

## Exhibit 1. Instream Flow Requirements.

### Marysville Gage (cfs)

Schedule	OCT		NOV	DEC	JAN	FEB	MAR	APR		MAY		JUN		JUL	AUG	SEP	Total Annual Volume (AF)
	1-15	16-31	1-30	1-31	1-31	1-29	1-31	1-15	16-30	1-15	16-31	1-15	16-30	1-31	1-31	1-30	
1	500	500	500	500	500	500	700	1000	1000	2000	2000	1500	1500	700	600	500	574200
2	500	500	500	500	500	500	700	700	800	1000	1000	800	500	500	500	500	429066
3	500	500	500	500	500	500	500	700	700	900	900	500	500	500	500	500	398722
4	400	400	500	500	500	500	500	600	900	900	600	400	400	400	400	400	361944
5	400	400	500	500	500	500	500	500	600	600	400	400	400	400	400	400	334818
6	350	350	350	350	350	350	350	350	500	500	400	300	150	150	150	350	232155

\* Indicated flows represent average volumes for the specified time period. Actual flows may vary from the indicated flows according to established criteria.

\* Indicated Schedule 6 flows do not include an additional 30 TAF available from groundwater substitution to be allocated according to established criteria.

### Smartville Gage (cfs)

Schedule	OCT		NOV	DEC	JAN	FEB	MAR	APR		MAY		JUN		JUL	AUG	SEP	Total Annual Volume (AF)
	1-15	16-31	1-30	1-31	1-31	1-29	1-31	1-15	16-30	1-15	16-31	1-15	16-30	1-31	1-31	1-30	
A	700	700	700	700	700	700	700	700	-	-	-	-	-	-	-	700	-
B	600	600	600	550	550	550	550	600	-	-	-	-	-	-	-	500	-

\* Schedule A used with Schedules 1, 2, 3 and 4 at Marysville.

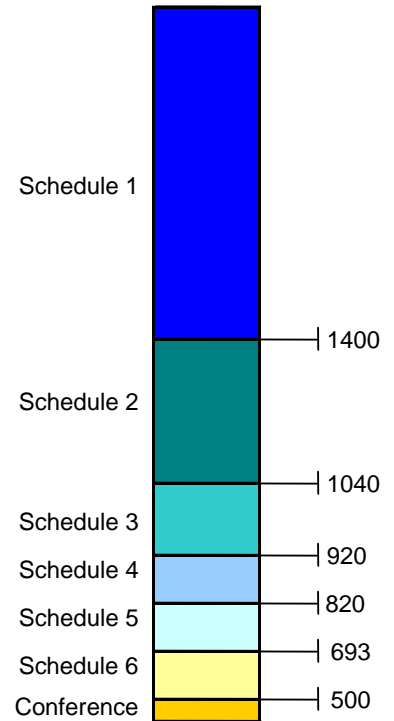
\* Schedule B used with Schedules 5 and 6 at Marysville.

## Exhibit 2

### FLOW SCHEDULE YEAR TYPES BASED ON THE NORTH YUBA INDEX FOR ESTABLISHING REQUIRED FLOWS IN THE LOWER YUBA RIVER FISHERIES AGREEMENT

The water year hydrologic classification for the Yuba River to determine the flow requirements of Yuba County Water Agency's water right permits shall be based on the North Yuba Index. Determinations of a year's flow schedule year type shall be made in February, March, April, and May and for any subsequent updates.

