

# 2016 North American Drought, Wildfire, and Climate Services Forum

Fort Worth, TX, USA

June 21-23, 2016

Meeting Report

## Workshop Summary

On June 21-23, 2016, the North American Climate Services Partnership (NACSP) joined with the biennial North American Drought Monitor (NADM) Forum and annual North American Fire Forecasting Workshop to convene a joint workshop in Fort Worth, Texas, on drought, wildfire and climate services across North America. Nearly 50 participants from the U.S., Canada, Mexico and the Caribbean came together to discuss existing monitoring, assessment, and outlook tools and products, and to explore opportunities for enhanced collaboration and partnerships across sectoral and jurisdictional boundaries. In the area of fire forecasting, recommendations were made on the following topics: improving product reliability with antecedent conditions and model input; enhancing efforts related to user feedback and engagement; and improving the product development process. In the area of drought monitoring, recommendations were made on the following topics: improving the timeliness of NADM product and narrative releases; enhancing web presence, assessment, and outreach; assessing the use of new products and scientific advances for drought monitoring; developing tailored or blended products for different stakeholder needs; increasing the use and awareness of drought impact reporting; developing an experimental North American Drought Outlook; and depicting flash drought. Workshop participants agreed that a regionally place-based transboundary experimental approach could be useful in addressing several of the above key physical science and user engagement needs related to drought monitoring and forecasting. Participants urged the establishment of demonstration projects to overlap with the approaching La Niña, which provides a useful context for exploring the effectiveness of climate services and advancing the underlying science. The Rio Grande/Rio Bravo (U.S.-Mexico) and the Pacific Northwest (U.S.-Canada) were identified as potential demonstration projects because of their sensitivity to impacts of La Niña and connection to NIDIS regional early warning systems.

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## Relevance

The economic, environmental, and social impacts of climate extremes across North America are significant<sup>1</sup>. 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 Mexico during recent North American droughts have been essential towards minimizing and controlling impacts such as reduced agricultural productivity, large wildfire outbreaks, and water shortages. The importance of tri-lateral partnerships in the delivery of drought early warning information, drought impact assessments, and drought forecasting is one of the primary focus areas for the **North American Climate Services Partnership (NACSP)**. The NACSP supports international collaboration between the United States, Canada, and Mexico in the delivery of tools such as the **North American Drought Monitor (NADM)** and **North American Seasonal Fire Assessment and Outlook (NASFAO)**.

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<sup>1</sup> Billion-Dollar Weather and Climate Disasters, [www.ncdc.noaa.gov/billions/events](http://www.ncdc.noaa.gov/billions/events)

## Workshop Goals

1. Report on the status and progress of improving NADM- and NASFAO-related drought monitoring, fire monitoring, and forecasting within each of the three member countries (U.S., Canada, and Mexico).
2. Address administrative, technical, scientific, and user issues related to the production of the NADM and NASFAO map and narrative products.
3. Share knowledge and practices between the U.S., Canada and Mexico
4. Explore emerging opportunities for strengthening the development, delivery and utilization of transboundary products, building on the linkages and synergies between drought and fire and emphasizing regionally place-based solutions.

## Background

In 2001, government officials within the U.S., 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 ***North American Drought Monitor (NADM)***. Each month, drought experts from these three countries create drought indicators spanning the continent using an array of analytical methods. National drought analyses are prepared by drought experts in each of the three countries through the use of numerous objective drought indices and indicators along with input from contributors at the regional, provincial, and local levels. These national analyses (U.S. Drought Monitor, Canadian Drought Monitor, Mexican Drought Monitor) form the core of the NADM continental analysis and are supplemented by the continental indicators. In this way, the NADM provides a comprehensive and consistent analysis of end-of-month drought conditions spanning the continent. 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.

The ***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 firefighting resource needs and distribution of capability. Each month, experts from the U.S., Canada and Mexico coordinate to prepare a three-month outlook of wildland fire potential across North America. The Outlook provides an assessment of the antecedent conditions that contribute to wildland fire and an outlook based on medium- and long-range weather and climate models coupled with historical fire occurrence.

