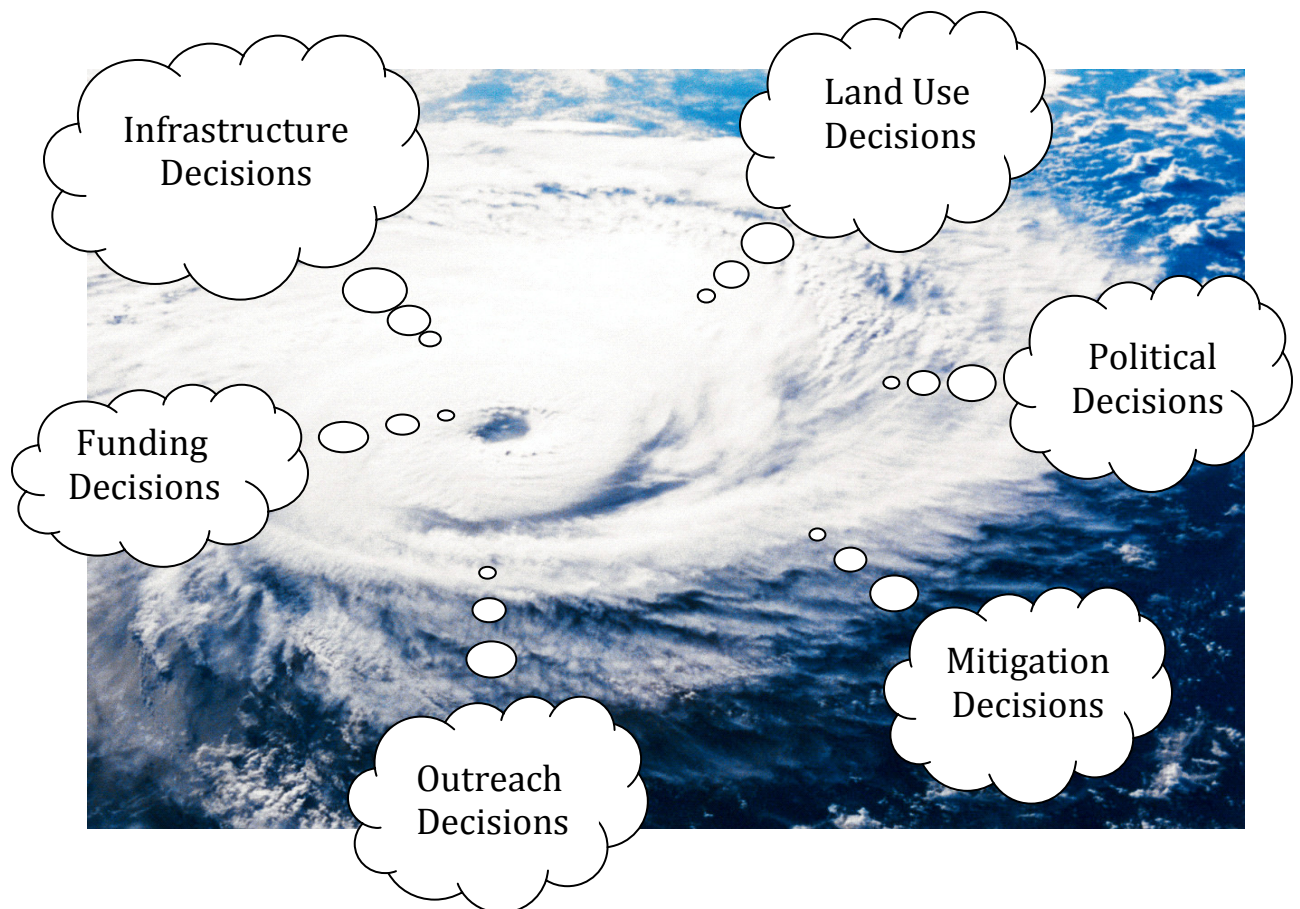


Local CZM Capacity Pre and Post Hurricanes Katrina, Rita, Gustav and Ike: A Comparison Study

by
Carla Norris-Raynbird



Louisiana Sea Grant College Program

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Local CZM Capacity Pre and Post Hurricanes Katrina, Rita, Gustav and Ike: A Comparison Study

Abstract

The hurricane events that continue since 2005 bring into critical focus the need to assess how best to provide the necessary tools to build knowledge and local capacities to manage the needs of present and future coastal Louisiana challenges. In this study, capacity is defined as agreement with regulator ideology that undergirds policy and regulation promulgated by Louisiana Department of Natural Resources. Designed as a natural experiment, this study is a follow-up to a pre-Hurricane Katrina study of the effectiveness of Louisiana's Local Coastal Program (LCP) in building local coastal zone management capacity in local decision-makers (Norris-Raynbird, 2006). Using personal interview and mail-out survey methods, it compares post event data (2011) with the pre-event data (2005).

Comparisons of the 2005 and 2011 data show that there has been a shift in ideological framing that moves the 2011 cohort of respondents further away from agreement with regulatory ideology. As expected, all respondents perceived high risk associated with hurricanes, surge and flooding, but three factors are found to influence perception of greater risk, specifically 'regulator frame', 'having an LCP' and 'proximity to coast'. In 2011 there is greater awareness of the how weather events translate into extended economic vulnerabilities from infrastructure damage, business interruption, loss of investment capital and property loss. Of all mitigation strategies presented, respondents overwhelmingly indicate that voluntary inland relocation is the least relevant mitigation strategy to their parish. Regardless of coastal or inland location, most parishes indicate reliance on large scale technological/engineered strategies (structural mitigation such as levees and flood control devices or non-structural mitigation such as wetlands restoration). Less support was found for regulatory mitigation strategies. For elevation requirements currently mandated by the state, parishes have adopted one of three strategies: 'stall tactics', 'enforcer strategy', and 'soft compliance – team effort'.

Executive Summary

This study has examined ideological framing shifts and perceptions of vulnerability and attitudes toward selected mitigation (both structural and non-structural) strategies among local decision makers in coastal Louisiana. In a natural experiment design, we have compared data from 2005 (pre-Hurricane Katrina) and 2011 (after several years of repeated hurricane activity). Much of the analysis is based on a frame index constructed from attitudinal measures. This frame index measures respondent agreement with ‘regulator ideology’ as this is defined by the mandates of LA DNR and from the literature on regulator framing. This is an important measure, as agreement with ideology behind the regulations, and agreement with regulation itself is inextricably connected to implementation of and compliance with regulations coming from LA DNR and federal agencies. The following statements highlight the findings:

- **All categories of respondents have shifted slightly away from the regulator frame** (comparing CZM Admin, Council/Jury and Advisory Panel). The respondent category showing agreement with regulator ideology were CZM Administrators and planners.
- Respondents exhibiting the **least agreement with regulator ideology were Council/Jury and Advisory Panel**. This was a surprising shift. In 2005, Advisory Panel members had exhibited the highest levels of agreement with regulator ideology.
- Wetland loss and elevation requirements are key concerns. While it is logical that concern over wetland loss and the related vulnerabilities would enhance agreement with elevation requirements, such is not the case. **78% parishes indicated reliance on non-regulatory technological/engineered infrastructure strategies** (i.e. wetlands restoration, hurricane levees, and flood control devices).
- Respondents were unified on voluntary relocation. Respondents from **83% of the coastal zone parishes indicated that voluntary relocation was not an option**. While next least desired, assisted relocation (buyout) had a greater range in perceived relevance.
- Perceived risk to physical hazards such as hurricanes, storm surge and flooding was high among all respondents. However **three conditions influenced even higher perceptions of risk: ‘having an LCP’, ‘regulator frame’, and ‘coastal proximity’**. No respondents perceived economic risk related to loss of natural resources due to coastal hazards.
- The **Regulator Frame Index** developed in 2005 and used again in 2011 has proven to be a **reliable and statistically robust assessment tool**.
- Parishes have adopted one of **three strategies in response to new elevation requirements: ‘stall tactics’, ‘enforcer strategy’, or ‘soft compliance’**.
- While capacity as defined by agreement with regulator ideology has diminished slightly, there are **other acquired capacities identified: constituent learning** in the recovery process, **political savvy of local officials** in attracting recovery dollars, and **operations knowledge** in preparedness and response.

Introduction

Subsequent to the passage of the federal Coastal Zone Management Act of 1972, the State of Louisiana Coastal Resources Management Act (1978) was passed to address coastal use issues and management of the state's coastal resources. Enabling legislation designated the Louisiana Department of Natural Resources (LDNR) as the lead agency responsible for resource management and coastal use issues of 7,721 miles of coast and a population of approximately 2,044,900 residents within the coastal zone (National Oceanic and Atmospheric Administration).

The state coastal zone management program known as the Louisiana Coastal Resources Program (LCRP) was federally approved in 1980 and established a general consistency with the aims and objectives of the federal program, while maintaining state authority to manage. Louisiana's coastal zone plan invited parishes within the designated coastal zone to develop Local Coastal Programs that would take on some of the permitting and public outreach responsibilities of coastal zone management as these apply to matters of local concern. In 2005, twelve (10) out of nineteen (19) coastal parishes had developed a Local Coastal Program (LCP) and two (2) had pending applications. In 2009 - 2011, there had been no official change in status (Fig. 1).

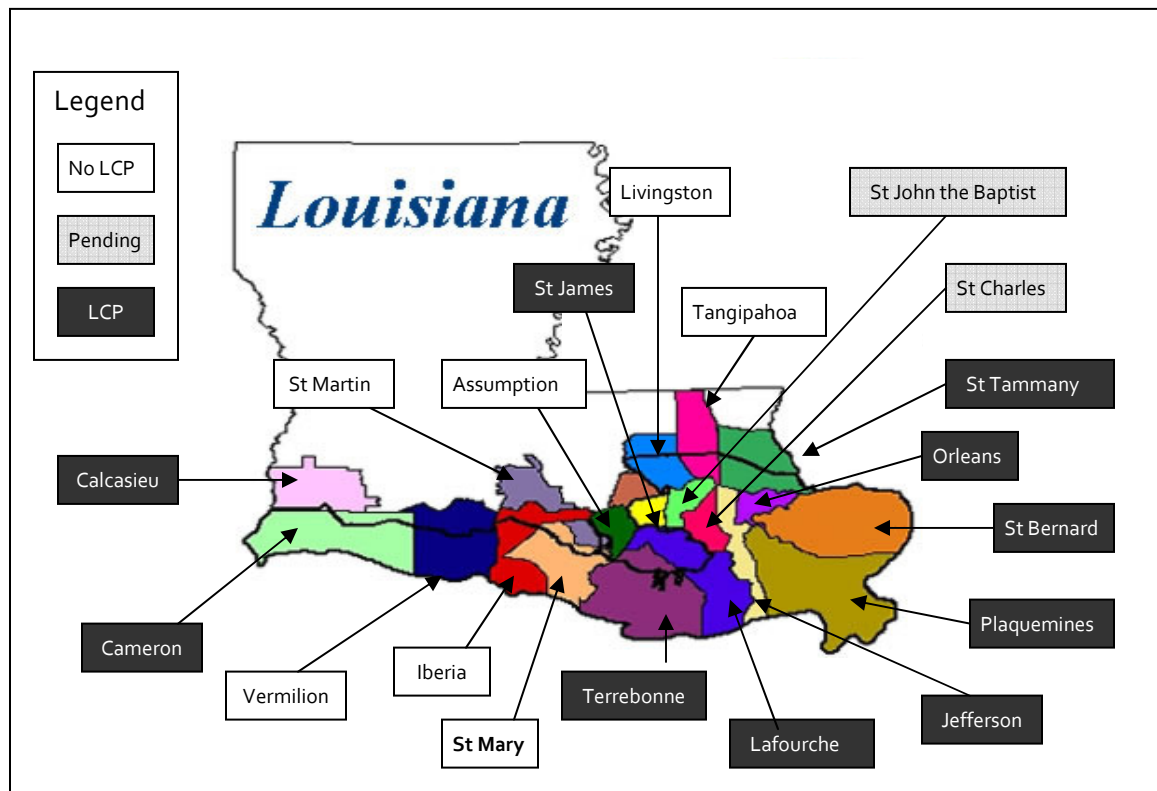


Fig. 1 Louisiana Local Coastal Program Parish Status Comparison 2005 and 2009

Source: Louisiana Department of Natural Resources, full citation in references.

With some parishes having an LCP and other parishes not, the decision-making process is somewhat disjointed. Decisions for such things as coastal land use, wetlands permitting, coastal community sustainability and resiliency designated ‘local concern’, are situated in parish government in parishes with an LCP. However, in parishes without an LCP, these same decisions of local concern are split between the state (wetlands permitting) and parish government (land use, community sustainability and resiliency). Non-LCP coastal zone parishes were required to have a Coastal Zone Manager employed by parish government. In this system, CZM mandates, training, regulations and funding flow from LDNR to parishes ostensibly to build capacity and create management consistency. This procedure of CZM knowledge transfer and management consistency has in effect attempted to create local ‘regulators’ out of those regulated. As previous studies on wetlands permitting (Krogman, 1996), local coastal zone management (Norris-Raynbird, 2006), and land use planning (Wilkins and Emmer, 2008) show, there are conceptual framing incoherencies and critical knowledge gaps in local coastal zone decision making in Louisiana.

The hurricane events of 2005 (Katrina and Rita) brought into public focus profound gaps in the management capabilities of all levels of government in Louisiana and the nation. In the aftermath, the dependency of local parishes on other levels of government and external resources coupled with painfully slow and sometimes absent local recovery (Harrison, 2008; Roberts, 2006) underscored local needs. In the past few years a concerted effort toward recovery has ensued (Lui and Plyer, 2008). Local parish government reorganization has occurred; new special interest organizations have emerged; research on response to the hurricanes and associated hazards has provided more knowledge; government outreach programs have been developed or are in developmental stages; and funding initiatives have invited and fostered industry/government/community partnerships. The aforementioned factors joined with repeated incidence of severe hurricanes have kept the collective memory of 2005 fresh and focused on meeting the risk challenges in the coastal zone. This leads to the question: has there been change to local coastal zone management capacity?

This study focuses on whether the factors of repeated severe hurricanes, a persistent focus on recovery and re-organization of parish governments have reduced the knowledge gaps and contributed to greater coherency in local decision making in coastal zone management, specifically as this applies to vulnerability and risk perception, land use planning, sustainable development, regulatory and non-regulatory mitigation¹ strategies and community resilience. Following after the study “Capacity Building: An Inquiry into the Local Coastal Program Component of Coastal Zone Management in Louisiana” (Norris-Raynbird, 2006), this research compares ‘before’ data (collected in the summer of 2005 prior to Hurricanes Katrina and Rita) with ‘after’ data (collected

¹ In using the term ‘mitigation’ we refer to both structural (i.e. permanent structures such as levees, flood walls, control devices, jetties, seawalls) and non-structural (i.e. wetland restoration, relocation, building codes, construction standards, land use regulations). We wish to acknowledge that FEMA uses ‘mitigation’ to refer specifically to non-structural strategies and ‘flood control works’ to refer to structural protection (FEMA.gov). See also Lindell, Perry and Prater, 2007.

2010-2011) on the ways that CZM issues (CZ management, risk, vulnerability, mitigation strategies, community adjustment and resilience) are framed and how CZM knowledge is acquired.

Unemployment, economic loss to communities, infrastructure loss, erosion of subsistence economy,, community fragmentation and disparate recovery are only some of the social stressors currently found in coastal Louisiana (Gramling, Darlington, Woodell and Brassieur, 2006; Kates, Colten, Laska and Leatherman, 2007; Coastal Communities Resiliency Project NOAA Bibliography, 2010), that may have profound effect on the frames relevant to and in use by local decision makers. Such stress may diminish local government capacity or enhance it. It is crucial that we better understand the relationship of these factors to conceptual framing to be better able to form and implement policy and programs to build local capacities consistent with resilient and sustainable objectives. Because recovery and restructuring have now been in process for six years, it is also an appropriate time to examine how social resources (intellectual, financial, organizational) are influencing coastal management decisions being made about how to live in the natural environment of coastal Louisiana.

