BUILDING A SUSTAINABLE NETWORK OF DROUGHT COMMUNITIES

Workshop Report

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Building a Sustainable Network of Drought Communities

EXECUTIVE SUMMARY

The first step in managing large-scale (national) collaborations and networks is to consider and address how a group and a potential partnership may match up (Luther, 2005). To explore this concept and many other collaborative concepts, the National Integrated Drought Information System (NIDIS) hosted a workshop, "**Building a Sustainable Network of Drought Communities,**" which was facilitated by the National Drought Mitigation Center (NDMC) in Chicago, IL, June 8-9, 2011.

The workshop explored current examples of good communication and lessons learned within the realm of drought planning in order to address a future NIDIS Engaging Preparedness Communities (EPC) working group that is solution-focused and collaborative. With the diversity and experience of the participants at this meeting, a wealth of good practices or lessons learned in drought planning, preparedness, and general stakeholder engagement set the pathway for building a sustainable community of drought practitioners.

In his opening remarks, NIDIS Director Roger Pulwarty noted that adaptive institutions can show robustness in the following ways:

Levels of alertness—monitoring the external world for early warning signs that key assumptions are likely to verify/fail and a commitment to rigorous monitoring of performance;

Agility—the ability to react to early warning signs of problems or opportunities; flow of knowledge across components, and to adjust strategies and tactics rapidly to meet changes in the environment; and

Alignment—the ability to align the whole organization (and partners) to its mission-policies and practices that give rise to failures/successes.

Through an interactive workshop format that used Appreciative Inquiry (framing breakout sessions on success), the group was able to effectively discuss topics such as:

- Integrating Planning Efforts
- Planning Under Uncertainty
- Evaluating, Assessing, and Updating Drought Plans
- Leveraging Resources for Risk Management
- Implementing Plans and Planning Information
- Synthesizing Success Stories and Lessons Learned
- Creating a Sustainable Network of Drought Professionals

The most common themes resulting from the workshop included:

- Importance of networking and collaboration—this is a necessity. Figuring out how to make it seamless is the main goal that the NIDIS EPC Community should foster. Good communication is the key among the drought practitioners and their stakeholders.
- Celebrate success—in this future drought network, successes related to drought efforts should be highlighted within the community and to the public. This will help drive future positive interactions and collaborations. It also gives the community a sense of pride.
- "Stakeholder Buy-In"—why should stakeholders stay engaged in an ongoing drought community? Especially when there is no drought? Again, good communication and collaborations with other multi-hazard, sustainability, and natural resources planning efforts will help keep drought a priority.
- Economic, environmental, and social aspects of planning for drought—these should always be considered. This was a recurrent theme in the workshop.
- Planners should not "reinvent the wheel"—planners involved in climate adaptation work can and should reference the best drought planning resources and case studies to help them incorporate drought in their overall planning efforts.
- "Have a plan for the plan"—how and who will make it happen? What kind of leadership is needed within the NIDIS EPC community to track its progress and success?
- Sharing of resources—as budgets become slimmer, a central location of available resources and the sharing of resources in the area of drought preparedness and mitigation is necessary. Communication regarding these potential resources should also be integrated into this NIDIS EPC community.

Since the occurrence of the workshop, several EPC-related activities have taken place, including a webinar in December 2011. This workshop report and additional EPC updates will be placed on the U.S. Drought portal (www.drought.gov). Currently, the American Planning Association (APA), NIDIS and the NDMC are collaborating to produce a Planning Advisory Service (PAS) Report to connect drought mitigation resources with the planning practices of local, regional, tribal and state governments. This builds on the work of the APA's Hazard Planning Center, which produced a similar PAS Report (sponsored by FEMA) on how to integrate multi-hazard planning into planning practices. In May 2012: The APA's drought planning project webpage went live and can be found at: http://www.planning.org/research/drought/index.htm

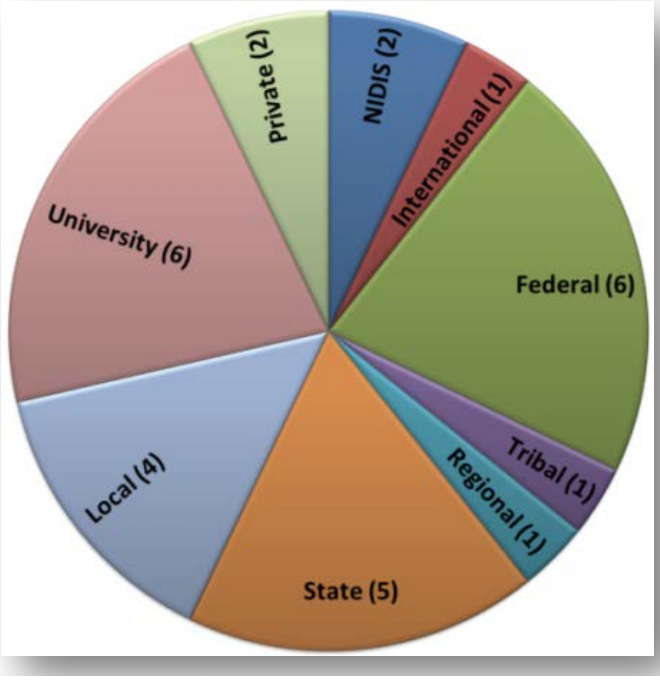


Figure 1: A breakdown of the participant demographics at the EPC Building a Sustainable Network of Drought Communities workshop. NDMC facilitators are not included in this diagram.

INTRODUCTION

The National Integrated Drought Information System (NIDIS) Program Office, along with the National Drought Mitigation Center (NDMC), hosted a workshop at the Summit Executive Centre in Chicago, Illinois, on June 8-9, 2011, to facilitate the enhancement of a cooperative network of drought professionals to expand communication related to planning, monitoring, research, and policy. Approximately 40 participants attended, representing a broad array of planning practitioners, researchers, and agency partners including the American Planning Association (APA), the International Council for Local Environmental Initiatives (ICLEI), the Chicago Climate Action Plan Team, Agriculture and Agri-Food Canada, AMEC of Colorado, the Colorado Water Conservation Board, the Texas Division of Emergency Management, the Interstate Commission of the Potomac River Basin, the Southern Climate Impacts Planning Program, Cornell University, South Dakota State University, the NDMC, the NIDIS Program Office, and the National Oceanic and Atmospheric Administration (NOAA). A breakdown of participant demographics is shown in Figure 1 (see Appendix 1 for a complete participant list).

The primary objective of this workshop was to expand communication and increase collaboration among drought professionals by engaging them in discussions of drought planning issues and problems that are important to them and by working together to develop strategies to address them.

Figure 2: Workshop participants.

NIDIS

NIDIS, established by federal law in 2006, is an interagency, multi-partner effort for improving drought early warning through research and through more targeted information dissemination. NIDIS draws on the personnel, experience, and networks of numerous federal agencies, tribal nations, 6 Regional Climate Centers, the Regional Integrated Science Assessments (RISAs), the NDMC, state climatologists, universities, and many other local emergency managers, planners, and organizations.

NIDIS builds on existing system infrastructure, data, products, and service networks to improve coordination of monitoring, forecasting, and impact assessment at national, basin, state, and local levels. For example, it incorporates data from numerous agencies such as the U.S. Department of Agriculture's Natural Resources Conservation Service, the U.S. Geological Survey, and the U.S. Army Corps of Engineers. It also incorporates operational products such as the U.S. Drought Monitor and the NOAA/Climate Prediction Center's Seasonal Drought Outlook. Additionally, researchers are working to help decision makers in many contexts by making drought monitoring, forecasting, and impacts information available for a variety of spatial scales and geopolitical boundaries. In late 2007, NIDIS launched the U.S. Drought Portal, or drought.gov, a website that pulls together many federal, state, and academic resources for monitoring and preparing for drought.

NIDIS is supported by the NOAA Climate Program Office (Figure 3) and is housed at the NOAA Earth System Research Laboratory in Boulder, Colorado.

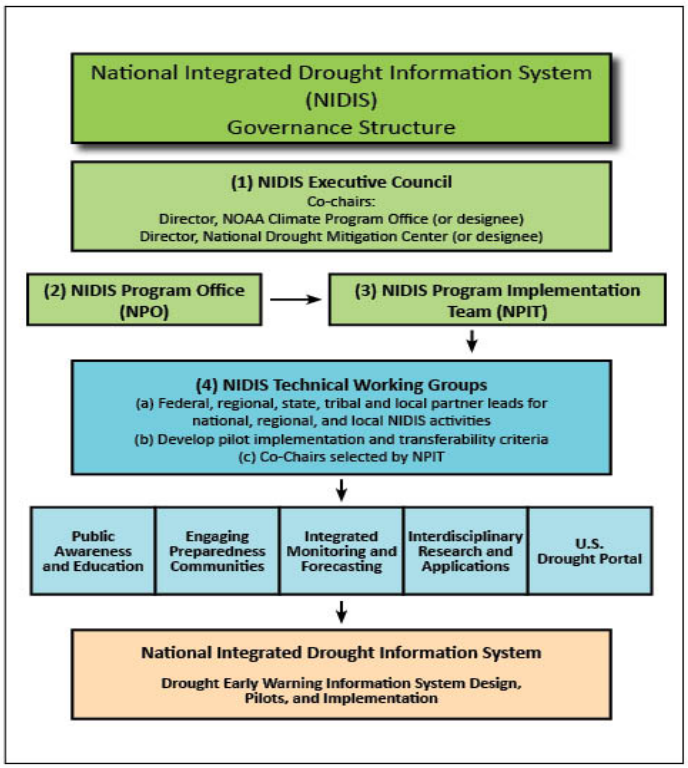


Figure 3: The NIDIS governance structure.

