DWR Forecast Discussion and Performance

A Definition of FORECASTING

A planning tool that helps management in its attempts to cope with the uncertainty of the future, relying mainly on data from the past and present and analysis of trends.

Forecasting starts with certain assumptions based on the management's experience, knowledge, and judgment. These estimates are projected into the coming months or years using one or more techniques such as exponential smoothing, moving averages, regression analysis, and trend projection.

Since any error in the assumptions will result in a similar or magnified error in forecasting, the technique of sensitivity analysis is used which assigns a range of values to the uncertain factors (variables).

Thoughts On Forecasting

- Forecasts tend to be WRONG!
- Forecasts can be biased!
- Forecasts tend to be better for near future
- So, Why Forecast?
  - Better to have “Educated Guess” about future than to not forecast at all!

2017 Funnel Containment

		2017	February 1		March 1		April 1		May 1	
		Observed	Funnel	Contain	Funnel	Contain	Funnel	Contain	Funnel	Contain
Total Inflow to Shasta Lake	90%		1500		1860		1870		2650	
	50%	2483	1960	C	2300	C	2220	C	2880	L
	10%		2960		3200		3020		3280	
Sacramento River above Bend Bridge	90%		2040		2620		2500		3730	
	50%	3550	2740	C	3250	C	3020	C	4030	L
	10%		4410		4680		4190		4560	
Feather River at Oroville	90%		1630		2230		2310		3370	
	50%	3056	2330	C	2830	C	2790	C	3640	L
	10%		3770		3980		3640		4050	
Yuba River at Smartville	90%		940		1280		1390		1920	
	50%	1712	1340	C	1640	C	1660	C	2060	L
	10%		2030		2210		2060		2210	
American River below Folsom	90%		1240		1910		2070		2540	
	50%	2302	1790	C	2360	C	2350	C	2710	L
	10%		2810		3190		3000		2910	
Cosumnes at Michigan Bar	90%		130		210		215		275	
	50%	234	200	C	270	C	260	C	310	L
	10%		380		420		380		360	
Mokelumne inflow to Pardee	90%		540		720		750		870	
	50%	870	680	C	840	C	830	C	930	C
	10%		980		1080		980		1000	
Stanislaus River below Goodwin	90%		810		1170		1210		1370	
	50%	1441	1040	C	2360	C	1340	C	1490	C
	10%		1500		1790		1620		1660	
Tuolumne River below La Grange	90%		1430		2020		2040		2230	
	50%	2454	1820	C	2280	C	2210	C	2400	C
	10%		2610		2900		2600		2660	
Merced River below Merced Falls	90%		790		1090		1060		1140	
	50%	1233	970	C	1230	C	1160	C	1240	C
	10%		1480		1580		1400		1380	
San Joaquin River inflow to Millerton Lake	90%		1690		2180		2110		2250	
	50%	2641	2050	C	2460	C	2300	H	2440	C
	10%		2870		3050		2640		2710	
Kings River below Pine Flat	90%		1570		2090		2070		2180	
	50%	2688	1970	C	2370	C	2230	H	2330	H
	10%		2770		2960		2530		2530	
Kaweah River below Terminus	90%		370		490		470		500	
	50%	552	470	C	550	C	530	C	550	C
	10%		710		750		660		620	
Tule River below Lake Success	90%		94		125		115		130	
	50%	100	120	C	145	L	135	L	145	L
	10%		210		220		185		175	
Kern River inflow to Lake Isabella	90%		780		1120		1010		1030	
	50%	1162	930	C	1230	C	1100	C	1110	C
	10%		1410		1530		1240		1230	
		H TOTAL		0		0		2		1
		L TOTAL		0		1		1		7

