

Story Mapping and Sea Level Rise:
Bringing a Global Risk Home

SIGDOC Career Advancement Research Grant Proposal

Project Investigators

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Description

Interactive maps are often used to communicate about complex environmental risks, such as sea level rise. With many available online, interactive sea level rise maps are both popular with the general public (Preston et al., 2011) and a powerful communication tool for understanding personal exposure to risk (Monmonier, 2008). Multiple actors produce sea level rise maps, including government agencies, non-governmental organizations, academics, and news organizations (e.g., Davidson & Miglarese, 2003; Wong-Parodi & Strauss, 2014; Stephens et al., 2015). Research has shown that maps can be more engaging than text alone for communicating risk (Retchless, 2014), as well as more familiar to novice users than graphs (Schnotz, 2002), but might not necessarily be more comprehensible (Covi & Kain, 2016). Given that the audiences for these tools are diverse, ranging from the general public to specialist users like community planners and land managers (Monmonier, 2008; Kostelnick et al., 2013), designing maps that both engage users as well as clearly communicate a risk and its uncertainty to users with multiple levels of domain and cartographical expertise is a complex challenge (Kostelnick et al., 2013).

We propose to investigate how narratives—specifically experiential stories from those in vulnerable regions—might be combined with map-based sea level rise risk visualizations to create an interactive, visual tool that gives more context or nuance to the risk. Exposure to risk narratives has been shown to increase audience engagement with complex environmental issues (Vervoort et al., 2010), and communication about the risks and uncertainty surrounding climate change via place-based scenarios has been shown to motivate concern and willingness to take mitigative actions (e.g., Shackley & Deanwood, 2002). As a complementary way to communicate about hazards, stories of individual experiences with environmental risks can also help develop and historicize the local risk cultures of a given community (Lejano et al., 2013), adding a significant level of detail and relatability to the larger risk narratives. In light of this research, we ask: What if data-centered interactive sea level rise maps could also provide access to community stories from long-term residents who have personally experienced the effects of water inundation? Might this add a powerful layer of context and potentially persuasion to risk visualization technologies? And how might such a tool be designed? While sea level rise maps afford users the opportunity to localize data to a region or even residence of relevance to them, such interactive maps are not fully “personalized” in that they exclude human subjects from the purview of visualization and engagement—an important consideration from both ethical and rhetorical design perspectives (Dragga & Voss, 2001). We thus approach this project as an opportunity to collect, curate, and share community stories about coastal risks to help contextualize impersonal map-based scientific information, and develop a more community-oriented, locally-focused story about sea level rise using risk visualizations.

Significance

Maps as a mode of visual communication have long been of interest to researchers in technical communication, with notable attention brought to the ideological (Barton & Barton, 2004), persuasive (Propen, 2007), political, (Kimball, 2006), and public health (Welhausen, 2015) properties of cartographical design. As technological affordances have transitioned maps from static to interactive, however, scholars in technical communication face a new research challenge of taking knowledge about maps as static, rhetorical artifacts to newer, more technically-challenging contexts that focus on decision-making, personalization, and open data exploration. To date, research on interactive sea level rise risk visualizations has tended to focus on data exploration and the use of mapping and other simulations to engage users in exploring their own local communities (e.g., Davidson &

Migliarese, 2003; Shaw et al, 2009; Stephens et al., 2015). And while some organizations have developed narratives to communicate about environmental risks, these efforts often do not connect to the everyday lived experiences of audiences (Lejano et al, 2013). There are only a few examples of projects that incorporate both risk mapping and explicitly narrative elements (e.g., see Nettley et al, 2014). Therefore, the significance of this project lies within its expansion of the work of communicating complex map-based risk information to be more inclusive of human stories, in a way that situates or localizes visualization tools not only by geographic region but by narrative voices.

This project builds on the work of technical communication researchers, who have explored the rhetorical construction of maps, by introducing the perspective of members of the general public to a map-based artifact through “story mapping.” Story mapping, or spatial narrative, is a technique that introduces elements of “a specified point of departure, a particular pathway, and a known end point” to a map-based visualization in order to tell a story (Ridge et al, 2013; 178). We will combine the recorded stories of community members with what we know about the rhetoric of maps and interactive risk visualization. Thus, we will introduce story mapping into the conversation about communicating sea level rise risks to a public audience. We plan to share the results of this project at the 2018 SIGDOC conference, as well as in a publication centered on the design process, to be submitted to *Communication Design Quarterly*.

Methodology

There are two main streams of work for this project: (1) building the risk map interface and (2) recruiting and interviewing individuals about their experiences with and concerns about coastal flooding. Both streams of work will take place simultaneously and across two geographic locations: the Space Coast in Florida and the Chesapeake Bay region in Virginia.

The sea level rise visualization tool will be built using ArcGIS, specifically through Esri’s Story Map technology, which allows designers to “combine authoritative maps with narrative text, images, and multimedia content” (<https://storymaps.arcgis.com>). While other existing sea level rise tools (e.g., NOAA’s Sea Level Rise Viewer) allow for story mapping, the stories are often linear, about regions and not people, and not always clear in their capacity to be interactive. The tool that we will create will afford users more explorative agency in connecting personal narratives to specific locations. The overall appearance of the project will be a map showing regions that are vulnerable to sea level rise, with discoverable “pinned” videos and textual transcripts of interviews with real residents that tell their stories. The data of our base maps will be borrowed from a combination of federal, state, and municipal government agencies.

We will recruit and interview residents in the two locations that have both experienced historical coastal flooding and are beginning to be impacted by sea level rise. The interviews will focus on the details of the individuals’ lived experiences and the connections they see to the larger conversations about sea level rise. By presenting the stories of residents in two distinct regions, we will be able to show both the similarities and the unique situations of these communities when it comes to coastal risk. Our intention is to recruit at least three participants at each location, and videotape their stories. We will seek participants to reveal a diversity of perspectives on the issue, including retired contractors and naval officers, teachers, and individuals living in the most vulnerable urban spaces. We hope to achieve diversity in terms of age, gender, race, class, and background.

We note that federal guidelines exempt oral history projects, such as this proposed research, from IRB review (AHA, 2017). We will follow the best practices for ethical conduct in oral history projects, as outlined by the Oral History Association (2009), for participant

recruitment, conduct, and dissemination of the research. Once the visualization tool is developed, we intend to apply for additional grants aimed at user experience testing. Planned further research will focus on the testing of the map on local audiences to explore the effects of layering and locating personalized stories onto sea level rise maps. Thus, we would use this award to initiate a longer-term research project.

Budget

If awarded, the funds would be allocated primarily towards travel of each investigator between the two locations to ensure most effective collaboration and ground observations. Supplies will also be required to ensure successful recruitment and preparation.

Item	Quantity	Cost
Flight for investigator one	1 roundtrip	\$300
Flight for investigator two	1 roundtrip	\$300
Accommodations for investigator one	2 nights	\$300
Accommodations for investigator two	2 nights	\$300
Supplies (gift cards for participants, printing costs, etc.)		\$300
Total		\$1500

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