THE NIDIS ENGAGING PREPAREDNESS COMMUNITIES WORKING GROUP

The Engaging Preparedness Communities (EPC) Working Group is one of 5 NIDIS technical working groups established by the NIDIS Implementation Team to facilitate the design and implementation of a national drought early warning system (Figure 3). The primary objective of this working group is to assist municipalities, states, tribes, and other entities in planning for and reducing drought risks.

To accomplish this, the NIDIS implementation plan states that the working group will

- Facilitate communication by establishing and improving collaborative networks for planning, monitoring, and research.
- Help secure funding and lead the development of drought simulations for risk scenarios and post-drought assessments.
- Highlight case studies and success stories from past droughts to assist communities in learning from others' experiences.

The EPC working group's overall strategy for addressing these tasks revolves around engaging a diverse group of drought professionals and stakeholders from across the United States in a variety of activities (Figure 4a & 4b). The initial engagement process began in June 2008 with the NIDIS workshop titled *The Status of Drought Early Warning Systems in the United States*. This seminal workshop brought together representatives from local, state, federal, and tribal agencies as well as academic institutions and private entities to discuss drought resources, policies, strategies, issues, and needs. Following the workshop, EPC members analyzed more than 100 pages of notes to identify key stakeholder needs relevant to each of the five NIDIS technical working groups (Bathke et. al, 2008). These findings were used as a basis to create a searchable state drought plan database for organizing drought policies and strategies; construct a series of surveys to establish communication and obtain additional information; and design a series of interactive webinars to expand communication and further explore issues in drought planning and preparedness. The *Building a Sustainable Network of Drought Communities* workshop continued the discussions that arose in previous EPC engagement activities, explored additional drought planning strategies and issues identified by participants, and provided an opportunity for important face-to-face dialogue and networking.

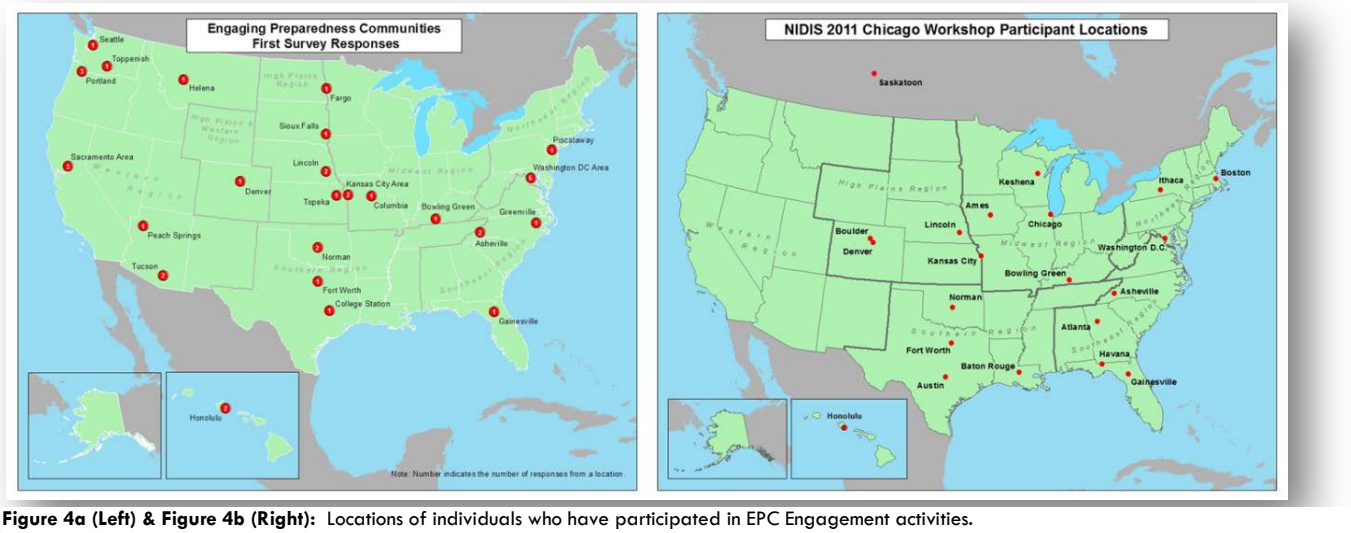


Figure 4a (Left) & Figure 4b (Right): Locations of individuals who have participated in EPC Engagement activities.

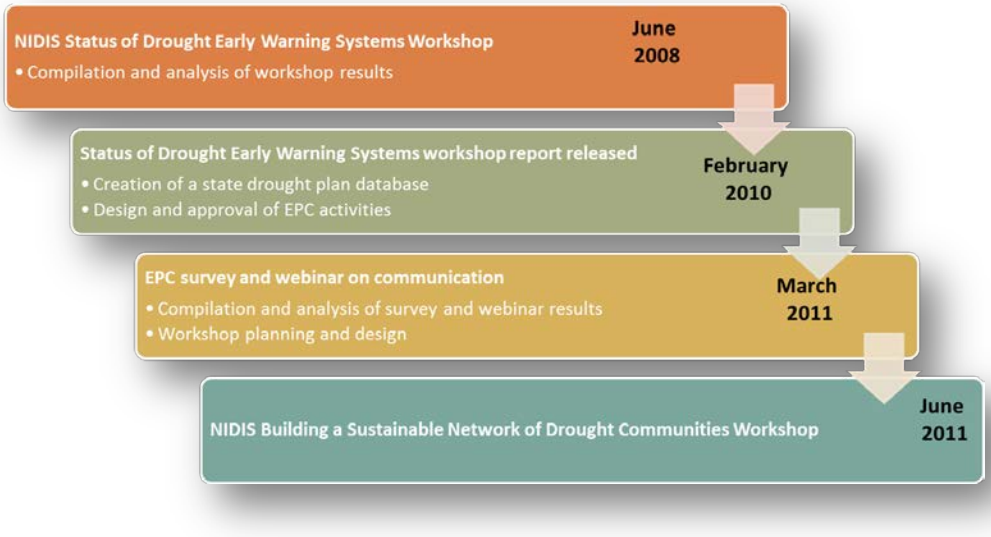


Figure 5: EPC activities leading to the NIDIS *Building a Sustainable Network of Drought Communities* workshop.

THE NEED FOR A COLLABORATIVE NETWORK

Drought is a complex problem that typically goes beyond the capacity, resources, and jurisdiction of any single person, program, organization, political boundaries or sector. Thus, by nature, monitoring, planning for, and reducing drought risk must be a collaborative process. For example, numerous monitoring networks exist. Because these networks are owned and operated by a variety of groups including federal agencies, states, tribes, and private networks, standardization issues can arise. Improved coordination could help increase the reliability and reduce redundancy of data. In addition, states are required to work together because of the existence of multi-state water compacts. Each jurisdiction may or may not have a drought plan and may have different ways of monitoring. Increased communication can help reduce inconsistencies across jurisdictions. In other circumstances, drought planning and preparedness activities are frequently carried out by water-dependent managers such as state engineers, water availability task forces, city councils, agribusinesses, land managers, and individuals. These groups and individuals may not have adequate resources or access to the latest research results to develop comprehensive risk management strategies. Building links and partnerships through collaborative networks can provide opportunities for increased communication in planning and risk reduction, promote the sharing of lessons learned and successful strategies, and foster a more effective use of resources.

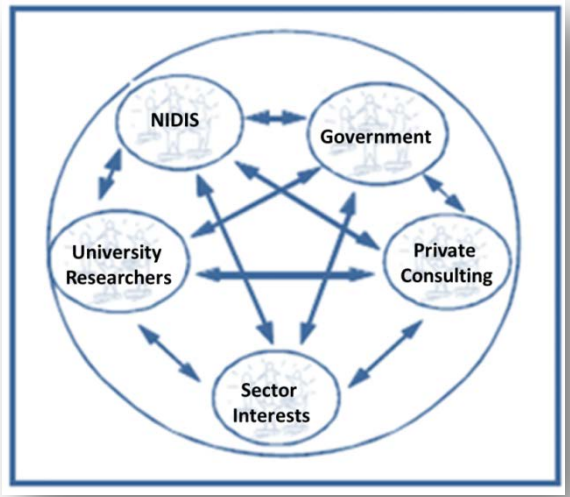


Figure 6: A problem-centered network. After Svendsen et al., 2005.

The NIDIS EPC working group envisions this network to be solution-focused, where individuals from communities, business, private consulting, and governmental institutions come together to find common solutions to drought-related planning problems that affect all of them (Svendsen et al., 2005). In such a network, the focus shifts from individual members to the network as a whole and relationships are built around a particular drought-related issue (Figure 6).

WORKSHOP SUMMARY

Workshop Format

This workshop followed the general format of plenary sessions followed by interactive small-group breakout sessions (see Appendix 2 for the workshop agenda). In the plenary sessions, all workshop participants met together for a general learning session in which speakers presented strategies and lessons learned for a variety of drought planning issues. For the breakout sessions, participants interacted to address questions and develop additional strategies for drought planning issues and problems that corresponded to the plenary session topics. The breakout sessions incorporated elements of Appreciative Inquiry (Figure 7), a public participation method that focuses on what works well in an organization and what can be done to make it even better (Figure 8). Its basic premise is, "If we focus on problems, we create more problems. If we focus on solutions, we create more solutions" (Emery et al., 2006). This method encouraged participants to focus on past and current best-practices and to use them in developing drought planning strategies and programs for the future.

Figure 7: Workshop participants engaged in an appreciative inquiry exercise.

Additionally, NDMC staff used the World Café public participation method to promote free-flowing conversations around a variety of drought-related issues. In this method, participants explore a particular issue by discussing it in small table groups. At regular intervals, participants moved to a new table to discuss a new issue. Each table had a host that stayed at the table during the entire time to keep the table discussion on task and to summarize the previous conversations for the newly arrived participants. All questions were phrased in a positive, open-ended format to allow for constructive discussion.

Figure 8: A modified model of the appreciative inquiry process used by the NIDIS working group. After Cooperrider et. al., 2003.

