The place for humans in Louisiana coastal restoration

Dossier das Águas : Gestão do Patrimônio Hídrico

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Abstract
Louisiana (USA) faces a serious coastal land loss crisis and has embarked on an ambitious plan to restore its littoral landscape. Yet the very population that depend on this environmental setting for their traditional livelihoods will be the most immediately impacted and they are not able to participate in the planning as they would like. This article will: (1) review the state's historical approach to environmental policy in order to expose a pattern of neglecting public wishes; (2) trace past efforts to re-engineer the Mississippi River and their impacts to natural resource economies as a source of lingering contention between residents and government officials; (3) relate the recognition of the coastal crisis with ensuing engineering works and litigation that contributed to tensions between citizens and state agencies; and (4) consider how the recent planning efforts have neglected natural resource-based economies despite advice to the contrary. Together these related observations offer useful insights for incorporating a long-term, human-centered component into coastal restoration planning.

Keywords
Louisiana, coastal restoration, social impacts.

1. Introduction

Environmental crises inspire a range of responses. They may take the form of social, engineering, or political efforts to reduce the negative impacts of extreme conditions. Coastal land loss is a pressing, although slow-moving crisis in Louisiana, USA. For decades, scientists have been reporting on the gradual erosion and subsidence of marsh lands and barrier islands (Figs. 1 and 2). In recent years, state authorities have assembled an ambitious Master Plan for offsetting land loss and protecting the state's littoral environments that depend to a large extent on engineering solutions based on extensive biophysical scientific analyses of the situation (CPRA 2012).

Figure 1. Dead trees in Plaquemines Parish, know locally as ghost trees, represent the subsidence of the land surface which drowns the trees. Photo by author.

Figure 2. A burial crypt at the edge of the marsh was once on solid land. Erosion and subsidence is destroying this old cemetery in Lafourche Parish. Photo by author.

A key component of this plan is to construct diversions to restore the delivery of water-borne sediments from the Mississippi River to the coastal marshes, mimicking the natural process that flood-protection levees have eliminated. One of the key diversions is planned for lower Plaquemines Parish in the river's bird's foot delta which is the setting for important oyster farming and shrimp fishing. Not surprisingly, public opposition to this part of the coast-wide plan has emerged. Much of the state's planning and analysis has focused on the biophysical dimensions of the crisis and how the proposed solutions will impact biotic communities. Huge

investments in analyzing the biophysical and engineering elements of the plan unquestionably have enlarged the scientific knowledge of the coastal ecology. Yet, in a region with a distinctive and deeply rooted culture, there has been no comparable effort to examine how this action will influence the human communities or to include them in meaningful dialogue in the planning process. This neglect, in part, explains why the very communities that depend on the coastal bays for their livelihood are resisting the state's plans to save the coastal zone.

This article will: (1) review the state's historical approach to environmental policy in order to expose a pattern of neglecting public wishes; (2) trace past efforts to re-engineer the Mississippi River and their impacts to natural resource economies as a source of lingering contention between residents and government officials; (3) relate the recognition of the coastal crisis with ensuing engineering works and litigation that contributed to tensions between citizens and state agencies; and (4) consider how the recent planning efforts have neglected natural resource-based economies despite advice to the contrary. Together these related observations offer useful insights for incorporating a long-term, human-centered component into coastal restoration planning.

2. Pollution and Environmental Policy

Beginning in the early 1900s, tensions emerged between farmers and fishermen and the increasingly powerful oil industry in Louisiana. Waste brine from oil wells destroyed rice crops when farmers unsuspectingly used polluted water to flood their fields. Bowing to the still influential agricultural interests, the state legislature passed its first explicit water-pollution law in 1910 which prohibited releasing oils or salt water into streams during the season when farmers would divert water to their rice fields. The state supreme court backed up the law when challenged by an oil company (COLTEN, 2000, p.145). In addition, local courts commonly sided with land owners during the early twentieth century and awarded plaintiffs sizable damages resulting from industrial pollution. These court decisions indicate an alignment between public wishes and the state's pollution control efforts (COLTEN, 2000, p.144). Nonetheless and over time, state tolerance for pollution created a gap between public expectations and government enforcement.

