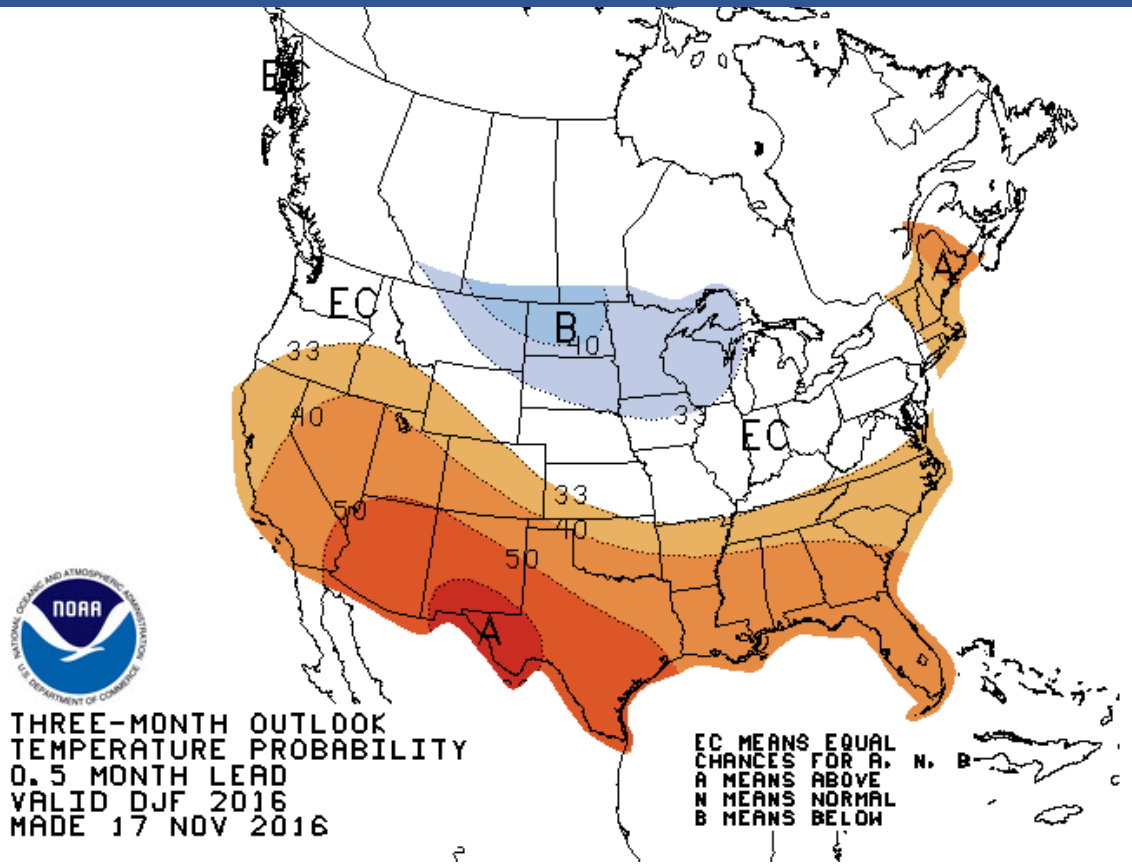
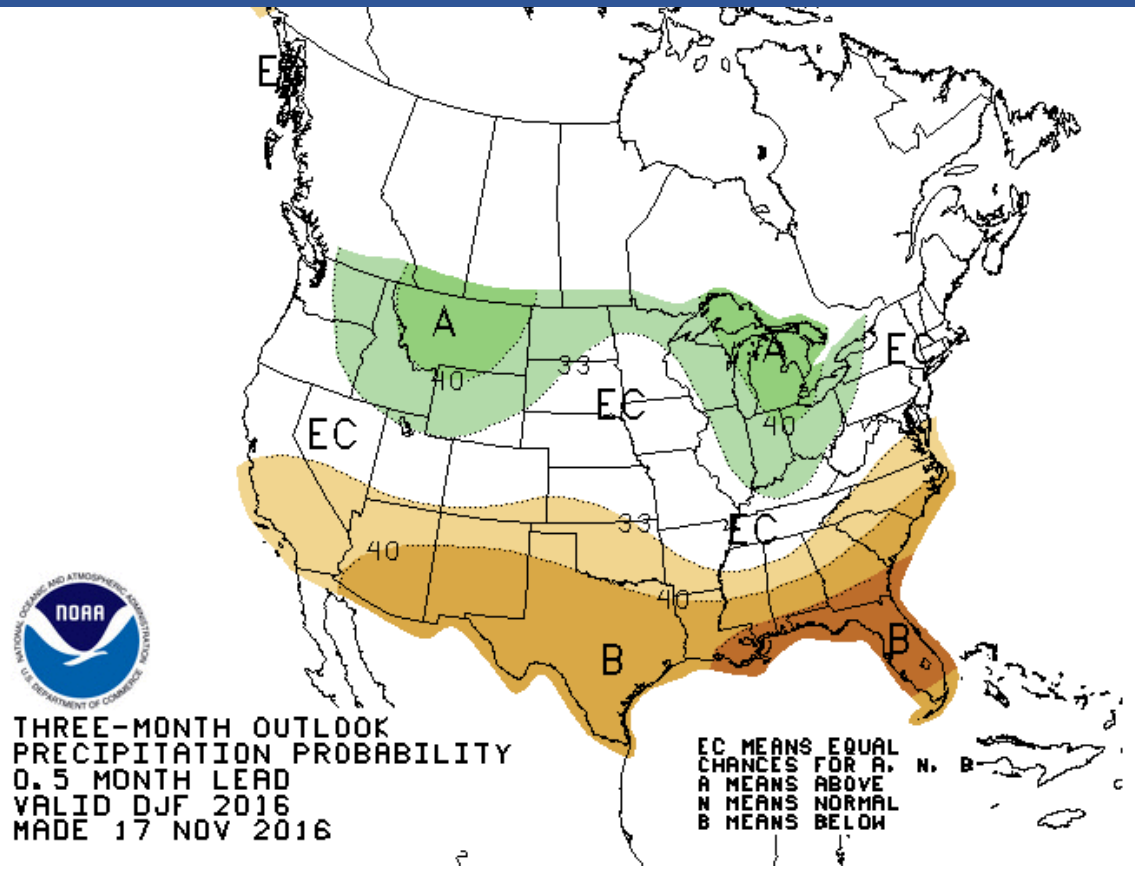
California-Nevada Drought Early Warning System
Drought and Climate Outlook Webinar
December 2nd, 2016

