APPENDIX E-1
SUMMARY OF SUPPLEMENTAL MODELING RESULTS TO SUPPORT THE UNFFR PROJECT EIR

October 2012

Upper North Fork Feather River Hydroelectric Project

Draft Environmental Impact Report

State Water Resources Control Board
Sacramento, CA

November 2014

Summary of Supplemental Modeling Results to Support the UNFFR Project EIR

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Summary of Additional Modeling Results to Support the UNFFR Project EIR
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Introduction

The purpose of this technical memorandum is to summarize the results of the additional modeling work for the following two combinations of temperature reduction measures selected by the State Water Board (SWB) and to prepare model output tables and graphs as directed by NSR for use in the EIR.

- Combination 1 — Thermal Curtains at both Prattville and Caribou Intakes and Modified Canyon Dam Flows up to 250 cfs from June 16 through September 15 (without removal of submerged levees near Prattville Intake).

- Combination 2 — Thermal Curtains at both Prattville Intake and Caribou Intakes (without removal of submerged levees near Prattville Intake).

Baseline and "Present Day" conditions are also included to provide a basis for comparing alternatives. These two conditions were already analyzed in Stetson's Level 3 Report. Baseline conditions are those that existed at the time the Notice of Preparation was submitted to the State Clearinghouse (September 1, 2005) and the CEQA scoping process was initiated. The "Present Day" alternative is essentially the alternative proposed by PG&E in its license application (essentially the same as the FERC staff recommended alternative in the EIS).

The Level 3 modeling work for Baseline and "Present Day" conditions and the additional modeling work for Combination 1 and Combination 2 considered the following flow releases:

Baseline Conditions:

CEQA Baseline conditions, for purposes of modeling flow regimes for the UNFFR, were the conditions that existed when the Notice of Preparation (NOP) was filed. The NOP of the UNFFR Project was submitted to the State Clearinghouse on September 1, 2005. Accordingly, the Baseline conditions, with respect to flows, were as follows:

- Canyon Dam releases to the Seneca Reach were those that actually existed as of the NOP, which were also the required minimum flows (i.e., 35 cfs) under the existing FERC license for the UNFFR Project;

- Belden Dam releases to the Belden Reach were those that actually existed as of the NOP, which were also the required minimum flows (i.e., 140 cfs) under the existing FERC license for the UNFFR Project;

- Rock Creek Dam releases to the Rock Creek Reach were those that actually existed as of the NOP, which were also those given in the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the first 5-year, plus about 30 cfs of leakage;

- Cresta Dam releases to the Cresta Reach were those that actually existed as of the NOP, which were also those given in the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the first 5-year, plus about 30 cfs of leakage; and,

- Poe Dam releases to the Poe Reach were those that actually existed as of the NOP, which were 100 cfs.

"Present Day" Conditions:

"Present Day" conditions more accurately reflect the foreseeable future conditions without consideration of the water temperature reduction measures at the UNFFR Project. "Present Day" conditions, with respect to flows, were as follows:

- Canyon Dam releases to the Seneca Reach were those agreed to in the Partial Settlement for the UNFFR Project (see Table 1);

- Belden Dam releases to the Belden Reach were those given in the Partial Settlement for the UNFFR Project;

- Rock Creek Dam releases to the Rock Creek Reach were those given in the proposed changes to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the second 5-year (see Table 1);

- Cresta Dam releases to the Cresta Reach were those given in the proposed changes to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the second 5-year; and,

- Poe Dam releases to the Poe Reach were those of current operations (about 100 cfs).

Combinations 1 and 2 Conditions:

- Canyon Dam releases to the Seneca Reach were those proposed by SWB for the UNFFR Project (see Table 2), except the increased Canyon Dam releases to 250 cfs from June 16 through September 15 for Combination 1;

- Belden Dam releases to the Belden Reach were those proposed by SWB for the UNFFR Project (see Table 2);

- Rock Creek Dam releases to the Rock Creek Reach were those given in the proposed changes to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the second 5-year;

- Cresta Dam releases to the Cresta Reach were those given in the proposed changes to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the second 5-year; and,

- Poe Dam releases to the Poe Reach were those of current operations (about 100 cfs).

Table 1. Seneca and Belden Instream Flow Release Schedule (cfs).
(Draft Settlement Agreement in April 2004, FERC #2105.)