By the 1940s, appeals courts typically reduced the sizable payments for damages awarded by local courts to plaintiffs in pollution cases (COLTEN, 2000, p.144). In addition, the state created a Stream Control Commission in 1940 and gave it power to establish rules and regulations to restrict undesirable pollution. It set out to establish a "cooperative" relationship with industry (COLTEN, 2000, p.145). This cooperative position included allowing industry to subsidize the salary of the biologists working for the state commission that determined threshold levels for oil-field pollution. The state also actively sought to convince fishermen that not all damage to aquatic life was due to industry, underscoring its cooperative position.

Nonetheless, citizens, particularly fishermen, found reason to challenge the pollution from oil producers and refiners, along with other industries. During the 1930s, commercial oyster fishermen in Terrebonne Bay challenged the release of oil field wastes into the brackish bay waters (MAASS, 2014). Sportsmen in north Louisiana complained about pollution from released by oil fields the adjacent state of Arkansas damaging tiny Corney Creek in the 1940s and 1950s. The state did almost nothing to assist the oystermen and took an ambivalent position on the interstate case. Only after vigorous efforts led by local sportsmen to alert federal authorities about the impacts caused by Arkansas oil producers were fishermen able to gain some satisfaction from federal authorities (COLTEN, 2006).

As the oil industry pushed aggressively into coastal waters in the 1940s and 1950s, oyster fishermen in particular had to take action to control the impacts of oil extraction. Oil platforms and pipelines installed across the coastal bays often had multiple impacts on oyster beds. Excavating trenches for pipelines could destroy portions of viable oyster leases and opening gaps in the marshlands could permit salt water to disrupt the delicate salinity levels necessary for successful oyster cultivation. Spills of oil or wastes could harm the immobile bi-valves as well. Oystermen

challenged the expansion of oil operations, but ultimately, as petroleum rose in economic significance in the state, public policy tended to accommodate this new activity. Without any state regulatory pressure, but facing potential law suits, pipeline companies adjusted their practices to avoid costly litigation. Among other things, they hired some oystermen to evaluate oyster beds in the path of projected pipelines in order to estimate and pay damages prior to carrying out their work (THERIOT, 2014, p.56-9). As the industry placated oystermen, government bodies expanded accommodations for mineral extraction companies. In a careful review of the pipeline industry, historian Jason Theriot documents the use of eminent domain to take pipeline right-of-ways from oyster leaseholders. This is a form of government sanction for the taking of property, and using this tool, pipeline companies were able to condemn property in the path of their projects. Although challenged by oystermen and land owners on several grounds, this practice was allowed in the public's interest for low-cost energy. And despite the fact that the natural resources belonged to the state's population, allowing an industry to acquire oyster leases fostered the growth of an industry controlled by a small number of corporations (THERIOT, 2014, p.54-55). The government's support of eminent domain clearly sided with the emergent industry and sowed seeds of discontent (THERIOT, 2014, p.62-3).

The push of the oil industry into the state's wetlands relied on excavation of an extensive set of canals that enabled the delivery of barge-mounted drilling rigs, crews, and other equipment. Some 10,000 miles of canals have been carved into the marshes of coastal Louisiana. These canals have accelerated saltwater intrusion which kills the freshwater marsh grasses and leads to the unraveling of the wetlands. In addition, the mounding of spoil has contributed to the acceleration of subsidence of the marshes. These changes have disrupted the ecology of the wetlands that serve as a nursery for marine species that provide a livelihood for coastal residents (TURNER and COSTANZA, 1983; TURNER, 1987; DAVIS, 1973).

3. Engineering Works on the Mississippi and Natural Resource Economies

Flood protection levees along the lower river date back to the eighteenth century French colonial period. Over the first century and a half since their erection began, they grew in size and length. By 1900, formidable bulwarks lined the river from Baton Rouge to the Gulf of Mexico. Current natural resource-based economic pursuits have largely grown with these engineering works in place. Both oyster gathering and shrimping became significant activities in the early twentieth century, although their historical roots extend further back. Before French colonists built the first modest levees in the early 1700s, annual floods would inundate much of the lower delta, depositing sediment as the river covered vast areas of wetlands. This process built the floodplain and created an ecology that fostered the natural production of oysters and shrimp in the coastal waters. With the construction and expansion of the levee system over the course of the eighteenth and nineteenth century, less and less sediment escaped the main channel. Confined between the earthen barriers, the river carried the sediment in suspension out into the deep waters of the Gulf of Mexico. Without regular replenishment of sediment, the delta, which naturally sinks under its own weight, began slowly disappearing. Thus, levees are one of the principal contributing factors to the current coastal crisis. They have also caused adjustments in the geography of oyster and shrimp populations.

