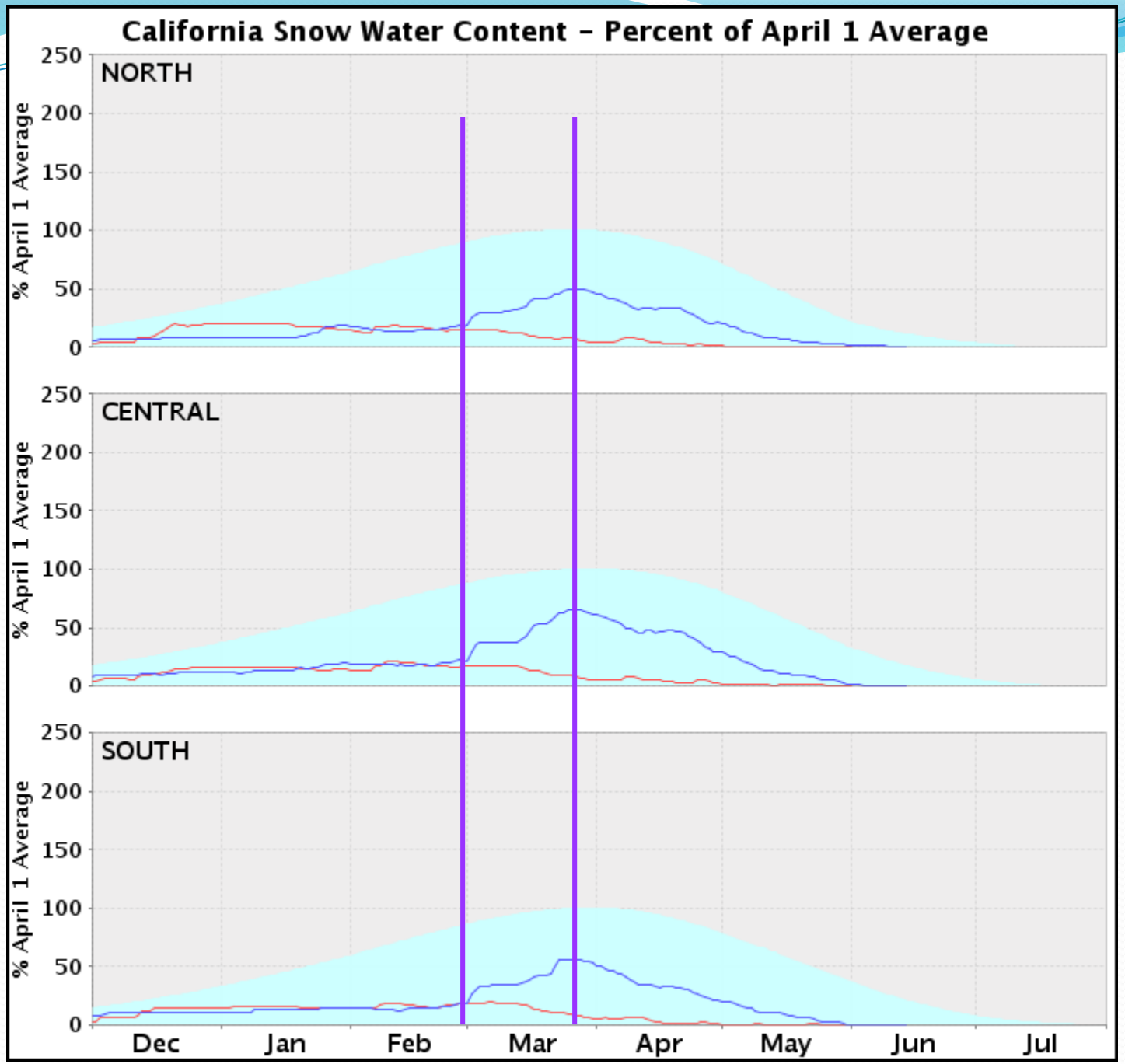
WY2018 Bulletin 120 Forecast Review

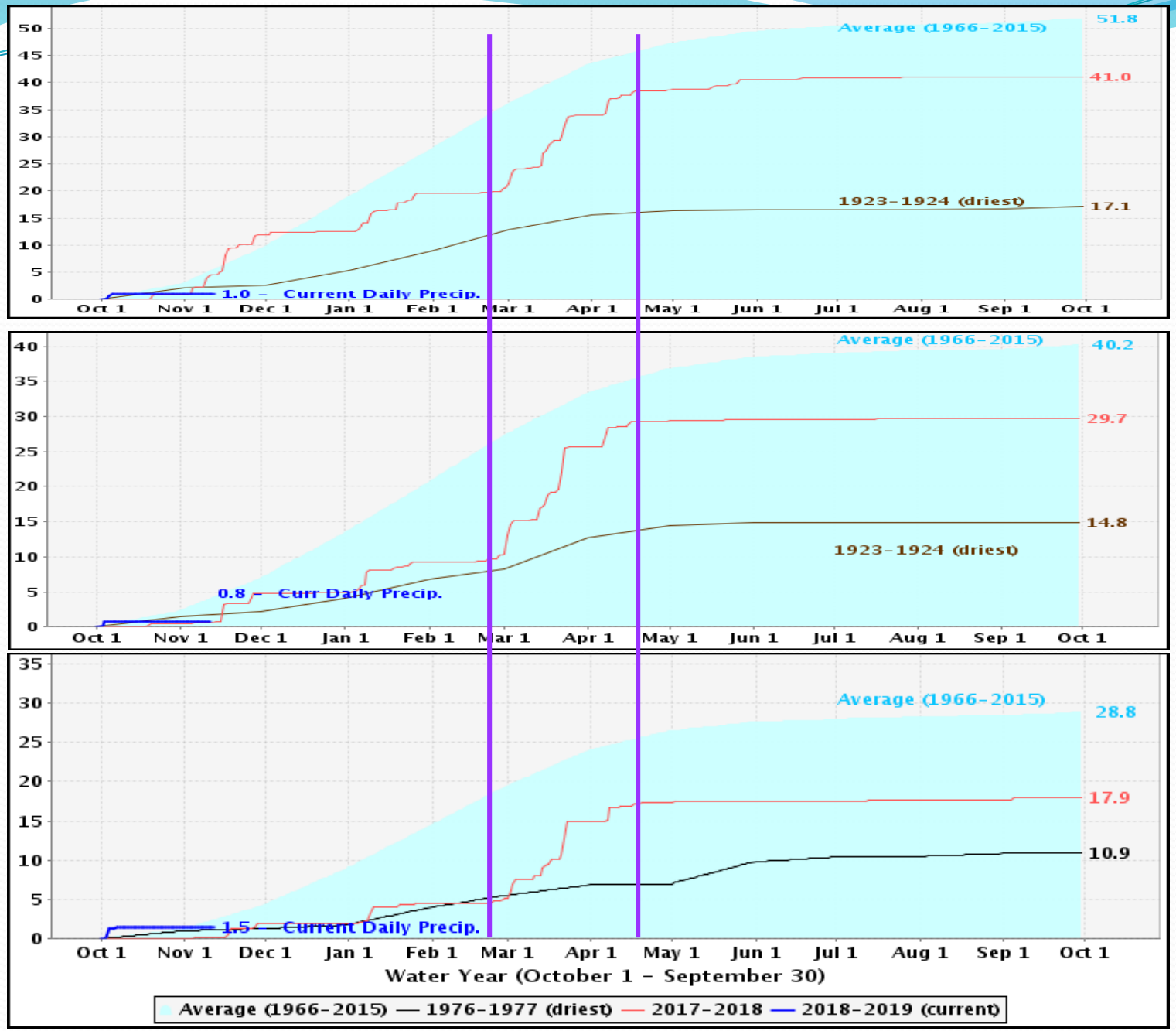
Andy Reising, DWR Snow Surveys

Thoughts on Forecast Season

- No water year is boring
- If it walks and quacks like a duck . . . it is NOT a duck!
  - Corollary: No year is the same as any prior year
- We were not perfect. Again. [*Sigh*].
- Our equations were not usually helpful after May 1
- We liked our updated dynamic funnels

