

RECLAMATION

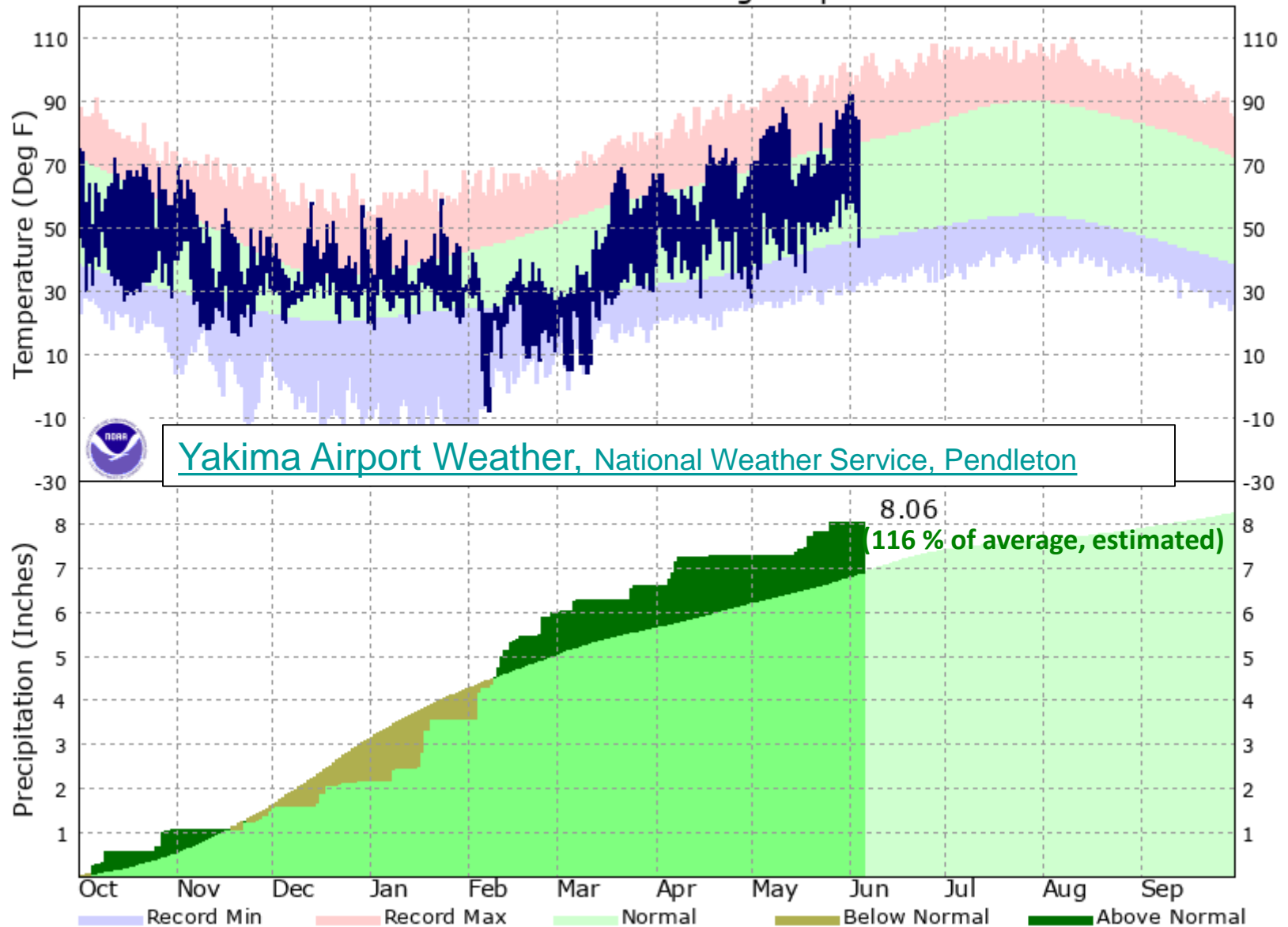
Managing Water in the West

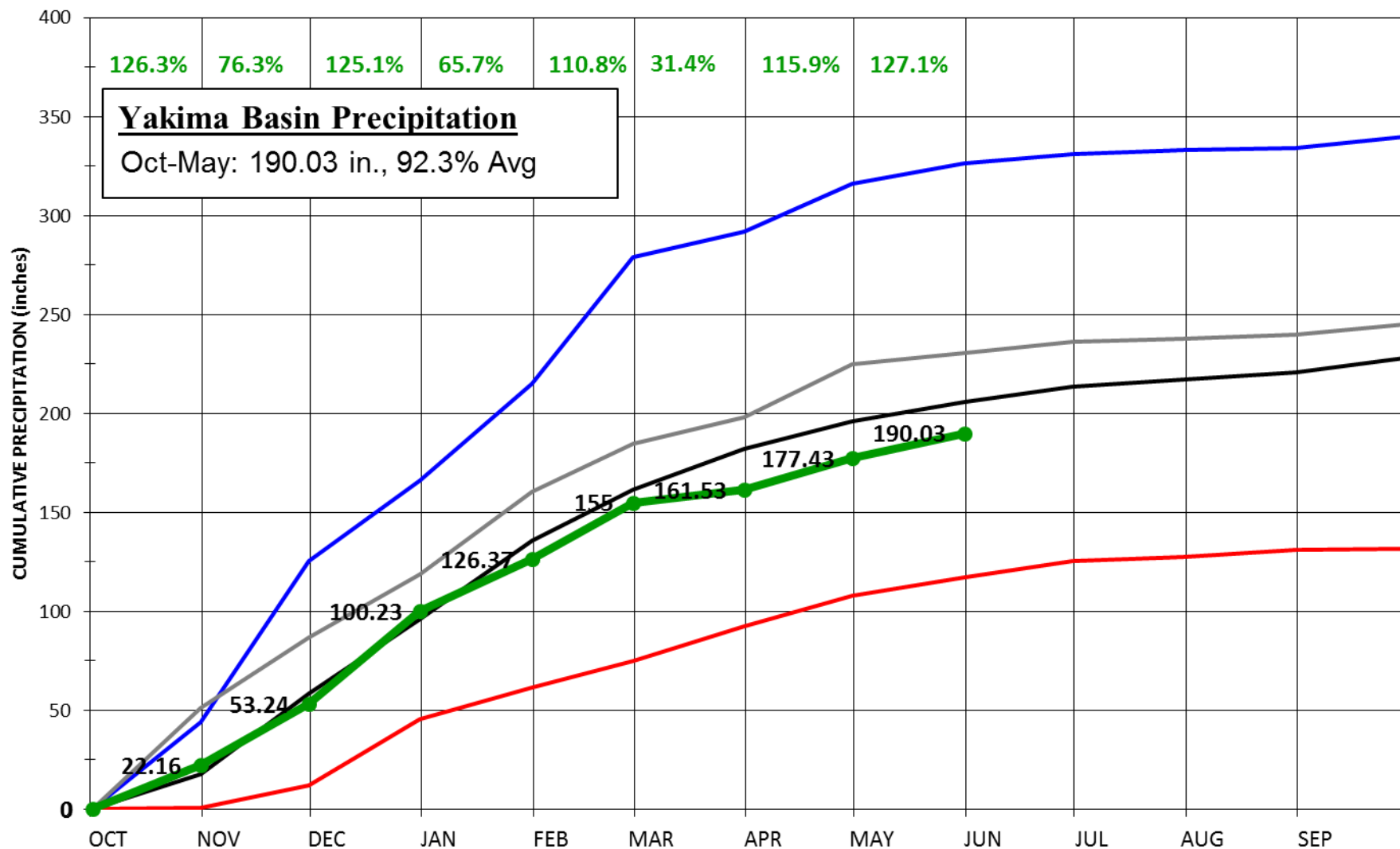
Yakima Basin WY 2019 TWSA & River Operations Meeting, June 6, 2019



