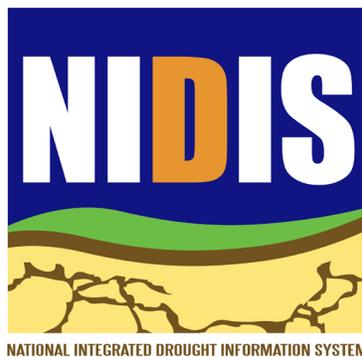


National Integrated Drought Information System – NIDIS



*National Integrated Drought Information System (NIDIS)
Southeast-ACF Drought Early Warning Information System Development Workshop
with special emphasis on the Upper Chattahoochee*

August 9-10, 2010, Stone Mountain, GA

Meeting Notes

Introduction

NIDIS Background:

The National Integrated Drought Information System (NIDIS) is an interagency and interstate effort to establish a national drought early warning information system. NIDIS builds on existing products and service networks like the U.S. Drought Monitor (<http://drought.unl.edu/DM/MONITOR.html>) and Seasonal Outlooks (<http://www.cpc.noaa.gov/products/predictions/90day/>) to provide fuller coordination of monitoring, forecasting, and impact assessment efforts at national, watershed, state and local levels. NIDIS is providing a better understanding of how and why droughts affect society, the economy, and the environment, and is improving accessibility, dissemination, and use of early warning information for drought risk management. NIDIS incorporates numerous federal agencies, tribal nations, emergency managers and planners, six Regional Climate Centers, Regional Integrated Sciences and Assessments (RISA), state climatologists, and local NOAA Weather Forecast Offices.

NIDIS Early Warning Information System Pilots:

NIDIS is undertaking several pilot projects to prototype and develop a drought early warning information system for the U.S. The goal of the NIDIS pilots is to explore and demonstrate a variety of early warning and drought risk reductions strategies that incorporate drought monitoring and prediction information in partnership with users and federal, state, regional, tribal and local agencies. Over the next five years, NIDIS will build on the successes of the U.S. Drought Monitor, Seasonal Outlooks, and other tools and products through better coordination of relevant monitoring, forecasting, educational and impact assessment efforts tailored to watersheds, regions, and local levels to design and establish a drought early warning information system. The guiding framework for designing each pilot will be completed over two years and will contain the following steps:

Year 1: Scoping the Drought Early Warning Information System

- Gap analyses: What information exists and how is it being coordinated and used?
- Characterize and communicate risks across timescales-with existing information for 2-3 critical issues.
- Develop subteams to assess (1) Monitoring and forecasting; (2) Impact indicators and triggers (3) Preparedness and education
- Assemble a drought-sensitive planning indicators and management triggers database; Assess present drought information coordination partnerships and processes

- Identify Federal and state-level partnerships, decision support tools and actions needed to improve information development, coordination and flow for preparedness and risk reduction
- Develop an operational plan for designing and implementing an early warning system process

Year 2. Implementation of the Drought Early Warning System (seasonal, multi-year, longer term trends):

- Develop drought sub-portals
- Embed information into preparedness and adaptation plans
- Establish network for ongoing briefings on impacts and projections across climate timescales
- Initiate development region or basin specific Drought Information Monitor and Portal (as a subset of the U.S. Drought Portal [www.drought.gov])
- Develop decision support tools for demand projections and revise triggering criteria
- Prototyping: Given better data and information coordination would responses have been improved for past events? Assess (1) value of improved information using past conditions, (2) responses for projections/ scenarios (decadal, climate change), (3) feedback on priorities (e.g. data gaps) to the NIDIS Executive Council.
- Feedback into regional Drought Monitor and Portal. Early Warning System maintenance (Fed-state-tribal) and transfer to other sub-basins

Purpose of the Southeast-ACF Scoping Workshop:

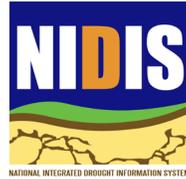
The goal of the workshop is to prioritize and design the NIDIS Early Warning System pilot over the next two years in the ACF Basin. The ACF Basin will serve as one of three in the first round of NIDIS pilots. The other two pilot projects include the Upper Colorado Basin and California.

