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# Ports Resilience Index: Participatory Methods to Assess Resilience

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PORTS RESILIENCE INDEX: PARTICIPATORY METHODS TO ASSESS  
RESILIENCE

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy

in

The Department of Geography and Anthropology

by  
Lauren L. Morris  
B.S., University of Maryland, 2008  
M.S., Louisiana State University, 2010  
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## **ABSTRACT**

Many hazard threats challenge the uninterrupted operation of the maritime transportation system across multiple temporal and spatial scales. Environmental hazard threats include hurricanes, storm surge, and sea-level rise. Resilience begins at the port, which provides the physical, economic, and social connection between sea and land transportation users. Ports function through port authorities, composed of people with decision-making abilities, which causes port resilience to be a complex process to understand. The paucity of metrics to quantify port resilience warrants other methods to study this place-specific topic. The goal of the Ports Resilience Index (PRI) project centered on the development of a qualitative resilience self-assessment tool for port authorities, using input of port practitioners.

Using a participatory approach, I facilitated three rounds of expert consultation with forty-nine port practitioners across the Gulf of Mexico coast to develop the PRI. One round included pilot-testing the PRI with three port authorities. This dissertation uses qualitative methods of historical and comparative case study analyses, thematic coding of written hurricane plans, focus group discussion analyses, and participant evaluations to analyze the effectiveness of a participatory approach in engaging port stakeholders.

The method to develop and complete the PRI might build capacity for resilience in port communities. Social interactions among port practitioners provided a look at the process of resilience that goes deeper than written hurricane plans but also identified challenges to resilience, including an emphasis on reactive, business-driven planning. Discussion facilitated by the PRI enhances anticipation by revealing collective perceptions of environmental risks and creating a non-competitive space to discuss risks. Completing the tool fosters on-going resilience

through identification of opportunities to implement feasible resilient practices, including communication strategies and agency partnerships.

The discussion-based assessment method of the PRI provides a connection between *what* researchers know about resilience and *how* we know it. A geographer's perspective provides a solid foundation to study and understand the process of resilience at the human-environment interface. Resilient adaptability of ports to other hazards depends on flexibility in decision-making, which can be strengthened through participatory and place-based methods.

# **CHAPTER ONE**

## **INTRODUCTION AND LITERATURE REVIEW**

### **Research Questions**

In today's globally connected world, coastal and inland ports provide a physical connection between sea and land transportation users. Given the location of ports at the interface of land and water, port and waterway managers and operators live with the constant threat of natural hazards. Disruption from natural hazards can produce impacts beyond port boundaries to local communities and waterway users along maritime transportation networks. After a natural hazard, ports play a critical role in community recovery, given their strategic and critical functions locations. Port involvement, however, in community disaster preparedness activities, hazard mitigation planning, and overall resilience building has only recently begun to be explored in the academic literature.

Across ecological, psychological, engineering, and social science disciplines, the term *resilience* implies the continuation or persistence of an ecosystem, person, building, or community after some disturbance or disruption. The mechanisms for understanding resilience vary across disciplines, but the concept of persistence and continued existence of an entity remains consistent. Resilience results from complex linkages and thresholds at different spatial and temporal scales, and efforts to develop precise measures of resilience come with many challenges. An approach to measuring resilience must be adaptable to the specific needs of the audience using it, which quickly renders a national-scale resilience metric nearly impossible. Place-based resilience may not be measurable or identifiable by a national-scale resilience metric, and a geographer's perspective can help understand resilience as an ongoing process.

From a government accountability and policy standpoint, in order to encourage and promote resilience, there needs to be a way to measure or assess it. Quantitative methods and

tools, stemming from engineering science and vulnerability studies, provide quick assessments of “resilience” at broad spatial scales, but do not dip below the surface into local scale, place-based, community resilience. Qualitative methods, on the other hand, help answer research questions that cannot be addressed with numerical data and dive into questions of attitude, perception, and social interaction. Existing resilience indices and metrics struggle to be multi-dimensional, community-focused, and place-based. Measures of resilience need to be place-based because the importance of *who* makes up a place cannot be overstated.

In general, the process of resilience depends on bottom-up community input and supportive governance structures (Beatley 2009; Cote and Nightingale 2012; Olsson, Folke, and Berkes 2004; Weichselgartner and Kelman 2015). For communities to be better prepared to handle and recover from disaster and even lesser disruptions, resilience-building activities need to occur at the local level. The social interactions happening at the local level provide insight to the dynamic process of building resilience that transfers across spatial scales. In addition, the extent of resilience is relative between and across geographic scales because the driving forces at each scale are constantly changing (Wilbanks 2009). In this sense, a geographer’s perspective helps differentiate between space, just a geographic territory, and place, a geographic location and its human community, with individual and collective experiences and perceptions of quality of place.

Given the nature of resilience as a dynamic process, methods of developing tools to assess place-based resilience may, in fact, build resilience and adaptive capacity. The process to develop a resilience metric should be open and widely accessible to all stakeholders (Cutter 2008a; The National Academies 2012). The value of a qualitative approach includes engaging people in a conversation about resilience. Therefore, a participatory approach to developing

indicators for resilience might bridge the gap between developing tools to assess resilience and understanding the mechanisms of resilience.

Research on port resilience typically falls under engineering and technical disciplines, and strategies to reduce interruptions to port operations generally focus on emergency response planning rather than long-range resilience planning. Port authorities face unique challenges for long-term resilience planning because of the push and pull between global and domestic market forces and inevitable exposure to hazards. Additional risks to ports and port authorities include waterway hazards, organizational challenges, and technological interruptions. Port authorities represent an audience with unique and specific needs for a resilience assessment tool. Therefore, using ports as an example, this dissertation will present the methods used to analyze the effectiveness of a participatory approach that engaged port stakeholders in developing a qualitative tool to assess resilience and to answer the following research questions:

1. How does a participatory approach to developing qualitative indicators of resilience challenge and address the weaknesses of existing quantitative approaches to measuring resilience?
  - How does the participatory process used to develop the Ports Resilience Index identify the factors that ports consider to be important in building resilience to hazards?
  - At a localized and individual scale, how does the process of engaging stakeholders in a discussion provide further insight into port resilience compared to the written plans and objectives of hazard-related port documents?
2. How do spatial, temporal, and organizational scales affect the understanding of resilience as a continuous social process?

- How does the Ports Resilience Index process incorporate contextual factors of a port's identity in discussions of resilience?
- How might the process of developing the Ports Resilience Index, a qualitative resilience assessment tool, be transferable across spatial and organization scales as a method to understand and build resilience?

In this chapter, I will set the stage for the dissertation by providing a literature review of methods to assess resilience, a brief review of port geography and resilience studies, and brief background information on characteristics of ports in the United States, including examples of legislatively given authorities and obligations of three ports along the Gulf of Mexico coast. I will conclude with a brief description of what each subsequent chapter of the dissertation will discuss.

## **Literature Review**

### **Resilience Concept**

The term *resilience* has been around for centuries and comes from the Latin word *resilio*, generally meaning the ability to jump or bounce back, either on an individual or collective scale. The concept of planning for resilience, however, has been a new idea as of the late twentieth century. Researchers and policy makers have paired the word *resilience* with several other words to conjure different meanings: ecological resilience, structural resilience, economic resilience, organizational resilience, social resilience, hazard resilience, and many others.

Ecologist C.S. Holling first applied the concept of resilience to natural ecosystems and defined resilience as “the capacity to persist within such a domain in the face of change” (Holling 1973). He used “basins of attraction” as the key component of his resilience concept. In ecological terms, resilience describes the level of disturbance or perturbation to push an ecosystem from one stable state or basin of attraction, across a threshold to another stable state,



or basin of attraction - one with different variables and relationships but overall persistence of the system itself (Carpenter et al. 2001; Folke 2006). In this way, systemic changes refer to how differences in one component or at one level manifest throughout the entire system. Advances in fields such as ecology, engineering, and construction science have allowed researchers to identify and formulaically quantify changes in the entire system based on changes to individual components throughout the system. Especially for closed systems, scientists and engineers use formulas to predict how systems might respond to change and the numerous pathways that the system might follow to reach new equilibrium. Holling furthered the concept that multiple stable states of equilibrium exist at the same time, and systems with high variability and resilience can persist through disturbance by shifting from one state to another. This movement and transition to multiple stable states describes non-linear, adaptive cycles of systems (Folke 2006).

Since the 1970s, academicians across many social science disciplines have acknowledged that ecosystems include humans and have applied the concept of ecological resilience to social systems (Adger et al. 2005; Folke 2006). Resilience applied to social-ecological systems includes adaptability and transformability, defined as the capacities of a system either to adjust its processes to remain in its current state or to establish new processes to shift to a new and possibly improved state (Carpenter et al. 2001; Walker et al. 2004; Folke et al. 2010; Lorenz 2013). The primary difference between social systems and ecological systems rests on the cognitive ability and adaptive capacity of humans to learn from past experiences, exercise flexibility in decision-making and problem-solving, and adapt to new circumstances, sometimes catalyzed by disturbance (Adger 2000; Adger et al. 2005; Carpenter et al. 2001; Folke 2006). Furthermore, non-systemic components of human society, such as religion, ethnicity, and ideology, cannot be predicted and thereby affect individual and group decision-making

processes. These non-systemic components do not exist uniformly throughout society, therefore infinite possibilities exist for how they may affect change. For example, ethnicity and ideology bring an abstract association of identities that affect each individual's implementation of decision-making, resulting in great variability that cannot be predicted for systemic outcomes.

Disturbances provide an opportunity for individuals and networks within social systems to innovate and develop, which indicates the level of resilience for that system (Adger et al. 2005; Campanella 2006). The individual and social learning that occurs within the system results in dynamic social relationships and interactions, which can be considered as fast variables that change on short time scales. These relationships and interactions build across spatial, temporal, and institutional scales and eventually lead to changes in the slow variables (i.e., global forces) that transform social system structure (Carpenter et al. 2001; Walker et al. 2004). Social resilience describes an attribute of a dynamic system that can be influenced by human action, thereby emphasizing social process rather than social structure (Lei et al. 2014).

The influence of human action on resilience requires the acknowledgement that resilience may not necessarily scale up in an overall positive manner. In some cases, resilient pathways at a smaller scale can result in negative resilience at a larger scale. For example, the resilience and persistence of the Ebola virus inhibits the resilience of human communities exposed to the virus. For hazard preparedness, leaders should consider how implementing resilient actions at one level (i.e., ports) might impact resilience at another level (i.e., neighboring residential communities), looking for relationships that might potentially cause negative feedback.

To be better prepared to cope and persist beyond natural hazard events, resilience-building activities should begin at the local level. Broad, national efforts for prevention, contingency planning, and top-down governmental response have limits for building community

resilience (Boin and McConnell 2007; Wilbanks 2009). Understanding relationships between elements of community structure on the local level and nested levels of community interdependence provide insight to the process of resilience. The innovation and leadership necessary to initiate a resilience-building process often comes from the local level but needs resources and support from higher levels to carry that resilience across scales. Overall system resilience requires integration of processes and decisions across geographic scales (Wilbanks 2009).

The role of human cognition and the ability to make decisions has been an integral component of applied hazards research and hazards geography. In 1975, geographer Gilbert White and sociologist Eugene Haas conducted the first national assessment of natural hazards to address human perception and awareness of the risks associated with hazards (White and Haas 1975). Through participation in national and international committees and workgroups, Gilbert White spent most of his career encouraging policy makers to focus on how humans adjust their behavior to cope with hazard risks and impacts. Hazard researchers developed the hazards adjustment paradigm, which informed the four stages of disaster management: preparedness, response, recovery, and mitigation (Mileti 1999).

Over the decades, global losses and harmful impacts of hazards continued to increase, which led to the United Nations declaration that the 1990s would be the International Decade of Disaster Risk Reduction. In this decade, policymakers focused on understanding and reducing vulnerability, which often revealed problems of poverty, social injustice, gender inequality, poor education, and a variety of other issues. Researchers focused on ways to measure and quantify vulnerability, in order to seek solutions to decrease it. Complexity resulting from many factors

influencing vulnerability led to the realization that no amount of post-disaster aid and relief can fix root causes of social and political problems (Wisner et al. 2004).

Since the mid-1990s, the policy focus has shifted to the expectation for communities to survive natural hazard events and disasters without external assistance, thereby putting the burden on community residents (Manyena 2006). Researchers have incorporated concepts of sustainability and resilience into the hazards paradigm, giving focus to mitigation and recovery (Tobin 1999). Planning for sustainability and resilience necessitates understanding what resilience is, how it happens, and to what extent it exists in communities.

The elements of community resilience parallel the phases of disaster management: anticipation, response, recovery, and reduced vulnerability (Colten, Kates, and Laska 2008; Wilbanks 2008). These elements indicate an on-going process of reflection on the past and anticipation of the future in order to adapt and transform actions to enable response, enhance recovery, and reduce vulnerability. As such, resilience should be considered both before the preparedness phase and after the response phase of a hazardous event. In disaster management, resilience thinking can occur in all four phases to help systems transform and bounce forward.

Transformation for social systems involves preparing for a change, using crisis as a window of opportunity for change, and building resilience for the new system (Folke et al. 2010). These phases should be continuous and reflective of unique circumstances facing communities. For effective disaster management, resilience thinking requires more than understanding the structure of a system; it requires understanding the processes happening within each level of the system, among levels of the system, and across levels of different systems. A process leading to greater resilience will involve multiple stakeholders, will recognize and use local citizen input and knowledge, will address the needs of the target community or group, and

will seek resources to implement strategies to promote resilience (Cote and Nightingale 2012; MacKinnon and Derickson 2013; Weichselgartner and Kelman 2015). Observations of resilience at a local scale can provide insight to the context-specific and nuanced complexities of social resilience and can help researchers learn about the process of resilience in order to inform policies and programs to foster resilience.

### **Quantitative Methods to Assess Resilience**

In the effort to know if communities have increased resilience or to be able to compare communities to each other, whether appropriate or not, academic institutions and government agencies have sought a baseline reference measurement for resilience to use as a starting point. In 2012, the National Academies of Science published a report titled *Disaster Resilience: A National Imperative*. In the report, the National Research Council's [NRC] Committee on Increasing National Resilience to Natural Hazards and Disasters wrote about the need for a national-scale resilience metric. One suggestion for such a metric involved monitoring the dollar amount of federal assistance spent annually on disasters, especially after years of increased spending on flood protection. Such a metric does not accurately reflect how and if federal money actually gets used to implement resilient strategies and if these strategies work to build resilience.

To quantify resilience and measure progress toward resilience, a lot of research has been done to develop indicators of resilience. Birkmann (2006) provides a rather lengthy definition of indicators related to natural hazards: "a variable which is an operational representation of a characteristic or quality of a system able to provide information regarding the susceptibility, coping capacity and resilience of a system to an impact of an...ill-defined event linked with a hazard of natural origin" (Birkmann 2006, 57).

Much of the research and literature on quantifying resilience comes from the engineering and construction sciences relative to earthquake resilience. Both engineering and construction science involve research on physical and mechanical properties that can be defined through complex and sophisticated equations. Engineering resilience can be easily quantified in terms of structural stability, material strength, and shear force. Furthermore, earthquakes lead to somewhat bounded impacts in terms of their magnitude and direct losses. Economic and structural loss functions do not describe social resilience or the loss of human capacity.

Therefore, resilience indices from engineering and construction science disciplines establish a useful reference and basis for comparison of one infrastructure system to another, in terms of acceptable levels of loss, disruption, and system performance (Tierney and Bruneau 2007). Bruneau et al. (2003) developed measures to assess resilience from the earthquake engineering and transportation perspective, in terms of critical infrastructure systems and their ability to recover over time. His work established the resilience triangle (Figure 1.1), which represents a graphic way to measure the loss of supply chain performance and the time to recover to an acceptable level of functioning or service (Bruneau et al. 2003).

The four components of Bruneau's Resilience Framework include redundancy and resourcefulness to achieve robustness and rapid recovery (Tierney and Bruneau 2007; Bruneau et al. 2003). To demonstrate the use of the concept through empirical methods, researchers developed formulas to quantify the resilience of health care facilities to earthquakes (Cimellaro, Reinhorn, and Bruneau 2010). Given the difficulties in assigning numerical values to processes of redundancy and resourcefulness, the formulas only consider the ends of resilience – robustness and rapidity. Both robustness and rapidity can be quantified in terms of loss

estimation related to structural building stability and the recovery time needed to reach full functionality (Cimellaro, Reinhorn, and Bruneau 2010).

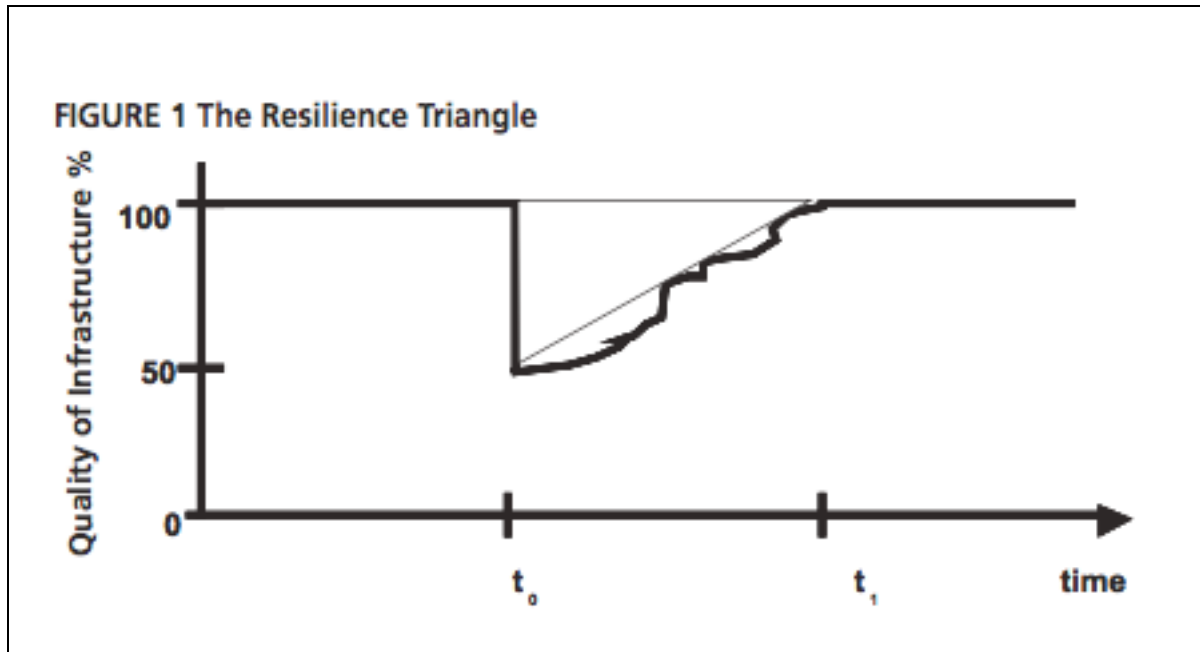


Figure 1.1.  $t_0$  represents the time of 50% loss of functionality, and  $t_1$  represents the time of full recovery to 100% functionality. In resilience-building efforts, the goal is to reduce the size of the resilience triangle (Tierney and Bruneau 2007).

The difficulty of quantifying the means of resilience, through redundancy and resourcefulness, has to do with the fact that both of these components depend on human decisions to implement action, which brings forth the non-systemic human dimensions of society. The formulas developed to quantify resilience depend on loss functions (direct and indirect; economic and casualties), recovery functions, and fragility functions. All of these formulas focus on structural integrity of buildings and recovery of infrastructure systems, like electrical utilities. Community recovery is a complex process and difficult to measure because of multiple spatial and temporal dimensions and overlapping interdependencies between physical

structures, economic sectors, and population (Cimellaro, Reinhorn, and Bruneau 2010). The same can be said for community resilience.

The psychological health and mental well-being disciplines offer a different perspective of community resilience, especially as it relates to human capacity. Through the lens of organizational behavior and social response, the process of resilience occurs by matching available resources to transform communities to new states of equilibrium (Norris et al. 2008). Norris et al. (2008) adapted Bruneau et al.'s (2003) resilient systems framework for resources, thereby renaming it the Resilient Resources Framework, with the components of resource strength, resource diversity, and resource timeliness. These components describe the aspects of resources that facilitate resilience through networked adaptive capacities, including economic development, social capital, information and communication, and community competence (Norris et al. 2008).

While Norris's networked adaptive capacities recognize the importance of the human components of factors like social capital and community competence, the methods to measure these assets in the Resilient Resources Framework still use quantitative data. Sherrieb, Norris, and Galea (2010) used archival population-level data from federal and state agencies to develop indicators for the capacities of economic development and social capital. For example, data for certain variables included percentage of voters, percentage of persons living in poverty, and number per capita of civic organizations. These descriptive measures do not adequately represent the nuances and local context of social capital within a community's network structure. In fact, due to the time commitment of collecting qualitative data from individuals, the researchers did not develop indicators for community competence or information and communication. Furthermore, the resulting economic development and social capital indicators did not go



through any ground-truthing with people in the communities being assessed or with the agencies that provided the data.

Several scholars consider resilience and vulnerability to be opposite ends of the same spectrum and therefore approach measurement of resilience by measuring vulnerability. Susan Cutter's Social Vulnerability Index [SOVI] uses socioeconomic and demographic data to provide a quantitative measure as a proxy of social vulnerability to natural hazards that can be compared across counties (Cutter and Finch 2008). Cutter's SOVI depends on eleven factors of income, age, race/ethnicity, occupation, commercial establishment density, single-sector industry, housing and infrastructure (Cutter, Boruff, and Shirley 2003). SOVI gives no emphasis to political power, representation, social networks, or social capital and does not actually measure vulnerability.

Cutter's more recent work addresses locally specific measures of vulnerability and the relationship with resilience (Cutter et al. 2008b; Cutter, Burton, and Emrich 2010). The Disaster Resilience of Place [DROP] model presents a conceptual framework for quantifying resilience to natural hazards at the community level (Cutter et al. 2008b). DROP operates on the condition that as frequency of hazardous events increases, a community's absorptive capacity and ability to recover diminishes. However, each event leads to a certain amount of social learning, which encourages mitigation and adaptation to increase levels of inherent resilience.

Cutter's team has established baseline disaster resilience indicators [BRIC] as a way to operationalize and test the DROP model at the local level. Once again, the material used to identify BRICs comes from publicly available quantitative and demographic data (Cutter, Burton, and Emrich 2010). Subcomponents for disaster resilience include variables for social resilience, economic resilience, institutional resilience, infrastructure resilience, and community

capital. All the variables can be quantified through data from nationally available sources, such as U.S. Census, County Business Patterns, Federal Emergency Management Agency datasets, National Oceanic and Atmospheric Administration datasets, U.S. Geological Survey datasets, the American Hospital Directory, and others (Cutter, Burton, and Emrich 2010). To represent indicators of social resilience, Cutter uses variables for educational equity, transportation access, communication capacity, and health coverage. For an indicator of institutional resilience, Cutter uses percent population covered by Citizen Corps programs (Cutter, Burton, and Emrich 2010). For community capital, Cutter uses the number of social advocacy organizations per 10,000 population as one of the variables for social capital (Cutter, Burton, and Emrich 2010). Quantitative measures define the variables for BRIC and cannot account for variation or nuance in social relationships and social networks.

Several studies describe the application of social vulnerability indices to assess place-specific vulnerability to natural hazards (Frazier et al. 2010; Garbutt, Ellul, and Fujiyama 2015; Koks et al. 2015). While less research has been conducted on the use of quantitative resilience indicators in local communities, a few studies show the place-specific application of quantitative resilience measures.

For example, the Spatially Explicit Resilience-Vulnerability [SERV] model uses place and scale-specific weighted indicators to assess vulnerability at the county level of Sarasota, Florida (Frazier, Thompson, and Dezzani 2014). In Sarasota County, the researchers developed sensitivity and adaptive capacity indicators for census blocks with data compiled from the U.S. Census, American Community Survey, InfoUSA Business Data, the local government, and the county tax assessor's office. Then, researchers overlaid various storm scenarios (hurricanes

plus storm surge) with census blocks to determine the exposure of the block within the hazard zone.

While sensitive to income and wealth data, limitations still exist with the quantitative and statistical approach of the SERV model. For example, the conversion of raw scores to z-scores resulted in clearly inaccurate conclusions (Frazier, Thompson, and Dezzani 2014). Some areas showed higher vulnerability in lower storm categories while others showed lower vulnerability in higher storm categories. The SERV model also does not include a temporal component and therefore assumes that adaptive capacity is static over time. To go one step further, the SERV model could be ground-truthed through interviews with the target community to validate the results found by the quantitative methods.

The Resilience Inference Measurement [RIM] model provides another example of the application of a quantitative resilience assessment tool. The RIM model considers exposure (number or intensity of hurricanes), damage (loss of lives or property), and recovery (population or economic growth) in its application to assess coastal resilience of countries in the Caribbean region (Lam et al. 2015). RIM goes beyond vulnerability indices by including recovery but does not accurately represent resilience, given that population growth can be influenced by factors completely unrelated to hazards, such as immigration. In addition, RIM uses statistical techniques to assign countries to four different “resilience” groups, based on socio-environmental variables that depend on population and access to resources, which do not account for social capital and social interactions. RIM also assesses resilience at a country level without any ground-truthing in those countries.

Quantitative methods and tools can provide quick assessments of “resilience” at broad spatial scales. However, given the dynamic nature of resilience and the importance of social

relationships on the local level, purely quantitative approaches do not dip below the surface into local scale, place-based, community resilience. Acknowledging that social-ecological systems include humans requires that approaches to measuring resilience account for human cognitive abilities realized through decision-making processes, and ultimately human agency, to influence action.

### **Mixed Methods to Assess Resilience**

Quantitative methods put a diagnostic number on resilience, and qualitative methods describe the process and mechanisms of that resilience, which may justify the use of a mixed methods approach. Often, the use of qualitative methods validates the results of quantitative analysis and can downscale results to a spatial level that considers the nuances of local context. National level indicators often do not have as much meaning on the local level and can be adjusted by local stakeholder input to increase their relevance. Some examples of this relationship occur through use of vulnerability indices. For example, Brooks, Adger, and Kelly (2005) used an expert panel to validate the results of a quantitative analysis to define national-level indicators for vulnerability and capacity to adapt to climate hazards. While the statistical analysis had governance indicators much lower on the list of importance, a focus group of experts made a distinction between vulnerability to short-term hazards and adaptive capacity over the long-term, which resulted in governance indicators rising to the top of the list. The researchers concluded that national level indicators should be complemented with indicators based on local context and setting, therefore being more reflective of actual vulnerability (Brooks, Adger, and Kelly 2005).

In a case study from Vancouver, local stakeholder engagement strengthened and validated a Social Vulnerability Index [SOVI] constructed for their communities (Oulahen et al.

2015). Researchers created a SOVI with census data and statistical analysis and created GIS maps to show the spatial distribution of SOVI. The researchers presented the maps to practitioners in five municipalities in a focus group format and collected feedback through a survey questionnaire and semi-structured discussion and shared experiences. The oral feedback provided in discussion validated the results of the survey questionnaire and led to a second SOVI and set of maps, which offered greater detail in terms of the degree of vulnerability at the local level (Oulahen et al. 2015). Researchers concluded that local practitioners should be included in the development of vulnerability indices to ensure applicability to local context.

For community resilience, a few frameworks have been developed with a mixed methods approach. Renschler et al. (2010) developed a framework, known as the PEOPLES Resilience Framework, that considers technical and organizational performance measures for physical capital as well as social and economic performance measures at broader spatial system scales. Researchers used a mixture of quantitative and qualitative data from a variety of sources to develop indicators for resilience under this framework, including: remote sensing data; housing stock and building information; critical infrastructure assessments; quality of life surveys; warning plans; organizational disaster training programs; literacy and poverty rates; evacuation plans; damage assessment plans; members in civic organizations; and plans to coordinate across diverse community networks (Renschler et al. 2010).

While the list includes sources of qualitative data, the framework aims to put a numerical value on resilience. PEOPLES intends to address multiple hazards from many spatial and temporal scales, but each element of the framework has a GIS layer associated with it that results in a resilience index contour map, which assigns a static value for resilience to a region of interest at any designated time (Renschler et al. 2010). Suggestions for future work include

developing consistent formulation to quantify resilience for the elements of population and demographics, physical infrastructure, and economic development, followed by application to a local case study (Renschler et al. 2010). Obviously, these elements would be easiest to validate first because of their dependence on secondary data. Conceptually, the framework includes social system components; however, Renschler et al. (2010) provide no evidence of efforts to validate its use in the field and apply it to a local setting.

Another example of mixed methods in developing a conceptual resilience framework is the Community Disaster Resilience [CDR] Framework and Index (Peacock et al. 2010). The framework intends to address all four phases of disaster management (mitigation, preparedness, response, and recovery) through analysis of community assets in terms of social, economic, physical, and human capital. Researchers listed the actions and practices associated with each phase of disaster management and the community capital resources necessary to complete these activities, resulting in a matrix of 120 indicators, informed by county-level data from various federal government agencies. Statistical tests of reliability and validity assessments ensured the statistical robustness of the CDR Index.

Phase two of this project included community workshops to contribute to development of the CDR Index. The workshops focused on discussing policies and tools for resilience, rather than pilot-testing the CDR Index with communities. The workshop aimed to understand community priorities of issues important for community resilience and to gauge perceptions of the effectiveness of policies, tools, and strategies to promote resilience. The results of the workshop helped justify policy action at the county level to implement hazard mitigation and land-use planning strategies, which seems to justify the county-level CDR Index (Peacock et al.

2010). While Peacock's work does not use local case studies to validate the statistically-driven CDR Index, his team does consider the input of local level officials.

Other examples of the use of mixed methods for resilience come from Sarasota, Florida and New Orleans. In Florida, Frazier and his team used qualitative methods through mitigation plan reviews and focus groups with local hazard mitigation practitioners to incorporate place-specific weighting to resilience indicators for Sarasota County (Frazier et al. 2013). By working with local stakeholders, the researchers identified spatial and temporal indicators specific to the community of Sarasota County and then analyzed these through quantitative methods such as spatial autocorrelation (Frazier et al. 2013).

Similarly, Gotham and Campanella (2013) used city-level GIS analysis of quantitative data in combination with semi-structured interviews to connect repopulation and recovery outcomes with social inequalities and racial diversity in post-Katrina New Orleans. At the neighborhood level, interviews with neighborhood stakeholders offered individual and collective experiences of post-disaster recovery and provided in-depth information to validate and prove the reliability of city-level data sources. Through a mixed methods approach, ethnographic methods helped compare and contrast findings between the city level and neighborhood level, highlighted grassroots institutions and local interactions, and clarified mechanisms of change indicated through census data or GIS analysis (Gotham and Campanella, 2013). In some of the examples provided, researchers used qualitative approaches to verify or validate quantitative measures of resilience.

### **Qualitative Methods to Assess Resilience**

Qualitative methods help answer research questions that cannot be addressed with numerical data. A variety of qualitative methods have been used in research related to

preparedness, resilience, and adaptive capacity. Qualitative methods help dive into questions of attitude, perception, and social interaction, sometimes by engaging people directly. For example, surveys, interviews, and focus groups have been used to understand the perceptions of tsunami risk and the factors that motivate action for preparedness (Johnston et al. 2005). The use of multiple methods (i.e., interviews, surveys, focus groups) helped validate the findings from each individual method, and researchers used the results to identify next steps for action in improving tsunami preparedness (Johnston et al. 2005).

Focus group sessions and their transcripts offer lengthy and in-depth sources of information for qualitative data analysis that can provide insight into processes of resilience, recovery, and adaptive capacity. Focus groups help provide place-specific and contextual information to understand individual and collective scales of culturally sensitive coping strategies to environmental change (Rajkumar, Premkumar, and Tharyan 2008). Focus groups often involve a facilitator, who reviews existing literature and leads an informal discussion while another person might take notes of participant interactions. Such close observation provides a look at place-specific and locally-driven responses and understanding of various issues but may also prove difficult to extrapolate and apply to other places and communities.

Comparative historical analysis provides another example of a qualitative method used to understand past experiences through the lens of various theoretical frameworks. Using four elements of community resilience (anticipation, reduced vulnerability, response, and recovery), historical analysis of multiple environmental hazards helped researchers understand the inherent resilience of Louisiana communities that have experienced oil spills and hurricanes (Colten, Hay, and Giancarlo 2012). Comparative historical analysis included sources from newspaper and trade journal accounts, litigation records, government reports, and hearings related to historical



technological hazards near coastal Louisiana. Historical analysis gives researchers the advantage of a temporally distant perspective that allows for documentation of actual resilient practices, instead of using quantitative proxies. A historical lens allows objective interpretation of events to understand the implications for present and future resilience.

Case studies and their analysis provide insight into complex processes of resilience, recovery, and adaptive capacity by exploring the nature of social capital and the uniqueness of social interactions at the local level. Using case studies as a tool for analysis helps researchers draw comparisons across spatial scales and potentially draw conclusions about strategies to adjust to environmental change. For example, a case study of climate change adaptation in African communities helped researchers understand the attributes of networking capability, collective power, and reliability (Kithiia 2015).

Interviews, surveys, focus groups, historical analysis, and case studies - the use of multiple qualitative methods strengthens research conclusions and provides insight to the dynamic processes of local-scale resilience. While these qualitative methods provide insight to the process of resilience or adaptation, they do not assess or measure resilience. The value of a qualitative approach includes engaging people in a conversation of resilience. Therefore, a participatory approach to developing indicators for resilience might bridge the gap between assessing resilience and understanding the mechanisms of resilience.

Participatory research methodologies use techniques to engage participants in a qualitative way. As a research strategy, participatory research engages research subjects as participants in a two-way conversation to move the research process toward useful results for real-world applications (Whyte 1991). Project participants continually communicate with the researcher or facilitator to adjust the research process and ensure the final benefit of the research

results (Pain 2004). The researcher involves the end user from the beginning, in identifying a problem, informing the study design, collecting and analyzing data, and applying research findings (Ozanne and Saatcioglu 2008).

Instead of bringing an inflexible research design to the process, participatory research allows for adaptation. Through a continuous mutual learning strategy, “the facilitator acts less as a disciplinary expert and more as a coach in team building” (Whyte 1991, 40). This provides the opportunity for participants to engage in conversation, bounce ideas off of each other, and generate knowledge. A participatory research approach allows the researcher to get close to the local context of the topic being studied, thereby preventing the sometimes “ivory tower” influence that comes with a distant and removed approach.

A participatory research approach advances epistemology by recognizing that participants possess knowledge and experience that is outside of the perspective of the researcher. The process of two-way conversation between facilitator researcher and project participants keeps a record of how the research topic evolves with information from the knowledge and experience of participants. An effective facilitator helps participants stay on track with the research inquiry while recognizing that knowledge continually evolves. By taking the knowledge of practitioners and extending it to new insights to inform new practices, researchers consider participants to be collaborators (rather than objects) and foster investment in the successful application of research results (Ozanne and Saatcioglu 2008).

In the discipline of geography, participant action research [PAR] has been used as a methodology to inspire change for the benefit of the group being studied. Researchers using a PAR approach often have emancipatory interests and seek to improve human welfare (Lindsey and McGuinness 1998; Ozanne and Saatcioglu 2008). Trends in using participant approaches in

critical and radical geography came from participatory rural appraisal methods in the 1970s and feminist geography approaches in the 1980s (Pain 2004). Geographers should be interested in participatory approaches because it allows the researcher to closely investigate and validate the relationship among people, space, and environment. In social geography, participatory research approaches emphasize the use of mapping and diagramming techniques with marginalized groups such as children, young people, ethnic minorities, women, and people with disabilities (Pain 2004).

Participatory research methods can also address organizational challenges. Using historical, reflective, or change-oriented methods associated with a participatory approach helps to provide context and insight into a current social situation and thereby define opportunities for improvement (Ozanne and Saatcioglu 2008). Participatory methods facilitate social learning and anticipatory learning, which actively increases resilience. By reflecting on lessons learned in the past, monitoring current trends, planning for surprises, and building capacity for change, anticipatory learning helps create spaces where community members move from vision of the future to actionable strategies to actually adapt to it (Tschakert and Dietrich 2010). Iterative cycles of reflection and learning build anticipatory capacity by moving participants from vision to action and consideration to implementation.

Methods in participation help address the complexities and non-linear nature of systems in change, provide insight to short-term and long-term coping mechanisms, and create new institutional linkages between researchers and community members that facilitate communication and build capacity for adaptation (Berkes and Jolly 2002). In an example from Puerto Rico, researchers facilitated participatory methods of concept mapping and sketch mapping to understand the spatial distribution of flood impacts and to rank flood mitigation

strategies by efficiency and feasibility (Lopez-Marrero and Tschakert 2011). This participatory process promoted social learning by building on existing knowledge and promoting linkages and partnerships between community members and emergency managers for collaborative flood management (Lopez-Marrero and Tschakert 2011).

In terms of resilience, participant methods seem to provide the bridge between building capacity for resilience and measuring or assessing resilience. In some cases, the participatory process of engaging stakeholders to develop measures of resilience facilitates a conversation about resilience that may actually increase community capacity for resilience. Using matrices during discussion facilitates participant understanding of the situation and the strengths, weakness, and areas that need improvement (Gibbon, Labonte, and Laverack 2002). Additional methods of sketch mapping and focus groups engage local communities in assessing coping capacity (Wisner 2006). Through a participatory and qualitative approach, the scale of analysis can be highly local and can focus on groups of people who have experienced damage from natural hazards.

Participant methods have been used with quantitative methods in studies of resilience. In one example, researchers in China used a two-phased participatory approach, through surveys and interviews of expert and local stakeholders, to incorporate resilience into sustainability indicators for a freshwater lake system exposed to the impacts of a human-created dam (Xu et al. 2015). Similarly, in Brazil, a participatory approach through surveys, interviews, and meetings with local stakeholders, informed the perceptions, expectations, and buy-in needed to develop a quantitative indicator system for integrated coastal management. (Fontalvo-Herazo, Glaser, and Lobato-Ribeiro 2007). While the objective of the project focused on sustainable livelihoods

dependent on natural resources, the process focused on participation, allowing the stakeholders to include indicators to show change over time in social-ecological interactions.

The Delphi method is one example of a participatory approach that has been used in implementing resilience and recovery frameworks. The Delphi method uses an iterative group communication process to collect feedback and reach consensus on a particular topic, often with experts who might be dispersed over a broad geographic area or engaged in the project over a long time frame (Jordan and Javernick-Will 2013; Labaka et al. 2014). The Delphi method usually involves three to fifteen experts, who have the time available to respond to surveys, have commitment to the end-result, have effective communication skills, and have a robust and stable knowledge of the topic at hand (Alshehri, Rezgui, and Li 2015; Vidal, Carvalho, and Cruz-Machado 2014). In a process using the Delphi method, researchers incorporate feedback from previous rounds of consultation before continuing on to the next round to gain feedback and reach a consensus of opinion.

The Delphi process has been used in combination with other qualitative methods, including case study analysis, document content analysis, and extensive literature review, to help researchers understand and develop resilience frameworks (Jordan and Javernick-Will 2013; Alshehri, Rezgui, and Li 2015; Labaka et al. 2014). In these studies, researchers effectively collected expert input and knowledge to inform their research; however, little evidence exists to show ground-truthing or pilot-testing of these tools and frameworks, beyond their development, to see if they make sense in a real-world application.

**Coastal Resilience Index.** As an example of a participatory tool to assess resilience, the Coastal Resilience Index (CRI) focuses on community resilience to natural hazards and operationalizes FEMA principles of resilience into an ordinal metric (The National Academies

2012). The CRI aims to help a community understand its level of resilience, through yes or no questions, under six different categories, including but not limited to critical infrastructure, transportation, community plans, mitigation measures and social systems (Sempier et al. 2010). A researcher or community extension agent usually facilitates the process of completing the questionnaire with members of a local government (i.e., parish police jury, county council, etc). The participatory approach of the CRI focuses on facilitating a discussion of local community resilience in order to establish a list of steps to take to enhance resilience.

Researchers intended for the CRI to be a quantitative tool to score a local community somewhere along a spectrum of resilience. The task of assigning a number to resilience, however, created problems. Participants became more focused on obtaining the “right” number rather than productive conversation to identify actions to improve resilience. The developers of the tool changed the format of the questions to be answerable with “yes” or “no,” instead of a certain number. As a result, the CRI became more of a self-assessment and communication tool to encourage steps toward improving resilience.

At the end of the process, CRI respondents count up the number of ‘yes’ marks and the number of ‘no’ marks and assign a range of resilience (i.e., low, medium, or high) for each category. No element of the index receives a particular weight or aggregates up into one single composite index. The focus of the CRI is not the “score” but rather the conversation that takes place. The CRI has value in the process of facilitating a discussion and encouraging critical discussion of community resilience. After several years of implementation of the CRI along the Gulf of Mexico Coast, participating communities often commented on the absence of ports in the discussion of community resilience.

## **Port Geography and Resilience Studies**

Prior to the 1950s, ports developed as trading centers and stopping points for ship travelers. The form and function of adjacent waterfront cities drove the form and function of ports. After World War II, ports truly became the economic and cultural centers of the regions and nations where they developed. As ports have adjusted to changes in shipping and maritime technology, geographers have studied changes in the relationship between port and city (Hoyle 2000). Due to the variable historical, cultural, economic, and political influences on port development, ports all over the world are extremely unique in geographic location, management structure, function, and cargo type. In the 1970s, changes in shipping technology led to the development of offshore terminals to allow berthing of super tankers and containerized units. All these developments allowed for increased capacity to move goods around the world, through more efficient packing and faster methods of loading and offloading cargo from vessels to storage warehouses.

Ports have also evolved into entities connected globally through international trade networks and global logistics management strategies. In the 1980s, with the increase of globalization, the transportation industry experienced deregulation by governmental bodies and increased privatization. Geographers began to look at how shipping agents and ocean carriers decided which ports to use based on port efficiency, availability of terminal space, efficiency in offloading cargo, access to inland railways, and proximity to deep water (Ng and Ducruet 2014).

In the 1990s, themes in port geographical studies expanded to include port governance, inter-port competition, and the role of human actors in port development, including port authorities, port planners, inland transportation authorities, and local community groups. By the early 2000s, port geographical studies evolved from studying ports as a space to ports as a very

complex place (Olivier and Slack 2006). Globalization and privatization have resulted in intra-port competition, as shipping companies evaluate different terminals, rather than the entire port, in deciding where to go.

At the intersection of maritime transportation, port, and hazards geography, academic research focuses on the impacts of and physical resilience of ports to earthquakes, tsunamis, and terrorist attacks (Barberopoulou et al. 2011; Gregory et al. 2012; Mansouri, Nilchiani, and Mostashari 2010; Martagan et al. 2009; Madhusudan and Ganapathy 2011). In 2007, the U.S. Government Accountability Office [GAO] released a report titled *Port Risk Management: Additional Federal Guidance Would Aid Ports in Disaster Planning and Recovery* (U.S. GAO 2007). As a response to Hurricane Katrina, the GAO interviewed port stakeholders and reviewed relevant planning and emergency operations documents for seventeen major U.S. ports to assess the status of preparing for and reducing damages from natural hazards, specifically earthquakes and hurricanes. Ports reported experiencing challenges with damage to port infrastructure, debris clogging the waterways, and delivery of utility services, such as electricity and water. The most reported challenges, however, included problems with communication, personnel, and coordination with local, state, and federal stakeholders, both in the response phase and for days to weeks after an event. Ports reported taking steps to mitigate natural hazard damages, including creating redundancy within communication systems and adding equipment at port facilities to assist with disaster response.

A key step in port planning includes understanding assets available for response (Berle, Asbjørnslett, and Rice 2011; Berle, Rice, and Asbjørnslett 2011; U.S. GAO 2007; Mansouri, Nilchiani, and Mostashari 2010; Mileski and Honeycutt 2013). By understanding assets ahead of time and assembling a preparedness plan, maritime industry members and governments with



maritime interests will know the availability of resources to deploy after an event in the effort to increase efficiency of disaster response and aid (Mileski and Honeycutt 2013). Federal legislation requires that ports prepare and plan for security threats and terrorist attacks. Since no specific federal requirements exist for disaster planning at ports, time and resources get devoted to security planning, and any existing disaster preparedness plans show wide variation from port to port (U.S. GAO 2007).

While ports have instituted coordination mechanisms and discussion forums with external stakeholders, challenges still exist for the ports and maritime industry in terms of disaster response and recovery, including hazard mitigation for waterfront buildings (Smythe 2013). The waterfront location of ports exposes them to natural hazards, such as sea level rise, ice, severe storms, tsunamis, storm surge flooding, and hurricanes.

Hazards geography and resilience studies have not greatly intersected with port geography. A few very recent studies have looked at the influence of Hurricane Katrina on perception of risk and how ports should incorporate resilience (particularly, to sea level change) into planning for the future (Becker and Caldwell 2015). Port stakeholders have a vested interest in the long-term function and viability of ports, but no standardized measures for resilience exist for ports. With sea level rise and increased hurricane frequency, port stakeholders should take a proactive stance in identifying risks rather than waiting until the damage assessment process after an event (Becker et al. 2014). The high number of large-scale global studies of ports and transportation and logistics networks has resulted in less emphasis on local and small scale studies of port management and social relations within port management structures.

## Types and Functions of Ports

Defining characteristics for ports include access to waterways, function and services they provide, or institutional structure. Ports themselves have physical boundaries, determined by the waterways leading into a physical port location and the railways and roadways leading from the port to other inland transportation networks. According to the U.S. Maritime Administration, the word *port* describes “a harbor with piers or docks,” with *seaports* handling oceangoing vessels and *river ports* handling river barges (U.S. Department of Transportation 2008). Ports that connect maritime transportation to inland transportation can also be described as multimodal or intermodal (Bichou and Gray 2005).

Port assets include maritime infrastructure, port infrastructure, land infrastructure, port superstructure, and operational infrastructure (Bichou and Gray 2005; Trujillo and Nombela 1999). Operational infrastructure describes the organizational structures set in place to manage port operations. Ports can be publicly owned and managed by a municipal or state authority, or they can be privately owned and operated. Ports managed by public bodies (i.e., a port authority) operate as landlord ports, tool ports, or operator ports (Trujillo and Nombela 1999). The most common type of port found in coastal areas of the United States includes landlord ports, where the port authority owns the port infrastructure (e.g., berths and docks). Private companies and tenants lease land, berths, docks, and storage areas from the port and provide their own superstructure and equipment to conduct movement of goods to and from warehouses and vessels. A tool port is similar to a landlord port, except the port authority owns the port superstructure (e.g., cranes, terminals, and buildings) and equipment, in addition to the infrastructure, and rents these port assets to private companies (Bichou and Gray 2005). A completely private port would be an operator port, where a private entity owns and operates the

infrastructure and superstructure. No standard institutional structure exists for ports, and ports all around the world present some mixture of public and private management and operation.

Port authorities function as a community, with stakeholders internal to the port authority and external to the port's physical boundaries. Port stakeholders include port authority management structure and tenants who lease port property; federal agencies with regulatory authority over some function of the port; importers and exporters; shipping lines and shipping agencies; and commercial and recreational users of port property (Becker and Caldwell 2015). The role of port authorities is to manage port property; facilitate movement of freight; and stimulate economic development (Trujillo and Nombela 1999; Bichou and Gray 2005). These actions have impacts to adjacent residential communities, whether positive or negative. For example, port authorities help create jobs but might also exacerbate environmental hazards by increasing traffic and congestion through nearby communities. The movement of freight through ports also affects larger regional economic and global trade networks (Bichou and Gray 2005; de Langen and Visser 2005).

### **Port Institutional Structure**

Along the Gulf of Mexico coast of the United States, most coastal ports are political subdivisions of the state with the power to perform governmental functions. A Board of Commissioners governs the port district with variable numbers of board members who serve variable lengths of terms, generally between three and six years. Commissioners can be elected by the general public or can be appointed by the governing authorities of the local municipality, whether that be city, county, or parish. In general, port commissions are charged with administering operations and activities that facilitate navigation of commerce and promote the industrial development and economic development of the port district territory. Port

commissioners have the authority to employ people with administrative, financial, engineering, clerical, and any other skills deemed necessary to administer and run the port district. Since landlord ports along the Gulf of Mexico are public institutions run by port authorities, they have certain roles and duties enacted by legislation of their state. This dissertation makes specific mention of three ports and describes their legally enacted authorities.

### **Port of Corpus Christi**

In 1911, Title 96 of the Revised Statutes of the state of Texas authorized the creation of navigation districts as special districts with the authority to perform governmental functions and whose boundaries are coterminous with county boundaries. Navigation districts also have the authority to construct navigation canals and waterways and to issue bonds for payment of construction activities that facilitate the operation or development of a port and waterways, both within the district and extending to the Gulf of Mexico (Texas Civil and Criminal Code 96:6001a).

Corpus Christi is located in Nueces County, on the southern Gulf coast of Texas and is considered part of the Texas Coastal Bend (Appendix A.1). As early as the 1850s, Corpus Christi provided a place for travelers and navigators to stop and trade their goods. When the time came to pick a location for a port, the U.S. Army Corps of Engineers (U.S. ACE) Galveston District Office recommended Corpus Christi as the logical site because of its natural elevation on a bluff nearly forty feet high (POCCA 2016).

In November of 1922, in response to a petition by local taxpayers, the Nueces County Commissioners Court created the Nueces County Navigation District No.1, whose boundaries coincided with the political boundary of Nueces County and would include the new port. The Board of Navigation and Canal Commissioners consisted of five members, which included

representation from the Nueces County Commissioners Court and the City Council of the City of Corpus Christi (Texas Civil and Criminal Code 96:6001g).

In September 1926, upon completion of the construction of the 25-foot deep channel and four cargo docks, the port officially opened for business. Given the prevalence of cotton farming in southwest Texas, the first business at the port was a lease between the Port and the Aransas Compress Company. In the 1930s, the opening of oil wells in Nueces and neighboring counties required the development of oil docks and refineries to facilitate the transshipment of petroleum products. Throughout the 1930s, tonnage through the port shifted from majority cotton to majority petroleum products. In the 1950s, the Navigation District built a grain elevator on port property to provide a way for farmers to save money on traveling to Houston or Galveston to load and ship sorghum grain.

In 1969, Port of Corpus Christi reached second place in annual tonnage for Texas ports with a total of 29.8 million tons of cargo shipped, with the majority of cargo in liquid petroleum and chemical products (*Corpus Christi Caller-Times* 1970). At this time, the Nueces County Navigation District oversaw 9.5 miles of dredged channels, including the Corpus Christi Ship Channel, which had been dredged to 40 feet deep and 400 feet wide (Nueces County Navigation District Number 1 1971). In May of 1981, both the Texas House and the Texas Senate passed H.B. No. 873, which changed the name of Nueces County Navigation District No. 1 to the Port of Corpus Christi Authority (POCCA) of Nueces County, Texas. Additionally, the Board of Navigation and Canal Commissioners also changed names to the Port Commission (Texas State Assembly 1981).

Currently, POCCA leases waterfront space to a variety of public and private organizations. POCCA facilities include twelve public oil docks, six public cargo docks, several

intermodal facilities, numerous private docks, and the Ortiz Conference Center (Appendix A.2). POCCA operates and manages the Corpus Christi Ship Channel, which is 45 feet deep and 29.4 nautical miles long, and the La Quinta Channel, which is 45 feet deep and 18.4 nautical miles long. In 2014, according to the U.S. ACE Waterborne Commerce Statistics Center, 84.9 million tons of cargo moved through the Port of Corpus Christi. Operating as a petrochemical port, top commodities include crude oil, fuel oil, gas oil, gasoline, and diesel.

### **Port of Pascagoula**

In 1956, the Mississippi state legislature passed Chapter 199, which created a county port authority for any county in Mississippi bordering the Mississippi Sound or the Gulf of Mexico (Mississippi State Law 199:1-28). The Jackson County Port Authority, given management authority over the Port of Pascagoula, is located in Jackson County, Mississippi. The Port Director receives oversight from the Jackson County Port Authority Board of Commissioners, which includes five members appointed by the Jackson County Board of Supervisors and four members appointed by the Mississippi Governor.

The Jackson County Port Authority (JCPA) has the authority to improve or develop the port, harbor, and channel. The county port authority has jurisdiction over “the ports, terminals, harbors, channels, and passes leading thereto, and all vessels, boats, and wharfs, common carriers and public utilities therein” (Mississippi State Law 199:1). JCPA works with the Jackson County Board of Supervisors to improve, promote, develop, construct, maintain, and operate harbors and seaports within the county. These authorities extend to wharfs, piers, docks, elevators, warehouses, roadways, water and rail terminals, and other facilities and land needed for the facilitation of waterborne commerce. The legislation states, “[i]t is hereby declared that the public policy of the State of Mississippi is to encourage the expansion and development of

Mississippi's harbors and ports" (Mississippi State Law 199:26). JCPA also has the authority to manage and promote the industrial and economic development of the Port of Pascagoula; manage the Jackson County Industrial Water System; partner with the Jackson County Economic Development Foundation to manage industrial parks and Singing River Island; and support the federal navigation project of the Pascagoula and Bayou Casotte Channels.

Like most ports, the Port of Pascagoula functioned as a trading center in the early 1800s. Before the Civil War, bales of cotton moved through the area by the Pascagoula River System. After the war, railroad development to New Orleans and to Mobile caused a transition in commodities from cotton to forest products (JCPA 2015). In the 1940s, shipbuilding became the dominant industry in south Mississippi, with Ingalls Shipbuilding located at the Port of Pascagoula.

The Port of Pascagoula is a deep water port split into the West Harbor and East Harbor. The 38-foot deep Pascagoula Channel leads to the West Harbor, which includes five public terminals, cold storage facilities, and two private terminals, including Ingalls Shipbuilding (Appendix A.3). The 42-foot deep Bayou Casotte Channel leads to the East Harbor, which includes five public terminals and several private terminals, including a liquefied natural gas facility, Gulf LNG Energy, LLC, and the Chevron Pascagoula Refinery. Port facilities are located twelve miles from the shipping lanes in the Gulf of Mexico, eight miles from the Gulf Intracoastal Waterway, and nine miles south of Interstate 10.

The Port of Pascagoula consistently ranks in the top tier of ports in the nation related to foreign trade, ranking 17<sup>th</sup> in total imports (11.2 million tons) and 20<sup>th</sup> in total exports (18.3 million tons) in 2014 (U.S. ACE WCSC 2014). Port of Pascagoula imports more than it exports, primarily from countries in Central America, the Caribbean, Africa, and the United Kingdom

(PEER 2006). Primary exports include frozen foods, grains, machinery, forest products, fertilizer, and petroleum products.

### **Port of Lake Charles**

The Port of Lake Charles, located 36 miles inland from the Gulf of Mexico in southwest Louisiana, unofficially existed since the beginning of the 1800s, functioning as a location for vessels sailing on the Calcasieu River to stop and pick up lumber. After the Civil War, the lumber industry and the rice industry required greater navigational access to Lake Charles. In 1915, the Gulf Intracoastal Waterway (GIWW) in between the Calcasieu and Sabine Rivers had been completed. In 1921, the Calcasieu Parish Police Jury called for a bond election, which received voter approval to issue a \$2.75 million bond to dredge the Calcasieu River Ship Channel, which would provide quick access from Lake Charles to the GIWW. In 1924, the Louisiana state legislature created the Lake Charles Harbor & Terminal District (Louisiana Revised Statutes 34:201-218), and the Port of Lake Charles officially opened as a deep draft coastal port in November 1930. A seven-member Board of Commissioners governs the district. The Lake Charles Harbor and Terminal District, as designated by U.S. ACE, has the authority to carry out any functions within its limits to facilitate the construction, operation, and maintenance of the Calcasieu River and Pass Project (Louisiana Revised Statutes 34:218). The Lake Charles Harbor and Terminal District also has the authority to encourage businesses to locate within its territory that contribute to the “general development of tourism,” emphasizing the role of the local area as an economic and cultural resource (Louisiana Revised Statutes 34:203).

The establishment of the port responded to the need for marine transportation for lumber and rice cargoes, but over the years, the port has grown into an industrial facility, moving 56.8 million tons of cargo in 2014 (U.S. ACE WCSC 2014). Principal cargoes include bulk cargoes of



petroleum coke and other petroleum products. The Port district includes an area of 5,000 acres and provides space to forty tenants while also owning and operating two marine terminals, two industrial parks, the City Docks barge terminal, and the three-mile long Lake Charles Industrial Canal (Appendix A.4). All along the Calcasieu River Ship Channel, at 40 feet deep, industrial plants and refineries have created an economic magnet for the petrochemical industry, including one of the nation's largest refineries and two of the largest liquefied natural gas facilities.

### **Challenges to Prevailing Concepts and Contributions**

One of the challenges to assessing the resilience of port authorities or port management organizations is that each port is unique in its geographic location, spatial expanse, commodity exchange, and operation and management. Port planning typically follows a business-driven approach, but ports can benefit from long-term resilience planning to ensure their economic viability in a future of uncertain environmental change. No standardized measures of port resilience currently exist, and the variable spatial scales and unique management structures of ports limit the useful application of national quantitative resilience metrics.

In terms of understanding, quantitative measures do not account for variations or nuances in social relationships and social networks that operate across temporal scales to build resilience. In terms of practice, quantitative methods do not necessarily engage audiences in a discussion about practices and processes to build resilience. Through a participatory approach with port practitioners, I facilitated the development of the Ports Resilience Index, a qualitative resilience assessment tool that incorporates elements of operations and management that port authorities consider to be important for resilience. An in-depth analysis of the process of engagement will challenge the methods used in quantitative approaches to assess resilience.

By taking an in-depth and detailed look at three different ports and considering resilience, this research is an example of geographic study. This research follows and furthers previous accomplishments in the geographic discipline, specifically by geographers Adger and Wilbanks, by elaborating on the process of social resilience at different spatial scales, by developing resilience indicators based on local context and setting, and by considering the impact of disturbance on social and organizational infrastructure through changes in coping and adaptive capacity.

The contribution of this research to the geographic discipline will emphasize two distinct topics: approaches to measuring resilience and issues of scale. First, the research will analyze the participatory approach used to develop resilience indicators instead of using national economic or demographic indicators. Quantitative methods approach resilience as an outcome; the qualitative methods of the Ports Resilience Index approach resilience as a process, thereby stimulating a discussion to enhance resilience. Second, the challenge of participatory development of a resilience index is to develop something that is specific enough to be useful to an individual entity but broad enough to be widely applicable across spatial scales to all entities within that sector. The participatory setting for discussion at an organization level provides an in-depth look at contextual factors that facilitate specific resilience of one organization to hazards, which builds into greater resilience of an entire regional economic network.

Using ports as an example, this research provides insight into the benefits and challenges of using a participatory approach to develop a qualitative resilience assessment tool. In addition, the process provides insight into the social interactions and local contextual factors that affect place-based resilience, including the influence of hazard experience on adaptability and transformability of ports. The discussion of port resilience, stimulated through the Ports

Resilience Index, builds capacity for resilience and enhances disaster management by creating a discussion space to foster on-going resilience. In this space, researchers might understand further the complexities between people, space, and environment.

### **Outline for the Study**

Chapter two describes the use of the Delphi Method to facilitate the indicator questions for the Ports Resilience Index (PRI). Following the assembly of an expert committee of port practitioners and an online survey to understand ports' previous experience with natural hazards, I facilitated two rounds of consultation with the expert committee. I incorporated the committee's feedback to refine the indicator questions in the PRI before pilot-testing the instrument. In the summer of 2015, I conducted focus group sessions with three different ports along the Gulf Coast where I acted as facilitator to lead the port and associated stakeholders through a simulated completion of the PRI in order to gain their feedback on the relevance and wording of the indicator questions. From each of three focus groups, I have transcripts of 2.5 hours of recorded discussion; handwritten notes on the draft PRI and the process agenda for each session; reflections on each visit from a facilitation standpoint; and evaluation sheets completed by focus group participants. I conducted one final round of expert consultation with a webinar before final production of the PRI and further analysis. All survey instruments and questionnaires received Institutional Review Board approval from Louisiana State University (Appendix A.5).

Chapter three provides historical information, in a case study format, about the experience of the three focus group ports with major hurricanes and corresponding actions to build resilience. Sources include local newspaper articles and government reports related to damage and recovery for each port in the first ten years after a major hurricane. For example, I

used search terms to name the port of interest (i.e., Port of Corpus Christi, Port of Pascagoula, Port of Lake Charles), the hurricane event (i.e., Celia, Katrina, Rita), and the time frame (i.e., 1970 to 1980; 2005 to 2015). I conducted a manual content analysis of relevant articles to search for information associated with the hurricanes: physical and economic damages, immediate response, evidence of prolonged economic impact, and steps taken to address recovery and mitigation. I use this historical lens to understand similarities and differences in how each port provided feedback on the PRI during the focus groups.

Chapter four presents the results of qualitative thematic analysis of port hurricane plans for each pilot-test port in order to understand coping capacity of ports and how each port implements resilient actions. I manually coded the port hurricane plans, beginning with codes driven by elements of community resilience (e.g., anticipation, response, recovery, and reduced vulnerability), followed by codes driven by categories of port operations (e.g., essential personnel, infrastructure, operations and management, and external communications and partnerships). I used a manual coding strategy, instead of software-driven coding, in order to achieve deeper analysis of content, as opposed to word counts. I also provide analysis of focus group discussion extracts that correspond to actions listed in the hurricane plans in order to show how the participatory process provides more information into how port authorities implement response and recovery.

Chapter five presents the results of focus group transcript analysis to show how discussion stimulated by the participatory process addresses anticipatory actions for future change that goes beyond written hurricane plans. Elements of the participatory process, such as participant interaction and the role of the facilitator, help us understand how port authorities perceive anticipatory strategies to build long-term resilience.

Chapter six provides evidence from focus group extracts and evaluation questionnaires that reveal participant feedback on the effectiveness of the participatory process to discuss resilience. Discussing the perspective of the focus group participants provides a more well-rounded view of the benefits and challenges of the PRI methodology, in addition to the researcher perspective.

A final concluding chapter provides a re-examination of resilience assessment methods within the topic of port resilience and considers the implications for the field of hazards geography. Across geographic scales, ports represent diverse organizations in the industrial sector. Therefore, understanding and building long-term resilience with ports necessitates a small-scale and participatory approach in order to account for the idiosyncrasies of each organization. Through an in-depth analysis of the participatory approach used to develop the Ports Resilience Index, I hope to contribute to scholarly literature by developing a qualitative resilience assessment tool that simultaneously engages audiences in a conversation of specific resilience on a local scale and provides insight to understand the mechanisms of resilience as an on-going social process.

## **CHAPTER TWO**

### **USE OF THE DELPHI METHOD FOR THE PARTICIPATORY DEVELOPMENT OF THE PORTS RESILIENCE INDEX**

#### **Introduction**

To understand resilience mechanisms requires more than understanding system structure; it requires understanding process and how that process occurs at various institutional levels and spatial-temporal scales. A process leading to greater resilience involves multiple stakeholders, recognizes local citizen input and knowledge; addresses the needs of the target community, and seeks resources to implement strategies to promote resilience (Cote and Nightingale 2012; MacKinnon and Derickson 2013; Weichselgartner and Kelman 2015). Such a process implies reflection on past experiences and conversation about how to anticipate, adapt, and transform action to work towards and perpetuate resilience. Quantitative tools to measure or assess resilience often capture a screen shot view of a situation and struggle to capture the multiple dimensions and place-specific contexts that reveal processes of resilience. Qualitative assessment tools can provide insight into social interactions and organizational process; the challenge becomes how to develop a useful tool to meet the specific needs of unique organizations.

