

APPENDIX E-1

SUPPORTING DOCUMENTATION FOR DEVELOPMENTAL ANALYSIS, PREFERRED PLAN AND ALTERNATIVES PROPOSED BY OTHERS

ATTACHMENT G

SUMMARY DESCRIPTION AND RESULTS OF OPERATIONS AND RIVER TEMPERATURE MODEL SIMULATION OF THE DISTRICTS' PREFERRED PLAN

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Base Case depicts the operation of the Don Pedro Project in accordance with the current FERC license, ACOE flood control management guidelines, and the Districts' irrigation and M&I water management practices. Under FERC policy, the Base Case represents the "No Action" alternative for purposes of evaluating future operation scenarios under NEPA. For purposes of representing the City and County of San Francisco (CCSF) operations, the Base Case also includes changes that are permitted under CEQA, approved by CCSF, and authorized (funded), but not yet fully implemented at the time of model development. Under Base Case conditions, the Districts are responsible for meeting 100% of the FERC license minimum flows. For a complete description of the Base Case, including Districts' and CCSF water supply operations, see W&AR-02: Tuolumne River Operations Model documentation provided in the AFLA.

DPP-1 is the designation for Don Pedro Project operations under the Districts' Preferred Plan, including the minimum instream flows as outlined below and with CCSF Hetch Hetchy system operations contributing 51.7 percent of the required releases greater than the current FERC license flows. The Water Supply Factor (WSF) represents Districts' management practices allocating the amount of water allowed to be delivered to the Districts canal system. WSF is established by forecasting upcoming water supply, based on antecedent storage and anticipated inflow to Don Pedro. As the storage and inflow drop below specified index values, the WSF is reduced to conserve water. WSF and storage/inflow index values are balanced by the modeler so that Don Pedro reservoir storage does not drop below approximately 375 TAF, the amount of storage "buffer" generally retained in the reservoir under historical conditions and the Base Case. It can be violated to meet minimum flows. The Districts' two infiltration galleries located at RM 25.9 are installed and operating under the DPP-1 as scheduled. Elements of the DPP-1 model input are:

- SJI 60-20-20 WY type is determined on April 15, and established based on historical water year type determinations.
- Pulse flows occur over the April/May period as follows:
 - In Wet (W), and Above Normal (AN) water years, release 150 TAF;
 - In Below Normal (BN) water years, release 100 TAF;
 - In first Dry (D) water year release 75 TAF;
 - In sequential Dry water years release 45 TAF;
 - In first critical (C) water year release 35 TAF; and
 - In sequential critical years release 11 TAF.
- October "flushing" flows:
 - In W, AN, and BN water years, provide a flushing flow by increasing the release from Don Pedro to 1,000 cfs (not to exceed 5,950 AF) on October 5, 6, and 7, with appropriate ramping up and down on October 4th and 8th; infiltration galleries (IGs) are turned off; there is no 3-day flushing flow in critical and dry years.
- Boatable flows in the lower Tuolumne River as follows:
 - In W, AN, and BN water years, cease IG withdrawal for one weekend in June; and
 - In all but critical water years, reduce IG withdrawals to the level necessary to provide 200 cfs or greater below RM 26 for two weekends in July or August and three days over the Labor Day and 4th of July holidays.

- Annual minimum flow schedule with IGs in service:
 - June 1 through June 30
In W, AN and BN water years, provide 200 cfs to La Grange gage and remove 100 cfs at the infiltration gallery for a net flow of 100 cfs below the IGs. In D and C water years, release 200 cfs to La Grange gage and remove 125 cfs at the IGs for a net flow of 75 cfs below the IGs.
 - July 1 – October 15
In W, AN, and BN water years, provide 350 cfs at La Grange gage and remove 200 cfs at the IGs from July 1 through October 15 for a net flow of 150 cfs at RM 26. In D and C water years, release 300 cfs and remove up to 225 cfs at the IGs gallery for a net flow of 75 cfs below the IGs.
 - October 16 – December 31
In W, AN, and BN water years, release 275 cfs from October 16 – December 31. In D water years, release 225 cfs and in C water years release 200 cfs. IGs are not operational for purposes of the Preferred Plan.
 - January 1 – February 29
In W, AN, and BN water years, release 225 cfs from January 1 – February 29. In D water years, release 200 cfs and in C years release 175 cfs. IGs are not operational for purposes of the Preferred Plan.
 - March 1 – April 15
In W, AN, and BN water years, release 250 cfs from March 1 – April 15. In D water years, release 225 cfs and in C years release 200 cfs. IGs are not operational for purposes of the Preferred Plan.
 - April 16 – May 15
In W, AN, and BN water years, release 275 cfs from April 16 – May 15. In D water years, release 250 cfs and in Critical years release 200 cfs. IGs are not operational for purposes of the Preferred Plan.
 - May 16 – May 31
In W, AN, and BN water years, release 300 cfs from May 16 – May 31. In D water years, release 275 cfs and in Critical years release 225 cfs. IGs are not operational for purposes of the Preferred Plan.

DPP-1

Operations Modeling

Results Summary

Table 1. Generation by Month in MWh

	Base Case	DPP-1	% of Base Case
January	1,063,873	1,049,423	99%
February	1,722,819	1,679,654	97%
March	3,042,430	2,983,289	98%
April	3,481,703	3,425,968	98%
May	3,491,340	3,993,678	114%
June	3,434,821	3,220,203	94%
July	3,521,988	3,458,801	98%
August	2,710,847	2,668,667	98%
September	1,340,662	1,323,736	99%
October	918,413	882,912	96%
November	402,483	420,920	105%
December	613,223	656,057	107%
Total	25,744,602	25,763,309	100%

Table 2. TID and MID Canal Water Deliveries

WY	SJI	Full Demand (TAF)	Base Case		DPP-1		
			TAF	% of Full	TAF	% of Base Case	% of Full
76-77	Drought	1,836	1,629	89%	1,590	98%	87%
87-92	Drought	5,198	4,590	88%	4,538	99%	87%
1971	BN	874	874	100%	874	100%	100%
1972	D	965	965	100%	965	100%	100%
1973	AN	865	865	100%	865	100%	100%
1974	W	825	825	100%	825	100%	100%
1975	W	873	873	100%	873	100%	100%
1976	C	915	915	100%	915	100%	100%
1977	C	921	713	77%	675	95%	73%
1978	W	767	752	98%	751	100%	98%
1979	AN	878	878	100%	878	100%	100%
1980	W	852	852	100%	852	100%	100%
1981	D	916	916	100%	916	100%	100%
1982	W	770	770	100%	770	100%	100%
1983	W	753	753	100%	753	100%	100%
1984	AN	912	912	100%	912	100%	100%
1985	D	896	896	100%	896	100%	100%
1986	W	839	839	100%	839	100%	100%
1987	C	895	895	100%	895	100%	100%
1988	C	855	759	89%	755	99%	88%
1989	C	846	744	88%	739	99%	87%
1990	C	876	771	88%	766	99%	87%
1991	C	881	774	88%	770	99%	87%
1992	C	844	647	77%	613	95%	73%
1993	W	823	807	98%	806	100%	98%
1994	C	835	835	100%	835	100%	100%
1995	W	774	774	100%	774	100%	100%
1996	W	841	841	100%	841	100%	100%
1997	W	918	918	100%	918	100%	100%
1998	W	757	757	100%	757	100%	100%
1999	AN	890	890	100%	890	100%	100%
2000	AN	798	798	100%	798	100%	100%
2001	D	865	865	100%	865	100%	100%
2002	D	898	898	100%	898	100%	100%
2003	BN	885	885	100%	885	100%	100%
2004	D	940	940	100%	940	100%	100%
2005	W	874	874	100%	874	100%	100%
2006	W	830	830	100%	830	100%	100%
2007	C	920	920	100%	920	100%	100%
2008	C	882	882	100%	882	100%	100%
2009	BN	903	903	100%	903	100%	100%
2010	AN	826	826	100%	826	100%	100%
2011	W	823	823	100%	823	100%	100%
2012	D	890	890	100%	890	100%	100%
Average		862	842	98%	839	100%	97%
Total		36,190	35,343	98%	35,251	100%	97%

Table 3. SFPUC Water Supply and San Joaquin Pipeline Deliveries to Bay Area in Thousand Acre Feet

WY	SJI	Base Case			DPP-1	
		SFPUC Total Service Area Demand	San Joaquin Pipeline Delivery to Bay Area ^{1,2}	SFPUC Delivery as % of Total Demand ^{2,3}	San Joaquin Pipeline Delivery to Bay Area ^{1,2}	SFPUC Delivery as % of Total Demand ^{2,3}
76-77	C	533	536	100%	536	100%
87-92	C	1,600	1,502	94%	1,471	92%
1971	BN	267	235	100%	235	100%
1972	D	267	270	100%	270	100%
1973	AN	267	219	100%	219	100%
1974	W	267	194	100%	194	100%
1975	W	267	204	100%	204	100%
1976	C	267	267	100%	267	100%
1977	C	267	269	90%	269	90%
1978	W	267	205	100%	205	100%
1979	AN	267	243	100%	243	100%
1980	W	267	198	100%	198	100%
1981	D	267	248	100%	248	100%
1982	W	267	189	100%	189	100%
1983	W	267	178	100%	178	100%
1984	AN	267	235	100%	235	100%
1985	D	267	257	100%	257	100%
1986	W	267	233	100%	233	100%
1987	C	267	268	100%	268	100%
1988	C	267	267	90%	267	90%
1989	C	267	250	90%	250	90%
1990	C	267	240	90%	236	85%
1991	C	267	243	90%	229	85%
1992	C	267	235	90%	221	85%
1993	W	267	211	100%	203	100%
1994	C	267	264	100%	264	100%
1995	W	267	189	100%	189	100%
1996	W	267	215	100%	215	100%
1997	W	267	222	100%	222	100%
1998	W	267	196	100%	196	100%
1999	AN	267	225	100%	225	100%
2000	AN	267	219	100%	219	100%
2001	D	267	251	100%	251	100%
2002	D	267	253	100%	253	100%
2003	BN	267	234	100%	234	100%
2004	D	267	249	100%	249	100%
2005	W	267	193	100%	193	100%
2006	W	267	199	100%	199	100%
2007	C	267	265	100%	265	100%
2008	C	267	247	100%	247	100%
2009	BN	267	240	100%	240	100%
2010	AN	267	226	100%	226	100%
2011	W	267	212	100%	212	100%
2012	D	267	220	100%	220	100%
Average		267	230	86%	229	86%
Total		11,197	9,676	86%	9,636	86%

Notes:

1 - San Joaquin Pipeline deliveries to the Bay Area include direct deliveries to water users in the service area and temporary deliveries to water storage facilities in the Bay Area.

2 - In the table above the Percent of Total Demand is summarized by demand year (July 1 through June 30), and the SJPL delivery is summarized by water year (October 01 through September 30). If the previous Percent of Total Demand and current Percent of Total Demand are not the same, this will result in SJPL deliveries for the water year reflecting a combination of two Percent of Total Demands.

3 -Total SFPUC water deliveries include deliveries from the San Joaquin Pipeline and deliveries from Bay Area water supply facilities.

