Workshop on Communicating Seasonal Climate Information:

Summary Report

27 September 2012, Norman, OK

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Introduction

Federal and state climate scientists, decision makers, and communication experts gathered in Norman, Oklahoma on 27 September 2012 to discuss the ways in which seasonal climate information should be communicated to various audiences. Drought information was the focus of much of the discussion because the Southern Plains had recently experienced a drought of significant magnitude and vast extent. All seasonal climate information was relevant to the workshop, however. The workshop was organized by the Southern Climate Impacts Planning Program (SCIPP), a National Oceanic and Atmospheric Administration (NOAA) Regional Integrated Sciences and Assessments (RISA) program, the National Integrated Drought Information System (NIDIS), and the NOAA Southern Regional Climate Services Director. Seventeen people participated in total; the list of participants is located in Appendix B.

This summary is based on the collective contributions of the workshop participants and provides an on-the-ground look into how climate information and products are being used by decision makers, including the strengths and weaknesses of those products and information. This report is geared towards scientists who wish to improve their communication with those outside of their field. Our desire is to continue to cultivate the partnerships that have been formed while managing the impacts of drought during 2010-2012 and to continue to meet the needs of climate information users as other climate hazards become relevant across the south central U.S. Critiques are not aimed at a particular person or agency but rather to motivate the climate science community as a collective unit. We recognize that some of the identified weaknesses may not be possible to improve due to scientific limitations or budget constraints. However, acknowledging the weaknesses is an important step in providing relevant climate services.

Getting the Word Out About Drought

The workshop began with an overview of the methods that have been used to communicate drought information over the past year and a half. As drought intensified in the Southern Plains in the Spring of 2011 (Fig. 1) it became apparent that there was a need to improve the communication of drought information to resource managers to help them manage the impacts of the drought. A four-pronged approach was used to begin the conversation about drought across the region (Fig. 2), including:

State Drought Planning. In April 2011, SCIPP gathered together leaders from each of the six states in its region (OK, TX, AR, LA, TN, MS) to discuss the ways in which their state drought plans could be improved and encouraged the development of a plan for the states that did not yet have one.

Outlook and Assessment Forums. In July 2011, the first of five drought outlook and assessment forums was held in Austin, TX. Subsequent forums took place in Fort Worth, Lubbock, and Abilene, TX and a virtual forum was also held and focused primarily on New Mexico. The forums brought together climate scientists, media, and decision makers from primarily the fields of water resources, agriculture, and livestock. Scientists provided an update on the drought including the seasonal forecast, and decision makers shared the impacts that the drought was having on their operational and planning activities. Sixty to 80 people participated in each of the forums.

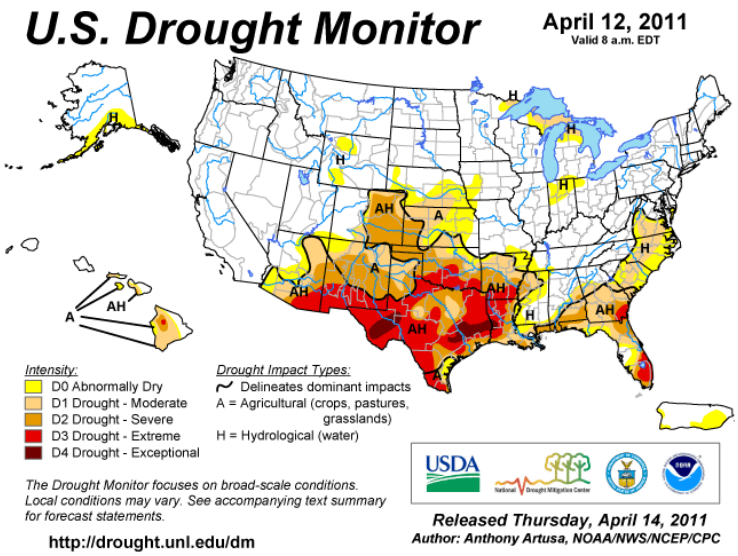

Figure 1: Extreme (D4) and exceptional (D3) drought began to appear in the Southern Plains in Spring 2011 (Courtesy of the National Drought Mitigation Center).

