

# CALIFORNIA HYDROELECTRIC ENERGY SNAPSHOT

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**STAFF PAPER**

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**California Hydroelectric Energy Snapshot**  
**Electricity Analysis Office, California Energy Commission**  
**February 20, 2004**

**Summary**

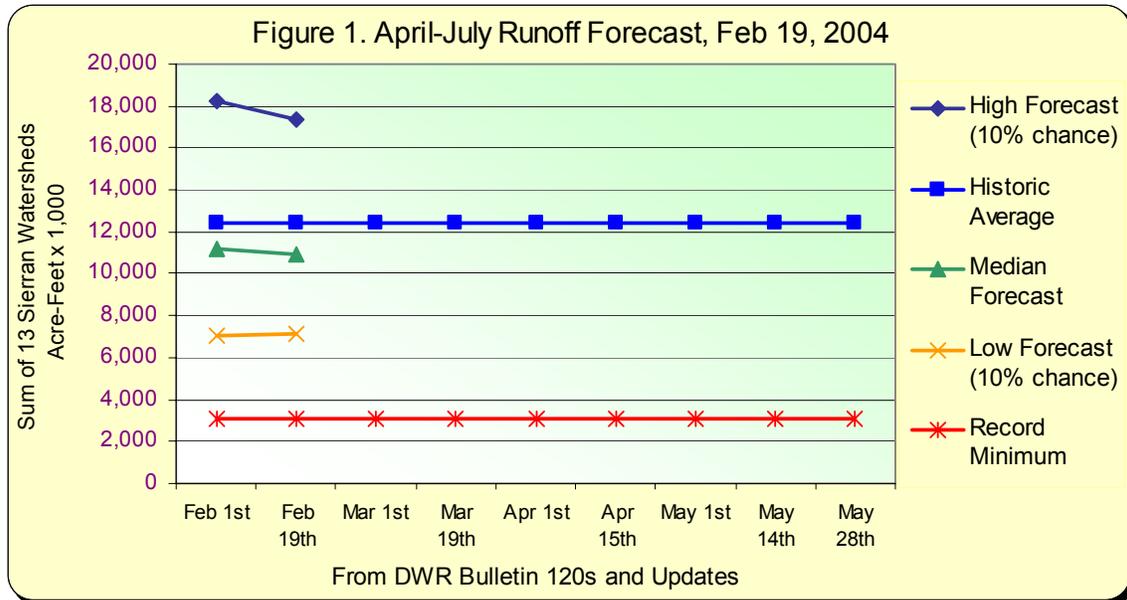
With the snowpack building season about 67% complete, statewide hydroelectric energy generation for calendar year 2004 is prospectively pegged at 91% of average. This gross estimate has large margins of error and uncertainty, and assumes that precipitation and runoff through remaining winter and spring months will be about average.

**California Water Supplies**

This winter began with strong similarities to the last water year. A warm and dry October, was followed by a wet November-December, and then a dry January. In 2003, dry conditions from January through mid-April led some utilities to secure alternative resources for summer needs. The arrival of late season storms in April and early May last year created periods of surplus and excess energy, especially in late May (during peak snowmelt) when off-peak prices sometimes fell to \$0/MWh. Total precipitation last year ended up close to "average". This year's December precipitation may have been close to ideal for water and electrical utilities: an early, colder than average snowpack with substantial snowwater content.

As of February 19, snowpack amounts statewide are 101% of average. Northern areas of the state have been more blessed with water all winter. The Northern Sierra snowpack is 118% of average for this date. The Central Sierra snowpack stands at 96%, and the Southern Sierra is at 89%, up 3% in two days. Statewide, precipitation October through January was 85% of average, based on 150 reporting sites. By contrast, precipitation to date in the Northern Sierra (an average of 8 stations) is 111% of average.

The mid-February "deluge" from sub-tropical storms brought several streams to flood stages in Northern and Central California. However, total unimpaired runoff in the Sacramento and San Joaquin Rivers has been below average all winter, and is forecast to remain below average this spring (85% and 82% of average, respectively). Recent storms provided useful amounts of moisture to the southern Sierra, and to previously dry coastal Southern California. However, these relatively warm weather systems did not greatly increase the snowpacks. The latest forecast from DWR shows that expected runoff from 13 major rivers, from the Pit River south to the Kern, is holding at 88% of average (**Figure 1**). At this early point in the season, there is a 10% chance that runoff on these rivers will be less than 58% of average, and a 10% chance that it will exceed 140% of average.



