



National Weather Service

California Nevada River Forecast Center

Fall 2008 Newsletter

HIC's Corner

By Rob Hartman
Hydrologist in Charge



Thank you for taking time to browse through our newsletter. We have much going on right now and one of our big projects is a dramatic shift to a new hydrologic forecasting software infrastructure.

We've recognized for some time that our software architecture (NWS River Forecast System) needs to be modernized so we can take better advantage of new science and models developed across the world-wide community of universities and operational agencies. This effort began (in concept) nearly 15 years ago, but has really gotten traction in the past 2 years.

Our new system is called CHPS, which stands for Community Hydrologic Prediction System. Four of our thirteen RFCs with guidance from our headquarters Office of Hydrologic Development began accelerating the search for candidate architectures in the summer of 2006. The CNRFC is participating in that process. A candidate architecture was selected,

Delft-FEWS, and prototype demonstrations were set up and evaluated at our RFCs in Portland, OR, Minneapolis, MN, and then Tulsa, OK. The CNRFC participated by using Delft-FEWS as a "go between" for running the US Army Corps of Engineers reservoir model, HEC-ResSim, as a part of the Yuba-Feather Forecast Coordinated Operations project (spring 2008 newsletter).

Prototyping, demonstrations, and testing went exceptionally well. In January 2008, the team recommended that the NWS select Delft-FEWS as the architecture for CHPS and work toward national implementation. Since this time, the team has been working to develop and implement a robust implementation plan. Four RFCs, CNRFC included, will begin migration in January 2009. We're expecting to be running parallel operations (with NWSRFS) by October 2009. Three other RFCs, NWRFC (Portland, OR), ABRFC (Tulsa, OK), and NERFC (Taunton, MA) will be on the same schedule. The remaining 9 RFCs will begin migration in January 2010.

The migration strategy is simple and designed to be safe. All of our models that require calibration are being brought over into the Delft-FEWS environment. Other procedures that do not require calibration (e.g.

simple math, displays, etc.) will be replaced by existing Delft-FEWS components. This allows us to maintain the huge investment we have in our calibrated model parameters, and provides a way to verify consistent model performance between the old and new systems. If our RFCs had to completely recalibrate their models and procedures in order to shift to a new modeling architecture, it would render the process impractical. Once we've replicated and verified our operations in this new environment, we can consider shutting down NWSRFS and begin introducing new science and new models.

While this may seem inconsequential, I can assure you it is actually huge. For the first time, our hydrologists will be able to "more easily" introduce new models and collaborate more efficiently with researchers and operational agencies around the world. CHPS will also remove the obstacles preventing implementation of the EXperimental Ensemble Forecasting System (XEFS) described in a previous newsletter.

If you have questions about this or any aspect of our operations or development, please feel free to drop me a line anytime.

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WY 2009 Climate Outlook - Cool Phase PDO Returns

By Pete Fickenscher

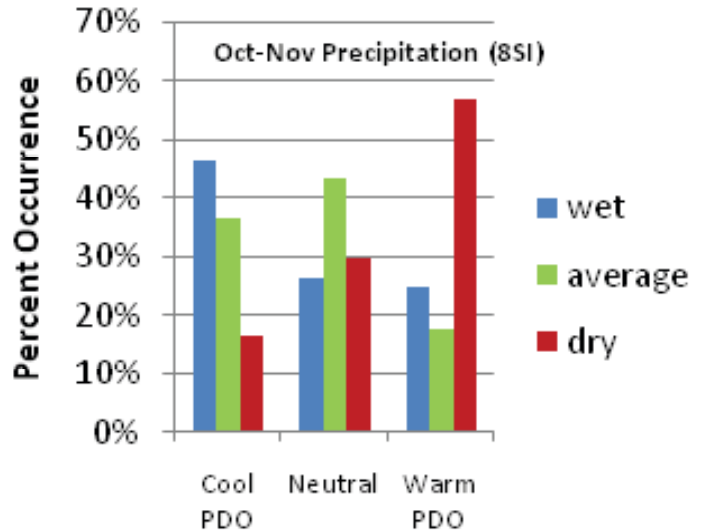
After two years of below normal precipitation, interest in WY2009 has been high. The last time Northern California was dry for three consecutive years was 1990-1992, with 1992 being the last year of a 6 year drought. Since every year is unique and different, let's look at what the major climate signals are at present.

