

# SOUTHERN CLIMATE IMPACTS PLANNING PROGRAM

A NOAA RISA Team

ANNUAL REPORT June 2020-May 2021



**SCIPP**  
A NOAA RISA TEAM

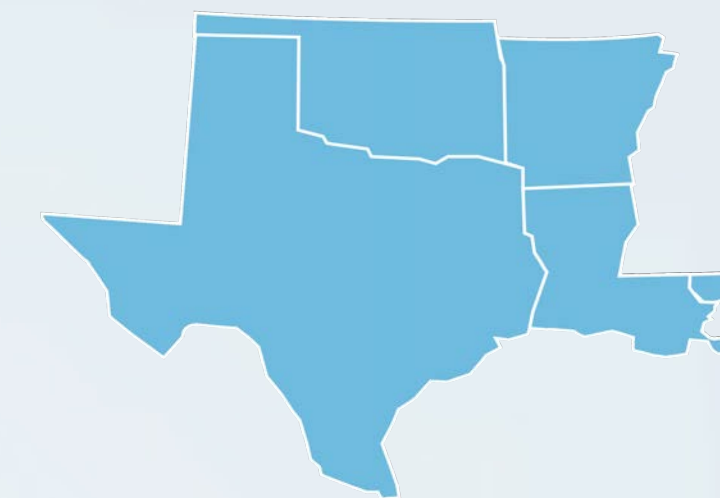


**RISA**  
Regional Integrated Sciences  
and Assessments

# Table of Contents

Our Mission	1
Our Team	2
Greatest Accomplishment	3
New Areas of Focus or Partnership	4
Research Highlights	5
Outreach & Engagement	9
COVID-19 Impacts	12
Ways Stakeholders Were Served	13
Evaluation	14
Societal Impacts	16
Next Steps	17
Narrative Case Studies	18
Appendix A: External Communication Product Workflow	20
Appendix B: Full Publication List	21
Appendix C: Relevant Presentations	22

# Our Mission



*Assist organizations with making decisions that build resilience by collaboratively producing research, tools, and knowledge that reduce weather and climate risks and impacts across the South Central United States.*

SCIPP Phase III was funded on award NA18OAR4310337. Our annual performance report is submitted under the title "Southern Climate Impacts Planning Program (SCIPP) Phase III".



**SCIPP**  
A NOAA RISA TEAM

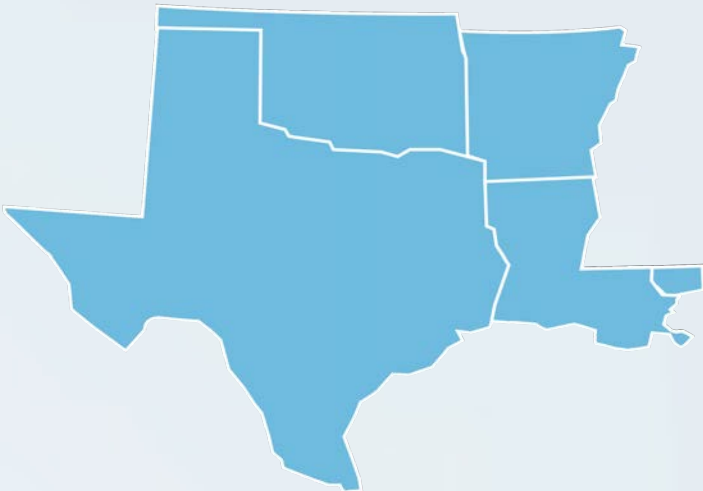


## About Us

SCIPP is a collaborative effort between the Oklahoma Climatological Survey (OCS), the Cooperative Institute for Mesoscale Meteorological Studies and the South Central Climate Adaptation Science Center (SCCASC) at the University of Oklahoma (OU), the Department of Geography and Anthropology and Southern Regional Climate Center (SRCC) at Louisiana State University (LSU), the School of Public Affairs & Administration Urban Planning Program at the University of Kansas (KU), the School of Natural Resources at the University of Nebraska – Lincoln (Nebraska), and Sea Grant Texas at Texas A&M University (Texas A&M).

This year in particular, SCIPP benefitted from key personnel additions which contributed to increased managerial efficiency, strengthened research efforts, and improved partner interactions. After onboarding four new people during a global pandemic, SCIPP's re-structuring and streamlining of the core office has improved to better serve the mission. For example, the new Program Manager (PM), Caylah Cruickshank, adds Business and Public Administration expertise to the team, and contributes to the exploration of new partnerships with communities of color in the SCIPP region. Darrian Bertrand, the new Climate Assessment Specialist (CAS), greatly expands our engagement efforts and leverages the CAS network to better serve our stakeholders. Simone Speizer bolsters our partnerships and efforts within the Texas region, and contributes to key research outputs. Finally, Erica Kronenberger assists in streamlining and strategically distributing SCIPP communication outputs (see Appendix A), while assisting the PM with essential tasks.

# The SCIPP Team



## Principal Investigators

Dr. Mark Shafer (OU)



Dr. Barry Keim (LSU)



Rachel Riley (OU)



## Core Office and Investigators

Caylah Cruickshank\*:  
Program Manager (OU)



Dr. Vincent Brown:  
Climate Research  
Director (LSU)



Darrian Bertrand\*:  
Climate Assessment  
Specialist (OU)



Amanda Lewis:  
Research Associate  
(LSU)



Simone Speizer\*:  
Research Associate (OU)



Erica Kronenberger\*:  
Climate Communications  
Assistant (OU)



\*Denotes recent addition to the SCIPP team

## Co-Principal Investigators

Dr. Renee Edwards (LSU)  
Dr. Michael Hayes (Nebraska)  
Cynthia Lyle (Texas A&M)  
Dr. Ward Lyles (KU)  
Dr. Renee McPherson (OU)  
Dr. Randy Peppler (OU)  
Dr. David Sathiaraj (LSU)

## Senior Personnel

Dr. Harold Brooks (OU)  
Dr. Aimee Franklin (OU)  
Dr. Kim Klockow-McClain (OU)

## Graduate Students

Ashlee Autore (LSU)  
Cameron Goff (LSU)  
Marisa Karpinski (LSU)  
Jessie Parrott (LSU)  
Penn Pennell (KU)  
Derek Thompson (LSU)  
Anna Wanless (OU)

## Advisory Committee

- Dr. Bill Hooke (American Meteorological Society)
- Dr. Maria Carmen Lemos (Great Lakes Integrated Sciences + Assessment)
- Tim Lovell (Disaster Resilience Network)
- Jamie Olson (Feeding Texas)
- Sascha Petersen (Adaptation International)
- Dr. Melissa Stults (City of Ann Arbor, MI)
- Trevor Timberlake (United States Army Corps of Engineers – Little Rock District)

F  
O  
L  
L  
O  
W  
  
U  
S



@SouthernClimateImpacts  
PlanningProgram

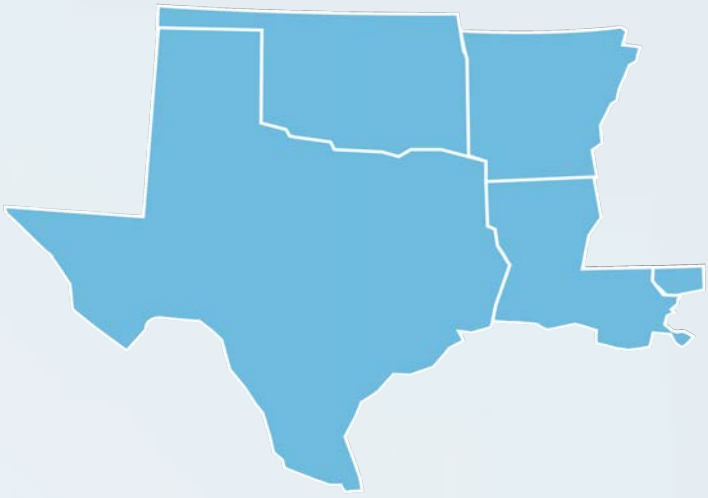


@SCIPP\_RISA



southernclimate.org

# Greatest Accomplishment



This year, SCIPP is most proud of the **expansions and extensions of original research that has led to collaborations with novel industries and stakeholders along and near the Gulf Coast**. Since 2016, SCIPP has partnered with entities such as the Sewerage and Water Board of New Orleans (SWBNO), Louisiana Sea Grant, Mississippi-Alabama Sea Grant, and the Louisiana Agricultural Center (AgCenter). The maturation of relationships with each of the organizations mentioned above have led to strengthened partnerships and strategic expansions in the past year. SCIPP targeted these groups because of their wealth of stakeholders within the region and their need for climate information. Integrating with organizations such as Sea Grant, which directly connects to real-world applications, helps SCIPP research become more impactful. Given the expansion of our connections, we have refined our coastal research in the SCIPP region. We leverage our contacts to ensure the research results are disseminated efficiently and reach communities, stakeholders, and decision-makers.



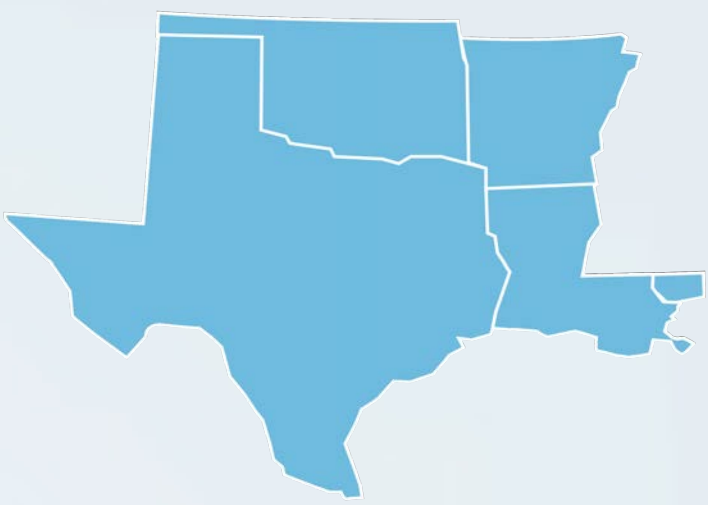
In July 2020, SCIPP, in partnership with NOAA, hosted a virtual [Water Workshop](#) for small to medium-sized Water Utilities in the Texas and Louisiana coastal zone that featured presentations from personnel at the SWBNO. At the workshop, the SWBNO identified gaps in knowledge that SCIPP could potentially solve. As a result, SCIPP submitted a proposal to NOAA's Adaptation Sciences Program (AdSci - recently awarded funding) to help the SWBNO understand the intersection of rainfall, flooding, and socioeconomic vulnerabilities across the city of New Orleans.

Building on the partnerships established during Coastal and Ocean Climate Applications (COCA) and Sectoral Applications Research Program (SARP) grants, SCIPP worked with personnel at Louisiana, Mississippi-Alabama, and Texas Sea Grants over the past year. For example, in 2019, SCIPP researchers worked with Louisiana Marine Extension Agents to investigate how meteorological variables impact crawfish yields in research ponds in Baton Rouge, LA (see Brown et al., 2020). This work continued in 2020 and is still ongoing in 2021 to increase the adaptive capacity of crawfish producers to climate change.

SCIPP is currently working with Louisiana Sea Grant personnel to investigate if meteorological conditions influence the presence of the White Spot Virus in crawfish ponds across southern Louisiana. In this same vein, SCIPP recently partnered with the U.S Geological Survey, Louisiana Fish and Wildlife, LSU AgCenter, and Texas A&M to develop a roadmap for resilient coastal shellfish populations. That work will largely take place during the next reporting period.

SCIPP partnered with Mississippi-Alabama Sea Grant to draft a review manuscript to advance the understanding of the sea-level rise and high tide flooding along the Gulf Coast targeted at decision-makers and the public. The manuscript is currently under review in Earth-Science Reviews. A co-author presented preliminary results from the manuscript at the Association of State Floodplain Managers (ASFPM) virtual conference on May 11th, 2021. Once the manuscript is complete, the information will be disseminated via tools like The Sea Level Rise Two Pager (<http://masgc.org/northern-gulf-of-mexico-sentinel-site-co/two-pager>), and via Sea Grant contacts.

# New Areas of Focus or Partnerships



## Cross -RISA Hazard Planning

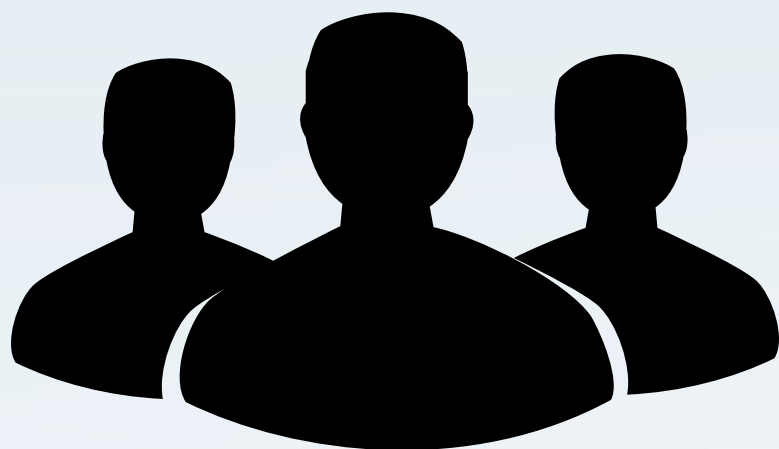
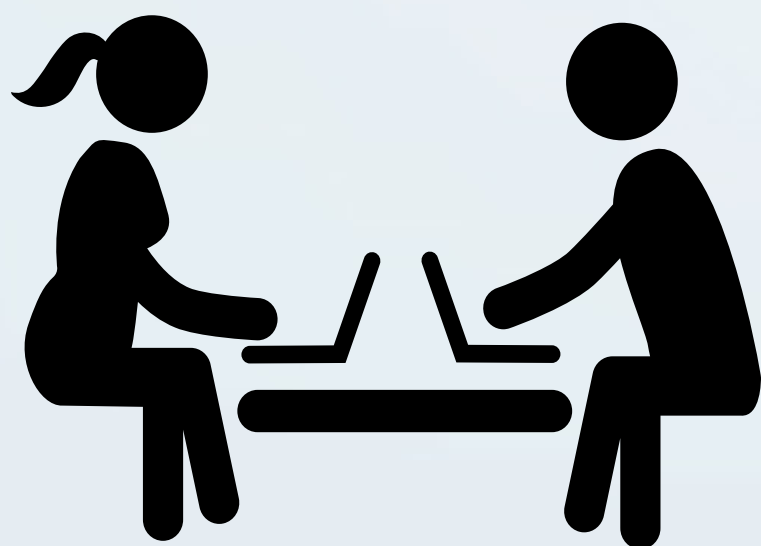
SCIPP's Rachel Riley and Darrian Bertrand began a new partnership with NOAA RISA's **Western Water Assessment (WWA)** this past year. WWA and SCIPP are well positioned to support climate-informed hazard mitigation planning and the transition from planning to action, and both lie within climate discourse-sensitive regions. This project is ongoing and aims to build the capacity of state and local hazard mitigation efforts to incorporate climate into their natural hazards planning efforts, and to use those planning efforts to support actionable climate adaptation.