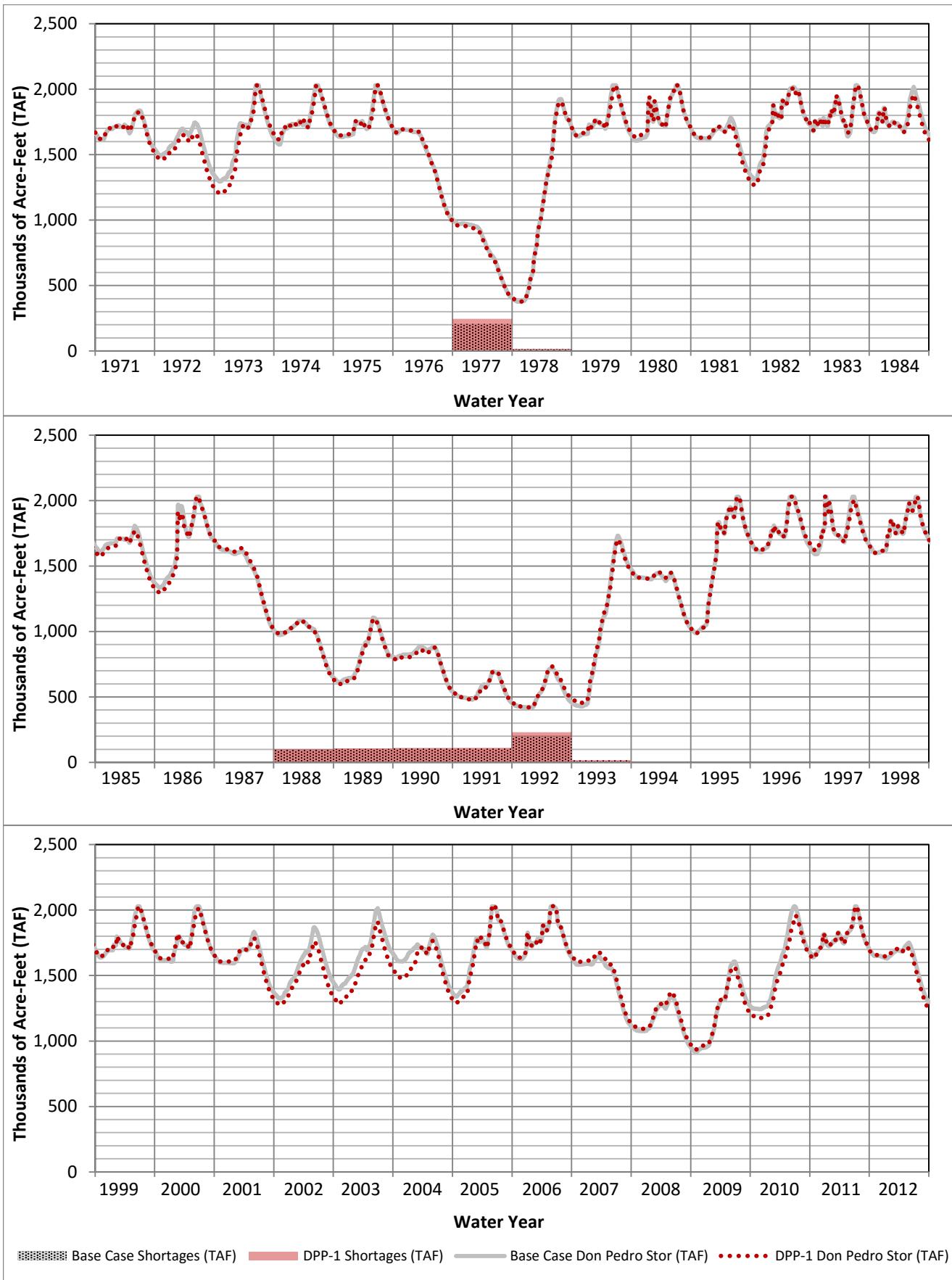


Figure 1. Don Pedro reservoir volume and total TID and MID canal shortages

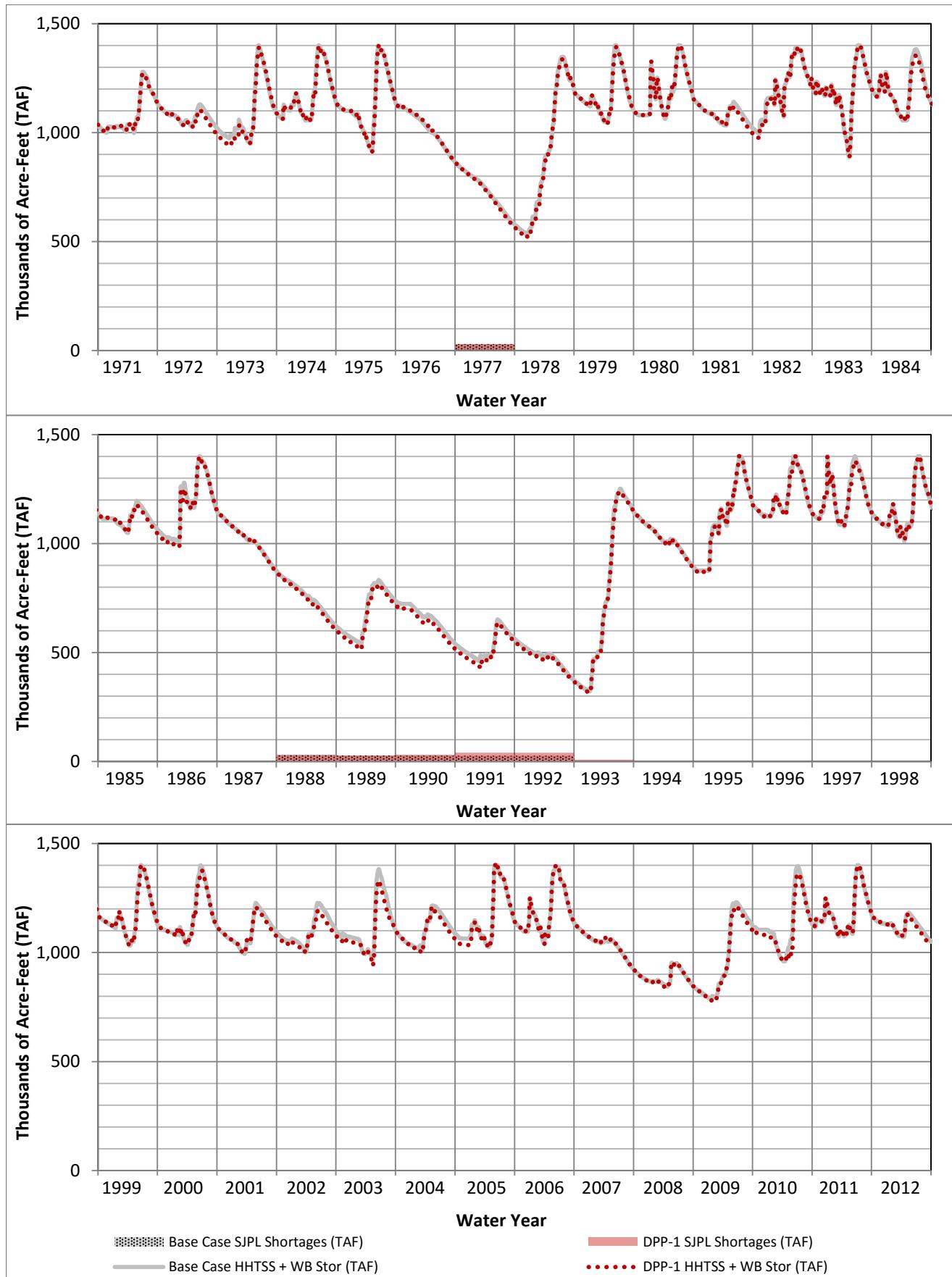


Figure 2. Hetch Hetchy Total System Storage and Water Bank Storage, and Total SJPL Shortages

Table 4. Minimum Required and Resulting River Flows at La Grange

WY	SJI	Base Case		DPP-1		
		TAF Required	TAF Resulting	TAF Required	TAF Resulting	% of Base Case Required
76-77	Drought	265	279	401	425	151%
87-92	Drought	713	713	1,100	1,106	154%
1971	BN	266	539	306	610	115%
1972	D	138	151	270	270	195%
1973	AN	237	613	339	536	143%
1974	W	301	1,050	356	1,116	118%
1975	W	301	887	356	940	118%
1976	C	171	185	226	250	132%
1977	C	94	94	175	175	186%
1978	W	235	349	330	398	140%
1979	AN	301	876	356	903	118%
1980	W	302	1,818	357	1,881	118%
1981	D	194	252	270	353	139%
1982	W	250	2,275	339	2,272	136%
1983	W	301	3,689	356	3,734	118%
1984	AN	302	1,463	357	1,551	118%
1985	D	205	340	270	391	132%
1986	W	237	1,496	339	1,496	143%
1987	C	179	179	225	230	126%
1988	C	94	94	175	175	186%
1989	C	116	116	175	175	151%
1990	C	103	103	175	175	170%
1991	C	116	116	175	175	151%
1992	C	105	105	175	175	167%
1993	W	235	235	330	330	140%
1994	C	182	182	225	225	124%
1995	W	237	2,098	330	2,142	139%
1996	W	302	1,281	357	1,305	118%
1997	W	301	1,954	356	2,028	118%
1998	W	301	2,226	356	2,264	118%
1999	AN	301	974	356	1,007	118%
2000	AN	302	916	357	973	118%
2001	D	193	233	270	334	140%
2002	D	137	137	252	252	185%
2003	BN	180	233	289	289	160%
2004	D	141	355	270	340	191%
2005	W	237	1,488	339	1,477	143%
2006	W	301	2,270	356	2,311	118%
2007	C	182	182	225	225	124%
2008	C	119	119	175	175	147%
2009	BN	156	156	280	280	180%
2010	AN	249	349	356	356	143%
2011	W	301	2,376	356	2,403	118%
2012	D	192	213	270	316	141%
Average (1971-2012)		216	828	291	881	134%
Average (1980-2009)		210	903	284	958	135%
Total (1971-2012)		9,092	34,765	12,210	37,015	134%
Total (1980-2009)		6,306	27,083	8,512	28,741	135%
						106%

To reflect actual operations, water year type determinations are implemented in the model on April 15 of each year. Therefore, minimum flow requirements for the period October 1 through April 14 are determined based on the previous water year type. In the table above the required flow is summarized by water year (October 01 through September 30); which, if the previous year and current year water year types are not the same, will result in the required flow reflecting a combination of two water year types.

Table 5. Minimum Required and Resulting River February - June Flows at La Grange

WY	SJI	Base Case		DPP-1			% of Base Case Required	% of Base Case Resulting
		TAF Required	TAF Resulting	TAF Required	TAF Resulting			
76-77	Drought	133	133	172	172	129%	129%	
87-92	Drought	403	403	451	451	112%	112%	
1971	BN	173	399	173	417	100%	105%	
1972	D	84	96	146	146	174%	152%	
1973	AN	154	515	219	415	142%	81%	
1974	W	176	760	223	767	127%	101%	
1975	W	176	728	223	752	127%	103%	
1976	C	83	83	102	102	123%	123%	
1977	C	50	50	70	70	140%	140%	
1978	W	154	193	216	219	140%	113%	
1979	AN	176	683	223	691	127%	101%	
1980	W	177	1,205	224	1,241	126%	103%	
1981	D	101	151	146	219	145%	146%	
1982	W	159	1,862	219	1,862	138%	100%	
1983	W	176	2,287	223	2,298	127%	100%	
1984	AN	177	552	224	617	126%	112%	
1985	D	112	247	146	267	130%	108%	
1986	W	154	1,388	219	1,342	142%	97%	
1987	C	91	91	101	101	112%	112%	
1988	C	50	50	70	70	140%	140%	
1989	C	72	72	70	70	97%	97%	
1990	C	59	59	70	70	119%	119%	
1991	C	72	72	70	70	98%	98%	
1992	C	60	60	70	70	116%	116%	
1993	W	154	154	216	216	140%	140%	
1994	C	93	93	101	101	108%	108%	
1995	W	154	1,482	216	1,483	140%	100%	
1996	W	177	1,126	224	1,140	126%	101%	
1997	W	176	859	223	888	127%	103%	
1998	W	176	1,667	223	1,680	127%	101%	
1999	AN	176	774	223	781	127%	101%	
2000	AN	177	791	224	832	126%	105%	
2001	D	100	140	146	210	146%	150%	
2002	D	86	86	142	142	165%	165%	
2003	BN	130	182	169	169	130%	93%	
2004	D	82	295	146	216	177%	73%	
2005	W	154	1,289	219	1,235	142%	96%	
2006	W	176	1,759	223	1,769	127%	101%	
2007	C	94	94	101	101	108%	108%	
2008	C	75	75	70	70	94%	94%	
2009	BN	106	106	166	166	157%	157%	
2010	AN	158	218	223	223	141%	102%	
2011	W	176	1,489	223	1,500	127%	101%	
2012	D	104	118	146	183	141%	156%	
Average (1971-2012)		129	581	168	595	131%	102%	
Average (1980-2009)		125	636	163	650	130%	102%	
Total (1971-2012)		5,411	24,398	7,073	24,981	131%	102%	
Total (1980-2009)		3,746	19,067	4,885	19,496	130%	102%	

The average volume of 40% of the February - June unimpaired inflow for the period of record is 583 TAF.