These avenues of inquiry speak to the serious need to assess how best to provide the necessary tools to build knowledge and local capabilities to meet the needs of present and future challenges in coastal management in Louisiana. By conducting the study after only a five year interval since Hurricane Katrina during which there have been repetitive storms, information is still fresh in the minds of the respondents who will be interviewed, yet the duration is long enough for there to have been the changes that are the focus of the study.

This study, funded by Louisiana Sea Grant specifically asks:

1. What are the current issues, concerns and challenges faced by parish decision makers and how have these impacted coastal zone management decisions?
2. Have there been any framing shifts among local CZM decision makers comparing Time 1(2005) and Time 2 (2011) data (in particular the comparison of the Regulator and the Regulated conceptual frames)?
3. What are the perceptions and attitudes on specified mitigation strategies for coastal vulnerabilities?
4. What are the current vulnerability/risk, sustainability and resiliency perceptions among local CZM decision makers and how do these compare to data from 2005?
5. What are the current attitudes towards regulatory and non-regulatory mitigation planning including land use and relocation?

Review of Literature

The Coastal Zone Management Act (1972) is considered exemplary of environmental laws enacted because it specifically emphasizes the importance of integrated state and

local planning (Burby and May 1997; May and Williams 1986). This integration of state and local planning in coastal management would suggest a coherency between state and local policy and sufficient capacity in both state and local governments to successfully accomplish the implementation process. However, chronic difficulties with commitment to common goals in shared governance have been documented in coastal management (Beatley, Brower, and Schwab 1994).

State level respondents in The National Coastal Zone Effectiveness Study² from 1995 to 1997 (Hershman et al. 1999) perceived the CZM program to be effective in increasing capacity to manage at the state and local government levels, stressing the importance of networking, state – local partnerships, discretionary funds, and consistency reviews. Despite these state-level perceptions, building local government capacities was a critical theme during the Coastal Zone Management Act reauthorization hearings in 1999 and 2000 (U.S. Congress 2000, 2002). The U.S. Commission on Ocean Policy (2004) made a specific recommendation to reauthorize the Coastal Zone Management Act to “strengthen the management capabilities of coastal states” that would require “the active involvement of state and local policy makers” and the participation of concerned stakeholders.³ Most recently the Government Accounting Office completed a report of Coastal Zone Management, concluding that challenges persist for adequate evaluation of the success of coastal zone management programs (GAO-08-1045).

On Capacity and Resource Mobilization

Capacity-building has been strongly linked to effective policy implementation (Burby and May 1997; Hershman et al. 1999). Most federal and state policies eventually arrive at the doorstep of local implementers and it is recognized that local implementers can make or break federal or state policy effectiveness (Burby and May 1997; Lindell 1997; Tuler et al. 2002).

A proliferation of funding and capacity-building opportunities indicate that federal and state governments recognize that local participation is a resource to be mobilized to effect policy implementation. However, the identification of local participation as a resource and the general provision of other resources to build capacity and mobilize those resources toward policy implementation, are in and of themselves insufficient motivators for local governments to accept invitations to participate (Burby and May, 1997; Norris-Raynbird, 2006). Favorable conditions to mobilizing local participation include constituency support, precipitating event, crisis or structural strain (Marx and McAdam, 1994). Organizational characteristics such as existing

² For state level CZM evaluations see also King and Olson 1988; Knecht et al. 1996, 1997.

³ In Louisiana parish the Police Jury or Parish Council is the local governing authority. Juries/Councils in parishes with a local coastal program make local policy and rules consistent with state and federal level policy. With or without an LCP, Juries/Councils also engage with and make public comment on State policy and regulations pertaining to State level Coastal Zone Management activities in their parish. Local CZM administrators/staff are ground level implementers of local, state and federal policy and regulation who make recommendations to Council/Jury. Advisory panel members represent concerned citizen stakeholders, who also make recommendations to CZM Administrator and Council/Jury.

organizational structure (Marx and McAdam, 1994) and having a network of people linked by similar cultural experiences, beliefs and values, or by formal organizational ideology (McCarthy and Zald, 1977; Snow and Benford, 1988), all contribute to efficiencies in the effort toward mobilization.

The term “capacity” has been used in a variety of programmatic contexts including availability of resources, physical outcome indicators, institutional support, and process evaluations among others (Flora and Flora 2005; Hershmann et al. 1999). Typical of more “top down” mandate delivery, capacity has been defined by May and Williams (1986:28) as the “ability to reach a goal, as reflected by available resources, and by political, managerial, and technical competence”. While recognizing the need for clear goals, resources and authority, integration and participatory factors have been incorporated into implementation models to diminish opposition and to work toward consensual goal attainment. Capacity-building is then also viewed as a dynamic and adaptive reciprocal learning process (Pigg and Bradshaw 2005; Tuler et al. 2002).

On Framing

A policy implementation model that accommodates the definitions above with a focus on process⁴ was developed by Tuler et al. (2002).⁵ In this model, “socio-political context” (where implementation is situated) focuses on the social environment and includes: 1) mandate fit of state goals with local goals, 2) “process design” (availability of various resources), and 3) “character of individuals” (personal values, past experiences of those participating in implementation). The framing process is particularly important to “socio-political context” and “character of individuals.”

Ideological factors (roles, values, beliefs, meanings, and norms) inform the multiple realities held by individuals and the frames they construct to interpret the world around them (Berger and Luckman 1967; Goffman 1974). Because frames originate within the individual and reflect past experiences, they are useful in understanding how the same information or situational cues can be framed differently by different individuals (Snow and Benford 1988; Benford 1993). Competing frames are filtered by past experience to ascertain which meanings are most salient (Snow and Benford 1988). Framing is a repeating process with a shifting dynamic that constantly takes in new information and carries past information forward into new frames (Goffman 1974). Repeated interaction is crucial to building cooperation and trust.

⁴ The term process refers to the developmental stages including participation, knowledge transfer, communication, negotiation, learning, networking, building of trust, cooperation and adaptation. In this context it is the ‘how’ of policy implementation.

⁵ The Tuler et al. model includes participation from citizen groups and as such is community based. In LCRP, similarities to the Tuler et al. model can be seen in the training, resources, goal development, mandate fit, networking, and social opportunities offered to LCP participants. Cooperation is facilitated by social networks and norms, through and around which interaction occurs and trust is built. Putnam (1993) refers to these organizational features and the mutual benefits that follow from them as “social capital.” Flora and Flora (2005) similarly link lateral community learning to networks and social capital.

In addition to individual level framing, programmatic learning communities develop group frames from collective identification with values and beliefs, and they provide social and non-social incentives for establishing and maintaining group cohesion and collective action toward common interests (Benford 1993; Goffman 1974; Snow and Benford 1988). Applying this to the LCP process, participants move through training, education, and social interaction guided by CZM mandates and ideology. Participants are not only receivers of agency or programmatic ideology, they also bring with them, share, contest, and develop ideological frames with CZM others. The process is attenuated in non-LCP parishes with limited exposure to CZM ideology and less interaction with CZM others.

Applying Frames within the Context of Coastal Zone Management

The historical contentiousness over the use and regulation of land and other resources is well-documented in Krogman (1996). Differentiated frames of 'regular' and 'regulated' are identified. Supporting this typology is the previous work of Dietz and Rycroft (1987) on regulators. The differences between the regulator frame and the regulated frame are clear in both degree and substance (Dietz and Rycroft 1987; Krogman 1996). Examples of concepts from the regulator frame include: permit applicants fail to "do their homework"; and regulation is necessary to protect resources in a market economy. This frame recognizes that the market (economic gain through development and industry expansion) exerts tremendous power on local decisions to the detriment of protecting and preserving resources. This frame sees an unbridled market as problematic; development and expansion should be regulated. On the other hand, examples of regulated frame include: regulations are obstructionist; use decisions should be made on market basis; and solutions to conflict are more important than understanding the complexities of environmental issues. This frame sees protection and regulation as problematic; economic activities should be unfettered. The two frames are diametrically opposed.

Exposure to a specific role over time influences the adoption of values and ideology (frame) of that role (Berger and Luckman 1967; Dietz and Rycroft 1987; Lindell 1997). It follows that local government officials and more particularly, local administrators who: 1) have a Local Coastal Program, 2) actively make CZM policy decisions or implement policy, and 3) are regularly exposed to state agency ideology and mandates, exhibit ideology consistent with the regulator frame. And if the Local Coastal Program implementation process imbues capacity to manage in keeping with state agency mandates, this would reinforce the expectation of increased agreement with regulator framing in parishes that have developed Local Coastal Programs (LCPs). The use of the presence of regulator frame as the indicator of programmatic capacity only accommodates a capacity measurement within the confines of CZM Local Coastal Program ideology. This is not to say that other capacities do not exist and are not being built. With new information and experiences particularly those related to profound events, it is expected that these will, in accordance with frames theory, exert some influence on the framing process of decision makers. The disaster literature, however,

points to bifurcated effects of disaster experience related to mitigation and risk aversion. While chronic disasters influence local decision makers toward mitigation measures, other factors such as disaster relief and economic incentives aimed at recovery and development effectively increase risk tolerance and acquiescence toward more durable mitigation measures (Burby, 1998; Birkland, 2006; Freudenburg et al., 2008).

Vulnerability, Resiliency and Capacity

‘Back to normal’ as a plan of recovery is a compelling and historical strategy; yet it holds illusive gain (Henstra et al. 2008; Mustafa, 2007; Mileti, 1999). Among parish decision makers, gaps in coastal zone knowledge and in translating hazard event vulnerability awareness into perceptions of potential loss were apparent prior to the 2005 storms (Norris-Raynbird, 2006). The state of ‘normal’ prior to Hurricanes Katrina and Rita would not place coastal zone communities at an advantage in dealing with future events (Daniels, 2006). Additionally, in the post-event scramble to recover, external resources and opportunity enhance the potential for ill-conceived strategies, unreasonable goals and inappropriate decisions as these apply to mitigation and long term sustainability (Burby, 1998; Mileti, 1999; Birkland, 2006; Kates et al., 2007). The pull of developmental dollars in an economically wounded disaster area woos decision makers who must weigh circumspection with visions of tantalizing gain. However, the degree to which these factors negatively influence sustainable mitigation, particularly given the condition of repeated loss, is unclear.⁶ Some local governments have successfully avoided the pitfalls of short term gains and opted for sustainable mitigation through regulatory strategies (Birkland, 2006). Considering the opposing effects of chronic loss and relief/recovery gains on regulatory mitigation strategies, we suggest that gains must be perceived as unsatisfactory for the effects of chronic loss to have positive influence on regulatory strategies.⁷

Better measures are needed to assess effects on local capacity from disaster events and cumulative learning. Cutter (2008) posits an elegant and comprehensive model to ascertain community resiliency to disasters along a number of dimensions. Resilience includes the capacity to return to a status that existed before the hazard event, but pushes beyond that to incorporate lessons from the experience that promote adaptation and cumulative learning. Without adaptive capacity, mitigation measures to ‘return to normal’ fall short of building resiliency. The value of building on the adaptive character of social resiliency (the emergent restructuring response of social groups and communities post event) is noted by Macguire and Hagan (2007). This research views

⁶ A study currently underway argues that post disaster hazard mitigation dollars made available in haste and in excess may actually impede sustainable mitigation as the spending of it becomes the focus - often in allocations not based upon adequate prioritization of projects and not fully considering the range of alternatives (Jerolleman, A., Forthcoming).

⁷ The problem of attracting the participation of local governments in programs where there are immediate and known (or even perceived) real dollar costs (i.e. taking land out of commerce), but where collective goods benefits (i.e. sustainable and resilient communities) are diffuse and difficult to quantify is well documented (Lindell, 1997).

capacity building as an adaptive process and thus holds that resiliency (in keeping with Cutter) is also an ongoing adaptive learning process. While Cutter's model in its entirety is beyond the scope of this research, its value pertaining to the sociopolitical and socioeconomic focus of this research is pertinent. To this end, several of the social, institutional, economic and community competence variables identified by Cutter are present in this research.

Methods

This study is a pre-event / post-event natural experiment. It is a follow up to a pre-hurricane study of the effectiveness of Louisiana's Local Coastal Program (LCP) in building coastal zone management capacity in local decision-makers (Norris-Raynbird, 2006). Field work consisting of personal interviews, attendance at LCP / CZM meetings and coastal zone related events, and attendance at parish jury or council meetings commenced summer 2009 and occurred again in the summer of 2010. We had set a target of twenty interviews with parish presidents and CZM Administrators. But opportunity allowed us to obtain interviews with 30 people including parish presidents, CZM Administrators, parish planners and engineers from 18 parishes. Despite repeated attempts we unable to schedule interviews in Orleans parish in 2009 or 2010. In this time frame, changes were occurring with city personnel and in 2010, the BP oil spill took precedence over all other activities (New Orleans was the hub of related activity).

The conversational interviews were semi-structured around specified topic areas (i.e. recollection of hazard events, views on hazard adjustments, local problems/concerns, perceptions of constituency viewpoints, perception of parish resiliency). The recorded interviews were transcribed and content analysis was done to identify common response trends and emergent themes. Meeting observation notes were similarly analyzed.

A mail-out survey was sent to the entire population (N = 333) of coastal parish CZM decision makers of the 19 coastal parishes (Appendix 1). This population included parish council or police jury members, CZM administrators and staff, coastal advisory panel members, and parish employees in ancillary positions (i.e. flood managers, parish engineers, planners, and emergency preparedness). The original plan was to send out the first mailing of the surveys in January 2010, however delays in transcription of the interviews slowed progress. Because the survey design was based in part on information from the interviews, it was necessary to have the interviews of 2009 transcribed and reviewed before the survey content could be finalized. One change to the survey instrument that was the result of several respondent comments was the change to include Gustav in the title of the research. This inclusion was very important to many respondents interviewed and validated the wisdom of gathering field data in preparation for survey distribution. When the BP oil spill occurred in April 2010, the decision was made to delay sending out the surveys until the focus on the oil spill had dissipated and the effect

on the survey minimized.⁸ Many months passed before it was felt that the attention on the oil spill had diminished enough so as not to direct the focus away from non-oil related coastal issues. We also felt that waiting to send out the survey would have a positive effect on the return rate. In the interim, the survey instrument was pretested with an individual who had previously worked for LADNR. No alterations to content matching the 2005 were made, however wording on some new questions was adjusted for clarity.

Descriptive	2005		2011	
	Frequency/ Range	%	Frequency/ Range	%
Surveys returned N	84	(100)	91	(100)
Gender: Male	74	(88)	71	(78)
Female	10	(12)	20	(22)
Age:	--		30 - 76 yrs	
Edu: less than H/S	0	(0)	1	(1)
H/S or GED	33	(39)	16	(17)
2yr Assoc/equiv	9	(11)	16	(17)
4yr degree	19	(23)	24	(26)
MA/MS/PhD/oth	21	(25)	33	(36)
No response		(2)		
LCP: yes	52	(62)	68	(81)
no	26	(31)	15	(16)
pending	6	(7)	8	(9)
Type: CZM staff	11	(13)	16	(17)
advisory panel	24	(28)	21	(23)
Council/Jury	48	(57)	20	(22)
Planners	--		22	(24)
FI mgr/EMS/Eng	--		12	(13)
No response		(2)		

Table 1 Selected respondent demographics 2005 and 2011

⁸ The researchers knew that they would already be in the field in summer 2011 to complete remaining interviews, and that the delays caused by the oil spill also presented a unique opportunity to efficiently gather oil-spill related data. A proposal to extend the research topic domain and research period into the third year was developed immediately but then languished unbeknownst to the researchers in Administration at UNO. By the time it was received by LA Sea Grant, the available funding had been dispersed and the proposal was rejected. The delays due to the oil spill issues put the initial research many months behind and with the research period terminating at the end of May 2011, an extension for submitting the report after the June due date was requested. Analysis of the survey data began in June 2011.