The collaborative work will be completed in two phases: Phase 1 focused on piloting SCIPP's Simple Planning Tool in Utah (WWA's region), which is complete. Phase 2 supports the transition from hazard mitigation planning to actionable climate adaptation at multiple scales in both the SCIPP and WWA regions. As part of Phase 2, SCIPP is currently working with emergency managers in Pawnee County, OK and the Oklahoma Department of Emergency Management and Homeland Security to help update the expired Pawnee County Hazard Mitigation Plan. While SCIPP provides updated hazard information and climate resources to the emergency managers, we are learning about existing resources and barriers to adaptation in this rural county. Furthermore, SCIPP and WWA will hold mini-workshops with emergency managers and planners in small- to medium-sized communities in each region to learn about their adaptation decision spaces. This cross-RISA collaboration transferred a tested tool across RISA regions and will build on each team's research to contribute to scientific understanding of climate-informed hazard planning.



## Oklahoma Planning Commissioners Handbook Revision

The Oklahoma Chapter of the **American Planning Association** invited Rachel Riley to participate in a team of people who are revising the *Oklahoma Planning Commissioners Handbook*. The primary purpose of the handbook is to assist citizen planners with making decisions in communities across Oklahoma. Citizen planners are volunteers who are members of Planning Commissions and Boards of Adjustments. While they typically have no formal training in planning or municipal government, they play a vital role in planning decisions across urban and rural communities and counties in Oklahoma. The revision process began in early 2021 and will be completed in 2022. Riley is contributing to the sections on climate change, hazard mitigation, and sustainability.

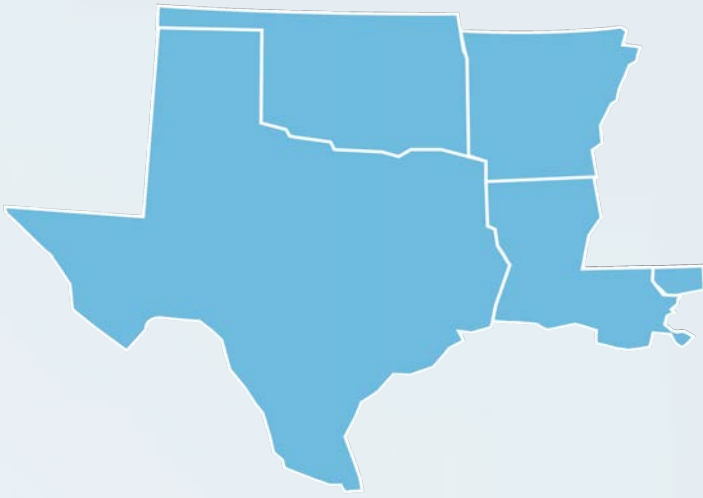


## Texas Sea Grant

This past year, SCIPP bolstered its relationship with **Texas Sea Grant** and the **Office of the Texas State Climatologist** by adding Research Associate Simone Speizer to the team. Speizer worked with co-PI Cynthia Lyle to improve access to climate information among Texas Sea Grant extension agents and educators. Speizer worked with Sea Grant educators to develop fact sheets about sea-level rise and high-tide flooding, compiled local climate information to support extension agents, and developed a new Texas temperature trends dashboard (see page 7). Working with Texas State Climatologist Dr. John Nielsen-Gammon, Speizer provided analysis of the relationship between climate patterns and soil moisture variation. Soil moisture is an important driver of not only drought, but also of potential summertime heat waves in Texas. Speizer used data from the Oklahoma Mesonet, which has an extensive observation network, to determine relationships that could be applied to Texas.



# Research Highlights



## Database of Depth-Area-Duration Tables

SCIPP's Vincent Brown, Barry Keim, and Amanda Lewis have continued research on precipitation as it relates to SCIPP Phase III, Objective I : *Assess changes in the frequency of events that may change hazard exposure profiles in communities within the region.* Like other manuscripts (Keim et al., 2019, Brown et al., 2020), SCIPP partnered with Applied Weather Associates (AWA) to draft a manuscript on the historical rainfall produced by Hurricane Harvey. The Hurricane Harvey manuscript will likely be submitted to a journal by the end of 2021. The manuscript reveals new estimates of storm totals and places the storm in a historical context. Furthermore, continuing the work with AWA, SCIPP created a database of depth-area-duration tables created by storms analyzed by the Storm Precipitation Analysis System (SPAS) – a proprietary program developed by AWA. Now that the database is complete, it can be queried and used for future research to investigate the climatology of some of the most significant rainfall events in the United States since roughly 1900.

## Information Sources and Planning for Flood by Water and Wastewater Managers

An essential element of public health is the ability to provide water and properly treat wastewater. Flood and other extreme weather events put water systems at risk, and this is particularly a problem in SCIPP coastal regions. This ongoing project examines factors associated with flood planning for water managers in coastal Louisiana. It addresses SCIPP Phase III Objective VI, as it assesses *what motivates some people and groups to act while others do not?*

Researcher Renee Edwards conducted interviews where water managers identified several factors that affect planning and preparation for flood. **Leadership** appears to be particularly important. Interviewees identified past and present leaders who work to maintain existing systems and others who promote and implement new systems to improve their services. **Resource limitations** also affect water management. For example, additional financial resources would permit one organization to provide on-site housing to employees during extreme weather. **Labor** is a challenging resource, especially for wastewater treatment. It is difficult to keep employees when better-paying (and more pleasant) work is available.

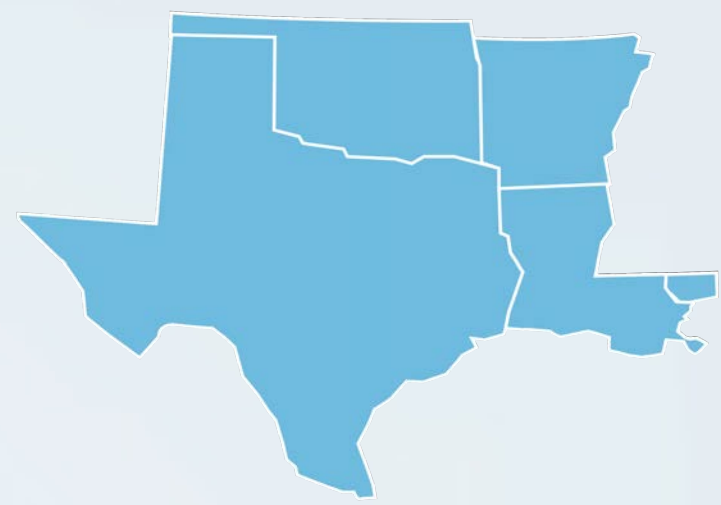
Some water systems are under the jurisdiction of political entities that control their finances and decisions. Water managers describe political bodies who typically approve requests as well as instances of political interference. When interference occurs, leadership within the organization is a key factor in the outcome. Interviews conducted to date reflect a range of priorities for water management systems. While some are focused on getting by, others can implement upgraded systems more able to withstand extreme events. Systems located in larger communities are in a stronger position to make investments because of greater financial resources.

## Stakeholder Network Analysis Results

In 2019, former SCIPP Climate Assessment Specialist, William Howe, began a project to improve connectivity between the National Climate Assessment (NCA) and stakeholders, allowing for bi-directional flow of information and application of state-of-knowledge practices and processes. His research was completed in 2020, and results from one of his studies entitled *A Social Network Analysis of Climate-Related Information Exchange in the Southern Climate Impacts Planning Program (SCIPP) Areas of Operation*, were communicated in an official [report](#).

Howe examined the relationships between SCIPP's primary stakeholders and sources of climate information. He examined familiarity with specific sources, such as the National Climate Assessment, U.S. Climate Resilience Toolkit, and NCEI/AMS State of the Climate Report, along with familiarity of climate information providers such as SCIPP, the USGS South Central Climate Adaptation Science Center, NOAA Southern Regional Climate Center, and local NOAA National Weather Service Forecast Offices. The analysis identified 81 unique organizations, 130 unique connections, and eight distinct groups. The study showed a need for more accessible information to stakeholders and suggests that SCIPP provide more timely updates to increase the relevance of its information. Furthermore, results highlighted the critical role of sustained assessment specialists in cultivating stronger relationships, particularly in two areas of focus: universities and underrepresented populations.





## Social Science Theories and a Simple Forecast Process Model Help Explain How Forecasters Internally Process and Externally Communicate Extreme Rainfall Events

This study investigated how National Weather Service (NWS) forecasters in the SCIPP region internally process and externally communicate extreme rainfall events. As these events are projected to increase in frequency and intensity in parts of the SCIPP region, forecasters must be able to effectively communicate the potential impacts of these events to their audiences. However, how forecasters translate their meteorological knowledge into useful forecast information has not been widely studied. Not only does this research attempt to bridge that knowledge gap, but it also addresses SCIPP Phase III Objective I, as it investigates the forecasting and communication processes of these events, which are impacting hazard exposure profiles in the SCIPP region.

Twenty-one NWS forecasters in the SCIPP region were interviewed about their experiences with extreme rainfall events. Deductive qualitative analysis was used to apply an existing social science theory and framework to the responses. It was found that forecasters go through sensemaking and decision-making processes to understand these events. They also consider how their audiences will go through these processes. Using these conceptual frameworks as well as principles of forecasting, a simple forecasting process model (Figure A) can be used to depict the forecasting and communication processes. Second, the interview data answered the following research questions:

1. How do forecasters process model outliers leading up to and during extreme rainfall events?
  - Forecasters monitored model outliers to see if other models come into agreement.
2. How do forecasters communicate model outliers?
  - Forecasters sometimes communicated to their sophisticated partners that model outliers were a reasonable worst-case scenario.
3. How do forecasters communicate outlier events?
  - How these events were communicated depended on the audience being addressed. Simpler information was communicated to the public whereas sophisticated partners were given more complex information that was tailored to their needs whenever possible. For example, public forecasts often included potential impacts and protective actions while sophisticated users were provided in-depth information such as multiple scenarios.
4. Do forecasters consider climate change when forecasting extreme rainfall events, if so, how?
  - Forecasters perceived climate change to be beyond the scope of their short-term forecasting role and most did not consider it during the extreme rainfall event forecast process. However, some forecasters thought about how an event may have been impacted by climate change after it had passed.

This research was conducted by Anna Wanless & Rachel Riley (SCIPP), Kodi Berry (National Severe Storms Laboratory (NSSL) and NOAA Sea Grant), and Harold Brooks (NSSL). NSSL and Sea Grant provided additional financial support for the project. It provides a high-level understanding of extreme rainfall forecast and communication processes. It also provides insight to researchers who are interested in improving forecast communication as well as stakeholders and decision-makers, as the study revealed that NWS forecasters desire to improve communication of extreme rainfall forecasts.

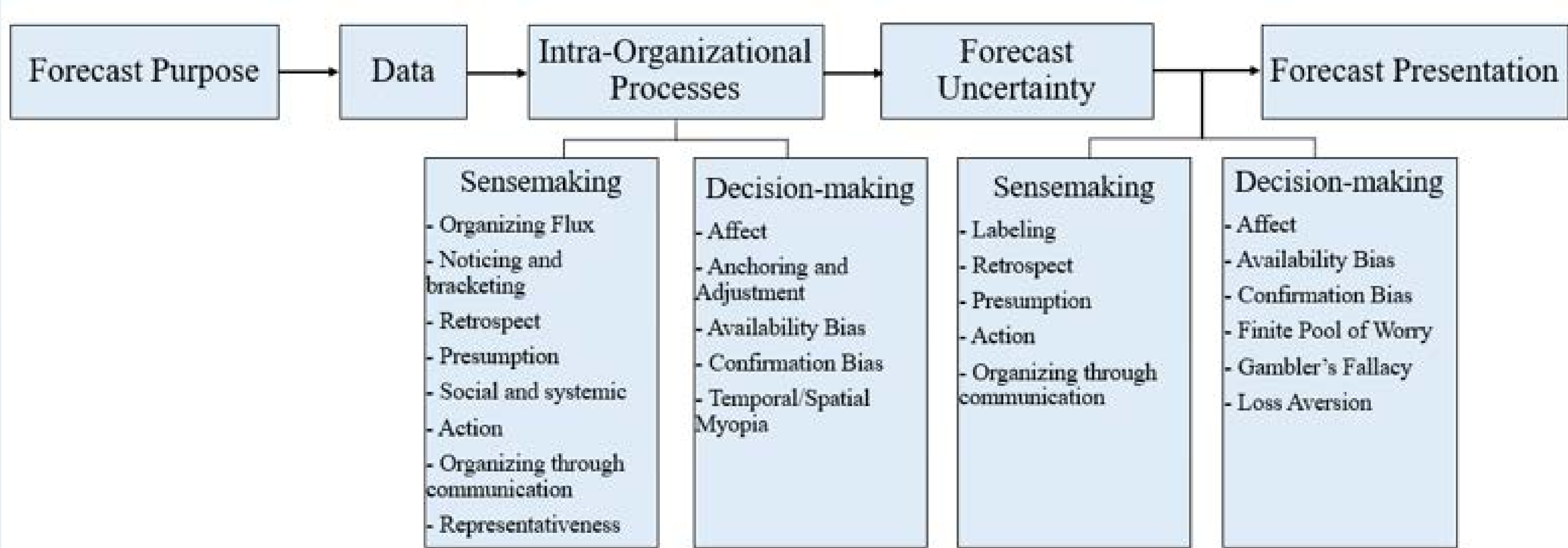
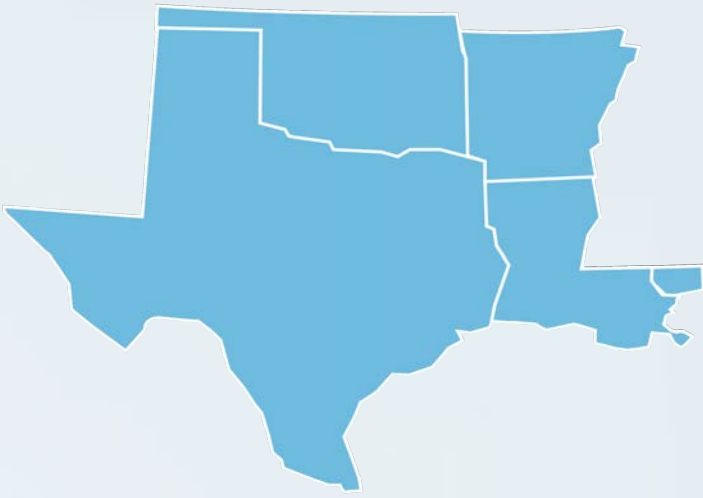