Oyster beds existed before Europeans arrived to the Louisiana coast and the annual pulses of freshwater did not destroy the massive reefs near shore. However, intense oyster harvesting in the late nineteenth century threatened to deplete some beds and prompted efforts to conserve this highly desirable resource. Indeed, by 1898, the U.S. Fisheries Bureau reported that oyster beds in Barataria Bay were "commercially extinct" (MOORE, 1898, p.76). In response to the depletion of this economically valuable resource, the state legislature created the Oyster Commission in 1902 to establish policies to conserve oysters. It created a system that grants the right to lease ocean "bottoms" and set aside state seed beds for nurturing oyster populations. Oystermen can acquire leases from the state and cultivate oysters within their holdings. They have worked the wetlands in Plaquemines and St. Bernard parishes for over a century based on the hydrological conditions created by the levees that divert the massive spring floods out into the Gulf of Mexico and allow the coastal bays to maintain satisfactory salinity levels for oyster

survival (WICKER, 1979). The leasing system created fixed oyster farms and expectations for constant, or at least minimal fluctuations in, environmental conditions. Yet, subsidence due to the lack of rejuvenating sediment to the delta wetlands, creates a dynamic environment. Areas with ideal salinity can become too salty over time as the wetlands recede and saltwater moves landward.

In addition, flood control structures have undergone modifications and this has created opportunities for additional impacts on marine life, and consequently, tensions between state officials and those harvesting natural resources in the lower delta. A massive flood in 1927 threatened to overtop the levees and inundate the state's largest city, New Orleans. In an effort to reduce pressure on the flood protection system along the city's riverfront, federal authorities blasted a breach in the levee downstream from New Orleans at Caernarvon (Fig. 3). This action, in effect, created an artificial second mouth and allowed a portion of the river to flow directly into the coastal marshes and on into the gulf. The surge in fresh water was devastating to the muskrats that lived in the coastal marshes and destroyed the livelihood of many trappers in neighboring St. Bernard Parish (GOMEZ, 2000). Damage to oysters east of the river was also extensive.