2016 Funnel Containment

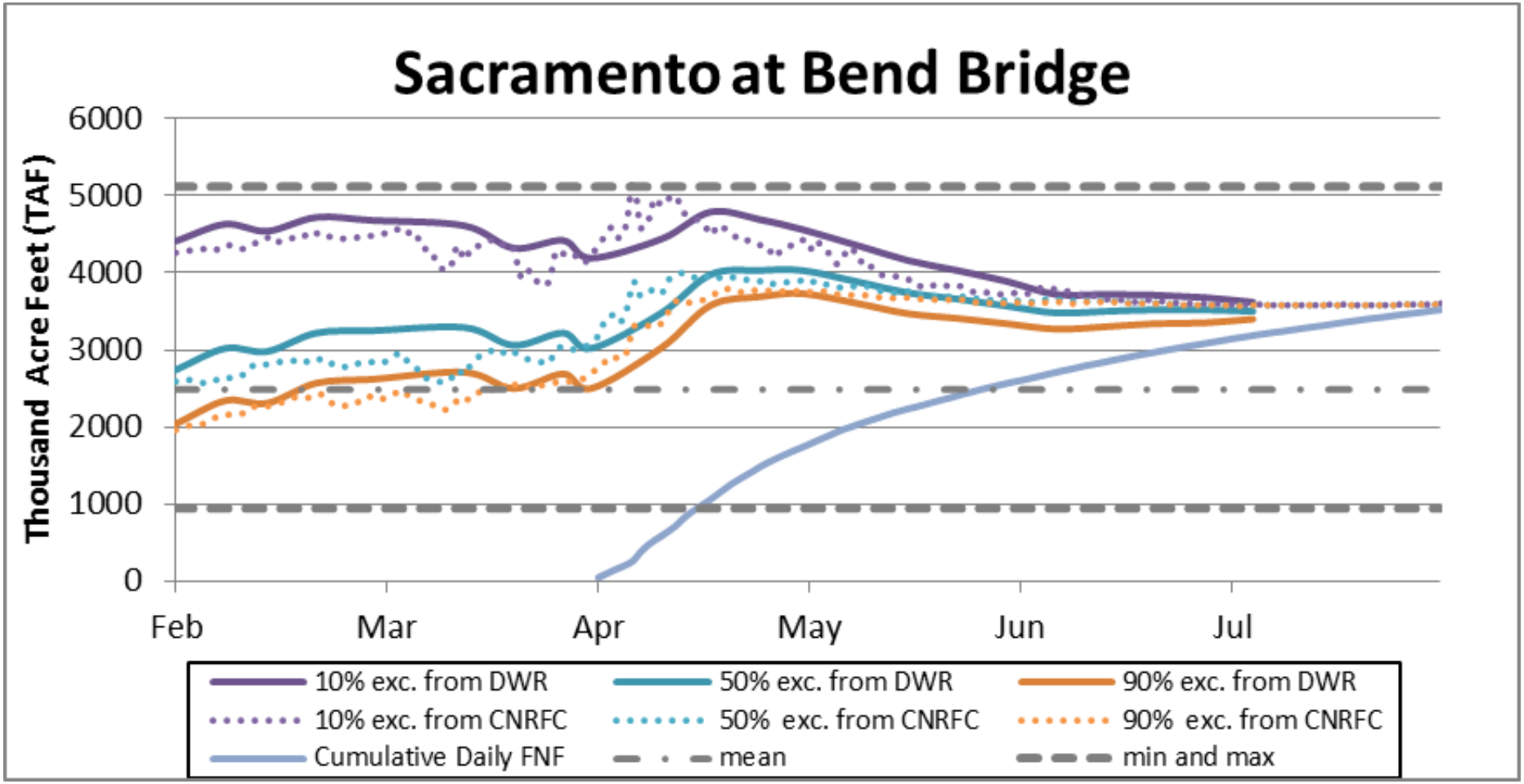
		2016	February 1		March 1		April 1		May 1	
		Observed	Funnel	Contain	Funnel	Contain	Funnel	Contain	Funnel	Contain
Total Inflow to Shasta Lake	90%		1220		1050		1340		1340	
	50%	1214	1680	L	1470	C	1680	L	1570	L
	10%		2680		2370		2480		1970	
Sacramento River above Bend Bridge	90%		1580		1410		1830		1850	
	50%	1739	2280	C	2040	C	2360	L	2150	L
	10%		3950		3470		3530		2680	
Feather River at Oroville	90%		990		770		1160		1200	
	50%	1137	1690	C	1370	C	1540	L	1470	L
	10%		3130		2520		2390		1880	
Yuba River at Smartville	90%		580		390		620		730	
	50%	768	980	C	750	C	890	C	870	C
	10%		1670		1320		1290		1020	
American River below Folsom	90%		750		560		900		980	
	50%	913	1300	C	1010	C	1180	C	1150	L
	10%		2320		1840		1830		1350	
Cosumnes at Michigan Bar	90%		65		40		65		60	
	50%	67	135	C	100	C	110	C	95	C
	10%		280		250		230		145	
Mokelumne inflow to Pardee	90%		360		290		380		410	
	50%	370	540	C	420	C	460	L	450	L
	10%		830		660		610		500	
Stanislaus River below Goodwin	90%		510		470		560		580	
	50%	568	770	C	640	C	680	C	670	L
	10%		1230		1030		930		770	
Tuolumne River below La Grange	90%		900		820		970		1040	
	50%	1020	1360	C	1090	C	1140	C	1140	L
	10%		2120		1710		1530		1310	
Merced River below Merced Falls	90%		440		360		420		470	
	50%	506	620	C	500	C	520	C	530	C
	10%		1130		850		760		640	
San Joaquin River inflow to Millerton Lake	90%		790		670		740		790	
	50%	893	1170	C	950	C	930	C	940	C
	10%		1990		1540		1270		1110	
Kings River below Pine Flat	90%		700		640		730		760	
	50%	880	1070	C	920	C	890	C	860	C
	10%		1900		1510		1190		980	
Kaweah River below Terminus	90%		150		150		157		175	
	50%	191	250	C	220	C	210	C	210	C
	10%		490		400		330		270	
Tule River below Lake Success	90%		22		22		19		25	
	50%	23	48	C	42	C	33	C	32	L
	10%		115		110		80		54	
Kern River inflow to Lake Isabella	90%		200		190		190		190	
	50%	220	350	C	300	C	260	C	230	C
	10%		830		600		380		300	
		H TOTAL		0		0		0		0
		L TOTAL		1		0		4		8

