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Abstract: Rural Libraries and Disasters: Investigating Resiliency in the Digital Environment and Beyond

Investigators at the University of Texas at Austin led by Dr. Sharon Strover in partnership with Dr. Marcia Mardis at Florida State University request \$284,870 for the 18-month project titled *Rural Libraries and Disasters: Investigating Resiliency in the Digital Environment and Beyond*. Our project team includes scholars with backgrounds in communications and library science who also have strong expertise in community development and its relationship to broadband networks. Our research examines how smaller and rural libraries approach resiliency, using moments of disaster in a series of case studies. The outcomes of the research will be used by librarians, managers, and community organizations and county planners active in these sometimes overlooked locations. The results will help library managers not only to plan for disasters but also to think more broadly about how they can work with the network of community organizations that responds in a time of disaster. We also anticipate our research will alert these same community organizations to the centrality of public libraries in their endeavors.

Using a grounded theory approach, our interviews and surveys investigate qualities of resilience. By developing approximately 12 case studies using varied public library sites in Florida and Texas, two states subject to numerous disasters, we will examine the phases and framings of resilience. Interviews and other data-gathering through surveys will allow us to create timelines and categories of responses to disasters. Our analysis will pay special attention to how libraries coordinate and communicate with other local organizations and their use of information and communication technologies. We conceptualize resilience as a process, basing our work on organizational research findings about the role of ICTs for libraries. While libraries are known for providing information and communication resources to their patrons through computers, wifi and digital literacy training, they also use ICTs themselves to share information, to connect to and to acquire new resources. Our research investigates some of the ways that libraries connect with broader relief efforts and build resilience through ICTs. The approach underscores the notion that catastrophic events entail phases of response (from preparation through aftermath) and that libraries' relationships with communities – patrons and local organizations – is comprised of information and resource needs and flows.

The research will be informed by an Advisory Committee composed of representatives from the Texas and Florida State Libraries, the two State Library Associations, and one or two other experts. This group of stakeholders will help to assess and to circulate the final report findings. The deliverables include (1) updating or re-creating a **Hurricane Preparedness** website and a toolkit targeting smaller libraries; (2) hosting a blog on “resilience best practices,” targeting smaller libraries; (3) convening *Hurricane Preparedness and Response Community Networking* events at the Florida and Texas Library Association conferences in order to share the results of research and also obtain feedback from the library community; (4) hosting a twitter chat to catalyze online discussion around the findings. The intended outcomes include improved understanding of how to build resilience and practical steps toward enhancing it in the local context.

Rural Public Libraries and Disasters: Investigating Resiliency in the Digital Environment and Beyond

Statement of Broad Need

Investigators headed by a team at the University of Texas at Austin are requesting \$284,870 to investigate how small and often rural public libraries contribute to community viability in the face of disasters and crises. We focus particularly the use of information and communication technologies, a facet of library services and operations that is increasingly important. The primary research questions are (1) How do small and rural libraries respond to disaster events, and particularly, how do they interact with their community members? (2) How do libraries use information and communication technologies (ICTs) during and after disaster events to interact with other organizations and institutions also assisting the community? and (3) What institutional practices contribute to libraries' resilience during and after disasters even as they contribute to their communities? The partnership between UT-Austin and Florida State University (Dr. Marcia A. Mardis) will contribute to improved planning and management tools and ideas, as well as an understanding of resilience features appropriate to stressed environments. Our research examines how smaller and rural libraries approach resiliency, using moments of disaster in a series of case studies. Librarians, managers and community organizations active in these often overlooked locations will use the outcomes of the research. The results will help library managers not only to plan for disasters but also to think more broadly about how they can work with the network of community organizations that responds in a time of disaster. We also anticipate our research will alert these same community organizations to the centrality of public libraries in their endeavors. A focal point for this inquiry is the aftermath of natural disasters when many public libraries were re-purposed as disaster relief centers during the record-breaking 2017 hurricane season in the Gulf region.

This research uses the concept of resilience in order to understand how libraries both prepare for and deal with disasters within the communities they serve. Such events stress communities in many ways, and recent history suggests that libraries can be central to local response and assistance. Their ability to work within their communities is an expression of their own resilience. Organizational resilience is comprised at least in part as the ability to effectively use whatever resources are on hand. For libraries, this may depend on their internal capabilities including staff expertise, the specific context of the disaster and the organization, and the ability to improvise and adapt to changing circumstances. Resilience is a term applied to numerous phenomena, but as non-profit, public institutions, libraries' organizational context suggests framing resilience in terms of how libraries (1) adapt to threats or disturbances, (2) refocus priorities and capacities, (3) learn and (4) change. Common organizational responses to stresses - from natural disasters to economic strain - include downsizing, reorganizing, and forming alliances, among other strategies.

Libraries are unique, public institutions operating within constrained circumstances including limited budgets and uneven access to technical assistance, even as they are imbued with public trust and expectations. Their resilience capabilities could vary tremendously. This research will try to account for variation in resilience among the small, often rural, public libraries facing disaster circumstances, and speaks to the IMLS interest in "developing the knowledge and competencies in libraries that can identify opportunities and address community needs" as cited in the NOFO.