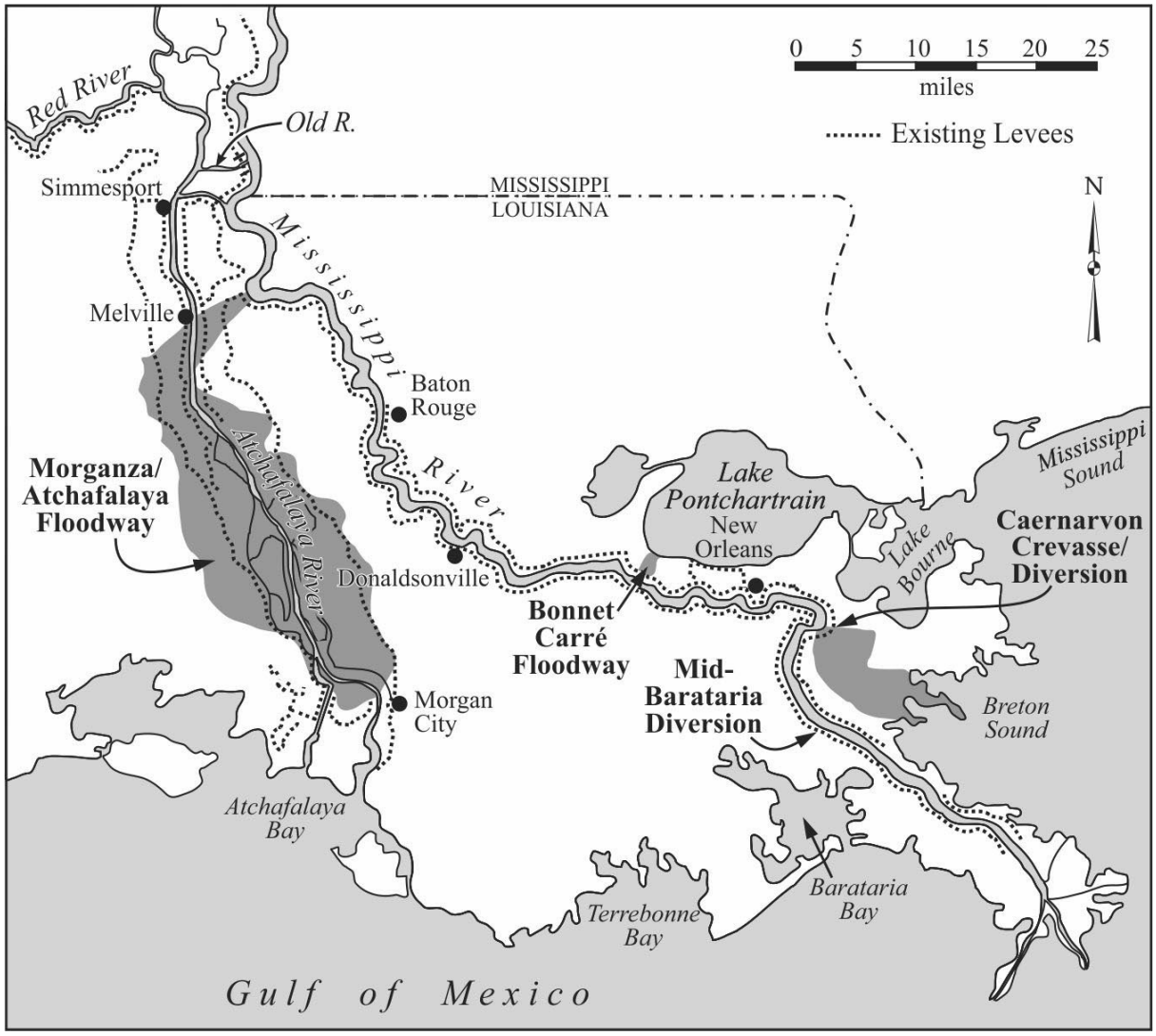

Figure 3. Coastal Louisiana and major diversions. Cartography by Mary Lee Eggart.

After the devastating 1927 flood, federal officials, with state support, revamped the flood protection system. Rather than relying strictly on levees to channel the high water, they created a pair of outlets to re-route extraordinary floods more directly to the Gulf of Mexico (Fig. 3). One, the Bonnet Carré, was constructed upstream from New Orleans, with a design to divert excess

flow into Lake Pontchartrain and on into the Gulf of Mexico. It was in operation by the 1930s although used infrequently. The second, the Morganza/Atchafalaya Floodway, was a larger and more ambitious project that was not completed until the 1950s. By design, these diversions send large quantities of freshwater into either brackish or salt water environments that are important fisheries. Although used only during exceptional high water, every use results in damages to the aquatic and marine life in the path of their flow (REUSS, 1998).

Farmers in the Atchafalya basin contested the creation of the spillway that would periodically flood their land, but there is no record of discontent among the oyster or shrimp fishermen. Their silence, in all likelihood, was a function of the public hearing process and the poor understanding of the impending environmental impacts and not a reflection of their approval. With the first full use of the Bonnet Carré in 1945, however, fishermen in Louisiana and Mississippi expressed strong opposition to the damages caused by the huge fresh water flushing of Mississippi Sound's significant oyster beds. Studies carried out by the U.S. government indicated a nearly complete destruction of oysters there. Again in 1973, use of both the Bonnet Carré and Atchafalaya spillways unleashed an outpouring of dissatisfaction over the disruption to natural resource-dependent economic pursuits. Subsequent investigations found "significant mortalities" in the areas receiving water from both spillways. After both incidents, however, state officials attempted to downplay the impacts. Furthermore, the U.S. Congress declined to issue a disaster declaration that would have aided the oyster industry in Louisiana. Flood control projects and their operation, which largely benefitted the state's cities and floodplain petrochemical businesses, took precedence over natural resource pursuits (Colten forthcoming).