Southeast NIDIS Workshops: Key Findings

In developing a drought early warning system in the Southeast, NIDIS has conducted several knowledge assessment workshops. These have included workshops in Peachtree City, GA, Chapel Hill, NC, and Columbus, GA. Also, in June 2008, a workshop was held in Kansas City, Missouri, to discuss the status of Drought Early Warning Systems across the United States. Summaries from most of these meetings can be found under "Events & Announcements" on the NIDIS Drought Portal (www.drought.gov).

AGENDA

National Integrated Drought Information System – NIDIS



Southeast-ACF Drought Early Warning Information System Development Workshop: Upper
Chattahoochee River Basin

August 9-10, 2010

Evergreen Marriott Conference Resort

4021 Lakeview Drive

Stone Mountain, Georgia

(<http://www.marriott.com/hotels/travel/atleg-evergreen-marriott-conference-resort/>)

Monday August 9, 2010

8:00 – 8:30 Light continental breakfast

8:30 – 8:35 Welcome – *Carol Couch and David Stooksbury*

NIDIS ACF Drought Early Warning System Goals, Overview and Activities

8:35 – 8:50 Introduction to NIDIS Overview and Pilot Goals – *Chad McNutt (NOAA/NIDIS)*

8:50 – 9:05 Overview of Previous NIDIS ACF Stakeholder Meetings and our Meeting Goals –
Lisa Darby (NOAA/NIDIS)

9:05 – 9:20 Update on the NIDIS ACF Pilot Data Committee activities – *Pam Knox (University
of Georgia)*

ACF Background – Climate, Operations, Monitoring & Forecasting

9:20 – 9:35 Climate and Drought in the Upper Chattahoochee River Basin – *David Stooksbury
(Georgia State Climatologist, University of Georgia)*

9:35 – 10:00 ACF Basin Operations: Focus on the Upper Chattahoochee River Basin – *Andy
Ashley (US Army Corps of Engineers, Mobile District)*

10:00 – 10:30 **Coffee Break**

10:30 – 10:45 Drought Monitoring and Forecasting from the NWS Forecast Office Perspective – *Kent Frantz (National Weather Service Weather Forecast Office, Peachtree City, GA)*

10:45 – 11:00 Drought Monitoring and Forecasting for the Upper Chattahoochee River Basin from the NWS River Forecasting Center Perspective – *Todd Hamill (National Weather Service Southeast River Forecast Center)*

11:00 – 11:15 Streamflow monitoring and lessons learned – *Brian McCallum (USGS)*

Dealing with Drought in the ACF Basin

11:15 – 11:30 Georgia State Drought Planning – *Tim Cash (Georgia Environmental Protection Division, Watershed Protection Branch, Chattahoochee and Flint River Basins)*

11:30 – 11:45 Effectiveness of Existing Drought Indicators and Management Triggers – *Carol Couch, University of Georgia*

11:45 – 12:00 Drought Early Warning and Information Tools – *Keith Ingram (Univ. of Florida)*

12:00 – 1:30 Group Lunch

1:30 – 1:45 How do Stakeholders Get a Voice? - *Wilton Rooks, ACF Stakeholders*

1:45 – 3:00 Group Discussions - *Victor Murphy (National Weather Service/Southeast Region)*
What are the critical information needs related to drought (e.g. gaps in monitoring and forecasting)

Effectiveness of existing drought indicators and management triggers

How can education, communication and transparency related to current and future drought status be improved in the region

3:00 – 3:30 **Coffee Break**

3:30 – 4:30 Group Discussions (continued) - *Victor Murphy (National Weather Service/Southeast Region)*

4:30 – 4:45 Meeting wrap-up

6:00 – **Evening Reception with cash bar**

Tuesday, August 10, 2010

8:00 – 8:30 Light continental breakfast

8:30 – 8:45 Review of Day 1

8:45 – 11:00 Group Discussions (with coffee break from 10:00 to 10:15) –
What is needed to improve drought planning and response in the Upper Chattahoochee River Basin? – *David Stooksbury (Georgia State Climatologist, University of Georgia)*

Next Steps: Developing a drought early warning information system

A customized ACF drought monitor: Audience and purpose

For the design of the customized ACF drought early warning information system, what is needed for the Upper Chattahoochee River Basin? What are the building blocks for the design of this drought early warning information system? What are potential end products?

