

Coastal Restoration and Management as a Strategy for Wealth Creation in Louisiana

By

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B.A., Ethnic Studies, University of California, Berkeley (2005)

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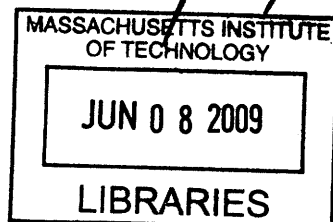
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## **ABSTRACT**

With more people in the world living along coasts than any other environment, planning for the coastal zone requires negotiating the socially constructed human relationships that have traditionally produced severe inequality between coastal residents and users. In Louisiana, this inequality is apparent in the great deal of wealth external users have extracted from the coast at the direct environmental and economic expense of local residents. An examination of the economic history of Louisiana's coast reveals how this disparity between coastal residents and users has produced deleterious environmental consequences, which have grown exponentially precisely because this inequality between human residents and users persists today. The current coastal restoration and management strategy in Louisiana does not focus on the socially constructed origins of this continuing environmental destruction, but it must do so in order to restore any hope of saving, restoring, and improving the coast.

This thesis offers a socially reconstructed strategy for coastal restoration and management in Louisiana that narrows the environmental and economic disparity between coastal users and residents to address the environmental harm. This new wealth creation strategy enables local firms and residents to offer their existing knowledge of the coast and participate in the implementation of restoring and improving the natural assets of their coast through a variety of economic incentives. In this way coastal residents are empowered to gain both the economic and environmental benefits of managing their coast, which I define as wealth. A case study of the Pulicat coastal community in Tamil Nadu, India provides valuable insights on how such a strategy can be implemented utilizing the existing civic and institutional infrastructure in Louisiana.

The three significant recommendations this thesis offers can be implemented immediately to begin socially reconstructing Louisiana's coastal restoration and management strategy. The urgency and magnitude of environmental destruction to Louisiana's coast mandates such a bold shift.

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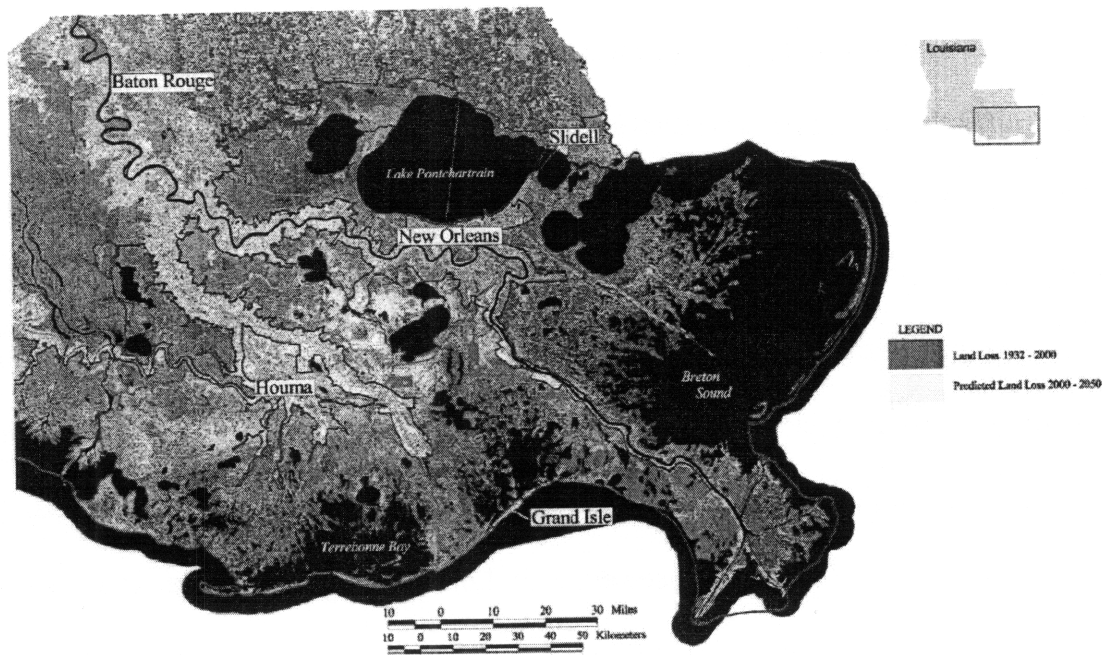


## **INTRODUCTION**

Louisiana has over 7,000 square miles of coast that lie along the alluvial Chenier and Mississippi Deltaic plains. As Louisianans have known for decades, the structural flood protection measures in the form of levees along the lower Mississippi River and Gulf of Mexico protect the city of New Orleans and the rest of coastal Louisiana from flooding, and yet these engineering feats simultaneously ensure the coast's vulnerability to environmental destruction over time. These levees coexist with the multiple canals created for shipping and navigation surrounding the lower Mississippi River and Gulf of Mexico, which has compounded the ecological vulnerability of coastal Louisiana. As a result, coastal land loss has been accelerated in Louisiana and is occurring at a staggering rate currently. Levees and canals have drastically altered the course of the Mississippi River and the estuarine environment between the river and Gulf of Mexico. When the Mississippi River was left to flow naturally it would regularly flood into the coastal wetlands along the Gulf and provide freshwater for the wetlands to continue growing. Today, the levees in particular have prevented natural freshwater flow into wetlands and starved them of nutrients. This is clearly seen in south Terrebonne parish where bald cypress trees haunt the skyline like burnt silhouettes along dried up wetlands. The wetlands are the most reliable and natural barriers to floods and storm surges, and as they disappear so does coastal Louisiana's natural flood protection system. Canals have created a natural pathway for storm surge to travel directly into residential settlements in

coastal Louisiana. The combination of levees created for regional flood protection and canals created for national economic development has compromised the entire coastal ecosystem, particularly the people who live there.

**Figure 1: Map of historic and projected coastal land loss in Louisiana**



Source: United States Geological Survey, National Wetlands Research Center: Lafayette, Louisiana

The physical deterioration of Louisiana's coast is both an issue of environmental and economic urgency because engineering feats are linked to the extractive economic enterprises that dominate the coast, which have together produced the current environmental devastation as seen in Figure 1 above. It is important to note that the costs and benefits of the extractive economic enterprises coupled with the resulting environmental destruction of the coast are distributed vastly unevenly. Local residents have been left to bear the vast majority of environmental costs (diminished natural assets) while coastal users have exported and captured the vast majority of economic benefits



(income) outside of Louisiana. As such, this socially constructed inequality between coastal residents and users has both negative environmental and economic consequences for Louisiana. The city of New Orleans, coastal parishes, and the state must acknowledge and address the duality of the coastal environment and economy and the inequity it has produced among communities to inform a new trajectory for coastal restoration and management in Louisiana. This environmental and economic dilemma has come to a fork in the road for coastal Louisiana that requires immediate action, conviction, and leadership. The current trajectory for coastal restoration and management depends heavily on structural flood protection measures that will require constant upgrading and heavy reliance on professional engineers. However in this current trajectory, the destructive coexistence of these engineering projects and extractive enterprises will remain. It is not possible to abandon engineering solutions to flood protection since so much of coastal Louisiana is dependent on those to survive. However, even if engineering solutions alone were sustainable, global climate change cannot be ignored; and numerous studies have shown that southern Louisiana is in the bull's eye of this change. Even if the levees were ever built to Category 5, 100-year storm standards, they cannot even sustain another Hurricane Katrina<sup>1</sup> no less predict and prepare for the consequences of global climate change. It is also not possible to continue unregulated and under-regulated extractive enterprises.

Therefore, an alternate trajectory for coastal restoration and management must prioritize ecological restoration of coastal Louisiana to not only re-establish coastal resiliency, but improve it over time. And, this can only be done with an affirmative

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<sup>1</sup> Grissett, S., Mark Schleifstein. (April 24, 2009). 100-year flood protection not enough for New Orleans, new report says. *The Times-Picayune*.

commitment to narrowing the disparity between those who have traditionally benefited from the current form of managing coastal resources and those who have born the costs. Although many recent studies of coastal Louisiana suggest aggressive ecological restoration, none discuss the socially constructed inequality between coastal residents and users that is the underlying cause for increased environmental harm. Therefore, ecological restoration must be accomplished through a socially reconstructed strategy directed to narrow the disparity between coastal users and residents to effectively remedy the environmental harm to Louisiana's coast. This implies that the wealth of Louisiana's coast and its people can no longer be used to exploit its own environment.

For the purpose of this thesis, wealth creation is defined as creating economic opportunities for local firms and residents to utilize and enhance their existing knowledge and labor for the purpose of restoring and creating new natural assets along Louisiana's coast. This socially reconstructed strategy does not demand a drastic change in the institutions and resources needed for change, but rather challenges existing institutions to recalibrate their resources and develop a system of incentives for local firms and residents to gain economic profit from implementing the work of coastal restoration and improvement. It also infuses a critical learning component to coastal restoration and management by valuing experiential knowledge, what fisheries expert John Kurien describes as "knowledge-through labor"<sup>2</sup> that local residents have of their environment, which will help create alternative pedagogies for learning about coastal ecosystems and

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<sup>2</sup> Kurien, J. (2004). The Blessing of Commons: Small Scale Fisheries, Community Property Rights, and Coastal Natural Assets. *Political Economy Research Institute, University of Massachusetts, Amherst, Working Paper Series (72)*

economies over time. Lastly, this strategy will shift the responsibility of managing coastal resources to local people who are economically and socially invested in its future.

There are limitations for ecological restoration considering the level of devastation to Louisiana's coast, particularly in the near term; however, an ongoing stewardship of the coast must replace the culture of dominating nature and then mitigating those effects as the means for coastal restoration and management in Louisiana. And, this will require a fundamental reconstruction of the human relationships among coastal users and residents. A political commitment to equity through local wealth creation must define the new trajectory for coastal restoration and management in Louisiana.

The purpose of this thesis is to examine why and how this new trajectory for coastal restoration and management in Louisiana can occur within existing institutions utilizing existing resources. The first chapter recounts the economic history of Louisiana's coast to provide the historical background for how human relationships to the coastal environment have been extractive and resulted in a deep economic and environmental inequality among communities along Louisiana's coast. The second chapter discusses how the tools and mechanisms of Louisiana's coastal restoration and management strategy in the last three decades have circumvented addressing this inequality, which is actually resulting in greater environmental degradation to the coast. These two chapters are intended to explain why a new strategy is necessary and urgent. The third chapter illustrates a case study of the Pulicat coastal community in Tamil Nadu, India and how their partnership with nearby Madras Christian College has actually inspired an empowered framework for local residents to be involved in the practice of

coastal restoration and management in their community, which will over time generate long-term local wealth. The fourth chapter discusses the limited forums for community participation in coastal restoration and management in Louisiana currently. It also highlights the work of various emerging initiatives and how they provide the foundation for socially reconstructing Louisiana's coastal restoration and management strategy through empowered forms of community participation. The fifth and final chapter outlines the components of a new strategy and how it can be implemented in Louisiana.

This strategy has three integral and mutually reinforcing components:

- 1) Creating a network of existing institutions in Louisiana to lead the formation of a wealth creation strategy
- 2) Identifying opportunities within existing institutions in Louisiana to frame coastal restoration and management as a sector for regional economic development in Louisiana to direct economic benefits to local firms and residents.
- 3) Establishing an international partnership between the new network of institutions in Louisiana and Madras Christian College that will be critical to collaboratively generate new knowledge on the subject and innovative forms of local wealth creation.

## CHAPTER 1

### The Economic History of Louisiana's Coast: A Foundation for Socially Constructed Inequality

#### *A History of Economic Disparity and Environmental Exploitation*

The struggle for maintaining both a coastal environment and a coastal economy in Louisiana has historically been both a physical and political struggle. And yet, coastal restoration and management strategies have been focused exclusively on maintaining the delicate physical balance between the coastal environment and coastal economy with little attention to the deeply political struggle at the heart of the two. Examining the evolution of this political struggle through the economic history of Louisiana's coast reveals three significant insights:

- 1) Those who have benefited from the economic activity of the coast and those who have experienced the direct environmental consequences of those activities are two very disparate groups of people.
- 2) Environmental destruction of the coast is not just a result of human exploitation of nature but human exploitation of other humans.<sup>3</sup>
- 3) The current strategy for coastal restoration and management in Louisiana focuses only marginally on the intersection of the coastal environment and coastal economy as a political relationship between humans, and this neglect has actually increased both environmental exploitation and economic disparity of Louisiana's coastal communities. Together these have produced a significant mistrust

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<sup>3</sup> Based on the work of James K. Boyce, Director of the Political Economy Research Institute, University of Massachusetts, Amherst

among coastal residents toward the formalized strategy for coastal restoration and management in Louisiana.

James K. Boyce, Director of the Political Economy Research Institute at the University of Massachusetts, Amherst asserts that inequality is in fact bad for the environment and defines environmental harm to mean “impacts on the natural environment that reduce human well-being. Therefore, to say actions are bad (or good) for the environment is to say that they are bad (or good) for humankind.” He redefines environmental harm as a relationship between users where some groups wield power over others. “...those who are harmed are alive today and well aware of the costs imposed on them, but lack the power to prevail in making social decisions about the environment. In this case, the solution lies in redistributing power, so that those who suffer environmental harm are better able to defend themselves-and the environment-from others who benefit from activities that cause the problems.”<sup>4</sup> He goes on to define the environmental impacts that result from this uneven distribution of power in two salient forms:

- 1) First, environmental harm is not randomly distributed across the population, but instead reflects the distribution of wealth and power. The relatively wealthy and powerful tend to benefit disproportionately from the economic activities that generate environmental harm. The relatively poor and powerless tend to bear a disproportionate share of the environmental costs.
- 2) Second, the total magnitude of environmental harm depends on the extent of inequality. Societies with wider inequalities of wealth and

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<sup>4</sup>Boyce, J. K. (2008). Is Inequality Bad for the Environment? *Research in Social Problems and Public Policy*, 15, 267-288.

power will tend to have more environmental harm. Conversely, societies with relatively modest degrees of economic and political disparities will tend to have less environmental harm.<sup>5</sup>

This thesis is premised on the consensus that Louisiana's coast is characterized by a long history of profound inequality among communities. And, a new strategy for coastal restoration and management in Louisiana must focus on narrowing the disparity between those who have experienced the economic benefits of the coast and those who have experienced the environmental exploitation and economic loss from these activities in order to restore any hope of reducing environmental harm. This chapter outlines a political history of Louisiana's coastal development to the present by detailing the various economic enterprises and their resulting environmental consequences to show how they have produced inequality among communities that remains today.

### **Early Extractive Enterprises**

Economic enterprises in coastal Louisiana have evolved significantly over the last two centuries, but they have been mainly extractive in that they have extracted the natural resources of the coast as well as extracted local knowledge and labor for profit.

Coastal Louisiana was initially characterized by robust and diverse subsistence agriculture. It began with indigenous communities who settled coastal Louisiana as well as the Mississippi River Valley. "Native American people have lived near New Orleans for at least 2,500 years, possibly as long as 4,000 years. A dependence on agriculture probably spurred this [particular] settlement growth."<sup>6</sup> Indigenous people lived as

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<sup>5</sup> Boyce, J. K. (2008). Is Inequality Bad for the Environment? *Research in Social Problems and Public Policy*, 15, 267-288.

<sup>6</sup> Dawdy, S. L. (2008). *Building the devil's empire: French colonial New Orleans*. Chicago: University of Chicago Press.

fishermen, trappers, and farmers in the region altering the environment for their own protection and economic enhancement. “Even before these European introductions, the “natural” environment of the New Orleans area had been modified by Native Americans confronting the same basic challenges that faced French settlers in New Orleans: sinking soils and endemic flooding. They responded by building up the sites with mounds of clamshells that provided flood protection, improved drainage, and enriched soil. This modification, in turn, encouraged the growth of trees in an otherwise flat marsh, stimulating the development of a diverse new ecosystem within the delta. The land surface was elevated and better drained. Ancient settlement sites hosted useful hardwoods.”<sup>7</sup> This is the first evidence in the area that indicates how local communities can contribute their knowledge and labor to improve the environment while simultaneously gaining economic benefits from it. This is not to idealize a subsistence lifestyle, but rather to point to the strong history of ongoing environmental stewardship on the part of indigenous communities that produced locally experienced economic and environmental benefits.

In the earlier part of the 18<sup>th</sup> century, various immigrant communities settled different parts of coastal Louisiana as farmers. The Germans arrived around 1720 and centered their settlement in Des Allamondes, known as the “German coast” in St. Charles parish. John Law introduced African slaves to these farmers. This begins the legacy of humans exploiting other humans, which not only increases economic exploitation but increases the magnitude of environmental destruction. The removal of indigenous communities and the exploitation of slave labor not only began the creation of a hierarchy

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<sup>7</sup> Dawdy, S. L. (2008). *Building the devil's empire: French colonial New Orleans*. Chicago: University of Chicago Press.



of wealth in coastal Louisiana, but also relegated certain populations to experiencing environmental degradation at higher levels than others. With increased production capacity through slave labor, the Germans built levees to protect their crops from flooding continuously. In 1755, the Cajuns followed after leaving Great Britain, settling in Acadia and Canada, and then arriving in southern Louisiana. They began their settlement in St. James parish or the “Acadian coast” and thrived as farmers, ranchers, fishermen, and hunters. They were instrumental in the shipbuilding and offshore oil industries in Louisiana centuries later. Figure 2 below shows where the Acadian and German coasts were located; it also shows how much of the land between the Mississippi River and Gulf of Mexico is coastal marsh.

The first large-scale coastal enterprises began with the rice industry through the introduction of slave labor in Louisiana. “The captains of the first two ships to bring African slaves to the colony in 1719 were told specifically by colonial authorities to purchase barrels of rice seed and several Africans who knew how to cultivate the crop.”<sup>8</sup> This is early evidence of utilizing local labor and knowledge but not to the benefit of local communities as rice farming ruined the coastal soil. Through a process of trial and error, at the expense of slave labor and coastal soils, it became apparent that the Louisiana landscape was better suited for tobacco and indigo. Consequently, these crops supplanted rice production after 1731.

The New Orleans vicinity had more than fourteen indigo plantations producing more than 70,000 pounds of dye by 1738 grown directly for export. “Africans clearly had knowledge of cultivating and processing the plant, as it grew wild in Africa and India,”<sup>9</sup>

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<sup>8</sup> Davis, D. E. (2006). *Southern United States: an environmental history*. Santa Barbara, Calif.: ABC-CLIO.

<sup>9</sup> IBID

and their labor was instrumental in indigo's proliferation in Louisiana into the 1780's. Indigo required wore out freshly cleared soils over relatively short periods of time, requiring the constant clearing of new ground in order to meet expected profits. Additionally, the increase in indigo production in the 1750's also saw the increased demand for cypress logs used to construct the large vats and troughs for indigo production as well as the planking for ships that would carry the large casks of the dye to the West Indies. As a result, the cypress industry there flourished, causing the felling of trees more than 1,000 years old typically through forced slave labor.<sup>10</sup> Cypress trees break wind and keep the soil rooted as well as hold down marsh and swamp grasses. Removing these trees drastically accelerated the coastal erosion processes and destroyed vital wetlands, which has produced enduring consequences today.

By the first decade of the 1800's sugarcane replaced indigo as an important staple crop in Louisiana. European settlers began to drain wetlands to build large sugarcane plantations again using mainly slave labor. "For the most part, sugar plantations have been situated on better-drained portions of natural levees of the Mississippi River and [coastal parishes].<sup>11</sup> Jesuits had even imported sugarcane and slaves familiar with its cultivation in the 1750's, but it was only later in the century when the industry began to thrive. "The enormous crop also represented substantial environmental changes across the state, as each hogshead of sugar, weighing 1,000 pounds each, represented at least one acre of plowed and cleared swampland adding up to more than 500,000 acres by 1850. Although farmers adopted "ratooning" (replanting the second crop of sugarcane

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<sup>10</sup> Davis, D. E. (2006). *Southern United States: an environmental history*. Santa Barbara, Calif.: ABC-CLIO.

<sup>11</sup> Rehder, J. B. (1999). *Delta sugar: Louisiana's vanishing plantation landscape*. Baltimore, Md.: Johns Hopkins University Press.

from the previous year's roots) and companion planting to minimize soil disturbance and nutrient and nitrogen loss in the soil, it continued to accelerate the natural erosion process."<sup>12</sup> Many acres of land that were once sugarcane plantations in southern Terrebonne parish have eroded into the Gulf of Mexico today.<sup>13</sup>

“By the time cotton became king in Louisiana, river navigation had improved significantly and the coastal landscape had been exposed to road development. Any semblance of subsistence survival such as grain-raising, stock-raising, ironworks, etc. languished. By the early 1820's, the rich alluvial soils of the Mississippi Delta began to produce large quantities of cotton, as plantations along the river were aided by their proximity to the region's most important transportation route. Cotton was especially injurious to the Southern soils, robbing them of important nutrients and generally exposing larger surface areas to erosion. Along the lower Mississippi Valley in 1842, James Paulding described in detail the cotton planters' antipathy for forested landscapes, as well as their usual method for “removing” trees from the plantation environments: ‘Trees were the greatest obstacle to cultivation, and the first enemies to be conquered. The labor of cutting them down, and removing the growth of the gigantic trees, such as those found in primeval forests, would amount perhaps ten, sometimes twenty times the original cost of the land itself.’ ”<sup>14</sup>

Without indigenous and slave labor and knowledge, the “taming” of southern Louisiana's coastal landscape into a thriving economy would have been impossible. The

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<sup>12</sup> Davis, D. E. (2006). *Southern United States: an environmental history*. Santa Barbara, Calif.: ABC-CLIO.