Flow Schedule Year Type	North Yuba Index Thousand Acre-Feet (TAF)
<b>Schedule 1</b> .....	Equal to or greater than 1400
<b>Schedule 2</b> .....	Equal to or greater than 1040 and less than 1400
<b>Schedule 3</b> .....	Equal to or greater than 920 and less than 1040
<b>Schedule 4</b> .....	Equal to or greater than 820 and less than 920
<b>Schedule 5</b> .....	Equal to or greater than 693 and less than 820
<b>Schedule 6</b> .....	Equal to or greater than 500 and less than 693
<b>Conference Year</b> .....	Less than 500



### **Exhibit 3. Dry Year Storage Adjustments To Instream-Flow Requirements**

- In some dry years with Schedule 5 instream-flow requirements, the September 30 New Bullards Bar Reservoir storage may be very low.
- To ensure sufficient carryover storage in the event of a subsequent very dry year, a dry-year storage adjustment will be made.
- The dry-year storage adjustment will be made as follows:
  - If the September 30 New Bullards Bar Reservoir storage is less than 400,000 acre-feet, then the Marysville Gage instream-flow requirement will be 400 cfs from October 1 until the next February Bulletin 120 forecasts are available.
  - If the September 30 New Bullards Bar Reservoir storage is less than 450,000 acre-feet but greater than or equal to 400,000 acre-feet, then, the River Management Team may decide to adjust the Marysville Gage instream-flow requirement to 400 cfs from October 1 until the next February Bulletin 120 forecasts are available.
  - When the next February Bulletin 120 forecasts are available, the instream-flow requirements will be based on those forecasts.

## EXHIBIT 4

### DEFINITION OF THE NORTH YUBA INDEX

The North Yuba Index is an indicator of the amount of water available in the North Yuba River at New Bullards Bar Reservoir that can be utilized to achieve flows on the Lower Yuba River through operations of New Bullards Bar Reservoir. The index is comprised of two components: (1) active storage in New Bullards Bar Reservoir at the commencement of the current water year and; (2) total inflow to New Bullards Bar Reservoir for the current water year, including diversions from the Middle Yuba River and Oregon Creek to New Bullards Bar Reservoir. The following is the definition of the index and the procedure for determining the index for each water year.

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$$\text{North Yuba Index} = Sa^{\text{NBB}} + I^{\text{NBB}}$$

Where:

$$Sa^{\text{NBB}} = \text{New Bullards Bar Reservoir Active Storage}$$

The New Bullards Bar Reservoir Active Storage for determining the current year North Yuba Index equals the actual recorded amount of water in storage in New Bullards Bar Reservoir on September 30<sup>th</sup> of the previous water year minus the Federal Energy Regulatory Commission Project License minimum pool amount of 234,000 acre-ft.

and:

$$I^{\text{NBB}} = \text{Forecasted Total Annual Inflow To New Bullards Bar Reservoir}$$

The Forecasted Total Annual Inflow To New Bullards Bar Reservoir shall be based on actual inflow to date to New Bullards Bar Reservoir, including the diversions from the Middle Yuba River and Oregon Creek plus forecasted inflow for the remainder of the water year, where such forecast is based on the Department of Water Resources 50%-exceedance forecast of unimpaired flow contained in Bulletin-120 at the beginning of each month from February until May or June, with periodic updates. The procedure for determining the Forecasted Total Annual Inflow To New Bullards Bar Reservoir is described in Exhibit 5, which is entitled "*Procedure for Calculating the Forecasted Total Annual Inflow Into New Bullards Bar Reservoir*".

Determination of the North Yuba Index for a water year shall be made based on 50%-exceedance estimates of unimpaired runoff as published in California Department of Water Resources Bulletin 120 beginning in February and updated in March, April and May, and any subsequent updates. The year type for the preceding water year shall remain in effect until the initial forecast of unimpaired runoff for the current year is available.

**Exhibit 5**  
**Procedure for Calculating the Forecasted Total Annual Inflow Into**  
**New Bullards Bar Reservoir To Calculate North Yuba Index**

The forecasted total inflow into New Bullards Bar Reservoir shall be calculated starting in February and updated periodically, but no less than monthly, until May. If a June updated Bulletin 120 forecast or any post May 1 update is published by the Department of Water Resources, then an updated forecast of total inflow to New Bullards Bar Reservoir shall be calculated as described below.