The total volume of 40% of the February - June unimpaired inflow for the period of record is 24,495 TAF.

To reflect actual operations, water year type determinations are implemented in the model on April 15 of each year. Therefore, minimum flow requirements for the period October 1 through April 14 are determined based on the previous water year type. In the table above the required flow is summarized by water year (October 01 through September 30); which, if the previous year and current year water year types are not the same, will result in the required flow reflecting a combination of two water year types.

Table 6. Minimum Required and Resulting River Flows Below RM 26

WY	SJI	Base Case		DPP-1			
		TAF Required	TAF Resulting	TAF Required	TAF Resulting	% of Base Case Required	% of Base Case Resulting
76-77	Drought	265	396	293	435	111%	110%
87-92	Drought	713	1,081	772	1,146	108%	106%
1971	BN	266	599	261	626	98%	104%
1972	D	138	210	220	280	159%	133%
1973	AN	237	693	291	569	123%	82%
1974	W	301	1,118	311	1,138	103%	102%
1975	W	301	952	311	960	103%	101%
1976	C	171	243	173	257	101%	105%
1977	C	94	152	120	178	127%	117%
1978	W	235	431	282	432	120%	100%
1979	AN	301	944	311	926	103%	98%
1980	W	302	1,901	312	1,919	103%	101%
1981	D	194	318	220	369	114%	116%
1982	W	250	2,362	291	2,311	116%	98%
1983	W	301	3,802	311	3,802	103%	100%
1984	AN	302	1,546	312	1,588	103%	103%
1985	D	205	400	220	402	107%	100%
1986	W	237	1,576	291	1,528	123%	97%
1987	C	179	241	173	240	97%	100%
1988	C	94	154	120	179	127%	117%
1989	C	116	175	120	179	103%	102%
1990	C	103	162	120	178	116%	110%
1991	C	116	179	120	183	103%	102%
1992	C	105	171	120	186	115%	109%
1993	W	235	315	282	362	120%	115%
1994	C	182	241	173	232	95%	96%
1995	W	237	2,192	282	2,189	119%	100%
1996	W	302	1,358	312	1,336	103%	98%
1997	W	301	2,043	311	2,071	103%	101%
1998	W	301	2,332	311	2,325	103%	100%
1999	AN	301	1,037	311	1,025	103%	99%
2000	AN	302	992	312	1,004	103%	101%
2001	D	193	293	220	345	114%	117%
2002	D	137	202	200	265	146%	131%
2003	BN	180	291	241	300	134%	103%
2004	D	141	416	220	351	156%	84%
2005	W	237	1,572	291	1,513	123%	96%
2006	W	301	2,356	311	2,351	103%	100%
2007	C	182	241	173	232	95%	96%
2008	C	119	185	120	186	101%	101%
2009	BN	156	216	232	292	149%	135%
2010	AN	249	413	311	376	125%	91%
2011	W	301	2,459	311	2,442	103%	99%
2012	D	192	272	220	324	115%	119%
Average (1971-2012)		216	899	242	904	112%	101%
Average (1980-2009)		210	976	234	981	112%	101%
Total (1971-2012)		9,092	34,765	12,210	37,015	134%	106%
Total (1980-2009)		6,306	29,267	7,032	29,444	112%	101%

To reflect actual operations, water year type determinations are implemented in the model on April 15 of each year. Therefore, minimum flow requirements for the period October 1 through April 14 are determined based on the previous water year type. In the table above the required flow is summarized by water year (October 01 through September 30); which, if the previous year and current year water year types are not the same, will result in the required flow reflecting a combination of two water year types.

Table 7. Minimum Required and Resulting River February - June Flows Below RM 26

WY	SJI	Base Case		DPP-1			
		TAF Required	TAF Resulting	TAF Required	TAF Resulting	% of Base Case Required	% of Base Case Resulting
76-77	Drought	133	183	157	207	118%	113%
87-92	Drought	403	572	407	576	101%	101%
1971	BN	173	424	168	437	97%	103%
1972	D	84	122	139	164	165%	135%
1973	AN	154	555	214	450	139%	81%
1974	W	176	789	218	790	123%	100%
1975	W	176	758	218	777	123%	102%
1976	C	83	108	94	120	114%	111%
1977	C	50	75	62	88	126%	117%
1978	W	154	237	210	257	136%	109%
1979	AN	176	713	218	715	123%	100%
1980	W	177	1,241	218	1,272	123%	102%
1981	D	101	180	138	242	137%	134%
1982	W	159	1,908	214	1,903	135%	100%
1983	W	176	2,348	218	2,353	123%	100%
1984	AN	177	578	218	637	123%	110%
1985	D	112	274	138	287	124%	105%
1986	W	154	1,435	214	1,383	139%	96%
1987	C	91	120	94	123	104%	103%
1988	C	50	76	63	88	126%	117%
1989	C	72	98	62	89	87%	91%
1990	C	59	84	62	88	106%	104%
1991	C	72	101	62	92	87%	91%
1992	C	60	94	63	96	104%	103%
1993	W	154	185	210	241	136%	130%
1994	C	93	119	94	120	100%	100%
1995	W	154	1,526	210	1,521	136%	100%
1996	W	177	1,164	218	1,172	123%	101%
1997	W	176	884	218	907	123%	103%
1998	W	176	1,727	218	1,733	123%	100%
1999	AN	176	803	218	804	123%	100%
2000	AN	177	833	218	868	123%	104%
2001	D	100	167	138	230	138%	137%
2002	D	86	112	135	160	156%	143%
2003	BN	130	208	164	189	126%	91%
2004	D	82	322	139	236	168%	73%
2005	W	154	1,325	214	1,266	139%	95%
2006	W	176	1,805	218	1,810	123%	100%
2007	C	94	119	94	119	100%	100%
2008	C	75	102	63	90	84%	88%
2009	BN	106	132	160	187	152%	141%
2010	AN	158	248	218	247	138%	100%
2011	W	176	1,528	218	1,533	123%	100%
2012	D	104	143	139	201	134%	141%
Average (1971-2012)		129	614	162	621	126%	101%
Average (1980-2009)		125	669	156	677	125%	101%
Total (1971-2012)		5,411	25,770	6,806	26,085	126%	101%
Total (1980-2009)		3,746	20,070	4,692	20,306	125%	101%

The average volume of 40% of the February - June unimpaired inflow for the period of record is 583 TAF.

The total volume of 40% of the February - June unimpaired inflow for the period of record is 24,495 TAF.

To reflect actual operations, water year type determinations are implemented in the model on April 15 of each year. Therefore, minimum flow requirements for the period October 1 through April 14 are determined based on the previous water year type. In the table above the required flow is summarized by water year (October 01 through September 30); which, if the previous year and current year water year types are not the same, will result in the required flow reflecting a combination of two water year types.

Table 8. La Grange 1 Day Flow Count

	DPP-1 Total La Grange Flow										
	Occurrences Of Flows Greater Than or Equal To Threshold Flow Value (cfs) For At Least 1 Day										
Water Year	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1971	88	30	1	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	79	60	20	13	5	3	0	0	0	0	0
1974	163	137	89	42	35	19	3	0	0	0	0
1975	116	114	81	47	19	7	0	0	0	0	0
1976	1	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	53	33	0	0	0	0	0	0	0	0	0
1979	126	113	72	55	26	17	0	0	0	0	0
1980	210	203	166	111	100	76	59	57	50	41	40
1981	8	0	0	0	0	0	0	0	0	0	0
1982	201	171	170	148	140	140	127	127	107	93	56
1983	351	306	278	269	229	227	210	186	163	159	139
1984	193	178	124	94	63	49	49	41	34	27	27
1985	6	2	0	0	0	0	0	0	0	0	0
1986	139	138	138	86	86	78	58	55	46	43	40
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	36	33	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	168	161	154	154	146	146	146	137	108	102	65
1996	155	153	108	104	89	70	43	33	23	6	6
1997	158	155	115	92	83	83	69	61	61	47	47
1998	203	202	187	180	167	146	122	109	92	79	66
1999	135	121	69	45	36	34	21	14	7	7	0
2000	115	105	77	59	50	41	32	21	19	13	0
2001	10	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0
2003	31	0	0	0	0	0	0	0	0	0	0
2004	7	0	0	0	0	0	0	0	0	0	0
2005	138	132	111	110	103	84	68	53	45	38	38
2006	194	190	179	172	171	140	123	95	79	79	78
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	31	0	0	0	0	0	0	0	0	0	0
2010	36	33	0	0	0	0	0	0	0	0	0
2011	252	238	224	203	175	159	144	101	61	43	39
2012	8	0	0	0	0	0	0	0	0	0	0
Total number of days greater than threshold flow	3,411	3,008	2,363	1,984	1,723	1,519	1,274	1,090	895	777	641
Number of years flows NOT achieved for threshold period	12	19	23	24	24	24	27	28	28	28	30

Table 9. February through June La Grange 1 Day Flow Count

	DPP-1 Total La Grange Flow										
	Occurrences Of Flows Greater Than or Equal To Threshold Flow Value (cfs) For At Least 1 Day										
February through June of Water Year	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1971	88	30	1	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	79	60	20	13	5	3	0	0	0	0	0
1974	127	122	82	42	35	19	3	0	0	0	0
1975	116	114	81	47	19	7	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	36	33	0	0	0	0	0	0	0	0	0
1979	108	106	65	55	26	17	0	0	0	0	0
1980	151	151	114	76	67	58	42	41	34	26	26
1981	7	0	0	0	0	0	0	0	0	0	0
1982	150	146	145	138	132	132	120	120	100	93	56
1983	150	149	149	148	148	148	148	147	146	144	127
1984	112	101	54	31	7	0	0	0	0	0	0
1985	6	2	0	0	0	0	0	0	0	0	0
1986	131	131	131	86	86	78	58	55	46	43	40
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	36	33	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	107	107	107	107	107	107	107	106	95	90	55
1996	148	146	108	104	89	70	43	33	23	6	6
1997	107	104	64	41	33	33	26	26	26	19	19
1998	150	149	146	146	134	113	99	89	81	71	59
1999	123	110	65	45	36	34	21	14	7	7	0
2000	114	105	77	59	50	41	32	21	19	13	0
2001	10	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0
2003	31	0	0	0	0	0	0	0	0	0	0
2004	7	0	0	0	0	0	0	0	0	0	0
2005	127	121	101	101	94	76	60	45	38	31	31
2006	149	149	142	141	141	117	101	73	65	65	64
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	31	0	0	0	0	0	0	0	0	0	0
2010	36	33	0	0	0	0	0	0	0	0	0
2011	150	150	148	141	134	127	113	71	38	28	24
2012	7	0	0	0	0	0	0	0	0	0	0
Total number of days greater than threshold flow	2,594	2,352	1,800	1,521	1,343	1,180	973	841	718	636	507
Number of years flows NOT achieved for threshold period	13	19	23	24	24	25	28	29	29	29	31