Topics for the plenary sessions and questions for the breakout sessions and the World Café were based upon needs identified by participants at the workshop or by participants in prior EPC activities. The topics fall under the following seven general categories:

1) Integrating Planning Efforts
2) Planning under Uncertainty
3) Evaluating, Assessing, and Updating Drought Plans
4) Leveraging Resources for Risk Management
5) Implementing Plans and Planning Information
6) Synthesizing Success Stories and Lessons Learned
7) Creating a Sustainable Network of Drought Professionals

Workshop Findings

The key findings for this workshop are divided into seven sections, which correspond to the topics addressed in the plenary sessions, the breakouts, and the World Café.

1) Integrating Planning Efforts

Developing strategies for integrated planning is a primary concern among drought professionals. At this workshop, select individuals presented case studies of recent work and participants discussed strategies for integrating local and state efforts, transferring planning efforts to different geographic locations, and incorporating drought into multi-hazard planning.

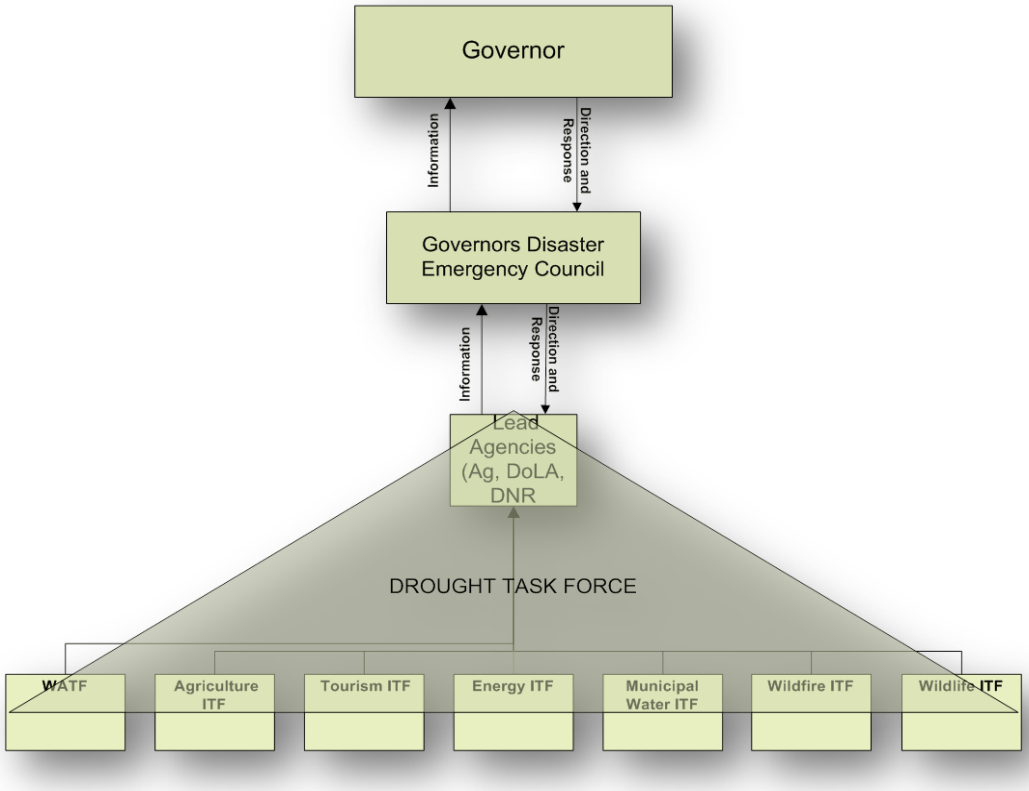
Case Studies: Success stories and lessons learned

Regional Drought Early Warning System Pilots

The NIDIS Program Office has been working with stakeholders in the Apalachicola-Chattahoochee-Flint (ACF) River Basin to develop a regional Drought Early Warning System (DEWS). The goal of the DEWS is to communicate potential problems that are associated with drought and develop methods that will allow agencies and citizens to work together to mitigate the negative impacts of drought. To develop this system, a five-step process was developed: (1) understanding the basic facts of the river basin, (2) engaging key stakeholders to build relationships and assess their needs, (3) holding stakeholder meetings and building the blueprint for the DEWS, (4) beginning DEWS activities such as developing committees to carry out the work, refining activities as lessons are learned, and evaluating the progress, and (5) continuing the DEWS beyond the pilot.

The following lessons were learned in the process of establishing the DEWS:

- Common concerns exist among stakeholders within the basin that could be addressed by the regional DEWS. Committees needed to be established to prioritize and carry out related activities.
- Fact sheets were useful for educating stakeholders and communicating climate conditions. The general public found these to be "too scientific," so the committee needs to find ways to make them more palatable.
- People want information and products on a basin scale rather than on a state scale.
- Numerous successful activities were already present in the basin. The DEWS needed to find a way to maximize efforts and avoid duplication.
- Time and money constraints can cause actions to mover slower than anticipated. In addition, you need to work with the comfort level and speed of those involved.
- Exchange of information in a setting focused on a shared resource can lead to enhanced understanding among stakeholders with competing needs.
- Each basin is unique. Therefore each DEWS pilot may need a different course of action to achieve the best results.
- Early adopters of the program were important to its successes.



Colorado State Plan Revision

Figure 9: Colorado's drought response framework.

In 2010 Colorado completed a comprehensive revision of their state drought plan. This was the first time the plan had been revised since the 2002 drought. The revised plan features the most recent advances in drought planning, includes a vulnerability assessment by county and sector using both qualitative and quantitative information, incorporates a climate change analysis, emphasizes local mitigation planning, and prioritizes and sets strategies for mitigation actions. In addition, the planning and response elements to the plan were streamlined to make them easier to understand.

The following lessons were learned throughout the drought plan revision process:

- A drought plan response annex serves as a convenient and useful tool during drought. This shorter reference document serves as a quick reference guide, so users do not have to read through an entire drought plan.
- Develop a strategy for mitigation activities. This may help individuals and entities start actions before a drought occurs.
- Keep the framework for drought response simple and logical. This has helped create clear lines of communication (Figure 9).
- Define roles and responsibilities to help ensure that individuals know who is supposed to do what and when.
- Link drought indicators to responses and actions. This has helped clarify actions for the drought task forces and has limited push-back from decision makers.

Community Level Planning

AMEC, a private consulting company, worked with the Colorado Water Conservation Board to develop a municipal drought management plan guidance document that takes features and components of the Colorado state drought plan and applies them at the local scale. The plan uses an eight-step process that includes

bringing stakeholders together; assessing past drought impacts and current vulnerability; developing mitigation and response strategies; identifying drought stages, trigger points and response targets; a staged drought response program; implementation and monitoring; and plan review and updates.

The following lessons were learned in the development of the community planning guidance document:

- Guidance documents should be specific to the issues and impacts encountered within a particular state.
- Guidance documents need to be flexible and scalable so that they are useful to both small systems with fewer resources and large urban systems with a range of professional staff. Geographic location, size, water supply sources, and financial resources are among the variables that dictate community needs.
- Vulnerability tools need to be refined and standardized for use at the local level.

Multi-hazard Planning

The American Planning Association's (APA's) Hazards Planning Research Center has worked with the Federal Emergency Management Agency (FEMA) on best practices in integrating multi-hazard planning into municipal planning processes. However, this work has not included drought. Based on their experiences, the APA identified several strategic points of intervention for drought planning. These include the following:

- Visioning and goal setting: Get drought on the agenda for community discussion.
- Comprehensive, functional and emergency area plans: Include drought with other hazards considered in a comprehensive plan; include drought-related issues in plans for water and sewer; identify issues related to area plans such as neighborhood and corridors.
- Implementation tools: Include drought considerations in regulations for zoning, subdivisions, landscaping, grading, building, and water conservation.
- Development work: Include drought considerations in redevelopment plans, open space preservation.
- Capital investments: Include drought considerations in water storage and distribution.

Breakout Sessions: Recommendations from workshop participants

Integrating Local and State Efforts

Drought crosses political boundaries and socio-economic sectors. As a result, any given area may be subject to more than one drought plan. For example, a community may have a local drought plan, but also fall under the jurisdiction of a state or watershed plan. Participants stressed that integrating planning efforts is a challenge that must be taken using the appropriate methods and tools. Successful integration of local and state planning efforts begins with stakeholder engagement. Building relationships and gaining trust is critical and takes time. This can be facilitated by engaging stakeholders early and often and by developing a plan encouraging all stakeholders to actively participate. Strong leadership and facilitation at stakeholder meetings combined with the use of public participation tools such as Appreciative Inquiry are effective in identifying and understanding stakeholder needs, encouraging stakeholders to recognize and focus on their common concerns, and helping stakeholders reach solutions tailored to them. Workshop participants also offered considerations for designing a drought plan that is integrated among several governmental levels. For example, regardless of the methods employed or the stakeholders involved in the effort, politics will inevitably factor into this endeavor, potentially hindering progress. To alleviate potential political issues, participants suggested that integrating efforts between local and state drought planning should start to occur. Efforts can then be scaled up to the state level, and also scaled down to the local (and/or basin) level.

Transferring Planning Efforts

A related integrated planning concern is the feasibility of transferring a plan designed for one geographic location to another. Based on their past experiences with non-drought related planning efforts, participants pointed out that it is helpful to consult the plans and approaches of other similarly sized institutions or jurisdictions and to extract those parts that are relevant. For example, the College of Menominee Nation consulted other institutions when developing their greenhouse gas inventory, and the city of Chicago consulted plans that had been developed by Toronto and New York City when developing its climate change plan. When adopting plans or components of plans developed by others, it is crucial to consider and incorporate the unique characteristics of your location. These include environmental concerns, climate features, social characteristics, attitudes toward risk, water source and demand data, economic indicators, state and local regulations, political issues, and trans-boundary coordination efforts.