<sup>13</sup> Interview with Patty Whitney, Community Organizing Director, Bayou Interfaith Shared Community Organizing (BISCO), November 11, 2008.

<sup>14</sup> Davis, D. E. (2006). *Southern United States: an environmental history*. Santa Barbara, Calif.: ABC-CLIO.

settlers were acutely aware of this and specifically brought African slaves with particular agricultural knowledge to ensure successful harvests. However, on their own time, slaves were much gentler on the landscape than in their forced roles in destroying the environment for large-scale enterprises. “Slaves in the South typically had a small patch of garden to grow their own crops. Many of the crops they planted were directly from Africa including yams, okra, cowpeas, castor beans, sorghum millet, collards, and peanuts. Decades later, African plants were being readily grown and consumed by the white population, including the planters themselves, who realized that African foodstuffs were perhaps better adapted to the South’s more nutrient-poor soils.”<sup>15</sup> Settlers also copied the Native Americans’ girdling techniques to remove trees, but their large-scale destruction of forests in no way mirrored indigenous methods, which followed the pattern of the beaver.<sup>16</sup> The strong social and environmental relationships built between people and the land have been etched into the coastal Louisiana landscape. European settlers did not balance environmental stewardship with economic pursuit. Although many settlers did realize the consequences of over planting, cutting down forests, and encroaching on wetlands, their reparative strategies to fix these were not directed toward preserving the environment as a natural asset. Instead, strategies such as ratooning, crop rotation, and soil building were only done to ensure the next harvest, and proved futile after several decades of planting, particularly with cotton. This highlights a very important and overlooked aspect of Louisiana’s coastal development, which is that local knowledge and labor has historically been utilized and co-opted for externally experienced economic

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<sup>15</sup> IBID

<sup>16</sup> IBID

benefit leaving locally experienced environmental exploitation. However, this is a hopeful insight because it means there is a great deal of existing knowledge of the coast that resides in local communities, which can be utilized to restore and create natural assets.

Although the removal of cypress trees became an integral part of every coastal enterprise until the twentieth century, the early 1900's marked the proliferation of timber as an industry itself. Many Northern lumberjacks came to Louisiana to cut down the cypress trees for this industry and had no incentive to replace the trees because they would not have to live there once their extractive work was completed. And, this marks a significant increase in both economic and environmental exploitation of the coast. External actors who only remain in Louisiana for the duration of their work and leave will have no incentive to reinvest in the landscape nor do they possess the knowledge of the environment to at least mitigate the negative effects of their enterprises like the earlier settlers attempted and slaves continuously did.<sup>17</sup> This exporting of wealth widens the disparity between external actors and local communities, which shows how greater inequality actually increases environmental degradation.

In the early 1920's, Tabasco tycoon Edmund McIllhenny has been "credited" with introducing nutria into the southern Louisiana marshes to meet a growing demand for fur products in Europe. These are small rodent-like animals that are notorious for eating through swamp grasses at astounding rates. It is still contested today whether he introduced the nutria or was only instrumental in their proliferation in southern Louisiana, although it is confirmed he did the latter. The nutria multiplied uncontrollably and destroyed the marsh environment of southern Louisiana. Swamp grasses provide a

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<sup>17</sup> Interview with Patty Whitney, Community Organizing Director, BISCO, November 11, 2008.

natural barrier against storms and nutria are just another in a long list of extractive enterprises that have diminished wetlands.<sup>18</sup>

### **Today's Extractive Enterprises**

The oil and gas industries arrived in the 1920's with offshore oil taking off in the 1930's. These companies cut canals through the wetlands to install pipe infrastructure for draining oil. Since this was very young land, it has since collapsed and allowed for saltwater intrusion from both the Mississippi River Gulf Outlet and the Houma Navigation Canal that is now corroding the exposed pipes. The oil and gas industries like earlier enterprises, extracted local knowledge and labor. Local Cajuns were skilled ship and boat builders and provided these to the oil and gas companies as well as helped construct oil derricks in the Gulf. Although this is evidence that local employment is an ancillary benefit with even extractive enterprises, it still forces local people to diminish or assist in diminishing their own natural assets to gain economic profit. Two other examples of these locally-based, ancillary enterprises are the PHI helicopter services to transport employees to the oil rigs in the Gulf of Mexico and the game fishing industry discussed below. The PHI helicopter services based out of Louisiana transport employees to oil rigs out in the Gulf of Mexico and contribute to the extractive offshore oil industry.

The game fishing industry has grown explosively in the last few decades with a recent upsurge. Residents in all coastal parishes report an enlarged presence of game fishermen who come to coastal Louisiana for weeks at a time to fish. Bayou Petit Calliou in Terrebonne parish is lined with raised vacation homes that are comprised of "fish camps" where game fishermen pay to stay during their short visits. These are some of the only raised homes in the entire area. Residents who live in Bayou Petit Calliou in

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<sup>18</sup>Interview with Patty Whitney, Community Organizing Director, BISCO, November 11, 2008.

Terrebonne parish typically cannot afford to raise their homes because retrofitting companies are charging exorbitant and inflated rates to do this work. These companies are demanding that residents report their government subsidy allocations for raising their homes and then deliberately charging multiple times over that amount to complete the work. If residents refuse to comply, then the companies simply leave because they have so much work available to them. The raised homes for fish camps are also accompanied by the creation of artificial ridges to further protect their homes. This actually causes the remaining un-raised homes to experience even greater damage from flooding and storm surge because of the unevenly altered landscape pattern. The game fishing industry also contributes to overfishing in areas where small-scale fishermen are experiencing shortages in their catches.<sup>19</sup>

Finally, the Louisiana seafood industry has become increasingly threatened because of the environmental exploitation of the coast over time. And, the activities of fishermen, shrimp fishermen, and oystermen have compounded these environmental consequences because they are overfishing a diminishing supply. Many of these communities are against the proposed restoration activities in Louisiana's most recent master plan because initiatives like freshwater introduction could render their enterprises obsolete even if only temporarily. Although these initiatives will potentially improve the longevity and quality of the seafood industry, these smaller scale enterprises have already suffered displacement from the offshore oil and game fishing industries and cannot afford additional concessions. A coastal restoration and management strategy that does not build in economic compensation and alternative economic opportunities for these local

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<sup>19</sup> Field visit to Terrebonne parish with Patty Whitney, February 1, 2009.

fishermen and oystermen does not acknowledge the inequity that has led to this situation. And, it continues to separate the practice of restoring and improving natural assets from increasingly beneficial economic opportunities since oystermen are economically coerced against rebuilding wetlands to maintain their current sources of income.

The economic history of Louisiana's coast cannot be separated from the environmental and economic exploitation it has produced in local communities. The purpose of this thesis is not only to critique Louisiana's current coastal restoration and management strategy, but to examine the human exploitation that is fundamentally tied to the environmental and economic exploitation that has occurred over time along Louisiana's coast and make the case for a deeply revised strategy. "The people [Louisiana residents] historically had no say in this; they did not make the fortunes from all of this. We don't have the money to protect our own environment," says Patty Whitney, community-organizing director for Bayou Interfaith Shared Community Organizing (BISCO) in Terrebonne parish. It is this simple and truly insightful statement that makes the strongest case for connecting economic opportunities with the restoration and improvement of natural assets for local residents. They can finally have the power to protect, enhance, and benefit from their own environments. There must be a robust system of incentives to encourage ongoing local management and stewardship of the coast and to ensure that the wealth of Louisiana's coast is captured locally.

The purpose of this chapter was to highlight the inherent inequity that persists because local residents are forced to diminish their natural assets to gain income from the existing economic activities associated with Louisiana coast. This chapter also introduced four main points that the rest of the thesis will explore in further detail.



- 1) There is a deep history of a dichotomy between those who experience the economic profits of coastal enterprises and those who experience the environmental consequences and economic losses from those enterprises.
- 2) Inequality is bad for the environment and the persistence of inequality guarantees the degradation of the coastal environment in short time for Louisiana.
- 3) Local communities can contribute to the environment while simultaneously gaining economic benefits from it because of the great deal of existing knowledge about the coast that resides in these communities.
- 4) An equitable coastal restoration and management strategy allows for both environmental and economic benefits to be experienced locally and this will be referred to as wealth creation.

The next chapter reviews the major tools and mechanisms of Louisiana's coastal restoration and management strategy over the last three decades, the objectives they are directed to accomplish, and their inability to negotiate the socially constructed relationships among human users of the coast necessary to resolve the magnitude of environmental harm to Louisiana's coast.



## **CHAPTER 2**

### **The History of Coastal restoration and Management in Louisiana**

Chapter 1 discussed how the economic development of Louisiana's coast produced an environmentally and economically uneven coastal landscape that persists today. This chapter will discuss how the trajectory of coastal restoration and management in Louisiana falls short in a number of ways. The chapter begins with the historic tension between flood protection and economic development in Louisiana and the inherent conflict of interest of the United States Army Corps of Engineers' involvement in ensuring both. The discussion then moves into a description and critique of the major tools and mechanisms of coastal restoration and management in the last thirty years. The purpose of this chapter is to show how these tools and mechanisms are insufficient in addressing the magnitude of environmental harm to Louisiana's coast precisely because they do not address the unequal human relationships.

#### ***The Dual Goals of Flood Protection and Economic Development***

It is impossible to discuss coastal restoration and management in Louisiana without discussing the origination of the elaborate network of levees and canals surrounding the Mississippi River, Lake Pontchartrain, and the Gulf of Mexico. And, it is impossible to separate the levees and canals legacy that has dominated flood protection and economic development planning in Louisiana for over one hundred years from the historic power struggle to control the mouth of the Mississippi River. In the nineteenth century, as more and more people began to settle the Mississippi River Valley in and around New Orleans, it quickly became apparent that whoever controlled the mouth of the Mississippi stood to control enormous wealth. This was through all of the domestic trade traveling through the port of New Orleans up and down the Mississippi River,

international trade entering through the Gulf of Mexico, as well as the resulting residential development along the floodplain.

In 1851, Captain Andrew Atkinson Humphreys of the U.S. Army, later to become chief of the United States Army Corps of Engineers (USACE) began a study of the Mississippi River to explore how the outlet to the Gulf of Mexico could remain unobstructed for trade and navigation while simultaneously preventing massive flooding where people had rapidly begun settling. Although the results of his study confirmed other studies of the time that new outlets to divert the river coupled with reservoirs should be created to achieve the stated objectives, he was far more interested in offering an exclusive strategy. Although his conclusion to construct levees could not be reconciled with the data he collected, he managed to reconfigure his reasoning to justify this approach. This monumental decision reflects the socially constructed process that even science and engineering are subject to.

Even after the levees sustained great damage from the Civil War, Humphreys as chief of the Army Corps of Engineers took on a new mission to support a canal rather than jetties to allow shipping between the Mississippi River and Gulf of Mexico. In 1874, he advised Congress: “The canal is the only project that will meet the commercial, naval, and military demands of the United States.”<sup>20</sup> This is a profound statement because it defines the conflicting objectives of the Army Corps of Engineers’ work in coastal Louisiana even today. What is best for shipping and navigation does not necessarily ensure the most effective flood protection measures. And, when those two objectives come directly into conflict, shipping and navigation interests will prevail because those

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<sup>20</sup>Barry, J. M. (1998). *Rising Tide: The Great Mississippi Flood of 1927 and How it Changed America*: New York Simon & Schuster.

are national priorities versus flood protection, which is seen as a regional priority. The uneven and unequal flood protection that has resulted from this hierarchy of priorities has clearly been documented in history with the tragic 1927 Mississippi River flood all the way to the controversial Mississippi River Gulf Outlet and Houma Navigation Canal during the recent 2005 and 2008 hurricanes.

***“Levees-only” Philosophy Lives Today***

Levees and canals have never historically provided adequate flood protection, and over time have worked to diminish the natural flood protection systems in place such as wetlands, cypress trees, and other natural shoreline barriers. Southeastern Louisiana has a unique ecosystem defined by these three bodies of water, which produces a mixed fresh and saltwater environment in many of the coastal areas. This estuarine or brackish water ecosystem requires certain levels of salinity to survive and levees and canals have destroyed this balance.

The Mississippi River begins in Cairo, Illinois and flows all the way through Louisiana and empties into the Gulf of Mexico. “By 1861, the levee system extended from New Orleans to the mouth of the Ohio River, with the most extensive earthen dikes and dams found just above and below the Crescent City. While state and federal engineers disagreed on how best to create a fail-safe flood control system along the main course of the [Mississippi] river, all agreed at the time that the flow and direction of the Mississippi had to be completely controlled.”<sup>21</sup> This flood protection system extended down to the Gulf coast and later along Lake Pontchartrain. Once again, an ethos of

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<sup>21</sup>Davis, D. E. (2006). *Southern United States: an environmental history*. Santa Barbara, Calif.: ABC-CLIO.

“taming” the environment and “reclaiming” land dominated the planning agenda mirroring the history of extractive enterprises described in the last chapter. “With each major flood along the Mississippi—and there were many—levees were built higher and higher along the river’s edge, which, paradoxically, served only to narrow the flow of water and raise water levels even further. As a result, large-scale channel construction and dredging continued well into the twentieth century, engineering efforts that would ultimately change entire marsh ecosystems in and around the city [of New Orleans] (Reuss 1998; Gomez 2000; Pabis 2000)<sup>22</sup>. Although severe flooding has been staved off for decades from these large-scale engineering feats, the environmental impact of this strategy for coastal and flood management has only served to undermine itself. The deterioration of surrounding wetlands and vegetation from these levees has rapidly accelerated coastal Louisiana’s susceptibility and vulnerability to hurricanes and floods that are an ever-increasing threat with global climate change. The Mississippi River Flood of 1927 revealed the first human consequences of an uneven flood protection system that resulted from levees and canals, which persists today.

### ***The 1927 Mississippi River Flood***

The 1927 flood devastated and inundated an area of land greater than Connecticut, Massachusetts, and Maryland totaling 28,570 square miles.<sup>23</sup> The elaborate system of levees and dykes could not hold back the mighty Mississippi, and St. Bernard and Plaquemines parish paid the price for everyone else. A coalition of elite politicians and businessmen made a series of executive decisions to deliberately misinform citizens as to the severity of the approaching 1927 flood. Additionally, they made a decision to

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<sup>22</sup> Davis, D. E. (2006). *Southern United States: an environmental history*. Santa Barbara, Calif.: ABC-CLIO.

<sup>23</sup> IBID

dynamite the levees to release the building pressure of the river, which inundated St. Bernard and Plaquemines parishes. Even then, they realized that this decision required “community participation” to ensure no fingers would be pointed when the damage occurred. However, there was no discussion to determine how to equitably notify and compensate the citizens in these parishes for their pending immense losses. Their fate was already negotiated and quantified, and they were only consulted in re-negotiating the amount of monetary compensation for their losses and strength of representation on the reparations commission.

The 1927 flood is one of many precedents for a deep mistrust between government and citizens in Louisiana. It is one of many instances of unequal flood protection among coastal residents. It is no wonder that there is serious apprehension among residents regarding coastal restoration and management today. They have repeatedly been told that their sacrifice is for the greater good, but really their sacrifice is the price for allowing economic development to continuously undermine flood protection. This trajectory has and will continue to breed mistrust as well as increase economic and environmental inequality and as such, the level of environmental harm to Louisiana’s coast. The 1927 Mississippi River flood clearly showed that “the struggle against the river had begun as one of man against nature. It was becoming man against man.”<sup>24</sup> This statement marks a significant historical moment in the relationship between humans and the coastal environment of Louisiana. No longer could anyone pretend that the struggle to dominate the natural environment was one against nature, but it was in fact a struggle between humans and the purpose of their relationships to the coastal

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<sup>24</sup>Barry, J. M. (1998). *Rising Tide: The Great Mississippi Flood of 1927 and How it Changed America*. New York Simon & Schuster.

environment. This paradigm shift is notable because it reveals the socially constructed struggle to achieve the dual goals of flood protection and economic development, and how that has historically been reconciled at the expense of less local residents.

A socially constructed dichotomy between flood protection and economic development coupled with a socially constructed decision-making process that is allegedly based on indisputable science cannot be settled by a single entity alone. This responsibility assigned to the USACE is misplaced and continuing to follow this history with no significant change will remain to be both environmentally and economically destructive to Louisiana's coast.

### ***United States Army Corps of Engineers***

The USACE is a branch of the United States military tasked with a regional duty of flood protection and a national duty of economic development through shipping and navigation. These conflicting goals place the USACE function in a serious conflict of interest. The USACE is also focused on the physical component of coastal restoration and management; however, the previous sections described the socially constructed origins of environmental harm to Louisiana's coast. And, this requires a sophisticated level of community participation and policy making that the USACE is not equipped to offer. The physical analysis framework of the USACE to address a socially constructed problem that is characterized by high levels of inequality will no longer be adequate. The 1927 flood set in place two protocols that reflect this mismatch, which the Corps still follows today in Louisiana:



- 1) The Corps community participation efforts are only directed at residents for pre-determined projects and typically done through lengthy meetings dominated by technical language.
- 2) Damage from flooding is only calculated for quantifiable assets, which completely neglects community and natural assets.

The exclusively physical content of the dialog in community participation meetings does not allow for communities to offer their critical input and the ways in which coastal restoration and management tools and mechanisms affect them. And, if only quantifiable damage is taken into consideration, an entire spectrum of assets continued to be destroyed with no recognition. These assets such as cypress trees and wetlands as well as entire communities being forced to relocate are not easily quantifiable, but these diminished assets contribute to the widening environmental and economic disparities in coastal Louisiana that a coastal restoration and management strategy must affirmatively address. According to Carlton Dufrechou, Executive Director of the Lake Pontchartrain Basin Foundation, even if the Corps meets its stated goal of 100- year storm protection by 2011, the Louisiana coast will still be more vulnerable than when Hurricane Betsy struck in 1965.<sup>25</sup> A recent report completed by the Interagency Performance Evaluation Task Force (IPET) reveals that 100-year flood protection will not even be adequate for another Hurricane Katrina.<sup>26</sup> Despite the infinitely higher technological advancements and funding that has gone into flood protection, coastal degradation has outpaced innovation.

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<sup>25</sup> Interview with Carlton Dufrechou, Executive Director of Lake Pontchartrain Basin Foundation, April 9, 2009.

<sup>26</sup> Grissett, S., Mark Schleichstein. (April 24, 2009). 100-year flood protection not enough for New Orleans, new report says. *The Times-Picayune*.

This only accelerates the urgency to move from an exclusively physical trajectory of planning for Louisiana's coast.

Even if the conflicts among human uses of the coastal environment cannot be resolved through strictly engineering or even ecologically restorative strategies alone, the socially constructed nature of these problems provides hope. A new trajectory that is committed to local empowerment can socially reconstruct the way humans interact with each other in relationship to a shared environment. But first, it will be important to examine the current policies, plans, and programs in place for Louisiana's coast to see how these can be socially reconstructed to address the problems laid out thus far in the discussion.

***Tools and Mechanisms for Coastal Restoration and Management in Louisiana  
Policies, Plans, and Projects: a Reactive Framework***

Currently, coastal restoration and management in Louisiana functions broadly within an overlapping network of policies, plans, and projects that leads to a reactive framework preventing environmental improvement, neglecting management, and achieving minimal restoration at best. Implementation of coastal restoration and management in Louisiana can be divided into three major tools:

- 1) Regulation
- 2) Large-scale flood protection planning
- 3) Ecological restoration

These three tools are implemented through five mechanisms:

- 1) Federal and state policies
- 2) Permits and review processes
- 3) State master plans

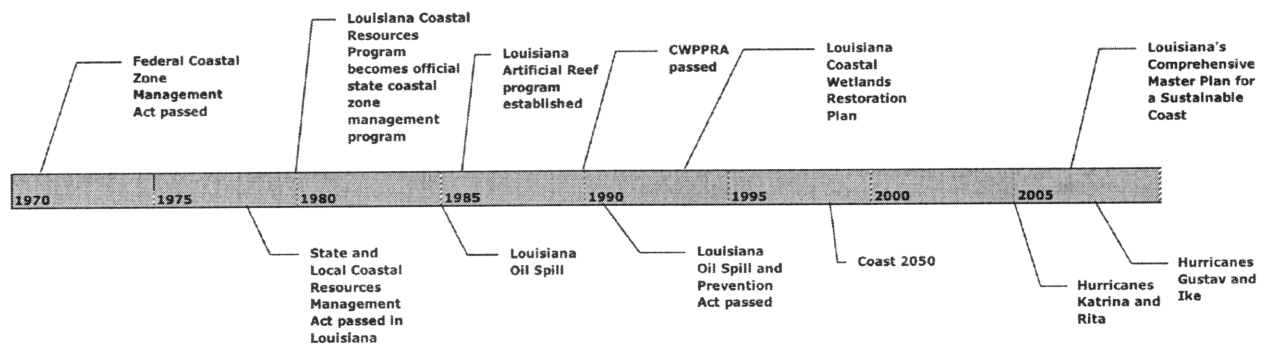
- 4) Structural flood protection projects
- 5) Ecological restoration program

Table 1 below breaks out Louisiana’s coastal restoration and management strategy into its component parts and the timeline in Figure 3 marks notable policies, plans, and programs in the last three decades.