Figure 2: A four-pronged approach was used to communicate drought information 2010-2012, including state drought planning, outlook and assessment forums, media engagement, and a *Managing Drought in the Southern Plains* webinar series.

Media Engagement. Two media-specific webinar briefings on drought conditions were held in April and May 2011, and media coverage occurred in conjunction with each of the outlook and assessment forums. Through media engagement the general public was informed about the drought and the visibility of NOAA's regional climate services was raised.

Webinar Series. Seventeen full length drought management webinars have been held to date. The webinars include a drought briefing followed by three presentations focused on a science or impact topic such as but not limited to La Niña, water resources, cattle and livestock, seasonal forecasting, and groundwater and surface water. Webinar summaries and recordings are located on the SCIPP website in the *Publications* and *Videos* sections, respectively. The summaries are also posted on the NIDIS Drought Portal, in the *Southern Plains* section. Webinar audiences range from 30 to 80 people; however several audience members have indicated that multiple people in their organization participate in the webinar via a single user, so the number directly participating is likely higher. The audience also continues to grow over time with the online presence.

Decision Maker Feedback

Following the overview of the methods used to disseminate drought information, two decision makers presented the types and sources of drought and seasonal climate information their respective agencies have used, and suggested improvements for future communication. First, Courtney Jalbert, a meteorologist who works at the Tarrant Regional Water District (TRWD), discussed how her agency uses drought information and what could be improved in the future.

TRWD is a water resource management agency that serves 65 cities in north Texas. Established in 1924 after a devastating flood, TRWD now operates 150 miles of pipeline for water transport and four major reservoirs. During 2011 when the drought was at its worst across TRWD's jurisdiction, staff members tuned into the SCIPP webinars and relayed the information to other staff during weekly operational planning meetings. TRWD's efforts to manage their water and communicate the severity of the drought paid off. Demand in 2011 was less than in 2006 when their region was also in drought, even though the drought in 2011 was much more intense than in 2006.

One product that TRWD created to meet a need was to overlay the U.S. Drought Monitor (USDM) map with the watersheds and reservoirs that they operate (Fig. 3). The need was identified when the Dallas, TX area received rain and residents did not understand why water restrictions remained in place. Using the map, TRWD effectively showed that even though some areas received rain, the locations at which their reservoirs are located were still in D4 drought. Hence, the continued water restrictions were necessary.

In addition to the need to **incorporate GIS overlays with drought information**, other feedback included:

- **Utilize Social Media.** Facebook and Twitter have become increasingly valuable for TRWD to connect with customers. Maps from TRWD and outside agencies (e.g., National Weather Service

