WATER RESOURCES MONITOR AND OUTLOOK

IMPROVING DELIVERY OF WATER RESOURCE INFORMATION

ANDREA RAY PHOTO

What is the WRMO?

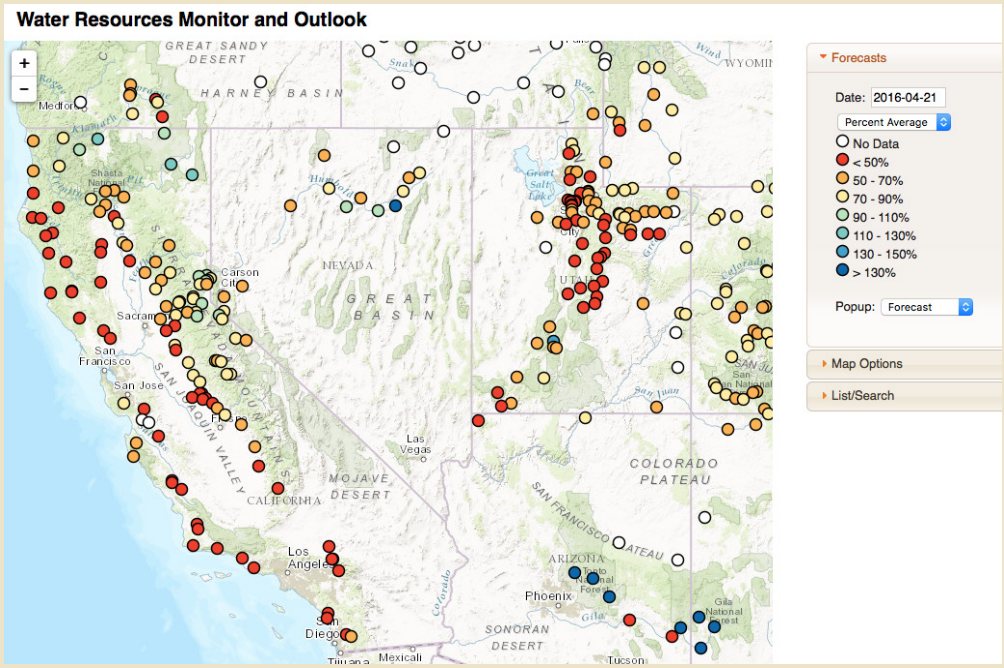
The Water Resources Monitor and Outlook (WRMO) is an online toolset that is being developed by NOAA and NIDIS to provide a suite of climate and hydrological information, including uniform access to NOAA's Ensemble Streamflow Prediction (ESP) water supply forecasts; visualization and analysis of observed and seasonal forecast data; forecast evolution; and verification tools to improve water resource information delivery.

Why use it?

The WRMO provides forecasts of seasonal streamflow at hundreds of locations across the western United States. NOAA's River Forecast Centers (RFCs) have been providing this information for decades, but in various formats. The WRMO brings these forecasts together to give a consistent, standard interface that seamlessly integrates the data across RFCs. Based on stakeholder input, the WRMO is designed to provide several options for the analysis and display of the water supply forecasts that can also be customized by users to meet their needs.

A map will allow the user to select a forecast point of interest, and provide at-a-glance water outlook information across the region (Figure 1).

Figure 1



The WRMO webpage will open with a map that provides at a glance information on the percent average forecast flow at that point, over a given time period, or other user-defined information. This map will show information across the Western United States.

Is the information in real time?

What is the lead time of the forecasts? The WRMO water supply forecasts are updated daily, and cover the next 365 days from the date issued.

Will the existing products from the RFCs still be available?

The products currently accessible from the various RFCs will either be integrated into this page, or made available on each RFC's webpage. It is envisioned that the WRMO will eventually provide all the information currently served up from the RFCs, with more flexibility, and more options to customize based on user needs.

What products will be available in the WRMO?

The WRMO will provide seasonal probabilistic volumetric streamflow forecasts, and supporting information such as observed flow to date, current snow conditions, current and forecast precipitation and temperature, soil moisture, reservoir storage, and seasonal climate outlooks, along with verification statistics for the water supply forecasts.

