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DEVELOPING A BASELINE FOR A RISA PROGRAM: SCIPP'S NATURAL HAZARDS AND CLIMATE CHANGE PLANNING SURVEY

James E. Hocker*¹, Lynne M. Carter², Mark A. Shafer¹, and Dan O'Hair³

¹Oklahoma Climatological Survey
Southern Climate Impacts Planning Program
University of Oklahoma, Norman, OK

²Southern Climate Impacts Planning Program
Louisiana State University, Baton Rouge, LA

³College of Communications and Information Studies
University of Kentucky, Lexington, KY

1. OVERVIEW OF SCIPP AND RISA

The Southern Climate Impacts Planning Program (SCIPP) is the newest addition to NOAA's Regional Integrated Sciences and Assessments (RISA) program. Established in August 2008, SCIPP is a joint research program of the University of Oklahoma (OU) and Louisiana State University (LSU) with combined expertise provided through the Oklahoma Climatological Survey, Louisiana Office of State Climatology, Department of Geography and Anthropology at LSU, Southern Regional Climate Center (SRCC) at LSU, and National Weather Center at OU.



Figure 1. SCIPP's 6-state area of responsibility.

The area of focus for SCIPP is the 6-state region including Oklahoma, Texas, Arkansas, Louisiana, Tennessee, and Mississippi; this same region corresponds to the operational area of responsibility for the SRCC thus creating a unique collaborative opportunity between research and operations (Fig. 1).

* Corresponding author address: James E. Hocker, Oklahoma Climatological Survey, 120 David L. Boren Blvd., Suite 2900, Norman, OK 73072; email: jhocker@ou.edu

The RISA program is a unique stakeholder-driven research and engagement program that focuses on regional climate issues across the United States through a collection of nine university-based research programs (Fig. 2).

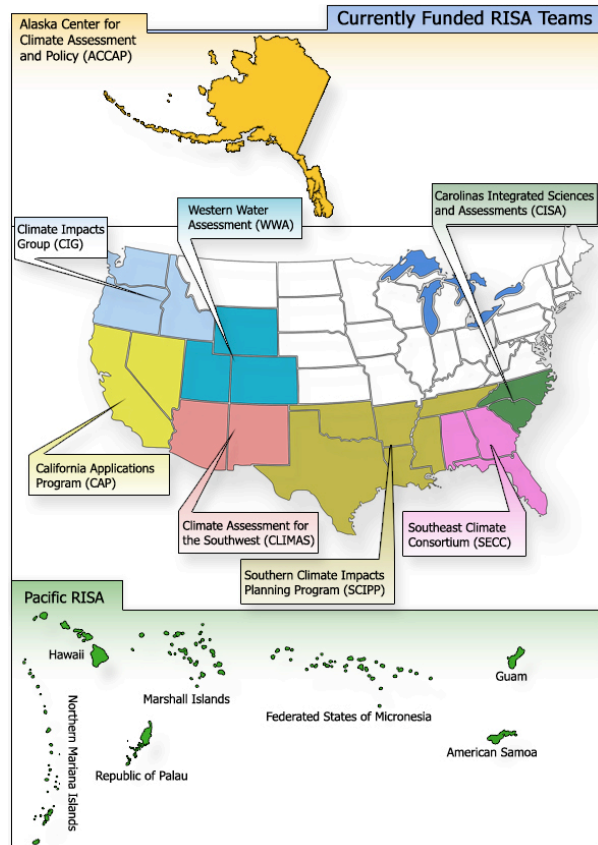


Figure 2. Currently funded RISA teams (as of January 2010).

Each RISA team focuses on climate issues inherent to the local region as identified through

interaction between local & regional decision makers and each team. Through this interaction, scientists gain a greater understanding of the information and research needs of the suite of decision-makers in their region which in turn leads to more relevant research, the development of practical information products and tools, and the establishment of suitable educational materials and training tools.

As the 9th RISA team, SCIPP's engagement and research concentrate on several critical climate issues in the Southern U.S., including multi-hazard planning (severe storms, drought, flooding, hurricanes, extreme temperatures, etc.), coastal impacts, downscaled climate projection applications, and climate adaptation planning. SCIPP addresses these regional climate issues through developing strong relationships with decision makers, partners, and other stakeholders, conducting pertinent and regionally relevant scientific research, and providing critical information, products, tools, and education.