U.S. Department of the Interior
Bureau of Reclamation

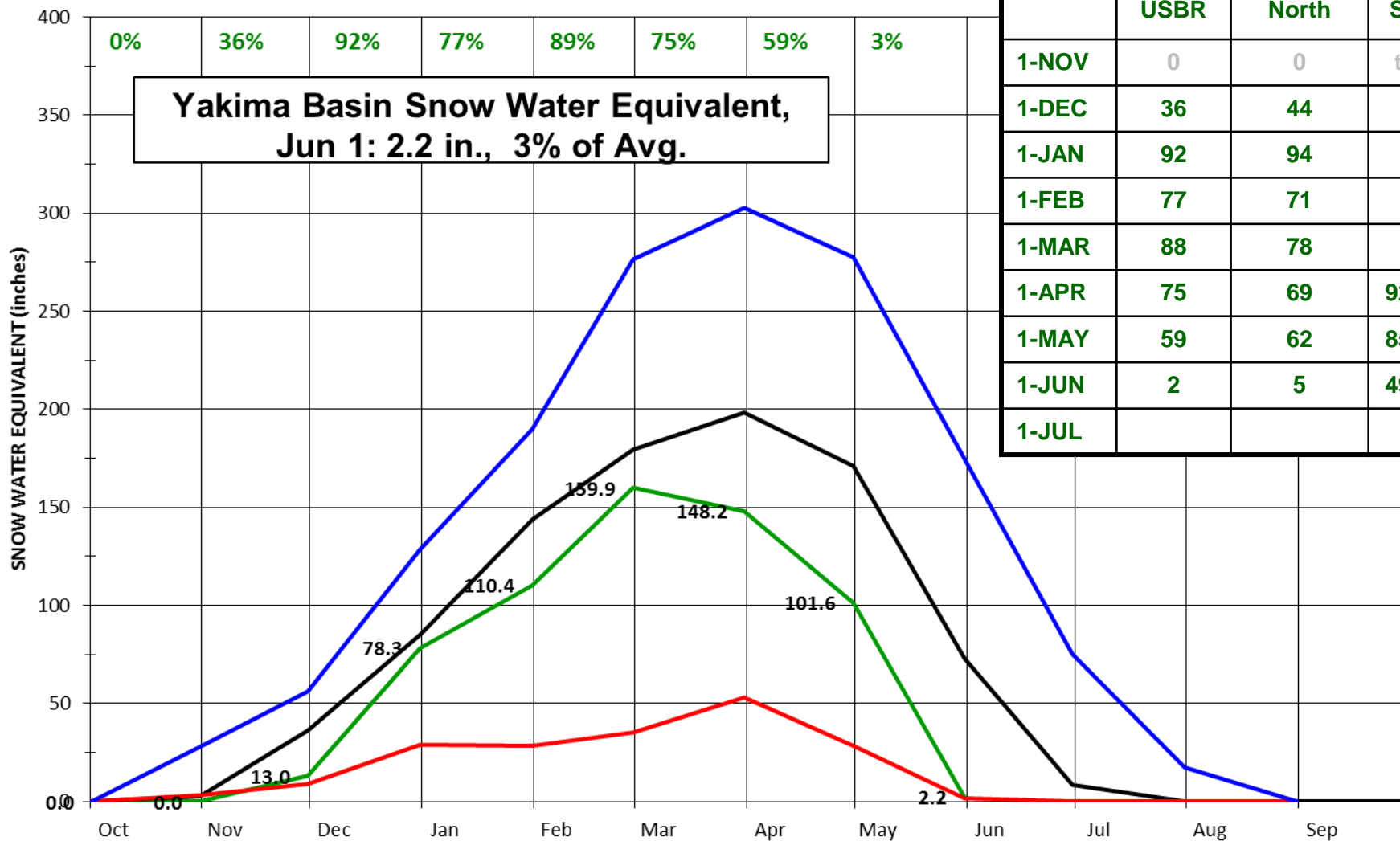
KYKM - Oct 2018 Through Sep 2019





YAKIMA BASIN
Combined Cumulative Precipitation
5 Reservoir Sites
WATER YEARS 1981-2010

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
YAKIMA FIELD OFFICE
1917 MARSH ROAD
YAKIMA, WA 98901