Effective communication is a key factor in the successful transfer of knowledge, strategies, and planning efforts. Appropriate training and documentation are required to ensure that those who are trying to learn a process understand the data, methods, and results. For example, officials in one state may use a certain type of model for risk analysis. Without the appropriate training and supporting information, officials in another state may not know how to use the model or how to interpret the output. Things that are second nature to one organization may not make sense to those trying to learn the process.

Additional factors that contribute to success in a transferability endeavor include

- ensuring that a clear direction exists for the project;
- finding an operational home and technical support for a product, program, or model;
- obtaining buy-in and participation of stakeholders;
- factoring in flexibility to incorporate local needs and demands;
- developing tool kits to help meet local guidelines;
- studying impact data and lessons learned; and
- setting clear benchmarks.

Integrating Drought Planning into Multi-Hazard Planning

Cities, counties, states, regions, and tribes have developed and implemented many different types of planning documents, including water supply plans, climate change action plans, and emergency plans. In addition, these governments are required to develop a hazard mitigation plan as a condition for receiving certain types of federal disaster assistance. Hazard mitigation plans are complex in nature as they require the identification, description, and incorporation of all the natural hazards that can affect the jurisdiction. However, taking the time to integrate planning efforts can help develop a more effective planning process and may create a more efficient use of resources.

To identify strategies for integrating drought planning into multi-hazard planning, participants first identified opportunities and processes for building drought resilience within local, county, and regional scopes of authority. During a current or after a recent drought, stakeholders are dealing with or have recently dealt with economic, environmental, and social impacts of drought. This presents an opportunity to engage stakeholders in discussions concerning the need for building drought resilience and improved coordination into existing planning documents. A suggested course of action includes the following:

- identify and meet with stakeholders;
- identify the problems and impacts;
- form the goals;

- create policies to eliminate barriers to effective planning;
- brainstorm potential incentives;
- create a drought resiliency plan or incorporate drought resilience into an existing plan; and
- Implement, monitor, and update the plan.

When incorporating drought into existing multi-hazard plans, it is necessary to include and integrate the needs of multiple sectors. Conflicts often arise over needs, uses, and perceptions of stakeholders within these sectors. For example, urban residents may not have a clear perception of the severity of a drought when they are able to maintain landscaped lawns because water prices do not increase. Conversely, rural populations may see and experience drought conditions more directly.

To avoid, reduce, or manage conflicts, workshop participants encouraged regional planning. Regional planning presents an opportunity to bring together all relevant stakeholders, engage them in discussions of the issues that they each face, and encourage them to collaborate and equitably share their limited natural resources. The following actions may help support regional planning efforts:

- Work with local hazard mitigation plans and the stakeholders that are affected by the plans.
- Obtain crucial drought-related data and information from local and regional climate centers.
- Use planning processes and personnel that are already in place as a resource or framework. For example, the Environmental Protection Agency (EPA) and tribal governments collaborate on ecosystem regulation and the U.S. Fish and Wildlife Service Landscape Conservation Cooperatives plan regionally across geopolitical boundaries. The associations of counties may also serve as an additional resource.
- Make contested situations work by putting the problem into context. For example, one of the driving forces behind the creation of NIDIS was the need for a forum for negotiations and conflict avoidance among river basin states.
- Use examples from the past, such as the conflicts over grazing rights that took place between cattlemen and sheep farmers during the early 1870s to the early1900s. Holding meetings near or at the contested water source and tasking stakeholders with collection and analysis of data and information may help them learn of resource limitations and the need to equitably share resources.

2) Planning Under Uncertainty

Drought professionals have become increasingly concerned with how to plan under uncertainty given the increased focus on climate change and the anticipated impacts. In this session, presenters highlighted cases where uncertainty has been incorporated into planning efforts.

Case Studies: Success stories and lessons learned

ICLEI-Local Governments for Sustainability

ICLEI-Local Governments for Sustainability provides technical consulting, training, and information services to build capacity,

Figure 10: Framework developed by ICLEI and pilot communities for integrating climate change into planning. Source: ICLEI, 2011.

share knowledge, and support local government in the implementation of sustainable development at the local level. As part of their climate programs, ICLEI has worked with a variety of pilot communities across the country, each with different motivations and vulnerabilities, to integrate climate change mitigation and adaptation into planning (Figure 10). Communities addressed the uncertainty associated with climate change in one of three ways: no regrets (provides benefits now regardless of future impacts), low regrets (increases resilience with little additional cost or risk), and win-win (reduces climate change impacts while providing other environmental, social, or economic benefits). To learn more about ICLEI and their efforts in climate, resilience, and adaptation, please visit: http://www.iclei.org/index.php?id=10832.

Lessons learned while developing climate change adaptation and mitigation plans include the following.

- A perceived competition with other priorities exists. Therefore, the vast majority of communities should not do separate climate change mitigation and adaptation plans. Instead, they should incorporate the associated principles into their existing planning processes.
- Strong political leadership and staff support is important so that planning can be made a priority and progress can be made.
- The support of stakeholders is essential, including non-traditional stakeholders and those that are most vulnerable.
- Connection to a science provider, such as a university, RISA program, or state climatologist is critical. Communities cannot do this work without climate experts.
- Imperfect information and lack of access to data (including streamlined access) can be a barrier to action. Decision-support tools are necessary to help people quickly get to the data they need.
- In general, a lack of knowledge exists about what the impacts of climate change will be and what to do about them. Translating the science needs into formats that are useful and understandable for communities can help increase awareness.
- Building resilience to disasters and climate change requires us to work in ways in which our governments and institutions are not set up to operate.
- A lack of resources, staffing and financial, can serve as a huge barrier to planning.
- Communication and visualization can serve as huge challenges. Find a champion within the community that has the skills to communicate, educate, and empower others.

Communities in New York State

Dr. Lee Tryhorn from Cornell University is collaborating with communities in the northeastern United States to determine the type and extent of climate change impacts on water resources in the northeast and the information needed by these communities to make robust adaptation decisions given the uncertainty associated with climate change. Collaborations and case studies are ongoing and scientists hope to identify adaptation strategies and solutions that will work for multiple communities, but will be flexible to a continually changing climate.

The lessons learned in the beginning stages of this project include the following.

- When possible, high resolution reanalysis and paleoclimatic data should be used to put recent events into historical context.
- The uncertainty is large in global circulation model (GCM) generated regional hydrologic projections, and some in the scientific community question whether they should be used for adaptation purposes. Thus, we need to be clear when working with stakeholders about what these models can and cannot do.

- Adaptation strategies considered by communities comes down to their attitude toward risk. This can be influenced by the types of stakeholders, the degree of uncertainty, the familiarity or perception of the risk, and the credibility of knowledge sources.
- The cost of infrastructure can serve as a barrier to climate adaptation.
- Opportunities to include climate adaptation strategies may be present when updating current planning documents.

Menominee Nation

The Sustainable Development Institute (SDI) at the College of Menominee Nation applies the values, wisdom, and practices of the Menominee culture to promote sustainable responses to change. Their mission is twofold: to reflect upon, rediscover, and strengthen the interconnected dimensions that define Menominee sustainable development. Also, to disseminate and advance the tenets of sustainability based on what is learned, known, and valued to those who wish to share this knowledge and wisdom within the Menominee approach. The SDI fulfills its mission through scholarship, academic preparation in sustainable development, research and demonstration projects, policy recommendations, and formal and informal forums.

Lessons learned from the Menominee and the SDI include the following:

- For more than 170 years, the Menominee have been practicing sustainable forestry. By taking care of the forest, the forest has become the economic base of their economy.
- The Menominee realize the scarceness of resources. The SDI teaches students to be resilient by reusing materials when making and building things (Figure 11).
- Mutual mentorship has been successful in educating students and the community about climate change. Students interview and interact with members of their community to learn about the observed changes through time, and then reaffirm this information with climate data and models.
- A mutually beneficial approach to working with tribal members has been to work with tribal members to formulate a research agenda. In other words, ask the communities about their research needs – what would they like to help study?

Figure 11: Menominee student project of a windmill built from materials from the trash and recycled parts. Source: Mitchell, 2011.

City of Chicago, Illinois

The city of Chicago launched a climate change action plan in 2008 that focused on greenhouse gas mitigation and adaption. Their plan was to reduce 1990 levels of greenhouse gasses by 25 percent by the year 2020 and by 80 percent by the year 2050. The Chicago Climate Action Plan outlines the following five strategies to reduce emissions and prepare for change: energy efficient buildings, clean and renewable energy sources, improved transportation options, reduced water and industrial pollution, and adaptation. The planning process included impacts research to identify the top climate change impacts for the city of Chicago and an economic risk analysis to determine the costs of inaction on city infrastructure, departments, and budgets. Adaptation strategies and tactics to reduce vulnerability were also identified and prioritized by risk, timing, and department.

Throughout their planning process, the city of Chicago has documented lessons learned to share with other cities. Examples of these lessons include:

- Reasons for success include strong support from the mayor, his staff, and mid-level department managers who lead by example with work plans and adaptation initiatives.
- Solid research helps decision makers choose credible actions. Research reports, such as the economic risk analysis for climate change, have become an important selling point for their climate change action plan, especially given their recent change in administration.
- Identifying and building on existing responses and initiatives saves time, leverages existing resources, and adds support to the plan.
- Track progress and reassess so that your plan can be adjusted as problems arise.

More information on the city of Chicago's Climate Action Plan and their research, strategies, and lessons learned can be found on their website at http://www.chicagoclimateaction.org.

Evaluating Local Climate Change Action Plans

Dr. Zhenghong Tang from the University of Nebraska-Lincoln conducts ongoing research on the evaluation of local climate change action plans. To date, his studies have investigated forty local climate change action plans from across the United States (Figure 12). These plans were evaluated in terms of their awareness (that is, do policy makers understand climate change concepts), assessment of the risks of climate change in their locale, and actions to address climate change mitigation and adaptations.