In terms of the equatorial tropics, last year's moderately strong La Niña conditions turned neutral over the summer and recently has shifted to cooler than normal (weak La Niña). Most climate forecasts are expecting conditions to remain neutral on the whole, with perhaps a few months of weak La Niña conditions. When the tropics are neither in an El Niño nor a La Niña state, some refer to this as "La Nada."

One climate variable has become quite pronounced during

the past 12 months, the Pacific Decadal Oscillation (PDO). While similar to the El Niño/La Niña signal, the PDO usually oscillates on a time scale of 20-30 years. For much of the recent past, beginning in 1977, the PDO has been in the positive or warm phase. While the PDO has fluctuated a lot over the past 10 years, it appears to have entered a more consistent negative, or cool phase, since 2006. One signal connected to a cool phase PDO for Northern California is a greater probability for a wet Fall (Oct. – Nov.) as measured by the 8 Station Index (8SI).

Also, cool phase PDO years tend to have a smaller standard deviation than warm PDO years when looking at the total precipitation for the water year. This means we are less likely to have an extremely dry or extremely wet year. However, we can certainly still have flooding events (e.g., December 1964 and December 1955 were moderate to strong PDO events). So like last year



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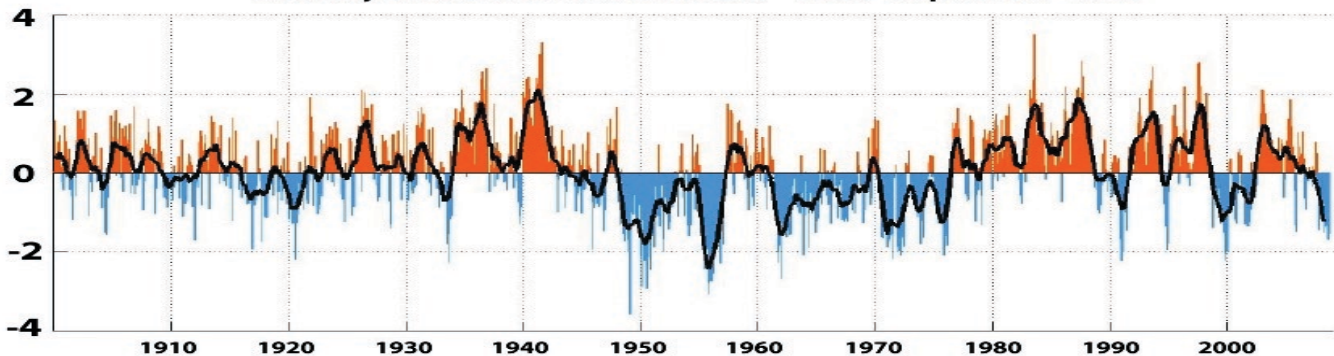
which was dry overall, we could have intense storm events, but probably not the persistent rains of an El Niño year.

One other variable to pay attention to is the Madden-Julian Oscillation (MJO). Researchers have noted that the MJO tends to be more active during "La Nada" years. An active MJO could provide additional subtropical enhancement

to the jet stream during the winter, leading to a few intense storm events.

It's important to note that a below average year still has a good probability of occurring. The Climate Prediction Center's latest winter forecast gives Northern California "equal chances" of being wet, dry, or near normal, while Southern California has a slightly greater chance of being dry this winter.

Monthly Values for the PDO Index: 1900 - September 2008





CoCoRaHS Network debuts in California; Volunteers sought to measure rain

By Michael Anderson
State Climatologist
CA Dept. of Water Resources

A new chapter in local weather observation was opened on October 1, 2008. Volunteer measurements of statewide rain, hail, and snow will now become part of a nationwide internet-based weather network.

CoCoRaHS, the Community Collaborative Rain, Hail, and Snow Network was developed in Ft. Collins, Colorado. California is the 36th state to join the network which has more than 11,000 volunteers currently. The non-profit CoCoRaHS network is sponsored in part by the National Oceanic and Atmospheric Administration, the National Weather Service and other individual contributors and organizations, including

Cooperative Extension. The long-term goal of CoCoRaHS is ultimately to recruit one volunteer observer per square mile in urban areas and one volunteer observer per 36 square miles in rural areas for all 50 states.

