

1. STATEMENT OF NATIONAL NEED.

In *iSmart for Disasters: Exploring Smart and Connected Disaster Planning for Small and Rural Libraries*, a *NLG Research in Service to Practice*, Florida State University, the Chief Officers of State Library Agencies (COSLA), the State Library of Florida, the Panhandle Library Area Network (PLAN), three public library systems, emergency management officers, climatologists, and behavioral therapists propose to *explore* existing disaster preparedness, response, and recovery (DPRR) plans and Continuity of Operations Plans (COOPs); *integrate* advanced geographic information system (GIS) mapping analyses to *develop* smart and connected data-informed library disaster plans, first for recently devastated public libraries of Florida's rural Panhandle, then for libraries outside of Florida; and *document and distill* evidence-based *processes and models* for small and rural public libraries throughout Florida and the nation. This research study builds on our current IMLS LB21 study (RE-96-18-0127, 2018-2020) of Florida Panhandle public librarians affected by Hurricane Michael's 2018 strike in which we found few formal DPRRs, consistent with *Protecting America's Collections* report in which they indicated that only

1/4 of small and rural libraries had a disaster plan [1]. Hurricanes are the most common U.S. natural disaster and, as Figure 1 shows, Florida is the #1 location for U.S. mainland hurricane hits and other natural disasters. Many states mandate that public librarians be contractually obligated first responders who serve during natural disasters, but few libraries have policies and procedures for this life-saving work. Even when a public library does have a disaster policy, rarely is it current, complete, based on

communities and the built environment, and evaluated for effectiveness. In short, Florida is an ideal context in which to center and scale research related to catastrophic events. We will gather data in and beyond Florida to adapt our learnings to other states, levels, and scenarios.

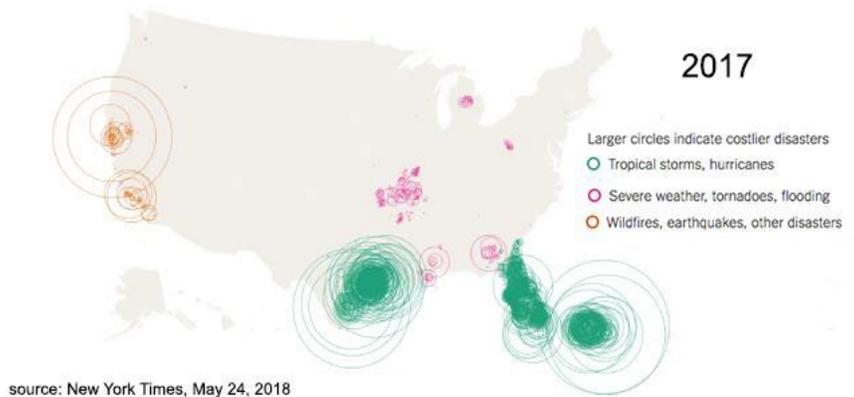


Figure 1. U.S. natural disaster prevalence

Effective policies are informed by high quality data and relevant, local, lived experience. Smart and connected libraries use real time data to plan and make decisions, yet many lack the expertise to systematically make use of these data. This *exploratory* study will develop collaborative, community-centric, multi-disciplinary, smart, and connected DPRR and COOP models informed by librarians' local knowledge, ongoing GIS analysis of community data, and stakeholder expertise to *build and strengthen small and rural libraries' capacity* to prepare library personnel to be *community catalysts* who safeguard citizens and library resources in disasters. This study captures a process for developing data-informed disaster plans, incorporates scaling and replication feedback from national advisors, and results in DPRR plans and COOP recommendations with a workbook and educative scaffolds that can that can be adopted and adapted by small and rural public libraries throughout the country. Our process may have direct implications for developing plans that address public emergencies beyond weather (e.g., mass shootings, pandemics) because these responses also require an integrated and coordinated response by county, state, and federal stakeholders and experts, like those included in this project.

1.1. Existing Theory, Scholarship, and Practice

Planning for Disasters. The *National Response Framework* [2], unites all levels of government, nongovernment, and private sectors in three phases of effective disaster response (e.g., catastrophic weather, public health crises) response: preparation, response, and recovery. Preparedness encompasses planning,

organizing, training, equipping, implementing, evaluating, and improving; response involves shifting from building capacity to employing resources, saving lives, protecting property and the environment, and preserving places and things; and recovery includes assisting others in returning to self-sufficiency through short-term and long-term efforts. Many states, including Florida, also require local continuity of operations plans (COOPs), which enhance disaster recovery. For example, Florida §252.365 mandates that local and state governments must maintain essential functions during catastrophic events [3]. While many states provide guidelines for developing disaster plans, creating these documents can be a daunting task for those who are not skilled in emergency management planning, especially when the plans require buy-in from various organizational leaders at different levels [4]. This project directly benefits public librarians in developing these essential documents, and organizes resources to simplify what can be an overwhelming, but critical, process.