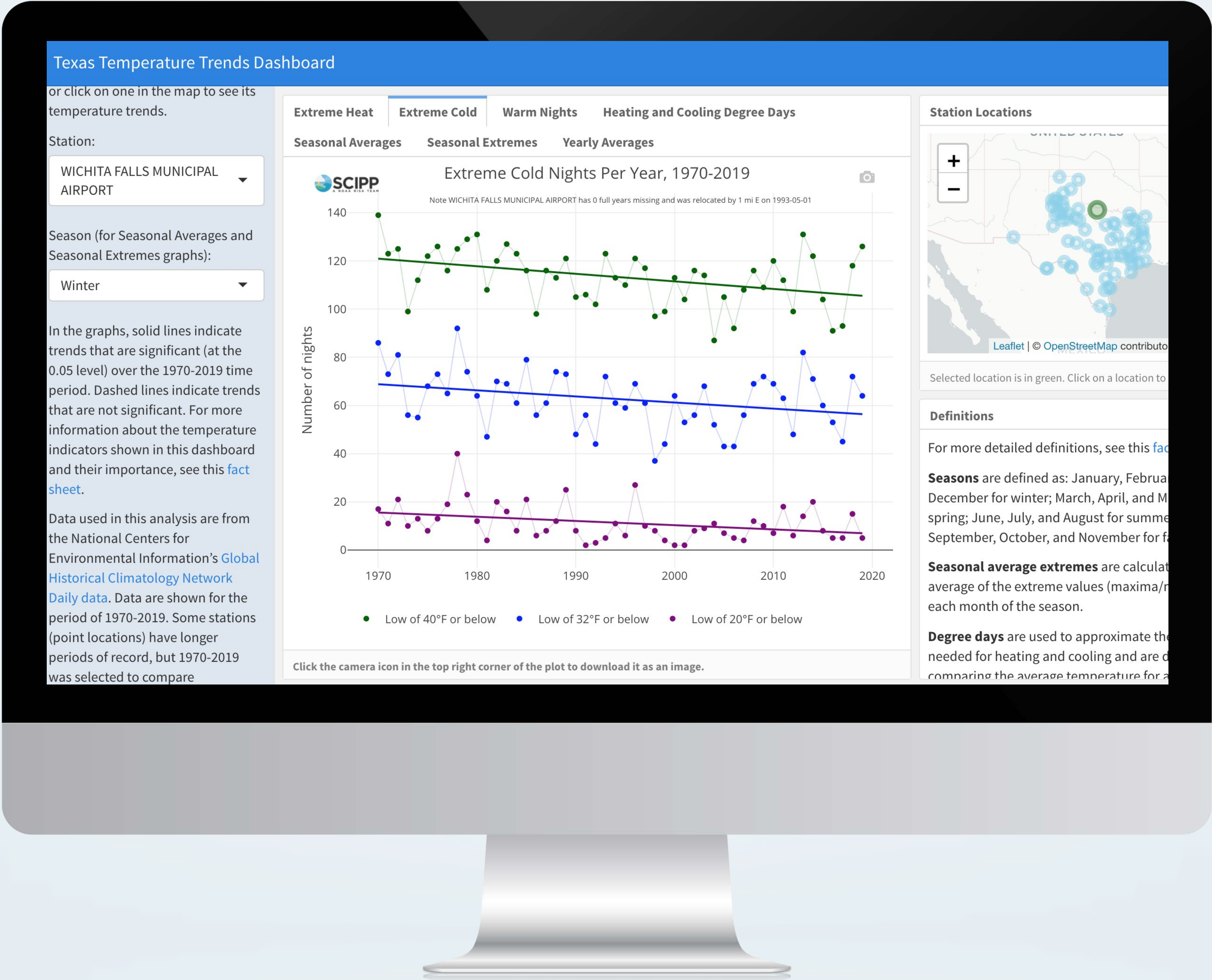
Figure A. A Simple Forecasting Process Model provides a conceptual framework for understanding how National Weather Service forecasters internally process and externally communicate forecast information during extreme rainfall events. The model begins with the forecast purpose, which guides forecasters to examine relevant meteorological data. Next, sensemaking and decision-making intra-organizational processes are used to begin to develop forecast information, along with forecast uncertainty considerations. Forecasters also consider the sensemaking and decision-making processes that their audiences will go through. The culmination and result of this process is the presentation of the forecast. How the forecast is presented depends on the audience (e.g., sophisticated partners like emergency managers and less sophisticated users like the public).



## Texas Temperature Trends Dashboard

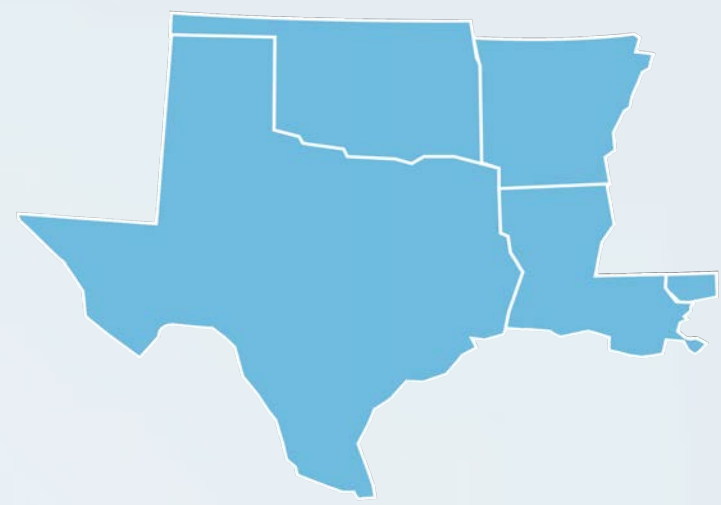
SCIPP Research Associate Simone Speizer, in collaboration with Texas Sea Grant, created a tool that shows historical trends in temperatures for locations across the state of Texas. The [Texas Temperature Trends Dashboard](#) displays trends in extreme heat, extreme cold, warm nights, heating and cooling degree days, seasonal average temperatures, seasonal extreme temperatures, and yearly average temperatures from 1970-2019 for 75 stations (point locations) in Texas. The graphs show both individual data points for each year and overall trend lines, and they can be downloaded as images. The dashboard also includes a link to a [fact sheet](#) discussing the temperature indicators shown in the tool and their importance. Speizer's work relates to SCIPP Phase III, Objective 2: *Improve the use of climate information, from sub-seasonal and seasonal forecasts to climate change projections, in planning processes.*

While other resources exist that present regional or national trends in temperatures, few tools offer such information on a local level. This dashboard helps to fill that gap by providing location-specific information about changes in temperature in the last 50 years. By incorporating trends in indicators such as extreme heat and warm nights to data of overall temperature trends, the dashboard delivers insight into changes in heat that can bring public health and economic ramifications to communities. Other indicators, such as heating and cooling degree days, are relevant to analyses of energy use and emissions. Access the online dashboard [here](#).



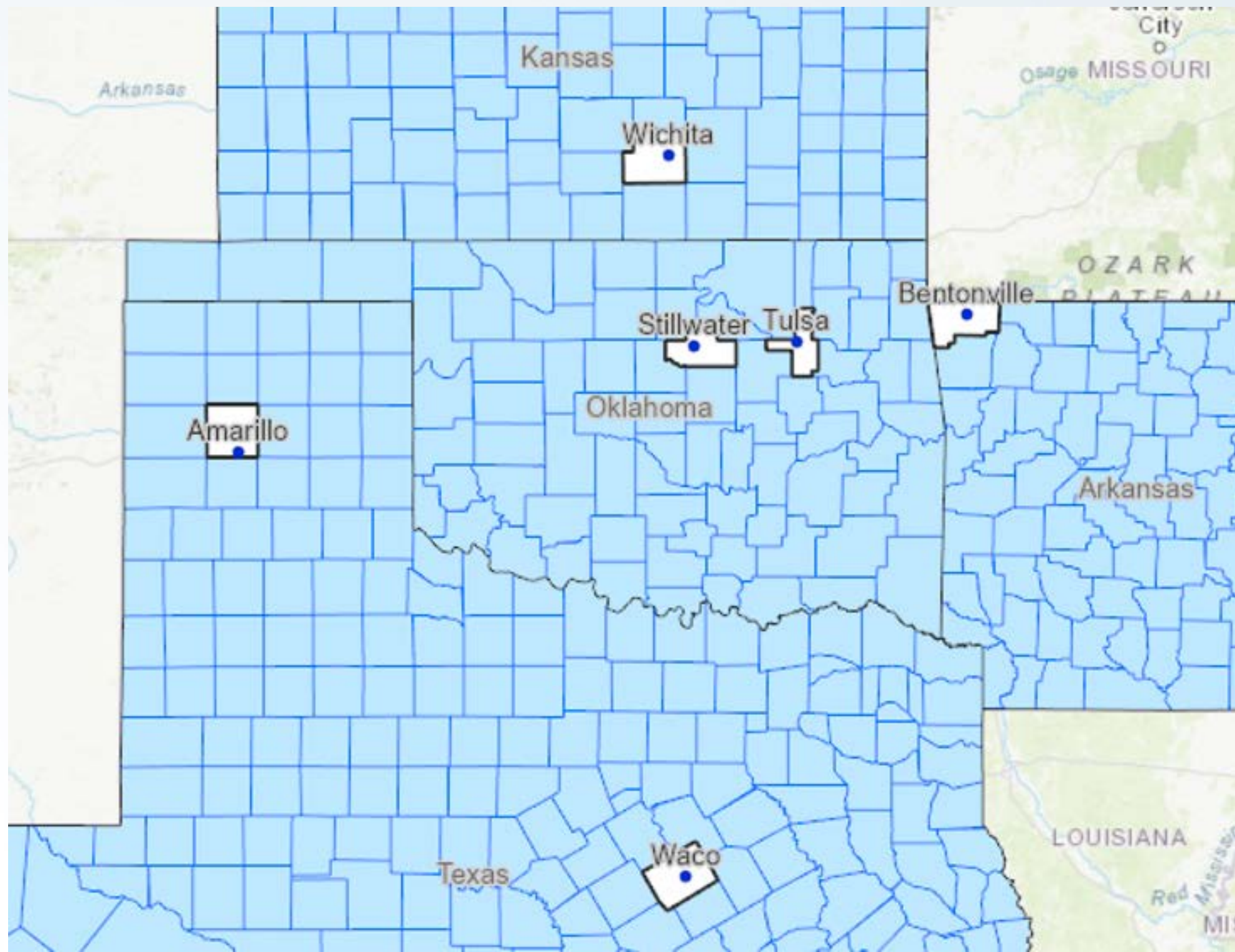
Display of Texas Temperature Trends Dashboard depicting "Extreme Cold Nights Per Year, between 1970-2019" for Wichita Falls Municipal Airport

# Research Highlights



## Case Comparison of Six Inland Counties Reveals Mediocre Hazard Mitigation Planning, More Than 20 Years Since the Disaster Mitigation Act was Passed.

This research is a collaboration between Ward Lyles & Penn Pennel (University of Kansas), as well as Rachel Riley (University of Oklahoma). It addresses SCIPP Objective 2: *Improve the use of climate information, from sub-seasonal and seasonal forecasts to climate change projections, in planning processes.* The original proposed comparison between emergency managers and city planners was expanded to reflect the broader network of officials who are often involved in accomplishing hazard migration initiatives. The research question addressed by this study was *what are characteristics of local hazard mitigation planning efforts in an inland region characterized by weak state contexts for planning and consistently conservative state and local politics?*



Map of six-city cohort: Tulsa County, OK, Sedgwick County, KS, Benton County, AR, McLennan County, TX, Potter County, TX, and Payne County, OK.

A comparative case study research design was employed to analyze six non-coastal counties with one principal city within and adjacent the SCIPP region that have historically not paid much attention to long range climate planning but have high hazard exposure. Selected counties were large enough to plausibly have a robust planning infrastructure (population 50,000 to 500,000), but not so large as to be idiosyncratic in the context of the region or nation, as would be the case with a city like Dallas or Oklahoma City. The counties included were Tulsa County, OK (Tulsa), Sedgwick County, KS (Wichita), Benton County, AR (Bentonville), McLennan County, TX (Waco), Potter County, TX (Amarillo), and Payne County, OK (Stillwater). Data collection took place in 2019-2020 and included content analysis of plan documents and semi-structured interviews with key officials involved in local mitigation and land use planning. The analytical approach included systematic comparison of plan contents, thematic analysis of interviews, and triangulation of core dynamics in the cases.