What actions can local, state, federal and tribal agencies take to lay the groundwork for this drought early warning information system? How best might these be coordinated for information sharing?

11:00 – 12:00 Develop a **plan of action and timeline**: Developing and implementing a drought early warning information system for the ACF Basin – needs of the Upper Chattahoochee River Basin - *Keith Ingram (Univ. of Florida)*

12:00 Lunch

Meeting Adjourns

Meeting Notes

Monday, August 9, 2010

Welcome – *Carol Couch and David Stooksbury*

- We need to prioritize our options for the drought early warning system
- We need to separate fact from fiction

NIDIS ACF DROUGHT EARLY WARNING SYSTEM GOALS, OVERVIEW AND ACTIVITIES

Update on the NIDIS ACF Pilot Data Committee activities

Pam Knox (University of Georgia)

- Status of the data committee and the spreadsheet containing information about available data sets was presented to the group
- The spreadsheet is a pointer to the data. It is not actually housing the data.
- There is an interest in accounting for water quality data in the spreadsheet
- A document will be sent out before the fall meeting for comment
- Q: Who will maintain the database spreadsheet? A: TBD

ACF BACKGROUND – CLIMATE, OPERATIONS, MONITORING & FORECASTING

Climate and Drought in the Upper Chattahoochee River Basin

David Stooksbury (Georgia State Climatologist, University of Georgia)

- 1998 is an analog year for the current conditions (1999 was a drought year)
- Population growth is driving the concerns over the water supply
- Water temperatures from accelerated runoff (from land-use changes) can decrease DO causing problems for trout.
- Water use practices can vary by sub-division, older subdivisions can have reduced water use practices as opposed to newer subdivisions.
- Fall has gotten wetter over north central Georgia, however, October is the driest month so it is of little significance that it is getting wetter.
- People are using much more water than they used to for landscaping – there has been a culture shift
- A strong La Niña sends dryness northward in Georgia
- Q: What is your definition of drought? A:
 - Short-term 3-6 months
 - Abnormally dry 1 in 5 years
 - Drought 1 in 10 years
- There is a disconnect between climatology and managed system conditions

ACF Basin Operations: Focus on the Upper Chattahoochee River Basin

Andy Ashley (US Army Corps of Engineers, Mobile District)

- During the recent drought the Corps started to decrease releases from Lake Lanier and let the other projects support the minimum flow in Apalachicola (based on inflow from their larger drainage areas)
- Drainage vs. stage are two different things
- Lake Lanier:
 - 1035 ft is the minimum for operations
 - 1071 ft is the conservation stage
 - 1085 ft is the spill level
- Guide curves and action areas guide operations
- There is not much hydropower being generated on weekends
- Levels in Zone 4 of the composite plot indicates drought operations in the basin
- The Corps needs to balance all of the reservoirs in the system
- Long-term storage in Lake Lanier can lead to seepage, which is not safe
- There needs to be some education for the public regarding weekend releases
- The new water control manual (available in June 2011) will have more about drought response
- Q: What additional products do you need? A: Oct-Dec precipitation

Drought Monitoring and Forecasting from the NWS Forecast Office Perspective

Kent Frantz (National Weather Service Weather Forecast Office, Peachtree City, GA)

- GA. has benefited from co-locating rain gages with stream gages
- Every two weeks the Peachtree City WFO issues a drought statement if Georgia is in D2. They use:
 - Drought Monitor
 - Lake levels – daily summary
 - Streamgages
 - Crop moisture index
 - Forecast fire danger
 - Rainfall resources page
 - Precipitation departure from normal
- Currently Athens and Columbus are close to 70% of normal for the last 6 months – may go to D1
- Drought tends to start in small areas and then expand
- Q: Can the precipitation departure from normal product be transferred to an Alabama WFO? A: Depends on the available data base (e.g., cocorahs history might not be long enough)
- Q: Is there value in reporting a longer average, such as 2 years or 5 years? A: A 2-month average would be valuable

Drought Monitoring and Forecasting for the Upper Chattahoochee River Basin from the NWS River Forecasting Center Perspective

Todd Hamill (National Weather Service Southeast River Forecast Center)