The first mailing of surveys took place in March 2011 and a second mailing followed in April 2011. These were accompanied by letters explaining the research project and included a return stamped envelope. The second letter thanked people who had already responded and encouraged the participation of those who had not. By the beginning of May, it was determined that survey return had been maximized and coding and data entry began. The survey return was 91 completed surveys – return rate of 28.5% (a little lower than the 2005 rate of return of 33%). Even though an updated mail list (to accommodate changes in personnel and office location) had been completed from official parish web sites, there were still fourteen (14) returned envelopes with bad addresses.

Among the 2011 respondents, Council/Jury representation was lower than in 2005 and female representation was higher. The 2011 target population also included ancillary parish employees such as planners, flood plain managers, parish engineers and Emergency Management. With the exception of Assumption, all parishes were represented in the 2011 survey responses. Table 1 highlights respondent demographics from Years 2005 and 2011. It is important to note that the respondents are not ‘matched’. The target population is local decision makers years 2005 and 2011. However, personnel and positional changes have occurred between Time 1 and Time 2. What is compared here is local capacity based on frames agreement with DNR regulatory mandates and perceptions of vulnerability. An SPSS-11 statistical package was used for data analysis.

Findings

1. What are the current issues, concerns and challenges faced by parish decision makers and how have these impacted coastal zone management decisions?

For this question, both the survey instrument and the conversational interviews provided qualitative data. As Table 2 shows, the most frequently noted coastal zone issue on the survey instrument was loss of wetlands, followed by land loss (attributed to erosion, subsidence, sea level rise).

Transcript analysis of the interviews produced corroborating and more detailed information. Some variance is expected between the survey instrument and the transcripts because the specific respondents in the interviews were CZM administrators/staff and parish presidents only. The quotes selected are not the sum total of references to a particular topic but rather a representation of those encountered in the interview transcripts.

Issue	Frequency
Wetland loss (mitigation, permitting, funding)	20
Land loss (subsidence, erosion, sea level rise)	10
Permits and regulations (building codes, zoning)	8
Federal Agencies – USWF, COE, FEMA (disputes, non-cooperation)	7
Funding (money for projects)	6
Storm vulnerabilities (levee protection, drainage/pumps)	6
Constituent compliance (knowledge gaps, resistance)	5
State political resistance (beneficial use, barrier islands)	5
Saltwater intrusion (rice, other farming)	4
Coherency and coordination of strategy (local, state, federal)	4
Salinity levels / freshwater introduction (estuaries, swamps)	2
Infrastructure (roads)	1
Pollution	1
Lack of knowledge of marine processes in regulating agencies	1
No response	11

Table 2 Frequency of ‘most important coastal zone issue facing your parish’ as noted by respondents on the survey

The most frequently mentioned issue was the **new elevation requirements** that resulted from new FEMA maps post Hurricanes Katrina and Rita. Several parishes noted that the elevations were being contested based on their perception of FEMA’s inaccurate analysis of geographical features:

...we’re doing some studies right now, some drainage studies that will give us the documentation to go back and change those errors when we have the documentation to make the official appeal or “letter of last revision” in FEMA’s terminology. (7.21.09)

...we’re fighting the V-Zones because of these D-Firm maps. FEMA chooses to use the D-Firm map for their project worksheets, any rebuild for public buildings. And that, like I said, 80% of the parish they put in the V-Zone. We immediately hired technical assistance... and they found lots of problems with the maps. And now, we are in appeal period with the maps. (7.21.09)

(FEMA Maps)...that showed flooding in XXX parish, not one of them, not a structure in that zone flooded for Rita; how much sense does that make? How accurate can that possibly be when it has no connection to what really happened on the ground? That’s a huge issue. So, I don’t know if there was just a basic flaw in their modeling effort or the imagery they used. (7.16.09)

We actually had to put in some appeals ... We had a new 911 map that we had adopted that they didn’t use that; they used an old map—so those sorts of small things. But I know talking to some other parishes and some other parish presidents where they were getting a lot more detail and hiring engineering firms to prove this map wrong. (7.22.09)

...then there were some legitimate issues with the maps, where things were modeled wrong or they had bad data going in and they showed either inaccurate flood height or flood areas. And some ... most of those appeals and protests have been denied by FEMA. One issue was that FEMA wouldn’t give the data needed to make an appropriate appeal until after they closed the appeal process. That’s created some hard feelings. (7.13.10)

Well, we have not seen the new regulations yet because we protested some of those things because of what we saw initially. And we had engineers come in and do some very serious engineering studies and we sent that in. And we have not heard a response from those folks yet and it's been about a year now, just a little over a year so we have not heard anything yet. (7.21.09)

Many other interviewees noted constituency issues and confusions over the substantial and rapid changes to elevation requirements, building codes and mitigation requirements which affected new construction, rebuilding, insurance, permits...and even if they qualified for 'temporary housing':

It has been a nightmare for us to put into place building codes... And I can tell you, there was a lot of resistance to that in rural communities. (7.15.09)

...a public hearing on Valentine's day and it was listed as a Valentine's day massacre, we had to move it to the school gymnasium we had so many people. And we invited the head of the Louisiana Code Council to come and talk, as well as legislators and ourselves, and it was a lot of reluctance, a lot of angry residents. (7.15.09)

The issue comes down to regulation. We have – obviously citizens don't want to have, you know, permits to get a lot of issues. (7.21.09)

So you're talking about beaucoup of homeowners that's gonna have to buy flood insurance... so, I tell these people that this is all I have now. "If you're not satisfied you can call the Corps". (7.9.09)

The elevation requirements require like 9 feet of fill and so that is a concern for the adjacent property owners and so they have applied to DNR through I believe the Corps because some of it is wetland issues and they've hired a consultant trying to resolve it, bank some of those wetlands. (7.8.09)

We have 200 hundred people that qualify for mobile homes from FEMA that now they won't get because they are in the V-Zone. And it's horrible how they've been waiting for years and now they change it and they're out in the cold. (7.6.09)

Another issue that emerged from several interviews was the perceived **failures in agency relations**. While not exclusively referenced, the most prevalent was FEMA. Respondents described lack of faith in agency ability to perform, heavy handedness, mandates and money shifted away from wetlands protection, and within/between agency dysfunction:

You're trying to fight battles with FEMA and trying to get things going in the right direction. Now, we have a new FEMA director that we are trying to get an audience with because we feel like if our technical people can show him the deficiencies in those maps that he will step in and not make us use them. But, we haven't been able to do that yet. (7.21.09)

Most of those appeals and protests have been denied by FEMA. One issue was that FEMA wouldn't give the data needed to make an appropriate appeal until after they closed the appeal process. That's created some hard feelings. (7.13.10)

When you look at now how our definitions through the CPRA are being issued...how those definitions are being refined, they have taken over authority of hurricane and flood protection and all these other things, under the old OCPR. So when that fund, that state wetland trust that was supposed to go to restoration is now under OCPR, it's gonna go to levees, it's gonna go to flood control like dams or locks or whatever. ...I they're not careful in how they fine tune those definitions ...we'll be funding projects all over the state of Louisiana that have nothing to do with coastal hazard mitigation, with coastal restoration, and with hurricane protection or anything it was remotely designed to do. (7.16.09)

I got chewed on pretty heavy cause I'm also the floodplain manager but we had another OEP director at that time and he said, "I'll handle all that", and I said, "ok", you know. Well, when FEMA gets down, the agents come straight to me, and I said, "whoa, whoa, you need to go see Mr. R". So, they needed direction on where to go, how, and stuff like that on where the most damage was. I got chewed pretty heavy, with me being the floodplain manager, so I said, "Wait a minute, now, OEP has the authority here". When the next one comes in I'll work pretty close with a new director. (7.9.09)

(we were) waiting on the State, Federal government, FEMA, the Corps—to come up with a plan, which I'm still debating whether they have a plan or not, we couldn't wait. (7.6.09)

Other respondents expressed hope and confidence that restructuring of state agencies, specifically the new Coastal Protection and Restoration Authority, will improve upon former perceived disjunctions:

...like a lot of government agencies, you know, sometimes the right hand doesn't know what the left is doing and now that they've formed this and of course they've added these protection and restoration together that they're going to be doing projects that look at both ways before they actually approve projects. (7.21.09)

CPRA is staffed by people who know, not by people who have learned, or not by people who have been educated, but by people who know what's going on out there. And I think this will be the body that makes the difference because they allow such interaction. It's an exchange of ideas. (7.7.09)

CPRA is pretty much, is kinda...they are the show. And I think DNR now, I'm trying to figure out how DNR is working because they pull a lot of people. They've kinda hand picked the chosen ones. The good ones out of that group, they've moved them over. (7.6.09)

The CPRA recently had a planning program that they're culling the funding. They actually came to the parish last month – where they're asking every parish to put on a map what in your parish is funded through any of these projects. Has anything been vetted through any of these programs and what else do you want to see? Where are the dots and how can we connect them? So, it's a great planning project/program. And then if they can actually fund it and make it happen quickly, that would be a miracle. (7.13.09)

In focusing on how the perceptions of local decision makers on the issues identified by them has impacted local coastal zone management, several themes emerged that are grouped as:

- compliance strategies
- knowledge gains in preparedness and response among local decision makers
- constituency learning
- local officials' ability to navigate political process of recovery

Compliance strategies refer to ways in which parishes have chosen to respond to implementing the new regulations (primarily building codes including elevation requirements). Of the eighteen parishes interviewed, respondent from eight (8) couched their strategy in words that implied solidarity in non-compliance with regulation – clearly aligning themselves with the regulated frame. Many objected to the accuracy of the ‘science’; many objected to the issue of land being taken out of commerce. Even with respondents discussing the accuracy of the elevation maps, a subtext to their objection was loss of developmental land. They adopted a stall strategy:

*We **found problems** there (DFIRMS)...how do you know if you didn't do the study? We trying to figure out what's going on (7/09/09)*

*We **gonna have to look** at building codes and hopefully we won't be 16 ft in the air (07/06/09)*

*..drawings of the areas **we objected to** (which had never been flooded before), would put a lot of property out of commerce (07/21/09)*

*We are **fighting it** right now. (07/07/09)*

*..we developing fast. Only some of the parish in the coastal zone...**we're objecting** now (to regs). (07/20/10)*

Respondents from seven (7) parishes spoke of their ‘team effort’ to move cautiously forward with compliance. Here, respondents had adopted a regulator approach that was educative. Some parishes had external officials from DNR attend Town Hall meetings, some had gradually implemented more rigorous regulations of their own accord prior to Katrina and Rita, and still other parishes focused on the interests of their constituents in remaining in their homes and in their parish showing them how to accomplish this goal...through accepting the benefits of stronger regulation. In each of these, parishes were interested in educating their constituency and avoiding conflict. They promoted soft compliance:

But we towed the line. We kept moving forward, saying “look, we're in the area, it's going to make a difference down the road, we reconciled to do it, we're going to try to do it right” and we've done it right. And we've maintained our course, you know, and I think now people's perception and understanding is changing with the landscape,... (07/15/09)

*Until that (flood protection) project finishes, this parish **does not have to** adopt DFIRMS...(but) **we are requiring** those higher numbers. (07/09/09)*

*(People) want to stay here...build smarter, safer, stronger. That's one **approach we've had on it.** (7/21/09)*

*We've got to be able to **offer** it (new regs) to 'em... got to have respect for them...understand how they feel. (07/21/09)*

***Our outreach has been good** - most are willing to listen and build safe. (07/13/10)*

The remaining three (3) parishes adopted an enforcer strategy which typically relied on the efforts of a single individual and promoted hard compliance. The absence of a united front in the decision of compliance and the reliance on heavy handedness left room for regulated ideology to persist. In fact, it assumed it.

*Sometimes people expect you to allow them to do what they've always done. [...] **I have no problem saying 'no'** (07/06/09)*

*I don't live in xxxx parish...but I'm the **hired gun** out here... (07/06/09)*

*'You suing me?' 'Yes I told you I was going to sue you'. I'm lucky, **I have three young judges**...every last one of those judges has built...under FEMA regulations. [...]So they understand that they **don't have a choice.** (07/09/09)*

Knowledge gains in preparedness and response among local decision makers is another theme that emerged from officials as they described the 'positive' effects of repetitive storms. Interviews from fourteen (14) parishes noted that parish officials had learned a lot more about preparedness and response:

*...because we'd seen the damage...and we evacuated for Rita, and we evacuated since...I mean **its serious now.** (07/21/09)*

*We didn't take the brunt of Katrina...biggest challenge was to **regroup and become more prepared.** Gustav...was a direct hit...but we were pretty much prepared.. (07/15/09)*

*We have **made great strides** (in response). We were **able to test** that during Gustav and Ike. (07/06/09)*

*We've been fortunate to have grants to plan and that has made a huge **difference in our resiliency.** (07/13/10)*

Interviews from fourteen parishes referred to **knowledge gains by their constituents:**

*(Residents) are **learning**...that they've got to **listen** to what professionals say about the tides and the heights that building have to be. (07/21/09)*

*There's more tolerance. They're **understanding**; they're **recognizing** the need, the requirements,' why'. (07/15/09)*

*People that came back were a little bit **more civic minded** and a little bit more **understanding** of all the other issues. (07/06/09)*

*General public is **smarter**...people have really **internalized** what the **risk** or cost-benefit analysis is... (07/06/09)*

Interestingly, without exception, all parish interviews noted at some point, **knowledge gains in navigating the political process of recovery.** Several parishes have long competed for CWPPRA (Coastal Wetlands Protection, Preservation and Recovery Act) money and have learned to liken that process (and their relative successes) to the process of recovery. Some are forming new alliances to weight the ‘clout’ they have, getting to know the multi-tiered layers of funding and ‘who’ to know within the tiers:

*We are speaking more in **one voice** (multiple parishes) ...more influential. (07/21/09)*

*My guys (staff) are getting **savvy**...It’s a huge **political process**. (07/09/09)*

*Other parishes...they’re starting to get the idea... everyone’s been very **aggressive** (going after funding) (11/18/09)*

*We learned the **tricks of the trade**...how FEMA works... how the State works when it comes to recovery. (07/21/09)*

*We have hired people **who know people** to consult. (7.20.10)*

2. Have there been any framing shifts among local CZM decision makers comparing Time 1(2005) and Time 2 (2011) data (in particular the comparison of Regulator and Regulated conceptual frames)?

The 2005 study showed that the regulator frame (the frame that expressed agreement with regulator ideology) was more prevalent among Advisory Panel respondents. CZM Administrators as a group showed ambivalence, that is, some in the group clearly agreed with regulator ideology and others less so. Council and Jury Members as a group were strongly in agreement with ideology of the regulated frame.