Table 10. La Grange Consecutive 7 Day Flow Count

	DPP-1 Total La Grange Flow										
	Occurrences Of Flows Greater Than or Equal To Threshold Flow Value (cfs) For At Least 7 Days										
Water Year	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1971	2	2	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	2	2	1	1	0	0	0	0	0	0	0
1974	3	2	3	2	2	2	0	0	0	0	0
1975	2	2	3	3	2	1	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	2	1	0	0	0	0	0	0	0	0	0
1979	2	2	3	1	2	1	0	0	0	0	0
1980	1	1	3	3	3	3	2	2	2	2	2
1981	1	0	0	0	0	0	0	0	0	0	0
1982	3	3	4	2	2	2	3	3	3	3	3
1983	2	3	5	8	7	7	7	5	4	4	4
1984	2	2	2	3	2	2	2	2	2	2	2
1985	0	0	0	0	0	0	0	0	0	0	0
1986	1	1	1	2	2	3	1	1	1	1	2
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	1	1	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	1	1	1	1	2	2	2	4	4	3	3
1996	2	2	3	3	4	3	2	1	1	0	0
1997	2	2	1	1	2	2	1	2	2	2	2
1998	1	2	3	2	3	4	4	5	4	3	3
1999	2	2	2	2	2	1	1	1	1	1	0
2000	1	1	1	2	2	1	1	1	1	1	0
2001	1	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0
2003	1	0	0	0	0	0	0	0	0	0	0
2004	1	0	0	0	0	0	0	0	0	0	0
2005	1	2	2	2	2	4	3	2	2	1	1
2006	2	2	3	3	3	4	4	4	3	3	3
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	1	0	0	0	0	0	0	0	0	0	0
2010	1	1	0	0	0	0	0	0	0	0	0
2011	1	1	2	2	3	2	2	4	4	2	2
2012	1	0	0	0	0	0	0	0	0	0	0
Total number of periods where flow is greater than threshold flow for at least seven consecutive days	43	38	43	43	45	44	35	37	34	28	27
Number of years flows NOT achieved for threshold period	14	20	24	24	25	25	28	28	28	29	31

Table 11. February through June La Grange Consecutive 7 Day Flow Count

	DPP-1 Total La Grange Flow										
	Occurrences Of Flows Greater Than or Equal To Threshold Flow Value (cfs) For At Least 7 Days										
February through June of Water Year	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1971	2	2	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	2	2	1	1	0	0	0	0	0	0	0
1974	2	1	2	2	2	2	0	0	0	0	0
1975	2	2	3	3	2	1	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	1	1	0	0	0	0	0	0	0	0	0
1979	1	1	2	1	2	1	0	0	0	0	0
1980	1	1	3	2	2	3	2	2	1	1	1
1981	1	0	0	0	0	0	0	0	0	0	0
1982	1	2	3	2	2	2	3	3	3	3	3
1983	1	2	2	3	3	3	3	2	3	3	4
1984	2	2	1	2	1	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0
1986	1	1	1	2	2	3	1	1	1	1	2
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	1	1	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	1	1	1	1	1	1	1	2	4	3	3
1996	2	2	3	3	4	3	2	1	1	0	0
1997	2	2	1	1	1	1	1	1	1	1	1
1998	1	1	1	1	2	3	3	4	4	3	3
1999	2	2	2	2	2	1	1	1	1	1	0
2000	1	1	1	2	2	1	1	1	1	1	0
2001	1	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0
2003	1	0	0	0	0	0	0	0	0	0	0
2004	1	0	0	0	0	0	0	0	0	0	0
2005	1	2	2	2	2	4	3	2	2	1	1
2006	2	2	2	2	2	3	3	3	2	2	2
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	1	0	0	0	0	0	0	0	0	0	0
2010	1	1	0	0	0	0	0	0	0	0	0
2011	1	1	1	1	1	1	1	2	2	1	1
2012	1	0	0	0	0	0	0	0	0	0	0
Total number of periods where flow is greater than threshold flow for at least seven consecutive days	37	33	32	33	33	33	25	25	26	21	21
Number of years flows NOT achieved for threshold period	14	20	24	24	25	26	29	29	29	30	32

Table 12. La Grange Consecutive 14 Day Flow Count

	DPP-1 Total La Grange Flow										
	Occurrences Of Flows Greater Than or Equal To Threshold Flow Value (cfs) For At Least 14 Days										
Water Year	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1971	2	1	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	1	1	1	0	0	0	0	0	0	0	0
1974	1	1	2	2	1	0	0	0	0	0	0
1975	1	1	1	1	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	2	1	0	0	0	0	0	0	0	0	0
1979	2	1	2	1	1	0	0	0	0	0	0
1980	1	1	3	3	2	2	2	2	2	2	2
1981	0	0	0	0	0	0	0	0	0	0	0
1982	3	3	3	2	2	2	3	3	3	3	2
1983	1	2	3	6	4	4	4	3	2	2	3
1984	2	2	2	2	1	2	2	2	2	1	1
1985	0	0	0	0	0	0	0	0	0	0	0
1986	1	1	1	2	2	1	1	1	1	1	2
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	1	1	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	1	1	1	1	2	2	2	2	2	1	1
1996	2	2	2	1	2	1	1	1	1	0	0
1997	2	2	1	1	1	1	1	2	2	2	2
1998	1	1	2	2	3	4	3	3	3	3	1
1999	1	2	1	1	1	1	1	1	0	0	0
2000	1	1	1	2	1	1	1	1	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0
2003	1	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0
2005	1	2	2	2	2	3	2	2	1	1	1
2006	2	2	3	3	3	4	4	3	2	2	2
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	1	0	0	0	0	0	0	0	0	0	0
2010	1	1	0	0	0	0	0	0	0	0	0
2011	1	1	2	2	2	2	2	2	1	1	1
2012	0	0	0	0	0	0	0	0	0	0	0
Total number of periods where flow is greater than threshold flow for at least fourteen consecutive days	33	31	33	34	30	31	29	28	22	19	18
Number of years flows NOT achieved for threshold period	18	20	24	25	26	27	28	28	30	31	31

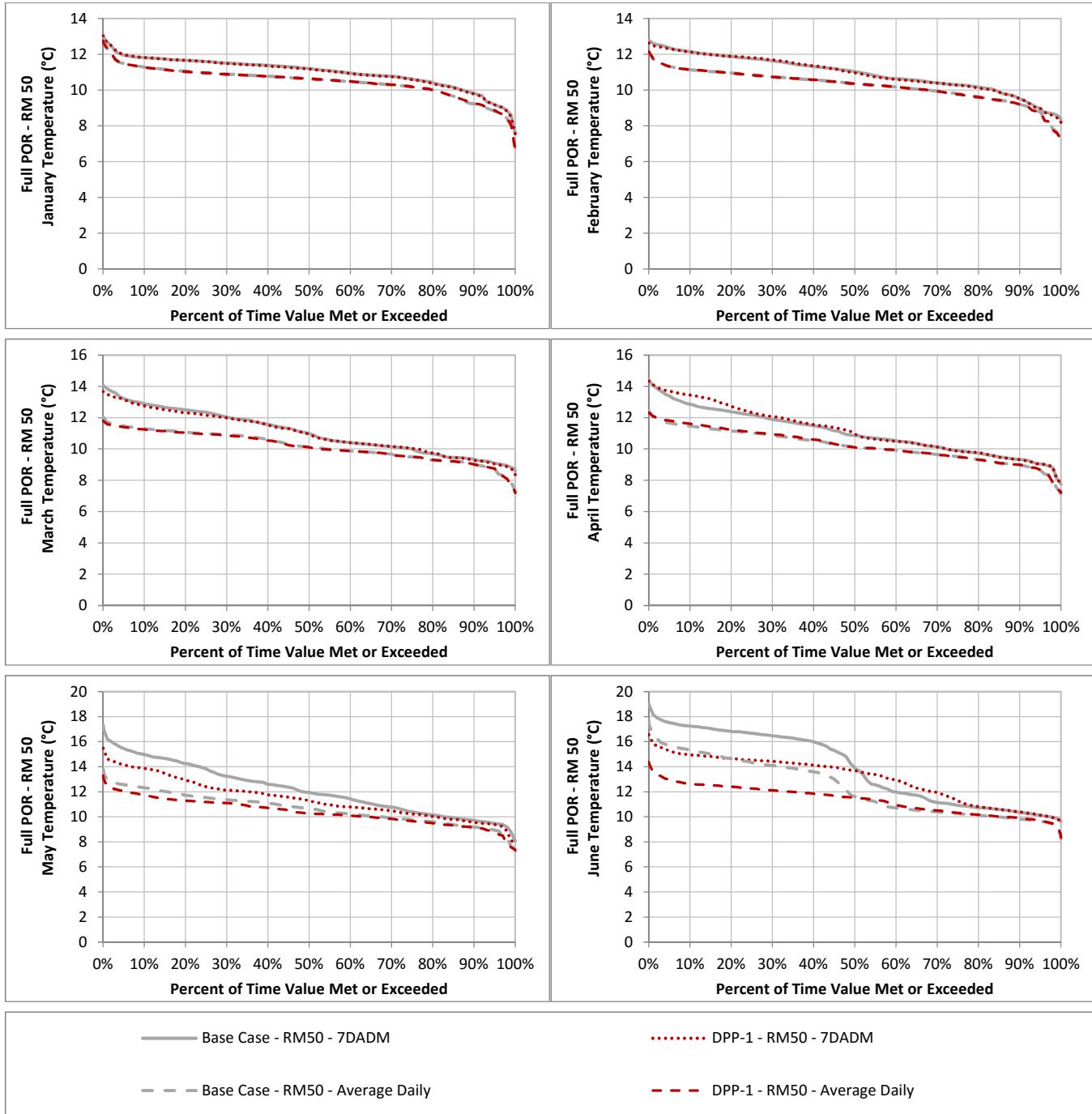
Table 13. February through June La Grange Consecutive 14 Day Flow Count

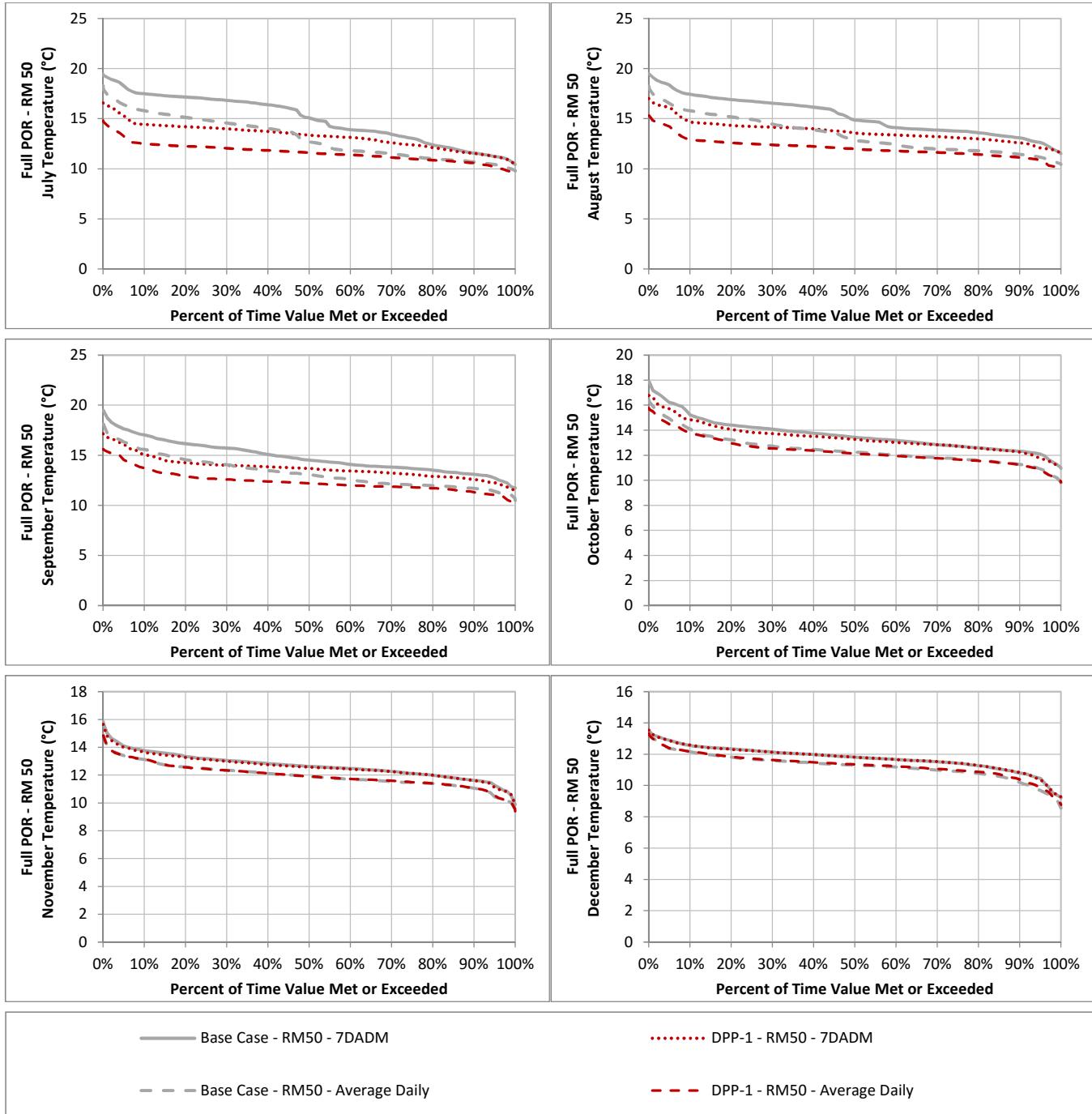
	DPP-1 Total La Grange Flow										
	Occurrences Of Flows Greater Than or Equal To Threshold Flow Value (cfs) For At Least 14 Days										
February through June of Water Year	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
1971	2	1	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	1	1	1	0	0	0	0	0	0	0	0
1974	1	1	2	2	1	0	0	0	0	0	0
1975	1	1	1	1	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	1	1	0	0	0	0	0	0	0	0	0
1979	1	1	2	1	1	1	0	0	0	0	0
1980	1	1	3	2	1	1	1	1	1	1	1
1981	0	0	0	0	0	0	0	0	0	0	0
1982	1	2	2	2	2	2	3	3	3	3	2
1983	1	1	1	2	2	2	2	2	2	2	3
1984	2	2	1	1	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0
1986	1	1	1	2	2	1	1	1	1	1	2
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	1	1	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	1	1	1	1	1	1	1	1	2	1	1
1996	2	2	2	1	2	1	1	1	1	0	0
1997	2	2	1	1	1	1	1	1	1	1	1
1998	1	1	1	1	2	3	3	3	3	3	1
1999	1	2	1	1	1	1	1	1	0	0	0
2000	1	1	1	2	1	1	1	1	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0
2003	1	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0
2005	1	2	2	2	2	3	2	2	1	1	1
2006	2	2	2	2	2	3	3	2	2	2	2
2007	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0	0	0	0	0
2009	1	0	0	0	0	0	0	0	0	0	0
2010	1	1	0	0	0	0	0	0	0	0	0
2011	1	1	1	1	1	1	1	2	1	1	1
2012	0	0	0	0	0	0	0	0	0	0	0
Total number of periods where flow is greater than threshold flow for at least fourteen consecutive days	29	29	26	25	22	22	21	21	18	16	15
Number of years flows NOT achieved for threshold period	18	20	24	25	27	28	29	29	31	32	32