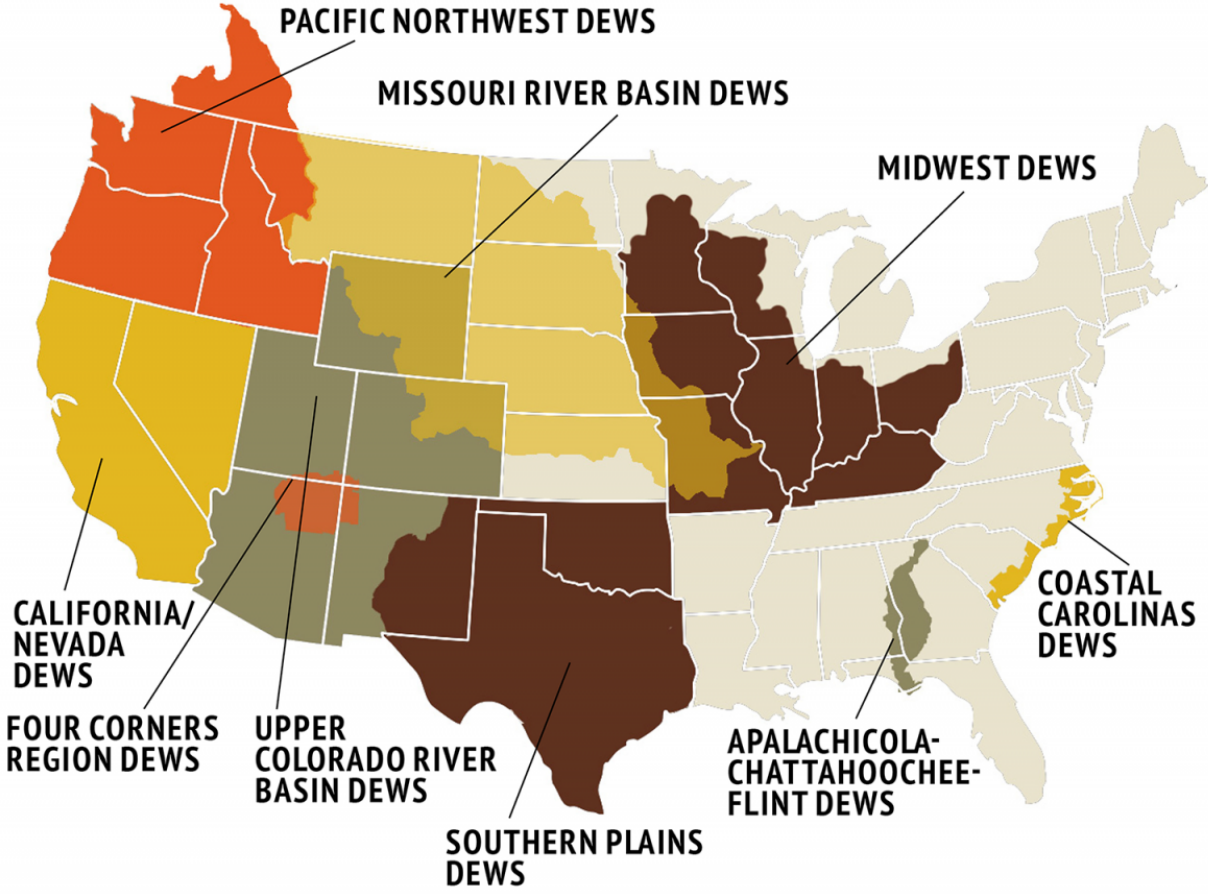




NIDIS · NOAA · National Weather Service · Western Regional Climate Center · CNAP California-Nevada Climate Applications Program, A NOAA RISA team · Scripps Institution of Oceanography, UC San Diego · DRI Desert Research Institute

National Integrated Drought Information System (NIDIS)

- Provide a better understanding of how and why droughts affect society, the economy and the environment.
- Improve accessibility, dissemination and use of early warning information for drought risk management.
- Build off of a network of regional Drought Early Warning Systems (DEWS) to create a National Drought Early Warning System.



California-Nevada Drought Early Warning System (DEWS)

What is a DEWS?

A DEWS utilizes new and existing partner networks to optimize the expertise of a wide range of federal, tribal, state, local and academic partners in order to make climate and drought science and impact data readily available, easily understandable and usable for decision makers; and to improve the capacity of stakeholders and economic sectors to better monitor, forecast, plan for and cope with the impacts of drought at all spatial and time scales.

- **New CA-NV DEWS builds off**
  - Original CA DEWS (est. 2010)
  - Gov. Sandoval's Nevada Drought Forum (2015)
- **CA-NV DEWS Strategic Plan under development**

https://www.drought.gov/drought/dews/california-nevada

California-Nevada Climate Applications Program (CNAP)

- **Climate information for decision-makers in California and Nevada**
- **Upcoming Two-Pagers:**
  - **Seasonal Forecasting**
  - **La Nina**

CNAP
California-Nevada Climate Applications Program
A NOAA RISA team

@CnapRisa

cnap.ucsd.edu

CNAP
California-Nevada Climate Applications Program
— A NOAA RISA —

SUB-SEASONAL TO SEASONAL FORECASTING

NOVEMBER 2016

What is Seasonal to Sub-Seasonal (S2S) Forecasting?

Although weather forecasts at a few day time ranges are now widely used in our everyday lives, forecast at longer lead times, 2 weeks to 12 months, often referred to as **sub-seasonal to seasonal (S2S) forecasts** are needed for decision making especially in water resources, energy and agriculture sectors. A recent National Academy of Science (2016) report offered a vision that S2S forecasts in the future could become more widely used, but the advances required depend upon dedicated research and more computing resources.