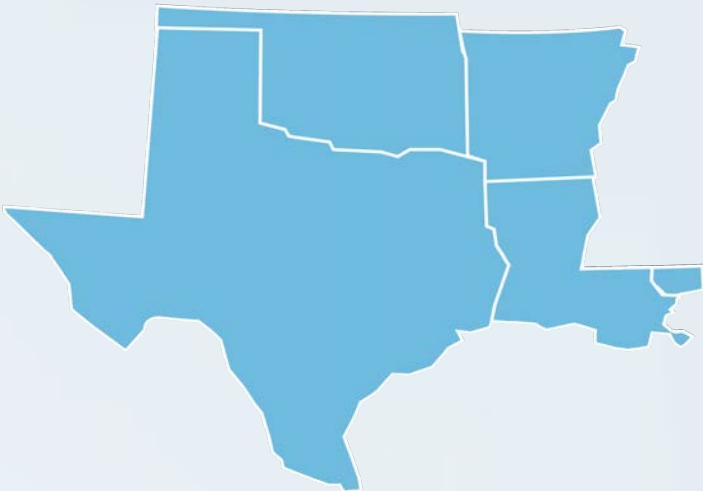
The analysis revealed three primary findings. **First**, as expected, the hazard mitigation plans tend to be of low to mediocre quality. Fortunately, interviewees were aware of the limitations of their existing hazard mitigation plans and in some cases were initiating changes, at least within the bounds imposed by their local political context. **Second**, the networks of hazard mitigation stakeholders vary widely in composition and leadership, some replicating emergency management networks suited to preparedness and response and some much better suited to the quite different demands of long-term mitigation work. **Third**, the types of consultants and their roles also varied across the six cases, bringing expertise characteristic of narrow emergency management perspectives to more integrated expertise in long-range land use and infrastructure planning perspectives.

In short, evidence mounts that the current planning framework for long-term natural hazard risk reduction is mismatched to the problems at hand. In each of the cases, plan documents leave lots to be desired, even when on-the-ground efforts are robust. Put simply, emergency management-driven planning initiatives are poorly integrated with other local planning efforts and generally perform poorly in terms of public participation, both of which are tasks more typical of the daily work of planners. The plans in the communities with emergency management-dominated networks and consultants also largely fail to incorporate land use perspectives in favor of logistical and operational approaches effective for preparedness and response.

The year 2020 was the 20th anniversary of the Disaster Mitigation Act (DMA), yet there is strong evidence of its effectiveness in catalyzing the development of lots of detailed, technical plans that characterize mediocre planning. Without the requirements of the DMA it is difficult to imagine that thousands of communities would have dedicated millions of dollars and untold hours to develop mitigation plans. However, these findings indicate that the DMA is likely in need of a major overhaul.

A peer-reviewed manuscript based on this study is currently in development.

# Outreach & Engagement



Lake Pontchartrain, LA

## Engaging Artists, Scientists and Educators in Learning

SCIPP Co-Director Barry Keim and graduate student Jessie Parrott served as science leaders for a unique, community-led initiative in New Orleans, Louisiana. *Engaging Artists, Scientists, and Educators in Learning* (EASEL) is a project funded by the National Science Foundation that joins performing arts and community participatory approaches to build knowledge on environmental change learning techniques and encourage application of the science to decision-making.

Keim and Parrott collaborated with artists and educators from Dillard University, STEM Nola, A Studio in the Woods, State University of New York-Buffalo, and ArtSpot Productions to produce an on-stage production entitled *Gentilly Lily's Mystical Porch* about the local impacts of climate change. The Gentilly community, a predominantly Black neighborhood in New Orleans, was the focus of this engagement initiative, where the acting participants for the project were drawn from the area. The goal of the effort was to have the actors and the community audience better understand the landscape in which they live, as this is a neighborhood that resides between 5-10 feet below sea level and faces persistent flooding problems.

This innovative engagement approach was a testament to trust building among underserved communities in the SCIPP region. As SCIPP continues to seek effective ways to engage with communities of interest, this initiative was helpful in exploring new approaches to involve community leaders.



Barry Keim explains Sea Level Rise to participant



Barry Keim engages with local artist

### OBJECTIVE 1

"Document and examine the collaborative process between artists, scientists, and educators engaged in informal science learning partnerships, in order to understand what aspects of A-S-E collaborations contribute to learning, and how collaborations can be supported and made most effective."

<https://www.art-sci-ed.org/about>



Theatrical production of "Gentilly Lily's Mystical Porch", which took place on June 25 & 26, 2021

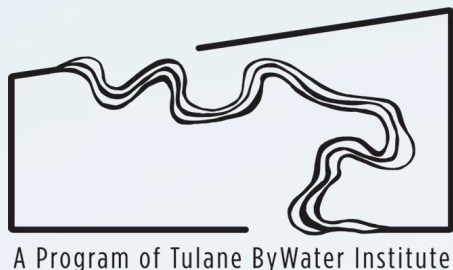
### OBJECTIVE 2

"Measure the impact of participatory performance arts-based informal science learning modules on community decision-making processes and learning about environmental change."

<https://www.art-sci-ed.org/about>



DILLARD  
UNIVERSITY



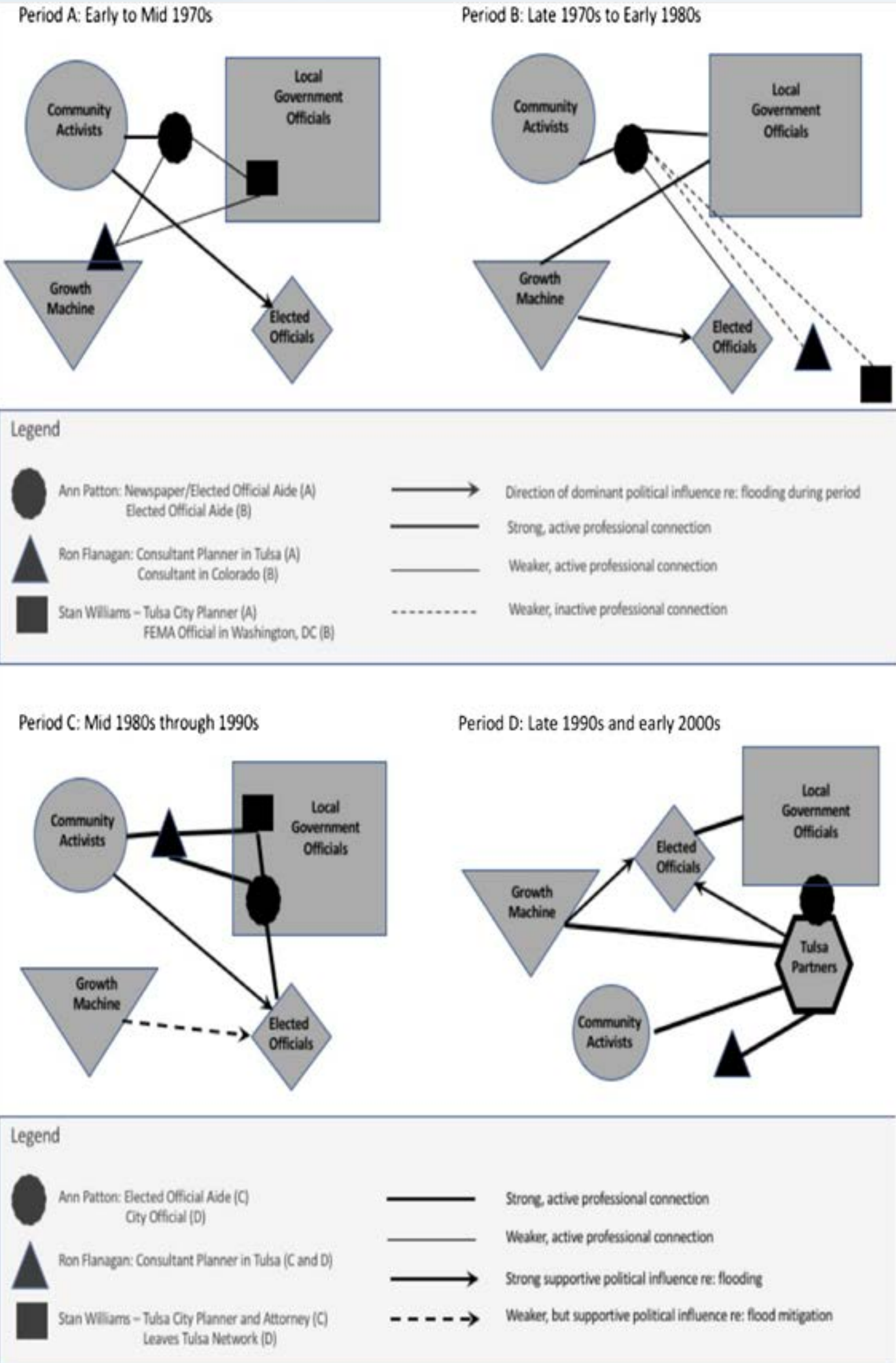
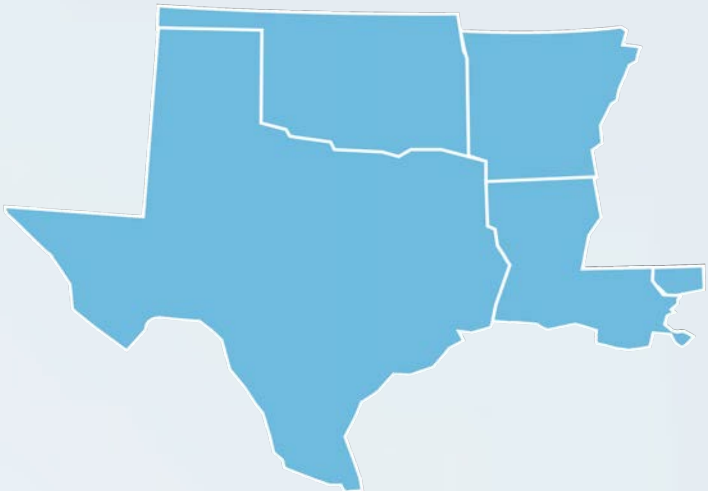
A STUDIO  
IN THE  
WOODS



STEM NOLA



# Outreach & Engagement



Tulsa’s hazard mitigation network and champions over time. The networks of key stakeholders in Tulsa in four periods of time are represented. The figures show the relationships between key champions and how those relationships changed over the four time periods, including how the individual champions associated with different types of stakeholder organizations evolved over time.

CRS 2021: Building Partnerships For Advancing CRS In Region VII

Wednesday, March 17, 2021

8:15 a.m. – 3:30 p.m. CT

In March, Ward Lyles gave a keynote talk at **FEMA Region VII’s Community Rating System Symposium: CRS 2021: Building Partnerships for Advancing CRS in R-VII**. His presentation, entitled "Flood Mitigation Champions, Networks, and ‘Soft Skills’", gave insight into how local champions shaped the network of mitigation advocates in Tulsa. Much of his engagement highlighted the importance of following the standard model for hazard mitigation, as well as promoting a diverse group of stakeholders with regard to their professional roles, personal characteristics, and relationships, in order to cultivate the conditions for local champions of hazard mitigation to succeed.

While the symposium was virtual this year due to the COVID-19 pandemic, it is estimated that between 50 and 100 people attended the online event. The audience included FEMA national and FEMA region VII representatives, as well as state and local (and other federal agencies like NOAA and USACOE) floodplain officials from across the Region VII states.

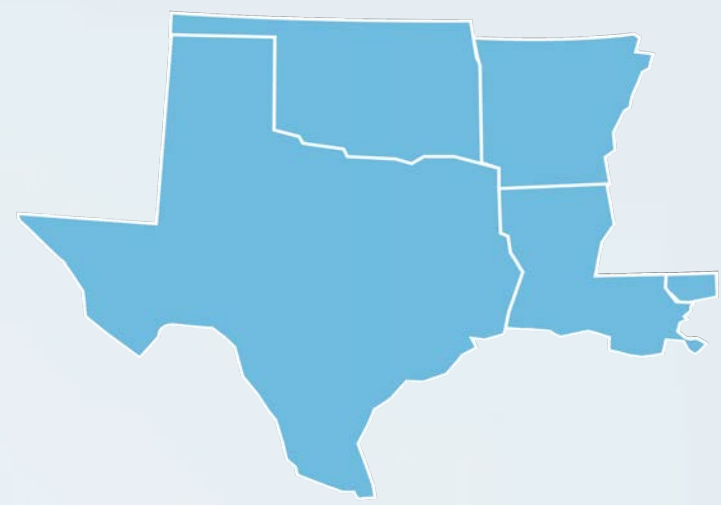
The full manuscript is available [here](#).



In April, Barry Keim and Amanda Lewis gave an in-person presentation to the **Environmental Science Honors Class at Parkview Baptist High school in Baton Rouge, LA**. Lewis presented on climate change, precipitation, and the impacts on crawfish farming in Louisiana. Keim presented on the tropical cyclones and climate change. The class, which consisted of approximately 20-30 High School Juniors and Seniors interested in pursuing college degrees in the environmental sciences, initially reached out to SCIPP because they were interested in learning more about Vincent Brown’s recent paper “Effect of meteorological variables on crawfish harvest in Louisiana, USA”. This presentation was a great opportunity to share SCIPP’s research within the local community and to foster an interest in climate science among a group of talented high school students.

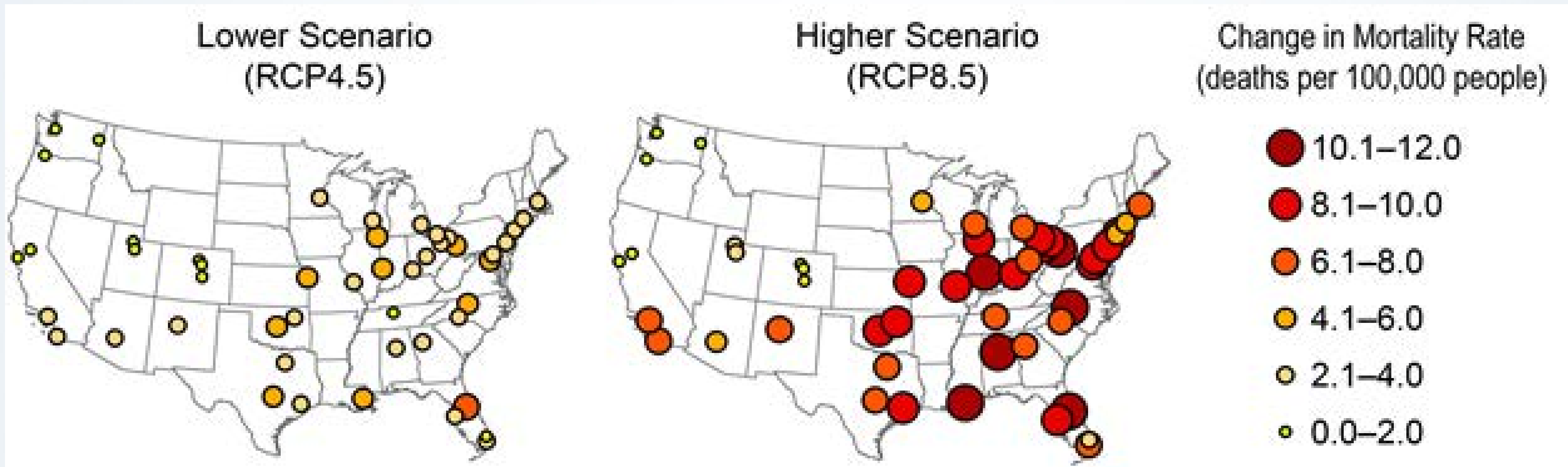


Barry Keim and Amanda Lewis present research hihglights to the Environmental Science Honors Class at Parkview Baptist High school in Baton Rouge, LA



## Collaboration with University of Central Oklahoma

In 2019, SCIPP (Mark Shafer, Margret Boone) were invited to the University of Central Oklahoma to meet with faculty, staff, and students on the topic of climate change and sustainability. Following that meeting, SCIPP was invited to present to their Educational Health class (J. Dunnington, instructor), on the topic of climate change and health. M. Shafer incorporated findings from the National Climate Assessment chapter on Human Health and other sources to bring climate change into a context specific for the class discussion. SCIPP was invited back to present to the class in Fall 2020, Spring 2021, and to a graduate version of the course in Fall 2020. Although public health was not a specific focus for SCIPP, this demonstrates SCIPP’s ability to identify and utilize resources to tailor information for relevant audiences.



