United States Department of the Interior

BUREAU OF RECLAMATION
Central Valley Operations Office
3310 El Camino Avenue, Suite 300
Sacramento, California 95821

IN REPLY
REFER TO:

CVO-100
ENV-7.00

SEP 0 8 2015

VIA ELECTRONIC MAIL

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SEP 8 2015
Nat'l Marine Fisheries Svs.
Sacramento, CA
DOC # 001431

Ms. Maria Rea
Assistant Regional Administrator
California Central Valley Area Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, CA 95814

Subject: Sacramento River Temperature Management Plan for Water Year (WY) 2015 Pursuant to Reasonable and Prudent Alternative (RPA) Action I.2.4 of the 2009 Coordinated Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) Biological Opinion (NMFS 2009 BiOp) – Real-Time Adjustment to Keswick Flows

Dear Ms. Rea:

By letter dated June 25, 2015, the Bureau of Reclamation (Reclamation) submitted a revised Sacramento River Temperature Management Plan (Plan) for Water Year 2015 that was prepared pursuant to RPA Action I.2.4 of the National Marine Fisheries Service (NMFS) 2009 BiOp. By letter dated July 1, 2015, NMFS provided concurrence with the revised Plan subject to a number of key conditions. Two of those key conditions related to Base Operations and Real-Time Management (page 6):

- *Base Operations:*
  - *Establish 7,250 cubic feet per second (cfs) as a base flow from Keswick Dam in June and July.*
  - *Keswick releases in August through October shall be as modelled (August: 7,250 cfs; September: 6,500 cfs; and October: 5,000 cfs). These releases are subject to adjustment by the real-time monitoring and decision making group based on performance of the plan in June and July.*

- *Real-Time Management:*
  - *Actual operations will be decided using a real-time monitoring and decision making process that includes representatives from the relevant Federal and State agencies. This decision making process may yield adjustments to base operations depending on real-*

Since June the cold-water management strategy at Shasta Lake has been conducted consistent with the submitted Plan, and the Keswick release has generally been held at 7,200 cfs through the summer. June and July ambient air temperatures in Redding were very warm, but tracked closely with the assumed values used to prepare the June Plan. By contrast the August air temperatures have been much closer to average and smoke cover from nearby wild fires have reduced radiant heating to the Sacramento River. Inflows to Shasta Lake this summer have also been slightly better than the 90% exceedance forecast used as part of the June Plan. As a result of the August meteorological conditions, the cumulative runoff into Shasta Lake and the close management of the Temperature Control Device shutter operations, the volume of cold water in Shasta Lake at the end of August is measurably better than what was forecasted in the June Plan.

Over the last few weeks, Reclamation has been working through the decision making process outlined above to assess the best management strategy for the remaining cold water resource at Shasta Lake. Based on the current information and coordination with the Federal and State fishery agencies, Reclamation believes the base operation of Keswick releases can be flexible managed in a way that will benefit winter-run Chinook salmon, fall-run Chinook salmon, and project water supplies this year. The attached technical information includes modeling results and operational forecasts for Sacramento River Temperature Management assuming continuation of the Keswick release schedule outlined in our June Plan (see above) and potential increased releases patterns for the remainder of the summer and fall.

Through our discussions, it is the consensus of the multi-agency group that Keswick releases should follow scenario 2 in the attached material, subject to ongoing monitoring of river conditions, cold water pool volume and Temperature Control Device performance. With this proposal the Keswick releases would continue at the current release of 7,200 cfs through about October 15 or 20 (the exact date will be based on field data for fish emergence from the gravel). Maintaining a release of 7,200 cfs will create maximum flow stability for all winter-run Chinook redds currently in place in the river. Once fish emergence has been established, flows will gradually be ramped down to target a Keswick release of 4,250 cfs by late October. The extended fall flow objective is to target a minimum Sacramento River flow of 4,250 cfs through the majority of the fall-run spawning reach. As the fall progresses, this minimum flow target would be met through a combination of Keswick releases and valley runoff. The current proposal is to target this flow through January 2016.

Reclamation requests concurrence from NMFS that the operations described above are consistent with the real-time provisions of Sacramento River Temperature Management Plan submitted in June and the overall Drought Contingency Plan prepared pursuant to RPA I.2.3. As always, we appreciate your willingness to work through these complex operations in a real-time process.

Sincerely,

Ronald Milligan
Operations Manager

Enclosures - 1

cc: Please see next page
Continued from previous page.

cc:

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(w/encl to each)

Summary -- Sacramento River Fall Flows

September 2, 2015

	Temp Plan 50% L3MTO 57 degree at CCR	Temp Plan 10% L3MTO 57 degree at CCR	Sep. 50% L3MTO (Base Case)	Sep. 50% L3MTO (Scenario 1)	Sep. 50% L3MTO (Scenario 2)	Sep. 10% L3MTO (Base Case)	Sep. 10% L3MTO (Scenaro 1)	Sep. 10% L3MTO (Scenaro 2)
Sep. Releases (cfs)	6500	6500	6500	7000	7200	6500	7000	7200
Oct. Releases (cfs)	5000	5000	5000	6000	6150	5000	6000	6150
Nov. Releases (cfs)	4000	4000	4000	5000	4250	4000	5000	4250
Dec. Releases (cfs)	4000	4000	4000	4500	4250	4000	4500	4250
Jan. Releases (cfs)	3250	3250	3250	3250	4250	3250	3250	4250
First Side Gate Used	Aug 31	Aug 31	Sep22	Sep20	Sep20	Sep 23	Sep 20	Sep20
Primary Reliance of Side Gate	Oct 11	Oct 9						Oct 31
End of Sep. Volume < 54 degree	207	207	321	287	291	319	287	291