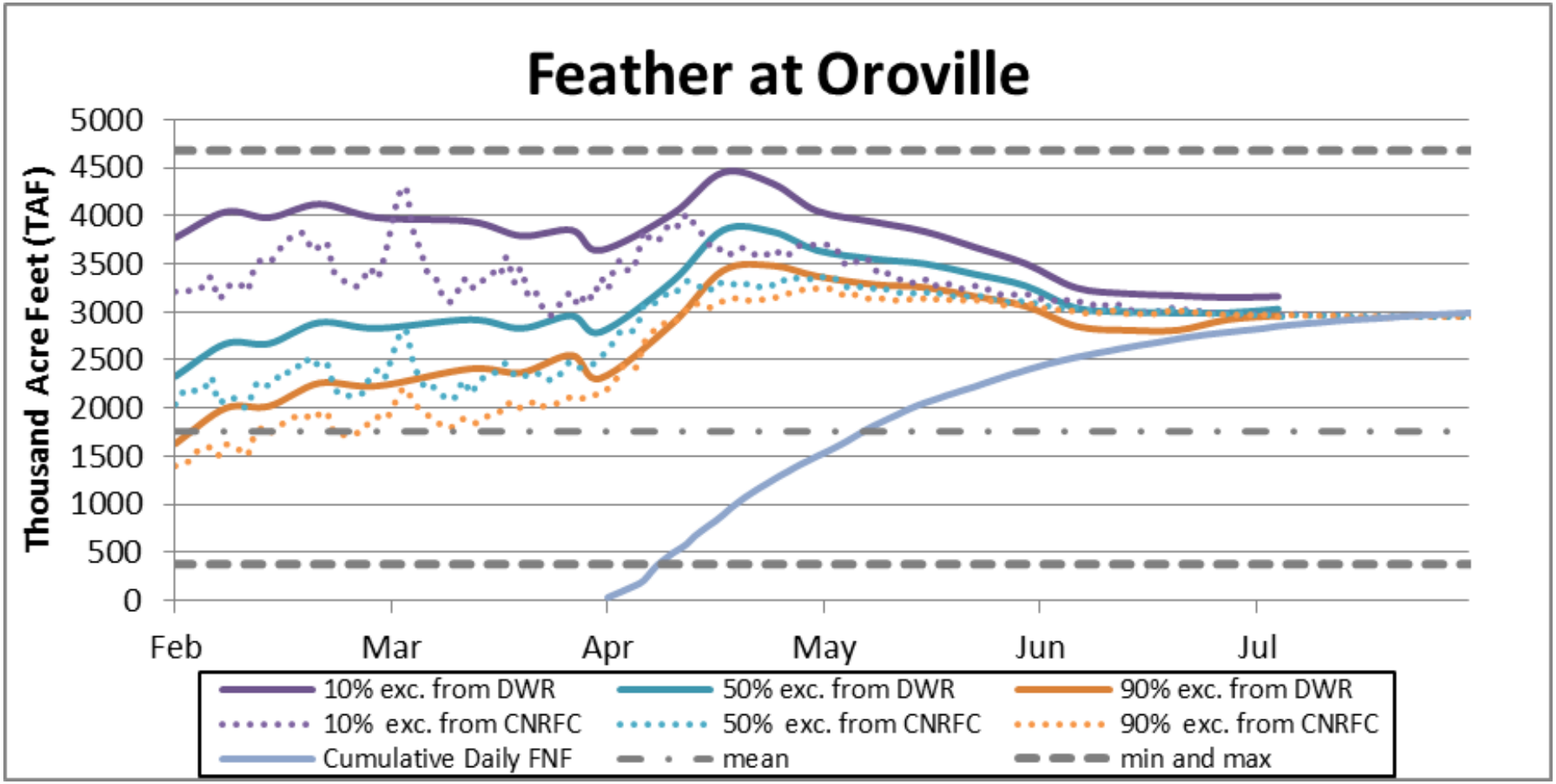
2015 Funnel Containment

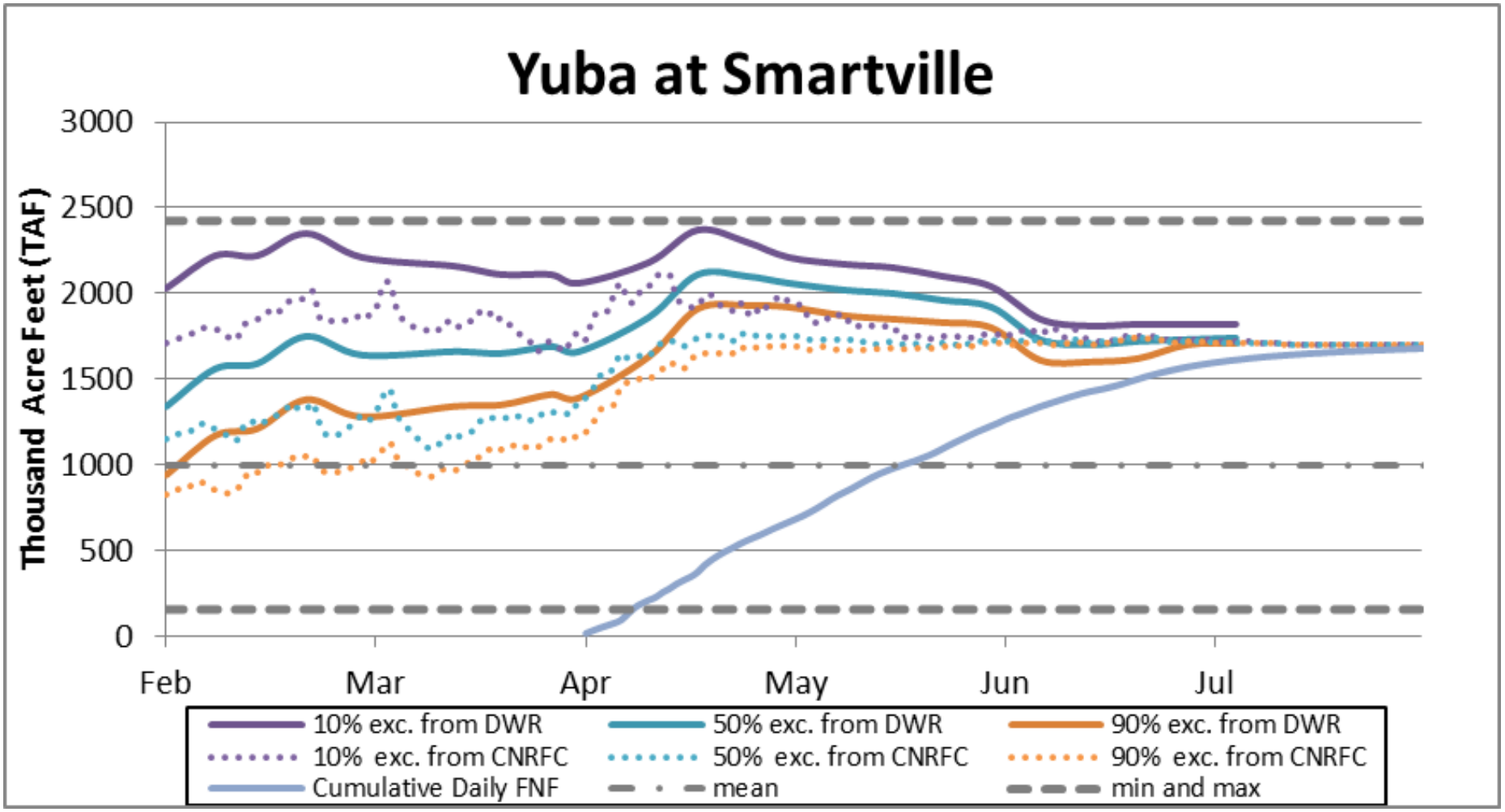
		2015	February 1		March 1		April 1		May 1	
		Observed	Funnel	Contain	Funnel	Contain	Funnel	Contain	Funnel	Contain
Total Inflow to Shasta Lake	90%		690		670		600		600	
	50%	711	1150	C	1050	C	860	C	710	C
	10%		2150		1850		1490		860	
Sacramento River above Bend Bridge	90%		890		870		800		800	
	50%	1056	1550	C	1450	C	1190	C	970	C
	10%		3220		2680		1800		1140	
Feather River at Oroville	90%		380		350		320		270	
	50%	378	860	L	680	C	460	C	340	C
	10%		2300		1720		1110		500	
Yuba River at Smartville	90%		190		160		145		140	
	50%	151	510	L	360	L	220	C	165	C
	10%		1200		910		550		230	
American River below Folsom	90%		190		190		165		145	
	50%	189	540	L	380	L	210	C	175	C
	10%		1560		1080		650		250	
Cosumnes at Michigan Bar	90%		6		6		7		7	
	50%	13	45	C	35	C	18	C	10	C
	10%		225		125		75		20	
Mokelumne inflow to Pardee	90%		85		80		65		60	
	50%	75	230	L	170	L	95	C	75	C
	10%		530		380		220		100	
Stanislaus River below Goodwin	90%		100		95		75		70	
	50%	133	350	C	260	C	160	C	95	C
	10%		810		590		370		160	
Tuolumne River below La Grange	90%		270		250		175		190	
	50%	308	640	C	460	C	260	C	240	H
	10%		1430		950		490		300	
Merced River below Merced Falls	90%		105		95		65		65	
	50%	105	270	L	155	C	90	C	85	C
	10%		780		480		270		140	
San Joaquin River inflow to Millerton Lake	90%		270		220		135		105	
	50%	193	550	L	320	L	170	C	130	C
	10%		1370		850		420		210	
Kings River below Pine Flat	90%		260		220		140		110	
	50%	208	540	L	310	L	175	C	135	C
	10%		1340		860		400		210	
Kaweah River below Terminus	90%		58		52		35		30	
	50%	42	130	L	90	L	50	C	38	C
	10%		370		200		110		55	
Tule River below Lake Success	90%		2		2		1		1	
	50%	1	9	L	6	L	4	C	2	C
	10%		99		53		26		11	
Kern River inflow to Lake Isabella	90%		80		70		45		35	
	50%	57	155	L	105	L	65	C	45	C
	10%		640		365		170		90	
		H TOTAL		0		0		0		1
		L TOTAL		10		8		0		0