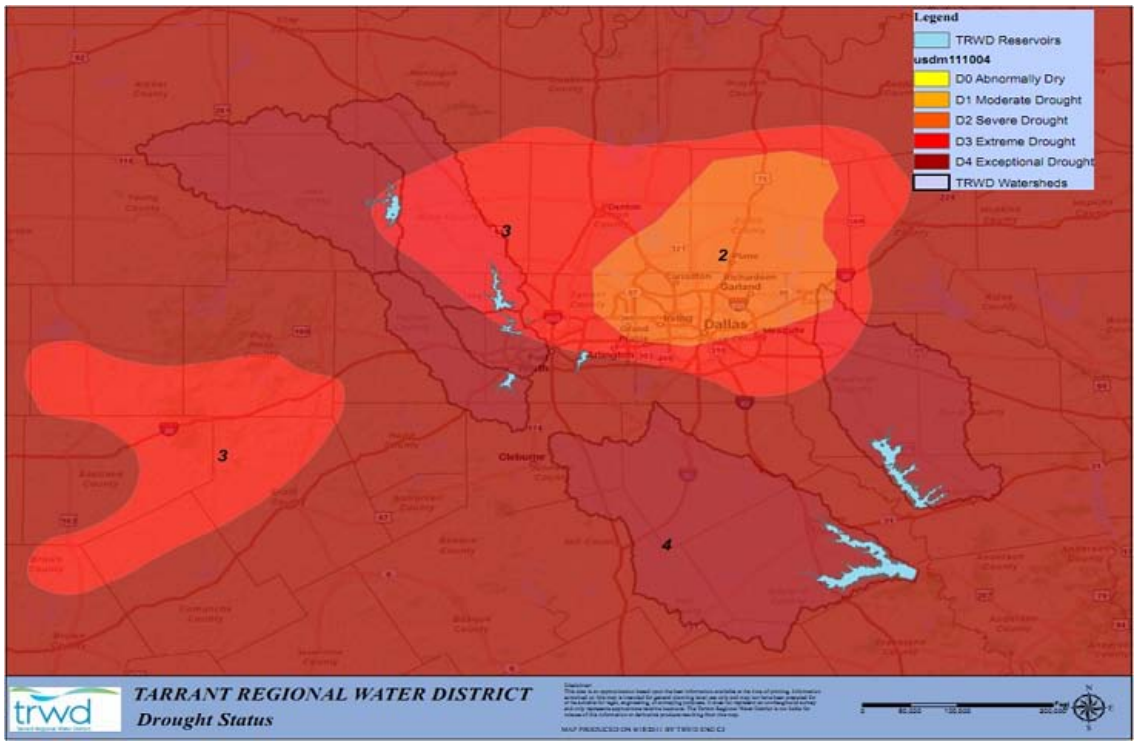

Figure 3: Tarrant Regional Water District reservoir map with U.S. Drought Monitor map (http://droughtmonitor.unl.edu/) overlay (Courtesy of Courtney Jalbert/Tarrant Regional Water District).

rainfall maps) can easily be shared on social media. TRWD has employees who are tasked specifically with handling social media communication.

- **Greater Focus on Science.** TRWD was more interested in the webinars that focused on science topics rather than the impacts topics because they are less familiar with the science. On the other hand, scientists are often more interested in the impacts because they are less familiar with them.
- **Information Access.** Drought information was not difficult for Jalbert to locate but she has a meteorological background. Her colleagues had a more difficult time finding appropriate information, however. Therefore, posting maps and other pertinent information on easily accessible websites is important. Readily available products are going to be used more often by decision makers than those that are buried in websites.

Next, John Longworth, an engineer from the New Mexico Office of the State Engineer (NMOSE), spoke about how his agency has used drought and seasonal climate information to make decisions. NMOSE is responsible for managing New Mexico's water resources. Longworth discussed several of the products he uses to brief the New Mexico State Engineer and other colleagues. For example, the Climate Prediction Center (CPC) U.S. Seasonal Drought Outlook (Fig. 4) is used to communicate with the Cabinet and Governor to develop executive orders for the state. This product was also used to communicate the drought severity and obtain emergency funding from the U.S. Department of the Interior.

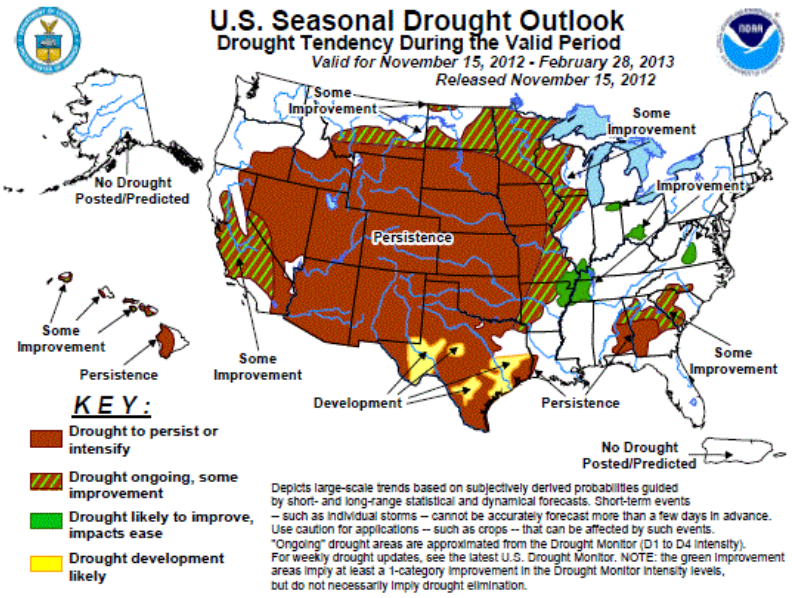

Figure 4: Example of the U.S. Seasonal Drought Outlook, one of the products that the New Mexico Office of the State Engineer uses to communicate with the Governor to develop executive orders for the state (Courtesy of the Climate Prediction Center).