Sacramento River Release Options Summary

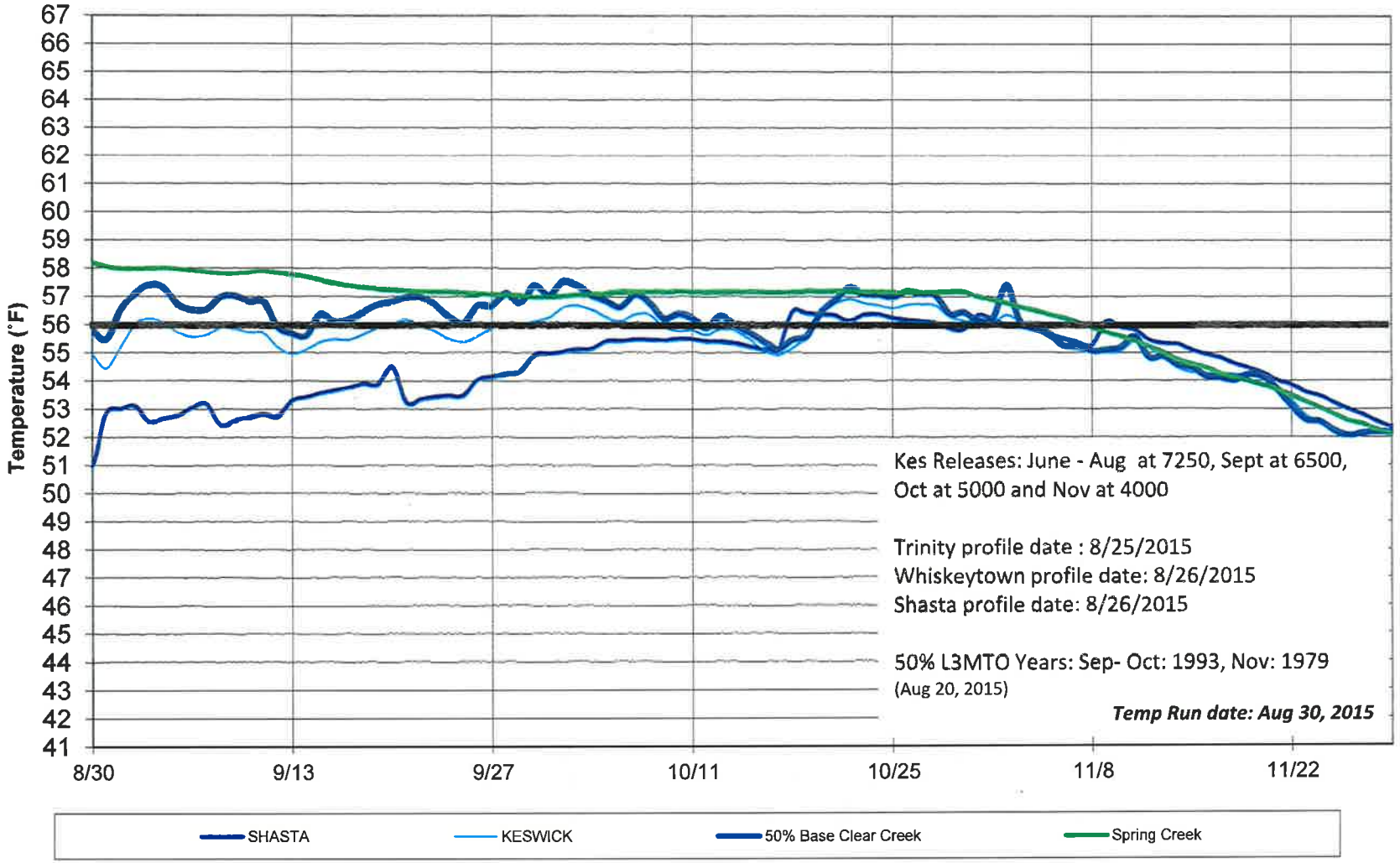
Base Case	Sep	Oct	Nov	Dec	Jan
Trinity Storage	584	553	520	504	512
Shasta Storage	1496	1415	1424	1449	1569
Folsom Storage	164	139	133	155	188
Federal San Luis Storage *	42	67	77	153	249
Trinity River Releases	795	373	300	300	300
Clear Creek Releases	150	175	175	175	175
Sacramento River Releases	6500	5000	4000	4000	3250
Carr Pumping Plant	62	15	28	19	6
Trinity Diversions (Spr Crk PP)	60	30	19	12	3
Delta Summary (TAF)					
	Sep	**Oct**	**Nov**	**Dec**	**Jan**
Tracy	130	125	87	120	114
State Export	35	50	48	139	241
Computed DOI	3009	4197	5093	4994	6003
Old/Middle R. calc.	-2732	-2554	-2212	-3653	-4714

Scenario 1	Sep	Oct	Nov	Dec	Jan
Trinity Storage	582	551	519	503	510
Shasta Storage	1464	1317	1267	1261	1382
Folsom Storage	164	139	134	156	188
Federal San Luis Storage *	72	157	227	334	430
Trinity River Releases	795	373	300	300	300
Clear Creek Releases	225	225	175	175	175
Sacramento River Releases	7000	6000	5000	4500	3250
Carr Pumping Plant	63	15	28	19	6
Trinity Diversions (Spr Crk PP)	57	27	19	12	3
Delta Summary (TAF)					
	Sep	**Oct**	**Nov**	**Dec**	**Jan**
Tracy	160	186	146	151	114
State Export	35	50	48	139	241
Computed DOI	3076	4262	5093	4994	6003
Old/Middle R. calc.	-3121	-3318	-2975	-4042	-4714