Dr. Tang's findings include the following:

- State mandates provide the essential motivation for localities to adopt climate change action plans. The issue is still relatively novel in local government awareness.
- Local climate change action plans focus predominately on the built environment and pay little attention to the natural environment.
- Localities feel that climate change is a global issue and are unable or reluctant to integrate global scientific risks and impacts into their action plans.
- Plan quality is related to transportation issues. Localities with a poor history of planning in other areas may find it difficult to enact strong controls or may be less interested in planning.
- Contrary to previous studies, frequent experience with hazards may limit planning for abstract issues like climate change if localities are preoccupied with the immediate, short-term concern of reducing hazard damage.
- Drought appeared in approximately one-half of local climate change action plans. However, only one community provided an analysis of drought impacts and only two had actions pertaining to drought.

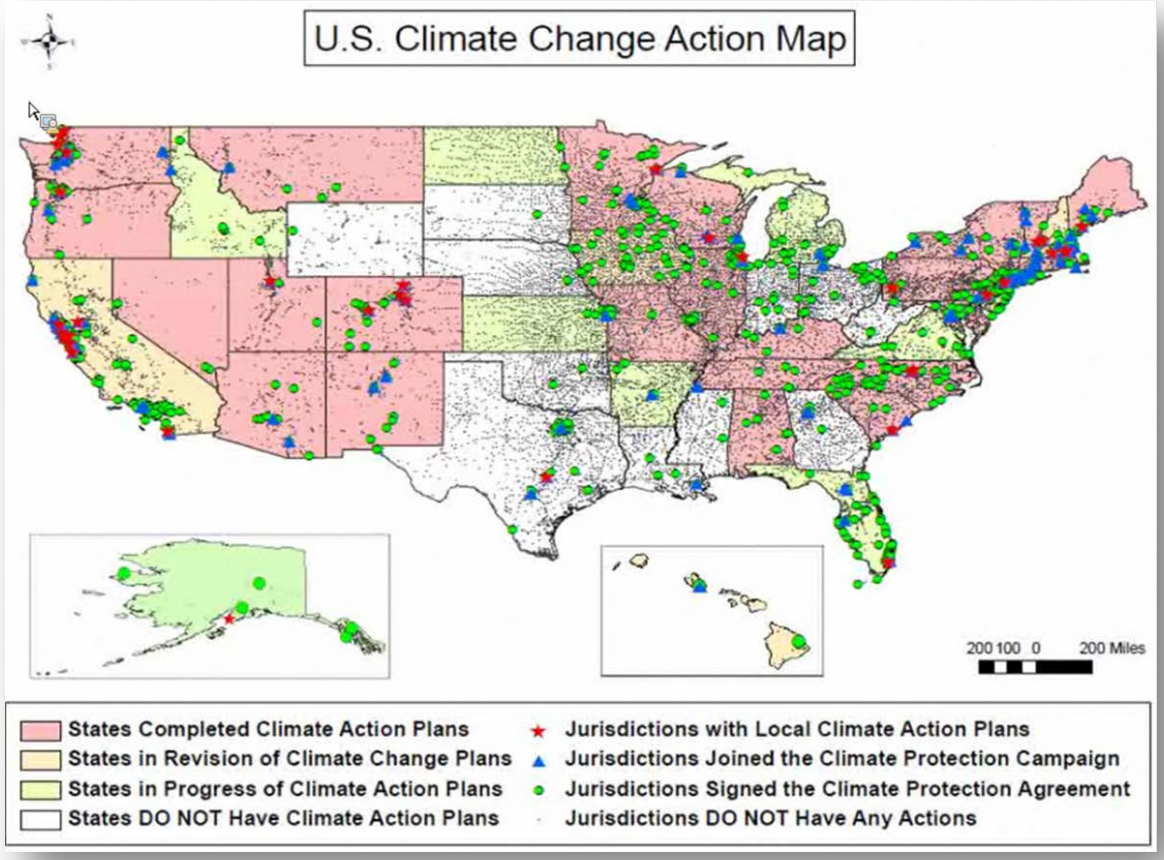


Figure 12: Status of climate change action plans in the United States, from Tang 2011.

Breakout Sessions: Recommendations from workshop participants

Incorporating drought into climate change and adaptation planning is not without its challenges. Participants have found that phrases such as "climate change" have become too political and polarizing and may hinder planning efforts. Substituting phrases such as "future climate scenarios" and "sustainability" may be more likely to get political leaders and the general public on board. An additional strategy for promoting buy-in is tying drought to national security issues and the increased conflicts that have occurred worldwide over water shortages.

Additionally, planners need to take into account that drought and climate change do not exist in a vacuum. Outside factors such as population growth, changes in land use, and shifting demographics also introduce uncertainty and need to be accounted for in plans.

3) Developing, Assessing, and Updating Drought Plans

Severe droughts in recent years have renewed interest and prompted efforts to develop drought plans at the individual, local, state, and tribal levels; evaluate existing drought plans through the use of virtual drought exercises; conduct post-drought assessments; and undertake measures to update drought plans to improve their performance in future drought conditions. For this topic, individuals who have been involved in these types of activities discussed their experiences and sought additional feedback from workshop participants.

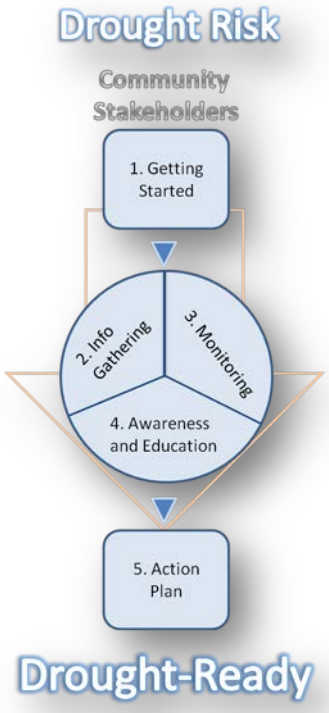


Figure 13: Drought Ready communities five-step plan to drought preparedness. Source: National Drought Mitigation Center.

Case Studies: Success stories and lessons learned

Drought Ready Communities

The Drought Ready Communities (DRC) project (http://drought.unl.edu/Planning/PlanningProcesses/DroughtReadyCommunities.aspx) was a collaborative effort aimed at adapting drought planning processes developed for a state or national level for use in municipal or regional contexts. The resulting document, the Guide to Community Drought Preparedness, includes step-by-step instructions and a series of worksheets to help communities understand and reduce their drought risk through gathering stakeholders, assembling information about the community's water use history and drought impacts, establishing drought monitoring, developing an education and awareness outreach plan, and planning responses to reduce impacts (Figure 13).

Lessons learned include the following:

- In the absence of a mandate, few communities are likely to undertake stand-alone drought planning.
- Community members like tools such as worksheets and case studies that provide instructions and demonstrations of how various aspects of a plan can be implemented.

Interstate Commission of the Potomac River Basin (ICPRB)

The Interstate Commission of the Potomac River Basin (ICPRB) has been conducting annual drought exercises for more than 20 years. In these exercises, the ICPRB, three major water utilities in the District of Columbia and the adjacent suburbs in Maryland and Virginia, governments, and the media practice communications and simulate operations as they would in an actual drought. The exercise is driven by the ICPRB Drought Operations Manual and provides the opportunity to test "what if" scenarios and new concepts and plans. The framework of the exercise is planned by ICPRB with the utility companies and is set in the context of the last exercise or actual drought. A kick-off meeting is held approximately one week before the exercise to review and set the stage, update participants on the current situation, and provide the exercise scenario. Once the exercise begins, it usually lasts about one week, includes a weekend, and involves multiple shifts for the utility companies. To ensure that everyone knows what is going on, conference calls are used to communicate the status and plans. They also attempt to make actual water releases or will simulate releases. At the conclusion of the exercise, they create an after-action report to disseminate results and recommendations.

From their many years of experience in conducting virtual drought exercises, the ICPRB has learned the following:

- Communications with the utilities companies and the media are a key activity.
- Staff changes for any of the participating groups affect the outcome of the exercise.
- Electronics, computers, and real-time data are beneficial so that staff can collect data and issue reports from anywhere.
- Test and exercise those things than can and will go wrong or will be difficult to implement. These include things such as governing bodies, politics, and recreation losses.
- Drought exercises can be used as an opportunity to explore new scenarios, situations in which the drought record is broken, synthetic or paleoclimatic records, etc.

- Including utilities and local governments in drought exercises has yielded greater cooperation during times of actual drought.

Canada Invitational Drought Tournament

Agriculture and Agri-Food Canada (AAFC) and the Canadian Water Resources Association organized the Canadian Invitational Drought Tournament to help individuals and institutions in decision-making roles think proactively about and visualize droughts that they do not normally experience. Organizers came up with the idea of using a gaming method as a means of getting people excited about working together on drought planning and preparedness. The tournament consists of multi-disciplinary teams of 4 to 6 players with representatives from policy, water, agriculture, environment, and industry. All teams work toward the goal of reducing short- and long-term drought risk by maximizing economic potential, minimizing social stress, and improving environmental conditions. Referees watch the game to lend their experience, score the adaptation and mitigation options, and assist in writing follow-up reports (Figure 14). The tournament is centered on a fictional water basin to avoid appearing as though organizers were trying to develop policy. Teams are guided through a multi-year drought scenario of unknown duration and intensity. A pre-determined budget is established and the teams make tactical and strategic decisions regarding the adaptation and mitigation of drought impacts. In addition, they have the option to implement adaptation options before drought occurs. A workbook outlines the scenarios and the purpose and rules of the game.

Figure 14: The Canada Invitational Drought Tournament.