**Table 1: Tools and Mechanisms of Louisiana’s Coastal Restoration and Management Strategy**

Tools	Mechanisms
<b>Regulation</b>	Federal and state policies
	Permits and review processes
<b>Large-scale flood protection and planning</b>	State master plans
	Structural flood protection projects
<b>Ecological Restoration</b>	Ecological restoration programs

**Figure 2: A Timeline of notable Policies, Plans, and Programs**



## Regulation

### *Federal and State Policies*

The federal government passed the Coastal Zone Management Act in 1972 to devolve power to states to develop their own state coastal zone management programs. States must provide a comprehensive program for how coastal lands and waters should be used and states must also establish a lead agency they will employ to achieve the objectives.<sup>27</sup> The basic principles of Integrated Coastal Management (ICM) guide state programs and objectives. Cicin-Sain and Knecht in their well-known book define “integrated coastal management as a continuous and dynamic process by which decisions are taken for the sustainable use, development, and protection of coastal and marine areas and resources. ICM acknowledges the interrelationships that exist among coastal and ocean uses and the environments they potentially affect, and is designed to overcome the fragmentation inherent in the sectoral management approach. ICM is multi-purpose oriented, it analyzes and addresses implications of development, conflicting uses, and interrelationships between physical processes and human activities, and it promotes linkages and harmonization among sectoral coastal and ocean activities.”<sup>28</sup> Such a definition allows ICM to function as a general framework open to wide interpretation and application to address varying contextual circumstances among coastal areas of the world. As will be discussed in the next chapter, the Pulicat community in Tamil Nadu,

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<sup>27</sup>Who's Minding the Shore?: A Citizen's Guide to Coastal Management. (1976), Natural Resources Defense Council.

<sup>28</sup>Cicin-Sain, B., Knecht, R. W., Jang, D., Fisk, G. W., University of Delaware. Center for the Study of Marine, P., Intergovernmental Oceanographic, C., et al. (1998). *Integrated coastal and ocean management: concepts and practices*. Washington, D.C.: Island Press.

India has adopted a different path for implementing the principles of ICM, which Louisiana can benefit from examining.

In Louisiana, the state law governing coastal restoration and management is the 1978 State and Local Coastal Resources Management Act (SLCRMA). The main goal of the SLCRMA is to develop and enforce a set of coastal use guidelines.<sup>29</sup> Once a state program is federally approved, federal laws must be consistent with the state program and its regulations. The Louisiana Coastal Resources Program (LCRP) became the federally recognized state coastal zone management program in 1980. The lead agency employed to achieve its objectives is the Louisiana Department of Natural Resources (Coastal Management Division). The main purpose of LCRP is to encourage multiple uses of resources and adequate economic growth while minimizing adverse effects of one resource use upon another without imposing undue restrictions on any user. In addition to regulating wetland development projects and resolving user conflicts, the LCRP also encourages coastal zone recreational values and determines the future course of coastal development and conservation.<sup>30</sup> These four goals of the LCRP include regulatory, planning, and negotiating functions.

The LCRP does not explicitly state whom it considers “users” of the coast. Within the dichotomy of environment and economy, recreational visitors, offshore oil workers, and fishermen are considered the coastal users in Louisiana. Rarely are local residents seen as users independent of their economic pursuits. However, local residents exist at the intersection of many sectors and their roles or potential roles in negotiating the conflicts between the coastal economy and environment is undervalued although their

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<sup>29</sup> <http://coastalmanagement.noaa.gov/mystate/la.html>

<sup>30</sup> <http://dnr.louisiana.gov>

investment in doing so is very high. And, SLCRMA and LCRP operate on a reactive regulatory framework whereby economic development must be limited in order to conserve the environment. This implies that economic development and environmental conservation are mutually exclusive categories. This framework prevents opportunities for exploring how economic development can promote and even enhance environmental stewardship or vice versa. By ignoring the synergies between categories and by ignoring the human relationships that characterize the various uses of the coast, regulation will only continue to marginally improve economic and environmental circumstances in coastal Louisiana.

The 1980's were an era of oil spills in United States' coastal waters. Louisiana suffered an oil spill in 1985 and the infamous Exxon-Valdez spill off the coast of Alaska occurred in 1989. That same year Louisiana passed the Wetlands Restoration, Protection, and Management Act creating the Wetlands Conservation and Restoration Authority. This mandated a percentage of oil and gas revenues to be reserved for wetland restoration in Louisiana. In 1990, the federal government passed the Oil Pollution Act and the Louisiana state legislature passed the Louisiana Oil Spill Prevention and Response Act in 1991. This set of laws reflects an ethos of "reactive restoration" and will be discussed in detail in a later section. This was a defining era in coastal restoration policy as both the federal and Louisiana governments adopted a corporate social responsibility strategy of regulation. Offshore oil companies are not actively regulated on the environmental consequences of their day-to-day activities or the cumulative consequences of their infrastructure development underneath wetlands. The 1986 Louisiana Artificial Reef program does give offshore oil companies the option to turn their decommissioned rigs

into reefs, but the required depth for these structures prevents many near shore fishermen from utilizing them. And, these reefs have not even made a dent in mitigating the cumulative impact of offshore oil infrastructure in coastal Louisiana. Rather, most regulatory mechanisms directed toward the offshore oil industry are conducted in an ex-post-facto manner whereby companies only face repercussions when there is an extraordinary incident that produces immediately visible environmental destruction.

In 1990 the federal government enacted the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) or Breaux Act named after Louisiana Senator Breaux who championed the legislation. It provides for the creation, restoration, protection, and enhancement of coastal wetlands in Louisiana and elsewhere in the nation. This legislation is directed toward ecological restoration and is focused less on restricting coastal uses so it will be discussed in detail in a later section.

A language of limitation dominates the policies of coastal restoration and management in Louisiana. Their purpose is to limit development along the coast so it does not harm the environment. The laws are directed at protecting nature from human use rather than examining the competing human uses of the coast. In creating such a maze of limitations, there are many potentially beneficial interactions between humans and the environment that can enhance environmental quality that are ultimately ignored.

### ***Permits and Review Processes***

A significant component of the LCRP is the Coastal Use Permit Program. The Louisiana Department of Natural Resources issues the state Coastal Use Permit (CUP) and it is required for any activity that could potentially result in the loss of wetlands. These activities are typically dredge and fill work, bulkhead construction, shoreline

maintenance, and other development projects. The CUP also helps resolve use and user conflicts so that one use/user does not impose undue restrictions on another.<sup>31</sup> However, there is a hierarchy of mutually reinforcing and at times conflicting permitting processes. The USACE also has a separate permitting process, and in most cases an USACE permit is not sufficient, and the state CUP is also required. However, in some instances one permit or the other is sufficient for work to begin. The final word typically rests with the Louisiana Department of Natural Resources.

The Louisiana Department of Natural Resources not only administers the CUP, but simultaneously administers a consistency review process. Any agency proposing a coastal development or restoration project must go through one of the processes, but that choice is left to the individual agency's discretion. The Federal Consistency section of the Coastal Management Division within the Louisiana Department of Natural Resources ensures that state and federal laws governing coastal restoration and management do not conflict. In that capacity they oversee federal licenses and permits as discussed above as well as direct federal actions, continental shelf activities, and federal assistance.

The "fast lands" or lands behind the levees are exempt from any permitting or review processes. Because specific areas and projects are subject to varying permitting and review processes, it is difficult to develop a coherent and coordinated strategy among federal and state agencies for coastal restoration and management in Louisiana. The newly proposed Louisiana Coastwide Authority program is intended to be a partnership between the state of Louisiana and the USACE to streamline state and federal processes, but Congress has largely rested authority and funding with the USACE. A partnership

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<sup>31</sup> <http://dnr.louisiana.gov>



between the federal and state government that does not grant equal authority to the state could create yet another complicated and lengthy process for proposed projects to move through.<sup>32</sup>

## **Flood Protection Planning**

### ***State Master Plans***

Master plans are another important component of the coastal restoration and management strategy in Louisiana. A hybrid of federal and state agencies has created three different master plans in the last twenty years. The first of these plans discussed here is the Louisiana Coastal Wetlands Restoration Plan produced by the CWPPRA. This plan used a basin-planning approach, identifying a number of projects in nine distinct hydrologic basins across the coast. These projects were estimated to last for approximately twenty years with monitoring and scientific evaluation, the results of which were to be reported to Congress. Restoration under CWPPRA proceeded early in the 1990's with the production of an annual list of restoration projects, which were a priority to construct. It quickly became clear that the staggering rate of coastal land loss could not be reversed through the \$40 million dollar per year in restoration projects that the CWPPRA is allocated.

In 1998, academia, private industry, local, state, and federal agencies took on an eighteen month effort to address the magnitude of ecological rehabilitation needed in Louisiana and developed a strategic plan for Louisiana's known as Coast 2050.<sup>33</sup> This plan served as the basis for the USACE's coastal restoration planning before Hurricanes

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<sup>32</sup> Interview with Jeff Harris, Louisiana Department of Natural Resources: Federal Consistency Division, February 26, 2009.

<sup>33</sup>Denise J. Reed, L. W. (2004). Coast 2050: A New Approach to Restoration of Louisiana Coastal Wetlands. *Physical Geography*, 25(1), 4-21.

Katrina and Rita. “The Coast 2050 plan embraces the problems at a ecosystem scale and seeks to restore essential processes rather than continued manipulation of wetland hydrology.”<sup>34</sup> It’s stated mission is to be a technically sound strategic plan to sustain coastal resources and provide an integrated multiple-use approach to ecosystem management. Coast 2050 divides coastal Louisiana into four hydrologic basins much like the CWPPRA plan mentioned earlier. Each basin had a planning team consisting of academics, policymakers, scientists, and local volunteers. The plan itself does not outline specific projects or a detailed implementation timeline. There have been incremental steps taken to implement Coast 2050 such as the creation of the Louisiana Coastal Area Ecosystem Restoration Plan in 2004, but before any action could occur Hurricanes Katrina and Rita hit in August, 2005.

The Louisiana Coastal Protection and Restoration Authority, a state agency created after Hurricanes Katrina and Rita, developed the third plan, “Louisiana’s Comprehensive Master Plan for a Sustainable Coast” in 2007. This plan reflects an ideological shift in coastal restoration and management strategies in the state. It adopts a multiple lines of defense strategy, proposed by the Lake Pontchartrain Basin Foundation, to take on both flood protection and ecological restoration. However, there are changes in language that relegate certain areas of the coast as completely uninhabitable any longer. The plan states that it is committed to “sustain to the extent possible, the unique heritage of coastal Louisiana by protecting historic properties and traditional living cultures and their ties and relationships to the natural environment.” Coast 2050 stated as one of its goals to also “preserve the heritage and culture of the region,” but it includes “for the

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<sup>34</sup>Denise J. Reed, L. W. (2004). Coast 2050: A New Approach to Restoration of Louisiana Coastal Wetlands. *Physical Geography*, 25(1), 4-21.

benefit of all communities.” This language is omitted in the current LACPRA plan.<sup>35</sup> The goal of preserving the heritage of the culture of the region implies that this culture and heritage has not evolved over time and adapted to changing circumstances. Local coastal communities have adapted to a rapidly evolving and disappearing coastline over centuries in Louisiana. This vast underutilization of coastal knowledge that historically resided with indigenous and slave communities in Louisiana and has grown in Louisiana’s existing coastal communities. This must be acknowledged and utilized rather than ignored with a only a minimal commitment to preservation. Second, some communities, particularly those south of the I-10 corridor, which are considered uninhabitable, are not included in this recent master plan’s flood protection measures. The rigidity of master plans does not allow a dynamic forum to utilize community knowledge nor does it allow for innovative strategies to work with communities located in particularly vulnerable environmental circumstances to ensure they are subject to continuous displacement.

### ***Large-scale Engineering Projects***

Although large-scale engineering projects have played a significant role in coastal restoration and management in Louisiana, they have taken on an increasingly important role in current efforts after Hurricanes Katrina and Rita. The USACE has taken the lead role in all aspects of coastal restoration and management in Louisiana, particularly at present. The USACE has a bidding process to contract the work of its engineering projects. It awards contracts based on the lowest bid for the work, but reserves the right to refuse contractors if they believe the integrity of the work will be compromised in any way. The USACE currently has no local hiring requirements and this has recently

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<sup>35</sup>Lopez, J. A., Carlton Dufrechou. (2007). *Coastal Planning in Louisiana Redefined Post-Hurricanes Katrina and Rita*. Paper presented at the Coastal Zone 07, Portland, Oregon.

produced conflict with local truck drivers who are being bypassed in the hiring process for out-of-state workers. Although local hiring is an integral component of involving local communities in a coastal restoration and management strategy, they should not be forced to destroy their natural assets to secure employment. Local employees hired to work in large-scale engineering projects may find a source of income, but they are simultaneously forced to perpetuate an environmentally destructive process that continues to provide uneven and inadequate flood protection for their communities.

The USACE planning process does entail a community participation mandate, and as such they are required to host public meetings before any projects are implemented. However, one must have a strong background in structural engineering to access the language of the meetings and participate meaningfully. These meetings are typically antagonistic and unproductive because of the language barriers. And, if one examines the areas the USACE has currently designated for its protection planning, it is clear that large swaths of coastal communities south of the I-10 corridor, particularly in southern Terrebonne and Lafourche parishes, lie outside of the USACE “planned for” areas. It is clear that large-scale engineering projects will not be sufficient for some areas of the coast because of the magnitude of environmental devastation and those residents have no forum to even voice their concerns because the existing planning tools and mechanisms do not address nor can they meet their needs.

### **Reactive Restoration**

#### ***Ecological Restoration Programs***

Much of the planned ecological restoration for coastal Louisiana, especially after Hurricanes Katrina, Rita, Gustav, and Ike has not been seen yet. The oil spill era of

legislation highlights a priority for reactive restoration whereby specific consideration is given to restoration projects that can meet the dual objectives of coastal restoration and spill mitigation without compromising the future of the oil and gas industry.

The 1989 Wetlands Restoration, Protection, and Management Act that provides revenues from oil and gas tax revenue for wetland restoration has many implications. As of 2005, Louisiana received less than 1% of the tax revenues or 40 million out of 5 billion dollars in total tax revenue from offshore oil drilling. “This speaks to the growing tension between the state’s uncompensated support for offshore drilling and the state’s coastal management program.”<sup>36</sup> Even the entire sum of Louisiana’s tax revenue share from offshore drilling cannot fund any significant restoration projects. Not only have the western U.S. states banned offshore oil drilling, but have secured 50% of tax revenues from the remaining limited drilling. Louisiana senators Landrieu and Vitter fought hard to ensure that at least 10% of oil and gas revenues from Louisiana’s coast are reserved for the state, but this will only be effective beginning 2012. The revenue sharing will go toward wetland restoration and levee protection, but it is directed specifically at protecting damaged oil infrastructure that is buried under disappearing wetlands.

Furthermore, the National Resource Damage Assessment process that is required under the Louisiana Oil Spill Prevention and Response Act of 1991 after an oil spill occurs is limited to restoration that is directly linked to the spill incidents, and narrows the scope of restoration to repair immediate damage. Although the legislation addresses the ecological impact of oil spills, it does not acknowledge the cumulative effect of oil infrastructure and transportation on coastal environments and communities.

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<sup>36</sup> Allen, G. (February 14, 2006). Louisiana Demands More of Offshore Oil Revenues. *NPR*.

The Coastal Wetlands Protection, Planning, and Restoration Act (CWPPRA) is currently the only formalized state program that addresses ecological restoration. The CWPPRA Technical Committee receives bids for coastal restoration and management projects; there are three agencies responsible for handling these bids: The Louisiana Department of Natural Resources, the United States Department of Agriculture-Natural Resources Conservation Service, and the USACE-New Orleans district. The CWPPRA task force is charged with making final decisions concerning issues, policies, and procedures necessary to execute the projects. The task force is chaired by the New Orleans District Commander of the USACE, which further reflects the heavy presence of the USACE in all aspects of coastal restoration and management in Louisiana. Although the ecology of Louisiana's coast has been diminished largely due to engineering feats, the USACE still oversees the main ecological restoration program of the state. This may explain why restoration activities have been mainly reactive rather than proactive in creating new natural assets.

There is a citizen participation committee in the CWPPRA hierarchy but it is disconnected from other committees like the environmental and economic assessment groups, which could potentially generate positive synergies. Instead, the citizen participation committee is only directly linked to the task force and technical committee and functions to review proposed projects. Although there is the opportunity for this committee to generate citizen input for new projects, the CWPPRA process is reputed to be long and laborious so residents are not inspired to meaningfully participate. Additionally, many restoration projects are not necessarily aimed at building a stronger coast; some species conservation projects are actually aimed at maintaining a certain

level of fauna for sport hunting such as the historic waterfowl conservation law.<sup>37</sup> Even if this law helps sustain waterfowl, it is intended for their further exploitation. This is yet another reason to gain community input in determining the kinds of restoration projects that have the greatest impact in protecting the coast.

Ecological restoration and improvement provide the most viable opportunities to reconcile the dual goals of economic development and flood protection. But, even those programs have always been directed toward protecting extractive enterprises rather than local residents. And, in that way Louisiana's current ecological restoration strategy has failed to restore deeply diminished natural assets. Ecological restoration and improvement activities have the potential to utilize existing community knowledge while providing economic opportunities for local residents in implementation. The next chapter discusses how the coastal community of Pulicat has done this in India.

### ***Moving Away From a Reactive Framework***

Regulatory measures combined with large-scale engineering projects and reactive restoration projects broadly covers the spectrum of coastal restoration and management tools and mechanisms in Louisiana currently. Regulatory tools control the extent of development along the coast, engineering projects provide inadequate and unequal flood protection while heavily diminishing natural assets, and ecological restoration is directed toward mitigating the environmental impact of these economic development and flood protection measures. This reactive framework is problematic in three significant ways:

- 1) There is no long-term vision to guide coastal restoration and management, which continues to perpetuate a reactive strategy

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<sup>37</sup>Davis, D. E. (2006). *Southern United States: an environmental history*. Santa Barbara, Calif.: ABC-CLIO.

- 2) The current tools and mechanisms of Louisiana's coastal restoration and management strategy completely circumvents many local communities' needs
- 3) The potentially economically and environmentally beneficial activities required for restoring and improving natural assets that integrate rather than separate economic development and flood protection cannot be implemented using the current tools and mechanisms

This chapter has shown how the current tools and mechanisms of coastal restoration and management are socially constructed to the disproportionate benefit of extractive enterprises and not local communities. The next chapter is a case study of Pulicat, a coastal community in India's Tamil Nadu state. The case study illustrates how this community's approach to coastal restoration and management directs the environmental and economic benefits to its local residents, providing valuable insights for Louisiana.



### CHAPTER 3

#### A Case Study for Comparison: Pulicat, Tamil Nadu

Many nations face the same urgent environmental and economic challenges as coastal Louisiana. India, a peninsular nation of nearly 5,000 miles of coastline faces multiple challenges in coastal restoration, management, and development identical to those in the United States. The field of comparative international studies has identified environmental degradation, marine pollution, resource depletion, and loss of habitat as problems faced by both developed and less developed nations.<sup>38</sup> Particularly, the coast of Tamil Nadu, a southern state of India, is comparable in many respects to coastal Louisiana. The Tamil Nadu coast of over 650 miles has been a national priority for coastal restoration in India because of the population density of its coastal communities including over 500 fishing villages. The 52 fishing villages near Pulicat Lake in Tamil Nadu, located thirty-six miles from the capital city of Chennai, referred to collectively as Pulicat, will be the focus of this thesis.

Pulicat is an ideal case study for comparison to coastal Louisiana because of the similarity in geography, environmental conditions, economic history, and coastal policy decision-making processes that it shares with coastal Louisiana, particularly Terrebonne parish. Figures 4 and 5 on the next page show maps of both Terrebonne parish and Pulicat at the same scale and Table 2 on the following page displays their similar characteristics in greater detail.