Drought can have a significant impact in New Mexico, especially on livestock and rangeland ecology. The risk of wildfire also increases with drought and water supplies are affected. Longworth commented on how the feedback that NMOSE provides to the USDM is always listened to and the map is usually accurate, at least to the best of his knowledge. The other products he uses were incorporated into the *Useful Products* section of this report.

The time allocated for briefing upper-level managers is always in short supply and typically ranges from 5 to 15 minutes. Thus, information contained in a graphical format is the best way to communicate with colleagues. Similar to what Jalbert noted, Longworth said that if information is not easily accessible it will probably not be used. Some suggestions for improving communication included:

- **Communicating Forecast Skill.** The CPC seasonal forecast maps are frequently used by NMOSE but decision makers are not always sure when they are appropriate to use. Thus, information on seasonal forecast skill needs to be readily available and in an easily accessible location. An image file can easily be passed around and accompanying text may get lost so including information about forecast skill on the image could be helpful.
- **Map Legends.** Legends need to be included in maps, graphs and images. Decision makers will often copy and paste a graphic into a presentation or report and an unattached legend might disappear. Acronyms should be spelled out in their entirety somewhere on the map. A short description would so be helpful. For example, many decision makers do not understand what "EC" is – "equal chances of normal, above normal or below normal" – on the CPC seasonal forecast maps.
- **GIS Data.** GIS data with overlays relevant to a local area are useful.

Communication Tips

Another component of the workshop was listening to two communication experts present on how drought and seasonal climate information should be communicated to non-technical audiences. Dr. Renee Edwards, Professor and Chair of the Department of Communication Studies at Louisiana State University, provided information on the topic that is rooted in the communication literature. Keli Pirtle, Public Affairs Specialist for the NOAA Office of Communications and External Affairs discussed tips for communicating with the media.

Edwards began by noting that communicating climate information is a form of technical communication, which implies that the material can be difficult for the audience to understand depending on their expertise. When a scientist prepares a presentation they should think about the outcomes of the presentation such as what they want the audience to learn. The scientist should present information that includes an introduction, a thesis statement or what they want the audience to get out of the presentation, a preview, main points, transitions, and conclusions or a summary. Jargon should be avoided or explained. When communicating with graphics it is important to label the image and the axes. Furthermore, color schemes or any other pertinent information should be explained. Finally, conclusions or a summary slide should be provided to remind the audience of the main points of the presentation.

Following Edwards' presentation, Pirtle discussed the ways in which one should approach a media interview. The media should be viewed as a strategic partner because they provide scientists with the opportunity to communicate their findings. Pirtle said that when approached by a reporter, a scientist should determine what they want their message to be and provide supporting information for the message, such as story. Then, provide a bridging statement that reminds the reporter of the important information such as "The fact is . . . ," "The truth of the matter is . . . ," "The real question is . . ." The interviewee should also think about their performance including volume, pitch and pace of their voice, passion, eye contact, gestures, and posture. Ten interview pitfalls were also discussed.

Top 10 Interview Pitfalls:

10. **Assuming the reporter has previous knowledge of climate, the area, your organization, etc.** Ask the reporter a few questions at the beginning of the interview to gauge their knowledge level.

9. **Treating the interview like a conversation.** Remember to repeat the question so that the reporter can get a full sound bite. This makes their job easier but also ensures a remark is not taken out of context. For example, instead of answering "65 degrees" to "What was the average temperature last month?" you should answer by saying, "The average temperature last month was 65 degrees." Also, remember to emphasize the important part of your message(s).

8. **Speaking off the cuff without preparation.** If you do, you might say something you do not intend to say. If a reporter contacts you without warning, ask if you can call them back in a few minutes. Then take that time to prepare.

7. **Uncomfortable silence.** Reporters often use this to get you to say something that should not be said. Avoid adding information for the sole purpose of filling the silence.

6. **Not considering the medium and the audience.** TV interviews are different from newspapers, which are different from radio. Newspapers typically provide the opportunity to go more in-depth than TV and radio. The Internet also provides a different dynamic.

5. **Talking about a subject that is outside of your area of expertise.** If you do not know the answer, say so. Avoid speculating and point the reporter to another person or organization who could provide a more informed response.