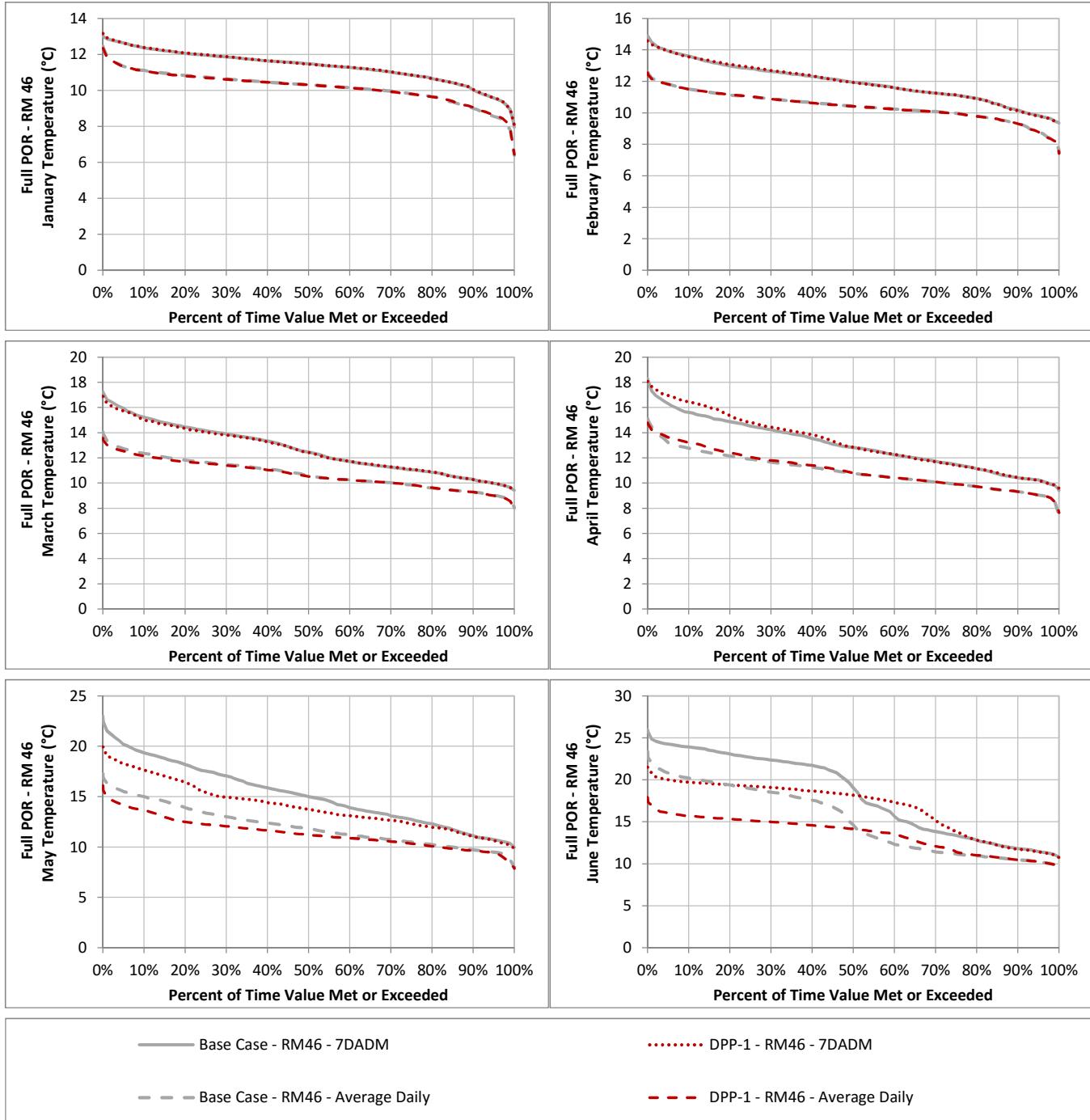
DPP-1

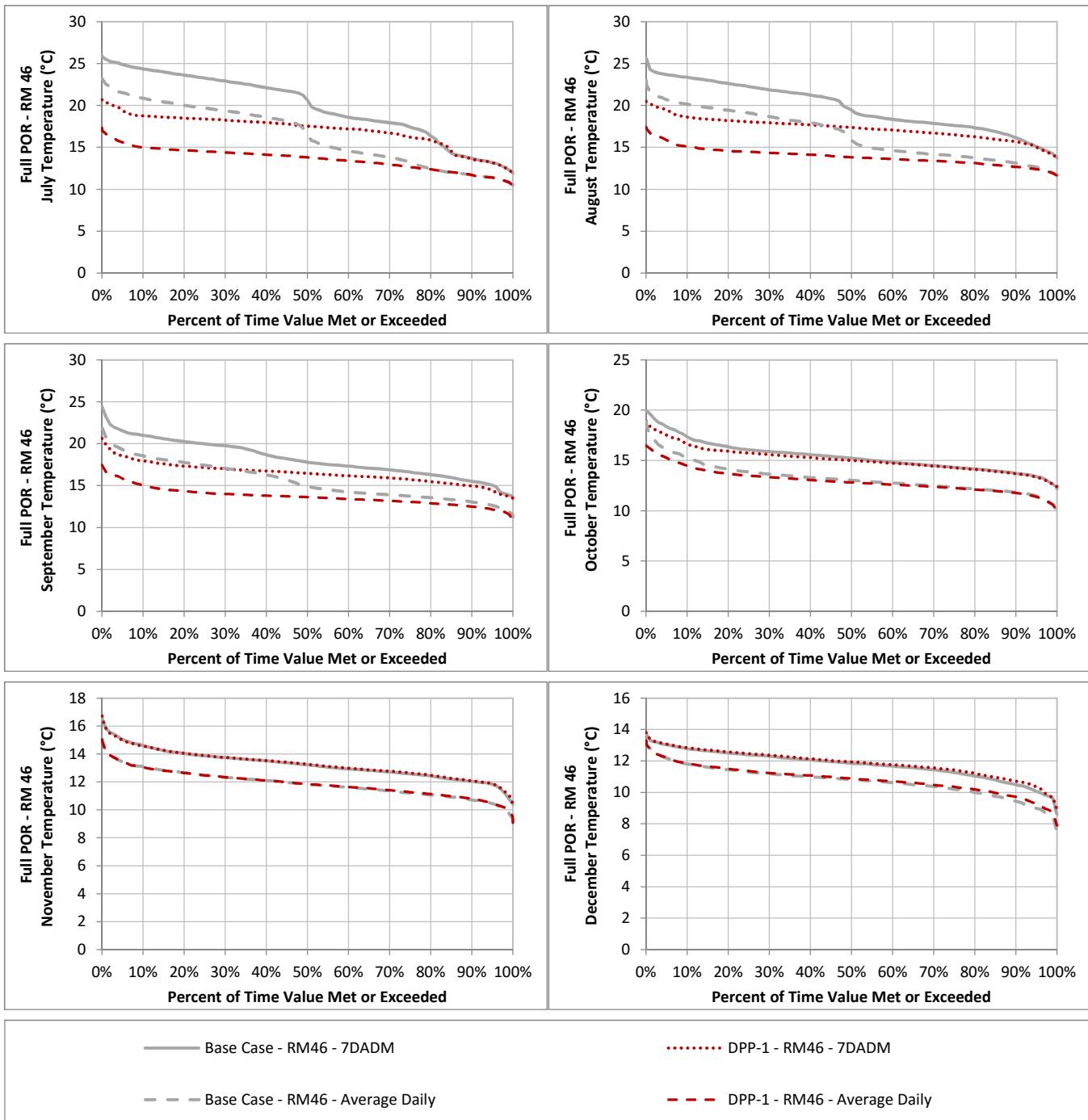
Dynamic Routing

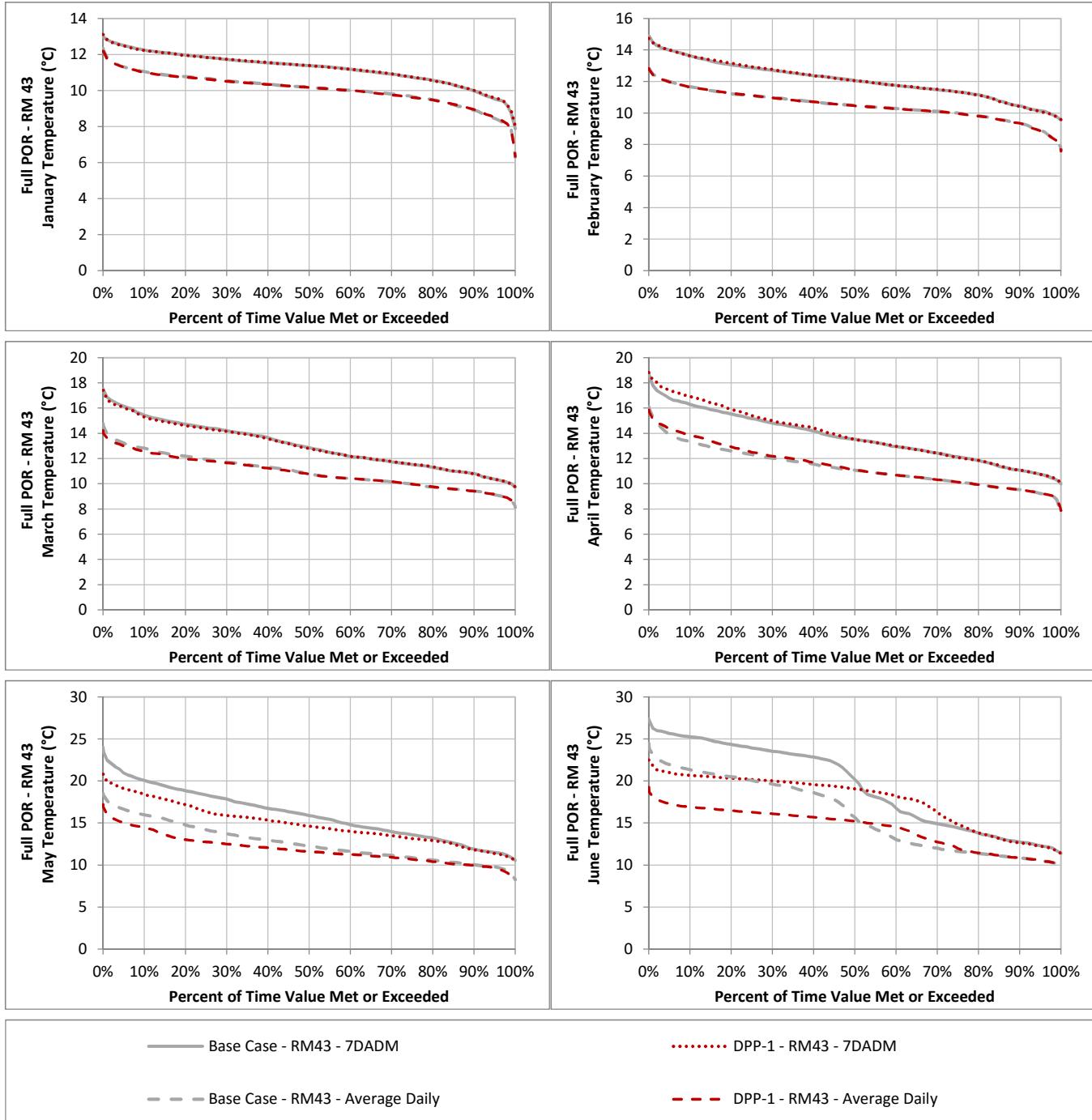