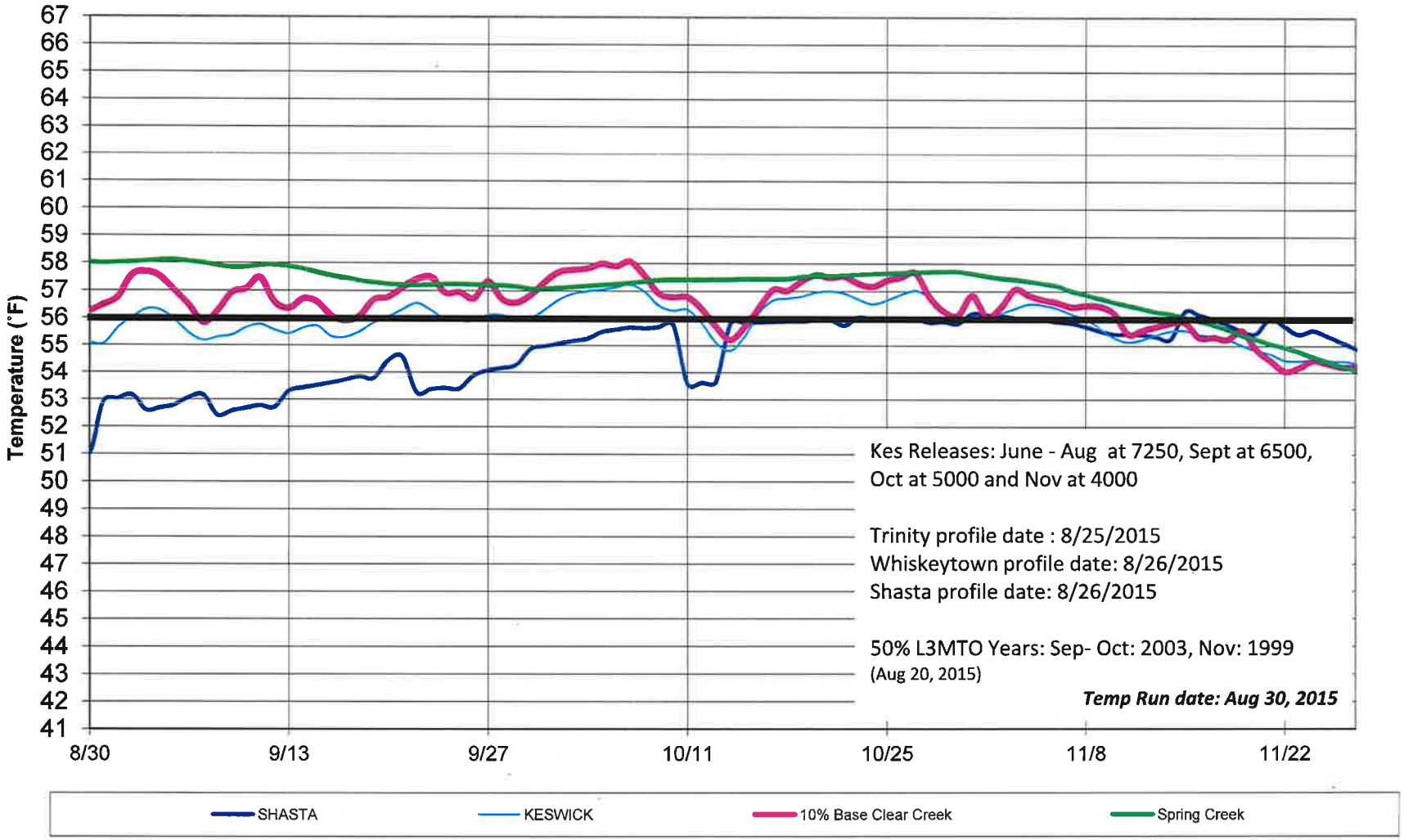
Scenario 2	Sep	Oct	Nov	Dec	Jan
Trinity Storage	582	551	519	503	510
Shasta Storage	1452	1296	1291	1300	1360
Folsom Storage	164	139	133	155	188
Federal San Luis Storage *	88	186	212	303	460
Trinity River Releases	795	373	300	300	300
Clear Creek Releases	225	225	175	175	175
Sacramento River Releases	7200	6150	4250	4250	4250
Carr Pumping Plant	63	15	28	19	6
Trinity Diversions (Spr Crk PP)	57	27	19	12	3
Delta Summary (TAF)					
	Sep	**Oct**	**Nov**	**Dec**	**Jan**
Tracy	176	199	102	135	138
State Export	35	50	48	139	241
Computed DOI	3009	4197	5093	4994	6003
Old/Middle R. calc.	-3328	-3481	-2406	-3841	-5015

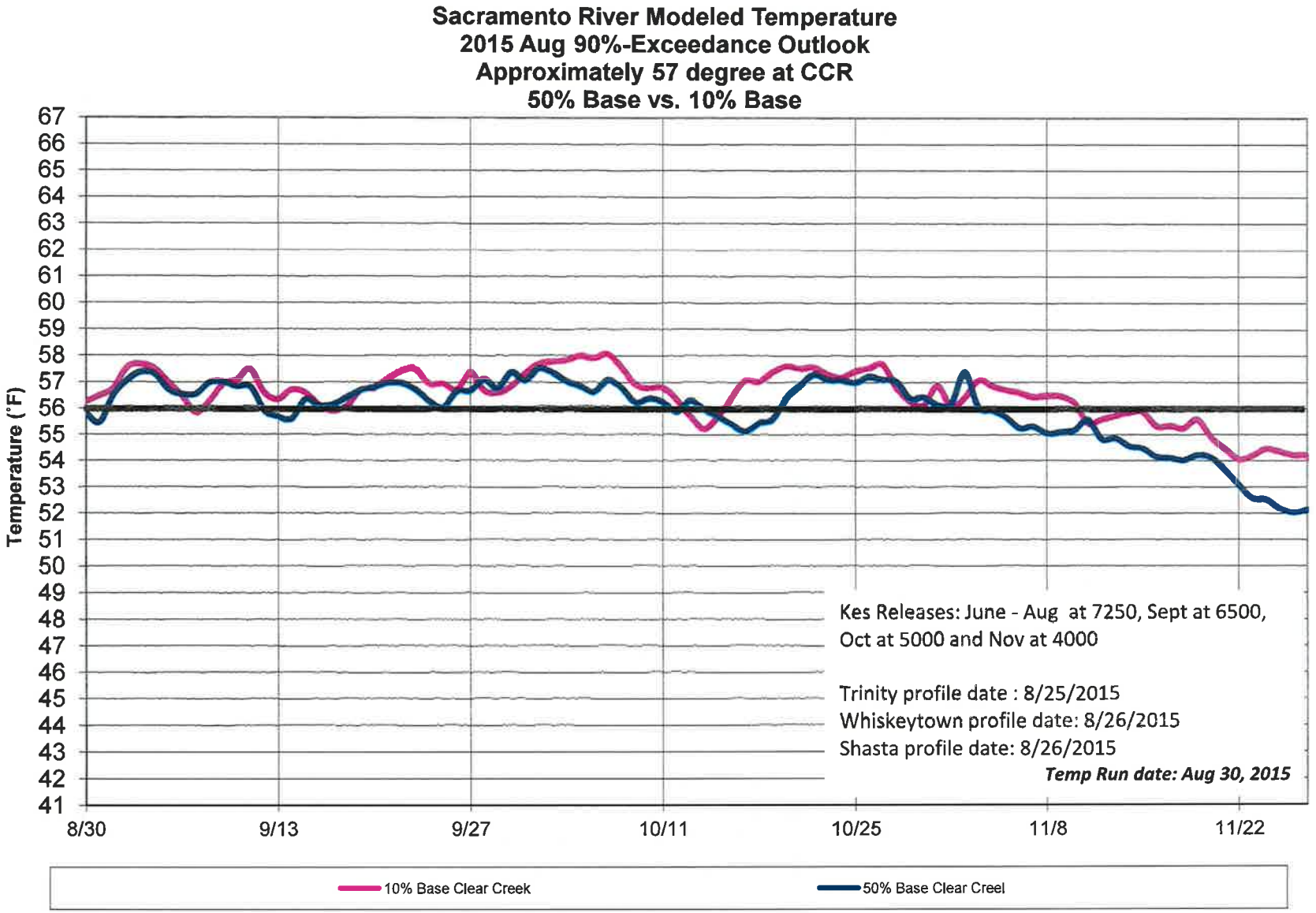
** Note - repayment to SWP of 80 TAF has NOT been taken out of FSL storage*

Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 50% L3MTO
Base - Approximately 57 degree at CCR



Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 10% L3MTO
Base - Approximately 57 degree at CCR




Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook
Approximately 57 degree at CCR
50% Base vs. 10% Base
Temperature (°F)
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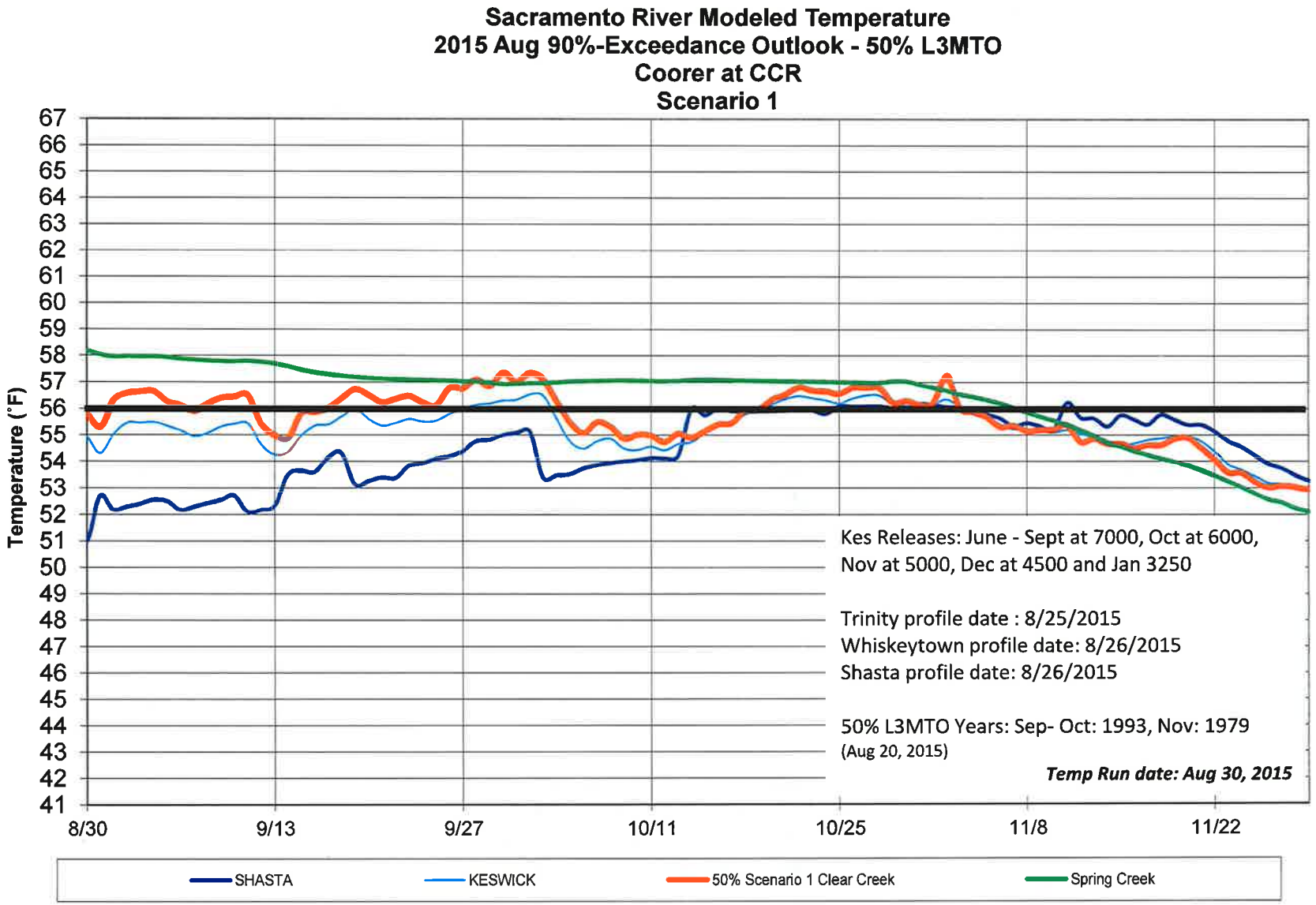
Kes Releases: June - Aug at 7250, Sept at 6500,
Oct at 5000 and Nov at 4000
Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
Temp Run date: Aug 30, 2015
10% Base Clear Creek
50% Base Clear Creel


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 50% L3MTO
Coorer at CCR
Scenario 1
Temperature (°F)
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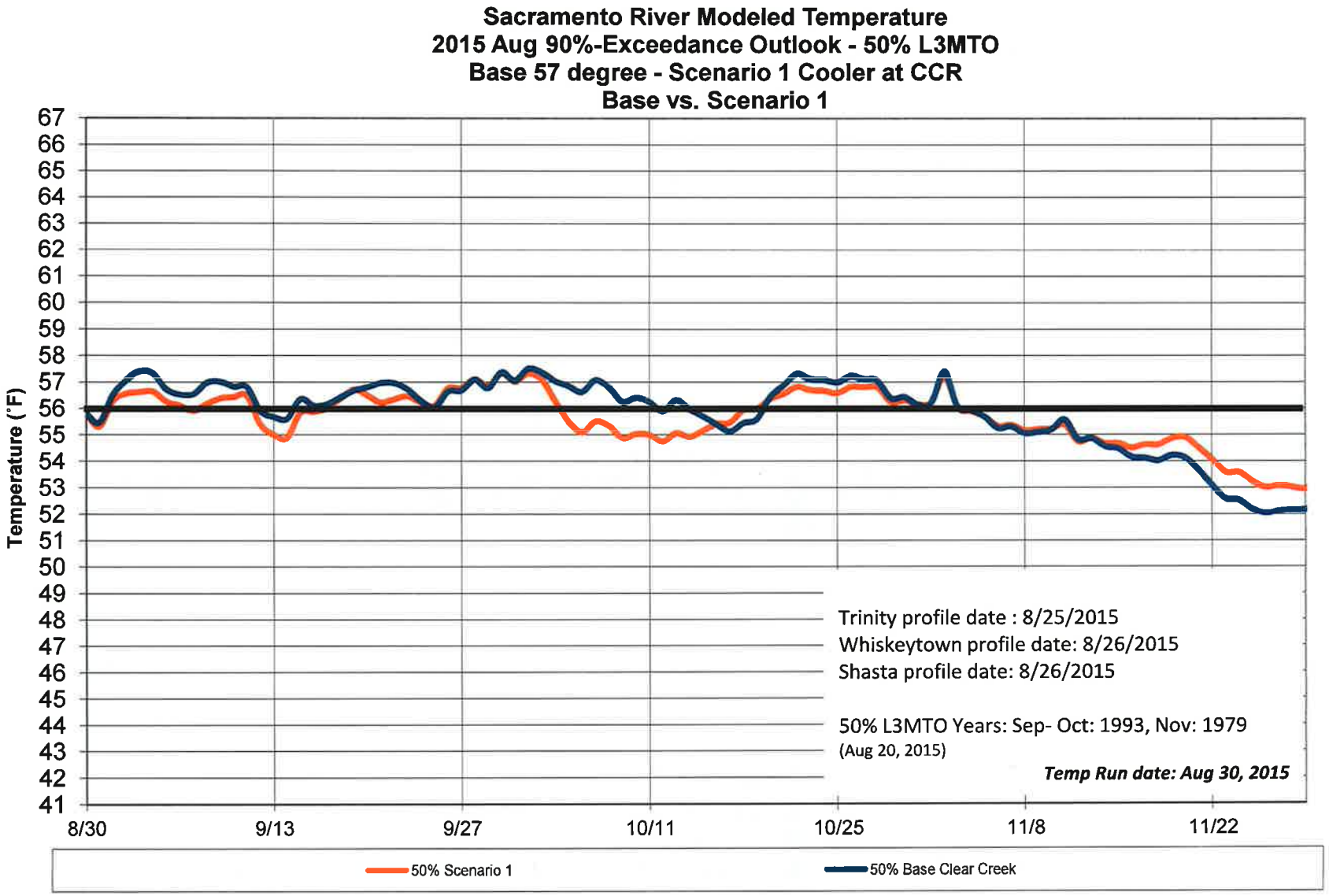
Kes Releases: June - Sept at 7000, Oct at 6000,
Nov at 5000, Dec at 4500 and Jan 3250
Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
50% L3MTO Years: Sep- Oct: 1993, Nov: 1979
(Aug 20, 2015)
Temp Run date: Aug 30, 2015
SHASTA
KESWICK
50% Scenario 1 Clear Creek
Spring Creek


