

# Project 184

## Forecast and Operations Plan

### March 2004

In the Department of Water Resources' (DWR) February 1, 2004 Bulletin 120, the 50<sup>th</sup> percentile American River Basin April-July unimpaired flow forecast was 91% of average, which equates to a below normal year. The 80% probability range (10%-90%) was 75% to 97% of average. DWR March Bulletin 120 will probably be available by March 7, 2004.

It appears there will be a slightly improved forecast of American River Basin flow when the March Bulletin 120 is completed. During February, the snow water content in the South Fork American River Basin has approached 100 % of the April 1 average, which is the normal date of maximum accumulation. As shown below, percentages tend to be a little higher in the lower elevations which may lead to earlier runoff when the pack melts.

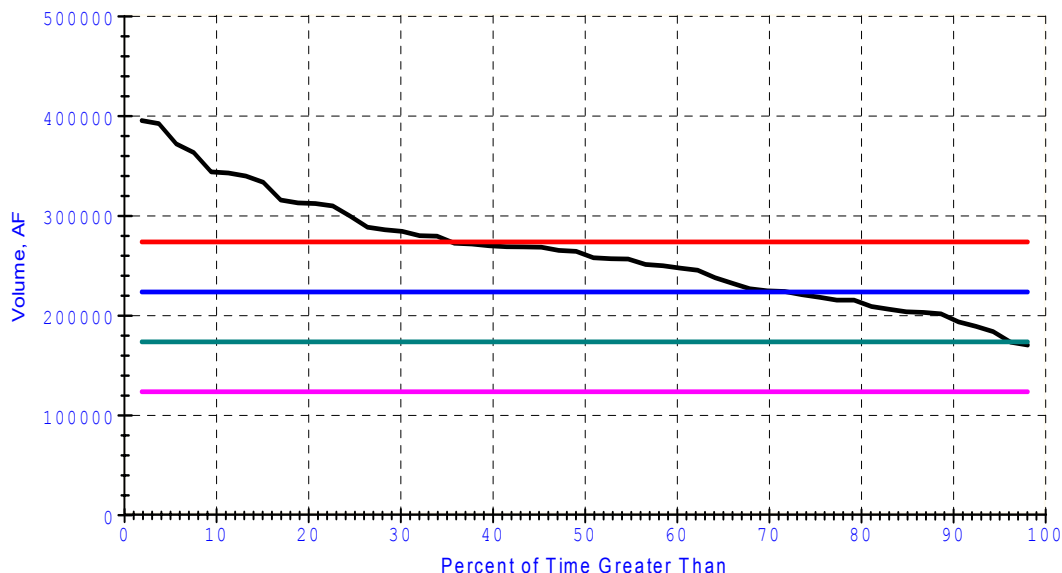
ECORP Consulting has developed a forecasting procedure for unimpaired South Fork American River at Kyburz to aid in the operations planning for Project 184. The procedure generates forecasts or "hydrologic scenarios" of unimpaired flow for the South Fork American River at Kyburz and reservoir inflow using current basin conditions and the historical climate data for the 1948-2000 period. Historic data from three snow gages (Echo Summit, Caples Lake and Silver Lake) were used to generate 52 forecasts of equally likely flow "traces." The table below provides a summary of snow water content (SWC) information for the three gages.

Snow Course	1/29/04 SWC, Inches	3/3/04 SWC, Inches	April 1 average, inches	Percent of April 1 Average
Echo Summit	18.7	28.4*	33.8	84%
Caples Lake	22.4	30.8	30.9	100%
Silver Lake	21.7	30.0	22.7	132%

\* Estimated Value

Shown in the figure below is an exceedance curve for April-July unimpaired flow of the South Fork American River at Kyburz. The horizontal lines indicate the 50%, 75%, 100% and 125% of normal runoff values and are the dividing lines between the Critical, Dry, Below Normal, Above Normal and Wet year types.