2. THE NEED FOR A SCIPP 'BASELINE'

2.1 Why Establish a 'Baseline'?

Due to the complex series of communications that occur between RISA teams and their suite of stakeholders, it is extremely difficult for each program to measure effected changes in decision-making and planning processes that occur throughout years of interactions. It is for this very reason that SCIPP undertook an effort in its first year and a half to establish a program 'baseline' from which future successes could be measured. The primary objective for establishing this baseline was to create a record of 'how things were' prior to closer interaction between our program and users.

While a variety of climate issues exist across the southern U.S., the main theme identified to serve as the core component of SCIPP's baseline effort is local and regional hazard planning. A review of FEMA disaster data illustrates that SCIPP states are among the most disaster affected areas of the United States as indicated by Table 1. FEMA disaster declarations include hazards such as severe storms, hurricanes, severe ice storms, fires, floods, snow, tornadoes, coastal storms, freezes, and other hazards – all of which impact SCIPP states to varying degrees. Drought is also a major regional contributor to SCIPP hazards as depicted in Fig. 3, although this particular hazard is not represented in FEMA data since drought is

the responsibility of the U.S. Department of Agriculture.

Rank	State	# of Disasters Declared
1	Texas	83
2	California	74
3	Florida	63
4	Oklahoma	62
5	New York	59
6	Louisiana	56
7	Alabama	53
8	Kentucky	51
9	Arkansas	50
10	Missouri	49
11	Illinois	48
12	Mississippi	46
13	Ohio	44
14	Tennessee	43
14	Washington	43
14	Kansas	43

Table 1. FEMA disasters as of Jan. 15, 2010 with each SCIPP state highlighted in green.

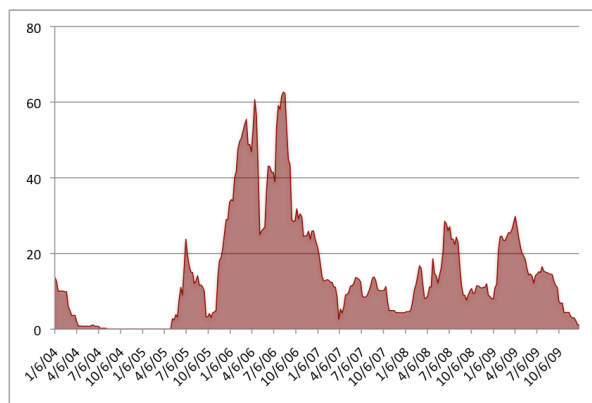


Figure 3. Percent area of the SCIPP region in severe (D2) to exceptional (D4) drought from January 2004 to December 2009. Average SCIPP area in D2 to D4 during this period was 14.77%.

While hazards are certainly not the only regionally relevant climate issue across the south (other issues include and are not limited to water resources, agricultural, ecosystem preservation, health, energy, transportation, etc.), it is one in which a dense network of planning and decision making entities exist region-wide, thus allowing SCIPP an entry into a community of critical regional stakeholders. In addition, with the prospects of increases in future climate hazards, it was determined that the involvement of this set of local- and regional-level planners was particularly important for the purposes of encouraging the incorporation of climate change into existing planning activities.

2.2 Survey Focuses

While hazards serve as the foundation for SCIPP's baseline study, several related themes were also included in this research: climate change planning & information use and needs. The climate change planning portion was included to quantify perceptions of climate change, learn about planning activities already undertaken, and determine climate change planning challenges and needs. The information use and needs component was incorporated into the baseline assessment to gauge the types of information sources already being used, determine the utility of information products to users, and finally learn the greatest information needs for planning purposes. Taking all survey components together, the SCIPP regional survey was conducted to reveal critical information in the following areas:

- Identify regionalized differences in hazard planning priorities – *What matters where?*
- Learn the network of partners contributing to hazard planning – *Who/what is key to the process?*
- Reveal the most significant barriers in hazard planning – *What hinders your ability to plan for hazards?*
- Evaluate climate change perceptions – *How concerned are you?*
- Quantify potential climate change impacts – *What impacts are concerning (or not) in your area?*
- Discover climate change-related planning activities occurring regionally – *What is your community already doing?*
- Diagnose climate change planning hurdles – *What factors limit your ability to incorporate climate change into the planning process?*
- Determine data and information sources used in hazard and climate planning – *What sources of information are indispensable?*
- Assess gaps in data and information – *What information, training, etc. is missing that would improve planning and preparedness?*
- Develop a growing list of regional contacts interested in working with SCIPP on these issues and further projects.

