



## Southeast Drought Early Warning System Southeast Partners Dialogue

August 9–10, 2022  
Atlanta Regional Commission, Atlanta, Georgia

### Meeting Goals

This regional gathering brought together partners for the first time under the newly established Southeast Drought Early Warning System ([SE DEWS](#)) network, coordinated by the National Integrated Drought Information System (NIDIS) to share and discuss ongoing drought-related activities, learn about new and innovative drought research and resources, explore emerging issues and opportunities, and identify collaborative paths forward that advance drought early warning and preparedness in this region. Specific topics addressed included:

- Sharing state and watershed approaches for drought planning and response
- Promoting effective practices for communicating current and future drought conditions
- Improving our ability to monitor, predict, and respond to rapid-onset ('flash') droughts
- Utilizing information on drought impacts to inform drought monitoring and decision-making

In addition, partners identified collaborative opportunities that the broader DEWS network can utilize to address drought across the region.

### Meeting Agenda

The agenda was organized around five distinct sessions identified as priority topics by regional stakeholders in the [2022-2025 Southeast DEWS Strategic Plan](#):

- Session 1: Today's Drought: Monitoring and Response
- Session 2: Tomorrow's Drought: Planning and Preparedness
- Session 3: New Developments in Drought Monitoring and Prediction
- Session 4: Drought Messaging and Communication
- Session 5: Drought Impact Reporting

The program included 38 talks from NIDIS partners representing a broad range of Federal, State, local and Academic interests. There was also a media panel with representatives from three media channels (radio, television, and print). The full agenda is included in Appendix A.

***Presentations and additional resources can be found on the [meeting website](#).***

## Meeting Participants

In total 70 people attended this meeting, primarily in person. This group represents 45 separate organizations or agencies including local, state, and Federal agencies, as well as representatives from universities, media, and NGOs. The list of meeting attendees is found in Appendix B.

We thank the meeting host, Katherine Zitsch from the Atlanta Regional Commission, for providing an excellent venue.

## Meeting Summary, Key Takeaways and Opportunities Identified

Meredith Muth (NIDIS) opened the meeting, welcomed participants, thanked the hosts at the Atlanta Regional Commission, and provided a brief background on the recent establishment of the newly expanded Southeast DEWS network. She also identified progress to date in the [SE DEWS 2022-2026 Strategic Action Plan](#), and provided an overview of the meeting agenda.

### Setting the stage: Drought in the Southeast

The meeting began with a series of context-setting presentations including an historical perspective on Georgia droughts, an overview of the 2019 flash drought, and progress on drought resilience from the city of Atlanta.

Pam Knox (UGA) provided a historical perspective on droughts in Georgia. Causes of previous droughts varied and include the lack of a tropical season, La Niña, and long-term climate trends. The Georgia Drought Management Plan was created following the 1998-2002 drought. Other recent droughts were in 2007-2009, 2011-2013, 2016-2017, and 2019. Each drought was different in timing, rate, intensity and the impacts observed.

Bill Murphey (GA State Climatologist) then described in more detail the meteorological setup of the 2019 fall drought. Key drivers included record-breaking heat and dryness, partially due to the strong subsidence from Hurricane Dorian and Huberto in September. The ridge amplification behind these slow-moving tropical systems stayed in place into October.

Katherine Zitsch (Atlanta Metro Commission) spoke on the need to plan for cycles of flood and drought in the Atlanta Metro region, including future long-term droughts. There is no groundwater in NE Georgia, and most of the water supply is from two primary reservoirs. Even with a growing population, water demand has declined by over 30% with investments in infrastructure (treatment plants and systems), outreach and conservation practices.

### Session 1: Today's Drought: Monitoring and Response

This session included an overview of approaches and lessons used by states to regularly assess current drought conditions, how this monitoring informs decisions and response at the state level, and a discussion of opportunities to improve state and regional monitoring.

Kirsten Lackstrom (USC) provided an overview of different state approaches to monitoring drought based on a regional research project. Key takeaways are that each state monitors drought differently due to different factors, including water rights considerations, with 6 of 7 states having a plan for drought monitoring, response, or planning. Some gaps identified include the need for post-drought assessments to revise state plans, shorter-term droughts often not addressed by current plans, tying drought mitigation needs to drought assessments, and incorporation of climate change into drought planning. The full report can be [found here](#).

Klaus Albertin then described in more detail the approach utilized by North Carolina. This includes a weekly call, organized under the NC Drought Management Advisory Council ([DMAC](#)) that solicits input from a broad range of experts and impact areas.

William Tollefson described a new effort in Tennessee on how they are using regularly updated story maps to help facilitate the sharing and coordination of [weekly drought assessments](#).

Finally, three U.S. Drought Monitor authors (Brian Fuchs, National Drought Mitigation Center; David Simeral, Desert Research Institute; Adam Hartman, NWS Climate Prediction Center) provided their perspectives on effective state input into the weekly map. For cross-state coordination on the weekly U.S. Drought Monitor input, speakers acknowledged that there has been an increase in cross-state coordination across the region but this could be further strengthened. Specific input and recommendations from this panel can be found on the meeting website.

The next set of presentations described processes for linking monitoring to decisions and responses at the state level, with speakers from Alabama, Georgia, and Florida.

Tom Littlepage (Alabama Office of Water Resources) described the Alabama Drought Management Plan which is updated every five years, and the ongoing monitoring processes utilized by the Alabama Monitoring and Impact Group (MIG) which provides information to the Alabama Drought Assessment and Planning Team (ADAPT).