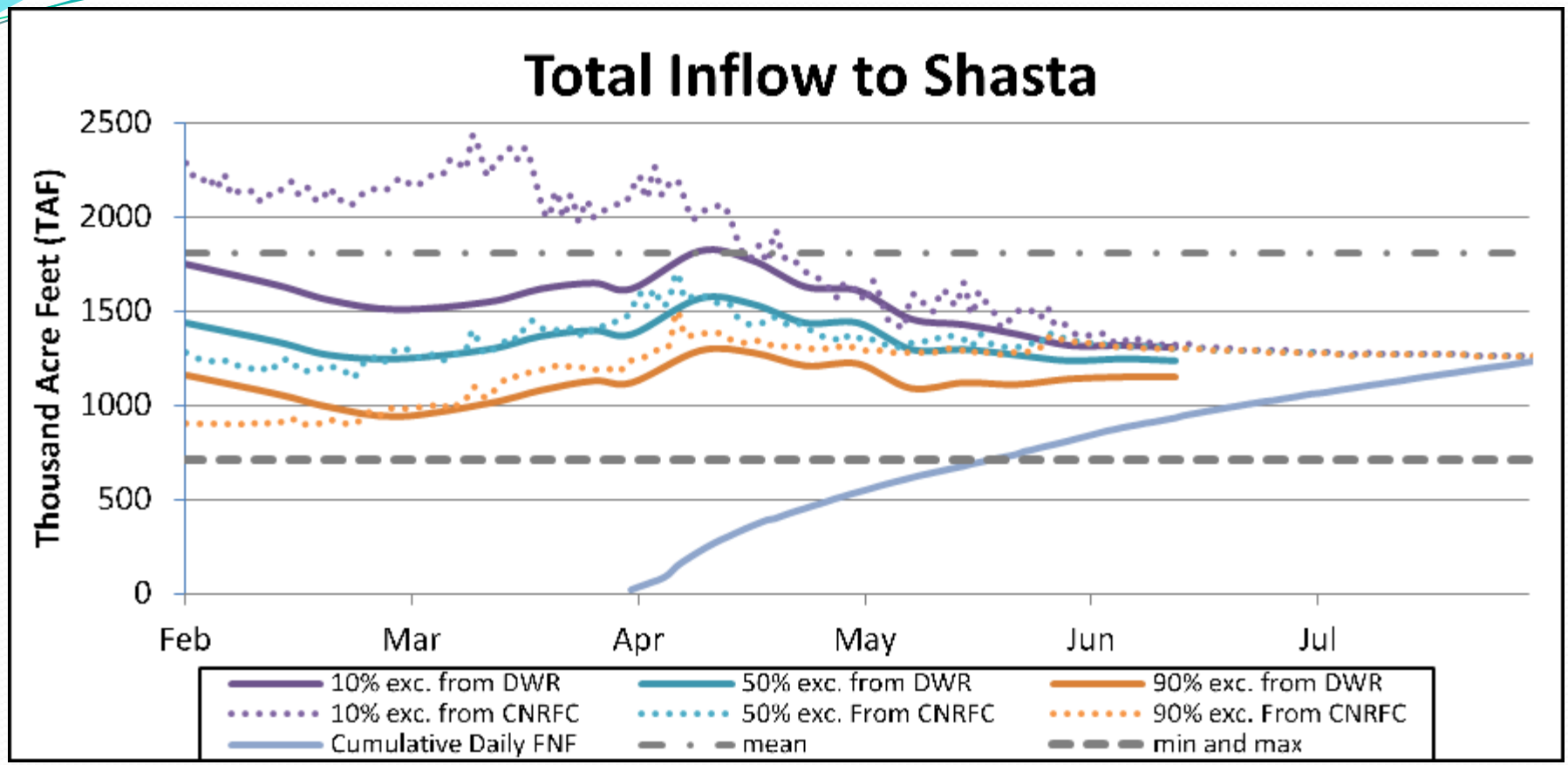

California Snow Water Content – Percent of April 1 Average
NORTH
CENTRAL
SOUTH
% April 1 Average
250
200
150
100
50
0
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul

Precipitation, inches



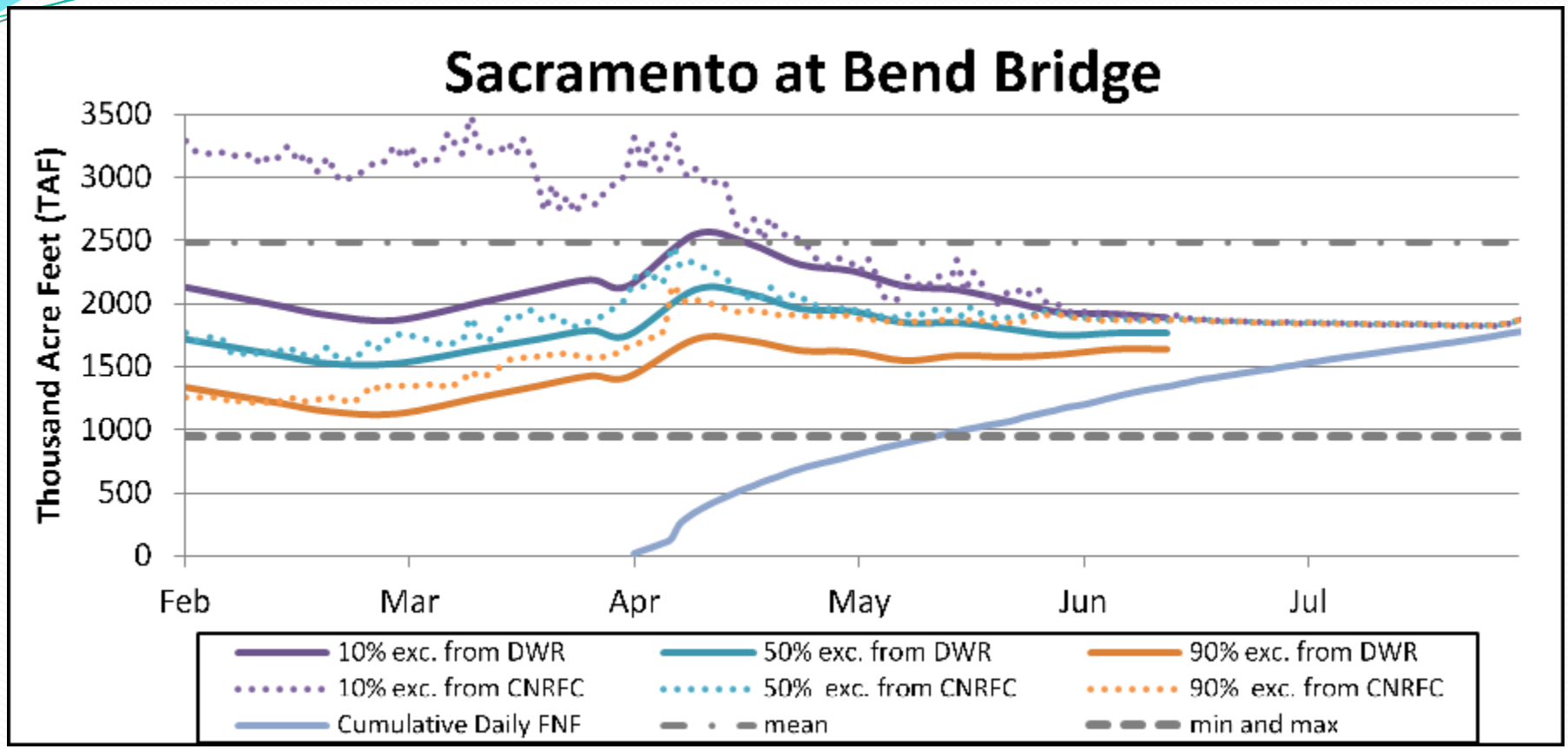
B120 Forecasts – at a Glance

River Basin	Feb 1	Mar 1	Apr 1	May 1	Jun 12	Observed	%Avg
Shasta Total Inflow	1440	1250	1380	1440	1240	**1250**	71
Sacramento River @Bend	1720	1530	1750	1940	1770	**1840**	76
Feather River	880	610	1090	1310	1280	**1321**	78
Yuba River	580	400	680	810	760	**761**	79
American River	670	450	900	1100	1060	**1071**	89
Mokelumne River	270	170	350	390	355	**347**	76
Stanislaus River	370	240	510	580	580	**590**	87
Tuolumne River	720	490	940	1050	1030	**1012**	85
Merced River	330	200	430	500	450	**459**	74
San Joaquin River	680	450	860	1000	950	**948**	77
Kings River	640	370	810	960	920	**916**	76
Kaweah River	120	65	145	165	165	**170**	60
Tule River	18	12	23	28	24	**25**	40
Kern River	220	175	240	250	230	**238**	52