Survivor-Led Response (SLR) theory [5] informs our conceptual framework and guides our proposed research; it is a theory of action that captures the immediate aftermath of disasters, before external aid intervenes. SLR’s six mechanisms include psycho-social support, short term material support, community empowerment, community cohesion, government collaboration, and addressing vulnerability root causes. SLR’s premise is that while local actors do not offer communities a complete solution due to power inequalities and governmental fragmentation, but opening up response and recovery management to meaningful local leadership in policy development and responsibility results in the most effective response. The six SLR mechanisms will be used in text analysis and to guide research and dissemination products.

Optimizing Public Libraries. Public libraries are critical gateways to information and resources, connecting communities in extreme weather events. A library disaster plan’s efficacy depends on facilities’ accessibility and availability; because facilities are limited in number, providing sufficient access should be a major concern for governmental agencies. Access is especially vital because vulnerable populations (e.g., seniors, disabled individuals) are disproportionately affected by health limitations, lack of internet access, and limited technology access. These challenges heighten the possibility that vulnerable population members cannot make life-saving decisions to prepare, respond, and recover in physically demanding circumstances such as unfamiliar severe weather events. In disasters, vulnerable populations, especially in rural areas, rely on public libraries, especially with hurricanes’ increasing frequency and severity [6]. However, when public librarians do not always know where their neediest users are, they cannot effectively target preparation, response, and recovery services. GIS can pinpoint populations’ spatial distributions relative to library facilities; however, it is underutilized in library siting and service design, especially for disaster planning [7].

2. PROJECT DESIGN

2.1. Conceptual Framework. This research project uses the concept of micro-, meso-, and macro- levels of

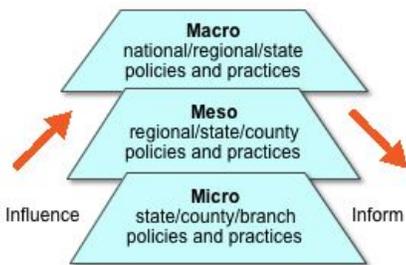


Figure 2. Analysis levels

organization to frame research that can be used to develop or enhance DPRR plans and COOPs to reflect the local needs and contributions small and rural public libraries. Micro level research on human decision-making [8], meso-level focus on organizations [9], and macro level [10] perspectives capture the many interlocking relationships in which to public libraries and library leadership exist. Our knowledge generation approaches include: 1) micro-level analysis of the branch-specific roles of librarians; 2) meso-level analysis of the library’s region or system; and 3) macro-level analysis at the regional, state, and national levels. As Figure 2 shows, these levels are overlapping units, each with policies, practices,

and processes that influence, inform, improve, or hinder services in the preparation, response, and recovery of libraries and patrons to natural disasters at other levels.

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2.2. Project Goals. This project's four nationally impactful goals are: 1) Create a universal workbook to be modified by small and rural state libraries to serve their unique needs; 2) Facilitate a consensus-seeking process between stakeholders to develop disaster plans; 3) Distill models and document process for replication at micro, meso, and macro levels, and 4) Generate new knowledge for practitioners and researchers relating to key aspects of policy creation and implementation. These goals will be operationalized in 3 research questions:

1. What are the elements of an effective DRR plans and COOP that address preparation, response, and recovery? How do these elements differ by geographic location and locale? What is the process of interpreting, adapting, and scaling effective elements to micro, meso, and macro contexts?
2. Who are the key participants within and outside of small and rural public libraries to be included in DRR and COOP design, implementation, and evaluation? How do these stakeholders differ between micro, meso, and macro response/organizational levels in disasters? What is the process for public librarians to interconnect with key stakeholders at these levels?
3. How do disaster plans reflect the needs of vulnerable populations? How can GIS-informed services inform and shape library policymaking? Which solutions are scalable and transferrable?

2.3. Key Research Activities.

Data Collection. Figure 3 depicts our *inductive and deductive sequential explanatory mixed method* design to understand the needs of small and rural libraries and their communities by contrasting existing GIS, DRR plan, and COOP data with library director and staff perspectives to identify missing or underdeveloped plan components. Deductively, we will explore current DRR plans and COOPs and compile essential plan elements in libraries in the state. We will use GIS to explore the connection between public libraries and their built environment (e.g., population densities, transportation infrastructure) to understand all segments' access, including vulnerable populations. In workshops, our 3 proof-of-concept counties, Bay, Calhoun, and Gulf, will review these data and identify the most salient features of GIS, DRR, and COOP plans for their small and rural libraries. Inductively, we will survey librarian directors and emergency personnel in Florida counties to understand the use of DRR and COOP plans for libraries during emergencies. Focus groups of rural, urban, and suburban library directors and librarians will be conducted to distill DRR and COOP elements by locale that can be modified to meet unique small/rural library needs. To prove concept, we will conduct and document workshops with Bay, Calhoun, and Gulf county libraries directors, librarians, EOC personnel, and key stakeholders to develop or modify plans.