Seneca Reach												
Water Year Type	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Critical Dry	75	75	90	90	90	80	75	60	60	60	60	70
Dry	90	100	110	110	110	110	80	70	60	60	60	75
Normal	90	100	125	125	125	125	90	80	60	60	60	75
Wet	90	100	125	150	150	150	95	80	60	60	60	75
Belden Reach												
Water Year Type	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Critical Dry	105	130	170	180	185	90	80	75	75	75	85	90
Dry	135	140	175	195	195	160	130	110	100	100	110	115
Normal	140	140	175	225	225	225	175	140	140	120	120	120
Wet	140	140	180	235	235	225	175	140	140	120	120	120

Table 2. Seneca and Belden Instream Flow Release Schedule (cfs).
(Proposed by SWB.)

Seneca Reach												
Water Year Type	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Critically dry	***70***	***70***	***80***	***80***	***85***	***85***	***85***	***80***	60	60	60	70
Dry	90	***90***	***100***	***100***	***100***	***100***	***100***	***100***	60	60	60	75
Normal	90	100	***110***	***110***	***120***	***120***	***110***	***100***	60	60	60	75
Wet	90	100	***110***	***130***	150	150	***110***	***100***	60	60	60	75
Belden Reach												
Water Year Type	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Critically dry	***110***	130	170	180	185	***140***	***140***	***140***	***140***	***110***	***110***	***110***
Dry	135	140	175	195	195	160	***140***	***140***	***140***	***120***	***120***	***120***
Normal	140	140	***205***	225	225	225	175	140	140	***140***	***140***	***140***
Wet	140	140	***210***	235	235	225	175	140	140	***140***	***140***	***140***

Note: ***Bold and Italic*** font indicates change in minimum flow from Settlement Agreement.

Methods Used in the Additional Modeling Work

To ensure that all alternatives were analyzed to the same level of detail as in Stetson's Level 3 Report, detailed model simulations of mean daily water temperature profiles and MWAT profiles along the bypass reaches were conducted for both Combination 1 and Combination 2. Detailed model simulations to analyze the effects on cold freshwater habitat in Lake Almanor and Butt Valley Reservoir were conducted for Combination 1 only. Effects of Combination 2 on the cold

freshwater habitat in Lake Almanor and Butt Valley Reservoir did not need to be re-modeled because Combination 2 is very similar to Alternative 4a which was analyzed in Level 3. Following is a brief summary of the steps used in the additional modeling work:

1. Generated long-term (1984-2002) daily hydrologic flow inputs for the Lake Almanor and Butt Valley Reservoir models. These inputs consisted of estimated long-term daily stream inflows and re-operated outflows through the Prattville Intake and the Canyon Dam outlet and Caribou PHs to account for the SWB-proposed minimum flow releases during the non-summertime and the increased releases at Canyon Dam during the summertime (i.e., 250 cfs for Combination 1 from June 16 through September 15).

2. Conducted mean daily water temperature profile analysis along the bypass reaches for different exceedance levels: Ran the linked MITEMP daily reservoir water temperature models for Lake Almanor and Butt Valley Reservoir and the SNTEMP stream temperature models for the bypass reaches, and then post-processed the modeling results.

3. Conducted MWAT profile analysis along the bypass reaches for different exceedance levels: Post-processed the 7-day rolling average of the daily output data from (2) above (discharge and water temperature) mixed for the Canyon Dam release and the Caribou #1 and #2 PH discharges to determine the MWAT period for the Belden Reservoir water temperature condition; conducted MWAT modeling along the NFFR using the linked SNTEMP stream temperature models for the bypass reaches; and post-processed the modeling results.

4. Conducted cold freshwater habitat analysis for Lake Almanor and Butt Valley Reservoir for Combination 1 using CE-QUAL-W2 models for the years 2000 (normal hydrologic year) and 2001 (critical dry year): Ran the linked Lake Almanor and Butt Valley Reservoir CE-QUAL-W2 models and then post-processed the modeling results.

Analytical Exhibits

Figures 1–4

Mean daily water temperature longitudinal profiles comparing EIR Combinations 1 and 2, Baseline, and "Present Day" for each of June, July, August, and September (4 graph panels on 1 page), for 50%, 25%, 10%, and maximum exceedance levels.

Tables 1–4

Summary tables of mean daily temperature conditions by reach for July and August.

Figures 5–8

Monthly MWAT longitudinal profiles comparing each EIR Combination 1 and 2, Baseline, and "Present Day."

Tables 5–6; Figures 9–10

Lake Almanor thermocline figures and tables, with approximate lake bed elevation at the station shown in figures.