Our work emphasizes the new challenges accompanying a *digital* information and resource environment in which displaced community members turn to libraries for assistance with information and communication needs on top of other material needs in times of disaster. Coping with dislocation, housing loss, and possibly job losses, communities turn to their libraries for the information technologies, expertise and

resources which become central to coordination purposes, social support, and pragmatic resource monitoring. In addition to possibly suffering their own internal damage, staff attrition and collection threats, local libraries must face the challenges of helping broader communities. There is a growing recognition that libraries' supporting roles within communities are under-recognized (OCLC and American Library Association, 2018). Public libraries anchor communities and can enhance the needed healing and economic and workforce revitalization, and a major component of this has to do with fulfilling the online and digital information needs community members experience during recovery.

Our emphasis on the community context and public libraries' relationships with other organizations is distinctive because it is driven by the recognition that in general, organizational resilience is greater with shared resources and connections (Chewning et al., 2012). Organizational resilience is comprised not just of the library's internal resources but also the connections across institutions, and the ability to access, deploy and use them. We know that local libraries, particularly in smaller communities, join with volunteer organizations, first responders, local economic development organizations, and various relief agencies in natural disaster situations. To the extent that libraries communicate and coordinate with other institutions, their longer term community role may be more significant: "The way an organization leverages resources of different types, such as financial, relational, structural, and technological can thus differentiate resilient organizations from less resilient ones" (Chewning et al., 2012, p. 240). We suggest that libraries are embedded in a network of relationships, with patrons at one level and with various local, regional, state and even national institutions at another level.

Libraries themselves "enact" resilience, tapping their own networks, interorganizational relationships, and human and material resources. We suspect some libraries are better able to do this than others. We seek to explain some of those differences, and produce research that can assist libraries and their surrounding institutional networks in developing resilience.

The objectives in the research are twofold: first, to decipher the hidden relationships and nonobvious trends that drive libraries' actions in contributing to communities during natural disaster episodes; second, to document and analyze the range of activities, paying special attention to communication dimensions, that libraries undertake with their patrons and communities before, during and after disasters. Thus, our research tackles the "downstream" work of libraries actually figuring out how and when to assist their communities and how to use communication mechanisms as well as the "upstream" work of interacting with the range of local and non-local institutions also responding to disasters. In the final stage of our work, the "lessons learned" from our research will be distilled in events in which libraries will actively engage with other local institutions – economic, voluntary, and beyond - in order to strengthen overall community resilience.

Previous research, most of it predating widespread use of social media, has identified several ways that libraries support communities during disasters (Hagar, 2015). For example, McClure et al. (2004) found that public libraries helped communities prepare before the storm, provided emergency information after the storms, provided physical shelter and aid, assisted in cleaning up damage, and contributed "continuity of services, stress reduction and restoring normalcy" (p. 4). Jaeger et al. (2006) identify four key roles: locating and interacting with missing and displaced family and friends; downloading and completing FEMA forms and insurance claims; checking for news and updates about local conditions; and trying to find information about the status of homes or workplaces. Libraries can help communities prepare (creating and distributing guides and info, for example), provide emergency information, give shelter, contribute physical aid, care for community members with needs, work with relief organizations, and assist with clean up (personal communication, Aransas County TX librarian, 2018).

More recently, Prestamo (2018) and Peet (2017) looked at how libraries responded to recent hurricanes, and both highlight how library employees assisted in non-library-related efforts. We observe as well that

in the aftermath of hurricanes Katrina and Rita, public libraries were frequently the only place where Internet access was available. How libraries assist in the aftermath of disasters, particularly in the face of so many organizational and operational changes that involve using ICTs over the past 10 years, is under-examined.

Small and rural libraries, numerically about 43% of all public libraries in the country, face special challenges during disasters. Their resources and staff are fewer, and the communities they serve often are older and poorer economically. At the same time, home broadband use and availability in rural regions lag that of metro regions, which in turn makes the local library's role in providing Internet access even more significant (Swan, Grimes & Owens, 2013). Real (2014) reports that 70.3% of rural libraries constitute the *only* free Internet access in their communities, compared to 46.6% and 60% figures for urban and suburban libraries. The Pew Research Center (2017) reports that rural Americans are less likely than those in metro areas to have home broadband, smartphones and other devices. This makes the library a communication center for online resources in smaller communities. We have found in our current research that rural libraries are especially relied on for their public and free wifi access. Libraries' ICTs may have outsize importance during and after a disaster.

Communication patterns during natural disasters in the 21st century emphasize the role of Internet access (Coombs & Holladay, 2010; Oyeniyi, 2017). Many people now rely on social media for up-to-date information during all phases of a disaster. In the early 2000s, organizations, including libraries, began to adjust to using a range of online communication systems to convey important information to communities (Perry, Taylor & Doerfel, 2003). It has become imperative that organizations find the best ways to use information and communication technologies to cope with critical events. As Jaeger et al. (2006) highlight in reference to libraries after hurricane Katrina "No other form of government... had the public access computers, the Internet access, and the dedicated professionals to turn information into a vital tool for finding the lost, searching for help, requesting aid, and beginning to recover" (p. 212). In their examination of libraries during a catastrophic flood in South Carolina, Liu et al. (2017) conclude that libraries could use social media to both maintain connections with patrons and to function as a source of *credible* information. Using the Internet was important for individuals and households in affected communities, and it also was essential for the institutions – libraries and others – themselves. Our approach to resilience foregrounds communication functions and capacities.