Lessons learned while facilitating and playing the tournament include:

- The tournament provides an opportunity for knowledge exchange and networking. It also allows people to look at drought in a holistic way.
- Participants tend to work as a team versus competitively in their sector roles. In an actual drought situation this is not likely to be the case.
- An automated process for running the game would allow for more adaptation choices.
- The scoring process need to be clear and transparent to promote learning. A cross-validation approach may assist with this.
- A significant investment is required to keep the technical elements correct. However, this is necessary to make the game work.

State of Texas Drought Plan

The state of Texas is in the process of evaluating and updating their state drought plan. The Texas Drought Preparedness Plan was originally written in 1999 and last updated in 2006. The plan provided for systematic data collection, an organizational structure that defined duties and responsibilities, an inventory of state and federal programs related to drought emergencies, a mechanism to improve the assessment of drought impacts, and provisions for dissemination of information to the media. Since then staff members have left office and knowledge of the plan and affiliated programs has been lost.

Lessons learned in the plan update are as follows:

- The original five-year planning cycle was too long. Many changes can take place in that amount of time, including new laws and statutes, organizational structure, staff turnover, agency roles, and a shifting of resources. The planning cycle has been changed to one year to allow for more frequent review. In the long run, this saves time because it is easier to keep individuals and agencies engaged in and informed of the process.
- Roles for responsible agencies need to be better defined. In the new plan, agencies are given more independence in what they are doing and provide feedback as to what they can bring to the table.
- The concept of operations should be simplified and provide for a clear line of communication between response agencies and the task force.
- A user-friendly website is necessary to assist in communication and the collection and dissemination of information.

Breakout Sessions: Recommendations from workshop participants

A virtual drought exercise provides decision makers with the opportunity to simulate the experience of being in a drought without the risk associated with an actual drought event. These exercises can be used to refine and test plans, to train new staff, and to update plans to reflect new information. Post-drought assessments provide another opportunity to document and critically analyze the response actions of decision makers during drought episodes. Recommendations for improvements can be implemented in future versions of the drought plan.

Structure and Execution of Virtual Drought Exercises and Post-Drought Assessments

Workshop participants offered recommendations on the structure and execution of virtual drought exercises and post-drought assessments. First, participants agreed that practice exercises can be applied to any type of drought plan and at any level of planning. Furthermore, the exercises should be conducted before and after the creation of the drought plan. When designing the exercise, it is beneficial to use historical data because it presents a realistic drought situation to those involved. All necessary players need to be involved in the exercise and it is imperative that they understand their role and purpose for being part of the exercise. Simple exercises, possibly conducted over the internet, provide an opportunity for more individuals to take part.

Benefits and Outcomes of Participation in Virtual Drought Exercises

Because virtual drought exercises give decision makers and stakeholders the opportunity to simulate the disaster without taking any risks, participation in these exercises offers a variety of benefits. Among the most important is that these exercises can foster better communication and build better relationships among stakeholders, which may help reduce conflict when an actual disaster occurs. Participation by a wide variety of sectors, including the media, can help ensure that the outcomes and conversations from these exercises can serve as a means to increase awareness and educate the general public.

Some entities, such as local governments, states, and regions, struggle with how to implement plans or how to integrate the requirements of multiple plans. Periodic drought exercises may ease implementation and integration and ensure that key stakeholders are kept up-to-date on the plan. Additionally, participation in these types of activities by student groups and faculty (secondary and post-secondary) either formally, through integration into curriculum, or informally, through groups and organizations such as Future Farmers of America, can serve as a way to inform and educate future planners, decision makers, and stakeholders about drought while promoting systems thinking.

Factors to Consider when Developing and Conducting Virtual Drought Exercises

- Maintain flexibility. The exercise should be applicable to all time scales and sensitive to social and cultural considerations.
- Include uncertainty and ambiguity. Participants will want certainty and quantitative information; however, these are not always available in the real world.
- Encourage innovation.
- Promote goal setting. Articulating desired outcomes helps participants stay focused and channel their time, energy, resources, and efforts into the things that matter most to them.
- Emphasize the role of the facilitator.
- Account for conflict. In basins or regions where water use is contentious or supply is limited, it is necessary to incorporate options and avenues for conflict resolution. Additionally, in these situations it is unlikely that the use of data will work, so organizers should consider using fictional data when developing the exercise. Having stakeholders and decision makers from conflict-prone areas work on the same team or toward the same goal is more likely to produce successful results.

4) Leveraging Resources for Risk Management

Research finds that hazard and resilience planning may be constrained by limited budgets and competing interests and priorities (Mileti, 1999; Booz et al., 2010; Schwab, 2010). The goal of this session was to discuss ways to help communities assess their existing resources and to coordinate and prioritize their efforts and interests to design and implement effective risk management strategies.

Expanding the Idea of Capital

Dr. Mary Emery, a sociologist from South Dakota State University, discussed ways to encourage successful engagement and implementation of planning efforts. These included appreciative inquiry, asset mapping using the Community Capitals Framework, and community coaching. Appreciative inquiry is a public participation process in which people learn from their successes. It focuses on finding solutions based upon strategies that are already working. Appreciative inquiry provides communities with a framework for identifying and leveraging existing community assets for economic development. The Community Capitals Framework (CCF) (Flora et al., 2004) identifies seven types of community assets, or capitals: financial, built, natural, human, cultural, social, and political (Table 1). Communities that use and build assets across these seven types of capital are generally more sustainable. The interconnectivity of these capitals in a drought situation is shown in Figure 15. Facilitators can use community coaching to enhance problem-solving and planning efforts. This technique encourages the use of local knowledge over outside expertise.

Figure 15: An example of the interconnectivity of community capitals during a drought. Source: Emery, 2011.

Lessons learned from using appreciative inquiry and asset mapping with CCF with communities around the world include:

- Focus on best strategies rather than best practices because what works in one community will not likely work in another.
- Appreciative inquiry helps people have conversations that are genuine and generative. It provides a way to take the confrontation out of sensitive issues such as water.
- Focusing on solutions rather than problems increases participation and engagement because people see that there is a place for their voice.
- Asset mapping with Community Capitals provides communities with a way to examine every aspect of their community and to explore how it can be used to meet goals such as economic development, drought resiliency, etc.
- In developing drought strategies, cultural, social, and human capitals are extremely important because we have to build the capacity for people to work together. We also need to change institutional and common ways of thinking and doing things based around water use and drought.
- Mapping the success of a community's efforts and the potential impacts of their strategies excites and motivates people to do more.
- When working with a community on planning efforts, use community coaching for readiness, relationships, results, reflection, reach, and resilience. This increases the capacity of the community, enhances leadership, and helps create sustainable results.

Breakouts: Recommendations from workshop participants

The CCF (Flora et al., 2004) lends itself to drought and water resources planning by providing a framework by which researchers, practitioners, and stakeholders can engage in dialogue about creating a comprehensive plan to increase drought resiliency. In this breakout session, workshop participants identified examples of tangible and intangible assets corresponding to the categories described in the CCF model (Box 1).

Table 1: The seven types of Community Capitals (Flora et al., 2004).

Capital	Definition
Financial	The financial resources available to invest in a community for capacity building, underwriting business development, and supporting entrepreneurship.
Built	The infrastructure that facilitates the livelihood or well-being of a community.
Natural	The foundation of what is available. It includes assets such as landscape, amenities, and natural resources.
Human	People's health, knowledge, skills, and motivation.
Cultural	Reflects how we see the world, what we take for granted and what we value.
Social	Reflects the connections among people and organizations that build trust and mutual support. It also includes the ties that can link the community to other assets, opportunities, and organizations with resources.
Political	The ability of a community to set standards, rules, regulations, and their enforcement.

Financial Capital
Tangibles: hazard funds, government grants, risk management insurance and federal programs

Intangibles: connections and cultural expectations

Built Capital:
Tangibles: wastewater treatment plants, wells and pumps, boat ramps, reservoirs, infrastructure, and free community meeting areas

Intangibles: good codes and ordinances, policy, and capital improvement plans

Natural Capital
Tangibles: rivers, forests, parks, reservoirs, trails, groundwater, wetlands, and wildlife

Intangibles: natural resource management, aesthetics, and historical sites

Human Capital
Tangibles: labor force, jobs, and social media

Intangibles: availability of training programs, well-educated work force, and diversity

Cultural Capital
Tangibles: written histories and government regulations

Intangibles: oral histories, indigenous knowledge, regional understanding, community values, environmental stewardship, and fishing techniques

Social Capital
Tangibles: social media, shared experiences, and shared spaces

Intangibles: volunteer organizations and relationships

Political Capital
Tangibles: mandates, laws, policies, communication, and social media

Intangibles: political pressure, political endorsements, internal politics, connections, and drought events

Box 1: Examples of capital relevant to drought planning and preparedness.

5) Implementing Plans and Planning Information

Many planners, decision makers, and citizens are not as attuned to the threat of drought as they are to the threats associated with floods, tornadoes, earthquakes, or other fast-moving, structurally damaging, and potentially life-threatening hazards. Thus, it can be difficult to sell drought planning to community leaders and stakeholders. In this session, workshop participants identified ways to encourage drought planning, to transition planning information and research into practice, and to ensure that plans are implemented.

Breakout Sessions: Recommendations from workshop participants

Encouraging Drought Planning

To encourage the inclusion of drought into planning efforts, workshop participants stressed the importance of framing the message in terms that are important to the stakeholders; educating them on the economic, environmental, and social impacts of drought; and emphasizing the benefits of planning to individuals, groups, and the community as a whole. Discussions that include the uncertainty of the future and "what if" scenarios based on projected growth and development, water shortages, and climate change scenarios may help emphasize the importance of including drought as a hazard.

