

## **Appendix I**

### **River Index Calculation and Water Year Characterization**

## Water Year Type and River Index Definitions

### River Indices

(<http://cdec.water.ca.gov/cgi-progs/iodir/wsi>; Website of the California Department of Water Resources)

The Sacramento valley 40-30-30 index for water year types; Wet, Above Normal, Below Normal, Dry, and Critical, is used to determine year types for Delta outflow criteria and Sacramento system requirements.

The San Joaquin Valley 60-20-20 Index is used to determine year types for flow requirements at Vernalis.

The Sacramento River Index (SRI), is used to trigger relaxation criteria related to May-June Net Delta Outflow (NDO) requirements. The SRI refers to the sum of the unimpaired runoff in the water year as published in the DWR Bulletin 120 for the Sacramento River at Bed Bridge, Feather River inflow to Oroville, Yuba River at Smartville, and American River inflow to Folsom reservoir.

The Eight River Index is used to trigger criteria related to January Net Delta Outflow, February to June X2 standards and February export restrictions. The eight river index refers to the unimpaired runoff for the four locations mentioned under SRI plus Stanislaus River inflow to New Melones Reservoir, Tuolumne River inflow to Don Pedro Reservoir, Merced River inflow to Exchequer Reservoir and San Joaquin River inflow to Millerton Lake.

Sacramento River Runoff is the sum of unimpaired flow in million acre-feet at:

- Sacramento River above Bend Bridge;
- Feather River at Oroville (aka inflow to Lake Oroville);
- Yuba River near Smartville;
- American River below Folsom Lake.

Also known as the "Sacramento River Index", this index was previously used to determine year type classifications under SWRCB Decision 1485.

Also previously referred to as the "4 River Index" or "4 Basin Index".

$$\begin{aligned} \text{Index} = & 0.4 * \text{Current Apr-Jul Runoff} \quad (1) \\ & + 0.3 * \text{Current Oct-Mar Runoff} \quad (1) \\ & + 0.3 * \text{Previous Year's Index} \quad (2) \end{aligned}$$

Notes:

(1) Runoff is the sum of unimpaired flow in million acre-feet at:

- Sacramento River above Bend Bridge;
- Feather River at Oroville (aka inflow to Lake Oroville);
- Yuba River near Smartville;
- American River below Folsom Lake.

(2) Maximum 10.0 for previous year index term.

### Year Type Classification

- Index based on flow in million acre-feet:

Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8, and less than 9.2
Below Normal	Greater than 6.5, and equal to or less than 7.8
Dry	Greater than 5.4, and equal to or less than 6.5
Critical	Equal to or less than 5.4

This index, originally specified in the 1995 SWRCB Water Quality Control Plan, is used to determine the Sacramento Valley water year type as implemented in SWRCB D-1641. Year types are set by first of month forecasts beginning in February. Final determination is based on the May 1 50% exceedence forecast.

- San Joaquin Valley Water Year Type Index (60-20-20)

Water Year Index based on flow in million acre feet

$$\begin{aligned} \text{Index} &= 0.6 * \text{Current Apr-Jul Runoff} \quad (1) \\ &+ 0.2 * \text{Current Oct-Mar Runoff} \quad (1) \\ &+ 0.2 * \text{Previous Year's Index} \quad (2) \end{aligned}$$

Notes:

(1) Runoff is the sum of unimpaired flow in million acre-feet at:

- Stanislaus River below Goodwin Reservoir (aka inflow to New Melones Res.)
- Tuolumne River below La Grange (aka inflow to New Don Pedro Reservoir)

Merced River below Merced Falls (aka inflow to Lake McClure)

San Joaquin River inflow to Millerton Lake;

(2) Maximum 4.5 for previous year index term

- Year Type Classification: Index based on flow in million acre-feet:

Wet	Equal to or greater than 3.8
Above Normal	Greater than 3.1, and less than 3.8
Below Normal	Greater than 2.5, and equal to or less than 3.1
Dry	Greater than 2.1, and equal to or less than 2.5
Critical	Equal to or less than 2.1

This index, originally specified in the 1995 SWRCB Water Quality Control Plan, is used to determine the San Joaquin Valley water year type as implemented in SWRCB D-1641. Year types are set by first of month forecasts beginning in February. Final determination for San Joaquin River flow objectives is based on the May 1 75% exceedence forecast.

- Sacramento Valley and San Joaquin 8 River Index

This index is the sum of the previous month's unimpaired runoff for the 8 rivers that are included in the above Sacramento River Unimpaired Runoff and San Joaquin Valley Water Year Type Index. A listing of reconstructed indices based on historical observed runoff is posted at [http://cdec.water.ca.gov/water\\_supply.html](http://cdec.water.ca.gov/water_supply.html). The official year types are based on May 1<sup>st</sup>'s forecasts, not the observed runoff.