From National Climate Assessment (2018), *Human Health*, Figure 14.4  
Projected change in annual extreme temperature mortality.

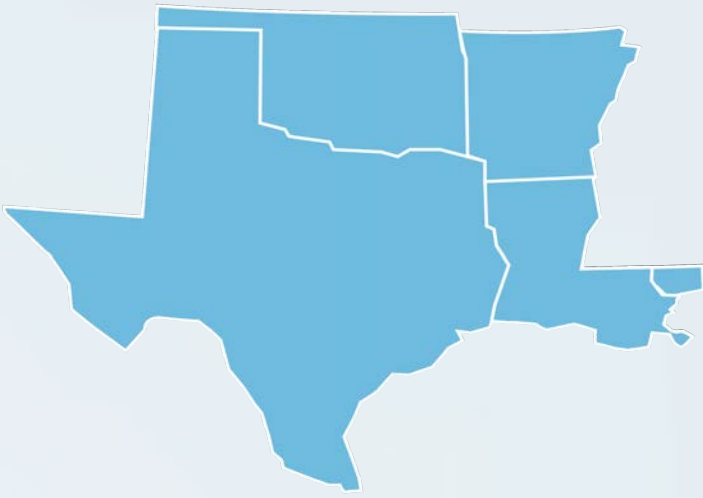
## Sea Level Rise and High Tide Flooding Presentation

In spring 2021, SCIPP Research Associate Simone Speizer presented at one of Texas Sea Grant’s Seaside Chats. Her presentation (which is now on [YouTube](#)) titled “Sea level rise and high tide flooding in Texas,” was geared towards both Sea Grant extension agents and the general public, particularly the communities that Texas Sea Grant works with along the coast. She discussed current trends and projections of sea level rise and high tide flooding in Texas, including tools for understanding and visualizing these predictions, as well as how communities can build resilience and adapt to the impacts of rising waters. Her presentation supported knowledge exchange between coastal residents and scientists and facilitated conversations about sea level rise and its impacts, as well as adaptation measures, among coastal communities.



Presentation slide for S.Speizer's talk on sea level rise and high tide flooding in Texas

# COVID-19 Impacts



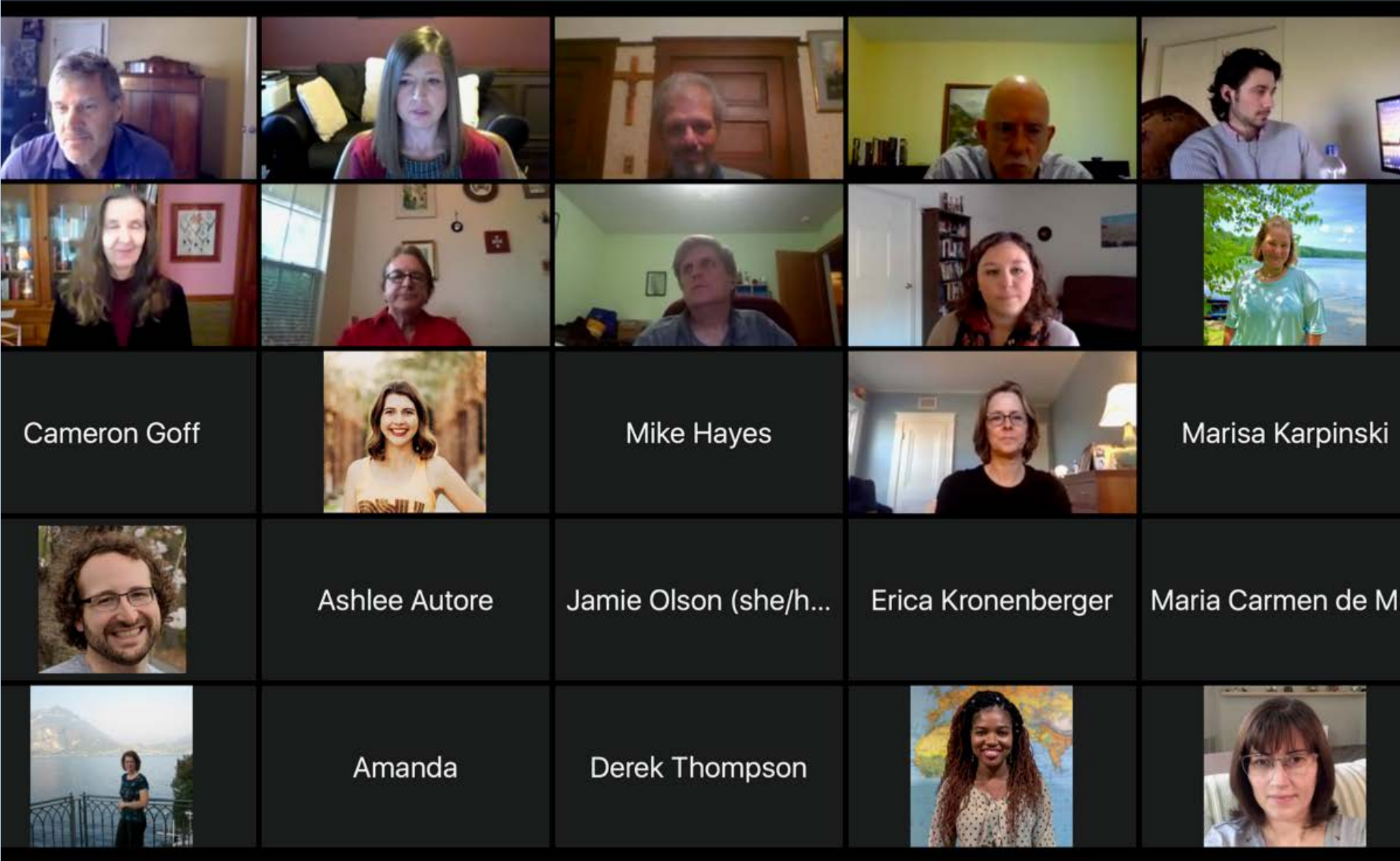
As the world continued to grapple with the lasting effects of the COVID-19 pandemic, SCIPP's in-person engagement efforts were interrupted, as the virtual engagement format became the primary means of interaction with stakeholders. While our team was affected in many ways, a few notable highlights are mentioned below.



## The 2020 Texas Resilience Conference was Cancelled

The Texas Resilience Conference aimed to convene about 200 representatives from all levels of government, non-governmental organizations, community groups, private industry, and academia that work on resilience and climate change adaptation in Texas. The conference would have provided a venue for practitioners and researchers to share information about current activities, plans, and opportunities for collaboration. SCIPP was listed as one of 20 organizations represented on the conference's steering committee. SCIPP's Rachel Riley had devoted countless hours to conference planning as the chair of the Program Committee and member of the Steering Committee. While the conference was initially rescheduled for Spring 2021 due to COVID, it was later canceled all together.

## The 2020 SCIPP Advisory Committee Meeting Went Virtual



SCIPP members and advisory meeting attendees on Zoom



SCIPP members and advisory meeting attendees on Zoom

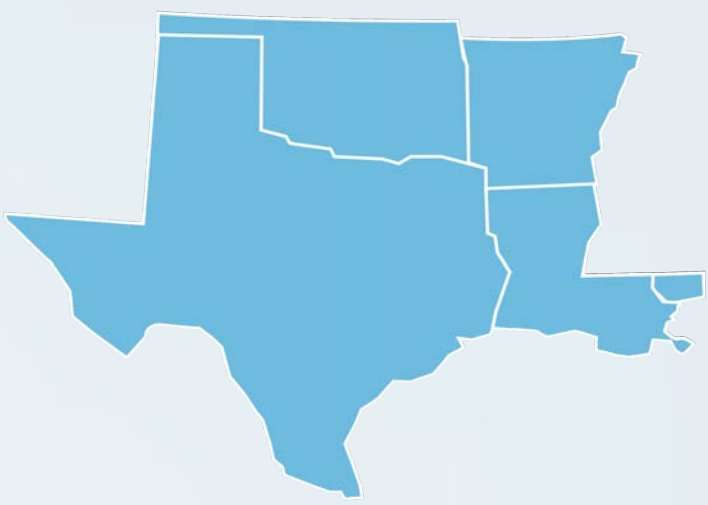
SCIPP typically hosts its annual Advisory Committee Meeting in-person. Due to the pandemic, the event was hosted virtually. Research updates were presented via Zoom, and advisory board discussions were convened through the use of a virtual breakout room.

## Virtual Engagements Presented Limitations

The global pandemic heavily reduced the number of SCIPP engagements during the reporting period. While virtual formats allowed SCIPP to continue some engagement efforts, it became apparent that this format is not always ideal when trying to solicit feedback or encourage discussion. The virtual format saves time and increases accessibility at the expense of quality discussion. Our observation was that not many people enjoy sitting behind screens all day.



# Ways Stakeholders Were Served



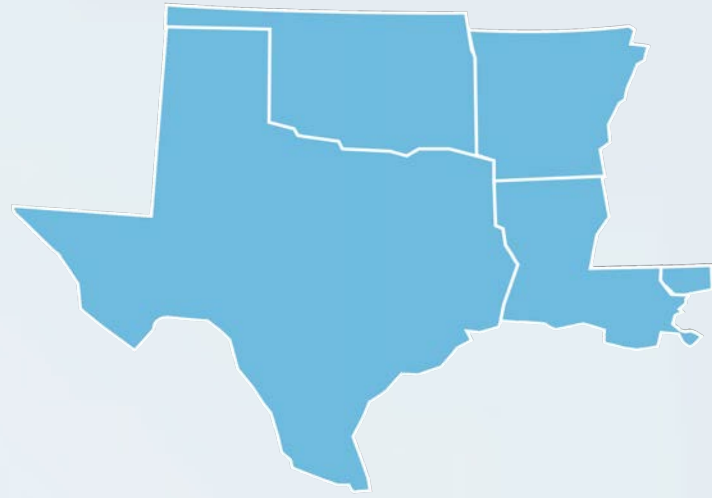
SCIPP hosted a [virtual workshop](#) in July 2020 to provide climate information to water, wastewater, and stormwater managers along the Gulf Coast, especially those in rural communities. There were approximately 45 attendees at maximum participation, including local water utility managers and employees from Coastal Louisiana and Texas, and representation from NOAA and non-governmental organizations. The workshop included information on weather and climate, tools available on the NOAA Water Resource Dashboard, and a discussion of equity and justice in water resource management. Support for the workshop was provided by NOAA Sectoral Applications Research Program (SARP).

Following the workshop, SCIPP asked the participants to complete a questionnaire. Most participants agreed that they could use the information from the Water Resources Dashboard immediately in their jobs and all participants agreed they would use it in the future. The stakeholder participants identified a number of information needs during the workshop including further research/data regarding past and future heavy rainfall events in the Gulf Coast region, scientific information that is more accessible and digestible for elected officials and the public, and tools to overlay physical science with social data to understand vulnerability. SCIPP has continued to work closely with one of the workshop participants, the Sewerage and Water Board of New Orleans (SWBNO), and will be assisting them in planning for future flood events as a part of a recently funded NOAA Adaptation Sciences grant.

## RISA Sustained Assessment Specialist Network

SCIPP’s Climate Assessment Specialist, Darrian Bertrand, is a member of the RISA Sustained Assessment Specialist (SAS) Network, which is composed of former and current SASs. While individual SASs lead assessment activities in their own region, the SAS network brings regionally-relevant work to a national level, working together to identify needs and gaps at a larger scale. The network meets on a monthly basis and promotes cross-regional collaboration, leverages each member’s expertise through peer exchanges, and facilitates learning in the adaptation community. During the rebid proposal process this past year, the network collaborated on future cross-RISA assessments, created cross-regional goals, and developed a vision for sustained assessment. Furthermore, they produced an informational document to promote sustained assessment, the SAS Network, and SAS impacts. The document will be released in summer 2021. The RISA program and U.S Global Change Research Program benefit from the coordinated efforts of the SAS Network, through cross-regional peer exchanges and collaboration as well as additional engagement capacity and local knowledge to the National Climate Assessment.





During 2020-2021, SCIPP contracted Ioana Cionea (Associate Professor in the Department of Communication at the University of Oklahoma) to conduct an evaluation of our program. The evaluation plan entailed a multi-pronged approach that consisted of surveying our stakeholders and conducting follow-up interviews with stakeholders, as well as interviewing staff and advisory committee members.