4. **Rambling and speaking in generalities.** Get to the point quickly and be precise. Use short, simple sound bites (15 to 20 seconds) to get your message across. This is especially important for TV and radio interviews.

3. **Getting too comfortable with a reporter.** Avoid jokes and sarcasm and never assume the microphone is off.

2. **Being too scientific/technical.** Avoid jargon and acronyms if possible. Remember that words that are extremely familiar to you might not be familiar to the reporter or the public.

1. **Assuming something is "off the record."** If you do not want to see it in print or watch it on TV do not say it.

Participant Discussion

Decision maker feedback and insight from communication experts were two components of the workshop. Another component was open dialogue among the participants about the usefulness of climate products, product deficiencies, communication challenges, and using social media to track drought information. Several other issues were discussed but no conclusions were made due to time limitations. The discussion is summarized below.

Some of the points that the participants generally agreed upon were that building relationships between decision makers, information providers and the media is very important for effective communication. Also, it is unrealistic to expect a single product to meet the need of every decision maker since the audience of a product or service is almost always heterogeneous. In terms of communicating with non-climate scientists it is often more effective to package information in smaller bits rather than trying to provide all of the details at once. People are only able to absorb so much information, especially in an informal learning environment.

For seasonal planning, the two decision makers said that products and information that focus on the 0-3 month timeframe is most relevant for their operations. The 3-6 month timeframe is sometimes used, but anything beyond that is used purely out of personal interest.

Discussion also occurred about practical tips for managing webinars. The following are based on input from workshop participants. No systematic evaluation of the *Managing Drought in the Southern Plains*

webinar series has been completed to date but evaluation was of significant interest to the participants, as noted in the *Unresolved Issues* section later in this report.

Webinar Tips from the Managing Drought in the Southern Plains Webinar Series

- **Personnel:** At least two people are needed to run the webinar; one to operate the webinar software and address technical issues and another to moderate the webinar by introducing the speakers and addressing questions that are posed by the audience.
- **Visuals:** Slides should be compiled into a single presentation at least 2 hours before presentation time.
- **Audio:** Only presenters call in; participants listen through their computer (unless technologically prohibitive, in which case they should be provided with the call-in number upon request). This significantly helps eliminate distracting background noises. One downside of only allowing the presenters to speak on the phone, however, is that the discussion may be limited if the audience does not engage through the software's chat box.
- **Software:** Try to use webinar software that does not require a plug-in (e.g., Adobe Connect, http://www.adobe.com/products/adobeconnect.html) so that first time audience members do not miss part of the webinar by having the download the plug-in. If a plug-in is required, notify the audience members ahead of time.
- **Recording:** Recording the webinars, which can be accomplished using Adobe Connect for example, allows one to easily post the recordings on YouTube or another video hosting website. This provides a permanent record of the webinar which can be useful for both the host and the audience.
- **Frequency:** Webinars should be held once per quarter, unless the hazard is ongoing and/or has a particularly large impact.
- **Content:** The audience is interested in more detail than they can obtain from a news report. Webinars provide the opportunity to meet this need.

Useful Products

In addition to discussing tips for managing the webinars, another topic of discussion was the products that are useful to decision makers. The following products and services were discussed during the workshop.

- **Climate Prediction Center (CPC) Portal:** http://www.cpc.ncep.noaa.gov/; provides much of the relevant seasonal climate forecast information in a single location.
- **Climate Division Precipitation Ranks:** e.g. http://www.srh.noaa.gov/images/abq/cli/monthly/highlights/2010/Annual/Spring2010-precip_percent.gif