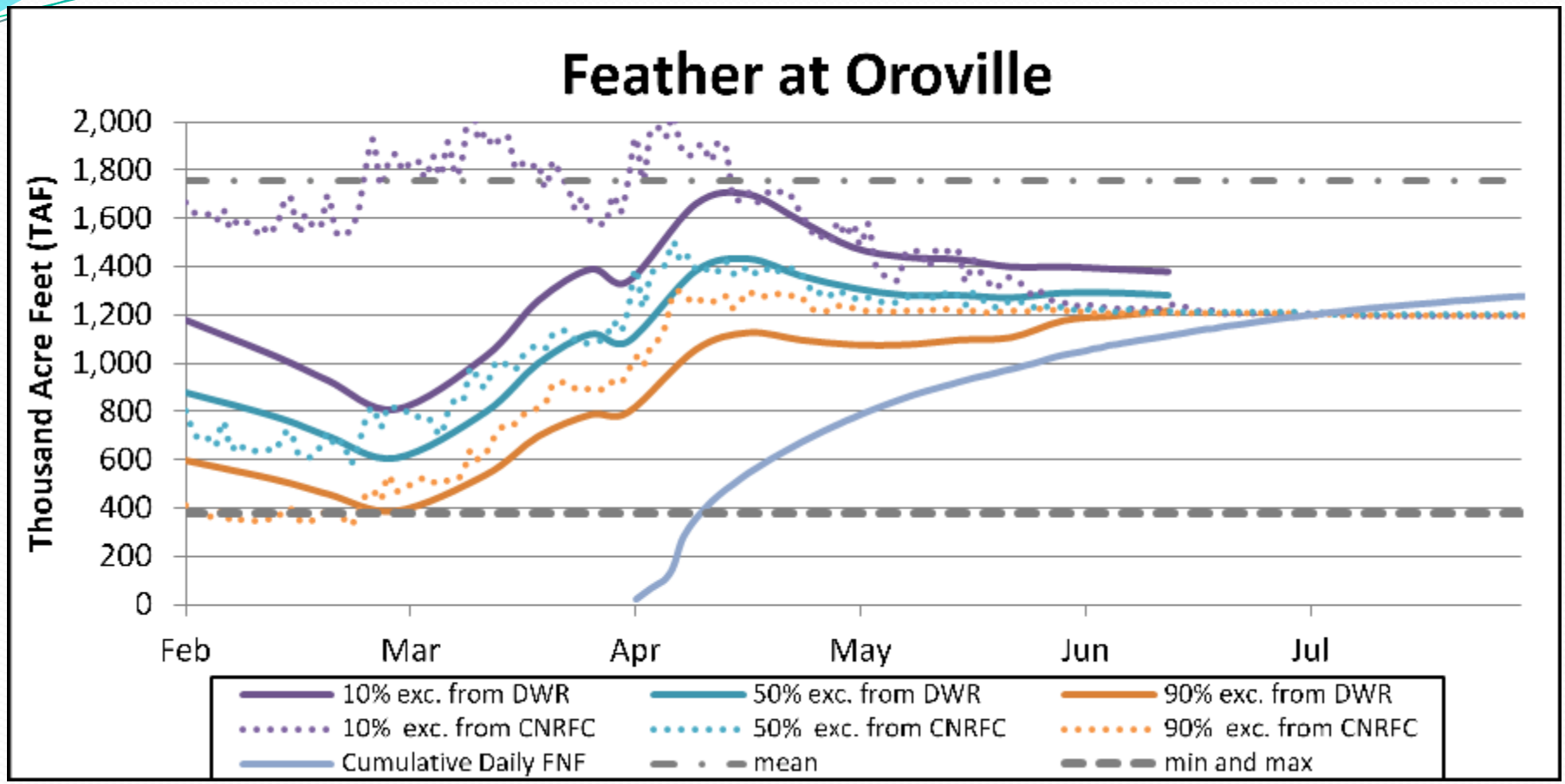
Shasta Total Inflow																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	1160	1060	990	940	1010	1080	1130	1120	1290	1280	1210	1220	1090	1120	1110	1140	1150	1150
50% exc.	1440	1340	1270	1250	1300	1370	1400	1380	1570	1540	1440	1440	1300	1300	1270	1240	1250	1240
10% exc.	1750	1640	1560	1510	1550	1620	1650	1620	1820	1770	1630	1610	1460	1430	1380	1320	1320	1310

Observed = 1250



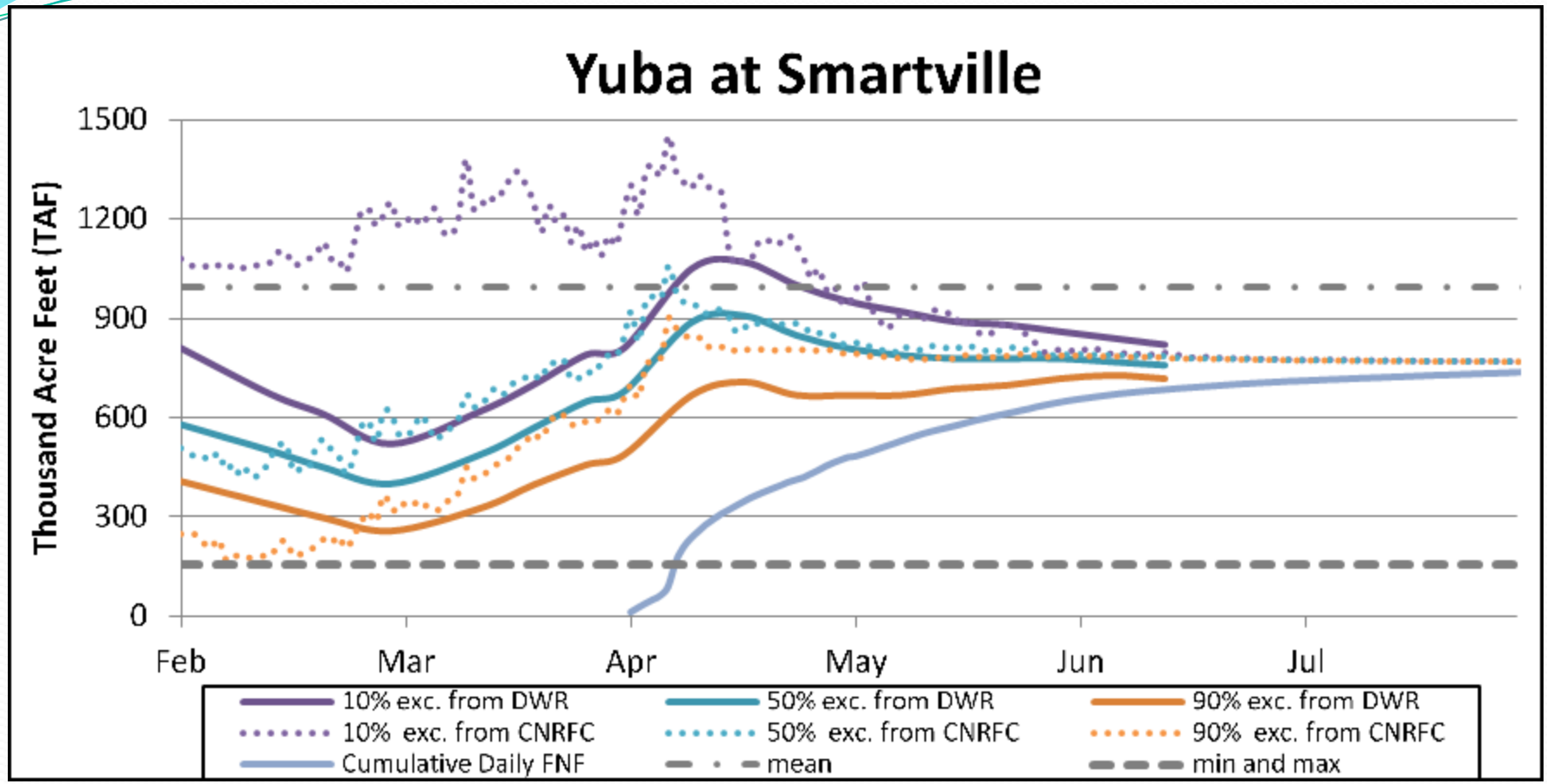
Sacramento River @Bend																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	1340	1220	1150	1130	1270	1350	1430	1420	1720	1710	1630	1620	1550	1590	1580	1600	1640	1640
50% exc.	1720	1600	1530	1530	1650	1720	1790	1750	2110	2080	1960	1940	1850	1850	1800	1750	1770	1770
10% exc.	2130	1990	1910	1870	2020	2110	2190	2140	2550	2480	2310	2260	2140	2110	2020	1930	1920	1890