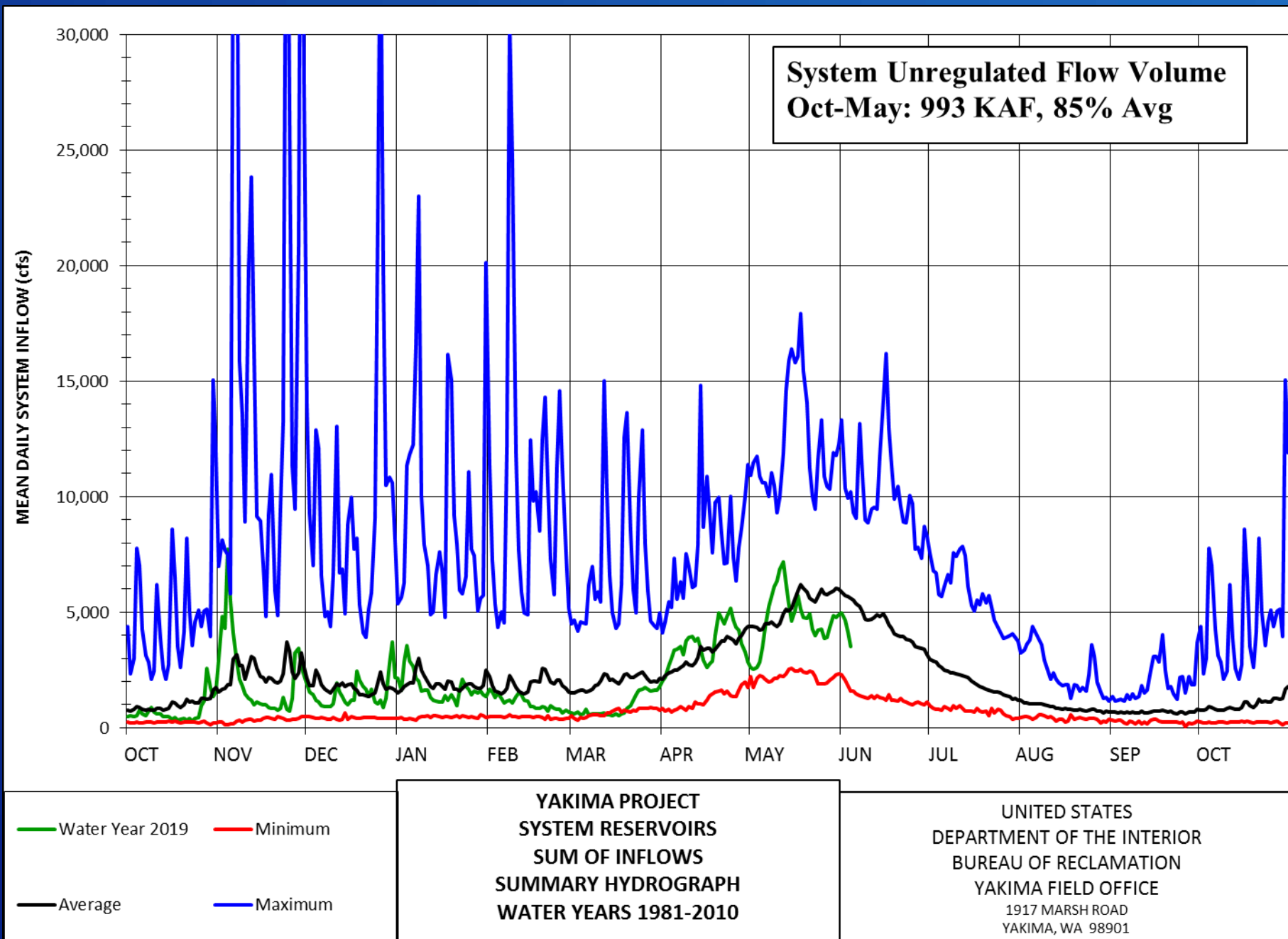
NRCS SWE % AVG			
	USBR	North	South
1-NOV	0	0	trace
1-DEC	36	44	45
1-JAN	92	94	94
1-FEB	77	71	85
1-MAR	88	78	97
1-APR	75	69	92 (79)
1-MAY	59	62	85 (79)
1-JUN	2	5	49 (51)
1-JUL			

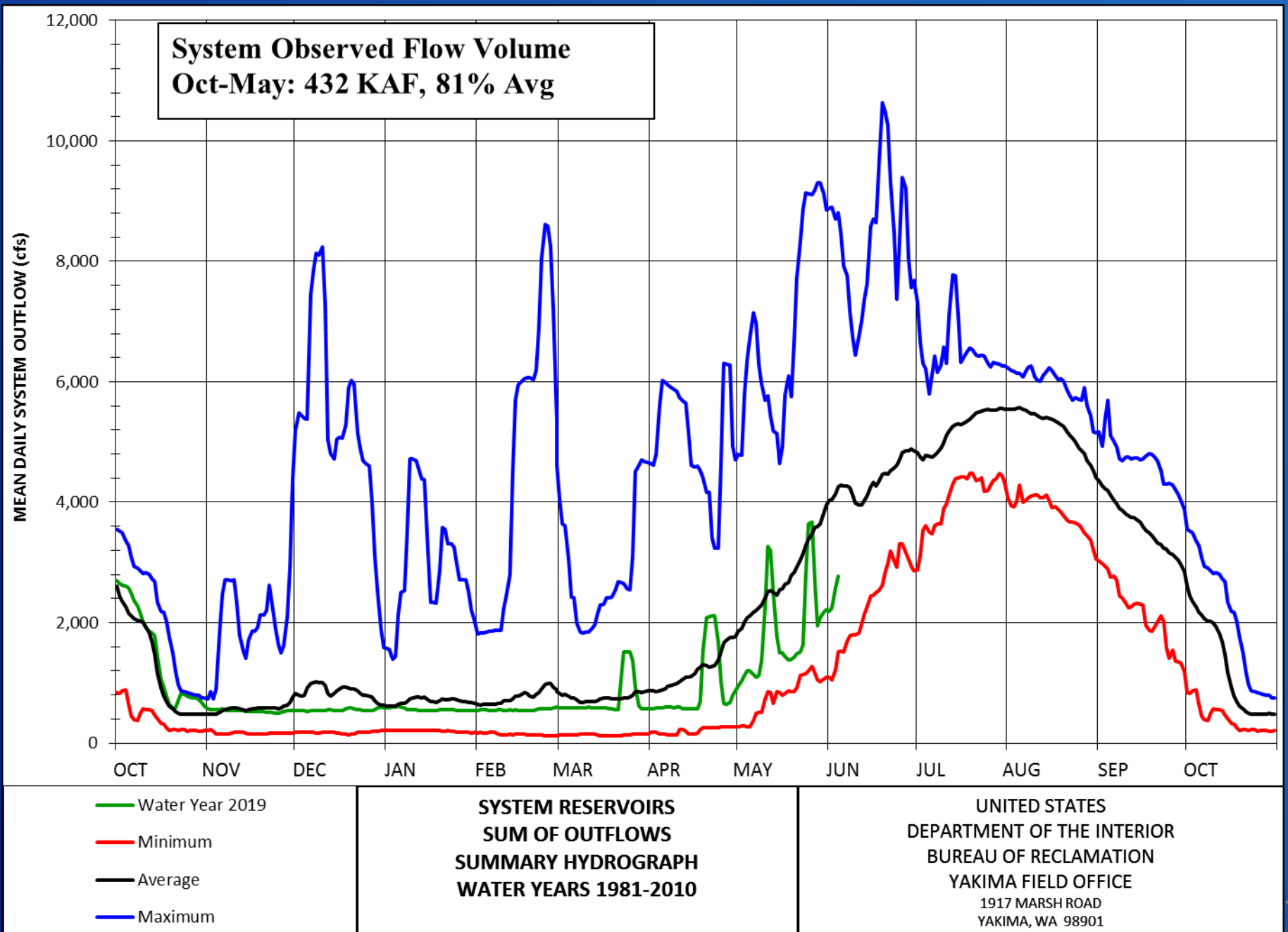
— Water Year 2019
— Average
— Low Year (2005)
— High Year (1999)