Wei Zeng (Georgia Environmental Protection Division) described the process of declaring drought and the levels of drought response in Georgia, an overview of the GA Drought Contingency Plan and Water Conservation Plan, and a description of how drought influences water use permits.

Mark Elsner (South Florida Water Management District) described Water Shortage Management Activities from the SFWMD, which include Consumptive Use Permitting, landscape irrigation rules, and water supply plans that are updated every 5 years based on a 1 in 10 droughts. Also discussed were assessment and outreach activities to the public during drought and non-drought periods.

Discussion topics included the timelines for reviewing and updating drought plans, evaluation of post-drought assessment to learn how well the plan worked, drought response triggers at the federal level, and coordination between state and federal authorities (such as the USACE). There was general agreement that the Southeast is going to see more significant droughts in the future, and that we need to be ready both with legislation and with the people to implement those plans. This is challenging because it is hard to get people to pay attention to drought planning when you are not in a drought.

*Opportunities identified for the SE DEWS in the next two years on Drought Monitoring:*

- Conduct an assessment of indicators to describe which ones work best for the Southeast.
- Better understand how to incorporate soil moisture into drought assessments.
- Continuing cross-border collaboration to ensure we are being consistent in the indicators and timescales we use in monitoring and weekly USDM recommendations.
- Continue to share ideas and concepts for drought assessment and reporting; especially relating to impact assessments and flash drought.
- Link drought monitoring and condition assessment with broader information on water resource status and trends.
- Work to get existing tools and resources (monitoring, information, communications, etc.) out to all relevant sectors.

## Session 2: Tomorrow's Drought: Planning and Preparedness

This session provided an overview of approaches utilized by different states and watersheds on formal drought and water planning, highlighted specific activities from each state that have supported drought planning and response efforts, and identified opportunities to strengthen drought planning in a Southeast multi-hazard context as states update their existing plans.

Kirsten Lackstrom (University of South Carolina) started with a summary of key findings from her research that outlined state-specific drought planning approaches across the Southeast, and highlighted planning needs, gaps and opportunities. One key finding was that agriculture impacts were not commonly addressed in existing plans. It was also noted that state requirements for local drought planning vary, but are required by all states. Few state hazard plans incorporated drought-specific mitigation actions. The full report can be [found here](#).

The next series of presentations provided examples on how individual states and basins are incorporating drought into watershed-based planning and management.

- Jimmy Bagley (City of Rock Hill, South Carolina) described the collaborative and collective approach to water planning and drought management by the Catawba Wateree Water Management Group.
- Ryan Green (Office of Water Supply, Virginia Department of Environmental Quality) described Virginia's approach to water planning and incorporating climate change scenarios into state, basin, and local level planning processes.
- Lee Ellenberg (Alabama Office of the State Climatologist, the University of Alabama in Huntsville), described Alabama's Irrigation Watershed Planning Project, and how this project is supporting sustainable irrigation expansion through a proactive planning process.
- Elliot Wickham (South Carolina State Climatology Office, SC Department of Natural Resources) described South Carolina's ongoing water planning process, which includes the incorporation of both top-down and bottom-up perspectives into River Basin Plans.

The final presentation focused on efforts to ensure that existing drought plans are relevant and useful, where Elliot Wickham described the South Carolina Drought Tabletop and Scenario Exercises as one effective approach that could be utilized by others in the region. Another example of using drought scenario exercise identified in the audience was conducted by the GA Department of Health to help identify actions that could be taken during a severe drought to prevent nursing homes from shutting down due to lack of water. Suggestions from the discussion of scenario exercise included the need to incorporate impacts across the board (not just agriculture), and to be realistic and reasonable when putting together a scenario. It is also useful to look at both long-term and short-term (but intense) droughts, focus on specific impacts, and identify how to handle them beforehand through mitigation efforts. It is worth having worst-case scenario discussions about problems that you wouldn't necessarily think would arise, even if they may be outside your scope and control. Others that have participated in similar exercises agreed that it was useful in itself to see all the different municipalities and entities come to the same room and work together on a single exercise with the same source of information. The National Drought Mitigation Center (NDMC) has [useful resources](#) to guide collaborative drought planning using scenario exercises.



Discussion topics raised at the end of this drought planning session included the challenges of incorporating climate data into long-term planning efforts (50-year horizons), including the balance between wanting to get something feasible accomplished without inundating the planners with information. Modeling was identified as a significant part of drought plans, and that comes with challenges in terms of selecting climate models, maintaining staff and resources to repeat and maintain models, and budgetary constraints. Additional issues discussed related to drought planning included approaches for including and getting support from the state legislature, building public support via ambassadors at the grassroots level, working with neighboring states and basins, and having water systems share resources and approaches within a state and/or basin.

*Opportunities identified for the SE DEWS in the next two years on Drought Planning and Preparedness:*

- Continue sharing tools and examples from other states and regions that work well for state drought management plans and hazard mitigation plans.
- Elevate specific state drought products that are effective and well used.
- Increase awareness of how new resources are being developed across the region.
- Conduct drought tabletop and scenario exercises (The ACF River Basin is planning one for 2023) to strengthen preparedness for future droughts.
- Connect with climate resilient agricultural advocacy groups so that drought resilience is considered in the Southeast.
- Increase awareness of how the USACE or other large hydro projects change operations during drought and proactive mitigation strategies.
- Improve understanding of how to incorporate drought recovery considerations (physical, biological, economics, etc.) into planning.
- Increase dialogue and discussion around adopting drought mitigation techniques.