- The Southeast River Forecast Center (SERFC) covers all of the southeast states and Puerto Rico
- Their main page on the web shows river conditions with a flood stage perspective
- The SERFC produces Water Resources Outlooks on a regular basis that have a regional focus with specific information; the user can go to their web site and watch the presentation at their convenience; users can sign up for updates
- They show past rainfall and climatology; short- and long-term forecasts, river flow exceedance plots; short-term ensemble forecasts
- The SERFC also puts out the "SERFC Journal" with more detailed updates about current conditions and short-term forecasts

Streamflow Monitoring and Lessons Learned

Brian McCallum (USGS)

- 100% real-time streamgages (321 gages), 57 cents/Georgia citizen (\$4.7M)
- Gages are like fine wines, they get better with age
- There is 1 streamgage for every 185 square miles of Georgia – this is good coverage
- GA groundwater network
 - Mostly in SW Georgia
 - Mostly funded by GA EPD (76% of network)
- Issues are starting to arise in SE Georgia regarding groundwater use
- GA Water Quality Network
 - 49 sampling locations, 3 are continuous sampling
 - Collected since 1970s
 - Sample for nutrients, bacteria, etc.
- Tools and Products
 - GA Water Science Center Webpage
 - Database=NWISWeb (NWisWeb)
 - A good product is the 7-day duration hydrograph
 - USGS WaterAlert
- Lessons learned during the last drought (2006-2009):
 - Greater need for verification of low-flows
 - Gages had to be retrofitted because they were out of the water
 - There was an increased demand for new gages
 - A rain gage collocated with a streamgage is invaluable (80% of streamgages have rain gages)
 - Need low-flow statistics updated

DEALING WITH DROUGHT IN THE ACF BASIN

Georgia State Drought Planning

Tim Cash (Georgia Environmental Protection Division, Watershed Protection Branch, Chattahoochee and Flint River Basins)

- Drought Time Line:
 - 4/06 – Level 1 (odd/even outdoor watering; no time limit)
 - 5/07 – Level 2 (odd/even outdoor watering; time limited)
 - 9/07 – Level 4 (Drought emergency; total ban on outdoor watering except for food gardens and new landscaping)
 - 11/07 – 10% reduction for all with water permits
 - 2/08 – Monthly reporting, hand watering only, new landscaping only (landscaping businesses starting to go under)
 - 5/08 – Swimming pools became exempt from water use restrictions; House Bill 1281 and drought response modifications
 - 3/09 – Use drip irrigation and soaker hoses for watering
 - All of these restrictions reduced revenues for water providers
 - 6/09 – Non-drought
- Housing market collapse – new housing starts had a big drop in 2007 and 2008 – we haven't yet quantified the relationship between housing starts and the decline in water use

Effectiveness of Existing Drought Indicators and Management Triggers

Carol Couch, University of Georgia

- Swimming pools
 - Exempted from water management (as stated above)
 - Public-health driven due to mosquitoes breeding in poorly maintained pools and concerns over West Nile virus
 - Also concerns about increases in domestic violence if pools aren't available during hot weather
 - Small fraction of the water use
- It's important to consider who is at the table for decision making
 - The Colorado River flows through a much higher percentage of federally controlled lands compared to the ACF rivers, therefore more state, utility and private land owners need to come to the table for ACF issues
- Better informed decisions and mitigation
 - Can't look at drought as only a climatological event, but intersects directly with the responsibility to protect the public's availability of water
- Georgia priority of water use
 - Drinking water supply and public health
 - Agriculture
 - Industry and business
- Vulnerability and risk to water supplies are not represented by climatology