4. Land Loss and Litigation

For decades, scientists have been investigating the perilous land-loss crisis in coastal Louisiana. As early as the late nineteenth century, initial reports on land loss began appearing (CORTHELL, 1897). More systematic observations were underway by the 1950s which began documenting land loss rates (MORGAN and LARIMORE 1957; ADAMS et al., 1978). Initial concern centered on the changing shoreline as it related to the territory where oil revenue would flow to the state. Studies documented the rate of coastal retreat in feet per year. Based on analysis of historic maps and aerial photos, investigators documented the pace of coastal recession at up to 62 feet per year in the most rapidly changing section of the coast and rates of 13 to 16 feet per year at the mouth of Barataria Bay and east of Plaquemines Parish (MORGAN and Larimore, 1957; PENLAND, 2005). More recently, concern has turned to the loss of the nurseries for shrimp and other marine life that sustain the considerable shrimping industry along with the diminished wetland buffer that can moderate the impacts of hurricane storm surge. Geographers Sherwood Gagliano, Klaus Meyer-Arendt, Karen Wicker, and Shea Penland reported on land loss in general in the early 1980s (GAGLIANO et al., 1981; PENLAND, 1981), and over the ensuing years, land loss emerged as one of the most prominent issues in the state (PENLAND, 2005). An overview of numerous studies released in 2005 reported that the average rate of loss was on the order of 19 feet per year between 1855 to 2002. The pace had accelerated to 39 feet per year by 1988 (PENLAND, 2005). While it has slowed in recent years, it remains a serious concern to the state. In terms of total coastal area, analyses indicate an annual average loss of about 23 square miles per year with a total loss of over 1500 square miles between 1956 and 2000 (REED, 2004). Public policy concerns about loss of access to mineral resources drove the first inquiries into coastal land loss, and in subsequent years land loss and restoration rose to be major fields of scientific inquiry. Since the 1990s, federal and state policy makers have made it a legislative agenda in its own right. Consequently, restoration has been at the center of legislation that has increased funding for projects to protect portions of the coast (CPRA 2012).

Ecologists, biologists, geologists, hydrologists, engineers, and geomorphologists have been the most prominent commentators on the rate of land loss and the projected future shoreline (REED, 2004). Although portrayed as a problem of science and engineering, environmental management is as much a matter of human actions as environmental processes. Science itself is a human pursuit and is shaped by changing technologies and priorities. Public policy and the implementation of environmental preservation/protection practices are the result of human

effort (LUDWIG et al., 1993). They also can impinge of human pursuits. This reality becomes evident in the responses to land loss in the lower delta. While overshadowed by the dominant scientific analyses, social science has not been ignored. Worthwhile studies have been emerging and point toward the pressing need to take the human dimension into consideration (LASKA et al., 2005; BURLEY et al., 2007; GRAMLING and HAGELMAN, 2005; BAILEY et al., 2014).

By the late 1970s, not only were scientists documenting the considerable loss of coastal wetlands, but oystermen were seeing the economic impacts. Saltwater was moving deeper into the oyster leases in Breton Sound and damaging some harvests. State engineers, in response to appeals from the oystermen, designed a freshwater diversion near the site of the deliberate 1927 levee breach. Completed in the early 1990s, it improved conditions in public oyster seed beds and led to improved productivity there (Fig. 4). Yet, at the same time, the increased flow of fresh water lowered salinity at some private leases, and prompted the oystermen to file suit against the state and the federal governments after they lost their crops. Plaintiffs claimed the damages to their leases and livelihood constituted a "takings." Initial court rulings found in favor of the oystermen and made awards in the hundreds of millions of dollars. The massive sums looked overwhelming to the state which appealed the decision, and eventually the state supreme court reversed the initial awards and released the state from a potentially burdensome cost (KEITHLY and WILKINS, 2006). A sizable engineering construction had unintended ecological impacts and prompted litigation that did not satisfy the plaintiffs. It was a political and judicial processes, not simply changing biophysical conditions, that undermined the livelihood of oystermen. The ultimate court ruling served to augment existing distrust among the natural resource-based residents in the delta parishes toward government in general and the state in particular.