Survey data from 2005 was compared to survey data from 2011. Using the same 8-item Likert attitudinal model⁹ as used in 2005, the data for 2011 produced a reliability

⁹ The scale was constructed from among twelve Likert statements on the survey instrument that represented either *regulator* framing or *regulated* framing. Response values (ranging from 1 – strongly disagree to 5 – strongly agree) were tallied for each statement across all respondents. There was missing data on a few items but there was no pattern. It was preferable not to drop cases therefore substitution was the best strategy. The missing values were replaced with the mean of the other index items responses from the respondent. By taking the mean from the respondent’s other responses, the value was predicted from the other responses and the error was reduced. In keeping with the supported assumptions of the 2005 study, high *regulator* frame agreement was associated with low agreement levels on regulated frame items.

alpha of .6870. This was very close to the Cronbach Alpha achieved in 2005 for the same index (see Model selection comparison statistics in Appendix 2). This demonstrated the reliability of the model. A respondent frame index variable was then constructed by summing scores across the 8 items.¹⁰

Because we had added two more categories to respondent type in the target population of 2011, namely planners and operations parish staff (flood plain mgrs, emergency preparedness, and parish engineers), we created a variable that contained the respondent categories comparable to the 2005 variable. We recoded the frame index variable (Index tally 2011) to produce variable that retained only CZM admin/staff, Advisory panel and Council/Jury responses (Index Tally Cat123). Planners and operations staff respondents were backed out. Now we had two comparable variables, one from 2005 (Index Tally 2005) and one from 2011 (Tally Cat 123), and a third that had more respondent categories (Index Tally 2011). We then examined all three variables. Descriptive statistics (Table 3) showed that all three respondent frame index variables had comparable means and range, but that Index Tally Cat123 and Index Tally 2011 had slightly increased negative skewness (as compared with Index Tally 2005). Kurtosis values showed some positive clustering in 2005. However, in 2011 some clustering occurs in the lower range of the index values in both 'Index Tally 2011' and 'Index Cat 123'. Histograms in Appendix 3 provide a visual of these slight shifts. As in 2005, the frame index variables in 2011 approximate normal distribution. Comparison of means (independent samples t-test) on a dummy variable (the combined three respondent frame tallies) grouped by year show that these small shifts are not statistically significant (2005 * 2011-123, $p = .222$; 2005 * 2011, $p = .360$). The assumption of equality of variance in the means is statistically significant at the 90% confidence level for the comparison of 2005 frame index variable and the 2011 Cat 123 frame index variable (Levene's $F = 2.880$, $p = .092$), but fails for the comparison of 2005 frame index variable and the 2011 frame variable which includes ancillary parish employees (Levene's $F = .285$, $p = .594$).

The statistical tests show the similarity in the mean values in respondent frame index tallies in 2005 and in 2011 among CZM admin/staff, advisory panel, and Council/Jury. There is, however, a shift downward meaning that *regulator* frame agreement in these respondent types is somewhat weaker. This downward shift does not achieve statistical significance however.

Conversely, low *regulator* frame agreement was associated with high agreement levels on regulated frame items. The five statements representing regulated frame were therefore reverse coded to align directionally with *regulator* framing. This produced a '*Regulator* frame index' variable.

¹⁰ Higher scores indicated greater agreement with the *regulator* frame, and lower scores indicated greater agreement with the regulated frame. Cut points for frame ranges were established as: • 'regulator' frame agreement: scores of 28 to 40 (Likert score 3.5 – 5 over 8 items); • mixed frame agreement: scores of 20 to 27 (Likert score 2.5 – 3.4 over 8 items); • 'regulated' frame agreement: scores of 8 to 19 (Likert score 1 – 2.4 over 8 items).

		frame index 2005	frame index cat123 -2011	frame index 2011
N	Valid	80	57	90
	Missing	11	34	1
Mean		26.16	25.05	25.47
Std. Deviation		4.801	5.662	5.046
Skewness		-.054	-.303	-.390
Std. Error of Skewness		.269	.316	.254
Kurtosis		.428	-.186	.217
Std. Error of Kurtosis		.532	.623	.503
Minimum		12	10	10
Maximum		38	37	37

Table 3 Descriptive statistics for respondent frame index years 2005 and 2011

LCP status

In 2005, the positive association between LCP status (No LCP, pending LCP, new LCP, mature <5yrsLCP) and respondent frame was statistically significant ($p=.008$). Between 2005 and 2011 LCP status has remained the same with regard to No LCP and pending statuses. New LCP status has disappeared as these LCPs have aged into Mature LCP status. We tested the association between LCP status and respondent frames in 2011, again using Analysis of Variance (ANOVA). Table 4 provides comparison. The association of LCP status with respondent frame 2011 was not significant for the variable which included only respondent categories CZM Admin/staff, Advisory panel, and Council/Jury only (Frame Tally 123). One consideration was that Frame Tally 123 had a smaller N and one cell had less than 3 cases.

Nonparametric correlation test was performed on Frame Tally 123 and LCP status; Kendall's Tau_b correlation coefficient was .227 and significant at 95% confidence level ($p=.042$). In testing Tally 2011, significance was achieved at the 90% confidence level ($p = .053$) with the respondent frame variable (Tally 2011) with a larger N that includes planners, flood plain managers, emergency preparedness managers and parish engineers.

In 2005, Bonferroni tests showed the greatest change in the means to be between New LCP and No LCP ($p=.005$). Because of missing cells, post hoc tests could not be done on Frame Tally 123, however post hoc tests on the second variable (Tally 2011) showed that the greatest change in means occurred between No LCP and Mature LCP ($p=.052$). This is consistent with the changes in LCP status. That is, having an LCP has a positive influence on respondent framing. This is confirmed with testing a dichotomous variable (LCP status yes or no with pending LCPs included in 'yes'). Significance was

not achieved with a One Way ANOVA for Frame Tally 123, however Kendall/s Tau_b value is .196 ($p = .082$). Significance at the 95% confidence level was achieved with Frame Tally 2011 ($p = .015$). However, the evidence also indicated that the association of LPC status on respondent framing was weaker in the 2011 data.

N=80 Tested: Frame Tally	Group statistics				Univariate Analysis of Variance		
	LCPstat	N	Mean	SD	Mean Square	F	Sig
2005	No LCP	25	23.68	3.934	134.889	4.213	.008**
	Pending	6	26.83	5.529			
	New<5yr	19	28.68	4.989			
	Mature	30	26.50	4.424			
	Total	80	26.16	4.801			
**Significant at 99% confidence level							
N = 56 Tested: Tally123	Group statistics				Univariate Analysis of Variance		
	LCPstat	N	Mean	SD	Mean Square	F	Sig
2011	No LCP	7	22.00	3.873	52.680	1.660	.186
	Pending	1	20.00				
	Mature	49	25.65	5.768			
	Total	57	25.11	5.662			
	No statistical significance						
N = 90 Tested: Frame Tally	Group statistics				Univariate Analysis of Variance		
	LCP stat	N	Mean	SD	Mean Square	F	Sig
2011	No LCP	15	22.60	3.355	74.193	3.048	.053*
	Pending	7	26.29	4.271			
	Mature	68	26.01	5.256			
	Total	90	25.47	5.046			
	* Significant at 90% confidence level						

Table 4 General linear model comparisons of means for effect of LPC status on respondent frame tally 2005, respondent frame tally 2011 (Cat 123), and respondent frame tally 2011 with all respondents

Respondent type

Another variable found in 2005 to have statistically significant positive association with respondent frame was respondent type, specifically, CZM Admin/staff, Advisory Panel, Council/Jury member. Table 5 shows the comparisons these variables for years 2005 and 2011.

We tested the association of the two frame variables from 2011, Frame Tally 123 and Tally 2011 with respondent type. In keeping with the 2005 analysis, a one-way ANOVA was performed. For variable Frame Tally 123, significance was achieved at

90% confidence level ($p=.086$) but post hoc tests revealed that no between group comparisons of the means achieved statistical significance. A one-way ANOVA was then performed with Tally 2011 and respondent frame type. The association was statistically significant at the 90% confidence level ($p= .052$). Post hoc tests showed that no between-group comparisons of the means achieved statistical significance; Levene's equality of variance was significant ($p=.030$).

N=80 Tested: Frame Tally	Group statistics				Univariate Analysis of Variance		
	Respondent type	N	Mean	SD	Mean Square	F	Sig
2005	CZM staff	11	26.64	5.464	100.041	5.861	.004**
	coun/jury	45	24.87	4.372			
	panel	24	28.38	4.595			
	Total	80	26.16	4.801			
**Significant at 99% confidence level							
N = 56 Tested: Tally123	Group statistics				Univariate Analysis of Variance		
	Respondent type	N	Mean	SD	Mean Square	F	Sig
2011	CZM staff	16	27.75	5.323	73.877	2.389	.086*
	coun/jury	21	23.95	6.336			
	panel	20	24.20	4.652			
	Total	57	25.11	5.662			
*Significant at 90% confidence level							
N = 90 Tested: Frame Tally	Group statistics				Univariate Analysis of Variance		
	Respondent type	N	Mean	SD	Mean Square	F	Sig
2011	CZM staff	16	27.88	5.277	74.193	3.048	.052*
	coun/jury	21	23.95	6.336			
	panel	20	24.20	4.652			
	planner	22	26.91	3.393			
	operations	11	24.27	3.977			
	Total	90	25.47	5.046			
* Significant at 90% confidence level							

Table 5 General linear model comparisons of means for respondent type on respondent frame tally 2005, respondent frame tally 2011 (Cat 123), and respondent frame tally 2011 (all respondents)

Of all types of respondents, CZM Administrators/staff and planners displayed the highest group means (27.88 and 26.91 respectively). It is worthwhile noting that in 2005 the Advisory panel respondent group mean was 28.38, while in 2011 it was 24.20. Recall that the cut point for *regulator* frame agreement was 28 or greater (3.5 agreement on 5 point scale over 8 items). The cut point for regulated frame was 20 or less (2.5 agreement on a 5 point scale over 8 items).

Comparing Frame Types

Using the cut points to create categorical frame types, we compared frequency distribution and group means across categories for years 2005 and 2011 (Table 6). The comparison confirms a slight downward trend in regulator frame agreement across all frame types. It also shows no real change to the in the distribution of respondents across frame types despite the addition of planners and operations staff to the 2011 target population.

Frame type	Year 2005				Year 2011			
	N	%	Grp mean	St dev	N	%	Grp mean	St dev
regulated	7	9	17.43	2.573	10	11	16.10	2.514
mixed frame	44	55	24.36	2.221	50	55	24.18	2.318
regulator	29	36	31.00	2.765	30	33	30.73	2.303
Total	80	100	26.16	4.801	90	100	25.47	5.046

Table 6 Comparison of group means for respondent frame types years 2005 and 2011

3. What are the perceptions and attitudes on specified mitigation strategies?

Particularly in the aftermath of repetitive storms since Hurricane Katrina, local, state and federal officials have been focused on addressing coastal vulnerabilities. In doing so, many strategies have been discussed (some implemented) that are intended to reduce risk to loss and damage associated with vulnerabilities to coastal hazards and processes. Several of these mitigation strategies were identified from interviews with respondents and included on the survey as were protective strategies.

A series of questions on the survey asked respondents about the level of their agreement with statements pertaining to mitigation (Likert 5 point scale with 1 being strong disagreement and 5 being strong agreement). Because *regulator frame* represents the ideological framing of the lead agency (LA DNR) mandates as these relate to Local Coastal Programs, respondent frame (Tally 2011) was correlated to mitigation responses to the statements below. The correlation matrix can be referenced in Appendix 5.

- 1) Land use planning is an appropriate mitigation strategy for my parish.
($r = .225, p = .034$) **

Positive correlation significant at 95% confidence level.

- 2) Zoning is not a consideration in my parish. ($r = -.195, p = .067$)*

Negative correlation significant at 90% confidence level.

- 3) Technology/engineering will provide the necessary mitigation strategies for coastal hazards in my parish. ($r = .096, p = .396$)

No statistical significance.

4) Inland relocation of coastal populations makes sense in a long term cycle of unstable weather and rising seas. ($r = .368, p = .000$) ***

Positive correlation significant at 99% confidence level.

5) Levee systems and flood control devices are the only means of reducing vulnerability for my parish. ($r = -.498, p = .000$)***

Negative correlation significant at 99% confidence level.

6) Relocation more inland is not something that I would ever consider. ($r = -.486, p = .000$)***

Negative correlation significant at 99% confidence level.

From the descriptive statistics the group means of each statement in relation to frame type is illustrated (Table 7). Each statement is discussed individually:

Tested	Frame type	N	Mean	Std. Dev.	Std. error
land use mitigation	regulated	10	3.60	1.506	.476
	mixed	49	3.71	.935	.134
	regulator	30	4.10	.803	.147
	Total	89	3.83	.980	.104
zoning not considered	regulated	10	2.90	1.524	.482
	mixed	49	2.39	1.133	.162
	regulator	30	2.17	1.262	.130
	Total	89	2.37	1.228	.130
eng / tech solution	regulated	10	2.80	1.317	.416
	mixed	49	3.12	.917	.139
	regulator	30	3.17	1.262	.230
	Total	89	3.10	1.108	.117
inland relocation	regulated	10	1.80	1.033	.327
	mixed	49	2.88	1.201	.172
	regulator	30	3.27	1.258	.134
	Total	89	2.65	1.102	.110
levee/flood control only	regulated	10	4.30	1.059	.335
	mixed	49	2.73	1.366	.195
	regulator	30	1.93	1.337	.244
	Total	89	2.64	1.487	.158
relocate not ever	regulated	10	4.20	1.317	.416
	mixed	49	3.35	.991	.142
	regulator	30	2.37	1.189	.217
	Total	89	3.11	1.238	.131

Table 7 Descriptive statistics on the associations between respondent frame type and attitudinal variables on mitigation

- **Land use planning is an appropriate mitigation strategy for my parish.**

There was a high level of agreement across all ideological frame type groups. Those respondents identified as having ‘regulator’ ideological framing indicated the highest level of agreement with the statement according to their group mean which was 4.10. But even respondents identified as having ‘regulated’ ideology agreed on average with this statement; their group mean was 3.60. Post hoc tests showed no statistically significant variance between group means.

- **Zoning is not a consideration in my parish.**

There was general disagreement with this statement. The least disagreement occurred with respondents identified as having the ‘regulated’ frame, their group mean being 2.90. The range of scores (1 – 5 in each group), however, indicated that there were some respondents who strongly agreed with this statement regardless of which ideological frame they had. The disagreement across all types of framing coupled with the range of scores in all frame type groups suggest that while respondents recognize zoning as ‘being on the table’ it remains a contentious issue.

- **Technology/engineering will provide the necessary mitigation strategies for coastal hazards in my parish.**

Responses to this statement were generally neutral across all frame types.¹¹ The group means increased gradually from regulated to regulator group types reaching a level of agreement of just above neutral (a score of 3 on the scale) in the regulator group. While engineering and technology are non-regulatory mitigation strategies, it is possible that some respondents who display regulator framing are also heavily invested occupationally in engineering and technology.

- **Inland relocation of coastal populations makes sense in a long term cycle of unstable weather and rising seas.**

There were marked differences in between group means.¹² Respondents having regulated frame ideology tended to disagree with this statement, respondents with mixed frame ideology tended toward less disagreement, while the regulator frame group tended toward agreement with the statement. One Way ANOVA showed the between group differences in means to be statistically significant at the 99% confidence level ($r = 5.566$, $p = .005$). Post hoc Bonferroni tests showed the greatest variance of the between means to occur between the regulated frame group and regulator frame group (difference in the means 1.467 with $p = .004$). The difference in group means between regulated and mixed frame

¹¹ It was possible that respondents from inland coastal parishes could have interpreted this question differently than respondents from coast proximate parishes. A check of means for this statement across parishes did not support this possibility. Seven out of 19 parishes (no data for Assumption) had a group means higher than 3.0 and they were divided evenly between inland coastal parish and coast proximate parishes.

¹² Descriptive statistics on this statement grouped by parish indicated that inland parishes had group means that showed agreement with this statement, while coastal proximate parishes had group means that showed disagreement with the statement.

groups was comparatively smaller but also significant (difference in the means 1.078 with $p=.035$). The difference in means between mixed frame and regulator groups was not significant.