- Going to be a direct reflection of the development of infrastructure that can carry a population through a multi-year drought.
- The importance of the drought levels are that they take into considerations the water supply levels in the State
- Drought triggers were developed by the state climatologist
 - SPI for 3, 6, and 12 months
 - Large reservoir levels (including Allatoona and Savannah projects)
 - Groundwater in southern Georgia
 - Streamflow, low-flow statistics
 - Analyzed on climate divisions – not necessarily a good fit
- Communities not reliant on Lake Lanier (e.g., communities in SW Georgia) felt that decisions regarding drought had nothing to do with them. May need different types of triggers for those who rely on Lake Lanier and those who don't.
- We need to create triggers that are understandable by those who are affected; Need indicators that can resonate with people or they should be effectively communicated to the common person in GA.
- Must recognize that vulnerability and risk should be managed but must be done so in the context of public policy and priorities (like swimming pools).
- Could use smaller reservoir information
- Representation on the basin-scale a good idea
- There is a high degree of tension among the three states
 - Need indicators and triggers that can be managed by all three states and viewed as equitable by citizens of all three states
 - In previous drought there was a lot of false information going around on why certain decisions were made. Need credible source for the information.
- Look at recession from early 90s to see what that did to water demand. Compare to recent recession and reduction in housing market
- Water providers have said water use is back to 1998 levels because there is a shift in how people think about drought
- The NIDIS pilot couldn't be coming at a better time
- How do we sustain whatever we decide upon?
- Need homegrown teaching initiatives

Drought Early Warning and Information Tools

Keith Ingram (Univ. of Florida)

- Timing of precipitation is key – less than normal precipitation spread out over time might be easier to deal with than a lot of precipitation at once
- Heat wave and drought is a deadly and expensive disaster
- The Lawn and Garden Moisture Index:
 - A weighted average of precipitation with more weighting on more recent rain events
 - Computed daily
 - Scale is inches/week

- KBDI (Keetch-Byram Drought Index) only produced January – June
- ARID (Agricultural Index for Drought) is a daily index using automated weather station data (radiation, wind, humidity) and analog years
- At nc-climate.ncsu.edu/et you can obtain a historical climatology of crop reference ET for the southeastern states (web site still under development)

How do Stakeholders Get a Voice?

Wilton Rooks, ACF Stakeholders

- The ACF Stakeholders is a grass roots organization built on this question:
 - Can the diverse users of the ACF Basin act cooperatively to create sustainable solutions among stakeholders that balance economic, ecological, and social values in the sharing of this natural resource?
- Important process points
 - We had to get the organization right before tackling tough issues
 - No requirement to abandon local interests but to put them in the context of a sustainable watershed
 - We excluded state and federal agencies (and lawyers) from the organization
 - Nothing personal but focus was on stakeholders working together
 - Litmus test was always ‘balance and diversity’
 - Sustainability became the holy grail
- Four sub-basins were defined
 - Upper Chattahoochee
 - Flint
 - Middle/Lower Chattahoochee
 - Apalachicola
- There are 14 members for each sub-basin, and they are a diverse group
- Needs-Data-Sustainability Work Group
- Do-Better Work Group
- Challenges
 - Relationship with state and federal agencies
 - Funding for major technical projects
 - First transition of officers
 - Transition from a solely volunteer organization
- Their next meeting is Sep 22/23 at Lake Eufaula, AL

GROUP DISCUSSIONS

Victor Murphy (National Weather Service/Southeast Region)

- *What are the critical information needs related to drought (e.g. gaps in monitoring and forecasting)?*
- *What is the effectiveness of existing drought indicators and management triggers?*
- *How can education, communication and transparency related to current and future drought status be improved in the region?*

Attendee input:

- Using climate divisions for presentation and analysis doesn't work
 - Need basin level data, reassess climate division data
 - Define this area in terms of water holding capacity
 - What about smaller reservoirs, how could those be incorporated?
- Need county-level precipitation (e.g., better gridded data)
- Need to have a seasonal outlook discussion but focus on the basin and the sub-basins. Also, need a strong education component and understand this would be an iterative process learning from stakeholders on how they view and perceive risk and how the information provided fits into their decisions
- Surface water vs. groundwater represented on basin scale or by watershed would be useful
 - North Carolina is already working on the watershed scale
- We need to know what is happening upstream of the watershed
- NCDC is funding soil moisture sensor installations
 - Q: Do we need more? A: Yes, a high priority
 - Soil moisture data would guide watering schedules
 - Farmers can measure locally
- There are old reports with ET climatologies but they need updating
- Unpermitted water users are not bad or illegal - they are small users that don't harm other users
- Users taking more than 100,000 g/day are permitted
- We need the right gages in the right places
 - Places that need gages: below West point and above Columbus, at every inflow and outflow point
- QC issues – must keep current and calibrated
- October is a good time to look at the recharge seasonal outlook
- The public would prefer to get information from a scientific community rather than a regulatory agency
- Historical analogs are easier to present to non-scientific people
- The Corps coordinates with Fish and Wildlife once a month
- Q: How can we provide a drought early warning system for small tributary towns? What do the smaller systems need? A:
 - Seasonal outlook could be very helpful to small systems but may have little to no effect on the USACE operations.