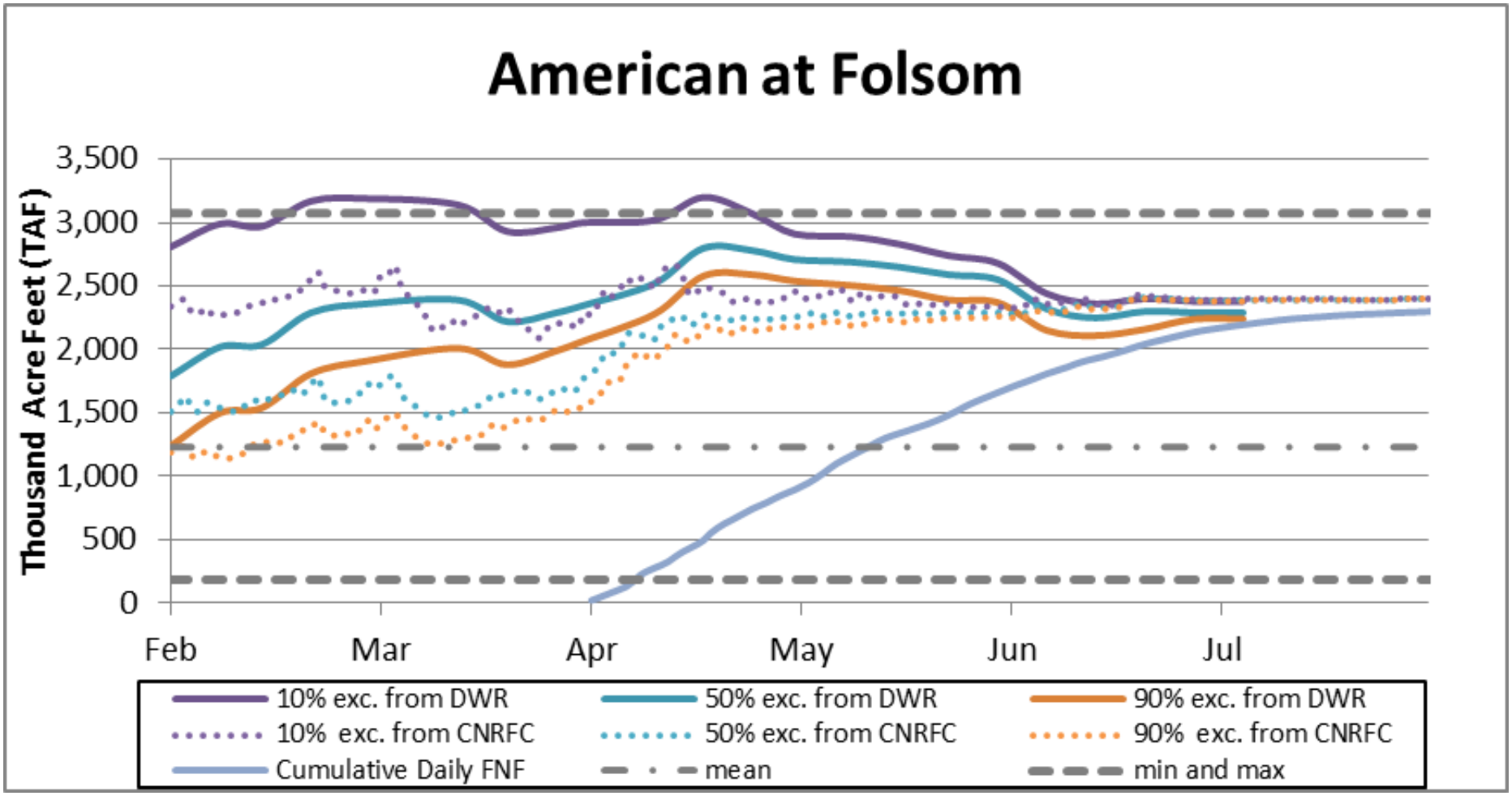
Talk About Variability!!

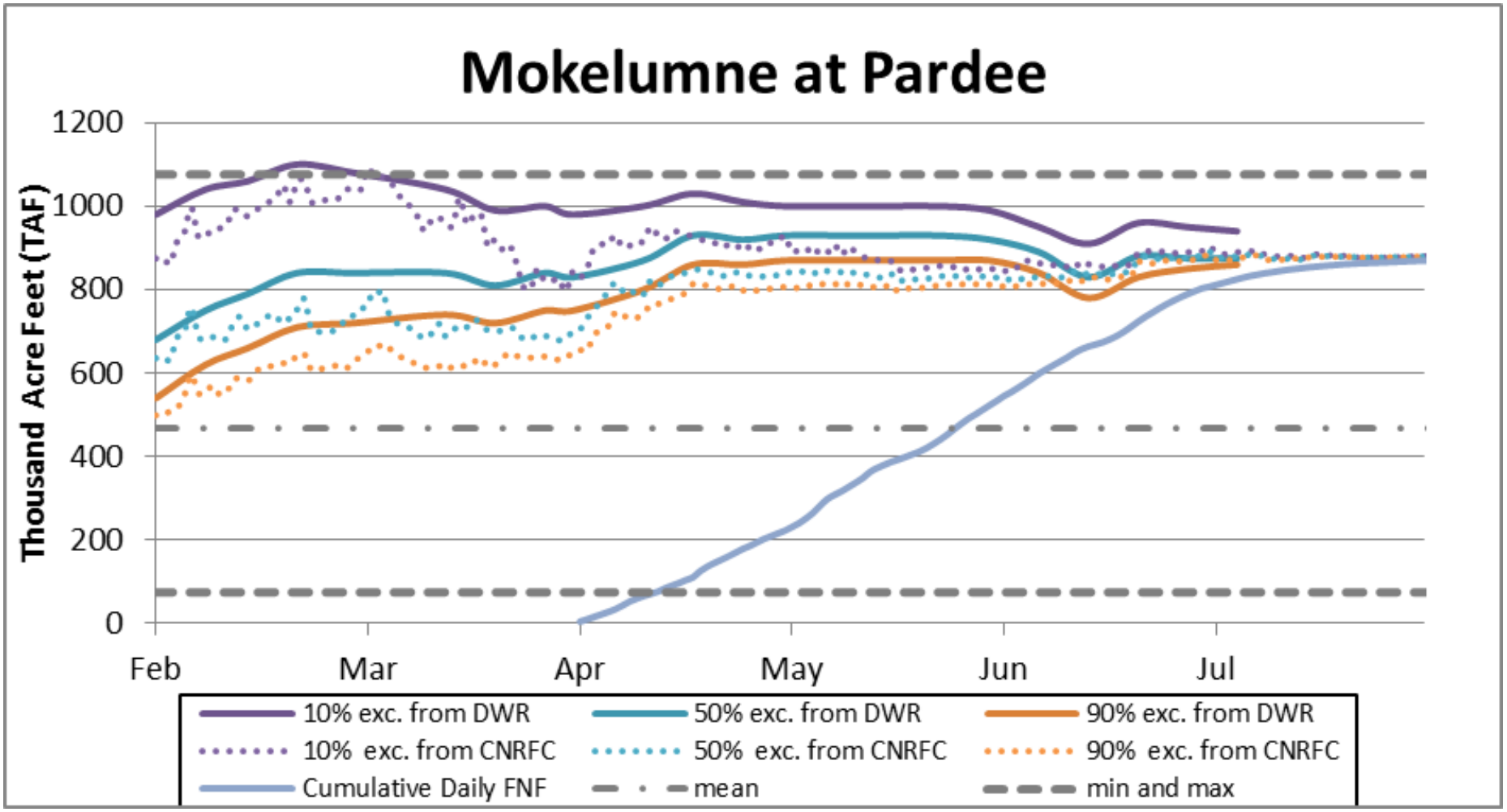
Basin	2015	2016	2017	2017 vs. 2015
Shasta total	711	1214	2483	3.5
Sacramento above Bend	1056	1739	3550	3.4
Feather at Oroville	378	1137	3056	8.1
Yuba at Smartville	151	768	1712	11.4
American at Folsom	189	913	2302	12.2
Cosumnes at Mich. Bar	13	67	234	17.5
Mokelumne at Pardee	75	370	870	11.6
Stanislaus at Melones	133	568	1441	10.8
Tuolumne at Don Pedro	308	1020	2454	8.0
Merced at Exchequer	105	506	1233	11.8
San Joaquin at Friant	193	893	2641	13.7
Kings at Pine Flat	208	880	2688	13.0
Kaweah at Terminous	42	191	552	13.1
Tule at Success	1	23	100	70.8
Kern at Isabella	57	220	1162	20.4