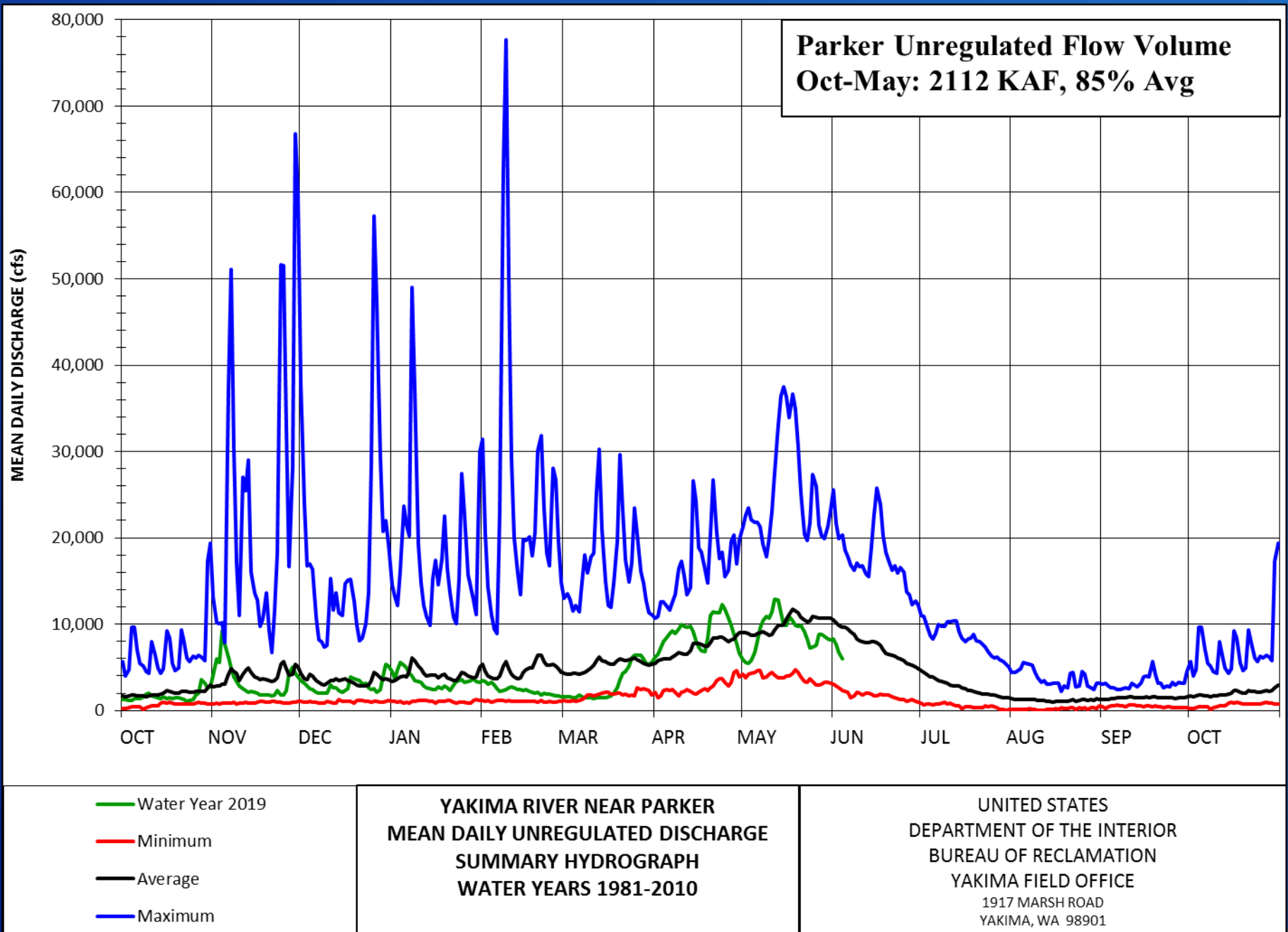
YAKIMA BASIN WATER YEAR SNOW WATER EQUIVALENT