- Since storage is limited (e.g., 10-12 day supply) conservation measures don't help as much; advance warning of drying conditions would help
- Most small communities don't have someone to monitor conditions – may have to wait for declarations. Need to have a different entity communicate to small towns early on.
- Need education program or component that can educate or build capacity in the basin
- It was proposed that NIDIS could provide education to town leaders
- It would be helpful for small town providers to have a contact to discuss current conditions
- Need a suite of decision support tools for local and state users
- At times we may have to put part of Georgia into drought because of agricultural impacts, not water supply

Tuesday August 10, 2010

Review of Day 1

Comments related to the Review of Day 1

- The issue of communication comes up a lot with the flood community also – could NIDIS collaborate with the flood communities?
 - Weather service already communicates about flood and drought under the water resources banner
- Puneet Srivastava and Chris Martinez will be surveying and interviewing users of drought products
- There are not many non-Fed decision makers here – how do we capture a wider audience?
- Tribal community needs a water planner – a desk-top tool that is not reliant on the internet – you could download updates, but otherwise work offline.

GROUP DISCUSSIONS

David Stooksbury (Georgia State Climatologist, University of Georgia)

- *What is needed to improve drought planning and response in the Upper Chattahoochee River Basin?*
- *Next Steps: Developing a drought early warning information system*
- *A customized ACF drought monitor: Audience and purpose*
- *For the design of the customized ACF drought early warning information system, what is needed for the Upper Chattahoochee River Basin? What are the building blocks for the design of this drought early warning information system? What are potential end products?*
- *What actions can local, state, federal and tribal agencies take to lay the groundwork for this drought early warning information system? How best might these be coordinated for information sharing?*

Attendee Input:

- We need to concentrate on the area above West point, also beyond the main stem
- Water Councils
 - Establish capacities for watersheds and aquifers (not a number, but a variation of the past hydrological record)
 - Not meant to be long-term organizations – when they finish with this they are done
 - Instream issues, women and minorities are missing from the councils
- The Corps has a very extensive communications list
- How early is early?
 - Will the stream go dry?
 - Will waterways become disconnected, isolating mussels from the stream?
 - Seasonal/summer forecast would be helpful
- There are small businesses on Lake Lanier that are dependent on lake levels but can't insulate themselves against drought
 - They need contingency plans
 - Lake associations can contact these folks
 - Could we also contact small business associations (e.g., Chambers of Commerce, Rotary Clubs, etc)
 - Businesses that don't prepare have the expectation that the government will take care of them
- The RFC is setting up a framework and it is getting better as they go. People are already engaged via the forecasts
- How do we make the information more relevant to people?
- Don't forget:
 - Mental health effects due to job loss, foreclosures and depression
 - Other vulnerabilities such as those who are on dialysis
- Don't forget water quality

Develop a plan of action and timeline: Developing and implementing a drought early warning information system for the ACF Basin – needs of the Upper Chattahoochee River Basin

Keith Ingram (Univ. of Florida)

When asked to report to the group what their priorities were as *users of drought information or providers of drought information*, priorities included (not in any particular order):

- More groundwater information and the establishment of groundwater indicators of lowering water table (i.e., contamination intensification in an indicator well)
- Information on water-vulnerable species such as changes in population or behavior
- Tools that make climate and drought information more readily available with feedback mechanisms from decision makers to scientists
- Implementation of basin management recommendations to mitigate human-created drought
- Long-range forecasts (e.g., multi-year streamflow forecast); presentation in a probability distribution is OK

