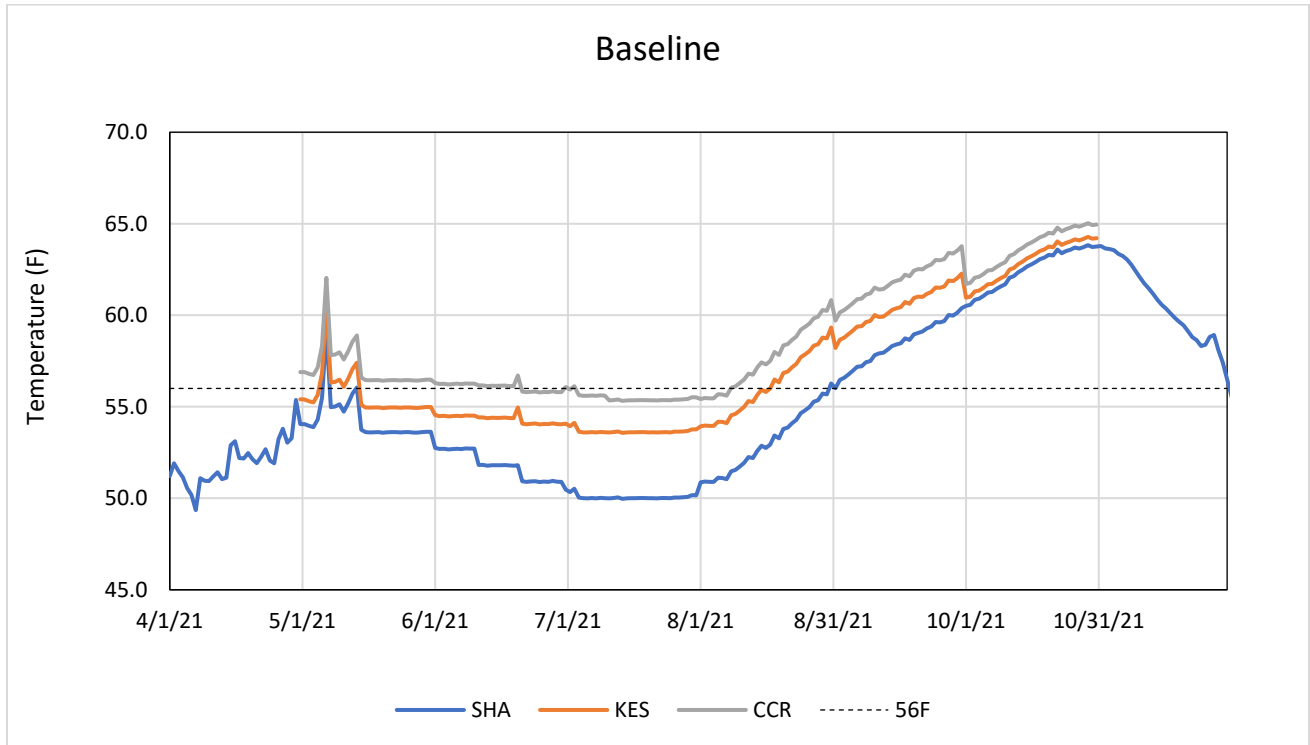


Warm Water Power Bypass Temperature and Temperature Dependent Mortality Modeling Results and Assumptions