Figure 4. Caernarvon Freshwater Diversion Channel flowing towards Breton Sound. Photo by author.

5. The Crisis and Current Conflicts

Since the initiation of the oyster law suits in the 1990s, Louisiana has embarked on an ambitious effort to offset the on-going coastal land loss crisis by creating a dedicated state authority and rolling out a series of coastal restoration master plans (CPRA 2012). With a track record of favoring oil and gas over other natural resources, and urban flood protection over rural communities, Louisiana has crafted a plan to combat land loss that has re-opened long-festering wounds. While the plan is couched in terms of sustainability (CPRA 2012), it does not propose sustainability for all. It proposes to restore a relatively small amount of coastal wetlands, compared to the amount lost in the past two centuries. The most recent plan projects additional losses of 1750 square miles by 2050 (Fig. 5). With the completion of the plan's projects, the state forecasts it can add about 30

square miles per year by 2050 and add about 800 square miles of coastal territory (CPRA 2012, p. 31). While in the less-than-optimal scenario, restoration may not entirely offset loss, but it could reduce the rate of loss. Central to the plan is maintenance of urban flood protection and navigation in the Mississippi. Simply removing the lower-river levees is not a viable option. Serving urban and shipping interests will require maintenance of the levees and a deep channel for ocean-going freighters. There is less emphasis in the plan to protect rural natural-resource based families, although a nod is given to cultural heritage. The planned projects will disrupt the existing coastal ecology, and thus indirectly impact those who depend on the current conditions. Cultural heritage will endure disruptions as they adjust to new resource ecologies. Proponents of the master plan argue that it is justified in the larger interest of the state and its citizens (CPRA 2012).