Tables 7–12; Figures 11–16

Lake Almanor coldwater habitat volume figures and tables.

Tables 13–14; Figures 17–18

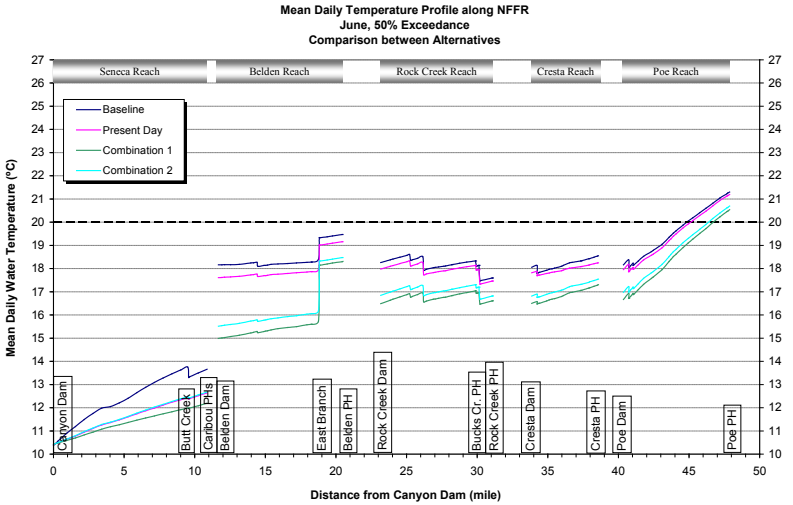
Lake Almanor metalimnion surface area figures and tables.

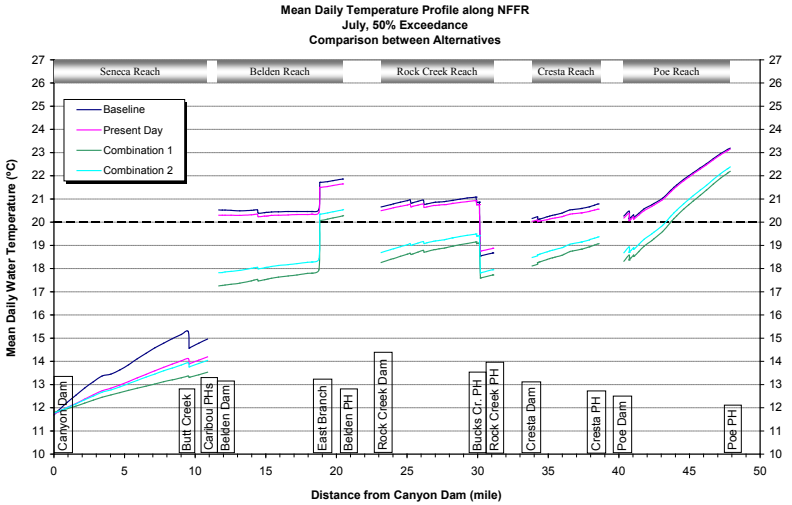
Tables 15–20; Figures 19–24

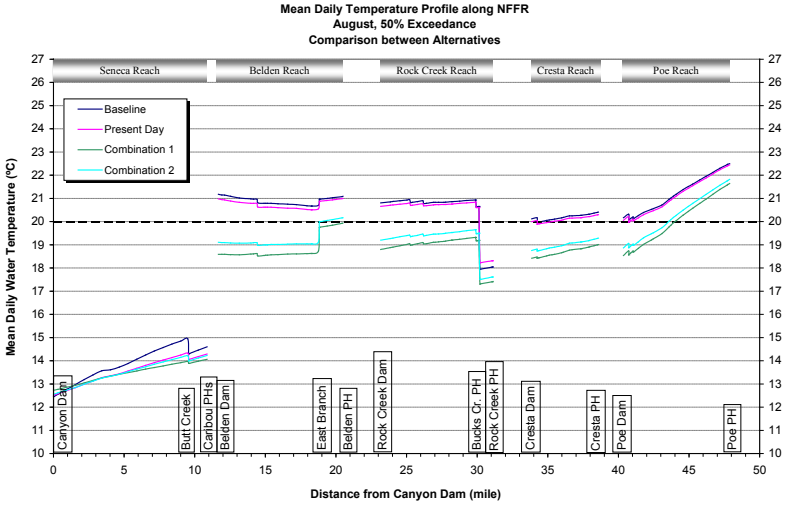
Butt Valley reservoir coldwater habitat figures and tables.