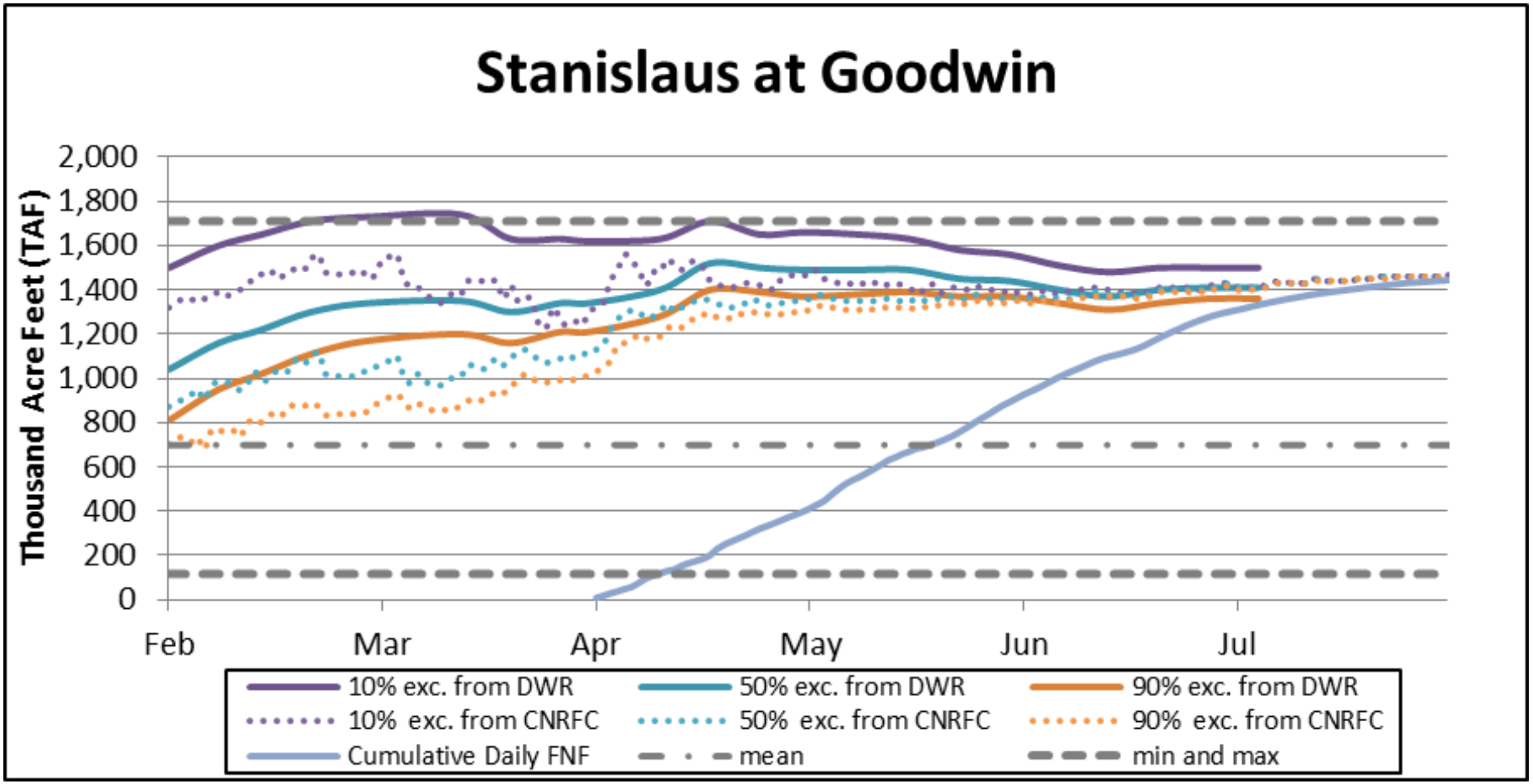

Sacramento at Bend Bridge
Thousand Acre Feet (TAF)
6000
5000
4000
3000
2000
1000
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max