When Chewning, Lai and Doerfel (2012) explored how information and communication technologies were used by several organizations in their recovery efforts post-Katrina, they found different stages of recovery corresponds to different ICT use. , Now that both individuals and institutions use social media to access more information from more people (Oyeniyi, 2017; Lai, 2017), the question of how libraries reach out to both patrons and other assisting organizations becomes crucial. Institutions help to support links among people but they also connect organizations to each other in order to foster greater regional and cohesive resilience. How organizations such as libraries use ICTs affects their ability to create the linkages with other local institutions. Those networks enhance the libraries' own recovery and long-term resilience in the community and its consequent ability to serve the community.

The Gulf Coast region has faced repeated disasters. Katrina, Ike, Harvey, Irma and Maria have challenged the area's institutions repeatedly, and libraries in the area have quietly adjusted, assisted, and endured. Taking a longer view of resiliency even as recovery efforts post-Harvey are now underway, we propose to sample a subset of libraries in this disaster-prone area in order to examine the critical factors that influence their resilience. Our research will attend to communication patterns and the uses of ICTs across phases of a disaster. We focus especially on smaller and rural libraries since they typically serve populations that have fewer resources in place. Our point of departure is not only the library's singular role but also the

significant organizations around it with which the library should coordinate, communicate, and engage. The libraries themselves as well as the region's recovery institutions should benefit from this research.

Project Design and Research Questions

Our research investigates 12 small and rural libraries' actions before, during and after disasters, focusing particularly on the ICT practices that influence coordination and responsiveness to communities and to other local institutions. They are informed by the idea that resilience has a reciprocal feature reflecting libraries' engagement with its community of users as well as its interactions with other organizations. Resilience takes shape in stages, and its characteristics change over time.

Our primary questions are:

Q1: How did small and rural libraries respond to disaster events?

Q1a: How did they communicate with members of the community before, during and after these events with respect to preparations, emergency services, and other resources?

Q1b: What communication practices did libraries use to reach and to assist their communities?

Q2: How do libraries use ICTs during and after disaster events to interact with other organizations and institutions also assisting the community? What are their connections - especially communication links - with local first responders, economic development, volunteer and relief organizations?

Q3: What institutional practices contribute to libraries' resilience and interaction with their communities? Which practices and factors might assist libraries' abilities to maintain organizational resilience in the short- and longer term?

Using a grounded theory approach informed by the literature on organizational resilience, our goal is to investigate qualities of resilience as expressed in our cases. Our 12 cases are not in themselves meant to generalize to all public libraries. Rather, the aspects of resilience they demonstrate will contribute to an understanding of the range of possibilities - the false steps, the positive steps - and the best practices that libraries should consider. While our event frame is "disasters," the broader goal is to illuminate practices that build resilience for the future beyond a disaster. We plan to use interviews with other assisting organizations as a method of determining ways that libraries can strengthen their strategic relationships.

Looking at the libraries specifically, we will develop an interview protocol designed to assess the actions libraries took before, during and after a recent disaster. We will query their communication actions in depth. The interviews will examine how, if and when libraries (1) recognized and adapted to the disaster threat, (2) refocused priorities and gauged capacity, (3) learned from their experience and (4) changed in material, transactional, or other ways. The categories generated by Jaeger et al. and McClure et al., provide a start to our inquiry: How did libraries prepare before the storm, provide emergency information, provide physical shelter, assist in clean up, and contribute to reducing stress, provide information resources for personal recovery by locating and interacting with missing and displaced family and friends and by helping with forms and insurance claims.

Libraries' broader information transactions with other institutions – such as FEMA or local food banks – may extend their role in circulating news and updates about local conditions. We seek to understand the information exchanges with library users as well as how the library functions in the fabric of local networks and institutions. We know that libraries frequently become critical information hubs and we will pay particular attention to their external communication roles and transactions. By gathering data from other assisting organizations in the target communities, we will generate another picture of the library role.

The grounded theory approach aims not so much to generate statistically generalizable results regarding library practices as to discern patterns and understand process. We plan to relate both to the four aspects of resilience noted earlier: recognizing the problem; refocusing; learning; and changing.

Sample: We are targeting between 10 and 12 small, public libraries on the Texas and Florida Gulf Coasts for a series of community and library case studies. Supportingdoc1 lists the 150 libraries that are in the FEMA-defined hurricane-affected areas of Texas, and we are targeting a subset for the Texas sites, particularly those noted in Supportingdoc2 and Supportingdoc3. Likewise, in Florida we will select from among libraries in communities affected by disasters, especially using the resources of the Panhandle Library Access Network (PLAN) and its documentation. Some possible Florida libraries are also noted on Supportingdoc2. Our selection criteria include size and ethnic diversity of the community. Many of these sites are underserved and most are rural, and all will have experienced a recent natural disaster.