### **Session 3: New Developments in Drought Monitoring and Prediction Research**

This session highlighted key takeaways from the 2022 SE DEWS March Technical Workshops on flash drought and soil moisture, along with other notable recent developments that can be utilized to support drought monitoring and early warning.

John Christy (Alabama State Climatologist, the University of Alabama in Huntsville) presented on unique characteristics of drought in Alabama, describing how rapidly a drought can intensify and impact agriculture under certain conditions, drawing from the 2012, 2016 and 2019 flash drought experiences in Alabama.

The next two presentations focused on forecast tools from the National Weather Service.

- Adam Hartman (NWS Climate Prediction Center) provided an overview of the new incorporation of Rapid Onset Drought into the CPC 2-week hazard product, as a way to bridge the gap between short and long term drought assessment. He also highlighted a CPC-NIDIS collaboration to develop a probabilistic flash drought product.
- Todd Hamill (NWS Southeast River Forecast Center) described progress in ensemble forecasting, including the Hydrologic Ensemble Forecast System (HEFS).

The next three speakers presented on the outcomes from the March 2022 Southeast DEWS Technical Workshops (virtual).

- Meredith Muth (NIDIS) introduced the workshops, explaining that the topics of (1) soil moisture and (2) flash drought were identified as areas of strong interest by SE DEWS partners across the region, and were therefore chosen for more detailed technical discussions that took place in March.
- Lee Ellenburg (Alabama Office of the State Climatologist, the University of Alabama in Huntsville) provided a summary of ongoing efforts to expand soil moisture networks and applications in the Southeast (AL, FL, GA) including an assessment on the viability of low-cost soil moisture sensors via test-bed calibration. He then provided an overview of the Soil Moisture SE DEWS technical workshop, focusing on regional research priorities identified by the workshop participants (see the Soil Moisture Workshop jamboards on the meeting website for more details).
- Kyle Lesinger (Auburn University) provided a summary of the the Flash Drought Technical Workshop, including the following topics: Defining the unique characteristics of FD in the southeast context, approaches for assessing and predicting FD including the wide range of indices used, and opportunities for improving FD products (see the Flash Drought Workshop jamboards on the meeting website for more details).
- This section concluded by presenting three future SE DEWS activities that were identified as a regional need in both technical workshops:
  - Conduct an historical southeast drought assessment.
  - Evaluate current drought products to look at those most effective for rapid onset drought, and improve existing tools.
  - Provide guidance for communicating flash drought.
- Discussion largely focused on the first proposed activity (historical assessment). Suggestions for ensuring this would be a useful endeavor included the inclusion of a story map to highlight the uniqueness of each drought, utilize daily data back to 140 years ago, use NDMC drought return periods, and use inflow hydrographs that would provide a hydrologic comparison of current to historic drought. Soil moisture was identified as a key variable and the usefulness of exploring a soil moisture climatology was emphasized. NIDIS offered to explore support of this research activity as a SE DEWS contribution, in collaboration with regional and state partners.
- There was also a discussion on the limitations of using the U.S. Drought Monitor to depict flash droughts and the associated rapidly manifested agriculture impacts, and continued encouragement for the regular reporting of impacts.
- Drought.gov has an extensive collection of resources on [soil moisture](#) and the [National Coordinated Soil Moisture Monitoring Network](#), and [flash drought](#), including background, curated data and maps, and webinar recordings.

*Opportunities identified for the SE DEWS in the next two years on Drought Monitoring and Prediction Research:*

- Incorporate historical atmosphere/land indicators in drought signatures.
- Conduct an assessment of historical droughts, including a drought frequency analysis, to help the region understand drought severity.
- Improved drought forecasting including quantitative forecasting capabilities.
- Continue to share new tools to monitor drought conditions.
- Continue to share new and emerging research on flash drought.
- Identify what metrics are most appropriate for identifying flash droughts.
- Assess the utility of current and new tools with users, especially agriculture and drought.
- Further explore and emphasize flash drought interactions with agriculture and the importance of monitoring soil moisture.

- Continue sharing and expanding soil moisture networks in the region, as it is such an important indicator in much of the Southeast.
- Improve spatial extrapolation of soil moisture network discrete data via modeling.
- Improve our understanding of non-stationarity of drought conditions associated with climate change, and implications across all topics and sectors.
- Gain a better understanding of how extended forecasts are used to influence decisions and operations.
- Better understand drought recurrence probability and who is working on this.

## Session 4: Drought Messaging and Communication

This session highlighted effective practices and lessons learned for communicating drought conditions and risk (current and future) and new approaches and tools that can be utilized to improve drought messaging and early warning in the region.

Corey Davis (State Climate Office of North Carolina) opened this session by describing North Carolina's recent experience at improving drought communications. This included a two year research project (Project Nighthawk) to better understand what people know about drought, needs of stakeholders, evaluating those needs and refining resources, and communicating drought more effectively. Outcomes of this work included a better understanding of how different sectors prefer to receive and utilize information, a drought process story map, weekly drought update infographics, and the development of short-range outlooks for NC. The templates for infographics and outlooks are available for use by other states, and are currently being used by 2 other states. Additional details [found here](#). Key recommendations:

- Understand who is using drought information and why
- Consider sharing regular updates on multiple platforms
- Translate, but don't oversimplify
- Collect feedback early and often

Next was a series of five minute presentations related to drought messaging and communication.