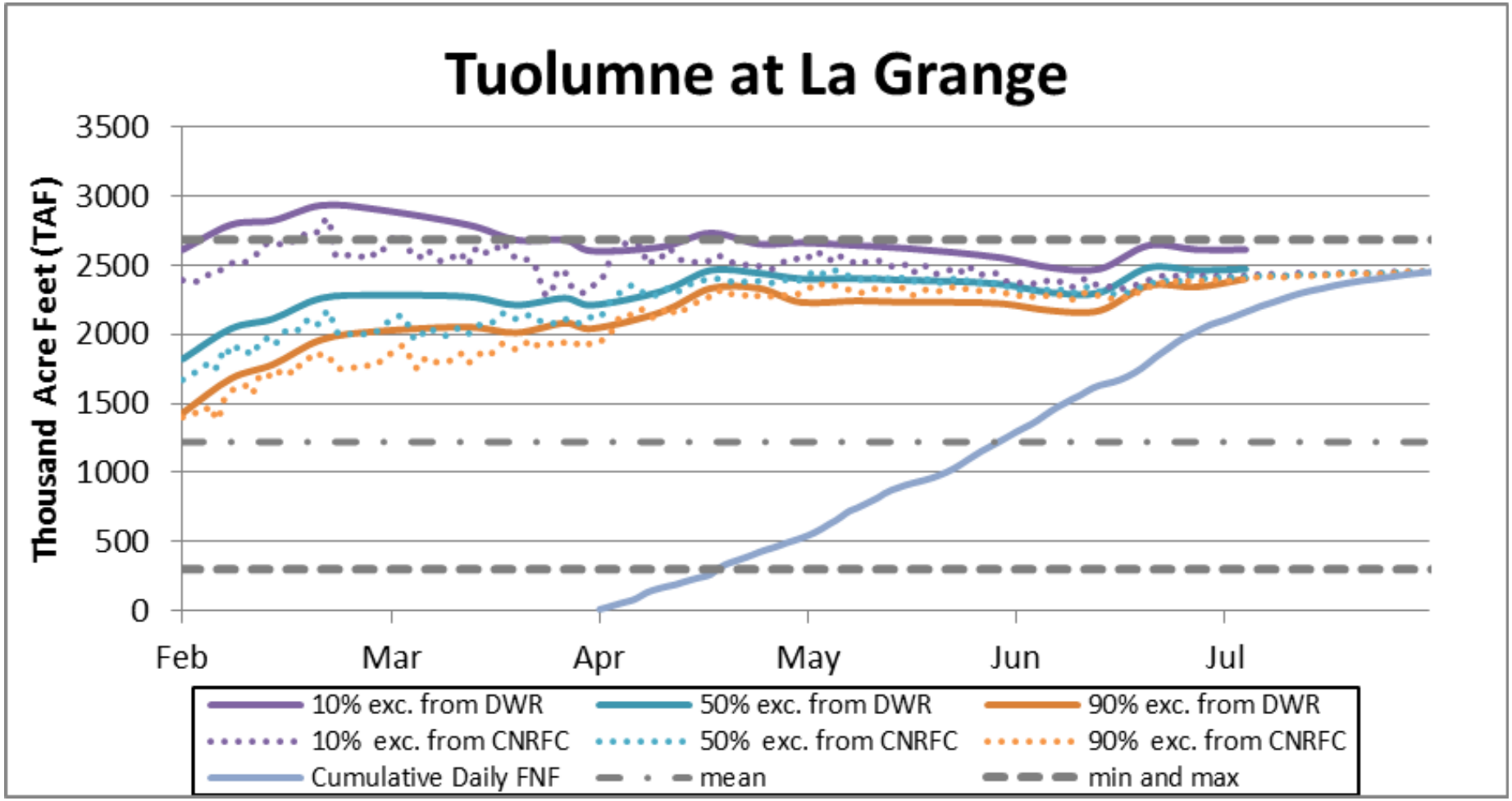

Feather at Oroville
Thousand Acre Feet (TAF)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max

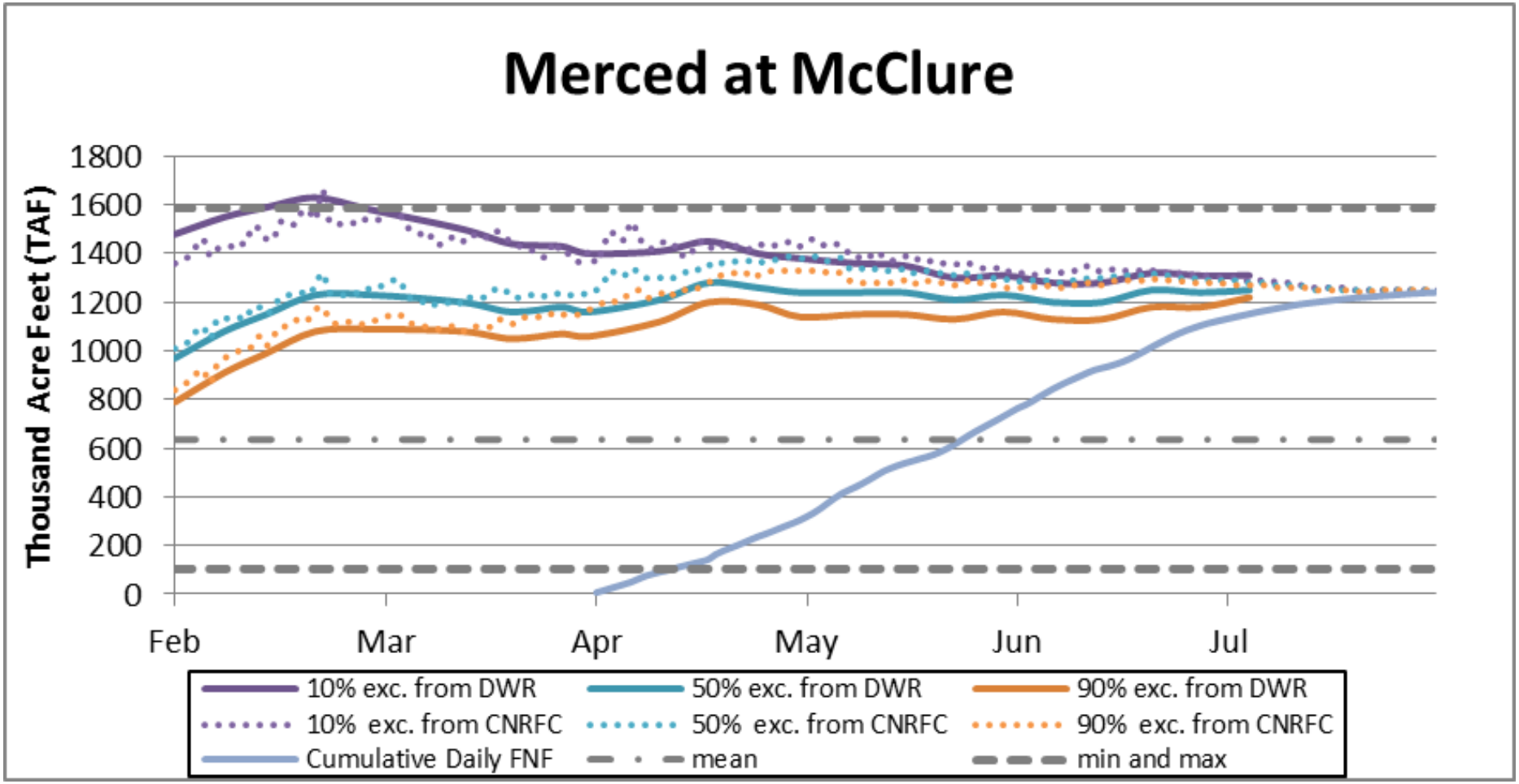

Yuba at Smartville
Thousand Acre Feet (TAF)
3000
2500
2000
1500
1000
500
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max