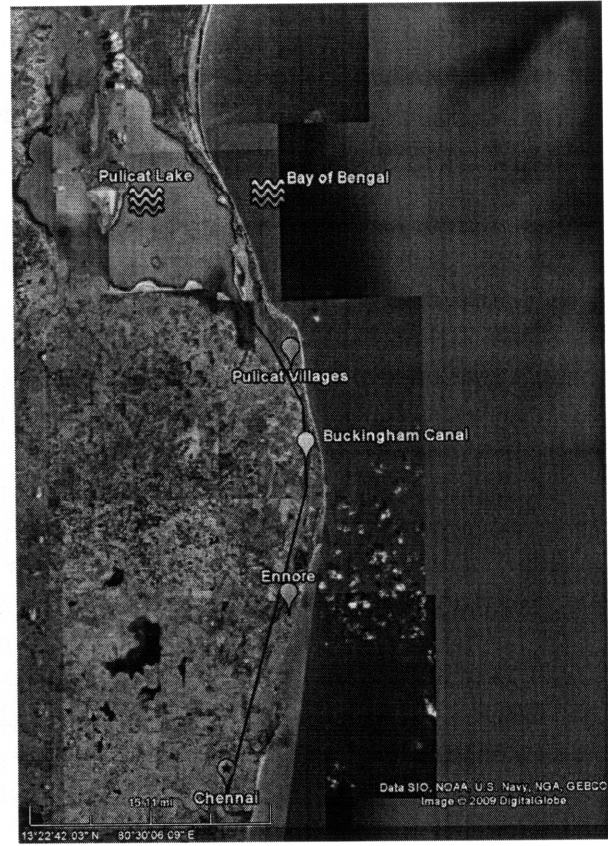
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<sup>38</sup>Manoj, G., Stephen Fletcher. (2001). The application of a proposed generic institutional framework for integrated coastal management to India. *Ocean & Coastal Management*, 44, 757-786.

**Figure 3: Terrebonne parish, Louisiana**



**Figure 4: Pulicat, Tamil Nadu**



**Source: Google Earth**

*Framework for Comparison*

**Table 2: Physical, Economic, and Political Characteristics for Comparison**

	<b>Comparative Features</b>	<b>Coastal Louisiana</b>	<b>Pulicat, Tamil Nadu</b>
<b>Physical</b>	<b>Geography</b>	Estuarine environment Cypress trees	Estuarine environment Mangrove trees
<b>Physical</b>	<b>Environmental Conditions</b>	Degraded coast, fisheries exploitation, vulnerability to natural disasters	Degraded coast, fisheries exploitation, vulnerability to natural disasters
<b>Economic</b>	<b>Economic History</b>	Extractive enterprises and subsistence livelihoods	Extractive enterprises and subsistence livelihoods
<b>Political</b>	<b>Decision-making entities</b>	U.S. Army Corps of Engineers Louisiana Dept. Natural Resources	India Ministry of Environment and Forests Tamil Nadu Ministry of Environment and Forests
<b>Political</b>	<b>Current Strategy</b>	*Formal 2007 plan has commitment to sustaining heritage of the coast to extent possible	*Formal 2008 plan has explicit commitment to coastal population
<b>Political</b>	<b>Community participation</b>	Communities are consulted during plan formulation	Interest groups lobby the states to represent their concerns in policy-making

The features in Table 2 above display the characteristics that provide the most significant comparisons between Pulicat and coastal Louisiana. However, the most striking comparison that brings all of these features together is that Pulicat also experiences great disparity between coastal residents and users that is increasing the level of environmental harm in the area much like in coastal Louisiana. However, Pulicat although existing in a very similar physical, economic, and political environment as coastal Louisiana has emerged as an example of empowered community participation directed toward reconciling ecological restoration and improvement with local wealth creation. This particular fishing community has developed ways of creating economic opportunities for local residents by utilizing and enhancing their existing knowledge of the coast for the purpose of protecting, restoring, and improving their natural assets.

Pulicat is characterized by a unique estuarine ecosystem nestled between Pulicat Lake to the north and the Bay of Bengal to the east much like The Mississippi River and Gulf of Mexico in coastal Louisiana. Three small rivers, Swarnamukhi, Kalangi, and Arni also open into the lake. Pulicat Lake is the second largest brackish water system in India. The fishing villages around the lake line a strip of approximately twelve to fifteen miles of coastline from the Ennore Creek in the south to the lake mouth where Pulicat Lake meets the Bay of Bengal in the north. Figure 6 on the next page shows a closer view of the area. This particular area, populated by over 100,000 residents, is a highly threatened coastal ecosystem in India today.<sup>39</sup> A closer examination of how these villages have adopted strategies addressing the various threats to their communities including pollution,

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<sup>39</sup>Sanjeeva Raj, P. J. (1999). North of Chennai, India: Developmental Impacts on Coastal Ecosystems. *The Indian Geographic Journal*, 74(1), 1-10.

coastal erosion, saltwater intrusion, and overfishing will provide an insightful comparison to coastal Louisiana.

The first part of this chapter discusses the geographic and economic similarities between Pulicat and coastal Louisiana. The second part broadly discusses the evolution of India's coastal management strategy and trajectory toward ecological restoration. The chapter concludes with an examination of the community-university partnership between Pulicat and Madras Christian College that serves as an example of a locally empowering implementation strategy for coastal restoration and management that reconciles both the need for economic opportunities and natural assets for local residents, who are almost exclusively fisherfolk.

### **Geography**

Pulicat's geographical location in northern Tamil Nadu along the Coromandel coast places it in a similar climate zone as most of coastal Louisiana. Pulicat is also known for its rich biodiversity, notably its pelicans, storks, flamingoes and egrets, which have made the community home to the largest bird sanctuary in India. Much like coastal Louisiana, fish, shrimp, and oysters are the main seafood industries in Pulicat, although oysters and catfish, found in abundance, are not sought after delicacies as they are in the United States. The white shrimp does remain the most popular seafood as in Louisiana. In addition to the three rivers listed above, the Buckingham canal completed by the British in 1876 runs through most of the lake's twenty-five mile length. The economic purpose and environmental consequences of this canal will be discussed later.

Pulicat was also once a rich mangrove forest; mangroves serve the identical protective purpose as cypress trees in Louisiana. For centuries they rooted the soil and

abated the coastal erosion process before being cut down. Mangroves in Pulicat, which are also found in coastal Florida and Louisiana, have historically grown in estuarine environments and require specific levels of salinity and water depth to survive. With increased saltwater intrusion coupled with an encroaching shoreline in Pulicat, they too have died. The Tamil name for Pulicat is Pazhaverkaddu (pronounced parra-ver-kaadu) Pazham means fruit, ver means root, and kaddu means forest. It is believed that the forest referred to in its name, is the mangrove forest that once covered the coastal landscape of Pulicat.

## **Environmental Conditions**

### ***Sedimentation***

Rapid silt deposition into Pulicat lake, typically during the monsoon season in the summer, has caused the lake mouth leading into the ocean to completely close on several occasions because large sand bars develop. This causes high variability in the salinity of the lake water. Initially, the monsoon brings in large amounts of fresh water, which decreases salinity, but water cannot move into or out of the lake once the mouth is closed, which causes the water in the lake to evaporate and the salinity begins to increase making it an unsuitable environment for most organisms.<sup>40</sup> Additionally, fish, shrimp, crab, plankton, etc. can neither enter the lake when the mouth closes nor can they breed when salinity is in constant flux, and that limits flora and fauna growth in the area. Inshore waters are the breeding grounds for economically important seafood and brackish waters are the growing grounds, and an open lake mouth is critical to maintaining this balance.

Interestingly, silt deposition is exactly the opposite problem coastal Louisiana faces because the entire levee system there was designed to abate the natural silt

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<sup>40</sup>Sanjeeva Raj, P. J. (December 29, 1984). Plight of fisherfolk of Pulicat area. *The Hindu*, p. 18.

deposition process produced by the Mississippi River, which historically inhibited trade into and out of the port of New Orleans. Silt deposition in Pulicat has occurred as an inevitable consequence of two activities in particular. The first is extensive deforestation, which has uprooted topsoil. The second is the digging of riverbeds for building materials, which results in top soil erosion along the watersheds and riverbeds as top soil drifts as silt into the waterways. Much like coastal Louisiana, economic enterprises have dictated the character of environmental harm.

Erosion in one part of the lake is directly connected to silt deposition in another part of the lake. Although this has led to some beneficial consequences like the development of marshes in the northern part of the lake, the undirected silt deposition has buried bottom vegetation, oyster beds, as well as shrimp and crab in the western part of the lake.<sup>41</sup> When speaking with villagers in Pulicat, I found that many have noted water levels approaching further and further inland over their lifetimes. They have had to move their modest homes further and further back every year because of the encroaching shoreline and they are almost at the point where backing up any further will run them into the Buckingham Canal. The most rapid erosion process is found mainly south of the lake, north of Ennore Creek, but that too is moving farther north every year. If this erosion intensifies, geographic changes like the sea merging with the backwaters, could change the entire hydrology and fisheries in Pulicat, forcing local people to drastically adapt or leave.<sup>42</sup>

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<sup>41</sup>Sanjeeva Raj, P. J. (1993). Sustainable Development of the Pulicat Lake, India. *Social Action*, 43, 226-233.

<sup>42</sup>Sanjeeva Raj, P. J. (2002). Coastal Ecotourism Potential, North of Chennai. *The Indian Geographic Journal*, 77(2), 77-89.

## *Overfishing*

All residents in the more than 52 villages of Pulicat are either directly or indirectly connected to the fishing industry. Many of the more than 10,000 fisherfolk in Pulicat limit their activities to the lake because of the type of boats and gear they own, while others with larger boats and capacity to stay out at sea for days at a time will venture to fish in the ocean. Overfishing has become an increasingly devastating problem as the traditional use of management systems has broken down in Pulicat and the co-management of the fisheries as common property has transformed into an unregulated open access resource to be exploited by those with the most advanced extraction techniques. The most noted traditional fishing management system in Pulicat is the Paadu system. This system meticulously regulates certain villages alone to fish in specified areas in the lake on certain days of the week, and limits the type of gear allowed. It is based on the caste system hierarchy, so higher castes are allowed to fish with more advanced gear and in better locations of the lake while lower castes are relegated to handpicking shrimp and remaining within a certain distance of the shoreline. Over time, as residents resisted the oppressive criteria of the Paadu system, villages began overfishing on the days they had access to the lake and this has led to severe depletion of the lake's fauna. However, this has contributed only slightly to overfishing, rather it has been the commercialization of the fishing industry that has caused the most severe damage. This transformation of the fishing industry in Pulicat will be explained in greater detail later in the chapter.



## ***Natural Disasters***

A significant comparison between coastal Louisiana and Pulicat as well as the entire coast of Tamil Nadu is the magnitude of natural disasters both have sustained in less than five years. The Indian Ocean Tsunami of 2004 overhauled the entire marine ecosystem in much of Tamil Nadu. Although Pulicat is located north of the critically affected areas, and did not suffer the same level of direct damage from the tsunami, those residents too have felt the environmental and economic consequences of the event. Fisherfolk in Pulicat, particularly those who fish in the ocean, have reported that they are catching half the fish they used to before the tsunami and that shrimp are smaller in size than they used to be. They also reported that the groundwater is much saltier after the tsunami and this requires de-salination mechanisms to be scaled up.

The level of environmental and economic exploitation by external actors has greatly increased after the tsunami because export-related business, such as the shrimp-farming industry which will be discussed later in the chapter, have been heavily under-regulated in hopes of bringing investment to devastated areas of the coast.

## **Economic History**

### ***A History of Economic disparity and Environmental Exploitation***

The history of Pulicat dates all the way back to 300 BC when it was established as a grand seaport. Nearby rulers of Tamil Nadu and Andhra Pradesh, two states that border the area, fought for control of the port and the associated revenues. Over centuries it became the most important Indian port along the Bay of Bengal. The Portuguese established a trading outpost in the town of Pulicat in 1502 and controlled the port for approximately one century. In 1606, the Dutch stopped in Pulicat and struck a deal with

the local residents to supply merchandise for their East India trade. From 1616 to 1690, Pulicat was known as the official headquarters of the Dutch East India Company and as the Dutch flagship settlement along India's southern Coromandel coast. During this same period, the Dutch also operated an extensive slave trade through the port at Pulicat, shipping over 38,000 Indian slaves to their various colonies. Slave labor was a defining element of the high production levels found in Pulicat much like the history of the agricultural landscape in coastal Louisiana. In Pulicat, manufacture of cloth for export was the principal occupation for local residents. Pulicat to this day is still famous for the quality and beauty of the checker-patterned lunghis (long skirts) produced there. The Dutch also began a timber industry from the dense mangrove forests found in Pulicat and shipped the wood up and down the lake and exported it through the port. This began the widespread destruction of the mangrove forest that had until then maintained a robust estuarine ecosystem. This history of natural resource extraction for export purposes foreshadows the character of extractive enterprises yet to arrive in Pulicat. It is notable that this history is identical to coastal Louisiana. By 1825, the British secured control of Pulicat from the Dutch. They completed the construction of the Buckingham canal in 1876, a 250-mile long salt water navigation canal, which cuts through Pulicat lake and runs north-south parallel to the coastline. The Cooum river connects the canal to the Bay of Bengal in Tamil Nadu's state capital, Chennai. The British created this canal to transport goods up and down the coast to Chennai. Over time this has had led to serious environmental consequences, which will be discussed later.<sup>43</sup>

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<sup>43</sup> Interview with Logamanya Tilak, Professor, MCC Department of Marine Studies and Coastal Resource Management. January 11, 2009.

The cumulative environmental fallout from extractive colonial enterprises in Pulicat is compounded today with contemporary forms of environmental and economic exploitation similar to coastal Louisiana. First, neighboring industries that have come into the area in the last few decades have created varieties of unbridled water pollution. The most significant of these is the North Chennai Thermal Power Station (NCTPS) located about thirty miles from Pulicat. The plant emits tons of thermal effluents as well as sulphur oxides down the lake through the Buckingham canal. The combined thermal and chemical pollution has caused a destructive rise in water temperature in the lake and even in the surrounding ocean water, sometimes as high as 58 degrees Celsius. This pollution is coupled with a swift current resulting from NCTPS suction pumps that are draining lake water through the Buckingham canal to serve as coolant for the plant. The cumulative effect of this trauma to the lake environment has led to massive fish killings, and over time fish, crab, and shrimp have migrated away from Pulicat. This has affected the lower caste, mainly Irular tribes people the most since they depend on handpicking shrimp close to the shore, but even large-scale fisherfolk who typically fish further out in the ocean are feeling the effects.<sup>44</sup> Next, the city of Chennai discharges its municipal sewage just five miles off shore and it floats down the Buckingham Canal to Pulicat and neighboring communities only adding to the pollution of the lake. Lastly, fourteen smaller petrochemical plants along the nearby coast discharge chemical waste that flows down the lake and is contaminating fish habitats and rendering the water completely unsafe for human use as well. In January 2009, MIT students conducted tests on various sites for drinking water in Pulicat. They found E.Coli colonies and at least 50 total

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<sup>44</sup>Sanjeeva Raj, P. J. (1999). North of Chennai, India: Developmental Impacts on Coastal Ecosystems. *The Indian Geographic Journal*, 74(1), 1-10.

Coliform in every one of the several 100 mL samples they collected. The very industries that are polluting the lake and the community's water supply while also displacing fisherfolk refuse to offer anyone from Pulicat jobs in the plants as an alternate source of income. The desperation of fisherfolk, who are turning to the very industries that are diminishing their environments for jobs, speaks to the great need for restorative activities that provide economic opportunities for local people. This mirrors Patty Whitney's statement from the beginning of this thesis that local people do not have the money to protect their own environment and they must be economically empowered to reduce environmental harm.

The creation of the Buckingham canal along Pulicat Lake for shipping and navigation, much like in coastal Louisiana, has resulted in severe damage to the ecosystem and surrounding communities. The Buckingham canal has filled with sewage, debris, and surface runoff over time. And, because the canal links freshwater from the lake with brackish which then runs into the ocean, it has been instrumental in destroying the saltwater environment by creating additional backwaters. This in turn floods much more of the coastal areas during a storm and increases saline variability in the water.

The systematic destruction of the mangrove forests over time has been severely detrimental to Pulicat. It began with the Dutch cutting down the mangrove forests for timber. And, today mangrove trees are continuously dying from exposure to the chemical and thermal effluents described earlier. Large seafood export companies have exploded along coastal India after the tsunami and compound existing threats to mangroves by clearing out masses of them to make room for shrimp aquaculture farms in the brackish water environment. This systematic destruction of mangroves has both accelerated the

coastal erosion process and reduced a nursery environment and habitat for fish, shrimp, and other flora and fauna, and explains why residents are seeing visible reductions. Much like coastal Louisiana, oxygen depletion from the destruction of mangrove trees in Pulicat has both serious human and ecological consequences. Massive scale reforestation will be necessary to reverse this process and restore the foundation for a healthy coastal ecosystem.

In the last two decades, the increased commercialization of the seafood industry has produced a number of negative environmental and economic consequences. This commercialization has occurred in two significant ways. First, traditionally subsistence fishermen have been forced into export fishing practices, which has undermined any form of a management system for fishing and resulted in severe overfishing. And, this export emphasis has forced fisherfolk to focus more on catching seafood that is desired for export resulting in a great deal of waste from their catches, which is diminishing the lake's biodiversity at a staggering rate. The coastal landscape of Pulicat has been transformed by middle-men and agents from export companies setting up purchasing stands, ice storage facilities, and transportation along the shore. Local fishermen are also faced with the economic consequences of this commercialization. Middle-men are deliberately buying fish at far below market prices because the fisherfolk have no other option but to immediately sell the additional fish they are catching upon arrival onshore since they do not have the technology to preserve their fish beyond half a day. They have no way of directly selling their catch in city markets so they depend on a single middle-man to whom they must commit all their sales. Overtime, local fisherfolk have been

forced to diminish their own natural assets to the disproportionate benefit of external actors.

The second form of commercialization has been the proliferation of shrimp aquaculture farming along India's coast. "The Indian government enacted a lease policy that rented government land very cheaply for shrimp aquaculture farming to private entrepreneurs. The government heavily subsidized start-up activities and provided investors with financial incentives while small-scale shrimp farmers were denied all forms of government support on the grounds that their land tenure for aquaculture was not secure."<sup>45</sup> Not only was the Indian government subsidizing private large-scale shrimp farming at the expense of small-scale fisherfolk, but not even benefiting itself from the revenues of the leased lands. This is exactly what happened in Louisiana through the offshore oil industry. The Louisiana government signed away its coast to the federal government and gained almost none of the oil revenues from drilling while coastal communities have borne the environmental costs. "Private shrimp farmers in India have seized open-access lands such as beaches, grazing areas, and mangroves at the expense of communities of fisherfolk who disproportionately bore the environmental impacts of shrimp businesses. This includes the depletion of fishing grounds through mangrove destruction and trawling for larvae, direct interference with fishing activities because of increased water turbidity, loss of traditional access rights to fishing grounds, and contamination of drinking water sources."<sup>46</sup> Although the export industry has allowed fisherfolk to gain additional income beyond a subsistence livelihood, it is coupled with a

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<sup>45</sup> Brugere, Cecile. "Can Integrated Coastal Management Solve Agriculture-Fisheries-Aquaculture Conflicts at the Land-Water Interface? A Perspective from New Institutional Economics." *Environment and Livelihoods in Tropical Coastal Zones*, 2006. p. 258-273.

<sup>46</sup> IBID

rapid diminishing of natural assets from a number of reinforcing sources. Overfishing coupled with the clearing of lands for aquaculture farming and the continuous unregulated pollution of the lake has resulted in serious environmental and economic exploitation, the combined impact which has yet to be quantified, but is acutely visible. Fisherfolk are gaining a marginal increase in expendable income but simultaneously, but at the expense of their own natural assets and ultimately their livelihood security.

### **Political Circumstances**

#### ***India's Integrated Coastal Management Framework***

India's national Ministry of Environment and Forests (MEF) determines national coastal restoration and management policies based on the principles of Integrated Coastal Management (ICM). While the U.S. follows an ICM strategy directed toward managing traditionally fragmented sectors of coastal development, the Indian MEF defines ICM as a "process by which decisions are made for the protection of coastal populations and infrastructure; protection and conservation of coastal and marine areas and resources; and sustainable development."<sup>47</sup> This definition makes an explicit commitment to coastal populations, separate of their role as users, as a priority in coastal management policy. This critical distinction is the foundation for a very different trajectory in coastal restoration and management in India than found in the United States. However, reconciling the ecologically restorative strategy for the coast with protecting coastal communities has been an enormous challenge. In India, protecting coastal communities is not just about flood protection, but includes livelihood security as well. In Louisiana the objectives of flood protection and large-scale economic development have undermined each other with little focus on consequences to livelihood and environmental security for

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<sup>47</sup>*Coastal Zone Management Notification*. (2008). Indian Ministry of Environment and Forests.

local populations until lately. In India large-scale economic development has severely undermined livelihood security for coastal communities, a disparity that has only increased after the Indian Ocean Tsunami in 2004. Although the Indian MEF is aware of this, many of its policies in the last two decades have still marginalized local communities, specifically because they restrict access to natural resources for subsistence level income-generating opportunities without matching restrictions on large-scale enterprises. However, communities have organized to ensure that policies do not continue to marginalize coastal residents both environmentally and economically.

The most significant and controversial national coastal policy was the 1991 Coastal Regulation Zone Notification (CRZ), which received much criticism for its rigidity in doling out development restrictions based on a single High Tide Line for the entire country. The legislation had a disproportionate impact on fisherfolk because many of their activities, typically occurred well within 500 meters of the High Tide Line, which was the limit for any economic activity. Going further out to sea to fish or harvest shrimp has led to a serious loss in profit to these fishermen over time. Much like the United States' 1970 Coastal Zone Management Act, India's national framework for coastal restoration and management devolves power to individual states to develop their own coastal zone management programs, but provides some fundamental national principles to abide by such as the 1991 CRZ did. This has not been accomplished without plenty of rebuttal from coastal populations in India and their representative agencies and organizations.