- Mark Masters, (Albany State University) provided an overview of how a user-driven process was utilized to develop the content for the new [ACF River Basin Drought and Water Dashboard](#). This web interface also includes a story map to help a more general audience understand the history of water development and current water management in the basin, what drought means in the basin, and build public buy-in. The ACF Dashboard has been replicated for the [ACT basin](#) as well, following a request by USACE and Alabama. These interactive dashboards are being used by USACE in briefings during both high and low conditions.
- Sylvia Reeves (NIDIS) walked through some of the new interactive U.S. Drought Portal ([drought.gov](#)) features that were developed based on user feedback. This includes the ability to download and share maps, access hyperlocal information, explore historical data for your location, and [receive alerts](#) to your inbox when your local conditions change. The media and others use drought.gov regularly to help communicate drought conditions.
- Maggie Hurwitz (NWS Climate Services Branch) shared ongoing national efforts to improve NWS drought messaging through training for their staff. NWS is also in the process of making improvements of the NWS local Drought Information Statements based on feedback via workshops and target groups. Improvement recommendations include the following: coordinating drought messaging at the state level; facilitating flow of information from local, state, to regional level with consistent infographics; modernize the statements through more easily produced graphics (including those on drought.gov); and break down statements into smaller messages.

- Laura Belanger (NWS Weather Forecast Office Peachtree City, GA) provided a local perspective to NWS drought communications. Drought falls between two clearly delineated NWS services (hydrological, climate) and is not well defined. Drought Information Statements are a common tool, issued by local WFOs during D3+ or during lesser conditions if more appropriate, but are not currently an effective communication tool (see previous speaker for recommendations on efforts to improve). Additional tools are used at the local level to provide drought messaging to partners including social media.
- Jon Becker, (EPA Water Division, Region 4) spoke about the need to emphasize and communicate about water conservation all the time, not just in drought. Several water conservation and outreach opportunities via EPA were described.

Discussion topics in this session included the usefulness of including communication professionals in developing or improving communication products, and the need to think about language barriers. The pros and cons of using social media for outreach was discussed, including the limited time posts are in news feeds. While digital delivery is most common now, there is still some demand for hard copies of information.

This session concluded with a **Media Panel** to provide their insights on 'How drought experts can help the media better communicate and tell the story of drought'. The panel was made up of Molly Samuel (WABE, NPR and PBS affiliate for the Metro Atlanta Area), Drew Kann (Atlanta Journal-Constitution), and Terah Boyd (WSB-TV | Cox Media Group). Questions asked of the panel included how the media comes up with questions, advice for drought technical experts on getting the public interested, and how drought experts can best help them tell their story. Some common themes raised across the panel:

- The media gets their stories largely from talking to people, as well as reading news coverage locally and in the broader region.
- Drought stories that are most compelling include those that interview real people seeing impacts to their lives, especially to their safety or economic well being. However, the impacts also must be broad enough to resonate with more than one person.
- Stories that impact communities, such as drinking water supply, are also effective.
- Depressing stories do not go over well.
- While the public in the west are primed for drought, it is harder to communicate in the southeast because drought is not always here.
- While climate change coverage and interest is increasing, we have to connect the dots for them in the stories we tell.
- Reporters want to connect any anecdotal stories back to the data and trends. This is an area where scientists can help.
- Agricultural impacts are a good way to drive home a complex issue on how drought impacts an industry, and can also resonate with urban readers. Farmers have credibility and everybody eats.
- Current events are always useful for educating the public on water, even in times of non-drought. For example, highlighting a new water infrastructure project.
- Need to be careful in pushing drought in times of no drought. There will be pushback from the readers and organizations don't want to scare people. Need to find the balance of educating continually on the importance of water issues and understanding the problem, without creating a story that has no specific context.
- Charts and graphs are useful for scientists to explain something to the writer, especially if you can describe the impact of the data in less than 20 seconds. However, the visualizations (unless very easy to interpret, such as a change map) will not likely be in the story. The quote they want is emotion, about the impact, and the objective pieces of information. Needs to grab people's attention regardless of education.
- Social media is not used consistently. It is unclear if it helps influence views or reach the people as it was intended. But it is still useful to drive stories forward.



- The term 'flash drought' is not well defined or described by the media, and not well understood by everyone. However, heatwaves are a compounding factor with drought that resonates and impacts society in a variety of ways and is easier to communicate.
- Be patient with media people because there are bigger stories that are more urgent, and flexibility is important in our industry.
- Background science conversations are helpful because it helps the media produce better stories with the background knowledge and helps them know who to connect with.

*Opportunities for the SE DEWS in the next two years on Drought Messaging and Communication:*

- Creation of simple one page infographics to reach more people and help them understand what we do (drought monitoring and early warning, planning), impacts and importance. The NC Weekly Drought Infographic was identified as a model for other states.
- Develop good drought "sound bites" (focused on impacts) in media interviews. Cultivate relationships with reporters; have soundbites ready to tell your story.
- Identify ways to downscale national messaging to improve outreach and collaboration with regional and local officials.
- Consider the use of storymap capabilities (GIS, etc.) as effective communication tools.
- Communicate new tools/strategies for improving drought services that may be 'under the radar'.
- Outreach and communication is needed to key sectors for emergency preparedness (e.g. schools, hospitals, public health community, emergency management agencies) to better understand their drought risk and to increase their awareness of that risk.
- Schedule more time with the media, such as holding a workshop on how to best get your (scientific) points across.

## **Session 5: Drought Impact Reporting**

This session highlighted current practices for documenting drought impacts, and how to best utilize this information for monitoring drought conditions and informing drought response decisions.