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 50% L3MTO
Base 57 degree - Scenario 1 Cooler at CCR
Base vs. Scenario 1
Temperature (°F)
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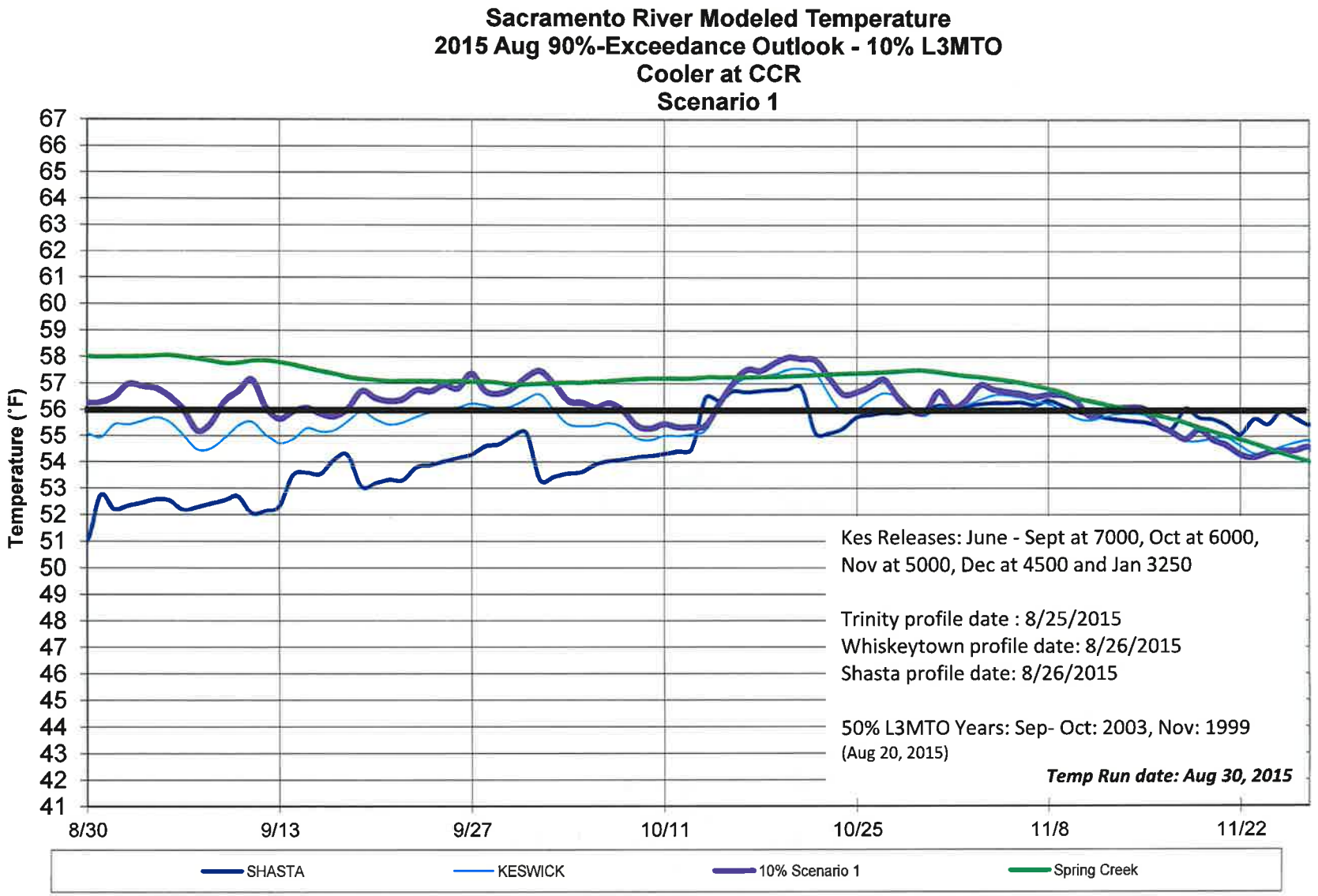
Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
50% L3MTO Years: Sep- Oct: 1993, Nov: 1979
(Aug 20, 2015)
Temp Run date: Aug 30, 2015
50% Scenario 1
50% Base Clear Creek