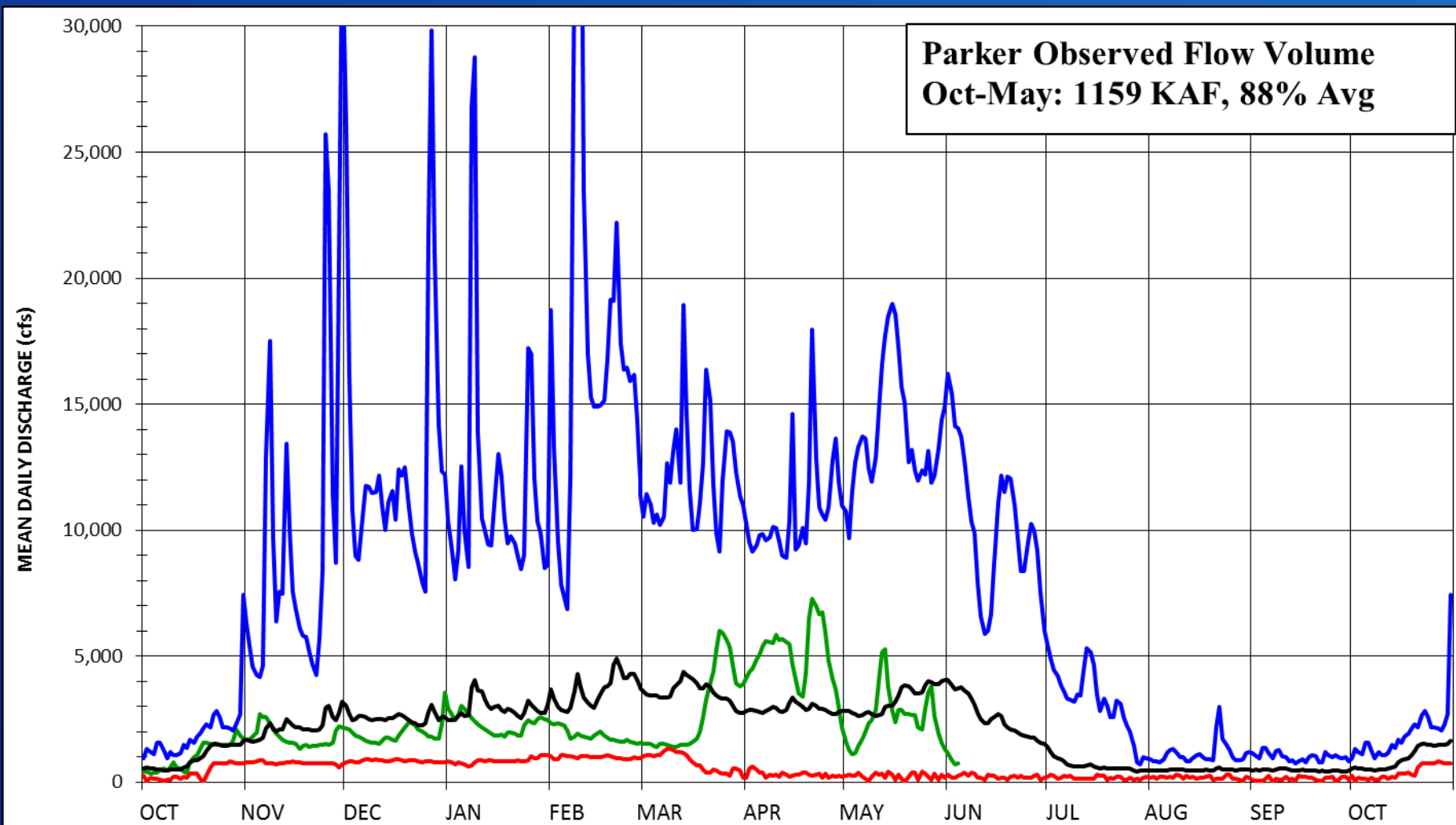
Average based on greater of 1971-2000 or POR-1995
 Totals derived from 7 Yakima forecast sites
 Corral, Stampede, Olallie, Fish, Bumping, Domerie, & Tunnel Avenue

UNITED STATES
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 1917 MARSH ROAD
 YAKIMA, WA 98901