Observed = 1840



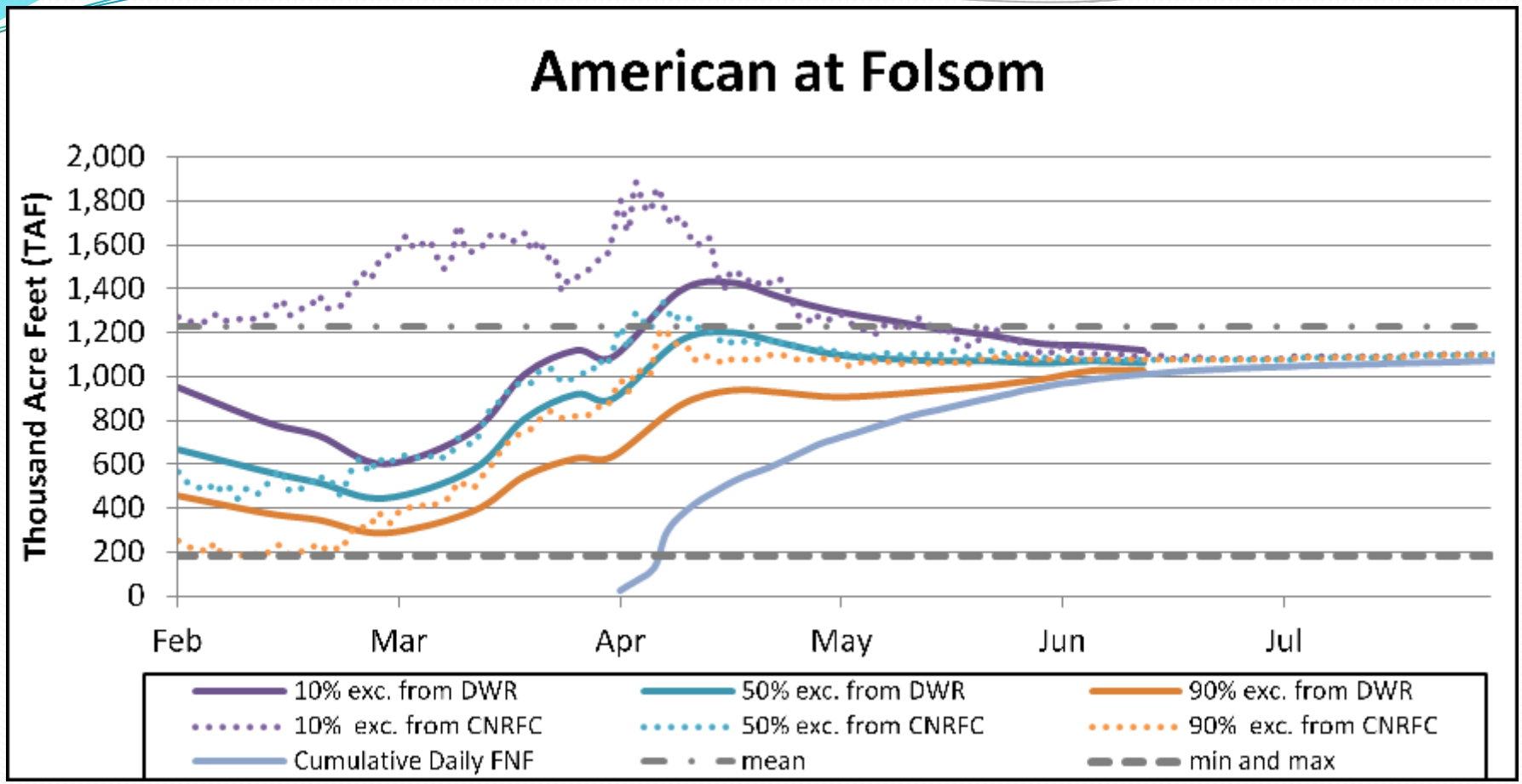
Feather River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	600	520	460	390	540	700	790	800	1060	1130	1100	1080	1080	1100	1110	1180	1200	1220
50% exc.	880	780	700	610	800	1000	1120	1090	1380	1430	1360	1310	1280	1280	1270	1290	1290	1280
10% exc.	1180	1030	930	810	1030	1260	1390	1340	1660	1700	1590	1480	1440	1430	1400	1400	1390	1380

Observed = 1321



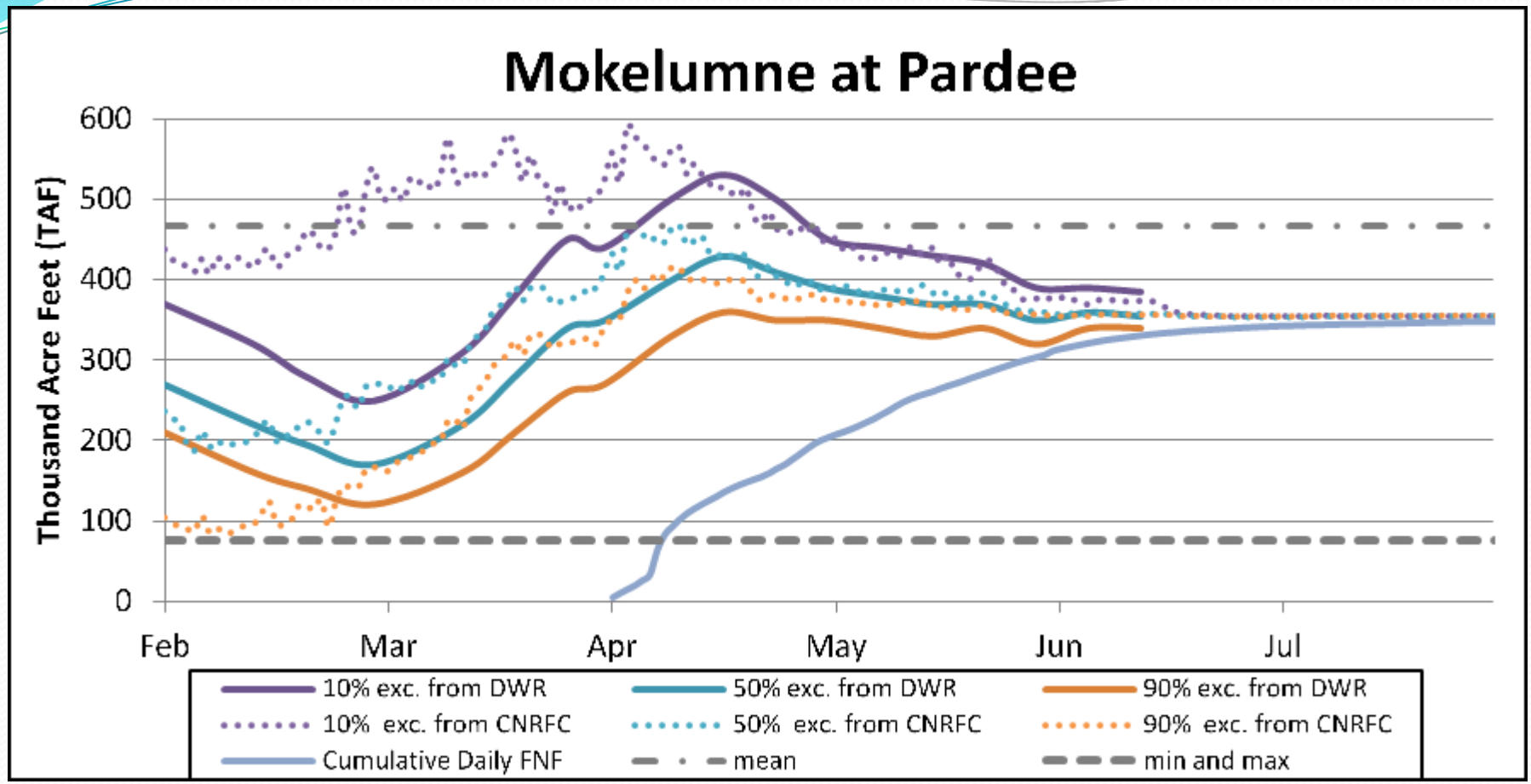
Yuba River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	410	340	300	260	330	400	460	490	670	710	670	670	670	690	700	720	730	720
50% exc.	580	500	450	400	490	570	650	680	890	910	850	810	790	780	780	780	770	760
10% exc.	810	670	610	520	620	700	790	810	1050	1070	1000	950	920	890	880	860	840	820