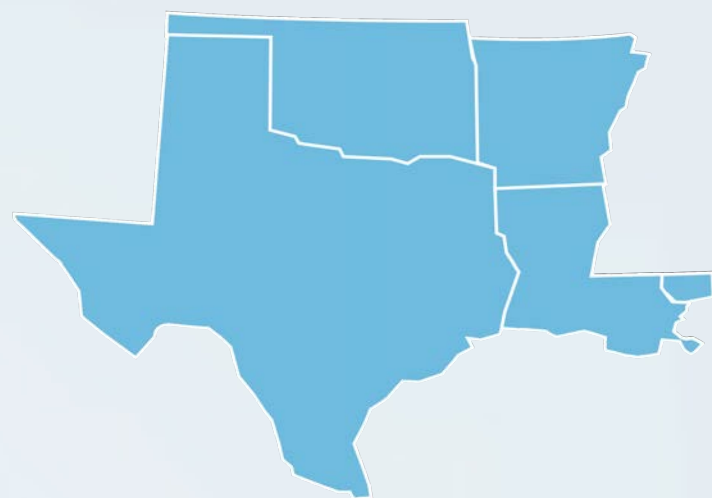
Stakeholders participated in a survey and interviews. The survey invitation was emailed between July and September 2020 and gathered 27 responses (18 complete) from stakeholders in Oklahoma, Arkansas, and Texas, in a variety of positions (e.g., emergency managers, city planners, climatologists). Responses revealed that stakeholders primarily interacted with SCIPP every few months or quarterly, mostly via email, attendance at a workshop, or informal interactions at conferences. Their primary information requests were for data that pertained to a specific aspect of their job, research documents or training materials. Stakeholders valued the regional data provided by SCIPP, its scientific and multidisciplinary nature, as well as its presentation, in an easy format and simplest terms that audiences could understand.

Quantitative data summaries from the survey regarding stakeholders’ perceptions are included in the table below.

Area assessed	Scale anchors	Min. score	Max. score	Mean	Standard deviation	Median
SCIPP’s ability to listen to stakeholders’ needs	0 = not at all well 100 = extremely well	82	100	95.42	6.20	99
SCIPP’s ability to respond to information requests	0 = not at all well 100 = extremely well	20	100	90.07	20.92	96.5
SCIPP’s expertise when requesting information from them	0 = no expertise 100 = excellent expertise	87	100	96.54	4.27	98
Quality of analyses provided by SCIPP to stakeholders	0 = no quality at all 100 = excellent quality	81	100	95.67	6.20	98.5
Satisfaction with SCIPP interactions	0 = not at all satisfied 100 = extremely satisfied	50	100	93.63	12.86	100

Qualitative data illuminated further the reasons for participants’ ratings above. For example, information from SCIPP is perceived to be “all inclusive,” and “is thorough, accurate, and reliable.” SCIPP’s “base of information is both scientific in nature and multidisciplinary in approach,” offering “local data, but with access/connections to broader datasets.” SCIPP is viewed as a team of “regional experts” and “a respected source in the region.” Furthermore, stakeholders viewed the staff as an asset, describing them with a multitude of complimentary adjectives such as **knowledgeable, professional, efficient, accurate, innovative, can-do attitude, enthusiastic** and **supportive**.

Follow-up interviews with stakeholders (*N* = 30) provided further information about stakeholders’ perceptions of their interactions with SCIPP. SCIPP’s wide array of stakeholders means different needs and different levels of involvement, from simple data requests to long-term collaborations. Echoing survey results, stakeholders indicated the regional, personalized data SCIPP provides was unique and extremely useful. SCIPP is able to satisfy their needs, being uniquely positioned as a highly credible entity associated with a research institution and under the auspices (yet not a part of) governmental entities. The tools SCIPP offers stakeholders (e.g., the Simple Planning Tool) are a high impact commodity that stakeholders find extremely beneficial.



Most importantly, SCIPP was perceived to provide an unparalleled service of translating scientific knowledge to meet stakeholders’ needs, adapting, and working with stakeholders to generate a final product the latter could then use for their needs. As one interviewee put it, **“They have the power to convene people and the reputation, I hope, as being an honest broker for information.”** Furthermore, as several interviewees noted, SCIPP listens (really listens) to their stakeholders and works with them as opposed to selling them an already pre-determined service/information. As one interviewee noted, SCIPP’s gathering of **“information from wide range of subject matter experts and listening to them [stakeholders], listening to their input and incorporating it into their final product”** is a strength that other agencies do not have. Overall, stakeholders value the existence of SCIPP and its services. As one interviewee put it, “It’s just such a wonderful program and I’m hoping that they continue.” In fact, several interviewees noted that SCIPP could likely grow and be able to serve an even wider base of diverse stakeholders. One interviewee who has worked with SCIPP repeatedly over the years noted, that “being able to have more resources to do more” could be beneficial, especially if SCIPP could have “a couple more people” on the team for the various projects they work on so that current staff is not “spread quite so thin.”

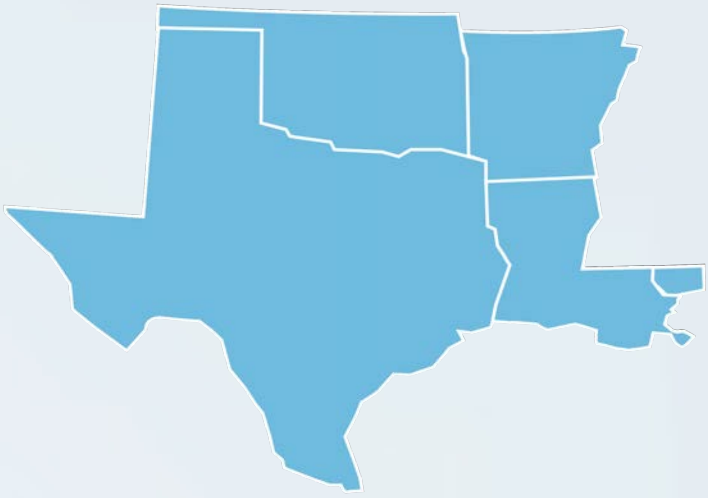
Internal interviews (current and former staff and advisory board members, *N* = 20) were also conducted with the goal of identifying internal perceptions about SCIPP’s operations. Key conclusions revealed SCIPP’s awareness of their stakeholders’ base, the services they can provide, and an understanding of their regional role and capabilities. Based on interviews, evaluation recommendations include articulating SCIPP’s focus and services further at this point in the program’s evolution, given the multitude of possible avenues of research and stakeholders’ needs. Additionally, streamlining internal organizational processes to maximize use of staff and resources could be beneficial in order to avoid overburdening team members. Finally, implementing a regular communication method with stakeholders and advisory committee would ensure interested parties remain up to date with SCIPP’s projects and activities between events.

The program evaluation conducted also revealed a need for more frequent, regular assessments of stakeholder interactions. The following framework for assessment is proposed, with the ultimate objective of generating a set of evaluation tools and materials that could be used in future grant cycles and potentially by other RISA programs:

- ① **Classify, categorize, and identify further potential stakeholders for a better understanding of needs, services to be provided, and opportunities for projects and collaborations.**
- ② **Implement a system of regular mini-evaluations following workshops, projects, or collaborations which would gather on-going information about stakeholder needs and SCIPP performance.**
- ③ **Conduct periodic in-depth evaluations at half-point and end-point of grant cycle to determine progress towards objectives and need for refocus/realignment. This information would aid in better planning, operation, and adaptation of projects and services in response to major trends and programmatic stages.**



# Societal Impacts



## February 2021 Extreme Cold, Snow and Ice in the South Central U.S.

SCIPP produced a summary of the February 2021 winter weather event that greatly impacted the south central U.S. It was the coldest event to occur in the SCIPP region in over 30 years, and the prolonged extreme cold coupled with wintry precipitation caused numerous waterline breaks, power outages, and nearly 200 fatalities, amongst other impacts. The summary was produced by SCIPP Climate Assessment Specialist Darrian Bertrand and SCIPP Research Associate Simone Speizer.

[February 2021: Extreme Cold, Snow, and Ice in the South Central U.S.](#) is a 30-page document that begins with information about the weather pattern and describes records that were broken, the context of the event compared to climatology, and past historic events. The second half of the document describes impacts to various sectors including energy, water, health, infrastructure, the economy, the environment, and society. Examples of hazard mitigation successes in the region are also provided to encourage stakeholders to reduce their vulnerability for future extreme cold events, especially in the energy sector. These distinct sections allow for easy navigation through the document.



To help meet stakeholder needs, this summary was written for a general audience with the goal of helping individuals compare the south central U.S. February 2021 extreme cold event to past events. Most notably, this summary was used as evidence to the **Oklahoma Senate Energy Committee**'s investigation of the energy prices impacted by the extreme cold, as it answered many important questions about the event.

Frozen Lake Overholser Dam, Oklahoma City, OK.  
Source: K. Kloesel

## Excerpts From Evaluation Results

The current and former staff and advisory board members stakeholder survey conducted revealed that information provided by SCIPP is used in two main ways: 1) to inform day to day operations in stakeholders' domains of activity and 2) to create educational and training materials. By far, the most prominent answer in both survey and interviews was that SCIPP information helps stakeholders fulfill a wide range of aspects of their jobs, from planning, mitigation, and policy development to outreach and assistance of community stakeholders.

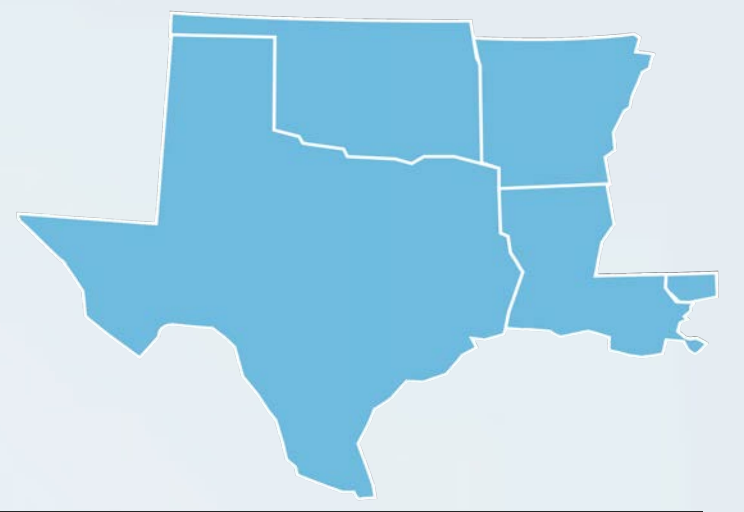
These findings were corroborated in interviews, in which stakeholders stressed how important and beneficial the data obtained from SCIPP was to generate reports for their jobs, include in planning materials they prepare, or share with others (e.g., contractors, communities with whom they interact). For instance, a stakeholder indicated that SCIPP information helps his job because it addresses gaps between community and emergency planners. Finally, information obtained from SCIPP also trickles down in stakeholders' networks, furthering its potential applicability and impact. Depending on its usage, information from SCIPP is shared further with training or public campaign audiences, such as tribes, communities, local businesses, subgrantees and, sometimes, with other governmental agencies (e.g., as indicated by a stakeholder, "natural resource agencies that plan for drought and climate changing impacts").

In Oklahoma, evidence of SCIPP's efforts are highlighted, as SCIPP is referenced in:

- Stillwater's [Hazard Mitigation Plan Update](#)
- Cleveland County's most recent [Hazard Mitigation Plan](#)

"[t]he information that SCIPP provides is included in our HMP. It is used by our city developers to look at mitigation measures for construction. We share SCIPP with new businesses [...] and it helps them to understand their environmental threats and risk assessment."

- Evaluation Participant



## Partnership with Natural Hazard Mitigation Association to Build Capacity in Under-Resourced Communities

SCIPP's Rachel Riley and Mark Shafer will be partnering with the Natural Hazard Mitigation Association (NHMA) to help build capacity for hazard and climate planning in under-resourced communities. Although SCIPP has had a few interactions with NHMA over the years, this upcoming work will be the first formal project. This project will explore how capacities and capabilities of under-resourced communities compare to Federal Emergency Management Agency hazard mitigation plan requirements. It will also investigate how the capability and capacity gaps that exist could be addressed by the NHMA Disaster Risk Reduction Curriculum. In addition to NHMA, new relationships will be established with the Texas and Louisiana chapters of the American Planning Association to carry out the work. Previous SCIPP research has shown that city, county and regional planners, not only emergency managers, play a vital role in accomplishing local hazard mitigation goals.

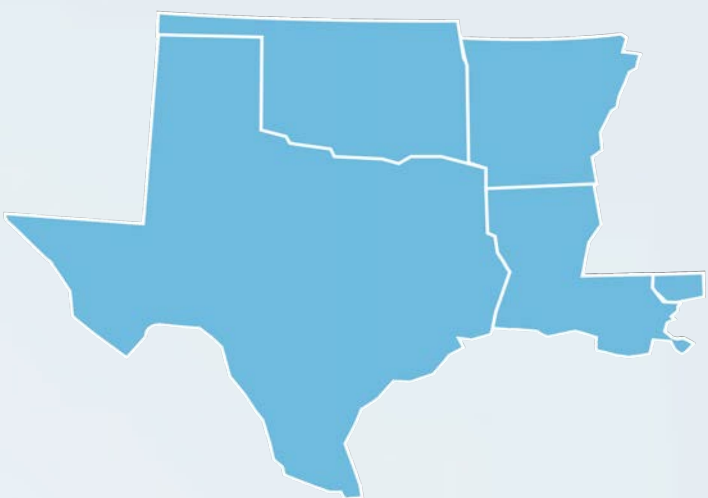


Houston Buffalo Bayou , TX

## Research and Existing Partnership Advancements

There are two other areas in which SCIPP plans to make advancements in the coming year. The first is a research effort grounded in our work with water utilities and communities frequently impacted by heavy precipitation events that often result in flooding. SCIPP's Vincent Brown, Amanda Lewis and Barry Keim, will continue to expand our precipitation research portfolio by 1) investigating individual, high impact precipitation events (case studies, e.g., Tropical Storm Imelda with Applied Weather Associates) and 2) leveraging new data products (grids) to investigate climatological questions (changes in frequency, intensity, etc.). While these efforts are labor-intensive, they are often impactful, especially when presented to local decision-makers and the public.

The second initiative we plan to advance is our partnership with Sea Grant (LA, TX, MS-AL, etc.) and the Louisiana AgCenter. Specifically, but not limited to, our work on species such as crawfish and oysters. In the last reporting period, SCIPP's Vincent Brown partnered with crawfish experts (LA Sea Grant) to investigate the effect meteorological variables have on crawfish harvests. Our work will continue, and we are currently working on a project researching the potential effect weather (specifically abrupt weather fluctuations) may have on the pervasiveness of the White Spot virus in crawfish ponds. Brown is also working with oyster experts to identify suitable locations for oyster aquaculture in the future under a range of scenarios. Finally, Brown, Keim and Lewis are working with Louisiana AgCenter Extension Agents to produce unique maps that will help them provide information – specifically on temperature (freeze hours) and precipitation (heavy event frequency) – to farmers, growers, and anyone interested in horticulture across Louisiana. This work is exciting because after a review process the maps we produce will be directly distributed to on-the-ground users who can use and benefit from the information.