Participatory research methodologies use techniques to engage participants in a qualitative way, facilitating a two-way conversation to move the research process toward useful results for real-world application. This provides opportunities for participants to engage in conversation, bounce ideas off of each other, and generate knowledge. The Delphi method represents one example of participant research techniques to collect experience and expert opinion on challenging concepts.

In the 1950s, the RAND Corporation developed the Delphi method as a way to solicit expert opinion and reach consensus on matters of defense and military strategy. Researchers

asked experts to assume the perspective of a Soviet strategic planner who might target some component of the U.S. industrial system in order to estimate the number of atomic bombs required to “reduce the munitions output by a prescribed amount” (Dalkey and Helmer 1963). RAND used successive rounds of intense questioning with the experts to refine their opinion and reach a statistically sound number to predict and quantify the answer to the problem. A decade after a completion of the military study, RAND published and released the Delphi method, which became known as the “procedures to be used with a group of experts or especially knowledgeable individuals” (Dalkey 1967).

After the Delphi method became public, researchers applied it to many problems and questions that used expert opinion to quantify uncertain or unknown variables. Over the years, the Delphi method has become recognized as a structured communication process that helps to organize information that lacks strong conceptual or theoretical form. Researchers use the Delphi method to deal with non-concrete concepts and to gather multiple opinions and varieties of experience (Pill 1971). A Delphi process with a good facilitator helps create an environment where participants feel comfortable being honest with their opinions and ideas. Sometimes, the group process encourages participants to recall certain instances and bring them up for discussion, which stimulates conversation. The Delphi process gathers and organizes expert opinion that produces information that can be used in decision-making (Pill 1971; Linstone and Turoff 1975; Okoli and Pawlowski 2004).

While traditionally used for quantifying variables of uncertainty and reaching a statistical consensus, the Delphi method can be used to help clarify or develop conceptual frameworks. In most applications of the Delphi method, “the problem does not lend itself to precise analytical techniques but can benefit from subjective judgments on a collective basis” (Linstone and Turoff

1975, 4). The format of the Delphi method as a process of communication lends itself well to the development of qualitative tools. As reviewed in chapter one, the academic literature vaguely defines the components of qualitative resilience assessment tools. Similarly, the literature does not clearly define or organize the concept of port resilience. We used the Delphi method to develop a qualitative resilience assessment tool, known as the Ports Resilience Index [PRI], which serves as a conversation starter to identify and discuss actions that contribute to and develop port resilience, at least as it applies to ports along the Gulf of Mexico. When asked the question “resilience of what, to what,” we would answer: resilience of port organizations to coastal hazards.

In this chapter, “we” represents the project team for the PRI project, which was funded by a NOAA grant to the Gulf of Mexico Alliance [GOMA], a non-profit organization that works toward a plan for environmental health and community resilience in the states bordering the Gulf of Mexico: Texas, Louisiana, Mississippi, Alabama, and Florida. The PRI project team consisted of two members: the regional program coordinator for GOMA and myself, an Extension Specialist for Louisiana Sea Grant. In this capacity, I coordinated and facilitated the PRI project, on behalf of GOMA. Over a year and a half, I facilitated a Delphi process to engage participants in a two-way conversation between researcher and expert community to develop a self-assessment tool for port authorities that provides a simple and inexpensive method of predicting their ability to reach and maintain an acceptable level of functionality during and after disasters caused by coastal hazards, specifically hurricanes. Such an assessment helps port authorities identify strengths and weaknesses in their operations and identify action items to work towards ensuring maximum functionality during and after disaster.



The final PRI consists of eight sections, each with questions that respondents can answer with a yes, no, or non-applicable (N/A). For each section, the ratio of questions answered “yes” to the total questions answered yields a percentage, which corresponds to a range of resilience decided by the project team (i.e., 0-49% = low; 50-75% = medium; and 76-100% = high). The project team considers the questions within each section to be directional indicators of port resilience. While the scoring rubric does not yield a numerical value that can be supported by existing engineering, economic or social indicators, the “yes” or “no” answers to the questions do indicate progress toward a higher range of resilience.

For the PRI project, the Delphi method had value because it engaged the expert community in defining the indicators that contribute to port resilience. I must acknowledge that the PRI is not a theoretical model but a communication tool to predict readiness and to encourage behavior change. The PRI does not aim to replace more academically stringent exercises that focus on quantitative measures of resilience. Rather, the PRI can be used as a starting point to have a conversation about resilience with port organizations and their communities. The PRI does not necessarily contribute to the science of port resilience but to the process of port resilience, and by extension, community resilience.

The following chapter describes the steps used in each phase of the Delphi process for the participatory approach to develop the PRI. I begin with detailing the assembly of a port expert committee. Then, I describe three rounds of expert consultation: a work session with the expert committee, three focus group pilot tests, and a final webinar with the expert committee. For each round of expert consultation, I describe the format of engagement, including the structure of facilitation used with participants; the summary of expert contribution to the discussion on port resilience; the feedback provided to participants to maintain rigorous communication and follow-

up; and a broad description of successive changes to the indicator questions. Chapters four and five will review details of specific changes to indicator questions. All survey instruments and questionnaires received Institutional Review Board approval from Louisiana State University. By the end of this chapter, the reader will understand the time and effort required to facilitate a participatory research process but, more importantly, the benefit of such a technique in developing a qualitative resilience assessment tool, informed by stakeholder input.

### **The Delphi Method for the Ports Resilience Index**

#### **Assemble the Ports Resilience Expert Committee**

Over the decades, researchers using the Delphi method have assembled groups of experts through various techniques, from distributing formal invitations to selecting top-cited and peer-reviewed academic experts. The suggested number of people to include in a Delphi expert group ranges anywhere from three to eighteen (Okoli and Pawlowski 2004; Alshehri, Rezgui, and Li 2015; Vidal, Carvalho, and Cruz-Machado 2014). For the development of the PRI, we wanted to ensure stakeholder input to the research process. Given the wide variety of stakeholders involved in marine transportation systems and port networks, full representation of every possible stakeholder on the expert committee would yield a group too large to facilitate effectively. Becker, Fischer, and Matson define a “port stakeholder cluster” as those people who have a stake in the functioning of a port and who have some role in planning or decision-making (2013). By this broad definition, a port stakeholder could be someone from the Port Commission, the local Environmental Protection Agency office, the adjacent municipal community, or any other group that depends on a healthy, functional port. For the purpose of developing a tool to be used by port management organizations, we chose to target stakeholders defined as those internal to the

port management structure, such as an Executive Director, Director of Operations, or any port authority staff member involved in emergency operations at the port.

With a couple recommendations of potential contacts, I began emailing staff members from various ports along the Gulf of Mexico. All emails led to phone conversations, where I explained the goal of developing the PRI and the desire for the individual's expertise and experience. We also discussed the expected time commitment, form of communication, and date for an initial face-to-face, project kick-off meeting. In some cases, the person I contacted referred me to a co-worker or colleague who seemed more appropriate for the task at hand. Some port staff also recommended project partners from the private sector who might be a good fit for the topic. For those people who expressed interest in being involved, I extended a formal invitational letter to give more weight to individual involvement on the expert committee.

After several phone calls and emails, the Ports Resilience Expert Committee [PREC] included thirteen members, mostly with representation from port authorities across the Gulf of Mexico (Table 2.1). These ports function as public agencies in their respective states and act as a

Table 2.1. Members of the Ports Resilience Expert Committee [PREC].

Title <sup>1</sup>	Organization (State)
Port Director	Port of Pascagoula (Mississippi)
Deputy Director of Port Operations	Port of Corpus Christi (Texas)
Harbor Police Department	Port of New Orleans (Louisiana)
Manager of Economic Development	Port of Morgan City (Louisiana)
Associate Coastal Engineer	Hatch Mott MacDonald

(Table 2.1 continued)

Title <sup>1</sup>	Organization (State)
Port Risk Specialist	McGriff, Seibels & Williams of Texas, Inc.
Port Director	Twin Parish Port District (Louisiana)
Port Director	Port of West St. Mary (Louisiana)
Executive Director	Gulf Ports Association of the Americas (Texas)
Manager – Operations, Maintenance and Security	Port of Pensacola (Florida)
National Director	Ready Communities Partnership
Director of Finance and Administration	Port of Lake Charles (Louisiana)
New Orleans Gateway Officer	U.S. Maritime Administration

<sup>1</sup>Individual names have been withheld to protect participant confidentiality.

landlord by leasing facilities and property to tenants. To ensure geographic diversity, the PREC included deep-draft and shallow-draft ports from Texas to Florida with operations including agricultural produce and grain imports and exports, military shipbuilding, and petrochemical refining and shipping. The PREC also included people with port-specific expertise, including port insurance, port engineering, and federal maritime administration.

### **Conduct Background Research**

Following the assembly of the expert committee, the first distinct phase of the Delphi method involves exploring the subject under discussion (Linstone and Turoff 1975). For the PRI project, this phase involved two parts: background research of the academic literature on port

resilience and distribution of an online survey to the PREC. Chapter one includes the literature review and discusses the vaguely defined place of ports and disaster resilience in academic and governmental literature. Another background research activity included viewing presentations from a workshop covering best practices in port preparedness after Hurricane Katrina, hosted by the American Association of Port Authorities [AAPA].

Another way to gather background information is through a preliminary survey of selected experts. During this phase of the Delphi method, researchers do not aim for statistical significance or robustness but instead seek to gather information from the expert group in order to establish a baseline of knowledge from which to work. Sources from the literature review informed a list of survey questions to gather baseline information from the PREC. We intended for the survey questions to begin identifying the factors that are important for ports to consider in order to build resilience to disasters and unexpected events. Fifteen survey questions addressed topics such as size and management structure of ports; previous experience with natural hazards; specific activities during planning and response phases; and general preparedness and planning efforts at ports (Appendix B.1).

The survey results provided an initial glimpse of the PREC's priorities for resilience. All respondents indicated experience in the last ten years with hurricanes, storm surge, flooding, high winds, and fire. In addition, ports had sustained damage to static structures, including storage facilities; docks and piers; terminals; electrical utilities; administrative buildings; water utilities; and phone lines. All respondents indicated that port resilience to hazards increases with preparedness and communication. Respondents prioritized plans to be developed in the pre-event planning phase: a crisis communications plan with port personnel and external stakeholders; a port re-entry policy; a contingency plan for backup power and water resources; a backup storage

plan for computer data; a plan for coordination with regional ports to prepare for response efforts; and a plan for temporary relocation of port operations and administration. After development of plans, respondents felt that ports should conduct annual drill exercises to test and adjust developed plans. Lastly, respondents indicated that ports should implement flood-resistant and wind-resistant construction techniques for port facilities.

After an event, port authority staff aim to assess the status of the port and to resume operations before communicating the status to the broader community. When asked about priorities for activities in the response phase (i.e., time of incident to 72 hours), respondents indicated port authority communication (first internal, then with external governmental agencies), followed by onsite infrastructure response (restore electricity and remove debris), restoration of ship traffic (clear waterways and restore aids to navigation), and communication with the media. The survey results provided a preliminary look at what port personnel consider to be priorities for resilience.

### **Project Kickoff Meeting with the Ports Resilience Expert Committee**

The second phase of the Delphi process involves “reaching an understanding of how the group views the issue” (Linstone and Turoff 1975, 5). Usually, researchers using the Delphi method maintain anonymity among participant experts (Landeta 2006). For the PRI project, however, members of the PREC stated that they would be more willing to participate if they could do it in person and have face-to-face conversations with the other participants. From the researcher perspective, we agreed with this strategy because of the necessity of practitioner expertise. As the project facilitator, I told PREC members that we would have a face-to-face meeting to discuss the purpose of the project and essentially “kick it off.” To capitalize on an opportunity when many port authority representatives would be in the same location, we held the

project kickoff meeting in conjunction with a meeting of the Gulf Ports Association of the Americas [GPAA]. The objectives of the kick-off meeting included convening the PREC; providing background on the GOMA project; and beginning to develop an indicator list for the PRI. The meeting agenda included time for participant introductions, a presentation of the project purpose and preliminary survey results, and group discussion on potential categories of indicator questions.

The PREC members spent most of the time discussing the meaning of port resilience and brainstorming what deliverable would be most useful for ports. One member of the PREC voiced the concern that resilience research usually happens at the macro or regional level. Ports, however, present a challenge because each port is very unique. The only thing that ports have in common is that they have water; the cliché “once you’ve seen one, you’ve seen them all” does not apply to ports. Rather, “if you’ve seen one port, you’ve seen one port” received mention several times. During a brief discussion on crisis communication and stakeholder coordination, PREC members offered insight into how ports can be very different from each other. For example, some port authorities run their own Emergency Operations Center [EOC] whereas other port authorities co-locate in the EOC of the local city or county. Still other ports do not have a physical EOC location. Therefore, developing a tool or resilience index for ports presents a challenge: to develop questions broad enough to be widely applicable to ports but also specific enough to be useful to individual port authorities.

As a group, we agreed that our working definition of resilience described the ability of ports to return to an acceptable level of functioning after a disaster and to bounce forward in preparation for the next event. Participants agreed that discussing long-term resilience planning is important for ports, but in a disaster situation, a lot of plans go out the window and result in

decision-making on the fly, so the challenge becomes one of developing adaptable plans to accommodate flexibility when needed. The PREC suggested that any plans or documents that come from the PRI should be role-specific for port users, rather than person-specific, in order to be useful over the long term and through personnel changes. The final product could be something for a new Port Director without previous disaster experience or for a new port manager to use when approaching disaster and resilience planning. In order to make the document less overwhelming for the end user, the PREC suggested that individual sections be developed as checklists that could stand on their own. In terms of immediate next steps, the PREC suggested using a document on emergency preparedness from the AAPA as a starting point for developing indicators for port resilience. Participants agreed that they would be willing to spend two days dedicated to discussing indicator questions.

We considered the PRI kickoff meeting to be a success because it provided a comfortable discussion space for port representatives to talk openly about challenges they face from day to day as well as challenges they have faced in past hurricanes. The discussion also informed us on challenges with port resilience planning from the perspective of practitioners as opposed to academics. In the end, both participants and researchers drove the research process by agreeing on the steps forward for developing a checklist for ports to complete as a self-assessment of their level of resilience. To recognize the contributions of the PREC, I sent a follow-up email to participants thanking them for their time and effort and securing a date for a stand-alone workshop to discuss draft indicator questions.

As a direct result of the PRI kickoff meeting, one of the PREC members provided the connection with the Executive Director of the AAPA who gave access to the aforementioned emergency preparedness document. In 2006, the managing director of Port Freeport in Texas



developed the *Emergency Preparedness and Continuity of Operations Planning Manual for Best Practices* as part of the AAPA Professional Port Manager Certification Program. This 253-page manual provides a “resource to improve emergency preparedness and continuity of operations planning of individual ports” (Saathoff 2006). At the suggestions of the PREC, I read the manual and rephrased suggested actions and best practices for ports as yes/no questions to maintain consistent style and format with other resilience indices developed by GOMA efforts. I also wrote questions where the answer would indicate the steps of how certain best practices might be achieved. For example, the manual suggests considering the vulnerability of the location of an EOC to natural or other hazards (Saathoff 2006, B-5). Rewritten as a yes/no question, this might read “has your port completed a vulnerability assessment of your EOC?” As another example, the manual lists various communication assets that may be “of critical importance to providing communications for personnel conducting emergency operations” (Saathoff 2006, C-5). Rewritten as a question, this suggestion reads “does your port conduct regular assessments of communications assets, including telephones, hand-held portables, cell phones, satellite phones, internet service, etc.?”

Since the AAPA manual focuses on emergency operations, I also included questions that would get port authorities to think about long-term planning for resilience, drawn from sources such as NOAA’s prototype *Port Tomorrow: Resilience Planning Tool* and Becker and Caldwell’s paper on resilient planning strategies for ports (Becker and Caldwell 2015).

The initial list included 251 indicator questions, divided into eight sections, with the following headings (Appendix B.2):

Section 1: Setting up the Emergency Operations Center (Physical or Virtual?)

Section 2: Hazard Vulnerability and Facility Risk Assessment

Section 3: Operations Planning and Procedures for Preparedness

Section 4: Planning for Response and Recovery

Section 5: Communications

Section 6: Accounting, Finance, and Administration

Section 7: Insurance and Risk Management

Section 8: Legal Issues

### **First Round of Expert Consultation: Work Session with the PREC**

The third phase of the Delphi process involves bringing out “the underlying reasons for the differences [disagreement on how the group views the issue] and possibly to evaluate them” (Linstone and Turoff 1975, 6). For the PRI project, this phase included a facilitated discussion among PREC members to review and critique the draft list of 251 indicator questions. In my role as facilitator, I needed an effective way to accomplish this task over a two-day period. I chose to capitalize on the expertise of the PREC members by asking individuals to lead small group discussions on the section most relevant to his or her experience. For example, the Manager of Economic Development at Port of Morgan City agreed to lead a discussion on the questions within section one (Emergency Operations Center) because of her experience in establishing an onsite EOC at the port. Similarly, the Deputy Director of Operations at the Port of Corpus Christi agreed to lead discussion on the questions within section three (Operations Planning and Procedures for Preparedness), partly due to his position at the port and his background as a retired Captain from the Coast Guard. By having PREC members serve as discussion leaders, the expert committee exercised ownership over the participatory research process.

At the work session, PREC members received an agenda with the meeting purpose and objectives clearly stated, all relating to producing a draft checklist of resilience indicators that

represents actions that ports can take for hazard mitigation, emergency preparedness, emergency response, and long-term recovery and resilience planning. Following the introduction to the meeting, participants self-selected their small discussion groups. To manage time effectively, two groups of five to six people met concurrently for one to two hours to discuss individual sections. To stimulate conversation, I provided each small group with general discussion questions: (1) what questions or topics are missing from the list; (2) what questions need to be removed or sent to another list; (3) can the indicator questions be categorized based on the size of a port or are they general enough to be applicable to any port; (4) do the activities suggested by the questions happen throughout the year, at the beginning of every hurricane season, or only when there's an event in the forecast; (5) at a port, who would complete the checklist; and (6) in general, does the checklist make sense, flow smoothly from one question to the next, and help a port realize its progress towards improved resilience.

The small group design allowed me as the meeting facilitator to step back and observe the overall discussion process. The combination of detail-oriented people and big-picture people within the same discussion groups worked really well. Discussion leaders kept their groups on task to move through the questions but also allowed participants to share their experiences and expertise as a way of troubleshooting the questions. For each small group, I asked meeting helpers to take notes on a computer to capture discussion points and changes to the wording of the questions. On the second day, each small group reported main points from their discussion to the whole PREC. This provided an opportunity for all participants to comment on other sections and provide large-scale suggestions on the content and format of the PRI.

PREC members asked for introductory text to the PRI to offer some points of clarification: the PRI is not a tool to shame port authorities and score them numerically. Rather,

the PRI raises awareness as an educational resource and assessment and planning tool. The roles and responsibilities indicated in the tool are essentially the same for each port authority, even if specific duties vary from port to port. Similarly, a difference exists between *Port* and *port*. *Port* represents the legally authorized management group whereas *port* represents a geographical area and includes the port authority along with tenants and users of the port area. Finally, PREC members emphasized that business, not risk, drives port planning. Therefore, port planning efforts focus on the economic bottom line. The PREC suggested removing most of the questions related to planning for long-term environmental change.

Regarding the format of the PRI, PREC members suggested that section headings be broadened, questions consolidated, and references added for more information. Some PREC members wanted to see a N/A column added as an answer option, to accommodate the unique nature of ports. The group agreed to table the discussion of answer options and scoring rubric until after testing of another draft. The PREC decided it necessary to have a round of pilot tests and agreed that ports represented by the PREC would serve as suitable pilot test partners because those members would be able to explain the purpose of the PRI and get buy-in from the rest of their organizations.

After the work session, I expressed appreciation for the work of the PREC with a follow-up email thanking the group for their time and effort, recapping conclusions from the meeting, and stating the next steps of revising the indicator questions with their feedback and arranging pilot tests. Over the next three and a half months, I incorporated the comments from each small group and revised the questions to reflect the input of the PREC, resulting in a list of 146 indicator questions, under seven reorganized sections (Appendix B.3). Several questions could be consolidated to limit repetition. In many cases throughout the PRI, PREC members suggested

either moving questions to other more applicable sections in the PRI or completely striking questions, if the subject was considered already standard practice or if a port authority could have no influence on certain actions (i.e., removing questions regarding agreements with utility companies to restore service because ports cannot dictate that to utility companies).

“Hazard Vulnerability and Facility Risk Assessment” became “Hazard Assessment” to reflect the input of the PREC that the term *vulnerability* connotes something negative that no port authority would be willing to have associated with their name, in any context. The PREC expressed concern that if the media somehow got hold of a section of the PRI with *vulnerability* in the title, a port could develop a poor reputation as a vulnerable place, possibly misinterpreted as economically vulnerable.

I consolidated questions within “Insurance and Risk Management” and “Legal Issues” into one section titled “Insurance, Risk Management, and Legal Protection,” intended to follow the “Hazard Assessment” section. The port authority first identifies hazards and then identifies strategies to protect its property from those hazards. The PREC suggested removing several questions under the “Legal Issues” checklist because in most cases, the question content referred to standard disclaimers for port authorities and therefore was unnecessary. New questions were added about awareness of rules for emergency bidding requirements, plans to obtain legal advice after an event, and pre-service contracts for response and recovery activities.

The PREC suggested renaming “Planning for Response and Recovery” to “Planning for Disaster.” New questions reflected the importance of having access to someone knowledgeable of the disaster assistance application process and of emphasizing the ability of a port authority to identify likely needs for post-event dredging. The “Communications” section remained with the same title but the questions’ contents changed to reflect new forms of communication technology

(i.e., communication through the internet) and the differences in communication procedures with internal stakeholders compared to external stakeholders. A major point of discussion involved port re-entry policies and the need to clarify those for port authority personnel and port tenants.

The “Emergency Operations Center” section remained in the PRI, but the specific wording of several questions changed to reflect lessons learned by those members of the committee involved in the small group discussion. For example, questions should address routine maintenance of EOC facilities so that a port authority understands the time and resources necessary to maintain a physical location. Similarly, contact lists should be maintained regularly as port personnel change. The group also discussed the preferred nomenclature of alternative operations location and essential personnel to reflect the fact that all ports may not have a physical EOC building and subsequent EOC team members.

At the request of the PREC, I sent out the revised list of questions via email for review and comment. Three members of the PREC volunteered their port organizations to serve as PRI pilot tests but expressed the same concern that 146 questions were too many to discuss with their staff. Since port personnel would be donating their time to participate in a pilot test, the volunteer PREC members suggested that the list be reduced even further and that a facilitated session with the port authority be planned for half a day.

Sometimes in a Delphi process the researcher or facilitator must trim down the questions to keep the group engaged (Landeta 2006). As a result of the suggestion to reduce the list, I went through the list of 146 questions and used my best judgment to select questions that targeted long-range resilience planning or actions that might require year-round effort, resulting in a tool that encourages anticipatory thinking. In some sections, such as “Emergency Operations Center,” I purposely selected questions not heavily edited by the PREC with the intention of gaining

additional feedback. In addition, the purpose of facilitating a discussion through the PRI is to stimulate a conversation about resilience. Therefore, the definition of resilience used in this exercise was front and center in deciding which questions to pilot with ports.

One of the challenges with the process of using multiple rounds of expert consultation is that some of the questions may have been repeated in other sections or may have been more appropriate, in terms of content, for other sections. In the effort to save space and time, I had the advantage of being able to step back and look at the entire list of questions and look for repetition or misplaced questions. The pilot test version included introductory material to reflect the purpose of the PRI, acknowledgement of the method being used for its development, and space for participants to take notes in each section (Appendix B.4).

### **Second Round of Expert Consultation: Three Pilot Test Focus Groups**

In this phase, I deviated slightly from a typical Delphi process. The PREC recommended that the indicator questions be tested with a few port authorities to gather more feedback and further refine the instrument. Based on the literature review of the Delphi method and resilience indicators, I felt that traditional Delphi processes rarely ground-truthed their products with actual practitioners during development. I wanted to conduct pilot tests as a way to ensure the effectiveness of the PRI for the end user, by developing a type of “local” knowledge with port practitioners.

The purpose of the pilot tests was to conduct a simulated facilitation of the PRI with staff and stakeholders of the port authority in order to collect feedback to improve the tool. Leading up to the visits, I worked with the pilot test representatives from the PREC to plan the meeting agenda and develop the list of invitees for the facilitated focus group discussions. We planned Port Resiliency Pilot Meetings for the Port of Corpus Christi in Texas, the Port of Pascagoula in

Mississippi, and the Port of Lake Charles in Louisiana. We wanted attendees to have representation from the port authorities but also from external stakeholders, including federal agencies and port tenants. Table 2.2 lists the position titles and affiliations of all pilot test participants: eighteen from Corpus Christi, eight from Pascagoula, and thirteen from Lake Charles.

Table 2.2. Position titles and affiliations of pilot test participants (39 in total).

<b>Port of Corpus Christi Authority (POCCA)</b>	
Position Title	Affiliation
Director of Operations	POCCA Executive Staff
Deputy Director of Operations	POCCA Executive Staff
Director of Information Technology	POCCA Executive Staff
Director of Human Resources	POCAA Executive Staff
Director of Community Relations	POCCA Executive Staff
Director of Business Development	POCCA Executive Staff
Director of Communications	POCCA Executive Staff
Foreign Trade Zone Manager	POCCA Office of Chief Commercial Officer
Risk Management Coordinator	POCCA Finance and Administration
Financial Analysis and Procurement Manager	POCCA Finance and Administration



(Table 2.2 continued)

Position Title	Affiliation
Harbormaster	POCCA Operations
Safety Manager	POCCA Operations
Maintenance Foreman	POCCA Operations
Senior Engineer Planner	POCCA Engineering
Environmental Compliance Manager	POCCA Engineering
Marine Transportation System Port Recovery Resilience Planner	U.S. Coast Guard – Sector Corpus Christi
Assistant Division Chief of Incident Management	U.S. Coast Guard – Sector Corpus Christi
Incident Management	U.S. Coast Guard – Sector Corpus Christi
<b>Port of Pascagoula</b>	
Deputy Port Director	Port of Pascagoula Operations and Facilities
Deputy Port Director	Port of Pascagoula Administration
Harbormaster	Port of Pascagoula
Finance Manager	Port of Pascagoula
Government Affairs and Public Relations Manager	Port of Pascagoula
Engineer and Utilities Manager	Port of Pascagoula
Port of Pascagoula Advisory Group Chairman	Operations Manager for Kinder Morgan, Inc.

(Table 2.2 continued)

<b>Port of Lake Charles</b>	
Position Title	Affiliation
Executive Director	Port of Lake Charles
Director of Navigation	Port of Lake Charles
Director of Engineering, Maintenance and Development	Port of Lake Charles
Director of Administration and Finance	Port of Lake Charles
Director of Operations	Port of Lake Charles
Director of Marketing and Trade Development	Port of Lake Charles
General Counsel	Port of Lake Charles
Assistant General Counsel and Director of Security	Port of Lake Charles
Assistant to Administration and Finance / Marketing	Port of Lake Charles
IT Technical Support Specialist	Port of Lake Charles
Executive Director	Port Rail of Lake Charles
General Manager	Federal Marine Terminals, Inc.

Each meeting began with introductions of the project team and the focus group participants. During the introduction, I explained that participant feedback would be used to

inform main ideas and to further the research process but specific names would remain confidential. I recorded each session with a digital voice recorder, and participants gave their “consent to participate” by signing an IRB waiver (Appendix B.5). Materials distributed to participants included a meeting agenda, the draft PRI, questions to consider for adaptation planning for long-term environmental change (discussed in Chapter 5), and evaluation sheets (discussed in Chapter 6). As discussed during the first round of expert consultation, the PREC emphasized that ports plan for business and not long-term environmental risk. Therefore, the PREC wanted to omit questions related to long-term adaptation planning for environmental change, such as sea level rise threats to port infrastructure. Heading into the pilot tests, I wanted to ground-truth the validity of these questions with a larger group of port professionals, especially those from engineering departments. Therefore, part of the focus group agenda included time to discuss some of these questions (Appendix B.6).

Following group introductions, we gave a presentation to explain Sea Grant, GOMA, and the origin of the PRI project. We spent two hours going through the questions in the pilot PRI. Following this intense discussion, we stepped back and spent about twenty minutes talking about the process of facilitation and who else needed to be in the room, an appropriate amount of time to devote to the PRI, and whether or not this activity could be incorporated into other already existing preparedness activities throughout the year. During the last half hour of each meeting, we talked about the questions related to long-term adaptation planning.

Each of the three groups of participants of the Port Resiliency Pilot Meetings received a follow-up email with an attached three-page report summarizing their feedback. The email thanked participants for their time, engaging conversation, and helpful comments and feedback on the questions.

After the pilot tests, the challenge for me was to incorporate all the comments from the focus group discussions, revisit the comments from the work session with the PREC, and develop another iteration of the PRI to send to the PREC for review. I transcribed the first pilot focus group discussion and used the Verbal Ink transcription service for the other two focus group discussions. I read each transcription several times to capture comments and suggestions for edits, which I recorded in an Excel spreadsheet to display the feedback from each pilot-test port side by side. Some of the conversation referred to questions that were not explicitly asked in the pilot PRI but were in the original longer checklist. Similarly, participant discussion on the long-term adaptation planning questions resulted in incorporation of some of those questions back into the checklist. The following discussion provides a broad overview of the process that influenced changes to the indicator questions from the pilot tests. Chapters four and five will present examples of participant interaction that provided specific comments on indicator questions.

**Hazard Assessment.** The questions in this section generated a lot of interesting discussion, especially in terms of regular port operations. The focus groups pushed for clarification on the number and types of facility and infrastructure assessments. Ports have maintenance and engineering staff that continually patrol port property and assess whether or not upgrades need to be made. However, the decision to undertake construction and implement upgrades depends on a cost-benefit analysis.

The pilot test groups also wanted further clarification on types of threats to consider, to expand beyond natural hazards and include technological hazards, port-specific hazards (e.g., vessel collisions) and cyber threats. In the final list, the “Hazard Assessment” resource page includes examples of types of weather hazards, geological hazards, technological hazards, and

port-specific hazards. The pilot tests made it clear that the questions on hazard assessment and planning could be split into two sections in the PRI – one related to planning documents for hazards and threats and one related to hazard assessment of infrastructure and assets.

**Insurance, Risk Management, and Legal Protection.** Pilot test participants recommended that scalar responses, instead of just “yes” or “no,” might help show partial progress on some of the questions. In addition, some of the questions needed further clarification on the intent of the question. For example, questions related to hazard insurance should indicate the level of risk that a port authority is willing to accept rather than trying to predict the amount of money required for certain types of repair and reconstruction. Expected damage will change based on the type of event, which requires that a risk management expert understand the type of threat and expected impacts.

After the three pilot tests, we felt that elements of several of the questions should be listed on a “Definitions” page for the “Insurance and Risk Management” section. These lists include pre-event and post-event materials for insurance claims, examples of emergency response and recovery elements of facility leases, and examples of elements of mutual aid agreements. Pilot test participants provided input to clarify these definitions and examples.

**Planning for Disaster.** The pilot tests showed that most of the questions in this section could fall under either the “Operations” section or the “Communications” section. During the pilot tests, by the time we got to section 4 (Communications) and section 6 (Operations Planning for Preparedness), most of the questions had already been discussed and answered in section 3 (Planning for Disaster). The section title itself, “Planning for Disaster,” generated confusion, especially when the ensuing questions seemed appropriate for operations or communications. For example, a question about the Port Coordination Team (PCT) makes more sense in a

“Communications” section, since PCT describes a forum for communication during an event. Therefore, in the editing phase, I moved the content of this section elsewhere within the PRI and removed this section.

**Communications.** Heading into the pilot tests, I wanted to focus on questions that addressed topics of communication not found in the AAPA Manual. During the pilot tests, we spent a lot of time discussing the need for clarification between port authority and port area. This distinction drives a lot of the meaning behind various questions regarding communication. Therefore, the distinction between communications internal to the port authority and communications external to the port authority merited two separate sections.

For “Internal Port Authority Communications,” the Definitions page includes examples of communications assets, example elements of a port emergency operations training program for personnel, and types of emergency planning or training exercises. For “Tenant and External Stakeholder Communications,” the Definitions page includes examples of people who should attend local harbor safety committee meetings, example organizations committed to environmental stewardship, and examples of PCT members or Port Emergency Action Team members. Operation of the Coast Guard PCT depends on the ability to conference call, so questions about the PCT need to reflect participation with such a group.

**Emergency Operations Center.** The questions in this section needed to specify whether they refer to an alternative operations location in general or an alternative operations location for a specified length of time. In general, the alternate operations location may not be a physically designated location because the decision to have a meeting point or muster point depends on the event. Having access to several locations and being able to pick up and move quickly is desirable because each event will have a different path and impact area. Using the terms *meeting point* or

*muster point* may be more appropriate than *offsite evacuation haven*. The supplies needed to resume some level of operation will be different for each event. In terms of surviving and operating without any external assistance, any port authority has to balance the efficiency of a skeleton crew versus maintaining the supplies required to support a larger staff.

**Operations Planning for Preparedness.** During the pilot tests, the major points of discussion within this section surrounded clarifying what is meant by *mutual aid* and *recall instructions for port employees*. Pilot test participants identified several questions as more appropriate in a Planning section, Emergency Operations section, or Communications section. To clarify the intent of the questions pertaining to operations, I renamed the section to “Continuity of Operations Planning for Infrastructure and Facilities,” with the objective of considering certain pre-storm measures to enhance response and recovery. For example, port authorities should have a pre-identified damage assessment team to conduct a quick assessment after an event but also to comply with FEMA regulations and procedures for a more thorough assessment.

**Accounting, Finance, and Administration.** This discussion proceeded the quickest in all three pilot tests. Some of the questions from the longer list naturally came up because of the discussion stimulated by the draft PRI. Discussion on IT practices and electronic or remote backup of electronic data also stimulated some new questions and resulted in renaming the section to “Critical Records and Finance.” The content of the questions addresses mostly critical record storage and access, and the Definitions page includes a list of categories and examples of important documents to back up electronically.

**General Comments on the Format of the PRI.** Upon reviewing the comments on the PRI, some questions needed clarification whereas others needed to be broader to be answerable.

While the temptation is to write very specific indicator questions and reach a consensus on “yes” or “no,” we intended for the tool to provide the stimulus for a conversation about resilience and to identify action items to improve resilience. Therefore, questions written in a more general manner help to start a conversation and get people from different sides of the table talking to each other. To accommodate all types of ports (i.e., large or small; public or private; part of municipality or independent), we added a N/A column to each section for scoring. This way, if a question does not apply to a port, the resilience range for that section will not be unduly affected. For example, questions about which personnel get sent to the alternative operations location may not apply if the port authority does not use a physical location.

For questions needing more clarification or explanation, I developed definitions and examples to go along with each section of the PRI. For example, the term *mutual aid* under the “Insurance, Risk Management, and Legal Protection” section needed more clarification. Larger ports may have access to federal agencies for mutual aid type activities whereas smaller ports may rely on other organizations. The Definitions pages include specific elements of mutual aid agreements. The pilot test phase yielded almost eight hours of discussion on the PRI. Incorporating the comments and feedback resulted in 87 indicator questions under eight section headings (Appendix B.7).

### **Final Round of Expert Consultation: Webinar with the PREC**

The final phase of the Delphi process occurs when “all previously gathered information has been initially analyzed and the evaluations have been fed back for consideration” (Linstone and Turoff 1975, 6). After incorporating comments and changes from the pilot visits, I sent the PRI to the PREC for review and organized a webinar to allow for final discussion and comments.



Due to time and budget constraints, PREC members agreed to a webinar as the most achievable and acceptable format for the last round of expert consultation.

Throughout the webinar, I aimed to show how the wording of the questions and the section titles had changed throughout the process over the past year. I explained how I used the PREC's initial feedback to edit the questions and how I selected questions to pilot test. I reviewed each pilot test and how I collected and used those comments to edit the questions. Then, I went through each section of the most recent PRI using the "share desktop" function of the webinar software. PREC members also had an opportunity to view the questions from the very beginning of the process that had been omitted, either because of tangential relevance to the topic of port resilience or because the questions addressed standard port operations and procedures.

Members of the PREC generally agreed with the evolution of the content of questions and supported the final format of the PRI. PREC members felt that the final section titles made sense and the questions within each section followed a logical order. The PREC's comments related to points of clarification. For example, the PREC originally suggested that port authorities establish master service agreements or pre-event contracts with recovery companies to enable faster service after an event. During the pilot test phase, the participating port authorities referred to pre-event contracts as nearly impossible to arrange because port staff do not know which companies will be present and available after an event; therefore, they suggested the question be rewritten to emphasize having a list of potential vendors and their contact information to ensure quick contact after an event. On the conference call, the PREC re-emphasized the importance of having relationships with recovery companies established ahead of time, before an event. Even if a port authority has to pay up front for such an agreement,

insurance will cover the cost when the service is used. As a way to reconcile different opinions, we agreed to include language about pre-event contracts on the Definitions page for the “Insurance and Risk Management” section.

### **Discussion and Conclusion**

After a year’s worth of effort, the PREC felt that the PRI had evolved into a tool that encourages port authority staff members to engage together in critical conversation about resilience. One PREC member suggested that port authorities complete the PRI each year as a way to record trends and progress in resilience planning. By establishing a record, any new staff member or executive leader will have the ability to go back and see how operations and planning have changed, establishing an internal accountability process. Several PREC members agreed that if port authority leadership buys into the PRI process and encourages it each year, then port personnel will have the incentive to avoid complacency and to sit down with each other to discuss areas of operation and planning where they might improve.

The Delphi method successfully resulted in a qualitative resilience assessment tool useful to the audience of port authorities. By using the input and expertise of the PREC members, we developed a draft list of indicator questions. Through the pilot test phase, we ground-truthed these questions with entire port authority staffs to dig into the specific wording and intent of the indicator questions. Based on input from each round of expert consultation, we adjusted the format of the tool, by adding a N/A column and pages of definitions, to improve the utility of the tool in stimulating a conversation on resilience. The Delphi method represents a technique that can be used to develop useful qualitative resilience assessment tools that are informed by expert input and that address social interactions and organization process. Five components of the Delphi method adapted for the PRI project contributed to the success of the project, and they

include a structured communication process; use of practitioner expert knowledge; role of the facilitator; pilot tests to ground-truth the PRI; and face-to-face interaction of participants.

In their 1975 book, *The Delphi Method: Techniques and Applications*, Linstone and Turoff write that structured communication is an art. Such a statement can be extended to the process of community engagement. In the process used to develop the PRI, the community included port leadership, port authority staff, and subject matter experts for port-related topics. One reason often given for the failure of a Delphi process is “poor techniques of summarizing and presenting the group response” (Linstone and Turoff 1975, 6). In my role as facilitator, I actively and intentionally made sure to acknowledge and use participant input. To ensure effective communication and stakeholder inclusion, I used a structured communication process — emails, meeting agendas, participant evaluations, and feedback reports — to show participants how their comments contributed to the development of the tool, which incentivized a geographically disparate group of port authority representatives and port experts to participate.

In mathematical or statistical exercises to develop quantitative indices, researchers have the tendency to get wrapped up in numbers and formulate indicators that can be answered by already available data, which may or may not actually fit the desired analysis. The analysis and discussion of the method used to develop the PRI begins to answer dissertation research question number one: how does a participatory approach to developing qualitative indicators of resilience challenge and address the weaknesses of existing quantitative approaches to measuring resilience? Ports themselves represent a unique industrial sector, and within that group, each port authority represents a unique organization in terms of geographic location, exposure to hazards, commodity flow, and management and operation. Existing quantitative measures for ports focus on structural engineering and infrastructure, but human communication and interpersonal

relationships necessarily influence the way a port operates, functions, and achieves resilience.

Researchers cannot understand the process of place-based resilience at ports except by engaging port practitioners in a conversation about resilience.

For the PRI, I began with an already established document to develop indicator questions. However, the participatory approach ensured that we took a critical approach to those original questions and modified them to reflect reality but also to encourage new ways of thinking and discussing resilience. We emphasized practitioner input, rather than academic expertise, to ensure that the final product would be useful to the end user group of port practitioners. In a way, our expert committee helped to build “local” expert knowledge, which successfully developed a useful tool and contributed to the concept of port resilience.

A good discussion leader determines the effectiveness of group interaction (Pill 1971). The facilitator does not necessarily need to be a subject-matter expert but should have the skills to maintain the 30,000-foot view to guide the group in critical discussion. For the PRI project, it helped that I did not get involved as a port expert but as a community resilience Extension Specialist. As an outsider looking in on port structure and management, I remained partially detached from the topic of port operations and focused on keeping the discussion moving forward to remain on track with the overall end goal of a resilience self-assessment for port authorities. During the pilot test phase, several participants commented that they felt it extremely useful to have an external facilitator lead the discussion. If the facilitator came from within the port authority, participants would be less willing to express their honest opinion or potential disagreement with co-workers. An external facilitator encourages groups to engage in critical discussion and can push the boundaries, as in the case of discussing long-term adaptation planning for environmental change.

The pilot test proved an essential step to ground-truth indicator questions, which became evident in each pilot port's critique of the questions and suggestions for improvement.

Traditional Delphi processes gather opinions to quantify uncertain variables, which then get applied in a real-world setting with little room for adjustment. To achieve the objective of developing a useful tool that would be broadly applicable to a wide variety of ports but also specific enough to be useful to one single port necessitated the collaboration of larger groups of port professionals. For the qualitative nature of our assessment tool, the pilot tests helped us gather additional on-the-ground expertise to inform the tool.

The benefits of face-to-face interaction become more evident during the pilot test phase and will be discussed further in chapters four, five, and six. As an organizational self-assessment, the PRI should not be completed by individuals at their desks but as a group sitting together in one room and having a conversation. During the pilot tests, members within a single port authority sometimes disagreed with each other on the answer to a question. Upon further discussion, the disagreement stemmed from different interpretations of the question, which merited some editing, or from unclear understanding of how individual departments operate within a port authority.

The Delphi method, as a technique of participant research, can be adapted to different social realities and can make positive contributions to social progress (Landeta 2006). The method itself stimulates productive discussion and simultaneously helps to develop tools that can be used to stimulate discussion on tough topics. The Delphi method aids in decision-making, which we saw over the process of the PRI. At the beginning, the initial online survey resulted in a very generalized list of priorities for port resilience, such as developing a crisis communications plan with port authority personnel. The Delphi process helped put structure to

the general category of “crisis communications plan” by developing questions that correspond to certain elements of a communications plan, such as particular methods of communication, timing of communication, and participation in forums for communication.

Both researchers and participants benefit from the participatory nature of the Delphi method. For the PRI, the process benefited participants by stimulating a conversation on resilience and by formalizing collective experiences to inform other port authorities. The PRI project benefited the researchers by contributing to the concept of port resilience, providing insight into place-based resilience at the port authority level, and providing structure to a methodology to develop resilience assessment tools. The Delphi process, though modified here with pilot tests and face-to-face interaction, uses a participatory approach to develop tools that stimulate conversation and aid in decision-making, to move beyond written plans on a shelf and to encourage action. From the perspective of the facilitator, each pilot port’s historical background and experience with natural hazards shaped the perception of the meaning of the questions and pathways to achieve resilience. The next chapter will address how local context and specific experience contributed to developing a qualitative assessment tool that uses group communication to illuminate place-based resilience.

# **CHAPTER THREE**

## **THREE GULF OF MEXICO PORTS AND THEIR HISTORICAL EXPERIENCES WITH MAJOR HURRICANES**

### **Introduction**

Social-ecological systems (SEs) have been defined as natural ecosystems where human action and management influence ecosystem processes and functions (Carpenter, Brock, and Hanson 1999; Carpenter et al. 2001; Walker et al. 2002). In resilience theory, social-ecological systems nest within each other and scale up into panarchy, defined as a hierarchical structure and nested system of nature, humans, SEs, and resource management strategies undergoing adaptive cycles through phases of accumulation, growth, reorganization, and renewal (Holling 2001). What happens at a particular level of the system has reciprocal influence over processes at larger scales and processes at smaller scales. For example, episodic disturbance at a lower level may scale up to have effects on higher levels; conversely, chronic disturbances at a higher level may scale down to have effects on lower levels (Wilbanks 2009).

Flows through a natural ecosystem provide a metaphor for the maritime transportation system since cargo, vessels, and services of different magnitudes move into and out of port areas. Ports might be identified as social-ecological systems because the movement of cargo around the world requires waterways integrated with terrestrial areas in addition to management and governance by humans. The natural ecosystem metaphor continues with maritime transportation systems since hazard-induced disturbances, either natural or technological, and economic disturbances, such as labor strikes, might disrupt the operation of an individual port. Depending on the magnitude of the hazard or disturbance, a disruption can ripple up the supply chain and affect a larger regional economic network. Alternatively, global disturbances, such as economic

recession or fluctuating commodity prices, might disrupt or transform the function of a regional economic network over longer periods of time.

Since ports require human governance and management in order to operate, social resilience becomes an important concept to discuss. Geographer W. Neil Adger first defined social resilience as the “ability of communities to withstand external shocks to social infrastructure” (2000, 361). In the case of ports, social resilience would describe the ability of port authorities and port users to withstand disturbances to their organizations. Throughout the academic literature, many references on social resilience describe the influence of networks and institutions that allow people to access resources and learn from experiences to develop solutions. In working with ports to understand their social resilience, we might look at coping capacity and adaptive capacity. Coping capacity describes the ability of human systems to absorb impacts from disturbance, respond and cope with stresses, and continue to persist whereas adaptive capacity describes the ability of human systems to learn from the past, adapt to adversity, and prepare for the future (Nelson, Adger, and Brown 2007; Obrist 2010; Lorenz 2013). Pre-hazard preparedness and social learning after hazardous events increase the capacity to anticipate future events (Cutter et al. 2008b). The capacity to be proactive, or adaptive capacity, results in greater social resilience (Obrist, Pfeiffer, and Henley 2010).

The Ports Resilience Index [PRI] aims to encourage anticipation for the future and build adaptive capacity, through social learning stimulated by interaction through a participatory process. A participatory process inevitably leads to reflection on past experiences and conversation about how port authorities have handled hazards in the past and adjusted to be more resilient in the future. We should understand the different experiences of port authorities in order to understand how that experience shapes the group conversation on resilience or the anticipatory



actions that might perpetuate resilience. This chapter may not necessarily show us anything new for the literature, but it sets the stage for later chapters by providing historical context for the three focus group ports that had an essential role in pilot-testing the PRI. Understanding the experience of the focus group ports also provides insight into how port authorities incorporate lessons learned to improve coping capacity. This chapter presents information and data from historical sources to tell how Port of Corpus Christi, Port of Pascagoula, and Port of Lake Charles have responded to and recovered from major hurricanes in the past.

### **Methods and Data Sources**

A variety of historical sources provided information and data on how Port of Corpus Christi, Port of Pascagoula, and Port of Lake Charles have experienced major hurricanes, defined as Category 3 or higher at landfall, in the past. The storms chosen for analysis included Hurricane Celia in 1970 for Port of Corpus Christi; Hurricane Katrina in 2005 for Port of Pascagoula; and Hurricane Rita in 2005 for Port of Lake Charles. Hurricane Celia was the last major hurricane to make landfall near the Corpus Christi area. More recent storms, such as Hurricanes Bret (1999) and Ike (2008) made landfall on different areas of the Texas coast and had no impact in Corpus Christi.

Search parameters included the name of the port, the name of the storm, and the ten-year time frame after the storm, and a variety of terms, including “port damage,” “port recovery,” “FEMA (Federal Emergency Management Agency),” and “MARAD (Maritime Administration).” Search results using the Newsbank database through LSU Libraries yielded a variety of local Louisiana and regional newspaper articles, related to hurricanes Katrina and Rita, in addition to trade-industry publications, including *The Gulf Shipper* and *The Journal of Commerce*. The Newsbank database collection of articles from the *Corpus Christi Caller-Times*,

however, only goes back to 1993. Because Hurricane Celia occurred in 1970, I used newspapers.com, a website that acts as a repository and search engine for archived newspapers from earlier decades. Newspapers.com provides access to historical newspapers, dating back to the 1700s, from all over the United States and beyond.

A few federal and state government reports provided information to supplement historical newspaper accounts of port experience with hurricanes. These reports included the *U.S. Army Corps of Engineers Report on Hurricane “Celia,”* a *2006 Report to the Mississippi State Legislature on the Impact of Katrina on Mississippi’s Commercial Public Ports*, the American Society of Civil Engineers *Hurricane Katrina Damage Assessment* (2007), the *Transportation Sector’s Response to and Recovery from Hurricanes Katrina and Rita* (2009), a U.S. Coast Guard Disaster Response brief (2005), and the Louisiana Recovery Authority’s *Rita Report* (2006). Port publications, specifically issues of *Port Report* from the Jackson County Port Authority at the Port of Pascagoula, provided further information.

In addition to articles and government reports, data from the U.S. Army Corps of Engineers (U.S. ACE) provides another source to look for hurricane impacts to cargo tonnage moving through ports. Since 1922, the U.S. ACE Waterborne Commerce Statistics Center, authorized by Section 11 of the Rivers & Harbors Act, has collected data of vessel trips and cargo movement on federally navigable waterways (33 U.S.C. § 555). All vessel operators must register with the United States federal government and complete reports that track the movement of waterborne cargo at the point of loading and at the point of unloading, for each individual commodity transported through public and private facilities. Each year, U.S. ACE releases the cargo tonnage data for four regions of the United States, including the Mississippi Valley and

Gulf Coast. Regional cargo tonnage data is available for download and analysis for 2003 – 2014 (U.S. ACE WCSC 2014).

For each of the three focus group ports, I present the characteristics of the major hurricane to make landfall and the immediate impacts to port operations and port infrastructure. I describe evidence of port and community resilience and recovery, as can be surmised from newspaper articles and government reports. Finally, I present data on cargo tonnage at the ports following the storms. This chapter focuses on sharing historical experience of the focus group ports with major hurricanes, but Hurricanes Katrina and Rita affected other ports beyond the ones discussed. Therefore, I conclude with brief mention of the regional impacts of the 2005 hurricanes to ports along the Gulf of Mexico coast.

### **Port of Corpus Christi**

#### **Hurricane Celia and Impacts to the Port**

In the summer of 1970, Hurricane Celia began as a tropical depression in the northwestern Caribbean Sea. As it moved on a northwest track through the Gulf of Mexico, winds vacillated between 75 miles per hour (mph) and 115 mph (U.S. ACE 1970) (Table 3.1).

Table 3.1. The Saffir-Simpson Hurricane Wind Scale.

Category	Wind Speed
1	74 – 95 mph
2	96 – 110 mph
3	111 – 129 mph
4	130 – 156 mph
5	157 + mph

(NOAA National Hurricane Center 2016).

Hurricane Celia condensed and strengthened to a Category 3 storm in the final hours before its landfall, north of Corpus Christi on August 3 (Figure 3.1). Wind gauges at the Corpus Christi Airport recorded sustained winds of 125 mph and wind gusts of 161 mph (Tinsley 2015).

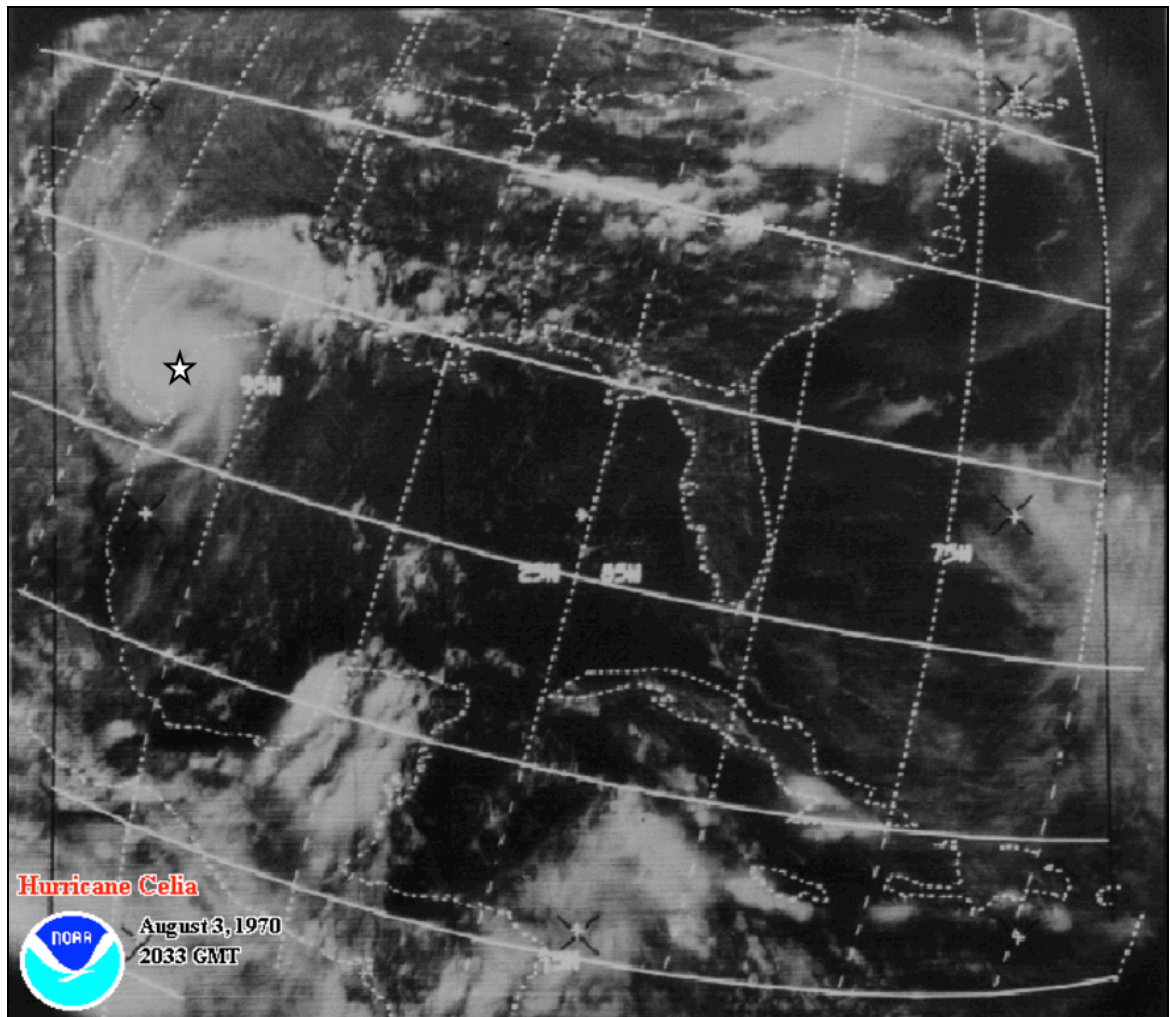


Figure 3.1. Hurricane Celia made landfall near Port Aransas on the Texas Gulf Coast on August 3, 1970. The star indicates the approximate location of the Port of Corpus Christi. (Image Credit: NOAA National Weather Service).

Hurricane Celia caused mostly wind damage to homes and commercial buildings, resembling the damage of an EF2 tornado (Tinsley 2015). In addition to severe wind damage, the low-lying areas of Port Aransas and Rockport experienced significant flooding and damage to

residential properties. Corpus Christi, in Nueces County, experienced minimal inundation, with storm tides ranging from 3.9 to 5.6 feet above mean sea level (U.S. ACE 1970). Widespread storm damage included blocked roads, downed powerlines, partially functional communication systems, destroyed and severely damaged homes, and ruined buildings. Total damage from Hurricane Celia amounted to \$467 million, with \$27.6 million attributed to inundation and \$440 million attributed to wind damage (U.S. ACE 1970). A string of barrier islands, including Padre Island and Mustang Island, provides a natural speed bump for hurricanes in the Texas Coastal Bend area, which includes Corpus Christi (Appendix A.1). Without structural hurricane defenses, however, Nueces County alone received more than 70 percent of the damage from Hurricane Celia. In 2005 dollars, adjusted for inflation, Hurricane Celia caused \$2.35 billion in total damage, with \$1.68 billion of that in Nueces County.

After hurricane landfall, the Corpus Christi area immediately needed debris removal. The Nueces County Navigation District, which had jurisdiction over the Port of Corpus Christi, conducted its own debris removal from the Corpus Christi Ship Channel (Appendix A.2) and port property, expecting reimbursement by the federal government at a later date (Phelps 1970b). The cost of debris removal at the port amounted to \$44,000 (Phelps 1970a). The U.S. ACE achieved debris removal and cleanup relatively quickly, within a two-month time period. Recovery and rebuilding estimates for the Texas Coastal Bend area, including the Port of Corpus Christi, ranged from twelve to eighteen months.

About a month after the storm, damage estimates to the port amounted to \$2.5 million (Phelps 1970a). Corpus Christi Main Harbor sustained \$1.2 million in damages, which included shoaling to federal navigation projects, destruction of entrance jetties at Aransas Pass, and removal of lights and aids to navigation (U.S. ACE 1970). Since Celia struck in the middle of

grain-loading season, port officials could not accurately assess damage to the public grain elevator at the port but estimated it to be around \$1 million (Phelps 1970a).

Despite immediate rumors of long-term inoperability, the Port of Corpus Christi resumed ship traffic and navigation a day and a half after Celia's landfall (Phelps 1970a). The Navigation and Canal Commission granted permission to the port director to forego the required thirty-day bid period in order to proceed with securing emergency bids to conduct repairs to transit sheds. Two months after the storm, the Navigation District reported that there remained no major obstructions to navigation and that shipping and commerce had recovered, even though repairs and rebuilding at the port might take a full year (Phelps 1970b).

In 1970, total tonnage moving through ports along the Texas Gulf Coast decreased by 2.2 million tons (*Baytown Sun* 1971). Even though overall tonnage increased at Port of Corpus Christi in 1970, specifically with increases in dry cargo tonnage (Table 3.2), hurricane damage to terminal loading facilities in the Corpus Christi area contributed to the coastwide decrease in tonnage (*Corpus Christi Caller-Times* 1971; *Baytown Sun* 1971). In addition, the Port of Corpus Christi lost two liquid refineries to hurricane damage (Pickering 1972). Challenges with post-hurricane economic recovery resulted in Howell Refining Company and Amerada Hess Corporation closing their doors in December 1970 and March 1971, respectively (Deswysen 1971). In 1971, the port director reported a 12 percent decrease in tonnage because of the refineries' closures (Nueces County Navigation District Number 1 1971).

In 1971, the Navigation District conducted engineering and maintenance repairs, including roof repair to transit sheds, facility cleanup, repainting of warehouses, and repairs to cargo docks and warehouses. The District spent \$365,159 on repairs to docks and machinery in 1971 (Nueces County Navigation District Number 1 1971). In 1972, tonnage at the port barely

Table 3.2. Annual Tonnage\* for the Port of Corpus Christi for Years 1969 to 1975.

Year	Short Tons
1969	29.8
1970	30.5
1971	26.1
1972	26.7
1973	30.0
1974	40.9
1975	44.6

\*Tonnage is reported in 1,000 short tons, or millions of tons. (U.S. Army Corps of Engineers Waterborne Commerce Statistics Center, reported in *Corpus Christi Caller-Times* 1976).

increased. In addition to the closure of the two liquid refineries, decreases in crop yields and government support of foreign-aid food programs reduced tonnage moving through the port (Pickering 1972). Port tonnage reached pre-Celia levels in 1973, with 30.0 million tons, partly due to increased foreign vessel calls at the port (Pickering 1974). While Hurricane Celia did have impacts to tonnage at the port, the data does not show those impacts beyond 1972.

### **Community Recovery Assistance**

The Navigation District provided assistance to the local community to facilitate regional economic recovery. The Aransas Cotton Compress, located on port property, sustained 80 percent damage to its facilities and shut down for most of the cotton season after Hurricane Celia (Deswysen 1971). The closure greatly affected the regional cotton industry and reduced cotton shipments, while the compress owners could not afford to repair and reopen the compress. In

response, the Nueces County Navigation District issued \$1.2 million in revenue bonds to buy the compress, renamed it the Corpus Christi Public Compress, and repaired it in order to reopen the compress for use by local cotton farmers in 1971 (Deswysen 1971; Nueces County Navigation District Number 1 1971).

The Port's Annual Report in 1971 stated "the loss of the compress would have been a hardship and handicap to agricultural interests in the Coastal Bend" (Nueces County Navigation District Number 1 1971, 3). In 1996, when the bonds were paid and compress operations moved under the jurisdiction of the Port of Corpus Christi Authority (POCCA), POCCA utilized its marketing department to attract vessels from all over the world to ship cotton directly from the port. Twenty-six years after Celia, the chairman of the Port Commission said "the port would never shirk any responsibility to the agricultural community" (Fisher 1996). This statement provides evidence for the interdependent relationship between the port authority and the adjacent community. Despite pressure for industrial expansion over the years, the Port of Corpus Christi has made efforts to support the regional agricultural community.

### **Long-term Impacts of Celia**

Hurricane Celia continues to provide the example that local emergency management officials and planners use each year in the Corpus Christi area when hurricane season approaches. Beginning in 1995, and every couple of years since that time, the *Corpus Christi Caller-Times* has published newspaper articles that relive and retell the experience of Hurricane Celia, which inflicted "indelible impressions upon the psyches of people who lived through the monster storm" (Parker 1995).

Each year that passes without delivering a damaging blow to the Corpus Christi area still brings action that encourages preparedness. Interestingly, on August 29, 2005, the day that



Katrina made landfall on the northern Gulf Coast, the *Corpus Christi Caller-Times* published an article about essential personnel and the rights of employees to evacuate during times of emergency. In 2005, a new state law amended the Texas Disaster Act of 1975 by giving authority to local mayors and county judges to recommend or mandate evacuation orders for areas in danger of being hit by hurricanes (Beshur 2005). In response to this new law, a local labor lawyer wrote a newspaper article to encourage businesses and employers to develop a list of essential personnel for times of emergency. The article highlights the Port of Corpus Christi and the Deputy Director of Operations for having designated essential personnel in order to keep ship traffic moving. The Deputy Director of Operations and 24 other essential personnel always remain at the port to remove potential flying debris before a storm hits. When the storm passes, these same essential personnel survey the Corpus Christi Ship Channel to begin removing obstructions to navigation (Beshur 2005). Organizations exempted from mandatory evacuation orders must provide written plans detailing the list of essential personnel and the plan for providing food, water, shelter, medical needs, backup power, and emergency communications for 72 hours after hurricane landfall. The Port of Corpus Christi Authority developed their hurricane plan in the 1970s, which has been updated as the port has changed and provides an example for emergency management in Corpus Christi.