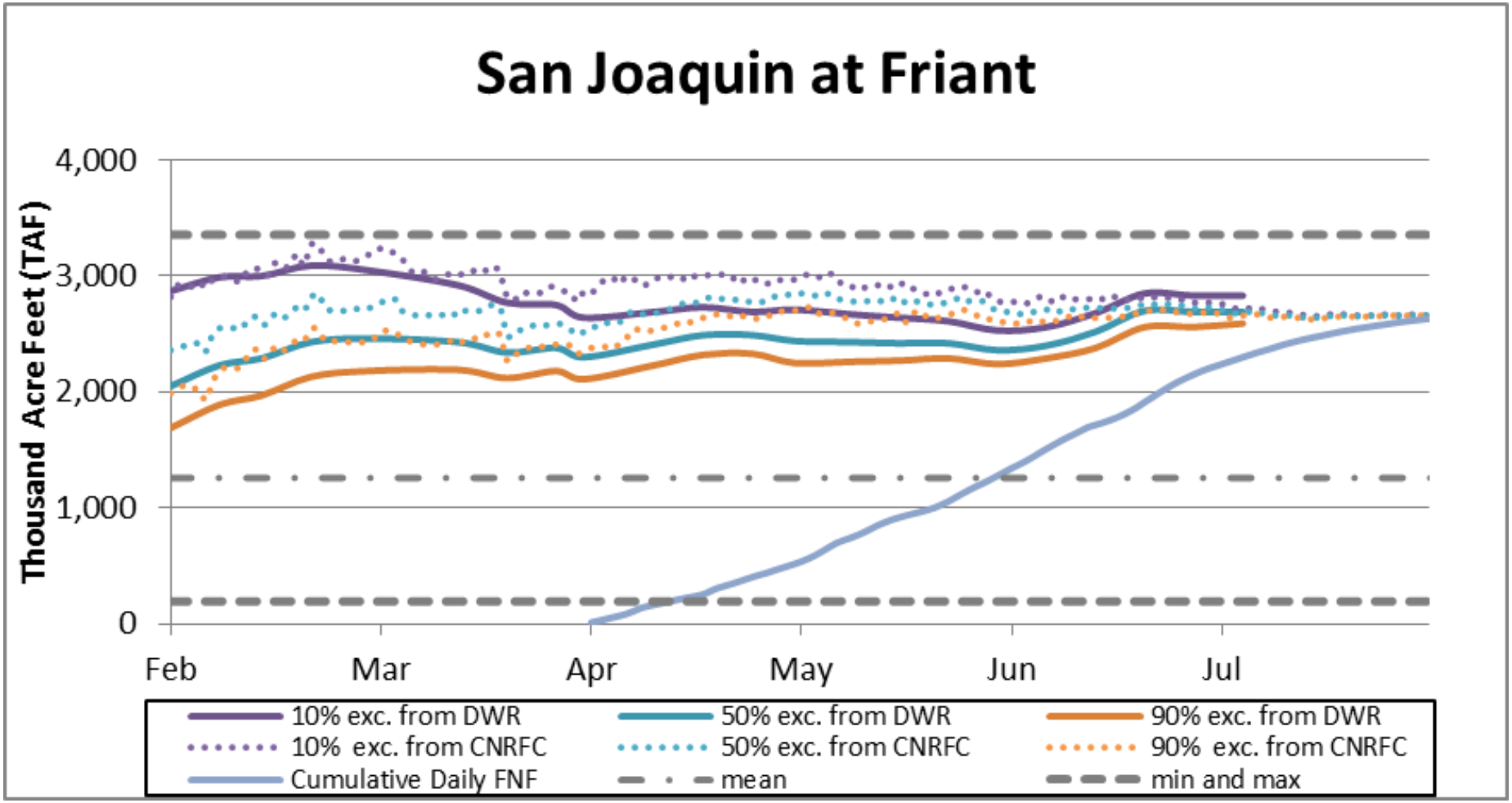

American at Folsom
Thousand Acre Feet (TAF)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max