Elliot Wickham (SC State Climatology Office, SC Department of Natural Resources) set the stage by describing why and how South Carolina invested time in expanding their drought impact reporting efforts. This effort has resulted in greater agricultural impacts being reported (FSA, extension, producers). Barriers still exist, such as insufficient and inconsistent reporting. They are exploring opportunities to work with other entities.

Elijah Worley (USDA Southeast Climate Hub) provided an overview of a joint NIDIS-USDA Climate Hub project: 'Assessment of Different Approaches, Barriers, and Opportunities in the Southeast: Drought Impact Reporting Processes for the Agricultural Sector'. This topic of impact reporting was identified by the SE DEWS as a priority of area interest, especially because of its relevance to triggering responses and relief programs. Elijah interviewed individuals across the region that are reporting impacts (e.g. extension) and those utilizing the report data (e.g. state monitoring groups, USDAM authors). While there were some differences across the region, most states experienced similar barriers and identified similar opportunities for improvement. Barriers included lack of consistent reporting, loss of impact information in NASS Crop Progress Reports, staffing reduction, lack of agent buy-in, poor rural coverage, and being more reactive rather than proactive in reporting. Recommendations to improve include more training and education, utilizing and tailoring Condition Monitoring Observer Reports (CMOR), encourage more citizen science and extension agent reporting, encourage image reporting, creation of state drought response teams where they don't exist, and ensuring that those who report see the value of their efforts such as incorporating and sharing infographics or condition summaries with impacts included. The full report will be released publicly soon by USDA and NIDIS.

Kelly Smith (National Drought Mitigation Center) provided an overview of NDMC resources related to drought impact reporting. A good starting place is the [Drought Impact Toolkit](#), which is a gateway to learn about and access several products including the Drought Impact Reporter, The Drought Impact Reporter Dashboard, Condition Monitoring Observer Reports (CMOR), The Visual Drought Atlas, The Media Drought Index, Drought Tweets and CoCoRaHS condition monitoring reports. There is also a new experimental “[Reported Drought Impacts by State and USDM Status](#)” tool that sorts and displays impacts by state from the Drought Impact Reporter through 2021.

The next section included a series of rapid talks (5 minutes each) to share experiences and lessons with expanding agricultural drought impact reporting at the state level.

- Georgia. Pam Knox, (University of Georgia) described how targeted outreach with producers via extension helped significantly improve the increase in reports during a recent 2022 drought. Lessons learned included the necessity to find people willing to work on outreach, provide incentives and explain how it works, give clear instructions, and remind them to report and repeat as needed.
- North Dakota. Elijah Worley (USDA SE Climate Hub) on behalf of ND. North Dakota has observed a significant increase in buy in and understanding of drought impacts across the state. Recommendations for other states include utilizing CMOR, communicating with Extension offices, creating education programs of reporting importance, fostering relationships between producers and extension agents, and interagency collaboration within their state.
- Kentucky. Chip Zimmer (Kentucky Division of Water). Kentucky created its own [Kentucky Drought Impact Reporter](#) working with CMOR, and this information is then shared publicly on the ‘Kentucky Drought and Climate Conditions’ [webpage](#) which contains a similar infographic that NC developed.
- Mississippi. Michael Brown (MS State Climatologist, MS State University). MS created its own app-based reporting system that focuses on extension, with a focus on gaining extension trust. Video description [here](#).
- Alabama. Kent Stanford and Rachel McGuire (Auburn University) presented on emerging efforts to improve their reporting while better serving extension and their clients. They will be using a wet to dry scale, similar to CMOR, will work closely with MS for cross-state collaboration, and are in the process of hiring a full time staff member to work on this.

*Opportunities for the SE DEWS in the next two years on Drought Impact Reporting:*

- States should continue making progress to improve drought impact reporting, and consider some of the recommendations shared.
- Streamline the drought reporting process, and work to improve consistency across states.
- Continue sharing of improved impact reporting across the region.
- Standardize reporting metrics across the region.
- Conduct hands-on exercises to improve drought impact collection.

## Southeast DEWS Network and Regional Collaboration - Looking Ahead

Participants strongly supported the need for the Southeast DEWS network to continue facilitating exchanges such as this meeting, where best practices and tools from states in the region could be shared and highlighted and professional relationships could be built and strengthened.

*Opportunities for the SE DEWS in the next two years on Regional Collaboration:*

- Hold regional collaboration meetings on a yearly basis (broad meetings, or more topic-specific workshops).
- Provide opportunities to share the latest science with stakeholders.
- Bring the region together for more frequent virtual meetings when D3 and D4 conditions are present, to ensure cross-state consistency and coordination.
- Incorporate climate change in future meetings.
- Provide opportunities to demo/walk through specific tools and dashboards - either in future meetings or virtual webinars.
- Explore ways to better connect or merge information from multiple entities that are related by borders or collaborators.
- Continue having smaller technical workshops that can report out to the broader SE DEWS

## Planning Team

NOAA's National Integrated Drought Information System (NIDIS); National Weather Service; USDA Southeast Climate Hub; USDA Natural Resources Conservation Service; National Drought Mitigation Center; Florida Climate Center and Florida State Climatologist; Metro Atlanta Commission; Alabama Office of the State Climatologist; Georgia Environmental Protection Division; Georgia Office of the State Climatologist, University of Georgia; South Carolina State Climatology Office; State Climate Office of North Carolina; North Carolina Drought Management Advisory Council; The Carolinas Integrated Sciences & Assessments (CISA, A RISA Team); Southeast Climate Adaptation Science Center; Southeast Regional Climate Center.