Figure 1. Comparison of NFFR Mean Daily Water Temperature Longitudinal Profiles between Alternatives for the Summer Months — 50% Exceedance

Similar to Figures 2-2a (July) and 2-2b (August) in Level 3 Report, with added graphs for June and September.







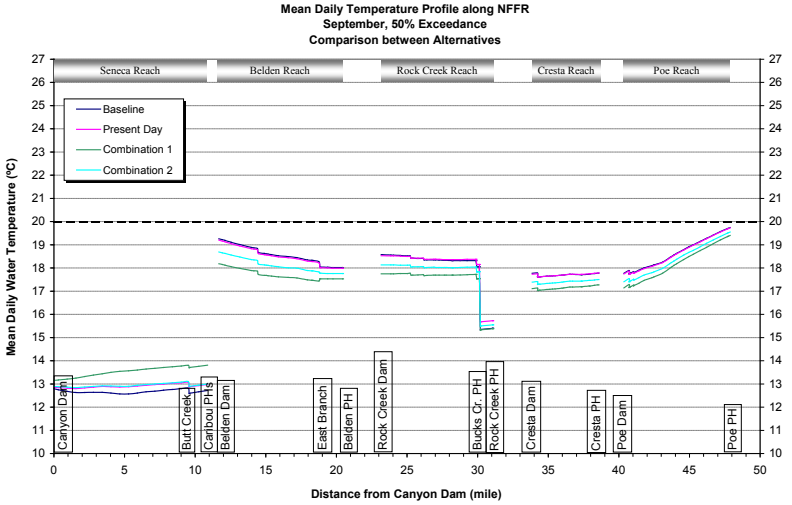
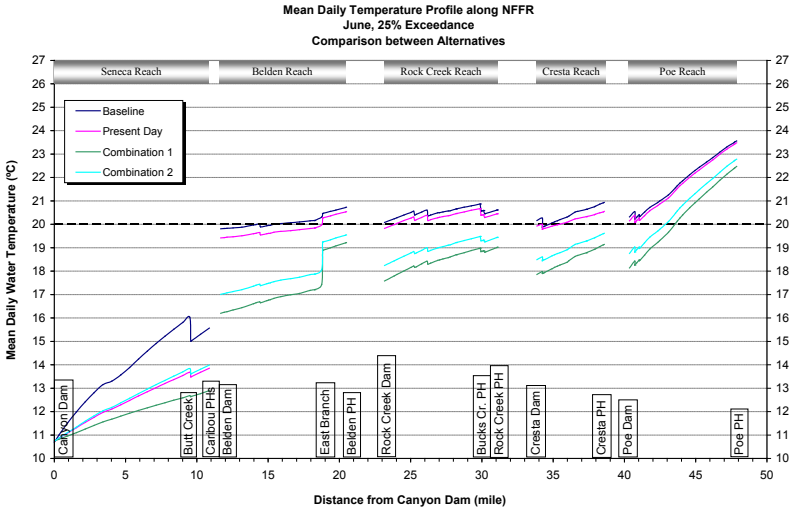
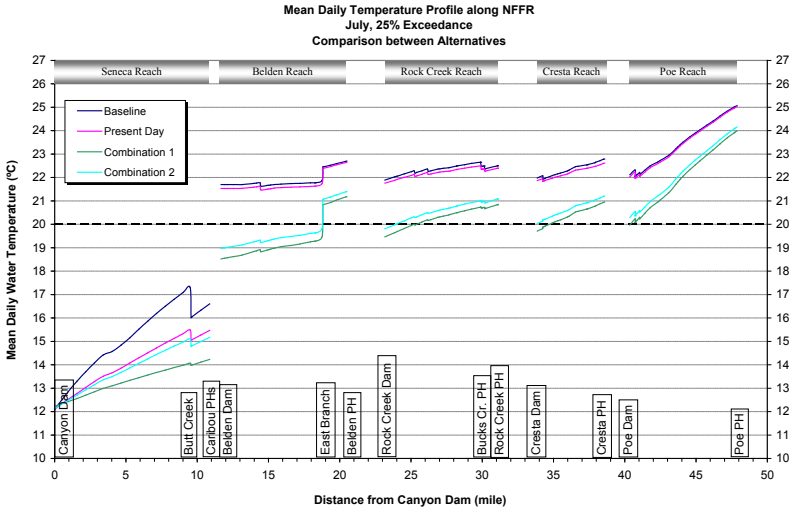
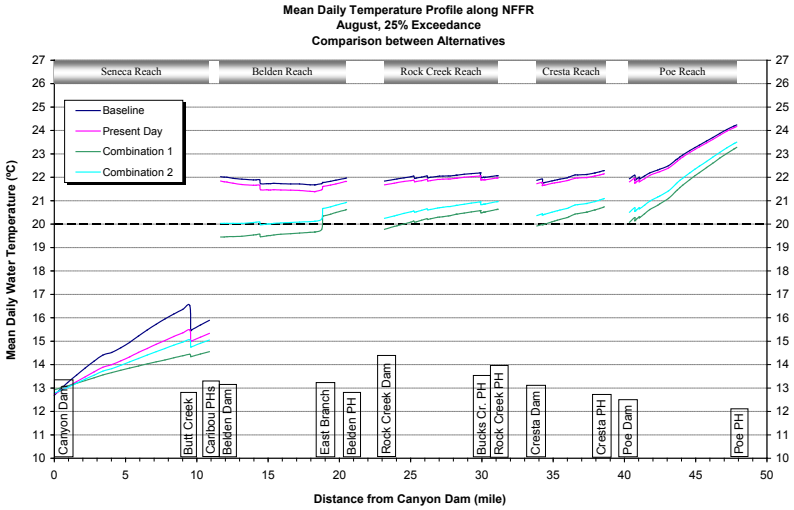