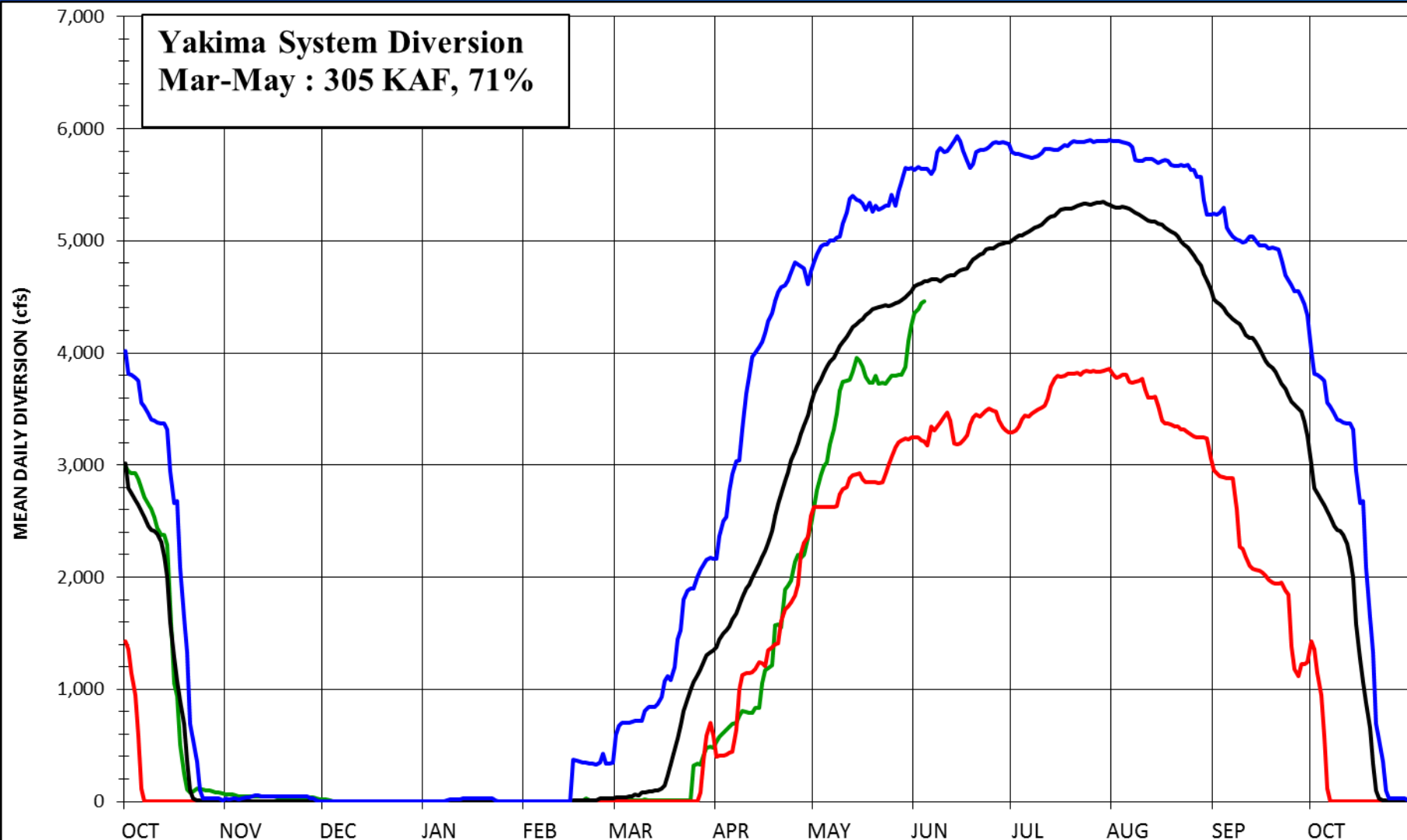


— Water Year 2019
— Minimum
— Average
— Maximum

**YAKIMA RIVER NEAR PARKER
MEAN DAILY REGULATED DISCHARGE
SUMMARY HYDROGRAPH
WATER YEARS 1981-2010**

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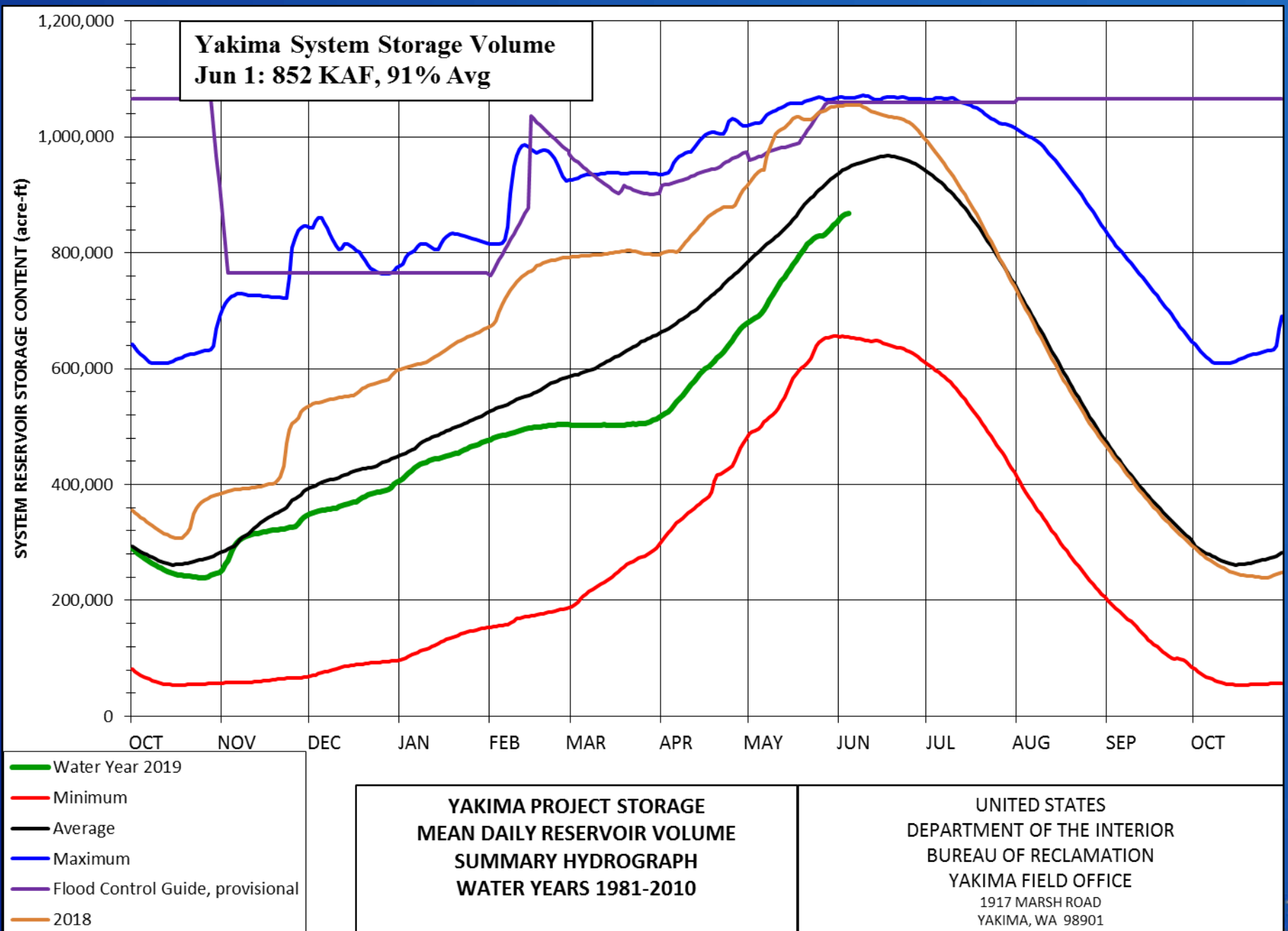
Yakima System Diversion
Mar-May : 305 KAF, 71%



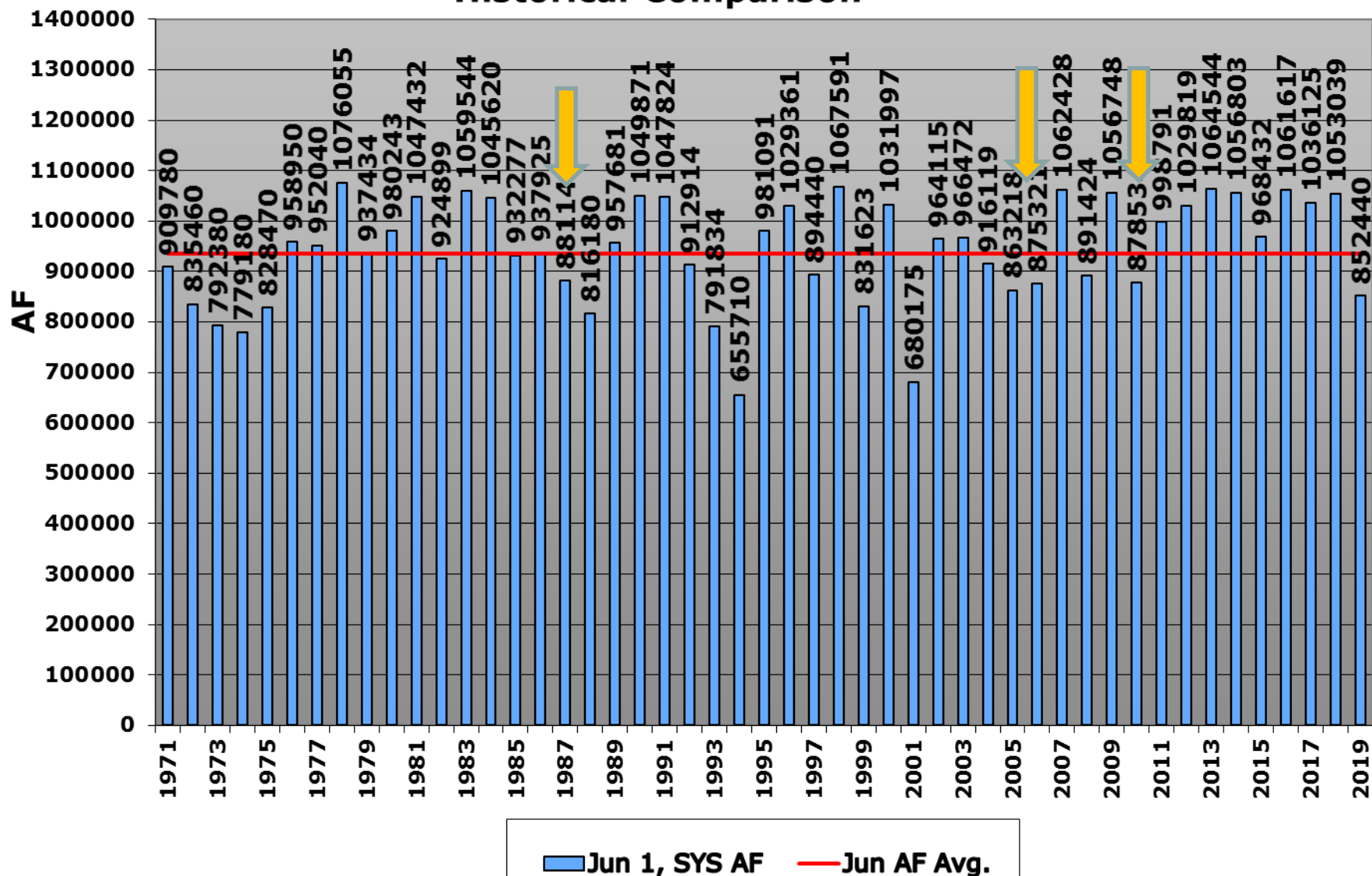
— Water Year 2019 — Minimum
 — Average — Maximum