## Appendix A: Southeast DEWS - 2022 Partners Dialogue - Agenda

### Southeast Drought Early Warning System (SE DEWS) Partners Dialogue

Atlanta, Georgia | August 9 - 10, 2022

**Location:** Atlanta Regional Commission (ARC), Harry West conference room.  
229 Peachtree Street NE. International Tower, Suite 100. Directions [here](#).

<b>Day 1 - Tuesday, August 9th</b> <b>DROUGHT MONITORING AND PLANNING</b>	
8:30	Continental Breakfast and Conversation ( <i>provided</i> )
<b>Welcome and Context Setting</b> <i>Moderator: Meredith Muth, Southeast DEWS Coordinator, National Integrated Drought Information System (NIDIS)</i>	
9:00	<b>Meeting Overview</b>
9:10	<b>Setting the stage: Drought in the Southeast</b> <ul style="list-style-type: none"> <li>● A historical perspective of drought in the Southeast. <i>Pam Knox, University of Georgia</i></li> <li>● Exploring the 2019 drought in Georgia. <i>Bill Murphey, Georgia State Climatologist, Georgia Department of Natural Resources</i></li> <li>● A local perspective from Atlanta: Actions taken in previous droughts, impacts on water supply, and looking to the future. <i>Katherine Zitsch, Managing Director of Natural Resources at Atlanta Regional Commission and Director of Metropolitan North Georgia Water Planning District</i></li> </ul>
9:45	<b>Review Agenda</b>
10:00	Break ( <i>beverages and snacks provided</i> )
<b>Session 1: Today's Drought: Monitoring and Response</b> This session includes an overview of approaches and lessons used by states to regularly assess current drought conditions, how this monitoring informs decisions and response at the state level, and a discussion of opportunities to improve state and regional monitoring. <i>Moderator: Andrew Joyner, Tennessee State Climatologist, ETSU</i>	
10:30	<b>Approaches to monitoring, including how states contribute to and use the USDM</b> <ul style="list-style-type: none"> <li>● Overview of State approaches: Who does what, what works well and why, where there may be opportunities for improvement. <i>Kirsten Lackstrom, University of South Carolina</i></li> <li>● North Carolina approach. <i>Klaus Albertin, North Carolina Division of Water Resources</i></li> <li>● Coordinating the process: Tennessee Weekly Drought Summary. <i>William Tollefson, Tennessee Climate Office at ETSU</i></li> <li>● USDM Author Perspectives. <i>Brian Fuchs, National Drought Mitigation Center; David Simeral, Desert Research Institute; Adam Hartman, NWS Climate Prediction Center</i></li> </ul>

	<b>Discussion and Q&amp;A</b>
11:15	<p><b>Linking monitoring to decisions and response at the state and local level</b></p> <ul style="list-style-type: none"> <li>Alabama approach. <i>Tom Littlepage, Alabama Office of Water Resources</i></li> <li>Georgia approach. <i>Wei Zeng, Georgia Environmental Protection Division</i></li> <li>Florida approach. <i>Mark Elsner, South Florida Water Management District</i></li> </ul> <p><b>Discussion and Q&amp;A</b></p>
12:20	Lunch on-site ( <i>provided</i> )
<p><b>Session 2: Tomorrow’s Drought: Planning and Preparedness</b></p> <p>This session will provide an overview of approaches utilized by different states and watersheds on formal drought and water planning, highlight specific activities from each state that have supported drought planning and response efforts, and identify opportunities to strengthen drought planning in a Southeast multi-hazard context as states update their existing plans.  <i>Moderator: Chris Manganiello, Water Policy Director, Chattahoochee Riverkeeper</i></p>	
1:15	<p><b>Long-term Drought Planning Processes</b></p> <ul style="list-style-type: none"> <li>An Assessment of State Approaches, Planning Needs and Gaps, Constraints, and Opportunities. <i>Kirsten Lackstrom, University of South Carolina</i></li> </ul> <p><b>Preparing for the Next Drought: Incorporating drought into watershed-based planning and management</b></p> <ul style="list-style-type: none"> <li>The Catawba Wateree Water Management Group: A collaborative and collective approach to water planning and drought management. <i>Jimmy Bagley, City of Rock Hill, South Carolina</i></li> <li>Virginia’s approach to water planning and incorporating climate change scenarios into state, basin, and local level planning processes. <i>Ryan Green, Office of Water Supply, Virginia Department of Environmental Quality</i></li> <li>Alabama’s Irrigation Watershed Planning Project: Supporting sustainable irrigation expansion through a proactive planning process. <i>Lee Ellenberg, Alabama Office of the State Climatologist, the University of Alabama in Huntsville</i></li> <li>South Carolina’s water planning process: Blending top-down and bottom-up perspectives into River Basin Plans. <i>Elliot Wickham, South Carolina State Climatology Office, SC Department of Natural Resources</i></li> </ul> <p><b>Keeping Drought Plans Relevant and Useful</b></p> <ul style="list-style-type: none"> <li>South Carolina Drought Tabletop and Scenario Exercises. <i>Elliot Wickham, South Carolina State Climatology Office, SC Department of Natural Resources</i></li> </ul> <p><b>Discussion and Q&amp;A</b></p>
2:45	Break ( <i>beverages and snacks provided</i> )
<p><b>Session 3: New Developments in Drought Monitoring and Prediction</b></p> <p>This session will highlight key takeaways from the 2022 SE DEWS March Technical Workshops on flash drought and soil moisture, along with other notable recent developments that can be utilized to support drought monitoring and early warning.</p>	