The answers to these questions are helping to guide future SCIPP research and engagement efforts while also serving as a record of

stakeholder perceptions and needs during the initial stages of SCIPP.

3. SURVEY METHODOLOGY

3.1 Survey Development

SCIPP's baseline effort was accomplished through the use of an electronic survey developed and tested during the spring and summer of 2009. Initial stages of development began with a full review of hazard and climate change-related surveys implemented elsewhere across the U.S. This process led to the development of a functional outline consistent with the informational goals of the survey (bulleted list to the left):

- Section 1 – Personal Information
- Section 2 – Local Level Hazard Planning
- Section 3 – Climate Change and Hazard Planning
- Section 4 – Information Use and Needs for Effective Hazard Planning

Survey questions were developed through a combination of originally developed material and synthesis of questions from other studies that were adapted as appropriate for this study. Utilized surveys included two hazard and communication surveys - Meo et al. (2002) and Oregon (2008) - as well as climate change perceptions, impacts, and planning survey - Moser and Tribbia (2006).

An iterative review process was undertaken in the months following initial development and was instrumental in establishing a valuable, yet manageable survey. Initial editorial revision occurred among members of the SCIPP team which helped to remove repetitive questions present in the initial draft. Following this initial internal review, an external survey pre-test was conducted during summer 2009 to test the effectiveness of the survey with a representative set of participants. The group involved in the testing was the University of Oklahoma Center for Risk and Crisis Management's Community Advisory Board (CAB). The CAB is comprised of a collection of local- and state-level stakeholders representing a variety of organizations including emergency management, public health, city planners, utility providers, municipal government, and various other groups. A presentation was provided to the CAB to overview the regional survey concept and solicit their interest in serving as pre-test participants.

A total of 21 CAB members participated in the survey pre-test which occurred during July 2009. In addition to the survey, participants also completed a series of feedback questions. Question-by-question statistics, combined with the follow-up questions, provided critical feedback necessary for further refinement of the survey. Among a number of details revealed by the pre-test results, the most significant finding was a relatively low completion rate of less than 60%. Based on this finding content was reduced by 25%, question sections were shortened to lessen fatigue, progress percentage bars were added, and material was re-organized as needed. Additional iterative review of the survey took place amongst the SCIPP team as well as the University of Oklahoma's Institutional Review Board (IRB) to ensure compliance with all university research rules and regulations.

The end product of the revision process was a 50-question, approximately 30-minute electronic survey administered through the popular survey site www.surveymonkey.com. At no time during the survey was any personally identifying information solicited, thus maintaining participant anonymity. Up front the survey included an IRB-approved consent form that the user was required to agree to prior to beginning the survey. Following the completion of the full survey, the participant was routed to an external website where they were given an option to provide an email address for the purposes of obtaining survey results and participating in future SCIPP-related projects and engagement.

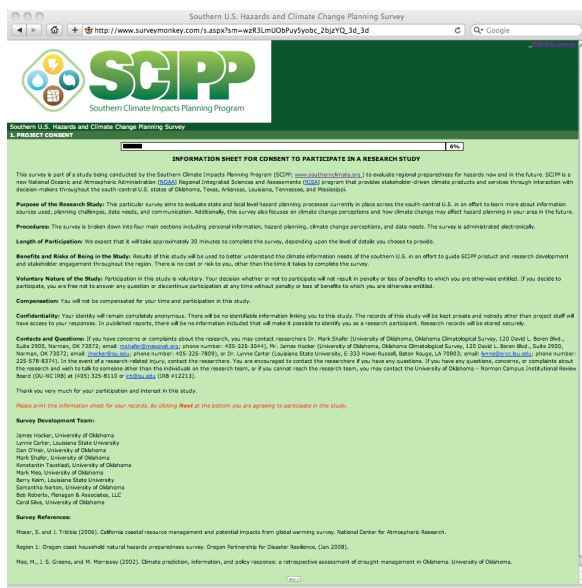


Figure 4. SCIPP region-wide survey entry page.