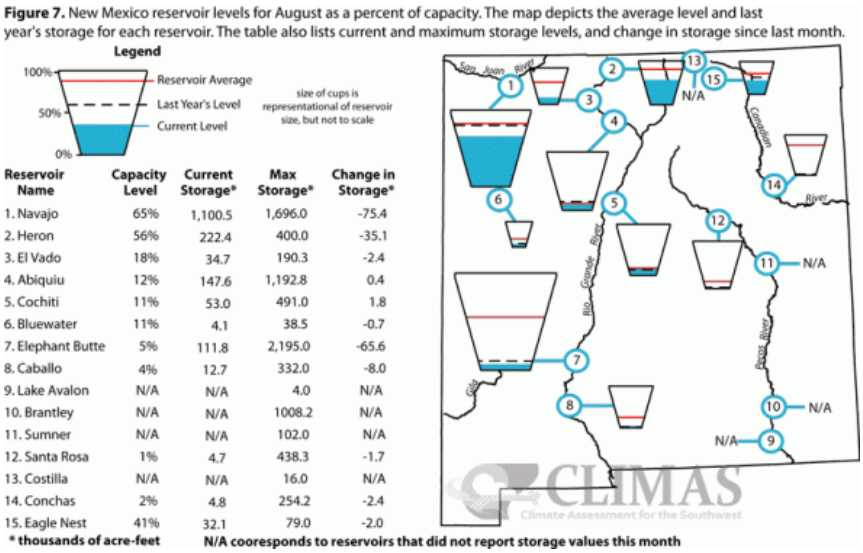

Figure 5: Example reservoir storage graphic from CLIMAS. The glasses are representational and not to scale. The data are based on monthly reservoir reports from the National Water and Climate Center of the U.S. Department of Agriculture's Natural Resources Conservation Service (Courtesy of Climate Assessment for the Southwest).

- **National Climatic Data Center Statewide Ranks Map:** http://www.ncdc.noaa.gov/temp-and-precip/maps.php; provides a relevant graphic that can be easily passed around departments and agencies.
- **Reservoir Status Tea-Cups:** The Climate Assessment for the Southwest (CLIMAS, a NOAA RISA) has been communicating the status of reservoirs using images similar to the Bureau of Reclamation "Tea-Cup" diagrams (Fig. 5). The graphic provides decision makers with easily accessible and understandable information. The graphic is currently produced on a monthly basis but would be even more beneficial if it was produced more frequently. Staffing limitations prohibit more frequent production, however.
- **U.S. Drought Monitor:** http://droughtmonitor.unl.edu/; used by a lot of people and often passed around Twitter and Facebook.
- **U.S. Seasonal Drought Outlook:** e.g., http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.gif
- Any product that shows the conditions of **water storage**, **snowpack**, **runoff**, **rangeland**, **forests**, **watersheds**, or **groundwater**.

Product Deficiencies

Several product deficiencies were also identified. The purpose of the comments was to improve communication from scientists to decision makers.

- **Inability to Zoom:** If scientifically appropriate, it would be helpful to have maps that allow one to zoom in like the USDM allows. This helps focus attention on a particular area when decision makers brief their colleagues. The participants also recognized that getting too localized could be problematic for some products or information, due to scientific uncertainty.

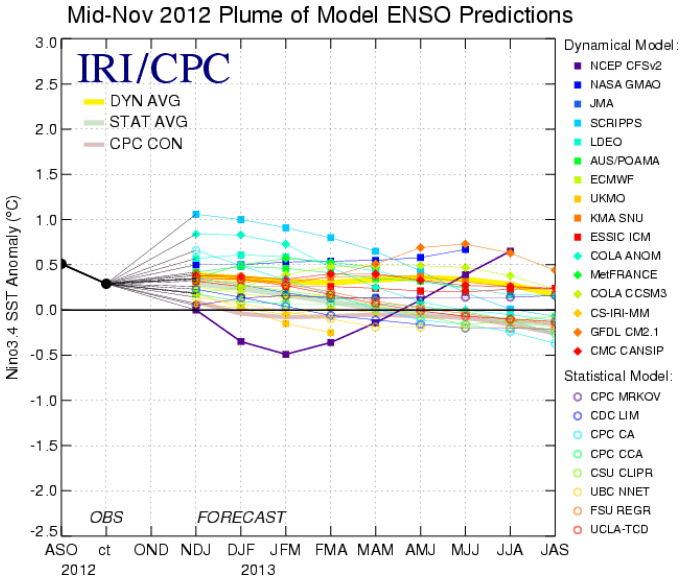

Figure 6: An example spaghetti plot showing El Niño Southern Oscillation (ENSO) predictions (Courtesy of International Research Institute for Climate and Society/Climate Prediction Center).