Figure 2. Comparison of NFFR Mean Daily Water Temperature Longitudinal Profiles between Alternatives for the Summer Months — 25% Exceedance

Similar to Figures 2-3a (July) and 2-3b (August) in Level 3 Report, with added graphs for June and September.







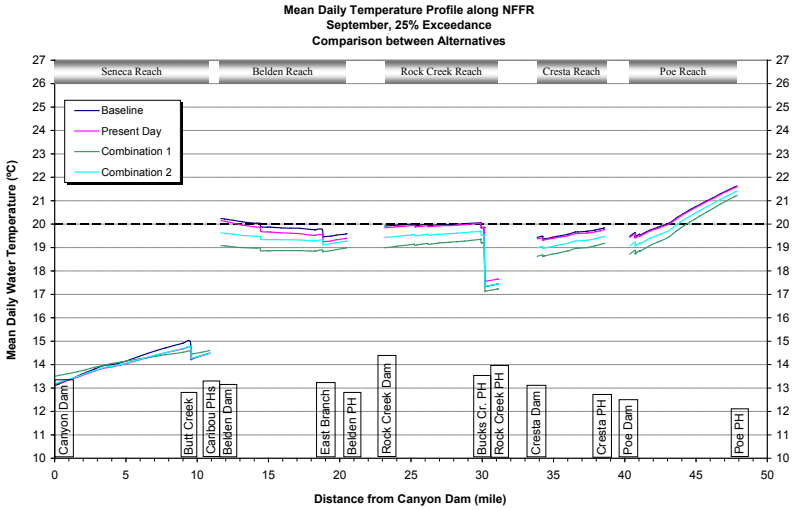


Figure 3. Comparison of NFFR Mean Daily Water Temperature Longitudinal Profiles between Alternatives for the Summer Months — 10% Exceedance

Similar to Figures 2-4a (July) and 2-4b (August) in Level 3 Report, with added graphs for June and September.

