

MEETING SUMMARIES

ADVANCING PREPAREDNESS AND RESPONSE TO DROUGHT AND WILDFIRES THROUGH NORTH AMERICAN TRANSBOUNDARY COLLABORATION

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The economic, environmental, and social impacts of climate extremes across North America are significant.¹ Drought, in particular, is one of the costliest and most prevalent natural hazards, and the impacts from drought are not constrained by any nation's borders. Coordination and communication between the United States, Canada, and

2016 NORTH AMERICAN DROUGHT, WILDFIRE, AND CLIMATE SERVICES FORUM

WHAT: A group of nearly 50 participants from the United States, Canada, Mexico, and the Caribbean came together to discuss existing monitoring, assessment, and outlook products for drought and wildfires and to explore opportunities for enhanced collaboration and partnerships across regions and borders.

WHEN: 21–23 June 2016

WHERE: Fort Worth, Texas

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Mexico during recent North American droughts have been essential toward minimizing and controlling impacts such as reduced agricultural productivity, large wildfire outbreaks, and water shortages. The importance of trilateral partnerships in the delivery of drought early warning information, drought impact assessments, and drought forecasting is a focus area for the North American Climate Services Partnership (NACSP), a platform utilized to facilitate transboundary collaboration on climate information and climate services. In 2016, the NACSP joined

¹ Billion-Dollar Weather and Climate Disasters (www.ncdc.noaa.gov/billions/events).

with the biennial North American Drought Monitor (NADM) Forum and annual North American Fire Forecasting Workshop to convene a joint meeting on drought, wildfire, and climate services across North America. Nearly 50 participants from the United States, Canada, and Mexico came to together to discuss existing monitoring, assessment, and outlook tools and products and to explore opportunities for enhanced collaboration and partnerships across regions and borders. Discussions resulted in specific recommendations on how to improve the development and delivery of North American and national products.

IMPROVEMENTS IN PREDICTING WILDFIRES. The monthly North American Seasonal Fire Assessment and Outlook (NASFAO) provides wildland fire managers a concise look at the expected conditions that will drive wildland fire activity in the coming months and allows them to make strategic decisions about potential international exchanges of firefighting resources. The fire forecast community uses antecedent condition products that specifically correspond to fire danger factors, such as fuel moisture, soil moisture, and burning indices. Better coordination between the meteorological/climatological community, the remote sensing analysis and products community, and the fire analysis and products community would help to foster the development and timely delivery of products relevant to the continent's fire preparedness and response missions. Specific recommendations included utilizing additional forecast models in the Canadian forecast and expanding the Canadian approach of fire severity forecasting to include the United States and Mexico. This will require the use of indices from the Canadian Forest Fire Danger Rating System, which will be applied to the United States and Mexico, as well as monthly predictions from the Canadian Interannual Predictions System (CanSIPS).

A further recommendation included working with the Desert Research Institute/Western Region Climate Center to create monthly North American precipitation analysis maps and developing a formal definition of what is being forecasted (such as a scale). An example product could be a static wildfire threat map of values at risk to guide impact assessment of monthly outlooks and defining a method of forecast verification. Finally, the importance of identifying datasets suitable to these needs (previous 6 months at a minimum) is essential.

In the area of user feedback and engagement, recommendations include the following: explore links

to the Western Governors Association to strengthen situational awareness of wildfire conditions; explore options for "packaging" together fire and drought products; explore options for translating the wildfire outlook into Spanish and French; explore how to expand and broaden participation into the outlook process beyond the existing authors, including Mexico's Agriculture Ministry, Comisión Nacional Forestal (CONAFOR) and Comisión Nacional para el Conocimiento y uso de la Biodiversidad (CONABIO); establish a discussion group (in Canada) to review forecast and outlook discussion in line with the NADM process; and engage provinces and territories to provide feedback on accuracy and usefulness of the forecast, possibly through the Canadian Interagency Forest Fire Center (CIFFC) Forest and Fire Meteorology Working Group.

IMPROVING DROUGHT MONITORING. In 2001, government officials within the United States, Mexico, and Canada established a trilateral partnership to improve drought monitoring on the North American continent and provide decision-makers with information essential to planning, mitigation, and response activities. This was accomplished through the initiation, in November 2002, of a NADM. Each month, drought experts from these three countries produce the NADM and associated drought indicators using an array of analytical methods for determining the current state of drought across the continent. The NADM provides a comprehensive analysis of end-of-month drought conditions through the use of numerous objective drought indices and indicators along with input from contributors at the regional, provincial, and local levels. Biennial workshops focus on improving various aspects of the NADM to better meet the needs of users and decision-makers at all levels of the public and private sector.

Workshop participants recognized at the workshop that narratives and translations are not always delivered in a regular, timely manner. This is due largely to staffing and regulation constraints, especially in Canada and Mexico. NADM authors will explore options for increasing timeliness of product and narrative delivery, which may include utilizing key bullets instead of extensive narratives, building networks in country to help with the work load, and considering other resources that could help with this topic.