- **Spaghetti Plots:** While scientists understand how to properly use these plots, they can be confusing to decision makers. For example, the consensus model in the El Niño Southern Oscillation (ENSO) forecast is somewhat hidden in the spaghetti plot (Fig. 6). This type of plot could be showed to a state engineer, but never to the legislature, due to its complexity.
- **Source Confusion:** Similar information can often be obtained from multiple sources (e.g., CPC and NCDC). In these cases it would be helpful to include with the graphic a brief explanation that describes where the product comes from and why.

Communication Challenges

Seasonal climate information is often complex. As such, it can be difficult to communicate a message that is simultaneously accurate and understandable to a broad range of people. Discussion among the workshop participants shed light on five challenges associated with communicating seasonal climate information.

1. **Relationship with the media.** This challenge has several dimensions including whether to trust the media, how to use social media, and what the media really want from interviews. For example, one participant spoke about a time where they were interviewed about drought but it seemed the news outlet primarily wanted a picture of a bloated cow. Another issue with the media is that it reports stories that have occurred but NOAA wants to get the word out before an event occurs.

2. **Unexpected use of information.** A variety of forecasts are published on NOAA websites even though scientists may have confidence in some forecasts more than others. This may lead to a decision maker sharing a forecast with someone who has little skill in interpreting it, and who

uses the information in a way that the science does not support. One participant described a town that did not adopt water conservation measures based on an overly optimistic expectation about the effects of El Niño.

3. **Probabilistic nature of information.** This challenge concerns how to communicate uncertainty about forecasts. For example, with spaghetti plots, is it better to show the full plot or to show a single (but likely wrong) outcome? In one community, different stakeholders argued for different policies, each on the basis of one of the forecast options in the full plot.

4. **Politicization of climate change.** The general public is divided in being convinced of anthropogenic climate change, largely as a function of political identity, which places NOAA in a difficult position as a source of information about climate change. Some audiences are more open to information about climate change than others; speaking with small groups about climate change may be easier than speaking with larger groups.

5. **Adaptation to the audience.** Some recipients (listeners) are very knowledgeable about climate science and others are not. A single audience may be heterogeneous. One issue is whether to adapt the message to the audience or to expect the audience to become sufficiently scientifically literate.

Additionally, drought is particularly challenging for the media landscape because of its slow onset nature. How and when drought becomes newsworthy was a topic of conversation.

Social Media

Social media such as Facebook, Twitter and YouTube are becoming increasingly common methods for communicating scientific and professional information. Social media usually involves a decentralized interactive dialogue that is distributed across a multitude of networks in real-time. Recent research suggests social media is an important way to rapidly disseminate information, both credible and non-credible, related to an ongoing or impending disaster. It can be used as a monitoring tool and a literacy tool, and provides organizations the opportunity to reach their audience directly rather than relying on a third party.

Two researchers from the University of Oklahoma Center for Applied Social Research presented about a pilot project that uses Twitter to capture the flow of drought information. While their results were preliminary, the presentation provided insight into the kind of analysis is possible, such as identifying how and what type of drought information was disseminated during the 2011 Southern Plains drought. Additional discussion is planned to determine whether pursuing this avenue of research would be valuable to the drought and seasonal climate community.

Unresolved Issues

Aside from that which is discussed above, several topics were discussed throughout the workshop that remain unresolved. These included (1) appropriate use of CPC seasonal forecast products, (2) the

research to operations transition, (3) determining the appropriate stopping or pause point for an effective outreach method, (4) when to communicate uncertainty, (5) identifying critical checkpoints, and (6) formal evaluation.

First, much discussion occurred on the appropriate use of CPC seasonal forecast products. Some products have more skill than others, or have more skill depending on the atmospheric conditions and the time of year they are issued. It became apparent throughout the workshop that this skill is not effectively communicated to decision makers. While some people thought this was a communication issue, others thought it might be an education issue. This dilemma is not unique to seasonal forecasting. In fact, finding a balance between communication and education is a challenge for anyone trying to communicate technical and complex information.

Another question raised was whether we should, and if so how do we, transition products from research to operations. RISAs provide added-value products such as the *Southwest Climate Outlook*, for example, that simultaneously communicate technical issues and builds capacity. Although very helpful to decision makers, the production of these products is time consuming. As soft-funded research organizations, is it appropriate for RISAs to produce the product indefinitely? Furthermore, some decision makers are weary of embracing products produced by soft-funded organizations because they do not want to get used to something just to see it disappear.