Observed = 761



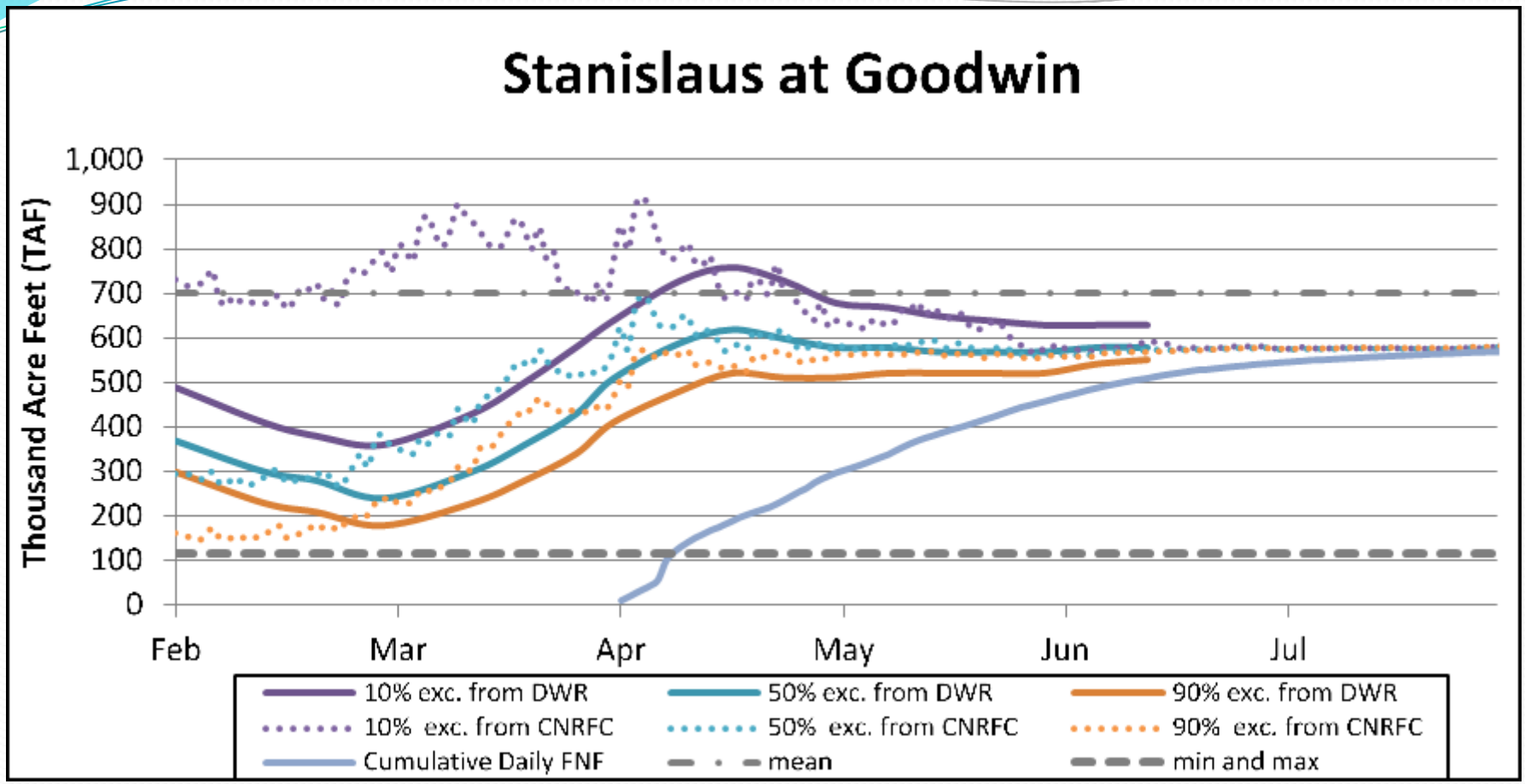
American River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	460	380	350	290	390	550	630	640	870	940	930	910	920	940	960	990	1030	1030
50% exc.	670	570	520	450	580	810	920	900	1160	1200	1150	1100	1080	1070	1070	1060	1070	1060
10% exc.	950	790	730	600	750	1010	1120	1090	1390	1430	1360	1300	1260	1220	1190	1150	1140	1120

Observed = 1071



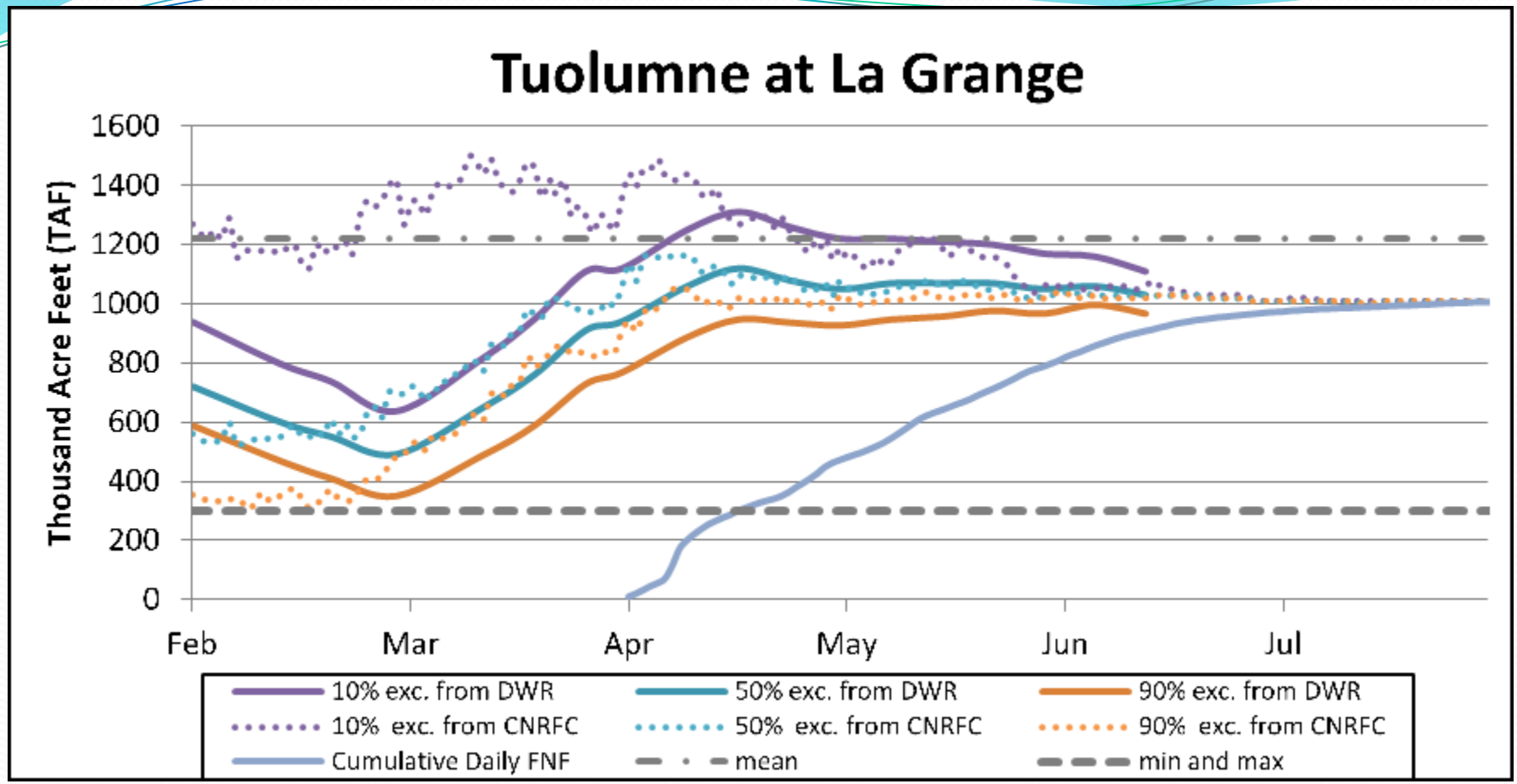
Mokelumne River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	210	160	140	120	160	210	260	270	330	360	350	350	340	330	340	320	340	340
50% exc.	270	220	195	170	220	280	340	350	400	430	410	390	380	370	370	350	360	355
10% exc.	370	320	280	250	310	380	450	440	500	530	500	450	440	430	420	390	390	385

Observed = 347



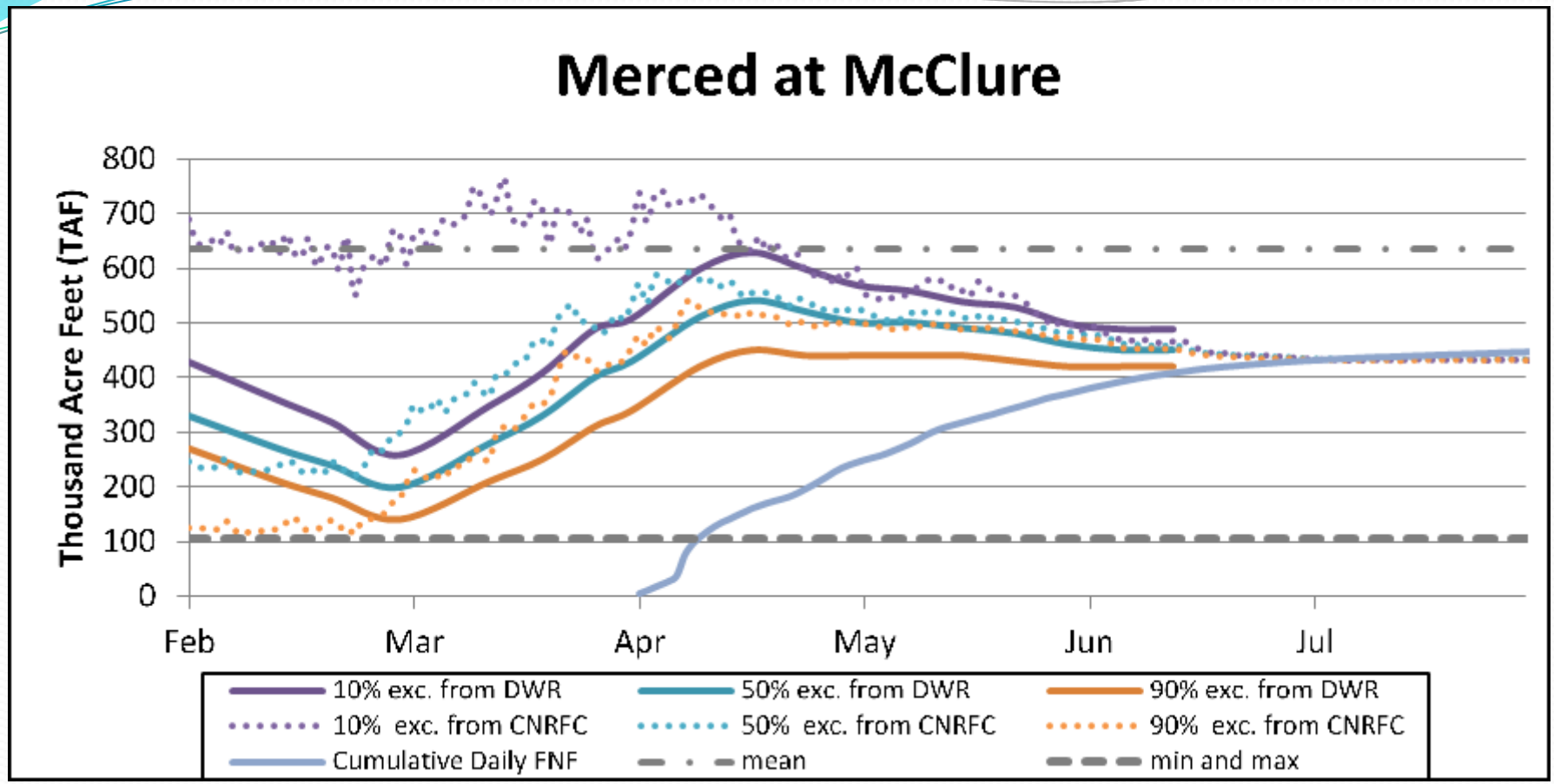
Stanislaus River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	300	230	210	180	230	280	340	410	480	520	510	510	520	520	520	520	540	550
50% exc.	370	300	280	240	300	360	430	510	590	620	600	580	580	570	570	570	580	580
10% exc.	490	410	380	360	430	500	580	640	730	760	730	680	670	650	640	630	630	630