3.2 Survey Distribution

Also occurring in tandem with the revision process in August and September 2009 was the development of a survey distribution list. Local, state, tribal, and regional contacts were obtained through an extensive online search which focused on the following stakeholder groups:

- Emergency management officials
- City officials
- Local-level hazard planners
- Members of regional planning districts, development districts, and councils of government (70 in all across the SCIPP region)
- Planning consultants
- Public works specialists

Contacts were sought for each city, county/parish, and tribal entity listed in the Federal Emergency Management Association (FEMA) Hazard Mitigation Plan status list available on the FEMA website (<http://www.fema.gov/library/viewRecord.do?id=3571>; available as of January 15, 2010). This comprehensive search yielded a contact list of more than 2,000 decision-makers across SCIPP's 6-state region of Oklahoma, Texas, Arkansas, Louisiana, Tennessee, and Mississippi.

Survey distribution was completed over a 2-month period from mid October to late December 2009 through a series of mass emails. The initial distribution occurred on October 15, 2009 and was sent to just under 2,000 separate contacts region-wide. Along with this distribution, representatives at the FEMA Region 6 office and the National Weather Service Southern Region Headquarters also mass distributed the invitation throughout their agencies for the purposes of reaching more local decision makers. A second distribution of more than 2,000 contacts occurred on November 4, 2009 and served as a reminder message for some as well as a thank you to those who already participated. Due to active participation, the survey deadline (originally scheduled for early December) was extended via a third distribution message sent on November 23, 2009. The fourth, and final survey reminder email was sent on December 14, 2009. During each major distribution, recipients were encouraged to pass the survey along to colleagues, partner institutions, and others as appropriate. Email and phone calls were also made as needed during the collection phase to ensure as complete regional representation as possible.

4. RESULTS

The following section highlights a selection of results obtained from the 50-question hazards and climate change planning survey administered by the Southern Climate Impacts Planning Program during October 15 to December 18, 2009. Additional research results will be made available through a more detailed report currently in the initial stages of development which will be posted on SCIPP's website at www.southernclimate.org when complete.

4.1 Summary of Results and Demographics

A total of 278 decision-makers participated in the regional survey which was focused on the 6-state SCIPP region of Oklahoma, Texas, Arkansas, Louisiana, Tennessee, and Mississippi; although participants from other states were welcome to participate as well. The completion rate for the regional survey was 70.9% (197 of 278 participants completed the survey in full), thus representing a significant improvement over the survey pre-test completion rate of 57.1% (12 out of 21 pre-testers completed the survey). The state-by-state breakdown of survey participants is as follows (with % of participants per state shown):

- Texas – 96 participants (36.2%)
- Oklahoma – 53 participants (20.0%)
- Louisiana – 48 participants (18.1%)
- Arkansas – 27 participants (10.2%)
- Tennessee – 26 participants (9.8%)
- Mississippi – 14 participants (5.3%)
- Alabama – 1 participant (0.4%)

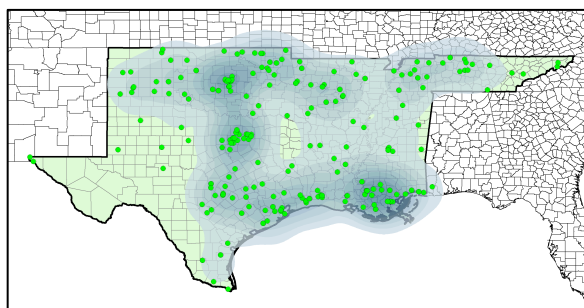


Figure 5. Regional participation in the SCIPP hazards and climate change planning survey. The blue shading is a density analysis (darker blue indicates a tighter clustering of participants).

The geographic coverage of survey participation was fairly consistent regionally as indicated in Figure 5. Large urban centers accounted for the highest density of survey participation, particularly

in New Orleans, LA, Dallas/Ft. Worth, TX, and Oklahoma City, OK, while other urban areas were also apparent throughout the region.

Survey participants came from strong educational backgrounds with more than 96% (254 of 263 that answered the educational question) having attended college or completed degrees. The average participant age was 51.5 years old with males comprising the majority at 76% (203 of 267). Participants were mostly of Caucasian descent at 92.3% (253 of 274) of the total.