There is a risk that our targeted libraries will decline to participate in the study. However, we intend to mitigate this risk using our strong and current partnerships with the State Libraries of both Texas and Florida, and thus will be able to identify suitable locations for the research.

Within each case, both the library and recovery organizations/institutions working with their communities are the subjects for qualitative data gathering. As noted earlier, libraries interacted in different ways with other assisting or relief organizations and with organizations such as Chambers of Commerce or local first responders that have permanent roles in the community. An inventory of local institutions active in recovery in Texas will be generated by examining the FEMA Hurricane Harvey Fact Sheet “Resources for Survivors” and the Florida analog, especially focused on post-Irma recovery institutions (FEMA, 2018). Some organizations will be local such as a community church doing clean up; some regional, such as multi-county Councils of Government in Texas; and some statewide, such as the State Library and Archives of Florida, the Texas Library Association and the state-located offices and personnel of FEMA offices in Texas and Florida. A preliminary conversation with some of the Texas state-level assisting organizations suggests cooperation.

Another source of data will be the actual “communications” that are available from disaster events. For example, Facebook communications related to disaster events on library pages will be accessed and coded. We plan to inventory and code the webpages and other social media traces for the selected libraries in terms of disaster-related information, themes, and messages. One risk is that these traces will be gone by the time we do our data-gathering. However, a preliminary look at some library’s webpages confirms at least some evidence that will be helpful to the investigation.

Project team: Sharon Strover, a Professor at the Moody College of Communication at the University of Texas at Austin, will direct the project. As Director of the Technology & Information Policy Institute, she is responsible for initiating and conducting numerous funded research projects. She is currently completing a research project on rural libraries and Internet connectivity (Strover et al., 2017) and she has actively worked with ALA and the Benton Foundation by sharing research results regarding library technology initiatives. She sits on the Board of the Texas State Libraries and Archives Statewide Resource Sharing Advisors. She has published numerous peer reviewed journal articles and sits on the Editorial Board of two major journals.

Marcia A. Mardis, Florida State University, is an Associate Professor, Assistant Dean, and Associate Director of the Information Institute. In her Institute leadership role, Marcia oversees activities related to sustaining *Improving Florida Public Libraries Hurricane/Disaster Preparedness and Response*, a toolkit and web portal funded by the Florida Catastrophic Storm Risk Management Center (2008-2010) and the State Library of Florida. Marcia’s experience with Florida’s public libraries, especially in the rural

Panhandle, and funded research conduct will ensure that the efforts in Florida parallel and reinforce project work in Texas.

Faye R. Jones, Florida State University, is Research Faculty, Data Coordinator, and Research Associate at the Information Institute. A fluent Spanish speaker, native Floridian, experienced researcher, and expert project manager, Faye's familiarity with coastal communities will be indispensable in data collection and analysis.

We also will convene an Advisory Board. Five times throughout the project we will virtually conference with our Advisory Board to share project updates, preliminary findings, and dissemination activities and request feedback. Our advisors will include:

Amy Johnson, State Librarian of Florida

Mark Smith, State Librarian of Texas

Carol Dement, Deputy Director, Panhandle Library Area Network (PLAN)

Lisa O'Donnell, Executive Director, Florida Library Association

Dana Braccia, Executive Director, Texas Library Association

Their input will provide us with critical insights about librarians' experiences across both states and will allow us to better determine the extent to which patterns and phenomena we are observing are common to the communities in the study. Letters from these advisors are in the Supplemental Documents.

Timeline: Site selection and fieldwork will be initiated in December 2019. We will seek site participation as early as possible so that we can develop our interview protocols and survey instruments with some attention to location and context. Approval from the University of Texas Institutional Review Board will be obtained for all interaction with human subjects. A brief Phase One of approximately two months will constitute the preparatory activities around literature review, site selection, and instrument development. Fieldwork will be conducted in Phase Two for roughly nine months. This will entail visiting all 12 sites and conducting interviews with the appropriate people at the libraries (all or most of the staff) as well as organizations identified as having a role in assisting the community during a disaster. In Phase Three (overlapping with Phase 2, eight months) the teams will work with transcribed interviews and construct preliminary analyses of our findings. We also will gather the relevant communication data, code it and analyze its patterns. The remaining months will be used to circulate our preliminary results and obtain feedback. We will share our results as early as possible and plan to have sessions at both the Florida and the Texas Library Association conferences in 2019 and 2020. We also plan to convene our target libraries and relevant community institutions virtually for feedback sessions. The Schedule of Completion notes these timeframes and activities.

Data-Gathering: Our methods include a mix of qualitative and quantitative data gathering. After designing and pre-testing an interview protocol and a survey instrument, we will interview librarians and institutional stakeholders and institutions identified as important to the recovery. We will:

(1) Interview library staff from all of our sites regarding their experience of and responses to the disasters; this will assist us in understanding the experiences of libraries through a disaster, including as communities return to "normal." We will focus on the preparatory phase, the "during" disaster phase, as well as the aftermath, with special attention to ICT use/deployment. We will develop a coding scheme to track typical responses in different stages of the disaster. Library assets, staff experience, use of ICTs to communicate with the public and with other organizations, and interactions with other institutions constitute some components of resilience, and our data-gathering will address these factors. We also will develop a catalog of ICT resources before our interviews based on previous studies and investigate the extent to which they

correspond to libraries' experiences. These data contribute to answering Question 1 and parts of Questions 2 and 3 (see p. 4).