The NADM and NASFAO are components of a broader collaboration between the U.S., Canada, and Mexico. A ***North American Climate Services Partnership (NACSP)*** was formed in 2012 to facilitate the exchange of information, technology and management practices related to the development of climate information and the delivery of integrated climate services for North America. This partnership provides a platform for integrating existing core capabilities and products related to forecasting, modeling, and sectoral needs including drought and wildfires. In addition, the NACSP utilizes regional pilot areas where prototype climate-related products and services related to continental-scale core capabilities can be tested at a local or regional scale. One such regional pilot area is the Rio Grande-Rio Bravo (RGB) basin along the U.S. –Mexico border. The RGB pilot is developing 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.

## Theme 1: Fire Forecasting

Key outcomes and recommended actions include the following:

- **Antecedent conditions and model input.** The fire forecast community uses antecedent condition products that specifically correspond to fire danger factors, such as fuel moisture, soil moisture, burning indices, and so on. 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.
  - *Recommendation:* Explore using additional forecast models in the Canadian forecast
  - *Recommendation:* Expand the Canadian approach of fire severity forecasting to include the US and Mexico. This will require the use of indices from the Canadian Forest Fire Danger Rating System, which will be applied to the US and Mexico, as well as monthly predictions from the Canadian Interannual Predictions System (CanSIPS).
  - *Recommendation:* Work with the Desert Research Institute/Western Region Climate Center to create monthly North American precipitation analyses maps
  - *Recommendation:* Develop a definition of what we are forecasting (such as a scale)
    - Create a static wildfire threat map of values at risk to guide impact assessment of monthly outlooks
    - Define a method of verification
  - *Recommendation:* Identify a dataset suitable to our needs (previous 6 months at a minimum)
- **User feedback and engagement**
  - *Recommendation:* Explore links to Western Governors Association to strengthen attention on wildfires
  - *Recommendation:* Explore options for 'packaging' together fire and drought products.
  - *Recommendation:* Explore options for translating the Wildfire Outlook into Spanish and French
  - *Recommendation:* Explore how to expand and broaden participation into the Outlook process beyond the existing authors, including Mexico's Agriculture Ministry, CONAFOR and CONABIO. One option is to host a special session on wildfires during an upcoming Mexico National Climate Outlook Forum with participation from Canada and the U.S.
  - *Recommendation:* Establish a discussion group (in Canada) to review forecast and outlook discussion in line with the NADM process.
    - *Engage provinces and territories to provide feedback on accuracy and usefulness of the forecast, maybe through the CIFFC Forest and Fire Meteorology Working Group*
- **Deadlines and coordination**
  - *Recommendation:* Use national drought monitor maps to avoid NADM map release date issues
  - *Recommendation:* NASFAO author(s) will join the NADM list serve in order to have earlier access to NADM antecedent drought information

## Theme 2: Drought Monitoring

Key outcomes and recommended actions include the following:

- **Timeliness of NADM product and narrative release.** It was recognized 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.
  - *Recommendation:* NADM authors will explore options for increasing timeliness of product and narrative delivery. This could 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.