Results Summary

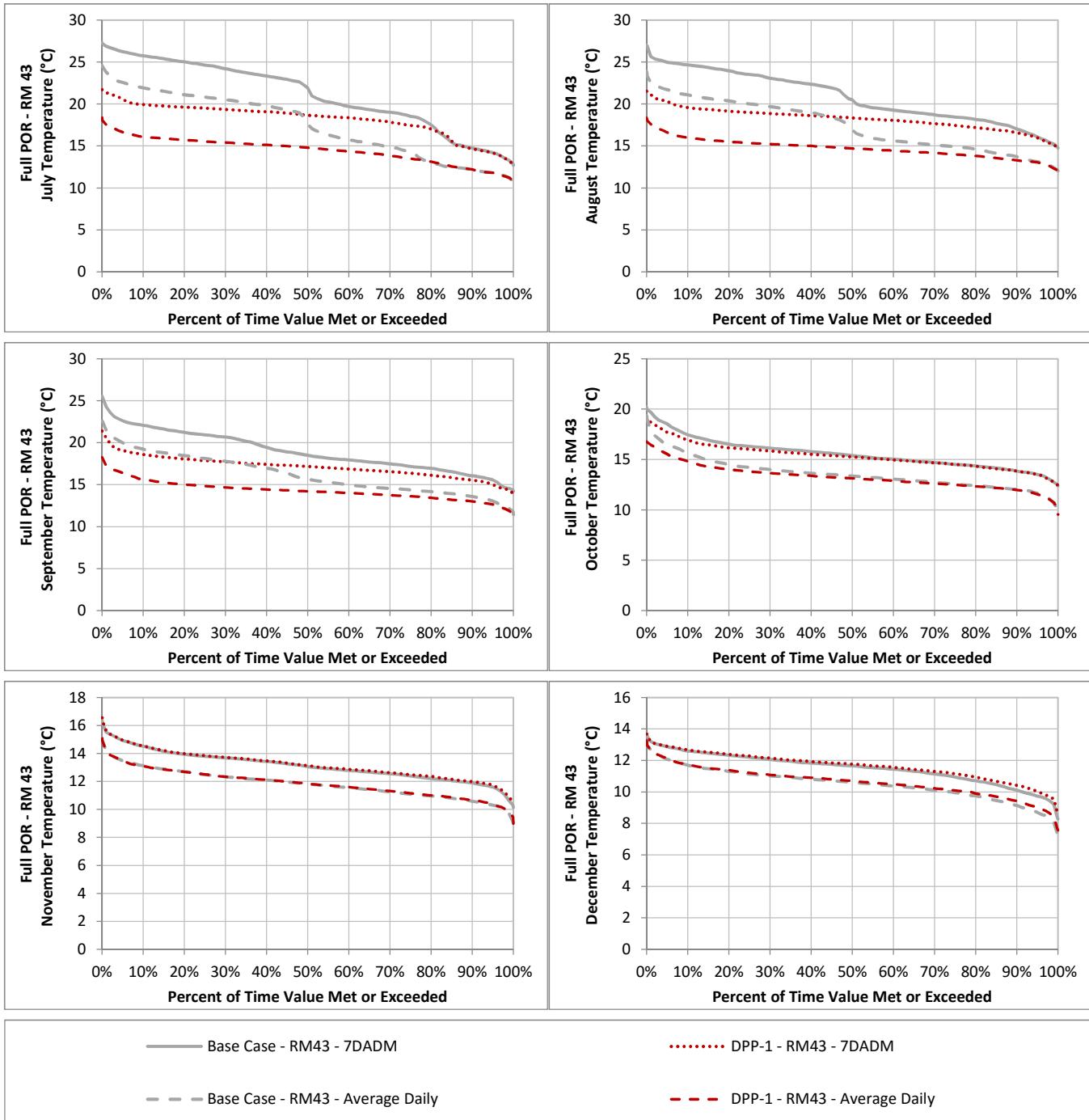


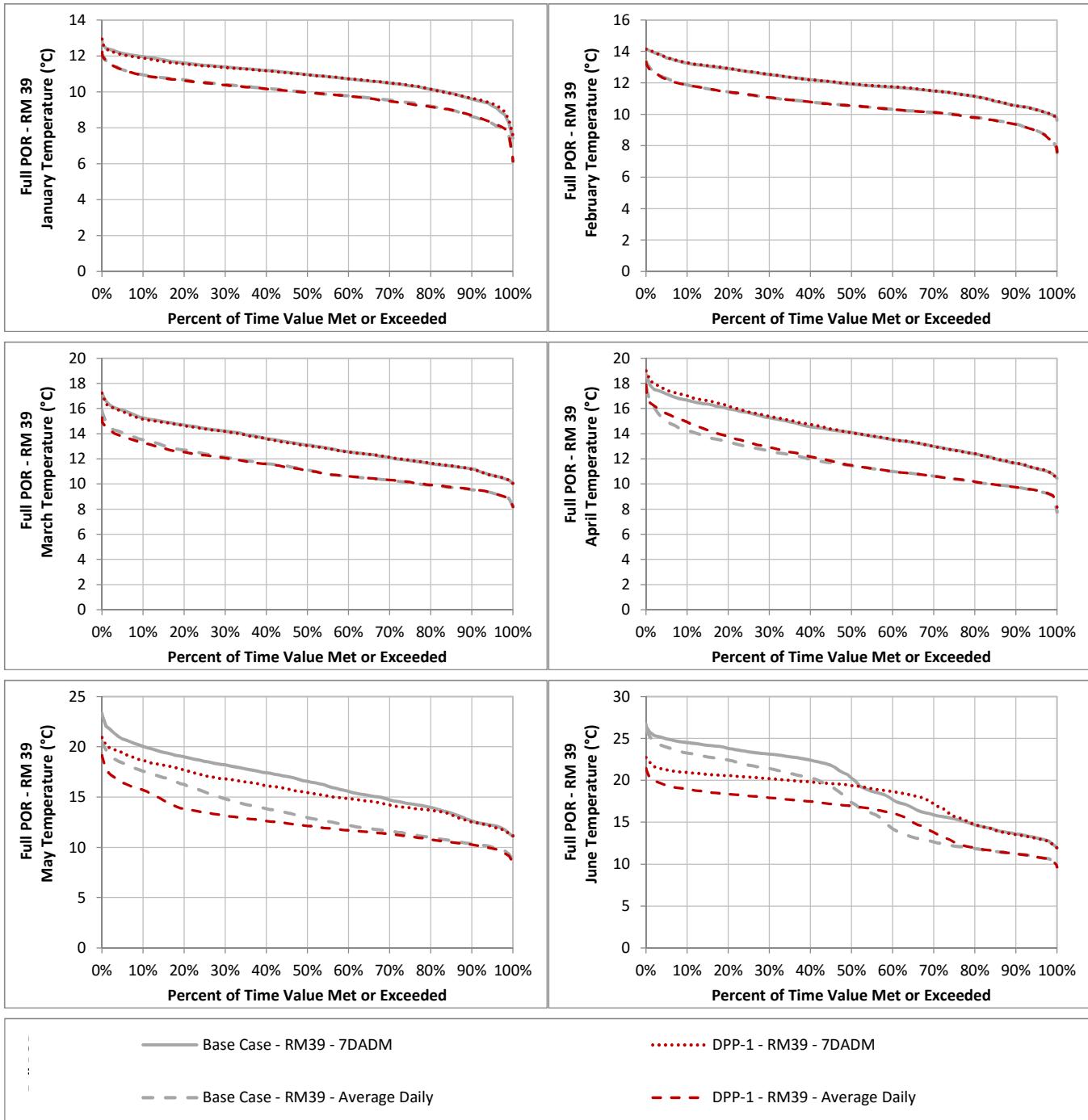


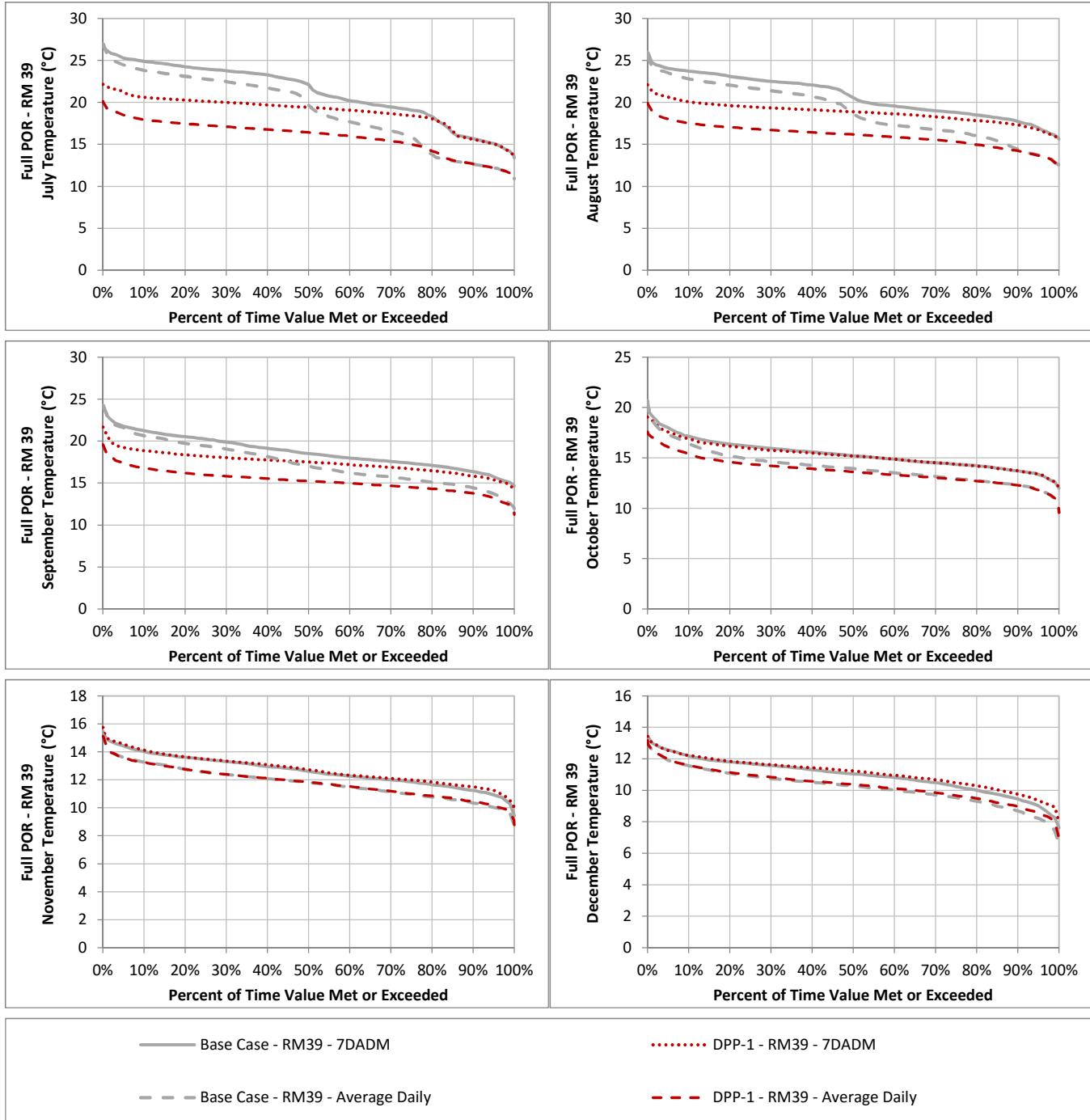