### Pacific Northwest

In the Pacific Northwest, hydro conditions are just below median probabilities. Runoff on the Columbia River at The Dalles is forecast (as of February 18) to be 92% of average for January through September. On the Columbia River, there is still a 5% chance that flows will be less than 75% of average, and a 5% chance they will exceed 116% of the 30-year average. This will likely be the 5<sup>th</sup> consecutive year of below average runoff, but water releases will be well above the 2001 drought year when flows were 55% of average. Snowpacks in the Columbia Basin were 101% of average on February 1, including 99% above Grand Coulee, and 106% in the Snake River. About 20% of the Columbia River watershed is in Canada, where snowpacks are slightly below average.

Elsewhere, inflows on the Kootenai River to Libby, Montana are forecast to be 91% of average. At Jackson Lake on the Snake River, 97% is the median expectation. At Dworshak, Idaho, 111% is forecast. In Oregon, the Willamette is predicted to run at 103% of average through September, again assuming that future precipitation will be "normal."

### Southwest and Interior West

Exceptional and extreme drought areas in the West are limited mainly to southeast Idaho and southernmost New Mexico, and even these areas are expected to have limited improvement through May. Mountain snowpacks in Arizona and New Mexico have been about 2/3 of normal.

The five-year drought affecting the State of Colorado is showing signs of partial relief. Generally wet conditions in the Southwest are expected by some to continue through March. However, reservoir levels in all interior western states will likely remain below normal. Snowpacks in the Upper Colorado River basin are the best in five years, but are still just 90% of average. With very dry soils, inflows to Lake Powell from April through July are forecast to be only 76% of average. Prior year inflows were 62% in 2000, 59% in 2001, 25% in 2002 (the record low), and 53% in 2003. Storage at Lake Powell is the

lowest in 20 years, but is still substantial. Water supplies are adequate to continue pulsed flow releases from Glen Canyon Dam through March. These experimental 11-hour peak flows, going from 5,000 cfs to 20,000 cfs, began in early 2003, and are intended to benefit the endangered humpback chub. (It is similar to pulsed release studies on the Tuolumne below New Don Pedro.) The lost generation from Glen Canyon will be made up by USBR's Flaming Gorge powerhouse in Utah to assist WAPA in meeting load.

### **Long Term Forecasts**

In the western Pacific Ocean, sea surface temperatures near the equator show no indications for the onset of El Niño or La Nina events. Neutral conditions in the tropical Pacific are expected to continue for several months, making for another "La Nada" year. Climate models show little consensus for weather patterns after March. As of February 19, the NWS Climate Prediction Center's long-term outlook calls for "better than average odds" that California will have warmer than average temperatures through June, and below median precipitation, especially in Northern California.