Hurricanes Katrina and Rita did not physically impact the Port of Corpus Christi, but POCCA came through to provide assistance to nearby ports affected by the storms. POCCA provided safe harbor to three Navy vessels during the storms and issued satellite phones to Houston and Galveston to ensure communication after Rita passed. In the *Gulf Shipper*, Executive Director John LaRue wrote “The Port of Corpus Christi has sent word to our neighboring ports that we stand ready and able to assist those in need of maritime services. We

wish the Gulf ports working to recover from the storms Godspeed in a return to normal operations and in returning their area economies to good health” (LaRue 2005). POCCA still incorporated lessons learned from other ports in 2005 by updating its hurricane preparedness plan to establish a remote operations location in San Antonio and to establish satellite communication devices to allow communication between port personnel and emergency response centers (LaRue 2005). The previous experience of Port of Corpus Christi with a major hurricane evidences itself in port actions to improve coping capacity by revising preparedness plans on an annual basis.

### **Port of Pascagoula**

#### **Hurricane Katrina and Impacts**

In late August 2005, Hurricane Katrina made landfall three times in the United States. After passing over southern Florida as a Category 1 hurricane, Katrina moved out over the Gulf of Mexico and strengthened to a Category 5 hurricane, the highest level on the Saffir-Simpson scale (Table 3.1). On August 29, Hurricane Katrina touched land in Buras, Louisiana as a Category 3 hurricane and made final landfall at the mouth of the Pearl River on the border of Louisiana and Mississippi, about 75 miles west of Pascagoula (Knabb, Rhome, and Brown 2005) (Figure 3.2). According to the National Hurricane Center, Hurricane Katrina brought between 24 and 28 feet of storm surge to the Mississippi coast and caused a total of 1833 fatalities and \$108 billion dollars in property damage across the storm’s impact area (Knabb, Rhome, and Brown 2005).

Total damage estimates to the four ports along coastal Mississippi amounted to \$99.9 million (PEER 2006). A chain of offshore barrier islands, Horn Island and Petit Bois Island, offered some protection to the Port of Pascagoula, compared to neighboring Mississippi State

Port Authority at Gulfport. At Pascagoula, thirteen feet of storm surge traveled up Bayou Casotte to the East Harbor, and both high winds and storm surge resulted in structural damage to landside and port infrastructure (Appendix A.3) (Curtis 2007).

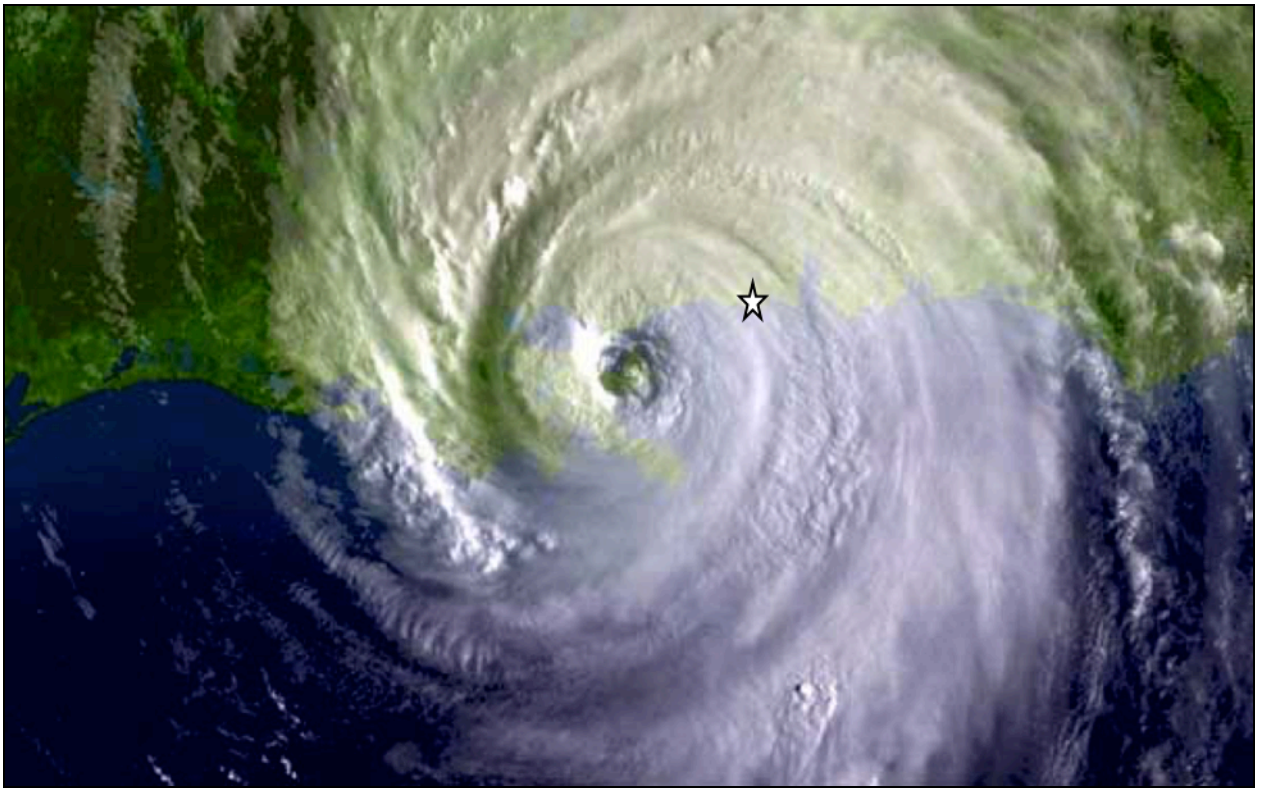


Figure 3.2. Hurricane Katrina made its final landfall on the border of Louisiana and Mississippi on August 29, 2005. The star indicates the approximate location of the Port of Pascagoula. (Image credit: NOAA National Weather Service).

Damages at the Port of Pascagoula included six feet of floodwater in warehouses; structural damage to warehouses, guard gates, truck scales, and waterfront offices; loss of aids to navigation (ATONs); channel shoaling; flooded vehicles; and two feet of water in the administrative offices of the Jackson County Port Authority (JCPA) (Myers and Plume 2005; Curtis 2007). Soon after the storm, the port director held a meeting at the port to assess the living conditions and home situation of port employees and their families. Within two weeks, JCPA

brought in three trailers to provide administrative office space. By mid-September, almost all port employees returned to work full-time, despite severe or total loss of their homes (Myers and Plume 2005).

Even though restricted traffic through the harbor resumed by September 8, several weeks passed before recovery work at the port began. In mid-October, the JCPA Board of Commissioners voted to approve emergency repair contracts for Katrina-related damages, including repairs to security fences, water and sewer lines, and the railroad (The McClatchy Company 2005). Vessel calls at the port increased from two during September 2005 to seven in December 2005. Annual revenue for Fiscal Year 2005 for JCPA could not be reported due to loss of records during the storm, but the tonnage for the last quarter of 2005 suffered a sixty-nine percent drop below the tonnage for the last quarter of 2004 (PEER 2006). By the end of January 2006, JCPA estimated total damages at the Port of Pascagoula at \$15.7 million (PEER 2006). Port Authority staff moved out of temporary trailers and back into repaired office space in April 2006 (PEER 2006).

### **Community Recovery Assistance**

Almost immediately after Katrina, JCPA assisted in coastal community recovery by providing berth space for an emergency response and relief vessel at the Port of Pascagoula. On September 9, 2005, the USNS *Comfort*, an 894-foot naval hospital ship, docked at the East Harbor. A crew of more than 270 doctors, nurses, and technicians treated hurricane victims suffering from external injuries and gastrointestinal distress (Collins 2005a). The Port Authority provided a location for the Navy Hospital Ship to provide necessary healthcare service while Gulf Coast hospitals recovered and rebuilt.

In another example of assisting in coastal community recovery, JCPA provided berth space to a cruise ship, the *Carnival Holiday*, at the site of a former grain elevator at Pascagoula River's South Terminal. After Katrina, FEMA contracted with three cruise ships to provide housing to displaced hurricane victims. At the Port of Pascagoula, more than a month passed before FEMA, the U.S. Coast Guard, and the state of Mississippi settled the logistics for onboard and docking security (Collins 2005b). When the *Carnival Holiday* finally moved from Mobile, Alabama to Pascagoula, Mississippi on October 29, it housed almost 1600 residents, fifty-five percent of whom lived in Jackson County, Mississippi (Collins 2005c). This assistance helped the Pascagoula School District retain seventy-four percent of its student population upon reopening its schools after Hurricane Katrina (Holland 2005).

The case of Singing River Island provides another example of assisted community recovery through post-disaster job creation facilitated by the JCPA. In 2005, the federal government closed the Pascagoula Naval Station at Singing River Island as a result of the Base Realignment and Closure Commission's nationwide effort to close military bases and save money in the defense budget (Chambers 2006). In 2007, the state of Mississippi regained control of Singing River Island and gave management authority to JCPA. In addition to providing space for U.S. Coast Guard offices and NOAA offices, JCPA and the Jackson County Board of Supervisors entered into a joint agreement to lease part of the island to the Ship Systems sector of the Northrop Grumman Corporation in an effort to bring economic development back to the area (Ward 2007). Northrop Grumman Corporation (NGC), now Huntington Ingalls Industries, already operated the Ingalls Shipbuilding yard located at the Port of Pascagoula, so the Island provided space for the administrative complex of NGC. Jobs provided by Northrop Grumman helped retain the 20- to 44-year old population in Jackson County (Havens 2008).

In 2010, the JCPA Board of Commissioners went a step further and adopted a joint resolution between the Port Authority, the County Board of Supervisors, and Northrop Grumman Corporation to secure \$20 million from Katrina Community Development Block Grant money to build a new maritime training facility near the Pascagoula Shipyard (Havens 2010). Opened in 2013, the Ingalls Shipbuilding’s Haley Reeves Barbour Maritime Training Academy expanded the apprentice program at Ingalls to 1,000 students (Leytham 2013).

### **Long-Term Impacts of Katrina**

Despite a hit to cargo movement in 2005, annual tonnage through the Port of Pascagoula recovered in 2006 and experienced normal fluctuations for each year after that (Table 3.3). The

Table 3.3. Annual Tonnage\* for the Port of Pascagoula for Years 2004 to 2011.

Year	Short Tons
2004	34.2
2005	29.3
2006	37.7
2007	35.2
2008	33.6
2009	36.6
2010	37.3
2011	36.9

\*Tonnage is reported in 1,000 short tons, or millions of tons (U.S. ACE WCSC 2014).

port director attributed some of the increase in tonnage to the broad and diverse assemblage of

exports at the port (Crocker 2008). Even with damages to port infrastructure, exports of forest products and frozen poultry at the Port of Pascagoula increased by almost fifty-nine percent from 2005 to 2006 (Crocker 2008). The increase in total tonnage can also be attributed to increased imports of materials associated with local construction and rebuilding (Havens 2009). In early 2008, construction began on a new liquefied natural gas (LNG) import terminal, resulting in higher tonnage from imported construction materials for 2008 to 2010 (Havens 2008; JCPA 2008; JCPA 2009; JCPA 2010).

Total tonnage through the port's public facilities fluctuated slightly between 2009 and 2011, providing evidence of the impact of global markets and policy on global commerce. In 2009, forest products moving through the Port of Pascagoula dropped, coinciding with the drop in the U.S. building industry and depressed housing market. However, increased poultry exports and construction of the Gulf LNG terminal balanced out the decrease in forest product movement. In 2010, the completion of the Gulf LNG facility reduced the need for construction materials. In the same year, Russia's ban on frozen poultry imports from the United States caused a reduction in frozen poultry exports from Port of Pascagoula. The opening of the Gulf LNG terminal in 2011, however, slightly balanced these decreases by increasing tonnage through the port. The fluctuation in commodities moving through the Port of Pascagoula, further understood through historical analysis, provides an example of port susceptibility to regional and global market influences.

In October 2010, five years after Katrina, JCPA's Board of Commissioners approved the bidding process for the last port project to be funded by FEMA Katrina relief funds, which included Katrina-related erosion repairs to the wharfs at one of the terminal facilities (Havens 2010). In August 2013, eight years after Katrina, the Board of Commissioners approved a project

to connect the port's West Bank facility to the city's water system in order to remove its reliance on well water (Leytham 2013). Before Katrina, the West Harbor had its own water wells. After Katrina moved through Pascagoula, facilities on the West Harbor had problems with water service and saltwater intrusion (McAndrews 2015). The decision to tap into city water lines without the support of FEMA funds in order to mitigate problems of water utility interruption represents an action by the Port Authority to improve its coping capacity for the future.

## **Port of Lake Charles**

### **Hurricane Rita and Impacts**

Three weeks after Katrina, Hurricane Rita moved over the Gulf of Mexico and strengthened to a Category 5 storm. Rita made landfall on the border of Louisiana and Texas as a Category 3 hurricane in the early morning of September 24, 2005 (Knabb, Brown, and Rhome 2006) (Figure 3.3). Rita brought extensive storm surge to the southwestern Louisiana coast, with estimated depth for Cameron Parish reaching 15 feet. Surge pushed up the Calcasieu River into Calcasieu Lake and flooded communities in Lake Charles, located 25 miles inland from the Gulf of Mexico. According to the National Hurricane Center, Hurricane Rita caused seven fatalities and \$12 billion dollars in property damage (Knabb, Brown, and Rhome 2006).

Due to its inland location, Port of Lake Charles' facilities sustained mostly wind damage, with blown off doors, damaged warehouse roofs, and downed power lines (Harper 2005c). The General Counsel for the Port of Lake Charles estimated about \$2 million in damage to roofs, transit sheds, and doors (Nodar 2006). Water damage impacted less than 3 percent of the 40,000 tons of cargo sitting in port (Harper 2005a). Throughout the port district, several feet of storm surge inundated refineries (Blanchard 2005). Twelve miles south of the City Docks, at the junction of the Gulf Intracoastal Waterway and the Calcasieu Ship Channel, a nine-foot storm



surge caused loss of power and prevented operation of the locks, resulting in interrupted transport of 400,000 tons of barged oil (Appendix A.4) (Louisiana Recovery Authority 2006).

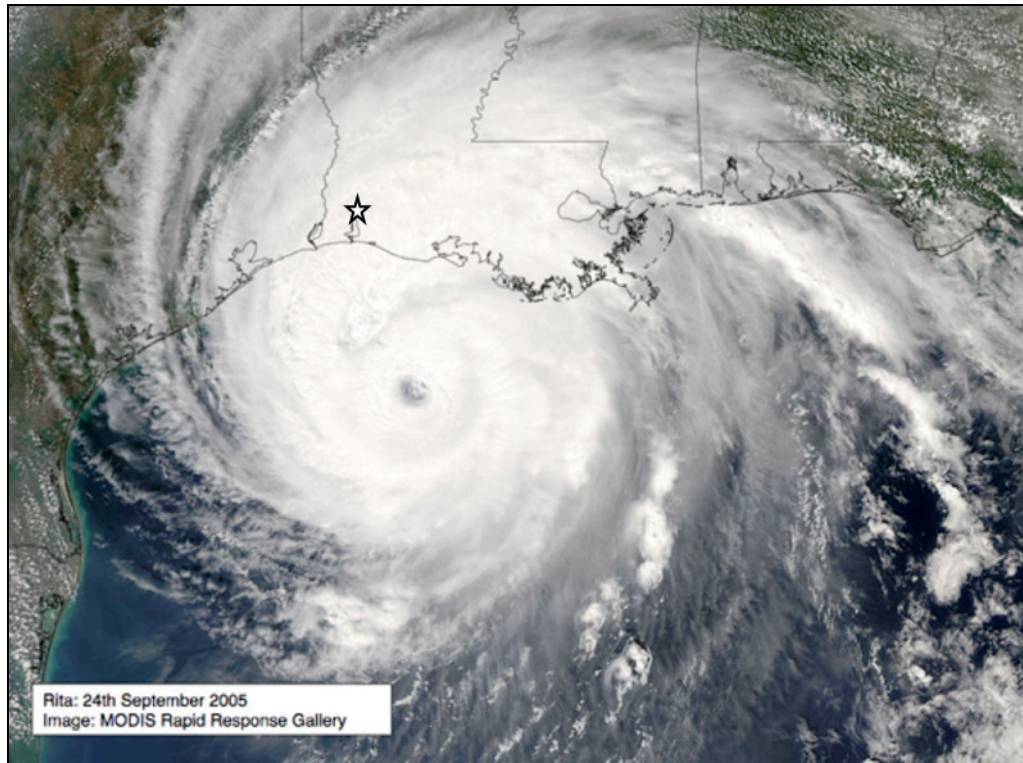


Figure 3.3. The Eye of Hurricane Rita made landfall on the border of Texas and Louisiana on September 24, 2005. In this image, the star indicates the approximate location of the Port of Lake Charles. (Image credit: MODIS Rapid Response Gallery, NASA).

During the storm, Port of Lake Charles provided safe harbor to over 700 vessels at its public City Docks. Seven port officials rode out the storm in a fortified port facility, which allowed them to secure a runaway barge before it collided with an interstate highway bridge (Harper 2005c). Some port personnel stayed at the port for a week while their personal homes remained without power. Cleanup and recovery work began immediately after the storm passed in order to facilitate a speedy return to business-as-usual. On September 26, port workers began to remove debris from roadways leading into the port and around port property. On September 27, trucks could enter and exit the port to carry cargoes of rice and lumber. Port District staff put

out a call over local radio to recruit volunteer cleanup workers to help unload a vessel carrying lumber, since displaced longshoremen could not return to work. Numerous people responded to the call, and volunteers actually had to be turned away (Harper 2005a).

The port resumed operation within one week and reached normal operation status within two weeks. In the first four days following Rita, the Port established a remote accounting office in Houston to conduct payroll and financial operations (Harper 2005a). The Port District also bought its own generators to power larger facilities. In one case, the Port moved a generator to power a water tower that served the local water treatment plant. Port staff worked with the U.S. Coast Guard and NOAA immediately after the storm to reopen the Calcasieu Ship Channel as quickly as possible. Shallow-draft vessels resumed navigation by September 28, (Harper 2005c) and the Ship Channel opened to complete project depth (40 feet) by October 6 (Louisiana Recovery Authority 2006). Even though all ATONS along the Calcasieu Ship Channel washed ashore during Rita, the U.S. Coast Guard fully restored them within a year (Louisiana Recovery Authority 2006).

As an example of unofficial mutual aid, Port of Lake Charles accepted ships and cargo from ports in southeast Louisiana that experienced damage from Katrina. The Executive Director of the Ports Association of Louisiana at the time stated that “the goal [was] to assist these ports and its customers by providing an alternate location until these ports [were] fully operational. The goal [was] to keep the commerce flowing and retain as much cargo as possible in Louisiana” (Joe Accardo, quoted in Dismukes 2011).

### **Community Recovery Assistance**

Similar to JCPA, Port of Lake Charles sprang into action to provide assistance for community recovery. When initial requests from the Port of Lake Charles to the state for

temporary housing went unanswered, Port officials acquired the *Texas Clipper II*, a Texas A&M University cadet training ship and Ready Reserve Fleet vessel docked at Port of Beaumont (Harper 2005b). The Port Director and the Director of Navigation and Security worked together with MARAD and FEMA to acquire the vessel by October 8 (Ports Association of Louisiana 2005). With this ship, 200 bunks became available for port employees, emergency workers, and displaced families. Seventy college students from McNeese State University ended up living on the ship for the fall semester in order to ease overcrowded dorms on campus (Arceneaux 2005).

In another example of assisting community recovery, Port of Lake Charles leased 55 acres of its property to FEMA to build a trailer park with 500 mobile homes and temporary trailers (San Miguel 2005). The Crying Eagle Village trailer park officially opened six months later with space for 2,000 displaced residents while they sought more permanent housing (Cormier 2006).

### **Long-term Impacts of Rita**

Hurricane Rita did not have long-term effects on tonnage at the Port of Lake Charles. Despite minor damage to port facilities and major damage to the surrounding area, cargo moving through district-owned and -operated facilities increased in 2006 and peaked in 2007 (Table 3.4). Tonnage at the Port of Lake Charles peaked in 2007, due to record high volumes of imported crude petroleum products<sup>1</sup>.

In early 2006, Louisiana's Agricultural Commissioner expressed interest in providing state funds for Port of Lake Charles to build a bulk rice terminal. Port of Lake Charles already had an automated bag-loading facility in order to facilitate quick loading of bags of rice onto

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<sup>1</sup> In 2007, five LNG import terminals operated in the continental United States, with Port of Lake Charles ranked number one in volume, importing 251 Billion cubic feet (U.S. Energy Information Administration 2009). For most of 2007, global demand for LNG happened to be low, resulting in high imports at U.S. ports.

ships but still used a grain elevator to process bulk rice (Harper 2006a). The rice farming and milling industry in southwest Louisiana took a huge hit from Rita, on top of falling global rice prices. Port of Lake Charles' Board of Commissioners wanted to make sure that the port met the

Table 3.4. Annual Tonnage\* for the Port of Lake Charles for Years 2004 to 2011.

Year	Short Tons
2004	54.8
2005	52.7
2006	58.4
2007	64.2
2008	53.8
2009	52.3
2010	54.6
2011	54.2

\*Tonnage is reported in 1,000 short tons, or millions of tons (U.S. ACE WCSC 2014).

needs of the local rice industry, especially with projections of increased demands for bulk rice from Cuba and Iraq. An unbagged rice terminal at the port would provide local producers with an additional market for their rice (Harper 2006a).

Port of Lake Charles used \$27 million in state funds to build both an unbagged rice terminal and a warehouse to store bagged cargoes (Harper 2006b). However, with federal budget

cuts to foreign food aid in 2006 and negative press associated with the discovery of genetically modified rice, rice exports decreased at Port of Lake Charles (Nodar 2007). Port revenues from rice dropped even further in 2007, when USAID ended its contract with Port of Lake Charles to ship breakbulk cargo (San Miguel 2008a). Despite efforts to support local and regional economies, rice business at the port still succumbed to global influences.

After Hurricane Rita, Port of Lake Charles faced its greatest challenge in finding enough skilled labor to complete jobs on-site. The skilled labor available before the storm either moved away from the area or switched to construction or other vocational trades after Rita (Nodar 2007). The decrease in federal government purchases for breakbulk cargo (e.g., bagged goods) resulted in declining labor opportunities for local longshoremen (San Miguel 2008b). After Hurricane Rita, the Port of Lake Charles shifted from a focus on exported bagged food to imported construction materials for the expansion of LNG facilities and imported petroleum products for the LNG industry. The construction of LNG facilities at the Port of Lake Charles fluctuates with changes in petrochemical investment, which impacts the jobs available for skilled labor.

In 2009, the Southwest Louisiana Port Network established itself with the objective to convene six ports in the five-parish region to discuss common issues, including a regional and effective management program for the Calcasieu River Waterway and the Gulf Intracoastal Waterway in order to promote regional economic development (*Southwest Daily News* 2011). The Calcasieu River Waterway Harbor Safety Committee leads the effort to foster common ground for several agencies to keep waterways operational while each port maximizes opportunities to capitalize on its unique niche. This network provides an example of individual

ports working together to ensure the economic sustainability of the region, thereby advancing coping capacity for future economic changes.

### **Discussion and Conclusion**

Historical study provides a deeper understanding of how individual Gulf of Mexico ports have responded to major hurricanes in the past, exhibited susceptibility to global market and policy influences, and provided assistance to local communities. In the years following major hurricanes, port authorities have helped create jobs and grow the local economy through foreign trade, regional rebuilding, and partnership with private industry. The experiences of the Port of Corpus Christi, Port of Pascagoula, and Port of Lake Charles provide examples that showcase the ability of ports to return to operation and recover relatively quickly from episodic events<sup>2</sup>. After hurricanes pass, the priority becomes debris removal from both the waterways and roadways leading into the port area in order to resume shipping and vessel movement as soon as possible. In the three cases presented, navigation was the first activity to be restored. Port of Corpus Christi resumed traffic a day and a half after Celia, and Port of Lake Charles resumed normal traffic within two weeks. Port of Pascagoula experienced the longest time for navigation recovery. A month after Katrina, the Port of Pascagoula opened to transits of 36 feet in the Pascagoula Channel and 41 feet in Bayou Casotte, where normal project depths reached 38 and 42 feet, respectively (U.S. Department of Homeland Security 2005).

Based on the cases presented, episodic events appear to have limited impact to cargo tonnage whereas global markets have greater influence over tonnage moving through ports. Adjusted for inflation, Hurricane Celia's \$2.5 million in damage to the Port of Corpus Christi in 1970 becomes \$12.5 million in damage in 2005 dollars. For two years after the storm, tonnage

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<sup>2</sup> It is important to note that none of the three ports presented in this chapter experienced complete and total devastation or washout from hurricanes.

moving through the Port of Corpus Christi declined, due to the loss of two refineries. Port of Pascagoula experienced the largest economic impact from a major hurricane, with almost \$16 million in damage from Katrina, and Port of Lake Charles suffered \$2 million in damage from Rita. Interestingly, in 2005, neither Port of Pascagoula or Port of Lake Charles had tenants that experienced total failure after the storms. Facilities sustained damage and some remained inoperable for many months, but all facilities returned to operation within a year.

Impacts to tonnage at several Gulf Coast ports in the years following Katrina show how each port fills a unique niche in the Gulf of Mexico region. Ports along the Gulf of Mexico have specific capabilities to handle bulk and breakbulk cargo, which includes petrochemical products and materials used for construction. After Katrina, while ports waited on U.S. ACE to complete channel surveys and restore waterways to full operation, carriers and shippers looking for alternative routes for bulk cargo shifted their destination to ports in Texas and Florida and then used rail and truck to transport goods (Frittelli 2005). In addition, Hurricane Katrina destroyed three major chiller freezers at the ports in New Orleans, Gulfport, and Pascagoula, which resulted in temporary shifts of frozen poultry exports to Corpus Christi, Houston, Mobile, Pensacola, and Tampa (*Journal of Commerce* 2006). Data from the Waterborne Commerce Statistics Center support this by showing increased tonnage at a few of the ports outside of Katrina's impact zone in 2005 (Table 3.5).

In a report on the recovery of the Gulf Coast a year and a half after the storms of 2005, the Economics and Statistics Administration reported that U.S. exports through Gulf Coast ports dropped by twenty-two percent in September of 2005, resulting in a loss of \$1.5 billion, but returned to pre-Katrina levels by October 2005 (Economics and Statistics Administration 2007). Similarly, U.S. imports to Gulf Coast ports dropped by eleven percent in September of 2005,

Table 3.5. Annual Tonnage\* for Ports along the Gulf of Mexico Coast for Years 2004 - 2009.

Port Location	Year					
	2004	2005	2006	2007	2008	2009
	short tons	short tons	short tons	short tons	short tons	short tons
Corpus Christi	78.9	77.6	77.5	81.1	76.8	68.2
Houston	202	212	222	216	212	211
Lake Charles	54.8	52.7	58.4	64.2	53.8	52.3
South Louisiana	224	212	225	229	224	213
New Orleans	78.1	65.9	76.9	76.0	73.0	68.1
Gulfport	2.40	1.78	1.47	1.81	2.14	1.86
Pascagoula	34.2	29.3	37.7	35.2	33.6	36.6
Mobile	56.2	57.7	59.8	64.5	67.6	52.2
Pensacola	0.93	1.29	1.33	0.95	0.83	0.77
Tampa	48.3	49.2	46.2	46.8	39.7	34.9
TOTAL*	780	760	806	816	783	739

\*Tonnage is reported in 1,000 short tons, also known as millions of tons. The bottom row provides the total for each year for the select ports shown (U.S. ACE WCSC 2014).

resulting in a loss of \$1.8 billion, but also returned to pre-Katrina levels in October 2005

(Economics and Statistics Administration 2007). Some of the port-specific impacts to shipping



referenced earlier, such as high imports of crude petroleum products in 2007 and imports of construction materials to support regional rebuilding and economic development, impacted other ports in the Gulf region, which is evident in the tonnage totals for 2006 to 2008 (Table 3.5). By 2009, port tonnage for the Gulf of Mexico fell below pre-Katrina values, possibly due to the impact of the “Great Recession” on global commerce and continually fluctuating oil prices. In general, the U.S. ACE data show that port tonnage has bounced back quickly from episodic hurricanes but has shown susceptibility to global economic forces.

While communities in the Gulf of Mexico region dealt with total devastation after Katrina and Rita, all three ports presented here provided assistance to local communities to enhance disaster response, whether through providing berth space for response and relief vessels or providing port property for temporary housing for displaced residents. In all three cases, these port authorities did not have a pre-determined plan to provide this type of assistance. As quasi-public agencies, port authorities offer a pathway for government resources for recovery and are physically located in the coastal environment to fulfill this role. As we will see in chapter four, port hurricane plans do not include provisions for community assistance. Given the prevalence of such assistance in the past, the PRI includes a question asking whether the port authority is aware of the roles it may be requested to fill to provide community assistance. The intent of this question is to encourage port authorities without recent hurricane experience to anticipate that they may be asked to fulfill such roles.

All three ports also played a role in facilitating economic recovery, through taking action to assist local agricultural communities, support economic development activities at the port, or pursue opportunities to maintain a local skilled workforce. Both Port of Corpus Christi and Port of Lake Charles took action to maintain or build equipment necessary for local agriculture. The

Jackson County Port Authority, in its role as a public agency, helped secure Katrina redevelopment money for a private company to invest in building a maritime training facility on port property.

Returning to the initial online survey distributed to the Ports Resilience Expert Committee, the actions that respondents prioritized for pre-event planning make more sense in light of historical study (Table 3.6). All of these items presented challenges in one way or another for the ports discussed above. For example, Port of Corpus Christi implemented a hurricane preparedness plan after Hurricane Celia. The plan included a list of designated essential personnel and a plan to provide basic needs for at least 72 hours after hurricane landfall. After Hurricane Katrina, JCPA took initiative by switching from well water to city water at one

Table 3.6 Prioritized Actions for Pre-event Planning Phase\*

1.	Crisis communications plan with port personnel and external stakeholders
2.	Port re-entry policy
3.	Contingency plan for backup power and water resources
4.	Backup storage plan for computer data
5.	Coordination plan with regional ports for response efforts
6.	Plan for temporary relocation of port operations and administration

\*Results of the online survey distributed to the Ports Resilience Index Committee (see chapter two for further explanation.)

of its public port facilities in order to avoid saltwater intrusion and problems with water service during future storm events. Port of Lake Charles secured its own generators, improving its capacity to cope with the stress of disrupted electricity. These reactive responses by JCPA and

Port of Lake Charles point to the need to develop a contingency plan for water resources and backup power ahead of time.

Having a backup storage plan for computer data became an evident need after the hurricanes of 2005. JCPA lost the hard copies of its financial records and Port of Lake Charles evacuated to conduct remote operations. After witnessing these impacts, POCCA updated its hurricane preparedness plan to establish a remote operations location. In addition, a planning priority for port authorities should be developing a plan to coordinate with regional ports in the area to prepare for response efforts. In 2005, Port of Corpus Christi assumed a role of readiness to offer assistance by providing safe harbor to Navy vessels and issuing satellite phones to Port of Houston and Port of Galveston.

Returning to the resilience concepts presented earlier, both coping capacity and adaptive capacity contribute to social resilience. The resilience of port authorities along the Gulf of Mexico coast has been tested in the past. At the time of hurricane landfall, each port authority had a certain coping capacity or ability to respond to the event. In all three cases, port authorities learned from their experiences and either implemented actions in the moment or a while later. The step to develop or update a hurricane preparedness plan suggests the adaptive capacity of port authorities to take lessons learned and improve their coping capacity for the next episodic event. The storms of 2005 led to all three ports incorporating lessons learned into hurricane preparedness plans. In general, port authorities have shown the ability to recover operations within a short time frame after a hurricane. Port hurricane plans themselves focus on the coping aspect of port planning, by devoting many pages to port emergency response rather than anticipation for long-term or future impacts.

The PRI includes questions to address some of the actions that ports have taken during and after hurricanes, including having designated essential personnel, offering or requesting mutual aid to and from other ports, filling roles to provide assistance to local communities, developing systems to store critical records digitally, and operating remotely in order to continue minimum business. These practices are incorporated in the PRI as yes/no questions in order to encourage action for port authority respondents who have not been through a major hurricane before. Studying past experience helps us understand how ports have operated and functioned after hazardous events, and we can see that learned lessons get included in port hurricane plans to improve coping capacity for the next event. The participatory process of discussion around questions within the PRI guides participants further than already existing written plans to improve adaptive capacity and identify actions needed to encourage anticipation for the future.

## **CHAPTER FOUR**

### **PARTICIPATORY PROCESS REVEALS PORT RESILIENCE BEYOND PLANS**

#### **Introduction**

Efforts to measure or assess resilience might include analysis of written documents, including hazard mitigation or emergency response plans. For example, a team of geographers used mitigation plan reviews and focus groups with local hazard mitigation practitioners to incorporate place-specific weighting to resilience indicators for a community in Florida (Frazier et al. 2013). The previous chapter shared some of the lessons that certain port authorities have learned in the past after enduring major hurricanes and how those port authorities have incorporated those lessons into hurricane preparedness plans in order to improve coping capacity for the next event. Hurricane plans might be a tool to help port authorities enact resilient practices, but simply analyzing plans provides a limited view of how organizations actually implement resilience. Most written documents for hazard preparedness emphasize the “response” phase. Port hurricane preparedness documents mirror the emphasis on “response” by focusing on the resources that port authorities need seventy-two hours before and after a hurricane makes landfall.

Before the focus group meetings, the Ports Resilience Expert Committee agreed on the definition of *resilience* to mean the ability of a port authority to reach an acceptable level of functionality after a hazard event and to bounce forward in preparation for the next event. The Ports Resilience Index [PRI] includes questions that align with actions listed in hurricane plans to encourage improved coping capacity to respond to future hazard events. The participatory process of developing the PRI generated discussion around these questions that provides insight into the variability of port operations and different strategies to improve coping capacity. The

social interaction between participants and facilitators, stimulated through focus group discussion, reveals more about actual port practices than what can be learned from only reading preparedness plans. Through discussion, focus group participants shared their experiences with each other and with the facilitators, which helped provide greater understanding of *how* ports implement actions to improve resilience and helped shape the questions of the final version of the PRI.

This chapter presents a qualitative thematic analysis of port hurricane plans, followed by analysis of selected extracts from focus group discussions. A hybrid approach of deductive and inductive coding drove the analysis of the hurricane preparedness documents (Basit 2003; Fereday and Muir-Cochrane 2006), beginning with theory-driven codes using four elements of community resilience (Wilbanks 2008), followed by data-driven codes using certain aspects of port function and management. The analysis shows that the hurricane plans emphasize the response and recovery elements of resilience with limited attention to the anticipation elements.

Focus group discussion extracts chosen for analysis in this chapter address topics that correspond to actions listed in the hurricane plans. The participatory process of discussing the questions within the PRI provides deeper insight and understanding into how port authorities implement elements of resilience in aspects of port function and management. As a result, the selected focus group discussion extracts provide examples of participant interaction and the facilitator's role in illuminating how ports implement response and recovery beyond what the hurricane plans describe.

### **Theory-Driven and Data-Driven Coding Method**

Each of the three ports visited during the pilot test phase have hurricane preparedness documents that present similar information. The hurricane plans acknowledge ports' coastal

location and exposure to coastal hazards, including hurricanes, tropical storms, floods, and tornadoes. Each readiness plan educates the reader on hurricane characteristics and what steps should be completed by port authority staff members in the effort to minimize disruption to port operations. The analysis in this chapter concerns the 2015 versions of the hurricane plans.

Each hurricane plan describes its readiness actions under five different port conditions. Port authorities announce the appropriate condition, depending on storm alerts or weather conditions set by the U.S. Coast Guard and National Weather Service. The nomenclature of these conditions varies from port to port. For example, when hurricane season begins on June 1, ports automatically enter a stage of “readiness.” Port of Corpus Christi calls this stage Hurricane Condition 5 or “seasonal alert.” Port of Pascagoula refers to this stage as Condition V or Port Status Normal. Port of Lake Charles refers to this time as “normal readiness status,” which is maintained throughout hurricane season unless conditions merit a change in the readiness status.

I used these port conditions to put concrete parameters on elements of community resilience, used for theory-driven coding (Table 4.1). For example, *anticipation* refers to activities that might take place during the normal readiness state or throughout the year, outside of hurricane season. *Response* refers to activities aligned with port conditions seventy-two hours before hurricane landfall. U.S. Coast Guard nomenclature for changing port conditions during the “response” phase corresponds to when ports should expect tropical storm force winds (Table 4.1). *Response* also includes the time phase immediately after a storm passes. POCCA and PP refer to this phase as post-storm recovery or post-storm status. PLC divides the recovery phase into three segments, and Priority 1 includes actions taken immediately after the storm and normally completed in one to two days. *Recovery* refers to a longer phase of time after a hurricane has passed, which each port categorizes differently. For example, POCCA defines

Table 4.1. Elements of community resilience (Colten et al. 2008; Wilbanks 2008) and their parallel in port hurricane plans.

Element of Community Resilience	Definition (Colten et al. 2008; Wilbanks 2008)	Port Readiness Phase Definition	Port Readiness Phase Nomenclature*
Anticipation	When a community understands the possibilities of hazard threats and takes actions to prepare, whether or not a storm is in the forecast	When a port authority and port area enters hurricane season (June 1)	POCCA: Condition 5 PP: Port Status Normal PLC: Normal Readiness
Response	When a storm is in the forecast, and a community takes action and immediately responds to protect lives and property	Tropical storm force winds expected within 72, 48, 24, and 12 hours  Immediate response after storm makes landfall and passes	POCCA: Condition 4, 3, 2, 1, Post-storm recovery  PP: Port Status Whiskey, X-Ray, Yankee, Zulu, Post-storm Status Zulu  PLC: Port Condition 4 (Whiskey), 3 (X-Ray), 2 (Yankee), 1 (Zulu), Recovery (Priority 1)
Recovery	When a community addresses long-term social and physical needs of its members and geographic location	When a port authority addresses the long-term needs of its personnel and geographic port area	POCCA: Post-storm recovery PP: N/A PLC: Recovery (Priority 2, 3)
Reduced Vulnerability	When a community reduces the potential for harm and social disruption from hazard threats	When a port authority reduces the potential for harm and disruption in operations from hazard threats	N/A

\*The nomenclature for each phase or element is provided for Port of Corpus Christi (POCCA), Port of Pascagoula (PP), and Port of Lake Charles (PLC).



the post-storm recovery phase as beginning “once the damage has been assessed and the necessary resources have been brought in to assist with the recovery phase” (POCCA 2015, 4). The reference to “once the damage has been assessed” demarcates the post-storm recovery phase as long-term recovery. Port of Pascagoula uses the terminology “port status post-storm zulu,” which means “a recovery condition in which tropical weather and hurricane conditions have passed but ports remain closed for assessment, restoration, and recovery” (Port of Pascagoula 2015, 5). Port of Lake Charles defines recovery phase, priority 2 as actions that take place between five and ten days after the storm and recovery phase, priority 3 as actions “completed when conditions permit” (Port of Lake Charles 2015, 13). For this analysis, “recovery” includes priority 2 and priority 3 actions.

The element of *reduced vulnerability* does not necessarily correspond to a phase of port readiness that can be found in preparedness documents that have already been written. *Reduced vulnerability* would be realized over time, from year to year, as port authorities revise hurricane plans to reflect lessons learned and implement actions to improve coping capacity and build long-term resilience. The focus group discussions revealed strategies that different port authorities have taken to decrease their susceptibility to damage for future events, thereby reducing vulnerability.

Iterative readings of the hurricane plans resulted in data-driven codes to categorize actions during different time phases with aspects of port function and management. Data-driven codes included infrastructure (both waterside and landside), essential personnel, operations and management, and external communication and partnerships. The code “infrastructure” applied to any language in the preparedness documents related to physical infrastructure at the port, either waterside (e.g., docks, wharfs, vessels) or landside (e.g., gantry cranes, grain elevators,

warehouses, transit sheds, container yards). The code “essential personnel” applied to segments of the plans dealing with categories of personnel and when they are expected to leave and return before and after a hurricane. The code “operations and management” applied to policies and procedures completed at the individual staff member level or the collective port authority level. “Operations and Management” included communication between personnel or internal to the port authority. The code “external communication and partnerships” applied to actions that address communicating with external partners or stakeholders that are outside of the port authority or management structure.

Thematic analysis of the port hurricane plans is presented first and focuses on actions assigned with the theory-driven codes of anticipation, response, and recovery. Thematic analysis of the focus group discussion extracts follows and highlights port authority actions assigned with data-driven codes. The analysis of the hurricane plans shows the emphasis on response and recovery, and the analysis of the focus group extracts shows how discussion provides deeper insight into the mechanisms of port resilience. The extracts are provided in Appendix C, with line numbers as a reference to particular segments of the excerpts. All names have been removed from the extracts to protect participant confidentiality. With each new extract, the participant numbering begins again. Therefore, “participant 1” in one discussion extract is not necessarily the same person as “participant 1” in another discussion extract. Numbers in parentheses indicate the length of conversation pauses, in seconds.

### **Thematic Analysis of Port Hurricane Plans**

#### **Origin of Port Hurricane Plans**

The three hurricane plans differ in the level of detail provided and when and how the plan was developed. For example, Port of Corpus Christi Authority (POCCA) lists duties and

responsibilities for an entire department whereas Port of Pascagoula (PP) and Port of Lake Charles (PLC) list duties for an individual person. At Port of Corpus Christi, port staff members first wrote the *Hurricane Readiness Plan* in the 1970s after Hurricane Celia. The introduction states that “POCCA is concerned about the safety and welfare of its employees, especially prior to, during and following times of inclement weather conditions” (POCCA 2015, 1).

At the Port of Pascagoula, the harbormaster first wrote the *Plan of Action* in 1998 after Hurricane Georges. As explained in the Foreword, the plan intends to establish procedures for securing facilities and informing marine interests; to provide for the security and preservation of port facilities and refuge for vessels seeking safe harbor; to assess the extent of damage to Port facilities and the condition of the channel; and to restore port operations and facilities in a timely manner (Port of Pascagoula 2015, 1).

At the Port of Lake Charles, port staff first wrote the *Lake Charles Harbor & Terminal District Hurricane Preparation, Response and Recovery Plan* in 2005, after Hurricane Rita. The purpose of the plan is to “establish basic procedures and assign annual planning and action responsibilities for securing Port facilities prior to an emergency and for assessment of damage and restoration of normal operations” (Port of Lake Charles 2015, 3). In addition to listing duties for each port condition, the plan includes emergency contact information for federal, state, and local agencies; power and utility companies; and suggestions for personal and community preparedness.

### **Anticipation**

When hurricane season begins on June 1, all three ports automatically enter a condition of readiness. In all three cases, the plans list similar actions to prepare for the potential onset of an emergency situation, involving whatever is necessary to prepare for action during the

response phase. During the normal readiness condition or seasonal alert, port authorities inspect all port facilities and reduce the amount of unsecured items that might become missile hazards, should winds increase. The facility manager or maintenance department inspects port facilities for safety hazards on a regular basis but looks for wind hazards during hurricane season. Port of Corpus Christi's plan allows for a practice tie down drill of gantry cranes and shiploader equipment. Additional actions during readiness include preparing the emergency operations location, identifying essential personnel, verifying personnel emergency contact information, and testing communication methods.

Port authority staff also inventory emergency response supplies and equipment, back up electronic data, and activate satellite phone service in order to continue port operations with minimal disruption. If port staff plan to remain at a specified alternate location during the storm, then actions during the readiness phase include securing the facility with backup power, checking communication capabilities, and supplying it with necessities for survival, including food and water.

Each plan includes certain nuances that signify wide variability in port hurricane preparedness. For example, POCCA's plan indicates that during readiness, port staff will update the list of local and area contractors that might be available to assist with post-storm repairs. POCCA's plan also defines essential personnel as either Category 1 or Category 2 at the beginning of hurricane season. Essential personnel have been given specific duties for the pre-storm readiness phase and post-storm recovery phase. Therefore, essential personnel must either ride out the storm on port property or must remain close enough to the port facility to be able to report to work, if requested, during an authorized closure of the port facility. POCCA also

reminds port employees to prepare their families for hurricane season, with an evacuation plan and supplies.

PP's plan addresses readiness actions in a more general manner and charges port authority staff with reviewing port procedures, identifying dangerous situations, and preparing port status reports for the Port Director. Port of Pascagoula does not identify essential personnel or make plans to ride out the storm at a designated location. This plan provides wide-ranging flexibility for adjusting operations, depending on the oncoming hazard. During the "Port Normal" condition, the Harbormaster establishes communication with the Jackson County Civil Defense and Emergency Management Organization and with the U.S. Coast Guard Captain of the Port. The port authority reviews the hurricane plan with marine interests and discusses protocol with all terminal operators for managing and securing cargo inventory during hurricane season.

PLC's plan lists very specific actions during normal readiness, which emphasizes being able to continue operations remotely but also ensuring the ability to respond and recover quickly. During normal readiness, PLC establishes radio frequencies for secure communication and implements redundancy in cell phone plans by having six cell phones, two each from three different providers. PLC ensures that its staff will be able to return to the port quickly by issuing "walking papers" consistent with the state police re-entry plan to critical employees; fueling survey and patrol vehicles; and providing the Harbor Police Department with keys to locked facilities.

Port of Lake Charles takes a proactive stance to enable quick recovery of ship traffic by including a list of Aids to Navigation (ATONs) prioritized for recovery in the hurricane plan. During the normal readiness state, the navigation staff organize mooring space for vessels that

plan to take refuge at port-operated facilities to ensure availability of pilot boats and harbor tugs for response activities. PLC also confirms with NOAA that a survey boat will be immediately available to begin clearing the Calcasieu Ship Channel as quickly as possible after a storm.

PLC also maintains a video file of all Port-owned or leased facilities for insurance claim purposes, should there be an event, and pre-arranges contracts for conducting storm damage surveys. In addition, PLC reviews and revises emergency berth applications to ensure that first responders have access to stay aboard vessels taking refuge at the port. The Port of Lake Charles conducts several outreach activities at the start of hurricane season, including attending annual community pre-hurricane season planning meetings; holding port readiness planning sessions to engage tenants, customers, service providers and labor; and notifying all port tenants when hurricane season begins.

## **Response**

Once a storm system enters the Gulf of Mexico, the port condition changes from normal to Condition 4. As the storm approaches the coast, the hurricane plans progress from securing all port facilities and equipment at Condition 4 to making final checks at Condition 1 and preparing port personnel for the onslaught of a hurricane. POCCA and PLC appear to be more active during Conditions 4 and 3, whereas PP becomes more active during Condition 2. Since the hurricane plans have a lot of similarities for actions related to response, I focus on the differences for each port and hurricane condition.

For Condition 4 or Whiskey, port staff secure buildings, facilities, and equipment, which includes picking up loose debris and tying down moveable items to prevent potential airborne missile hazards. During this time, the Executive Director at all three ports begins implementing

the readiness plan to test communications equipment and to distribute satellite phones to certain port authority personnel.

At Port of Corpus Christi, each department confirms its list of essential and non-essential employees so that phased evacuation can begin. The Port Police supply the emergency shelter with cots, sleeping bags, food, and water for one week for fifty essential personnel. The Engineering Department establishes emergency contracting authority and procedures for post-storm contractor assistance. The Accounting Department secures materials to continue accounting operations, including a check signing machine. POCCA also double-checks electronic and communications equipment at the emergency operations location (e.g., Continuity of Operations site).

Port of Pascagoula's plan includes generally written action statements and allows for precautionary actions during Condition Whiskey. When a Hurricane Watch is applied to the geographic area surrounding the Port of Pascagoula, all port personnel receive a notification, and the port authority establishes communication with marine interests (i.e., lessees, tenants, and managers) to learn what they intend to do with their vessels. The Jackson County Port Authority (JCPA) contacts both the U.S. Coast Guard to discuss vessel movement and the Mississippi Security Police to review hurricane plans. Port staff inventory equipment and supplies, service and fuel maintenance trucks, and double-check all equipment for emergency response.

At Condition Whiskey, PLC maintains contact with U.S. Coast Guard, U.S. ACE, and response agencies through conference calls. PLC's plan includes specific language intended for addressing vessels approaching the port. The Director of Navigation and Security makes sure that any vessels arriving to port or sailing from port follow emergency procedures established by the harbor safety committee. If vessels anticipate arrival in the next seventy-two hours, they will

be notified of the storm condition and encouraged to make special arrangements for entering harbor. The Director of Navigation coordinates with Lake Charles Pilots and U.S. Coast Guard to set a deadline for vessels who intend to leave port. The port also coordinates with U.S. Coast Guard to relocate large vessels that might pose a threat to landside infrastructure and works with owners and agents to have all vessels moved to a safe haven. Since the port staff wrote the plan after Hurricane Rita, relocating large vessels represents a lesson learned from when a large barge broke loose and collided with an interstate highway bridge.

For Condition 3 or X-Ray, port staff continue securing port buildings, facilities, and equipment. POCCA specifically mentions securing shore power and accounting for predicted storm surge when tying down and mooring vessels. The Harbormaster and Port Police work together to coordinate dock assignments for vessels seeking safe harbor, making sure that pre-reserved mooring sites remain available for Texas Department of Transportation ferries and other emergency response designated vessels. Port staff meet with the U.S. Coast Guard Captain of the Port to discuss hurricane readiness for the Corpus Christi Ship Channel and Inner Harbor. The Engineering Department establishes contact with the Galveston District office of the Army Corps of Engineers to coordinate post-storm sounding of the Ship Channel and to coordinate dredging assistance that will be necessary to reopen the Ship Channel. POCCA releases essential and non-essential personnel and provides them with the 1-800 Emergency Information Hotline Number. The IT department performs a backup of system files and moves phones and computers from outlying facilities to the second floor of the Administration office building. The Accounting department establishes a petty cash fund of \$5,000.

For Port of Pascagoula, priorities during Condition X-Ray include performing a computer system back-up to a remote server and coordinating preparedness efforts for industrial operators.



JCPA contacts the Port Emergency Action Team, facilitated by the U.S. Coast Guard and establishes contact with the facility security officers for lessees and tenants, the Pascagoula Police Department, and the Jackson County Sheriff's Office.

During Condition X-Ray, Port of Lake Charles continues to participate in conference calls with the local Office of Emergency Preparedness, the U.S. Coast Guard, U.S. ACE, and other response agencies. Vessels seeking refuge must provide their Emergency Berth application to the Harbormaster. Port staff provide the latest storm information to tenants and direct cargo handling operations to cease. Port personnel begin evacuating, and the Accounting Department establishes controlled access to emergency funds and arranges to use a remote financial institution.

At Condition 2 or Yankee, port hurricane plans show a lot of variability. POCCA continues Condition 4 and 3 actions by securing port facilities and equipment, docking vessels, backing up computer files, and stocking shelter supplies. At Port of Pascagoula, Condition Yankee is when staff begin to secure port facilities and tie down and store loose equipment. Port staff secure and fuel emergency vehicles, prepare generators and pumps, photograph major buildings and facilities, fill gas cans and water reservoirs, and ensure that industrial operators assign staffing responsibilities and provide information on evacuation routes. The Port Director may call an emergency meeting of all marine interests to discuss how vessels will be moved or evacuated. The harbormaster assigns emergency berths to vessels seeking refuge and provides weather advisories and safety advice to all vessels. If necessary, the Port Director releases staff and closes the office. At Port of Lake Charles, most infrastructure preparations and continuity of operations procedures have been completed by Condition Yankee. Port staff continue to

communicate with U.S. Coast Guard, U.S. ACE, and response agencies through conference calls and request personnel from the U.S. Coast Guard to ride out the storm with the harbormaster.

By Condition 1 or Zulu, final preparations have been completed and personnel hunker down for the storm, if still on-site. POCCA removes police patrol boats from the water; turns off power to the gantry, shiploader and cargo dock warehouse; and terminates all cargo discharge operations. Category 1 essential personnel activate the Emergency Command Center, and the port Emergency Operations Liaison goes to the City's Emergency Operations Center. All personnel must notify the Director of Engineering of their intent to evacuate, where they will be going, and the best phone number where they can be reached. The harbormaster gathers all information on vessels moored at POCCA facilities and communicates that with the U.S. Coast Guard Captain of the Port.

Port of Pascagoula does not have a whole lot of tasks listed for Hurricane Condition Zulu, except to assist in coordinating outside efforts. During the onslaught of the storm, port personnel should stay in touch either directly with the Port's main office or with the Civil Defense organization, using phone, radio, internet, or other means. The port director maintains communication with port interests and Mississippi Security Police.

During Condition Zulu, Port of Lake Charles focuses on limiting refuge locations on port property and requires periodic reports of the safety of port personnel remaining on-site, using radios. During the storm onslaught, security personnel on duty maintain contact with local emergency responders through the Lake Charles Mutual Aid Radio Network. The Calcasieu Ship Channel will close at this time if it has not closed already. Port of Lake Charles references previous hurricane experience and implies that recovery is faster if port personnel ride out the storm on-site: "from previous lessons learned, had the remaining staff opted to weather the

onslaught off Port premises, felled trees, downed power lines and flooding would have significantly delayed recovery!” (Port of Lake Charles 2015, 13).

In the post-storm phase, during immediate response and recovery, port actions focus on assessing damage to port property and personnel and following procedures to begin cleaning up and clearing the waterways in order to resume navigation. All three plans instruct port staff to coordinate with the U.S. Coast Guard and U.S. ACE to conduct a damage assessment of the federal navigation channels in order to identify sunken vessels and areas of shoaling where dredging assistance may be needed, reopen the waterways, and resume navigation as quickly as possible. On the land side, staff survey port property for environmental concerns or problems. POCCA’s plan states that they will recall port employees when it’s safe to do so. At Port of Pascagoula and Port of Lake Charles, staff gather to inspect, assess, and report all damages to port property and facilities, whether that means documenting damage in a log book (Port of Pascagoula) or taking photos of all post-storm damage and filing reports (Port of Lake Charles). Port of Pascagoula’s Port Director calls a meeting of all marine interests to communicate the impacts of the storm to port facilities, the federal channel, and aids to navigation; establishes priorities for restoration; and assesses the time frame and cost to resume normal operations.

In addition to establishing priorities for restoration, PLC prioritizes re-establishing contact with government authorities to seek assistance to re-open and requesting MARAD resources (i.e., ships) for temporary housing for labor and administrative staff, if necessary.

## **Recovery**

The three plans considered for this analysis have limited scope over long-term recovery steps for ports affected by a hurricane. For POCCA, after initial damage assessment, the priority after a storm is to clear the ship channel of debris that might hinder navigation, so the

harbormaster contacts owners or agents of sunken or wrecked vessels in the channel. Across the Port Authority, all department heads receive instructions to give the Executive Director a status report and recommendations for action, which the director extends to the Board of Commissioners to make them aware of the damages incurred from the storm, and the estimated time and cost of recovery.

PLC's plan includes the most detail for recovery. For PLC, Priority 2 describes five to ten days after the storm and the actions required to restore navigation and dockside operations. Such actions include initiating repairs to water and electrical systems, staffing the designated alternate operations site, obtaining hard copies of channel survey results, resuming navigation, making sure that berths and warehouses are operable, and accessing record archives. At this time, PLC staff register damage claims with FEMA. Priority 3 actions, which take place beyond ten days, include staffing the administrative office at the port and expressing "appreciation for extraordinary or especially effective services rendered during and subsequent to the storm" (Port of Lake Charles 2015, 14).

### **Thematic Analysis of Focus Group Discussion Extracts**

Port authority actions to prepare for resilient operations can be separated into four broad categories, determined by analysis of the hurricane plans, with corresponding data-driven codes: infrastructure, essential personnel, operations and management, and external communications and partnerships. The PRI addresses these categories through sub-sections such as Continuity of Operations Planning for Infrastructure and Facilities, Internal Port Authority Communications, and Critical Records and Finance. Focus group discussion extracts demonstrate how participatory discussion provides insight into how port authorities implement various elements of hurricane plans. The social interaction between focus group participants helps shed light on how

each port authority is unique in its operations, which affects how participants make suggestions for a resilience assessment tool meant to be broadly applicable to ports.

### **Infrastructure**

The PRI includes questions that correspond to actions in hurricane plans related to infrastructure preparation. For example, one of the questions from the PRI asks “does your Port have a plan to prevent flying debris by securing or moving equipment including gantry cranes, container equipment, intermodal transportation and facilities, buildings and high mast lighting, vehicles, and utilities?” During each pilot test, focus group participants did not have any discussion on this question and answered “yes.” This question could be answered just by looking at the preparedness plans and refers to standard practice, with specific steps laid out in well-developed plans. However, port authorities with smaller staff or jurisdiction over a smaller geographical area or no prior experience with hurricanes need questions like this as a reminder of important actions to take ahead of time to prepare physical infrastructure.

### **Essential Personnel**

The hurricane plans for POCCA and PLC specifically mention essential or critical personnel, who are expected either to ride out the storm on port property or to remain in the area in order to return quickly. To facilitate re-entry to the port, PLC’s plan includes provisions to issue “walking papers,” or re-entry authorizations, to critical personnel during normal readiness. A pilot-test question asked about re-entry policies and who is subject to them (Table 4.2). This is an important question to ask for port authorities that have not developed a re-entry policy because adjacent municipalities might be subject to a mandatory evacuation order or curfew, which might prevent port personnel from entering port property and beginning damage assessment.

Table 4.2. PRI questions from Internal Port Authority Communications, revised with feedback from focus group participants (in italics).

Pilot-test Question	Final Version of Question
Does your Port have a re-entry policy that considers check-in procedures for Port employees and tenants, issuance of keys or codes to re-open the port, TWIC cards, and release of gate security personnel in coordination with local authorities?	Does your Port have a re-entry policy that <i>follows the city, county, or parish re-entry policy and considers the following</i> : check-in procedures for Port Authority employees; check-in procedures for port tenants; issuance of keys/codes to re-open the port; TWIC cards; release of gate security personnel; and coordination with local authorities ( <i>e.g., National Guard, local and state police</i> )?

The focus group discussions reveal that ports might be subject to local municipal or state policies; therefore, re-entry policies might be different from port to port and might apply to different people. At POCCA, for example, the port re-entry policy follows the county policy and only applies to port authority employees. Participant interaction (Appendix C.1, lines 9-33) reveals that the county sets the re-entry policy, which applies separately to port authority employees and tenants. Expanding further, the facilitator engages participants to gather feedback on how to revise the question to clarify that the port authority may not have control over the re-entry policy (Appendix C.1, lines 56-64). A participant clarifies the difference between port employees and Port Authority employees (Appendix C.1, lines 86-90), which is used later to revise the question.

At Port of Pascagoula, whose hurricane plan does not specifically mention its re-entry policy, port practitioner input during the focus group makes it clear that the re-entry policy is event-driven, established by the port authority and applied to port authority personnel (Appendix C.2, lines 107-116). At PLC, the discussion expands on the relationships that make the re-entry authorizations useful and more meaningful. Interaction among focus group participants reveals that the re-entry passes, or “walking papers,” get sent to the sheriff’s department and can be used with local security, state security, or the National Guard (Appendix C.3, lines 129-131). The hurricane plan indicates that a list of names must be sent to the sheriff during normal readiness, but the focus group discussion elaborates on this further. At each focus group meeting, the discussion reveals the unique nature of each port authority and how they address post-storm re-entry, which is difficult to surmise just from looking at the plans. The question for the final PRI was re-worded to reflect the variability of re-entry policy options (Table 4.2).

### **Operations and Management**

Many of the actions suggested in the hurricane plans fall under the category of Operations and Management, which describes policies and procedures necessary to keep a port operating and includes communication within the port authority. For hazardous events, port authorities might have an emergency operations location or alternative operations location where they can evacuate and continue administrative procedures. If only looking at the hurricane plans, one might assume greater resilience at a port where there is a physical emergency operations location. The participatory process helped to clarify what works for each port and the advantages of remaining flexible on this topic. One of the questions from the pilot test phase asked whether or not ports have an alternative operations location (Table 4.3).

Since POCCA has a Continuity of Operations Site physically located 39 feet above sea level, focus group participants had no discussion on this question. During the other two focus groups, however, the discussion revealed more information about port variability for emergency

Table 4.3. PRI questions from Emergency Operations Location (Physical or Virtual), revised with feedback from focus group participants (in italics).

Pilot-test Question	Final Version of Question
Does your Port have an offsite evacuation haven or alternative operations location site?	Does your Port have an offsite evacuation haven or alternative operations location site, <i>based on the type of event, where it can continue basic operations?</i>

operations sites. At Port of Pascagoula, the initial response to the question was “no.” During focus group discussion, a participant states that the new location is not identified in the plan (Appendix C.4, line 187). Social interaction between the participants further clarified that JCPA did not have an evacuation location during Katrina, but since then, they have acquired new property that could serve as an evacuation location if needed, depending on the event. Port of Lake Charles has several evacuation locations that they can choose from, depending on the type of event. Through discussion with port practitioners, we learn that both physical locations and remote operations are options for Port of Lake Charles (Appendix C.5, lines 203-207). The participatory process of discussion revealed that port authorities make event-driven decisions to relocate and that the two ports with recent hurricane experience have flexibility with location whereas the port without recent experience has one physical location high above sea level. Focus



group feedback informed the rewording of the question to reflect the possibilities of remote operations and the importance of the type of event (Table 4.3).

If an event prevents physical access to port records or important documents, then operations will be disrupted. All three hurricane plans specifically mention electronic backup of system files and computer data during Port Condition 3 or X-Ray. The pilot-test PRI included some questions about electronic backup of important documents, which sparked several discussions on critical record storage, especially in the digital age (Table 4.4).

Table 4.4. PRI questions from Critical Records and Finance, revised with feedback from focus group participants (in italics).

Pilot-test Question	Final Version of Question
Does the Port keep hard copies and electronic backup storage of important documents at the alternative operations location?	<i>Does your Port have service contracts with an archival agency to store critical records?</i>  <i>If you do not have access to the office, do your Port employees have access to electronic documents?</i>
Does your Port store backup files offsite at a location not subject to the same risks?	<i>Does your Port implement offsite storage for electronic data (e.g., files stored on laptops, hard drive backup at offsite location, backup to the cloud)?</i>

Port of Pascagoula and Port of Lake Charles answered “yes” to both questions, but the discussion between participants revealed further information about best practices for building

redundancy in file storage and led to suggestions to revise the question to consider ports that do not have a physical alternative operations location. For example, Port of Pascagoula stores information on a server, which is backed up to a server in another location. If employees have access to laptops, they have access to the files, no matter where they are physically located (Appendix C.6, line 219). Similarly, Port of Lake Charles regularly backs up computer information, which is backed up again to servers in another location (Appendix C.7, line 236). The conversation also reveals that Port of Lake Charles contracts with an archival company to store hard copies of older documents off-site (Appendix C.7, lines 250-252).

The discussion with Port of Corpus Christi revealed something different and provided new information to the assembled participants. Staff shared that they back up their computer files to a flash drive when it's time to move to the alternate operations location (Appendix C.8, lines 278-279). Participants mentioned that data is also stored off-site, but this is not elaborated upon until discussion on the next question. In response to the second question, a participant explains that the daily backup of data to electronic servers occurs in the same geographical area as the alternate operations location; therefore, the offsite location for file backup is subject to the same risks, and the answer to the question would be "no" (Appendix C.9, lines 340-345). During this discussion, one staff member discloses a third alternate operations location in another city that could be an option for file storage (Appendix C.9, lines 319-324), and comments "I don't even know if this whole group knows" (Appendix C.9, lines 320-321).

In all three focus groups, the participatory process of group discussion revealed something particular about how each port authority practices file backup and storage. The conversation uncovered information in more detail and beyond the hurricane plans, which expanded the knowledge base of understanding how ports implement resilient practices,

minimizing disruption in operations. In addition, the feedback provided by participants resulted in revising the pilot-test questions and adding a question about critical record storage (Table 4.4).