- Short-term drought information (when and for how long), including what regions will be affected and what restrictions will be instituted
- A roster of valid/reliable historical-to-date streamflow and precipitation data sources for the user to make their own assessments (e.g., 10 to 20 good URL sites)
- Some sense of benchmark years and characterizations of current or recent events (e.g., recurrence intervals)
- Updated streamflow data with updated statistics so that (1) the current hydrologic reality can be put into context and (b) those that have, or are about to build new reservoirs can reassess and update the firm yield calculations
- Information presented at the watershed level
- More information about instream flows and their water quality impacts; degree to which those impacts will further stress the system; how to mitigate the adverse impacts; what will happen if we don't mitigate
- Develop state or basin contingency plans
- Determine how are end-users are impacted
- Publish a drought monitor at the basin scale
- More stakeholder engagement
- Current conditions presented with analog years
- The SERCC can provide
 - Data clearing house (one-stop-shop view)
 - Decision support tools
 - Education media (web and print)
 - Analysis of forecast (i.e., what is happening compared to the forecast?)
- Indicators of conditions
- Planned surveys will lead to enhanced information
- State climatologists need more funding for observation and monitoring activities
- Provide accurate and timely data for analysis, trends, tech support
- Short-term ensemble streamflow – we are working on it
- Impacts of drought/low-flow to users
- Reliable source of 1-stop-shop data and information needs
- Potential effects of release decisions
- Federal 3-state drought calls; Drought call for a larger audience
- Federal agencies use the offices of the state climatologists as a first stop for state information
- Pre-scripted PSA
- Provide accurate real-time hydrologic data
- Provide quality analyses of data and trends
- Provide technical support related to questions of data and products
- 32-km gridded potential evapotranspiration observations and forecasts (1-9 months?)
- 1-9 month probability of exceedance streamflow forecasts (monthly)
- Residential/turf drought index forecasts (1-3 months)
- 1-4 week streamflow forecasts using analog rainfall (weekly)

- Look at current conditions and identify analog years; prepare outlooks based on the analog years and make available on the web; look for groups to target with drought outlooks
- Funding
- Drought contingency plans
- Basin-level data (move away from climate divisions)
- More gridded data products
- Seasonal outlook discussion is important
 - Explain the outlook in understandable terms
 - Effective communication strategy
 - Focus on small reservoirs off the main stem where there is little storage; advance notice will help with communicating with customers
- Engagement and assessment of stakeholders
- Drought forecast product for small communities (3-6 month inflows and water availability forecast)
- Streamflow forecast based on analogs up to one year based on SERFC ESPs
- Water outlooks through SECC
- Duration and frequency of low-flow events and areas susceptible to low-flow events
- User-generated ensemble streamflow statistics
- Short-term ensemble streamflow forecasts
- Forecasts with probability factors for 2-6 months, 6-12 months, and 1-2 years with a severity level projection for each time period
- Audience focused information
- Organize a summary of ACF/NIDIS pilot discussions and recommendations of the 3 sub-basin workshops into the categories of
 - Data and Information
 - Monitoring Gaps
 - Communication
 - Coordinated Processes
 - Funding Issues

After discussing stakeholder priorities, it was suggested that the SERCC, SERFC and CPC collaborate on a drought outlook by providing common press releases from the state climatologists and the SECC should lead tri-state webinars for discussing current and future conditions. The National Hydrologic Warning Council could disseminate the information to a wider area.

Plan of action and timeline:

- Stakeholder engagement and assessment is critical and need to understand their decision making process
- Many people want a multi-month streamflow forecast that have benchmark years
- The SECC could be key participants in the seasonal climate outlooks

- Most SCs operate in reactive mode. Where will funding come from to allow the SCs to be more proactive
- Need data clearinghouse, one-stop shopping for climate/drought data
- In situ analysis of what actually is happening compared to what has been forecasts. When does the forecast verify or not
- Range of indicators with monitoring and forecasting capabilities communicated in a way that allows effective use of the information
- Need solid funding base for GA-SC to develop consistent information, data, tools and products (including monitoring networks)
- Fact sheet showing a cost-benefit analysis of streamgage data
- Provide short-term ESP forecasts
- Assess use of ESP information, how people are using the information to make decisions

How can we make information available and when?

- Brief/educate the new Governors on water resource issues in the State
 - First step could be to have a full basin discussion
 - Develop briefing papers or fact sheets for new leadership in the three states
- September-Develop consensus of basin conditions for the upcoming season

MEETING ADJOURNED