With respect to web presence, assessment, and outreach for the NADM, National Oceanic and Atmospheric Administration (NOAA)/National Centers for Environmental Information (NCEI)

agreed to set up a web-based process for authors to input and edit narratives and will conduct a web analytic assessment of the two sites the NADM is posted on (U.S. Drought Portal, NOAA/NCEI). If resources allow, there is interest in including more statistics on how and whom drought is impacting. This can include agricultural statistics on farms, crops, and livestock.

Numerous challenges were identified in having one map utilized for different stakeholder needs. Mexico is interested in tailoring drought monitors (DMs) for different users. Lack of consistent spatial data in Canada is a problem. Experts attending the workshop recommended that NADM authors and relevant partners work on exploring and developing high-resolution blended products for North America that would be specifically useful for water managers and other users and would leverage existing continental-scale products. Attention should also be placed on how to fill in the missing historical record for Canadian stations and consider changing the continental indicators' calibration period (currently 1951–2001).

There was consensus that drought impact reporting efforts, which currently exist in the United States and Canada, should be promoted more and include adequate training materials. Recommendations include providing educational materials about the National Drought Mitigation Center's Drought Impact Reporter (DIR; <http://droughtreporter.unl.edu>) to local partners and encouraging various agency (state and federal) constituents to enter impacts into the DIR. The Canadian version of the DIR, called the Agroclimate Impact Reporter (www.agr.gc.ca/atlas/air), should look at similar initiatives that the United States has undertaken, including the linkages to the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS; <http://cocorahs.org/>), a community-based network of volunteers that measure and map precipitation. The Mexican Drought Monitor's authors find it difficult to depict flash drought within Mexico because the drought impact information is not relayed fast enough. A case study was recommended to see if some indicators [e.g., vegetation drought response index (VegDRI), evaporative stress index (ESI), and evaporative demand drought index (EDDI)] could pick up this information if data are sparse or impacts information is late in arriving.

ASSESSING THE STATE OF DROUGHT PREDICTION IN A TRANSBOUNDARY CONTEXT. Scientific advances for predicting drought were presented and discussed. Participants expressed an interest in developing an experimental

North American Drought Outlook. Consideration should be given to the following: scientific evaluation of existing methods [including Caribbean Drought Outlook Standardized Precipitation Index (SPI), U.S. Climate Prediction Center (CPC) probabilistic temperature and precipitation outlooks, and U.S. Drought Outlook methods]; probabilistic versus deterministic approaches; presenting options including regional place-based pilot(s) that would be conducted separately; focusing on boundary locations where information would be most useful; using less resource-intensive methods such as automated approaches, utilizing an alert system approach balancing the risk of false alarms, which would undermine user confidence in the product; and articulating the relevance and need of a product. Participants also recommended that rigorous scientific evaluations of the U.S. Drought Outlook and NADM-related products is needed. This could include setting up a verification page for these forecasts that is transparent and readily accessible by users. It would also be useful to consider packaging drought outlook and monitor products together.

REGIONAL DEMONSTRATION PROJECTS FOR LA NIÑA EARLY WARNING AND IMPACTS.

Participants agreed that using a regionally place-based transboundary experimental approach could be useful in addressing several key physical science and user engagement needs related to both drought monitoring and forecasting. Establishing demonstration projects during an approaching La Niña provides a useful context for exploring the effectiveness of climate services and advancing the underlying science. Such a project could test the effectiveness and skill of different drought monitoring and forecasting/outlook tools for minimizing the impacts of La Niña and drought. Other questions that could be addressed include assessing how the existing suite of products and tools are being used by different sectors. Formal evaluation methodologies or social network analyses could be utilized to answer this question. The Rio Grande/Rio Bravo (RGB; United States–Mexico) and the Pacific Northwest (United States–Canada) were identified as ideal locations for regional demonstration projects because of their sensitivity to impacts of La Niña, connection to National Integrated Drought Information System (NIDIS) regional early warning systems, and existing connections to regional partners for implementation. As part of the place-based approach, the NACSP regional pilot in the RGB basin along the United States–Mexico border should continue to develop a community of practice to facilitate the

timely development and delivery of drought-based climate services that will assist water resource managers, agricultural interests, and other climate-affected economic sectors and activities within the basin.

DROUGHT MONITORING IN A MANAGED SYSTEM. The U.S. Drought Monitor (USDM) was developed for “unmanaged” systems. Supply versus demand and water scarcity are not accounted for in either the USDM or the NADM. Additionally, these maps depict drought at the source, which may be different from the impact area. A sister product, such as a “Water Monitor” (see <https://watermonitor.gov/>), might fill gaps in communicating drought information to a broader range of stakeholders who are managing water resources. A demonstration project could further explore whether a separate Water Monitor packaging of data and information is useful

to stakeholders in the region and can be a useful approach to identifying requirements for such a product.

OVERALL CONCLUSIONS AND NEXT STEPS. The aforementioned list of recommendations represents outcomes from cross-disciplinary and regional- to continental-scale interactions and highlights the value of transboundary collaboration. There was also a clear consensus that both monitoring and prediction of drought should be addressed in a more coordinated manner. These recommendations will help strengthen existing efforts such as the NADM and NASFAO, while steering the direction of future research and product development that will benefit both national and cross-boundary efforts to increase proactive drought and wildfire preparedness and reduce the severity of impacts and the costs of disaster response in all three countries.