Regarding the employment background of the participants, a mixture of professions was represented with emergency service managers, city planners, elected officials, police & fire personnel, and environmental specialists comprising the vast majority of those taking the survey. 84.4% of those taking the survey indicated that they are involved in some capacity in the hazard planning process. Roughly half of the participants have responsibilities at the community (50.4%) or county (47%) levels while nearly 20% work at the state level. 76.6% indicated that their offices have 3 or fewer staff members devoted to hazard planning responsibilities for their respective areas.

4.2 Hazard Planning Results

Among the most important questions posed in the hazard planning section was a question rating the level of importance of various weather hazards to a given area's hazard planning. This question was included to elucidate the perceived level of importance of all hazards by location. Participants ranked each hazard from critically important (4) to not important at all (0). Table 2 denotes the top ranking hazards by state.

State	Critical Hazards
TX (n=92)	Drought, wildfire, hurricane, flooding, windstorm, tornadoes
OK (n=48)	Wildfire, flooding, tornadoes, severe winter storms
LA (n=44)	Hurricane, storm surge, flooding, inundation
AR (n=25)	Tornadoes
TN (n=22)	Tornadoes
MS (n=12)	Hurricane, storm surge, flooding

Table 2. Hazards receiving more "critically important" rankings than any other ranking; shown for each state. Number of individuals is shown in parentheses as n=number.

Not surprisingly, tornadoes were frequently rated as a critical hazard, which was the case for all states except for Louisiana. Participants in Texas and Oklahoma, which are two of the most disaster declared states in the nation, identified the greatest mix of hazards, many of which related to recent significant events (TX: Hurricane Ike in 2008, severe drought in 2008-2009, wildfires in 2009; OK: major ice storm in 2007 and wildfires in 2009). Coastal states heavily identified the hydrologic- related hazards as would be expected (storm surge, flooding, hurricanes, and inundation).

Most hazards were found to be largely present in local-level mitigation, response, or other plans. Figure 6 illustrates the existence of plans for each hazard, with the plan category including all plan types combined. The hazards most prevalent in plans included flooding, tornadoes, and wildfires with more than 200 plans each. Regarding hazards lacking plans (aside from the location-specific hazards such as inundation, storm surge, and hurricanes), the most significant were drought, heat waves, and extreme cold.

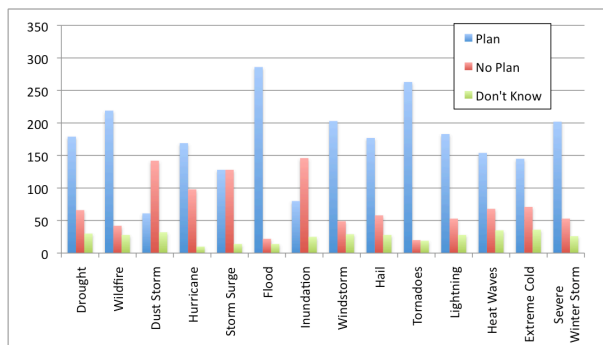


Figure 6. The number of plans or no plans per hazard. The “plans” category includes the collection of mitigation, response, and other plans. The total number of participants to answer this question was 244 (n=244).

A series of questions were posed to reveal the key network of agencies and organizations that contribute to the hazard planning process. Table 3 reveals the partner organizations that planners relied upon most heavily in support of developing hazard-related plans out of the more than 40 options provided in the survey. Particularly key hazard planning partners included public safety agencies and public works at the local level, state department of emergency management at the state & regional level, and the Federal Emergency Management Agency and National Weather Service at the federal level.

Level	Key Hazard Planning Partners
Local (n=226)	Public safety agencies (77.9%), Public works (77%), County & Parish Commissioners (69.9%), Association of City/Council Governments (66.8%)
Regional & State (n=218)	State Dept. of Emergency Management (91.3%), State Dept. of Environmental Quality (67.4%), State Dept. of Health (66.1%)
Federal (n=209)	Federal Emergency Management Agency (82.3%), National Weather Service (71.3%), U.S. Army Corps of Engineers (55%)
Other (n=182)	American Red Cross (92.9%)

Table 3. Organizations that hazard planners most frequently interact with in support of developing plans. The value in parentheses indicates the relative number of participants to select each organization.