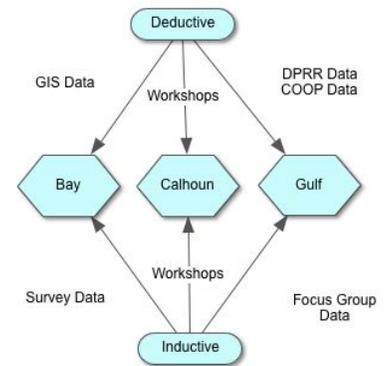


Figure 3. Data sources and workshops

Plan and Process Development Workshops, Y1-Y3, (RQ1, RQ2) – As proof of concept, we will develop DRR and review COOPs in workshops with Bay, Calhoun, and Gulf library directors, library department heads/key staff, county EOC personnel. These counties, still recovering from Hurricane Michael, have expressed a desire to develop and/or improve their plans (see *Supporting Document 1*) and we have strong relationships with their directors through our current IMLS-funded study. Most importantly, these counties' libraries are typical of rural counties nationwide and reflect similar population size, community structures, and demographics. In these workshops, we will integrate research with practice to:

- 1) develop new or modify existing DRR plans and suggest modifications to COOPs;
- 2) explore how the relationship between the county's Emergency Operations Center (EOC) and small/rural library directors and staff guides DRR and COOP development and implementation; and

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- 3) address how the adopted plans will be evaluated, updated, and staff trained in the libraries of Bay, Calhoun, and Gulf counties.
- 4) translate activities and processes into workbook content, thus facilitating replication and scale.

GIS Analyses (RQ3) – GIS will help the researchers and librarians determine where their libraries and services can be best situated to serve target populations. The FAMU-FSU College of Engineering GIS team and the researchers will work closely with our proof-of-concept Bay, Gulf, and Calhoun libraries to conduct baseline GIS analyses to locate vulnerable populations and overlay them on maps of current library services access points and services. With the researchers, proof-of-concept county library directors and librarians will compare survey, plan analyses, and GIS data to their existing plans and identify revisions to repurpose sites and services for vulnerable populations or design other means to maximize their accessibility to different population groups.

Figure 4 presents a hypothetical county’s library accessibility by time. When vulnerable populations (e.g., senior citizens, low SES groups, persons with disabilities) are added to the analysis, decisions can be made about which libraries have the highest accessibility (in time) to these populations. When GIS analysis identifies that certain libraries can meet one or more critical needs, “repurposing” of libraries can occur, which is any possible structural or purpose change of an existing library rather than building another one, which can include but is not limited to: increasing the capacity, possibly by enlarging the building itself and/or including more personnel; providing other services such as food sheltering and/or food distribution; providing specialized services for a population, and continuous service by using generators or solar panels. The optimization model will identify those critical library locations that need to be repurposed based on different objectives such as serving vulnerable population groups. Optimal location results will be presented via GIS-based maps. In our model, disruptions in the transportation network will also be represented by the inaccessibility of the libraries connected to those disrupted roadways that reach the libraries.

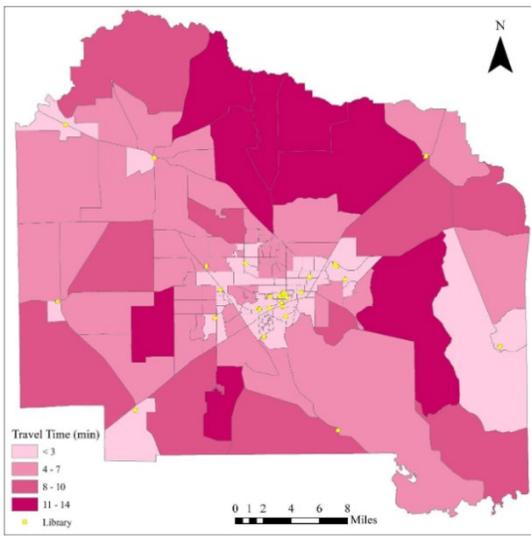


Figure 4. Sample Library Accessibility Map

The baseline GIS investigation will include three basic data components: 1) origins, (U.S. Census population block groups centers); 2) destinations (i.e., library locations), and 3) the statewide roadway network that connects these origins and destinations based on the Florida Department of Transportation’s Standard Urban Transportation Model Structure (FSUTMS) [11]. **Supporting Document 2** contains detailed information on the GIS Information Systems-based methodology, more scenarios, and maps.

GIS Training. Training will include modules including introductory material describing GIS basics and simple mapping, as well as specific exercises in QGIS (an open-source software) to reinforce data collection techniques and allow participants to get hands on real-life disaster scenarios in the context of library accessibility. Librarians will be provided skills to support their daily and emergency operations including analyzing the spatial distributions of populations and libraries, conducting “closest facility” and “shortest path” analyses, and developing accessibility maps with respect to populations of interest. This training will also help librarians interact with other agencies such as EOCs who are actively using GIS for their operations and provide valuable resources to improve public participation and communication. The GIS modules for librarians include: 1) QGIS basics, 2) general data analysis, 3) population demographics, 4) library site selection, 5) roadway network, 6) accessibility analysis, 7) impact assessment, 8) visualization, and 9) using findings for agency and public participation. These modules and complementary workbook will be made available to other librarians at the conclusion of the project. GIS training module examples are in **Supporting Document 3**.