<i>Moderators: Victor Murphy, National Weather Service Southern Region</i>	
<b>3:15</b>	<p><b>What we learned from the 2012 drought and what more is needed.</b> <i>John Christy, Alabama State Climatologist, the University of Alabama in Huntsville</i></p> <p><b>Drought and Streamflow Prediction</b></p> <ul style="list-style-type: none"> <li>• CPC Drought Forecast Tools. <i>Adam Hartman, NWS Climate Prediction Center</i></li> <li>• Hydrologic Forecasting Tools. <i>Todd Hamill, Southeast River Forecast Center.</i></li> <li>• Drought.gov and Climate Engine. <i>Meredith Muth, NIDIS</i></li> </ul> <p><b>Outcomes from the 2022 SE DEWS Technical Workshops and Next Steps</b></p> <ul style="list-style-type: none"> <li>• Overview. <i>Meredith Muth, NIDIS</i></li> <li>• Soil Moisture. <i>Lee Ellenburg, Alabama Office of the State Climatologist, the University of Alabama in Huntsville</i></li> <li>• Flash Drought. <i>Kyle Lesinger, Auburn University</i></li> </ul> <p><b>Discussion and Q&amp;A</b></p>
<p><b>Day 1 Wrap Up:</b> Addressing regional challenges and identifying opportunities to improve drought monitoring, planning, and management  <i>Moderator: Meredith Muth, NIDIS</i></p>	
<b>4:45</b>	<b>Future opportunities for the Southeast DEWS</b>
<b>5:00</b>	End Day 1
<b>5:30</b>	Networking social at local bar/restaurant ( <i>will be announced at meeting</i> )
<p><b>Day 2 - Wednesday, August 10th</b>  <b>DROUGHT COMMUNICATION AND IMPACT REPORTING</b></p>	
<b>8:00</b>	Continental Breakfast and Conversations ( <i>provided</i> )
<p><b>Session 4: Drought Messaging and Communication</b>  This session will share effective practices and lessons learned for communicating drought conditions and risk (current and future) and highlight new approaches and tools that can be utilized to improve drought messaging and early warning in the region.  <i>Moderators: Nyasha Dunkley, Georgia EPD and State Climate Office; Katherine Zitsch, Atlanta Regional Commission</i></p>	
<b>8:30</b>	<p><b>Best practices for experts to translate drought information and reach a broader audience</b></p> <ul style="list-style-type: none"> <li>• North Carolina's experience at improving drought communication. <i>Corey Davis, State Climate Office of North Carolina</i></li> <li>• Cross-State Perspective: ACF Drought and Water Dashboard. <i>Mark Masters, Albany State University</i></li> <li>• National Perspective: Drought.gov. <i>Sylvia Reeves, NIDIS</i></li> <li>• National Perspective: National Weather Service. <i>Maggie Hurwitz, NWS Climate</i></li> </ul>

	<p><i>Services Branch</i></p> <ul style="list-style-type: none"> <li>Local Perspective: National Weather Service. <i>Laura Belanger, NWS Weather Forecast Office Peachtree City, GA</i></li> <li>Water Conservation Perspective. <i>Jon Becker, EPA Water Division, Region 4</i></li> </ul> <p><b>Discussion and Q&amp;A</b></p>
9:30	<p><b>Media Panel: How drought experts can help the media better communicate and tell the story of drought</b></p> <ul style="list-style-type: none"> <li>Molly Samuel, WABE, NPR and PBS affiliate for the Metro Atlanta Area</li> <li>Drew Kann, Atlanta Journal-Constitution</li> <li>Terah Boyd, WSB-TV   Cox Media Group</li> </ul>
10:30	Break ( <i>beverages and snacks provided</i> )
<p><b>Session 5: Drought Impact Reporting</b>  This session will highlight current practices for documenting drought impacts, and how to best utilize this information for monitoring drought conditions and informing drought response decisions.  <i>Moderators: Michael Gavazzi, USDA SE Climate Hub; Kelly Smith, National Drought Mitigation Center</i></p>	
11:00	<p><b>Current status of Drought Impact Reporting in the Southeast</b></p> <ul style="list-style-type: none"> <li>South Carolina's journey for Drought Impact Reporting. <i>Elliot Wickham, SC State Climatology Office, SC Department of Natural Resources</i></li> <li>An Assessment of Different Approaches, Barriers, and Opportunities in the Southeast: Drought Impact Reporting Processes for the Agricultural Sector. <i>Elijah Worley, USDA Southeast Climate Hub</i></li> <li>NDMC Drought Impact Toolkit, including Condition Monitoring Observer Reports. <i>Kelly Smith, National Drought Mitigation Center</i></li> <li>Georgia's 2022 experience with drought impact reporting. <i>Pam Knox, University of Georgia</i></li> </ul>
11:40	<p><b>State-Level Efforts to Expand Agricultural Extension Engagement and Reporting at the State Level</b></p> <ul style="list-style-type: none"> <li>North Dakota. <i>Elijah Worley, USDA SE Climate Hub, on behalf of ND</i></li> <li>Kentucky. <i>Chip Zimmer, Kentucky Division of Water</i></li> <li>Mississippi. <i>Michael Brown, MS State Climatologist, MS State University</i></li> <li>Alabama. <i>Kent Stanford and Rachel McGuire, Auburn University</i></li> </ul>
12:00	<b>Discussion and Q&amp;A</b>
<p><b>Session 6: Forum Wrap Up and Next Steps</b>  <i>Moderator: Meredith Muth, NIDIS</i></p>	
12:30	<p><b>Facilitated Discussion</b></p> <ul style="list-style-type: none"> <li>Review key themes identified over the past two days</li> <li>Identify specific topics that can be further explored as a regional network</li> <li>Identify tangible activities over the next two years</li> </ul>
1:00	Forum Ends - Safe travels!