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 10% L3MTO
Cooler at CCR
Scenario 1
Temperature (°F)
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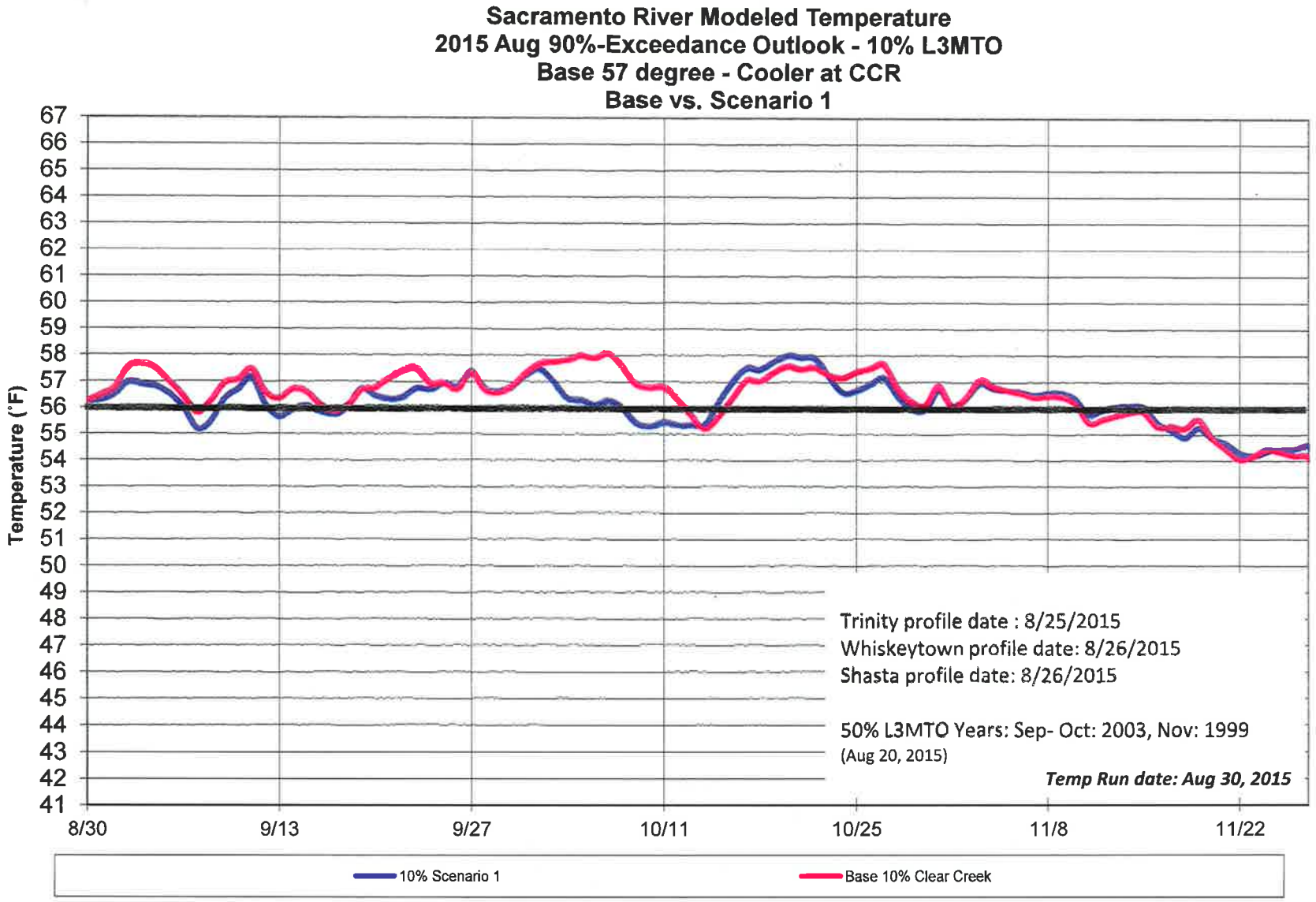
Kes Releases: June - Sept at 7000, Oct at 6000,
Nov at 5000, Dec at 4500 and Jan 3250
Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
50% L3MTO Years: Sep- Oct: 2003, Nov: 1999
(Aug 20, 2015)
Temp Run date: Aug 30, 2015
SHASTA
KESWICK
10% Scenario 1
Spring Creek


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 10% L3MTO
Base 57 degree - Cooler at CCR
Base vs. Scenario 1
Temperature (°F)
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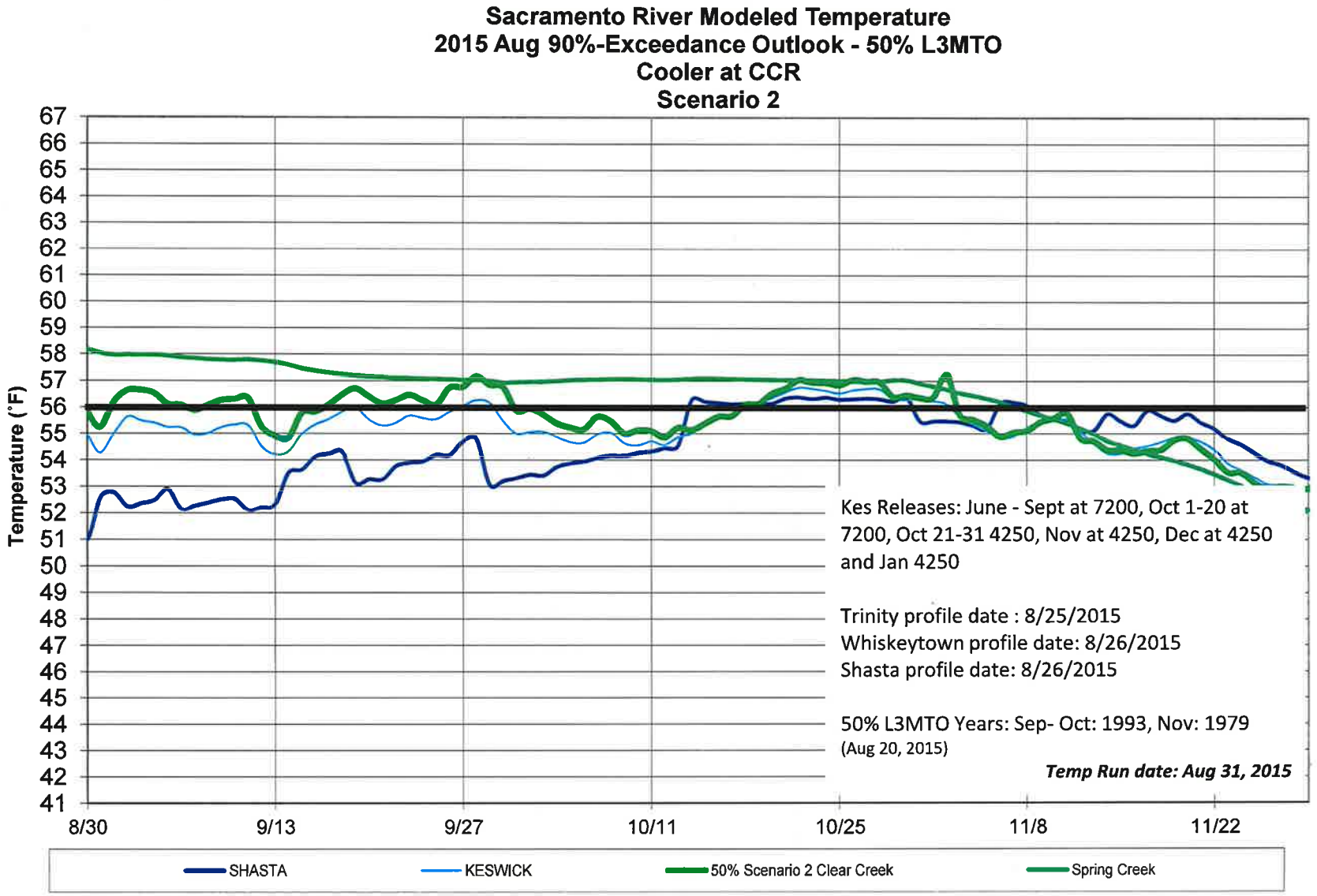
Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
50% L3MTO Years: Sep- Oct: 2003, Nov: 1999
(Aug 20, 2015)
Temp Run date: Aug 30, 2015
10% Scenario 1
Base 10% Clear Creek