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Workbook Creation. As Figure 4 suggested, our research will identify each level's policy and practice influences and how each level influences the others. We will distill our findings into micro, meso, and macro models with a corresponding workbook, developed gradually through participant workshop activities and complementary researcher work, that includes recommendations by levels of analysis. The workbook will be developed as an interactive online site with responsive templates, questionnaires, and scenarios (also available in PDF). The workbook site will include an upload function to allow users to contribute the plans they create with our materials. We will share these tools at pre-conference workshops and webinars held at COSLA, PLA, and ALA annual conferences with presentations and papers at other disciplinary conferences (e.g., LIS, transportation, climate, engineering). The research team will annually communicate project progress and results for feedback with COSLA and PLA members. The research team will also host a joint webinar to the Florida State Library Directors to share project findings, resources, and materials with other rural and small libraries.

Dissemination. Project dissemination will occur across academic and professional venues:

1. Annual conference presentations at ALA, FLA, and PLAN to share updated project findings.
2. Publications submitted to relevant scholarly journals (*LISR*, *Public Libraries Quarterly*, *Journal of Applied Communication*, *JASIST*).
3. A culminating workshop at PLA with up to 30 participants on how to develop DPRR/COOP plans.
4. Findings shared annually at COSLA by President Stacey Aldrich, and Executive Director Tim Cherubini, and State Librarian of Florida Amy Johnson, and the research team to facilitate COSLA members' replication of the research in their states and seek the members' feedback.
5. Workbooks and models for developing DPRR plans and COOPs. Models of how library responses may be structured to provide services in natural disasters will also be on our project website <http://hurricanes.ii.fsu.edu/> [12]. This site currently contains original research on libraries in natural disasters and will be enhanced with findings from this project. PLAN, PLA, and COSLA will promote.
6. Piloted and refined GIS modules to help librarians understand county demographics and improve local decision-making will also be shared on the project website. PLAN, PLA, and COSLA will disseminate.

2.5. Research Phases. We will investigate the research questions in phases, with workshops and dissemination:

Phase 0: Planning (Y1) (RQ1, RQ2, RQ3). We will begin with a literature review and policy analysis of local, state, regional, and national DPRR and COOP statutes, plans, and models. The literature review will include international perspectives on disaster management and focus on guidance to community organizations (including libraries); the policy review will include cognizant statutes affecting local, state, and national EOCs. Workbook development: Community brainstorm of workbook needs.

Phase I: Baseline Surveys, Plan Analyses, and GIS (Y1) (RQ1, RQ3) With the State Library of Florida and Florida's State EOC, we will survey public library directors and county EOC directors to collect and define DPRR and COOP plans in place. We will email surveys to all 126 county public library directors in Florida, with an incentive of \$25 for the first 50 directors who upload their disaster plans. Two follow-up reminders will be sent to participants, one by the research team and the other by Amy Johnson, the State Librarian of Florida, although only the research team will know who has responded. The Florida EOC Director, Jared Moskowitz, will aid us in surveying county EOC county directors to understand their involvement, relationships, and expectations of county libraries/librarians during natural disasters. Along with standard survey analyses, to efficiently analyze the large text volume, we will text mine and topic model submitted DPRR plans and state-approved county COOPs for key aspects aligned with SLR categories. We will surface differences by location and create visualizations of content overlaps and gaps. **Sample survey questions for library directors and EOC personnel are in Supporting Document 4.** Workshop 1 anchors Phase I:

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- **Workshop 1, Y1: Project Overview, Baseline Data Presentation** - Overview research process, introduce researchers and county/library participants, present/gain feedback on initial GIS analysis plan and statewide survey findings. Workbook development: Adapt survey instruments and feedback for workbook section.

Phase II: Focus Groups and DPRR Revisions (Y2) (RQ1, RQ2) –To explore how approaches may be linked to locale, we will conduct a focus group of 14 Florida library directors (5 urban, 2 suburban, 7 rural) at the State Library Directors annual meeting. We will stratify-sample directors by geographic locale and select those with the greatest experience as indicated in the Phase I survey responses (by time-in-position and experience in leading library personnel during natural disasters). We will also conduct two focus groups of 10 library staff from public libraries, the first focus group comprised only of rural and small librarians in Northwest Florida at the annual meeting of Panhandle Library Access Network (PLAN) and the second with Public Library Association (PLA) members at the American Library Association (ALA) annual conference with a nationally representative group of 4 urban, 3 suburban, and 3 rural librarians. Focus group participants will be recruited in several ways. PLAN will help to recruit small and rural library staff for the focus groups. PLA Deputy Director, Scott Allen, will help to conduct a focus group composed of PLA members. Focus group participants will be compensated \$100 for ½ a day of focus group participation.