(2) Undertake phone-based surveys and select interviews targeting the locally and regionally responsive institutions in the sampled communities in order to investigate aspects of resilience, information needs and organizational resources as they bear on libraries. A combination of phone-based surveys will gather data on roles, responses, and the ICTs used in the recovery effort of institutions active in recovery efforts and associated with libraries. Given past experience, we anticipate roughly 100 interviews. The goal of the survey is to trace how these institutions interact with local libraries in assistance efforts and ongoing support interactions. Phone-based surveys will augment in-person interviews and enable us to reach more community institutions. Phone surveys typically have high response rates, and with proper notification and preparation of the respondent, we believe the completion rates will be very good. The institutions surveyed would include relief agencies, county-level first responders, and local economic development agencies active in the communities of the selected libraries, among others. The interviews will be conducted primarily within the communities of the selected libraries, augmented by phone-based interviews. These data will address Questions 2 and 3.

(3) Analyze content data from library Facebook, websites and available social media source and other local community sites and sources reflecting on the disaster experience. These data contribute to responding to Questions 2 and 3. We will construct a "life cycle" of community and organizational responses to disasters, and we will plot timeliness and type of responses (textual content, visual content), particular stress events (should they exist), and breakthroughs.

Analysis: Quantitative data will be analyzed using standard statistical techniques available through SPSS or Stata. NVivo or Dedoose will be used to help analyze qualitative data. We will also use Leximancer to create conceptual visualizations of the qualitative data. Our analyses will take into account the contextual features in the library settings that affect individual use of and community outcomes associated with broadband.

Deliverables and Dissemination: The case study research design with qualitative data from library staff and from institutions with which the library interacts will allow us to position resilience in terms of contextual features and practices in library settings, including services provided to others and used by the libraries (such as broadband connectivity). The survey will offer a broader set of experiences useful to either corroborate our in-depth field work and/or to extend our understanding of library resiliency.

We aim to produce practical dissemination activities and products in addition to traditional scholarly research outputs such as journal papers and conference presentations, and routine project reporting. Our practical dissemination will include:

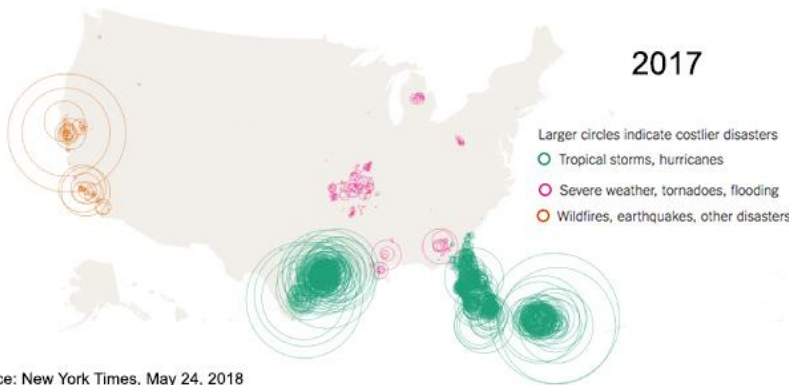
1. An updated and expanded Hurricane Preparedness website and toolkit currently at <http://hurricanes.ii.fsu.edu> (see [Supportingdoc6](#)).
2. Hurricane Preparedness and Response Community Networking events at Florida Library Association and Texas Library Association conferences. The goal of Year 1 events will be to capture ground truth regarding response and resiliency; the goal of Year 2 events will be research findings review and community feedback. These two events will allow us to gauge the extent to which our findings in rural Florida and rural Texas exemplify librarians' experiences, perceptions, and strategies.
3. Twitter chats related to hurricane preparedness and response as well as library and community resilience. The Twitter chats will be hosted by the research team and occur at the beginning, midway, and conclusion of the project.

4. Convening selected libraries with assisting institutions to debrief with the results of our research. We anticipate doing this in a virtual conference environment although some TLA or FLA participation may be possible.

Diversity Plan

The public libraries of Florida and Texas' Gulf coast regions serve a diverse population; these residents constitute the communities whose resilience we will study and who will be the direct beneficiaries of our practical research products. Working with local librarians, we will gather the perspectives and needs of residents and ensure that diversity is reflected in our community engagement.

Ethnic and racial diversity. The Gulf region is incredibly diverse, with more than 13.5 million residents who trace their origins to many places in Europe, Africa, Asia and Latin America (LSU AgCenter, 2013).



source: New York Times, May 24, 2018

Figure 1. 2017 Natural Disaster Locations and Costs

African Americans constitute roughly 19% of the people in the coastal Gulf state and are represented broadly in the workforce. Latinos and Asians comprise about 30% and 4.15%, respectively, and are strongly represented in the offshore drilling, seafood, and tourism industries. Native American groups in the region average only 0.64% of the overall population, but these

communities are also heavily engaged in the tourism industry and aquaculture industries that

define the region. The coastal workforce is diverse and dependent on natural resources for their livelihoods (Oxfam America, 2009).