Transitioning Planning Information and Research into Practice

Based on their previous experiences in transitioning research to operations, workshop participants stated that one of the most important factors for success is establishing trust and maintaining good working relationships between researchers and practitioners. This begins by bringing people together at the beginning of the process so that practitioners can inform researchers of their specific needs. Likewise, researchers will have the opportunity to tell practitioners what is doable given the current state of knowledge and technology. Maintaining communication throughout the project enables researchers to find ways that the project can be improved and identify gaps.

Once the research is complete, participants stressed the importance of framing things carefully and using appropriate terminology. Websites and decision-support tools help distribute research and assist practitioners in applying it. Extension Services and other agencies can aid in increasing awareness and educating individuals on how to use the product, tool, or information.

Implementing Drought Mitigation Plans

Historically, a recent drought has been a primary motivating factor for a community, state, region, or tribal government to develop, revise, or implement a drought plan. Thus, workshop participants unanimously suggested that entities considering developing or revising their drought plan use recent widespread droughts and any highly publicized impacts to stress the importance of drought planning and to educate political leaders and the general public about the social, environmental, and economic benefits of having a mitigation plan. Other recommendations by workshop participants are included in the following paragraphs.

Proponents of drought planning may need to lobby the government to obtain support or to mandate planning and subsequent implementation. Educating political leaders on the necessity of hazard mitigation research may also be necessary to ensure that the latest innovations in planning are incorporated. To promote buy-in by the general public and to identify and address potential barriers, stakeholders should be involved in the design and any revisions of the plan. This can encourage stakeholders to take ownership so that they will be more likely to see the plan through the implementation process. Suggestions for stakeholder involvement in plan implementation include researching culturally appropriate protocols, maintaining communication, and demonstrating how stakeholder input influenced the plan design.

A lack of funding frequently serves as a major barrier to planning. Consequently, workshop participants suggested ways to overcome this obstacle. One way is to segment drought planning activities into two categories: things related to currently funded projects and things that require additional funding. That way, progress can still be made even with a lack of resources. When taking this approach, it is important to document and show measures of success for those things that were accomplished without the use of additional resources.

When developing or revising a drought plan, it is important to keep the plan simple, yet structured. It should have enough specificity to identify who implements what components or mitigation activities and when they

should do so. This can help ensure timely responses when drought occurs. In addition, continuity in individuals working with the plan helps instill trust and gives credibility when it comes time for implementation. Periodically exercising elements of the plan, possibly in conjunction with severe weather week or a drought awareness event, can also publicize the plan and maximize the likelihood that it will be implemented during an actual drought event. Participants also suggested implementing the plan in phases, where certain components are put into effect during year one or the next drought and others are activated during year two or subsequent droughts.

When implementing mitigation activities, financial considerations can serve as a deterrent. To address this, it may be helpful to hold discussions of success stories and how mitigation activities have saved money in the past. This can take away some of the risk of implementation and demonstrate that the cost and/or investment is worthwhile. Individuals, business, and agencies may also be strongly encouraged to cooperate with mitigation activities if incentives for action and consequences for inaction are provided (for example, price water according to availability and use; those that use more should pay more).

Finally, the role of the media is critical for plan implementation. They can spearhead public awareness campaigns, educate the public, promote buy-in, provide updates on current conditions, disseminate information on implementation phases and mitigation activities, and spread and celebrate successes.

6) Synthesizing Success Stories and Lessons Learned

A goal of the NIDIS EPC Working Group is to create a database of success stories and lessons learned in drought planning. To help with this effort, workshop participants offered a variety of suggestions based on their experiences with gathering and organizing stakeholder information.

Breakout Sessions: Recommendations from workshop participants

Success stories and lessons learned are both valuable pieces of information and should be captured and shared, ideally as the planning and implementation process progresses. Success stories serve as a means to educate decision makers and stakeholders about the impact of the planning program and demonstrate a responsible use of the funding and resources that went into plan development and implementation. This can be advantageous when policy makers and stakeholders are making decisions concerning program support. Furthermore, success stories can be used to breed more success.

Sharing best-practices and lessons learned is beneficial to other similar programs. Documentation of unsuccessful practices and situations can be valuable pieces of information for other entities looking for guidance.

When collecting success stories, best practices, and lessons learned, it is important to avoid stakeholder fatigue. Thus, every effort should be made to collect existing information before involving stakeholders. Obtaining information through face-to-face interactions builds trust and increases the probability of gaining more information. To prevent information from being forgotten or lost, information should be gathered as soon as possible after a drought event. Likewise, agencies should document and transfer institutional knowledge so that new or future staff will have access to that information when it is needed in future drought events.

Workshop participants also suggested that the database of success stories and lessons learned should be accessible and easy-to-use, and should include a visual component to help make them more personal to end users. It may also be beneficial to coordinate with groups such as ICLEI or non-governmental organizations (NGOs) to assist with the collection and organization of information.

7) Building a Sustainable Network of Drought Professionals

A goal of the NIDIS EPC working group and the primary objective of this workshop was to expand communication and increase collaboration among drought professionals by engaging them in discussions of drought planning issues and problems that are important to them and by working together to develop strategies to address them. Thus, a portion of this workshop was dedicated to identifying ways to build a community of practice for drought professionals.

Case Studies: Success stories and lessons learned

Southern Climate Impacts Planning Program

The Southern Climate Impacts Planning Program (SCIPP) is one of the NOAA RISA programs (Figure 16). It is a multi-level partnership between the state climate offices of Oklahoma and Louisiana, the Southern Regional Climate Center, and the National Weather Center. SCIPP strives to increase the awareness and preparedness for all climate hazards in the southeastern United States; partner with and engage stakeholders to assess information needs and decision-making processes; develop online visualization tools to assist with local hazard mitigation planning; promote considerations of climate variability and change in long-term community planning; and provide general education and outreach. As part of their goal, SCIPP is building knowledge communities that can be resources for relevant information for local planners by translating scientific and technical information into formats more readily accessible to policy makers and integrating information inventories into a shared analytic framework. One such community is the Oklahoma Drought Community, which consists of the governor and the Oklahoma Water Resources Board, Department of Agriculture, Emergency Management, and State Climate Office. Agencies involved in this community produce a monthly publication of Oklahoma's drought status. SCIPP supports the efforts of this community by working with these agencies and stakeholders to improve and expand impacts reporting. Another knowledge community that SCIPP is building is a state planning community, which consists of officials from a variety of agencies from states in the southern region as well as climatologists. To help build this community, SCIPP held a workshop in May 2011 to introduce representatives to one another and to provide them with time to work with experts and each other to outline elements of future planning efforts.

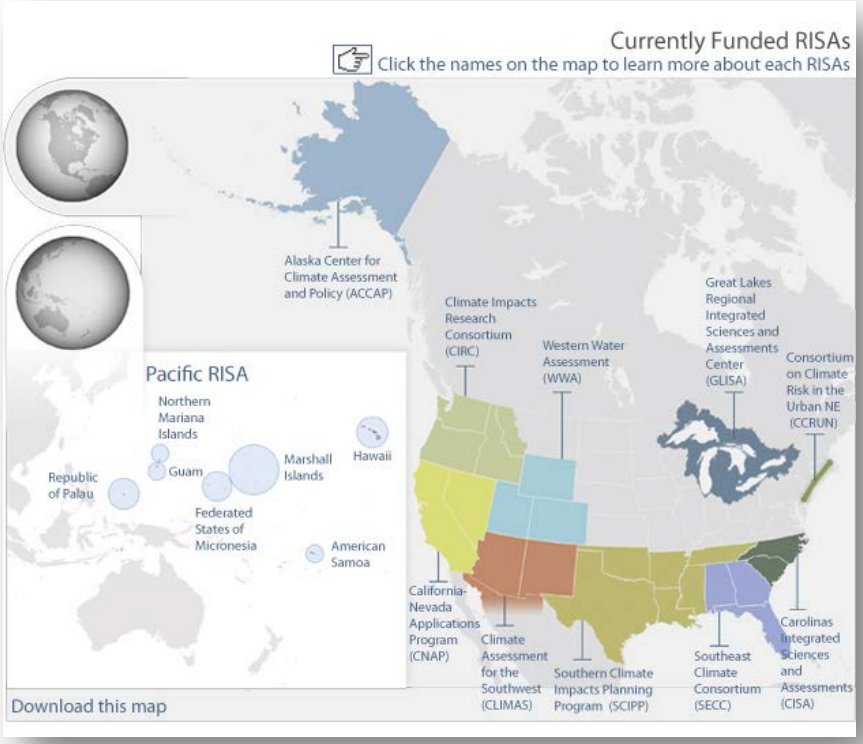


Figure 16: Currently funded RISA programs. Source: NOAA.

Lessons learned from the SCIPP efforts are as follows:

- Look for opportunities to accomplish goals with existing resources.
- Provide clear instructions and an easy process for people to report impacts and information and to share knowledge.
- Regional planning challenges include a need for more monitoring tools and predictions, additional analysis, better coordination between sectors and agencies, including drought in water plans, and determining the involvement of appropriate agencies.
- Include the diversity of local sectors and resources in discussions and planning processes.
- Provide opportunities for face-to-face interactions and conversation among members of the knowledge community so that they can share strategies and draw upon the expertise of others in the group.

Breakout Sessions: Recommendations from workshop participants

The goal of this breakout session was to discuss strategies for building the community, sustaining the community, and communicating among members. Participants first defined the community as a community of practice (CoP) or a group of people who share a common concern, are committed to common goals and objectives, and are engaged in sharing knowledge and solving problems. At the same time, the CoP should include experts and members with a wide area of expertise to address the complexity of problems that drought practitioners face. The community is envisioned as being action-oriented, willing to evolve and adapt to address new issues, and able to bring stakeholders together. Strong leadership and facilitation is important to encourage active participation, motivate discussion, and organize, update, and distribute knowledge. Anticipated benefits to the CoP include assisting members with their jobs through the sharing of knowledge. This decreases the time required for problem solving and prevents reinvention of the wheel.