The forecast **skill** (quantitative performance measure of forecasts) is calculated using one or more different formulations. The skill varies with season, with region, with the particular variable that is being predicted (e.g. temperature, precipitation), and with different properties of a forecast including lead-time and time scale (e.g., daily, weekly, monthly average; see Figure 1). Different kinds of forecasts shown in Fig. 1 employ different methods and data sources in order to make best use of the sources of the predictability. Weather forecasts, which largely depend on initial conditions of the atmosphere have poor forecast skill beyond 1-2 weeks. Since atmospheric conditions can change rapidly, the influence of the initial conditions declines with time.

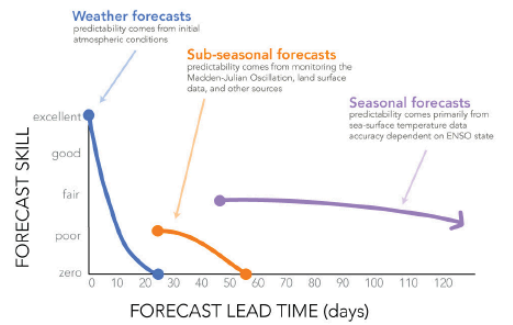


Figure 1. Qualitative behavior of forecast skill by forecast lead time (days) and by type of forecast (weather, sub-seasonal, seasonal). Source: http://iri.columbia.edu/news/qa-subseasonal-prediction-project/

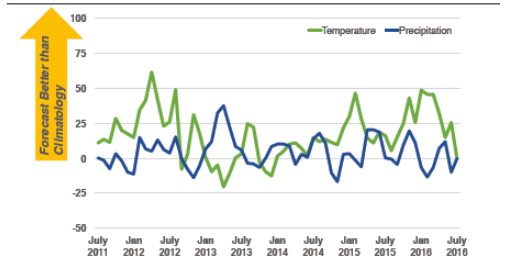


Figure 2. Heidke skill scores from the past 5-years for temperature and precipitation for the continental US. Data for these figures can be found at http://www.cpc.ncep.noaa.gov/products/verification/summary/index.php?page=tutorial

FORECAST PERFORMANCE

Forecast **skill** is a measure of the performance of a forecast relative to a given standard. Often, the standard used is the long-term (30-year) average - called the climatology - of the parameter being predicted. Thus, skill scores measure the improvement of the forecast over the climatology. CPC uses the Heidke skill score (Fig. 2) - the ratio of (a) the difference between how many more times a forecast ends up matching the later observations than would be expected at random, to (b) the total number of forecasts minus the number of correct forecasts that would be expected by chance - as a measure of how well a forecast did relative to a randomly selected forecast. A score of 0 means that the forecast did no better than what would be expected by chance. A score of 100 depicts a "perfect" forecast and a score of -50 depicts the "worst possible" forecast.

Temperature forecasts generally have more skill than the precipitation forecast (Fig. 2, and example from December 2015-February 2016 in Fig. 3), as does winter precipitation than summer precipitation (Kirtman et al. 2014). The increased skill in the temperature and winter precipitation forecast lies inherently in the regional scale of controls on these climate and weather processes. As forecast lead times increase, so does forecast uncertainty. We are not only limited by errors in initial conditions and our current understanding of the climate processes involved but the chaotic nature of the global climate system that grows with time.

CONTACTS: Amanda Sheffield – amsheffield@ucsd.edu
Shraddhanand Shukla - shrad@geog.ucsb.edu
Alex Tardy - alex.tardy@noaa.gov

NIDIS · CW3E

In Memorial: Kelly Redmond

- ***Dr. Kelly Redmond, a research professor of climatology in DRI's Division of Atmospheric Sciences passed away in early November.***
- ***As deputy director for the Western Regional Climate Center (WRCC), Dr. Redmond spent more than three decades dedicated to the management, application and dissemination of climate data and knowledge to the general public.***

Western Regional Climate Center

DRI Desert Research Institute

CNAP California-Nevada Climate Applications Program
A NOAA RISA team

Today's Webinar Agenda

- **California-Nevada Drought and Climate Status Update – *USDM Author Dave Simeral (WRCC, DRI)***
- **Start to the Water Year - *Nina Oakley (WRCC,DRI)***
- **ENSO: Recent Evolution, Current Status & Predictions - *Andrea Bair (NWS)***
- **Nevada Drought & Impacts Update - *State Climatologist Doug Boyle (UNR)***