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 50% L3MTO
Cooler at CCR
Scenario 2
Temperature (°F)
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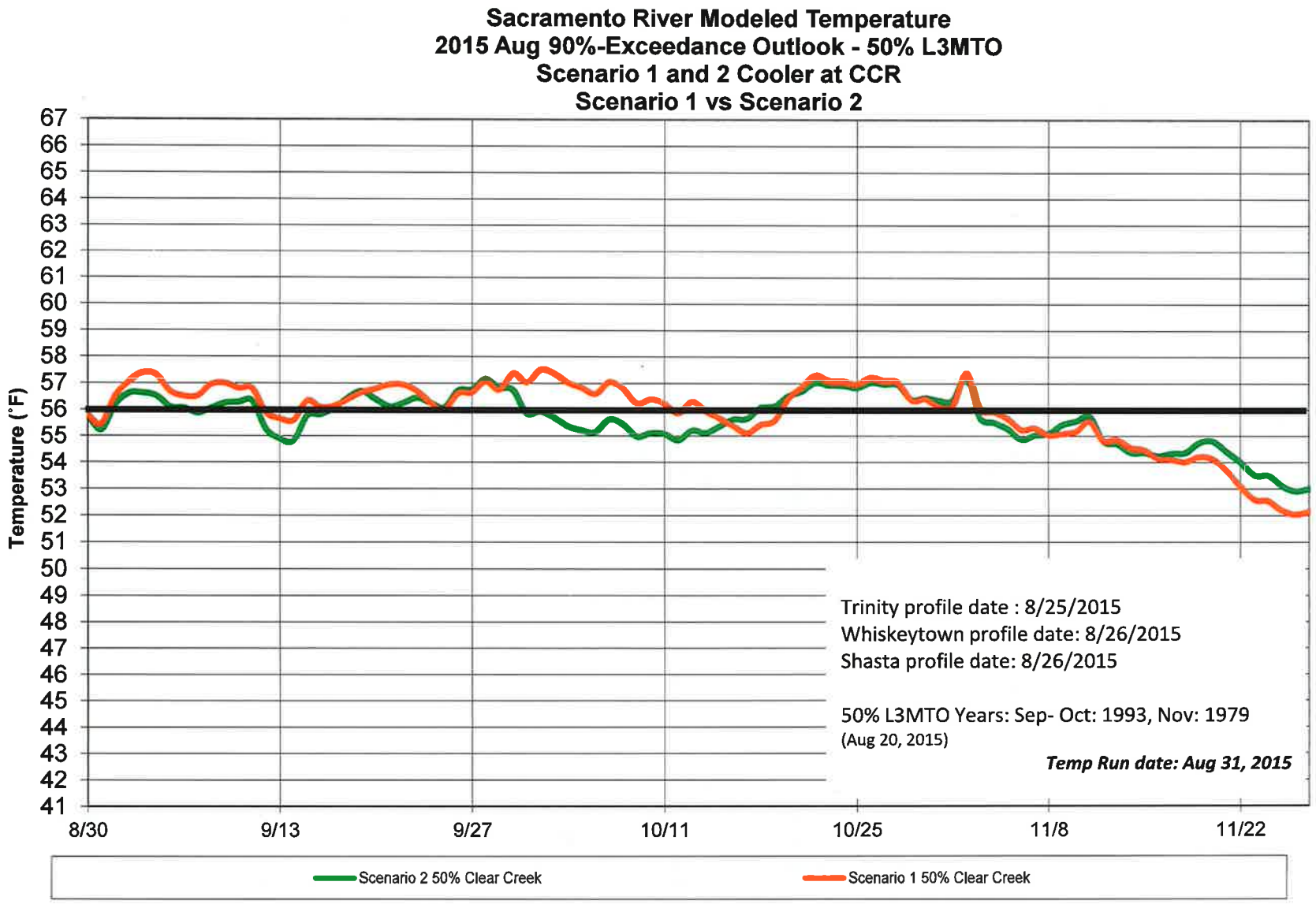
Kes Releases: June - Sept at 7200, Oct 1-20 at 7200, Oct 21-31 4250, Nov at 4250, Dec at 4250 and Jan 4250
Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
50% L3MTO Years: Sep- Oct: 1993, Nov: 1979
(Aug 20, 2015)
Temp Run date: Aug 31, 2015
SHASTA
KESWICK
50% Scenario 2 Clear Creek
Spring Creek