The focus of this paper is the state of Tamil Nadu where Pulicat is located. "Some of the negative consequences of the CRZ are particularly acute in the southern states of



Tamil Nadu and Kerala because of the state shoreline barrier planting initiatives coupled with the restrictions of the High Tide Line. The ecological benefit of these initiatives is not balanced with the consequences it will have on local communities, which includes a higher cost to access the ocean for traditional fisherfolk who typically remain closer to the shore as well as decreased income from the reduction in biomass based income sources.”<sup>48</sup> These ecological restrictions imposed by the government coupled with the under-regulated encroachment of export companies along the coast who can bypass the cost of restrictions impacts local communities the most. They are faced with both diminishing natural assets and economic opportunities. And, similar to the United States, a need for individual awareness on climate change and coastal erosion in local communities is misplaced because it assumes they are source of the problem.

The protests from fisherfolk all over coastal India, most vehemently from the Tamil Nadu Fishermen’s Association, resulted in 21 revisions of the 1991 CRZ in less than fifteen years. “It was amended 21 times and each time the rules were relaxed, activists and fishermen allege, it was done to accommodate developers’ interests.”<sup>49</sup> Finally, the Indian MEF convened an Expert Committee to review the CRZ from July 2004 to February 2005. The Expert Committee led by the M.S. Swaminathan Research Foundation (MSSRF) in Tamil Nadu included experts from the areas of environmental law, marine biodiversity, marine geology, environmental economics, socioeconomics, remote sensing, coastal engineering, urban planning, and marine fisheries. Engineering is only one component of many in this more holistic approach, which in India is a new direction in coastal restoration and management.

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<sup>48</sup>Damodaran, A. (2006). Coastal resource complexes of South India: Options for sustainable management. *Journal of environmental management*, 79(1), 64-73.

<sup>49</sup> Who's happy with CRZ notification? (January 13, 2009). *The Deccan Herald*.

Similar to the engineering heavy ethos of coastal restoration in Louisiana, the Tamil Nadu government demanded the creation of a 650-mile sea wall after the 2004 tsunami to protect its coast from future natural disasters. While the penchant for constructing sea walls has not completely waned, it has gradually given way to bio shields as natural barriers. And, the M.S. Swaminathan Foundation has been spearheading this bio shield restoration strategy in India. Consequently, the Expert Committee found seven significant parameters for determining vulnerability of the coast: elevation, geology, geomorphology, sea level trends, horizontal shoreline displacement, tidal ranges, and wave lengths. The committee then developed a set of recommendations that reflect a more integrated approach inspiring the most recent Coastal Zone Management Notification (CMZ) in May 2008. This legislation was intended to acknowledge the geographic, economic, and demographic diversity in coastal zones throughout India. However, non-profits that tracked the committee review process say that the Indian MEF diluted the seven parameters down to only four when creating the 2008 CMZ.<sup>50</sup> The 2008 CMZ also proposes to set up a 32-member National Board for Sustainable Coastal Zone Management to be chaired by the Indian MEF. The board is intended to provide policy advice, but will have no regulatory functions. This is similar to the participatory platforms available in Louisiana's coastal restoration and management framework where input is limited to consultation.

India's CMZ divides the country's entire coast into four zones. Zone 1 delineates ecologically sensitive areas; Zone 2 delineates areas of particular concern, which include economically important areas, high population density areas, and culturally and/or strategically important areas; Zone 3 delineates open areas excluded from the other

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<sup>50</sup> Who's happy with CRZ notification? (January 13, 2009). *The Deccan Herald*.

zones; and Zone 4 delineates India's island territories of Andaman and Nicobar, Lakshadweep, and other areas where mostly indigenous communities live. The vast majority of Tamil Nadu's coast falls under Zone 2, which is the most complex, diverse, and contested coastal area of the nation precisely because it consists of multiple users and interests. The national framework provides a set of basic guidelines for each zone. Below is a list of significant guidelines for Zone 2 that attempt to protect coastal communities from inundation as well as their livelihood security:

1. All the existing roads including the internal roads shall be strengthened as these roads serve livelihood, communications, and evacuation purposes for coastal communities
2. Adequate cyclone shelters shall be constructed taking into account the population of the area
3. Bioshields utilizing local vegetation and mangroves shall be planted along the coast
4. Sand dunes, shall be maintained or regenerated by planting shrubs or through other appropriate measures
5. There shall be no regulation with regard to fishing and fishery related activities.<sup>51</sup>

Each state in India is still in the process of creating its own programs based on the principles outlined in the national framework. This has proven to be a difficult process as discussed earlier; there are numerous published critiques on how the state planning efforts have failed to produce truly integrated plans for coastal management. In fact, in

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<sup>51</sup><sup>51</sup>*Coastal Zone Management Notification*. (2008). India Ministry of Environment and Forests.

September 2008, the Tamil Nadu Chief Minister, the equivalent of a state governor in the United States, asked the Indian Prime Minister to defer the CMZ because Tamil Nadu coastal communities, specifically fishermen, remained apprehensive about the effect it will have on their livelihoods. This continues to be an ongoing state-federal conflict that sheds an important insight for developing coastal policy.

Although the evolution of coastal policy-making has focused on integrating environmental and economic concerns through ICM principles, it has neglected to address the complexity of human relationships that dominate the environmental and economic coastal landscape on a number of levels. Coastal communities represent the physical intersection between environmental and economic uses of the coast. As discussed in the first chapter, they have utilized the coastal environment for centuries in a sustainable manner while also gaining economic opportunities from the associated activities. And, any coastal restoration and management strategy that does not commit to empowering coastal communities to restore this relationship with the economy and environment will continue to allow increased environmental harm.

The revised spatial division of the coast in the CMZ addresses the need for protection through infrastructure, economic development, and ecological restoration of the coast, but many of these directly undermine the stated goals of sustainable development and livelihood security for coastal communities. For example, if all fisheries related activities remain unregulated, it continues to benefit larger export-oriented activities over traditional fisherfolk. The objectives of protecting coastal communities and maintaining their livelihood securities must be reconciled through policies, education, and elevated forums for community participation.

It is important to note that much like Louisiana and the United States, India and Tamil Nadu still maintain a very sectoral approach to planning for the coast. Although the four zone designations above reflect a deeper analysis into the complex web of coastal uses and communities, the framework does not immediately enable an approach to planning for intersecting and at times conflicting coastal uses. Much like the United States, citizens are forced into interest groups, which are simultaneously competing and inherently forced to undermine each other for resources and protection, and often this is accomplished through existing community participation forums. There is no reason that fisherfolk should be against bio shield restoration activities along the coast. Ultimately, ecological restoration will improve their livelihoods exponentially. However, there is no system of economic incentives that encourages local residents to participate in ongoing stewardship of their environment and they remain to be coerced into diminishing their natural assets to generate income. The new zone designations in the 2008 national plan do not address the perceived competing interests of environmental improvement and economic activities, but rather continue to divide economic zones from ecologically sensitive zones while simultaneously severing those objectives from local wealth creation. And, with that the possibility for achieving multiple objectives becomes a distant reality. Rather, coastal interest groups lobby for sectoral interests and the most organized groups win, which has typically been the large associations that speak for fisherfolk.

## **Community Participation**

### ***Interest Group Competition***

Tamil Nadu fisherfolk in particular have very strong and organized support from the state fisheries department. In the last months, the state fisheries department has come out against the CMZ asserting that it still restricts fisherfolk's activities too much. Much like coastal Louisiana there are strong interest groups that represent a variety of coastal stakeholder interests. Commercial fisherfolk are well-represented whereas indigenous Irular tribes people and women are not formally represented unless through NGO advocacy efforts. Allowing fisherfolk unrestricted fishing rights directly undermines traditional fisherfolk, and that is compounded further by complex caste-based hierarchies. Irular tribes people's livelihood securities are further compromised and disproportionately affected by the negative environmental impact of large-scale fishing activity such as pollution and overfishing. The absence of a forum for these competing interests to be heard for the purpose of building a more coherent strategy for coastal restoration and management continues to be the most significant challenge.

India's national framework is not perfect nor is it the best example of a coastal restoration and management strategy, but there is at least a national consensus to commit to amending the overall strategy based on local input as evidenced in the CRZ and CMZ processes. The national government has a pulse on local concerns and consequences of plans through the active involvement of state fisheries departments, NGO's, and educational and research institutions in coastal communities throughout India.

## *Insights from a Case Study*

### **Community-University Partnership**

Governmental and non-governmental intervention in coastal restoration and management in India has been well documented. However, the involvement and impact of educational institutions in coastal communities is not as well documented and this may be the path to a new coastal restoration and management strategy that moves away from the master plan and competing interests methodology into a coalition-based mosaic of community-scale responses characterized by empowered community participation. Not only do educational institutions possess an appreciation for recognizing and utilizing community knowledge, but the ability to enhance this knowledge to co-create innovative strategies in coastal restoration and management. Many times they also possess the political clout to convene multiple interest groups while also possessing the ability to remain somewhat detached in facilitating discussion among them as well to avoid mis-education. Lastly, they have resources to initiate smaller scale community-level responses to coastal restoration and management that are customized to meet local needs, but also institutional foresight to help build a more comprehensive strategy from these small-scale responses. Madras Christian College's partnership with the community of Pulicat is a relevant case study detailing some of these community-scale projects intended to avoid mis-education, provide elevated levels of community participation, and influence coastal restoration and management policies.

As discussed earlier, none of the governmental institutions in Tamil Nadu has yet to develop a state-specific framework for coastal restoration and management. However, individual educational and research institutions have paired with coastal communities to

initiate community-level change that is tailored to the specific needs of those areas. The following discussion will focus on the community-university partnership between Madras Christian College and Pulicat coastal community.

Professor P.J. Sanjeeva Raj, former head of the Zoology Department at Madras Christian College (MCC), located in Chennai, established a partnership between the department and Pulicat in 1968. One of the initial steps in the partnership was constructing a lab directly on the lakeshore where graduate students from MCC can reside for weeks at a time while conducting fieldwork. The lab also employs local fisherfolk to maintain the facility and serve as community liaisons for not only MCC students, but students from around the world who come to conduct field work there. Upon one of many visits to Pulicat for my field-work, I came to know the lab keeper Karunanadi and his impeccable knowledge of fish shoals, high tide times, and sustainable fishing practices. And, I also realized that since 1968, the string of graduate students who had visited the lab had taught him all of the scientific names of the marine and freshwater species in the area. He could identify them immediately by their scientific name during our numerous treks onto the lake. This is a prime example of the potential for utilizing existing local knowledge of the coast, but also generating new knowledge about the coastal environment through effective and sustained community-university partnerships.

Under the guidance of Dr. P.J Sanjeeva Raj, the zoology department has initiated several projects for both the ecological improvement and economic upliftment of the community since 1968. These activities culminated in the creation of a comprehensive strategy for coastal restoration and management for Pulicat in 2006. However, this framework only grew from proven smaller community-scale responses over decades.



## **Empowered Community Participation**

One of the most notable projects pioneered by Sanjeeva Raj was his collaboration with the fisherfolk of Pulicat in the installation of artificial reefs that not only attracted more fish to the area, but also served as breeding grounds increasing total biomass in the area overall. These reefs were based on the practices of ancient Tamil Nadu fisherfolk who would deploy benthic (bottom) artificial reefs, called mulom, out of tree trunks or branches weighted with rocks. Fisherfolk in Pulicat and surrounding coastal communities near Chennai for generations would place the branches of the locally available White Gulmohur tree at a depth of about seven feet into inshore coastal waters. These branches would rot in the seawater and the foul stench emitted would attract bottom-dwelling fish to this artificial reef. Upwards of 33 species of fish would collect around these reefs.<sup>52</sup> Pulicat fisherfolk are very knowledgeable of their ecosystem and sensitive to the changes that have occurred over time. Coastal communities in Tamil Nadu are multi-generational dating back centuries so intimate knowledge of the coast has been directly passed down and lived. Consequently, their knowledge has been used to inform several measures of ecological improvement in their communities.

Sanjeeva Raj initially attempted to create artificial reefs from the branches of the Neem, Portia, Date-Parm, and Indian-Ash trees to determine if they too would produce the same increase in biodiversity as the White Gulmohur tree did. But, he quickly learned that these did not compare to the quantity and diversity of biomass at the White Gulmohur reefs. Sanjeeva Raj then improved this traditional method in 1988 when he attempted to create an artificial reef from locally available materials in Pulicat that would

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<sup>52</sup>Sanjeeva Raj, P. J. (1999). *Traditional Knowledge of Tamil Fishermen*. Chennai: C.P.R. Environmental Education Centre.

not diminish the local trees. He found concrete well-rings in abundance there and employed several fisherfolk to help construct a pyramid of 145 of these rings, which were each two feet in diameter and one foot wide and bound together by nylon rope. Within two weeks of installing the reef, they began to see results. More than 38 species of fish were attracted to the reefs, and of those six to eight bred there while the rest aggregated there from other areas. Marine algae, barnacles, and green mussels settle first as biofuelers meaning that they serve as the foundation for new food chains that begin attracting small then larger fish. These biofuelers also cleanse seawater by filtering out as well as absorbing dissolved and particulate chemical pollutants from coastal waters. The fisherfolk were getting an average of 200 rupees per day (\$5.00) when fishing in these areas, which is much higher than they normally would make fishing on their own without even adding the time searching for productive fish shoals. Additionally, in the 1980's bottom trawling mechanized boats were encroaching on inshore coastal waters of traditional fisherfolk in Pulicat. These artificial reefs produced a rocky bottom that would rip their nets and consequently these fisherfolk would remain in deeper waters leaving the local fisherfolk to their entitled area of three miles within the shore.<sup>53</sup> The reefs all survived the tsunami as well. These artificial reefs are an example of an ideal wealth creation strategy because they provide economic opportunities for local residents to utilize their existing knowledge and protect as well as improve their natural assets.

Managing and maintaining the reefs has been an ongoing challenge. First, fisherfolk would fight over who controlled the reef since over time the lake and nearby ocean has gone from a common property resource to open access, and soon local

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<sup>53</sup>Sanjeeva Raj, P. J. (1996). Artificial Reefs for a Sustainable Coastal Ecosystem in India, Involving Fisherfolk Participation.

fisherfolk were overfishing at the reefs as well. Second, fisherfolk were not interested in reef upkeep after MCC's involvement. MCC faculty and students would clean the reefs and ensured they were not covered in silt for two years following the installation. After that it was up to the fisherfolk to maintain them, but they have not, and since then the reefs have been covered in silt. Although this is a hopeful story about the possibilities for investment in natural assets, it is impossible to ignore the fisherfolk's needs for a daily source of income to compensate and incentivize them to invest in their natural assets. They do not possess enough resources to manage, protect, and maintain reefs, and ensure that they will capture enough each day to survive. The state must recognize and compensate fisherfolk for these activities. Artificial reefs not only have short-term benefits but long-term cumulative benefits as well that have positive impacts even beyond the fishing community. Although community-scale responses such as these require consistent commitment, they also require monetary compensation for their environmental value so that fisherfolk are able to take time to invest in maintenance and expansion of such projects. As an educational institution, MCC is limited in the financial capital it can invest, but it does possess academic foresight, sustainable community presence, and capacity for change.<sup>54</sup>

Sanjeeva Raj also initiated a mapping project of the inshore coastal waters utilizing fisherfolk's knowledge in three fishing villages south of Chennai this time. He found that fisherfolk in these three villages were able to map the topography, water depth, and substratum type of the ocean floor precisely in an area ranging five to ten kilometers within the shore. No organization has taken on the task of creating these maps in mass

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<sup>54</sup> Interview with P.J. Sanjeeva Raj, Chair and Professor Emeritus, Zoology Department, MCC, January 18, 2008.

scale to improve the distribution and extent of fishing in Tamil Nadu, which has become even more urgent with export-related fisheries burgeoning everywhere. “Such maps would be of great use for their [fisherfolk’s] routine fishing operations, installing artificial reefs, and studying the changing patterns of submarine erosion and sedimentation, the distribution of flora and fauna, as well as the breeding and nursery grounds for important marine life.”<sup>55</sup> There has been no effort to scale-up map-making efforts such as these that would help collect critical information of inshore coastal waters. However, this is one way of utilizing existing knowledge to increase the quality of information available for improving resource management and fishing patterns as well as documenting threats to the ecosystem. Fisherfolk can be compensated for their knowledge while also efficiently managing their environments to improve their livelihoods. National organizations such as the Indian National Center for Ocean Information Services (INCOIS) can scale up such efforts since they possess both the capacity as well as existing relationships with fishing villages all over India through their work.

Lastly, an unexplored potential for pro-poor eco-tourism exists in Pulicat. Much like Louisiana, India too has natural assets and industries that make it ideal for tourism, but the exploitative nature of tourism specifically on local residents employed in the industry has led to negative environmental and economic consequences. Rather tourism can be directed toward economically and environmentally empowering local residents. Specifically, Pulicat is the largest bird sanctuary in India with several historic Dutch landmarks in addition to numerous secluded beaches all navigable by boat. Sanjeeva Raj

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<sup>55</sup>Sanjeeva Raj, P. J. (1990). Mapping the Inshore Floor of India. *Seafood Export Journal*, 2(2), 1-4.

has attempted to catalyze pro-poor eco-tourism this in the area through small-scale initiatives, but it requires a partnership between the community as well as the Tamil Nadu government or even a private entity. Activities such as underwater photography and scuba diving can be utilized to enhance maps of the inshore coastal waters described above. Tourism can be utilized to improve these efforts as well as produce an additional source of income for residents.

During an interview with fisheries expert John Kurien, fisheries co-management advisor for the United Nations, Food and Agriculture Organization and alumnus of Madras Christian College, he emphasized the importance of tailoring pro-poor eco-tourism initiatives to the specific economic and physical geography of a place. In his work, one of the most successful examples he witnessed was an agreement between the five-star Oberoi hotel and local residents in Indonesia. Local villagers had created a process for restoring coral in their waters and the hotel also needed the corals restored in their elaborate water display, so they employed some of the villagers to do this. Later the hotel owner helped set up an arrangement between his visitors and the villagers to allow visitors to restore coral in their waters as a tourist activity. The visitors could name their coral and return to it anytime to see how it had grown over time. This encouraged visitors to return to the area, assist in improving the coastal ecosystem, and provide a source of income to the villagers. Similar activities are possible in Pulicat where there is a great need to replant mangroves. The Indian MEF has declared mangrove restoration as an immediate priority, but has not developed an implementation methodology or timeline to accomplish this urgent shoreline barrier restoration. The Tamil Nadu government can hire residents of Pulicat to administer a mangrove restoration program that integrates tourists

as well. Even minimal marketing of Pulicat's bird sanctuary, historical Dutch landmarks, and secluded beaches would attract tourists, but establishing an economically and environmentally empowering framework that directs benefits to local residents will ensure that it serves as a pro-poor eco-tourism industry.

Empowered community moves beyond input and involves local residents in implementation. These three examples uplift existing community knowledge in effectively managing natural assets to create economic opportunities for local residents. John Kurien also emphasized that many of these initiatives to enable local people to reclaim their natural assets for both environmental and economic benefits have failed over time because of the changing political climate and aggressive capitalist commercialization of coasts. However, he believes that if these participatory initiatives result in community trust building and a general consciousness around these issues whereby local residents are willing to find new ways to improve rather than continue to diminish their natural assets, then they should be deemed successful. This consciousness-building component is critical in envisioning a new trajectory for coastal restoration and management anywhere because it helps develop a new pedagogy for building new knowledge about the coastal zone to inform new initiatives that are economically and environmentally empowering. One way to ensure that learning is captured and utilized to inform current and future projects is through a community-university partnership. Local colleges and universities can help not only utilize existing community knowledge but work to enhance it as well.

## **MCC's Marine Studies and Coastal Resource Management Program**

Madras Christian College recently created a Marine Studies and Coastal Resource Management graduate program in 2005. The program chair Dr. Moses Inbaraj is a zoologist and he brought on three professors with marine studies backgrounds to the faculty. MCC has also just completed construction of an official dormitory at Pulicat with capacity for more than fifty people to accommodate long-term student field visits. The program's stated objectives are to develop an awareness of the sea and coastal zone for present and future generations as well as appreciate and respect the culturally diverse attitudes of different coastal communities. The curriculum is geared to:

- Meet the present day challenges in society through interdisciplinary and application oriented coursework
- Teach and conduct research in marine sciences with emphasis on basic biology, conservation, management, and sustainable aquaculture
- Develop management and conservation models with emphasis on coastal ecosystems such as coral reefs, sea grasses, mangroves, fish, and iliotrophic communities
- Link marine sciences with human development
- Promote environmental stewardship
- Evolve effective methods to utilize coastal resources in India and Asia<sup>56</sup>

The coursework, though heavy in biological sciences, does have a strong focus in the socio-economic impact of coastal resource management. This is further enhanced by the department's collaboration with its School of Social Work, which also does work in

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<sup>56</sup> Marine Studies and Coastal Resource Management (2005). Unpublished Curriculum and Syllabus. Madras Christian College.