- **Levee systems and flood control devices are the only means of reducing vulnerability for my parish.**

The between group differences were again large. Regulated frame respondents strongly agreed with this statement, while the mixed frame group showed slight disagreement and the regulator frame group disagreed more strongly. One Way ANOVA showed the between group differences in means to be statistically significant at the 99% confidence level ($p= .000$). Post hoc test showed that the difference in means between regulated and mixed frame groups was 1.560 ($p=.003$); the difference in means between mixed and regulator frame groups was .807 ($p=.029$); and the difference in means between the regulated and regulator frame groups was 2.367 ($p= .000$).

- **Relocation more inland is not something that I would ever consider.**

This question shifted the idea of relocation from a generalized one based on a logical assumption, to personal choice. Regulated frame respondents agreed strongly with this statement. The group mean of mixed frame respondents showed slight agreement, and the group mean for regulator frame respondents showed slight disagreement.¹³ Post hoc tests showed the greatest change in the group means to be between regulated and regulator frames (difference in the means -1.833, $p=.000$). The difference in the group means was also significant between mixed frame and regulated frame groups although the frame effect was not as strong (difference in means -.860, $p = .076$).

4. What are the current vulnerability/risk, sustainability and resiliency perceptions among local CZM decision makers and how do these compare to data from 2005?

Respondents were asked to indicate the level of vulnerability they perceived their parish to have to specified coastal hazards (Low = 1, Moderate = 2, High = 3). Vulnerability variables were then dichotomized (0 = low, moderate vulnerability; 1 = high vulnerability). Following after the design from 2005, cross tabulation 2 X 2 tables were computed for each dichotomous coastal hazard grouped by dichotomous variable LCP or No LCP. This alleviated thin cells and provided a more robust comparison using Fisher's exact test. The comparisons between 2005 and 2011 responses are display in Table 8 below. As can be seen, there have been significant shifts in the between group (LCP or non-LCP respondent) framing differences between 2005 and 2011. In the 2011 survey, land loss was separated by cause and the difference of group means for both variables was statistically significant when grouped by LCP or non-LCP respondents. LCP

¹³ Descriptive statistics on this statement grouped by parish indicated that four parishes had group means above 3.5 in agreement with this statement. Two were inland coastal parishes and two were coastal proximate parishes.

respondents as a group indicated greater vulnerability to hurricanes/tropical storms, land loss due to subsidence, land loss due to erosion, and saltwater intrusion than did non-LCP respondents. Cross tabulation 2X2 tables were then computed for the vulnerability to hazards variables grouped by regulator frame or other. Three physical vulnerability variables were significant (one-sided p value): land loss due to subsidence ($r = 2.930$, $p=.069$); land loss due to erosion ($r = 6.042$, $p = .011$); and pollution ($r = 2.346$, $p=.069$).

With regard to economic vulnerabilities, there were differences in the perceptions between LCP respondents and non-LCP respondents in vulnerability to property damage, infrastructure damage, business interruption and loss of investment capital and these are statistically significant in the 2011 data. Only infrastructure damage and business interruption were statistically significant for differences in how LCP respondents perceived vulnerabilities compared to non-LCP respondents in 2005.

When cross tabulation 2X2 tables were computed for Respondent frame (regulator or other) and dichotomous vulnerability (high or low/moderate vulnerability), there were no statistical differences between the group means for any of the variables.

Vulnerability item	2005			2011		
	N	Pearson Chi-Sq	Fisher Exact (1-sided)	N	Pearson Chi-sq	Fisher Exact (1-sided)
PHYSICAL:						
Hurricanes / tropical storms	80	.658	.302	91	7.215	.015**
Flooding / storm surge	80	.188	.428	91	.161	.708
Pollution	77	.730	.277	89	.806	.272
Land loss	79	1.197	.201			
subsidence				88	10.122	.003***
erosion				87	7.105	.011**
Saltwater intrusion	78	3.693	.050*	87	6.425	.015**
ECONOMIC:						
Property damage	78	3.625	.051*	88	5.481	.024**
Infrastructure damage	78	8.496	.004***	88	4.409	.039**
Business interruption	78	5.142	.021**	88	8.090	.007***
Loss of investment capital	76	2.096	.115	88	3.106	.074*
Loss of natural resources	79	.837	.252	88	.739	.286

Table 8 Chi-square and Fisher exact significance tests for perceptions of physical and economic vulnerabilities grouped by LCP or non-LCP respondent

It was expected that the most distinguishing variable in vulnerability perceptions would be whether or not the respondent was from a coastal proximate parish or an inland coastal parish. The parish variable was dichotomized into the two categories. The following parishes were categorized as coastal proximate: Cameron, Iberia, Jefferson, Lafourche, Orleans, Plaquemines, St. Bernard, St. Mary, Terrebonne and Vermilion. Orleans parish was categorized as coastal proximate because of its unique vulnerability to

water due to Lake Pontchartrain, the MRGO funnel and devastated ‘land mass’ to the east and southeast in St. Bernard parish. The following parishes were categorized as an inland parish: Assumption, Calcasieu, Livingston, St. Charles, St. James, St. John the Baptist, St. Martin, St. Tammany, and Tangipahoa.

Cross tabulations were computed for dichotomized physical and economic vulnerability variables grouped by coastal proximate or inland coastal parish for both 2005 and 2011 data sets. Not surprisingly, almost all physical and economic vulnerability variables were statistically significant. The only variable in which there was no statistical difference in the group means was for perceived vulnerability due to pollution. This occurred in years 2005 and 2011. But there were changes to pollution perceptions worth noting. While responses were split fairly evenly between low/moderate and high vulnerability among coastal proximate parish respondents in years 2005 and 2011, there was a slight shift in responses from inland parish respondents. In 2005 about 67% inland respondents had indicated low/moderate vulnerability to pollution. In 2011, this percentage had decreased to 50%. Perceptions of pollution vulnerability in inland coastal and coastal proximate were roughly commensurate. In all other variables, identity of parish as coastal proximate or inland coastal made a significant difference in perceptions of vulnerability.

5. What are the current attitudes towards regulatory and non-regulatory mitigation planning including land use and relocation?

Respondents were asked to rank a series of structural and non-structural mitigation strategies according to the relevance to their parish (with 1 being very relevant and 5 being least relevant). A second question asked respondents to rank series of implementation strategies according to the relevance to their parish. A full table of mitigation and implementation mean rankings by parish is in Appendices 5 and 6.

Structural and Non-structural Mitigation strategies

The most relevant and least relevant mitigation strategies are listed by parish. Please note that there is no data for Assumption parish. Because these are ordinal ranked responses, we are looking at the lowest mean.

Calcasieu	Most: ‘education of parish residents on mitigation’ (Mean = 1.17) ‘tighter building codes on new construction’
	Least: ‘parish levees and flood control devices protection’ (Mean 4.50)
Cameron	Most: ‘large wetland restoration projects’ (Mean 1.55) ‘projects to maintain/repair existing wetlands’
	Least: ‘voluntary relocation (no buyout)’ (Mean 4.09)

Iberia	Most: 'mandatory elevation of homes in flood zones' (Mean 3.00) Least: there were several. Overall, none of the strategies were perceived as relevant to this parish.
Jefferson	Most: 'parish levees and flood control devices' (Mean 1.00) Least: 'voluntary relocation of residents (no buyout)' (Mean 4.00) 'assisted relocation of residents (buyout)'
Lafourche	Most: 'parish levees and flood control devices' (Mean 1.25) Least: 'voluntary relocation of residents (no buyout)' (Mean 3.75) 'assisted relocation of residents (buyout)'
Livingston	Most: 'mandatory elevation of homes in flood zones' (Mean 1.00) 'large engineered hurricane projects' 'building code standards on repairs to structures' Least: there were several.
Orleans	Most: 'parish levees and flood control devices' (Mean 1.00) 'large wetland restoration projects' 'projects to maintain/repair existing wetlands' Least: 'voluntary relocation of residents (no buyout)' (Mean 3.60)
Plaquemines	Most: 'large wetland restoration projects' (Mean 1.30) 'projects to maintain/repair existing wetlands' Least: 'voluntary relocation of residents (no buyout)' (Mean 4.10)
St Bernard	Most: 'parish levees and flood control devices' (Mean 1.33) Least: 'voluntary relocation of residents (no buyout)' (Mean 4.33)
St Charles	Most: 'parish levees and flood control devices' (Mean 1.00) Least: 'voluntary relocation of residents (no buyout)' (Mean 5.00)
St James	Most: 'parish levees and flood control devices' (Mean 1.00) Least: 'voluntary relocation of residents (no buyout)' (Means 4.00)

St John the Baptist	Most: 'parish levees and flood control devices' (Mean 1.00) 'education of residents on mitigation' 'large wetland restoration projects'
	Least: 'voluntary relocation of residents (no buyout)' (Mean 4.00)
St Martin	Most: all except those listed below were most relevant (Mean 1.00)
	Least: 'voluntary relocation of residents (no buyout)' (Mean 5.00) 'assisted relocation of residents (buyout)' 'large engineered hurricane projects'
St Mary	Most: 'parish levees and flood control devices' (Mean 1.00)
	Least: 'voluntary relocation of residents (no buyout)' (Mean 5.00) 'assisted relocation of residents (buyout)'
St Tammany	Most: several were most relevant at Mean 1.00. All with the exception of the item listed below were considered quite relevant for the parish.
	Least: 'parish levees and flood control devices' (Mean 3.00)
Tangipahoa	Most: 'land use regulations' (Mean 2.00)
	Least: 'voluntary relocation of residents (no buyout)' (Mean 5.00)
Terrebonne	Most: 'parish levee and flood control devices' (Mean 1.00)
	Least: 'voluntary relocation of residents (no buyout)' (Mean 3.44)
Vermilion	Most: several were considered 'most'. All except one were quite relevant.
	Least: 'voluntary relocation of residents (no buyout)' (Mean 5.00)

To investigate the relationships of ideological frame (regulator, mixed, regulated) and role type (CZM staff, advisory panel, council/jury, planner, operations) to perceptions of structural and non-structural mitigation strategies, an ANOVA comparison of means was performed on mitigation variables grouped by respondent frame and then by respondent type.

Mitigation strategy perceptions and ideological frame

Four mitigation strategies produced statistically significant variance in the means: assisted relocation of residents, mandated elevation of homes in flood zones, tighter building codes on new construction, and land use regulations (Table 9).

From the table it is evident that the group of respondents with a regulated frame did not perceive ‘assisted relocation of residents’ to be nearly as relevant as did the group of respondents with the regulator frame (recall that the rankings are in ordinal form and lower mean indicates relevance). The difference in the mean is quite large between the regulated group and regulator group. Mixed frame respondents tended to align with the regulated frame (the difference in group means between the regulated and mixed frame groups was not significant).

N = 83

Mitigation strategy	F	Sig	Post hoc Frame comp	Mean diff	Sig
Assisted relocation of residents (buy out)	9.023	.000	Regulated – regulator	1.871	.001***
			Mixed – regulator	1.083	.004***
Mandatory elevation of homes in flood zones	7.565	.001	Regulated – mixed	1.544	.005**
			Regulated – regulator	1.914	.001***
Tighter building codes on new construction	20.764	.000	Regulated – mixed	1.967	.005**
			Regulated – regulator	2.543	.000***
			Mixed – regulator	.576	.086*
Land use regulations	5.217	.007	Regulated – mixed	1.422	.007**
			Regulated – regulator	1.371	.015**
* Sig at 90% confidence ** Sig at 95% confidence *** Sig at 99% confidence					

Table 9 Comparison of means (one way ANOVA) of mitigation strategies grouped by respondent frame with post hoc tests (Bonferroni)

For the ‘mandatory elevation of homes in flood zones’, the difference in means between regulated frame respondent group and mixed frame respondent group was quite large as was the difference in mean between regulated and regulator respondents. But the mean difference was not significant between mixed frame respondents and regulator, indicating that with this strategy, the mixed frame group of respondents aligned themselves more with regulator ideology. The mean difference was not significant between mixed and regulator frame groups. The regulator frame respondent and mixed frame respondent groups perceived this strategy to be highly relevant for their parish.

The greatest variance in mean occurred with ‘tighter building codes on new construction’. For this strategy there was significant difference in group means between all three groups. While the group of mixed frame respondents tended toward perceiving this strategy to be relevant, there was sufficient difference in the mean between mixed and regulated frames to situate mixed frame response closer to a neutral position.

‘Land use regulations’ was perceived as very relevant by regulators and mixed frame groups of respondents. It was not considered a relevant strategy among regulated frame respondents.

Noteworthy to the investigation of ideological frame and structural and non-structural mitigation strategies was the fact that none of the other mitigation strategies garnered statistically significant support from the regulator group of respondents. While some of this can be explained by location factors (as we saw in the most and least relevant strategies by parish), a review of the means of respondent frame groups for each frame type (which is not related to location) shows that respondent groups show clear preferences in what strategies are relevant and which are not. But regardless of ideological frame, groups did not perceive ‘voluntary relocation – no buyout’ or ‘expansion of the coastal zone boundary’ to be a relevant strategy. Overall, groups supported ‘education of parish residents on mitigation’, ‘large engineered hurricane protection projects’, ‘large wetland restoration projects’, ‘projects to maintain/repair wetlands’ and ‘building code standards on repairs to structures’ regardless of frame type. All groups were relatively neutral about the relevance of ‘developmental restrictions in designated areas’ – a phrase which is another way of saying ‘land use regulations’ and which inferred that areas could be designated ‘no build’ and ‘limited build’. Because of the clarity of response to ‘land use regulations’, it is quite likely that this phrase did not resonate with respondents and not being clear on its meaning, they opted for a neutral stance. The neutrality to the phrase ‘developmental restrictions in designated areas’ indicated by survey responses should therefore not be taken as ambivalence to it.

Mitigation strategy perceptions and respondent role type

One Way ANOVA was performed on structural and non-structural mitigation strategies grouped by respondent type (CZ/staff, advisory panel, council/jury, planners, operations). The analysis of two associations achieved statistical significance, specifically, ‘building code standards to existing structures’ and ‘expanding your coastal zone boundary’ (Table 10). Post hoc tests for difference in group means between groups were not statistically significant for the first strategy. A review of the means for each group showed that advisory panel and operations groups perceived ‘building code standards to existing structures’ to be less relevant than did the other groups (CZM Admin/staff, planners, Council/Jury). For ‘expanding your coastal zone boundary’, while group means indicated less support for this mitigation strategy overall, council/jury and operations were more supportive of this as a relevant strategy. Post hoc tests were significant between CZM/staff group mean and council/jury group mean.

Review of the means for each respondent type group for each mitigation strategy shows some interesting patterns. For ‘parish levees and flood control devices’ advisory panel and council/jury groups perceived this structural mitigation strategy to be highly relevant, while planners, operations and CZM/staff perceived them to be less so. No group type perceived ‘voluntary relocation–no buyout’ and ‘assisted relocation-buyout’ to be a relevant strategy. All groups were similar in their perceptions that the remaining mitigation strategies were relevant for their parish.

N = 83

Mitigation strategy	F	Sig	Post hoc Frame comp	Mean diff	Sig
building code standards to existing structures	2.305	.066			
expanding your coastal zone boundary	2.136	.084	CZM/staff – council/jury	1.400*	.094
* Sig at 90% confidence					

Table 10 Comparison of means (one way ANOVA) of mitigation strategies grouped by respondent type with post hoc tests (Bonferroni)

Implementation strategies

The most relevant and least relevant implementation strategies are listed by parish.