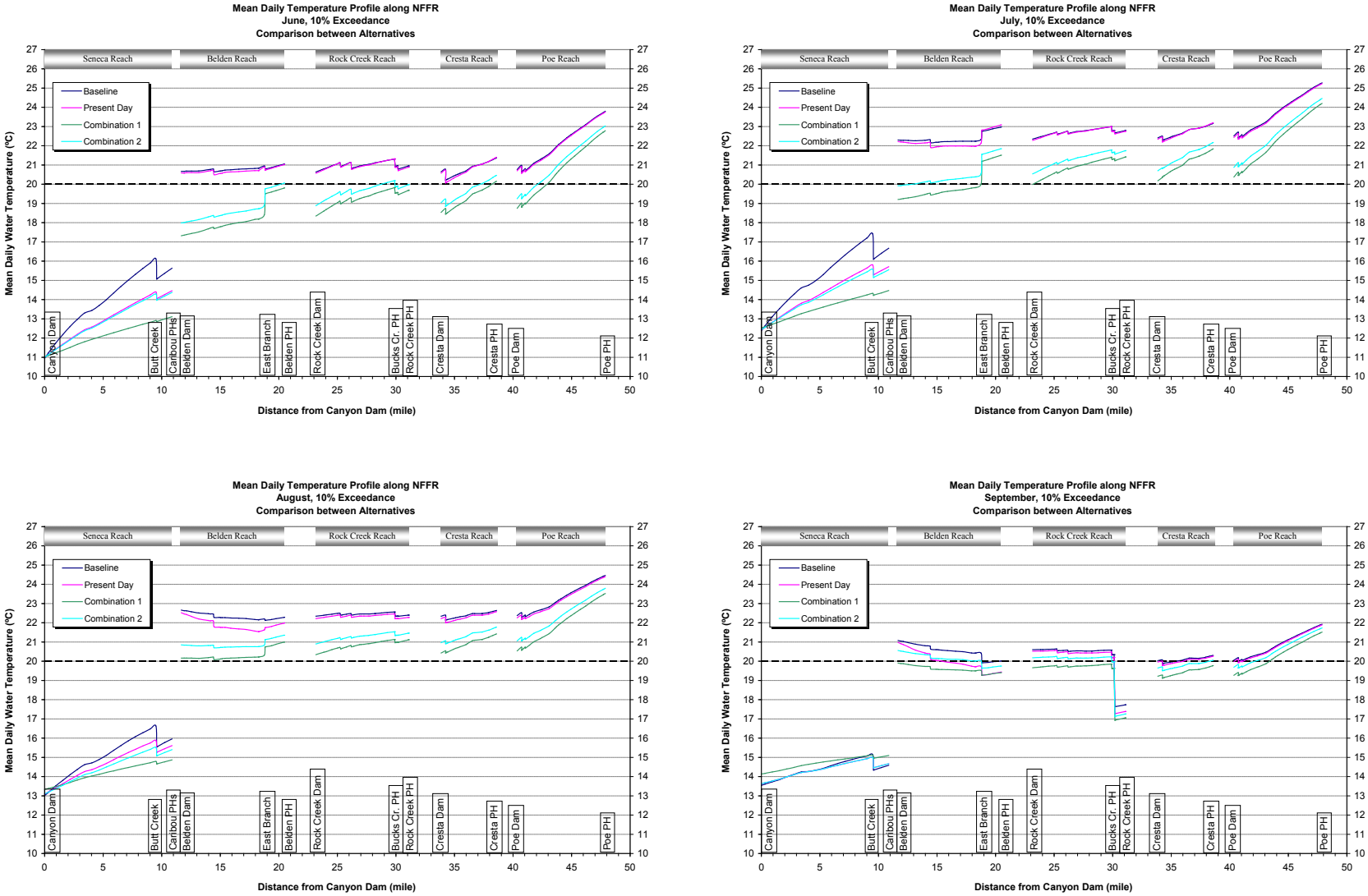


Figure 4. Comparison of NFFR Mean Daily Water Temperature Longitudinal Profiles between Alternatives for the Summer Months — Maximum

Similar to Figures 2-5a (July) and 2-5b (August) in Level 3 Report, with added graphs for June and September.