Keeping communication flowing before, during, and after a hazardous event builds resilience by facilitating quicker response and recovery and by protecting port personnel. One of the pilot-test questions asked if the Port had identified communication methods with port personnel for times of emergency. In all three pilot tests, participants answered “yes” and described their chosen methods. Both Port of Corpus Christi and Port of Lake Charles use a 1-800 telephone number for employees to call to receive emergency-related information. At the time of the focus group session, Port of Corpus Christi was implementing a reverse alert communication system that sends all port employees a text message or email alerting them of changes in port status, before and after any hazard event. Port of Lake Charles had already implemented a similar system, called Dial My Calls, to contact port employees.

At Port of Pascagoula, the discussion revealed an entirely different way to make sure that port status gets communicated on the home webpage. For example, JCPA can post port status updates to its website during hazard events because they have a full-time port representative stationed in Miami (Appendix C.10, lines 385-387). The hurricane plan does not highlight that a port representative works in a different geographical location, but this comes out in discussion as a way to keep communication flowing during a hazard event.

Another way to enhance faster recovery and resume full operations as quickly as possible is to have an established procedure for damage assessment. In order to secure government assistance, certain procedures must be followed to maintain compliance with FEMA. One pilot-test question asked about having a pre-identified Damage Assessment Team (Table 4.5). All three hurricane plans mention conducting damage assessment in the post-storm phase, so

respondents answered this question relatively quickly. POCCA had no discussion on this question and answered “yes” because their plan specifically states that the Directors of Operations and Engineering coordinate the damage assessment. JCPA participants had no discussion except to say that “yes,” the facilities team and a contract engineer conduct the

Table 4.5. PRI questions from Continuity of Operations Planning and Critical Records and Finance, revised with feedback from focus group participants (in italics).

Pilot-test Question	Final Version of Question
Does your Port have a pre-identified Damage Assessment Team (e.g., in-house or contractors)?	Does your Port have a pre-identified Damage Assessment Team (e.g., in-house or contractors) and <i>the resources to conduct both an initial damage assessment and the formal damage assessment process per FEMA regulations?</i>
-	<i>Does your Port have pre-event video or photo documentation of its assets and infrastructure and the supplies to document damages to provide for FEMA and other insurance claims after an event?</i>
-	<i>Is your Port familiar with FEMA procedures for purchasing or acquisition and record-keeping for purchasing items after an event?</i>

damage assessment. At Port of Lake Charles, however, the discussion centered on whether assessment referred to an initial “eyes on the situation” assessment or the formal FEMA damage assessment process. PLC’s participants shared their experience after Hurricane Rita, where the personnel who stayed on-site conducted an initial damage assessment to determine where to begin cleanup work, which was an important step in stimulating their recovery.

During the PLC focus group, participants discussed with each other and elaborated on different aspects of damage assessment, whether initial assessment, formal FEMA damage assessment, or cargo damage assessments (Appendix C.11, lines 417-430). Participants interacted with each other to discuss the various parties involved in conducting damage assessments, whether port police or structural engineers (Appendix C.11, lines 467, 488). The facilitated discussion process stimulated participant feedback, which helped clarify the wording of the question to be more explicit (Table 4.5).

All three hurricane plans specifically list conducting an inventory of facilities and supplies available for response but do not suggest annual documentation of assets. Discussion about the formal damage assessment process sparked an additional conversation on the importance of having photo documentation of assets available, mentioned in discussion at PLC (Appendix C.11, lines 451-454). At the Port of Pascagoula, participants suggested adding two questions related to FEMA purchasing procedures and having photographs to use for FEMA damage claims, all in the effort to protect the port in post-event situations (Appendix C.12, lines 507-509; 522-525) (Table 4.5). The participatory discussion process presented an opportunity for participants to suggest additional PRI questions that would be useful to consider.

## External Communications and Partnerships

Coordination with state and federal agencies presents a challenge for disaster response and recovery at ports (U.S. GAO 2007). The hurricane plans for each focus group port mention communication and coordination with external agencies, such as U.S. Coast Guard and U.S. ACE. Two questions during the pilot-test PRI asked about the Port Coordination Team, or a similar entity, as a mechanism to stay up-to-date on damage assessments and communicate about crises with stakeholders (Table 4.6).

Table 4.6. PRI questions from Tenant and External Stakeholder Communications, revised with feedback from focus group participants (in italics).

Pilot-test Question	Final Version of Question
Does the Port use a Port Coordination Team or similar entity (includes USACE, USCG, and terminal operators) to remain up-to-date on damage assessments (i.e., federal navigation channel, aids to navigation, berthing areas)?	Does the Port <i>participate</i> in Port Coordination Team <i>conference calls</i> to remain up-to-date on crisis response and damage assessments?
Does your Port have a Port Coordination Team or Port Emergency Action Team that addresses crisis communications, planning and delivery with local and regional stakeholders?	Does your port <i>participate on</i> a U.S. Coast Guard Port Coordination Team or Port Emergency Action Team?

At Port of Corpus Christi, the discussion provided clarification about the Port Coordination Team (PCT) in terms of purpose, membership, and operation. The Coast Guard Captain of the Port leads the PCT, and any party that has interest in the port resuming operation as soon as possible is welcome to participate (Appendix C.13, lines 569; 594-596). Participation in the PCT only requires the ability to conference call (Appendix C.13, lines 623-624). In addition to providing more detail beyond the hurricane plan, the focus group discussion revealed that not every port authority staff member possesses common understanding of what the PCT is and how it operates (Appendix C.13, lines 555-567). For example, one participant asked “[W]ho makes up the Port Coordination Team? What other agencies?” (Appendix C.13, line 632). Participant interaction during discussion allowed for clarification on this topic, for the benefit of all port staff.

At Port of Pascagoula, the facilitators learned that staff participate in conference calls with the Port Emergency Action Team, which includes the U.S. Coast Guard and U.S. ACE. The participants go a step further in the discussion to describe the Port of Pascagoula Advisory Group as another mechanism to communicate information to tenants and port stakeholders (Appendix C.14, lines 661-663). Participants also mention that U.S. ACE conducts its own conference calls, separate from the Coast Guard, which is another way to stay informed (Appendix C.14, lines 687-691).

At Port of Lake Charles, the subject of two conference calls, one through U.S. Coast Guard and one through U.S. ACE, came up as a point of frustration for port personnel. In the instance where two different agency districts have jurisdiction over the same port, the conference calls quickly accumulate and take a lot of time and effort (Appendix C.15, lines 729-733, 741-745). The discussion at Port of Lake Charles also clarified the difference between a PCT and a

Harbor Safety Committee. The PCT operates during times of crisis whereas the Harbor Safety Committee is a permanently operating group. The focus group discussions on these questions about the PCTs provided insight into the mechanisms for communication when there is a hazard event and went into greater depth than what can be understood from the hurricane plans. This discussion informed the re-wording of the questions to clarify their meaning regarding communication with the PCT and communication with port tenants (Table 4.6).

### **Discussion and Conclusion**

This chapter answers part of research question one: at a localized and individual scale, how does the process of engaging stakeholders in a discussion provide further insight into port resilience compared to the written plans and objectives of hazard-related port documents? The analysis shows that port hurricane plans vary greatly from port to port and heavily emphasize the “response” element of resilience. Engaging port practitioners in a participatory process stimulates a forum where resilience assessment extends beyond statements in a plan to discussions of how a port authority implements certain actions, providing insight to the mechanisms of port resilience.

The summary and comparative analysis of three port hurricane plans indicate large variability in the application of the plans to various members of the port community. POCCA’s plan addresses communication and preparation within the port authority to great detail, including many pages devoted to identifying essential personnel and describing their obligations. In contrast, the plans for Port of Pascagoula and Port of Lake Charles provide direction for communicating with port personnel but also for communicating with federal and state agencies and with tenants and port users before a hurricane makes landfall. The reference to communication with external agencies and port tenants may be a result of previous experience



with hurricanes. Forums for cross-communication among port authorities, agency partners, and marine industries occurred in the past as a way to share storm information, mitigate damages, spur recovery, and access post-storm resources. The hurricane plans reflect this difference in experience with references to groups like the Port Coordination Team.

All three hurricane plans undoubtedly emphasize preparedness actions for infrastructure and communication procedures that would be required during the response phase from Condition 4 to Condition 1, which includes the seventy-two hours before and immediately after a hurricane makes landfall. The three port authorities that participated in the focus group meetings exhibited considerable variability in how they implement these actions, which became apparent in the discussion as participants answered the pilot-test PRI questions. This variability might be attributed to the size of the port authority staff and previous experience with hurricanes but also to the diverse individuals who assembled for discussion. Each person, whether from the port authority, the U.S. Coast Guard, or a private company, brought unique perspective and experience to the table. The participatory process of going through the questions allowed flexibility in the discussion of the responses and provided a space for participants to learn from each other and for me, as the lead facilitator, to learn from port practitioners.

The participatory process also allowed me, as the researcher, to gather expert input and participant feedback to revise the wording of the questions for the PRI. As presented in this chapter, feedback from the participants on topics such as damage assessment, communication methods, and alternative operations locations informed the wording of the pilot-test questions and led to suggestions for additional questions in order to achieve the objective of the project: to develop a tool broad enough to be completed by many port authorities but specific enough to be useful to an individual port authority.

Every data set has its limitations, so I must acknowledge the limitations of the focus group discussion extracts. Individual perspective creates a situation where data cannot be standardized or normalized. Challenges exist in taking nuanced discussion extracts from a few individual ports and generalizing it to the maritime industry, and this provides justification for a participatory process as an appropriate method for the purpose of assessing organizational resilience. Developing resilience is a process that leads to an outcome of greater resilience, which depends on the decisions and actions of people. Since individual staff members and tenants bring unique perspective to the collective whole of a port authority and port community, a process to assess resilience that revolves around discussion and interaction is an appropriate way to discuss resilience and inherently build capacity for resilience.

In addition, the questions from the PRI served as the object of discussion, which might be viewed as guiding participants in a certain direction or narrowing the topic of resilience. However, the facilitators had the job of digging deeper when a response to a question warranted more discussion. Facilitators also could provide information for clarification when confusion pervaded the discussion with participants. At the beginning of the project, the Ports Resilience Expert Committee agreed that the most beneficial product would be a checklist that could serve as a reference for new port leadership or staff. Presenting a standard self-assessment with the same questions to each group allowed for flexible discussion to reflect unique needs of the organization.

The literature indicates that emergency planning for ports heavily focuses on the response aspect, and gaps exist for long-term planning (U.S. GAO 2007; Smythe 2013; Becker et al. 2015). Since I defined *anticipation* with Port Condition 5 or normal readiness, actions labeled as *anticipation* focus on securing loose items, both landside and waterside, and “battening down the

hatches,” implicitly preparing for strong winds. The hurricane plans make no mention of readiness actions or anticipation for long-term threats, such as sea level rise or shoreline erosion, or for actions that might take place outside of hurricane season. The PRI includes questions to encourage respondents to consider long-term planning for environmental change, insurance and risk management strategies, and partnerships with entities external to the port authority. Focus group participants discussed and provided feedback on these types of questions, which will be presented in chapter five.

In the next chapter, we will see extracts from focus group discussion that show how the participatory process of discussion helps port authorities increase their adaptive capacity for long-term resilience. The PRI, which is a tool to promote active discussion and anticipatory thinking, helps bridge the gap between written hurricane plans and actions required to improve long-term resilience.

## **CHAPTER FIVE**

### **PARTICIPATORY PROCESS REVEALS PERCEPTIONS OF ANTICIPATION**

#### **Introduction**

Port planning for hazard events might include assembling preparedness plans, identifying availability of assets for response, developing communication plans, instituting alternative locations for emergency operations, and identifying federal resources to assist with recovery (Berle, Asbjørnslett, and Rice 2011; Berle, Rice, and Asbjørnslett 2011; U.S. GAO 2007; Mansouri, Nilchiani, and Mostashari 2010; Mileski and Honeycutt 2013; Saathoff 2006). The summary and analysis of three port hurricane plans, presented in chapter four, provides evidence of the detail that port authorities invest in conducting these activities and preparing port infrastructure and equipment, communicating storm status to port authority personnel, and preparing for remote financial operations in the ninety-six hours leading up to the arrival of tropical weather. Focusing on the days and hours leading up to an event helps port authorities increase their coping capacity to respond to disturbance, but this type of planning activates a short-term mindset and reactive approach to oncoming events. Port authorities should exercise anticipation and use a long-term perspective in preparing for future hazards in order to be proactive before an event, rather than reactive after an event. Taking anticipatory action drives adaptive capacity, which describes the ability of human systems to learn from the past, adapt to adversity, and prepare for the future (Nelson, Adger, and Brown 2007; Obrist 2010; Lorenz 2013).

Since the catastrophic hurricane season of 2005, published reports and studies have addressed the challenges of taking a proactive approach towards port planning. In the Government Accountability Office's 2007 report *Additional Federal Guidance Would Aid Ports*

*in Disaster Recovery*, port authorities from around the country identified challenges with communication systems, personnel management, and interagency coordination during times of disaster. Steps taken to mitigate future hazards included building redundancy in communication systems, storing response equipment on port property, holding discussion forums with port stakeholders, and coordinating with neighboring ports for response (U.S. GAO 2007). Similar to the port hurricane plans, these steps for mitigation focus on preparing for a short temporal window (e.g., on the order of days and hours) before a storm makes landfall. In 2012, the impacts of Hurricane Sandy to infrastructure at the Port Authority of New York and New Jersey reinforced that structural mitigation of waterfront buildings and implementation of flood design standards still present major challenges for port authorities that need to be addressed to prepare for long-term environmental change (Smythe 2013).

A step toward building adaptive capacity could include participatory methods as a way to stimulate interaction among people that generates discussion on lessons learned in the past and how to be ready for the future. Chapter four describes how the participatory process of discussing the PRI questions provides insight beyond hurricane plans into how port authorities implement actions for response and recovery that are listed in hurricane plans. The PRI also includes questions that promote discussion of anticipatory actions. In the research being presently described, discussion about mitigation for future hazards provides enlightenment from the perspective of members of port authorities. For some activities, such as building redundancy in communication systems, port authorities have succeeded in taking steps toward mitigation. Activities requiring more of an anticipatory approach, such as building for structural mitigation, coordinating with neighboring ports, and holding discussion forums with port stakeholders, have not been implemented. The participatory process of discussing these topics as indicator questions

through a self-assessment format reveals how members of port authorities, at least along the Gulf of Mexico coast, perceive these anticipatory strategies for resilience.

This chapter analyzes segments of the focus group discussions pertaining to questions in the pilot-test PRI having to do with anticipatory actions not addressed in the hurricane plans. To improve anticipation for response and recovery in order to reduce future vulnerability, the questions selected for analysis target actions including hazard mitigation for infrastructure, insurance and risk management strategies, and communication with tenants and stakeholders external to the port authority. After selecting these questions, I studied the flow of conversation and looked for instances of where the participatory process elicited examples of previous experience to inform the wording of the question. In addition, I used a critical lens in reading the interactions between participants and with the facilitators in order to understand how port authorities perceive anticipatory actions for long-term resilience. The insight provided through the pilot tests justifies the participatory methodology of the PRI as a way to understand progress towards port resilience.

I will highlight extracts from focus group discussion that show how the participatory process of discussion helps port authorities discuss topics that might increase their adaptive capacity for long-term resilience. The extracts are provided in Appendix D, with line numbers as a reference to particular segments of the excerpts. All names have been removed from the extracts to protect participant confidentiality. With each new extract, the participant numbering begins again. Therefore, “participant 1” in one discussion extract is not necessarily the same person as “participant 1” in another discussion extract. In addition, numbers in parentheses indicate the length of time of conversation pauses, in seconds.

## **Hazard Mitigation for Infrastructure**

Long-term planning for infrastructure, specifically to include hazard mitigation measures, continues to challenge port authorities. Becker et al. interviewed port stakeholders in Gulfport, Mississippi and Providence, Rhode Island to develop a list of resilient strategies for ports (2015). After fifty-seven interviews, the researchers identified 128 resilient strategies, divided into several overarching categories, including building codes and land use regulations; long-range planning efforts; and construction and design (Becker et al. 2014). Stakeholders interviewed for the project included representatives from a state port authority, port tenants, terminal operators, the U.S. Coast Guard, the U.S. Army Corps of Engineers (U.S. ACE), the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration, the Gulf of Mexico Alliance, state emergency management agencies, state departments of transportation, state economic development organizations, state coastal resource management departments, local civil defense organizations, community groups devoted to advocating for job growth, and university researchers (Becker et al. 2014; Becker and Caldwell 2015).

Since a broad and diverse group of port stakeholders identified these resilient strategies, our research team wanted to include these topics as indicator questions in the PRI. The resilient strategies incorporated into PRI questions represent anticipatory actions to prepare infrastructure for environmental change, such as including hurricanes and sea-level rise in designs and permits for future waterfront construction, elevating and hardening existing structures, retrofitting structures to mitigate for potential flood damage, evaluating impacts of storm surge and sea level rise on port facilities, and accounting for sea level rise in floodplain mapping (Becker and Caldwell 2015). During the development of the PRI, described in chapter two, the Ports Resilience Expert Committee [PREC] did not want to include these types of questions, often

commenting that port planning is business-driven, not risk-driven. From the research perspective, I wanted to test these types of questions with the three pilot-test port authorities, who would be the entities that might eventually implement these strategies. After pilot-test participants completed the PRI and provided feedback, the facilitators asked a few additional questions about planning for adaptation or long-term environmental change in order to understand how ports approach these challenging topics.

One of the pilot-test questions asked about the use of historical information in planning for the future (Table 5.1). Through previous Extension experience, I have learned that local

Table 5.1. PRI questions related to hazard mitigation for infrastructure, revised with feedback from focus group participants (in italics).

Pilot Test Question	Final Version of Question
Does your Port consider historical trends and past events (i.e., climatic data and hurricane paths) to identify information related to hazard risks in long-term planning (i.e., 20 years) for disasters?	Does your Port consider historical trends and past events (e.g., climatic data, <i>weather records, incidents on-site, economic trends</i> ) to identify information related to hazard risks <i>and probabilities for future acute events (e.g., hurricanes, chemical spill)?</i>
	Does your Port consider historical trends and past events (e.g., climatic data, <i>weather records, incidents on-site, economic trends</i> ) for <i>future chronic events (e.g., sea level rise, shoreline erosion, economic recession)?</i>



(Table 5.1 continued)

Pilot Test Question	Final Version of Question
Does your Port implement flood-resistant design standards?	Does your Port <i>follow FEMA Floodmap Base Flood Elevation standards?</i>
Has your Port performed a study to identify upgrades necessary to limit damage due to flooding, wave and wind action?	Has your Port performed an <i>assessment</i> to identify <i>infrastructure and facility</i> upgrades necessary to limit damage due to flooding, wave and wind action <i>for various storm scenarios?</i>

governments have struggled with long time frames for community planning. Local elected officials tend to think on the time frame of political office (e.g., four to six years), even though infrastructure planning requires a longer view. With port authorities, we wanted to learn more about time frames for long-term planning and chose twenty years as a starting point, to reflect the PREC's emphasis on business-driven planning. We also asked if port authorities implement flood-resistant design standards and if port authorities have performed a study to identify upgrades to mitigate for flood and wind damage (Table 5.1). These questions seek to encourage port authorities to be proactive in building design, but the discussion shows that insurance requirements drive the building design.

At the Port of Corpus Christi, when asked if twenty years is a typical planning time frame for port infrastructure, a participant stated that the planning time frame depends on the structure. Port of Corpus Christi Authority [POCCA] does consider flood-resistant design, especially in

light of changing FEMA flood maps, which have caused some buildings on port property to move into the floodplain (Appendix D.1, lines 7-9). Participant interaction reveals that POCCA is currently working on a strategic plan for the port and is working with the City of Corpus Christi to identify flood infrastructure that needs upgrades (Appendix D.1, lines 34-37).

The topic of structural mitigation came up again, later in discussion at POCCA, when the facilitator asked additional questions about planning for long-term environmental change, including if the port authority plans to retrofit structures to protect against flood damage and to implement wind-resistant design. At this point in the discussion, the participants provided additional information about their practices and disclosed that POCCA has its own design manual for any construction proposed to take place on port property (Appendix D.2, lines 76-79). In fact, POCCA's design manual often exceeds other design standards, including those of the City of Corpus Christi. The participants interacted with each other to discuss how this question might apply to other port authorities. Through the discussion, we learn that port authorities can implement their own building codes, as long as they meet the minimum standards of the local building code. The facilitator rephrased an earlier question and asks whether or not project planning incorporates hazard mitigation for potential sea level rise impacts (Appendix D.2, lines 40-43). One of the participants affirmed that port authorities should be looking at long-range plans for constructing and upgrading facilities to ensure survivability into the future: "How do we make sure that we plan for the - that our facilities are going to be able to have survivability as we go down the road" (Appendix D.2, lines 60-62). The participant mentions that having a facilities management plan is a good idea.

At Port of Pascagoula [PP], the discussion offered a very different view in terms of how ports perceive planning for the future. The facilitator probed a little bit by asking what time

frame PP uses to plan for construction and facilities (Appendix D.3, lines 132-133). The response indicated that port planning depends on market projections and market movement, so five to ten years would be considered long-term for port planning (Appendix D.3, lines 135-136, 140-142). To clarify the intent of the question, the facilitator asked about long-term planning for storm surge and flooding impacts (Appendix D.3, lines 154-156). Subsequent participant interaction revealed that everything changed after Hurricane Katrina, and all planning is based on the worst event experienced in the past. Historical storms and flood insurance requirements drive port planning for infrastructure (Appendix D.3, lines 171-175). Even despite the damages experienced by Katrina, one participant said that projected sea level rise is not considered in infrastructure planning (Appendix D.3, lines 179-180). More than one participant stated that planning is “reactive after an event and then proactive based on the worst event” (Appendix D.3, lines 164-165, 185-189, 251).

At Port of Pascagoula, the discussion transitioned to post-storm changes to National Flood Insurance Program requirements for new structures, and participants describe how the port’s geographical area encompasses two different political jurisdictions: City of Pascagoula and Jackson County. As a governmental entity, the port authority does not necessarily have to obtain a city building permit for new structures on port property (Appendix D.3, lines 216-218). Participants shared that Jackson County Port Authority [JCPA] conducts a cost-benefit analysis of proposed structures to decide which pathway will be more cost effective: building for compliance with flood insurance requirements or foregoing flood insurance and building cheaply for the short term, with the intention of rebuilding after the next storm event (Appendix D.3, lines 222-226). JCPA essentially evaluates the benefit of insuring structures on port property and views this as an approach to prevent large expenditures on insurance perceived as unnecessary.

When asked about flood-resistant design standards, participants shared that JCPA *considers* flood-resistant design standards but whether or not they *implement* those standards depends on the situation, again referring to the previous discussion on cost-benefit analysis of insurance (Appendix D.3, lines 293-294). The facilitator and co-facilitator pushed further with the participants and inquired whether it is even important to ask port authorities about a specific time frame for planning (Appendix D.3, lines 259-261). Once again, the respondents indicated that all planning is reactive and based on the worst-experienced event, so other ports will relate their planning to their worst-experienced event (Appendix D.3, lines 241-244).

In response to the question about conducting a study to identify upgrades for mitigation, participants referred to previous experience with hurricanes and mentioned that FEMA forced JCPA into mitigation assessment after Hurricane Katrina (Appendix D.3, 322-325) so that JCPA obtained eligibility to receive hazard mitigation funding. One participant's description of how storm impacts diminish with time after an event provides evidence of short-term memory after a major storm. "Early on, after the storm, when you're in the recovery and rebuild mode, you're focused on the flooding, the wave, and the wind action. But as we grow, that gets to be an afterthought..." (Appendix D.3, 327-332). For the PRI question, participants suggest changing "study" to "assessment," because study implies an official activity that costs time and money (Appendix D.3, lines 380-383). Even though JCPA does not conduct a port-wide study to identify upgrades, participants suggested that questions within the Hazard Assessment section be re-ordered by asking first if port authorities conduct a facility assessment and then use the results of that assessment to plan for upgrades (Appendix D.3, 387-390).

Participant discussion about questions to promote long-term thinking provide more insight to the business-driven aspects of port planning, especially at Port of Pascagoula. One

question asked if the port authority plans to elevate existing structures. Participants responded that FEMA required some structures to be elevated after Hurricane Katrina but for the most part, port business requires facilities to be at ground level (Appendix D.4, lines 395-396). One participant made a reference to the Port of Gulfport, which changed its proactive redevelopment plan after Katrina. Part of the post-Katrina Community Development Block Grant money went towards the expansion of the Mississippi State Port Authority [MSPA] at Gulfport. Initially, Gulfport planned to elevate port infrastructure between 10 feet and 25 feet after experiencing 28 feet of storm surge during Katrina (Becker and Caldwell 2015). However, in 2012, the MSPA Board of Commissioners reversed this decision, in favor of focusing on economic expansion instead of elevating infrastructure. The money intended to increase resilience and sustainability of the MSPA at Gulfport shifted towards economic development.

One participant commented that questions related to protecting structures against flood damage and wind damage should be automatic practices for port engineers (Appendix D.4, lines 414-417). These practices, however, include things like hurricane straps and wind-resistant doors, instead of elevating for sea level rise. Another participant described the reality of rebuilding after Katrina and states that the port authority chose not to elevate certain structures for both cost and operational reasons (Appendix D.4, lines 424-426). Ultimately, JCPA makes decisions with operations in mind first, even if that means building for exposure to hazards at ground level rather than building at higher elevation. “If it impacts how we operate, it’s gonna cost - it could potentially cost somebody, whether it’s money or time” (Appendix D.4, lines 432-433).

At Port of Lake Charles, discussion on questions about hazard mitigation resembled that of Port of Pascagoula and provided further insight into the importance of planning for business

and immediate functionality at ports. The Port uses previous wind events to determine wind insurance policies for future events, but that future planning does not extend to storm surge or flooding. The facilitator asked about planning time frames for buildings on port property, to which a participant described how planning for new docks considers historical tides but ultimately results in matching existing infrastructure to maintain immediate functionality (Appendix D.5, lines 456-459).

Later in the discussion, the facilitator asked if the port authority incorporates hazard mitigation actions into project development applications. Similar to the Port of Pascagoula, the initial response from Port of Lake Charles provides evidence of a short-term mindset, since a decision to include hazard mitigation depends on how long ago the last storm hit and if the port authority is willing to spend money on hazard mitigation (Appendix D.6, lines 521, 523). One participant asked what “environmental change” means, and when the facilitator suggested sea-level rise and climate-influenced factors, two participants responded “I think all that stuff’s a bunch of BS, honestly...I don’t think we take that into consideration at all” (Appendix D.6, lines 535, 537). Continuing with the theme of planning for business “tomorrow,” one participant again recalled a recent experience with designing a new dock and the challenges with incorporating storm surge and sea-level rise (Appendix D.6, lines 544-551). Ultimately, the infrastructure must match what already exists to remain operational.

For the question about flood-resistant design standards, Port of Lake Charles participants clarified that they use FEMA’s published Base Flood Elevation (BFE) standards in their design and construction, with one participant implying that building permits cannot be obtained without following BFE standards (Appendix D.5, lines 486-488). If PLC did secure a building permit, they would not be able to obtain flood insurance without following BFE standards.

The focus group discussions provided considerable insight into how port authorities approach port infrastructure planning and hazard mitigation. While Port of Corpus Christi recognizes the importance of long-term survivability of facilities and infrastructure, Port of Pascagoula and Port of Lake Charles reaffirm the importance of immediate functionality and the ability to keep doing business. The revised questions reflect participant input by avoiding reference to a specific planning time frame and instead referring to planning for episodic events and planning for long-term environmental change (Table 5.1).

Even though two of three focus groups responded negatively to questions about long-term environmental change, the discussion offered enlightenment on port authority perceptions of climate change. Therefore, these PRI questions remained in the final version to encourage respondents at least to consider future environmental change. Furthermore, POCCA implements a strict design manual while PLC builds to BFE and JCPA sometimes avoids following flood-resistant design. The revised questions related to flood mitigation more specifically mention FEMA BFE standards and conducting facility assessments, rather than studies, to identify upgrades (Table 5.1).

### **Insurance and Risk Management Strategies**

In addition to questions about structural mitigation, the PRI includes questions about insurance plans and risk management strategies. These topics may not necessarily be addressed in hurricane plans but increase the coping and adaptive capacity for future events, which is essential to enhancing resilience. One pilot test question implied a future damage assessment or use of predictive modeling for impacts to infrastructure, based on various storm scenarios (Table 5.2). Such predictive modeling might take place at a local government or municipality level, as a way to understand hazard risks to buildings. The PREC suggested this type of question to

encourage port authorities to be more proactive in developing their insurance packages. The PREC also suggested a follow-up question asking if the port authority understands its insurance policies and financial reserves in order to estimate how much money is needed to fund repairs and reconstruction (Table 5.2).

Table 5.2. PRI questions related to insurance and risk management strategies, revised with feedback from focus group participants (in italics).

Pilot Test Question	Final Version of Question
Does the Port conduct regular hazard risk assessments of infrastructure to determine what level of damage and repair can be expected based on the size of an event?	<i>Has your Port determined an acceptable level of risk (or risk tolerance) for various hazards?</i>
Has your Port determined the level of repair and reconstruction that could be supported from unrestricted reserves considering insurance deductibles and/or financial responsibility levels?	

At Port of Corpus Christi, participants shared that a wind study, which estimates property damages based on Category 5 hurricane wind speeds, determines the annual property insurance renewal rates (Appendix D.7, lines 572-576). Based on the results of the wind study, the port authority decides how much risk it will accept and how much money it will pay beyond the insurance policy for repairs. One participant provided a reality check by saying that no one



knows what level of reconstruction they might need unless they are looking at a scenario of total devastation (Appendix D.7, lines 646-647). Therefore, instead of putting aside money for specific repairs based on unknown damage scenarios, participants suggested asking about having a sufficient emergency fund for *some* repairs.

At Port of Pascagoula, the participants repeated that there is no regular formal assessment of potential impacts of storms. Participant interaction reveals how the two questions might confound each other. For example, each forecasted event, such as a Category 3 hurricane, has a different size and follows a different path to landfall, even if the wind speeds are the same. Similarly, expected damage to infrastructure depends on how infrastructure changes from year to year, whether buildings are added, altered, or removed. One participant disclosed that the port authority keeps \$100,000 as a threshold to fund insurance coverage and repairs and reconstruction (Appendix D.8, lines 750-754). The response at Port of Lake Charles mirrors that of Port of Corpus Christi. The wind study includes future assessments of wind impacts, but the staff were unsure whether the same predictive assessment occurs for storm surge modeling. The port authority determines its level of financial reserves when it purchases insurance coverage (Appendix D.9, lines 772-774). As discussed in chapter four, port operations can change rapidly, depending on the storm forecast. Predictive modeling for impacts to port infrastructure, however, appears to be more foreign to port authorities. The final PRI consolidated these questions and revised them to explicitly ask about accepting risk, rather than predicting potential loss (Table 5.2)

Another risk management strategy for port authorities to increase coping capacity is to have mutual aid agreements with other organizations that might provide emergency support operations (Table 5.3). Mutual aid agreements require anticipatory action because they list and

formalize the relationships that provide aid. The AAPA manual includes a template for a mutual aid agreement that addresses how aid will be requested, the type of aid to be provided and how personnel giving support will be provided for, in terms of food, housing, and communication mechanisms. The focus group discussions revealed that mutual aid agreements between Gulf of Mexico ports may not be very common, which might be attributed to the wording of the

Table 5.3. PRI questions related to mutual aid and master service agreements, revised with feedback from focus group participants (in italics).

Pilot Test Question	Final Version of Question
Does your Port have mutual aid agreements with other organizations to provide emergency support operations?	Does your Port have mutual aid <i>or formal agreements with neighboring ports</i> to provide emergency support operations ( <i>e.g., providing fuel for generators; water; food; people to help with cleanup</i> )?
Does your Port have pre-event contracts in place to allow for fast-track procurement of emergency response and recovery services?	Does your Port have <i>a list of vendors and contact information to allow for quick scheduling</i> of emergency response and recovery services ( <i>e.g., equipment, supplies, damage assessment, facility control, channel maintenance</i> )?

(Table 5.3 continued)

Pilot Test Question	Final Version of Question
Do other government entities in the local area have master service agreements for emergency response and restoration that could include the Port?	Do other government entities in the area have master service agreements for emergency response and restoration that could <i>benefit</i> the Port ( <i>e.g., highway cleaning equipment to clear debris from roads leading into or out of the port facility</i> )?

question. At Port of Corpus Christi, a participant responded immediately by describing pre-event service contracts to speed up the availability of post-storm recovery equipment and services (Appendix D.10, lines 782-786). Further participant interaction revealed that the port authority has various contracts lined up with companies to enhance storm response and recovery, but the port authority would not offer the services guaranteed by those companies to the City of Corpus Christi (Appendix D.10, lines 837-838).

Additional pilot-test questions specifically asked about service agreements at the Port and with local government (Table 5.3). Port of Corpus Christi has service contracts in place with a company that many entities in the Corpus Christi area use, but POCCA does not know the specific details of the master service agreements that the City has in place (Appendix D.10, lines 883-889). Participant interaction provides insight into the uniqueness of port authorities and the subsequent need to have a N/A response option for this question. For example, the governance structure of a port authority will determine whether master service agreements for the city or the

county would include the port authority (Appendix D.10, lines 916-940). Since the Port of Corpus Christi is its own governmental entity, the question about master service agreements with other governmental entities does not immediately apply to them. Instituting master service agreements for response and recovery requires advanced communication and relationship-building with those entities.

At the Port of Pascagoula, recent experience with response and recovery after Hurricane Katrina came up in the discussion on mutual aid agreements. No written mutual aid agreements exist, but various organizations will provide assistance to industrial companies, if needed (Appendix D.11, lines 959-960). For pre-event contracts, participants described the difficulty of having these in place for the port authority. First, no one can predict which service companies will be available and operational after an event (Appendix D.11, lines 972-978). The port authority places more emphasis on having a list of potential vendors available to call after an event. In addition, pre-event contracts cost money, and service companies will more likely respond to large operators (e.g., oil and gas companies) rather than port authorities with smaller operating budgets. Two participants shared their experiences with other entities during Hurricane Katrina and described how the city government and private companies have pre-event contracts to enable response and recovery immediately after an event (Appendix D.11, lines 1006-1028). Members of JCPA openly acknowledged that this is an example of business continuity, but the port does not do it (Appendix D.11, lines 1030-1035). On the other hand, however, a port tenant may pay for road clearing that would include roadways leading into the port area. Port users like Chevron pay for pre-event contracts, which may end up benefitting the port authority (Appendix D.11, lines 989-997).

At Port of Lake Charles, participants responded to questions about mutual aid by describing how the port authority provides safe harbor for vessels. When asked specifically about pre-event contracts for emergency response and recovery services, participants shared that having contracts will not make anything faster because all affected organizations will be calling those companies (Appendix D.12, lines 1157-1169). Instead, the Port maintains a list of potential vendors for emergency response and recovery. For master service agreements, City of Lake Charles' pre-event contracts do include the Port, which differs from the other pilot-test ports.

The discussion on questions about insurance and risk management strategies brings out the influence of previous experience with hurricanes. Out of the three ports visited, Port of Corpus Christi has a pre-event service contract in place and has not experienced a major hurricane since 1970. The other two ports, with more recent experience, indicated that pre-service contracts may not work because no one knows which companies might be available and operational after a major storm. In the discussion with Port of Corpus Christi, a participant suggested that smaller ports may need mutual aid agreements because they may not have the resources necessary to respond and resume operations quickly. To clarify the difference between mutual aid agreements and service contracts, I revised the questions to reflect that mutual aid might come from neighboring ports and that having a list of potential vendors to contact for emergency services is important in the cases where actual contracts are not feasible (Table 5.3).

### **Tenant and External Stakeholder Communication**

Chapter four described how the PRI includes questions about groups like the Port Coordination Team or the Port Emergency Action Team to facilitate a discussion on mechanisms for communicating with federal agencies such as the U.S. Coast Guard and U.S. ACE. Communicating with port tenants and port users also helps to improve resilience by reaching out

to other members of the port community and increasing awareness of readiness policies and procedures. Distinguishing between Port Authority responsibility and port user responsibility leads to challenges in communicating with tenants. For ports that may not be a port authority, this distinction is essential. The PRI includes questions that generate participant interaction to consider anticipatory actions that broaden the reach of port communications beyond the Port Authority staff. The pilot-test PRI asked two questions about port authority efforts to raise awareness of port policies to customers and tenants in order to minimize property damage and ensure personal survival during and after an event (Table 5.4).

Table 5.4. PRI questions related to communications with tenants and stakeholders external to the port authority, revised with feedback from focus group participants (in italics).

Pilot Test Question	Final Version of Question
Does your Port conduct routine emergency preparedness and hurricane readiness meetings to review policies and procedures with customers and tenants?	<i>Is there a mechanism in place for your Port to conduct emergency preparedness and hurricane readiness meetings to review the Port's policies and procedures with customers and tenants?</i>
Does your Port remind tenants and customers to review their company's storm plans for storm preparation activities (e.g., coordinating vessel activity; moving barges; securing cargo)?	<i>Is there a mechanism in place for the Port to remind tenants and customers to review their company's storm plans for storm preparation activities (e.g., coordinating vessel activity; moving barges; securing cargo)?</i>

(Table 5.4 continued)

Pilot Test Question	Final Version of Question
-	<i>Does your Port require its tenants to provide a copy of their business continuity plan?</i>
-	<i>Does your Port re-broadcast internal and external advisories (e.g., U.S. Coast Guard Marine Safety Information Bulletin) to communicate with tenants as needed during the crisis?</i>

At Port of Corpus Christi, interaction between participants and the facilitators provides support for inclusion of these types of questions and reinforces the distinction between port users and Port Authority staff members. Participants initially responded that POCCA does not conduct routine emergency preparedness meetings to review procedures with customers and tenants. Four participants went back and forth with each other to discuss *why* the port authority should remind tenants to assume responsibility for their property and facilities. One participant offered that it is professional courtesy to remind tenants of the port tariff, especially as it relates to company responsibility after an event. "...[T]here's due diligence on both parts required...We can advise them though...as a professional courtesy" (Appendix D.13, lines 1198-1215). Furthermore, one participant justified why the Port Authority should remind port users to review company preparedness plans: "...kind of almost a moral obligation, I mean, we [the Port Authority] have to recognize that we have lots of tenants that are coming in here that are not from this area, that

are not climatized to our, our situations. I mean, we have foreign construction, and stakeholders now that may need a little assistance” (Appendix D.13, lines 1296-1299). With high traffic flow from customers representing all parts of the world, the act of raising situational awareness with port users sets the port up for survival during events. Participants agreed that the Port Authority can send media broadcasts to customers to remind them of hurricane season and to encourage them to review the port tariff (Appendix D.13, lines 1222-1223). Another participant suggested that participation by customers and tenants in a port-wide group would allow information to be shared with port users (Appendix D.13, 1303-1304).

At the Port of Pascagoula, participants responded quickly with “yes” to both questions. The hurricane plan for Port of Pascagoula indicates that the Port Authority reaches out to marine interests and port users to remind them of hurricane season, provide them with the plan, and keep communication open during the ninety-six hours before hurricane landfall. Similarly, at the Port of Lake Charles, staff distribute the hurricane plan to their customers and tenants and remind them to review their own company’s readiness plans. However, the discussion reveals that the Port staff do not actively review the policies and procedures in a meeting format with customers and tenants; such an active review strictly happens with other Port Authority staff. One participant suggested that the communication system used with Port Authority personnel should be expanded to include port tenants so they receive updates on port status (Appendix D.14, lines 1366-1368).

During the discussion at Port of Lake Charles, one of the participants, a representative from private industry, offered his previous experience with his company having to submit a hurricane preparedness plan to the property landlord. He describes how the preparedness plan needed to replicate the preparedness plan of the landlord. The participant suggested that



requiring tenants to submit a preparedness plan might be something for the Port Authority to consider: “That may be something you might wanna think about, you know. I mean, we just would mirror yours [hurricane plan], but at least we’d sign off on it and say ‘we’re buying into what you’re selling.’ That we’d pick up all our stuff, that we’d be responsible for all our equipment...” (Appendix D.14, lines 1374-1378). Another participant mentioned that when the port closes, all the tenants have to leave anyways, which elicits a response from a third participant, who said “[B]ut it may not be a bad idea to have the tenants...everybody’s got the plan...if you have a plan that mirrors ours and we say we’re at [Condition] Whiskey, you know what to do” (Appendix D.14, lines 1397-1399).

As vessels move through the maritime transportation network, high fluidity across port users and tenants requires action by the port authority to promote readiness. The discussion stimulated by questions about communication with tenants and port users provides support for the participatory process as a method to promote adaptive capacity. For example, even though the Port of Lake Charles distributes its hurricane plan to port users, staff members recognize that they could take more active steps in making sure that port tenants understand preparedness policies. Sharing experience in a discussion-based setting allowed this conversation to take place.

Two additional questions reflect participant suggestions for action to include tenant business continuity plans and port-wide broadcast advisories (Table 5.4). The adjusted questions reflect the need for distinction between responsibility of the Port Authority and port community. By visiting three different port authorities with three different perspectives, the researchers gathered practitioner input to revise the questions of the PRI and promote anticipatory actions to build resilience of the port community.

## **Discussion and Conclusion**

This chapter answers part of research question one: at a localized and individual scale, how does the process of engaging stakeholders in a discussion provide further insight into port resilience compared to the written plans and objectives of hazard-related port documents? The questions discussed in this chapter address actions beyond the scope of the hurricane plans. Through discussing anticipatory actions for long-term resilience, such as incorporating hazard mitigation into infrastructure planning, we learn that some port authorities understand and accept future risks and take proactive steps to prepare for those impacts whereas other port authorities choose not to anticipate and prepare for future environmental risks.

Comparison among the three focus group discussions reveals a very stark difference in the collective port authority mindset towards environmental change and hazard mitigation. Port of Corpus Christi representatives seek to understand how flood zones have changed and published a design manual with strict standards for construction on port property. Officials from the Port of Pascagoula and Port of Lake Charles, on the other hand, boldly state in discussion that they do not consider future environmental changes, such as sea level rise, in port planning but choose to focus on immediate functionality and potential market movement. Reasons for different approaches to long-term planning might include the influence of recent experience with major storm events and a pervasive cultural mindset toward controversial topics, such as climate change. Interestingly, the port authorities choosing to ignore the future environment also have the most recent experience with major hurricanes. A logical assumption might be that the reason for the short-term mindset corresponds with “surviving” recent hurricanes with very little long-term damage to infrastructure and operations. In fact, as discussed in chapter three, the influx of

federal recovery resources after the storms provided a boost to regional economic recovery, accompanied by increased traffic flow moving through the ports.

The focus group discussions show a preponderance for considering recent historical events instead of future environmental change in planning for facilities and construction. For the Jackson County Port Authority, all local building codes and design standards use Hurricane Katrina as the baseline. The Port Authority itself conducts a cost-benefit analysis for each proposed structure to determine if the structure should be built with the expectation that it will eventually get destroyed. For Port of Lake Charles, design standards incorporate adjustments based on the most recent hurricane but also reflect FEMA BFE standards. At Port of Corpus Christi, however, staff use up to a 50-year planning timeframe for some of their structures and implement strict design standards based on the FEMA-designated flood zones for port facilities.

Adaptability of operations seems to be more feasible and more palatable to port authorities than adaptability of infrastructure. A few participants offered comments that suggest a short-term and reactive perspective of port operations. For example, at the Port of Pascagoula, one participant said "...if push comes to shove, we could set up a couple of desks and computers and stuff, and go back to work. At least the essential staff pretty quick." At Port of Lake Charles, one participant said "we just take care of it." Another participant referred to challenges with obstructions to navigation in the channel and said "what good is it to be resilient if you can't do what you're supposed to do?" This analysis informs a discussion on port authorities and their concern for adapting to future environmental change. The 128 resilient strategies proposed by Becker et al. and developed with port stakeholder input include strategies to encourage adaptation to environmental change (2015). The participatory process discussed here, however, provides conflicting interpretations of the concept of port resilience from the perspective of port

practitioners. How might society encourage port authorities to adapt infrastructure and operations when the short-term view guides the planning?

This chapter also answers part of research question two: how does the PRI process incorporate contextual factors of a port's identity in discussions of resilience? The discussion on hazard mitigation elicits organizational identities and mindsets toward environmental change, but the process of interaction among focus group participants and with the facilitators also helps explain unique operational components related to governance structure for each port authority. For example, each port authority's jurisdictional oversight influences how it obtains building permits for construction. In addition, governance structures and organizational relationships influence whether city-wide master service agreements include port authorities. For example, the City of Lake Charles has a master service agreement, which includes the Port of Lake Charles. This is not the case for POCCA or JCPA. Furthermore, discussion highlights previous experience with hurricanes, which is unique to collective port authorities and individual staff members and influences responses to PRI questions. For example, recent hurricane experience at Pascagoula and Lake Charles has not resulted in pre-event service contracts.

We have learned that port authorities operate at variable spatial scales and have unique governance structures, so the process of going through a self-assessment for resilience and discussing the questions allows for flexibility in applying the content to the individual needs of the organization and to building resilience for multiple types of disruption, not just forecasted hurricanes. Discussing the items within the PRI promotes readiness and resourcefulness for any disruption. The concept of resourcefulness, put forward by MacKinnon and Derickson, emphasizes "the possibilities of community self-determination through local skills and 'folk' knowledge" (2013, 267). Similar to how port authorities operate at variable spatial scales, the

interpersonal and social relationships change at variable spatial scales. At the individual organizational level, the participatory process of discussing indicator questions brings forth multiple perspectives to generate collective resourcefulness.

The participatory process of the PRI also helps port authority staff members learn new perspectives from others in the room. The discussion format provides a comfortable space to approach new ideas and consider new practices. In this chapter, both mutual aid agreements and communication processes with tenants represent topics that spark new ideas for participants. While completion of the PRI does not enforce action, the nature of discussion on tenant communication versus hazard mitigation shows that the participatory process is effective. Participants seem more likely to consider new practices to extend communication with port users rather than consider sea level rise in infrastructure planning. Either way, the fact that a discussion on these topics even occurred helps promote adaptive capacity by guiding participants in linking the past with the future. The next chapter will present and discuss evidence of the effectiveness of the participatory process, from the perspective of the focus group participants.

## **CHAPTER SIX**

### **FOCUS GROUP PARTICIPANT PERSPECTIVES OF PORTS RESILIENCE INDEX**

#### **Introduction**

The preceding chapters have focused on elements of the participatory approach used to develop the Ports Resilience Index [PRI] and the function of that tool in facilitating a conversation on resilience, as it relates to port authority preparedness for hurricanes and anticipation for future environmental change. The research and analysis have applied the concept of community resilience to port authorities and have broadened the scope of knowledge related to qualitative methods to assess and understand resilience on smaller spatial and organizational scales. The PRI project began with a goal to develop a resilience assessment tool broad enough to be widely applicable to ports but specific enough to be useful to an individual port authority, and the use of participatory research methods helped achieve this goal. A participatory approach, as a broader research strategy, moves forward with new ideas that come up during a process of engagement, which allows practitioners to share control of the research process (Whyte 1991, 97-98). With each round of expert consultation, the project team gathered information on the topics considered to be most important for resilience to port practitioners, at least along the Gulf of Mexico coast. This information and feedback from port practitioners resulted in the development of the PRI, a resilience self-assessment tool.

Participatory research involves practitioners as co-researchers who make free and informed choices, including the choice to participate (Whyte 1991). During the pilot-test phase of the PRI project, we conducted focus groups as a way to collect feedback to continue to develop the tool. The design and implementation of the focus groups also allowed us to collect

feedback on the process of completing the PRI in a participatory setting. In a way, a sort of “nested participation” allowed for several cycles of feedback during the PRI project (Figure 6.1).

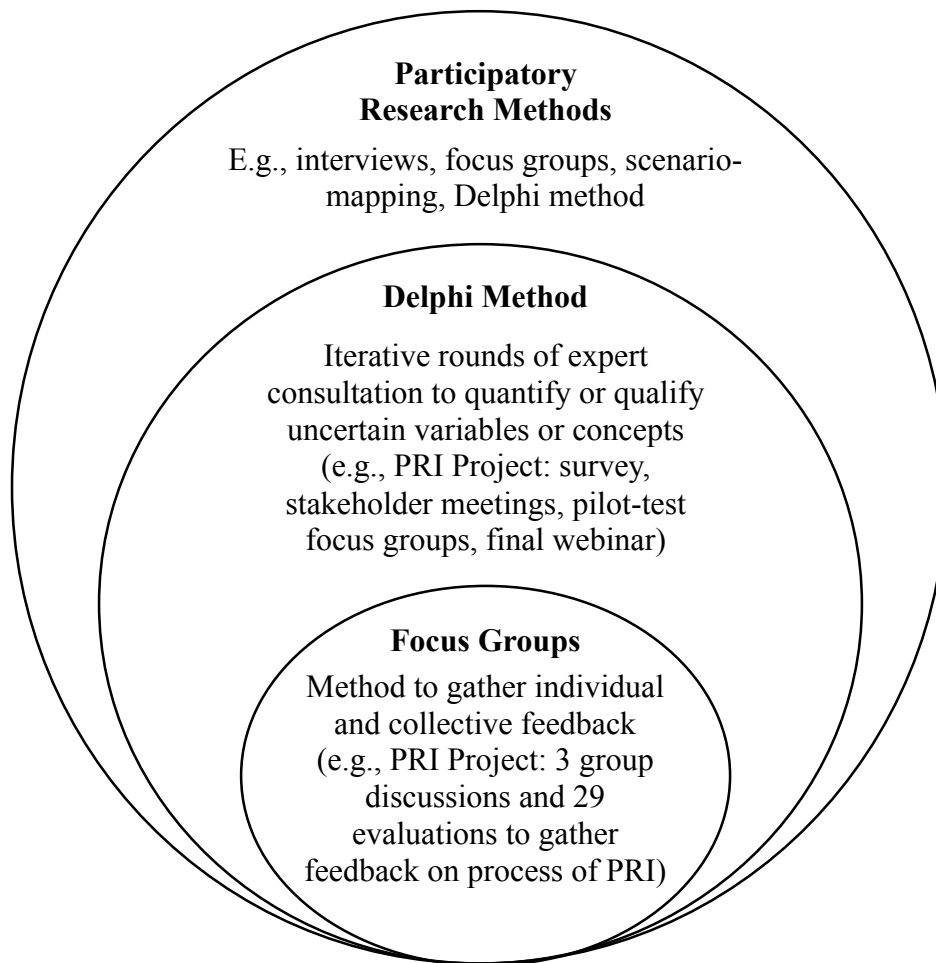


Figure 6.1. Participatory research strategies and nested cycles of participation implemented for the Ports Resilience Index project.

Chapters four and five provided evidence to show that pilot-testing the PRI with port practitioners across the Gulf of Mexico coast helped to ground-truth the tool, which supports the use of a participatory process from the researcher perspective, but what about from the participant perspective? Through discussion and evaluations with a total of thirty-nine participants, I used the focus groups to understand the participant perspective of completing the PRI assessment in a participatory setting.

This chapter aims to show that port practitioners willingly participated in the focus groups and to explore how they perceived the effectiveness of the participatory process to discuss resilience. The evidence supports the use of focus groups, the Delphi method, and participatory research strategies to link method to theory by implementing methods that provide a structure to understand the concept of resilience. This participatory methodology can be applied at other spatial and organization scales in order to build capacity for resilience.

### **Methods for Focus Groups and Evaluations**

Focus groups represent one qualitative method to gather social data and collective input in a semi-structured manner, using a particular topic or item to stimulate discussion (Silverman 2013). When designing and implementing focus groups, elements to consider include the role of participant interaction (e.g., to stimulate opinions or to build knowledge collectively); the structure of the focus group (e.g., semi-structured format or free-flowing conversation); the role of the moderator or facilitator (e.g., objective or actively political); and the approach to data analysis (e.g., verbal content analysis or narrative analysis) (Ryan et al. 2014). These elements influence the type of information or results produced by focus groups. For the pilot-test phase of the PRI project, the focus group format closely resembled that of a scoping focus group but included some elements of a theory-building focus group, as presented by Ryan et al. (Figure 6.2). For each of the three focus groups, most of the data analysis pertained to verbal content.

While described in chapter two, the format of the pilot-test focus groups bears repeating here. All participants received a meeting agenda (Appendix E.1) and a copy of the draft PRI (Appendix B.4), which included forty-six indicator questions. The facilitators reviewed the origin of the PRI project and then led the participants through a simulated completion of the PRI in order to gather feedback on the content and format of the questions. Following the completion



of the PRI, the facilitators engaged participants in a discussion about the process of going through the PRI in a participatory setting. Specific questions to the participants included: are

Descriptive Framework for Focus Group Design Characteristics and Evidence.			
	Type A approach [Scoping focus group]	Hybrid approach [Theory-building focus group]	Type B approach [Narrative focus group]
Theoretical perspective	Individualistic social psychology	Mixed	Social constructionist
Purpose or use	Pretest, hypothesis generating	Build mid-range theory, constructs	Fill in gaps—how and why questions, empowerment
Type of information	Stable personal opinion	Mixed-opinion/experiences	Social and/or tacit knowledge
Role of participant interaction	Stimulate and elaborate personal opinion	Generate mix of personal opinion and collective experiences	Facilitate collective knowledge building
-Structure	Standardized, replicable, directive, predetermined	Mixed with semistructured conversation	Nonstandardized, variant, emergent, spontaneous, natural conversation
-Evaluator stance/role	Scientific neutrality/ perhaps technician	Empathic interviewer with authority	Ancillary and/or political
-Data analysis	Content-oriented analysis	May mix or merge interaction with content; grounded theory analysis	Narrative analysis
Evidence	Basic information Simple qualitative description	Rich description preliminary program/policy theory	Narratives

Figure 6.2. Design characteristics for three types of focus groups (Source: Ryan et al. 2014).

there people missing from the table who you think should be here; is three hours a reasonable amount of time to devote to this activity; and is there an opportunity to integrate completing the PRI into another planning process, such as annual hurricane planning? Responses to these questions resemble responses provided on the evaluation questionnaires, but the discussion process allowed participants to bring up additional thoughts and suggestions.

In the last segment of each focus group, participants had the opportunity to voluntarily complete and submit an evaluation questionnaire. The questionnaire served to gather feedback on the perceived success of the meeting and the process of group completion of the PRI and to

solicit suggestions to improve the PRI for future use with other port authorities. The evaluation questions included a variety of response options, such as likert scale, multiple choice, and open-ended response (Appendix E.2). All survey instruments and questionnaires received Institutional Review Board approval from Louisiana State University. Out of thirty-nine focus group participants, twenty-nine participants returned an evaluation sheet, for an overall response rate of 74 percent. To clarify, not all twenty-nine respondents provided an answer to every question on the evaluation. For example, if twenty-eight out of twenty-nine participants answered “yes,” the twenty-ninth person may have chosen not to answer that particular question.

### **Evaluation Results and Focus Group Discussion Analysis**

After each focus group session, I immediately recorded my reflections on how the process of the meeting went and what I learned, substantively, from spending time with the port authority. For the Pilot Port Resiliency meetings, the agenda allotted one hour for gathering feedback on the PRI questions. In all three cases, we spent almost two hours going through the PRI. With each port authority, the facilitation began awkwardly, with stops and starts in the conversation. Within ten minutes, however, more participants talked, and the conversation took on a critical tone as participants reviewed each question. To facilitate productive conversation, I embraced the role of clarifying feedback and responses from focus group participants.

Each session began with a level of awkwardness and discomfort that dissipated when the participants understood that they were not being graded or scored in that moment. Eventually, all participants spoke up and provided input on the questions. In addition to increasing the amount of time to gather feedback on the questions, we also added a ten-minute bathroom and refreshment break in the middle of the PRI facilitation. This break allowed participants to stretch their legs but also to engage in casual conversation with each other and with the facilitators. For

example, during the break at the Port of Pascagoula, one participant said “this is way more interesting than I thought it would be!” From the facilitator perspective, such comments provide secondary feedback for designing and planning effective facilitation sessions.

Even though an independent observer did not evaluate the focus group sessions, the evaluation results suggest that participants felt the process to be useful and that individuals benefitted from the meetings. For the first three questions on the evaluation, the responses indicate that participants generally found the focus group to be useful, the objectives well-defined and understood, and the time commitment worth it (Table 6.1).

Table 6.1. Responses to evaluation questions one through three.

Question	Percentage of Respondents	Number of Respondents
1. The focus group was useful.	97 Agree	28/29 Agree
2. The objectives were well defined and understood throughout the meeting.	69 Agree 28 Somewhat Agree	20/29 Agree 8/29 Somewhat Agree
3. The time commitment was worth it.	93 Agree	27/29 Agree

Questions four, five, seven, and eight asked respondents for their opinion on the process of the entire meeting. For number four, the question re-stated the purpose of the meeting: “The purpose of this focus group was to conduct a simulated facilitation of the PRI with staff and stakeholders of the Port of (Corpus Christi, Pascagoula, or Lake Charles) in order to collect

feedback to improve the tool.” Twenty-seven respondents (93 percent) answered positively that they thought the focus group achieved its purpose in the course of the meeting (Table 6.2).

Table 6.2. Responses to evaluation questions four, five, seven, and eight, pertaining to participant opinions on the process of the meeting.

Question	Percentage of Respondents	Number of Respondents
4. Do you think the purpose of the focus group was achieved throughout the meeting?	93 Yes	27/29 Yes
5. Which of the following activities was most useful to you?	7 - all activities	2/29 - all activities
	45 - discussion on content	13/29 - discussion on content
	10 - facilitation of the PRI	3/29 - facilitation of the PRI
	24 - discussion on process	7/29 - discussion on process
	7 - discussion on content	2/29 - discussion on content
Introduction to the PRI Project	AND process	AND process
Group Facilitation of the PRI	3 - facilitation and	1/29 - facilitation and
Group Discussion on process	discussion on process	discussion on process
Group Discussion on content	3 - facilitation and	1/29 - facilitation and
	discussion on process	discussion on process AND
	AND content	content

(Table 6.2 continued)

Question	Percentage of Respondents	Number of Respondents
7. Did you feel that it was beneficial to have all departments in one room to go through the questions on the PRI?	97 Yes	28/29 Yes
8. Did you feel that anyone was missing from the discussion this afternoon (or morning)?	48 No 41 Yes	14/29 No 12/29 Yes

Question five gave respondents the option to select multiple responses, which corresponded to different segments of the meeting, indicated on the agenda. For example, “Group Discussion on Content” corresponded to the segment of the meeting addressing the questions about planning for adaptation and long-term environmental change (Appendix E.3). In hindsight, the question may have confused respondents, since it appeared at the end of the focus group session and did not explicitly refer to the questions about long-term environmental change. Participants may have interpreted the response option “Group Discussion on Content” as referring to discussing the content of the entire PRI. Either way, the responses suggest that participants found the content of the PRI to be most useful. In response to question five, two respondents (7 percent) selected all response options, with an additional comment to “remain

flexible to discuss any as applicable.” Thirteen respondents (45 percent) selected “Group Discussion on the Content” as most useful. Three respondents (10 percent) selected “Group Facilitation of the PRI” as the most useful. Seven respondents (24 percent) selected “Group Discussion on the Process” as most useful, suggesting an interest in exploring the participatory process. While the evaluation question may have some limitations as written, most of the respondents did select “Group Discussion on the Content” as most useful.

Questions seven and eight asked respondents about the composition of the participants who attended the meeting to go through the PRI. We wanted to know if it was helpful to have port authority staff members in the same room to complete the assessment. Almost all respondents (97 percent) indicated that yes, they felt it was beneficial to have all departments present in one room to go through the questions (Table 6.2). During the focus group at Port of Corpus Christi, one participant spoke about one of the benefits of completing the self-assessment in a participatory setting. As a member of the Facilities and Maintenance Department, this person commented on the difficulty of answering questions related to other areas of port operations, such as engineering and insurance and risk management: “We [Facilities & Maintenance] don’t know...what their [Engineering] processes are. I’m not aware of that...but they have something in place...we don’t know the scope of work that she [Risk Manager] does, so the question is too generalized for everybody to answer, without really knowing the facts.” With representatives from multiple port departments in one room, the participatory process of completing the PRI creates a space for reflective discussion and helps facilitate a conversation about resilient practices.

At Port of Pascagoula, the facilitator asked if individuals should go through the checklist separately and then come together to discuss their responses. Participants concluded that the

participatory process of completing the PRI uses time efficiently and provides an opportunity for participants to explore and confer about disagreements over the answers. One participant spoke about the benefit of collectively discussing disagreements about the answers: “I think you’re gonna get more done in a short period of time. And, you know, if he says something that I disagree with, then we can talk it out and see how we need to modify the answer.”

For question eight, which asked whether anyone was missing from the discussion, responses split pretty evenly between yes (41 percent) and no (48 percent). Many of the respondents who answered “yes” suggested that representatives from the port police or port security management should be present. Other suggestions included having representatives from U.S. ACE, FEMA, the City, the County, and the Port Commission. One respondent suggested conducting a similar but separate meeting with tenants.

Facilitators also asked this question during the focus groups. At Port of Corpus Christi, participants specifically highlighted the unique nature of each port authority and suggested that the PRI include a list of suggested participants but remain flexible to fit the needs of individual port authorities. One participant commented that the type of port and its operation structure will determine attendance at a port resilience meeting. For larger port authorities, such as at Corpus Christi, having all staff present would result in a group too large to facilitate effectively. For smaller port authorities, however, the entire staff may need to be present in order to have a complete discussion. One participant referenced previous experience working at another port authority: “at a small Port that I’ve worked at, I would encourage you to have the entire staff.” The list of invitees for completing the PRI depends on the management structure and operational needs of the port authority.

For some groups, discussing the PRI might be a mechanism to establish relationships with external stakeholders, such as U.S. ACE or FEMA. One topic brought up during discussion related to whether or not to include private industry representatives or port tenants at the PRI meeting. At Port of Pascagoula, participants suggested that private tenants be involved in the conversation in some way to communicate that they understand all the procedures for evacuation and return. Participants discussed the potential advantages of expanding the process to private tenants. “The same things [topics in the PRI] could apply to any port user industries...if you’ve got a small terminal, private terminal, or a small tenant, just running through this to say, okay, what do we need to be thinking about?” A private tenant representative, who also sits on the Port of Pascagoula’s advisory group, attended the meeting and offered anecdotes from the private company perspective while also understanding port authority operations. In the final version of the PRI, the introductory text clarifies that the intended target audience begins with the port authority or port management organization. Beyond that, the port authority should work with the facilitator to develop an invitation list.

Questions nine and ten asked about participants’ gain in knowledge and perception of usefulness of the PRI. Since the participants represented port authorities and port stakeholders, the evaluation did not seek to measure a change in knowledge about general port operations or port management but rather to understand if the participatory process enabled anyone to learn something new. A large majority of respondents (76 percent) noted that they did learn something new from going through the PRI, and many of these positive respondents offered explanations (Table 6.3). Interestingly, the subject matter of new things learned related to port operations during a hazard event. For example, two respondents specifically mentioned learning about their port’s alternative sites for operation during times of disaster. Two other respondents wrote that



they learned something completely new about port policies, in one case commenting: “learned about Port’s processes as a newcomer, very useful.” One respondent wrote about learning “some things that Port does that I was not aware of,” and another respondent indicated learning about their port’s involvement in the U.S. Coast Guard Port Coordination Team.