Calcasieu Most: ‘using permit process to enforce’ (Mean = 1.00)

Least: ‘waiting to implement regulations’ (Mean 5.00)

Cameron Most: ‘staff physically monitoring compliance’ (Mean 1.36)

Least: ‘waiting to implement regulations’ (Mean 3.09)

Iberia Most: ‘using permit process to enforce’ (Mean 2.00)

Least: ‘seeking revision of regulations’.

Jefferson Most: ‘using permit process to enforce’ (Mean 1.33)

Least: ‘waiting to implement regulations’ (Mean 2.67)

Lafourche Most: ‘using permit process to enforce’ (Mean 1.87)

Least: ‘waiting to implement regulations’ (Mean 4.14)

Livingston Most: all implementation strategies were most relevant including ‘waiting to implement regulations’ (Mean 1.00)

Least: none

Orleans Most: ‘using permit process to enforce’ (Mean 1.20)

Least: ‘waiting to implement regulations’ (Mean 3.00)

Plaquemines	Most: 'seeking revision of regulations' (Mean 1.30) Least: 'using permit process to enforce' (Mean 4.10)
St Bernard	Most: 'using permit process to enforce' (Mean 1.00) Least: 'waiting to implement regulations' (Mean 5.00)
St Charles	Most: 'staff physically monitoring compliance' (Mean 2.00) Least: none – all others neutral
St James	Most: 'using permit process to enforce' (Mean 1.50) Least: 'waiting to implement regulations' (Means 3.13)
St John the Baptist	Most: 'staff are educating residents' (Mean 2.00) Least: 'using the permit process to enforce' (Means 1.00) 'staff physically monitoring compliance'
St Martin	Most: 'seeking revisions of regulations' (Mean 1.00) 'physically monitoring compliance' 'waiting to implement regulations' Least: 'using the permit process to enforce' (Mean 3.00)
St Mary	Most: 'using permit process to enforce' (Mean 1.00) Least: 'waiting to implement regulations' (Mean 5.00)
St Tammany	Most: 'seeking revision of regulations' (Mean 1.00) Least: 'staff are physically monitoring compliance' (Mean 3.00)
Tangipahoa	Most: 'using permit process to enforce' (Mean 1.50) Least: 'waiting to implement regulations' (Mean 5.00)
Terrebonne	Most: 'staff are educating residents' (Mean 2.00) Least: 'waiting to implement regulations' (Mean 3.38)

Vermilion Most: ‘seeking revision of regulations’ (Mean 1.00)
‘staff educating residents’

Least: all means ranged from (1.67 to 2.00)

To investigate the relationships of ideological frame (regulator, mixed, regulated) and role type (CZM staff, advisory panel, council/jury, planner, operations) to perceptions of implementation strategies, an ANOVA comparison of means was performed on implementation variables grouped by respondent frame and then by respondent type.

Implementation strategy perceptions and respondent ideological frame

Only one implementation strategy, ‘educating residents’, showed statistically significant variance in the group means when grouped by respondent ideological frame ($F = 3.417$, $p = .038$). Post hoc tests showed the greatest difference in the group means between regulated frame and regulator frame (mean difference = 1.157, $p = .032$). For the regulator frame group, this strategy was viewed as more relevant whereas with the regulated group this strategy was viewed as less relevant.

Group means were similar and low for all respondent frames for ‘using permit process to enforce’ indicating agreement that this implementation strategy was perceived as relevant for all frame groups. Group means were also similar but higher for all respondent frames for ‘waiting to implement regulations’ indicating agreement that this implementation strategy was perceived as not relevant for all frame groups.

Implementation strategy perceptions and respondent type

Only one implementation strategy, ‘using the permit process to enforce’, showed statistically significant variance in the association when grouped by respondent type ($F = 2.653$, $p = .085$). The Post hoc tests showed that the difference in means between groups was not statistically significant however. The group mean for planners was the lowest (1.40) indicating their support for the relevance of this implementation strategy. However, even the highest group mean (2.24) indicated some support for the relevancy of this implementation strategy.

Discussion of Findings

The study has centered around five questions which we address individually.

1. What are the current issues, concerns and challenges faced by parish decision makers and how have these impacted coastal zone management decisions?

The survey instrument and the interviews produced somewhat different results in identifying the coastal zone issue of greatest concern. While many articulated a resistance to permits, without doubt, the issue of greatest concern for respondents on the survey had to do with land loss – **both wetland loss and other land loss**. Regardless of whether a respondent was noting failed mitigation measures, problems with controls of the permit process, or funding inadequacies in large and small projects to restore wetlands, all of these tied into the relentless loss of land as a result of natural processes¹⁴ (subsidence, erosion and sea level rise) and failed attempts to protect, maintain and restore coastal lands. As was the case in 2005, many surveys contained exclamation marks beside comments; some included clippings; some took advantage of the provided sheet to carefully explain their concerns. While this indicated frustration – even desperation, it also indicated pro-action; taking the opportunity to be heard on issues.

The interviews targeted the implementation arm of parish government (Parish Presidents, Parish Managers, CZM Administrators and planners). When asked what the greatest coastal zone issue was for their parish, conversations almost invariably focused on implementation of regulations and compliance issues – a narrower focus but one that reflected their day to day activity. **New elevation requirements** in relation to the FEMAs flood zone maps was a hot topic with concerns raised about the comprehensive regulatory changes mandated and the speed with which they came into effect, accuracy issues, constituency compliance and confusion.

Another concern articulated quite clearly in the interviews was **failures in agency relations** primarily with the Federal Emergency Management Agency (FEMA), but also with the Army Corps of Engineers. A profound lack of faith in the expertise of the agencies and also distrust were prevalent in the interviews. This interfaced with the ‘disputes and non-cooperation’ comments on the surveys. This may provide some explanation of the slippage away from regulator framing when comparing 2011 and 2005 data. While concern for federal agencies verged on the hostile and reservation in state agencies’ ability to manage coastal concerns was evident, hope and tentative confidence was expressed for some state agencies – in particular the newly formed Coastal Protection and Restoration Authority (CPRA).

The impact that these concerns have had on local coastal zone decision making and regulatory adjustments are evident in the **compliance strategies** adopted by parishes, specifically the ‘stall’ strategy, the ‘soft compliance’ strategy and the ‘enforcer’ strategy. Several parishes initiated stall tactics in relation to the new regulations by filing for appeal and contesting the DFIRM maps, thus keeping widespread compliance with the new regulations at bay. Other parishes elected to promote the new regulations through education and outreach programs, ‘one on one’ assistance to their constituents, and developing a team effort with their constituents in working toward compliance. A few parishes adopted an ‘enforcer’ strategy, where an individual had responsibility for being the new sheriff in town so to speak and mandated compliance with a heavy hand.

¹⁴ We are not making the distinction here between natural processes and natural processes that have been induced or exacerbated by human activity.

An effect of coastal recovery mandates and the funding available to kick start the implementation process, is the scramble to get it. This has led to parish officials' increasing self-described **savvy in political maneuvering** to attract 'recovery' funding to the parish.

Knowledge gains were not limited to political savvy however. A common theme in the conversational interviews was **knowledge gains in preparedness and response among local decision makers**. Respondents described a sharp learning curve and the sense that they had learned much about preparedness which had in turn increased their capacity to respond to the needs of the parish in disaster situations. In a similar vein, respondents noted that **constituent learning** was in evidence in the responsiveness of citizens to calls for evacuation. Respondents also noted a new trend of constituents listening to expert advice, the openness to learning how to build more sustainably, and an improved 'civic mindedness' that began to understand the multiple issues involved in recovery and resilience. While it would be an error to suggest that these 'positive' repetitive storm learning outcomes are widespread and deeply embedded in the psyches of the coastal constituency, there was sufficient mention of constituent learning to identify unmistakable inroads in the area of constituent engagement in building resilient homes and communities.

2. Have there been any framing shifts among local CZM decision makers comparing Time 1(2005) and Time 2 (2011) data (in particular the comparison of the Regulator and the Regulated conceptual frames)?

It is important to reiterate the relevance of assessing the framing present in respondents when examining dimensions of capacity in local decision making. The mandates and regulations that flow from LA CPRA and LA DNR, the training provided in agency outreach, and the information made available to local coastal parishes stem from 'regulator' ideology which promotes non-structural mitigation, sustainable development, comprehensive planning, building codes and the like. The rules and regulations that flow from this limit what citizens and local governments can and cannot do in their parishes. Those who are regulated may have an opposing frame promoting non-regulation, non-compliance, freedom to act without restraint and the unimpeded authority of the parish to set their own rules. These opposing frames were identified in 2005 prior to Hurricane Katrina. The question at hand asks: are there shifts in framing that have occurred after a period of devastating and repetitive loss due to storms? The findings show that there have indeed been shifts in framing. However, **these shifts are not as great as expected, and they are not in the direction of regulator frame agreement**. Overall, agreement with the regulator frame ideology is slightly weaker in 2011 compared to 2005.

Effect of respondent type

Noteworthy is the comparison between different types of respondents. In 2011, agreement levels with regulator framing increased in the CZM Administrators/staff group

compared to 2005. Both CZM Administrators/staff and planners (a new group added in 2011) had the highest levels of regulator frame agreement. In contrast, **advisory panel members as a group showed less agreement with the regulator frame**. This is a change from 2005 where that group had the highest level of regulator frame agreement; there is a marked decrease in the group means between 2005 and 2011. Change to membership rosters for advisory panels that have occurred since 2005 offers one explanation. With the many additional resources available to parishes, this has been an incentive for constituents with specific interests to exert influence through advisory panel membership. Comments on surveys and interview data support this explanation.

Effect of having an LCP:

While there is no official change in the number of local coastal programs (LCPs) there is evidence in the interview transcripts of two parishes considering developing a local coastal program. This is in addition to the parishes that have remained stuck in the pending stage since 2005. The 2005 study demonstrated that having an LCP had a statistically significant positive effect on regulator frames agreement. This effect was most noticeable in parishes with newer and pending LCPs and was attributed to the focused effort of developing and learning to manage an LCP plan consistent with state and federal coastal legislation and mandate. The findings of 2005 are corroborated in 2011. Having an LCP exerts a positive effect on regulator frame agreement. With the ‘newer’ LCPs (in 2005) now having aged into the mature LCP category, the effect is most significant when we compare the group means of No LCP parishes with that of the Mature LCP parishes. It is important to note that the strength of the effect of having an LCP on regulator frame agreement has weakened slightly since 2005 in all categories of LCP status. This supports the finding that overall, agreement with regulator frame ideology has decreased. Further, slight movement away from regulator frame agreement may shed light on what appears to be a status quo situation despite repetitive loss and efforts on the part of regulatory agencies to educate local coastal decision makers on the necessity of regulation and benefits of sustainable practices.

From the interviews, it is evident that the Local Coastal Program has taken a back seat to other agendas and initiatives. This program has not attained the importance, effort or resources necessary to support the central role it could potentially play in reaching out to all local decision makers. Few other state coastal initiatives are set up to be a continuous part of local government structure. Even CWPPRA projects and other funding initiatives which bring Council/Jury members, Advisory panel members and CZM Admin/staff to the table do so only sporadically. The focus is on securing a successful bid on funding. These initiatives are perhaps not the best means of delivering lessons in sustainability and resilience. This study affirms that encouraging development of an LCP and maintaining good agency relations is a successful method of disseminating information and educating local constituents on best practices in coastal decisions as defined by LA DNR.

3. What are the perceptions and attitudes on specified mitigation strategies?

Coastal mitigation can take many forms. It can be on an individual scale i.e. choosing to move inland, having a household evacuation plan, elevating your home. Mitigation can also be large scale, for example, relying on large engineered flood control systems, building higher levees, building diversions. The attitudinal measures on specific mitigation strategies were analyzed with the frame index variable. All but one achieved significance, but the items pertaining to **relocation** and the item on **relying on levees and flood control devices** to ease vulnerability produced very strong results. A generalized statement said that 'inland relocation makes sense in a long term cycle of unstable weather and rising seas'. Respondents with a regulator frame tended to agree with this somewhat, but those with regulated frames disagreed strongly. One thought was that inland coastal respondents might perceive things differently than coastal proximate respondents, but such was not the case. There was no pattern to the responses that aligned with coastal parish location. The pattern was based on ideological frame.

Another statement took a more personal stance, stating that 'inland relocation is not something that I would ever consider'. Here, regulated frame respondents agreed very strongly and regulator frame respondents disagreed only slightly. Once more, the pattern was not associated with location but rather with ideology. An important distinction to make, was while it was profoundly clear that relocation was not an option with which most respondents agreed, the differences between those who agreed somewhat and those who did not at all, had to do with their conceptualization of coastal vulnerabilities. There was at least some consideration of relocation regardless of how small in the minds of regulator frame respondents. For those with mixed frames and with regulated frames, the resistance to relocation was marked. We address additional data on this issue in the discussion of the last research question (Question 5).

Attitudes on the structural mitigation strategy statement that pertained to relying only on levee systems and flood control devices to reduce vulnerability in their parish, showed that regulated frame respondents strongly agreed, and regulator frame respondents strongly disagreed. Regulated frame respondents preferred external large scale technological/engineered structural mitigation options to individual level non-structural mitigation including regulatory mitigation strategies.

There was general agreement by respondents that **land use planning** was an appropriate mitigation strategy for their parish, and there was general consensus that **zoning** was on the table for in all parishes. It is important to note language and phrasing changes incorporated into the survey to get at finer distinctions in meaning. The contrast between 'land use planning' and 'land use regulation' produced very different results and is discussed in Question 5. With regard to zoning, this question was phrased in the absolute negative ('zoning is not a consideration in my parish') so most respondents disagreed with this statement – they admitted that zoning was a consideration. Note that the question did not ask them if they agreed with it. Having said this, it is also important to note that within the duration of this study, there have been inroads made in the area of zoning and land use. The interviews most of which were done summer 2009, told of the

difficulties faced by parish governments in the attempt to introduce land use planning and the 'Z-word' into conversations with constituents. By spring 2011, most survey respondents indicated at least some support of land use planning and acknowledged that zoning was being considered in their parish. With regard to regulatory mitigation, the greatest contention revolved around regulations pertaining to building codes and elevation requirements.

4. What are the current vulnerability/risk, sustainability and resiliency perceptions among local CZM decision makers and how do these compare to data from 2005?

There were statistically significant differences in the perception of multi-hazard physical vulnerabilities: between LCP parish respondents and non-LCP parish respondents. There were also statistically significant differences in the perception of multi-hazard vulnerabilities between regulator frame respondents and respondents having other frames. This was expected as presence of LCP exerted a positive effect on agreement with regulator frame. Also as expected, parish location was statistically significant in its influence on perceptions of vulnerability. The variables (parish location, LCP/ no LCP) however were not highly correlated. Parishes were fairly evenly split between coastal proximate (10 parishes) and inland coastal (9 parishes). And as noted previously, LCP parishes were evenly distributed between inland coastal and coastal proximate locations.

A fascinating difference between 2005 and 2011 has occurred. In 2005, before Hurricane Katrina, almost all respondents perceived moderately high vulnerability to hurricanes/tropical storms and there was no statistical difference between LCP respondents and non-LCP respondents. In 2011, while most respondents rated vulnerability to hurricanes as high, there now was a discernable difference in how high. LCP respondents perceived far greater vulnerability. For LCP respondents, perceived vulnerability to hurricanes/storms had increased disproportionately to non-LCP respondents in comparison to 2005 responses. The same phenomenon occurred with land loss. In 2005, there was no statistically significant difference between LCP respondents and non-LCP respondents in their perceptions of high vulnerability to land loss. In 2011, LCP status respondents perceived greater vulnerability to land loss due to both erosion and subsidence than did non-LCP respondents. This is likely due to the fact that LCP respondents have been more frequently exposed to information on current coastal conditions as a result of organized effort enabled by the LCP. Efforts by CZM Admin/staff, planners and advisory panel members in outreach and education of constituency and Council/Jury have intensified around the issue of risk. The effect of organized effort around risk perception is less evident in non-LCP respondents.