Pulicat. Other departments from MCC also stay regularly committed to Pulicat by conducting monthly health assessments for villagers. The synergy among the various departments has led to a deeper understanding of coastal issues from ecological degradation to potential economic opportunities, to the physical and mental health of residents. Additionally, students in the Marine Studies and Coastal Resource Management program are encouraged to learn swimming and scuba diving during the program and develop local vernacular language competence to communicate effectively with local fisherfolk. There is heavy emphasis on increasing the level of connectivity to the community.

The program is also committed to collaboration with international universities to continuously enhance the student educational experience, but also to share lessons learned in ecological restoration. They are currently partnered with Silliman University in the Phillipines to learn about their successful community-based artificial reef program. Every year three to five MCC Marine Studies students go to Silliman University and work with their Marine Studies students for two weeks studying artificial reefs there. MCC has also recently partnered with MIT's Development Lab course where students from MIT will visit every January to collaborate with students there on developing small-scale appropriate technologies that will meet the dual objectives of ecological sustainability and income generating capacity. The inaugural January 2009 trip of Development Lab yielded a variety of potential projects for student and community collaboration from water desalination devices to solar fish dryers made from locally available materials.



The Marine Studies and Coastal Resource Management program to date has graduated two classes of students who are employed in a variety of marine and coastal resource management jobs including marketing, conducting fieldwork in coastal communities, supervising in industrial plants along the coast, and working in nongovernmental organizations. The vast majority of students are from the state of Tamil Nadu and typically take on jobs within the state after graduation. There is no established career path yet that directly bridges the graduates' academic expertise and community development experience in coastal resource management with particular policy objectives, which is one area for future potential development of the program. Another possible area for growth in this program is creating a career ladder in the field of coastal management that enables local people to not only utilize their experiential knowledge for the benefit of their environments, but also identify opportunities to utilize their knowledge in related industries. This creates long-term impact in both the coastal environment but also in the industries which rely on the coast. This potential for long-term visioning is one that MCC is ready and willing to take on and serves as an excellent example of the ability of educational institutions to move beyond simply the role of entry-level workforce training and into developing a transformative strategy for both the knowledge and practice of coastal restoration and management.

### **Civic and Institutional Infrastructure in Tamil Nadu**

MCC exists within a civic infrastructure composed of multiple educational and research institutions committed to the environmental and economic improvement of coastal communities within the state of Tamil Nadu. These include the University of Madras, Anna University, National Institute of Ocean Technology, INCOIS, and the M.S.

Swaminathan Research Foundation (MSSRF) among many others. The University of Madras has been working with international universities on developing a national emergency warning system for approaching tsunamis; Anna University has been collaborating with INCOIS to develop cell phone devices that fisherfolk can take out to sea to assist them in identifying fish shoals; The National Institute of Ocean Technology has distributed advanced culturing devices to help fisherfolk culture crab and shrimp; and MSSRF is committed to enabling local communities to have a major stake in safeguarding their coastal environmental assets, specifically through mangrove reforestation and artificial reef management programs. Much like Louisiana, these programs do not coordinate with each other, but they are ultimately committed to the empowerment of local people to not only protect themselves from natural disasters, but to gain economic opportunities from restoring their natural assets. However, also similar to Louisiana, coastal restoration and management work is focused heavily on initiating restorative activities with little consideration to maintenance and management of natural assets. Management and stewardship activities present an entire suite of economic opportunities for coastal residents to be involved in.

Madras Christian College is the most progressive of the various institutions in forging ahead with small-scale projects inspired by a larger vision for empowered coastal restoration and management as the ultimate objective. Although Tamil Nadu is still creating its own master plan for coastal restoration and management in the state, Sanjeeva Raj has helped create a shorter integrated coastal management plan framework informed by MCC's forty-year involvement in Pulicat. The plan focuses on habitat improvement, sustainable fishing practices, disaster preparedness and management, women's

empowerment, pro-poor eco-tourism, and international collaboration. The projects described earlier address income-generating opportunities for local residents in the sustainable fishing practices, habitat improvement, and pro-poor eco-tourism categories. There are several other potential opportunities in the other categories as well, and the next chapter will discuss international collaboration in greater detail with respect to Louisiana.

There are three significant insights for Louisiana from India's general framework for coastal restoration and management as well as the case study of Pulicat:

- 1) An explicit commitment from the Indian MEF to protecting coastal communities
- 2) New tools and mechanisms to implement the practice of coastal restoration and management that produce local wealth
- 3) A successful community-university partnership that utilizes the existing civic and institutional infrastructure of Tamil Nadu to address areas of coastal restoration and management that formal policies neglect

The purpose of this chapter was to highlight India's trajectory of coastal restoration and management as well as offer a case study of a fishing community experiencing similar circumstances as local communities in coastal Louisiana. The chapter illuminates how and why a strong community-university partnership supported by the state's civic and institutional infrastructure has empowered local residents to implement an approach that will build long-term wealth. The case is not perfect nor does it provide a completely new way of implementing coastal restoration and management. Rather, it should be used to inspire Louisiana to examine the potential of its own civic and institutional infrastructure in developing new tools and mechanisms to transform its coastal

restoration and management strategy. The next chapter will explore the limited forums for community participation within Louisiana's existing framework for coastal restoration and management, but also the emerging initiatives within several of its civic and educational institutions that have the potential to develop a local wealth creation strategy

## **CHAPTER 4**

### **An Examination of Louisiana's Civic and Institutional Infrastructure**

#### *A History of Mistrust*

The first chapter of this thesis outlined the exploitative economic history of Louisiana's coast. That history coupled with a legacy of unequal flood protection has resulted in an accumulation of mistrust among residents of coastal Louisiana in the practice of coastal restoration and management itself. Therefore, it is not enough to say that residents are not interested or committed to changing their practices to adapt to climate change, systematic degradation of the natural environment, and increasing susceptibility to flooding. Their individual action has been neither the main cause nor will it be the main solution to reversing coastal land loss in Louisiana. The inequitable share of economic benefits and environmental consequences that coastal residents experience must be acknowledged and addressed through empowered forms of community participation. Historically, community participation with respect to coastal restoration and management in Louisiana has been relegated to a consultative role typically conducted in inaccessible language and offering no platform for residents to determine the trajectory of coastal restoration and management.

As discussed in the previous chapter, an elevated level of community participation involves residents naming both the economic and environmental consequences of coastal degradation to their lives. They are then empowered to identify wealth-creating opportunities that address those economic and environmental disparities while simultaneously restoring the coast. This process should direct the trajectory of a coastal restoration and management strategy. "Prioritizing local concerns first allows for greater ease in creating a common line of interests among other coastal authorities and

stakeholders and inform policy and management reforms for coastal restoration and management.”<sup>57</sup> The Pulicat case study in the last chapter shows that communities can simultaneously address local concerns as well as issues of inequity through economic opportunities that allow them to reclaim their natural assets. By managing their own artificial reefs, they were able to enhance their income, increase biodiversity, and keep away the extractive mechanized trawlers. This will over time increase the wealth of the community and most importantly direct a positive trajectory for a local coastal restoration and management strategy.

This chapter will review the current forms and roles for community participation in coastal restoration and management in Louisiana; the limited scope of issues for which community input is sought; the consistent undervaluing of community, economic, cultural, and ecological assets in the cost/benefit assessment of worthwhile restoration and management efforts; and the failure to integrate local ownership of natural assets and sustained economic opportunities for coastal communities to create long-term wealth. It also highlights the emerging initiatives that many of Louisiana’s civic and educational institutions

### ***Unpacking Community Participation***

Currently, community participation regarding coastal restoration and management in Louisiana is limited in depth and breadth. Community participation is largely contained within review committees for projects outlined in the most current master plan. And, the level of participation is limited to consultation for large-scale projects that are

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<sup>57</sup>Thia-Eng Chua, D. B., and Nancy Bermas-Atriengo. (2006). Dynamics of Integrated Coastal Management: PEMSEA's Experience. *Coastal Management*, 34, 303-322.

already proposed where the purpose of interaction with the community is to mitigate negative local impacts as much as possible.

The three notable master plans written for Louisiana's coast in the past twenty years fall short in empowered forms of community participation in a number of ways. They do not address the historic inequity between coastal residents and users that has led to the environmental destruction of the coast; they do not activate existing knowledge of the coast to inform how restoration and management is done; and they do not include explicit objectives for allowing coastal residents to participate meaningfully in restoration and management work with economic opportunities to restore and improve natural assets. Rather, the urgency of natural disasters and a chain of reactive responses dictate the language of the plans and diminish the depth, quality, and opportunity for community participation. Table 3 on the next page displays each of the three most recent master plans for restoring Louisiana's coast with their respective objectives, forms of community engagement, and connection to wealth building strategies, which none create the potential to address.

**Table 3: Louisiana’s most recent master plans to restore the coast**

	<b>Louisiana Coastal Wetlands Restoration Plan</b>	<b>Coast 2050</b>	<b>Louisiana’s Comprehensive Master Plan for a Sustainable Coast</b>
<b>Year</b>	<b>1990</b>	<b>1998</b>	<b>2007</b>
<b>Objective</b>	1) No net loss of wetlands due to development activities	1) To sustain a coastal ecosystem with the essential functions and values of the natural ecosystem 2) To restore the ecosystem to the highest practicable level of acreage of productive and diverse wetlands 3) To accomplish this restoration through an integrated program that has multiple-use benefits, benefits not solely for wetlands but for all the communities and resources of the coast	1) Reduce risk to economic assets 2) Restore sustainability to the coastal ecosystem 3) Maintain a diverse array of habitats for fish and wildlife 4) Sustain Louisiana’s unique culture and heritage
<b>Form of Community Engagement</b>	Citizen participation committee that reports directly to Task Force	Working groups given responsibility to conduct public outreach through local governments	Integrated planning teams made up of experts, residents, and policy makers
<b>Wealth Creation</b>	No potential	No potential	No potential



As seen in Table 3, the forms of community engagement in each of the three most recent master plans to restore Louisiana's coast do not provide opportunities to address wealth creation strategies because community participation is directed toward mitigating project impact rather than determining the overall trajectory of the approach.

### **Mitigating Impact v. Determining Trajectory**

There is an important distinction to be made between community participation in mitigating the impact of coastal restoration and management projects versus being involved in determining the overall strategy and trajectory of restoration and management. Much of the current discussion and axis of conflict centers on community voice in mitigating project impacts because of the current reactive management ethos. Community participation itself functions in a reactive form because it exists within a reactive paradigm. Negotiating the terms of mitigation by nature is a reactive process that does not question the origination of a project, but its aftermath. There are many roles for community participation in coastal restoration and management, which can enable a transition from a reactive to a proactive paradigm:

- 1) It can bridge knowledge where there are serious gaps in information among decision-making entities and generate better ideas or alternatives for addressing coastal restoration and management
- 2) It can involve local residents and businesses in the implementation of those alternatives
- 3) It can empower residents to reclaim ownership of their natural assets and even create new ones

- 4) It can enable residents to find meaningful economic opportunities through asset creation to build long-term wealth
- 5) It can aid in the development of a deeper consciousness and pedagogy for learning about the coast

These are sophisticated levels of community participation that can help move Louisiana's coastal restoration and management strategy from an ethos of reactive restoration to one of equitable environmental and economic reclamation of natural assets.

To date, the visible forms of community participation in Louisiana have been centered on individual awareness building with no mention of local ownership of resources. There is a plethora of organizations dedicated to coastal awareness programs, which are useful but wholly insufficient in inciting communities to take an empowered role in changing how they relate to their degrading environment and to other users of the environment. For example, awareness alone can do nothing to change how the Black community of Crozier in Bayou Dularge deals with the impact of the Houma Navigation Canal in its front yard. The individual reductionist implications of "personal awareness" in coastal processes will not address economic and environmental disparities. Current community participation efforts in Louisiana center around mitigating the impact of proposed coastal restoration and management projects, projects that attempt to reconcile both navigation and flood protection objectives, but have historically failed in flood protection. This reactionary form of community participation will only continue to breed mistrust and inequity. Below is an example of two coastal projects in the Holy Cross and Lower Ninth Ward communities of New Orleans. One addresses the economic opportunities component, but at the expense of the asset-building component of

community ownership of resources. The other reconciles these two components to produce an empowered form of community participation that allows citizens to reclaim ownership of their resources.

The USACE has recently signed a job-training and local hiring agreement in the Industrial Canal-Lock Project with the Lower Ninth ward and Holy Cross communities of New Orleans. This particular project will expand the Inner Harbor Navigation Canal to make it both deeper and wider, and has tremendous negative environmental impacts for the already environmentally and economically marginalized Lower Ninth ward and Holy Cross communities. There has been considerable resistance from these communities regarding this expansion, which has delayed the project for years. However, even with a complete environmental impact assessment, the project will move forward. Not only is this another example of the navigation interest bias of the USACE, the job training and local hiring agreement follows in the tradition of a mitigation ethos. The job training and local hiring are results of demands from the community because they have been forced to accept the project, and this is the only way they can at the very least receive minimal economic benefits from it. However, they are once again being forced to diminish their own natural assets to gain income. The widening of the Inner Harbor Navigation Canal will continue to increase the environmental and subsequently economic vulnerability of the Holy Cross and Lower Ninth Ward communities. Therefore job creation is not an empowering strategy, but one that still does not begin to address the dilemmas set forth in the beginning of this thesis of reconciling economic opportunities with improving natural assets to produce wealth. If community members are trained in this type of work, then they will be forced to transfer these skills to other similar jobs to maintain a source of

income and this ultimately does not contribute to creating a cadre of residents and employees trained in managing their natural assets, but rather continuously diminishing them.

An alternative project occurring in the Holy Cross and Lower Ninth Ward communities is the Bayou Bienvenue Central Wetlands Restoration Project. This project is intended to restore the cypress trees that once existed between New Orleans and Lake Borgne and protected surrounding residents from storms. The Mississippi River Gulf Outlet coupled with Hurricanes Betsy and Katrina has diminished this thriving cypress swamp in just 50 years because of heavy saltwater intrusion. The Louisiana State University Agriculture Center Seagrant program is supporting the Sewerage and Water Board of New Orleans and St. Bernard parish who have partnered to begin a phased plan to restore the more than 10,000 acres of cypress swamp that once existed in this area. There are already plans for local schools to conduct science classes in the designated area as well as opportunities for students to examine wetland restoration.<sup>58</sup> This is an example of an empowering restoration activity that has potential economic opportunities and consciousness building components through natural asset building. This also allows residents to determine the trajectory of coastal restoration and management because their initial interest inspired the project rather than being a result of mitigating the consequences of an ultimately destructive project such as the expansion of the Inner Harbor Navigation Canal.

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<sup>4</sup> Marcos, L. (December 10, 2009). Wetland Restoration Project in Lower Ninth Ward. *ABC 26 Local News*.

## Moving Beyond Cost-Benefit Analyses

Currently, the USACE's method for quantifying coastal restoration is through neoclassical economic cost-benefit analysis. Is the cost of restoring an area less than or greater than the economic loss that will result from flood damage? If the cost of restoration is less than the deemed economic value, then the area is worth planning for and saving. This form of calculation has had devastating environmental consequences. For example, the Mississippi River Gulf Outlet has only recently been deemed to have a lower economic value than the cost of maintaining it, which is why the Corps has agreed to finally close it. "The Mississippi River Gulf Outlet also led to the destruction of thousands of acres of fresh and brackish marshlands as the opening of the canal allowed saltwater intrusion to destroy the fragile ecosystems."<sup>59</sup> If there was a way to calculate the environmental impacts of the destruction caused by this outlet not to mention the human consequences of the increased storm surge produced by the outlet during hurricanes, then it would have been closed much sooner.

Even with the Corps' increasingly sophisticated multipliers built into their traditional analysis that can project job and income loss, there is no calculation of "equity, sustainability, resilience, and non-economic dimensions of welfare."<sup>60</sup> To this I add, there is no calculation of the potential wealth that can remain within communities if they are able to reclaim ownership of their natural assets and stay in place without fear that their land will collapse beneath them. This is especially critical in communities south

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<sup>59</sup>Duxbury, J., & Dickinson, S. (2007). Principles for sustainable governance of the coastal zone: In the context of coastal disasters. *Ecological Economics of Coastal Disasters - Coastal Disasters Special Section*, 63(2-3), 319-330.

<sup>60</sup>Boyce, J. K., Narain, S., & Stanton, E. A. (2007). *Reclaiming nature : environmental justice and ecological restoration*. London ; New York: Anthem Press.

of the 1-10 corridor in Louisiana that are completely left out of the formal planning boundaries of the USACE. These areas are filled with “Louisiana’s unique culture and heritage” that the most recent master plan states as necessary to sustain. And, according to Carlton Defrechou, these are the areas that rely most heavily on ecological restoration over engineering solutions like the more urbanized parts of the coast. The cost-benefit analysis that the Corps has followed does not capture the components outside of traditional flood protection and navigation concerns particularly if they are outside the scope of national economic development interests.

A traditional cost-benefit analysis does not capture the benefits that external economic enterprises have gained from Louisiana’s coast and the costs local residents have been left to bear, which has directly produced the vulnerable coastal landscape that the USACE is left to measure its costs and benefits from. Integrating community participation into a framework confined by a traditional cost-benefit analysis cannot produce an empowering strategy for coastal restoration and management.

### ***Empowered Community Participation***

Residents of coastal Louisiana must be empowered to produce a higher quality of input across a variety of forums to ensure that the environmental and economic benefits of coastal restoration, management, and improvement are locally experienced. This is already occurring in a variety of organizations in Louisiana, but without salient synergies among their various forms of engagement. It will be useful to discuss a cross-section of these forms of empowered community engagement already taking place in Louisiana to identify common interests among them. Below are six exemplary cases of existing educational and civic institutions working to empower coastal communities of Louisiana.

Table 4 on the next page condenses these examples followed by a discussion to highlight common interests and potential wealth creation strategies. Not all of the examples in Table 4 match the wealth creation definition I offer in this thesis, but each offers either economic opportunities or recognizes and uplifts existing knowledge to build alternative pedagogies around coastal restoration and management to the benefit of local communities.

**Table 4: Institutions in Louisiana working to empower coastal communities**

Institution	Activity	Community	Form of Engagement	Wealth Creation Components		
				Provides Economic Opportunities	Recognizes and Uplifts Local Knowledge	Builds Natural Assets
<b>Seedco Financial Services Inc.</b>	Providing new technologies for fishing boats to ensure a more efficient catch	Fisherfolk	Coalition of organizations each offering a form of technical assistance	Yes	Potential	Yes
<b>Greater New Orleans Foundation</b>	Enabling local engineers to work as community liaisons	Local residents and engineers	RFP to local engineers to serve as “translators” during USACE public meetings	Yes	Yes	Potential
<b>University of New Orleans CHART</b>	Conducting research intended to empower local communities	Local residents	Participatory Action Research	Potential	Yes	Yes
<b>Louisiana State University Agricultural Center-Sea Grant Program</b>	Informing communities and decision-makers of critical ecological processes	Local residents and state/federal agencies	Ongoing research programs and community outreach	Potential	Yes	Yes
<b>NOAA-CREST</b>	Creating new indices for coastal community resilience	Local residents	Co-produced research and knowledge to inform policies	Potential	Yes	Yes
<b>Louisiana Universities Marine Consortium (LUMCON)</b>	Utilizing the research expertise on coastal issues across the state	Local research institutions	Ongoing research and community outreach programs	Potential	Potential	Yes



## **Enhancing Economic Opportunities that Build Natural Assets**

Seedco Financial Services is working with fishermen in Plaquemines parish to finance the installation of more efficient gear and technologies onto their boats. These are intended to help reduce environmental impacts of fishing and improve the longevity and quality of the catch. Seedco also recently spearheaded the opening of the Fisheries Assistance Center in Belle Chasse for fishermen to learn about services and resources available to them. This initiative is a partnership between a variety of financial, community, and state/federal entities including the Louisiana Small Business Development Center, Market Umbrella, Louisiana Seafood Promotion and Marketing Board, LSU Agriculture Center/ Sea Grant, ASI Federal Credit Union, Mary Queen of Vietnam CDC, The Louisiana Technology Council, and Louisiana Department of Wildlife and Fisheries. Each of the partners will likely bring their direct services to this part of Plaquemines parish beginning with a program center brought by the Louisiana Technology Council and possibly an ASI credit union branch, which will be the first in the parish.

This form of community participation allows for a significant part of the coastal population, fishermen to access resources and make their livelihoods more environmentally efficient as well as economically prosperous. It also empowers fishermen to take action in improving their livelihoods while benefiting their natural assets, the fisheries. It moves the platform for participation beyond an advisory role and into implementation. The unique coalition of organizations that formed the Fisheries Assistance Center is a powerful foundation for building a community-centered alternative to how coastal restoration and management is done in Louisiana. The center enables the

multiple organizations to offer their expertise for the stated goal of improving both access and efficiency of resources available to fishermen in the area. This approach allows for very different organizations to work in conjunction toward a single purpose rather than working across purposes as many of the agencies involved in coastal restoration and management in Louisiana do currently.