Socioeconomic Status and Relative Vulnerability. As Figure 1 illustrates, Florida and Texas are particularly hard hit by costly natural disasters (Chinoy, 2018). This impact is notable because these coastal

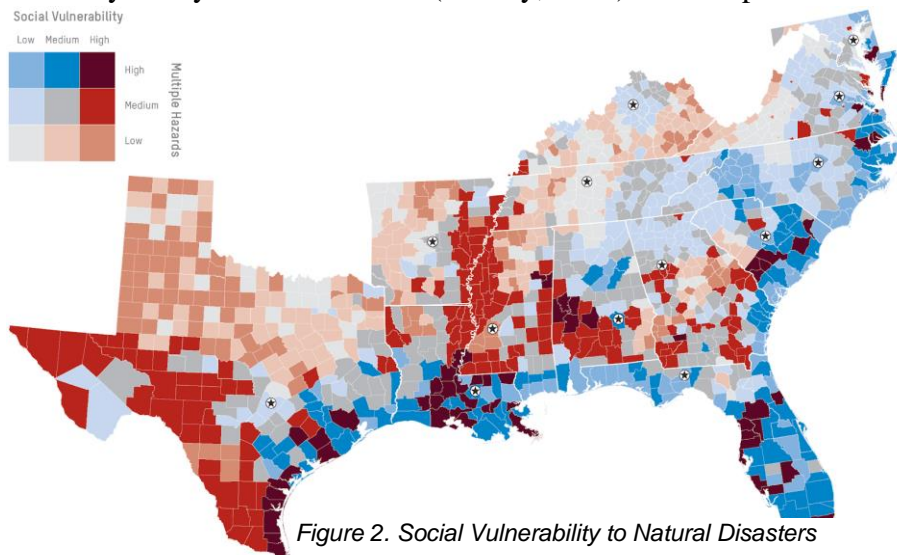


Figure 2. Social Vulnerability to Natural Disasters

communities are economically vulnerable. The Economic Policy Institute's *Income Inequality Viewer* (<http://www.epi.org/multimedia/unequal-states-of-america/>) ranks Florida as the 5th highest U.S. income

inequality rate with Gulf coastal counties Franklin and Collier ranking the 7th and 8th most unequal in the nation. Texas ranks #8 in U.S. income inequality, and some coastal-adjacent counties have low median incomes.

The difference between high and low SES fuels a community's ability to respond to a catastrophic weather event. As Figure 2 shows, many of the same communities that experience the natural disasters depicted in Figure 1 are the communities with the highest social vulnerability (Oxfam America, 2009).

Broad Impact

This research contributes to the broader literature on resilience, and applies it specifically to small and often rural public libraries. One outcome will be an action template for developing strategic and enhanced services within stressed communities. We will offer recommendations that can assist libraries in preparing for the next set of stresses that reach them, whether they are natural disasters or other types of crises. We plan to frame our outcomes in ways that can directly contribute to librarians' local management and communication efforts. Our twitter chats will be one mechanism used to include a broad community of librarians in the dialogue.

One important goal will be to share the research findings in order to help libraries and communities work with each other and address regional problems. Building off the hosted meetings between libraries and local organizations noted earlier, we would like to model outreach on the State of Colorado's plans as detailed in the Aspen Institute's publication *Libraries: Building Community Resilience in Colorado* (2018). We will have an Advisory Board that includes State Librarians to evaluate our research and to make suggestions while it is ongoing; it also will assist with dissemination. Our endorsements from the State Librarians of Texas and Florida and the State Library Associations in the supporting documents indicate their support.


Our communication plans includes collaborating with several organizations that will help to share the research results (specifically, the final report and guidelines for successful program implementation) with various relevant constituencies and maintaining the information in an online form so that it is sustainable and available. We plan to share the initial results with the participating libraries and assisting institutions and will include their feedback in the final report. A final report and results will be shared with the Texas and Florida State Libraries and at the State Library Association conferences.

We also will reach a broader and more community-based constituency of civic leaders and elected officials. In particular, The Center for Rural Strategies convenes an annual conference called the National Rural Assembly. Since our approach underscores the importance of resilience in terms of interactions among several organizations in the community setting, this venue could be particularly important. They could provide a spot in their conference where we can share results with community leaders and local officials who would be interested in such a program. They also sponsor an online newspaper, [The Daily Yonder](#), which reaches people across the U.S. and beyond.

We have participated in and led in webinars the past and will contribute to do so in order to share the results of this research. We will seek to share our work at the Texas Library Association Annual Conference and the American Library Association and Public Library Association conferences and the Association of Rural and Small Libraries. We also plan to submit results in scholarly journals and to communicate with policy constituencies such as ALA where we have contacts.