Related to the research to operations problem, the participants discussed how to determine a stopping or pause point for an ongoing outreach effort. For example, the *Managing Drought in the Southern Plains* webinar series began on 29 September 2011 as a biweekly series when the drought was intense and of vast extent. As the drought improved and interest somewhat waned, SCIPP continued with a full webinar and briefing every month. The production of each webinar is time-consuming, but the hosts are pleased to produce it as long as interest remains. Yet, determining a stopping point or establishing a reasonable frequency that is considerate of time constraints is important so that resources can be allocated to other projects or hazards as needed.

Another topic that was discussed but no conclusions were made was whether to communicate uncertainty information. On the one hand it can provide an “out” for a decision maker if their policy-oriented decision ends up being wrong. On the other hand, some decision makers do not know how to use the information appropriately.

Identifying societal and scientific critical checkpoints was another topic of discussion. If scientists understood the times of year that are crucial to decision making (e.g. right before Memorial Day Weekend when lots of people are traveling and vacationing), their provision of climate information may be more effective. This exercise could be completed on a sector basis. Additionally, it is also important to identify the points in which a seasonal forecast is not longer useful. For example, if rain did not fall at the end of November like it was forecasted, the predicted precipitation trend for a November-January forecast may not be valid by December and January.

Finally, there was interest in conducting a formal evaluation of the impact of the four-pronged approach that was and is being used to communicate drought information. Research questions that were of

interest to the participants included: How did the information change people and planning? What infrastructure needs to be set up ahead of time to track information and impacts (e.g., related to drought) that cannot be accomplished after the fact? How do we track effectiveness? How do we measure outcomes?

Summary

The purpose of this workshop was to bring together climate scientists, decision makers and communication experts to discuss the methods that have been used to communicate drought information in the Southern Plains during 2010-2012 and to determine the areas in which scientists can improve their communication of seasonal climate information. The discussion focused on several topics including tips for managing webinars, useful products, product deficiencies, communication challenges, the role of social media, and several unresolved issues.

The decision makers were interested in the science as long as it is in a format that is easily accessible and that some materials could be used for 5-15 minute briefings. Climate information and products are often used as evidence to a governing board, state agency, or the public for why a particular decision is being made, so it is important that it is displayed and formatted in a way that effectively and accurately communicates the data. Moreover, improving the connection between statistics and impacts will help decision makers better understand what to do with the information. The participants also agreed that building relationships between decision makers, information providers and the media is one of the most effective ways to ensure that scientific information is portrayed appropriately and accurately. Traditional and social media should be viewed as a strategic partner, not an adversary.

Climate science information is complex but that should not deter scientists from communicating in a way that is relevant to decision makers and via various media platforms. The information that is communicated through these channels helps society manage the impacts of climate hazards such as droughts, floods, and heat waves.

Appendix A: Agenda

Workshop on Communicating Seasonal Climate Information

National Weather Center, Room 1120
120 David L. Boren Blvd. Norman, OK 73072

26 September 2012

6:00 Informal Dinner at BJ's Restaurant and Brewhouse

27 September 2012

8:30 Refreshments Available (*Courtesy of SCIPP*)

9:00 Brief Welcome and Introductions (Riley)

9:05 What We Have Done: Recap of Drought Services (Brown, McNutt, Shafer)

- Memphis Meeting
- Webinar Series
- Drought Outlook and Assessment Forums

9:30 Perspectives from Decision Makers (Longworth, Jalbert, Bewley)

- How has the information been used?
- What needs to be improved?

10:15 BREAK

10:30 Communicating the Message: What did and did not work?

- Discussion Among All Participants

11:30 LUNCH (On your own in the *Flying Cow Cafe*)

12:30 Communication Primer (Edwards, Pirtle)

- Best Practices, Verbal and Visual

1:30 BREAK (*Refreshments courtesy of SCIPP*)

1:45 Formal Evaluation of Drought Activities/Communication Effectiveness (All)

- How do we improve the dissemination of information in the future?
- Using Social Media to Track Drought (Silva)
- Method for Evaluating Effectiveness
- Implementation Plan

3:30 Adjourn

Appendix B: Workshop Participants

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