Observed = 590



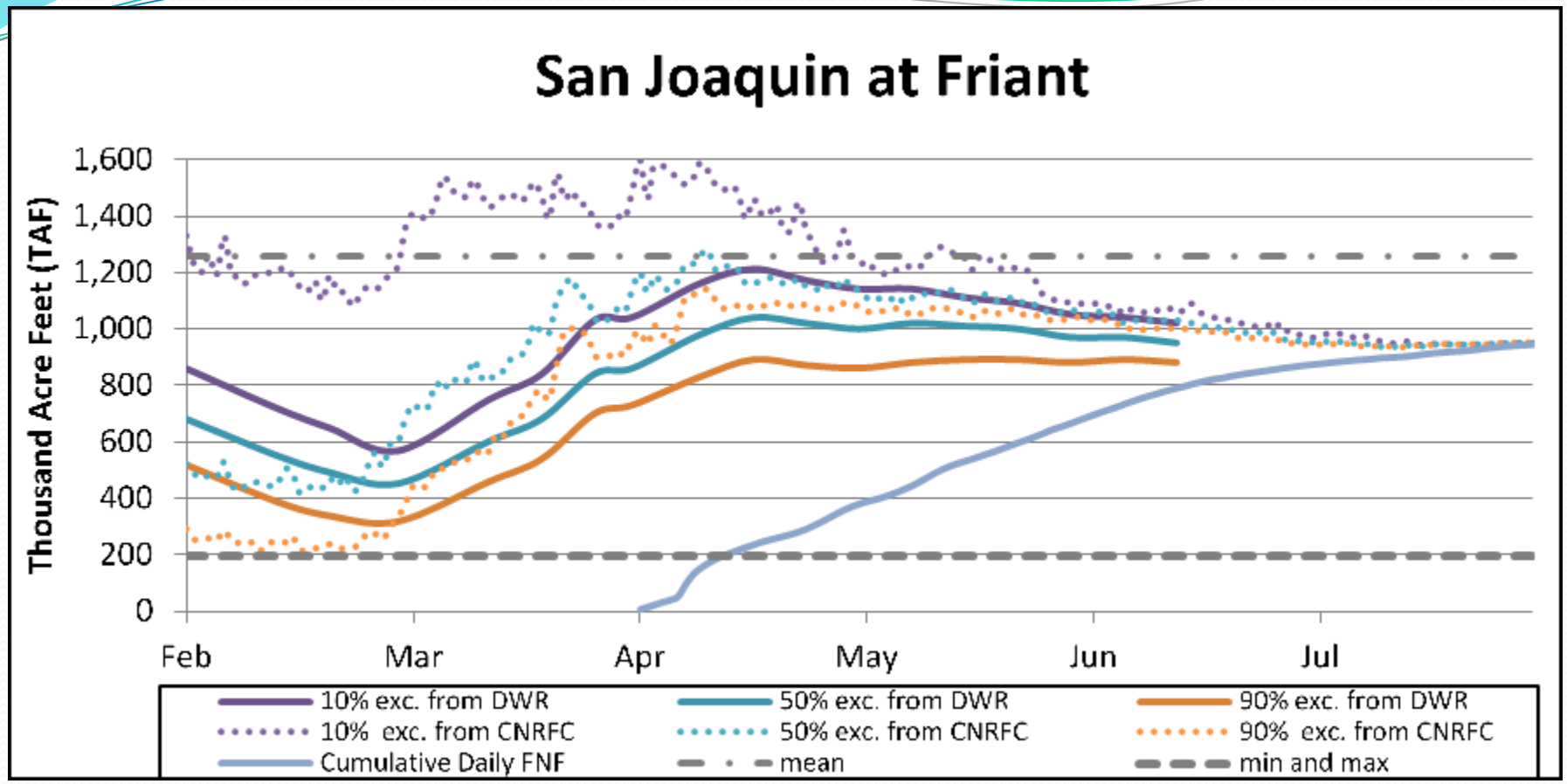
Tuolumne River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	590	470	410	350	490	590	730	770	890	950	940	930	950	960	980	970	1000	970
50% exc.	720	600	550	490	650	760	910	940	1060	1120	1080	1050	1070	1070	1070	1050	1060	1030
10% exc.	940	800	740	640	820	950	1110	1120	1250	1310	1260	1220	1220	1210	1200	1170	1160	1110

Observed = 1012



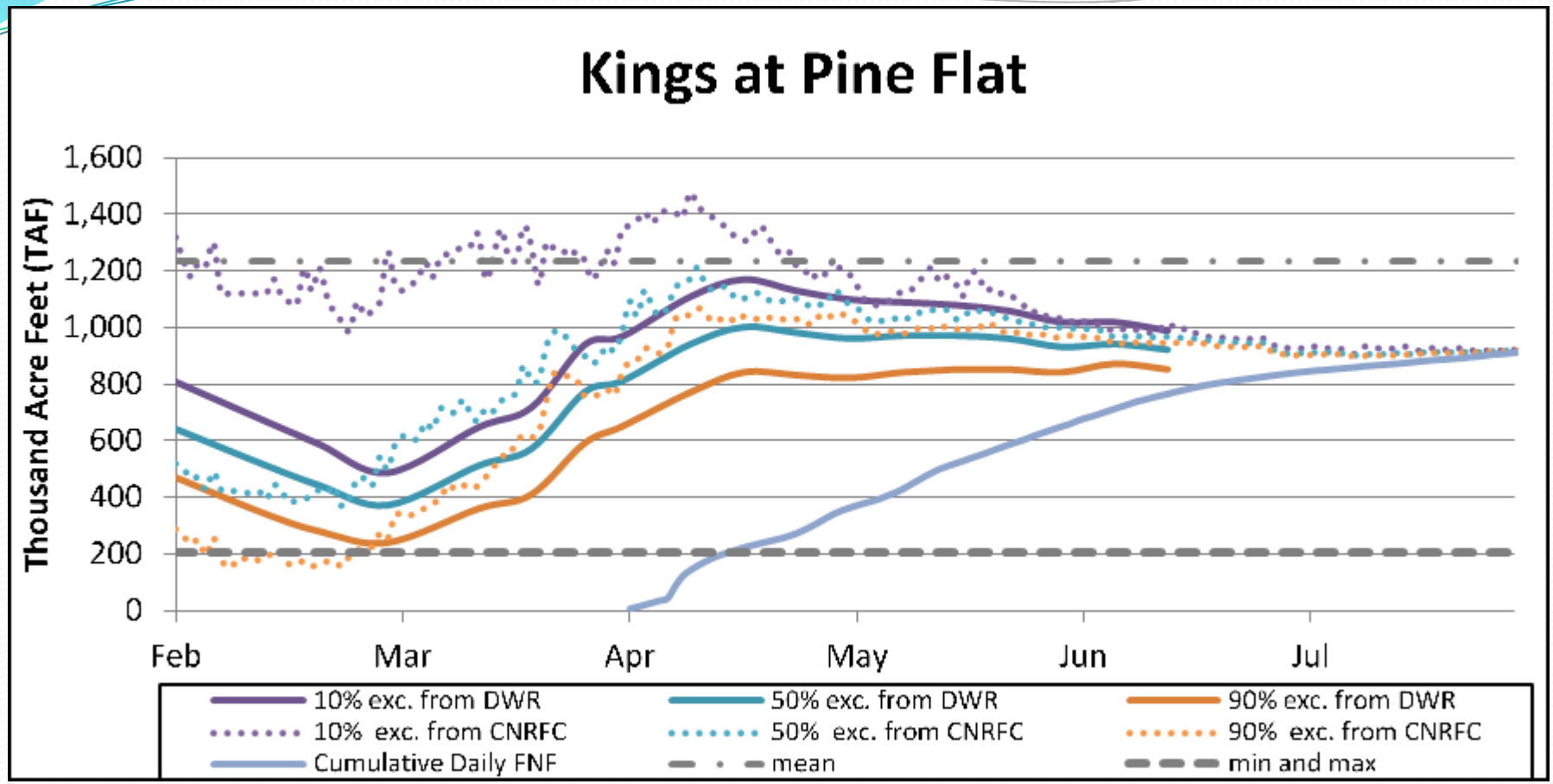
Merced River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	270	210	180	140	210	250	310	340	420	450	440	440	440	440	430	420	420	420
50% exc.	330	270	240	200	280	330	400	430	510	540	520	500	500	490	480	460	450	450
10% exc.	430	360	320	260	350	410	490	510	600	630	600	570	560	540	530	500	490	490