The forecasted total inflow into New Bullards Bar Reservoir is based on two main components: (1) the actual measured inflow into New Bullards Bar Reservoir to date; plus (2) the Bulletin 120 based calculation of forecasted inflow for the remainder of the water year. The following formula shall be used to calculate the forecasted total inflow to New Bullards Bar Reservoir (NBBR):

$$I^{NBB} \text{ (TAF)} = \text{Total Actual Inflow to NBBR from October 1 to the end of Month}^{i-1} \\ + \text{Forecasted Inflow from the beginning of Month}^i \text{ to September 30}$$

*(Month<sup>i-1</sup> is the previous month and Month<sup>i</sup> is the current month)*

Where:

**Total actual inflow to NBBR** is the calculated inflow based on a daily summation of inflow for the month as follows:

$$\text{Total Actual Inflow to NBBR (TAF)} = \text{Monthly change in stored water (TAF)} + \\ \text{Monthly outflow (TAF)}$$

and where:

The forecasted inflow from the beginning of Month<sup>i</sup> to September 30 is calculated using statistically derived linear coefficients applied to the measured inflow into New Bullards Bar reservoir and the Bulletin 120 published 50%-exceedance forecasts of unimpaired flow of the Yuba River at Goodyears Bar and at Smartville, and for the time periods identified in the following table:

**Table 1. Coefficients For the Calculation of Forecasted New Bullards Bar Inflow (AF)**

Forecast Month	Forecasted For:	Constant (C)	Total Actual Inflow to NBBR (C1)	Bulletin 120 Forecasted Smartville (C2)	Bulletin 120 Forecasted Goodyear's Bar (C3)
<b>February</b>	February	-2,146	0.01424	0.52533	
	March	-3,221	0.02458	0.54787	
	April-July	-30,416	0.01413	0.62473	-0.24081
	August-September	-	0.01593	0.64037	
<b>March</b>	March	-23,495	0.00596	0.55386	
	April-July	-31,134	0.01237	0.62162	-0.23266
	August-September	-	0.01473	0.59396	
<b>April</b>	April-July	-30,665	0.00547	0.61332	-0.19623
	August-September	-	0.01409	0.53241	
<b>May</b>	April-July	-31,652	0.01033	0.61645	-0.22353
	August-September	-	0.01298	0.50071	

*For all subsequent forecast updates the May coefficients shall be used, with the forecasted Goodyears Bar runoff equalling 0.273 times the current forecasted Yuba River unimpaired flow at Smartville.*

The following procedure shall be used to calculate the Forecasted New Bullards Bar Inflow:

The general formula for Forecasted New Bullards Bar Inflow is:

$$\text{Forecasted NBB Inflow}^i = \text{February NBB Inflow} + \text{March Inflow} + \text{April-July Inflow} + \text{August-September Inflow}$$

Formula terms are only applicable as shown in Table 1. As an example, the March forecast does not include a term for forecasted February NBB Inflow. The following formulas shall be used to calculate the terms of the formula above using the corresponding coefficients from Table 1 (*Note terms are calculated in AF and the result is converted to TAF for use in the calculation of the Forecasted Total Inflow to New Bullards Bar ( $I^{NBB}$  (TAF))*):

$$\text{February NBB Inflow} = C + C1 \times \text{Total Actual Inflow to NBB} + C2 \times \text{Forecasted Smartville}^{(\text{February})}$$

$$\text{March NBB Inflow} = C + C1 \times \text{Total Actual Inflow to NBB} + C2 \times \text{Forecasted Smartville}^{(\text{March})}$$

$$\text{April - July Inflow} = C + C1 \times \text{Total Actual Inflow to NBB} + C2 \times \text{Forecasted Smartville}^{(\text{April - July})} + C3 \times \text{Forecasted Goodyears Bar}^{(\text{April - July})}$$

$$\text{August - September Inflow} = C1 \times \text{Total Actual Inflow to NBB} + C2 \times \text{Forecasted Smartville}^{(\text{August - September})}$$

*("Forecasted Smartville" is the DWR forecast for "Yuba River at Smartville Plus Deer Creek")*

The May calculation of Forecasted NBB Inflow and subsequent updated calculations shall be reduced by the actual NBB inflow between April 1 and the calculation date.