Schedule of Completion: Rural libraries and Disasters: Investigating Resiliency in the Digital Environment

	FY2018	FY2019											FY2020					
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Phase 1																		
Activity 1: Literature Review																		
Task 1.1: Gathering literature																		
Task 1.2: Final literature review																		
Activity 2: Develop interview protocols and survey instrument																		
Task 2.1: Develop sets of interview questions and survey questions																		
Task 2.2: Pretest interview protocol																		
Task 2.3: Obtain Institutional Review Board Approval for Data-Gathering																		
Activity 3: Site Selection																		
Task 3.1: Gather data on potential library sites and community institutions																		
Task 3.2: Draft participation letter and send to community institutions																		
Task 3.3: Draft participation letter and send to sites																		
Task 3.4 Consult with sites and make final selection																		
Phase 2																		
Activity 4: Fieldwork																		
Task 4.1: Schedule site visits and plan interviews																		
Task 4.2: Fieldwork with libraries and locally-based organizations																		
Task 4.3: Additional interviews with institutions - phone-based																		
Task 4.4: Transcription																		
Phase 3																		
Activity 5: Analysis - Library activities																		
Task 5.1: Preliminary summary																		
Task 5.2: Reporting																		
Task 5.3: Advisory Board teleconferences																		
Activity 6: Analysis - community organizations																		
Task 6.1: Code data																		
Task 6.2: Analysis of coded data																		
Task 6.3: Six month Reporting																		
Phase 4																		
Activity 7: Analysis of communication data																		
Task 7.1: Identify and collect relevant data																		
Task 7.2: Develop coding scheme																		
Task 7.3: Code data																		
Activity 8: Dissemination																		
Task 7.1: Participate and present at TL conference																		
Task 7.2: Participate and present at FL conference																		
Task 7.3: Create/update hurricane web and blog site																		
Task 7.4: New social media dissemination (twitter chat etc)																		
Activity 9: Final Report																		
Task 8.1: Debriefing with Library Sites																		
Task 8.2: Debriefing with community organizations and institutions																		
Task 8.3: Reporting																		

 milestone

DIGITAL PRODUCT FORM

Introduction

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to federally funded digital products (i.e., digital content, resources, assets, software, and datasets). The products you create with IMLS funding require careful stewardship to protect and enhance their value, and they should be freely and readily available for use and re-use by libraries, archives, museums, and the public. However, applying these principles to the development and management of digital products can be challenging. Because technology is dynamic and because we do not want to inhibit innovation, we do not want to prescribe set standards and practices that could become quickly outdated. Instead, we ask that you answer questions that address specific aspects of creating and managing digital products. Like all components of your IMLS application, your answers will be used by IMLS staff and by expert peer reviewers to evaluate your application, and they will be important in determining whether your project will be funded.

Instructions

- Please check here if you have reviewed Parts I, II, III, and IV below and you have determined that your proposal does NOT involve the creation of digital products (i.e., digital content, resources, assets, software, or datasets). You must still submit this Digital Product Form with your proposal even if you check this box, because this Digital Product Form is a Required Document.

If you ARE creating digital products, you must provide answers to the questions in Part I. In addition, you must also complete at least one of the subsequent sections. If you intend to create or collect digital content, resources, or assets, complete Part II. If you intend to develop software, complete Part III. If you intend to create a dataset, complete Part IV.

Part I: Intellectual Property Rights and Permissions

A.1 What will be the intellectual property status of the digital products (content, resources, assets, software, or datasets) you intend to create? Who will hold the copyright(s)? How will you explain property rights and permissions to potential users (for example, by assigning a non-restrictive license such as BSD, GNU, MIT, or Creative Commons to the product)? Explain and justify your licensing selections.

We plan to develop questionnaires and to gather interview and some survey data. The N is uncertain but we anticipate approximately 30-40 librarian interviews and 100 surveys from community institutions/stakeholders. Since the data come from case studies and the N is low and much of the data are qualitative, we do not believe it is easily reused. It will constitute a "dataset" however.

A.2 What ownership rights will your organization assert over the new digital products and what conditions will you impose on access and use? Explain and justify any terms of access and conditions of use and detail how you will notify potential users about relevant terms or conditions.

All data that we collect will be non-personally identifiable. Human subjects-based data will carry the University of Texas' IRB approval. Our procedures should resolve any privacy concerns. We will own the data. We would be willing to share them if they will be used appropriately.

A.3 If you will create any products that may involve privacy concerns, require obtaining permissions or rights, or raise any cultural sensitivities, describe the issues and how you plan to address them.

We have an IRB-approved information sheet for all people involved in data gathering. We will give people the option of our not recording their interview.

Part II: Projects Creating or Collecting Digital Content, Resources, or Assets

A. Creating or Collecting New Digital Content, Resources, or Assets

A.1 Describe the digital content, resources, or assets you will create or collect, the quantities of each type, and format you will use.

Our interviews will be transcribed and entered into analysis programs such as Dedoose and SPSS. We anticipate about 40 librarian interviews and close to 100 surveys.

A.2 List the equipment, software, and supplies that you will use to create the content, resources, or assets, or the name of the service provider that will perform the work.

A.3 List all the digital file formats (e.g., XML, TIFF, MPEG) you plan to use, along with the relevant information about the appropriate quality standards (e.g., resolution, sampling rate, or pixel dimensions).

Simple text and spreadsheet data as well as SPSS files will be used.

B. Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan (i.e., how you will monitor and evaluate your workflow and products).