Questions will be answered at the end, please type questions in the chat box

NIDIS NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE

NATIONAL WEATHER SERVICE

Western Regional Climate Center

CNAP California-Nevada Climate Applications Program A NOAA RISA team

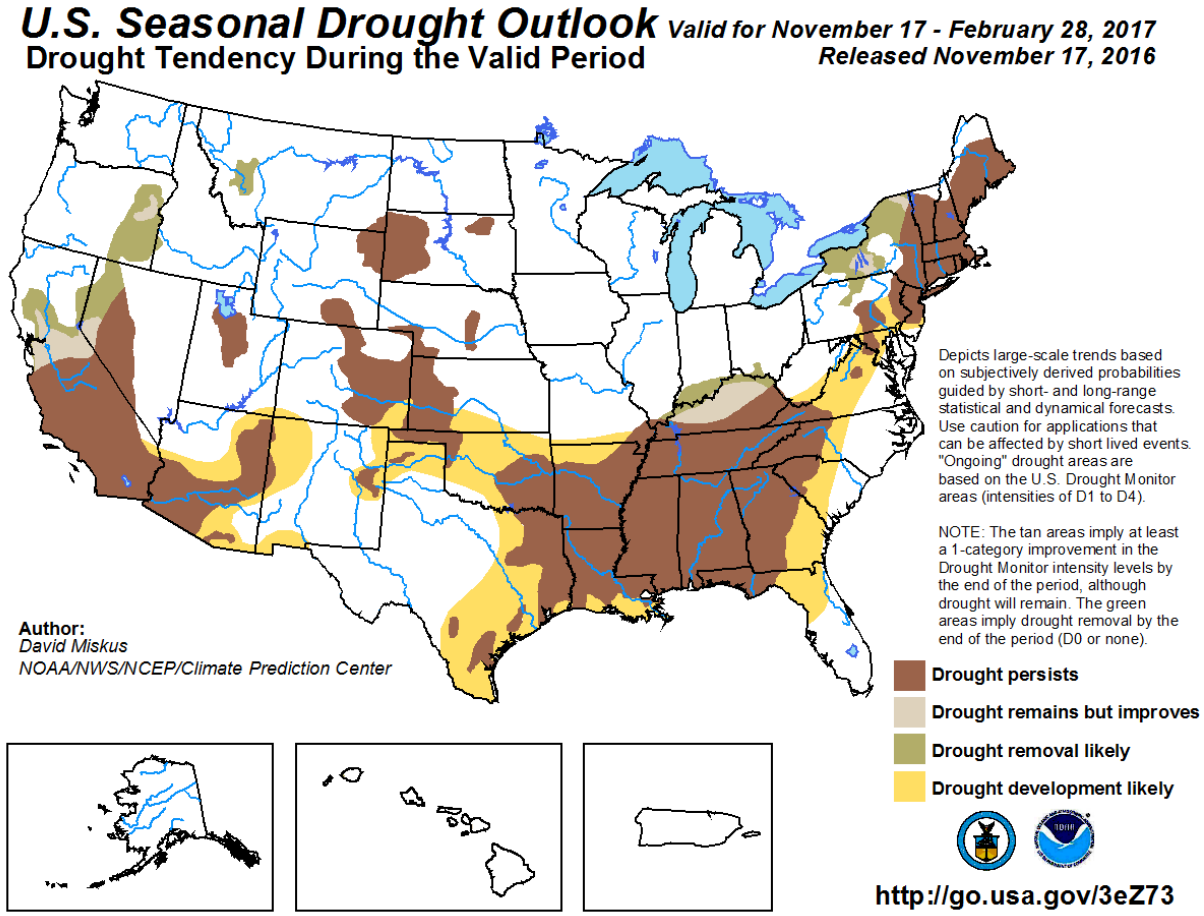
SCRIPPS INSTITUTION OF OCEANOGRAPHY UC San Diego

DRI Desert Research Institute

N

Questions & Answers

- *Please type questions in the chat box*
- *Please fill out our 3 question survey at the end of the webinar.*
- *Next webinar: Late January 2016*



NIDIS
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

@DroughtGov
www.drought.gov

CNAP
California-Nevada Climate Applications Program
A NOAA RISA team

@CnapRisa

cnap.ucsd.edu