Mardis (PI) and Jones (Co-PI) will co-moderate library director and library staff focus groups, with one asking questions and the other guiding discussion to ensure that questions are answered. In the focus groups, public librarian directors and staff will identify the resources, policies, internal and external relationships, librarian roles, and personnel issues that should be considered in the development of a contextually appropriate DPRR plan. We will analyze focus group transcripts in NVivo using SLR categories to identify contextually relevant aspects of existing and ideal plans. Workshop 2 and 2a-2c anchors Phase II:

- **Workshop 2a-c, Y2: Focus Group Results, Plan Analyses, Integrating Initial Research Results** - Review focus group findings and current DPRR plans/COOPs; review of initial GIS-based vulnerable populations analysis; identify plan areas for development or revision based on survey/focus group feedback and GIS data use; Workbook development: document feedback on corresponding workbook activities.
- **Workshops 2, Y2, plus online supplemental GIS Training**: Combined workshops (3 counties) will take place during Y2. Selected librarians (chosen by county library directors) will be trained on how to update GIS data and will provide feedback for refining the GIS-training modules (see details **Supporting Document 3**). The GIS introductory workshop is 1 day with 5 online follow-ups. Workbook development: GIS learning and implementation supporting documents.

Phase III: Data Integration, Plan Finalization, Workbook Completion

The final workshops and activities include:

- **Workshop 3a-3c, Y3: County-Specific Plan and GIS Module Revision** – At each county, review and revise initial draft of DPRR plans, update GIS analyses, and review of revised GIS modules.
- **Workshop 4, Y3 – All counties share completed DPRR/COOP plans.** One workshop with all three counties combined for sharing plans, and breakout groups for reviewing/revising plans. Review and revise initial draft of DPRR/COOP workbook and obtain feedback on final workbook activities.

Final disaster plans will be exemplars from which other states can develop their plans. We will develop interactive templates from these plans, align the plans with the workbook, and share them annually with COSLA members for feedback. The final plans and workbook will be disseminated through the project site.

The phases as they relate to project goals, activities, and deliverables are summarized in Table 1.

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Table 1. Project Goals Mapped to Activities and Deliverables

Goal [Research Question]	Activity	Deliverable
G1. Create a universal workbook that can be modified by small and rural state libraries to serve their unique needs. [RQ1, RQ2, RQ3]	<i>Inductive</i> A1. Conduct librarian focus groups A2. Conduct library director focus group <i>Deductive</i> A3. Survey library directors A4. Survey county EOC officials A5. Analyze DPRR and COOP A6. Perform GIS analysis <i>Integrative</i> A7. Conduct Advisory Board meeting	D1. County library director survey instrument and data set D2. Focus group questions and data set D3. GIS models for 3 counties D4. Visual representations and topic models D5. Advisory Board recommendations list
G2. Facilitate a consensus-seeking process between stakeholders to develop disaster plans. [RQ1, RQ2, RQ3]	<i>Integrative</i> A8. Give workshops at 3 county libraries A9. Hold GIS training events A10. Conduct Advisory Board meeting A11. Attend COSLA meeting	D6. Workshop materials D7. Advisory Board recommendations list D8. GIS training curriculum D9. COSLA recommendations list D10. Workshop curriculum
G3. Generate models and capture processes for integrating plans at micro, meso, and macro levels. [RQ1, RQ2, RQ3]	<i>Integrative</i> A12. Integrate findings A13. Draft workbook content A14. Construct workbook website	D11. DPRR/COOP plans and models D12. DPRR/COOP workbook
G4. Produce new knowledge for practitioners and researchers. [RQ1, RQ2, RQ3]	<i>Disseminative and Educative</i> A15. Perform literature review A16. Draft publications A17. Prepare conference presentations A18. Present COSLA State and Florida County Directors’ webinars A19. Give PLA pre-conference A20. Cross-promote project products through social media, presentations, webinars, and conference presentations	D13. Completed literature review D14. GIS modules D15. Manuscripts D16. Presentation and pre-conference materials D17. Webinar recordings D18. Project website

Research Limitations. This research cannot capture all scenarios or combinations of factors that can manifest in a natural disaster, but proper planning and preparation by libraries can mitigate risk and increases options and actions in disasters that can enhance opportunities and reduce threats.

Evaluation. Dr. Sharon Strover will lead formative and summative evaluation. The formative aspects of the evaluation will center on research conduct, quality, and trustworthiness. Formative evaluation will also include dissemination and sustainability efforts. Summative evaluation will focus on the extent to which the researchers accomplished study goals. The evaluation will require primary qualitative data collection and analysis methods to improve data quality, minimize challenges and risks, and ensure that project implementation activities occur as planned. The following evaluation types and questions will guide the evaluation process:

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Process/Implementation Evaluation

- Is the research proceeding timely and as planned? Is the project getting the expected level of participation at local, state, and national levels?
- Are the DPRR plan and COOP revision processes being adequately captured for future replicability?