All transcribed interviews will be maintained in files on secure computers at the University of Texas.

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period of performance. Your plan may address storage systems, shared repositories, technical documentation, migration planning, and commitment of organizational funding for these purposes. Please note: You may charge the federal award before closeout for the costs of publication or sharing of research results if the costs are not incurred during the period of performance of the federal award (see 2 C.F.R. § 200.461).

We can make the survey data available on a request basis. It will be so context-dependent that it is probably of limited use to the general public. This possibility will be noted on our permissions.

C. Metadata

C.1 Describe how you will produce any and all technical, descriptive, administrative, or preservation metadata. Specify which standards you will use for the metadata structure (e.g., MARC, Dublin Core, Encoded Archival Description, PBCore, PREMIS) and metadata content (e.g., thesauri).

C.2 Explain your strategy for preserving and maintaining metadata created or collected during and after the award period of performance.

C.3 Explain what metadata sharing and/or other strategies you will use to facilitate widespread discovery and use of the digital content, resources, or assets created during your project (e.g., an API [Application Programming Interface], contributions to a digital platform, or other ways you might enable batch queries and retrieval of metadata).

D. Access and Use

D.1 Describe how you will make the digital content, resources, or assets available to the public. Include details such as the delivery strategy (e.g., openly available online, available to specified audiences) and underlying hardware/software platforms and infrastructure (e.g., specific digital repository software or leased services, accessibility via standard web browsers, requirements for special software tools in order to use the content).

D.2 Provide the name(s) and URL(s) (Uniform Resource Locator) for any examples of previous digital content, resources, or assets your organization has created.

Part III. Projects Developing Software

A. General Information

A.1 Describe the software you intend to create, including a summary of the major functions it will perform and the intended primary audience(s) it will serve.

A.2 List other existing software that wholly or partially performs the same functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

B. Technical Information

B.1 List the programming languages, platforms, software, or other applications you will use to create your software and explain why you chose them.

B.2 Describe how the software you intend to create will extend or interoperate with relevant existing software.

B.3 Describe any underlying additional software or system dependencies necessary to run the software you intend to create.

B.4 Describe the processes you will use for development, documentation, and for maintaining and updating documentation for users of the software.

B.5 Provide the name(s) and URL(s) for examples of any previous software your organization has created.

C. Access and Use

C.1 We expect applicants seeking federal funds for software to develop and release these products under open-source licenses to maximize access and promote reuse. What ownership rights will your organization assert over the software you intend to create, and what conditions will you impose on its access and use? Identify and explain the license under which you will release source code for the software you develop (e.g., BSD, GNU, or MIT software licenses). Explain and justify any prohibitive terms or conditions of use or access and detail how you will notify potential users about relevant terms and conditions.

C.2 Describe how you will make the software and source code available to the public and/or its intended users.

C.3 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository:

URL:

Part IV: Projects Creating Datasets

A.1 Identify the type of data you plan to collect or generate, and the purpose or intended use to which you expect it to be put. Describe the method(s) you will use and the approximate dates or intervals at which you will collect or generate it.

We will have transcribed interviews and some survey data. These will be used to answer our research questions. The methods include (1) qualitative interviews and (2) semi-closed ended phone-based interviews. We will collect it in months 4 through 14 of our project. We also will examine public communication data available from library websites.

A.2 Does the proposed data collection or research activity require approval by any internal review panel or institutional review board (IRB)? If so, has the proposed research activity been approved? If not, what is your plan for securing approval?

We will obtain IRB approval for all human subjects data after we have constructed our instruments since these must be submitted for approval.

A.3 Will you collect any personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information? If so, detail the specific steps you will take to protect such information while you prepare the data files for public release (e.g., data anonymization, data suppression PII, or synthetic data).

Initially, we will have scheduled with people's names on them but we will not maintain personally identifiable information associated with the actual interviews. Surveys will be identified only by an individual's role.

A.4 If you will collect additional documentation, such as consent agreements, along with the data, describe plans for preserving the documentation and ensuring that its relationship to the collected data is maintained.

The consent agreements will be kept in a locked file drawer at the University of Texas offices for the duration of the project plus three years. Any personally identifiable permissions (if we use exact quotes, for example, we may want signed permissions) will be stored separately from the actual data.

A.5 What methods will you use to collect or generate the data? Provide details about any technical requirements or dependencies that would be necessary for understanding, retrieving, displaying, or processing the dataset(s).

Data will be textual (transcribed interviews) and some coded quantitative data from phone interviews.

A.6 What documentation (e.g., data documentation, codebooks) will you capture or create along with the dataset(s)? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the dataset(s) it describes?

We will have a codebook for the quantitative data that will reside alongside the dataset.

A.7 What is your plan for archiving, managing, and disseminating data after the completion of the award-funded project?

We plan to share the results of the data analyses widely and the survey data will be available on a request basis.

A.8 Identify where you will deposit the dataset(s): *We do not have a site for the data but any published materials will list the authors' names as a point of contact.*

Name of repository:

URL:

A.9 When and how frequently will you review this data management plan? How will the implementation be monitored?

We will review this plan every three years. The PI will monitor the implementation.