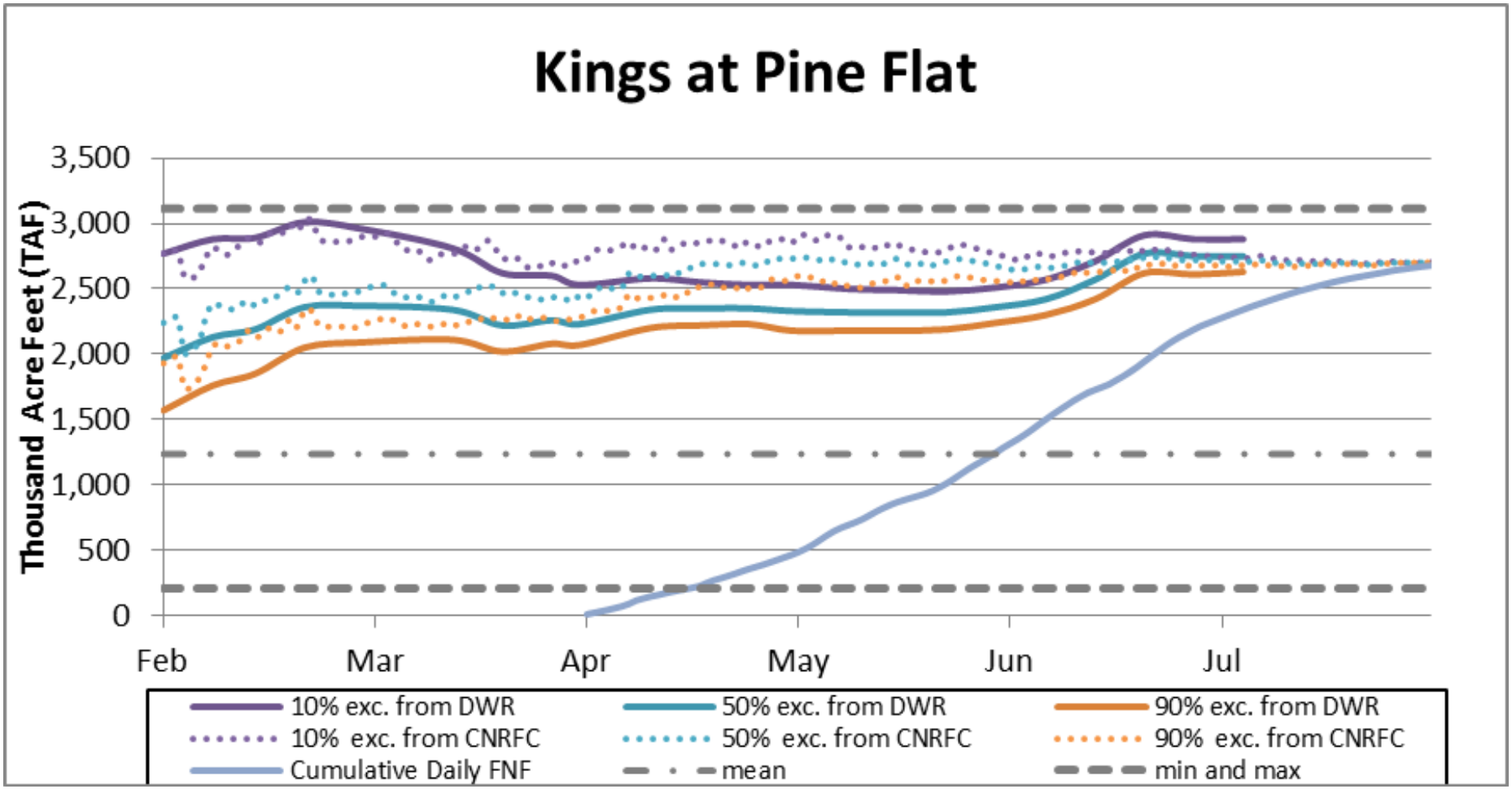

Mokelumne at Pardee
Thousand Acre Feet (TAF)
1200
1000
800
600
400
200
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max

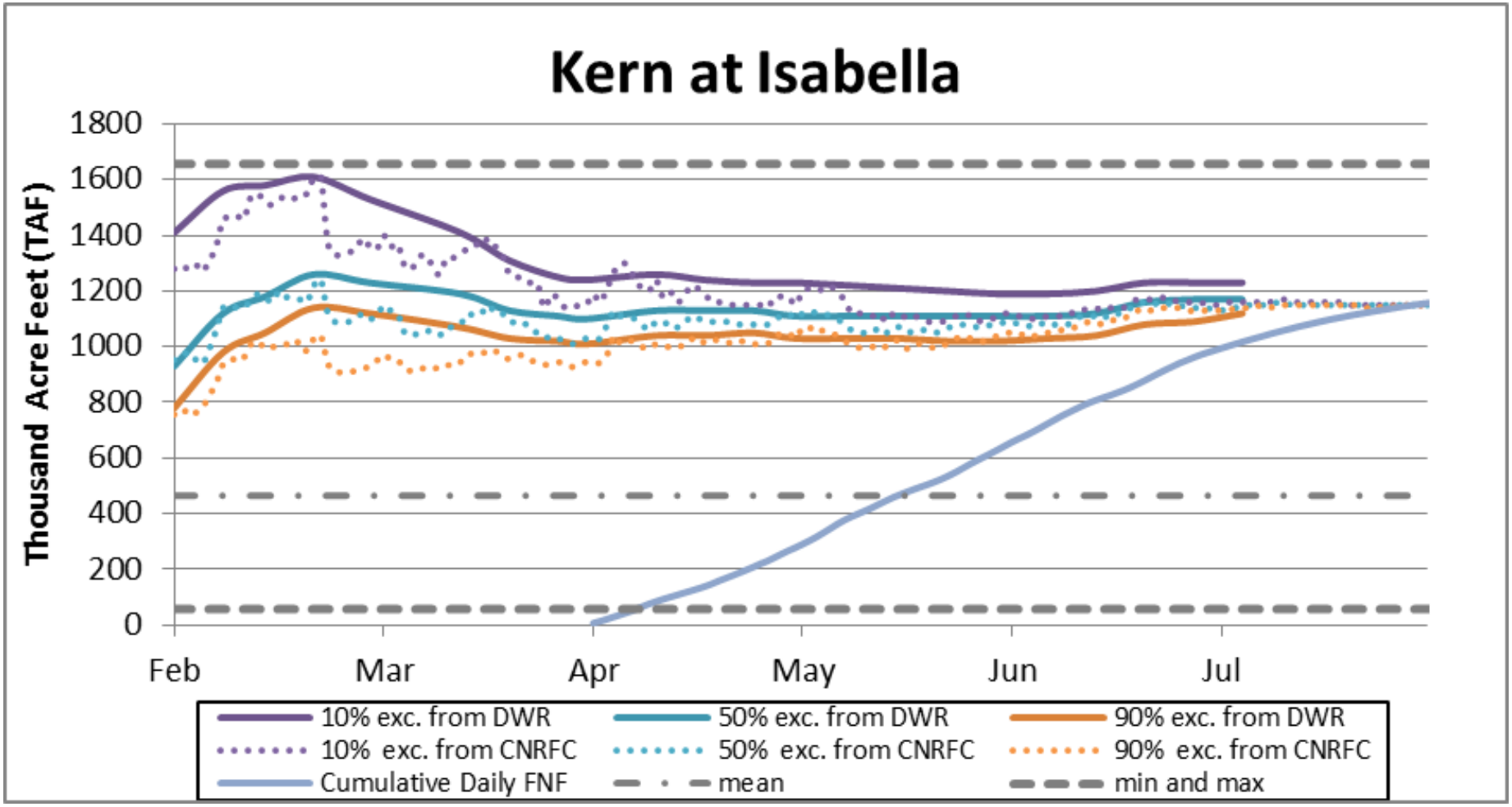

Stanislaus at Goodwin
Thousand Acre Feet (TAF)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max


Tuolumne at La Grange
Thousand Acre Feet (TAF)
3500
3000
2500
2000
1500
1000
500
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max


Merced at McClure
Thousand Acre Feet (TAF)
1800
1600
1400
1200
1000
800
600
400
200
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max


San Joaquin at Friant
Thousand Acre Feet (TAF)
4,000
3,000
2,000
1,000
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max


Kings at Pine Flat
Thousand Acre Feet (TAF)
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max


Kern at Isabella
Thousand Acre Feet (TAF)
1800
1600
1400
1200
1000
800
600
400
200
0
Feb
Mar
Apr
May
Jun
Jul
10% exc. from DWR
50% exc. from DWR
90% exc. from DWR
10% exc. from CNRFC
50% exc. from CNRFC
90% exc. from CNRFC
Cumulative Daily FNF
mean
min and max