Formative Evaluation

- What unexpected outcomes are emerging in the research? What project activity adjustments are necessary to attain project goals?
- How have advisory board and other formative evaluation responses impacted project quality and progress?

Summative Evaluation

- Has the project accomplished goals, objectives, and outcomes?
- How effective are the partnerships and collaborations in achieving the project goal of micro, meso, and macro integration? How might they be extended for future work in the area (i.e., generalizability and replicability)? Are the products resulting from this study broadly disseminated to appropriate audiences?

The evaluation plan will include: 1) program profile, 2) evidence to support or negate the use of the conceptual framework and plan creation, 3) inclusion of stakeholders at each level of analysis, 4) evaluation questions, 5) evaluation methodology, 6) measurable outcomes, and 7) communication plan to share evaluation findings. Dr. Strover will provide a preliminary formative and summative evaluation plan for DPRR plan development and COOP revision, for utility, feasibility, propriety, and accuracy, that can be applied and refined with program maturity or replication. See *Supporting Document 1 for Strover's letter of collaboration*.

2.6. Partners and Advisors. Letters of support and collaboration are in *Supporting Document 1*.

Bay, Calhoun, and Gulf County Libraries. As proofs of concept, Bay, Calhoun, and Gulf directors and librarians will work directly with researchers and library/EOC county and state stakeholders to develop DPRR and COOP plans in annual workshops. Letters of support are included from Robin Shader at Bay County Libraries Director; Mimi Minnick, Gulf County Libraries Coordinator; and Rita Maupin, Calhoun County Public Libraries Director. Each partner library system, still recovering from Hurricane Michael, will be provided with a \$2,000 per year organizational stipend. (\$18,000 total).

Panhandle Library Access Network (PLAN). Charles Mayberry, Executive Director of PLAN and Assistant Director, Carol DeMent, will consult to the project, providing advice on the project, promoting the survey, identifying rural librarians in Northwest Florida for focus groups, and providing opportunities for project dissemination of findings at annual PLAN conferences. PLAN will receive \$2,000 per year for their consultation to the project (\$6000 total).

Public Library Association (PLA). We will conduct a member focus groups, provide project updates, and give a pre-conference workshop at PLA's annual conferences. Scott Allen, PLA Deputy Director, will participate.

State Library of Florida. Amy Johnson, State Librarian of Florida, will promote project research and results; serve to integrate and implement project findings; liaise to COSLA members, and advise on the feasibility, replicability, and applicability of the plans for small and rural libraries in Florida.

Chief Officers of State Library Agencies (COSLA). Stacey Aldrich, President, and Timothy Cherubini, Executive Director, will advise on project findings and implications for state libraries and archives, and provide opportunities for obtaining feedback from COSLA members and workshops.

Advisory Board: We have a diverse Advisory Board of micro-, meso-, and macro-level experts on public libraries, natural disasters, local planning, and community resiliency to advise, support, and further our work:

- Brooke Powell, Bay County Chief Administrative Officer, and Ben Guthrie, Tri-County 911 Coordinator (Gulf/Calhoun/Franklin), and Jared Moskowitz, Florida's State EOC director will serve as EOC representatives and planning advisors for the libraries in their counties.

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- Feili Tu-Keefner, Associate Professor at the University of South Carolina School of Library and Information Science, researches librarians' roles in emergencies and will advise whether DPRR plans and COOPs capture librarians' full roles in emergencies and natural disasters.
- David Berlan, FSU Public Administration Professor is a national non-profit crisis management expert;
- Scott M. Pickett, FSU College of Medicine Behavioral Sciences and Social Medicine professor is an international expert on socio-emotional impacts of and support for vulnerable populations during disasters;
- David Zierden, State Climatologist of Florida is a national expert on assessing natural disaster impacts and will disseminate project results to the American Association of State Climatologists;
- Stacey Aldrich and Timothy Cherubini from COSLA and Amy Johnson, State Librarian of Florida, will also serve on the advisory board in addition to their partner roles. They will ensure that project results reach all COSLA member state librarian and archivists.

The Advisory Board will meet semiannually to advise on plan development processes, data collection instruments, and findings interpretation. Researchers will work with the project evaluator to make project adjustments based on Advisory Board recommendations.

2.7. Project Management.

Marcia A. Mardis (PI) is a Professor and the Associate Dean of Research at the FSU College of Communication & Information. Dr. Mardis is Co-PI on the current *Rural Libraries and Disasters* (RE-96-18-0127; 2018-2020) and has led over two decades of funded research.

Eren Ozguven (Co-PI) is an Associate Professor of Civil & Environmental Engineering at the FAMU-FSU College of Engineering. Ozguven will lead GIS modeling and training efforts and will develop GIS modules.

Faye Jones (Co-PI) is a Senior Faculty Researcher for FSU's Information Use and Policy Institute. Dr. Jones is Co-PI on *Rural Libraries and Disasters* (RE-96-18-0127). Jones will be the research manager and ensure that developed instruments are validated and that data are accurately collected and analyzed.