Recommended approaches to building the CoP and expanding membership included reaching out to professional organizations. Presentations at annual meetings for these types of organizations are an efficient way to reach the right people and to build bridges between other communities of practice. Once the professional communities are on board, it is easier to work through these groups to reach the general public with consistent messages about drought and drought planning.

To keep the CoP action-oriented over time, workshop participants stressed the importance of defining goals as a group and periodically assessing, revising, and changing those goals as issues of importance change. Clearly defined roles and rules were also viewed as essential for making the CoP a successful endeavor. Incentives and demonstrated benefits to members of the CoP and the people they serve will increase the chances of members remaining actively engaged. Face-to-face interactions through annual workshops are desirable; however, this may not be feasible once NIDIS monies are gone. Thus, it is important that communication is maintained through platforms such as the U.S. Drought Portal, teleconferences, or webinars. In using the Portal, workshop participants felt that it is important to simplify the registration and log-in process and, when possible, eliminate log-ins altogether.

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APPENDIX 2: WORKSHOP AGENDA

Day 1 – JUNE 8TH, 2011

Start Time	End Time	Description	
8:30	**9:30**	**Welcome and Opening Remarks**	**Chair: Mark Svoboda** National Drought Mitigation Center
8:30	8:35	Local Host Welcome	Jim Schwab American Planning Association
8:35	8:45	Workshop Welcome and Goals	Mark Svoboda National Drought Mitigation Center
8:45	9:05	NIDIS Overview and Update	Roger Pulwarty NOAA, NIDIS Program Office
9:05	9:15	NIDIS Engaging Preparedness Communities Overview	Deborah Bathke National Drought Mitigation Center
9:15	9:25	Framing the Agenda	Deborah Bathke National Drought Mitigation Center
9:25	**9:45**	**Interactive Ice Breaker**	Nicole Wall National Drought Mitigation Center
9:45	**10:05**	**Break**	
10:05	**11:30**	**Integrating Planning Efforts**	Chair: Lisa Darby NOAA, NIDIS Program Office
10:05	10:10	Introduction and Session Goals	Lisa Darby NOAA, NIDIS Program Office
10:10	10:30	Synthesizing Diverse Stakeholder Needs for a Drought Early Warning System in the ACF River Basin	Lisa Darby NOAA, NIDIS Program Office
10:30	10:50	2010 Colorado Drought Mitigation and Response Plan	Veva Deheza and Taryn Hutchins-Cabibi Colorado Water Conservation Board
10:50	11:10	Community Level Planning: Lessons Learned	Jeff Brislawn and Courtney Peppler AMEC
11:10	11:30	Integrating Drought Planning into Multi-Hazard Planning	Jim Schwab American Planning Association
11:30	**12:30**	**Lunch**	
12:30	**2:00**	**Interactive Breakout Sessions**	
		Transferability of Pilot Efforts	Facilitation: Mark Svoboda, Mark Shafer, Lisa Darby
		Integrating Local and State Efforts	Facilitation: Deborah Bathke, Jeff Brislawn, and Courtney Peppler
		Integrating Drought Planning into Multi-Hazard Planning	Facilitation: Kelly Smith, Jim Schwab

Day 1 – JUNE 8TH, 2011 (continued)

2:00	**2:15**	**Break (refreshments provided)**	
2:15	**4:00**	**Planning Under Uncertainty**	**Chair: Missy Stults, Recorders: Kelly Smith & Donna Woudenberg** ICLEI (Local Governments for Sustainability)
2:15	2:20	Introduction and Session Goals	Missy Stults ICLEI
2:20	2:40	Case Study of Current Efforts with Climate Change	Missy Stults ICLEI
2:40	3:00	Climate Change in Planning: An Example from New York State	Lee Tryhorn Cornell University
3:00	3:20	College of Menominee Nation, Sustainable Development Institute	Beau Mitchell Sustainable Development Institute, College of Menominee Nation
3:20	3:40	Moving from Agenda to Action: Evaluating Local Climate Change Action Plans. Does Drought Matter?	Zhenghong Tang University of Nebraska-Lincoln
3:40	4:00	Chicago's Adaptation Planning Efforts	Olivia Cohn City of Chicago, Department of Environment
4:00	5:00	World Café	Mike Hayes and Nicole Wall National Drought Mitigation Center
Adjournment			

Day 2 – June 9th, 2011			
Start Time	End Time	Description	
8:30	**10:00**	**Evaluating, Updating, and Assessing Drought Plans**	**Chair: Mike Hayes** National Drought Mitigation Center
8:30	8:35	Introduction and Session Goals	Mike Hayes National Drought Mitigation Center
8:35	8:55	Basin Level Drought Exercise	Joe Hoffman Interstate Commission of the Potomac River Basin
8:55	9:15	Texas Drought Preparedness Council: Updating and Evaluating the Texas Drought Plan	Mario Chapa Texas Division of Emergency

			Management
9:15	9:30	Drought Ready Communities	Mark Svoboda and Kelly Smith National Drought Mitigation Center
9:30	10:00	Invitational Drought Tournament (Canada)	Harvey Hill Agriculture and Agri-food Canada
10:00	**10:15**	**Break**	

Day 2 – June 9th, 2011

10:15	**11:20**	**Interactive Breakout Sessions**	
		Invitational Drought Tournament (Canada)	Harvey Hill
		Potomac River Drought Exercise	Joe Hoffman, Crystal Bergman (Recorder)
		Climate and Drought Tools for Decision Support	Mark Svoboda
11:20	**12:20**	**Communication**	**Chair: Doug Kluck NOAA**
11:20	11:25	Introduction and Session Goals	Doug Kluck NOAA
11:25	11:40	Engaging Stakeholders	John Feldt NOAA
11:40	11:45	Using the Drought Portal for Communication	Mike Brewer NOAA, NCDC
11:45	12:20	Interactive Activity and Discussion on Maintaining Communication	Deborah Bathke National Drought Mitigation Center
12:20	**1:20**	**Lunch**	
1:20	**2:05**	**Resource-Based Risk Management**	**Chair: Mark Shafer Southern Climate Impacts Program**
1:20	1:25	Introduction and Session Goals	Mark Shafer Southern Climate Impacts Program
1:25	1:45	SCIPP Update and Lessons Learned	Mark Shafer Southern Climate Impacts Program
1:45	2:05	Three Ways to Encourage Successful Engagement and Implementation	Mary Emery South Dakota State University
2:05	**2:45**	**Interactive Activity: Community Capitals**	**Mary Emery South Dakota State University**
2:45	**3:00**	**Break**	
3:00	**4:00**	**Next Steps**	**Lisa Darby and Deborah Bathke**
Adjournment			

APPENDIX 3: BREAKOUT SESSION & WORLD CAFÉ QUESTIONS

Transferability of Pilot Efforts - Lisa Darby, Mark Shafer, & Mark Svoboda

1. Recall an instance where your organization successfully transferred a framework, methodology, or organizational structure that was developed for another geographic location (e.g. locale, county, basin, state, etc...).
2. What components and/or factors contributed to the success?
3. Envision a scenario where your community is developing a drought early warning system.
    a. What unique characteristics (e.g. environmental, social, economic, etc…) would need to be included?
    b. What spatial scale would be ideal?
    c. What data and/or information would need to be included?

Integrating Local and State Efforts – Jeff Brislawn and Courtney Peppler

1. Identify examples of successful processes or tools that have been used to facilitate the integration of any type of multi-level organizational and/or governmental planning efforts (e.g., city to state, state to federal, local chapter to regional chapter).

2. What were the general characteristics of these processes or tools in terms of each of the following:
    a. Communication and coordination methods?
    b. Resources?
    c. Other?

3. Envision that you are tasked with designing a drought plan that is to be integrated with other organizational or government levels.
    a. What considerations would you include?
    b. Describe the type and scale of the vulnerability assessment you would use.

Integrating Drought Planning into Multi-Hazard Planning – Jim Schwab and Kelly Smith

1. Identify opportunities to build drought resilience within the municipal, county or regional scopes of authority, where many land and water use decisions are made and implemented.
   Describe the process by which this could occur.

2. It can be challenging to convince people that drought is a real hazard because it is slow moving and causes little structural damage. How can we “sell” drought planning to community leaders and stakeholders?

3. You are tasked with creating a drought plan that successfully integrates multiple sectors. What planning processes provide opportunities to address conflicts over water for:
    a. Urban vs. rural?
    b. Managed environment vs. natural environment?
    c. Other?

Potomac River Basin Drought Exercise - Joe Hoffman

1. You are charged with developing a practice drought exercise for your community.
    a. Who should participate in the drought exercise?
    b. How should the exercise be structured?
    c. What are the potential benefits of conducting drought exercises?
    d. What are the potential benefits of developing the drought exercise before the creation of your drought plan? After the creation of your drought plan?

2. You are charged with creating a post-event analysis (for a drought exercise or actual drought event). What/Who should be included?

DSS Climate Tools - Mark Svoboda

1. Envision an "ideal" decision-support system.
    a. What additional information and/or products would you use?
    b. How would you obtain this information (e.g. drought portal, email, Facebook, blog)?

Effective Communication on Drought Related Information - John Feldt and Deborah Bathke

1. What type of drought-related weather/water information is most useful to your agency for your operational decision-making? How are you using this information?
2. What suggestions do you have to improve engagement among stakeholders, scientists, planners, and policymakers?
3. What would encourage you to use the Drought Portal for communication and exchange of information?

World Café Questions:

1. How can we as a drought planning community ensure that drought is appropriately addressed in climate change and adaptation planning?
2. One of EPC's goals is to create a database of success stories and lessons learned. In the past when you've gathered stakeholder info: What worked well? What could be built on for this effort?
3. How do we get more people involved?
4. We have written a comprehensive drought preparedness and mitigation plan. What can we do to ensure that it gets implemented?
5. If we had the most sustainable, successful community of practice (what make people agree and work), what would it look like?

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