Table 6.3. Responses to evaluation questions nine and ten, pertaining to participant opinions on knowledge gain and usefulness of the PRI.

Question	Percentage of Respondents	Number of Respondents
9. Did you learn anything new today?	76 Yes 14 No	22/29 Yes 4/29 No
10. Do you think the PRI is a useful tool to improve resilience?	97 Yes	28/29 Yes

Respondents also wrote about the benefit of having the port resiliency meeting close to the start of hurricane season because it helped identify areas for improvement in port hurricane plans. Two respondents wrote that the conversation highlighted areas where “holes” exist in the hurricane plans, which led to discussion on ideas for possible solutions. Two other respondents wrote that the meeting helped them consider new ideas for port operations. Several respondents noted the benefit of going through the process together, in terms of learning more about port policies and procedures that may not necessarily be communicated by individual port managers. At Port of Pascagoula, participants talked about how the participatory method creates an opportunity for participants to reflect on historical experiences together, which also allows newer

staff members to learn more. One participant commented “even though you may be the person [in charge] over that area, somebody else may remember something that you don’t.”

Almost all respondents (97 percent) positively answered question ten, which asked about the usefulness of the PRI to improve resilience. Several respondents offered explanations to support their answer, including “makes you discuss things you may not normally discuss or think about”; “gets the discussion started on multiple levels”; and “provides a forum for thinking through and formalizing planning processes.” One respondent wrote “good group think / exchange of ideas.” Critics of the process of self-assessment might consider “group think” as unnecessarily influencing, or even forcing, participants to answer a certain way. However, the comment “group think” in context with “exchange of ideas” highlights one of the benefits of a participatory process. Instead of individuals completing the assessment on their own in separate offices, the participatory process stimulates a collective discussion that more appropriately represents the collective experience and ideas of the port authority.

One respondent wrote that the PRI is a useful tool to improve resilience, “when accurately rated.” This response suggests that even outside the circle of academic researchers and resilience “experts,” the methodology of quantitative or qualitative resilience assessment raises concern. Even with this single comment, participants generally viewed the PRI as a useful method to start a conversation. When obtaining a certain number or score becomes secondary, participants value being able to share ideas and experiences. For each focus group meeting, we discussed the scoring table at the beginning of the session but never actually tallied a score at the end. At the end of the meeting at Port of Corpus Christi, one participant commented that removing the focus from the final score at the end helped participants focus on the process and

the conversation. The simple act of discussing the questions, instead of trying to obtain a certain score, raises awareness of what the port authority can do to work towards resilience.

Questions number six and eleven, while positioned separately in the evaluation, elicited similar responses and therefore will be considered together (Table 6.4). Respondents made similar suggestions for ways to improve the process, related to modifying response options and sharing lessons learned, which led to suggestions for next steps. In terms of the response options, one respondent suggested including a range of responses, rather than just “yes” or “no,” to give respondents “an actual opportunity to continually improve,” rather than answering “yes” to try to achieve a higher numerical score at the end. A few respondents commented that the questions did not have enough detail, which may have caused participants to answer less confidently. Another respondent suggested including alternative questions for those participants who answer “no” to a question.

Table 6.4. Responses to evaluation questions six, eleven, twelve, and thirteen, pertaining to suggestions for improvements and next steps for the PRI project.

Question	Percentage of Respondents	Number of Respondents
6. If this meeting were to occur again, what would you suggest we do differently?	28 offered suggestions	8/29 offered suggestions
11. How could this process be improved?	31 offered suggestions	9/29 offered suggestions

(Table 6.4 continued)

Question	Percentage of Respondents	Number of Respondents
12. What resources would you like to see offered for Ports? Please circle all that apply.	79 Workshops 45 Documents 34 In-person trainings & Technical Assistance	23/29 Workshops 13/29 Documents 10/29 In-person trainings & Technical Assistance
13. Are you willing to be contacted in the future for follow-up questions related to the PRI?	90 Yes	26/29 Yes

During the focus group sessions, participants at all three pilot-test ports requested being able to see case studies and examples of how other port authorities work towards resilience, in addition to a final concluding report from the PRI project or a list of examples of best management practices. Respondents indicated an interest in sharing and learning from, rather than being compared to or ranked against, other port authorities. Two participants acknowledged that sharing responses to the tool provides an opportunity for everyone to learn new ideas from other port authorities: “I think through your assessment, just in rating the assessment that you provided to us...important things [were] in there that was like - I never thought of that,” and “somebody may identify something that we didn’t think of, for sure.” Both of these quotes suggest that participants value being a part of resilience assessment tool development and want

to learn from others, rather than be compared to them. In addition to sharing experiences of other port authorities, respondents suggested sharing the final PRI product after the other focus group sessions. One participant suggested that it might be helpful to come back after the pilot-test phase of the project and conduct the PRI facilitation again, which justifies a longitudinal approach to studying and assessing port resilience.

Substantive suggestions to improve the process provided on the evaluations by respondents included working with current asset management initiatives with AAPA, less focus on hurricanes, and going through a table top exercise to simulate a disaster event. These topics also came up during the focus group meetings. At Port of Corpus Christi, one participant described efforts by the AAPA to develop a facilities or asset management plan, which would include vulnerability analyses for port facilities. Knowledge of this effort opens the door to introducing the PRI at a higher level. At Port of Lake Charles, participants commented that ports along the Gulf Coast have extensive experience with hurricanes. The PRI should include other threats, such as cyber security and terrorist attacks. These suggestions provide a few potential next steps to continue PRI research and application.

For question twelve, regarding resources for port authorities, respondents selected all options, with most responses for workshops (79 percent) and documents (45 percent) (Table 6.4). The high response rate for workshops suggests that participants enjoy the participatory nature of the process and derive greater benefit by discussing the topic of resilience together. For the final question, 90 percent of respondents answered that they would be willing to be contacted in the future for follow-up questions, which again indicates the willingness of respondents to participate and suggests that they find value in the process.

At both Port of Pascagoula and Port of Lake Charles, the facilitator asked participants if someone from within the port authority might be able to facilitate the PRI. In both cases, participants discussed the benefits of having an “outsider” conduct the facilitation. At the Port of Pascagoula, participants talked through the benefit of having someone external to the port authority come in to facilitate to avoid bias in the process and discussion: “[if] you have somebody within the area, they’re - they may invoke more of their thoughts into what’s going on rather than asking generic stuff to, to make them talk.” At Lake Charles, participants suggest that having someone external to the port authority gives the activity more status: “A facilitator helps...somebody external coming in to give it more status and more, “hey, we need to do this,” rather than if I [member of port district staff] put the meeting together.” In addition, a facilitator helps clarify questions that might require some explanation or may not apply to different types of ports: “there are questions here, though, that we even had to scrutinize and make clearer or eliminate, umm, and if you’re sending these to smaller ports, that may be difficult.” In conclusion, having an external facilitator mitigates both potential bias and uncertainty from influencing the process.

### **Discussion and Conclusion**

This chapter seeks to provide positive evidence to support the process of completing the PRI in a participatory setting, from the perspective of the focus group participants with evidence from discussion and evaluation questionnaires. The focus group method, as a subset of the entire PRI methodology, has several contributing factors to facilitate a conversation on resilience. The evidence presented in this chapter begins to answer one of the research questions: how might the process of developing the PRI, a qualitative resilience assessment tool, be transferable across spatial and organization scales as a method to understand and build resilience? The participatory

process for development and completion of the PRI helps start a conversation that brings forward new ideas about resilience, and the questionnaire format of the PRI helps give structure to this process. Perhaps the participatory process serves as a step toward building capacity for and promoting resilience in a manner more responsible than quantitative diagnoses or proxies of resilience.

The pilot-test focus groups most closely resembled scoping focus groups, with a few elements of theory-building focus groups (Ryan et al. 2014; Figure 6.2). The type of information collected in the focus groups included a mixture of port personnel opinions and experiences, indicated by numerous references to previous experience with hurricanes. Participant interaction played a role in elaborating on the personal opinions of port staff members but also allowed for sharing collective experiences, on behalf of the port authority and port geographic area. A standardized structure existed for the focus groups, through the questionnaire format of the PRI, but the facilitator allowed the conversation to wander, at times, and go beyond the boundaries of the PRI questions. The facilitator assumed a position of neutrality from port operations but capitalized on opportunities in the conversation to clarify feedback from participants and probe further on questions about topics that pose challenges to the resourcefulness of port authorities and resilience of port operations. Most of the analysis of focus group data pertained to the content of the discussion regarding the wording and formatting of the PRI questions, but certain instances of data analysis emphasized conceptions and perceptions of resilience from the perspective of port authorities.

During the pilot-test phase, the focus groups presented an opportunity to gather participant feedback on the process of completing the assessment in a participatory setting. Focus group discussion and evaluation questionnaire results helped identify beneficial aspects of the

participatory approach to completing the resilience assessment: a collective opportunity to exchange ideas, discuss disagreements, and arrive at consensus; a discussion space to reflect on previous experiences and lessons learned; a non-competitive space to share knowledge and practices with others, including newer employees; and a communication mechanism to establish relationships with external partners. During the focus group meetings, participants spoke up, provided their insight, and questioned their co-workers on disagreements. In the event that two individuals offered different responses to the same question, the participatory setting allowed us to take time to deliberate the reason for conflicting answers. Was it due to a matter of interpreting the question because of unclear wording or definitions that needed explaining? Or was it because participants on opposite sides of the room remained unaware of each other's actions? The participatory group setting to complete the PRI created a space for exchange of ideas and an opportunity for participants to learn from each other in a relaxed and non-competitive setting. Participants exercised their ability to listen to each other, discuss reasons for disagreements, and propose ideas or solutions to adjust procedures to improve resilience.

The participatory nature of completing the PRI fosters a cooperative environment for productive discussion. The PRI as a research product is qualitative in nature, but perhaps the process to complete it is more effective than a quantitative or numerical checklist. Port authorities exist as organizations made up of individual people with values and unique perspectives. The participatory process of development allowed for integration of technical expertise and of values and preferences, between practitioners on the Ports Resilience Expert Committee and practitioners in the focus groups. Creating an opportunity for voluntary completion of a self-assessment removes the layer of pressure from a higher entity or authority to “be resilient” and promotes an atmosphere of engaging in conversations about processes to



improve resilience or promote resourcefulness, focusing on action instead of diagnostic labels. Without a primary focus on achieving a certain numerical score at the end, the discussion is not shadowed by a perception of judgment or criticality but is enlightened by a sense of “togetherness” in trying to understand and improve resilience. In addition, a quantitative approach may not consider the unique responsibilities of each port authority, which presents a conflict for wide application of standardized quantitative assessments, which currently do not exist for ports.

The mere completion of the PRI development suggests that participants exercised ownership and interest in the process. The needs of the user group drove the research process. At the end of each focus group, participants consistently requested a summary report of the meeting and examples of how other port authorities completed the PRI. Although inherently competitive, the pilot-test port authorities expressed more interest in learning from others than being compared to others. To satisfy participants and honor their requests, I summarized feedback for each section of the PRI and established a list of best practices and identified needs. All focus group participants received summary reports and had the opportunity to comment on the summaries before they became content for a website to share with focus group participants (Morris 2016).

The questionnaire format of the PRI opens the door for its expansion to other regions of the country and to include other types of hazard threats facing ports. For example, by discussing topics such as communication with tenants about preparedness, port authorities can discuss communication for hurricanes but can also discuss communication for other types of hazard events. The self-assessment format of the PRI allows some flexibility in the conversation, which helps this tool and method become a mechanism to build capacity for resilience. In this sense, the

PRI offers an initial step in helping port authorities talk about threats, in general. The PRI project started with hurricanes because collective hurricane experience exists at port authorities along the Gulf of Mexico coast. With the establishment of a participatory methodology to develop a resilience assessment tool, the format of the tool can be transferred to other regions or applied to other hazards and threats. Perhaps the most effective way to bridge the gap between resilience for known threats and resilience for unknown threats is through facilitated discussion with collective groups to link the past with the future and determine a path forward. One contributing factor to enhancing a non-competitive environment for completing the PRI includes having an external facilitator, rather than someone within the port authority, to lead respondents through the questions. This collegial environment might facilitate the beginning of a conversation to answer the question: how does resilience for a known threat (e.g., hurricanes) prepare a port authority for the unexpected (e.g., a terrorist attack)?

The active method of engaging port practitioners in a discussion on resilience while simultaneously developing a resilience assessment tool creates a space for co-production of knowledge. Critics of the participatory process might say that the researcher acts as an interventionist and unfairly guides the research process by being too close to the research subjects. As presented in other chapters, every participant brings a certain historical perspective to the conversation, based on previous hurricane and employment experience. At the same time, the facilitators bring a certain perspective to the conversation, which reflects academic training in conceptual resilience theory and practical experience in community facilitation. Linking the method with the theory through the facilitated gathering of the perspective of practitioners helped develop a tool. Pilot-testing that tool with port authorities represented a step in validating and supplementing the information and process developed in a participatory manner.

The development of the PRI might have enacted a boundary between port authorities by instituting a label of resilience. The goal of this research, however, was not to generate theory about port resilience or to institute resilience comparisons but rather to develop a useful tool with practitioner input, through voluntary participation, to start a conversation about resilience. Visiting and analyzing three port authorities did highlight similarities and differences between these three organizations. However, through comparative analysis, in my role as researcher, I have aimed to honor participation rather than diagnostics and have approached actor-oriented resilience as a participatory process dependent on reflective discussion. What does this methodology offer to the field of hazards geography, in terms of resilience assessment, and what are the broader implications for port resilience? Such questions will be addressed in the final concluding chapter.

## **CHAPTER SEVEN**

### **A RE-EXAMINATION OF RESILIENCE ASSESSMENT METHODS WITHIN PORT RESILIENCE**

#### **Introduction**

A port authority, composed of individual people with values, attitudes, and perceptions, causes port resilience to be a complex process over multiple spatial and temporal scales. Methods of developing tools to assess place-based resilience at individual ports may, in fact, build resilience and adaptive capacity of port communities across several spatial and temporal scales. The primary goal of the Ports Resilience Index [PRI] project centered on the development of a resilience self-assessment tool for port authorities, using the input of port practitioners. The participatory process used to achieve this goal resulted in layers of multi-dimensional research and analysis. On the surface, rounds of expert consultation helped gather feedback on the content and format of the tool. Through each round, I learned about the social nature of resilience and the indicators of port resilience considered to be important to port practitioners. Beneath the surface of *developing* the tool, *completing* the tool in a participatory setting revealed how port authorities perceive and implement resilience. Multiple group discussions around the same questions facilitated dynamic participant interaction, which illuminated examples of port resilience and brought forward mixed experiences and opinions on both an individual level and a collective level. Engaging with practitioners revealed processes that challenge prevailing resilience concepts, including efforts to measure resilience quantitatively and to develop uniform methods to assess ports on a broad, national scale.

This dissertation uses qualitative methods of historical and comparative case study analyses, thematic coding of written documents, focus group discussion analyses, and participant evaluations to analyze the effectiveness of a participatory approach in engaging port stakeholders

to develop a qualitative resilience assessment tool. Research results provide support for the use of participatory approaches, emphasizing the benefits of learning about the mechanisms of social interactions and local contextual factors that affect place-based resilience, such as the influence of experienced hazards on adaptability and transformability of ports. Social interactions among members of a geographically disparate expert working group and among members of individual port authorities provided a look at the process of understanding and building port resilience across spatial scales. The participatory method to develop an assessment tool presents its own challenges for resilience assessment methodology: to balance the investment of time and energy to facilitate a flexible process with the rigidity of ports' emphasis on reactive, business-driven planning. Despite the challenges, discussion facilitated by the PRI process enhances the anticipation element of community resilience and disaster management by creating a non-competitive space to foster on-going resilience.

A geographer's perspective brings attention to the interface of humans and the environment and helps understand the process of place-based resilience. Resilience, both the term and the concept, implies persistence or continued existence of a system, whether physical or human, collective or individual. For ports, resilience of individual port authorities contributes to the collective resilience of regional and national economies and global trade networks. The contribution of this dissertation research to the geographic discipline emphasizes two distinct topics: qualitative approaches to assessing resilience and transferability across scale. The participatory methodology of the PRI considers resilience to be a process, which stimulates social interaction to discuss ways to improve resilience. A participatory approach to develop indicators for resilience bridges the gap between developing tools to assess resilience and understanding the process of resilience. The participatory process at the port authority level

provides an in-depth look at contextual factors that facilitate specific resilience of one organizational type to environmental hazards, which transfers to greater resilience of an entire regional economic network.

This final concluding chapter will present conclusions from earlier chapters and will re-examine resilience assessment methods within the topic of port resilience. I will use these conclusions to revisit the dissertation research questions and discuss the implications of this research for hazards geography. I will briefly discuss how the PRI research might be useful to different audiences and why a geographer's perspective is valuable to study resilience. Some final concluding thoughts and potential "next step" research questions will bring this dissertation to a close.

### **Conclusions from Previous Chapters**

Chapter two describes the broad participatory approach, through the Delphi method, used to develop the Ports Resilience Index [PRI]. The analysis and discussion of the Delphi method for PRI development begins to answer part of the first research question: how does the participatory process used to develop the PRI identify the factors that ports consider to be important in building resilience to hazards? Certain elements of the Delphi method, adapted and adjusted for the PRI project, contributed to its success, including the use of port practitioner knowledge, pilot tests to ground-truth the PRI, and face-to-face interaction of participants. In this dissertation, the iterative process of stakeholder engagement helped dig deeper into topics that cannot be described by numbers and can be shared with other port authorities, thereby providing a structure to discuss and assess port resilience. More broadly, the act of creating a space to convene practitioners to discuss tools collectively and generate "local" expert knowledge around complex topics offers a unique approach to resilience assessment.

Chapter three presents information gleaned from historical research and analysis to describe the experience of three Gulf of Mexico coastal ports with significant major hurricanes. Part of the value added by a geographer's perspective to resilience research includes a historical lens to understand how interactions at the human-environment interface have occurred in the past and manifested with each step forward in time. Learning about port's previous experience with hurricanes provides context for port authority perceptions and understanding of resilience. While the cases presented in this dissertation do not fully account for every hurricane or disturbance experienced in the past, the historical analysis presented an opportunity for types of port assistance and roles in community recovery to be incorporated in the content of PRI indicator questions. Including these topics in the PRI becomes especially important for other port authorities that have not experienced direct impacts from a major hurricane but want to take steps to improve resilience.

Chapter four describes the thematic analysis of port hurricane plans and provides examples from focus group discussion to illuminate how ports implement resilient practices. This chapter answers part of the first research question: at a localized and individual scale, how does the process of engaging stakeholders in a discussion provide further insight into port resilience compared to the written plans and objectives of hazard-related port documents? The written hurricane plans for the port authorities that participated in the focus groups exhibited considerable variability, and social interaction during the focus group discussions revealed more about actual port practices than what can be learned from only reading preparedness plans. The participatory process of discussing the PRI questions goes beyond the *what* of hurricane plans to the *how* of resilient practices. In this manner, the PRI methodology allows a look at the mechanisms of port resilience, through the eyes of port practitioners.

Chapter five offers evidence of a collective mindset toward future environmental change and a preponderance for planning based on recent historical events, rather than future possible scenarios. Chapter five answers part of the second research question: how does the PRI process incorporate contextual factors of a port's identity in discussions of resilience? The participatory approach to completing the PRI establishes a non-competitive environment where individuals within a port authority can discuss challenging topics without the threat of being ranked or compared to other port authorities. The act of discussing anticipatory strategies as indicator questions through a self-assessment format reveals how members of port authorities perceive controversial topics, such as sea-level rise and climate change, in addition to more feasible strategies, such as proactive communication with tenants. The discussion around questions for anticipatory actions reminds researchers of the truly social nature of resilience and the role that humans play in implementing resilience.

Chapter six presents feedback on the participatory process from the perspective of the focus group participants and offers an answer to part of the second research question: how might the process of developing the PRI, a qualitative resilience assessment tool, be transferable across spatial and organization scales as a method to understand and build resilience? Participants identified beneficial aspects of completing the PRI in a participatory setting, including an opportunity to exchange ideas and discuss disagreements; a discussion space to reflect on previous experiences; a non-competitive space to share knowledge and practices; and a communication mechanism to establish relationships with external partners. Some participants noted that with repeated completion of the PRI (e.g., yearly), port authorities can establish a longitudinal record of progress toward resilience. Having the buy-in of practitioners and participants speaks to the value of a participatory approach instead of an external review.



The substantive and content-driven outputs of the focus groups cannot necessarily be extrapolated and applied to other types of organizations (e.g., local governments, residential communities) but the method of soliciting input from practitioners and gathering feedback on qualitative indicator questions is transferable. The PRI methodology, as a strategy for engagement and interaction with practitioners, can be extended to other organizations and implemented at other spatial scales. Focus groups, the Delphi method, and broader participatory research strategies provide a structure to understand the concept of resilience and serve as a step toward building capacity for and promoting resilience in a manner more responsible than quantitative diagnoses or proxies of resilience.

### **Implications for Port Resilience, Resilience Assessment Methods, and Hazards Geography**

When it comes to hazard preparedness and port resilience, port authorities are concerned with the safety and welfare of port personnel and the ability to resume navigation and shipping as quickly as possible. The emphasis on quick recovery after an event shows ports' priority for short-term survival and short-term economic gain, rather than long-term sustainability. Historical experience plays an important role in shaping this perception of resilience. Focus group discussions showed evidence for a more proactive approach to planning for hurricanes and hazard mitigation at Corpus Christi, compared to a more reactive approach at Pascagoula and Lake Charles. Since the latter two ports experienced major hurricanes in 2005 and survived with relatively little economic damage, an air of human-centered superiority to nature appears to promote an assumption by port staff that "we survived it once, we can survive it again."

Even with a reactive approach to preparedness, the participatory approach of the PRI helps show how lessons learned in the past have been implemented into planning efforts. A focus on softer approaches to resilience, through communication strategies, reveals some of the social

nature of resilience and the willingness of port authorities to discuss certain actions, like having well-developed plans of communication for personnel, which can be helpful during any hazard event. Having relationships in place to enable quick cleanup and recovery of navigation channels also establishes a pathway to quicker recovery. The PRI methodology begins to forge a path toward anticipatory strategies and harder approaches to resilience, such as hardening structures and preparing infrastructure for sea-level rise. The fact that a discussion on these topics even occurred helps promote adaptive capacity by guiding participants to link the past with the future.

Discussing relationships and the process of recovery impacts preparedness and resilience to unknown or unpredictable threats. Incorporating actions from previous experiences of recovery, such as interactions with the U.S. Coast Guard, into the content of PRI indicator questions might help other port authorities consider how to be prepared for potential “unknown” threats. Focus group participants recommended that the PRI be completed on an annual basis, which addresses temporal scales associated with resilience. As time goes on and events and experiences occur, resilience changes through changing coping and adaptive capacity and through loss of a sense of urgency to take immediate action. The self-assessment and qualitative format of the PRI allows for repeated implementation that easily captures changes in progress toward resilience, through ongoing processes of reflection on the past and anticipation for the future.

The introduction to this dissertation briefly reviewed the field of hazards geography, focusing on research studies that use quantitative and mixed-method approaches to study resilience. The research and analysis presented in this dissertation begins to develop the concept of port resilience, expands resilience assessment methodology to include qualitative and participatory approaches, and contributes to the field of hazards geography through intersections

with applied geography and port geography. A geographer's perspective has been appropriate to recognize and understand the similarities and differences between port authorities in a more holistic way than perhaps engineers, ecologists, or sociologists using quantitative approaches.

The value of this dissertation hinges on the participatory nature of the research. Being able to assess or encourage resilience requires incorporating tenets of the qualitative, place-based, and often complex process of resilience: environmental context, social interactions, long-term relationships, and anticipatory thinking. The discussion-based assessment method of the PRI provides a connection between *what* we know about resilience and *how* we know it. With an objective to identify opportunities for improvement and then implement the most accessible ones, we might improve performance.

The two overarching research questions that drove this dissertation research centered on qualitative methods to understand resilience and the influence of scale in understanding resilience as a social process. First, how does a participatory approach to developing qualitative indicators of resilience challenge and address the weaknesses of existing quantitative approaches to measuring resilience? The participatory approach, with the Delphi method and the pilot-test focus groups, used discussion and face-to-face interactions as a way to reveal and understand the truly social nature of resilience. Focus groups, as a method for social research, allow place-specific and contextual information to come to light, furthering the understanding of individual and collective scales of resilience. At the individual level, one person's perspective or opinion cannot be standardized or normalized. Taking nuanced discussion extracts from a few individual ports and generalizing it to the maritime industry presents challenges, which provides justification for a participatory process as an appropriate method to assess organizational resilience. Rather than an output, resilience is a process that leads to an outcome of greater

resilience and depends on the decisions and actions of people. Since individual staff members and tenants bring unique perspective to the collective whole of a port authority and port community, a process to assess resilience that revolves around discussion and interaction is an appropriate way to discuss resilience and inherently build capacity for resilience.

The process of going through the PRI questions in a participatory setting allows researchers to understand how port practitioners perceive anticipatory actions, which is different from how researchers perceive them. Researchers maintain a position of being removed from ports in a physical and operational sense. From the practitioner's side, the realities of the job put anticipatory actions in a different light. While academic researchers may experience frustration with audiences that do not implement anticipatory actions, the participatory process of discussing questions within the self-assessment puts the issue on the table for discussion, in a setting where individuals' jobs are not on the line, and budget pressures are minimized.

I want to avoid appearing overly flexible and without a sound and consistent method to apply across port authorities or any organization. As a reminder, in this research, port practitioners presented hesitation to include questions related to planning for future sea-level change impacts. I still included questions on these topics, despite the aversion from some of the focus group participants, in order to provide a conversation starter for respondents to discuss tough or challenging topics. The inclusion of a N/A response option gives respondents the opportunity to completely skip discussion on these topics; however, by including these questions, participants might be motivated to discuss them without the pressure of being rated or scored a certain way.

The second overarching dissertation research question asked, how do spatial, temporal, and organizational scales affect the understanding of resilience as a continuous social process?

The participatory methodology used in the development of the PRI can certainly be transferred and applied to other organization scales. The process requires an investment in time and resources to appropriately engage practitioners across broad spatial scales, which may sacrifice some of the detail that is captured at a small spatial scale, such as one port. At each higher spatial level, marginal detail about social interactions is lost, rendering quantitative tools more attractive. Regardless of spatial scale, however, I would caution against using only quantitative measures because numbers show one dimension and cannot represent the multi-dimensionality of historical experience, social interactions, and personal relationships. The participatory process of discussing indicator questions helps acknowledge and understand the intertwining connections of cause and effect. The flexibility to consider different hazard scenarios in a participatory setting helps discover multiple potential pathways to resilience instead of direct causes and effects.

This dissertation considers the role of community in building capacity for resilience and draws parallels between port resilience and broader community resilience literature by considering ports as communities. While port practitioners and port stakeholders form a community of people, the underlying identity of a port community differs from that of a residential community or local government community as understood in the literature. Port communities have a professional identity as industrial organizations with a stake and vested interest in the economic success and smooth operation of the business of navigation and shipping of goods and services. Of course, overlap exists between port communities and residential communities. While members of the port community may also be members of the neighboring residential community, their role in the resilience of the port is driven by operational success and job profession, not necessarily a sense of place. Researchers studying community or social

resilience should clarify the composition of their target community in order to distinguish how individual members of a community contribute to the collective identity of that community.

Gilbert White encouraged policy makers to focus on how humans adjust their behavior to cope with hazard risks and impacts. A geographer's awareness and understanding of the integration of natural science and social science encourages an approach to studying ports as social-ecological systems, whose function depends on human decision-making to adjust to the natural environment. Through a systems approach, a geographer's perspective expands the study of port adaptive capacity to include variability in spatial scale, such as an individual port compared to an economic region, and variability in temporal scale, such as acute hazard events compared to long-term chronic events.

Improving port resilience, or resilience of any social-ecological system, requires effort in a physical and structural sense as well as a social and organizational sense. At the interface of humans and the environment, the nature of resilience is complex, both physically and socially. To understand the intertwining effects between social resilience and physical resilience, researchers and policy makers should consider both sides of the coin. A geographer's perspective, through acknowledgement and understanding of human-environment interactions, provides a solid foundation to study and understand the complex process of resilience happening at the human-environment interface. Other academic disciplines encourage an emphasis on only environmental resilience, only structural resilience, only social resilience, or only psychological resilience. These components of resilience are necessary to understand, but a geographer's perspective encourages the integration of physical and social elements of resilience, resulting in a more comprehensive understanding of human-environment interactions at variable spatial and temporal scales.

To recognize resilience as a continuous social process, a participatory process stimulates reflection on past experiences and conversation about how groups have handled hazards in the past and adjusted to be more resilient in the future, both structurally and operationally. Perhaps the most effective way to bridge the gap between resilience for known threats and resilience for unknown threats is through facilitated discussion with collective groups to link the past with the future and determine a path forward. A geographer's perspective allows for recognition of contextual differences associated with different geographical settings and for flexibility in understanding the challenges with implementing certain actions, as opposed to assigning a hard and fast number with no discussion or adjustment.

### **Next Steps and Remaining Research Questions**

For one possible next step, researchers can continue to collect data from port authorities through implementation of the PRI and can begin to generate testable hypotheses about port resilience. I would caution against forming hypotheses for testing, however, and focus on gathering more data and experiences to adjust the categories of port resilience, as identified in this dissertation. I postulate that a participatory strategy is more appropriate than hypothesis-testing or quantitative assessment because it brings many people together in one room to share knowledge and expertise and have a conversation about resilience, digging into social process within communities to understand perceptions of and challenges to resilience. The dissertation has shown evidence of the social mechanisms of resilience. Facilitators implementing the PRI in port communities can formulate a representation of resilience from the perspective of ports and conduct the participatory research process to build capacity for actor-oriented, or port authority-driven, resilience. Hypothesis-testing may revert to more rigid assessments that deny variability

in the process of resilience. Researchers must be responsible to the differences in meaning produced from many perspectives and experiences.

Another logical next step for research of the participatory process could be through a co-production perspective and exploring how knowledge-making gets incorporated into practice. The participatory approach of the PRI has the potential to bring institutional knowledge into a setting where it may influence port governance. A co-production perspective would draw attention to if and how the process of facilitating a group discussion leads to implementing changes in port operations and management to improve resilience. If the process of developing this tool leads to changes in behavior in terms of promoting resilience to hazards, then the research process actively and positively intervened in the world.

Understanding how knowledge and governance influence each other may not predict change in the future, but it may be able to provide historical insight into how organizations respond to disturbance or disruption. Given the exposure of coastal ports to known hazard threats such as hurricanes and flooding, port authorities in coastal regions stand to benefit from long-term resilience planning to ensure their continued existence and economic viability in a future of uncertain environmental change. A geographer's perspective helps maintain the situational context and connection between past experiences and future change, hinging on the social process of understanding abstract perceptions of resilience and variations in implementation of resilience.

As of early 2017, federal government efforts are underway to develop quantitative metrics for maritime transportation system [MTS] performance and, eventually, resilience. The U.S. ACE has been leading a project to compile all nationally available datasets that might be relevant to MTS performance, which are now available online ([www.data.gov/maritime](http://www.data.gov/maritime)). In the



technical report about MTS performance measures, U.S. ACE identifies one currently applicable dataset for resilience: the U.S. ACE physical condition ratings of critical coastal navigation infrastructure (Kress et al. 2016). U.S. ACE acknowledges that “resilience is ultimately location and event-specific...unlikely to be reduced to a single measurement” (Kress et al. 2016, 50, 52). Even so, the focus is clearly on physical infrastructure resilience, which leaves a huge gap in understanding maritime resilience, as acknowledged in this dissertation.

The research and analysis presented in this dissertation can be useful to a variety of audiences. For government agencies and policy makers, the PRI content and self-assessment format recognizes the complex and place-based nature of resilience and should be considered alongside governmental efforts to develop quantitative metrics for resilience. A geographer’s understanding of the differences between organizations poses a challenge to strict top-down regulation but recognizes the ability of organizations to affect resilient processes. Governmental efforts to define quantitatively-driven metrics for resilience result in a somewhat absolutist view of what resilience should look like. A geographer’s perspective considers the intertwining connections between forced regulations and actual improved resilience. For academic researchers, the PRI methodology offers another approach to understand resilience and develop resilience assessment tools. For port practitioners, the PRI process promotes awareness of environmental and operational challenges and helps identify actions to address those challenges. Resilient adaptability and transformability of ports depends on flexibility in decision-making, which can be facilitated and strengthened through participatory and place-based methods.

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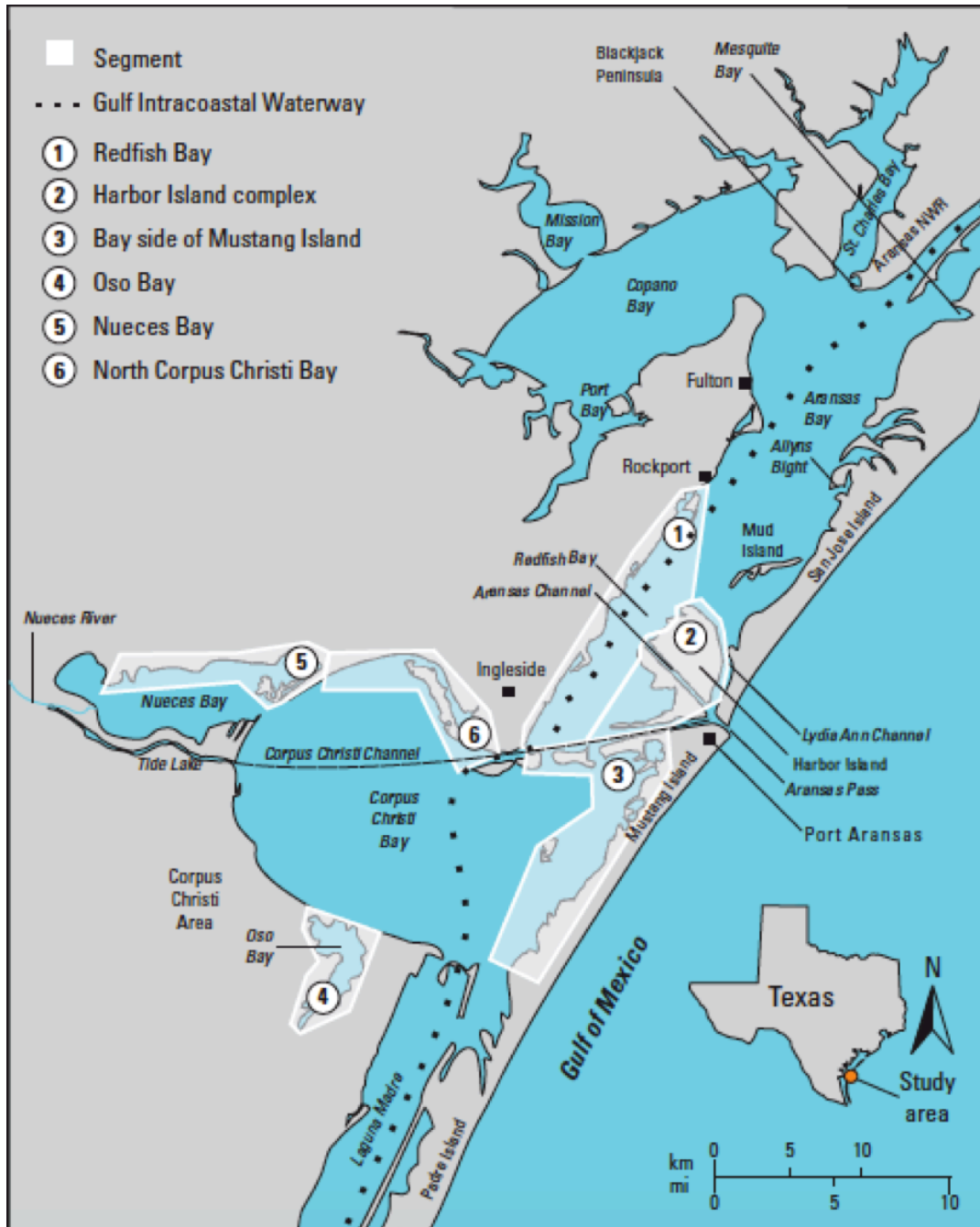
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## APPENDIX A

### MAPS AND INSTITUTIONAL REVIEW BOARD APPROVAL



A.1. Texas Coastal Bend Area Map (Pulich 2002).









A.3. Port of Pascagoula (Jackson County Port Authority 2016).



A.4. Port of Lake Charles Harbor and Terminal District (Port of Lake Charles 2017).

**ACTION ON EXEMPTION APPROVAL REQUEST**



Institutional Review Board  
Dr. Dennis Landin, Chair  
130 David Boyd Hall  
Baton Rouge, LA 70803  
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**TO:** Lauren Land  
Sea Grant

**FROM:** Dennis Landin  
Chair, Institutional Review Board

**DATE:** October 15, 2014

**RE:** IRB# E8792

**TITLE:** Resilience Benchmarking for Industry

**New Protocol/Modification/Continuation:** New Protocol

**Review Date:** 10/14/2014

**Approved**     X     **Disapproved**           

**Approval Date:** 10/14/2014 **Approval Expiration Date:** 10/13/2017

**Exemption Category/Paragraph:** 2b

**Signed Consent Waived?:** Yes

**Re-review frequency:** (three years unless otherwise stated)

**LSU Proposal Number** (if applicable): 41717

**Protocol Matches Scope of Work in Grant proposal:** (if applicable)           

**By:** Dennis Landin, Chairman 

**PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –  
Continuing approval is CONDITIONAL on:**

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects\*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.

**8. SPECIAL NOTE:**

*\*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>*

A.5. Institutional Review Board Approval by Louisiana State University.

## **APPENDIX B**

### **SURVEY INSTRUMENTS USED IN PRI DEVELOPMENT**

#### **B.1 ONLINE SURVEY TO THE PORTS RESILIENCE EXPERT COMMITTEE**

The Gulf of Mexico Alliance defines resilience as "the capacity of human and natural/physical systems to adapt to and recover from change" ([www.gulfofmexicoalliance.org](http://www.gulfofmexicoalliance.org)). One way to increase the resilience of natural, built, and social environments is by assessing risks to natural and built environments to future disasters and taking action to mitigate those risks. The current project seeks to develop an index with indicators of resilience to assist ports and harbors in assessing their level of resilience and identifying areas for improvement. We ask for a portion of your time to complete the following survey to begin to identify the factors that are important for ports and harbors to consider in order to build resilience to disasters and unexpected events.

The following four questions will tell us about the size of your port and how it is managed.

1. What is the average annual tonnage of your imports?
2. What is the average annual tonnage of your exports?
3. Is your Port an agency of the following?
  - State where the Port is located
  - County (Parish) where the Port is located
  - City or Municipality where the Port is located
4. How is your port management structured?
  - Port Authority manages port operations and all services
  - Port Authority acts as a landlord and leases operations and facilities to tenants
  - Port Authority has a limited role in operations and gives management of operations and facilities to third-party entities

The next four questions will tell us about your port's previous experience with natural hazards.

5. In the last ten years, what types of hazards has your port experienced? Check all that apply.
  - Hurricane
  - Storm surge
  - Flooding
  - High winds
  - Fire
  - Chemical spill
  - Other
6. Which of the following types of infrastructure have been damaged at your port as a result of hazardous events? Check all that apply.
  - Administration buildings
  - Storage facilities

- Gantry cranes
  - Terminals
  - Docks or piers
  - Vessels
  - Water utility
  - Electric utility
  - Sewer utility
  - Phone lines
  - Other
7. How long did it take for damaged infrastructure to be restored?
- N/A
  - 1-3 days
  - 3-5 days
  - 5-7 days
  - 1+ weeks
8. What types of federal assistance has your Port received in the past?
- FEMA Public Assistance Program (grants for the repair, replacement, or restoration of disaster-damaged, publicly owned facilities)
  - FEMA Hazard Mitigation Grant Program (grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration)
  - FEMA Predisaster Hazard Mitigation Program (competitive funds available to states, territories, Indian tribal governments, and communities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event)
  - U.S. Maritime Administration (MARAD) National Defense Ready Reserve Fleet (Ready Reserve Force (RRF) Vessels or National Disaster Recovery Framework (NDRF) vessels)
  - Other

The next three questions are related to port activities during the planning phase, before a hazardous event occurs, and during the response phase (incident to 72 hours).

9. In your opinion, please rank the following activities in order of importance for ports to do during the pre-event planning phase.
- Develop a crisis communications plan with port personnel and external port stakeholders
  - Develop a contingency plan for backup power and water resources
  - Develop a backup storage plan for computer data
  - Coordinate with neighboring or regional ports in preparation for response efforts
  - Implement wind-resistant construction standards for port facilities
  - Implement flood-resistant construction techniques for port facilities
  - Develop a plan for temporary relocation of port operations and administration
  - Develop a port re-entry policy

- Conduct annual drill exercises to test and adjust developed plans
10. In your opinion, please rank the following activities in order of importance for ports to do during the response phase (incident to 72 hours after):
- Communicate with port personnel and workforce
  - Establish a consistent message on port status for the media
  - Clear the waterways leading into the port
  - Remove debris from roads leading into and out of the port facility
  - Restore aids to navigation
  - Restore electricity and water
  - Coordinate with local, state, and federal agencies
11. Please indicate during which phase (before an event, during the response phase (incident to 72 hours), or during the recovery phase (after 72 hours)) when it is most critical for the Port to communicate with the following stakeholders:
- FEMA
  - MARAD
  - U.S. Coast Guard
  - U.S. Army Corps of Engineers
  - State Emergency Management Agency
  - Local Emergency Management Agency
  - Utility Companies
  - Terminal Operators
  - Vessel Operators
  - Local Chambers of Commerce

The final four questions are related to general preparedness and planning efforts for ports.

12. In your opinion and based on your experience, which of the following plans do you think are critical for ports to increase disaster resilience? Check all that apply.
- Hurricane Preparedness Plan
  - All Hazards / Emergency Readiness Plan
  - All Hazards / Emergency Response Plan
  - Infrastructure and Engineering Plan
  - Crisis Communications Plan
  - Personnel or Workforce Management Plan
  - Utility Services Contingency Plan
  - Business Continuity Plan
  - Insurance and Risk Management Plan
  - Other
13. In your opinion, how easily could natural hazards planning be integrated with current security planning efforts at your Port?
- Natural hazards planning and security planning already happen simultaneously at my Port
  - I think the two planning efforts could be easily integrated
  - It would take some work to integrate the two planning efforts, but it could be done.

- It would involve a great amount of effort and maybe some outside consulting to integrate natural hazards planning with security planning
  - It is not feasible to do natural hazards planning and security planning at the same time. They need separate processes.
14. Please select the topics that represent the biggest challenges to your port in either the preparedness phase or the response phase.
- Emergency Operations Center Plans
  - Communications (Resource Requirements, storm warnings and notifications, public information and media relations)
  - Evacuation
  - Fire & Rescue
  - Law Enforcement & Security
  - Operations
  - Damage Assessment and Facility Repair
  - Risk Management and Insurance Claims
  - Legal Issues
  - Human Resources Issues
15. Please add any additional comments you would like to make known regarding indicators of resilience at ports and harbors. Additionally, if you have a disaster- or hazard-related document that you would like to share with the ports and harbors planning committee, please provide a web address to the document or email it to Lauren Land ([lland1@lsu.edu](mailto:lland1@lsu.edu)).

## **B.2 PRI INDICATOR QUESTIONS BEFORE FIRST ROUND OF EXPERT CONSULTATION (251 QUESTIONS)**

### **Section 1: Setting up the Emergency Operations Center (Physical or Virtual?)**

*Does the Port have an Emergency Operations Center plan that provides a location to initiate and restore critical emergency functions, identifies initial emergency functions and recovery priorities, and lists delegations of authority for essential personnel?*

#### *Alternative Site Location & Materials*

1. Does the port have an offsite evacuation haven or alternative operations site?
2. Does your port have an offsite data backup plan for electronic data?
3. Does the Port consider the following in selection of an alternative location?
  - is it large enough to accommodate EOC Team operations?
  - Is there adequate space for sleeping?
  - Is emergency backup power available with proper connections?
  - Does it have outside ventilation?
  - Does it have natural lighting?
  - Is it within reasonable proximity to primary facilities?
  - Are adequate restroom facilities available?
  - Are shower facilities available?
  - Is there a basic break room with water?
  - Is there a refrigerator and microwave?
  - Is there a washer and dryer?
  - Are there sufficient electrical outlets to power computer equipment, phone charges, radio charges, and other equipment?
  - Are enough computer workstations, including printers, available?
  - Are enough telephone jacks and telephones available?
  - Is there an adequate supply of basic office supplies (paper, pens, pencils, purchase orders, etc.)?
  - Is a copier/fax machine available?
4. Is your Port ready to survive without assistance for up to 7 days?
5. Does the EOC have the following basic emergency supplies for essential personnel?
  - food provisions for at least 10 days
  - water (at least 1 gallon per person per day)
  - toiletries
  - first aid kits
  - flashlights and batteries
  - provisions for sleeping and bathing
  - trash containers or bags
  - laundry detergent
6. Does the port have the following communications assets at the EOC?
  - Landline telephones?
  - Television?
  - cellular phones
  - satellite phones
  - radios



- UHF radios
  - Marine band VHF radios
  - VHF amateur radios
7. Does the Port maintain an inventory of supplies to implement emergency mitigation measures and temporary repairs?
    - generators with fuel supply
    - emergency lighting
    - barricades
    - supplies for marking off unsafe areas
    - plywood
    - plastic sheeting
    - tarps
    - rope
    - drills, hammers, nails, etc.
    - shovels
    - pry bars
    - electrical supplies
    - electric test meters
    - plumbing supplies
    - heavy equipment for debris removal
    - helicopter for fly-over
  8. Does the EOC have the following important documents:
    - copies of Port emergency plans?
    - Port telephone directory?
    - Incident Command System forms (incident briefing form; incident objectives list; organization assignment list; incident status summary report; incident check-in lists)?
    - Hard copies of a map of the port, terminals and facilities?
    - Hard copies or electronic storage of as-built building plans, specifications, drawings, warranties and proposals of all Port facilities?
    - Terminal/facility addresses and telephone numbers?
    - Local/state/federal government contact lists?
    - Tenant and customer contact lists?
    - Vendor contact lists?
    - Pilots and vessel operator contact lists?
    - Media contact lists?
  9. Do you have a transportation plan to reach the EOC?
  10. Do outside emergency personnel have access to your EOC?

*Roles and Responsibilities of EOC Staff*

11. Has the Port identified essential personnel?
  - Port Director
  - Deputy Port Director
  - Senior Managers
  - Facility Managers
  - Port Police Department
  - Harbormaster

- Media Relations Manager
  - Environmental, Health and Safety Manager
  - Engineering Manager
  - Risk Manager
  - Community Fire Department
  - Community Police Department
  - Facility Security Officer
12. Do the Port's policies designate Essential Personnel and their rate of pay in time of emergency?
13. Has the Port identified critical functions and responsibilities of essential personnel?
- Command: establish goals, objectives, and strategies for the incident
    - EOC Director
    - Public Information Officer
    - Safety/Security Officer
    - Liaison Officer
  - Operations: implements priorities and actions defined by Command Section
    - Damage assessment (cranes, substations, utilities, etc.)
    - Debris removal from roadways and buildings
    - Applying for mutual aid or disaster assistance with city/county/state operations
  - Planning: processes and maintains official records related to the event
  - Logistics: provides support to EOC staff
  - Finance/Administration: documents all costs associated with the incident
14. Have you identified the following:
- a "preparation" team
  - a "ride out" team
  - a "recovery" team
15. Does your port utilize the Incident Command System framework?
16. Do your Port's EOC Team Members participate in National Incident Management Systems (NIMS) trainings?
17. Does each EOC Team Member have an Emergency Kit containing a list of their critical tasks?
18. Do all members of the EOC have a hard copy of the plan?
19. Does the EOC Plan include a list of EOC team members, listed by functional area?
20. Who coordinates emergency response information?
21. Does your EOP Communications Plan include a public information and media relations plan?
- Designated Public Information Officer?
    - Have you identified a person who is responsible for gathering information related to the crisis?
    - Do you have a point-of-contact who can speak for your organization identified for media relations?

## **Section 2: Hazard Vulnerability and Facility Risk Assessment**

*Does the Port have a plan to assess all hazards and risks to facilities and infrastructure?*

### *Hazards, Risks and Design*

1. Does your port conduct an annual risk or hazard vulnerability assessment of critical infrastructure and operations?
2. Does the Hazard Vulnerability Assessment identify hazards and threats that could impact the port community?
3. Does the Hazard Vulnerability Assessment include the Emergency Operations Center?
4. Does the risk assessment include natural hazards?
5. Does the port identify information and trends related to hazard risks and probabilities?
6. Does your port consider event histories and future outlooks for:
  - weather-related disasters (hurricanes, coastal storms, flooding)
  - geological events (earthquakes, tsunamis)
  - technology-related events (oil spills, chemical incidents)
  - chronic hazards (sea level rise, shoreline erosion)
7. Does your port identify and evaluate water transportation safety requirements and conditions?
8. Does your port identify and evaluate severe weather effects on marine transportation system operations?
9. Does your port evaluate the impacts of increasing storm surge heights and sea level rise on facilities and operations?
10. Do you identify and consider the impacts of hazards on lifeline support services, including:
  - water utility
  - wastewater
  - energy
  - solid waste treatment
11. Does the Port have a schedule of current replacement costs for Port facilities?
12. Is the schedule updated at least every 3 years?
13. Do you identify potential impacts of hazards on port system infrastructure, including:
  - waterways
  - docks, wharves, and piers
  - terminals
  - storage facilities
  - connecting roadways and railroads
14. Have you identified likely needs for post-event dredging and material removal from navigation channels?
15. Are hazard risks considered in port master plans?
16. Does your port implement flood-resistant design standards?
17. Does your port implement wind-resistant design standards?
18. Do design standards address the use of:
  - breakaway walls
  - sacrificial decking materials
  - construction with steel and concrete
  - barriers around individual structures
  - hardening of critical structures
  - installation of anchors for hurricane tie-down straps to secure terminal installations, equipment and materials

- submersible structures
- elevation of structures
- debris catchment fencing system
- pass-through fencing (to allow water to flow through freely)

*Annual Assessment of Infrastructure, Facilities, Equipment, and Utilities*

19. Has the Port identified and prioritized the critical facilities and services to be restored in order for the Port to resume normal operations?
  - utility infrastructure
  - channel
  - berths and wharves
  - roadways
  - rail
  - terminal equipment
  - storage facilities
20. Does the Port conduct regular assessment of the condition of its facilities to identify maintenance issues requiring corrective action to increase port safety?
21. Has the port identified critical business processes (i.e., email, payroll, purchasing, accounts payable, business support, etc.) and priorities for post-event restoration?
22. Does the Port have a protocol to establish emergency reactivation of utilities after an event?
23. Does the Port maintain the following important documents, with backups at the Emergency Operations Center?
  - maps of Port terminals and facilities
  - at least annual condition surveys of Port facilities
  - annual still photographs and videos of Port facilities
  - drawings/diagrams of all utilities, with connections, cut-off valves, and control panels, on Port premises
  - classification of essential vs. non-essential utilities
  - potential standby utility needs and current inventory of available equipment
  - vendors for obtaining standby utility equipment
  - documented protocol for utility notification and reactivation by local utilities
  - list of available utility contractors with emergency contact information for personnel, equipment resources, and mobilization timelines
24. Have you done a vulnerability assessment of rail lines leading to inland hubs?
25. Does the Port conduct regular hazard vulnerability assessments of infrastructure to determine what level of damage and repair can be expected based on the size of an event?
26. Does the Port consider container stack heights as part of its hazards vulnerability assessment?
27. Does the Port conduct routine checks and maintenance of emergency equipment?
28. Does the Port have on hand (or service contracts for) dehumidifiers, wet vacuums, and portable air conditioning units to prevent mold and mildew growth on port records?
29. Does the Port maintain an inventory of port surveillance equipment?
30. Do you regularly assess your assets for law enforcement and security in times of crisis?
  - law enforcement and/or security officers
    - number of trained personnel

- number of trained personnel that could be deployed to an incident at the Port
  - time frame for deploying personnel
  - communications equipment
  - mobile command units
  - canine search and rescue
  - evidence gathering capability
  - other support supplies and equipment needed for secure (i.e., fuel, power generation equipment, etc.)
31. Does the Port regularly conduct assessment of finance and accounting assets?
- communications equipment
  - Management Information Systems equipment
  - Support supplies and equipment needed for finance and accounting functions
  - Alternative site for accounting and administrative functions
32. Does your port conduct structural stability analysis for port structures to be in compliance with federal requirements for FEMA monies?
33. Have you valued your IT hardware and software?
34. Does the Port conduct periodic inspection of port facilities to identify hazards that create the potential for fire?
- hazard description
  - hazard location
  - type of fire suppression equipment appropriate to control fire
35. Does the Port operate a Foreign Trade Zone?
36. If yes, does the Port have on hand the contact information and procedures for:
- Executive Secretary of the Foreign-Trade Zones Board
  - U.S. Customs and Border Protection

#### *Long Term Hazard Mitigation Planning*

37. Has your port performed a study to identify upgrades necessary to limit damage due to flooding, wave and wind action?
38. Do long-term capital plans identify means to reduce natural hazard risks?
39. Do you incorporate hazard mitigation actions into project development applications?
40. Does your port plan to elevate existing structures?
41. Does your port plan to retrofit structures to protect against flood damage?
42. Does your port appropriate adjacent property to accommodate surge waters?

### **Section 3: Operations Planning and Procedures for Preparedness**

*Does the Port's Emergency Operations Plan include provisions for securing terminal equipment and facilities, evacuation plans, personnel management, and annual training exercises to test and update the plan as necessary?*

#### *General*

1. Does the port emergency plan provide a summary of the situations that it addresses?
2. Does the port emergency plan provide a general concept of emergency operations?
3. Does the port emergency plan cite legal authority for emergency operations?
4. Have you identified a person who has the authority to activate the response plan?
5. Is the port plan capable of execution without mutual aid?

6. Does your port follow procedures according to the National Response Plan?

*Securing Equipment and Facilities:*

7. Does the Port have a plan for securing:

- container cranes
  - quay gantry cranes
  - normal dockside cranes
  - mobile harbor cranes
  - rubber-tired gantries
  - rail-mounted gantries
  - straddle carriers
- reach stackers and fork lift trucks
- road vehicles
- railroad freight cars
- warehouses / transit sheds
- buildings
- high mast lighting
- utilities:
  - electrical
  - gas
  - water
  - sewer
  - telephone
  - fiber optics

8. Does the Port have documentation showing utility diagrams/drawings that clearly identify location of utilities and connection points, cut-off valves, and control panels?

9. Does your port manage items on location that could potentially end up as debris?

10. Do you block and reinforce dry-docked vessels?

11. Do you cover equipment?

12. Do you move equipment to high ground on port property?

13. Do you press up petroleum tanks with water?

14. Do you tie equipment and containers down using lash-in-place methods?

15. Do you shut off power at the port?

*Evacuation*

16. Does the port emergency plan include evacuation routes and information?

- evacuation route maps for the port facilities
- equipment and personnel needed for safe and efficient evacuation from the port facilities
- identified routes for police, fire protection, and medical services
- permanent signage indicating evacuation routes leading into and out of the port facilities
- evacuation route maps and instructions for the city/parish/state?

17. Does the evacuation plan include additional cash or cashiers checks?

18. Does the port identify threshold criteria for issuing evacuation orders?

19. Does the port consider congestion-related constraints when planning for evacuation?

20. Does the port have connecting infrastructure to aid in evacuation of the port?

*First Aid and Medical Services*

21. Does the Port have stocked First Aid kits on site?
22. Does the Port routinely check and inventory the contents of the First Aid Kits?
23. Are a sufficient number of Port personnel trained in first aid and CPR?
24. Does the Port have any automatic external defibrillators (AEDs)?
25. Has the Port identified alternate medical transport services?
26. Does the port emergency plan include the contact information for helicopter services in the region?
27. Does the port emergency plan document the procedures for requesting MARAD hospital ships?

*Personnel Management*

28. Has the Port identified the communications equipment required to communicate with Port personnel in the event of an emergency?
29. Does the Port require that employees report their planned evacuation destination?
30. Does the Port require that employees report their arrival at their evacuation destination?
31. Does the Port have a policy with local labor unions to manage the issue of labor recall after an event?
32. Does the Port provide employees with a one-page document on what to do in the event of a Port evacuation and how to obtain information related to employee recall?
33. Does the Port identify how port employees will receive notice of when they are to return to work and their responsibilities for obtaining this information?
34. Are there written instructions for employees to follow after recall?
35. Does the Port make employees aware that:
  - their job at the Port is secure
  - they can take care of personal matters without the fear of repercussion
36. Has the Port identified qualified personnel to provide psychological counseling to those employees who need and request it?
37. Does the Port identify and document contact information for trained professionals that can provide counseling services?
38. Does the Port remind employees that access to direct deposit funds could be restricted in the event of an emergency?
39. Does the port hire more staff for hurricane events?
40. Does the Port have a re-entry policy for port employees (i.e., requiring check-in)?
41. Does the Port have a re-entry policy for tenants?
42. Does the Port have a plan for who will be issued keys/codes for re-opening the Port?
43. Does the Port have a plan for when will gate security personnel be released?
44. Is the re-entry policy coordinated with local authorities? (i.e., National Guard, local and state police)
45. Does the Port have plans to provide temporary housing for port employees and first responders?
46. Does the Port have documented procedures for requesting housing assistance from MARAD and FEMA?
47. Does the Port maintain a list of suppliers to provide camping trailers on short notice?

48. Has the Port identified an area (with utility connections) for placement of temporary housing?
49. Has the Port obtained permits for placement of trailers in an emergency situation?
50. Does the port have a plan to communicate with MARAD to arrange for temporary housing for recovery agents?

*Annual Training Events and Drill Exercises*

51. Do EOC Team members meet regularly?
52. Does the Port regularly assess emergency support trained personnel?
  - qualified personnel to assess structural, electrical and mechanical facilities
  - industrial hygienist
  - environmental specialist for hazardous material clean-up
53. support supplies and equipment needed to conduct damage assessments and reporting
54. Does the Port conduct routine emergency preparedness and hurricane readiness meetings with customers and tenants?
55. Do you remind tenants and customers to review their company's storm plans, especially for:
  - coordinating vessel activity
  - barges
  - securing cargo
56. Does the Port have a training program for Port Emergency Operations?
57. Are all Port employees included in this training program?
58. Do you conduct regular emergency planning or training exercises at least every 18 months?
  - orientation
  - tabletop exercises
  - functional exercises
  - full-scale exercises
59. Do the training exercises (i.e., tabletop scenario exercises) involve multiple actors and agencies?
60. Have practice drills been performed to restore data?
61. Has your port developed and utilized gaming exercises, simulations, and scenario planning tools to assist with annual drills?
62. Do you provide them with recommended precautionary measures they can take to reduce the potential for loss of life, injury, or property damage?
63. Does the Port provide personal emergency planning assistance (in the form of a manual) to its employees to enhance their preparedness and recovery?
64. Does the Port conduct training classes and workshops for Port employees in personal preparedness and filing insurance claims after an event?
65. Does the Port EOP identify and document contact information for public adjusters in the region?
66. Do you review agreements and contracts with tenants on an annual basis?

#### **Section 4: Planning for Response and Recovery**

*Does the Port have a plan for Damage Assessment and Facility Repair and Restoration that includes contracting for assessment, repair and restoration services, control and coordination of damage assessment and reporting, and debris management?*



### *Pre-event Contract Services for Response and Recovery*

1. Does the Port have contracting services (or a list of vendors and contact information) in place to allow for fast-track procurement of emergency response and recovery services, including the following?
  - Equipment for emergency response
  - damage assessment
  - debris removal
  - mud removal
  - removal of standing water
  - facility dehumidification
  - corrosion control
  - smoke removal
  - electrical restoration
  - portable toilets
  - equipment rental including generators
  - fuel
  - water
  - channel sounding
  - channel dredging
  - air transportation
  - engineering services
2. Do other government entities in the local area have pre-bid service contracts for emergency response and restoration that the Port could be part of?
3. Do you have an intergovernmental agreement with USCG for removal of sunken vessels from federal waterways?
4. Do you have an intergovernmental agreement with USACE for removal of sunken vessels or dredging in state waterways needed after a storm?
5. Does your port identify funding streams to support adaptation?
6. Is the Port eligible for an Emergency State Infrastructure Bank Loan through the State Department of Transportation?

### *Damage Assessment*

7. Does the Port have a pre-identified Damage Assessment Team with the following areas of expertise represented?
  - structural engineering
    - to include analysis for structural damage related to water
    - to include analysis for structural damage related to fire
  - electrical engineering
    - to include analysis of water for ionic content, acidity, suspended solids, and organic content
  - hazardous materials
    - protective clothing/equipment and special training/certification for PCBs, asbestos, lead, cadmium, mercury, combustibles, etc.
  - environmental issues
    - to include analysis for mold and mildew spores

8. Does the Damage Assessment Team have an emergency kit containing:
  - cameras for taking videos and still photographs of damages
  - forms for recording and reporting damages
9. Does your port have access to a helicopter for preliminary damage assessment?
10. Does the Port identify a POC for the USACE, USCG, and terminal operators to remain up-to-date on damage assessments for:
  - federal navigation channel
  - aids to navigation
  - berthing areas

#### *Debris Management and Removal*

11. Does your port inventory hazardous material and debris as part of the damage assessment process?
12. Does your port have a debris removal plan?
13. Does your port have pre-storm master agreements with service providers to facilitate timely cleanup?
14. Do you have a list of equipment available to remove sunken vessels in inland waterways?
15. Does the port have an emergency vessel boat launch?
16. Do you have access to highway cleaning equipment to clear debris from the roads leading into and out of the port facility?

#### *FEMA Disaster Assistance Grant Program*

17. Does the EOP include a plan to seek disaster assistance through FEMA after an event?
18. Does the EOP include provisions to:
  - analyze and identify potential uninsured loss exposure
  - develop and implement a mitigation strategy
  - create the control and coordination for loss assessment, filing requests for assistance, recordkeeping, and financial accountability
19. Does someone at the Port understand the process of the FEMA Disaster Public Assistance Grant Program?
20. Does the Port have a plan to apply for Hazard Mitigation Grant funds in the event of a disaster declaration?

#### *General Public Assistance*

21. Is the Port aware of the roles it may be requested to fill to provide assistance to the community in the event of a disaster?
  - Navy Hospital Ships: requires a navigable channel, available berth space, a supply of potable water, and access to and from the vessel through the Port
  - FEMA/MARAD temporary housing on ships
  - Relief supplies being delivered from around the country
  - Debris removal of roadways leading into the Port
22. Do you utilize the port as an emergency response asset?
23. Does your port emphasize its role in disaster recovery?
24. Do you educate stakeholders about hazard risks and resilient strategies?
25. Does your port consider resilience as an economic advantage?
26. Does your port use resilience as a marketing strategy?