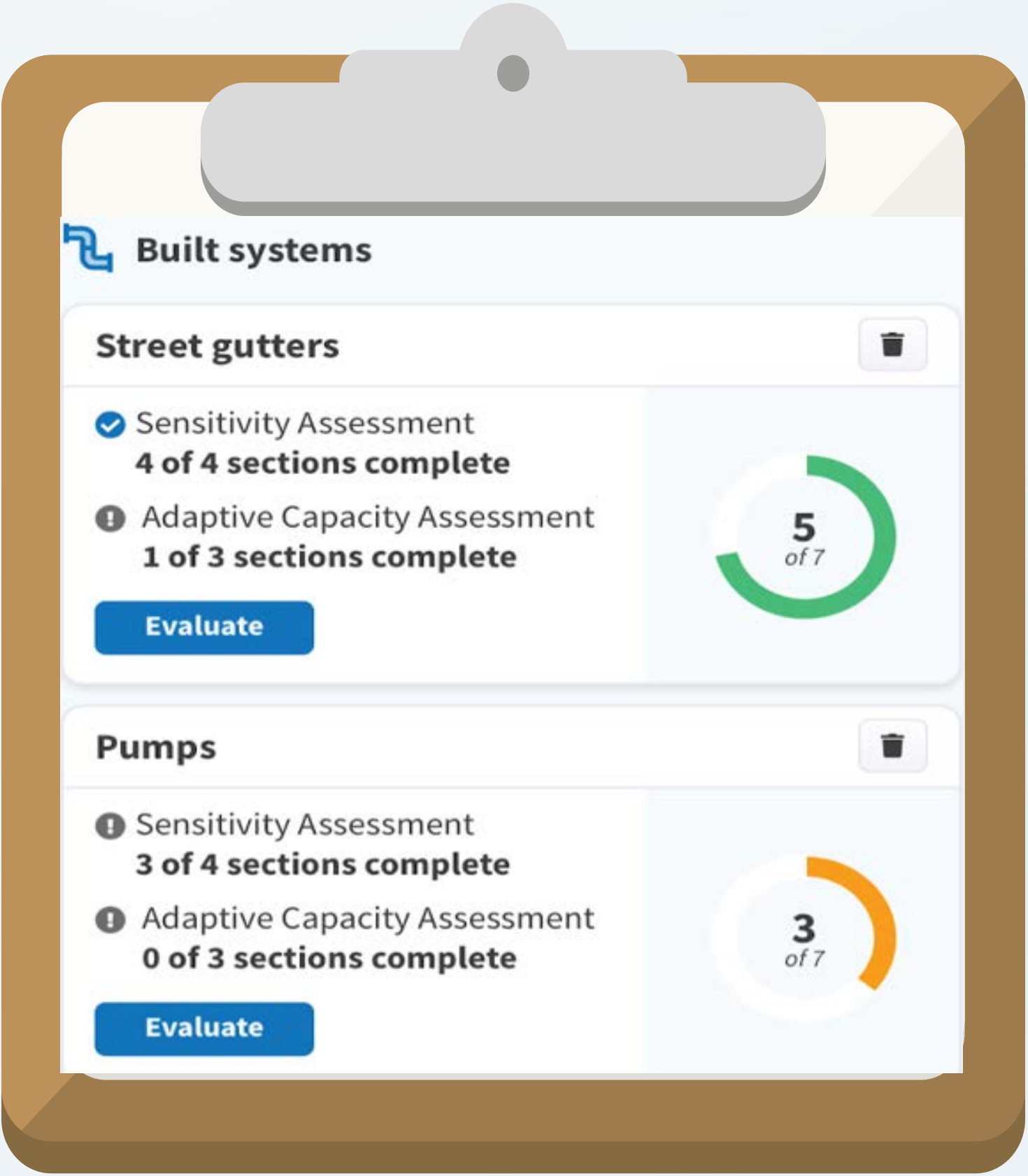
## Cross-RISA Collaboration: Making Gulf Communities More Resilient

Cities and counties along the Gulf Coast have experienced increased climate impacts, such as extreme rainfall events associated with flooding and longer duration and intensity of heat waves. These trends are expected to continue. Coastal communities also face increased risks from more intense hurricanes, related storm surge, and inundation from sea-level rise. Many cities and counties within the region have limited resources and lack of access to relevant and actionable climate information, which impedes them from implementing hazard- and climate-related adaptation actions to increase their resilience.

To address this need, GLISA, SCIPP, and other project partners developed a Research to Action Project that helps Gulf Coast communities with their planning to improve resilience. The project works with 60 coastal communities to use a stormwater vulnerability assessment tool to identify risks related to extreme precipitation and flooding and localized vulnerabilities associated with varying socio-economic characteristics across their jurisdictions. These communities are typically ones with populations of fewer than 200,000 people; several of them include large populations of underrepresented groups. Participating communities are divided into three cohorts: in-person engagement, online engagement, and self-directed. The project is examining the efficacy of different engagement methodologies to determine optimal ways for engaging with communities in the future that will lower transaction costs, such as time, effort, and consulting fees.

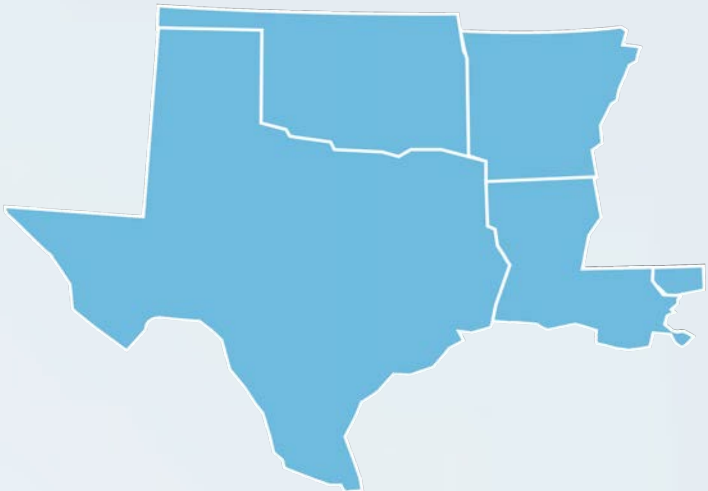
The project team includes two NOAA RISA teams – GLISA and SCIPP – along with Stanford University, Headwaters Economics, and Adaptation International. Funding is provided by the National Academies of Sciences, Engineering, and Medicine’s Gulf Research Program, and leverages expertise from the two RISA teams and other partners. In addition to studying engagement methodologies, the project team is examining how participating locations’ adaptive capacity informs their plans and abilities to implement mitigation measures and how boundary organizations can improve the recruitment process.

Each participating team receives access to an online vulnerability assessment tool (developed by GLISA with previous support from NOAA SARP), localized climate assessments (developed by SCIPP), and relevant socio-economic data (provided by Headwaters Economics). Previous work by GLISA suggests that in addition to developing profiles of stormwater risks, cities and counties can use the data and tool for other outcomes, such as updating land use plans, zoning ordinances, communicating about climate risks, and developing public health initiatives. The project team is completing recruitment and will begin engagement in Summer and Fall 2021.



Sample of a city stormwater systems assessment

# Narrative Case Studies

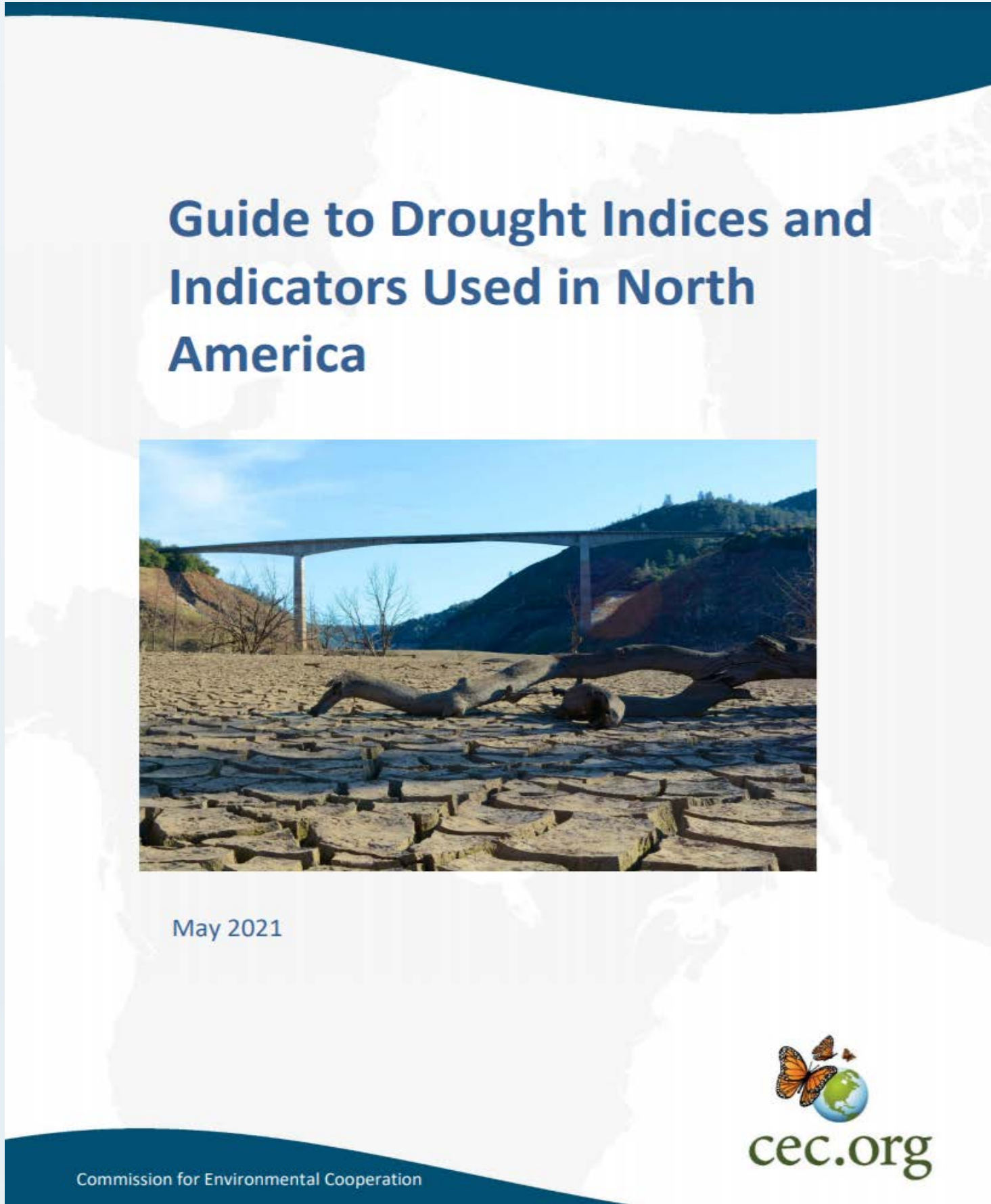


## Improving the Effectiveness of Early Warning Systems for Drought

The Commission for Environmental Cooperation (CEC), a multi-national organization of Canada, Mexico, and the United States, commissioned a study of the use of drought information and guidance for more effective use of available drought information. Meredith Muth, then with NOAA’s Climate Program Office (CPO), organized participation from the United States. U.S. organizations participating in the project included SCIPP, the National Drought Mitigation Center, the National Integrated Drought Information System (NIDIS), NOAA CPO, NOAA National Centers for Environmental Information (NCEI), American Planning Association, and the USDA Agricultural Research Service. Agriculture and Agri-Food Canada, Servicio Meteorológico Nacional (SMN), CONAGUA, SADER, Comisión de Nacional de las Zonas Áridas (CONAZA), Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP) represented partners from Canada and Mexico. The effort was led by E. Cooper Environmental Consulting.

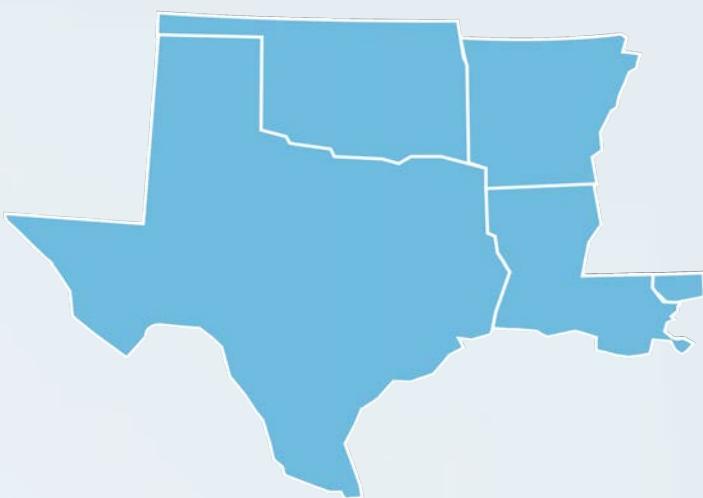
The project had 3 objectives: (1) to produce a set of guidelines for use of North American drought indicators, (2) to increase local capacity to use available drought information for planning and risk management, and (3) to strengthen existing trilateral partnerships across North America related to use of the North American Drought Monitor. To achieve these objectives, the consultants developed and executed surveys of drought information users and local officials who manage drought in each of the three nations. In addition, the consultants organized an online drought summit to discuss local needs for information. The [Guide to Drought Indices and Indicators Used in North America](#) was published in May 2021. The results of the drought summit have not yet been released.

SCIPP’s participation in the project focused on objective 2. The initial draft of the survey and format for the summit built upon SCIPP’s previous work, [Local Drought Management: A summary of how counties and parishes use drought information in the South Central United States](#). SCIPP assisted the consultants in developing survey questions, identified presenters for the summit, and reviewed the draft summary document. NIDIS and NOAA NCEI were also actively involved in the summit.