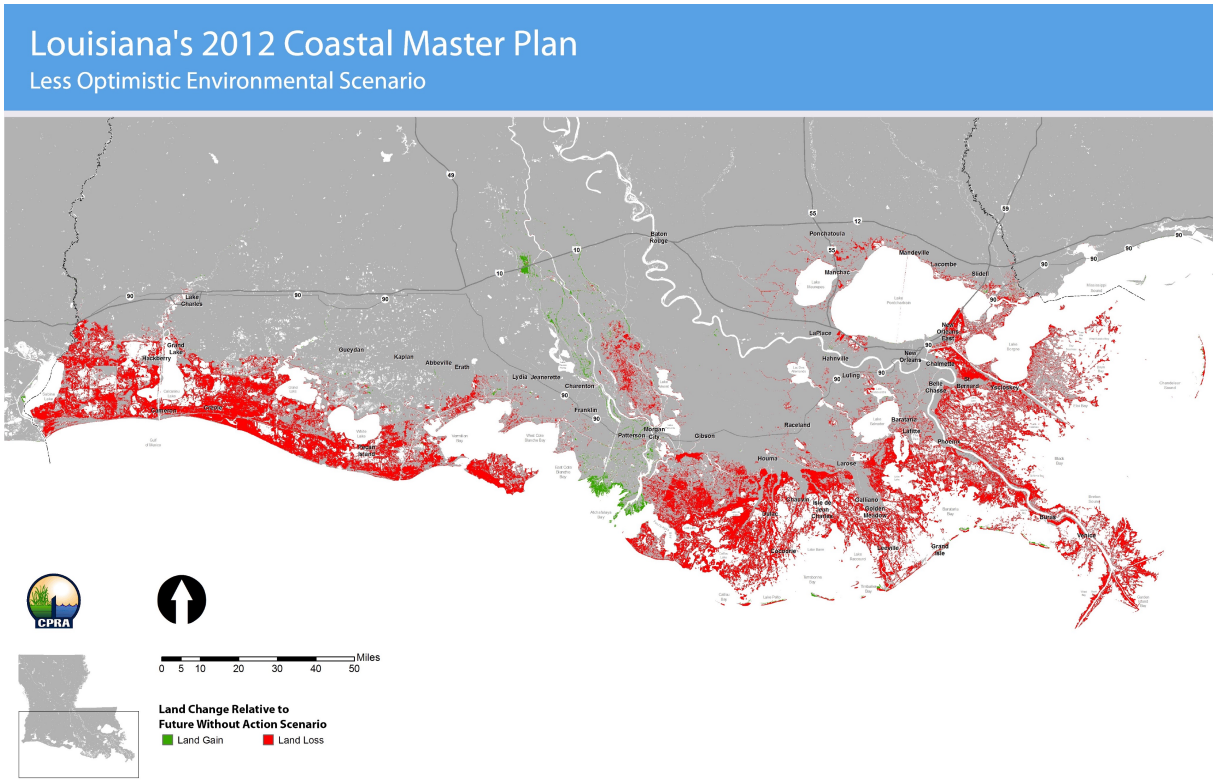

Figure 5. Projected Coastal Land Loss. Courtesy Coastal Protection and Restoration Authority of Louisiana, Master Plan 2012.

A central component to the plan are diversions that will reintroduce sediment to disappearing wetlands. The planned diversions will be different from the flood control spillways and the freshwater diversion at Caernarvon – although they build on experience gained at those engineering works. Their purpose is not to redirect spring floods or to dilute increasingly saline waters, but to carry sediment-laden freshwater into the brackish bays with the explicit intent to allow the sediment to settle out and thereby restore the process of land-building that the levees have eliminated. The goal is to bolster the acreage in wetlands by filling in wetlands and open water. In 2013, the state was deliberating the design and implementation of one such project known as the Mid-Barataria Diversion. It is planned for a location on the west bank of the Mississippi River in the bird's foot delta (Fig. 3) (CPRA 2012). Up to that point in time, the principal research and planning efforts had been confined to biophysical and engineering aspects of the project.

Barataria Bay where the proposed diversion is to be built contains many oyster leases, a sizable bay shrimp fishery, and crabbing activity (Fig. 6). Communities in lower Plaquemines and Jefferson parishes, on opposite sides of the bay, have one of the highest percentages of resource-dependent employment in the state. In these communities, this means fishing. Diversions will alter the salinity levels and deposit sediments which can destroy the fixed oyster leases; they can modify water quality and push bay shrimp coastward disrupting established small-scale fishing operations. The efforts to restore the beleaguered coast have the potential to impact severely the local society and economy.

Figure 6. Shrimp boats in Barataria Bay. Photo by author.

As with many environmental management projects, the assembly of scientific data and the development of engineering plans sought to provide a solution to an obvious problem. Yet, the planners neglected a fundamental issue. Environmental management is not just a matter of manipulating nature, but at its core is a social process – management (LUDWIG et al., 1993). The Louisiana Master Plan calls for "participatory process" that will enable citizens "to learn about and comment on the tools and processes that create the plan and not just the finished plan" (CPRA, 2012, p.47 and p.49). And indeed there were periods for public comment on the draft 2012 plan. Yet, public participation has been somewhat limited as the state moves toward more detailed plans, and residents of the impacted areas feel excluded from the process (COLTEN, 2014). Louisiana is not alone in neglecting to develop a robust public engagement. Coastal zone management activities around the globe have fallen short of international standards of assessing social impacts leading to a “democratic deficit” (VANCLAY, 2012, p.149).

Federally funded projects in the United States must prepare an environmental impact statement before work can begin, and in all likelihood, some federal funds will be involved in the diversions. This type of analysis is expected to include a “social impact assessment” which complements the review of potential biophysical impacts by focusing on the human consequences of projects (GRAMLING & FREUDENBURG, 1992). Since human communities can follow the news and citizens in democratic societies expect to participate in critical decisions, according to international standards, social impacts should take place before detailed planning and design begins. Typically, impacts to ecological communities and even cultural resources such as archaeological or historical sites, follow the initiation of construction. However, it is widely accepted that the mere announcement of a project can create the first impact in a human community. Consequently to mitigate social impacts, engagement, or public participation, must precede explicit project planning. Authorities on social impact assessments argue, that while time consuming, effective and early public engagement can reduce long-terms costs and also lessen opposition (VANCLAY, 2012).