The survey also evaluated the challenges and limitations associated with hazard planning at the community, county/parish, and state levels (Fig. 7). Hazard planners consistently indicated that factors such as limited staff, limited funds, and higher work priorities elsewhere presented significant challenges to the hazard planning process. Additional comments provided by those taking the survey also identified several common areas or concern including lack of interest and support by local officials, difficulty in obtaining local information easily, and the cumbersome federal review process.

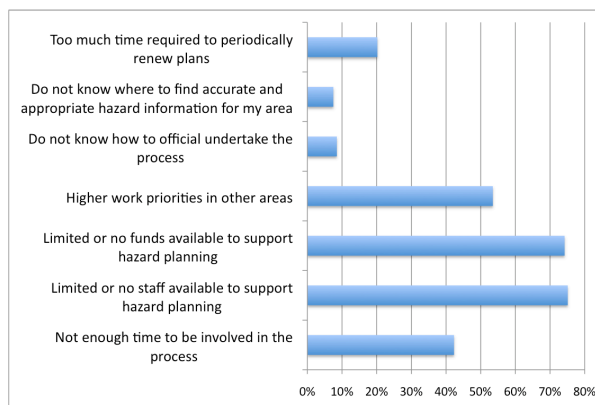


Figure 7. Challenges faced by planners in developing hazard plans. The percentage values represent the relative number of participants to select each statement (n=213).

4.3 Climate Change & Hazard Planning Results

A series of thirteen climate change-related questions were presented in section 3 of the survey in an effort to evaluate regional climate change perceptions and the potential impacts of climate change on regional hazards. Questions also investigated climate change planning activities underway and if these had been incorporated into hazard planning. Finally, critical hurdles and information needs were assessed. The results presented here represent a sampling of the answers provided in this survey section.

The initial question posed in this section evaluated the participant's level of agreement with several statements on climate change. Figure 8 illustrates the results of two of the five climate change statements posed. The statements in Fig. 8 are antithetical, so it is an excellent opportunity to measure the consistency of the responses. The results indicated that 71% of the participants either strongly or slightly agreed with the statement that climate change is occurring. 71.1% strongly or slightly disagreed with the statement that climate change is not happening now, thus establishing that participants were consistent with their answers. Although smaller, there was a non-negligible set of participants who disagreed with the notion of climate change occurring; this represented approximately 22% of the participants.

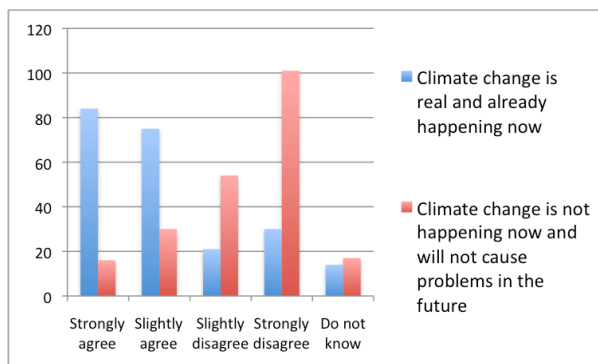


Figure 8. Results showing the participant's level of agreement with two of the five included statements on climate change (n=225).

In terms of individual level of concern over climate change, 21.3% indicated that they were very concerned, 41.8% were concerned, 33.3% were not very concerned, and 3.6% were not concerned at all. When asked how informed they were about the issue, 25.3% believed they were well informed, 60.4% felt moderately informed, and the remaining

14.2% indicated they were not well informed. In a subsequent question, survey takers were asked to select a statement that best represented their opinion towards preparing for future climate change and associated impacts. The statement most widely selected (with 58.5% of the total) was, *"We should prepare for the most likely scenario based on the best available information (e.g., scientific studies, economic forecasts), especially in planning decisions that have long-term impacts of 30 or more years."*

In later questions climate change was more closely associated with hazard planning. In one particular question, participants were asked whether or not they had included (or considered including) climate change in hazard planning and why. The responses identified that 26.3% had included climate change while 73.7% had not. The answers to the open ended question of "why?" provided a rich source of more than 100 unique, written explanations revealing a number of issues, concerns, successes, and challenges faced by decision-makers. The following selection of answers illustrate the mix of responses:

- *"Current mitigation planning calls for hazard analysis of known hazards. Global warming is not scientifically proven to the majority of the emergency managers. In other words, global warming as well as creation is a THEORY. I'm not wasting my time planning on theories."*
- *"Not enough confirmed data for me to know exactly what to prepare."*
- *"Our plan was adopted in 2006, at a time when 'climate change' had not been fully recognized."*
- *"Focus on more immediate hazards."*
- *"Time and manpower on 'more' planning is not available. We can't keep up with the mandatory ones."*
- *"During the next review of the Hazard Mitigation Plan, there will be consideration of climate change. However, cycles, naturally occurring events, are already considered. The verdict is still out on 'global warming'. I think it may be poor science."*

To wrap up the climate change section, participants were asked to identify the most critical needs for including climate change in local or state-level hazard plans. A total of nine different answer options were provided as shown in Figure 9.

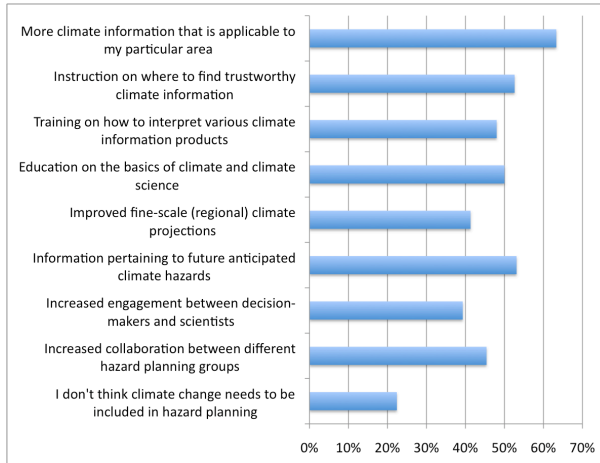


Figure 9. Critical needs for including climate change in hazard plans. The percentage values represent the relative number of participants to select each need statement (n=196).

Among the most frequently selected needs identified were “more climate information that is applicable to my particular area” (63.3%), “information pertaining to future anticipated climate hazards” (53.1%), “instruction on where to find trustworthy climate information” (52.6%), and “education on the basics of climate and climate science” (50%). Somewhat surprising was the relatively low percentage of participants who felt climate change should not be included in hazard planning (22.4%).

4.4 Information Use and Needs Results

In the final section of the survey, twelve questions were asked with a focus on information sources used in hazard planning, utility of information sources, and needs. The purpose of the section was to learn the critical sources of information in planning in addition to determining the sources of data needed to further support hazard and climate change planning.

A series of data source questions were presented to evaluate how critical information was in the hazard planning process. Figure 10 represents survey responses provided for weather, climate, and water information regularly used in hazard planning. Weather information, flood risk maps, as well as return periods of past extremes were found to be the most frequently used data sources in this category. Data sources in other categories were also measured; these included socioeconomic information, environmental resource information, and geologic information (not shown).

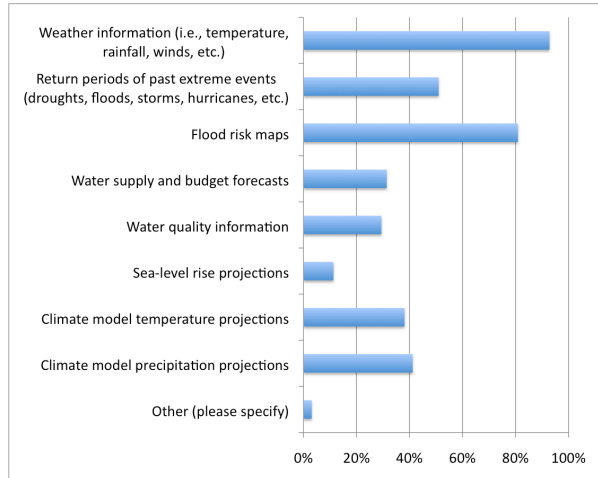


Figure 10. Weather, climate, and water information sources regularly used in hazard planning. The percentage values represent the relative number of participants to select each data source (n=194).