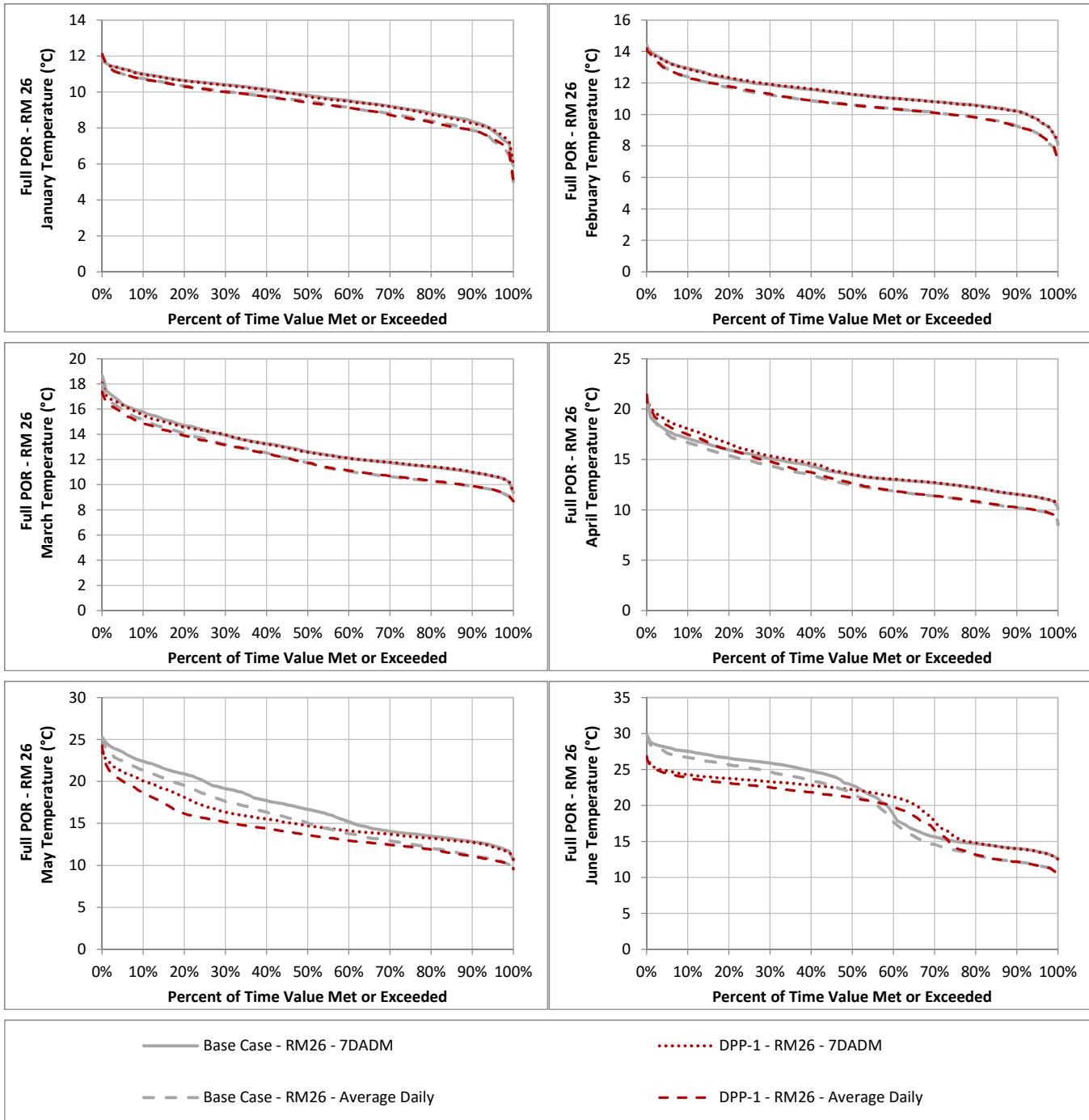


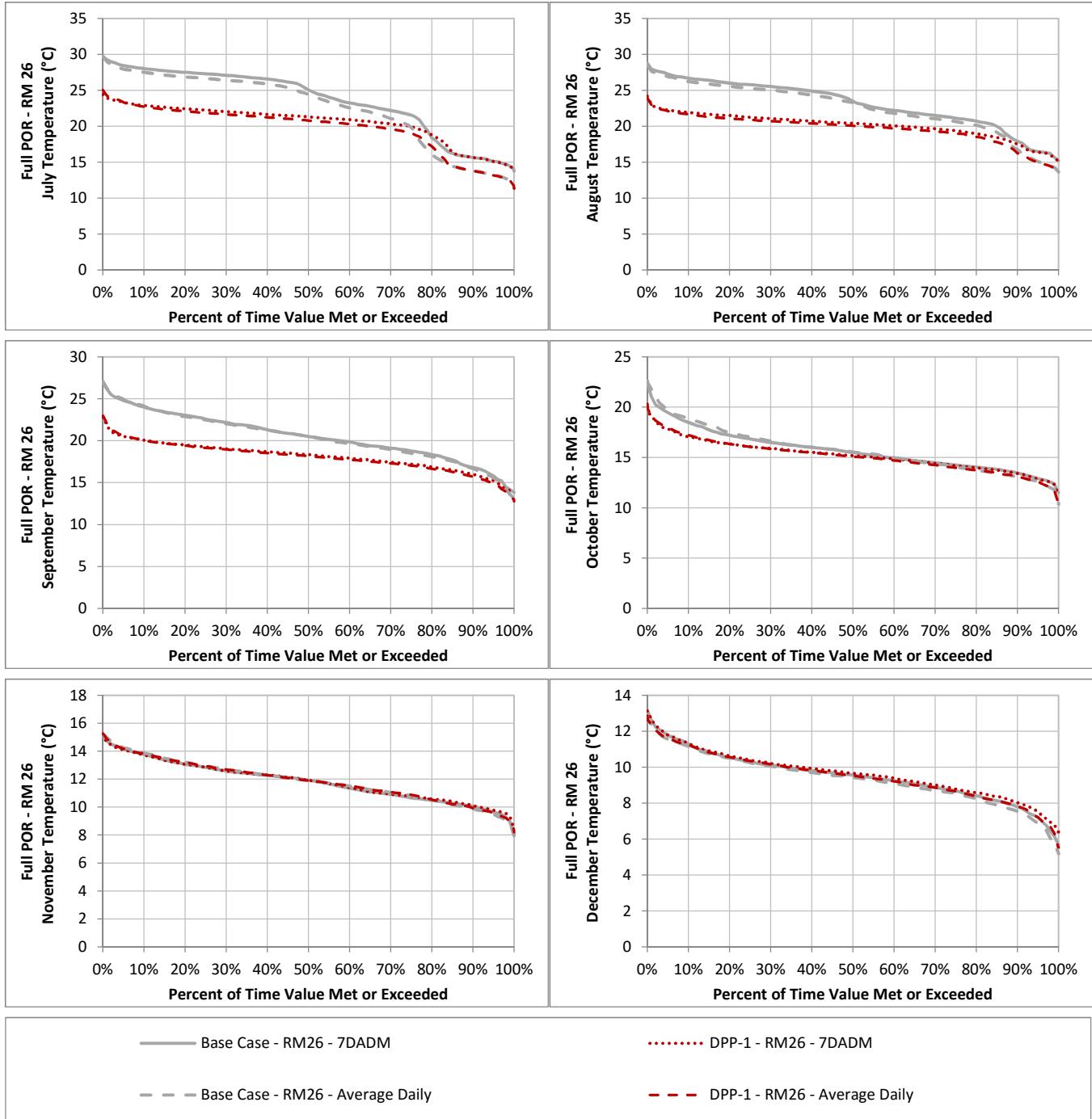


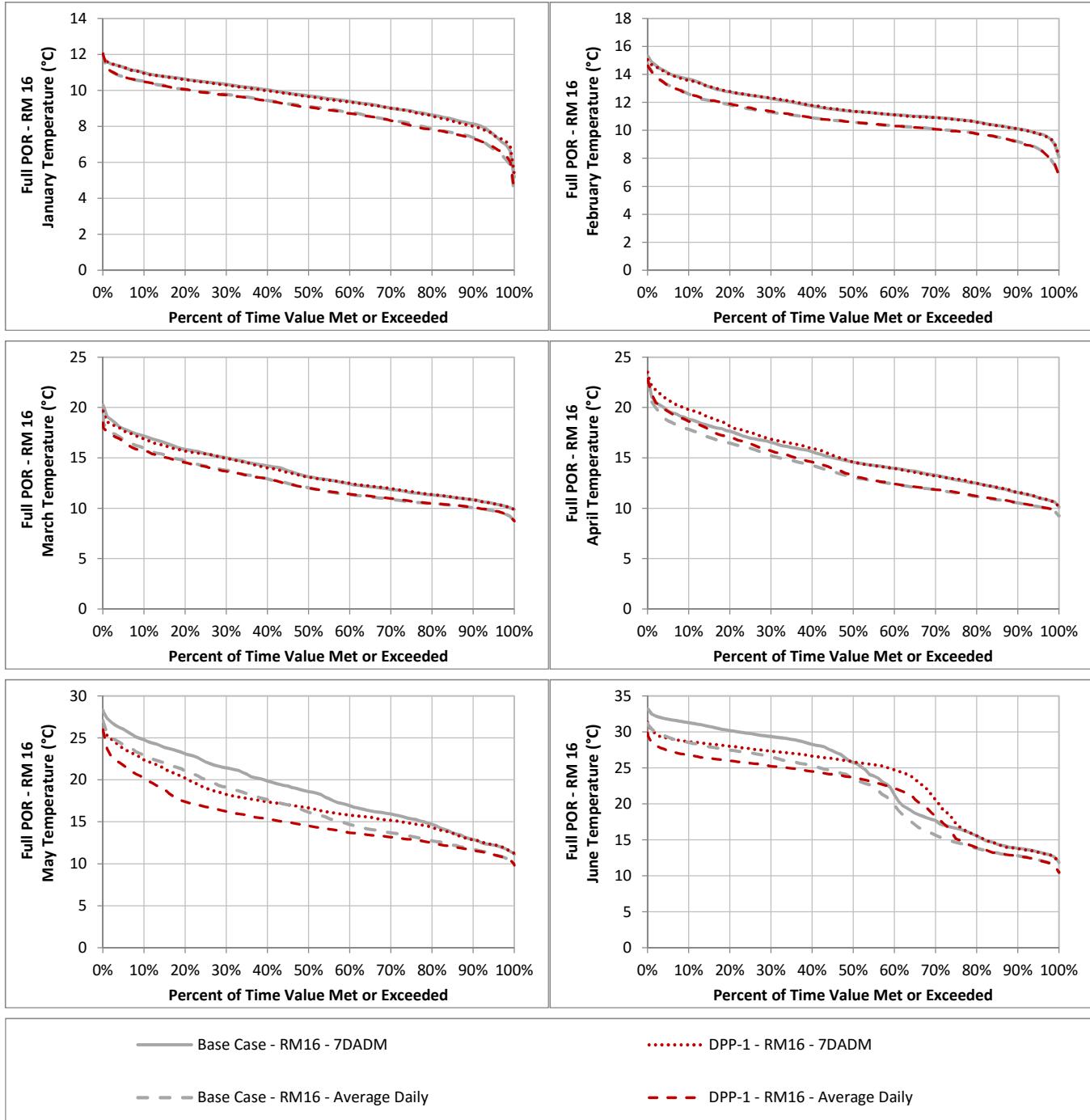


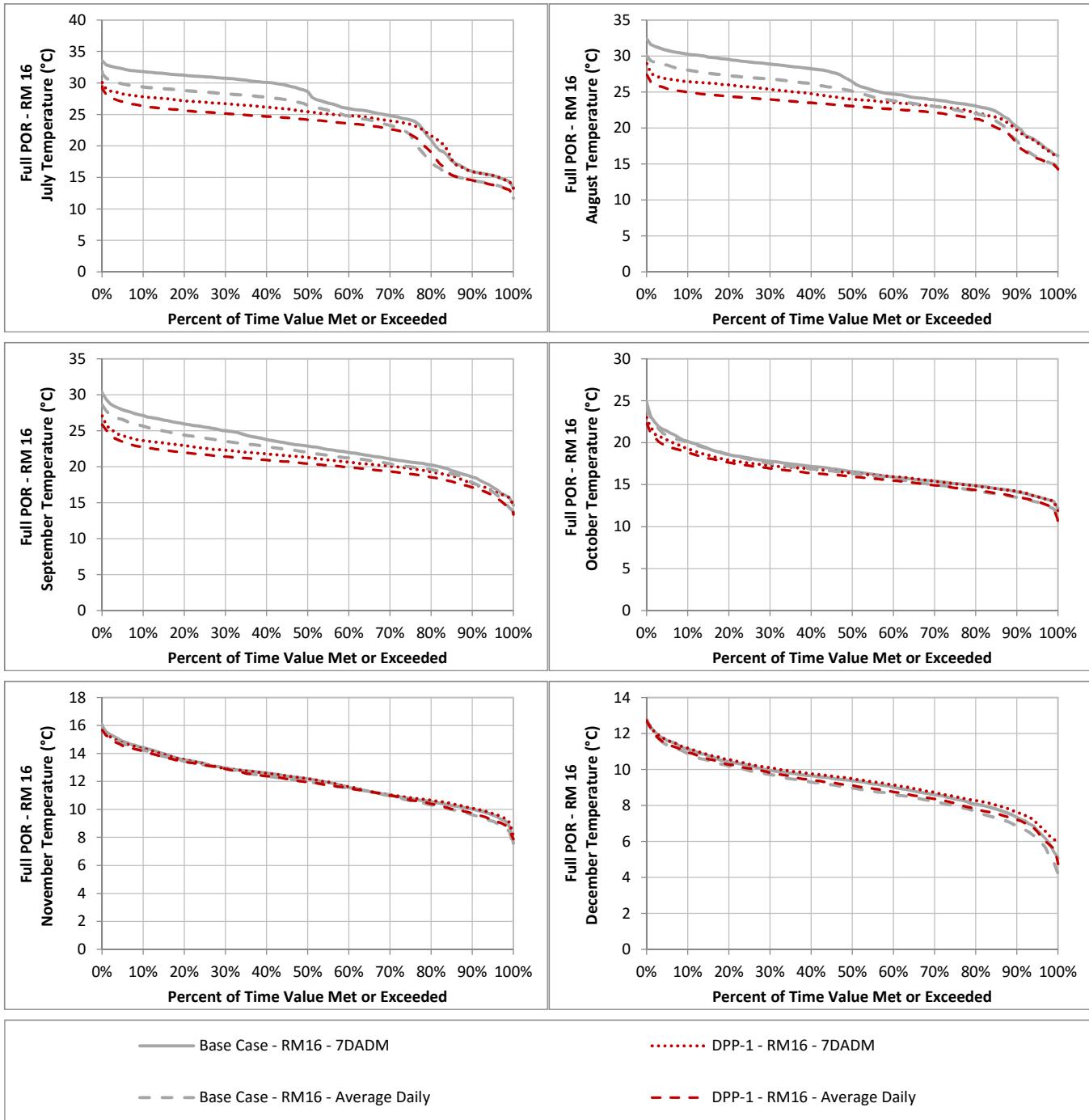