Fig. 2a

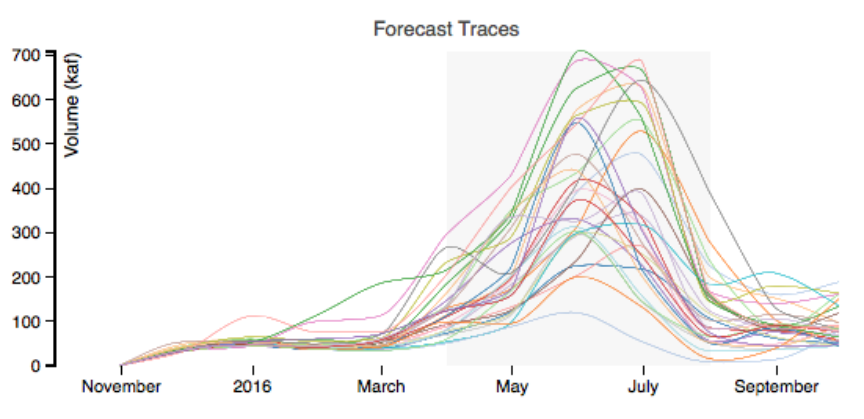


Fig. 2b

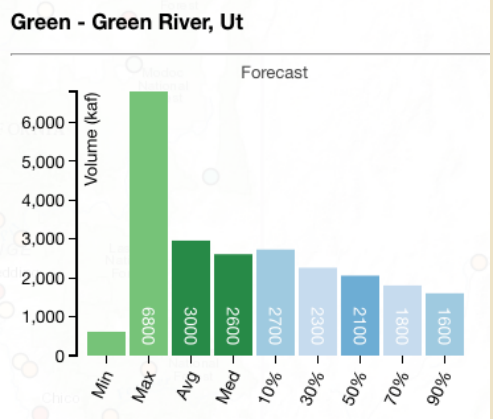


Figure 2a. Forecast Ensemble (left). Thirty traces from a daily run of the hydrologic model initialized on November 1st are shown. These traces are then used to develop probabilistic outlooks illustrated in Figure 2b.

Figure 2b. Probabilistic Water Supply Forecast (right) for the Green River at Green River, UT. The green bars on the left show the minimum, maximum, average, and median flows for the past 30 years. The blue bars on the right are based on the traces in Figure 2b, and show probabilities of exceedance for flow volume 50% exceedance level analogous to the median flow (also known as most probable volume), and 10% exceedance indicating that that flow level is only exceeded in one in 10 of the forecast traces (i.e. the upper range of the forecast flows), and 90% indicating that 9 of 10 of the traces exceed that amount (the low range of the forecast). Forecasts shown are for April-July flows, but the user can define the forecast period, or choose other forecast points on a map like that in Figure 1.

How are NOAA seasonal water forecasts made?

NOAA's River Forecast Centers run a hydrologic model every day to provide 10-day streamflow forecasts across the country at thousands of locations, using observations as well as forecast temperature and precipitation information from NOAA's weather forecasting models. These forecasts are used for near-term flood forecasting, recreational interests, and water management. To generate the seasonal water supply forecasts, this same hydrologic model is run to forecast a full year ahead, using temperature and precipitation data from the past 30 years. This method provides an ensemble of 30 different possible "traces," (Figure 2a) or scenarios for the upcoming year given today's hydrologic conditions (current soil moisture, snowpack, streamflow).

Each trace represents a forecast of streamflow starting with today's hydrologic conditions and using the weather from one of the 30 prior years to run the model for the next 365 days. From this ensemble, the RFCs generates various statistics, including most probable water supply volumes, and ranges of possible volumes for various time frames (usually during the snowmelt period) (Figure 2b).

Other products (not shown) will allow users to assess how the forecast of water supply changed since the previous forecasts for a given location. These changes occur based on new information including the observed weather and streamflows in the intervening period. A plot of the current forecast and all prior forecasts during a particular water year will allow the the user to see how the forecast changes due to a heavy storm, or an unusual dry spell.

Why produce multiple traces? What do they tell us?

Each trace represents forecast streamflow based on a water year's temperature and precipitation from the past 30 years. The multiple traces provide a range of possible outcomes, based on historical weather (temperature and precipitation). By analyzing the 30 traces the WRMO can generate a probabilistic forecast for streamflow volume forecast over a user-defined time period, e.g. the water year, the April-July runoff period, or other period.

Where do I find the WRMO?

The WRMO is currently in development. A prototype will be available online in late 2016, you will be able to find it from a link at: cbrfc.noaa.gov/WRMO.