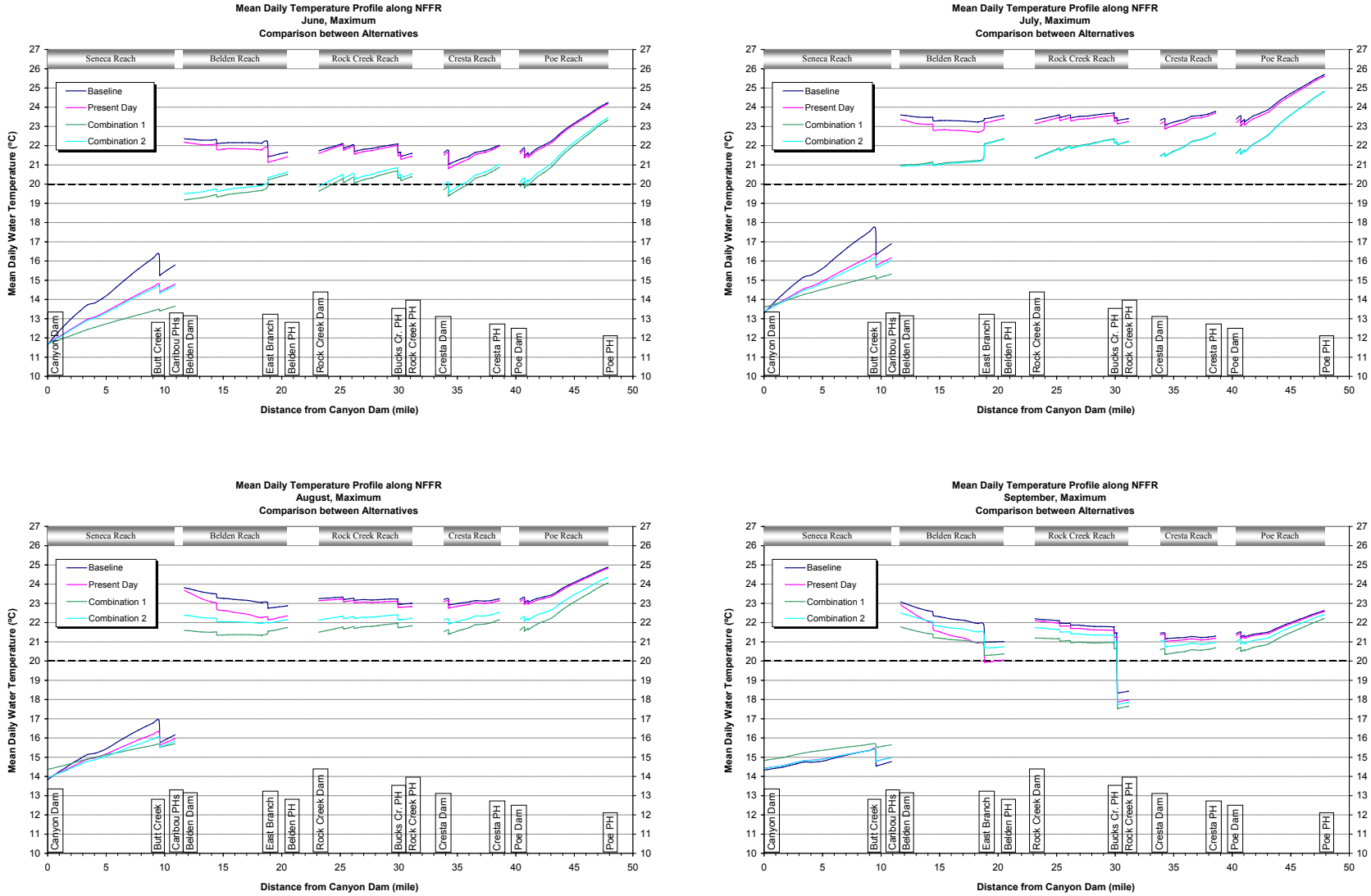


Table 3. Summary of Mean Daily Water Temperature Profiles for Different Alternatives — June.

Alt.	Exceedance Level	Belden Reach (Reach length = 8.8 miles)		Rock Creek Reach (Reach length = 7.9 miles)		Cresta Reach (Reach length = 4.7 miles)		Poe Reach (Reach length = 7.5 miles)	
		Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach
Baseline	Maximum	Entire reach	21.4-22.4°C	Entire reach	21.5-22.1°C	Entire reach	21.1-22.0°C	Entire reach	21.4-24.2°C
	10% Exceedance	Entire reach	20.7-21.0°C	Entire reach	20.6-21.3°C	Entire reach	20.2-21.4°C	Entire reach	20.6-23.8°C
	25% Exceedance	5.3	19.8-20.7°C	Entire reach	20.1-20.9°C	4.2	19.9-20.9°C	Entire reach	20.2-23.5°C
	50% Exceedance	0	18.2-19.5°C	0	17.5-18.6°C	0	17.8-18.6°C	2.9	18.0-21.3°C
Present Day	Maximum	Entire reach	21.2-22.2°C	Entire reach	21.3-22.0°C	Entire reach	20.9-22.0°C	Entire reach	21.4-24.2°C
	10% Exceedance	Entire reach	20.6-21.0°C	Entire reach	20.6-21.3°C	Entire reach	20.1-21.4°C	Entire reach	20.6-23.8°C
	25% Exceedance	1.6	19.4-20.5°C	7.1	19.8-20.7°C	3.3	19.8-20.6°C	Entire reach	20.1-23.5°C
	50% Exceedance	0	17.6-19.2°C	0	17.3-18.3°C	0	17.7-18.3°C	2.6	17.9-21.2°C
Comb 1	Maximum	1.6	19.2-20.5°C	6.6	19.6-20.7°C	2.5	19.5-20.9°C	6.8	19.9-23.4°C
	10% Exceedance	0	17.3-19.8°C	0	18.4-19.8°C	0.3	18.5-20.2°C	4.8	18.8-22.8°C
	25% Exceedance	0	16.2-19.2°C	0	17.6-19.0°C	0	17.9-19.1°C	4.2	18.1-22.5°C
	50% Exceedance	0	15.0-18.3°C	0	16.5-17.0°C	0	16.5-17.3°C	1.2	16.7-20.5°C
Comb 2	Maximum	1.6	19.5-20.6°C	7.4	19.9-20.9°C	3.3	19.6-21.0°C	Entire reach	20.0-23.5°C
	10% Exceedance	0.4	18.0-20.1°C	1.3	18.9-20.2°C	1.3	18.9-20.5°C	5.6	19.3-23.0°C
	25% Exceedance	0	17.0-19.6°C	0	18.2-19.5°C	0	18.5-19.6°C	4.8	18.8-22.8°C
	50% Exceedance	0	15.5-18.5°C	0	16.7-17.3°C	0	16.8-17.6°C	1.6	17.0-20.7°C