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 50% L3MTO
Scenario 1 and 2 Cooler at CCR
Scenario 1 vs Scenario 2
Temperature (°F)
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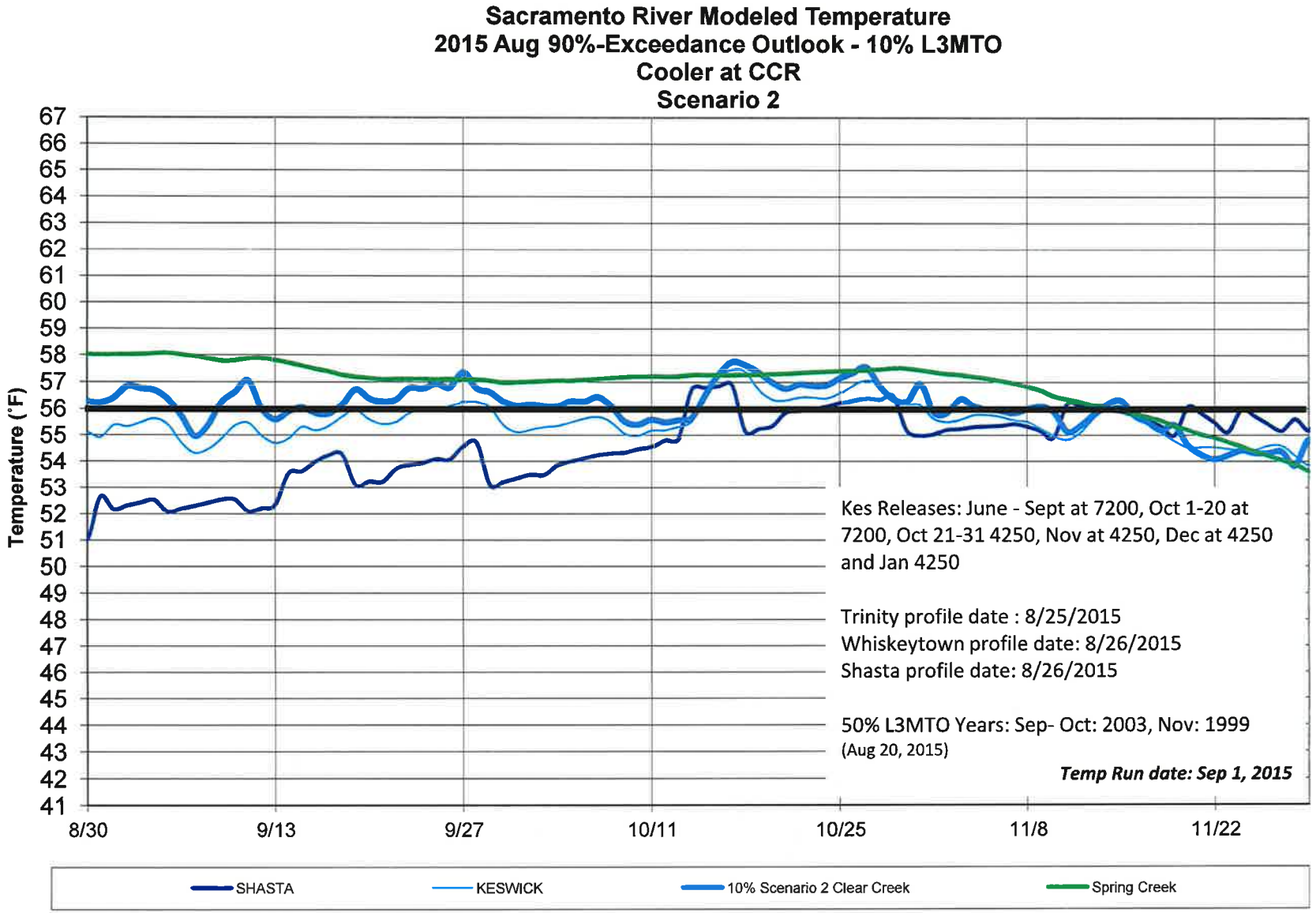
Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
50% L3MTO Years: Sep- Oct: 1993, Nov: 1979
(Aug 20, 2015)
Temp Run date: Aug 31, 2015
Scenario 2 50% Clear Creek
Scenario 1 50% Clear Creek


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 10% L3MTO
Cooler at CCR
Scenario 2
Temperature (°F)
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Whiskeytown profile date: 8/26/2015
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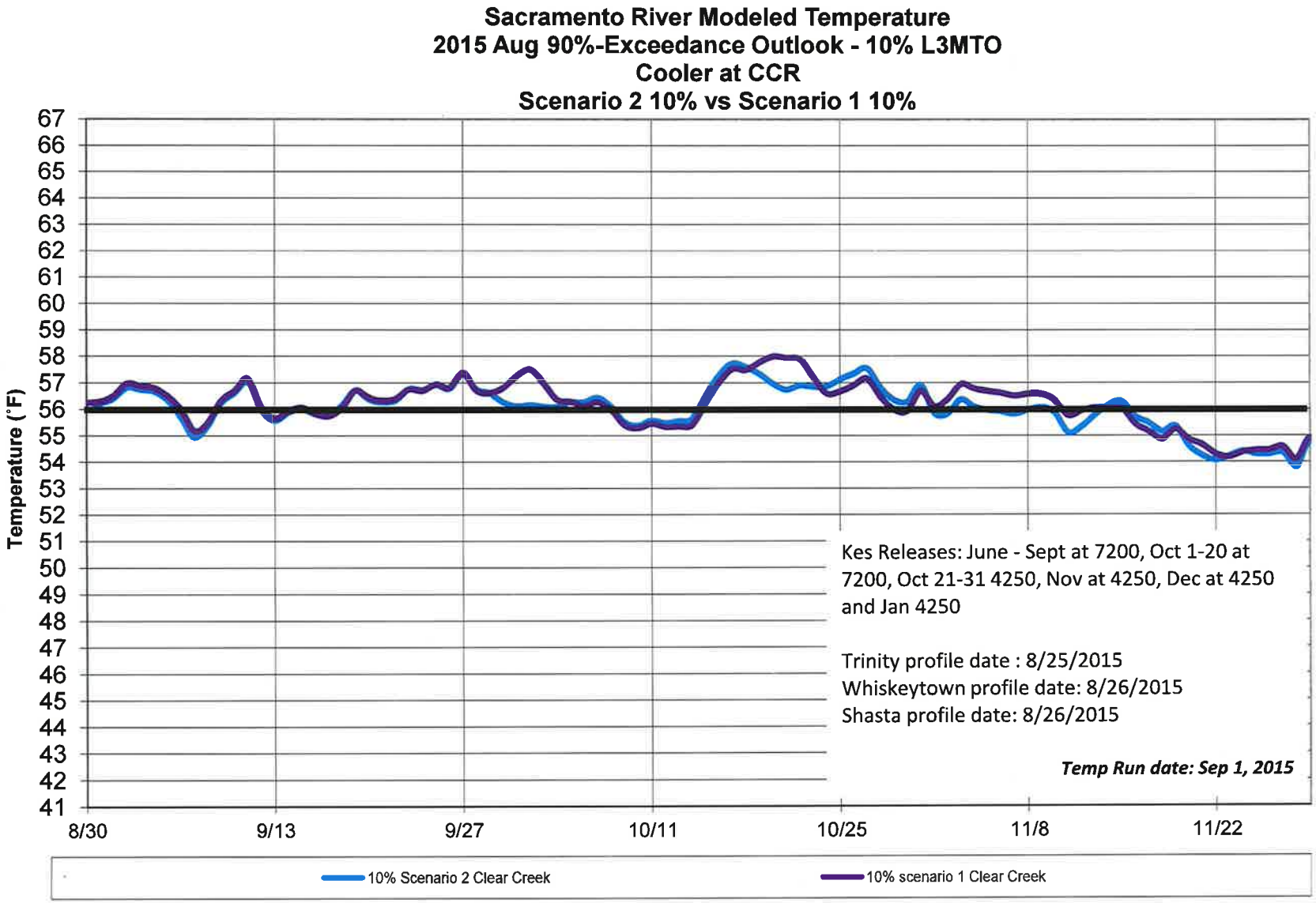
Spring Creek


Sacramento River Modeled Temperature
2015 Aug 90%-Exceedance Outlook - 10% L3MTO
Cooler at CCR
Scenario 2 10% vs Scenario 1 10%
Temperature (°F)
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Trinity profile date : 8/25/2015
Whiskeytown profile date: 8/26/2015
Shasta profile date: 8/26/2015
Temp Run date: Sep 1, 2015
10% Scenario 2 Clear Creek
10% scenario 1 Clear Creek