## Appendix B: Participants (In person and remote, emails found [here](#))

<b>Name</b>	<b>Affiliation:</b>
Katherine Zitsch	Atlanta Regional Commission
Bill Murphey	Georgia Department of Natural Resources, EPD Division
Wei Zeng	Georgia Department of Natural Resources, EPD Division
Henian Zhang	Georgia Department of Natural Resources, EPD Division
Nyasha Dunkley	Georgia Department of Natural Resources, EPD Division
Kelli-Ann Sottile	Georgia Department of Natural Resources, EPD Division
Pam Knox	University of Georgia
Jasia Jannat	University of Georgia
Zach Pilgrim	University of Georgia
Vanessa Tigert	Fayette County Water System
Benjamin Martin	Fayette County Water System
Mark Masters	Albany State University, Georgia Water Planning & Policy Center
Kirsten Howard	City of Gainesville, GA
Wilton Rooks	Georgia Water Resources Institute, Georgia Tech
Tom Littlepage	Alabama Office of Water Resources, ADECA
John Christy	University of Alabama in Huntsville, Office of the State Climatologist
Lee Ellenburg	University of Alabama in Huntsville, Office of the State Climatologist
Kent Stanford	Auburn University and Alabama Extension
Rachel McGuire	Auburn University Water Resources Center
Sanjiv Kumar	Auburn University
Kyle Lesinger	Auburn University
Latif Kalin	Auburn University
Klaus Albertin	North Carolina Division of Water Resources (DWR)
Corey Davis	North Carolina State Climate Office
Elliot Wickham	South Carolina Dept. of Natural Resources, State Climatology Office,
Jimmy Bagley	City of Rock Hill, South Carolina
Heidi Sanders	City of Rock Hill, South Carolina
Kirsten Lackstrom	University of South Carolina
David Zierden	Florida Climate Center, Florida State University (FSU)
Mark Elsner	South Florida Water Management District
Andrew Joyner	East Tennessee State University, Tennessee Climate Office
Dalton Van Stratton	East Tennessee State University
William Tollefson	East Tennessee State University, Tennessee Climate Office
Ryan Green	Virginia Dept. of Environmental Quality, Office of Water Supply
Mike Brown	Mississippi State University
Chip Zimmer	Kentucky Division of Water
Michelle Lovejoy	Environmental Defense Fund
Chris Manganiello	Chattahoochee Riverkeeper
Ben Emanuel	American Rivers
Mac Callaham	USDA U.S. Forest Service, USDA Southeast Climate Hub
Marcus Williams	USDA Forest Service Southern Research Station
Michael Gavazzi	USDA Southeast Climate Hub
Elijah Worley	USDA Southeast Climate Hub
Mark Brusberg	USDA, Office of the Chief Economist

Meredith Muth	NOAA National Integrated Drought Information System (NIDIS)
Sylvia Reeves	NOAA National Integrated Drought Information System (NIDIS)
Laura Belanger	NOAA National Weather Service (NWS), Atlanta GA
Ansley Long	NOAA National Weather Service (NWS), Atlanta GA
Nick Morgan	NOAA National Weather Service (NWS), Atlanta GA
Barrett Smith	NOAA National Weather Service (NWS), Raleigh NC
Kristopher White	NOAA National Weather Service (NWS), Huntsville, AL / NASA SPoRT
Jonathan McGee	NOAA National Weather Service (NWS), Wakefield VA
Jeff Dobur	NOAA National Weather Service, Southeast River Forecast Center
Shelby Ingram	NOAA National Weather Service, Southeast River Forecast Center
Todd Hamill	NOAA National Weather Service, Southeast River Forecast Center
Victor Murphy	NOAA National Weather Service (NWS), Southern Region Headquarters
Chris Stachelski	NOAA National Weather Service (NWS), Eastern Region
Maggie Hurwitz	NOAA National Weather Service (NWS), Climate Services Branch
Adam Hartman	NOAA National Weather Service (NWS) Climate Prediction Center
Brad Pugh	NOAA National Weather Service (NWS) Climate Prediction Center
Sharon Mesick	NOAA National Centers for Environmental Information (NCEI)
David Sumner	U.S. Geological Survey (USGS) Caribbean-Florida Water Science Center
Paul Ankorn	U.S. Geological Survey (USGS) South Atlantic Water Science Center
Victor Engel	U.S. Geological Survey (USGS) South Atlantic Water Science Center
Jon Becker	US Environmental Protection Agency (EPA), Region 4
James Hathorn	U.S. Army Corps of Engineers (USACE), Mobile District
Tony Young	U.S. Army Corps of Engineers (USACE), Wilmington District
Kelly Smith	National Drought Mitigation Center (NDMC)
Brian Fuchs	National Drought Mitigation Center (NDMC)
Dave Simeral	Desert Research Institute
Molly Samuel	WABE, PBS and NPR affiliate in Atlanta
Terah Boyd	WSB-TV Cox Media Group
Drew Kann	Atlanta Journal-Constitution