### **Building Alternative Pedagogies for Coastal Restoration and Management**

The Greater New Orleans Foundation recently released a request for proposals through its Environmental Fund for local engineers to serve as liaisons between local communities and the USACE during the Corps' public participation meetings. This is intended to allow communities to both understand the Corps technical language as well as communicate their feedback to the USACE through a trusted fellow community member. It also allows local engineers to build their portfolios by engaging in the proposed work while keeping their communities informed. This is an example of how the local expertise of engineers can be used to both "translate" and build knowledge about coastal restoration and management practices, but also how these local engineers can increase their own practice to the benefit of their communities. Creating community assets such as local engineers who are involved in restoration work as well as ensuring a well-informed public is a critical foundation for long-term wealth creation.

The Louisiana State University Agriculture Center-Sea Grant Program recently partnered with the University of New Orleans Foundation, Audubon Institute and others to create a Coastal Education Community Center to inform community members, project managers, and even the USACE about coastal issues and restoration work from grounded academic experience and community engagement. Coalitions such as these are critical in

developing alternative pedagogies to coastal restoration and management that transcend beyond immediate issues, and over time build a consciousness around the coast that continues to evolve. Mark Schexnayder, Coastal Advisor for the Louisiana State University Agriculture Center-Seagrant program, works closely between coastal communities and The Southeastern Louisiana Flood Protection Authority as well as the USACE to ensure that their funds set aside for mitigation can be utilized for the best ecological outcomes. Much like the Greater New Orleans Foundation RFP, this enables local “translators” to ensure that existing projects can have potentially beneficial impacts on local communities.<sup>61</sup>

The University of New Orleans’ Center for Hazard Assessment, Response, and Technology (CHART) utilizes a participatory action research model (PAR) in several coastal communities. This bold emerging research methodology moves away from the traditional extractive model of taking data from communities for institutional research objectives, and empowers the community to define the scope and direction of the research to address the issues they identify. UNO is currently using the participatory action research model to develop a new set of indices to measure community resiliency in Jean LaFitte. These new indices will not only help communities better prepare for natural disasters, but simultaneously challenge the traditional standards for disaster preparedness and recovery that have proved ineffective in the recent onslaught of hurricanes in Louisiana over the last four years. This is an example of how existing knowledge of the coast and historical adaptive practices from local communities can be recognized, valued, and even enhanced by educational institutions to co-produce and inform new standards and policies regarding coastal restoration and management.

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<sup>61</sup> Interview with Mark Schexnayder, Coastal Advisor, Louisiana Sea Grant program, March 18, 2009.

The National Oceanic Atmospheric Association's Remote Sensing Science and Technology Enhancement Center (NOAA-CREST) has organized a group of scientists and engineers to partner with local coastal communities in Louisiana to blend remote sensing with traditional ecological knowledge to both assess and respond to marsh health. This hybrid methodology of knowledge creation is yet another way of recognizing, utilizing, and even enhancing existing knowledge of the coast to better inform restoration and management efforts. Although this particular example relates to marsh health, it can be translated to other aspects of coastal restoration and management.

The Louisiana Legislature created the Louisiana Universities Marine Consortium (LUMCON) located in Cocodrie, Louisiana in southern Terrebonne parish in 1979 to both promote and coordinate marine research and education in Louisiana. Located in the estuarine wetlands, this field laboratory resembles Pulicat's laboratory. LUMCON, however is more research focused than Pulicat in that its facilities are geared for students, educators, researchers, and public groups and less about involvement from local communities in the knowledge development process. However, the coordination of coastal ecosystems research among more than twenty Louisiana universities is valuable for activating existing institutional knowledge to inform how a future trajectory for coastal restoration and management can be shaped.

The examples listed above show that existing institutions and organizations in Louisiana are organizing and re-organizing themselves to find new ways to address coastal restoration and management issues that are complicated by intersecting and conflicting human uses of the coast. Although they are not currently strategically aligned to develop a new trajectory for coastal restoration and management in Louisiana, it is

important to note that their work departs from a reactive restoration ethos to one of beginning to empower local communities by valuing their existing knowledge of the coast, partnering with them on research and monitoring work, and, in some cases, enabling local parties in implementing solutions. However, a significant problem among these institutions is that the knowledge they are co-producing with local communities is fragmented from a larger strategy for coastal restoration and management in the state. This leaves a huge gap among residents and organizations in specific pieces of knowledge about the coast and how it can be collectively directed toward a new strategy for coastal restoration and management that empowers local firms and residents to create wealth. An effective coastal restoration and management strategy will bring together a critical mass of these organizations, support their current forms of community engagement, and enable them to commit to the purpose of local wealth-creation. Currently, these organizations are forced to respond to the existing trajectory for coastal restoration and management, which only continues to produce disjointed positive results and leaves institutions and local residents trapped in a reactive framework.

### **Implications for Fragmented Knowledge**

The fragmentation of the knowledge acquired about the coast produces significant barriers to moving forward with a new trajectory for coastal restoration and management in Louisiana, specifically when reconciling short-term and long-term objectives. One of the most notable examples of this in coastal Louisiana is that oystermen believe that their enterprise will be completely diminished with freshwater introduction, which is necessary for land building in areas where wetlands have collapsed. Although they are right in fearing the consequences of freshwater introduction, it is also true that this short-term

concession is for an exponentially higher return in the long-term with freshwater introduction. However, the deep history of sacrifice that local communities in Louisiana's coast have had to make for the greater good of the rest of the population dominates even today. Oystermen must be fairly compensated for their displacement regardless of how temporary it is.

According to Mark Schexnayder, coastal interest groups have worked to convince local people against their own environmental and economic interests. For example, he has worked with freshwater fisherfolk and shrimpers who were convinced by coastal interest groups that freshwater introduction would ruin their enterprises. This shows that individual awareness alone of ecological processes is not sufficient since the politicization and misinformation of even seemingly basic ecological processes is powerful and coercive. A strong re-socialization of knowledge about ecological processes must occur rapidly to gain community investment in reconciling both long-term economic and environmental objectives with short-term actions that can break a tradition of environmental exploitation for economic profit. The translation of this new co-produced knowledge at various institutions and among emerging networks must occur in a strategic way for it to shape a new trajectory in coastal restoration and management in Louisiana that is locally empowering.

The most effective way for channeling this information is to frame it in a way that does not continue to call for individual environmental awareness, but instead provides local people opportunities to build wealth through compensated short-term concessions if necessary, with the goal of empowering them to reclaim their natural assets for long-term environmental and economic gain. In the oystermen's case, this means that they are

compensated for their short-term displacement, but that they are also involved in the process of implementing freshwater reintroduction projects. This can mean that they are given training and employment opportunities to participate in the associated restoration work to occur. It can also mean that they are given an opportunity to renegotiate their land leases with the state that involves an ongoing environmental stewardship component on their part. In this way, economic opportunity is directly tied to restoring and improving natural assets over time. A newly organized coastal restoration and management strategy must make this connection between the coastal environment and economy a core objective of its policies.

Another example of the fragmentation of knowledge are the long-term objectives of the USACE goals for navigation, which span at least 50 years versus local and regional economic interests in Louisiana, which have a much shorter planning horizon of ten to fifteen years. The Corps is envisioning a coast 50 years from today and implementing projects accordingly whereas the majority of citizens in Louisiana need to see short-term results. If the public is not made aware of these conflicting priorities of the Corps, then they are not empowered to offer meaningful recommendations at the public meetings they attend. The fragmentation of knowledge about current processes and priorities for coastal restoration and management in Louisiana prevents community participation that may offer local and regional strategies for wealth creation. Jane Duxbury and Sarah Dickinson point out that fragmentation of knowledge is also compounded by a “fragmentation of responsibility among various agencies that has resulted in a lack of management integration, which has led needlessly to reactive management of the

coast.”<sup>62</sup> Historically, coastal restoration and management in Louisiana has been directed by several agencies that do not adequately manage cross-boundary environmental, economic, and community concerns because that is currently not in their purview. This results in a collision rather than integration of interests when agencies and communities come together during planning processes. Vallejo states that “the formulation of and implementation of integrated coastal zone management programs presents considerable challenges both to institutions and individuals involved with the development of human resources. This is because there is a lack of people capable of tackling the planning and management challenges involved in integrated coastal zone management.”<sup>63</sup> This is indisputably true in Louisiana and this lack of coordination means that local communities can at best gain participation in fairly small and isolated projects that have limited impact and opportunity for long-term wealth creation.

The purpose of this chapter was to emphasize how the various historical and emerging initiatives among Louisiana’s existing civic and educational institutions provide a strong foundation for a new trajectory in coastal restoration and management. As the insights from the Pulicat case study reflect, these institutions are local assets and they should be directed to benefit local people. Louisiana’s institutions contain the leadership, legitimacy, and expertise necessary to form a strong network and test new ecological approaches to coastal restoration and management by utilizing and enhancing existing local knowledge and ensuring that the economic benefits of coastal restoration

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<sup>62</sup>Duxbury, J., & Dickinson, S. (2007). Principles for sustainable governance of the coastal zone: In the context of coastal disasters. *Ecological Economics of Coastal Disasters - Coastal Disasters Special Section*, 63(2-3), 319-330.

<sup>63</sup>Vallejo, S. M. (2001). A cooperative training programme in the field of coastal and ocean management. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 11, 339-342.



and management are directed to local people and firms. The next chapter will discuss how the currently fragmented efforts of Louisiana's institutions can form a cohesive network to carry out the steps necessary for implementing a new strategy for coastal restoration and management.



## **CHAPTER 5**

### **Socially Reconstructing Louisiana's Coastal Restoration and Management Strategy**

#### *Utilizing Louisiana's Civic and Institutional Infrastructure*

As demonstrated in the discussion of the previous chapter, there are numerous existing institutions that have the penchant and commitment for serious change in Louisiana's coastal restoration and management strategy. Much of the existing literature on Integrated Coastal Management (ICM) calls for the creation of a new coordinating body to manage the various functions of an ICM strategy. However, the expertise among various organizations and institutions in coastal Louisiana whether it be in science, community engagement, project management, workforce development, etc. should be re-calibrated to facilitate a long-term vision for coastal restoration and management in the state. It is not necessary to create yet another entity to accomplish this. The purpose of this chapter is to identify Louisiana's opportunities to socially reconstruct its coastal restoration and management strategy utilizing its own assets, which are its institutions.

According to Richard Manguno, the Chief of the Economic and Social Analysis branch of the USACE, New Orleans District, the Corps is re-visiting its four original accounts for multi-criteria decision-making. These are:

- 1) National economic development
- 2) Environmental quality
- 3) Regional economic development
- 4) Other social effects

Although typically the USACE has been concerned the most with national economic development, it has recently committed to focusing particularly on regional economic development in Louisiana. This implies that the USACE will have to focus on reconciling

its national economic development objectives with regional objectives, which will require closer connections to local economic development agencies and interests. This is an incredible opportunity for local residents in Louisiana to define the region's economic and environmental interests. If the same process persists in which extractive enterprises dominate the trajectory of regional economic development, then it will not matter whether national or regional economic development takes precedence because it will reproduce the same exploitative economic and environmental results for local residents.

### ***Recommendations***

There are three significant ways to ensure that the opportunity to define regional economic development in Louisiana with respect to coastal restoration and management is economically and environmentally empowering for local residents and leads to long-term wealth creation.

- 1) One is to improve the governance of ICM in Louisiana by forming a network of institutions who are already engaged in innovative work to build a long-term vision for coastal restoration and management and simultaneously utilize and increase each institution's expertise in doing so. This will allow for a long-term vision to guide the work of coastal restoration and management and move away from a reactive framework.
- 2) The next step is for this network to frame coastal restoration and management work as a regional economic development sector with a defined suite of jobs and long-term careers. Local educational and workforce development institutions can utilize their expertise to train potential employees as well as create pathways to

vocational, professional, and academic careers in coastal restoration and management.

- 3) Lastly, this network can develop an international partnership between coastal communities in Louisiana and Pulicat to both build knowledge on the practice of coastal restoration and management as well as identify economic opportunities that can help residents restore and improve their natural assets to generate long-term wealth.

### **Supplementing Instead of Supplanting**

These recommendations will require a strategy and process for implementation that can function collaboratively within the current network of organizations and agencies involved in coastal restoration and management in Louisiana. It is important to emphasize that the proposed network for Louisiana will not supplant the work of existing institutions and agencies that are tasked with coastal restoration and management in the state currently. Rather, there are three valuable roles for this network that will allow it to overlay within the existing network of decision-making entities and enhance its existing capacities.

- 1) Influence policies and policy-making to reflect current and future needs
- 2) Collaborate and partner with existing agencies to implement action in coastal restoration and management
- 3) Provide an accountability structure that pushes the existing network of decision-making entities to support a socially reconstructed strategy for coastal restoration and management in Louisiana that is directed toward long-term local wealth creation for its people

The following discussion addresses how the network can accomplish these roles while implementing the three recommendations offered above.

### **Shifting the Agents for Change and Policy Tools Employed**

Lester M. Salamon in his book The Tools of Government: A Guide to the New Governance calls attention to the paradigm shift in American governance. There has been a shift in management and implementation responsibility from the public agency to a wide assortment of third parties.<sup>64</sup> This is especially true for coastal restoration and management in Louisiana, which contracts the implementation of the work to a variety of contractors and subcontractors while the management of the work is scattered across a wide range of agencies as described in Chapter 2. Salamon describes this new governance paradigm in terms of five concepts that shift the “unit of analysis” away from existing agencies and institutions. There are two particularly relevant ways to change governance that he offers that can be applied to Louisiana’s current paradigm of ICM: the first is shifting the locus of change from existing hierarchies to networks and the second is moving away from depending on agencies and programs for change and focusing on the actual tools employed.

Improving the governance of coastal restoration and management in Louisiana involves redefining the purpose of ICM. India’s definition places coastal populations in the center of its strategy and moves beyond defining integrated coastal management as simply the intersection of the coastal economy and environment or the intersection of the land and sea. As explained in Chapter 1, a central, but overlooked issue in coastal restoration and management in Louisiana is a socially constructed inequality among

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<sup>64</sup>Salamon, L. M. (Ed.). (2002). *The Tools of Government: A Guide to the New Governance*. Oxford: Oxford University Press.

humans and their relationships to the environment and how those relationships have produced unequal benefits and consequences among coastal communities. And, that inequality is visibly manifested in the devastated coastal environment today. Therefore, the agents for change and the tools employed must commit to addressing this disparity as a central purpose to be effective in the practice of coastal restoration and management. There are several agents of change working in a largely disparate manner as displayed in Table 4 in the last chapter. With appropriate leadership, funding, and a unifying purpose, these organizations can form a network that directs the implementation of coastal restoration and management in Louisiana.

The two immediate policy tools this network can employ toward implementation are regional economic development and international collaboration. It is important to return to the original purpose of this thesis, which was to search for ways to utilize coastal restoration and management as a strategy for wealth creation in Louisiana. I defined wealth as providing economic opportunities for local residents to utilize and enhance their existing knowledge of the coast for the purpose of restoring and improving their natural assets. As such, framing the implementation of coastal restoration and management as regional economic development addresses the first part of this definition to provide economic opportunities to local firms and residents in the form of training, employment, and other economic incentives. And, an international collaboration between this network and Madras Christian College addresses the second part of this definition that calls for continually recognizing and enhancing existing knowledge of the coast.

## **From Hierarchy to Network**

The previous chapter described the work of a variety of organizations in Louisiana engaged in sophisticated forms of community empowerment, but also how their disjointed nature has prevented them from functioning toward a single purpose. This is coupled with a complex and disjointed network of public agencies, which are working across purposes with different “goals, operating styles, skills, worldviews, incentives, and priorities, that even with the best of intentions, often differ widely from each other.”<sup>65</sup> One of the most salient examples of this in coastal restoration and management in Louisiana is the USACE’s responsibility for issues that are completely outside of its expertise such as negotiating relationships between coastal residents and users. Rather than focusing on moving tools through the established hierarchy of public agencies that are not equipped for the social reconstruction of coastal restoration and management strategy, it will be important to develop a network of existing organizations to emerge and take on the implementation process necessary to accomplish this.

## **From Agency and Program to Tool**

The second chapter of this paper distilled the tools and mechanisms of Louisiana’s coastal restoration and management strategy from the complex hierarchy of agencies in which they exist. The three main tools of regulation, large-scale engineering, and ecological restoration expressed through policies, plans, and programs have not adequately addressed the socially constructed inequality among coastal communities. As, Salamon observes “among other things, these tools define the set of actors who will be

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<sup>65</sup>Salamon, L. M. (Ed.). (2002). *The Tools of Government: A Guide to the New Governance*. Oxford: Oxford University Press.



part of the cast during the all-important implementation that follows program enactment, and they determine the roles that these actors will play.”<sup>66</sup> The existing tools for coastal restoration and management have limited the depth, quality, and opportunity for public participation, which has held local residents, firms, and institutions outside of the implementation process. Therefore, new tools must activate the participation of local residents, firms, and institutions, who will all be part of the network mentioned and consequently involved in the implementation process. Salamon also adds that “tool choices are not just technical decisions. Rather, they are profoundly political: they give some actors, and therefore some perspectives an advantage in determining how policies are carried out.”<sup>67</sup> This speaks to the socially constructed nature of Louisiana’s coastal restoration and management strategy and the need to choose agents of change and tools that have the ability to socially reconstruct it. Regional economic development and international collaboration are two tools that will help socially reconstruct Louisiana’s strategy for coastal restoration and management. The next section will discuss the process for developing the network mentioned above and these tools it will employ.

### ***Process for Implementation***

The network of existing institutions and organizations in Louisiana proposed as the locus for change will require a critical mass of members, leadership, incentives for participation, and funding mechanisms to operate effectively. The institutions listed in the previous chapter who are already engaged in empowered community participation are a combination of educational, research, and non-profit organizations. It is important to note that when many institutions in Louisiana such as these did attempt to form a coalition

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<sup>66</sup> Salamon, L. M. (Ed.). (2002). *The Tools of Government: A Guide to the New Governance*. Oxford: Oxford University Press.

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around coastal restoration and management in Louisiana, there was a power struggle, which eventually resulted in no action. Therefore, it will be critical to identify leadership that will not co-opt the process, but facilitate and manage the recruitment and retention of other institutions into this network and ensure that the multiple interests and areas of expertise represented are directed toward the purpose of local wealth creation through coastal restoration and management.

### **Educational Institutions as Leaders**

As mentioned in Chapter 3, the involvement and impact of educational institutions in coastal communities have been under studied in both Tamil Nadu and Louisiana. However, educational institutions are the most natural choice for leadership for the network, as evidenced in the case study of Pulicat. Madras Christian College provided a forum for both utilizing existing local knowledge of the coast and enhancing it through a combination of technical innovation and grounded community participation. Importantly, since MCC is comprised of mostly Christian professors and students, they do not subscribe to the heavily entrenched Hindu caste system in Pulicat, and are committed to working with all castes of fisherfolk. The ability for an educational institution such as MCC to take this powerfully political stance was critical to ensuring all residents could benefit from the economic opportunities and improvement of natural assets in Pulicat. Next, MCC was able to secure funding to initiate, monitor, and evaluate projects such as the community-based artificial reefs, which enables the continuous learning required for creating new pedagogies in both the knowledge and practice of coastal restoration and management.

Furthermore, educational institutions carry legitimacy and serve as an intersection between local firms and the state apparatus currently in place for coastal restoration and management in Louisiana. And, unlike political agencies and non-profits, their consistency and longevity are almost unquestionably guaranteed. This legitimacy and longevity enables educational institutions to be innovative and cutting edge in the tools they employ to create change. This coupled with their generally strong pulse on local concerns and existing knowledge as well as high level of technical expertise places them in a unique position to both convene and lead a network of institutions to socially reconstruct a locally empowering strategy for coastal restoration and management in Louisiana.

In fact, the former president of the Louisiana State University System, Dr. William Jenkins, stated in his remarks at the 14<sup>th</sup> Biennial Coastal Zone Conference in New Orleans, July, 2005 that “while we [Louisiana’s educational institutions] remain steadfastly engaged in the emerging science and policy of ecosystem restoration, we must also acknowledge that there are many other challenges associated with the rapid deterioration of our coastal infrastructure and communities. He calls for “our universities to take a lead role in addressing the politically-sensitive and economically challenging aspects of [coastal restoration].”<sup>68</sup> This speaks to the importance of the socially constructed nature of coastal restoration and management issues and the need to consider elements that will enable a social reconstruction. It also speaks to the breadth of issues that educational institutions can take on. And, most importantly it is a call to leadership to the LSU system in particular to challenge Louisiana’s coastal restoration and

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<sup>68</sup> Jenkins, W. (2005). *Coastal Louisiana: A Mission for the State's Colleges and Universities*. Paper presented at the Proceedings of the 14th Biennial Coastal Zone Conference, New Orleans.

management strategy and address issues that have been historically neglected, but are critical to the future of Louisiana's coast.