Michael Anderson, State Climatologist with the California Department of Water Resources, is looking for much-needed volunteers. He wants to get as many rain gauges as possible in backyards all around the state to help forecasters and climatologists map California's diverse rain patterns. "There is no substitute for accurate, local measurement of the weather. This data will help not only short time-scale events like storms and floods, but also serve as an added tool for recording and analyzing climate change."

Home-based and amateur rain spotters take daily rainfall measurements and report

them to the CoCoRaHS website:

www.cocorahs.org



Each volunteer is asked to read the rain gauge each day at the same time and upload the measurement to the website. The result is more precise information about where rain, snow and hail falls and in what amount.

Anderson said that anyone with an interest in weather and access to the Internet can sign up. The only equipment needed is a cylindrical rain gauge available from the network for \$23 plus shipping. Simple training is available at <http://www.cocorahs.org>.

For more information, please contact either:

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New "Development and Operations Hydrologist" Selected For The California Nevada River Forecast Center

By Alan Haynes

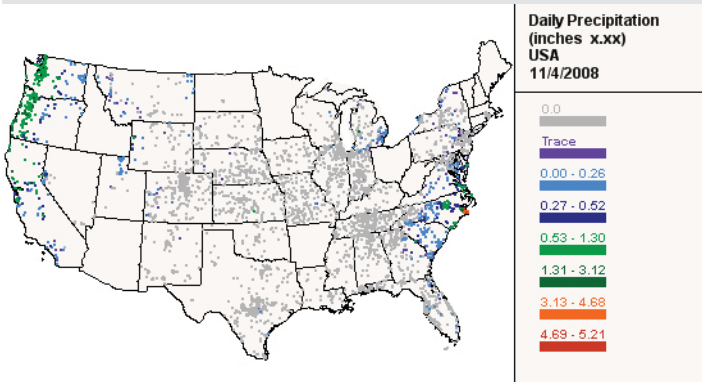
Art Henkel was selected for the Development and Operations Hydrologist (DOH) position in August and was promoted on-station. Art served as a Senior Hydrologist at the CNRFC for the past seven years.

The DOH is part of the CNRFC management team and is responsible for providing direction in integrating and implementing new science and technology into operations, as well as overseeing training in hydrology, hydrometeorology, and technical operations support.

Art brings a wealth of talent and experience to this important position; he has graduate education from the University of Arizona and UC Davis, and he pioneered advances in databasing and in spatially distributing forecasts and observations of temperature and precipitation.

Congratulations Art on your promotion!

"California is the 36th state to join the network which has more than 11,000 volunteers currently."





Water Year 2009 Hydrologic Conditions

By Scott Staggs and Pete Fickenscher

Going into the new hydrologic year, much of California is in moderate to severe drought conditions. The drought has brought about two challenges to our work that will impact us in the year ahead.

Reservoirs

Drier than normal conditions have persisted for the past two years over most of California and Nevada. Statewide, in California, average precipitation for the last two years has only

storing it for water supply during the summer dry season. Due to the lack of precipitation and subsequent lack of runoff, current storage in these reservoirs is adequate for now, but of serious concern for next summer. In California, total reservoir storage, on October 1, 2008, was 73% of average for this date. This is down from 85% at the same time last year. Lake Oroville, the primary water supply for the California State Water Project, was only at 30% of capacity on October 1. This is the lowest level it has been on October 1 since the drought of 1977.

“...Lake Oroville, the primary supply for the California State Water Project, was only at 30% of capacity on October 1. This is the lowest level it has been on October 1 since the drought of 1977.”

been around 70% of normal. Conditions in the Northern Sierra Nevada have been worse. Precipitation in the Northern Sierra for two year period 2007 and 2008 was the ninth driest in the 88 year record. Southern California recorded its driest year on record for 2008. Nevada has also experienced below average precipitation for the past two years in most locations.