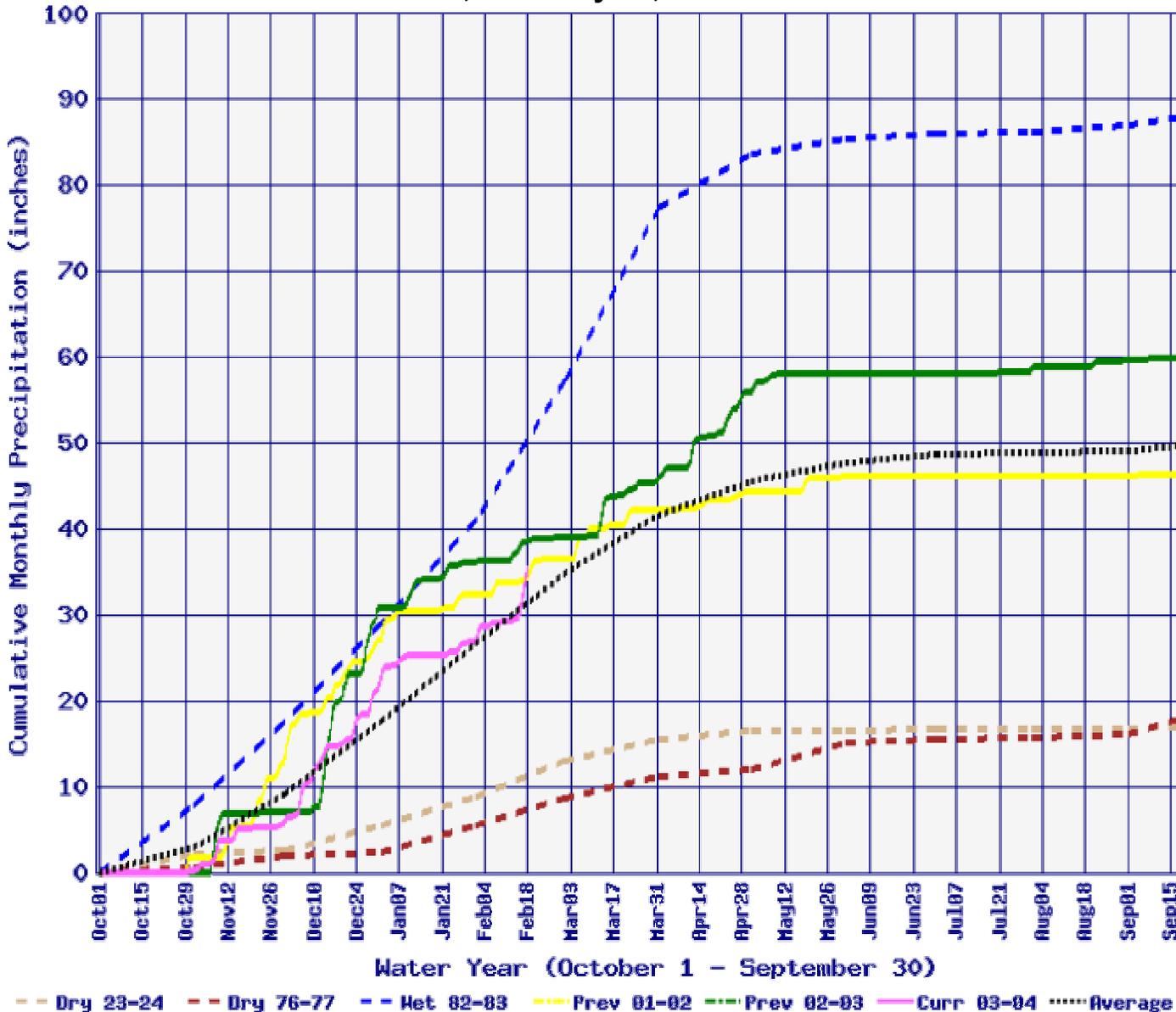
### **Postscript on Precip**

While precipitation and runoff numbers statewide are still below average, rain and snow delivery to the Northern Sierra is running at 111% of average for this date (**Figure 2**). Most of this renewable fuel supply remains in "cold storage". In the absence of El Niño and La Nina disturbances, this year's snowmelt, runoff and groundwater supplies are likely to be conserved, managed and optimized for a variety of beneficial uses, including power and profit generation, low-cost energy delivery, grid support and system reliability.

A reliable estimate of hydroelectric generation in a large region cannot be based on a single indicator, gage, or model. This snapshot summary relies on several web-published reports, especially those by the California Department of Water Resources, and some confidential communications from cooperating utilities. Monthly updates to this report are planned for March through May.

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**Figure 2. (From DWR) California Northern Sierra Precipitation 8-Station Index, February 19, 2004**



The average of eight precipitation stations serves as a witness index for the Sacramento River hydrologic region. It provides a representative sample of the region's major watersheds: the upper Sacramento, Feather, Yuba, and American rivers, which produce inflow to some of California's largest reservoirs - the source of much of our water supply. The eight stations are: Blue Canyon, Brush Creek Ranger Station, Mineral, Mount Shasta City, Pacific House, Quincy Ranger Station, Shasta Dam, Sierraville Ranger Station. Seasonal runoff forecasts are based on many more measurements than this index, including snowpack and prior streamflow. The [seasonal forecasts](#) are a more accurate measure of water supply.