Overall, perceived vulnerability to pollution was not on the radar in both 2005 and 2011, with one exception. Regulator frame respondents perceived higher vulnerability to pollution than did other respondents. For both years, when respondents were grouped by parish location and LCP status, the variance between the groups was not great; and group means were only mid-range. The percentage of respondents who perceived only

low/moderate vulnerability, however decreased to 50%. What this means is that while perceptions on vulnerabilities to pollution have increased slightly in the respondents of 2011, the differences (with the exception of regulators) is not statistically significant for groupings by LCP status or parish location.

When we looked at the economic vulnerabilities, there were fewer differences between 2005 and 2011. The differences between LCP and non-LCP respondents in perceptions of vulnerabilities for infrastructure damage, property damage and business interruption are commensurate in 2005 and 2011. LCP respondents perceived greater vulnerability in both years. New in 2011 was the perception of vulnerability to loss of investment capital. LCP respondents perceived greater vulnerability than did non-LCP respondents. Interestingly, there was not even a moderate level of perceived risk to loss of natural resources for either LCP or non-LCP respondents in either 2005 or 2011.

More change was evident in perceptions of physical vulnerability than in economic. LCP respondents perceived greater economic vulnerabilities in both 2005 and 2011 than did non LCP respondents. But LCP respondents in 2011 perceived greater vulnerability to physical hazards than they had in 2005. The possible explanation when comparing the changes visible in 2011 to 2005 is two-fold. First, LCP respondents may be better-versed in the economic vulnerabilities due to infrastructure damage, business interruption and property damage because these things may be more regularly and broadly discussed in planning and advisory meetings resulting in a more coherent understanding of relative risks. Second, LCP respondents may be ‘outpacing the pack’ so to speak in their perceptions of very high vulnerability to physical hazards for the same reasons – they are involved as a cohort. The LCP may be instrumental as an organizing feature and as this data demonstrates, is associated with perceptions of vulnerability and perhaps an enhanced realization of risk. An interview with a non-LCP respondent comes to mind. When asked if the parish felt any urgency with regard to vulnerability to storms and hurricanes the response was the same as it had been when asked in 2005: “It’s not on their (constituents’) plate yet”. In 2005, this same respondent had said “The wolf’s not at the door”. Perhaps minimization is a luxury that LCP respondents have realized they don’t have.

5. What are the current attitudes towards regulatory and non-regulatory mitigation planning including land use and relocation?

In a resounding and unified voice, respondents indicated that **voluntary relocation inland was not an option**. Fifteen (15)¹⁵ coastal parishes (83%) specified this strategy as the least relevant to their parish. Less resounding and unified was the reaction to **assisted (buyout) relocation inland**. While it was the next least relevant mitigation measure, there was a much broader range of responses to assisted buyout which were associated with ideological framing (i.e. regulator frame, mixed frame and regulated

¹⁵ Recall that there was no survey data for Assumption parish; 83% is 15 out of 18 parishes.

frame). Regulator frame respondents were the lone voice that thought that assisted relocation was a relevant strategy.

Four parishes (4) specified **educational outreach** to citizens as being most relevant to their parishes (three of which were inland coastal). Six (6) parishes specified **regulatory strategies** (mandatory elevation, tighter building codes or land use regulations) as most relevant. Both of these are internal social-structure strategies. Educational outreach to citizens and regulatory mitigation strategies fit hand in glove, but there was no evidence of this connection among most respondents. Without educational outreach to citizens (including elected officials that represent them), regulatory mitigation strategies are a tough sell in the implementation process – compliance strategies as we have seen can produce stall tactics or heavy-handedness, both of which lead to resistance and failed mitigation. There isn't the time or the money to accommodate such outcomes.

There was also a **reliance** (with the exception one coastal proximate and two in inland coastal parishes) by parishes **on non-regulatory structural technological/engineered infrastructure strategies** (parish levees and flood control devices, large engineered hurricane projects) and **non-structural wetlands restoration** projects as the most relevant mitigation strategies. A total of fourteen (14) parishes specified infrastructure as the most relevant to their parish and this was a fairly even split (6 inland coastal and 8 coastal proximate parishes). Only two parishes indicated that a mix of both social and infrastructure strategies were needed – a more holistic understanding of the importance of social (education and regulation) strategies combined with technological/engineered infrastructure strategies.

There was a clear preference for non-regulatory mitigation strategies across parishes. In Question 3, respondents indicated their agreement with statements. In Question 5, respondents did the reverse, they indicated the ranking of each mitigation strategy. This provided a kind of 'double check' on perceptions. Regulated frame respondents consistently balked at any strategy resembling regulation including 'assisted relocation – buyout'. Despite being a small group of survey respondents (11% in 2011) they exerted a considerable effect when surveying perceptions of local decision makers.

One noteworthy distinction is the language of the land use mitigation statements in the attitudinal measure ('land use planning') and the ranking question ('land use regulation'). While as discussed under Question #3, agreement levels were high across all categories of respondent frames in the attitudinal measure that used the phrase 'land use planning', there was considerable variance created when the word 'regulation' was introduced in the ranking question. What appears on the surface as a contradiction in findings is really the effect of language. 'Land use planning' affords a broader interpretation than does 'land use regulation'. This is supported by the consistent aversion to 'regulation' most specifically on the part of 'regulated' frame respondents.

Statistical significance of variance in group means between regulated frames respondents on all regulatory strategies indicate the importance frames analysis to better understanding the attitudes of local coastal decision makers. The good news is that there was a healthy group of regulator frame respondents (33% of survey respondents in 2011) and another also robust group of mixed frame respondents (55% in 2011). This is where

efforts should be focused to build greater support for state and federal coastal management mandates.

Recommendations

The recommendations in this section meet the objectives of the research study and provide critical information to LA Sea Grant for program planning and management in:

- topic orientation in local focus groups, workshops, and administrative seminars conducted or sponsored by LA Sea Grant as part of their outreach commitment
- identifying areas of resistance and areas of cooperation in parish jurisdictions to assist interagency and intergovernmental communications
- strategies for achieving federal mandates of coastal community resiliency and sustainability

1. Focus group topic: inter-parish information exchange for parish decision makers

Local decision makers have developed strategies for dealing with new regulations that have been mandated in the coastal zone. Some strategies are less conducive to compliance and implementation than others. Some interview respondents noted that there is no information on how other parishes are managing the implementation process. In essence, many of the strategies of implementation are strategies of default because parishes do not have the tools for facilitation of implementation strategies that are more conducive to compliance. So there are two levels of compliance at issue here: first at the local government level, and second at the constituency level. Because there is so much organizational variation between parishes, a cross section focus group of parish officials, administrators, planners and operations people will gather specific information on what information is needed and how Sea Grant could be involved in development of an exchange site. By galvanizing around the constituency issue, a neutral area of information exchange could be created that would facilitate the issue of local government buy in.

2. ‘No Council/Jury Member Left Behind’ workshops

Of all respondent groups, Parish Council and Police Jury members are far more likely to have a ‘regulated’ frame and little in-depth coastal management knowledge. A more recent development (in 2011 data) is the stronger presence of the regulated frame in Advisory Panel members – largely due to opportunities to exert special interests in recovery and development of parishes. Both these groups share a common desire to “get a piece of the pie”. The pie should have educational requirements attached to it. Individuals in local government are forming local policy, making decisions on development and land use, spending precious resources to fight regulatory mandates from the state and federal level. And they are doing these things with inadequate knowledge about coastal processes, sustainable development and resiliency. Even when the administrative branch of parish government understands state and federal coastal

mandates, many respondents have implicated the elected officials in the parish as a difficult stumbling block. It is critical to reach this group and they must perceive a benefit to participating in knowledge acquisition if building capacities in local parishes that align with sustainable practices is going to occur.

3. Cross sectional intra-parish integrated training seminars

Much of the training respondents report receiving (and what has been witnessed in the field) happens in silos. That is, flood plain managers are training with flood plain managers, CZM administrators are training with DNR, more specifically LCP training, planners are training with planners. This is not to say that there are no venues where they meet up, and certainly there is evidence of key actors in some parishes who regularly attend a multitude of venues focused on multitude of coastal topics. But typically, potential receivers of information are fragmented...some are isolated and not actually receiving information. Integrated training needs to occur so that information silos do not occur. This is particularly important for mitigation strategies and establishing coherent understandings of sustainable practices and resiliency. For logistical reasons, it makes sense to hold these training seminars in each parish with representatives from many parish departments. It also builds importance, legitimacy and respect for their time. This means a longer term commitment by Sea Grant. One example of a topic would be to introduce the information exchange website that is for coastal parish employees. This could be used as a door opener to initiate conversations with and between representatives from many departments (planning, operations, CZM administrators/staff, flood plain managers). Another topic is ‘unpacking sustainability and resilience’ – appropriate for facilitated conversations among a cross section of parish personnel.

4. Workshops to train the trainers

In support of items 2 & 3, a small cadre of individuals should be trained in: coastal zone best practices, understanding and promoting the mandates of LA CPRA and LA DNR, and understanding the political terrain of each parish. In the ideal, these individuals would speak the different languages of scientists, engineers, planners, Council/Jury members, CZM Administrators, constituents, etc enabling them to facilitate integrated conversations with these groups. They would be able to bridge between divided interests and know (or be able to determine) where the common ground is. They would understand who the stakeholders are in every parish and what their specific interests are. Trainers would hold a delicate position – one that would build trusted relationships with local decision makers, would be respectful of opposing views, and would be able to facilitate learning in hotly contested ideological terrain. Such professionals may exist within local agencies or can be engaged from national organizations and university programs that specialize in environmental issues discussions.

5. Support the Local Coastal Program

This may be a challenging topic for Sea Grant because the LCP is nested in LA DNR. But the LCP program is withering – the intent of the program to build capacity in local

parishes in the image of the policy mandates of the State, and the Federal Coastal Zone Management Act and program has fallen considerably short of that goal largely because the program has been ignored. Sea Grant can use its resources to interface or partner with LA DNR...or perhaps LA CPRA, to bring more attention and support to a program that could (and should) play a central role in education and outreach – to local decision makers and beyond to the constituency.

6. Work on areas of resistance through working with areas of less resistance

- **Voluntary relocation (no buyout)** garnered adamant and cohesive resistance across all parishes and across all respondent types. Slightly less objectionable was **assisted relocation (buyout)**. Having said this, many respondents mention the mass of evacuees from hard hit areas having fled inland, who have not been able to return. Certainly this is evident in Plaquemines, St. Bernard, Orleans, and Cameron parishes in particular. Inland coastal parishes have noticed growth, but many parish presidents felt that population patterns had not stabilized. **There is room for negotiation and programmatic assistance in ‘assisted’ relocation (buyout)**. Considering the ‘collective resistance’ to the mention of relocation, it is probable that outreach strategies need to be developed that work one on one with constituents living in areas placing them more ‘at risk’. Sea Grant can adopt a support role in partnering with programs designed for ‘relocation assistance’. In addition, Sea Grant could **collate funding information**. There is a confounding amount of information that has not ‘trickled down’ to the constituent base in any coherent fashion. Synthesizing available funding program information into a web-based and hard copy reference source – a ‘one stop shop’ of sorts – would make accessing and comprehending the many available federal, state and parish programs so much easier. Frequent updating of this site and binder would be required.

- **Regulations (primarily those attached to the FEMA flood maps)** are energetically being opposed by some parishes that are using precious resources to obtain new data and launch objections. At the heart of this issue, is **taking land out of commerce**. There is much work to be done in managing the perceived potential economic loss and this is an opportunity for Sea Grant to work with local decision makers to see the broader picture. Coastal residents have strongly indicated their desire to stay where they are. Learning how to build sustainable communities that are resilient to severe weather and changing environmental conditions will diminish considerably the vulnerabilities of coastal communities. This will necessarily include sustainable decisions on development. It may be difficult for local decision makers to consider land use regulation as a means to insuring that the communities remain in their vulnerable coastal location. Recall that we earlier suggested (in the literature review) that when short term monetary gains are perceived as unsatisfactory vis à vis long term goals, regulatory strategies are considered more useful. In this current study, land use regulations would be for addressing the effects of chronic, long-term coastal land loss. This is a reframing issue. Sea Grant might ask: how can local decision makers and constituents be given tools to see the bigger picture? Can the interests to remain in their communities and to

preserve their culture be more compelling to constituents and local decision makers than short term monetary gains?

7. Build upon areas of cooperation

- Several of the non-structural mitigation strategies have modest support that can be built upon (**zoning, land use planning, elevation requirements, tighter building codes on new construction, tighter codes on repairs to existing structures, expanding the coastal boundary**). While we in no way suggest that these are not still hotly contentious, we do suggest that there is sufficient variance in support of them to see these strategies as ‘on the table’. There is ripeness to the contentiousness. The modest shift away from regulator framing in favor of regulated framing signifies key actors in place who are promoting individual and special interests. Individual and special interests however, may not serve the community as a whole. The shift also suggests slippage in the faith placed in regulating agencies. But there remains important representation of the regulator frame – often in pivotal positions – with support for the mandates of LA CPRA and LA DNR and more broadly federal coastal zone mandates.

From these findings it is evident that Sea Grant has a clear opportunity to support enhanced coastal community resiliency and sustainable practices.

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Appendices

Appendix - 1

1. What is your occupation? (If retired, state former occupation) _____

2. What is your highest level of education completed?

- ____ less than high school completion
____ high school/ GED diploma
____ 2 yr associate degree /equivalent college yrs.
____ 4 yr college degree
____ MA/MS/PhD/Prof degree

3. Are you: ☐ Male ☐ Female 4. Age: _____

5. In your role as a police juror, council member, advisory panel member, or parish employee, list any duties that relate to managing coastal resources, hazards, permits, development, industry, facilities, infrastructure:

6. How many times per week do you have telephone or personal contact about CZM matters within your own parish with:

- a) police jury/council members _____ times / wk
b) advisory panel members _____ times / wk
c) CZM Administrator /staff _____ times / wk

7. Excluding members of your parish police jury, council, advisory panel, or staff, how many times per week do you have:

- a) telephone contact with professionals working in coastal zone management? _____ times / wk
b) in person contact with professionals working in coastal zone management? _____ time / wk

8. How many times a year do you participate in the following coastal zone issue related activities:

- conferences _____ field trips _____
training seminars/workshops _____
town hall and other public meetings _____
special interest organization meetings _____

9. How many times a month do you do the following coastal zone issue-related activities:

- read technical reports _____
read journal articles _____
access federal or state agency web sites _____

10. What is your primary source of information regarding coastal zone issues: _____

11. What in your opinion is the 'best' (reliable and accessible) source of information on coastal zone issues for the public? _____

12. Using the scale as a guide, circle the number that best describes the extent to which you agree or disagree with statements:

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

a) Coastal zone managers have better knowledge in coastal issues compared to that of the general public.

1 2 3 4 5

b) Regardless of ownership, wetlands are a 'public good'.

1 2 3 4 5

c) Having a Local Coastal Program negatively affects local benefits from development.

1 2 3 4 5

d) Environmentalists stall the permit process with complaints.

1 2 3 4 5

e) Permitting is based largely on political interests.

1 2 3 4 5

f) LCPs make coastal mitigation efforts more efficient.

1 2 3 4 5

g) The permit process is unnecessarily problematic.

1 2 3 4 5

h) Considering coastal zone issues, some restraint on use is important in a market economy.

1 2 3 4 5

I) CZ regulations serve environmentalist interests.