In another question, survey participants were asked to rate the usefulness of different types of information for determining future climate hazard risks (Fig. 11). Data sources found to be most useful included weather and/or seasonal climate forecasts, information on potential changes in climate impacts, and climate projections for the next few years. Interestingly, survey participants indicated that longer-term model projection information (i.e., 2040 and beyond) held less value to them than more near term projections.

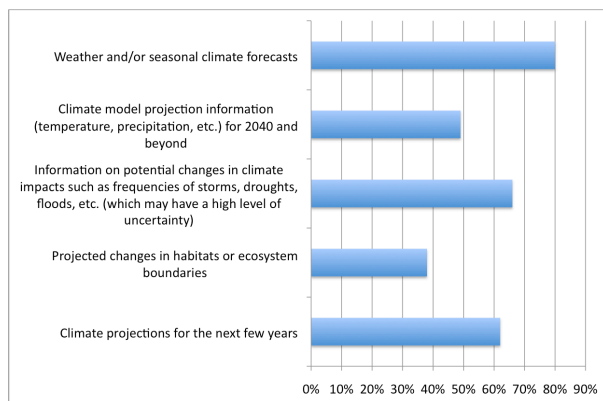


Figure 11. Data sources rated either extremely useful or very useful in assisting future climate risk assessments. The percentage values represent the relative number of participants to select “extremely useful” or “very useful” (n=194).

To close out the survey, several questions were asked to evaluate the best possible opportunities for improving the use of information and tools as shown in Figure 12.

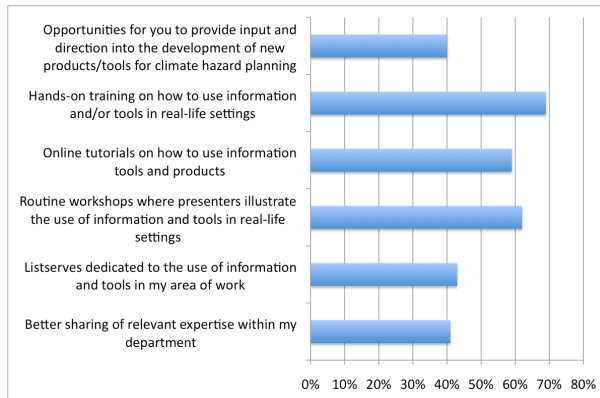


Figure 12. Opportunities for improving the use of new information and tools. The percentage values represent the relative number of participants to select “extremely useful” or “very useful” (n=193).

Participants expressed the most value in hands-on training, routine interactive workshops, and online tutorials (more than 50% of those taking the survey selected each of these). Quite surprisingly, the item found to be the least useful was the opportunity for users to provide input and direction in the development of new products and tools. It appears that options involving formal training, meetings, or instruction were generally of greatest interest to those taking the survey.

5. FINAL THOUGHTS

The process of undertaking a fairly comprehensive regional survey, albeit time-consuming, was an incredibly worthwhile and important process, particularly during the early stages of the new Southern Climate Impacts Planning Program RISA. Each phase, from development, to testing, to revision, and ultimately distribution, provided important information and key learning opportunities that will benefit the program in the long run. As SCIPP’s first major regional surveying effort, this project helped to achieve several important tasks including:

- The identification of a key set of critical stakeholder contacts throughout the region,
- The initial introduction of SCIPP to a broad network of planners region-wide which in turn revealed numerous stakeholders ready and interested to be engaged with the program, and
- The initial measurement of hazard and climate change perceptions, institutional & agency communication lines, information needs, and key challenges.

The information obtained from the regional survey serves as a record of conditions that existed at the beginning of the SCIPP program. In future years portions of the survey will be re-distributed throughout the region for the purposes of re-evaluating various key areas to gauge SCIPP’s contribution to progress at the decision-maker level. Aside from utilizing the survey as a ‘marker of success’ it holds significant merit as a cost-effective method for soliciting valuable information from local-level stakeholders.

Future and current stakeholder-driven research programs (RISA and otherwise) are highly encouraged to undertake similar efforts to establish baselines relatively early in their course of work; for mature programs this may be more useful as a periodic evaluation exercise. Through the process, much can be gained including the identification of key stakeholders, the emergence of users who want to be engaged, and the provision of important stakeholder information that can help to guide future work, research, and engagement.

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