## Apr-Jul Kyburz Unimpaired Flow Forecast



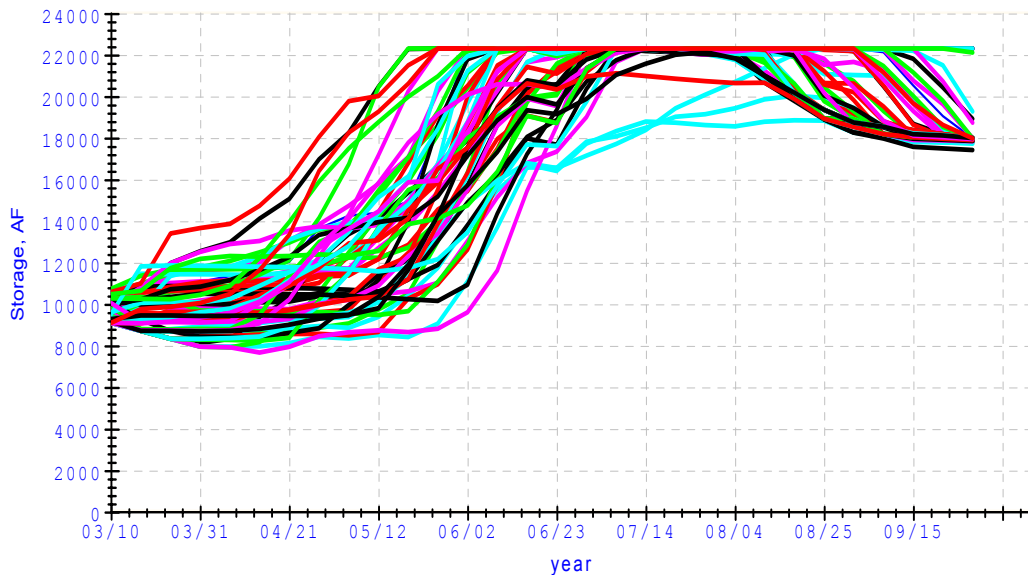
Given today’s basin conditions, there is about a 95% chance that the April-July flow volume will be Below Normal or greater. There is a 70% chance that the April-July flow volume will be Above Normal or greater and a 35% chance that April-July flow volume will be Wet. The table below presents the percent chance of this year falling into one of the five year types. This information is used to set year type when testing a proposed operation plan using position analysis.

Year type	% chance
Wet	35
Above normal	35
Below normal	26
Dry	2
Critical	0

A position analysis is a study which includes several modeling runs, all with the same operating rules and initial conditions. Each component run, or “trace” has an equal number of time steps. The only thing that varies from trace to trace is the hydrologic scenario. The purpose of the position analysis is to find the likelihood of the system being at a certain state at some future time, given the current state (“position”) of the system.

In the Project 184 position analysis, each of the 52 South Fork American River at Kyburz forecasts is assumed to be equally likely to occur. Therefore, each of the 52 forecasts can be used with current snow pack and the four reservoir storage levels to test the operation plan for Project 184. The current plan is to operate in compliance with the Settlement Agreement starting on March 1 and continuing during 2004. ECORP used the Project 184 OASIS model in the position analysis mode to assess that operation plan. It is clear from the analysis that there is a very high likelihood that all minimum flow standards will be met and all four reservoirs will fill. It is almost certain that Caples Lake will fill even if Caples Lake is drawn below 10,000 acre-feet storage to support generation during March.

## Caples Lake Storage



The figure above shows all 52 equally likely traces of Caples storage levels for the coming year. In 48 of the 52 cases Caples Lake fills by mid-July. Although the model predicts that Caples storage will not be required to support generation during March, it is possible that some storage withdrawals will be required over the next three or four weeks if accretions above Kyburz do not remain adequate to support the diversion for generation and consumptive use. This possibility does not alter the probability of filling Caples Lake.