Sharon Strover (Evaluator), an expert on disaster communication, is a Professor of Communication and director of the Technology and Information Policy Institute at the University of Texas at Austin. Strover will be the external evaluator, implement formative and summative evaluation plans, and provide guidance to Mardis.

Graduate Students. Two graduate assistants will be assigned to this study. GA1 will work with Mardis and Jones on literature reviews, monitor survey data collection efforts and plan retrieval, transcribe focus group and advisory board recordings, and assist with other data analyses. GA1 will assist with scheduling workshops and events. GA2 will work with Ozguven on 3 county GIS models, applicable census data retrieval, vulnerable population identification, modeling of library site accessibility, and module development and training. GAs will participate in dissemination efforts and product development.

Developer. A content developer will update the project website, create visualizations, record data events (e.g., focus groups, advisory board meetings, workshops), and coordinate video conferences/webinars.

Ongoing Meetings: PIs will meet each week to discuss research progress and milestones. Mardis, Jones, and Ozguven will meet with GAs weekly to ensure that research needs are met.

Internal Project Coordination: The team will use secure Google Drive to organize and archive data, documentation, articles, and events for this project. The public website will be the data and findings gateway.

3. DIVERSITY PLAN

Florida's public libraries serve a diverse population who will directly benefit from tailored, practical research:

- **Ethnic and Racial Diversity.** Bay, Calhoun, and Gulf counties are incredibly diverse [13]. African Americans are 19% of coastal Gulf population and are represented broadly in the workforce. Latinos and Asians comprise 30% and 4.2%, respectively, and work in offshore drilling, seafood, and tourism industries. Native Americans, less than 1% regional population, are heavily engaged in tourism and aquaculture.

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- **Economic Vulnerability.** Florida is particularly hard hit by costly natural disasters [14]. Because the coastal workforce is diverse and dependent on natural resources for their livelihoods [15], these coastal communities are economically vulnerable. Florida has the 5th highest U.S. income inequality rate, with Gulf 175th, Bay 198th, and Calhoun 1120th most unequal out of 3061 U.S. counties.
- **Seniors.** This study especially focused on at-risk senior populations, whose residents over 60: 23.6% Bay; 25% Calhoun, and 27.2% Gulf. This population is predicted to grow by 79% nationally in the next 20 years; research results will help to ensure that high need groups are not isolated in disaster situations [16].

4. NATIONAL IMPACT

This study's national impacts are achieved by:

- 1) thoroughly documenting interplays between micro, meso, and macro policies and practices that will result in disaster planning processes and integrative models adaptable to a range of library organization structures and emergencies (e.g., natural disasters, public health crises, pandemics);
- 2) closely assisting 3 disaster-affected typical rural public library systems as proofs of concept with implications for 75% small and rural libraries nationally, especially near coastal areas that lack DPRRs;
- 3) distilling and disseminating research outcomes, education, and integration strategies for and beyond libraries ensures that considering varying population densities and high-need groups will improve public librarians' policy, practice, and local relationships;
- 4) engaging an advisory board of national and international experts to ensure that project results reflect a wide range of situational factors and penetrate deeply within and far beyond public libraries; and
- 5) generating new knowledge about effective library disaster preparedness to address research gaps and enrich subsequent empirical explorations across the country and internationally.

Scalability. With its #1 risk in disaster vulnerability as shown in Figure 1, Florida, the 3rd most populous state, ranks 6th in cultural diversity, 3rd in political diversity [17] and is a key context to understand and document the process of creating, integrating, and scaling library disaster plans at all levels. As Figure 2 showed, this research is attentive to the many levels that influence and inform library policies and practices. The theoretical framework of this study and conceptual findings integration at micro, meso, and macro levels of analysis provide models for states. Key personnel (e.g., librarians and EOC officials) at all analysis levels will provide recommendations for successful interactions between key stakeholders to develop plans that are fully integrated at the state level. The inclusion of national audiences, e.g., COSLA, PLA, ALA, and disciplines (e.g., LIS, engineering, climatology, behavioral science) will facilitate horizontal and vertical spread.

Replicability/Adaptability. Project deliverables (e.g., plan models, workbook, webinars, workshops) make the process of small and rural county librarians' developing DPRR/COOP plans transparent, replicable, and adaptable. We will work with COSLA and PLA to replicate this research in additional locations and investigate how the process and planning principles are applied other types of disasters.

Project Sustainability. "Small and rural libraries...serve a strategic role in extending public services to residents...hard to reach by other means [and] are accustomed to linking...to other social, educational and economic development programs" [18, p.9]. Including all levels' stakeholders and leaders in the development process provides a sense of shared ownership. DPRR/COOP plans are not simply a required policy, but life-saving proper planning and execution. We will ensure that the plans contain procedures for reviewing and modifying these documents and work with COSLA and PLA to continue this research in other contexts.