1 2 3 4 5

j) A focus on regulations leads to less protection of resources.

1 2 3 4 5

k) Its more important to find solutions to conflicts than to understand the complexities of coastal zone problems.

1 2 3 4 5

l) Its up to the applicant to smooth the permit process by 'doing their homework'.

1 2 3 4 5

m) LCPs ensure that local issues are 'weighed in the balance' of competing interests.

1 2 3 4 5

n) Resource use decisions should be based solely on greatest economic benefit.

1 2 3 4 5

13. Please check the one box that accurately describes your parish with regard to the Local Coastal Program:

- ☐ No LCP ☐ Pending LCP application
☐ Inactive LCP ☐ Active New LCP < 2 yrs old
☐ Active Established LCP 2 - 5 yrs old
☐ Active Mature LCP > 5 yrs old

14. How many times in the past five (5) years has your parish suffered serious damage due to:

- a) hurricanes / tropical storms _____
b) floods _____ c) storm surge _____
d) tornado _____ e) other (specify please): _____

15. Please circle the degree of vulnerability of your parish to the following:

	Low	Moderate	High
a) hurricanes/tropical storms	1	2	3
b) flooding/storm surge	1	2	3
c) pollution/contamination	1	2	3
d) land loss (subsidence)	1	2	3
e) land loss (erosion)	1	2	3
f) saltwater intrusion	1	2	3

16. Please circle the degree of economic vulnerability of your parish due to coastal hazards with respect to:

	Low	Moderate	High
a) property loss	1	2	3
b) infrastructure damage	1	2	3
c) business interruption	1	2	3
d) loss of investment capital	1	2	3
e) loss of natural resources	1	2	3
f) job loss / unemployment	1	2	3
g) loss of labor pool	1	2	3

17. Using the scale as a guide, circle the number that best describes the extent to which you agree or disagree with statements below:

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

a) Land use planning is an appropriate mitigation strategy for my parish.

1 2 3 4 5

b) Zoning is not a consideration in my parish.

1 2 3 4 5

c) Technology/engineering will provide the necessary mitigation strategies for coastal hazards in my parish.

1 2 3 4 5

d) Inland relocation of coastal populations makes sense in a long term cycle of unstable weather and rising seas.

1 2 3 4 5

e) Levee systems and flood control devices are the only means of reducing vulnerability for my parish.

1 2 3 4 5

f) There have been changes in perceptions in my parish concerning land use and coastal permits since 2005.

1 2 3 4 5

g) Relocation more inland is not something that I would ever consider.

1 2 3 4 5

h) Residents in my parish support elevation regulations.

1 2 3 4 5

i) Coastal management has improved in LA since 2005.

1 2 3 4 5

18. Please rank each 'mitigation' strategy listed below according to their relevance for your parish. You can use the same number more than once (1 = very relevant and 5 = least relevant).

- a) parish levees and flood control devices _____
- b) voluntary relocation of residents (no buyout) _____
- c) assisted relocation of residents (buyout) _____
- d) mandatory elevation of homes in flood zones _____
- e) education of parish residents on mitigation _____
- f) tighter building codes on new construction _____
- g) large engineered hurricane protection projects _____
- h) large wetland restoration projects _____
- i) projects to maintain/repair existing wetlands _____
- j) land use regulations _____
- k) developmental restrictions in designated areas _____
- l) building code standards on repairs to structures _____
- m) expanding your parish coastal zone boundary _____

19. In your opinion, does a parish Local Coastal Program make a difference in how coastal zone issues are addressed at the parish level?

☐ Yes ☐ No ☐ Don't know

Please explain: _____

21. Rank each strategy (1-5 where 1=priority) in order of its importance to how your parish is or is not implementing new elevation regulations.

- a) My parish is seeking revision of regulations _____
- b) Parish staff are educating residents _____
- c) Parish staff are physically monitoring compliance _____
- d) Parish staff are using the permit process to enforce _____
- e) Parish staff are waiting to implement regulations _____

22. In your opinion, what is the most difficult coastal zone issue in your parish?

Thank you for your participation. If you would like to add a comment, please use the lined sheet insert.

Local Coastal Zone Management Capacity Post Hurricanes Katrina, Rita, Ike and Gustav: A Comparative Study

SURVEY:

*Parish Government Officials
CZM Parish Administrators
Parish Departmental Managers
Coastal Advisory Panel Members*

*Principal Investigators:
Shirley Laska, Ph.D.
Carla Norris-Raynbird, Ph.D.
University of New Orleans*

SG-LNR - 1001

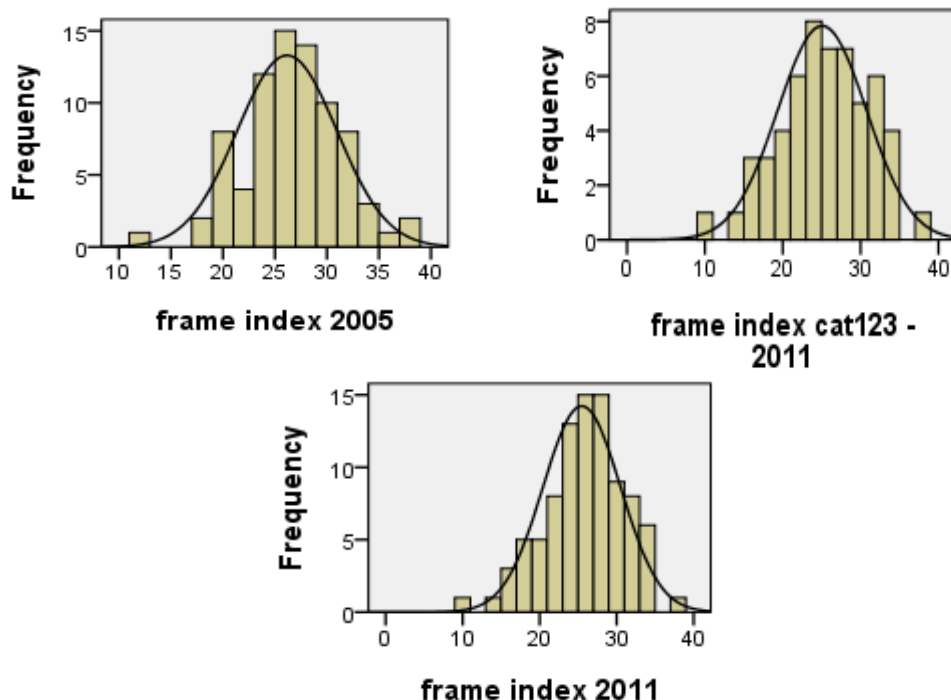
Appendix 2 – Comparison of frame index model selection years 2005 and 2011

	Model 2005	Model 2011
N	72	90
No. of items	8	8
F Value	15.2496	23.741
Probability at 95% confidence	.0000	.0000
Chronbach alpha	.7107	.6800
Standardized model alpha	.7103	.6720
Item Means Variance	.1787	.2620
Inter Item Correlations Variance	.0149	.0280

Question items in model as they appear on survey

C) LCPs negatively affect local benefits from development.
D) Environmentalists stall the permit process with complaints.
F) LCPs make environmental mitigation efforts more efficient.
G) The permit process is unnecessarily problematic.
I) Coastal zone regulations serve environmentalist interests.
J) A focus on regulations leads to less protection of resources.
M) LCPs ensure that local issues are ‘weighed in the balance’.
N) Resource use decisions should be based solely on greatest economic benefit.

Appendix 3 – Histogram frequency distributions of Respondent frame index tallies 2005 and 2011.



Appendix 4 – Correlation matrix of Likert measure mitigation statements and tally 2011

Correlations^a

	land use mitigation	zoning not considered	eng / tech solutions	inland relocation	levee / flood control only	relocate not ever	frame 2011
land use mitigation	1	-.344*** .001	.194 .069	.159 .137	-.104 .330	-.162 .129	.225** .034
zoning not considered	-.344*** .001	1	-.245** .021	-.280*** .008	.205 .055	.280*** .007	-.195 .067*
eng /tech solutions	.194 .069	-.245** .021	1	.016 .880	-.005 .961	.016 .878	.096 .369
inland relocation	.159 .137	-.280*** .008	.016 .880	1	.021 .848	-.514*** .000	.368*** .000
levee / flood control only	-.104 .330	.205 .055	-.005 .961	.021 .848	1	.306*** .004	-.498*** .000
relocate not ever	-.162 .129	.286*** .007	.016 .878	-.514*** .000	.306*** .004	1	-.486*** .000
frame 2011	.225** .034	-.195 .067*	.096 .369	.368*** .000	-.498*** .000	-.486*** .000	1

***. Correlation is significant at the 0.01 level (2-tailed).

** Correlation is significant at the 0.05 level (2-tailed).

* Correlation is significant at the .10 level (2-tailed).

a. Listwise N=89

Appendix 5 - Mitigation strategy implementation rankings sum and means by CZ parish* (2011)

Report														
parish#		levee & flood control	vol reloc no buyout	assist reloc buyout	mandate elevation flood zone	citizen mitigation edu	code reform new const	large engin hurr protec projects	large wetland protec projects	maintain exsit wetland projects	land use regs	devel restrict select areas	code reform repair exist structures	expand cz boundary
Calcasieu	Mean	4.50	3.00	3.00	3.17	1.17	1.17	2.33	1.67	1.67	1.67	2.33	1.83	3.67
	Sum	27	18	18	19	7	7	14	10	10	10	14	11	22
Cameron	Mean	2.55	4.09	3.45	2.45	2.36	2.64	2.91	1.55	1.55	4.00	3.09	2.82	3.55
	Sum	28	45	38	27	26	29	32	17	17	44	34	31	39
Iberia	Mean	4.00	4.00	3.33	3.00	3.67	3.67	4.00	3.67	3.67	4.00	3.33	3.33	4.00
	Sum	12	12	10	9	11	11	12	11	11	12	10	10	12
Jefferson	Mean	1.00	4.00	4.00	2.00	2.25	1.75	1.25	1.25	1.25	1.75	1.75	1.75	2.67
	Sum	4	16	16	8	9	7	5	5	5	7	7	7	8
Lafourche	Mean	1.25	3.75	3.75	2.63	2.00	2.63	2.38	1.50	1.50	2.63	2.38	2.00	3.00
	Sum	10	30	30	21	16	21	19	12	12	21	19	16	24
Livingston	Mean	5.00	4.00	4.00	1.00	3.00	5.00	1.00	3.00	3.00	4.00	4.00	1.00	5.00
	Sum	5	4	4	1	3	5	1	3	3	4	4	1	5
Orleans	Mean	1.00	3.60	2.40	1.60	1.60	1.20	1.60	1.00	1.00	1.40	1.40	1.40	2.20
	Sum	5	18	12	8	8	6	8	5	5	7	7	7	11
Plaquemines	Mean	1.40	4.10	2.90	2.00	1.70	1.60	2.00	1.30	1.30	1.90	2.00	1.90	2.50
	Sum	14	41	29	20	17	16	20	13	13	19	20	19	25
St Bernard	Mean	1.33	4.33	3.33	2.33	2.00	1.67	2.00	2.00	2.33	2.00	2.67	2.67	4.00
	Sum	4	13	10	7	6	5	6	6	7	6	8	8	12
St Charles	Mean	1.00	5.00	4.20	2.40	2.20	2.20	2.00	2.40	2.40	2.40	2.40	2.20	3.20
	Sum	5	25	21	12	11	11	10	12	12	12	12	11	16
St James	Mean	1.29	4.00	3.71	1.86	2.00	1.57	1.86	1.86	1.57	2.71	2.57	2.29	3.57
	Sum	9	28	26	13	14	11	13	13	11	19	18	16	25
St John Baptist	Mean	1.00	4.00	3.00	2.00	1.00	2.00	3.00	1.00	1.50	1.50	1.50	1.50	3.00
	Sum	2	4	3	4	2	4	3	1	3	3	3	3	3
St Martin	Mean	1.00	5.00	5.00	1.00	1.00	1.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00
	Sum	1	5	5	1	1	1	5	1	1	1	1	1	1
St Mary	Mean	1.00	5.00	5.00	2.50	3.00	1.50	1.00	2.00	2.00	3.00	3.50	1.50	4.50
	Sum	2	10	10	5	6	3	2	4	4	6	7	3	9
St Tammany	Mean	3.00	2.00	2.00	1.00	1.00	1.00	2.50	1.50	1.50	1.50	1.00	1.00	2.50
	Sum	6	4	4	2	2	2	5	3	3	3	2	2	5
Tangipahoa	Mean	4.75	5.00	4.00	2.50	3.25	2.25	4.25	2.75	3.00	2.00	2.25	2.50	4.25
	Sum	19	20	16	10	13	9	17	11	12	8	9	10	17
Terrebonne	Mean	1.00	3.44	1.88	2.44	2.33	1.78	1.11	2.00	2.00	3.33	2.78	2.44	3.11
	Sum	9	31	15	22	21	16	10	18	18	30	25	22	28
Vermilion	Mean	1.00	5.00	2.33	1.33	1.67	1.67	1.00	1.00	1.00	3.00	2.33	1.33	2.67
	Sum	3	15	7	4	5	5	3	3	3	9	7	4	8
Total	Mean	1.92	3.99	3.26	2.24	2.07	1.97	2.18	1.74	1.74	2.57	2.41	2.12	3.21
	Sum	165	339	274	193	178	169	185	148	150	221	207	182	270

* No data for Assumption parish

Appendix 6 – Implementation strategy rankings sum and means by CZ parish* (2011)

parish#		seeking revision of regs	staff are educating residents	staff phys monitoring compliance	using permit process to enforce	waiting to implement regs
Calcasieu	Mean	2.17	1.50	1.50	1.00	5.00
	Sum	13	9	9	6	25
Cameron	Mean	1.45	3.00	1.36	2.00	3.09
	Sum	16	33	15	22	34
Iberia	Mean	4.33	2.67	3.00	2.00	3.00
	Sum	13	8	9	6	9
Jefferson	Mean	1.67	2.00	1.67	1.33	2.67
	Sum	5	6	5	4	8
Lafourche	Mean	2.13	3.00	2.50	1.87	4.14
	Sum	17	24	20	15	29
Livingston	Mean	1.00	1.00	1.00	1.00	1.00
	Sum	2	2	2	2	2
Orleans	Mean	2.80	2.20	2.20	1.20	3.00
	Sum	14	11	11	6	12
Plaquemines	Mean	1.90	2.60	2.50	2.70	2.44
	Sum	19	26	25	27	22
St Bernard	Mean	3.00	1.50	1.50	1.00	5.00
	Sum	6	3	3	2	10
St Charles	Mean	3.00	3.00	2.00	2.20	2.60
	Sum	15	15	10	11	13
st James	Mean	3.38	2.63	2.75	1.50	3.13
	Sum	27	21	22	12	25
St John Baptist	Mean		2.00	1.00	1.00	
	Sum		2	1	1	
St Martin	Mean	1.00	2.00	1.00	3.00	1.00
	Sum	1	2	1	3	1
St Mary	Mean	3.50	3.50	2.00	1.00	5.00
	Sum	7	7	4	2	10
St Tammany	Mean	1.00	2.00	3.00	2.50	2.50
	Sum	2	4	6	5	5
Tangipahoa	Mean	3.75	3.00	2.75	1.50	5.00
	Sum	15	12	11	6	20
Terrebonne	Mean	2.22	2.00	2.13	2.22	3.38
	Sum	20	18	17	20	27
Vermilion	Mean	1.00	1.00	2.00	1.67	1.67
	Sum	3	3	6	5	5
Total	Mean	2.32	2.42	2.11	1.82	3.25
	Sum	195	206	177	155	257

* No data for Assumption parish