**Example calculation of the North Yuba Index for February 1, 2003:**

*Excerpt from February 2003 DWR Bulletin -120:*

**FEBRUARY 1, 2003 FORECASTS  
APRIL-JULY UNIMPAIRED RUNOFF**

HYDROLOGIC REGION and Watershed	Unimpaired Runoff in 1,000 Acre-Feet					
	HISTORICAL			FORECAST		
	50 Yr Avg	Max of Record	Min of Record	Apr-Jul Forecasts	Pct of Avg	80 % Probability Range
<b>Yuba River</b>						
North Yuba below Goodyears Bar	286	647	51	240	84%	
Yuba River at Smartville Plus Deer Creek	1,044	2,424	200	900	86%	510-1,560

**FEBRUARY 1, 2003 FORECASTS (CONT'D)**  
**WATER YEAR UNIMPAIRED RUNOFF**

Unimpaired Runoff in 1,000 Acre-Feet													
HISTORICAL			DISTRIBUTION								FORECAST		
50 Yr Avg	Max of Record	Min of Record	Oct Thru Jan*	Feb	Mar	Apr	May	Jun	Jul	Aug & Sep	Water Year Forecasts	Pct of Avg	80% Probability Range
564	1,056	102											
2,459	4,926	369	675	255	300	360	380	130	30	30	2,160	88%	1,510-3260

\*Unimpaired runoff in prior months based on measured flows

From the published Bulletin-120 information, and from historical gaged date for New Bullards Bar Reservoir, the North Yuba Index can be calculated as follows:

- 1) The end-of-September 2002 New Bullards Bar Reservoir Storage (from USGS gage number 11413515) is 532,088 acre-feet.
- 2) From end-of-October, November, December, and January New Bullards Bar storage figures and monthly reservoir releases (from USGS gages 11413510 and 11413520), the total inflow to New Bullards Bar between October 1, 2002 and January 31, 2003 is 387,302 acre-feet.
- 3) Using the B-120 information and the inflow to date, the forecasted February inflow is calculated as follows:

$$\text{Inflow} = C + C1 * (\text{Oct-Jan Inflow}) + C2 * (\text{B120 Forecasted Flow at Smartville for February})$$

$$\text{Forecasted February Inflow} = -2,146 + 0.01424 (387,302) + 0.52533 (255,000) = 137,328 \text{ acre-feet}$$

- 4) The forecasted March inflow is calculated as follows:

$$\text{Inflow} = C + C1 * (\text{Oct-Jan inflow}) + C2 * (\text{B120 Forecasted Flow at Smartville for March})$$

$$\text{Forecasted March Inflow} = -3,221 + 0.02458 * (387,302) + 0.54787 * 300,000 = 170,660 \text{ acre-feet}$$

- 5) The forecasted April-July inflow is calculated as follows:

$$\text{Inflow} = C + C1 * (\text{Oct-Jan Inflow}) + C2 * (\text{B120 Forecasted Flow at Smartville for April-July}) + C3 * (\text{Forecasted Flow at Goodyear's Bar for April-July})$$

$$\text{Forecasted April-July Inflow} = -30,416 + 0.01413 * (387,302) + 0.62473 * (900,000) + 0.24081 * (240,000) = 479,519 \text{ acre-feet}$$

- 6) The August and September inflows are calculated as follows:

$$\text{Inflow} = C1 * (\text{Oct-Jan Inflow}) + C2 * (\text{Forecasted flow at Smartville for August and September})$$

$$\text{Forecasted August and September Inflow} = 0.01593 * (387,302) + 0.64037 * (30,000) = 25,381 \text{ acre-feet}$$

7) The North Yuba Index for 2003, as calculated for February 1, 2003, is:

Active NBB Storage + Actual Inflow (Oct – Jan) +forecasted Feb Inflow + forecasted Mar Inflow + forecasted Apr-Jul Inflow + forecasted Aug-Sept Inflow =

(532,088-234,000) + 387,302 + 137,328 + 170,660 + 479,519 + 25,381 = 1,498,278 acre-feet = **Index Number of 1498 which is a Schedule 1 year**

**Example calculation of the North Yuba Index for May 1, 1999:**

*Excerpt from May 1999 DWR Bulletin -120:*

**May 1, 1999 FORECASTS  
APRIL-JULY UNIMPAIRED RUNOFF**

HYDROLOGIC REGION and Watershed	Unimpaired Runoff in 1,000 Acre-Feet					
	HISTORICAL			FORECAST		
	50 Yr Avg	Max of Record	Min of Record	Apr-Jul Forecasts	Pct of Avg	80 % Probability Range
<b>Yuba River</b>						
North Yuba below Goodyears Bar	286	647	51	330	115%	
Yuba River at Smartville Plus Deer Creek	1,029	2,424	200	1,200	117%	1,090-1,360

**May 1, 1999 FORECASTS (CONT'D)  
WATER YEAR UNIMPAIRED RUNOFF**

Unimpaired Runoff in 1,000 Acre-Feet													
HISTORICAL			DISTRIBUTION								FORECAST		
50 Yr Avg	Max of Record	Min of Record	Oct Thru Jan*	Feb *	Mar *	Apr *	May	Jun	Jul	Aug & Sep	Water Year Forecasts	Pct of Avg	80% Probability Range
564	1,056	102											
2,337	4,926	369	720	520	350	305	510	310	75	55	2,845	122%	2,720-3,030

\*Unimpaired runoff in prior months based on measured flows

From this information and historic information, the North Yuba Index can be calculated as follows:

- 1) The end-of-September 1998 New Bullards Bar Reservoir Storage (from USGS gage number 11413515) is 708,904 acre-feet.
- 2) From end-of-October, November, December, January, February, March and April New Bullards Bar storage and monthly reservoir releases (from USGS gages 11413510 and 11413520), the total inflow to New Bullards Bar between October 1, 1998 and April 30 1999 is 1,098,591 acre-feet.
- 3) Using the B-120 information and the inflow to date the forecasted April - July inflow is calculated as follows:

Inflow = C + C1\*(Oct-April Inflow) + C2\*(B120 Forecasted Flow at Smartville for April-July) + C3\*(Forecasted Flow at Goodyear's Bar for April-July)

Forecasted April-July Inflow =  $-31,652 + 0.01033 * (1,098,591) + 0.61645 * (1,200,000) + -0.22353 * (55,000) = 707,142$  acre-feet.

- 4) The August and September inflows are calculated as follows:

Inflow =  $C1 * (\text{Oct-April Inflow}) + C2 * (\text{Forecasted flow at Smartville for August and September})$

Forecasted August and September Inflow =  $0.01298 * (1,098,591) + 0.50071 * (55,000) = 41,799$  acre-feet

- 5) The North Yuba Index for May 1, 1999, is calculated as follows:

Active NBB Storage + Actual Inflow (Oct – April) + forecasted Apr-Jul Inflow + forecasted Aug-Sept Inflow – Actual April Inflow =

$(708,904 - 234,000) + 1,098,591 + 707,142 + 41,799 - 182,647 = 2,139,789$  acre-feet = **Index Number of 2140 which is a Schedule 1 year**

**Exhibit 6. Predicted Occurrences of Flow Schedules**

<b>Schedule</b>	<b>North Yuba Index (TAF)</b>	<b>Percent Occurrence</b>	<b>Cumulative</b>
1	$\geq 1,400$	56%	56%
2	1,040 to 1,400	22%	78%
3	920 to 1,040	7%	85%
4	820 to 920	5%	90%
5	693 to 820	5%	95%
6	500 to 693	4%	99%
Conference	<500	1%	100%