- **Web presence, assessment and outreach.** Each country (Canada, Mexico, U.S.) currently hosts its own National drought monitoring website in which national Drought Monitor maps are produced along with various indicator products and analysis. For the NADM information that is currently posted on the web, there are several opportunities for improvements.
  - *Recommendation:* NCEI agreed to set up a web-based process for authors to input and edit narratives. NCEI will also conduct a web analytic assessment of the two sites the NADM is posted on (drought.gov, NCEI), to determine how the product is being accessed.
  - *Recommendation:* The U.S. (Richard) will share social media report with Canada (Trevor) and Mexico (Reynaldo) to minimize work load and ensure consistency in reporting.
  - *Recommendation:* If resources allow, there is interest in including more statistics on how and whom drought is impacting. This can include agriculture statistics on farms, crops and livestock.
- **Scientific Advances for drought monitoring.** Presentations were made on advances related to VegDRI, QuickDRI and Drought Amelioration, with relevance to the challenges and importance of stakeholder feedback.
  - *Recommendation:* Explore using a transboundary regional scale approach in the Rio Grande Bravo as a 'proof of concept' to solicit stakeholder input on key emerging products as well as the NADM itself. A group will be formed to scope out the details and next steps.
- **Objective Blends and Drought Indicators for North America.** Numerous challenges exist in having one map utilized for different stakeholder needs. Mexico is interested in tailoring DMs for different users. Lack of consistent spatial data in Canada is a problem.
  - *Recommendation:* NADM authors and relevant partners will work on exploring and developing high resolution blended products for North America that would be specifically useful for water managers and other users. We can leverage existing continental scale products.
  - *Recommendation:* Address this important issue of how to fill in the missing historical record for Canadian stations and consider changing the continental indicators' calibration period (currently 1951-2001). The former should be discussed separately between the U.S. (NOAA) and Canada (ECCC, AAFC).
- **Drought Impact Reporter.** Both the U.S. and Canada have related efforts. Consensus that these should be promoted more, with adequate training materials.
  - *Recommendation:* Provide educational materials about the National Drought Mitigation Center's Drought Impact Reporter (DIR) (<http://droughtreporter.unl.edu>) to local partners and encourage various agency (state and federal) constituents to enter impacts into the DIR.
  - *Recommendation:* The Canadian version of the DRI, called the Agroclimate Impact Reporter (<http://www.agr.gc.ca/atlas/air>), should look at similar initiatives that the U.S. has done and are planning to do including the linkages to CoCoRaHS.
- **Drought Outlooks**
  - *Recommendation:* Consider developing a draft proposal for an experimental North American Drought Outlook. Consideration should be given to the following: scientific evaluation of existing methods (including Caribbean Drought Outlook SPI, U.S. CPC probabilistic temperature and precipitation outlooks, and U.S. Drought Outlook methods); probabilistic versus deterministic approaches; presenting options including a 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.

- *Recommendation*: Promote rigorous scientific evaluations of the U.S. Drought Outlook, and NADM-related products. This could include setting up a verification page for these forecasts that is transparent and readily accessible by users.
- *Recommendation*: Consider packaging drought outlook and monitor products together

### Theme 3: Climate Services

Key outcomes and recommended actions include the following:

- **Depicting Flash Drought.** 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.
  - *Recommendation*: Consider supporting a case study to see if some indicators (ESI, satellite indicators, or other indicators) could pick up this information if data are sparse or impacts information is late in arriving.
- **Mexico's Drought Observer.** To improve the ability of Mexico's early warning to drought, Mexico is in the process of developing a new 'Drought Observer' that will complement the Mexico DM.
  - *Recommendation*: Consider a special session on 'drought' at the next Mexican National Climate Outlook Forum (COF), to include participation by Canada and the U.S., where this new product can be discussed.
- **Regional Demonstration Projects for La Niña Early Warning and Impacts.** Forum 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. Topics that could be addressed include:
  1. *Monitoring and Prediction.* Compare the effectiveness and skill of different tools in (1) drought monitoring and (2) drought forecasting/outlooks. How effective are these tools for minimizing the impacts of La Niña and drought? Continental, national, sub-national tools can all be considered.
  2. *User Engagement and Feedback.* How are the existing suite of products and tools being used by different sectors? Formal evaluation methodologies or social network analyses could be utilized to answer this question. What is role of weather and climate information in the context of other information in decision making?
  3. *New Product Development/Testing for Early Warning.* The 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 [watermonitor.gov](http://watermonitor.gov)), might fill gaps in communicating drought information to a broader range of stakeholders who are managing water resources. A demonstration project could explore whether a separate 'Water monitor' is useful to stakeholders in the region and, if so, what its requirements would be. Are there any 'water monitors' are under development and, if so, is there is an opportunity to include a transboundary component? What is the potential role of the NWS National Weather Center?
  - *Recommendation*: The **Rio Grande/Rio Bravo** (U.S.-Mexico) and the **Pacific Northwest** (U.S.-Canada) are ideal locations for regional demonstration projects because of their sensitivity to impacts of La Niña, connection to NIDIS regional early warning systems, and existing connections to regional partners for implementation. Project participants could be invited to participate in scoping discussions to further identify near-term transboundary opportunities in the context of drought and La Niña. NACSP could lead in convening these scoping discussions. This effort should strengthen and complement – not duplicate - existing initiatives such as NIDIS regional early warning systems.

## 2016 North American Drought, Wildfire and Climate Services Forum - Participant List

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