5 MAJOR IRRIGATION DIVERSIONS
YAKIMA R. ABOVE PARKER
SUMMARY HYDROGRAPH
WATER YEARS 1981-2010

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Yakima Basin Storage Historical Comparison



Climate Prediction Center

<u>Period</u>	<u>Temperature</u>	<u>Precipitation</u>
6-10 day (Jun 11-15)	Above Normal	Below Normal
8-14 day (Jun 13-19)	Above Normal	Below Normal

Seasonal Outlook

Sumer (May 16)	Above Normal	Equal Chance
Fall (May 16)	Above Normal	Equal Chance
Winter (May 16)	Above Normal	Equal Chance

“The majority of models predict El Niño to continue through 2019. However, model predictions made during the spring tend to be less accurate relative to the rest of the year, so uncertainty remains whether this outcome will occur. (9 May 2019)

<http://www.cpc.ncep.noaa.gov/products/predictions/610day/>

<http://www.cpc.ncep.noaa.gov/products/predictions/814day/>

<http://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/enso.shtml>

<http://www.nws.noaa.gov/climate/outlook.php?wfo=pdt&site=459465>

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/

http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.php

RECLAMATION

Extended Range Forecasting 30-90 Day

“No big heat issues for June for the PacNW, BC and No. Rockies. Washington will benefit from this weather pattern as the potential for rain or showers is much greater over Washington, BC, NE Wa. & Northern Rockies. .” Phil Volker, Jun 1, 2019.

<i>Period</i>	<i>Temperature</i>		<i>Precipitation</i>
Jun	HIGH: +2.9 TO -0.6	LOW: +2.5 TO -0.5	PREC: 78 TO 92%
Jul	HIGH: +3.8 TO +0.5	LOW: +2.9 TO +0.2	PREC: 13 TO 65%
Aug	HIGH: +3.6 TO +1.2	LOW: +2.7 TO +0.8	PREC: 10 TO 78%

RECLAMATION

Yakima Subbasin forecasts

Runoff, AF and % of Average

June, 2019	Low	Adopted	High	Low	Adopted	High
Parw	310000	398477	522199	0.51	0.65	0.85
kee	14300	24253	32088	0.34	0.58	0.77
kac	10800	20113	26056	0.30	0.55	0.72
cle	74000	101495	123399	0.43	0.60	0.72
bum	24000	33152	43346	0.46	0.63	0.83
rim	57000	66305	76011	0.63	0.73	0.84
Yumw	111060	170625	215506	0.38	0.58	0.74
Nacw	154833	194338	237309	0.54	0.68	0.83

RECLAMATION

June 1, 2019 TWSA ESTIMATE

June 1 - September 30

Parameter*	+/-/=	Low	Adopted	High
June 1-Sep 30 Natural Flow at Parker est.	+	426	525	624
Return Flow Estimate	+	230	235	235
June 1, Reservoir Content	+	852	852	852
TWSA	=	1508	1612	1712
SEP 30 EST RESERVOIR CONTENT	-	76	76	76
EST FLOW OVER SUNNYSIDE DAM	-	120	135	155
TWSA FOR IRRIGATION	=	1312	1401	1481
NONPRORATABLE ENTITLEMENT	-	723	723	723
REMAINING TWSA	=	589	678	758
PRORATABLE ENTITLEMENT		917	917	917
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		64%	74%	83%
TITLE 12 FLOW REQUIREMENTS, cfs	June	300	300	300
Flow available to Title 12, cfs ***		143	148	154
Non-storeable Portion of added flow, cfs		46	46	46
Storable portion of added flow, cfs		97	102	108

*Values are in 1,000 ac-ft unless otherwise specified.

*** State & YRBWEP Trust, Acquisition, & Conservation additions to Title XII flow range from 143 to 154 cfs.

RECREATION

June 3, 2019 TWSA ESTIMATE

June 3 - September 30

Parameter*	+/-/=	Low	Adopted	High
June 3-Sep 30 Natural Flow at Parker est.	+	394	493	592
Return Flow Estimate	+	230	234	235
June 3, Reservoir Content	+	863	863	863
TWSA	=	1487	1590	1690
SEP 30 EST RESERVOIR CONTENT	-	76	76	76
EST FLOW OVER SUNNYSIDE DAM	-	120	135	155
TWSA FOR IRRIGATION	=	1291	1379	1459
NONPRORATABLE ENTITLEMENT	-	711	711	711
REMAINING TWSA	=	580	668	749
PRORATABLE ENTITLEMENT		900	900	900
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		65%	74%	83%
TITLE 12 FLOW REQUIREMENTS, cfs	June	300	300	300
Flow available to Title 12, cfs **		143	148	154
Non-storeable Portion of added flow, cfs		46	46	46
Storable portion of added flow, cfs		97	102	108

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** State & YRBWEP Trust, Acquisition, & Conservation additions to Title XII flow range from 143 to 154 cfs.