## **Section 5: Communications**

*Does the Port have a robust communications plan for during times of crisis and for times outside of crisis?*

### *Times of Crisis*

1. Do you have phases of time before a hurricane makes landfall that you broadcast to your tenants?
2. Have you identified “backup” or external communication assets that would be available to provide warning to persons within the impact area?
3. Have you identified visible and audible warning signals and procedures that could be used to communicate emergency incidents to Port staff and management?
4. Do you have a plan to relay pertinent incident information to the tenants after the incident has occurred?
5. Do you broadcast Public Service Announcements on the radio?
6. Do you maintain a website that is updated daily with current storm information?
7. Does your port emergency plan designate someone to update the website with relevant information during an emergency situation?
8. Do you send emails or text messages to your tenants with up-to-date information?
9. Does the port emergency plan identify a regularly occurring time during the crisis to communicate with higher port leadership?
10. Does the port emergency plan identify a regularly occurring time during the crisis to communicate with the media?

### *Times of Non-Crisis*

11. Do you regularly assess the following and install necessary updates:
  - warning alert systems
  - emergency notification list
  - pre-written/standard messages for various emergency scenarios
  - alternative activation of Management Information System
12. Do you regularly assess and update your communications assets?
  - Landline telephone system
  - base station and hand-held portables
  - cell phones
  - satellite phones
  - internet service
  - email system
  - intranet
  - 1-800 telephone line (For employees? For customers?)
  - television/radio
    - UHF radios
    - Marine band VHF
    - VHF Amateur radio
13. Do you have Telecommunication Service Priority through the Government Emergency Telecommunications Service (GETS) program?

14. Do you have Wireless Priority Service through the federal government?
15. Do you keep a current and updated list of email addresses for those with whom the port communicates? (i.e., employees, commissioners, tenant reps, customer reps, etc.)
16. Does your port utilize multi-agency response and crisis communications planning, including the following groups?
  - Port employees
  - Chairman/Board of Directors
  - Federal Government:
    - U.S. Army Corps of Engineers
    - U.S. Coast Guard
    - Federal Emergency Response Agencies
  - State Emergency Response/Coordination Agencies
  - County (Parish) Emergency Response Groups
  - Local emergency response groups
  - Tenants
  - Transportation Partners (steamship lines; terminal operators; railroads; trucking companies)
  - Customers
  - Contractors
  - Local utility service providers
  - General community
  - Media
17. Does this happen at a regional level?
18. Do you have a harbor safety committee that includes:
  - port authorities
  - vessel owners and operators
  - harbor pilots and pilot associations
  - marine exchanges
  - docking pilots
  - tug and tow operators
  - shipping agents
  - terminal operators
  - industry associations
  - organized labor
  - commercial fishing industry associations
  - state and local government agencies
  - federal government representatives
19. Are the port emergency response and contingency plans integrated into state and local emergency planning?
20. Does the port have a defined role in the response and recovery plans of the surrounding community?
21. Does your port participate in local partnerships committed to environmental change?

## **Section 6: Accounting, Finance and Administration**

*Does the Port have plans for restoring Port finance and accounting operations, re-establishing banking services and establishing financial accountability and management of cash resources during an extended recovery period?*

*General*

1. Does the Emergency Operations Center contain the following financial resources and records?
  - purchase orders
  - checks
  - check signing equipment
  - tax exempt forms
  - checking account balances
  - directory of vendors and suppliers
  - port emergency plans
  - petty cash
  - banking/financial institution information
2. Has the Port determined the level of repair and reconstruction that could be supported from unrestricted reserves?
  - how liquid are the unrestricted reserves?
  - Do investments mature ratably during the year?
  - Will investments have to be sold at market rates?
3. Does the Port have access to a Mobile Data Center?

*Vital Records*

4. Does the Port regularly conduct inventory of its records and record keeping systems?
5. Have the Port's vital records and data been identified?
  - leases
  - contracts
  - easements
  - minutes of board meetings
  - employee records
  - facility maps
  - facility construction records
  - accounting data
6. Are records stored in an electronic format?
7. Are electronic records routinely backed up?
8. Are backup files stored offsite at a location not subject to the same risks?
9. Will you evacuate with a backup of the files?
10. Can files be restored easily?
11. Do you have a contract with a records backup/data management company?

*Payroll*

12. Does the Port maintain a backup of all payroll data?
13. Does the Port have the ability to process payroll from an alternate location?
14. Does the Port have a backup plan for distributing physical payroll checks if the area is severely damaged and mail service is suspended or restricted?

15. Does the Port have a plan for paying employees in cash as a last resort?

#### *Emergency Spending*

16. Does the Port Executive Management have emergency spending authority?
17. Does the Port's annual budget include a contingency line item for emergency spending?
18. Does your port have extra expense coverage to resume alternative operations?
19. Has the Port assessed the possible cash flow needs to support operations and facility repairs and rebuilding after an incident?
20. Does the port have the authority to spend above its normal limits during an emergency?
21. Does the Port have plans for making emergency purchases in the first hours and days after an event?
22. Does the Port maintain adequate emergency petty cash fund levels?
23. Do first responders have access to petty cash?
24. Does the Port have plans to deliver cash supplies to the recovery team, if necessary?
25. Does the Port have recordkeeping procedures for emergency purchases?
26. Have Port employees been properly trained to maintain records of emergency purchases?
27. Will departments involved in response and recovery efforts be supplied with purchase orders for use in emergency situations?
28. Does the Port have a work order process to capture expenses associated with pre and post-event work?
29. Does the Port have appropriate work order forms to capture the following information?
  - date
  - location
  - facility
  - whether it is Pre Event: Preparedness and Setup or Post Event: Response or Recovery
  - description of work performed
  - employee who performed the work
    - when work was started/completed
    - was it regular time or over-time
  - stock parts/supplies used
    - non-stock parts supplies purchased
  - port equipment used
    - equipment identification number
    - time use started/completed
30. Does the Port train employees on when to use the forms and how to complete them?

#### *Banking and Bonds*

31. Do you maintain a master list of all bank and investment accounts associated with the Port?
  - financial institution name, address, phone number
  - account names, numbers, and those authorized on the accounts
32. Is the Port able to make transactions at any branch location?
33. Does the Port have an account at an alternate financial institution that is not subject to the same risks?
34. Does the Port maintain a schedule of financial institutions and accounts to which payments are made?

35. Does the Port maintain a list of all outstanding bond issues and scheduled bond payments?
36. Does the Port maintain a schedule of the financial institutions from which bond payments are paid?
37. Are bond payments set up as repetitive wires?
38. Does the Port maintain a list of rating agencies and bond insurers?
39. Have bond resolutions been reviewed for disclosure requirements?

### **Section 7: Insurance and Risk Management**

*Does the Port have an insurance and risk management plan that analyzes and identifies potential loss exposure, implements a mitigation strategy, and coordinates insurance claim filings in the event of disaster?*

1. Does the Port analyze financial loss exposure for every risk and consider maximum loss value and probability of occurrence?
2. Does the Port have a property insurance strategy based on the identified risks, loss exposure, and economic tolerance of the Port?
3. Does the insurance policy include listed structures, amount of coverage (updated annually?), replacement costs (updated annually), listed perils?
4. Does the Port have flood insurance through the National Flood Insurance Program or the open market?
5. Does the Port have windstorm coverage through state wind pools or the open market?
6. Does the Port have coverage for costs incurred to prevent loss? (i.e., mitigation activities)
7. Does your port have a business continuity plan?
8. Does the Port have Business Interruption coverage for the following:
  - Business income coverage?
  - Contingent business interruption coverage?
  - Profit and commission?
  - Extra expense?
  - Civil authority?
  - Ingress/egress coverage?
  - Miscellaneous related coverages?
9. Do the insurance policies define the period covered? (i.e., complete or partial cessation of business)
10. Does BI coverage end when business is partially resumed?
11. Is the replacement period for electronic data and documents limited?
12. Does the port emergency plan include calling insurance carriers to request an adjuster when an event is in the forecast?
13. Has the Port identified a person who will notify the insurance carrier(s) in the event of an emergency?
14. Does the Emergency Operations Center contain an “insurance claims manual” with the following elements?
  - time and origin of the loss
  - interest of the insured and others on the property
  - actual cash value of the property damaged
  - all encumbrances on the property

- all contracts of insurance potentially covering any of the property
  - records of physical address for tenants and insurance identification numbers
  - all changes in the title, use, occupation, location, and possession of the property since the policy was issued
  - by whom and for what purpose any buildings were occupied at the time of loss
  - plans and specifications for all buildings, fixtures and machinery destroyed or damaged
  - current video and photographs of all Port property
  - copies of all policies and claims manuals including required forms
  - contact information, phone and mailing address, for the insurance agent or broker for claim reporting
  - address to which formal written notice is to be sent to carrier
  - list of deadlines for filing notice of loss or claim
15. Is the Port aware of duties required on its part by insurance carriers in order to proceed with making a damage claim?

### **Section 8: Legal Issues**

*Does the Port tariff reference any port documents related to emergency preparedness, response, and recovery?*

1. Does the Port tariff include language that addresses liability for any loss or damage to cargo handled over or through Port facilities or stored in Port facilities?
2. Does the Port EOP include language that waives liability claims consistently with the Port tariff/rules?
3. Does the Port tariff expressly waive Port liability for force majeure conditions?
4. Does the Port tariff waive demurrage claims associated with force majeure conditions?
5. Does the Port tariff include language that requires the responsible party to remove cargo that sustains damage due to fire, flood and other occurrences while on Port premises within 30 days after notification by the Port or the cargo will be removed and sold or disposed of?
6. Does the Port tariff waive common carrier status for cargo claims?
7. Does the Port tariff include language that states that the Port is not a common carrier and does not accept care, custody or control of any cargo or other property while on or in Port facilities?
8. Does the Port tariff address the removal of damaged cargo?
9. Does the Port tariff address the mooring of vessels?
10. Do Port facility leases waive liability for force majeure conditions?
11. Do Port facility leases address the removal of damaged cargo?
12. Do Port facility leases waive common carrier status for cargo claims?
13. Do Port facility leases reference the Port tariff and all rules and regulations therein unless otherwise specified in the lease?
14. Do Port leases define what will happen in the event of damage to facilities under lease?
15. Do Port leases give the Port the option to terminate if there is total destruction or insurance proceeds are insufficient?
16. Is the Port obligated to rebuild/repair?
17. Do Port leases waive liability for replacement of tenant fixtures or improvements?



18. Does the Port have legal options to finance operations and repair and rebuilding efforts on a short-term basis, including:
  - line of credit?
  - Bank loan?
  - FEMA Community Disaster Loans?
  - Commercial paper issuance?
19. In an emergency situation, does the law allow the Port to waive certain bidding requirements and spending level restrictions?
20. Does your Port have mutual aid agreements with other organizations to provide emergency support operations?
21. Do the Port's mutual aid agreements address the following issues?
  - activation of the agreement
  - description of aid to be provided
  - procedures for requests for assistance
  - supervision and control
  - food, housing and self-sufficiency
  - communications
  - rights and privileges of personnel
  - term of deployment
  - responsibility for all costs of providing assistance
  - insurance responsibilities
  - waiver of claims against each other
  - immunity retained
  - termination provisions

### **B.3 PRI INDICATOR QUESTIONS FOLLOWING WORK SESSION WITH THE PREC (146 QUESTIONS)**

#### **Hazard Assessment**

*These questions help a Port determine if it has a plan to assess all hazards and risks to facilities and infrastructure.*

1. Does your Port have a hazard or emergency response plan?
2. Does your Port conduct an annual risk assessment and disaster planning process to identify natural hazards and threats that could impact critical infrastructure (including Transportation, Port and Utility infrastructure<sup>3</sup>)?
3. Has your Port identified critical business processes (i.e., email, payroll, purchasing, accounts payable, business support, etc.) and priorities for post-event restoration?
4. Has the Port identified and prioritized the critical facilities and services to be restored in order for the Port to resume normal operations (i.e., berths and wharves, roadways, rail, terminal equipment, storage facilities)?
5. Does your Port consider historic trends and past events (i.e., climatic data and hurricane paths) to identify information related to hazard risks and probabilities for future events (including weather, geological, technological, and chronic hazards<sup>4</sup>)?
6. Does your Port consider long-term planning (i.e., 20 years) for disasters?
7. Has your Port identified its cyber risk and mitigation procedures to address that risk?
8. Does your Port conduct regular assessment of the condition of its facilities to identify maintenance issues requiring corrective action to increase port safety?
9. Does your Port evaluate the impacts of increasing storm surge heights and sea level rise on facilities and operations?

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<sup>3</sup> Examples of Transportation Infrastructure (e.g., waterway systems, connecting roadways and railroads); Port Infrastructure (e.g., terminals, storage facilities, docks, wharves and piers); Utility Infrastructure (e.g., water towers, wastewater, energy, solid waste treatment)

<sup>4</sup> Examples of weather-related disasters (e.g., hurricanes, coastal storms, flooding); geological events (e.g., earthquakes, tsunamis); technology-related events (e.g., oil spills, chemical incidents); and chronic hazards (e.g., sea level rise, shoreline erosion)

### **Insurance, Risk Management and Legal Protection**

*Once the risk assessment is complete, the Port identifies funding mechanisms to address those risks. The following questions help a Port decide if it has the right property insurance strategy based on its identified risks, loss exposure and economic tolerance.*

10. Has your Port conducted or contracted a risk assessment process to analyze financial loss exposure for identified risks that considers maximum loss value and probability of occurrence?
11. Does the Port conduct regular hazard risk assessments of infrastructure to determine what level of damage and repair can be expected based on the size of an event?
12. Has your Port identified its risk tolerance and level of financial participation?
13. Has your Port identified the probable risk transfer methods and what will be covered by insurance contracts?
14. Has your Port determined the level of repair and reconstruction that could be supported from unrestricted reserves considering insurance deductibles and/or financial responsibility levels?
15. Has your Port secured the required coverage as identified above?
16. Does your Port's insurance policy include a comprehensive Statement of Values with Construction, Occupancy, Protection, and Exposure information, replacement costs, or Actual Cash Values for its assets (i.e., owned, leased, IT hardware and software)?
17. Does your Port have a schedule of current replacement costs for Port facilities?
18. Is the schedule updated at least every 3 years?
19. Does your Port have flood insurance through the National Flood Insurance Program on all buildings and/or excess coverage on the open market?
20. Does your Port have windstorm coverage?
21. Has your Port identified deductible options for Windstorm and Flood coverage and budgeted accordingly?
22. Does your Port have coverage for costs incurred to prevent further loss in the event of a covered peril? (i.e., mitigation activities)
23. Does your Port have a business continuity plan? If so, is this plan part of your emergency plan?
24. Does your Port have Business Interruption (BI) coverage to include business income, contingent business interruption, extra expense, civil authority, ingress/egress challenges, and miscellaneous related expenses?
25. Has the Port identified a person who will notify the insurance carrier(s) in the event of an emergency?

26. Does the Port emergency plan include notification to the Port's insurance broker and contracted respondents (i.e., vendors and consultants) to request an adjuster when an event is in the forecast?
27. Does your Port have an Insurance Claims Manual with the following elements?
- Pre-event Materials (copies of all policies and required forms for filing claims; current video and photographs of all Port property; contact information [phone and mailing address] for the insurance agent or broker for claim reporting)
  - Post-event Materials (time and origin of the loss; plans and specifications for all buildings, fixtures and machinery destroyed or damaged; all contracts of insurance covering any of the property; records of physical address of contacts for Port assets)
28. Is your Port aware of duties, required on its part by insurance carriers, in order to proceed with making a damage claim<sup>5</sup>?
29. Does the Port tariff include language that requires the responsible party to remove cargo that sustains damage due to fire, flood and other occurrences while on Port premises within a length of time as provided in the tariff after notification by the Port or the cargo will be removed and sold or disposed of?
30. Does the Port review the responsibility for removal of damaged cargo with tenants?
31. Do Port facility leases take into account emergency response and recovery efforts and procedures, such as the following?
- Waiver of liability for force majeure conditions
  - Removal of damaged cargo
  - Waiver of common carrier status for cargo claims
  - Reference to the Port tariff and all rules and regulations therein unless otherwise specified in the lease
  - Definition of what will happen in the event of damage to facilities under lease
  - Reminder of the Port's ability to terminate if there is total destruction or insurance proceeds are insufficient
  - Waiver of liability for replacement of tenant fixtures or improvements
32. Does the Port have legal options to finance operations and repair and rebuilding efforts on a short-term basis such as lines of credit, bank loans, and disaster assistance loans?
33. Is the Port aware of state or jurisdiction rules related to emergency bidding requirements and spending level restrictions? (Refer to Stafford Act.)

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<sup>5</sup> Duties include documenting interest of the insured and others on the property; by whom and for what purpose any buildings were occupied at the time of loss; list of deadlines for filing notice of loss or claim

34. Does your Port have mutual aid agreements<sup>6</sup> with other organizations to provide emergency support operations?
35. Does your Port have a backup plan to get legal advice when decisions need to be made quickly, in case your main point of contact is unavailable?

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<sup>6</sup> Mutual aid agreements should address the following issues: activation of the agreement; description of aid to be provided; procedures for requests for assistance; supervision and control; food, housing and self-sufficiency; communications; rights and privileges of personnel; term of deployment; responsibility for all costs of providing assistance; insurance responsibilities; waiver of claims against each other; immunity retained; termination provisions

## **Planning for Disaster**

*These questions help a Port decide if it has considered appropriate pre-storm measures to enable its response and recovery, including pre-event service contracts, damage assessment, debris management, FEMA disaster assistance, and general community assistance.*

36. Does your Port have pre-event contracts (or a list of vendors and contact information) in place to allow for fast-track procurement of emergency response and recovery services, such as the following?
  - Equipment (e.g. for removal of debris, mud, standing water, smoke; generators)
  - Supplies (e.g., fuel; water; portable toilets)
  - Damage Assessment (e.g., air transportation, engineering services, FEMA consultants)
  - Facility Control (e.g., dehumidification; corrosion control; electrical restoration)
  - Channel Maintenance (e.g., channel sounding; berth or channel dredging)
37. Does your Port have on hand (or service contracts for) dehumidifiers, wet vacuums, and portable air conditioning units to prevent mold and mildew growth on Port records?
38. Do other government entities in the local area have master service agreements for emergency response and restoration that could include the Port?
39. Does the Port have a protocol to establish emergency reactivation of utilities after an event?
40. Does your Port have a pre-identified Damage Assessment Team (e.g., in-house or contractors) with the following areas of expertise represented?
  - Structural Engineering (e.g., damage related to water and fire)
  - Electrical Engineering (e.g., water analysis for ionic content, acidity, suspended solids, and organic content)
  - Hazardous Materials and Environmental Issues (e.g., PCBs, asbestos, lead, cadmium, mercury, combustibles, mold and mildew spores)
  - Police Department
  - Tenants
41. Does your Port have access to or a master service agreement in place for a helicopter or drone for preliminary damage assessment?
42. Does your Damage Assessment Team have an emergency kit of items to assist with the process, such as the following:
  - Cameras (e.g., to document damage)
  - Forms (e.g., to record and report damages)
  - Communications Equipment (e.g., satellite phones, portable radios)

43. Does the Port use a Port Coordination Team or similar entity (includes USACE, USCG, and terminal operators) to remain up-to-date on damage assessments (i.e., federal navigation channel, aids to navigation, berthing areas)?
44. Does your Port identify hazardous material and debris as part of the damage assessment process?
45. Has your Port identified likely needs for post-event dredging and material removal from navigation channels?
46. Does your Port have access to an emergency vessel boat launch?
47. Does your Port have access to highway cleaning equipment to clear debris from the roads leading into and out of the port facility?
48. Does your Port maintain an inventory of supplies<sup>7</sup> to implement emergency mitigation measures and temporary repairs at the main Port facility?
49. Does your Port have knowledge of or access to a consultant who has knowledge of disaster assistance programs (i.e., FEMA Public Assistance, FEMA Hazard Mitigation Grant Program) and a plan to apply for assistance after an event?
50. Is your Port aware of the roles it may be requested to fill to provide assistance<sup>8</sup> to the community in the event of a disaster (i.e, Navy Hospital Ships, FEMA/MARAD Ready Reserve Force, etc.)?
51. Does your Port utilize itself as an emergency response asset (e.g., safe harbor for vessels)?
52. Does your Port educate stakeholders about hazard risks and resilient strategies?
53. Does your Port consider resilience as an advantage?
54. Does your Port use resilience as a marketing strategy?

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<sup>7</sup> Supplies include: generators with adequate fuel supply; emergency lighting; supplies to mark unsafe areas (e.g., barricades, plywood, rope); tools (e.g., drills, hammers, nails, shovels, pry bars); tarps and plastic sheeting; electrical supplies and test meters; plumbing supplies

<sup>8</sup> Navy Hospital Ships require a navigable channel, available berth space, a supply of potable water, and access to and from the vessel through the Port; FEMA/MARAD Ready Reserve Force vessels provide temporary housing for relief workers; Ports may be expected to receive relief supplies being delivered from around the country

## Communications

*These questions help a Port determine if it has a robust and sustainable communications plan for times outside of crisis and for times during crisis.*

55. Does your Port regularly assess capacity of its communications assets and update integrated communications technology<sup>9</sup> (i.e., Emergency Notification Systems; Telephone Systems; Internet Systems; Radio Systems)?
56. Does your Port regularly update its emergency notification list and pre-written messages for various emergency scenarios?
57. Does your Port have a plan to activate the Management Information System from its alternate operations location?
58. At the alternate operations location, does your Port regularly update activation technologies?
59. Has your Port considered applying for priority services offered through the Department of Homeland Security's Office of Emergency Communications (i.e., GETS, WPS)<sup>10</sup>?
60. Does your Port have a Port Coordination Team or Port Emergency Action Team that addresses crisis communications, planning and delivery with local and regional stakeholders<sup>11</sup> (e.g., Port Stakeholders, Transportation Partners, Federal Agencies, State and Local Agencies, Local Utility Service Providers, Vendors and Contractors, the wider community, and Media)?
61. Does your Port coordinate internally and externally (i.e., through a Port emergency action or Port coordination team) to communicate with tenants as needed for preparedness?
62. Does your Port have designees who attend local harbor safety committee meetings (e.g., Port Authorities; Port-related Associations<sup>12</sup>; Operators<sup>13</sup>; Federal,

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<sup>9</sup> Emergency Notification Systems (e.g., audible and visual signals; 1-800 telephone line for employees and customers); Telephone Systems (e.g., landline; base station and hand-held portables; cell phones; satellite phones); Internet Systems (e.g., Intranet; email); Radio Systems (e.g., UHF/VHF; Marine Band VHF; Amateur/Hamm)

<sup>10</sup> GETS = Government Emergency Telecommunications Service: supports emergency preparedness users when the landline network is congested; WPS = Wireless Priority Service: supports emergency preparedness users when the wireless network is congested

<sup>11</sup> Port stakeholders (e.g., Chairman/Board of Directors; Port Commission; Employees; Tenants and Customers); Transportation partners (e.g., Steamship Lines; Terminal Operators; Railroads; Trucking Companies); Federal Agencies (e.g., U.S. Army Corps of Engineers; U.S. Coast Guard; Federal Emergency Management Agency); State and Local agencies (i.e., emergency response and management)

<sup>12</sup> Port-related Associations include harbor pilot associations; industry associations; organized labor unions

<sup>13</sup> Operators include vessel operators, harbor pilots, docking pilots, tug and tow operators, and terminal operators



State, and local government representatives; Marine Exchanges; Shipping Agents)?

63. Are the Port's emergency response and contingency plans integrated into state and local (parish/county) emergency, response, and recovery plans?
64. Does your Port establish local relationships with organizations committed to environmental stewardship?
65. Does your Port identify a coordinator for emergency response information and a point-of-contact to represent your organization to the media?
66. Does your Port identify someone responsible for updating all emergency documents?
67. Does your Port re-broadcast internal and external advisories (e.g., U.S. Coast Guard Marine Safety Information Bulletin) to communicate with tenants and internal stakeholders as needed during the crisis?
68. Does your Port's website provide a link to the U.S. Coast Guard's homeport page?
69. Has your Port considered maintaining an RSS feed on its webpage?
70. Has your Port identified back up communications systems (e.g., two-way radios, satellite phones, landline telephones) in the event of the loss of cell phone towers?
71. Has your Port determined a daily briefing schedule and communicated that time for internal and external communication with stakeholders (e.g., Coast Guard, local mayors)?
72. Does the Port Emergency Plan identify a regularly occurring time during the crisis to communicate with the media?
73. Does your Port have a re-entry policy that considers the following?
  - Check-in procedures for Port employees and tenants
  - Issuance of keys/codes to re-open the Port
  - Transportation Worker Identification Credential (TWIC) cards
  - Release of gate security personnel
  - Coordination with local authorities (e.g., National Guard, local and state police)?
74. Does your Port use its website to communicate the Port's re-entry policy?

### **Emergency Operations Center (Physical or Virtual)**

*The questions in this section will help a Port evaluate whether or not it has the time, manpower, and financial resources to staff, run and maintain its own Emergency Operations Center. Each question may not apply to every Port because of its size. While some Ports may not have the resources to have a physical EOC, they should consider remote operations and the Essential Personnel needed to continue some level of operation and functionality in the event of a disaster. Alternatively, the Port may consider teaming up with a local county or city Emergency Operations Center.*

*To be completed by: Emergency Response Coordinator*

*When to complete: This checklist is meant to be a living document and provides important guidelines for a Port to select actions, which need to be addressed throughout the year. Proximity to the shore will have an impact on when the checklist is completed. In addition, turnover in personnel and agencies requires regular updates to the plan.*

75. Does your Port have an offsite evacuation haven or alternative operations location site?
76. Does your Port coordinate with the local Emergency Operations Center and government-based Emergency Operations Center efforts?
77. Do outside emergency personnel (e.g., FEMA, USCG, USACE) have access to your alternative operations location?
78. Does your Port consider certain characteristics in the selection of an alternative operations location site including space and structure<sup>14</sup>, emergency backup power<sup>15</sup>, amenities<sup>16</sup>, and office supplies?
79. Does your Port stock the alternative operations location with basic emergency supplies?
  - food provisions for at least 10 days
  - water (at least 1 gallon per person per day)
  - basic toiletries (e.g., toilet paper, tissues, soap, toothpaste)
  - First Aid kits
  - flashlights and batteries
  - provisions for sleeping and bathing (e.g., sleeping bags, towels)
  - trash containers or bags
  - laundry detergent and dish soap

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<sup>14</sup> Operations space, outside ventilation, natural lighting, reasonable proximity to primary facilities

<sup>15</sup> Proper connections for generators, electrical outlets for computer equipment, phone chargers, radio chargers, etc.

<sup>16</sup> Sleeping space, restrooms, showers, water, refrigerator, microwave, washer, dryer

80. Does your Port conduct routine maintenance checks throughout the year of the alternative operations location to check batteries, electricity, and generator operation and fuel supply?
81. Does your Port have communications assets at the alternative operations location including phones<sup>17</sup>, radios, television, and computer equipment?
82. Does the Port keep hard copies of important documents at the alternative operations location, including Port Documents<sup>18</sup>, Port Facility Information<sup>19</sup>, Incident Command System forms<sup>20</sup>, phone and email contact lists<sup>21</sup>, Essential Personnel Information<sup>22</sup>, Utility Information<sup>23</sup>, and Port Condition Information<sup>24</sup>?
83. Does your Port regularly update contact lists as personnel change?
84. Does your Port implement offsite storage for electronic data (e.g., files stored on laptops, hard drive backup at offsite location, backup to the cloud)?
85. Is your Port ready to survive without external assistance for up to 10 days?
86. Do you have a transportation plan to reach the alternative operations location, in accordance with the city's evacuation and re-entrance plan?
87. Has your Port identified the following?
  - a "preparation" team
  - a "ride out" team
  - a "recovery" team
88. Does your Port identify Essential Personnel and list their functions in the Port Emergency Plan?
  - Port Director and Deputy Port Director

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<sup>17</sup> Phones – landline, primary and secondary cell phone, satellite phone

<sup>18</sup> Port Documents (e.g., Port Emergency plans; Port employee telephone directory; map of Port, terminals and facilities)

<sup>19</sup> Port Facility Information (e.g., building plans, specifications, drawings, warranties, proposals, main office address)

<sup>20</sup> Incident Command System forms (incident briefing form; incident objectives list; organization assignment list; incident status summary report; incident check-in lists)

<sup>21</sup> Phone and Email Contact Lists (e.g., terminal operators, facility operators, tenants, customers, pilot and vessel operators, local/state/federal government agencies, response and recovery vendors, media)

<sup>22</sup> Essential Personnel Information (e.g., designated department, assigned tasks, names and phone numbers)

<sup>23</sup> Utility Information (e.g., drawings and diagrams of utility connections, cut-off valves, and control panels; emergency contact list for response and restoration contractors; equipment resources; mobilization timelines; protocol for utility outage notification and reactivation; vendors for standby utility equipment)

<sup>24</sup> Port Condition Information (e.g., annual condition surveys of facilities; still photographs and videos)

- Managers (e.g., Senior; Facility; Media Relations; Environmental, Health and Safety; Engineering; Risk; Maintenance)
  - Security (e.g., Port Police force; Facility Security Officers)
  - Emergency Response (e.g., local Fire Department liaison; local Police Department liaison)
  - Communications (e.g., public information officer; media relations)
  - Harbormaster
89. Do your Port personnel plans designate Essential Personnel and their rate of pay in time of emergency?
90. Does your Port utilize the Incident Command System framework for critical functions and responsibilities of Essential Personnel? (For more information, refer to the U.S. Coast Guard Incident Management Handbook, Chapter 12 (COMDTPUB P3120.17A).
91. Do your Port's Essential Personnel participate in National Incident Management Systems (NIMS) trainings?
92. Does each Essential Personnel member have an Emergency Kit that includes a list of his or her critical tasks?
93. Does each Essential Personnel member have a hard copy of the Port emergency plan?

## **Operations Planning for Preparedness**

*The following questions should be answered along with the Port Coordination Team and will help a Port determine if it has procedures in place for securing equipment and facilities, evacuation, First Aid and medical services, personnel management, and training exercises. Plans and procedures should be copied on to a USB drive or to the cloud to be portable in case of emergency.*

94. Does your Port emergency plan provide a summary of the situations that it addresses and a general concept of emergency operations?
95. Does your Port's emergency plan identify procedures to activate emergency operations (e.g., cite legal authority per U.S. Coast Guard Incident Management Handbook; authorize a person to activate the response plan)?
96. Does your Port's emergency plan address execution without assistance of mutual aid?
97. Does your Port's emergency plan consider elements of the National Response Plan?
98. Does your Port have a plan to prevent flying debris by securing or moving equipment including gantry cranes, container equipment, intermodal transportation and facilities, buildings and high mast lighting, vehicles, and utilities?
99. Does your Port assign accountability for items that could potentially end up as flying debris?
100. Does the Port plan consider the circumstances under which the power at the Port is shut off?
101. Does your Port's emergency plan include locally established evacuation routes and information<sup>25</sup>?
102. Does your Port identify threshold criteria for issuing evacuation orders in coordination with local authorities?
103. Does your Port have a plan to decide which personnel get sent to the alternate operations location and when that decision is made?
104. Does your Port consider congestion-related constraints when planning for evacuation?
105. Does your Port stock and routinely maintain an inventory of the contents of First Aid Kits on site ("Refer to Appendix A for a sample list of First Aid items, including Automatic External Defibrillators (AEDs)")?
106. Are a sufficient number of Port personnel trained in First Aid and CPR?

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<sup>25</sup> Evacuation route maps for port facilities; equipment and personnel needed for safe and efficient evacuation from the port; identified routes for police, fire protection and medical services; permanent signage indicating evacuation routes leading into and out of the port; evacuation route maps and instructions for the city/country/state

107. Does your Port have a plan to provide or request mutual aid for regional emergency procedures (e.g., alternate medical transport services; regional helicopter services; MARAD hospital ship requests)?
108. Has your Port identified the communications equipment and methods (e.g., twitter, radio, texting, etc.) required to communicate with Port personnel in the event of an emergency?
109. Has your Port considered requiring that employees report their planned evacuation details and arrival at their evacuation destination?
110. Has your Port considered providing employees with a one-page document on what to do in the event of a Port evacuation and how to obtain information related to employee recall?
111. Has your Port considered identifying how Port employees will receive notice of when they are to return to work and their responsibilities for obtaining this information?
112. Has your Port developed written instructions for employees to follow after recall?
113. Has your Port considered a policy with local labor unions to manage the issue of labor recall after an event?
114. Does your port pre-contract or hire additional staff to prepare for and respond to hurricane events?
115. Has your Port considered documenting contact information for trained professionals that can provide counseling services to those Port employees who request it?
116. Has your Port considered reminding employees that access to direct deposit funds could be restricted in the event of an emergency?
117. Has the Port considered addressing temporary housing needs, including Housing Assistance Requests<sup>26</sup> or Emergency Trailers<sup>27</sup>?
118. Does your Port offer a Port Emergency Operations training program to Port personnel on a regular basis that considers the following?
- Recommended Precautionary Actions (e.g., measures to reduce the potential for loss of life, injury, or property damage)
  - Emergency Planning Assistance Manual (e.g., information to enhance individual preparedness and recovery)
  - Port Employee Trainings (e.g., workshops on filing insurance claims after an event)

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<sup>26</sup> Housing Assistance Requests might include requests for Port employees, first responders, or recovery agents from FEMA or MARAD

<sup>27</sup> Preparation for hosting Emergency Trailers includes having a list of suppliers, permits for emergency placement, and identified areas with utility connections

119. Does your Port regularly assess emergency support assets, including trained personnel<sup>28</sup> and necessary supplies and equipment<sup>29</sup>?
120. Does your Port conduct routine emergency preparedness and hurricane readiness meetings to review policies and procedures with customers and tenants?
121. Does your Port recommend equipment security procedures to tenants (e.g., block and reinforce dry-docked vessels; press up petroleum tanks with water)?
122. Does your Port remind tenants and customers to review their company's storm plans for storm preparation activities (e.g., coordinating vessel activity; moving barges; securing cargo)?
123. Does your Port reference appropriate manuals and federal guidelines for emergency planning and training exercises (Examples in the Appendix)?
124. At least every 18 months, does your Port conduct emergency planning or training exercises (e.g., orientation; tabletop/functional/full-scale exercises)<sup>30</sup>?
125. Has your Port considered developing and utilizing gaming exercises, simulations, and scenario planning tools to assist with annual drills?

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<sup>28</sup> Trained Personnel include people qualified to assess structural, electrical, and mechanical facilities; industrial hygienist; and environmental specialist

<sup>29</sup> Supplies and equipment for hazardous material clean-up; damage assessments and reporting

<sup>30</sup> Provide definitions from AAPA Manual

### **Accounting, Finance, and Administration**

*These questions will help a Port determine if they have strategies to address vital records, payroll, emergency spending, and banking and bonds during an emergency situation.*

126. Does your Port regularly conduct assessment of finance and accounting assets, including the following?
  - Communications Equipment
  - Management Information Systems Equipment
  - Support supplies and equipment needed for finance and accounting functions<sup>31</sup>
  - Alternative operations location for accounting and administrative functions
127. Does your Port's evacuation plan consider supplies needed (e.g., additional cash or cashiers checks) for employee payroll and other expenses?
128. Does your Port identify and periodically review vital records and data<sup>32</sup>?
129. Does your Port store and routinely back up records in an electronic format?
130. Does your Port store backup files offsite at a location not subject to the same risks?
131. If not stored offsite, will your Port evacuate with a backup of the files?
132. Does your Port have a contract with a records backup or data management company?
133. Does your Port maintain a backup of all payroll data?
134. Does your Port have the ability to process payroll from an alternate location?
135. Does your Port have a backup plan for distributing physical payroll checks if the area is severely damaged and mail service is suspended or restricted?
136. Does your Port have a plan for paying employees in cash as a last resort?
137. Does your Port's Executive Management have emergency spending authority?
138. Does your Port maintain adequate emergency petty cash fund levels?
139. Does your Port have an appointed person or staff member responsible for distributing petty cash and money?
140. Does your Port have plans to deliver cash supplies to the recovery team, if necessary?
141. Does your Port have recordkeeping procedures<sup>33</sup> for emergency purchases and distribution of petty cash or purchase orders?

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<sup>31</sup> Purchase orders and tax exempt forms; checks and check signing equipment; checking account balances; directory of vendors and suppliers; Port emergency plans; petty cash; banking and financial institution information

<sup>32</sup> Leases; contracts; easements; minutes of board meetings; employee records; facility maps and construction records; accounting data; certificates of insurance

<sup>33</sup> Recordkeeping procedures include description of work performed (e.g., date, time, location, facility, tasks completed); pre-event vs. post-event status (e.g., Preparedness and Setup; Response or Recovery); employee who performed the work (e.g., start and end time of work;



142. Does the Port train employees on how to properly document expenses in an emergency situation?
143. Does your Port maintain a master list of all bank and investment accounts associated with the Port, including the following information?
- Financial institutions (e.g., name, address, phone number)
  - Account information (e.g., names, numbers, and authorized users)
144. Does your Port bank with an institution with multiple locations?
145. Does the Port have an account at an alternate financial institution that is not subject to the same risks?
146. Is your Port able to maintain and prioritize financial obligations in an emergency situation, including bonds, loans, notes, and bills?

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regular time vs. over-time); Port equipment used (e.g., equipment identification number; start and end time of use); and stock parts and supplies used (e.g., non-stock parts purchased)

## **B.4 PRI INDICATOR QUESTIONS USED FOR THE PILOT TESTS (46 QUESTIONS)**

### **Introduction**

As the frequency of naturally driven disasters and other hazards increases, Ports play an important role in waterfront community resilience and should be considered part of the solution to achieve that resilience. The Ports Resilience Index (PRI) is a self-assessment tool developed for Port and marine industry leaders. It serves as a simple and inexpensive method of assessing if Ports and the regional marine transportation sector are prepared to maintain operations during and after disasters. Completing the PRI will assist Ports in developing actions for long-term resilience.

As you complete the PRI, you should consider your Port's level of preparedness for both large and small-scale events. Large-scale events include natural hazards affecting a widespread area, such as hurricanes. Small-scale disasters can be thought of as short-term weather events or an event that affects only your facility, such as a fire or flood on-site.

Being able to withstand and adapt to change has become a focal point for several business sectors and industries. Resilient industries recognize the vital role that planning, preparation, and collaboration play in developing and executing an ability to respond to challenges, adapt to changes and thrive. The PRI development team stresses that Port resilience planning should be completed in collaboration with the Port Coordination Team or with a similar group of internal and external Port stakeholders.

Coastal seaports will benefit from the PRI by identifying strengths and weaknesses in their management and operations. These indicators can provide an important baseline by which to measure progress toward resilience goals. In addition, the PRI assists in assessing the overall resilience of the Ports industry. The process of completing the PRI will help identify the action items the industry should work towards to address system vulnerabilities and maintain long-term viability.

### **Methods**

The PRI was developed with broad participation from industry leaders. The PRI Development Team prepared a checklist of possible indicators of resilience for seaports, using the American Association of Port Authorities 2006 *Emergency Best Practices Manual* as a starting point. To ensure we collected a robust and thorough set of draft indicators, the coordinating team asked for assistance from leaders in the Ports and marine transportation industry to identify measures of resilience (indicators). Using those indicators, the PRI was organized into broad categories (i.e. hazard assessment, risk management, emergency operations, etc.). Each indicator is written in the form of a yes or no question that can be answered in terms of existing Port facility conditions

and operations. A point system is used for each indicator so an overall score can be calculated. Instructions and interpretation of a score will be included as part of the PRI. It is important to note that the process of completing the PRI is intended to be an in-person activity bringing together various members of a Port management team to discuss the questions and determine an answer. This process creates dialogue about important issues and joint solutions to challenges the industry may face as well as documents strengths of current industry best practices.

## Important Definitions

*Alternate Operations Location* – a physical or virtually remote location from which Port operations can continue before, during, and after a hazardous event

*Disaster* – an event that is experienced collectively, resulting in infrastructure and property damage, and requires external aid and assistance in order to respond

*Essential Personnel* – those Port employees who are required to maintain Port operations before, during, and after a hazardous event

*Hazard* – an event that precedes disaster; sources of hazard include environmental, national security, technological, or public health

*Resilience* – the ability to return to an acceptable level of functioning after a disaster and “bounce forward”

## Target Audience for Pilot Tests

The list of potential invitees to a facilitated run-through of the PRI includes those internal to the Port and those external to the Port. Internal invitees include divisions of Port management, including executive leadership, operations, environmental health and safety, finance and administration, security, communications, human resources, etc. Other internal invitees include representatives from operators, tenants, or Port-related associations. External invitees include representatives from the local emergency management agency; local utility companies; and federal partners (e.g. closest MARAD gateway officer).

## Hazard Assessment

Does your Port have plans to assess all hazards and risks to facilities and infrastructure? *Check Yes or No.*

Hazard Assessment	YES	NO
<i>Example: Consider historic trends and past events</i>	✓	

Does your Port conduct an annual risk assessment and disaster planning process to identify natural hazards and threats that could impact critical infrastructure?		
Has the Port identified and prioritized critical business processes, critical facilities and critical services to be restored after an event in order for the Port to resume normal operations?		
Does your Port consider historic trends and past events (i.e., climatic data and hurricane paths) to identify information related to hazard risks in long-term planning (i.e., 20 years) for disasters?		
Does your Port implement flood-resistant design standards?		
Has your Port performed a study to identify upgrades necessary to limit damage due to flooding, wave and wind action?		
<b>Total number of Yes and No answers:</b>		

*For resources to improve your Port in these areas, see the “Resilience Resources” section.*

Notes:

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## 2.

### Insurance, Risk Management, and Legal Protection

Does your Port have the right property insurance strategy based on its identified risks, loss exposure and economic tolerance? *Check Yes or No.*

Insurance, Risk Management, and Legal Protection	YES	NO
<i>Example: Have flood insurance, windstorm coverage, and business interruption coverage</i>	✓	
Has your Port conducted or contracted a risk assessment process to analyze financial loss exposure for identified risks that considers maximum loss value and probability of occurrence?		
Does the Port conduct regular hazard risk assessments of infrastructure to determine what level of damage and repair can be expected based on the size of an event?		
Has your Port determined the level of repair and reconstruction that could be supported from unrestricted reserves considering insurance deductibles and/or financial responsibility levels?		
Does your Port's insurance policy include a comprehensive Statement of Values with Construction, Occupancy, Protection, and Exposure information, replacement costs, or Actual Cash Values for its assets?		
Does your Port have flood insurance, windstorm coverage, and business interruption coverage?		
Does your Port have a business continuity plan?		
Do Port facility leases take into account emergency response and recovery efforts and procedures?		
Does the Port have legal options to finance operations and repair and rebuilding efforts on a short-term basis such as lines of credit, bank loans, and disaster assistance loans?		
Does your Port have mutual aid agreements with other organizations to provide emergency support operations?		
<b>Total number of Yes and No answers:</b>		

*For resources to improve your Port in these areas, see the "Resilience Resources" section.*

Notes:

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3.

### Planning for Disaster

Does your Port have the following pre-storm measures in place to enable response and recovery? *Check Yes or No.*

Planning for Disaster	YES	NO
<i>Example: Pre-event Contracts</i>	✓	
Does your Port have pre-event contracts (or a list of vendors and contact information) in place to allow for fast-track procurement of emergency response and recovery services?		
Do other government entities in the local area have master service agreements for emergency response and restoration that could include the Port?		
Does your Port have a pre-identified Damage Assessment Team (e.g., in-house or contractors)?		
Does the Port use a Port Coordination Team or similar entity (includes USACE, USCG, and terminal operators) to remain up-to-date on damage assessments (i.e., federal navigation channel, aids to navigation, berthing areas)?		
Does your Port have knowledge of or access to a consultant who has knowledge of disaster assistance programs (i.e., FEMA Public Assistance, FEMA Hazard Mitigation Grant Program) and a plan to apply for assistance after an event?		
Is your Port aware of the roles it may be requested to fill to provide assistance to the community in the event of a disaster (i.e., Navy Hospital Ships, FEMA/MARAD Ready Reserve Force, etc.)?		
<b>Total number of Yes and No answers:</b>		

*For resources to improve your Port in these areas, see the “Resilience Resources” section.*

Notes:

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## 4.

### Communications

Does your Port have the following robust and sustainable communications practices in place for times during and after a crisis? *Check Yes or No.*

Communications	YES	NO
<i>Example: Re-entry policy</i>	✓	
Does your Port regularly assess capacity of its communications assets and update integrated communications technology (i.e., Emergency Notification Systems; Telephone Systems; Internet Systems; Radio Systems)?		
Does your Port have a Port Coordination Team or Port Emergency Action Team that addresses crisis communications, planning and delivery with local and regional stakeholders (e.g., Port Stakeholders, Transportation Partners, Federal Agencies, State and Local Agencies, Local Utility Service Providers, Vendors and Contractors, the wider community, and Media)?		
Does your Port identify a coordinator for emergency response information and a point-of-contact to represent your organization to the media?		
Has your Port determined a daily briefing schedule and communicated that time for internal and external communication with stakeholders (e.g., Coast Guard, local mayors)?		
Does your Port have a re-entry policy that considers: check-in procedures for Port employees and tenants; issuance of keys/codes to re-open the Port; Transportation Worker Identification Credential (TWIC) cards; release of gate security personnel; and coordination with local authorities?		
<b>Total number of Yes and No answers:</b>		

*For resources to improve your Port in these areas, see the “Resilience Resources” section.*

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### Emergency Operations Center

Does your Port have the time, manpower, and financial resources to staff and run its own Emergency Operations Center? *Check Yes or No.*

Emergency Operations Center	YES	NO
<i>Example: Survive without external assistance for up to 10 days</i>	✓	
Does your Port have an offsite evacuation haven or alternative operations location site?		
Does your Port consider certain characteristics in the selection of an alternative operations location site including space and structure, emergency backup power, amenities, and office supplies?		
Does the Port keep hard copies and electronic backup storage of important documents at the alternative operations location, including Port Documents, Port Facility Information, Incident Command System forms, phone and email contact lists, Essential Personnel Information, Utility Information, and Port Condition Information?		
Is your Port ready to survive without external assistance for up to 10 days?		
Has your Port identified a “preparation” team, “ride out” team, and “recovery” team?		
Does your Port identify Essential Personnel and list their functions in the Port Emergency Plan?		
<b>Total number of Yes and No answers:</b>		

*For resources to improve your Port in these areas, see the “Resilience Resources” section.*

Notes:

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### Operations Planning for Preparedness

Does your Port have the following procedures in place to minimize damage and ensure survival during an event? *Check Yes or No.*

Operations Planning for Preparedness	YES	NO
<i>Example: Mission Statement</i>	✓	
Does your Port emergency plan provide a summary of the situations that it addresses and a general concept of emergency operations?		
Does your Port have a plan to prevent flying debris by securing or moving equipment including gantry cranes, container equipment, intermodal transportation and facilities, buildings and high mast lighting, vehicles, and utilities?		
Does your Port have a plan to decide which personnel get sent to the alternate operations location and when that decision is made?		
Does your Port have a plan to provide or request mutual aid for regional emergency procedures (e.g., alternate medical transport services; regional helicopter services; MARAD hospital ship requests)?		
Has your Port identified the communications equipment and methods (e.g., twitter, radio, texting, etc.) required to communicate with Port personnel in the event of an emergency?		
Has your Port developed written instructions for employees to follow after recall?		
Does your Port conduct routine emergency preparedness and hurricane readiness meetings to review policies and procedures with customers and tenants?		
Does your Port remind tenants and customers to review their company's storm plans for storm preparation activities (e.g., coordinating vessel activity; moving barges; securing cargo)?		
At least every 18 months, does your Port conduct emergency planning or training exercises?		
<b>Total number of Yes and No answers:</b>		

*For resources to improve your Port in these areas, see the "Resilience Resources" section.*

Notes:

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### Accounting, Finance, and Administration

Does your Port have the following procedures in place to address vital records, payroll, emergency spending, and banking and bonds during an emergency situation? *Check Yes or No.*

Accounting, Finance, and Administration	YES	NO
<i>Example: Ability to process payroll from an alternate location</i>	✓	
Does your Port's evacuation plan consider supplies needed (e.g., additional cash or cashiers checks) for employee payroll and other expenses?		
Does your Port store backup files offsite at a location not subject to the same risks?		
Does your Port have the ability to process payroll from an alternate location?		
Does your Port's Executive Management have emergency spending authority?		
Does your Port have recordkeeping procedures for emergency purchases and distribution of petty cash or purchase orders?		
Does your Port bank with an institution with multiple locations?		
<b>Total number of Yes and No answers:</b>		

*For resources to improve your Port in these areas, see the "Resilience Resources" section.*

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## SCORING TABLE

Use the box labeled “Total Number of Yes or No Answers” from Sections 1-7 to complete the following chart.

Sections 1-7	Number of Yes answers	Translate number of Yes answers to Resilience Index	Resilience Index	Comments
<i>(Example) Section 3: Planning for Disaster</i>	<i>6</i>	<i>7 or fewer (LOW) 8 to 11 (MEDIUM) 12 or more (HIGH)</i>	<i>LOW</i>	<i>We are planning a tabletop exercise where we can practice our Continuity of Operations Plan. We are also developing a program for cross-training our employees.</i>
Section 1: Hazard Assessment		1 (LOW) 2 to 3 (MEDIUM) 4 or more (HIGH)		
Section 2: Insurance, Risk Management, & Legal Protection		3 or fewer (LOW) 4 to 6 (MEDIUM) 7 or more (HIGH)		
Section 3: Planning for Disaster		2 or fewer (LOW) 3 to 4 (MEDIUM) 5 or more (HIGH)		
Section 4: Communications		1 (LOW) 2 to 3 (MEDIUM) 4 or more (HIGH)		
Section 5: Emergency Operations Center		2 or fewer (LOW) 3 to 4 (MEDIUM) 5 or more (HIGH)		

		(HIGH)		
Section 6: Operations Planning for Preparedness		3 or fewer (LOW) 4 to 6 (MEDIUM) 7 or more (HIGH)		
Section 7: Accounting, Finance, & Administration		2 or fewer (LOW) 3 to 4 (MEDIUM) 5 or more (HIGH)		

## **B.5 EXAMPLE CONSENT FORM SIGNED BY FOCUS GROUP PARTICIPANTS**

### **Port Resiliency Pilot Meeting May 12, 2015 Sign-In Sheet**

#### *Institutional Review Board Statement for Informed Consent:*

The current project seeks to develop an index with indicators of resilience to assist ports and harbors in assessing their level of resilience and identifying areas for improvement. We are conducting research, which includes a focus group session to answer questions, which are related to resilience. Data collected via this study may be used to improve your Port community. By answering the questions, you consent to participate in this focus group. There are no known risks associated with this focus group, and all of your responses in this study are confidential. If this research is presented or published, no information that would identify you will be included. You may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which you might otherwise be entitled. This study has been approved by the LSU Institutional Review Board (IRB).\*

<b>Name</b>	<b>Department/Agency</b>	<b>Email Address</b>	<b>Sign for Informed Consent</b>

\* For questions concerning participant rights, please contact the IRB Chair, Dr. Dennis Landin, 578-8692, or [irb@lsu.edu](mailto:irb@lsu.edu). You may direct additional questions regarding study specifics to Project Coordinator, Lauren Land, Louisiana Sea Grant, (225) 578-5865, [lland1@lsu.edu](mailto:lland1@lsu.edu)

## **B.6 QUESTIONS ABOUT LONG-TERM PLANNING FOR ENVIRONMENTAL CHANGE**

What do you think about adding these questions to the PRI?

### *Large Scale Maritime Transportation Network:*

1. Does your Port identify and evaluate water transportation safety requirements and conditions?
2. Does your Port identify and evaluate severe weather effects on marine transportation system operations?

### *General Port Planning*

3. Are hazard risks considered in Port master plans?
4. Do long-term capital plans identify means to reduce natural hazard risks?
5. Does your Port incorporate hazard mitigation actions into project development applications?
6. Does your Port appropriate adjacent property to accommodate surge waters?
7. Does your Port plan to elevate existing structures?

### *Structures on Port Property*

8. Does your Port plan to retrofit structures to protect against flood damage?
9. Does your Port implement wind-resistant design standards?
10. Do design standards address the use of hardening of critical structures, installation of anchors for hurricane tie-down straps, elevation of structures, etc.?

### *National Flood Insurance Program and Community Rating System*

11. Does your Port conduct structural stability analysis for Port structures to be in compliance with federal requirements through the National Flood Insurance Program?

## **B.7 FINAL PORTS RESILIENCE INDEX**

### **Introduction**

As the frequency of natural and manmade hazards increases, Ports play an important role in waterfront community resilience and should be considered part of the solution to achieve that resilience. The Ports Resilience Index (PRI) is a self-assessment tool developed for Port and marine industry leaders. It serves as a simple and inexpensive method of assessing if Ports and the regional marine transportation sector are prepared to maintain operations during and after disasters. Completing the PRI will assist Ports in developing actions for long-term resilience.

As you complete the PRI, you should consider your Port's level of preparedness for both large and small-scale events. Large-scale events include natural hazards affecting a widespread area, such as hurricanes. Small-scale disasters can be thought of as short-term weather events or an event that affects only your facility, such as a fire or flood on-site.

Being able to withstand and adapt to change has become a focal point for several business sectors and industries. Resilient industries recognize the vital role that planning, preparation, and collaboration play in developing and executing an ability to respond to challenges, adapt to changes and thrive. The PRI development team stresses that Port resilience planning should be completed in collaboration with the Port Coordination Team or with a similar group of internal and external Port stakeholders.

Coastal seaports and inland river ports will benefit from the PRI by identifying strengths and weaknesses in their management and operations. These indicators can provide an important baseline by which to measure progress toward resilience goals. In addition, the PRI assists in assessing the overall resilience of the Ports industry. The process of completing the PRI will help identify the action items the industry should work towards to address system vulnerabilities and maintain long-term viability.

### **Methods**

The PRI was developed with broad participation from industry leaders. The PRI Development Team prepared a checklist of possible indicators of resilience for ports, using the American Association of Port Authorities 2006 *Emergency Best Practices Manual* as a starting point. Other resources included the NOAA Port Resilience Planning Tool and academic sources (e.g., Becker, A., and M.R. Caldwell. 2015. Stakeholder Perceptions of Seaport Resilience Strategies: A Case Study of Gulfport (Mississippi) and Providence (Rhode Island). *Coastal Management* 43(1): 1-34.).



To ensure we collected a robust and thorough set of draft indicators, the coordinating team asked for assistance from leaders in the ports and marine transportation industry to identify measures of resilience (indicators). Using those indicators, the PRI was organized into broad categories (i.e. hazard assessment, risk management, emergency operations, etc.). Each indicator is written in the form of a ‘yes’ or ‘no’ question that can be answered in terms of existing port facility conditions and operations. A percentage system is used for each indicator so an overall score can be calculated. Instructions and interpretation of a score are included at the end of the PRI. It is important to note that the process of completing the PRI is intended to be an in-person activity bringing together various members of a Port management team to discuss the questions and determine an answer. This process creates dialogue about important issues, stimulates discussion on joint solutions to challenges the industry may face, and documents strengths of current industry best practices.

### **Important Definitions**

**Alternate Operations Location:** A physical or virtually remote location from which port operations can continue before, during, and after a hazardous event

**Disaster:** An event that is experienced collectively, resulting in infrastructure and property damage, and requires external aid and assistance in order to respond

**Essential Personnel:** Those Port employees who are required to maintain port operations before, during, and after a hazardous event

**Hazard:** An event that precedes disaster; sources of hazard include environmental, national security, technological, or public health

**Resilience:** The ability to return to an acceptable level of functioning after a disaster and “bounce forward”

### **Intended Target Audience**

The intended target audience for the Ports Resilience Index begins with the Port Authority or Port management organization. Many visits and discussions during the process of the development of the PRI clarified that *Port* signifies the Port Authority or Port management organization whereas *port* signifies the geographic area included within the jurisdictional boundaries under the authority of the Port. Since the content of the questions within the PRI targets Port management, you will see *Port* as the actor of the questions.

The list of potential invitees to a facilitated run-through of the PRI includes those internal to the Port and those external to the Port. Internal invitees include divisions of Port management, including executive leadership, operations, environmental health and safety, finance and administration, security, communications, and human resources. Other internal invitees include representatives from operators, tenants, or Port-related associations. External invitees include representatives from the local emergency management agency; tenant representatives; and federal partners (e.g. closest MARAD gateway officer). In collaboration with the facilitator, each Port will develop the invitation list of the people necessary to complete the PRI.

### **When to Complete**

The PRI is meant to be a living document and provides important guidelines for a Port to select actions that need to be addressed throughout the year. Exposure to environmental hazards will have an impact on when the checklist is completed. For example, a coastal port exposed to hurricanes might want to complete the PRI prior to the beginning of hurricane season. In addition, turnover in personnel requires regular updates to preparedness plans. Although there is no set timeframe, the PRI should be revisited at least every 1-2 years.

## Planning Documents for Hazards and Threats

Plans and procedures should be copied onto a USB drive or backed up to the cloud to be portable in case of emergency.

Planning Documents for Hazards and Threats		Yes	No	N/A
<b>Example:</b> Regularly update contact lists as personnel change		√		
1.	<b>Does your Port have a hazard or emergency preparedness plan that includes the following:</b> A summary of the situations that it addresses and a general concept of emergency operations Essential Personnel and their functions (e.g., Director, Managers, Security, Emergency Response, Communications, Harbormaster) Locally established evacuation routes and information			
2.	<b>Are the Port's emergency response and contingency plans integrated into state and local (city, parish or county) emergency, response, and recovery plans?</b>			
3.	<b>Has your Port identified and prioritized the critical facilities and services to be restored in order for the Port to resume normal operations (e.g., berths and wharves, roadways, rail, terminal equipment, storage facilities)?</b>			
4.	<b>Has your Port identified critical business processes (e.g., email, payroll, purchasing, accounts payable, business support, etc.) and priorities for post-event restoration?</b>			
5.	<b>Does your Port identify someone responsible for updating all emergency documents?</b>			
6.	<b>Does your Port regularly update contact lists as personnel change?</b>			
7.	<b>Does your Port reference appropriate manuals and federal guidelines for emergency planning and training exercises (See Resources on page 25)?</b>			
8.	<b>Has your Port considered developing and utilizing gaming exercises, simulations, and scenario planning tools to assist with annual drills?</b>			
<b>Total number of Yes and No answers:</b>				

## EXAMPLES

### Essential Personnel:

Port Director and Deputy Port Director

Managers (e.g., Senior; Facility; Media Relations; Environmental, Health and Safety; Engineering; Risk; Maintenance)

Security (e.g., Port Police force; Facility Security Officers)

Emergency response (e.g., local Fire Department liaison; local Police Department liaison)

Communications (e.g., public information officer; media relations)

Harbormaster

### Evacuation Information:

Evacuation route maps for port facilities

Equipment and personnel needed for safe and efficient evacuation from the port

Identified routes for police, fire protection and medical services

Permanent signage indicating evacuation routes leading into and out of the port

Evacuation route maps and instructions for  
the city/county/state

## ADDITIONAL NOTES

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### Hazard Assessment:

#### Infrastructure and Assets

These questions help a Port determine if it has a plan to assess all hazards and risks to facilities and infrastructure.

Hazard Assessment		Yes	No	N/A
Example: Identified its cyber risk and possible mitigation procedures to address that risk			√	
1.	Does your Port conduct a regular assessment of critical infrastructure and facilities to identify potential threats, including weather hazards, technological hazards, port-specific hazards, and cyber threats?			

<b>Hazard Assessment</b>		<b>Yes</b>	<b>No</b>	<b>N/A</b>
2.	Does your Port conduct a regular assessment of the condition of its facilities to identify maintenance issues requiring corrective action to increase safety?			
3.	Has your Port performed an assessment to identify infrastructure and facility upgrades necessary to limit damage due to flooding, wave and wind action for various storm scenarios?			
4.	Does your Port follow FEMA Floodmap Base Flood Elevation standards?			
5.	Has your Port identified likely needs for post-event dredging and material removal from navigation channels, based on various storm scenarios?			
6.	Does your Port consider historic trends and past events (e.g., climatic data, weather records, incidents on-site, economic trends) to identify information related to hazard risks and probabilities for future acute events (e.g., hurricanes, chemical spill)?			
7.	Does your Port consider historic trends and past events to identify information related to hazard risks and probabilities for future chronic events (e.g. sea level rise, shoreline erosion, economic recession)?			
8.	Has your Port identified its cyber risk and possible mitigation procedures to address that risk?			
Total number of Yes and No answers:				

## EXAMPLES

Weather Hazards:

Hurricanes  
Coastal storms  
Flooding  
Ice and snow

**Geological Hazards:**

Earthquakes  
Tsunamis

**Technological Hazards:**

Oil spills  
Chemical releases  
Fires  
Cyber security threats

**Port-Specific Hazards:**

Vessel collisions  
Vessel groundings  
Train derailment  
Labor strikes  
Equipment failure

**ADDITIONAL NOTES**

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**Insurance and Risk Management**

Once the hazard assessment is complete, the Port identifies mechanisms to address those risks. The following questions help a Port decide if it has the right property insurance strategy based on its identified

risks, loss exposure and economic tolerance.

Insurance and Risk Management		Yes	No	N/A
Example: Have flood insurance and business interruption coverage		√		
1.	Has your Port conducted a risk assessment process to analyze financial loss exposure for identified hazards and risks that considers probability of occurrence and maximum loss value for physical assets and revenue loss?			
2.	Has your Port determined an acceptable level of risk (or risk tolerance) for various hazards?			
3.	Does your Port have the following types of insurance on all buildings managed by the Port? Property insurance, wind insurance, and flood insurance			
4.	Does your Port's insurance policy include a comprehensive Statement of Values with replacement costs or actual cash values for its assets?			
5.	Does your Port have Business Interruption (BI) coverage to include business income, contingent business interruption, extra expense, civil authority, ingress/egress challenges, and miscellaneous related expenses?			
6.	Does the Port's emergency plan include notification to the Port's insurance broker and contracted respondents (e.g., vendors and consultants) to request an adjuster when an event is in the forecast?			
7.	Does your Port have pre-event video or photo documentation of its assets and infrastructure and the supplies to document damages to provide for FEMA and other insurance claims after an event?			
8.	Is the Port aware of state or jurisdiction rules related to emergency bidding requirements and spending level restrictions? (Refer to Stafford Act)			
9.	Does the Port have the ability to access lines of credit, bank loans, and disaster assistance loans to finance operations and repair and rebuilding efforts on a short-term basis?			
10.	Does your Port have coverage for costs incurred to prevent further loss in the event of a covered peril? (e.g., mitigation activities)			
11.	Do Port facility leases take into account emergency response and recovery efforts and procedures?			
12.	Does your Port have mutual aid or formal agreements with neighboring ports to provide emergency support operations (e.g., providing fuel for generators; water; food; people to help with cleanup)?			
13.	Does your Port have a plan to provide or request mutual aid for regional emergency procedures (e.g., alternate medical transport services; regional helicopter services; MARAD hospital ship requests)?			

