

Scott River Fall Flow Forecast, 2026

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Below, we predict the minimum 30-day average flow at the Scott River (Fort Jones gauge), as well as the amount of rain needed to end the dry season, in 2026 (see end of document for prediction values). These predictions come with some uncertainty (discussed below).

Background

In a 2024 [study](#), we showed that it is possible to estimate two key metrics describing end-of-dry-season hydrology in the Scott River watershed. They aim to answer the following questions:

- Approximately how low will Fort Jones flows drop in the driest month of the water year? (V_{min} , flow volume/30 days)
- Approximately how much rainfall will be needed to bring on the wet season/storm flow/“spilling” watershed conditions, as measured at the Fort Jones stream gauge? (P_{spill} , mm precipitation)

Both predictions are based on precipitation and snowpack data from the preceding wet season. They are associated with an average model error (RMSE) of 1.4 Mm³ per 30 d (19.4 cfs) and 25.4 mm (1 in.), corresponding to 49% and 37% of mean observed values, respectively. Nonetheless, accounting for this uncertainty, the equations in this study are a tool for converting public data, at the end of April, into a prediction of Scott River hydrologic conditions in October-November.

Methods notes

Both metrics reference average daily flow at the Fort Jones (FJ) gauge (USGS streamflow gauge ID 11519500).

Conceptually, minimum fall flows depend on several factors, including (but not limited to):

- Snowpack and precipitation (water inputs)
- Evaporation and transpiration through plants (water outputs as ET)
- Water in the aquifer (water in storage)

Many complexities affect the water in each of these budget terms: irrigation diverts water onto crops, where some of it is transpired by plants and some recharges the aquifer. Nonetheless, in the Scott River system, these factors have historically interacted in a predictable-enough fashion that it is possible to forecast end-of-dry-season hydrology using only the inputs. In the future, if there are significant changes in water use behavior

(such as irrigation patterns) or climate forces (such as proportion of precipitation falling as snow versus rain), this fall-flow behavior exercise may have less predictive power.

Minimum 30-day fall flow volume, V_{min}

Instead of predicting the absolute minimum daily average flowrate, we used a 30-day analysis period to focus on sustained low flows. We calculated a rolling 30-day sum of daily flow volumes in the period July-December for each calendar year to identify the 30-day period with the least flow volume. The total flow volume in this period is referred to as V_{min} (see [study](#) for more details).

$$V_{min,i} = -1.33 + 0.0053 * FJCI_i + 0.0027 * SWJ_i$$

Where:

- $V_{min,i}$ is the predicted value of minimum 30-day dry season baseflow volume in calendar year i (i.e., at the end of water year i) (million m³ or Mm³)
- SWJ_i is the maximum snow water content recorded at the Swampy John snow course (CDEC station ID SWJ or 285) in water year i (millimeters)
- $FJCI_i$ is the cumulative precipitation, October-April, of water year i (millimeters) (details below)

$FJCI_i$ is based on the NOAA weather station records of two primary and four supporting weather stations.

- The two primary weather stations are located in Fort Jones and Callahan (NOAA station IDs USC00043182 and USC00041316). Callahan is generally drier than Fort Jones; the $FJCI$ record is the day-by-day mean of precipitation at these two stations. This matches methodology used to create the precipitation input for the Scott Valley Integrated Hydrologic Model; see [Foglia et al. 2013](#).
- Daily precipitation records from the four supporting weather stations (in Etna, Greenview, and two in Yreka; NOAA station IDs USC00042899, USC00043614, USC00049866 and US1CASK0005) are used to fill gaps in the Callahan and Fort Jones records, using statistical relationships between stations.

Precipitation needed to start the wet season, P_{spill}

$$P_{spill,i} = 128 - 0.095 * FJCI_i - 0.028 * SWJ_i$$

Where:

- $P_{spill,i}$ cumulative rainfall at the end of the dry season, starting Sep. 1, on the first day that the Fort Jones gauge records flow greater than or equal to 120 cfs in calendar year i (i.e., at the end of water year i) (millimeters)
- SWJ_i and $FJCI_i$ are defined above

Data Sources

Snow course data and NOAA weather station data is accessible from multiple web portals, including the two listed here:

<https://wcc.sc.egov.usda.gov/nwcc/snow-course-sites.jsp?state=CA>

<https://www.ncei.noaa.gov/cdo-web/datasets/GHCND/stations/GHCND:USC00043182/detail>

Validation: 2022-2025

These equations were constructed using data from 1935-2021. Since several years have elapsed since the study was published, we are now able to test the predictive model on data not used in its development.

Seasonal forecast validation: end of dry season watershed behavior, water years 2022-2025

Water Year	Max. Snow Water Equiv., mm	Cum. Precip. mm, Oct-Apr	Predicted Vmin, cfs	Obs. Vmin, cfs	Vmin Error, Obs-Pred	Predicted Pspill, mm	Obs. Pspill, mm	Pspill Error, Obs-Pred
2022	470	480	33.8	6.8	-27.0	96	180	84
2023	813	598	54.9	20.9	-34.0	94	79	-15
2024	572	419	33.2	27.5	-5.7	104	65	-39
2025	1,016	660	66.9	41.8	-25.1	94	66	-28

This forecast, in recent years, has overpredicted the minimum 30-day flow by a significant margin. The biggest miss was in 2022, with observed flow only 20% of predicted; the smallest error term was in 2024, with observed flow at 83% of predicted. Predictions of P_{spill} performed slightly better, with observed values ranging from 188% to 62% of predicted values.

Forecast: end of dry season 2026

The nature of this seasonal forecast is temporally indeterminate: without knowing when the rains arrive in the fall, it is not possible to know the timing of the minimum 30-day flow volume.

The 2026 maximum snow water equivalent is the lowest on record. Correspondingly, this year's forecast for minimum fall flows (6.5 cfs average) is lower than any of the previous 4 years.

Seasonal forecast, end of dry season watershed behavior, water year 2026

Water Year	Max. Snow Water Equiv., mm	Cum. Precip. mm, Oct-Apr	Predicted Vmin, cfs	Predicted Pspill, mm
2026	51	316	6.5	99.4