brazil Amazon Resource Management and Human Ecology

Academic Director – Gustavo Negreiros Ph.D.

Application for Review of ISP Research with Human Subjects

* adapted from the SIT Study Abroad AD Handbook September 2009

Complete all questions, print it out and sign it. Submit this document with your ISP proposal and related document to your AD if your ISP involves human subjects in any way.

1. Name: Hannah Khouri

2. Program: Amazon Resource Management and Human Ecology

3. Student Phone / E-mail: khour22h@mtholyoke.edu 91-8281-2544

4. Title of ISP: The Social and Biological Consequences of Dam Building on Fisheries:
A Case Study on the Belo Monte Dam

5. Site of ISP: Altamira, Brazil

6. Funding Source, if any:

7. ISP Advisor Name, Title, and Contact and telephone:

Profa. Dra. Nirvia Ravena, UNAMA - Universidade da Amazônia e UFPA -
Universidade Federal do Pará, niravena@uol.com.br (91) 84129483

8. Brief description of the purpose of the study.

The purpose of this is to study impacts of the construction of Belo Monte on riverine community members and involuntarily displaced individuals, with a particular

emphasis on understanding local fishing techniques.

9. Brief description of procedures relating to human subjects' participation:

a. How are participants recruited? (Is an inducement offered?)

There is no inducement offered. The participants will be selected from the fishermen in the community who are willing to speak with me. I will be able to visit these communities with a representative from Movimento Xingu Vivo.

b. What is the age range of the participants?

18-70

c. What is the gender breakdown of the participants?

Both males and females will be represented

d. What are other relevant characteristics of subjects, including (but not limited to) institutional affiliation if any?

They will have to participate in the catching, use, or distribution of fish in the community to some capacity. I will be sampling from ribeirinhos communities and local fishermen.

e. What is the number of participants?

I assume about 10 total interviews from traditional populations and 4 interviews with fish biologist

f. If there is a cooperative institution, how was their permission obtained?

o What will subjects be asked to do, and/or what information will be gathered? (Append copies of interview guides, instructions, survey instruments, etc.)

The subjects will only be asked to answer questions about their fishing habits and lifestyle. The information will be gathered through a structured interview (see attached). They will be informed of their rights to leave the interview at any time and anonymity before the interview begins, both orally and in a written form.

g. If subjects are interviewed, who are the interviewers?

Hannah Khouri

h. In what language(s) will you interview participants?

Portuguese

i. How will the interviewers be trained?

Through the Amazon Resource Management and Human Ecology program

j. What number of times will the intervention be made? (Will it become a burden to the human subjects of the research?)

Interviews will be conducted one time; it will not be a burden for the human subject

10. Protection of human subjects. Before completing this section, you must read and agree to comply with the SIT Study Abroad Statement of

Ethics, SIT Human Subjects Policy, and the program's additional Human Subject Research Guidelines.

o Have you read and do you agree to comply with the SIT Study Abroad Statement of Ethics, SIT Human Subjects Policy, and the program's additional Human Research Guidelines (attached)?

Yes

o Do subjects risk any stress or harm by participating in this research? If so, why is this necessary? How will these issues be addressed? What safeguards will minimize the risks?

No risk involved

a. How will you explain the research to subjects and obtain their informed consent to participate? (It is essential to allow participants to ask questions at any point. Be sure to append your Informed Consent Form if applicable.)

I have created a written consent form for all interviewees (please see attached). They will have to sign this document, of which they will be able to keep one copy and I the other.

b. If subjects are minors or not competent to provide consent, how will it be obtained?

No minors will be used in this study

c. How will subjects be informed that they can refuse to participate in aspects of the study or may terminate participation whenever they please?

Prior to any interview, I will inform participants of their right to refuse to partake in any portion of the interview and their right to terminate the interview as whenever they please. They will also sign a written consent form that informs them of these rights in written form.

d. If subjects are students or clients, how will you protect them from feeling coerced due to the (if only perceived) power differential?

I will not interview any students or clients

e. How might participation in this study benefit subjects?

They will not benefit directly from the findings of this study

f. Will participants receive a summary of results or other educational material?

They will not

11. How will the following be protected?

a. Privacy (protecting information about participants): Refers to an individual and their investment in controlling access to information about themselves.)

Prior to interviewing any subject, I will take the time to explain the exact objective of my study as well as how the information will be used in the future (ex. That SIT will be able to use/print my ISP for future students to

read and that my university will have access to the information so that I can obtain credit for my work). In addition, I will not provide any names without prior consent and will also ask in advance if I can distribute information about the names of the locations of the populations and the ages of those interviewed

b. Anonymity (protecting names and other unique identifiers of participants): Names should not be attached to the data, unless subject chooses to be identified.

I will not use the names of any participants in my final study unless prior consent is given

c. Confidentiality (protecting data about participants): How is access to data limited? Consider how coding will be kept separate from information obtained; how data will be stored and when will it be destroyed; whether data will be used in the future and, if so, how permission for further use will be obtained? Will your ISP paper be accessible on line?

Data will be stored on my laptop and on a USB drive and will be destroyed after the completion of my ISP. It will be limited to being seen by my academic director, my ISP advisor, and me. My ISP paper may be available online if SIT chooses to distribute it as such, so prior to all interviews I will explain the possibility of information distribution to interviewees to gain their consent.

12. Are there any other details or procedures of the study that should be known by the ISP Program local Review Board, and if so, discuss.

By signing below I certify that all of the above information (and that attached) is true and correct to the best of my knowledge, and that I agree to fully comply with all of the program's ethical guidelines as noted above and as presented in the program and/or discussed elsewhere in program materials. I further acknowledge that I will not engage in ISP activities until such a time that both my ISP proposal as well as my Human Subjects Research application are successful and I have been notified by my Academic Directors to this effect.

Student's name (printed) : _____

Student's signature and date

ATTACHMENTS INCLUDED AS APPROPRIATE (CHECK ALL THAT ARE ATTACHED):

Recruitment letters or fliers

Written Informed Consent form

Instructions to informants

_Interview guide

_Survey instrument

_Other(s) (please specify): _____

Written Consent Form

Entrevista do Termo de Consentimento

O objetivo desta entrevista é estudar o impacto na construção de barragens no que diz respeito ao processo migratório de peixes e da biodiversidade, bem como as conseqüências sociais da possível mudança nos hábitos de pesca das populações afetadas que moram na localidade de Altamira, no Estado do Para, no Brasil. Ela será conduzida por Hannah Khouri, que é um estudante no Programa da SIT Recursos Naturais da Amazônia e Ecologia Humana.

Gostaria de fazer-lhe algumas perguntas para conclusão do meu trabalho e isso durara aproximadamente 30 minutos e a mesma será gravada, bem como, durante a entrevista fique a vontade para fazer perguntas. Tudo bem

Sua participação é voluntaria e caso não aceite, isso não acarretara nenhum problema junto ao SIT, podendo, inclusive, a qualquer momento, se assim o desejar, interromper a sua participação.

Todas as informações pessoais colhidas nesta entrevista são classificadas como confidenciais e só poderão ser divulgadas mediante autorização dos senhores endereçadas a Mount Holyoke College.

Qualquer duvida a respeito do que foi abordado, por favor contactar com khour22h@mtholyoke.edu.

E, por estarem Entrevistado e Entrevistador de pleno acordo com todos os termos deste documento, assinam o presente em 02 (duas) vias de igual teor e forma, para um só efeito.

Assinatura: _____

Data: _____