Insurance and Risk Management	Yes	No	N/A
Total number of Yes and No answers:			

## EXAMPLES

### Pre-event Materials for Insurance Claims:

- Copies of all policies and required forms for filing claims
- Current video and photographs of all Port property
- Contact information for the insurance agent or broker for claim reporting
- Pre-service contract or established relationship with recovery companies prior to event to set reasonable rates for post-event services

### Post-event Materials for Insurance Claims:

- Time and origin of the loss
- Plans and specifications for all buildings, fixtures and machinery destroyed and damaged
- All contracts of insurance covering any of the property
- Records of physical addresses of contacts for Port assets

### Emergency Response and Recovery Elements of Facility Leases:

- Waiver of liability for force majeure conditions
- Removal of damaged cargo
- Waiver of common carrier status for cargo claims
- Reference to the Port tariff and all rules and regulations therein unless otherwise specified in the lease

Definition of what will happen in the event of damage to facilities under lease

Reminder of the Port's ability to terminate if there is total destruction or insurance proceeds are insufficient

Waiver of liability for replacement of tenant fixtures or improvements

#### Elements of Mutual Aid Agreements:

Activation of the agreement

Description of aid to be provided

Procedures for requests for assistance

Supervision and control

Food, housing and self-sufficiency

Communications

Rights and privileges of personnel

Term of deployment

Responsibility for all costs of providing assistance

Insurance responsibilities

Waiver of claims against each other

Immunity retained

Termination provisions

## ADDITIONAL NOTES

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### Continuity of Operations Planning for Infrastructure and Facilities

These questions help a Port decide if it has considered appropriate pre-storm measures to enable its response and recovery.

Continuity of Operations Planning		Yes	No	N/A
Example: Have a list of vendors and contact information for response services			√	
1.	Does your Port have a plan to prevent flying debris by securing or moving equipment including gantry cranes, container equipment, intermodal transportation and facilities,			



<b>Continuity of Operations Planning</b>		<b>Yes</b>	<b>No</b>	<b>N/A</b>
	<b>buildings and high mast lighting, vehicles, and utilities?</b>			
<b>2.</b>	<b>Does the Port plan consider the circumstances under which the power at the Port is shut off?</b>			
<b>3</b>	<b>Does the Port have a protocol to establish emergency reactivation of utilities after an event?</b>			
<b>4.</b>	<b>Does your Port have a list of vendors and contact information to allow for quick scheduling of emergency response and recovery services (e.g., equipment, supplies, damage assessment, facility control, channel maintenance)?</b>			
<b>5.</b>	<b>Do other government entities in the area have master service agreements for emergency response and restoration that could benefit the Port (e.g., highway cleaning equipment to clear debris from roads leading into and out of the port facility)?</b>			
<b>6.</b>	<b>Does your Port have a pre-identified Damage Assessment Team (e.g., in-house or contractors) and the resources to conduct both an initial damage assessment and the formal damage assessment process per FEMA regulations?</b>			
<b>7.</b>	<b>Does your Port have knowledge of or access to a consultant who has knowledge of disaster assistance programs (i.e., FEMA Public Assistance, FEMA Hazard Mitigation Grant Program) and a plan to apply for assistance after an event?</b>			
<b>8.</b>	<b>Does your Port have access to an emergency vessel boat launch?</b>			
<b>9.</b>	<b>Does your Port utilize itself as an emergency response asset (e.g., safe harbor for vessels)?</b>			
<b>10</b>	<b>Is your Port aware of the assistance it may be asked to provide to the community in the event of a disaster (e.g., Navy Hospital Ships, FEMA/MARAD Ready Reserve Force)?</b>			
<b>Total number of Yes and No answers:</b>				

## EXAMPLES

### Emergency Response and Recovery Services:

Equipment: for removal of debris, mud,  
standing water, smoke; generators

Supplies: fuel; water; portable toilets

Damage assessment: air transportation,

engineering services, FEMA consultants

Facility control: dehumidification; corrosion control; electrical restoration

Channel maintenance: channel sounding;  
berth or channel dredging

**Expertise to be Represented on the Damage Assessment Team:**

Structural engineering: for damage related to water and fire

Electrical engineering: for water analysis for  
ionic content, acidity, suspended solids, and  
organic content

Hazardous materials and environmental issues: PCBs, asbestos, lead, cadmium, mercury, combustibles,  
mold and mildew spores

Police department

**Port Amenities for Response and Recovery Services:**

Navy Hospital Ships require a navigable channel, available berth space, a supply of potable water, and  
access to and from the vessel through the Port

Berth space for FEMA/MARAD Ready Reserve Force vessels, which provide temporary housing for relief  
workers

Preparation for hosting Emergency Trailers includes having a list of supplies, permits for emergency  
placement, and identified areas with utility connections

**ADDITIONAL NOTES**

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**Internal Port Authority Communications**

These questions help a Port determine if it has a robust and sustainable communications plan for Port employees for times of crisis and normal operations.

Internal Port Authority Communications	Yes	No	N/A
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Internal Port Authority Communications		Yes	No	N/A
Example: Have clear recall instructions to communicate return of employees to work			√	
1.	Does your Port assess capacity of its communications assets and implement newer technologies as needed?			
2.	Does your Port offer a Port Emergency Operations training program to Port personnel?			
3.	For hazardous events, has your Port identified a preparation team, ride out team, and recovery team?			
4.	Does your Port utilize the Incident Command System framework for critical functions and responsibilities of Essential Personnel?			
5.	Do your Port's Essential Personnel participate in National Incident Management Systems (NIMS) trainings?			
6.	Does each Essential Personnel member have a hard copy of the Port emergency plan?			
7.	At least every 18 months, does your Port conduct emergency planning or training exercises with the management staff to practice response plans and procedures for various emergency scenarios?			
8.	Has your Port identified the communications equipment and methods (e.g., twitter, radio, texting, etc.) required to communicate with Port personnel in the event of an emergency?			
9.	Does your Port regularly update its emergency notification list and pre-written messages for various emergency scenarios?			
10.	Does your Port identify threshold criteria for issuing evacuation orders in coordination with local authorities?			
11.	Does your Port provide employees with information on what to do in the event of a Port evacuation?			
12.	Are recall instructions clear in communicating to Port employees how they will find out when they are to return to work after an event?			
13.	Does your Port remind employees that access to direct deposit funds could be restricted in the event of an emergency?			
14.	Does your Port have a re-entry policy that follows the city, county, or parish re-entry policy and considers the following? Check-in procedures for Port Authority employees Check-in procedures for port tenants Issuance of keys/codes to re-open the Port Transportation Worker Identification Credential (TWIC) cards			

Internal Port Authority Communications		Yes	No	N/A
	Release of gate security personnel Coordination with local authorities (e.g., National Guard, local and state police)			
15.	Has the Port considered addressing temporary housing needs, including Housing Assistance Requests (e.g., for employees, first responders, or recovery agents) or Emergency Trailers?			
Total number of Yes and No answers:				

## EXAMPLES

### Communications Assets:

Emergency notification systems: audible  
and visual signals; 1-800 telephone line for employees and customers

Telephone systems: landline; base station  
and hand-held portables; cell phones;  
satellite phones

Internet systems: Intranet; email

Radio systems: UHF/VHF; Marine Band  
VHF; Amateur/Hamm

### Elements of a Port Emergency Operations training program for personnel:

Recommended precautionary actions:  
e.g., measures to reduce the potential for loss of life, injury, or property damage

Emergency planning assistance manual:  
e.g., information to enhance individual preparedness and recovery

Port employee trainings: e.g., workshops on filing insurance claims after an event

### Emergency Planning or Training Exercises:

Orientation: follows a seminar format to remind employees of port plans and procedures

Tabletop: follows a roundtable format to discuss a variety of problem scenarios and the application of  
port plans and procedures

Functional: follows an actual drill exercise with Emergency Operations staff through use of port plans and  
procedures and readiness tests of facilities

Full-Scale exercises: follows a full performance exercise, with a field component, to test port-wide plans and procedures and deployment of resources to the field

## ADDITIONAL NOTES

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### Tenant and External Stakeholder Communications

These questions help a Port determine if it has a robust and sustainable communications plan for port tenants and stakeholders for times outside of crisis and for times during crisis.

Tenant and External Stakeholder Communications		Yes	No	N/A
Example: Remind tenants to review their company's storm readiness plan		√		
1.	Does your Port designate someone to attend local harbor safety committee meetings?			
2.	Does your Port work with the Coast Guard and the Corps of Engineers to identify and evaluate water transportation safety requirements and conditions?			
3.	Does your Port establish local relationships with organizations committed to environmental stewardship?			
4.	Does your Port coordinate internally and externally to communicate with tenants as needed for preparedness, response, and recovery?			
5.	Is there a mechanism in place for your Port to conduct emergency preparedness and hurricane readiness meetings to review the Port's policies and procedures with customers and tenants?			
6.	Does your Port require its tenants to provide a copy of their business continuity plan?			
7.	Is there a mechanism in place for the Port to remind tenants and customers to review their company's storm plans for storm preparation activities (e.g., coordinating vessel activity; moving barges; securing cargo)?			
8.	Does your Port recommend equipment security procedures to tenants (e.g., block and reinforce dry-docked vessels; press up petroleum tanks with water)?			
9.	Does your Port participate on a U.S. Coast Guard Port Coordination Team or Port Emergency Action Team?			

<b>Tenant and External Stakeholder Communications</b>		<b>Yes</b>	<b>No</b>	<b>N/A</b>
<b>10.</b>	<b>Does your Port re-broadcast internal and external advisories (e.g., U.S. Coast Guard Marine Safety Information Bulletin) to communicate with tenants as needed during the crisis?</b>			
<b>11.</b>	<b>Does the Port participate in Port Coordination Team conference calls to remain up-to-date on crisis response and damage assessments (i.e., federal navigation channel, aids to navigation, berthing areas)?</b>			
<b>12.</b>	<b>During times of crisis, does your Port have a daily briefing schedule for internal and external communication with stakeholders?</b>			
<b>13.</b>	<b>Does your Port identify a coordinator for emergency response information and a point-of-contact to represent your organization to the media?</b>			
<b>14.</b>	<b>During a crisis, does your Port have a regularly occurring time to communicate with the media?</b>			
<b>Total number of Yes and No answers:</b>				

## EXAMPLES

### Who should attend local harbor safety committee meetings:

Port authorities

Port-related associations: harbor pilot associations; industry associations; organized labor unions

Operators: vessel operators; harbor pilots; docking pilots; tug and tow operators; terminal operators

Federal, state, and local government representatives

Marine exchanges

Shipping agents

### Organizations committed to environmental stewardship:

National Estuary Programs

Non-governmental organizations (NGOs)

for restoration

NGOs for recycling

**Members of Port Coordination Team or Port Emergency Action Team:**

Port stakeholders: chairman/board of directors; port commission; employees; tenants and customers

Transportation partners: steamship lines; terminal operators; railroads; trucking companies

Federal agencies: U.S. Army Corps of Engineers; U.S. Coast Guard; Federal Emergency Management Agency

State and local agencies: emergency response and management

**ADDITIONAL NOTES**


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### **Emergency Operations Location (Physical or Virtual)**

The questions in this section will help a Port evaluate whether or not it has the time and resources to staff, run and maintain its own Emergency Operations Center. Each question may not apply to every Port because of its size. While some Ports may not have the resources to have a physical EOC, they should consider remote operations and the Essential Personnel needed to continue some level of operation and functionality in the event of a disaster.

<b>Emergency Operations</b>		<b>Yes</b>	<b>No</b>	<b>N/A</b>
<b>Example:</b> Conduct routine maintenance checks of the Emergency Operations Center				√
<b>1.</b>	<b>Does your Port have an offsite evacuation haven or alternative operations location site, based on the type of event, where it can continue basic operations?</b>			
<b>2.</b>	<b>Does your Port consider certain characteristics in the selection of an alternative operations location site including emergency backup power, office supplies, and exposure to hazards?</b>			
<b>3.</b>	<b>Does your Port conduct routine maintenance checks throughout the year of the alternative operations location to check batteries, electricity, generator operation, fuel supply and key access?</b>			
<b>4.</b>	<b>Does your Port have communications assets at the alternative operations location including phones, radios, television, and computer equipment?</b>			
<b>5.</b>	<b>Does your Port have a transportation plan to reach the alternative operations location, in accordance with the city's evacuation and re-entrance plans?</b>			

<b>Emergency Operations</b>		<b>Yes</b>	<b>No</b>	<b>N/A</b>
<b>6.</b>	<b>Does your Port coordinate with the local Emergency Operations Center and government-based Emergency Operations Center efforts?</b>			
<b>7.</b>	<b>Do outside emergency personnel (e.g., FEMA, USCG, USACE) have access to your alternative operations location?</b>			
<b>8.</b>	<b>Is your Port ready to be self-sufficient without federal or external assistance for at least 3 days?</b>			
<b>Total number of Yes and No answers:</b>				

## EXAMPLES

### Supplies for Emergency Mitigation Measures and Temporary Repairs:

Generators with adequate fuel supply

Emergency lighting

Supplies to mark unsafe areas (e.g., barricades, plywood, rope)

Tools (e.g., drills, hammers, nails, shovels, pry bars)

Tarps and plastic sheeting

Electrical supplies and test meters

Plumbing supplies

### Needs for Emergency Backup Power:



Connections for generators

Electrical outlets for computer equipment, phone chargers, radio chargers, etc.

#### Basic Emergency Supplies:

Food provisions for at least 7 days

Water (at least 1 gallon per person per day)

Basic toiletries (e.g., toilet paper, tissues, soap, toothpaste)

First aid kits

Flashlights and batteries

Provisions for sleeping and bathing (e.g., sleeping bags, towels)

Trash containers or bags

Laundry detergent and dish soap

## ADDITIONAL NOTES

### Critical Records and Finance

These questions will help a Port determine if it has strategies to address vital records, payroll, emergency spending, and banking during an emergency situation.

Critical Records and Finance		Yes	No	N/A
Example: Have the ability to process payroll from an alternate location		√		
1.	Does your Port have service contracts with an archival agency to store critical records?			
2.	Does your Port implement offsite storage for electronic data (e.g., files stored on laptops, hard drive backup at offsite location, backup to the cloud)?			
3.	Does your Port store backup files offsite at a location not subject to the same risks?			
4.	If you do not have access to the office, do your Port employees have access to electronic documents, (e.g., Port Documents, Port Facility Information, Incident Command System forms, Essential Personnel Information, Utility Information, and Port Condition Information)?			
5.	Does your Port's Emergency Operations Plan consider supplies needed (e.g., additional cash or cashiers checks) for employee payroll and other expenses?			

<b>Critical Records and Finance</b>		<b>Yes</b>	<b>No</b>	<b>N/A</b>
6.	Does your Port have the ability to process payroll from an alternate location?			
7.	Does your Port's Executive Management have emergency spending authority?			
8.	Is your Port familiar with FEMA procedures for purchasing or acquisition and record-keeping for purchasing items after an event?			
9.	Does the Port train employees on how to properly document expenses in an emergency situation?			
10.	Does your Port bank with an institution that has multiple locations?			
11.	Does the Port have an account at an alternate financial institution that is not subject to the same risks?			
<b>Total number of Yes and No answers:</b>				

## EXAMPLES

### Important Documents to Back up Electronically:

Port documents (e.g., Port emergency plans; Port employee telephone directory; map of port, terminals and facilities)

Port facility information (e.g., building plans; specifications; drawings; warranties; proposals; main office address)

Incident command system forms (incident briefing form; incident objectives list; organization assignment list; incident status summary report; incident check-in lists)

Phone and email contact lists (e.g., terminal operators, facility operators, tenants, customers, pilot and vessel operators, local/state/federal government agencies, response and recovery vendors, media)

Essential personnel information (e.g., designated department, assigned tasks, names and phone numbers)

Utility information (e.g., drawings and diagrams of utility connections, cut-off valves, and control panels; emergency contact list for response and restoration contractors; equipment resources; mobilization timelines; protocol for utility outage notification and reactivation; vendors for standby utility equipment)

Port condition information (e.g., annual condition surveys of facilities; still photographs and videos)

## ADDITIONAL NOTES

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### Scoring Table

Tally the number of “yes” answers for each Section and use those numbers in the second column to complete the following table. The resilience index correspond to percentages (e.g., LOW (0-49%), MEDIUM (50-75%), and HIGH (76-100%)) based on the total possible number of questions that could be answered within each section.

Section	Number of “yes” answers/Number of questions answered	Translate ratio of “yes” answers to percentage	Resilience Index LOW = 0-49% MED = 50-75% HIGH=76-100%	Comments
<b>(Example)</b> Insurance & Risk Management (13 Possible Questions)	6/13	$(6/13) \times 100 = 46\%$	LOW	We are getting updated FEMA floodmaps and buying flood insurance for buildings in the special flood hazard area.
<b>Planning Documents for Hazards and Threats</b> (8 Possible Questions)				
<b>Hazard Assessment: Infrastructure and Assets</b> (8 Possible Questions)				
<b>Insurance and Risk Management</b>				

Section	Number of “yes” answers/Number of questions answered	Translate ratio of “yes” answers to percentage	Resilience Index LOW = 0-49% MED = 50-75% HIGH=76-100%	Comments
(13 Possible Questions)				
<b>Continuity of Operations Planning for Infrastructure and Facilities</b> (10 Possible Questions)				
<b>Internal Port Authority Communications</b> (15 Possible Questions)				
<b>Tenant and External Stakeholder Communications</b> (14 Possible Questions)				
<b>Emergency Operations</b> (Physical or Virtual) (8 Possible Questions)				
<b>Critical Records and Finance</b> (11 Possible Questions)				

## INTERPRETING PORTS RESILIENCE INDEX RESULTS

**RESILIENCE INDEX:** A Resilience Index is an indicator of your Port organization’s ability to reach and maintain an acceptable level of functioning and structure after a disaster.

After completing the Scoring Table section of this document, your Resilience Index was identified as **LOW**, **MEDIUM**, or **HIGH** in different categories.

**LOW Resilience Index.** A low Resilience Index indicates that your Port organization should pay specific attention to this category and should make efforts to address the areas of low rating. For example, if you received a low rating for Continuity of Operations Planning for Infrastructure and Assets, then your port may encounter multiple problems reopening and becoming functional after a disaster.

**MEDIUM Resilience Index.** A medium Resilience Index indicates that more work could be done to

improve your resilience in this category. If the Continuity of Operations Planning for Infrastructure and Assets section received this rating, there will be some challenges to reopening and quickly getting the port to full operational status.

**HIGH Resilience Index.** A high Resilience Index indicates that your Port is well prepared for a storm event. If the Continuity of Operations Planning for Infrastructure and Assets section received this rating, then your Port will likely reopen and be functional with few difficulties.

### **What's Next?**

Regardless if your Port has a **LOW**, **MEDIUM**, or **HIGH** Resilience Index, you should learn about and investigate the weaknesses you have identified during this process. Refer to the Resources section for additional information on resources, training, and support. You can use the space provided on page 24 to start your own list of action items and best practices.

### **FOR MORE INFORMATION**

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### **Next Steps**

**Short-Term** (in the next 3 months): If you are completing the PRI at the beginning of or in preparation for hurricane season, what actions might you be able to implement to increase resilience before reaching the

“peak” of hurricane season (mid-August to late-September)?

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**Mid-Term (3–6 months):** In the next six months, what actions might you be able to implement with your staff (e.g., begin or continue a planning process, attend a local harbor safety committee meeting, initiate partnerships with local government)?

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**Long-Term (6–12 months):** In the next 12 months, what actions might you be able to initiate to increase resilience (i.e., conduct a study of port infrastructure to understand flood risk; plan a tabletop exercise with Port personnel and port tenants, etc)?

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### **Port Resilience Resources**

**The American Association of Port Authorities:** [www.aapa-ports.org](http://www.aapa-ports.org)

The AAPA is the leading national organization for the port industry. The AAPA website offers a page of “Publications & Resources” that are freely available, including the West Coast Ports Sustainable Design and Construction Guidelines. On the website, under “Programs & Events”, you can find the titles and slideshows of past seminar presentations, including presentations for the 2006 seminar series on emergency preparation and response. The presentations cover information helpful to port management, attorneys, engineers, operations personnel, communications staff, and risk managers. Seminar material covers lessons learned from Hurricane Katrina. If your Port is a member of AAPA, you can obtain access to the 2006 *Emergency Preparedness and Continuity of Operations Planning Manual for Best Practices*.

**The United States Coast Guard:** [www.uscg.mil](http://www.uscg.mil)

Users can do a Google search to find the most recent version of the U.S. Coast Guard’s Incident Management Handbook. This document provides guidance to response personnel and specifically assists Coast Guard personnel in the use of the National Incident Management System (NIMS) Incident Command System (ICS) framework during response operations and planned events.

**Federal Emergency Management Agency:** [www.fema.gov](http://www.fema.gov)

FEMA’s Emergency Management Institute provides online training courses for the National Incident Management System (NIMS) and Incident Command System (ICS) Framework. The training program and schedule is available at <https://training.fema.gov/nims/>.

**The National Flood Insurance Program:** [www.floodsmart.gov](http://www.floodsmart.gov)

This website is the official site for the National Flood Insurance Program and provides relevant flood insurance information for residential and commercial property owners. The website also includes tutorials to understand how to read and understand FEMA flood maps.

**Department of Homeland Security Emergency Communications:**

[www.dhs.gov/topic/emergency-communications](http://www.dhs.gov/topic/emergency-communications)

The Emergency Communications page on the DHS website provides links to several programs and offices, including Government Emergency Telecommunications Service (GETS) and Wireless Priority Service (WPS). GETS supports emergency preparedness users when the landline network is congested, and WPS supports emergency preparedness users when the wireless network is congested.

**NOAA Sea Level Rise Viewer:** [coast.noaa.gov/digitalcoast/tools/slr](http://coast.noaa.gov/digitalcoast/tools/slr)

The Sea Level Rise Viewer tool allows the user to visualize sea level rise scenarios for any coastal location (with the exception of Alaska) along a sliding scale from one to six feet above the average highest tide. The tool shows the corresponding land areas that would be impacted by flooding. This tool can be useful in identifying what coastal infrastructure is at risk due to potential sea level rise.

**Climate Central Surging Seas:** [sealevel.climatecentral.org/maps](http://sealevel.climatecentral.org/maps)

Climate Central's Surging Seas Map is another online tool that helps the user visualize the impacts of potential sea level rise scenarios side by side. Other available tools include a risk zone map, which shows coastal locations at risk for flooding impacts.

## **References**

- Becker, A., and M.R. Caldwell. 2015. Stakeholder Perceptions of Seaport Resilience Strategies: A Case Study of Gulfport (Mississippi) and Providence (Rhode Island). *Coastal Management* 43(1): 1-34.
- NOAA Port Resilience Planning Tool: <https://coast.noaa.gov/digitalcoast/tools/port>.
- Saathoff, P. 2006. Emergency Preparedness and Continuity of Operations Planning: Manual for Best Practices. American Association of Port Authorities.
- U.S. Government Accountability Office. 2007. Port Risk Management: Additional Federal Guidance Would Aid Ports in Disaster Planning and Recovery. Washington, D.C: U.S. GAO.

## **DEVELOPMENT TEAM**

Gulf Ports Association of the Americas  
Hatch Mott MacDonald  
McGriff, Seibels, & Williams of Texas, Inc.  
Port of Corpus Christi  
Port of Delcambre  
Port of Lake Charles  
Port of Morgan City

Port of New Orleans

Port of Pascagoula

Port of Pensacola

Ready Communities Partnership

U.S. Maritime Administration

## **Partners**

NOAA

Gulf of Mexico Alliance

Louisiana Sea Grant

Mississippi-Alabama Sea Grant

Dewberry



**APPENDIX C**  
**FOCUS GROUP EXTRACTS FOR CHAPTER FOUR**

**C.1**

Facilitator: Umm, does your Port have a re-entry policy that considers check-in procedures for Port employees and tenants, key codes to re-open the Port, port – the TWIC cards – I know we’ve sort of talked about this over the last day and a half, so – yes. Umm, is there –

Participant 1: Not so much a port-specific card but a county-specific card.

Facilitator: It’s the county? Ok.

Participant 2: I thought this question had some good points in it because we really don’t have a, a good coordination for our, our tenants and whatever.

Participant 3: Yeah, ours doesn’t cover tenants. Ours is just specifically addressed to our internal employees.

Participant 2: Even terminal operators don’t necessarily have a formal communication chain.

Participant 3: In our area, it’s us following the, what the county has told us we have to do in order to get back. It’s not the media trying to make up how it gets done. It’s following what the county is putting out there.

Participant 4: And that, that would apply to all of our tenants too, that, that evacuated (Facilitator: Ok.). Because, we don’t determine that, it’s determined by the re-entry policy that the county does.

Facilitator: That the county puts in. Ok.

Participant 3: They [tenants] all have to submit on their own, what their plan is, if they’re going to gain access back, so we don’t have to drain support for what our needs are for the people that we would – for our port-provided for employees.

Facilitator: Ok.

Participant 5: But specific to the Port-owned property – does PD [Police Department] control access to the gates and have a plan around that?

Participant 4: Well they, they have a plan for controlling it now. I would assume it would also apply after an emergency because uhh, - that, you know, all of our, uhh, security personnel at the gates answer to the Port PD.

(Pause: 5 seconds)

46 Co-facilitator: So I'm trying to figure out – so this one might – so there's the two different  
 47 things, the tenants versus the port employees. And then also – cuz there's just so much in this  
 48 question – also there's a large portion of that, that the county regulates so – it's almost like it  
 49 needs to be pulled out into two different questions, with the different components but then also,  
 50 umm, maybe reword it to indicate that the county, that you know – because you don't have  
 51 control over the re-entry, right?  
 52

53 Participant 2: Yes. Some of it is mandated by the (Participant 5: By the state.) local yeah, by the  
 54 local municipality, not the -  
 55

56 Co-facilitator: So it's somehow (Facilitator: So it's not your call?) – the coordination of the re-  
 57 entry, like you know what the plan is, you know where you're going to go to get that, so maybe  
 58 somehow we need to rephrase the question to reflect that rather than – I feel like what you're  
 59 saying is that the Port can't, doesn't have that control, so it's not really fair to say, are you –  
 60

61 Facilitator: So maybe, is your port aware of the county's – or the local municipality's re-entry  
 62 policy.  
 63

64 Participant 6: That would be a good breakout question.  
 65

66 Participant 4: That – that's great, for us here. Other ports? Who knows (Facilitator: Right.) how  
 67 they're set up. And who, who is the, the lead. I also don't understand the release of gate security  
 68 personnel. What is, what's that?  
 69

70 Facilitator: Umm, that's referring to, if you do have police officers that are, you know, checking  
 71 the re-en – checking the TWIC cards to come back into the Port, is - does the plan, does the re-  
 72 entry policy consider when they get released from that duty. Is there, you know, maybe, will they  
 73 have to be there for three days, right afterwards, to check people's cards in and out?  
 74

75 Participant 4: Well, uhh, I mean, basically what you're saying is, have we resumed normal  
 76 operations or not. Under normal operations, we have (Facilitator: That's when the police - )  
 77 basically, you know, people that relieve each other and have a – assuming that all of our security  
 78 persons at the gates have been allowed in and made it back, if they evacuated, then they're  
 79 already back on normal watch rotation.  
 80

81 Facilitator: Ok. So that doesn't really – in the sense of this whole purpose, that doesn't really  
 82 apply.  
 83

84 Participant 4: Right.  
 85

86 Participant 6: Right. You know, another thing that lend – that, uhh, makes confusion in here –  
 87 we're talking about port employees and tenants. We're really talking about Port Authority  
 88 employees. And that's a distinction that's not really made in this thing. (Facilitator: Ok.) I don't  
 89 know, it's something to think about later. The Port Authority employees are different than port  
 90 employees. But we're using it kind of interchangeably, I think. (Facilitator: Yeah.)  
 91

92 Participant 4: Good point.

93

94 (Pause: 4 seconds)

95

96 Facilitator: Ok, so some clarification there we need to do –

97

98 Co-facilitator: Between Port Authority employees and port employees.

99

100 Participant 6: Right.

101

## 102 C.2

103 Facilitator: And then the last question here, does your port have a reentry policy that considers  
104 check-in procedures for employees and tenants, issuance of keys or codes to reopen the port,  
105 TWIC cards, uh, release of gate security personnel in coordination with local authorities?

106

107 Participant 1: We have a policy. (Pause: 3 seconds) Umm, you know, for starters, everybody's  
108 gotta have a TWIC card. That's a given. Um, we do release the gate security personnel, (1.0)  
109 umm, but that is going to be relative to (1.0) the approach and size of the storm, or the  
110 emergency. Um, check-in procedures, I believe that would be best described as partly our  
111 responsibility. (1.0) Um, before you let 'em, before you cut them loose, the individual supervisor  
112 should have something in play as to 'let me know you're okay.' And then at that point, it's up to  
113 the supervisors to communicate when we're back open because there's a point after the storm,  
114 you don't want your employees back. (Facilitator: Right.) You don't want to see them. Take care  
115 of your family. Take care of your situation first, and then when it's safe, (1.0) we'll convene  
116 operations.

117

118 Participant 2: Please say yes.

119

120 Participant 3: Yes.

121

122 Participant 4: Yeah, we do.

123

## 124 C.3

125 Facilitator: Umm, and does your port have a reentry policy that considers check-in procedures  
126 for port employees and tenants, issuance of keys or codes to reopen the port, TWIC cards, uh,  
127 release of gate security personnel and coordination with local authorities?

128

129 Participant 1: Yes. We even carry, um, passes with our photos on 'em that, if we do have to  
130 evacuate and Security is up on the highway, state police or the National Guard, so that we can  
131 get back and get through, that's – and Ricky gets those issued to all the people. So –

132

133 Participant 2: And that list is, uh, sent to the sheriff's department who typically, in the past, has  
134 manned, you know, if the area has been, uh, – there's a curfew or whatever? (Facilitator:  
135 Mhmm.) – or not even a curfew. If it's just, you can't come in, (Facilitator: Right.) they'll let us  
136 come in. We call them walking papers. I don't know what the – (Laughter.)

137

138 Facilitator: Yeah. Walking papers sounds like you got out of jail or something. Walking papers.  
 139 Okay. That's umm – I haven't heard of that yet, you know, having a direct relationship with the  
 140 local sheriff's department, uh, to facilitate getting back into the port, so –  
 141  
 142 Participant 1: Well, and here again, it depends on the situation if, say, uh, Rita, the roads were  
 143 blocked, everybody was – you know, nobody was coming in, um, and there were roadblocks, the  
 144 whole nine yards. So. Whether that was state police, you know, the state police probably  
 145 coordinates that, governor's office or whatever the case, but we need to get back to assess  
 146 damage or get personnel here that did leave with their families, then that's how we get in.  
 147  
 148 ...  
 149  
 150 Participant 3: We have those laminated cards. (Participant 2: Yeah. Yeah. Facilitator: Yeah.)  
 151  
 152 Participant 2: And it's – that led to a little brief – one two- or three-sentence paragraph from the  
 153 Port Director, signed by the Port Director, with our picture on it. (Facilitator: Ok.) But again, that  
 154 list is, uh, distributed to the sheriff's department. And maybe the state police, but I know  
 155 definitely the sheriff's department.  
 156  
 157 **C.4**  
 158 Facilitator: So does your port have an offsite evacuation haven or alternative operations location  
 159 site?  
 160  
 161 Participant 1: (2.0) Mmm, I would say no.  
 162  
 163 Participant 2: No.  
 164  
 165 Facilitator: Yeah. (5.0) Um...  
 166  
 167 Participant 2: If so, we couldn't find it during Katrina. (Laughter)  
 168  
 169 Participant 3: Well, we just met at the gazebo.  
 170  
 171 Participant 2: That's it. (Laughter)  
 172  
 173 Participant 4: (1.0) But that's gonna be, there again, event-driven.  
 174  
 175 Facilitator: Right.  
 176  
 177 Participant 4: We had something that damaged this building, but it didn't damage the island.  
 178 We've got multiple buildings out there with back-up generators. So it's (1.0) it just depends on  
 179 what gets damaged.  
 180  
 181 ...  
 182

183 Co-facilitator: So but that, but that, but – you just said that during – so you have a place that you  
184 go (1.0) if this building is not...[crosstalk. Participant: Well, we didn't have it during Katrina, so  
185 I guess it's kind of a new thing.].

186  
187 Participant 1: And I guess we have it now, but it's not identified as in, let's plan on moving there.  
188

189 Participant 4: That's assuming it doesn't get...

190  
191 Participant 3: Are the generators waterproof?  
192

193 Participant 4: (1.0) No, but there a lot of areas that didn't get water during Katrina. (1.0)  
194

## 195 **C.5**

196 Facilitator: Does your port have an off-site evacuation haven or alternative operations location  
197 site?  
198

199 Participant 2: Yes.  
200

201 ...  
202

203 Participant 2: I mean, we have Shreveport, which is actually a co-location with our servers. Plus,  
204 it could be an office if we need it to. Last time, y'all did Houston, I mean, that was effective.  
205 There was some – we couldn't get some of our resources internally here, but, um, that's resolved  
206 now. And then, of course, um, we had the EOC over here, or our police. That's supposed to be a  
207 fortified building, so I mean, it's definitely several locations that we can choose.  
208

## 209 **C.6**

210 Facilitator: Does the port keep hard copies and electronic backup storage of important  
211 documents, um, port documents, important facility information, ICS [Incident Command  
212 System] forms, phone and contact lists? So, a lot of these things that are kept in hard copies,  
213 they're electronic documents?  
214

215 Participant 1: Yeah, they're on a server and our servers are backed up.  
216

217 Participant 2: It says at the alternative operations location, so...  
218

219 Participant 3: They may be in your car, and several of us have laptops as well, so...  
220

221 Facilitator: So maybe these questions need to be reworded to, um, (1.0) clarify...that (1.0) even  
222 if there is not a building somewhere that says emergency operations...  
223

224 Participant 2: Do we have access to, should we not be able to get in the office? Is that kind of –?  
225

226 Facilitator: Yeah. Mm-hmm. That gets at it. Do you have access to.  
227  
228

**C.7**

Facilitator: Does the port keep hard copies and electronic backup storage of important documents at the alternative location, including port documents, port facility information, incident command system forms, phone and e-mail contact lists, essential personnel, utility information and port condition information? That's a whole laundry list of documents.

Participant 1: I mean, essentially everything – correct me if I'm wrong...but everything that we have on our servers here electronically is backed up nightly, I guess, to Shreveport. There's – the systems mirror each other.

Participant 2: Yeah, referring to backups, I mean, we have two backup units – a primary backup unit and a secondary backup unit, and then we have Shreveport, obviously, that replicates the data there too. So I mean, we've got basically backups of backups. Hard copies would be about the only thing we don't really have covered. Umm, there are some things in our archive system that does, you know, scan those items into it, but I don't know if it's, like, insurance and things like that would be –

Participant 1: We receive most of those now electronically anyway.

Participant 2: So they're probably on the server already, which is backed up.

Participant 3: But hard copies we have off-site. We have a certain amount, maybe one or two years, of files onsite, but anything else has been put in archive off this site, and if we need something, we call them, they bring the box over, and we can get into the documents. So, unless we, you know, and then certain rules and regulations that the state demands and the Federal Maritime Commission, you have to keep certain documents for so long and then you can get rid of 'em and that type of thing, so –

**C.8**

Facilitator: So the next question is, does the Port keep hard copies and electronic backup storage of important documents, including, at the alternative operations location, including any port documents, port facility information, Incident Command System forms, phone and email contact lists, essential personnel information, utility information, port condition information – this is quite a laundry list of things to have, umm, but is that a consideration to have hard copies and electronic backup storage of all of this at your COOP [Continuity of Operations] site.

Participant 1: We have, we have these items but they're not maintained at that COOP site because they're ever-changing.

Participant 2: But, I think what our plan – what we talked about in our plan was that everybody try to put it on some kind of (Participant 3: flashdrive Participant 1: Right. Yeah.) flashdrive or something. And they would have it available.

Participant 1: And we maintain that (Participant 2: Right.) part of our plan but we don't run it up the hill [to the COOP site]. (Participant 2: Correct.) Yeah.

275 Co-facilitator: So, it's like you take the flashdrive with you when you go to the COOP site, that's  
 276 the idea right? Ok.  
 277  
 278 Participant 1: Yeah, we routinely store hard copies in electronic flashdrives that we keep, you  
 279 know, here or on our persons. But we don't put it in that location until we go to that location.  
 280  
 281 Co-facilitator: Ok.  
 282  
 283 Participant 4: But – doesn't IT have somewhere they take stuff to what, the bank or somewhere  
 284 and store all that?  
 285  
 286 Participant 3: Yeah. It's not stored at the, uhh (Participant 1: COOP Site.) the COOP site, but all  
 287 of our data is off-site.  
 288  
 289 Participant 4: Yeah.  
 290  
 291 Facilitator: Ok.  
 292  
 293 Participant 5: It's in the cloud.  
 294  
 295 **C.9**  
 296 Facilitator: And does your Port store backup files offsite at a location not subject to the same  
 297 risks?  
 298  
 299 Participant 1: Yes.  
 300  
 301 Facilitator: We talked about that.  
 302  
 303 Participant 2: Yes.  
 304  
 305 Facilitator: Does your Port have the ability to process payroll from an alternative –  
 306  
 307 Participant 3: Ac-  
 308  
 309 Participant 1: Yes, we (indistinct)  
 310  
 311 Participant 3: I kinda disagree on the offsite, cuz it -  
 312  
 313 Facilitator: Oh ok.  
 314  
 315 Participant 3: I mean, storm surge maybe, but hurricane, uhh –  
 316  
 317 ...  
 318  
 319 Participant 2: One thing that has not been brought up, and maybe, I don't even know if this  
 320 whole group knows. You know, we've got our primary, uhh, command post. We've got our

321 secondary command post, which you all visited. But we also have a tertiary one, located in San  
322 Antonio, at the Port of San Antonio. So uhh – that is, uhh, you know, another possibility. That  
323 one we haven't exercised in a while but we probably should to make sure that we're still  
324 welcome and still have the same points of contact over there.

325  
326 ...

327  
328 Facilitator: So – so on this question, uhh – does your port store backup files offsite at a location  
329 not subject to the same risks, would you answer...

330  
331 Participant 3: Today, the answer is no.

332  
333 Facilitator: Today the answer is no. Ok.

334  
335 ...

336  
337 Participant 2: I don't understand the, uhh – what is this backup that you all do daily and have  
338 something at the bank downtown?

339  
340 Participant 3: Right, so we store it downtown, but it's in the same geographical area as –

341  
342 Participant 2: Well, yeah. But I mean, unless they nuke the place, uhh –

343  
344 Participant 3: Well, but you're still exposed to the hurricane risk, we're saying, you know, as  
345 opposed to having it in San Antonio, Dallas, California - we're gonna –

346  
347 Participant 2: Ok, so are you planning to move it out of town?

348  
349 Participant 3: Yeah.

350  
351 Participant 2: Ok. That's fine.

352  
353 ...

354  
355 Participant 3: Plus, we have plans to – with hurricanes coming, we'll take tapes and things like  
356 that (Facilitator: Right.) out of the area.

357  
358 **C.10**

359 Facilitator: Has your port identified the communications equipment and methods required to  
360 communicate with port personnel in the event of an emergency? (3.0) Now earlier you said that  
361 it was sort of department heads or supervisors that are responsible for communicating with their  
362 employees. So is there some – is there a standard method that that happens, or does each  
363 department head decide?

364  
365 Participant 1: I know for me, it's gonna be whatever I can handle.

366



367 Participant 2: Yeah.  
368  
369 Participant 1: Yeah. We'll start by trying a phone call because of the cellular networks being so  
370 much better, but outside of that, text message would be next. Umm, and I would think if I can't  
371 text or cell...  
372  
373 Participant 2: You're done.  
374  
375 Participant 1: I'm not going to Twitter or Facebook or anything either, so...(Facilitator: Yeah.)  
376 (1.0) you just can start with one and go to the next.  
377  
378 ...  
379  
380 Participant 4: We might could put something on our website.  
381  
382 Participant 5: We've done that before.  
383  
384 Participant 3: Well we've done that. We've also put out the word that we've got, uh – our Trade  
385 and Development director is in Miami, so if we have something here, he's still gonna have  
386 communications. He can be used as someone who we (1.0) (Facilitator: Ok.) contact because  
387 he's gonna have Internet, phone service...  
388  
389 Facilitator: (2.0) Yeah. (4.0) Yeah, that's kind of, umm (2.0) that's the first time I've heard of  
390 that, you know, having someone for this group, but somewhere else entirely. Is that pretty  
391 common among ports?  
392  
393 Participant 6: They'll, they'll evacuate to certain –  
394  
395 Participant 5: ...having somebody on staff...  
396  
397 Participant 4: ...located somewhere else.  
398  
399 Participant 3: You know, ports have representatives (1.0) in different locations.  
400  
401 Participant 5: They do.  
402  
403 Participant 3: Bigger ports tend to. For smaller ports, it's not gonna be common, and it's  
404 probably a little different for us since ours is a regular full-time dedicated employee, not a  
405 contract representative.  
406  
407 Facilitator: Okay.  
408  
409 **C.11**  
410 Facilitator: Does your port have a pre-identified damage assessment team, whether that's in-  
411 house or contractors?  
412

413 Participant 1: Yeah. Our engineering department.

414

415 Facilitator: Okay.

416

417 Participant 2: Well, it depends on the situation, but generally, generally we leave somebody at  
418 the port. We have people at the port. We have harbor police that stay at the port, and then there's  
419 several individuals that historically have stayed at the port, so we do go around, you know, when  
420 we think it's safe, to take a look and see what's there and what isn't. What's damaged and what  
421 isn't. So. But we don't have the – generally it's just our facilities that would be subject. Our cargo  
422 is uh, is uh, uh – you know, usually it's – it depends on what the cargo is, of course, but most of  
423 it is not something that because – it's either gonna be already damaged and nothing can be done  
424 for it, but it's not something that, over time, if it sits in water, will get more damaged.  
425 (Facilitator: Okay.) Okay. Whatever's – as soon as water hits it, it's damaged, so you know, we  
426 would just have to fix the – the cargo's really the big issue.

427

428 Participant 3: You might need to clarify damage assessment team. Like, where is that going? Is  
429 that going in the hopes of doing a project worksheet or is it just strictly to say this is not what it  
430 was before the event.

431

432 Facilitator: So, uh, this question, I think the intent was for that FEMA process, to be able to  
433 document the damage and then file the project worksheet and start going through the FEMA  
434 process of getting public assistance funds. But, umm, is there a value in doing that just because,  
435 you know, not necessarily for FEMA purposes, but just having a record of –

436

437 Participant 3: Yeah, you're gonna need it for insurance.

438

439 Participant 4: Yeah. I mean, I think also for, like, whether or not – if it's a berth, whether we  
440 could allow ships to go – I guess I'm thinking from an operational standpoint, (Facilitator: Okay.)  
441 I think there's a – that's the way I think I was looking at the question more so from operations,  
442 like in - can they store cargo in this transit shed or is it gonna leak when it rains. Um, I mean,  
443 from a project worksheet perspective, I think we – that's probably my area, and we take – and in  
444 addition to, you know, help with Donald and his group on the PWs, but –

445

446 Participant 2: Well, all that is developed days after. It's not an immediate – I thought you asked  
447 for –

448

449 Participant 4: But she's –

450

451 Participant 5: Don't you have a – don't you take a video inventory of the assets once a year or  
452 once every two years?

453

454 Participant 2: Yeah. But there's a difference between getting into a project and assessing whether  
455 you're gonna use – if we got a big – if we lose a skylight, of course, we're gonna move the cargo  
456 and not use that shed until the skylight's repaired, or not use that section of the shed. I mean,  
457 that's a - pre-assessment is different to me than actually getting into a project.

458

459 Facilitator: So there's – it sounds like maybe some clarification on this question, what it's  
 460 referring to. Is it referring to the legal process of having to file with FEMA or is it referring to  
 461 general operations and function?  
 462

463 Participant 5: Well, and the other thing is, is a pre-identified damage assessment team. I think  
 464 the damage assessment team after a hurricane is anybody who can show up. So, uh, you know,  
 465 based on who's available and what their expertise is, you'll be –  
 466

467 Participant 2: We keep harbor police here. Harbor police make the initial assessment.  
 468

469 Participant 5: That's true. And they'll tell you if you've got a broken skylight or if this got  
 470 flooded. So if you wanna call them a pre-identified damage assessment team, yes, we have one.  
 471

472 Participant 2: Plus we have individuals that are assigned to get back or be here during the event,  
 473 so those individuals are involved.  
 474

475 Facilitator: They're – 'cause they're already here.  
 476

477 Participant 2: Yes.  
 478

479 Participant 4: But none of those people are gonna make – give you an opin – well, they'll give  
 480 you an opinion, but, of the structural integrity of a building, you know, they're not gonna –  
 481 they're not gonna determine that.  
 482

483 Participant 3: There's different levels of assessment, and it all depends which track you're going  
 484 towards.  
 485

486 Participant 2: Yeah, that's what I say. You have to figure out if you're talking about initial  
 487 assessment, which is just eyeballs on the situation and coordination with all the different entities,  
 488 or are you talking about getting an engineer out and looking at it and letting him give you a  
 489 report.  
 490

491 Participant 6: I think the harbor police department is going to be the agency within the port that  
 492 provides the initial assessment and they'll provide that to Operations and to Donald's team for  
 493 further evaluation as that's -  
 494

495 Facilitator: Okay. And then you would, you know, go to those locations that have been  
 496 identified as damaged to do another assessment, or one with the engineer's checklist?  
 497

498 Participant 7: Or get the, the right professional involved to assess it.  
 499

500 Facilitator: Okay. So some clarification on what the damage assessment team is referring to  
 501 would help clarify that question, but it seems like the answer is yes from Lake Charles'  
 502 perspective.  
 503  
 504

505 **C.12**

506

507 Participant 1: You know, somewhere in here, you might want to put (1.0) – or ask if they’re  
508 familiar with FEMA procedures, if you put that potential reimbursement, FEMA purchasing or  
509 acquisition and record keeping, uh...

510

511 Facilitator: That’s a good, that’s a good point.

512

513 Co-facilitator: (2.0) So like the – yeah, the official pers– like know ahead of time what they’re  
514 gonna have to keep so that the...

515

516 Participant 1: It’s gonna be inspected, so you don’t go out and buy a bunch of stuff, and then  
517 they say ‘you need to do it this way.’ (Facilitator: Right.) You need to keep these records, and  
518 you don’t have it.

519

520 Facilitator: And then you’re out, (1.0) out of pocket. Yeah.

521

522 Participant 2: Along the same line, you might put in a question somewhere, maybe back in the  
523 preparedness, do they (1.0) do they photograph stuff (1.0) before an event because that’s – it  
524 would be important to FEMA (1.0) and the insurance and all that. A lot of stuff is filled out  
525 ahead of time. You can’t take too many pictures.

526

527 Facilitator: Right.

528

529 Co-facilitator: (2.0) So that would be like of your infrastructure – all of your assets, like just so  
530 then you could – you have documentation of where it is...

531

532 Participant 3: Under property insurance...

533

534 Co-facilitator: Mm-hmm.

535

536 Participant 3: I mean section – on your insurance section, you might have (1.0) does the port  
537 have, um, video, or, (1.0) you know, (1.0) media of (1.0) its assets.

538

539 Participant 4: And remind your employees to do the same at their (1.0) personal places.

540

541 Participant 3: Yeah.

542

543 Co-facilitator: Yep.

544

545 Facilitator: Yeah, that’s, that’s a good point too.

546

547 Participant 4: That may help you to not have them (1.0) away from work as much afterwards if  
548 they’ve got it documented as well at home.

549

550

551 **C.13**

552 Facilitator: Does the Port use a Port Coordination Team or similar entity with both federal  
553 partners and terminal operators to remain up-to-date on damage assessments?

554  
555 Participant 1: With the Corps?

556  
557 Participant 2: Well, we have a PCT, and we participate.

558  
559 Participant 1: Well, the Corps would probably lead the charge on it.

560  
561 Participant 2: The what?

562  
563 Participant 1: The Corps?

564  
565 Participant 2: Is...

566  
567 Participant 1: The Corps of Engineers would probably lead the charge on it?

568  
569 Participant 3: It's the Captain of the Port (Participant 1: Ah, ok.) that leads the Port Coordination  
570 Team. Uhh, we do have a Port Coordination Team but we have a Marine Transportation  
571 (Participant 1: Ok.) System Recovery Unit, which is very similar, basically the same thing. So  
572 Port Coordination Team does exist.

573  
574 Facilitator: Ok.

575  
576 Co-facilitator: So that's a 'yes.' Ok.

577  
578 Participant 3: So that would be yes.

579  
580 Facilitator: Is that something that the terminal operators or, or tenants – are they involved in that?

581  
582 Participant 3: Yep.

583  
584 Facilitator: They are? Ok. Ok. Does –

585  
586 Participant 1: Not necessarily all the tenants though.

587  
588 Participant 4: Right.

589  
590 Participant 3: Correct.

591  
592 Facilitator: Ok. I guess it's a, it's a choice – is it a choice?

593  
594 Participant 2: Well, it depends who needs to get back into business the fastest. Does it behoove  
595 them to help us and other entities to sound the channel and do other things that are necessary  
596 before we can resume vessel traffic.

597 ...  
598  
599 Facilitator: Does your Port have a Port Coordination Team or Port Emergency Action Team that  
600 addresses crisis communications, umm, planning and delivery – that should be planning and  
601 delivery of communications with local and regional stakeholders.  
602  
603 Participant 5: Yes.  
604  
605 Participant 2: Well, we don't have our own PCT. We participate in the Coast Guard's.  
606 (Participant 5: Participate in the PCT.)  
607  
608 Participant 3: Yeah. Yeah.  
609  
610 Co-facilitator: So maybe we should say, does your port participate on a Port Coordination Team.  
611  
612 Participant 3: Yeah, that's right. Or are you a member of something like that, yeah.  
613  
614 Facilitator: And this question might be, umm, for a port that – is in a smaller, smaller area or in  
615 an area that doesn't have vessel traffic service. Maybe, maybe there's not an active Port  
616 Coordination Team there but it might stimulate that port to think that they will – these are ideas  
617 for how we could communicate or people we might need to communicate with, so.  
618  
619 Co-facilitator: Yeah.  
620  
621 Facilitator: Ok.  
622  
623 Participant 2: Well, sometimes for the Port Coordination Team to work, all you need is the  
624 ability to conference call, regardless of where you are.  
625  
626 Participant 3: Yeah.  
627  
628 Participant 2: Even if the Coast Guard office is, you know, 400 miles away.  
629  
630 Facilitator: Ok.  
631  
632 Participant 1: Who makes up the Port Coordination Team? What other agencies?  
633  
634 Participant 3: Uhh, there's the Corps, there's industry reps, there's city reps, so it's a variety of,  
635 uhh, folks that, uhh, have vested interest in getting the port back...so that's the general  
636 membership.  
637  
638 **C.14**  
639 Facilitator: Does the port use a port coordination team or a similar entity that includes (1.0)  
640 Army Corp of Engineers, Coast Guard, and terminal operators to remain up-to-date on damage  
641 assessments?  
642

643 Participant 1: The PEAT.  
644  
645 Facilitator: The PEAT. Yes, Mark talked about that yesterday. (3.0) And so that team will  
646 provide (1.0) status (1.0) updates (1.0) on the condition of the port?  
647  
648 Participant 2: Yeah. We have, uh, daily conference calls with the Corps, the Coast Guard, and  
649 industry. We also hold meetings here (1.0) as well.  
650  
651 Facilitator: Who manages or organizes the PEAT? Who's the leading authority?  
652  
653 Participant 2: The lead would be the Coast Guard, but the conference calls, the Corps of  
654 Engineers runs those.  
655  
656 Facilitator: Okay.  
657  
658 Participant 3: And more than just up-to-date on assessments, it's also used to coordinate and  
659 prioritize, uh (1.0) repairs, and, and getting back up and operating.  
660  
661 Participant 2: Locally, we have the Port of Pascagoula Advisory Group, which we call and  
662 convene meetings on the local level. Um, not everybody will get all the information, so that's  
663 just another avenue of disseminating information.  
664  
665 Facilitator: Okay.  
666  
667 Co-facilitator: And that's the Port of Pascagoula – it's an Advisory...?  
668  
669 Participant 2: Advisory board.  
670  
671 ...  
672  
673 Facilitator: So that group (.) is involved in the PEAT (.) or represented in the PEAT. Okay.  
674  
675 ...  
676  
677 Facilitator: And we've already talked about this: does your port have a port emergency action  
678 team that addresses crisis communications, planning and delivery with local and regional  
679 stakeholders? (1.0) And I've got quite a list here, including transportation partners, federal  
680 agencies, state and local agencies, utility service providers, (1.0) vendors and contractors, the  
681 wider community, which would be county, Jackson County or the city, and the media. (1.0)  
682  
683 Facilitator: So does that PEAT (1.0) address (1.0) communications? I know you've mentioned  
684 that there's a 9:00 (1.0) daily briefing, um, so is there outreach to (1.0) different stakeholder  
685 groups after that 9:00 briefing? (1.0)  
686  
687 Participant 2: Um (1.0) the only other outreach (1.0) that we found is helpful (1.0) is the Corp of  
688 Engineers (1.0) conference call. Uh, (1.0) that one usually (1.0) provides a lot of things that the

689 Coast Guard is gonna brief us on because the Coast Guard is in on that conference call. (1.0) So  
690 they have a set window where the Coast Guard will also give a briefing at that one too, so a lot of  
691 things they say at the PEAT meeting, they reiterate on the conference call.

692  
693 Facilitator: Okay.

694  
695 Participant 3: Typically, the vendors, contractors, community media are something to get  
696 involved with, and there are some exceptions. The dredging contractors, they're gonna  
697 participate in some of these things. (1.0) I may be the only one that touches contractors who  
698 participate.

699  
700 Participant 2: Not really.

701  
702 **C.15**

703 Facilitator: Does the port use a port coordination team or a similar entity, uh, including Corps of  
704 Engineers, the Coast Guard, terminal operators to remain up-to-date on damage assessments,  
705 umm, and that's including the navigation channel, aids to navigation, berthing areas. So –

706  
707 Participant 1: Yes.

708  
709 Participant 2: And that's y'all's harbor safety -

710  
711 Participant 3: It'd be the harbor -

712  
713 Participant 1: Well, it's also the PCT meeting calls we have with Coast Guard and –

714  
715 Participant 2: What is PCT?

716  
717 Participant 3: Port Coordination Team.

718  
719 Participant 2: Okay.

720  
721 Participant 1: So that – in fact, we have too many because we –

722  
723 Participant 3: And I think with your Port Coordination Team on here, it's gonna be comprised of  
724 the majority of the Harbor Safety Committee.

725  
726 Participant 1: Yeah. Pilots call in, ports call in, terminal operators, et cetera. (Facilitator: So the –  
727 oh, go ahead.) And we're in a little unique situation because, uh, the area of responsibility for the  
728 Coast Guard is out of Port Arthur. Carryout of responsibility of the Corps of Engineers is out of  
729 New Orleans. So we gotta make sure – we've gotta be on two calls, and then we also have to  
730 make sure that those two entities – Port Arthur Captain of the Port and New Orleans District are  
731 talking to each other so they know what's happening, at least over here. They don't have that  
732 problem in New Orleans because both the Captain of the Port of New Orleans and the – and the  
733 Corps of Engineers are based over there.

734



735 Facilitator: So in the case of the Port Coordination Team and those calls, is the Coast Guard  
736 facilitating that?  
737

738 Participant 3: In the past it has been. It's been the Captain of the Port is usually the one that's  
739 kinda leading it. (Facilitator: Okay.)  
740

741 Participant 1: But the Corps of Engineers is also facilitating a second call. That's the point I'm  
742 trying to make. (Facilitator: Okay. I see.) So if we get into a situation where Captain of the Port  
743 of Port Arthur thinks that we need a call at 10:00 in the morning and 2:00 in the afternoon, and  
744 the District Commander over in New Orleans thinks we need a call at 10:00 in the morning and  
745 2:00 in the afternoon, we've got some coordination to do between those two agencies.  
746

747 Participant 4: And then it could be completely different, too, depending on what the event is. If  
748 it's a land-based event and you've got debris all over the place, then Captain of the Parish OEP's  
749 [Office of Emergency Preparedness] probably gonna handle the coordination and the calls and  
750 have their regular updates. So – and then, and then like [he] said, it might be a subset. If it's  
751 both land- and water-related, then Coast Guard would take over. But if we've got, you know,  
752 trees that have fallen down and damaged sheds and water lines within the port, as long as  
753 navigation's good to go, they're not worried about that necessarily.  
754

755 Facilitator: Okay. So in terms of this question, there –  
756

757 Participant 1: The answer is yes.  
758

759 Participant 4: Somebody will step up.  
760

761 Facilitator: Somebody is going to be communicating –  
762

763 Participant 3: If you have an incident, that's gonna affect the channel, you're gonna stop traffic  
764 and you're gonna have an ACP [Area Contingency Plan] being implemented or being activated,  
765 and then you're gonna have all those people coming together to determine, all right, what do we  
766 need to do (Facilitator: Okay.) and who do we need to get in here first, after everything is  
767 cleared.  
768

769 Facilitator: So the PCT is an incident-based group and then the Harbor Safety Committee is the  
770 ongoing - ?  
771

772 Participant 3: Yes.  
773

774 Facilitator: Okay. And the Harbor Safety Committee includes – um, you were saying the, like,  
775 pilots, operators -  
776

777 Participant 3: You could almost say your PCT is like a – an ICS-type situation, almost like an  
778 incident command where you're having all your parties coming together to, to come up with, all  
779 right, how are we gonna fix this. And with your Harbor Safety Committee, that's gonna – I  
780 mean, that's always ongoing and you have your quarterly meetings with the Harbor Safety

781 Committee, so you're always meeting with those personnel to determine what's going on within  
 782 the port. What are we doing to address it...the big one is dredging the channel. So. That always  
 783 comes up, uhh...

784 ...

785 ...

786

787 Facilitator: Does your Port Coordination Team address crisis communications planning and  
 788 delivery with local and regional stakeholders? And there's a whole long list in there. Or is there  
 789 some entity that does that?

790

791 Participant 1: Well, when you say address crisis communications, what are you meaning?

792

793 Facilitator: Um, so in terms of, you know, in the parentheses here, port stakeholders,  
 794 transportation partners, different agencies, utility service providers, umm. Is there an entity that  
 795 communicates sort of the status of the port?

796

797 Participant 1: Well, yeah, but if this is under communications, that addresses crisis  
 798 communications. Does that mean that they communicate during a crisis? If that's what you  
 799 mean, the answer to the question is yes. If you mean do they address communications issues  
 800 before the crisis, then as far as a Port Coordination Team is concerned, the answer's no. So we  
 801 need to know what do you mean by 'address crisis communications'?

802

803 Participant 7: We could, you know, even with the storm here, uh, you know, Bill, I mean, we got  
 804 – [he] was sending me whatever updates he was getting from the port – I mean, from, you know,  
 805 weather bulletins, uh, Coast Guard alerts about the status of the port, the channel, this, that. I get  
 806 stuff when there's gonna be a freeze warning. I mean, leave your faucets dripping. There's – I  
 807 mean, I get those communications from Port Authority. I don't know if it's set up and there's a  
 808 plan, but people are nice enough to pass it along.

809

810 Participant 8: We don't get up in front of the media and say, you know, this is the disaster at the  
 811 port or that type of thing. We – that's – we're concentrating on what we need to do to take care  
 812 of these assets or get these assets back into working order, and anything else that, if this  
 813 organization's been affected, then the entire area has, so then therefore, the media does go to the  
 814 Coast Guard, the mayor, um, the city manager or whomever, and we're not – we don't say, hey  
 815 look at us. We're just doing what we gotta do.

816

817 Participant 1: The other point, again, is that Port Coordination Team is a term of art. When you  
 818 say that, a lot of us around this table has one or two ideas in mind as to what that is. So the Coast  
 819 Guard and Corps PCTs don't address crisis communications, but they have crisis  
 820 communications. That's what they're set up for.

821

822 Participant 2: Yeah. But if the port was gonna communicate the status of the port after a  
 823 hurricane, it would be done by the Executive Director.

824

825 Participant 8: Or his designee. We don't let – we try not to let anybody go – we refer, quite  
 826 frankly, any communication to the Executive Director. That simple...

827 Facilitator: Okay. Umm. Yeah, so I think what I'm hearing is this question needs some  
828 clarification on what, you know, addresses crisis communications, what exactly that means.  
829 Umm. And I, I perceived it as, you know, communicating with different partners and  
830 stakeholders that work with the port on the condition of the port, but maybe that's not as  
831 appropriate, uh, because that's what the Executive Director is doing. Umm.  
832  
833 ...  
834  
835 Participant 4: It's like internal and external communications.  
836  
837 Facilitator: Yeah. Yeah. So maybe, uh, the question should say – it shouldn't say Port  
838 Coordination Team. There should be a different terminology.  
839  
840 Participant 4: Port stakeholders for communications and then maybe external, public  
841 communications.

**APPENDIX D**  
**FOCUS GROUP EXTRACTS FOR CHAPTER FIVE**

**D.1**

Facilitator: Does your Port implement flood-resistant design standards?

Participant 1: We are looking closer at that, moving forward. You know, they just changed the floodmap, floodplain maps, and so some of our facilities that were not prone to flooding now are. So that has become a bigger part of our planning process.

Facilitator: So that's kind of on-going. It depends on, depends a lot on FEMA. FEMA regulations (2.0) Has your Port performed a study to identify upgrades necessary to limit damage due to flooding, wave or wind action? (3.0) Is there a facility assessment that occurs?

Participant 1: Probably not that I'm aware of, not a formal one. That is actually important, to put together a facilities management plan, and a part of that would be an assessment of vulnerability of each facility.

Participant 2: Who generates that? Is that a table generated by the Corps? Or...

Participant 1: Uhh, see, I haven't seen anything for it. That's part of the strategic plan, we've...our plan is we have all of this information, but it's not all in one place. So, it needs to be put in one place.

Participant 2: But the starting point is what a tidal surge would look like with this kind of wave height. Now I'm trying to, I don't know what, I forget what federal agency would generate that.

Participant 1: FEMA maps show wave action and flood surge, storm surge information.

Participant 3: Don't we have it already for the, umm, Inner Harbor entrance – so the Inner Harbor with the levee and, umm, the heights that were built to? And then the surrounding retaining ponds...

Participant 1: That's, that's, that's a piece of it because, umm, the FEMA maps have changed. We're now - the City and the Port and several other entities - we're going around and looking at all the flood infrastructure here again, whether or not it is still viable or needs to be upgraded to a new standard.

**D.2**

Facilitator: What about long-term, umm, project planning from the Port's standpoint? Are there considerations for – I think we touched on this earlier – on hazard mitigation, or umm, considering, considering, uhh, sea level rise impacts to infrastructure and how that needs to be incorporated?

...