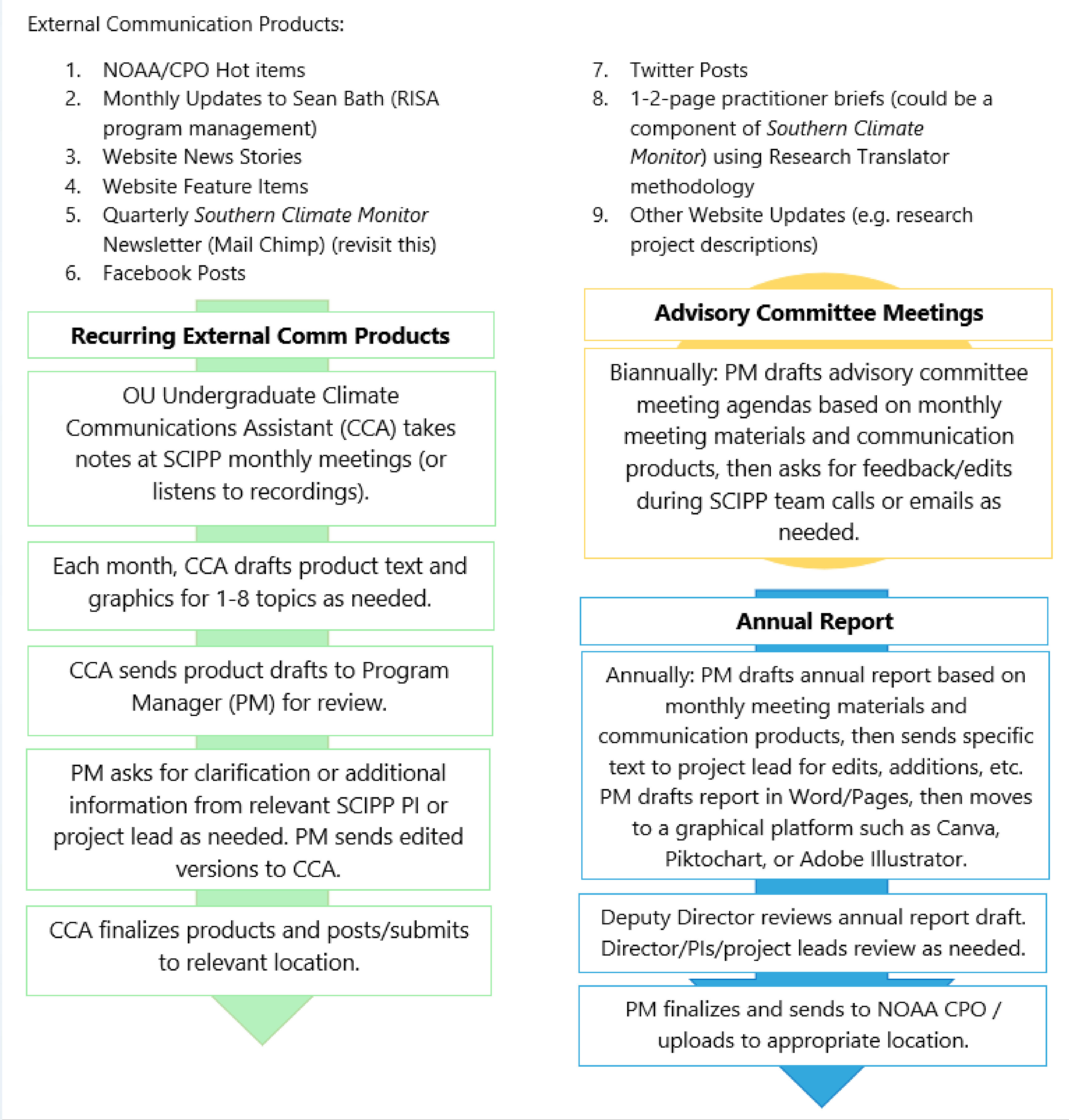


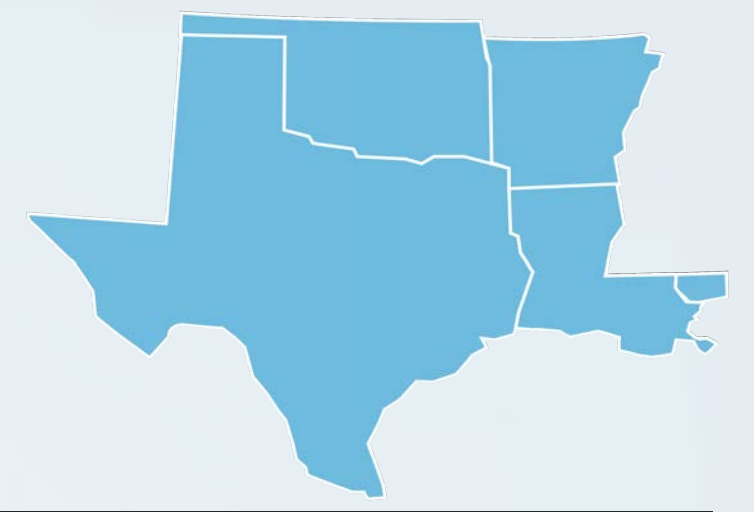
Cover Page for the "Guide to Drought Indices and Indicators Used in North America"





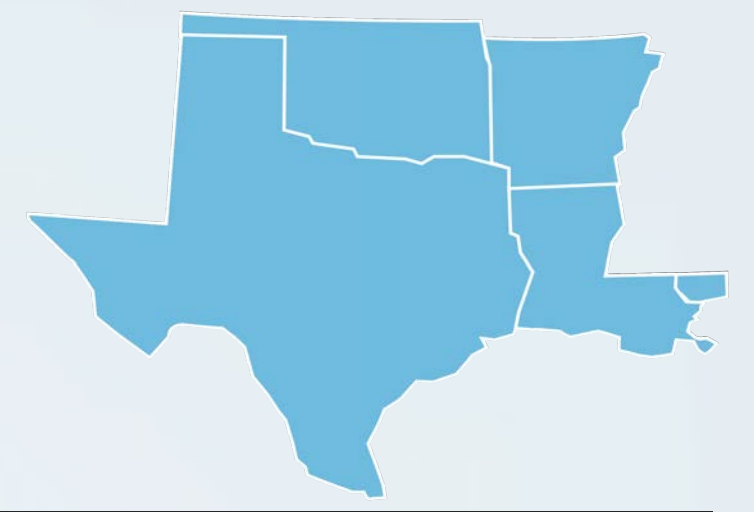
## External Communication Product Workflow





## Full Publication List

- Bartels, R.J., A.W. Black, and B.D. Keim, 2020: Trends in Precipitation Days in the United States. *International Journal of Climatology* 40(2):1038-1048. <https://doi.org/10.1002/joc.6254>
- Bertrand, D. and S. Speizer, 2021: February 2021: Extreme Cold, Snow, and Ice in the South Central U.S. Southern Climate Impacts Planning Program, 30 pp., <http://www.southernclimate.org/documents/Feb2021ExtremeCold.pdf>.
- Brown, V.M., B.D. Keim, and A. Black. 2020: Trend Analysis of Multiple Extreme Hourly Precipitation Time Series in the Southeast United States. *Journal of Applied Meteorology and Climatology* 59:427-442.
- Brown, V.M., Keim, B.D., Kappel, W.D., Hultstrand, D.M., Peyrefitte, A.G., Black, A. W., Steinbilber, K. M., and Muhlestein, G.A., 2020: How Rare was the August 2016 South-Central Louisiana Heavy Rainfall Event? *Journal of Hydrometeorology* 21:773-790.
- Brown, V.M., M. Shirley, B.D. Keim, B. Marx, and C. Lutz, In Press: Effect of Meteorological Variables on Crawfish Harvest in Louisiana. *Climate Research*.
- Eachus, J.D., and B.D. Keim, 2020: Content Driving Exposure and Attention to Tweets during Local, High-Impact Weather Events. *Natural Hazards* 103(2):2207-2229. <https://doi.org/10.1007/s11069-020-04078-6>
- Grondin, N., and B.D. Keim, 2021: Spatial and Temporal Characteristics of Tropical Cyclone Strikes in the Northeastern Pacific Basin between San Diego, California and Las Peñitas, Nicaragua. *International Journal of Climatology* 41:E2178-E2193.
- Howe, W. T., M. Shafer, and R. Riley, 2020: A social network analysis of climate-related information exchange in the Southern Climate Impacts Planning Program (SCIPP) areas of operation. Southern Climate Impacts Planning Program, 29pp. [Available online at <http://www.southernclimate.org/documents/SCIPPSNA2020.pdf>].
- Keim, B.D., Kappel, W.D., Muhlestein, G.A., Hultstrand, D.M., Parzybok, T.W., Lewis, A.B., Tomlinson, E.M. and Black, A.W., 2018: Assessment of the extreme rainfall event at Nashville, TN and the surrounding region on May 1–3, 2010. *JAWRA Journal of the American Water Resources Association*, 54(5), pp.1001-1010.
- Langsdon, J., R. Riley, and D. Bertrand, 2021: Planning for Climate Resilience and Adaptation: A Compilation of Planning Process and Financial Assistance Resources in the South Central United States. Southern Climate Impacts Planning Program, 32 pp., <http://www.southernclimate.org/documents/ResourceCompilation.pdf>.
- Le, J., Lyndahl (Brucks), M., Shafer, M., and Franklin, A. L., accepted: Identifying Roles for Public Administrators to Foster Anticipatory Altruism for Severe Weather Preparedness. *Public Administration Quarterly*.
- Lyles, W., P. Pennell, and R. Riley, 2021: Jazz on Tulsa time? The remarkable story of the network of flood mitigation champions behind the Tulsa turnaround. *Nat. Hazards Rev.*, **22**(4), [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000480](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000480).
- Lyndahl (Brucks), M., Le, J., Shafer, M., and Franklin, A.L., accepted: The Influence of Individualistic Worldviews on Severe Weather Preparation. *Journal of Emergency Management*.
- Osland, M.J., P.W. Stevens, M.M Lamont, R.C Brusca, K.M. Hart, J.W. Waddle, C.A. Langtimm, C.M. Williams, B.D. Keim, A.J. Terando, E.A. Reyier, K.E. Marshall, M.E. Loik, R.E. Boucek, A.B. Lewis, J.A. Seminoff, 2021: Tropicalization of Temperate Ecosystems in North America: The Northward Range Expansion of Tropical Organisms in Response to Warming Winter Temperatures. *Global Change Biology* 27(13):3009-3034. <https://doi.org/10.1111/gcb.15563>
- Riley, R. E., 2021: An evaluation of the utility of a decision maker-driven climate hazard assessment tool, *Wea. Clim. Soc.*, **13**, 147-157, <https://doi.org/10.1175/WCAS-D-20-0019.1>.
- Spade, D., K. de Beurs, and M. Shafer, 2020: Major Over- and Underestimation of Drought Found in NOAA's Climate Divisional SPI Dataset., *J. Appl. Meteor. Climatol.*, **59**: 1469-1480. <https://doi.org/10.1175/JAMC-D-19-0272.1>



## Relevant Presentations

“An Evaluation of the Utility of a Decision Maker-Driven Climate Hazard Assessment Tool”, *16th Symposium on Societal Applications: Policy, Research and Practice, American Meteorological Society*, January 14, 2021, Virtual (Riley).

“A Freeze Climatology for Southeast Louisiana.” *The American Society of Sugar Cane Technologists – Louisiana Division Annual Meeting*, February 4, 2020, Baton Rouge, LA (Keim).

“Climate and Data Science for Hazard Mitigation and Resilience at the Local Level” (panel), *National Academies of Sciences, Engineering, and Medicine, Committee on Applied Research Topics for Hazard Mitigation and Resilience*, May 25, 2021, Washington, DC (Shafer).

“Climate Change & Health”, *Contemporary Issues in Public Health (HLTH 5223) guest lecture*, November 12, 2020, University of Central Oklahoma, Edmond, OK (Shafer).

“Climate Change & Health”, *Educational Health (EDU 311) guest lecture*, October 15, 2020, University of Central Oklahoma, Edmond, OK (Shafer).

“Climate Change & Health”, *Educational Health (EDU 311) guest lecture*, April 6, 2021, University of Central Oklahoma, Edmond, OK (Shafer).

“Climate Change and Impacts to the Hydrologic Cycle”, *Mississippi River: Delta Blues hosted by the Kurt Vonnegut Museum and Library*, May 13, 2021, Greenville, MS (Brown).

“Climate Change and Precipitation”, *Filling the Gaps: Climate and Weather Information for Small to Medium Sized Water Utilities, Southern Climate Impacts Planning Program*, July 13, 2020, Virtual (Brown).

"Climate Change, Precipitation, and Crawfish", *Parkview Baptist Church*, April 13, 2021, Baton Rouge, LA (Keim and Lewis).

“Examining Extreme Rainfall Forecast and Communication Processes in the South-Central United States”, *National Weather Center Weather & Climate Systems Seminar*, April 14, 2021, Virtual (Wanless).

“Examining Extreme Rainfall Forecast and Communication Processes in the South-Central United States”, *16th Symposium on Societal Applications: Policy, Research and Practice, American Meteorological Society*, January 9, 2021, Virtual (Wanless, Riley, Berry and Brooks).

“Flood Mitigation Champions, Networks, and ‘Soft Skills’”, *FEMA Region VII’s Community Rating System Symposium: CRS 2021: Building Partnerships for Advancing CRS in R-VII*, Wednesday, March 17, 2021. Virtual (Lyles).

“Hurricanes and Storm Surge in a Changing Climate and other SCIPP Projects.” *The Southern Plains Science Seminar*, August 12, 2020, Virtual (Keim).

“Hurricane Signatures.” *The LSU Science Café*, August 25, 2020, Virtual (Keim).

“Hurricanes, Storm Surge, Heavy Rainfall, and Freezes in a Changing Climate.” *National Academy of Sciences Gulf Research Program*, September 27, 2020, Virtual (Keim).

“Tornadoes.” *Lion’s Club of Baton Rouge*, June 7, 2021, Baton Rouge, LA (Keim)

“2020 Hurricane Season.” *Lion’s Club of Baton Rouge*, October 19, 2020, Baton Rouge, LA (Keim).

“2021 Hurricane Season.” *The Hurricane and Extreme Weather Experts Media Briefing*, June 15, 2021, Baton Rouge, LA (Keim).



**SCIPP**  
A NOAA RISA TEAM

**KU** INSTITUTE FOR POLICY  
& SOCIAL RESEARCH  
The University of Kansas



**Sea Grant**  
Texas  
AT TEXAS A&M UNIVERSITY