Observed = 459



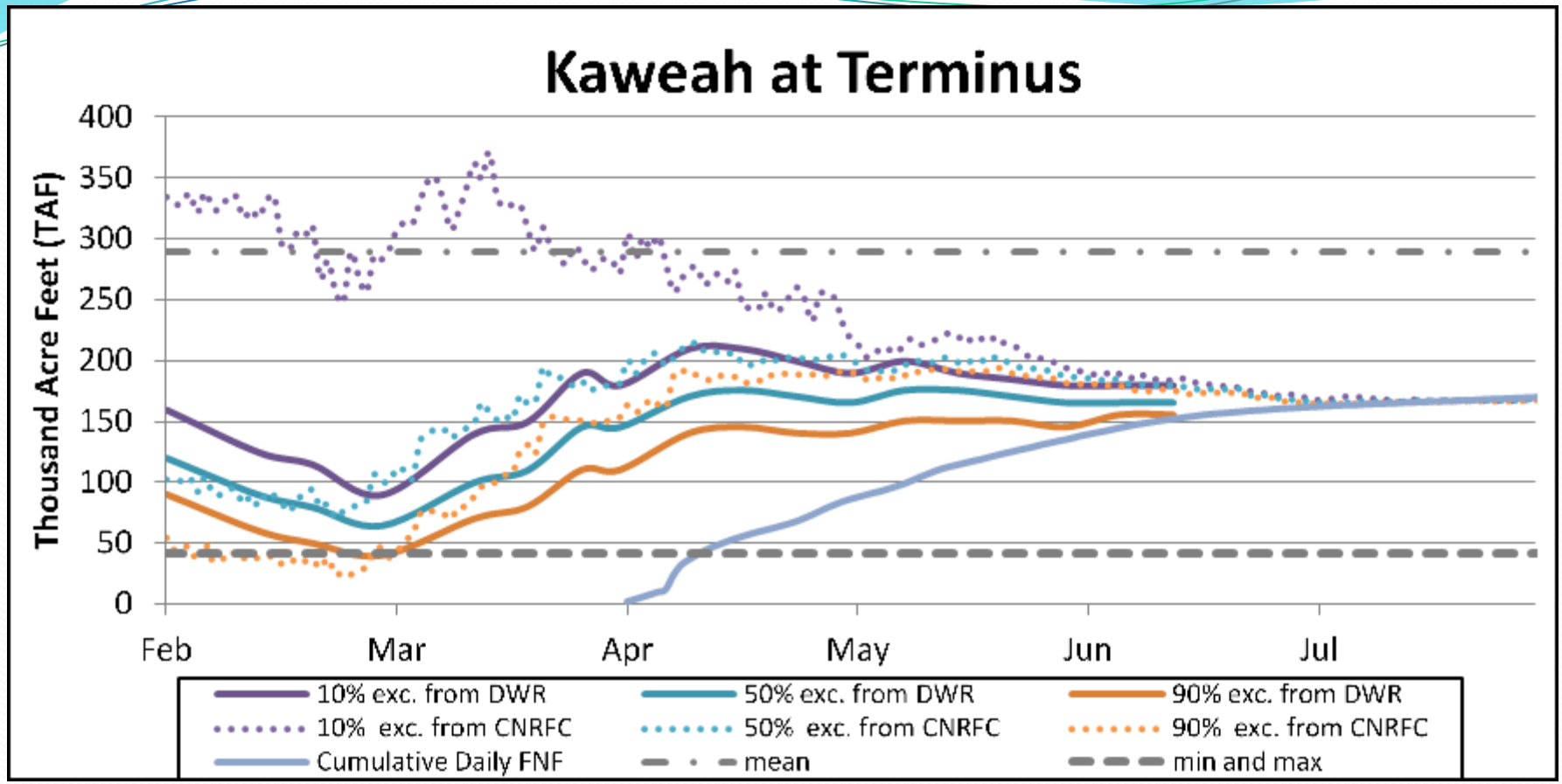
San Joaquin River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	520	390	340	320	460	540	700	730	830	890	870	860	880	890	890	880	890	880
50% exc.	680	550	490	450	600	680	840	860	980	1040	1020	1000	1020	1010	1000	970	970	950
10% exc.	860	720	650	570	750	840	1030	1040	1160	1210	1170	1140	1140	1110	1090	1050	1040	1020

Observed = 948



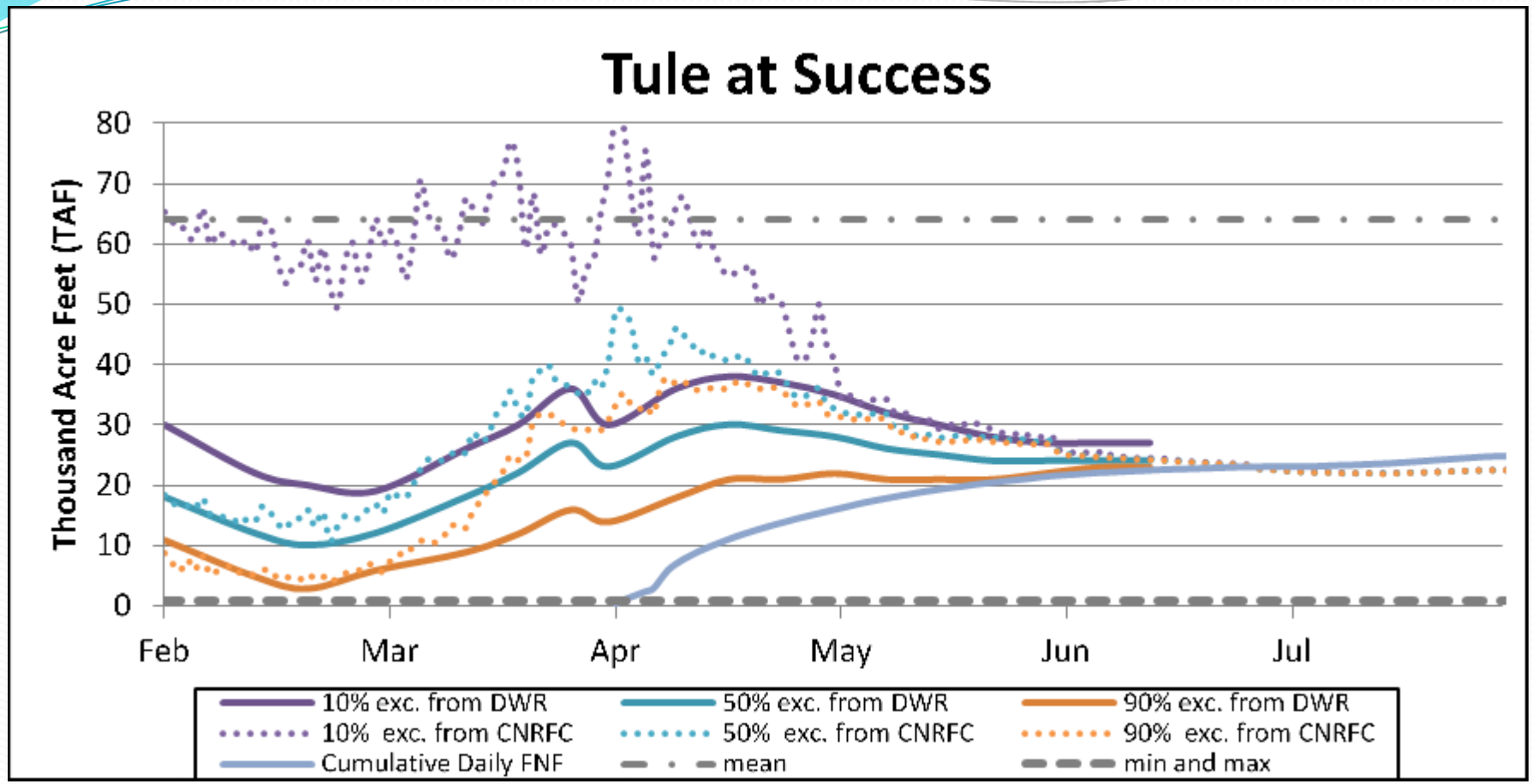
Kings River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	470	340	280	240	360	410	590	650	770	840	830	820	840	850	850	840	870	850
50% exc.	640	510	440	370	510	570	770	810	940	1000	980	960	970	970	960	930	940	920
10% exc.	810	670	590	490	650	720	940	970	1110	1170	1130	1100	1090	1080	1060	1020	1020	990