46 Participant 1: I said any good engineer would have a risk assessment attached to any kind of  
 47 long-term plan.  
 48  
 49 Facilitator: Ok.  
 50  
 51 Participant 2: That's why we hired you.  
 52  
 53 (Group Laughter.)  
 54  
 55 Participant 3: I think the answer is like what you said earlier. We're getting there, I mean, our  
 56 strategic plan is –  
 57  
 58 Participant 1: Well, she's just saying are these things we oughta be – oughta be included in this  
 59 tool. I think definitely, we should be looking at - as we're planning, as we're building new  
 60 facilities, as we're upgrading facilities, we should be thinking about those types of things. How  
 61 do we make sure that we plan for the – that our facilities are going to be able to have  
 62 survivability as we go down the road.  
 63  
 64 ...  
 65  
 66 Facilitator: Umm. And some of these other questions about flood-resistant design and wind-  
 67 resistant design – we did talk about that in terms of, uhh, and we talked about it yesterday driving  
 68 around the Port that a lot of the facilities, in terms of federal flood insurance programs, have  
 69 been grandfathered in, so now it's time to look at those facilities and, and figure out, what is the  
 70 cost and the benefit of ... making it flood-resistant. I'm recalling we talked about the facility  
 71 management, or asset management plan, and the efforts to put one of those together, so would  
 72 that be a place to consider wind-resistant design or flood-resistant design?  
 73  
 74 (3.0)  
 75  
 76 Participant 1: Well, yes. And also, I mean, we have, we have a design manual for any  
 77 construction of a building, by the Port or by a tenant of the port, we have certain design standards  
 78 that typically exceed other standards. That is a requirement that we have, and our lease requires  
 79 tenants to build to those standards.  
 80  
 81 Facilitator: Ok. Is that a Port of Corpus Christi standard?  
 82  
 83 Participant 1: It is.  
 84  
 85 Co-facilitator: So maybe you can even consolidate some of those questions about asking if they  
 86 have like a manual, cuz I'm assuming that the manual addresses several of these things, right?  
 87  
 88 Facilitator: Yes.  
 89  
 90 Participant 1: You could just ask, does the Port have a design standard that addresses...  
 91

92 (Indistinct chatter.)  
 93  
 94 Facilitator: Ok.  
 95  
 96 Participant 3: But it may not be specific to a Port. So for instance, we are better than – we exceed  
 97 the city requirements so that’s why we can do it. We have to at least meet or exceed the city  
 98 requirements where there may be another place where the county or the city regulations would  
 99 override what the Port might have?  
 100  
 101 Participant 1: Well, you can’t – you typically couldn’t override the local code. We can’t override  
 102 the City of Corpus Christi. We can’t say, we’re not going to follow your code.  
 103  
 104 Participant 4: Right, we can go -  
 105  
 106 Participant 1: We can go above and beyond. Codes are always considered minimum.  
 107  
 108 Co-facilitator: Minimum.  
 109  
 110 Participant 1: So, we, we as an entity can say ‘we are going to require that our structures are –  
 111 exceed the code, umm. Different places you may have, you know, you may have a different  
 112 structure. You know, I say every Port is different, so you know, some cases, there may - most  
 113 Ports probably just say local building codes. But, umm, that’s a valid question, I think, is do you  
 114 have a standard? And at least, in some instances, about should we have a standard.  
 115  
 116 Co-facilitator: Ok.  
 117  
 118 **D.3**  
 119 Facilitator: Okay. (2.0) So the next question: Does your port consider historic trends and past  
 120 events, hurricane - historical hurricane paths, past climate data, to identify information related to  
 121 hazard risks in long-term planning? And I have here a parenthetical, 20 years for disasters.  
 122  
 123 (2.0)  
 124  
 125 Participant 1: I think we’re a creature of, uh, learning from our lessons and learning from the  
 126 past.  
 127  
 128 ...  
 129  
 130 Participant 1: Yeah, I think so.  
 131  
 132 Facilitator: What is a timeframe, a good timeframe, or a time frame that Pascagoula uses to plan  
 133 for construction or facility planning?  
 134  
 135 Participant 2: We’re on a relatively short term just because (1.0) a lot of it is dependent on (3.0)  
 136 market speculation, so we look at five to ten years.  
 137

138 Co-facilitator: So should we change that 20 years then?  
139  
140 Participant 3: Yeah, because probably for the ports, I don't know five or ten years is pretty – isn't  
141 that pretty – a long term – you know, wouldn't you consider that, um, long-term as far as our  
142 port operations go, about that?  
143  
144 Participant 2: Uh, I think 20 is -  
145  
146 Participant 4: I'm confused with the question.  
147  
148 (3.0)  
149  
150 Participant 1: The question says disasters.  
151  
152 (4.0)  
153  
154 Facilitator: Yes, long-term planning for disasters. So, um, maybe to clarify that question, um, I  
155 could add long-term planning for storm surge impacts, or for flooding impacts. (2.0) So that's a  
156 lot more structural.  
157  
158 [Indistinct]: I don't think there is.  
159  
160 Participant 5: Yeah, that's kind of a case-by-case thing. I mean we, once Katrina hit, we...  
161  
162 Participant 4: It's all changed.  
163  
164 Participant 5: Yeah, we – it was – it all changed. So we base everything now based on the worst  
165 storm that we've experienced.  
166  
167 Participant 4: I think it goes back to the historical thing, which, you know, it's yes/yes.  
168  
169 Participant 6: Unless it's related to like floodplain management insurance.  
170  
171 Participant 4: Yeah.  
172  
173 Participant 6: It kind of incorporates that thought in there – having to.  
174  
175 Participant 3: Yeah, FEMA has a say so in how you plan as well after a disaster.  
176  
177 Co-facilitator: Mm-hmm. (3.0) So -  
178  
179 Participant 2: We have not looked at anything like projected sea level rise in the next 50 years or  
180 whatever.  
181  
182 Participant 6: No, just like response to FEMA, you know, saying you're in the floodplain. You  
183 need to do this, that, and the other. (5.0)

184  
 185 Participant 5: Reactive instead of proactive.  
 186  
 187 (3.0)  
 188  
 189 Participant 6: Yeah, reactive after an event and then proactive based on the worst event.  
 190  
 191 Participant 1: And this why we're talking about years because this is the ten-year anniversary of  
 192 Katrina, so...it's perspective on how long ago it was.  
 193  
 194 Co-facilitator: Do you think that that's pretty common for ports to – because I think, I think what  
 195 you're saying, and correct me if I'm wrong, is like, you know, whatever that benchmark storm is.  
 196 So Katrina, you know, it's been ten years, or whatever that, um, the, um – so it's reactive to like  
 197 what storm was, so now we know kind of where we need to move things, but then it's also  
 198 reactive to things like the National Flood Insurance Program, and what the new base flood  
 199 elevations would be, and where you have to build to. Is that like those kinds of things, in terms  
 200 of –?  
 201  
 202 Participant 6: All the codes were adjusted and everything after a storm event that exceeded what  
 203 we had before. So for all construction, we're locked down to minimum codes at least.  
 204  
 205 Co-facilitator: And those, umm, I guess the port then takes on whatever the code that the city of  
 206 Pascagoula adopts is that right, or is it Jackson County code?  
 207  
 208 Participant 3: Well, some of ours is in the city, and some is in the county.  
 209  
 210 Co-facilitator: Ok. So you could theoretically, depending upon if the city adopted a newer code,  
 211 you could be looking at two different international building code standards if that happened. Ok.  
 212 That's interesting. I would think that could be challenging, huh?  
 213  
 214 ...  
 215  
 216 Participant 2: And that's something else that will come up as a government agency, is whether  
 217 city regulations apply to our buildings. We can start something, we don't necessarily go out and  
 218 get a city permit.  
 219  
 220 Co-facilitator: Okay.  
 221  
 222 Participant 2: ... As we look at what we're doing is (3.0) what insurance requirements are gonna  
 223 be, what FEMA requirements are gonna be, so to decide whether it's worth it or not. And then  
 224 even in some cases, whether we just want to go ahead and do something and not be able to insure  
 225 it because it's more cost effective to say we have to replace it every, historically, every 15-20  
 226 years because of a storm, umm, that's just the way it is.  
 227  
 228 Co-facilitator: So you kind of do a cost benefit analysis and figure out is it gonna be more  
 229 effective for us to build this, you know, as a break away – like we know we're gonna lose it



230 probably in the next storm, but it's gonna be less expensive to do it that way than it would be –  
 231 Okay. That makes sense. Okay.  
 232  
 233 (3.0)  
 234  
 235 Facilitator: So in terms of a timeframe for long-term planning, is it important to include some  
 236 reference number there for ports, or is it just so variable, case-by-case basis that it doesn't really  
 237 matter?  
 238  
 239 (2.0)  
 240  
 241 Participant 2: I think it's gonna be variable because everybody kind of relates it to their worst  
 242 event. [Yeah, and somebody else's may not necessarily be ours]. And then if you look at other  
 243 things, the planning, they've got SLOSH models or something, and they show different scenarios  
 244 where you're not gonna be impacted in different events.  
 245  
 246 ...  
 247  
 248 Participant 6: Would it be true to say we kind of have a plan with the – whatever that plan is,  
 249 then we start looking at the impacts from – I mean it kind of works the other way around.  
 250  
 251 Participant 5: That's why - we're reactive instead of proactive.  
 252  
 253 Participant 6: I don't know if we looked ahead of time for our plan to, uh, to develop the plan.  
 254 We kind of developed the plan and see what happens, like flood insurance and flood issues, and  
 255 flood plain management. It's kind of...  
 256  
 257 Facilitator: Okay.  
 258  
 259 Co-facilitator: Do you think this is a good question to ask ports, I mean to generate – because  
 260 what we're trying to do is generate the conversation, you know, around, you know, how the port  
 261 wants to, you know, wants to...  
 262  
 263 ...  
 264  
 265 Participant 2: It could be changed - rather than saying do you consider it - I mean, of course,  
 266 yeah, we consider that - to how would you consider?  
 267  
 268 Facilitator: Okay.  
 269  
 270 Participant 2: Because that's gonna generate more thought, more process than 'do you.' It's like,  
 271 hell yeah, we do. We had a storm ten years ago. We consider it. [Participant 5: Right, but how is  
 272 that yes or no].  
 273

274 Co-facilitator: So maybe, maybe we need to have like something over here where you kind of  
 275 describe – like if you say yes, then you kind of have to describe how you do it, maybe or  
 276 something.  
 277  
 278 (4.0)  
 279  
 280 Facilitator: Okay. (2.0) So the next question kind of, um, comes out of the discussion we were  
 281 just having about flood insurance, maybe. Does your port implement flood resistant design  
 282 standards?  
 283  
 284 (3.0)  
 285  
 286 Participant 6: Where applicable.  
 287  
 288 Facilitator: Where applicable. And that would be in line with the building code for – or the  
 289 building code and the floodplain management ordinance?  
 290  
 291 Participant 6: And then...whether or not...  
 292  
 293 Participant 2: Yeah, we consider flood resistance design standards when we're in the process.  
 294 Whether we actually implement them or not would depend on the situation.  
 295  
 296 Facilitator: Okay.  
 297  
 298 Co-facilitator: And that would be- that would – this – and when you say that situation, it would  
 299 be like the cost benefit thing that you were talking about earlier? Yeah. Okay.  
 300  
 301 Facilitator: Okay. (3.0) Has your port performed a study to identify upgrades necessary to limit  
 302 damage due to flooding, wave, and wind action?  
 303  
 304 (4.0)  
 305  
 306 Participant 6: No.  
 307  
 308 (3.0)  
 309  
 310 Facilitator: Is that something that a port would do, would consider doing? (5.0) I guess it's higher  
 311 than –  
 312  
 313 Participant 2: I think it could be. Yeah...  
 314  
 315 Participant 3: Wouldn't it go back to what mostly, in our case, it's a public agency, what FEMA  
 316 requires, and so we haven't performed a study, no, um, but limiting damage, you know, for the  
 317 future, is a lot of that, dependent upon, um, you know, after a disaster, what FEMA has to say,  
 318 you know, what they require.  
 319

320 ...  
 321  
 322 Participant 6: We did do – although these are kind of like pushed upon you in some ways, like  
 323 after Katrina, we did a hazard mitigation assessment, I guess, where we identify projects that we  
 324 can do under basic FEMA, whatever FEMA, what do you call it. Grants? I'm not sure what you  
 325 would call it, but the thing that provided hazard mitigation funding.  
 326  
 327 Participant 1: I think what we also found our self is, say, for example, ten years after Katrina,  
 328 we've grown so much. Early on, after the storm, when you're in the recovery and rebuild mode,  
 329 you're focused on the flooding, the wave, and the wind action. But as we grow, that gets to be an  
 330 afterthought, so are we still in that same, um, preparatory mode that we were back then, or are  
 331 we just growing so much we're going, oh yeah, we're gonna have to move that. We didn't think  
 332 about that. So that would make this assessment on buildings really applicable.  
 333  
 334 Co-facilitator: Mm-hmm.  
 335  
 336 Participant 2: Part of the question - perform this study, well, I mean we've done some of this, but  
 337 we haven't done a study. But it's something we think about, talk about...  
 338  
 339 Male: Talk about all the time.  
 340  
 341 Participant 2: ....talk about, and we made implements and some upgrades, but we haven't sat  
 342 down and done a consolidated study to the entire port in that specific light.  
 343  
 344 Facilitator: So do you – as a port, would you rather see – 'performed a study' or 'conducted a  
 345 facility risk assessment.'  
 346  
 347 Participant 2: Uh, um - has your port considered? Considered and identified upgrades necessary?  
 348 You know, something...  
 349  
 350 Facilitator: Okay. Yeah.  
 351  
 352 Participant 2: A study to me just seems like it's a...  
 353  
 354 Facilitator: Really – [Participant 2: official report]. Okay. Okay.  
 355  
 356 Co-facilitator: You would say considered and identified, right, the upgrades.  
 357  
 358 Male: Mm-hmm.  
 359  
 360 Co-facilitator: Okay. Maybe it's a reword.  
 361  
 362 Facilitator: Okay. (5.0) Okay.  
 363  
 364 Participant 4: Could you use assessment instead of study, would that clarify it?  
 365

366 (3.0)

367

368 Participant 6: Yeah, I mean like through FEMA, they specifically do a hazard mitigation  
369 assessment, where we specifically identify ‘you need to raise these electrical receptacles or  
370 whatever.’

371

372 (5.0)

373

374 Facilitator: Mm-hmm. So assessment might be more – offer more clarification than just a study.

375

376 Co-facilitator: And it sounds like between this question and the – the first and the last question,  
377 we have to be more specific about what the (Facilitator: more specific about what the  
378 differences) differences are.

379

380 Participant 1: Well, technically the assessment can be done in-house versus the study implies  
381 you’re gonna have to get somebody else out for me and wiggle through your stuff.

382

383 Facilitator: I see. Okay. Which has a cost to it...

384

385 Male: Uh-huh.

386

387 Participant 5: Does the last question play off the first question? To me, the first question, have  
388 you done – you know, you do this annual risk assessment. The last one is saying, okay, have you  
389 used that assessment to necessarily do the upgrades or plan to do upgrades based on that  
390 assessment? That’s how I read the two questions.

391

#### 392 **D.4**

393 Facilitator: (3.0) Are there any plans to elevate (1.0) structures (1.0) at the port?

394

395 Participant 1: (3.0) Not, (1.0) not a lot of them because I mean most of what we do, (1.0) you  
396 have to be at ground level to, to conduct your business.

397

398 Facilitator: So is that even a relevant (1.0) question to ask?

399

400 Participant 2: Some things were [required to be elevated]. FEMA required some things to be  
401 elevated after Katrina, and those were elevated.

402

403 Facilitator: Ok.

404

405 Participant 3: It depends on which port. I mean, for example, Gulfport, (2.0) they’re a different  
406 creature than we were during the – during Katrina.

407

408 Facilitator: Okay.

409

410 Participant 3: They had a (2.0) different surge effect.

411

412 ...

413

414 Participant 4: To elevate structures on port property, ... to me, (1.0) those are things that for port  
415 people, (1.0) that's gonna come automatic. I don't (1.0) – I couldn't imagine, uh, (1.0) you  
416 know, (1.0) a facility staff, um, a port engineer at any port, you know, um, a harbormaster, all, all  
417 of our – all of our stuff kind of intertwines at some point. So (1.0) I think those would be things  
418 that would be just normal operating procedures in just about any place. So I don't know if it  
419 would be worth adding that, to something, except for maybe as an example.

420

421 Participant 3: There may be an operational variable that needs to be taken to have a closer look  
422 taken at - for example, when we rebuilt the Guard Shack, uh, (1.0) into the west bank after  
423 Katrina, (1.0) there were elevation questions as to whether or not we need to elevate it. But from  
424 a functional point of view, (1.0) we chose not, um, (1.0) not just for cost, but for operational  
425 aspects of it. So now we just designed it where the water is gonna flow through, and we hope it  
426 does (1.0) and doesn't take the rest of the building down, but from what we do at a port, we have  
427 to look at operations first and foremost because if we're not...

428

429 Participant 5: (3.0) You can't make your everyday, everyday in the daylight based on something  
430 that may or may not happen.

431

432 Participant 3: Yeah. Because if it impacts how we operate, it's gonna cost – it could potentially  
433 cost somebody, (1.0) whether it's money or time.

434

#### 435 **D.5**

436 Facilitator: Yeah. Umm. Does your port consider historic trends and past events, looking at  
437 previous hurricanes, storms or severe flooding events or severe, uh, surge events to identify  
438 information related to hazard risks in long-term planning for disasters? Umm.

439

440 Participant 1: We do a wind storm study about every three years. Uh, if you would consider that,  
441 you know, historic, then I would say the answer to that one's yes too. I don't think we look at  
442 climate data, but I guess the wind storm would consider the past event, you know, following the  
443 past event.

444

445 Participant 2: Have we ever used it for long-term planning though?

446

447 Participant 1: We do for the insurance. We do it primarily to determine whether or not we're  
448 buying a sufficient amount of insurance to cover our risk.

449

450 Facilitator: Okay. What about for, um, buildings or structures on the port grounds?

451

452 Participant 2: No.

453

454 Facilitator: Okay. Is –

455

456 Participant 2: Well, I say that. When we design it – like, we've just designed a new dock and  
457 they've looked at tides – the historic tides. But then again, you also have to match what's there as

458 well, so kinda limited. You look at it, say well, okay, we're just gonna – we're gonna make it  
459 match instead of having something 20 feet higher.  
460  
461 ...  
462  
463 Facilitator: Okay. Okay. The next question is does your port implement flood-resistant design  
464 standards?  
465  
466 Participant 2: I wouldn't say implement, but we use the published base flood elevations to design  
467 from.  
468  
469 Facilitator: Okay. So maybe if the – if the question was worded –  
470  
471 Participant 2: Are base flood elevation standards followed?  
472  
473 Facilitator: Okay.  
474  
475 Participant 2: Yes.  
476  
477 Participant 1: Aren't they required to, though? Wouldn't they be required to by law?  
478  
479 Participant 2: Yeah, 'cause I mean, they probably wouldn't get insured. (Laughter.)  
480  
481 Participant 1: I mean, that's like you can't build in Zone J or whatever the – is it – it's not J, but I  
482 forgot what it is.  
483  
484 Facilitator: So, umm –  
485  
486 Participant 2: Cause most of the time, you won't be able to get a building permit if you try to  
487 build below the base flood elevation, and then, secondly, if you get away with that, then it won't  
488 get insured.  
489  
490 Facilitator: So does your port follow the base flood elevation standards?  
491  
492 Participant 2: Yes.  
493  
494 Facilitator: That's a more clear question.  
495  
496 Participant 2: That's the FEMA floodmaps.  
497  
498 Facilitator: FEMA floodmaps. Okay. Umm... We kind of talked about this last question already.  
499 Has – or maybe. Has your port performed a study to identify upgrades necessary to limit damage  
500 due to flooding, wave and wind action?  
501  
502 Participant 3: I think we've already talked about it.  
503

504 Participant 2: Yeah, I wouldn't – I would even delete the question or not use the word 'study'.

505

506 Facilitator: Okay. What would – what word would you –

507

508 Participant 2: Assessment.

509

510 Facilitator: ...use instead? Assessment.

511

512 Participant 2: 'Cause then that – to me, study means you hire a consultant, you've got a report,  
513 whereas an assessment may be something you do internally and, you know, generate a memo.

514

515 **D.6**

516 Facilitator: But in terms of long-term planning, some of these questions target, for example,  
517 Number 5 on here, does your port incorporate hazard mitigation actions into project development  
518 applications. So if someone – there's a project that's gonna be occurring at the port, is there  
519 active consideration of hazard mitigation? Is that important to do?

520

521 Participant 1: All depends on when the last storm hit. How fresh it is.

522

523 Participant 2: Whether or not we're willing to spend the money.

524

525 Participant 1: These questions are specific to environmental change.

526

527 ...

528

529 Participant 2: I guess, what do you mean by environmental change?

530

531 Facilitator: Sea level rise. Sea level rise, umm, and other climate change, or climate-influenced  
532 factors. So increased precipitation, increased hurricane frequency, increased hurricane intensity.  
533 I mean, I know –

534

535 Participant 1: I think all that stuff's a bunch of BS, honestly. I mean –

536

537 Participant 2: I don't think we take that into consideration at all.

538

539 Participant 1: You go on the West Coast, that's all they wanna talk about, but it doesn't apply  
540 here. That's all BS on the West Coast.

541

542 Participant 2: When [the engineer] builds a building, he doesn't take that in consideration.

543

544 Participant 1: Believe it or not, we had – we just went through that dock design and the  
545 consultant, even though they were in Louisiana, they were a nationally-based consulting firm,  
546 and they talked about – they wanted to talk about sea level rise and storm surge and, you know,  
547 and they wanna talk about, you know, is the tide actually getting higher and all this stuff, and I  
548 said – they looked at it and they saw that it's not changing all that dramatically, and I don't wanna  
549 design a dock...that's, you know, 20 feet above the one that's already there. 'Cause in the next 20

550 years, whether or not this thing happens, we need to use it for 20 years, it needs to connect.  
551 (Laughter.)  
552

553 **D.7**

554 Facilitator: Does the Port conduct regular hazard risk assessments of infrastructure to determine  
555 what level of damage and repair can be expected based on the size of an event?  
556

557 (6.0)  
558

559 Participant 1: We conduct an annual inspection of our infrastructure. I wouldn't go so far as to  
560 say what kind of damage would occur in a Category 4, Category 3 -  
561

562 Participant 2: Yeah. I don't think we do.  
563

564 Participant 1: I think a lot of these may need a middle column here for things we sorta do.  
565

566 Participant 3: He wants half credit is what he's saying. (group laughter)  
567

568 Facilitator: Ok.  
569

570 Participant 2: You need a 'maybe' box. (group laughter)  
571

572 Participant 4: We do, we do our, our annual property renewal. Umm, they conduct a wind study.  
573 And based on that study is where we put our level of insurance. Umm, and we rate that study  
574 based on a Cat 5, you know, where we'd lose 150 million [dollars] in property damages. And  
575 that's how, how we assess. That's how we get our, renew our insurance. That's what we base it  
576 on.  
577

578 ...  
579

580 Facilitator: Ok! Umm. So has your Port determined the level of repair and reconstruction that  
581 could be supported from unrestricted reserves considering insurance deductibles and financial  
582 responsibility levels?  
583

584 (3.0)  
585

586 Participant 2: Umm, that's answer's probably a 'no, but'. Uhh, no, not the way you worded this  
587 question, but, you know, our insurance is, is basically based on how much risk are we willing to  
588 take, and how much money are we willing to spend to fix things that are not covered by  
589 insurance. So we do carry out that process and therefore, when it comes to determining, you  
590 know, what deductibles we have, and how much we could be on the hook for in a major storm,  
591 we either say 'yes, we're willing to take that risk, and be on the hook for two or three or five  
592 million' or not. And we adjust our insurance accordingly. But we have not translated that  
593 amount, whatever it is, into what, the way you worded the question, what kind of repair and  
594 reconstruction would that carry out. We, we just do it more from the financial point of view. Not  
595 translating that into 'we can repair two and a half buildings and one dock' or things like that.



596  
 597 Facilitator: Ok. Ok.  
 598  
 599 Participant 3: Hmm.  
 600  
 601 Participant 5: In our, in our financial structure, we have reserves for, uh, insurance deductibles  
 602 and disaster recovery. And then, we also always consider our own restricted cash reserves as  
 603 applicable, but we don't, we're not specific as to what types of construction. We're saying, 'oh,  
 604 we're going to hold this much reserve for insurance deductibles, this much in reserves to repair  
 605 major infrastructure, as needed.' And then we move on to our unrestricted cash reserves – our  
 606 general funds to do whatever else is needed.  
 607  
 608 Participant 2: So if that question were worded, taking out repair and reconstruction, you know,  
 609 put a, uh, a dollar value to it, you know, the answer would be 'yes.' We, we have determined,  
 610 you know, how much insurance we want to carry, and therefore, how much we will be willing to  
 611 pay for, in a major case.  
 612  
 613 (6.0)  
 614  
 615 Facilitator: And again, maybe this is where, a - like a five-point scale might be helpful, with  
 616 ranges?  
 617  
 618 Co-facilitator: I got that in there.  
 619  
 620 (6.0)  
 621  
 622 Facilitator: Ok. So, umm, what is the consensus on that question? I know we said a 'no, but' –  
 623  
 624 Participant 2: Well, it's really a 'yes', technically.  
 625  
 626 (Multiple yesses from the group.)  
 627  
 628 Participant 2: It's just that we don't translate it to a physical repair, we just put money, and how  
 629 much will that fix, we don't know yet.  
 630  
 631 Facilitator: Yes. Ok.  
 632  
 633 Co-facilitator: So it's really the level of funds that could support the repairs.  
 634  
 635 Participant 2: Exactly.  
 636  
 637 Co-facilitator: Ok, so maybe we replace that with -  
 638  
 639 Participant 5: Right. To me, it's more about, do you have an emergency fund set aside to take  
 640 care of whatever comes your way.  
 641

642 Co-facilitator: Well, is that a better way to say it?  
643  
644 Participant 2: Yes.  
645  
646 Participant 5: Who knows what level of repair and reconstruction they're going to need, unless  
647 you're looking at a total devastation scenario.  
648  
649 Co-facilitator: So, you said, do you have an emergency fund in place to, umm, and I'm just  
650 trying to write exactly what you said, so.  
651  
652 Participant 5: I don't know what I said. (group laughter)  
653  
654 Co-facilitator: Oh, that's - I got that part! Ok. Yeah. Ok. So put –  
655  
656 Participant 5: Yeah, because we have an emergency fund in the reserve that we, that we reserve  
657 for any emergency that comes our way, that we require insurance claims, or out-of-pocket  
658 reconstruction.  
659  
660 Co-facilitator: Right. Ok. Ok. Great.  
661  
662 **D.8**  
663 Facilitator: Okay. So the next question, um, does the port conduct regular hazard risk  
664 assessments of infrastructure to determine what level of damage and repair can be expected  
665 based on the size of an event?  
666  
667 (2.0)  
668  
669 Participant 1: I think that might be what you were referring to earlier...  
670  
671 Participant 2: Yeah, I don't know if we looked at what this is implying to the detail, if we had a  
672 five-year storm or ten-year storm, or...  
673  
674 Facilitator: Right.  
675  
676 Participant 3: Depending on what category. No, I wouldn't say we've done that.  
677  
678 Facilitator: Is that something that you could ask a risk management expert who comes in, could  
679 you ask them to do that? (2.0) Does that fall under their – I, I guess their mode?  
680  
681 Participant 3: I don't know if we'd ask to do that because they gotta understand what the threat is  
682 and the impacts in addition to what your facilities are and how it's gonna...  
683  
684 Participant 4: How big it's gonna be.  
685  
686 Co-facilitator: You know how they come in and do, um, like a – MEMA would come in and do  
687 like the substantial damage and loss, you know, of buildings, that kind of thing. I think that – I

688 guess what my understanding was from this question was that it's like as a port, do you have a  
689 way to, um, sort of value, you know, think about what's gonna happen, you know, when you do  
690 have damage based upon a category one versus a category five or something like that. You  
691 know, do you expect to lose this much versus that much.

692  
693 Participant 3: Yeah, we would have expectations, and some level of understanding, but we don't  
694 conduct a regular hazard risk assessment of that. But we know if we're expecting a category one  
695 storm, the way we'll respond differently, prepare differently and expect different results if it's a  
696 category three or a category four. And, you know, most of this, our biggest threat is hurricanes,  
697 which is why we keep talking about that here.

698  
699 Facilitator: Mm-hmm.

700  
701 Participant 3: Um (2.0) so – and I'd say we, we have kind of an understanding of what to expect  
702 because we never had a formal regular assessment done.

703  
704 (3.0)

705  
706 Facilitator: Okay. (2.0)

707  
708 Co-facilitator: So there's sort of an – I'm just trying to make sure – is it, is it a fair question, you  
709 know, for a port to ask them to do that? I mean because you're kind of saying that you do it in  
710 an informal way, I think, is what I hear you saying. So it's like, you're doing it in an informal  
711 way, you just may not have it...

712  
713 Participant 2: We can't go look up a report and...point to a million dollars.

714  
715 Co-facilitator: Right. You can't point to a, to a – okay. I see.

716  
717 Participant 1: A regular hazard risk assessment could be expected based on the size of an event,  
718 would that really change annually? I mean the facilities are what they are, so this year, you  
719 know, based on – like [he] said with big hurricanes, category one, that damage, is it gonna be the  
720 same damage as it would be next year for category one, and the next year for a category, so,  
721 um...

722  
723 Co-facilitator: I guess it would only change if the port was growing, right, because you'd be  
724 adding infrastructure?

725  
726 Participant 1: I guess so, yeah.

727  
728 Facilitator: All right.

729  
730 Participant 1: I don't know about the word "regular".

731  
732 Facilitator: Yeah.

733

734 Participant 1: You know, that's kind of subjective, "regular".

735

736 Participant 5: And there again, any new construction is gonna be based on the last major event.

737

738 Participant 2: Yeah. The same thing, when you demolish an existing facility, it'll go down  
739 maybe.

740

741 (5.0)

742

743 Facilitator: Okay. So there's some nuances here that, the wording is really important. (3.0) Um,  
744 okay. So the next question, which I think is a follow-on to the one we were just discussing – has  
745 your port determined the level of repair and reconstruction that could be supported from  
746 unrestricted reserves, considering insurance deductibles, and/or financial responsibility levels?

747

748 (5.0)

749

750 Participant 1: Yes. Since I've been here, we've implemented basically a \$100,000.00 threshold  
751 for reconstruction and repair, um, and, and insurance coverage. Um, we kind of just internally,  
752 after the risk manager came in and did his study, we kind of just decided internally to accept that  
753 risk, um, for repair and construction as far as, um, um, insuring and then the deductibles, you  
754 know, as well. We raised some; we lowered some, that kind of thing.

755

#### 756 **D.9**

757 Facilitator: Does the port conduct regular hazard risk assessments of infrastructure to determine  
758 what level of damage and repair can be expected based on the size of an event?

759

760 Participant 1: That's, I think, is covered in the wind storm study.

761

762 Facilitator: Okay. Now what about storm surge that might be associated with a hurricane? I  
763 know we are further inland.

764

765 Participant 1: I haven't looked at the wind storm study recently, but, umm, I'm sure that it takes  
766 that into consideration.

767

768 Facilitator: Okay. Has your port determined the level of repair and reconstruction that could be  
769 supported from unrestricted reserves, considering insurance deductibles, uh, or financial  
770 responsibility levels?

771

772 Participant 1: We do that when we purchase the insurance. You know, the deductible scheme,  
773 we've had – when we borrow the insurance, uh, we've had different deductible schemes by  
774 different – you know, Lloyd's, we had a higher deductible scheme than we have – I mean, I'm  
775 sorry, with AIG, we had a higher deductible scheme than we have with Lloyd's right now. So we  
776 take all that, I guess, into consideration when we purchase the insurance.

777

#### 778 **D.10**

779 Facilitator: And does your Port have mutual aid agreements with other organizations to provide

780 emergency support operations?  
781  
782 Participant 1: It's not really mutual aid, but we have contracts with, uh, contractors whose  
783 business it is to provide relief equipment to you, and uh, the contract is free until you actually  
784 engage them. So uh, yes, that's the same thing the City does. Uhh, but it's not a mutual aid, it's  
785 more direct contracting with a company that provides all kinds of post-storm recovery equipment  
786 or disaster recovery slash -  
787  
788 Participant 2: What is meant by organization, is it meant to be companies, service companies? Or  
789 agencies.  
790  
791 Facilitator: Well this – so the service companies and the service contracts, that question does  
792 come up later. Umm, this question is targeted towards the Port providing emergency support  
793 operations maybe to the City?  
794  
795 Participant 1: Oh? I don't read that –  
796  
797 Facilitator: You don't read it that way.  
798  
799 Participant 1: No.  
800  
801 Facilitator: So it needs to –  
802  
803 Participant 1: That needs to be clarified.  
804  
805 Facilitator: Ok.  
806  
807 Participant 3: You're right.  
808  
809 Participant 1: Mutual aid involves give and take.  
810  
811 Facilitator: Right. Ok. So this needs to be reworded. Umm.  
812  
813 Co-facilitator: But it sounds like the question, does your Port have, you know, arrangements or  
814 agreements with other organizations to provide, like outside – that would be like debris removal,  
815 other kinds of relief efforts – would be a valid question, right, because that is something that  
816 happens, that is essential to getting the port back online, maybe?  
817  
818 Participant 4: Well, it's really not an agreement, it's a service contract. It's not like we're saying,  
819 we will work with you to do it, we're saying, we need – this is what we're going to need so  
820 we're signing a contract.  
821  
822 ...  
823  
824 Participant 5:...list of recovery organizations that you can sign an agreement with. 'Should we  
825 have this, we expect your team to come in and start doing this this and this for coordination.'

826 Participant 1: But putting the term, ‘mutual aid agreement’, makes it extremely narrow and  
827 specific and doesn’t apply to us.  
828  
829 Co-facilitator: Ok.  
830  
831 Participant 4: Maybe if it’s just that we have arrangements -  
832  
833 Participant 1: Yes.  
834  
835 Participant 3: Right.  
836  
837 Participant 2: But if you’re saying that the Port provides that service, umm, we do for the Port  
838 area, but not outside of the Port area. So we wouldn’t go into town and...  
839  
840 Facilitator: What if the –  
841  
842 Participant 6: You know, sometimes if something happens, the Port Police goes and support  
843 the...you know, if they ask for help. Sometimes they go, you know, so I guess it’s a – yes and no  
844 too.  
845  
846 Participant 3: That’s absolutely true, but I don’t think that’s in the line of what this is asking.  
847 We’re under Insurance, Risk Management, and Legal Protection. I think it’s like [she], kinda,  
848 summarized it. Do we have things to help us bounce back.  
849  
850 Participant 7: We have relationships with all kinds of vendors and agencies to procure their  
851 services as needed.  
852  
853 (Pause: 2 seconds)  
854  
855 Co-facilitator: Ok. That’s good.  
856  
857 ...  
858  
859 Facilitator: Ok. Umm, next question – do other, do other government entities in the local area  
860 have master service agreements for emergency response and restoration that could include the  
861 port?  
862  
863 (4.0)  
864  
865 Participant 4: Yes? In a way, yes, because we use the same vendor to therefore benefit all the  
866 parties involved for...what specifically  
867  
868 Participant 5: You mean – what you talkin’ ‘bout, what you talkin’ ‘bout?  
869  
870 Participant 3: Ha.  
871

872 Participant 4: We all use Garner. As a contract that we would contact for any kind of services or  
873 supplies that we would need, so while they're rounding up equipment for the city, they could  
874 also be rounding out our equipment, therefore delivering all this requested equipment or supplies  
875 to one locale. During this whole –  
876  
877 Participant 1: But, we would not be included in the city's agreement.  
878  
879 Participant 4: Right. They have their own -  
880  
881 Participant 1: So that's really the question.  
882  
883 Participant 5: But we have no way of – except for interaction on an individual basis, we have –  
884 it's kind of like [his] question. We don't have a clue what the City's master service agreements  
885 involve.  
886  
887 Participant 8: I'm sure we're not in it.  
888  
889 Participant 5: That's right. You're on your own.  
890  
891 Participant 3: Hmm.  
892  
893 (4.0)  
894  
895 Facilitator: Ok.  
896  
897 Participant 5: Would that be something we should ask?  
898  
899 Participant 4: Well we do have, I mean, we do have a contract.  
900  
901 Participant 9: Are they requiring us to do something for -  
902  
903 Voices: No, no. It's not -  
904  
905 Participant 7: We would, we would just piggy-back on what they have.  
906  
907 Participant 1: And we're restricting this just to governmental entities. So we're talking city,  
908 county, even feds. Or state.  
909  
910 Facilitator: So would this, uh, this setting be something that someone from the city or the county  
911 should be present at? To go through these questions?  
912  
913 Participant 1: Not necessarily, unless the intent was to get them to involve the Port on their  
914 contract. And that wouldn't really be the, the reason.  
915  
916 Participant 2: For other ports, it might be. So, for instance, Port of L.A. Port of Long Beach are  
917 connected to their city council or city hall and so [the question about MSAs] would be

918 appropriate for them.

919

920 Voices: Yes. Yes.

921

922 Participant 3: Hmm, good point.

923

924 Facilitator: Ok.

925

926 Participant 3: So, as appropriate as -

927

928 Participant 5: So, this kind of reads like the other government entities have an obligation to help

929 us. Response or restoration, that could include us.

930

931 Participant 3: It could, depending on the governance of it, I think.

932

933 Participant 5: In this case –

934

935 Participant 3: But not for us.

936

937 Participant 7: They're under the city or the county.

938

939 Co-facilitator: So I think I'm hearing a 'Not Applicable' in this instance. Almost like a column

940 for 'not applicable' or something.

941

942 Participant 3: Mhmm. Yeah, good point.

943

944 Co-facilitator: Or, or it might be a question that is not applicable, so therefore, it doesn't - you

945 just change the scoring to reflect that or something at the end. Somehow. Ok.

946

947 **D.11**

948 Facilitator: Does your port have mutual aid agreements with other organizations to provide

949 emergency support operations? (3.0)

950

951 Participant 1: N-no. (3.0)

952

953 Participant 2: Not written.

954

955 Participant 3: Nothing written.

956

957 Participant 1: But here again there is – what's that industry group they got in Bayou Casotte?

958

959 Participant 4: Uh, Bayou Casotte Emergency Communications Network...There are specific

960 organizations with industry in mind. It's not written, but they will assist.

961

962 Facilitator: Okay. (3.0) So sort of an informal agreement or understanding. (5.0) Okay...does

963 your port have pre-event contracts or a list of vendors and their contact information to allow for



964 fast track procurement of emergency response and recovery services? (3.0)  
 965  
 966 Participant 5: I'd say yes.  
 967  
 968 Participant 1: We don't maintain any specific lists, or –  
 969  
 970 Participant 5: Oh, just for that?  
 971  
 972 Participant 3: Yeah. We don't know who's gonna be operational. We get stuff thrown out.  
 973  
 974 Participant 5: Well, I just thought we have our.... we have a list.  
 975  
 976 Participant 1: Not contracts.  
 977  
 978 Participant 3: But we don't have any contracts.  
 979  
 980 Participant 5: Okay. Oh, I see. Okay.  
 981  
 982 Participant 6: We know contractors that can support us if they have the ability to after an event.  
 983 [Crosstalk].  
 984  
 985 Participant 5: We know who to call.  
 986  
 987 ...  
 988  
 989 Participant 6: And a pre-event contract may be difficult to have because you have to have a – you  
 990 may have to have a dollar amount attached to it, so you've got to estimate the type of damage  
 991 that you have. And a lot of contractors may not want to – they may sign up for it, but then when  
 992 the event happens (2.0)...  
 993  
 994 Participant 4: If Chevron, if Chevron needs them, they're gonna go to Chevron.  
 995  
 996 Participant 6: That's exactly right. They're not gonna chase \$100,000.00 when they can chase  
 997 [Chevron].  
 998  
 999 Facilitator: Right. Okay. So for this – the wording of this question, it's more appropriate  
 1000 probably to just have, "Does your port have a list of vendors and contact information?"  
 1001  
 1002 Male: Yeah.  
 1003  
 1004 ...  
 1005  
 1006 Participant 3: See, I remember with the city, we had a contract, but I can't remember the  
 1007 company. But they came here and started getting the city back up and running, and provided  
 1008 food and all kind of stuff for people, workers, and con-, you know, people working for the city  
 1009 and all that other stuff. To me, that's what this is asking, do you have that person to come in that

1010 kind of handles that? I can't remember the company's name. But as soon as everything cleared,  
 1011 they were here starting to clean streets and everything else.  
 1012  
 1013 Participant 5: Was that in place before the storm or right after the storm?  
 1014  
 1015 Participant 3: That was in place before the storm.  
 1016  
 1017 Participant 7: We have the same kinds of things in our facility. (1.0) We have preferred  
 1018 contractors that are on the list. They're actually part of our emergency response plan, but we pay  
 1019 a price for that. I mean It's not a – k, we won't show them this list, you won't be able to –we  
 1020 pay for that so that when something happens, they're there.  
 1021  
 1022 Participant 5: So yours kind of is a pre-event contract.  
 1023  
 1024 Participant 7: Oh, ours, ours - yeah, they're master service agreements.  
 1025  
 1026 Participant 3: See, we had a contract in place with those people too. (1.0) Like I said, as soon as  
 1027 the wind died down, they're here cleaning the streets, you know, trying to get access for people  
 1028 and in and out so that other folks can come in and help, and all so -  
 1029  
 1030 Participant 4: That kind smells like it falls under the business continuity. (1.0) If you've already  
 1031 got somebody planned and contracted to come in to fix your place after an event, that's part of  
 1032 the business continuity plan. This is how we're gonna get back up and running step-by-step-by-  
 1033 step.  
 1034  
 1035 Participant 3: We don't have that in place here, but we have people we can call.  
 1036  
 1037 Participant 2: Although, strangely, (1.0) I think we're impacted because other (1.0) industries  
 1038 have direct priority that puts us (1.0) – secondary, at times.  
 1039  
 1040 Co-facilitator: That's an interesting concept. So some of the tenants or the folks that share the  
 1041 port space might get priority over the actual port because of how big they are.  
 1042  
 1043 Participant 6: The city of Gulfport after Katrina, their immediate thing was minimal amount of  
 1044 road clearing, and then clearing to the right-of-ways. They took and made up their own list of  
 1045 items that they, they needed work items, put a price to it, and sat down with about 15 contractors  
 1046 and said whoever's got time, they'll agree to these prices; sign it, and they wound up with about  
 1047 six or seven different contractors working in different areas. But they did it right after the storm.  
 1048 (1.0) So they wound up with a contract, but they did it after.  
 1049  
 1050 Co-facilitator: And that sort of speaks to what you all were saying earlier about you have to  
 1051 know who's gonna be able to be there (1.0) to do the work, and that that's a big part of this.  
 1052  
 1053 Participant 7: Well, it's all about manpower because they have to be able to, number one, like  
 1054 after Katrina, you gotta have somewhere for all these people to come and stay. They gotta have  
 1055 a way to get here. And these big companies that like we use, they'll stage people in Meridian

1056 before the storm. And we're small compared to Chevron in size. I can't imagine what their (1.0)  
1057 – I mean, I guarantee you, they have 1,500 people sitting somewhere and bought hotel rooms so  
1058 as soon as the road is open, they can come in. But you just can't do that (1.0) – I'm probably  
1059 speaking out of turn, but a group like this, you just (1.0) – I wouldn't see how that's even  
1060 possible.

1061  
1062 Co-facilitator: Mm-hmm. Mm-hmm. That's good to know.

1063  
1064 Facilitator: Okay. (2.0) So having a list is probably more appropriate so you know who to contact  
1065 afterwards. Do other government entities in the local area have master service agreements for  
1066 emergency response and restoration that could include the port? (2.0) You were speaking earlier  
1067 to the city having those agreements in place.

1068  
1069 Participant 3: Mm-hmm. I think, I think we kind of indirectly benefit from that. You know,  
1070 they're gonna clean off Jerry St. Pe Highway for Ingalls [Shipbuilding], and that also leads into  
1071 the port. So the same with Chevron, you gotta get into Chevron that leads into our port. So I  
1072 think we're...(1.0)

1073  
1074 Participant 8: Rather than include the port, maybe you could say it would be benefit the port.

1075  
1076 ...

1077  
1078 Participant 8: Well, in that question "may" should be "if" other government entities have master  
1079 service agreements. You know, could the port benefit, right, because we don't know. You say  
1080 'do they have master service agreements,' we don't know. And could they include the port, you  
1081 know, they might.

1082  
1083 Facilitator: Yeah.

1084  
1085 Participant 8: So that question is a little bit...

1086  
1087 Co-facilitator: I think this one of the areas that we're kind of, we're gonna struggle with a little  
1088 bit because what our vision is, is that, that, that, um, community resilience index at that level.  
1089 Because we're asking them about memorandums of agreements and that kind of thing, that's  
1090 kind of how that could benefit or inform, you know, the process of the port – you know, sort of  
1091 that cross-fertilization of information so that like, you know, then we would bring like let's say  
1092 in a perfect world, we can bring the results of that meeting from the city, and then you'd have a  
1093 list of all that stuff. So that's – we'll have to work on how that can be better integrated.

1094  
1095 Facilitator: Yeah, that's a good point.

1096  
1097 Participant 3: And as important as we like to think we are in the port industry, they don't really  
1098 care about opening up the waterways and all that. I mean they do, but the first response is gonna  
1099 be to get roadways clear so that supplies, gas, and all that can get back in here. (1.0) So I mean  
1100 we're kind of gonna be far down on the food chain anyway.

1101

1102 **D.12**

1103

1104 Facilitator: Does your port have mutual aid agreements with other organizations to provide  
1105 emergency support operations?

1106

1107 Multiple Voices: Yes. I think so. Yeah.

1108

1109 Facilitator: And is that, um – is that the, the port offering emergency support or is it the  
1110 organization offering emergency support?

1111

1112 Participant 1: The organization.

1113

1114 Facilitator: The organization.

1115

1116 Participant 2: Like the sheriff's department?

1117

1118 Participant 1: Like, we receive help. We don't give help.

1119

1120 Facilitator: Yes. (Laughter.)

1121

1122 Participant 2: We let the – we let the hospital ships dock at our – and we actually give –

1123

1124 Participant 1: Safe harbor.

1125

1126 Participant 2: Safe harbor.

1127

1128 ...

1129

1130 Participant 3: Yeah, and they'll go out with an emergency berth application. We start safe harbor  
1131 when Coast Guard sets condition Whiskey. And, um, safe harbor continues for 24 hours after the  
1132 Coast Guard has stood down from any hurricane condition. That gives vessels time enough to get  
1133 fully crewed 'cause they're not allowed to stay here with nobody. They have to have some crew  
1134 to tend lines, et cetera, but the 24 hours gives them time to get any additional crew they need, get  
1135 stores and bunkers and then shove off to wherever it is they're going.

1136

1137 Participant 4: Pilots, tugs.

1138

1139 Participant 3: Yes.

1140

1141 Facilitator: Okay.

1142

1143 Participant 3: And that's a good point. We have a special place on the wharf where we keep the  
1144 boats that we're gonna need the soonest, the tugs, pilot boats, uh, MSRC's response boat, the Gulf  
1145 responder. They're all tied up.

1146

1147 Participant 5: You saw that yesterday down at the turning basin.

1148  
 1149 Participant 3: And easy to get out, uh, for whatever we have need for, for them to do.  
 1150  
 1151 Facilitator: Okay. Yeah, that – that seems like definitely a best practice or a good – a good  
 1152 practice, having a specified place for those – for those vessels to be able to be accessed quickly  
 1153 when needed. Okay....Does your port have pre-event contracts or a list of vendors and their  
 1154 contact information in place to allow for fast track procurement of emergency response and  
 1155 recovery services?  
 1156  
 1157 Participant 6: We don't.  
 1158  
 1159 Facilitator: Okay.  
 1160  
 1161 Participant 1: We do have a list of vendors but it won't make anything fast.  
 1162  
 1163 Facilitator: Right.  
 1164  
 1165 Participant 3: 'Cause everybody else is calling 'em too.  
 1166  
 1167 Facilitator: Everybody else in the –  
 1168  
 1169 Participant 6: Area.  
 1170  
 1171 Facilitator: ...in the local area. Okay. Umm. Do other government entities in the local area have  
 1172 master service agreements for emergency response and restoration that could include the port?  
 1173  
 1174 Participant 6: Yes.  
 1175  
 1176 Facilitator: Okay.  
 1177  
 1178 Participant 2: We can piggyback on their -  
 1179  
 1180 Participant 6: The city has a brief pre-event – brief, umm pre-event contract.  
 1181  
 1182 **D.13**  
 1183 Facilitator: Does your Port conduct routine emergency preparedness and hurricane readiness  
 1184 meetings to review policies and procedures with customers and tenants?  
 1185  
 1186 (4.0)  
 1187  
 1188 Participant 1: Not with customers and tenants.  
 1189  
 1190 Participant 2: No.  
 1191  
 1192 Facilitator: Is that an appropriate question?  
 1193

1194 Participant 1: It's a very appropriate question.  
1195  
1196 Participant 3: It is.  
1197  
1198 Participant 2: Well, but it's - it's basically the tenant's responsibility to look out for their  
1199 property and their people.  
1200  
1201 Participant 1: Right, but I think it's the port's responsibility to remind them, and even in our  
1202 tariff, that we are, we tell them, 'hey, you are responsible for this.'  
1203  
1204 Participant 3: Yep.  
1205  
1206 Participant 4: So basically, there's due diligence on both parts required.  
1207  
1208 Participant 1: It's just, I think we just need to have a little bit –  
1209  
1210 Participant 3: Well, [his] point is how much responsibility is it for us to keep reminding them to  
1211 do their job. And [her] point is, they should know what they're supposed to do. So, is it the Port  
1212 Authority's job to remind people to be responsible? I don't know. That's what the question's  
1213 asking.  
1214  
1215 Participant 4: We can advise them though as a professional courtesy.  
1216  
1217 Participant 1: It could go as easy as our briefings that we say, ok, hey - June 1 is around the  
1218 corner.  
1219  
1220 Participant 3: Yeah.  
1221  
1222 Participant 1: We could send a broadcast to our customers through our media outlets to remind  
1223 them, of course.  
1224  
1225 Participant 3: To review tariff item, whatever it is.  
1226  
1227 Participant 1: Yeah.  
1228  
1229 Participant 2: And then if you miss some, and they hold you responsible, for missing it cuz  
1230 they're supposed to be our babysitter –  
1231  
1232 Participant 3: Ha.  
1233  
1234 Participant 1: Then we pull out the tariff and show 'em, hey damage removal, it's your – at your  
1235 expense.  
1236  
1237 Participant 3: Good question.  
1238  
1239 Facilitator: Ok.

1240 Participant 1: I think it's important that we –  
1241  
1242 Facilitator: To consider it?  
1243  
1244 Participant 3: Mhmm.  
1245  
1246 Participant 1: keep our communications open...with our constituents.  
1247  
1248 Participant 3: Yep.  
1249  
1250 Facilitator: So the next -  
1251  
1252 Participant 2: But the question, as worded, is 'no', right?  
1253  
1254 Participant 5: Right.  
1255  
1256 Participant 6: Yeah.  
1257  
1258 Participant 1: We don't. We should. But we don't.  
1259  
1260 Facilitator: And the next question is kind of a, a follow-on to that – does your Port remind  
1261 tenants and customers to review their company's storm plans for storm prep activities.  
1262  
1263 Participant 3: So you're assuming that we should do that.  
1264  
1265 Co-facilitator: The question is -  
1266  
1267 Facilitator: The question assumes that, yes.  
1268  
1269 Co-facilitator: So then that's another - is that a fair question?  
1270  
1271 Participant 2: Yeah, exactly.  
1272  
1273 Participant 3: Exactly. Same discussion.  
1274  
1275 Co-facilitator: Yeah.  
1276  
1277 Participant 2: Or do we say it's the customer's responsibility to tell the Port to remind them.  
1278  
1279 Participant 3: Every twelve months.  
1280  
1281 Participant 2: Yeah.  
1282 Man: Tell them what you say.  
1283  
1284 Facilitator: Ok –  
1285

1286 Participant 7: I guess, umm - as we're going through this – so maybe clarifying like ones that,  
1287 instead of using it interchangeably, when it is a Port function and all the groups that may be  
1288 associated with the Port and, versus the Port Authority? Cuz when it's a 'does your Port' – I  
1289 mean, there could be a group within the port that maybe reminded, people along, you know,  
1290 industry along the channel that, you know, we use to go to harbor safety meetings when the Port,  
1291 you know, and harbor safety that, you know – we're coming into hurricane season, this is the  
1292 time that you start preparing, and that kind of stuff. But – Port Authority responsibility to do that,  
1293 you know – we do not, and we wouldn't, but you know – but maybe clarifying some of that as  
1294 well.

1295  
1296 Participant 1: Yeah. I think it's more just a - kind of almost a moral obligation, I mean, we have  
1297 to recognize that we have lots of tenants that are coming in here that are not from this area, that  
1298 are not climatized to our, our situations. I mean, we have foreign construction, and stakeholders  
1299 now that may need a little assistance.

1300  
1301 Participant 2: They don't always know there's a plan.

1302  
1303 Participant 7: But if they're participating in a port-wide group, and those discussions and  
1304 reminders were discussed, you know.

1305  
1306 Participant 1: So you're advocating – developing maybe –

1307  
1308 Participant 7: No, I'm just saying maybe clarifying, I mean, is it for the Port overall, is this  
1309 resilience for the Port Authority, or for the ports. For those ports that may not be a Port  
1310 Authority, they may be a combined, you know -

1311  
1312 Participant 3: Good point.

1313  
1314 Facilitator: Yes.

1315  
1316 Participant 1: Cuz some of them are operating ports and some of them aren't.

1317  
1318 Participant 7: Yeah.

1319  
1320 Facilitator: I mean, the (3.0) the initial goal was to develop something useful to all ports but all  
1321 the – (Participant 7: All ports are not equal.) All ports are not equal. Umm, all the ports that have  
1322 been represented on the working group to inform this have all been, uhh, landlord ports. So –

1323  
1324 Participant 1: That is predominant.

1325  
1326 Facilitator: Yes.

1327  
1328 Participant 8: Maybe a better wording is, is there a mechanism in place to remind them that  
1329 they've gotta be – if the Port Authority reminds them or not - is there a, some forum in place -

1330  
1331 Participant 3: The Harbor Safety Committee, perhaps.



1332 Participant 2: PCT.  
1333  
1334 Participant 1: I don't know if it can be just as easy as – a few thousand things saying hey, don't  
1335 forget, these are your responsibilities and these are ours.  
1336  
1337 Participant 3: Yeah. That's a good point.  
1338  
1339 Participant 7: And to make it easier for whichever type of Port that's looking at this to fit it to  
1340 where it can be applicable to all...  
1341  
1342 Participant 3: Yeah, that's a good point. Is there a mechanism.  
1343  
1344 Facilitator: Ok. So is there a mechanism in place to remind tenants and customers to review their  
1345 company's storm plans.  
1346  
1347 Participant 3: Yes.  
1348  
1349 Facilitator: So that addresses the communication but doesn't say, hey port, you're responsible for  
1350 doing this.  
1351  
1352 ...  
1353  
1354 Participant 3: Yep. Good point. The mechanism wording is good, I think.  
1355  
1356 Facilitator: Ok. I think, yes – I think that makes sense. It's more broadly applicable.  
1357  
1358 **D.14**  
1359 Facilitator: Does your port conduct routine emergency preparedness and hurricane readiness  
1360 meetings to review policies and procedures with customers and tenants?  
1361  
1362 Participant 1: Yes, wouldn't you think?  
1363  
1364 Participant 2: I don't know about customers and tenants. Internally we do, but –  
1365  
1366 Participant 1: Yeah, but one thing [we] were talking about this morning is – is setting up our  
1367 tenants, you know, on that call-in service. Having a group for just tenants? That would be kinda  
1368 – if we wanted to send one mass communication to 'em.  
1369  
1370 Participant 2: The port is open, the port is closed.  
1371  
1372 Participant 3: One thing, when I was at that steel mill in Alabama, and we were a contractor in  
1373 the mill providing services for them, they made us submit a hurricane preparedness plan that  
1374 mirrored theirs. I mean, we had to prepare a plan and submit it to them, the landlord, which in  
1375 your case would be you, to make sure that we're prepared, that we have a plan. That may be  
1376 something you might wanna think about, you know. I mean, we just would mirror yours, but at  
1377 least we'd sign off on it and say we're buying into what you're selling. That we'd pick up all our

1378 stuff, that we'd be responsible for all our equipment, you know, we'd get things tidied up and all  
1379 that.  
1380  
1381 Participant 1: Mike, is there any limit to the number of people we can use on that system?  
1382  
1383 Participant 4: Right now we're just paying for 200 numbers, but we can increase that.  
1384  
1385 Participant 1: As a sliding scale.  
1386  
1387 Participant 4: Even on the fly if we needed to, right.  
1388  
1389 Participant 5: Well, you know, it may be a good –  
1390  
1391 Participant 6: Well, hurricanes, you know, we generally have general meetings where all the  
1392 tenants come to the meeting. We tell 'em where we're at and what we're planning on doing, what  
1393 they need to do and so forth. I mean, we do have some communication with 'em, and they  
1394 generally close down before we do. And then we just kinda move amongst ourselves after that.  
1395 But we'll close the port so the tenants will be out, you know.  
1396  
1397 Participant 5: But it may not be a bad idea to have the tenants, and even the employee  
1398 communication system, you know, the port's at hurricane condition whiskey. Everybody's got  
1399 the plan, they oughta know what's going on at that point.  
1400  
1401 Participant 1: And we share that with the tenants, right? They have a copy of our hurricane plan,  
1402 don't they? (Multiple yeahs.)  
1403  
1404 Participant 7: It's on our web site too.  
1405  
1406 Participant 5: But if we – you know, and your comment is well taken. If you have a plan that  
1407 mirrors ours and we say we're at whiskey, you know what to do.

## **APPENDIX E**

### **FOCUS GROUP MEETING AGENDA AND EVALUATION**

#### **E.1 EXAMPLE FOCUS GROUP MEETING AGENDA**

**Port Resiliency Pilot Meeting**  
**Tuesday, May 12, 2015**  
**1300 – 1600**  
**Conference Room, Port of Corpus Christi**

**Purpose:**

The purpose of this meeting is to conduct a simulated facilitation of the Ports Resilience Index with staff and stakeholders of the Port of Corpus Christi in order to collect feedback to improve the tool.

**Objectives:**

The objectives of the meeting include the following:

1. To introduce the Ports Resilience Index project
2. To complete the Ports Resilience Index and understand the “score”
3. To discuss the process of completing the Ports Resilience Index
4. To consider additional content related to resilience planning and adaptation for long-term environmental change

**Agenda:**

<b>Time</b>	<b>Activities</b>
1300 – 1310	<i>Welcome and Introductions</i> Participants will introduce themselves and meet the project coordinators.
1310 – 1325	<i>Background on the Ports Resilience Index Project</i> Participants will understand the background and the purpose of the Ports Resilience Index project.
1325 – 1330	<i>Review the Agenda for the Rest of the Afternoon</i> Participants will receive an overview of the activities for the rest of the afternoon.
1330 – 1430	<i>Group Facilitation of the Ports Resilience Index</i> Participants will complete the Ports Resilience Index and understand the score.
1430 – 1500	<i>Group Discussion on the Process</i> Participants will discuss the process of completing the Ports Resilience Index and will have an opportunity to provide feedback on the process.
1500 – 1545	<i>Group Discussion on the Content</i> Participants will consider additional content and material to be included, potentially, in the Ports Resilience Index.
1545 – 1600	<i>Next Steps for PRI and Wrap Up</i> Participants will complete evaluation sheets and have another chance to provide feedback.

## E.2 EXAMPLE FOCUS GROUP EVALUATION QUESTIONNAIRE

### Port Resiliency Pilot Meeting Port of Corpus Christi Evaluation Sheet

Thank you for taking the time to be here today! As the first pilot test of the Ports Resilience Index, we would like to collect your feedback on the process of the meeting this afternoon and any suggestions you have to make the Ports Resilience Index beneficial and useful.

For each of the following questions, please check the box of the answer that best describes your opinion.

	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree
The focus group was useful.					
The objectives were well defined and understood throughout the meeting.					
The time commitment was worth it.					

Please answer the following questions.

1. The purpose of this focus group was to conduct a simulated facilitation of the Ports Resilience Index with staff and stakeholders of the Port of Corpus Christi in order to collect feedback to improve the tool. Do you think the purpose of the focus group was achieved throughout the meeting?  
A. Yes  
B. No
2. Which of the following activities was most useful to you?  
A. Introduction to the Ports Resilience Index Project  
B. Group Facilitation of the Ports Resilience Index  
C. Group Discussion on the process  
D. Group Discussion on the content
3. If this meeting were to occur again, what would you suggest we do differently?
4. Did you feel that it was beneficial to have all departments in one room to go through the questions on the Port Resilience Index?  
A. Yes  
B. No

5. Did you feel that anyone was missing from the discussion this afternoon? Please explain.

A. Yes

B. No

Additional Comments:

6. Did you learn anything new today? Please explain.

A. Yes

B. No

Additional Comments:

7. Do you think the Ports Resilience Index is a useful tool to improve resilience?

A. Yes

B. No

Additional Comments:

8. How could this process be improved?

9. What resources would you like to see offered for Ports? Please circle all that apply.

A. Workshops

B. Documents

C. In-person trainings

D. Technical Assistance

10. Are you willing to be contacted in the future for follow-up questions related to the Ports Resilience Index?

A. Yes

B. No

Please provide any additional comments!

## **E.3 QUESTIONS RELATED TO LONG-TERM ENVIRONMENTAL CHANGE**

### **Thinking about Long-Term Planning for Environmental Change and How it Affects Port Operations and Business**

What do you think about adding these questions to the PRI?

#### *Large Scale Maritime Transportation Network:*

1. Does your Port identify and evaluate water transportation safety requirements and conditions?
2. Does your Port identify and evaluate severe weather effects on marine transportation system operations?

#### *General Port Planning*

3. Are hazard risks considered in Port master plans?
4. Do long-term capital plans identify means to reduce natural hazard risks?
5. Does your Port incorporate hazard mitigation actions into project development applications?
6. Does your Port appropriate adjacent property to accommodate surge waters?
7. Does your Port plan to elevate existing structures?

#### *Structures on Port Property*

8. Does your Port plan to retrofit structures to protect against flood damage?
9. Does your Port implement wind-resistant design standards?
10. Do design standards address the use of hardening of critical structures, installation of anchors for hurricane tie-down straps, elevation of structures, etc.?

#### *National Flood Insurance Program and Community Rating System*

11. Does your Port conduct structural stability analysis for Port structures to be in compliance with federal requirements for FEMA monies?

## VITA

Lauren L. Morris was born to John and Nancy Land and raised in Maryland. She has a younger sister and brother, who both live and work in the Baltimore area. In 2008, Lauren received her Bachelor of Science in Environmental Science and Policy from the University of Maryland at College Park. After college, she moved to Baton Rouge, Louisiana and earned her Master of Science in Oceanography and Coastal Sciences from Louisiana State University in 2010. She participated in the Knauss Marine Policy Fellowship in Washington, D.C. during 2011, after which she moved back to Baton Rouge to work as Sustainability Coordinator for the Louisiana Sea Grant College Program until early 2016. In fall 2013, Lauren returned to school to begin working towards her PhD in Geography and Anthropology. Lauren expects to graduate with this degree in May 2017. Lauren resides in Clarksville, Tennessee with her husband Jordan, who serves as a Captain in the U.S. Army at Fort Campbell at the time of this writing.