The Louisiana State University system can answer this call to leadership and serve as the leader for the network mentioned above; it has multiple programs dedicated to improving the knowledge and practice of coastal restoration in Louisiana, the Seagrant program being one of those mentioned in the previous chapter. There are several roles that a group of institutions can serve in the network. The LUMCON educational consortium is another leader that can activate the coalition of over twenty educational institutions it is comprised of for the purpose of socially reconstructing a strategy of coastal restoration and management in Louisiana. There is also a tremendous opportunity to connect the workforce development and job training capacity of the Louisiana Technical and Community Colleges in coastal restoration and management to the academic and policy aspects of this work within four-year institutions such as the LSU system, including the University of New Orleans, and Tulane University. This workforce development role of educational institutions will be described in further detail in a later section.

### **Creating the Network**

It is important that the network includes a critical mass of representative educational, research, and non-profit institutions. In order to ensure this, each institution must have a clear role in the expertise it will offer and the benefits it will gain from participation. I recommend beginning with the list of institutions I discuss in the previous chapter. These institutions can come together around a collective vision for local wealth creation, and each offers a different area of expertise such as listed in Table 4 in the last

chapter. The potential benefits these institutions have for forming a network is the ability to increase their capacity and legitimacy, which will help them secure new funding sources and create a meaningful forum for informing coastal restoration and management policy in the state.

The network can begin its work by performing an audit/review of the current coastal restoration and management framework in Louisiana that is much more detailed than offered in Chapter 2 of this thesis. This will require a small grant from a foundation such as Ford or Rockefeller, which most would be ready to fund because of the insights such an audit/review will provide for coastal restoration and management programs around the world. And, each institution listed in Table 4 can begin by offering its expertise to conduct this audit/review. The University of New Orleans' participatory action research (PAR) can provide information about the local impacts of current policies, the Greater New Orleans Foundation can lay out the process for the current distribution of state and federal contracts to perform the work of coastal restoration and management in Louisiana, NOAA can provide information about how to utilize existing community knowledge to inform future disaster management policies, Seedco Financial Services can provide the needs that technological innovation must address to develop sustainable fishing practices in increasingly overfished coastal waters, the Louisiana Seagrass program can provide information on critical ecological processes that coastal restoration and management strategies must address, and the USACE can solicit input from the network to determine how to enable successful regional economic development. All of these roles acknowledge and value the expertise of existing institutions, but also

recalibrate them toward the purpose of socially reconstructing a coastal restoration and management strategy for Louisiana that will ultimately generate long-term wealth locally. Any institution or organization that has expertise it is willing to direct toward the purpose of local wealth creation should be actively encouraged to join the network.

A second task for the network will be to secure a coalition of funders who can consistently offer funding for long-term initiatives beyond the audit/review process to ensure that the initial audit/review leads to action in the identified areas of most need. This coalition of funders should include foundations and organizations who are also committed to advancing a socially reconstructed strategy for coastal restoration and management. One of the initial areas of great need will be shifting how federal and state agencies disburse contracts and implement the work of coastal restoration and management currently. The coalition of funders will play a critical role in enabling local firms and residents to access the workforce opportunities that have traditionally been buried in large state and federal contracts. The coalition of funders will also simultaneously enable the network to challenge the current nature of the work associated with coastal restoration and management so that it meets the criteria for wealth creation.

The two other recommendations mentioned earlier as the tools the network can employ for developing a local wealth creation strategy for coastal restoration and management in Louisiana based on the potential of the state's civic and institutional infrastructure are:

- 1) Developing coastal restoration and management into an effective regional economic development sector in Louisiana

- 2) Establishing an international partnership between the network to be created in Louisiana and the Pulicat-Madras Christian College coalition.

These two initiatives are mutually reinforcing and, therefore, should be pursued simultaneously. Each one is discussed in separate sections below for clarity while highlighting the intersections.

### ***Developing Coastal Restoration and Management into a Sector of Regional Economic Development***

Given the conflicted history between flood protection and economic development in coastal Louisiana, the most compelling reason to transform coastal restoration and management into a regional economic development initiative is to finally reconcile the dual goals of flood protection and economic development to the benefit of coastal Louisiana's residents. The other compelling reason is that local residents are the most invested in the long-term well-being of their environments and should be given opportunities to contribute their knowledge of the coast and gain the economic benefits from performing the associated work. This includes both job and non-job related economic benefits. Not all coastal residents are interested in new forms of employment, but are more interested in maintaining their livelihoods in a sustainable way. And, long-term management and ongoing stewardship of the coast can entail building in economic incentives for coastal communities to adopt sustainable practices to continue their existing livelihoods.

With both the pending Gulf Coast Civic Works Act and the Corps recent commitment to revisiting its regional economic development objective, it will be crucial to ensure that residents are trained in restoring, managing, and improving the coast in a

way that is locally empowering and does not reproduce the same dichotomy between flood protection and economic development that has persisted. Local jobs for residents cannot continue the same trajectory of diminishing natural assets to install extensive infrastructure projects. Local training programs must make efforts to gather and incorporate the existing knowledge that institutions like NOAA, University of New Orleans, Louisiana State University, and Greater New Orleans Foundation are working to enhance.

During an interview with Margaret Montgomery-Richard, former chancellor of the Louisiana Technical and Community Colleges, she stated that there are no established career training programs in any aspect of environmental planning for Louisiana's coast. She also emphasized that there has been no state investment in actually examining the jobs related to the practice of coastal restoration and management or the training necessary for this work to be directed to local firms and residents. With a strong pulse on the community's needs, she added that training local firms and residents to take charge of this work will require matching that state's educational objectives with its workforce development needs, which has never happened effectively in Louisiana.

The network will have an important role of securing and directing funding toward re-socializing the strategy for coastal restoration and management in developing the content of the related educational and workforce training curriculum. This will mean identifying new forms of restoring, managing, and improving the coast and assisting in the development of workforce training that teaches to these new concepts and associated skills. As such, local residents will not be trained in only infrastructure construction jobs, but in ecological restoration, management, monitoring, and improvement as well as



teaching on the practice of coastal restoration and management at all educational levels. This ensures that the continuous learning of the coast will become institutionalized over time and begin to bridge the gap between educational objectives and workforce development needs with respect to coastal planning. There is just as much a need to implement the actual practice of transforming coastal restoration and management as there is to continuously learn, build, and institutionalize knowledge about it over time. According to Carlton Defrechou, part of the reason coastal restoration and management would be such a rich sector of economic development is because in the last five years especially, there has been a tremendous creation and accumulation of new knowledge [in Louisiana] on this matter. It will be critical to capture, challenge, and transform this knowledge to the environmental and economic benefit of local communities.

This is where an international partnership with Madras Christian College will be central to informing how effective learning about the coast can be both academically enriching as well as locally empowering like their Marine Studies and Coastal Resource Management program. The University of New Orleans' PAR methodology as well as NOAA's endeavor to co-create knowledge with local communities will assist in transforming the pedagogy for coastal restoration and management in Louisiana that will both inform new policies and build a deeply seated consciousness over time. A partnership between these institutions and Madras Christian College will be an incredibly insightful exchange that can facilitate the way learning about the coast is institutionalized in both places to the benefit of the respective local communities.

Developing coastal restoration and management into a regional economic sector in Louisiana will require a much deeper understanding of the type of work associated

with this sector and the process by which this work is contracted out in order to challenge and transform how it can be implemented by local firms and residents. Restoration itself is not a long-term area for economic or even environmental growth because it implies a finite timeline. However, the ongoing stewardship and management of the coastal environment is a long-term, locally grounded, and largely unexplored area of regional economic development in coastal Louisiana. The framework for coastal restoration and management currently has focused on reactive restoration to the critical neglect of management and an ongoing stewardship of the coastal environment. And, it is in this neglected area of long-term coastal stewardship where existing institutions can play a key role in empowering local firms and residents to be involved in implementation.

One of the reasons coastal restoration and management has never evolved into a robust regional economic sector of development in Louisiana is because the associated work has been concentrated within the USACE and their contractors and subcontractors, many of which are not local. Bryan Moore, Workforce Development Director of New Orleans, stated during an interview that coastal restoration and management would be a very productive sector to develop locally because of the immediate and guaranteed demand for work in protecting the coast, but that is coupled with the immense difficulty of negotiating these job contracts with the USACE along existing terms.

The network will be critical in reframing the type of work that is needed to perform long-term management and stewardship. The work associated with this has been largely unexplored and will require research to identify the jobs, but also negotiation with the USACE and Louisiana Department of Natural Resources to open up current monitoring and management efforts to local firms and residents. Having educational

institutions that carry legitimacy leading the network and working with the coalition of funders will be very important in carrying out this negotiation.

Some identifiable activities in coastal restoration, management, and improvement that can provide opportunities for local wealth creation are:

- Improving water quality in highly disturbed estuarine environments
- Utilizing dredged material for land building
- Re-designing and landscaping the coast
- Restoring natural habitats like cypress swamps
- Planting natural shoreline barriers
- Initiating community-based tourism that involves visitors in restorative activities
- Teaching sustainable practices of coastal restoration, management, and improvement on all educational levels
- Negotiating equitable resettlement of communities that will be forced to relocate because of the irreversible nature of degradation to their environments
- Re-negotiating land lease terms with oystermen after freshwater reintroduction schemes are implemented to include a local stewardship incentive
- Ongoing monitoring and management of coastal ecosystems

Not all of these activities are necessarily new employment opportunities, but they provide economic opportunities and incentives for coastal residents to participate in the ongoing stewardship of their environments. And, it is this commitment to local wealth creation that should guide the way coastal restoration and management becomes a sector of regional economic development in Louisiana. Both Bryan Moore and Margaret Montgomery-Richard emphasized that there has been very little research on the types of jobs and other

economic incentives for local residents and firms to be involved in coastal restoration and management. An international partnership with Pulicat and Madras Christian College can allow institutions in both places to direct research toward this unexplored area and develop a system of economic incentives for local people to be involved and benefit from the work.

### ***Establishing an International Partnership between Coastal Louisiana and Pulicat***

An effective international partnership between the Louisiana network and the Madras Christian College-Pulicat coalition will be important to exploring the types of activities associated with coastal restoration and management, institutionalizing collective learning about the respective coasts, and creating a system of economic incentives to engage local firms and residents in the ongoing management and stewardship of their environments.

A key insight for Louisiana from the Pulicat case study is how to effectively utilize the assets of the existing civic and institutional infrastructure. This insight alone shed tremendous light on the possibilities for Louisiana to socially reconstruct its coastal restoration and management strategy. A formalized international partnership will yield many more insights, but more importantly it will enable both places to generate innovative pathways for local firms and residents to implement action.

The literature on ICM falls short of documenting or highlighting the importance of international partnerships in coastal restoration and management. However, many of the recommendations that come out of international conferences on ICM involve building greater capacity, which is at the heart of any effective international partnership. The Rio Declaration on Environment and Development of 1992 identified several methods to

build local capacity for coastal restoration and management. The methods shown below are slightly amended to highlight the potential for international partnerships to greatly improve ICM:

- Developing institutions and local communities' capacity to conserve and manage marine living resources
- Strengthening research facilities
- Building capacity for data and information storage and retrieval
- Maintaining references on global ICM efforts
- Indexing global motivating issues for ICM programs
- Modeling planning approaches and techniques
- Indexing challenges in ICM to all countries
- Utilizing Comparative assessment methods
- Testing effective policies
- Developing new evaluation indices for success

An international partnership would allow both Louisiana and Tamil Nadu to engage in the activities listed here that will enhance and redefine the current tools and mechanisms employed for coastal restoration and management in both places. A simple way to initiate this partnership will be to begin with a graduate program related to coastal restoration and management at LSU and Madras Christian College's Marine Studies and Coastal Resource Management program.

Cicin-Sain and Knecht conducted a cross-national survey to determine capacity-building measures for ICM. One of the most important and yet under implemented tools they found is the creation of graduate programs in ICM. Although they identify this as

especially important in developing nations, this is arguably crucial in Louisiana as well. They also suggest that “this is an area for increased activity and possibly partnerships between government, universities, and communities, and might be a better mechanism than universities ‘going it alone.’” Two of the goals of the Network for Environmental Training at Tertiary Level in Asia and the Pacific (NETTLAP) that are particularly relevant to the purpose of graduate programs in ICM are:

- To enhance the environmental expertise of tertiary level educators and through them the knowledge and skills of decision-makers and policy formulators.
- To strengthen the overall environmental expertise in the region in technical, management, and policy levels.<sup>69</sup>

LSU and Madras Christian College can utilize a partnership to strengthen their respective graduate programs. This can be accomplished by students and professors from both institutions participating in an exchange program to develop effective tools and mechanisms in the practice of coastal restoration and management as mentioned above, discuss best practices in coastal community-university partnerships, enhance the academic and professional pedagogies of coastal restoration and management, and provide valuable insights for creating a system of incentives that empowers local firms and residents to benefit from managing their coasts. There are multiple benefits to this valuable exchange for Louisiana and Tamil Nadu. First, it creates a cohort of graduates who can enter the field to implement, manage, challenge, and transform policies from a variety of grounded and deeply informed global perspectives, especially if the pedagogies are interdisciplinary. Second, collective knowledge between programs can be used

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<sup>69</sup> Wescott, G. (2002). Partnerships for capacity building: community, governments, and universities working together. *Ocean & Coastal Management*, 45, 549-571.

toward integrating ecological management of natural resources with a system of economic incentives to engage local communities in participating and benefiting from the ongoing management of their environments. Third, a partnership can help create effective programs as well as pathways for careers in ICM that are vocational, professional, and academic.

These recommendations are intended to provide a realistic pathway for implementing a socially reconstructed strategy for coastal restoration and management in Louisiana. The purpose of this chapter was to identify opportunities for change within the existing network of institutions tasked with coastal restoration and management and discuss the process for developing a wealth creation strategy led by Louisiana's educational and civic institutions. The only way to begin addressing and hopefully reversing and eventually improving the degradation to Louisiana's coast is an aggressive prioritization of management and stewardship accomplished through a system of incentives that incites local firms and residents to participate in the implementation process.





## CONCLUSION

This thesis has shown that the knowledge and labor of local residents has always been extracted for the economic development of coastal zones in both Louisiana and Tamil Nadu. Local residents have not been recognized nor rewarded for this contribution through economic incentives and benefits, rather the profits of this economic development have bypassed them almost totally and instead left them with dire environmental consequences. The visible physical manifestation of this socially constructed disparity is the environmental destruction that both coastal Louisiana and Pulicat are fighting to reverse. However, focusing exclusively on the physical management of resources without considering the socially constructed inequality that has produced this magnitude of environmental degradation will be insufficient in saving, restoring, or improving the coast.

This thesis is a call to transform the current reactive paradigm of coastal restoration and management in Louisiana so that economic development and environmental resiliency no longer continue to undermine each other and the people of Louisiana. This transformation can only be accomplished with an explicit commitment to creating local wealth, which is done by providing economic opportunities to local residents that recognize and enhance their local knowledge of the coast while empowering them to participate in the implementation of restoring and improving their natural assets.

The recommendations offered here do not guarantee success in restoring or improving Louisiana's coast because the level of environmental degradation is so severe. However, these recommendations offer a more flexible strategy than the one currently in

place for coastal Louisiana. Large-scale engineering projects are capital heavy investments that are irreversible once implemented. A socially reconstructed strategy that prioritizes ongoing management of the coast and involves local firms and residents in implementation is empowering both economically and environmentally because it is a long-term strategy that has cumulative benefits from the time it commences. It will continuously enable monitoring, management, and improvement of natural assets over time, it will consistently build knowledge of the coast over time, and it will provide economic opportunities that will expand and innovate over time.

Most importantly, the time for this change is now. With the U.S. Army Corps of Engineers committing to regional economic development along with the American Recovery and Reinvestment and the pending Gulf Coast Civic Works Act combined with the most recent federal investments in coastal restoration and management for Louisiana, there are multiple windows of opportunity to socially reconstruct a strategy. These windows of opportunity coupled with the emerging initiatives in several of Louisiana's civic and educational institutions mandate a serious change in the coastal restoration and management strategy that is practical and actionable now.

Above all else, the residents of coastal Louisiana deserve to create and experience the economic and environmental benefits of their coast because they are the most economically and socially invested in its ensuring its continuity.

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## Appendix 1

### List of Interviewees

**Robin Barnes**, *Executive Director*, Seedco Financial Services Inc.

**James K. Boyce**, *Director*, *Political Economy Research Institute*, University of Massachusetts, Amherst

**John Christian**, *IPET Committee Member*, Massachusetts Institute of Technology

**Marco Cocito-Monoc**, *Director of Regional Initiatives*, Greater New Orleans Foundation

**Carlton Defrechou**, *Executive Director*, Lake Pontchartrain Foundation

**Jeff Harris**, Federal Consistency Division, Louisiana Department of Natural Resources

**Moses Inbaraj**, *Chair*, Marine Studies and Coastal Resource Management Program, Madras Christian College

**Alex Jesudasen**, *Chair*, Zoology Department, Madras Christian College

**John Kurien**, *Fisheries Co-Management Advisor*, United Nations, FAO

**Shirley Laska**, *Director*, CHART, University of New Orleans

**Richard Manguno**, *Chief*, *Social and Economic Analysis branch*, United States Army Corps of Engineers, New Orleans District

**Margaret Montgomery-Richard**, *Former Chancellor*, Louisiana Technical and Community Colleges

**Bryan Moore**, *Director of Workforce Development*, City of New Orleans

**P.J. Sanjeeva Raj**, *Chair and Professor Emeritus*, Zoology Department, Madras Christian College

**Nicolas Rockler**, *Regional Economist*, Department of Urban Studies and Planning, Massachusetts Institute of Technology

**Vardarajan Sampath**, *Fisheries Expert*, United Nations Environment Program

**Deepak Samuel**, *Professor*, Marine Studies and Coastal Resource Management Program, Madras Christian College

**Mark Schexnayder**, *Coastal Advisor*, Louisiana State University Agricultural Center-Sea Grant program

**Logamanya Tilak**, *Professor*, Zoology Department, Madras Christian College

**Patty Whitney**, *Community Organizing Director*, BISCO

## Appendix 2

### Map of Terrebonne parish with the "Acadian" and "German" Coasts



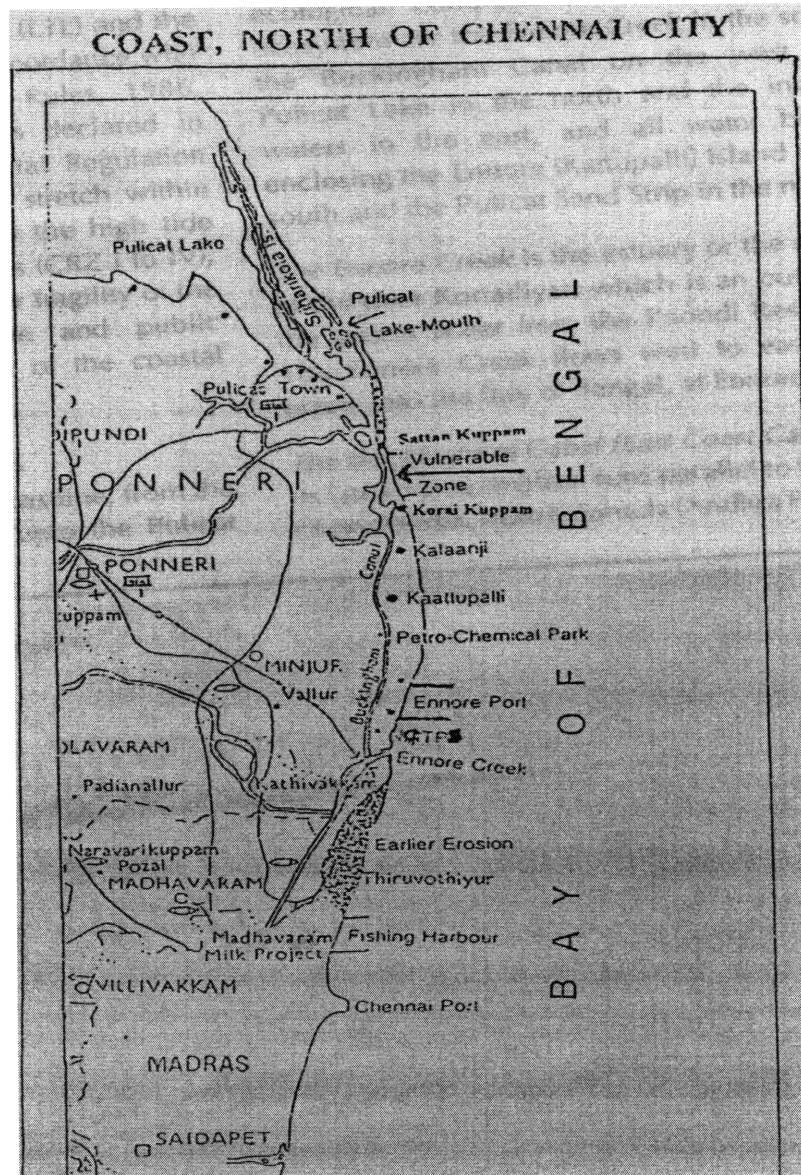
Source: The Gambit, <http://blogofneworleans.com>



### Appendix 3

### Map of Pulicat and the surrounding coast

Note: Madras = Chennai



Source: Madras Christian College archives