DIGITAL PRODUCT FORM

INTRODUCTION

The Institute of Museum and Library Services (IMLS) is committed to expanding public access to digital products that are created using federal funds. This includes (1) digitized and born-digital content, resources, or assets; (2) software; and (3) research data (see below for more specific examples). Excluded are preliminary analyses, drafts of papers, plans for future research, peer-review assessments, and communications with colleagues.

The digital products you create with IMLS funding require effective stewardship to protect and enhance their value, and they should be freely and readily available for use and reuse by libraries, archives, museums, and the public. 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

If you propose to create digital products in the course of your IMLS-funded project, you must first provide answers to the questions in **SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS**. Then consider which of the following types of digital products you will create in your project, and complete each section of the form that is applicable.

SECTION II: DIGITAL CONTENT, RESOURCES, OR ASSETS

Complete this section if your project will create digital content, resources, or assets. These include both digitized and born-digital products created by individuals, project teams, or through community gatherings during your project. Examples include, but are not limited to, still images, audio files, moving images, microfilm, object inventories, object catalogs, artworks, books, posters, curricula, field books, maps, notebooks, scientific labels, metadata schema, charts, tables, drawings, workflows, and teacher toolkits. Your project may involve making these materials available through public or access-controlled websites, kiosks, or live or recorded programs.

SECTION III: SOFTWARE

Complete this section if your project will create software, including any source code, algorithms, applications, and digital tools plus the accompanying documentation created by you during your project.

SECTION IV: RESEARCH DATA

Complete this section if your project will create research data, including recorded factual information and supporting documentation, commonly accepted as relevant to validating research findings and to supporting scholarly publications.

SECTION I: INTELLECTUAL PROPERTY RIGHTS AND PERMISSIONS

A.1 We expect applicants seeking federal funds for developing or creating digital products to release these files under open-source licenses to maximize access and promote reuse. What will be the intellectual property status of the digital products (i.e., digital content, resources, or assets; software; research data) you intend to create? What ownership rights will your organization assert over the files you intend to create, and what conditions will you impose on their access and use? Who will hold the copyright(s)? Explain and justify your licensing selections. Identify and explain the license under which you will release the files (e.g., a non-restrictive license such as BSD, GNU, MIT, Creative Commons licenses; RightsStatements.org statements). 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.

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.

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.

SECTION II: 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 the format(s) you will use.

A.2 List the equipment, software, and supplies that you will use to create the digital 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, OBJ, DOC, PDF) you plan to use. If digitizing content, describe the quality standards (e.g., resolution, sampling rate, pixel dimensions) you will use for the files you will create.

Workflow and Asset Maintenance/Preservation

B.1 Describe your quality control plan. How will you monitor and evaluate your workflow and products?

B.2 Describe your plan for preserving and maintaining digital assets during and after the award period. Your plan should 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).

Metadata

C.1 Describe how you will produce any and all technical, descriptive, administrative, or preservation metadata or linked data. Specify which standards or data models you will use for the metadata structure (e.g., RDF, BIBFRAME, 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).

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, delivery enabled by IIIF specifications).

D.2. Provide the name(s) and URL(s) (Universal Resource Locator), DOI (Digital Object Identifier), or other persistent identifier for any examples of previous digital content, resources, or assets your organization has created.

SECTION III: SOFTWARE

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 or similar functions, and explain how the software you intend to create is different, and justify why those differences are significant and necessary.

Technical Information

B.1 List the programming languages, platforms, frameworks, 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), URL(s), and/or code repository locations for examples of any previous software your organization has created.

Access and Use

C.1 Describe how you will make the software and source code available to the public and/or its intended users.

C.2 Identify where you will deposit the source code for the software you intend to develop:

Name of publicly accessible source code repository:

URL:

SECTION IV: RESEARCH DATA

As part of the federal government's commitment to increase access to federally funded research data, Section IV represents the Data Management Plan (DMP) for research proposals and should reflect data management, dissemination, and preservation best practices in the applicant's area of research appropriate to the data that the project will generate.

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

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?

A.3 Will you collect any sensitive information? This may include personally identifiable information (PII), confidential information (e.g., trade secrets), or proprietary information. If so, detail the specific steps you will take to protect the information while you prepare it for public release (e.g., anonymizing individual identifiers, data aggregation). If the data will not be released publicly, explain why the data cannot be shared due to the protection of privacy, confidentiality, security, intellectual property, and other rights or requirements.

A.4 What technical (hardware and/or software) requirements or dependencies would be necessary for understanding retrieving, displaying, processing, or otherwise reusing the data?

A.5 What documentation (e.g., consent agreements, data documentation, codebooks, metadata, and analytical and procedural information) will you capture or create along with the data? Where will the documentation be stored and in what format(s)? How will you permanently associate and manage the documentation with the data it describes to enable future reuse?

A.6 What is your plan for managing, disseminating, and preserving data after the completion of the award-funded project?

A.7 Identify where you will deposit the data:

Name of repository:

URL:

A.8 When and how frequently will you review this data management plan? How will the implementation be monitored?