June 1, 2019 TWSA Comparison

June 1 - September 30

Parameter	" +/- / ="	Jun 2018	Jun 2019	May 2019
June 1-Sep 30 Natural Flow at Parker est.	+	577	525	1123
Return Flow Estimate	+	240	235	285
June 1, Reservoir Content	+	1053	852	677
TWSA	=	1870	1612	2085
SEP 30 EST RESERVOIR CONTENT*	-	76	76	76
FLOW OVER SUNNYSIDE DAM	-	188	135	244
TWSA FOR IRRIGATION	=	1606	1401	1765
NONPRORATABLE ENTITLEMENT	-	723	723	909
REMAINING TWSA	=	883	678	856
PRORATABLE ENTITLEMENT		917	917	1145
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		96%	74%	75%
TITLE XII FLOW REQUIREMENTS, cfs	June	300	300	300
TOTAL FLOW AVAILABLE AT PARKER, cfs **		456	448	438

*Values are in 1,000 ac-ft unless otherwise specified.

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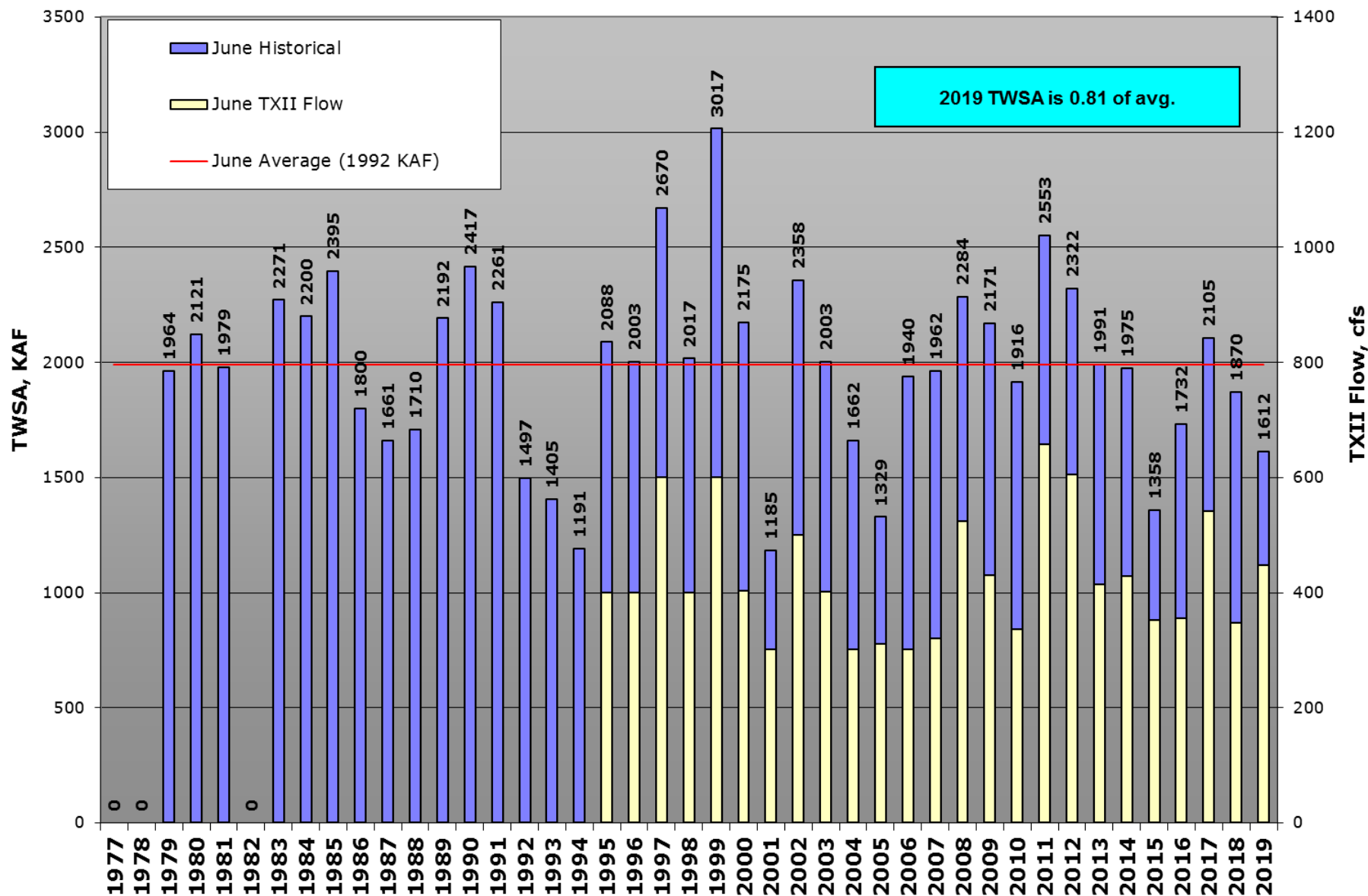
June 1, 2019 TWSA Comparison

June 1 - September 30

Parameter	" +/- / ="	Jun 2019	03 Jun 19	May 2019
June 1-Sep 30 Natural Flow at Parker est.	+	525	493	1123
Return Flow Estimate	+	235	234	285
June 1, Reservoir Content	+	852	863	677
TWSA	=	1612	1590	2085
SEP 30 EST RESERVOIR CONTENT*	-	76	76	76
FLOW OVER SUNNYSIDE DAM	-	135	135	244
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NONPRORATABLE ENTITLEMENT	-	723	711	909
REMAINING TWSA	=	678	668	856
PRORATABLE ENTITLEMENT		917	900	1145
% RATIO= REMAINING TWSA/PRORATABLE ENTITLEMENT		74%	74%	75%
TITLE XII FLOW REQUIREMENTS, cfs	June	300	300	300
TOTAL FLOW AVAILABLE AT PARKER, cfs **		448	448	438

*Values are in 1,000 ac-ft unless otherwise specified.

TWSA Historical Comparison



Reservoir Refill

% filled, Storage Max, Likely timing of max)

- The Cle fish flume will not open for fish in 2019.
- Cle: 358-364, June 7 to 10
- Kee: 120, May 18
- Kac: 200 – 225, Late June
- Bum: full, 34, May 22
- Rim: 165, Late June

RECLAMATION

River Operations Summary

- El Nino continues.
- Reservoir Storage is 91% of avg and 81% full.
- Precip in May was decent.
- Snowpack mostly gone.
- TWSA is 81% of average.
- Prorationing is 74%. (Range from 65% to 83%)
- Title XII flow is 300 cfs plus 148 cfs.

RECLAMATION