Observed = 916



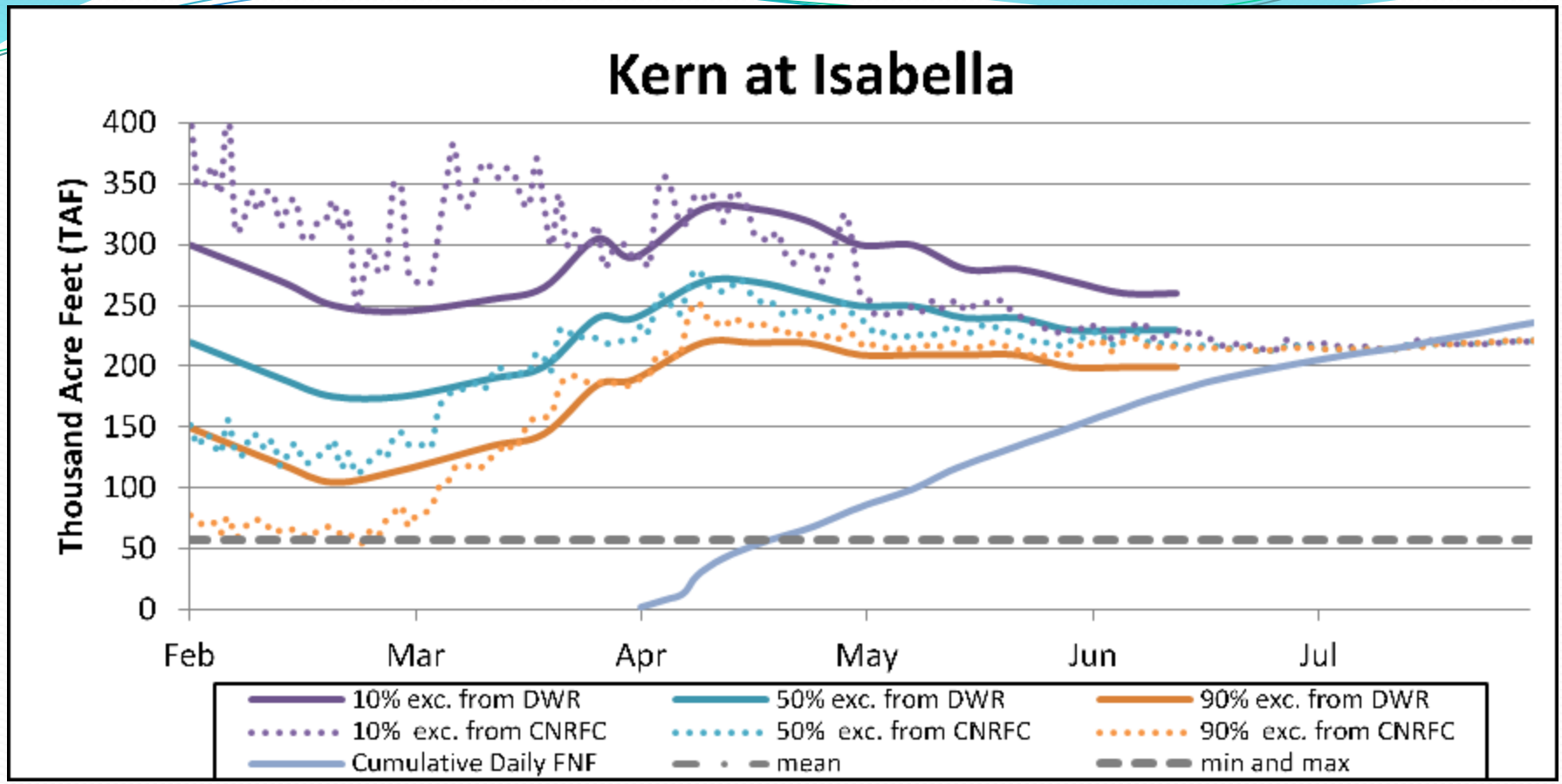
Kaweah River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	90	60	50	40	70	80	110	110	140	145	140	140	150	150	150	145	155	155
50% exc.	120	90	80	65	100	110	145	145	170	175	170	165	175	175	170	165	165	165
10% exc.	160	125	115	90	140	150	190	180	210	210	200	190	200	190	185	180	180	180

Observed = 170



Tule River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	11	5	3	6	9	12	16	14	18	21	21	22	21	21	21	22	23	23
50% exc.	18	12	10	12	18	22	27	23	28	30	29	28	26	25	24	24	24	24
10% exc.	30	22	20	19	26	30	36	30	36	38	37	35	32	30	28	27	27	27

Observed = 25



Kern River																		
Exceedance	**Feb 1**	**Feb 13**	**Feb 20**	**Mar 1**	**Mar 13**	**Mar 20**	**Mar 27**	**Apr 1**	**Apr 10**	**Apr 17**	**Apr 24**	**May 1**	**May 8**	**May 15**	**May 22**	**May 29**	**Jun 5**	**Jun 12**
90% exc.	150	120	105	115	135	145	185	190	220	220	220	210	210	210	210	200	200	200
50% exc.	220	190	175	175	190	200	240	240	270	270	260	250	250	240	240	230	230	230
10% exc.	300	270	250	245	255	265	305	290	330	330	320	300	300	280	280	270	260	260

Observed = 238

SACRAMENTO VALLEY WATER YEAR TYPE INDEX 40-30-30 (SVI)

Probability of Exceedance

Forecast Date	99%	90%	75%	50%	25%	10%
Dec 1, 2017	5.8	7.0	7.9	9.3	11.1	12.8
Jan 1, 2018	5.6	6.4	7.2	8.1	9.5	10.8
Feb 1, 2018	5.7	6.0	6.3	6.7	7.1	7.5
Mar 1, 2018	5.2	5.4	5.7	6.0	6.2	6.4
Apr 1, 2018	6.3	6.4	6.7	6.9	7.1	7.3
May 1, 2018	6.7	6.8	7.0	7.2	7.3	7.5

INDEX	7.10

SAN JOAQUIN VALLEY WATER YEAR TYPE INDEX 60-20-20 (SJI)

Probability of Exceedence

Forecast Date	99%	90%	75%	50%	25%	10%
Dec 1, 2017	1.8	2.2	2.8	3.4	4.3	5.2
Jan 1, 2018	1.6	1.9	2.3	2.8	3.5	4.3
Feb 1, 2018	2.0	2.1	2.3	2.4	2.6	2.8
Mar 1, 2018	1.6	1.7	1.8	2.0	2.1	2.3
Apr 1, 2018	2.4	2.6	2.7	2.9	3.1	3.2
May 1, 2018	2.7	2.9	3.0	3.1	3.3	3.4

INDEX	3.03

SACRAMENTO RIVER UNIMPAIRED RUNOFF - SACRAMENTO RIVER INDEX (SRR) (MAF)

Probability of Exceedance

Forecast Date	99%	90%	75%	50%	25%	10%
Dec 1, 2017	9.0	12.6	15.2	19.6	25.0	30.2
Jan 1, 2018	8.4	10.8	13.3	15.9	20.0	24.2
Feb 1, 2018	8.6	9.4	10.6	11.7	13.0	14.3
Mar 1, 2018	7.2	7.8	8.6	9.5	10.2	10.9
Apr 1, 2018	10.3	10.9	11.5	12.1	12.6	13.2
May 1, 2018	11.4	11.7	12.2	12.8	13.2	13.7

Water Year	12.70

Take Aways

- We feel we did relatively well with our B120 April-July forecasts this past water year
- Our regression equations were tricky with this type of flip-flop year, and at times misleading.
- The new dynamic funnels served us well this year.
- Our May WSI forecasts were as close as we could have hoped.

Questions?