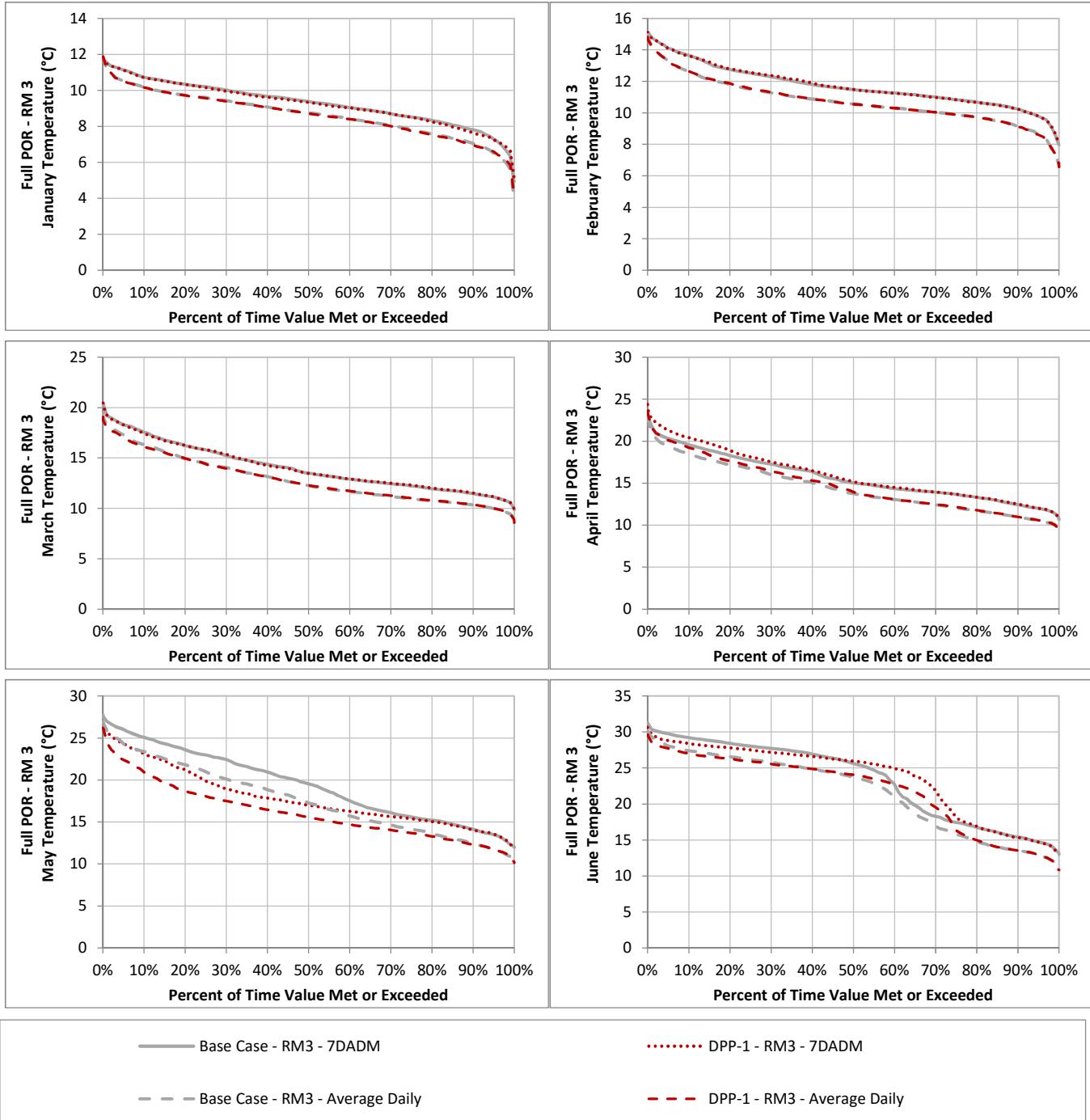


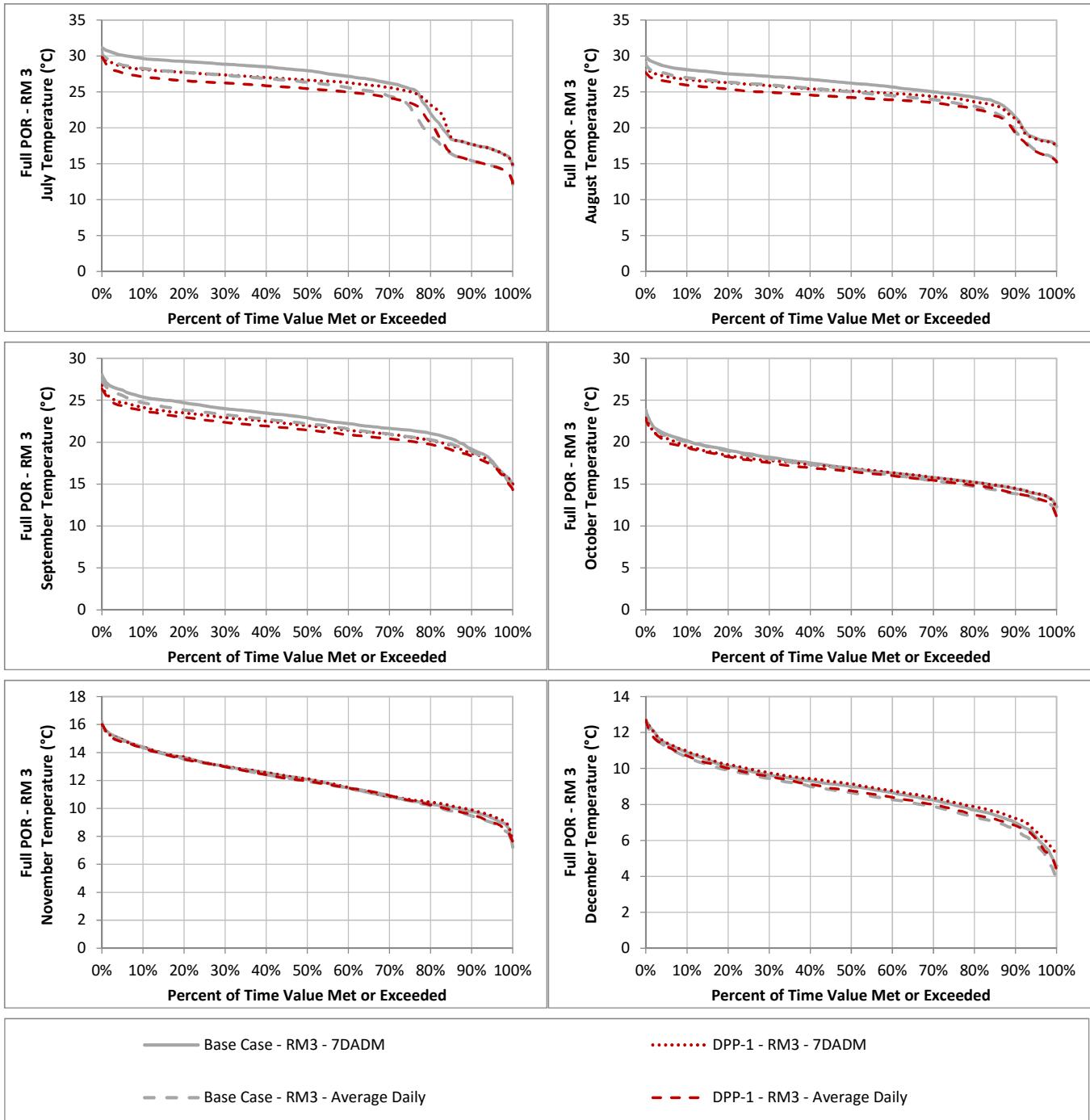












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