Numerous reservoirs on the west slope of the Sierra Nevada capture winter precipitation and spring snowmelt,

On the east slope of the Sierra Nevada, the primary water supply for western Nevada, precipitation over the past two years has also been below average. Total reservoir storage, on October 1, 2008, on the Truckee River was only 47% of average for this date. Lake Tahoe is only at 6% of its usable storage capacity of 745,000 acre-feet. This is down from 37% of capacity for the same date last year. Due to a lack of precipitation in the Tahoe basin over the past two years, Lake Tahoe is expected to recede below its natural

rim sometime in the next couple months. Outflow from Lake Tahoe, into the Truckee River, will then end until the lake once again rises above its natural rim with more precipitation and snowmelt runoff. Lake Tahoe is now 6 feet lower than its most recent high stage of June 2006. The last time Lake Tahoe fell below its natural rim was in September 2004.

In summary, precipitation and snowmelt runoff have been below average for the past two years in many regions of California and Nevada. Reservoir storage is low in both California and western Nevada. Near normal to above normal precipitation is desperately needed this upcoming winter and spring to help relieve the region from the persistent dry conditions and avoid potential water shortages in 2009 and beyond.

The CNRFC will start producing its official water supply forecasts

for the Spring/Summer 2009 beginning in early January and will update these forecasts monthly until May. Mid-month updates will be available for selected water supply forecast points. Water supply forecasts, updates, and much more information on water supply can be found in the Water Supply section on the CNRFC website at www.cnrfc.noaa.gov/water_supply. Water resource managers and other users can also generate their own forecasts, anytime, through the CNRFC website’s AHPS/ESP Trace Analysis Interface at www.cnrfc.noaa.gov/ahps.

Burn Areas

During March through May 2008, northern California experienced its driest spring on record. This led to much drier vegetation early in the summer and set the stage for a major

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Lake Oroville 2008

Image courtesy of California Dept. of Water Resources



(cont'd from page 4)

outbreak of fires. On June 20, 2008, a dry lightning storm with over

heavily burned basins. For example, the Basin/Indians fire south of Monterey, burned 100% of the Big Sur River

of the U.S. Geological Survey, an expert in post-wildfire debris flow modeling says, "Our recent simulations of the Big Sur area watersheds show some of the highest probabilities of debris flows that we've calculated to date."

in progress, documenting more events like this will help us to have even better guidance in the future.

Eric Strem, Development and Operations Hydrologist Retired in August

By Mike Ekern

Eric Strem, Development and Operations Hydrologist at the California Nevada River Forecast Center, retired at the beginning of August. Eric served nearly his entire career here at the CNRFC, having started as a hydrologist intern in the mid 1970s.

Eric has been a valuable and dedicated contributor in several key areas, having served as Senior Hydrologic Forecaster for several years and since the mid 90s in his role as the Development and Operations Hydrologist. Eric was instrumental in the development of software to streamline operations and improve forecast products that serve the customers and partners of the CNRFC. Eric was widely recognized as an expert in the calibration of the Sacramento Soil Moisture Accounting Model.

His presence will be greatly missed by all who had the pleasure of working with him throughout the course of his career. We wish him and his wife Carol many healthy and fulfilling retirement years.



View from space of dense smoke from northern California wildfires June 2008 (NASA)



Burned Vegetation in the Big Sur Watershed

Photo by Reid Fisher

6,000 lightning strikes ignited over 2,000 new fires. By the end of the summer, over one million acres had been burned, making 2008 the worst year for wildfires in California's history.

The CNRFC has made several operational changes in response to the widespread fires. First, wildfire perimeter maps were added to many products, both on the web and internally. Second, we adjusted our hydrologic models for

watershed. The CNRFC has adjusted its soil model to account for the loss of vegetation and enhanced runoff capacity of the watershed. While still an experimental operation, the adjusted hydrologic model will give forecasters a second look at what kind of runoff may occur from burn areas.

Burn areas also increase the risk for flash flooding and debris flows. The Big Sur area watersheds are of special concern this winter. Sue Cannon

The CNRFC has adjusted its flash flood guidance (FFG) for areas that were burned this past summer. While FFG can often vary from basin to basin, very low values were chosen for burn areas to highlight the danger, especially for debris flows. The one hour rainfall threshold for burn areas is currently 0.5 inches/hour.

On October 3rd, these FFG values were verified when debris flows from the Butte fire near the NF Feather River impacted Highway 70 for several hours. At 8:33 pm, the Sacramento WFO issued a Flash Flood Warning for the Butte fire scar. Three rain gages in the area later registered hourly rainfall rates in excess of 0.5 in./hour. While burn area FFG is still a work