Preliminary Baseline Scenario

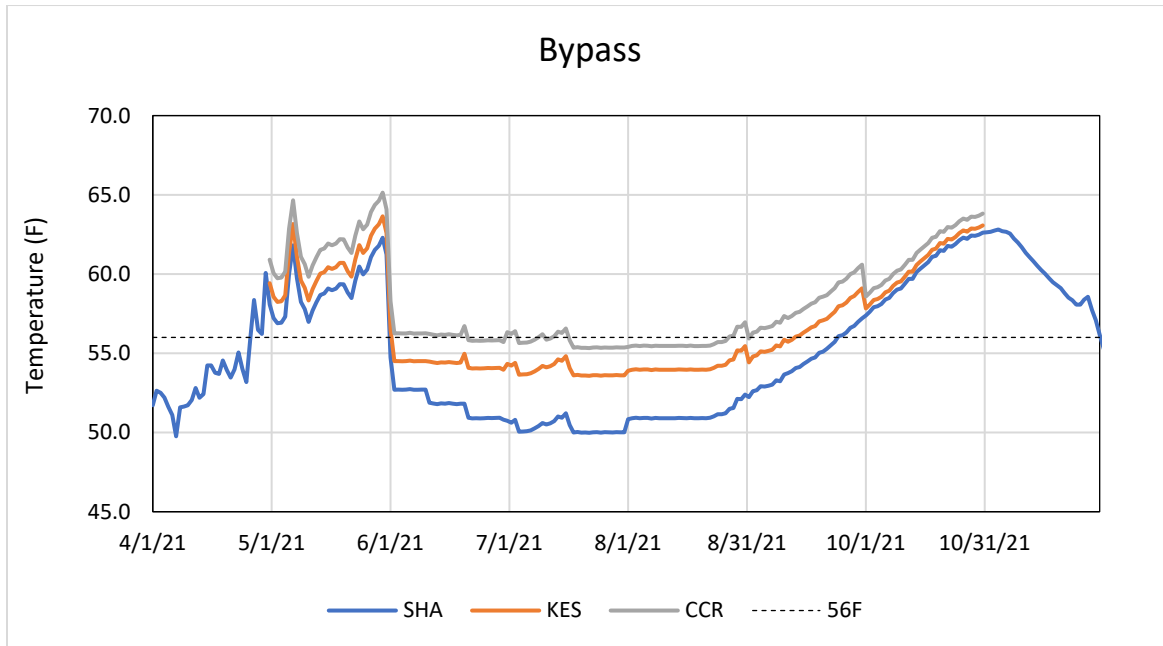


4/12/2021
90% March forecast
Shasta Tailbay Target (see table at right)
Target +/- 4 weeks of lower Tw centered at 8/1
2015 meteorology
Shasta Inflow Tw based on 2015 meteorology
Estimated heating Shasta Dam (SHA) to Keswick Dam (KES) based on 2015 heating rates
Estimated heating Keswick Dam to Clear Creek (CCR) based on 2015 heating rates
Side gate 7/1

	TAILBAY	TAILBAY
	TARGET	TARGET
	C	F
1-Apr	20.0	68.0
30-Apr	20.0	68.0
1-May	12.0	53.6
31-May	12.0	53.6
1-Jun	11.5	52.7
10-Jun	11.5	52.7
11-Jun	11.0	51.8
20-Jun	11.0	51.8
21-Jun	10.5	50.9
30-Jun	10.5	50.9
1-Jul	10.5	50.9
3-Jul	10.5	50.9
4-Jul	10.0	50.0
31-Jul	10.0	50.0
1-Aug	10.5	50.9
28-Aug	10.5	50.9
29-Aug	11.0	51.8
10-Sep	11.0	51.8
11-Sep	11.0	51.8
20-Sep	11.0	51.8
21-Sep	11.0	51.8
30-Sep	11.0	51.8
1-Oct	11.0	51.8
31-Oct	11.0	51.8