Rather than roll out a social impact assessment prior to planning, state authorities have been working on plans for one of the initial diversions for at least a decade according to Kyle Graham of the Coastal Protection and Restoration Authority. The public announcement of the project took place even before the development of a plan to conduct social impact assessments (SCHLESFSTEIN, 2013). In fall 2013, state officials publicly announced that they hoped work on the Mid-Barataria project could begin within two years. The thinking at that time was that the environmental impact statement (EIS) process would begin shortly after the announcement. In the ensuing months, as part of its planning for an EIS, the state contracted with the Water

Institute of the Gulf, an independent research organization, to develop a methodology for a social impact assessment. The state also funded the development of an expert panel, also through the Water Institute, to review the diversions biophysical and social-economic implications. State officials also indicated there would be a series of public hearings (SCHLESFSTEIN, 2013; WATER INSTITUTE OF THE GULF, 2014 and 2015).

The social impact methodology called for multiple forms of public engagement and not just public hearings. It proposed extensive qualitative methods, including interviews, surveys, community mapping, and public forums, to discern what counts, and not just what can be counted. Such qualitative approaches would add insights to the economic and demographic data (COLTEN and HEMMERLING, 2014). It also emphasized the need for social science to be integrated with biophysical studies and to run parallel with them. The state-funded expert panel met in April 2014, shortly after the release of the SIA report, and concluded that "little or no social science or social analysis is underway connected to diversion planning or implementation" (WATER INSTITUTE OF THE GULF, 2014, p.7). It urged the state to quickly "make progress on identifying the most appropriate and useful roles for social science and analysis in planning for diversions" (WATER INSTITUTE OF THE GULF, 2014, p.7). Simultaneously, the Water Institute was conducting a series of "scenario building workshops" to gauge what local stakeholders saw as important issues in the broader coastal crisis and the restoration planning. Citizens in St. Bernard and Plaquemines parishes, where diversions would have the greatest impacts, expressed fundamental distrust of government, at all levels, and great apprehension about large diversions (COLTEN, 2014). Additionally, a coalition of fishermen and other citizens in these parishes have mounted a campaign to oppose the large diversions as well. They have expressed fear that the diversion will destroy local fisheries when other forms of restoration would be less detrimental (Save the Louisiana Coast 2015; and BAHR, 2009) (Fig. 7). The mid-Barataria diversion could seriously impact these fishing communities. For a livelihood that is economically eclipsed by the revenue from oil and gas and shipping, fishing's stature in Louisiana is in a tenuous situation. Furthermore, some state officials, unofficially and off the record, point out that most fishermen are aging and few young men are taking up the profession. Thus, officials anticipate that fishing may disappear, as we know it, in a relatively short period of time – well before the completion of the coastal restoration projects. There is, consequently and quite cynically, little political will to protect a declining and oftentimes troublesome constituency.

Figure 7. Land building using sediments dredged from the Mississippi River and piped as a slurry to the wetlands near Barataria Bay. This process is favored by local fishermen in contrast to the large-scale sediment diversions. Photo by author.

Administrative changes in the state coastal authority have delayed the launching of the environmental impact analysis for the diversion project. The state has funded some regional economic and fisheries analysis, but has not taken action on a full-fledged, integrated social impact assessment (WATER INSTITUTE OF THE GULF, 2015). Also, a coastal atlas is also in the final stages of preparation and it will offer some baseline information and trace social-economic change over the past half century (Hemmerling forthcoming). While an important resource, it will not provide site specific information that can serve as a social impact assessment. None of the ongoing social science involves direct and extensive community engagement/participation. Meanwhile, intensive modeling of hydrological aspects of the diversion has been ongoing with no parallel social science. Over a year after the expert panel called for more deliberate social science and stakeholder engagement, no coordinated effort has taken place. None of the projects currently underway are part of a formal social impact assessment.

6. Conclusions

Coastal restoration is a complex human and biophysical/engineering process. Much is at stake in Louisiana – lives and livelihoods, in additional to the very coast and it fecund ecology. In a state with a long-standing record of accommodating activities that damage or disrupt the environment over small resource-based economic pursuits, it should be no surprise that the well-being of fishing communities is of less concern to major coastal restoration projects. Although the coastal projects are explicitly intended to restore and protect the disappearing littoral landscape, they will likely impose, at least temporary, negative impacts on established fishing activities. The very residents who learned to live with a highly altered ecology, as a result of levee construction, now face the prospect of having to learn to live with a new set of environmental realities.

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