Parameter	Baseline Scenario. File titled “ W2 Simulation Draft Result_8-1 Center 4-12-21” Sheet titled “Baseline”	Baseline Scenario. File titled “ W2 Simulation Draft Result_8-1 Center 4-12-21” Sheet titled “Baseline”
Meteorology source	2015 (most severe record available)	2015 (most severe record available)
Time period	5/1/21-10/31/21	5/1/21-10/31/21
Reservoir Model used	CE-QUAL (M. Deas modeled)	CE-QUAL (M. Deas modeled)
River Model used	Estimated from 2015 river heating rates	Estimated from 2015 river heating rates
Shasta Profile date	3/31/21	3/31/21
TCD Gate operations	CE-QUAL (M. Deas modeled)	CE-QUAL (M. Deas modeled)
Sacramento water temperatures	Estimated heating Shasta Dam (SHA) to Keswick Dam (KES) and Clear Creek (CCR) based on 2015 heating rates.	Estimated heating Shasta Dam (SHA) to Keswick Dam (KES) and Clear Creek (CCR) based on 2015 heating rates
Biological Model	SacPAS Fish Model. Used water temperature file titled “Input 041221 baseline.”	SacPAS Fish Model. Used water temperature file titled “ Input 041221 baseline .”
Temperature Mortality Model	Stage-dependent mortality (Anderson)	Stage-independent mortality (Martin)
Egg emergence timing model	487 (degree C days)	Linear. 958 ATUs (degrees C), as indicated for Zeug et al. on SacPAS under Egg to emergence timing model.
TDM redd time distribution	Observed 2000-2020	Observed 2000-2020
TDM redd space distribution	Observed 2000-2020	Observed 2000-2020
TDM Tcrit (50th percentile)	12.04 degrees C	12.14 degrees C
TDM bT (50th percentile)	1.17 °C-1d-1	0.026 °C-1d-1
Critical Days	3	All
TDM estimate	77.5%	85.6%

Preliminary Power Bypass Scenario



4/12/2021
90% March forecast
Target +/- 4 weeks of lower Tw centered at 8/1
2015 meteorology
Shasta Inflow Tw based on 2015 meteorology
Estimated heating Shasta Dam (SHA) to Keswick Dam (KES) based on 2015 heating rates
Estimated heating Keswick Dam to Clear Creek (CCR) based on 2015 heating rates
90% bypass (300 cfs through TCD)
Bypass 4/1 to 5/31
Side gate 7/17

Parameter	Baseline Scenario. File titled “ W2 Simulation Draft Result_8-1 Center 4-12-21” Sheet titled “Bypass”	Baseline Scenario. File titled “ W2 Simulation Draft Result_8-1 Center 4-12-21” Sheet titled “ Bypass ”
Meteorology source	2015 (most severe record available)	2015 (most severe record available)
Time period	5/1/21-10/31/21	5/1/21-10/31/21
Reservoir Model used	CE-QUAL (M. Deas modeled)	CE-QUAL (M. Deas modeled)
River Model used	Estimated from 2015 river heating rates	Estimated from 2015 river heating rates
Shasta Profile date	3/31/21	3/31/21
TCD Gate operations	CE-QUAL (M. Deas modeled)	CE-QUAL (M. Deas modeled)
Sacramento water temperatures	Estimated heating Shasta Dam (SHA) to Keswick Dam (KES) and Clear Creek (CCR) based on 2015 heating rates.	Estimated heating Shasta Dam (SHA) to Keswick Dam (KES) and Clear Creek (CCR) based on 2015 heating rates
Biological Model	SacPAS Fish Model. Used water temperature file titled “Input 041221 powerbypass”	SacPAS Fish Model. Used water temperature file titled “Input 041221 powerbypass .”
Temperature Mortality Model	Stage-dependent mortality (Anderson)	Stage-independent mortality (Martin)
Egg emergence timing model	487 (degree C days)	Linear. 958 ATUs (degrees C), as indicated for Zeug et al. on SacPAS under Egg to emergence timing model.
TDM redd time distribution	Observed 2000-2020	Observed 2000-2020
TDM redd space distribution	Observed 2000-2020	Observed 2000-2020
TDM Tcrit (50th percentile)	12.04 degrees C	12.14 degrees C
TDM bT (50th percentile)	1.17 °C-1d-1	0.026 °C-1d-1
Critical Days	3	All
TDM estimate	70.6%	67%