Notes:
The State Water Board has determined that the Seneca Reach is not impaired for water temperature; therefore it is excluded from this table.
The length of the lower Belden Reach below East Branch = 1.6 miles.
The length of the lower Rock Creek Reach below Bucks Creek = 1.2 miles.

Table 4. Summary of Mean Daily Water Temperature Profiles for Different Alternatives — July.

Similar to Table 2-3a in Level 3 Report.

Alt.	Exceedance Level	Belden Reach (Reach length = 8.8 miles)		Rock Creek Reach (Reach length = 7.9 miles)		Cresta Reach (Reach length = 4.7 miles)		Poe Reach (Reach length = 7.5 miles)	
		Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach
Baseline	Maximum	Entire reach	23.2-23.6°C	Entire reach	23.3-23.7°C	Entire reach	23.1-23.8°C	Entire reach	23.3-25.7°C
	10% Exceedance	Entire reach	22.2-23.0°C	Entire reach	22.4-23.0°C	Entire reach	22.3-23.2°C	Entire reach	22.5-25.3°C
	25% Exceedance	Entire reach	21.7-22.7°C	Entire reach	21.9-22.7°C	Entire reach	22.0-22.8°C	Entire reach	22.1-25.1°C
	50% Exceedance	Entire reach	20.4-21.9°C	6.9	18.6-21.1°C	Entire reach	20.1-20.8°C	Entire reach	20.2-23.2°C
Present Day	Maximum	Entire reach	22.7-23.2°C	Entire reach	23.1-23.6°C	Entire reach	22.9-23.7°C	Entire reach	23.1-25.6°C
	10% Exceedance	Entire reach	21.9-23.0°C	Entire reach	22.3-23.0°C	Entire reach	22.3-23.2°C	Entire reach	22.4-25.2°C
	25% Exceedance	Entire reach	21.5-22.6°C	Entire reach	21.8-22.5°C	Entire reach	21.9-22.6°C	Entire reach	22.0-25.0°C
	50% Exceedance	Entire reach	20.2-21.7°C	6.9	18.8-20.9°C	Entire reach	20.0-20.7°C	Entire reach	20.1-23.2°C
Comb 1	Maximum	Entire reach	21.0-22.4°C	Entire reach	21.3-22.3°C	Entire reach	21.4-22.6°C	Entire reach	21.6-24.8°C
	10% Exceedance	1.6	19.2-21.5°C	Entire reach	20.0-21.4°C	Entire reach	20.2-21.8°C	Entire reach	20.4-24.2°C
	25% Exceedance	1.6	18.5-21.2°C	5.7	19.5-20.8°C	4.0	19.7-21.0°C	Entire reach	20.0-24.0°C
	50% Exceedance	1.6	17.3-20.3°C	0	17.6-19.1°C	0	18.1-19.1°C	4.0	18.3-22.3°C
Comb 2	Maximum	Entire reach	21.0-22.4°C	Entire reach	21.3-22.3°C	Entire reach	21.4-22.6°C	Entire reach	21.6-24.8°C
	10% Exceedance	8.0	19.9-21.8°C	Entire reach	20.5-21.8°C	Entire reach	20.7-22.2°C	Entire reach	20.9-24.5°C
	25% Exceedance	1.6	19.0-21.4°C	7.2	19.8-21.1°C	Entire reach	20.0-21.2°C	Entire reach	20.3-24.2°C
	50% Exceedance	1.6	17.8-20.5°C	0	17.8-19.4°C	0	18.5-19.4°C	4.8	18.7-22.4°C

Notes:
The State Water Board has determined that the Seneca Reach is not impaired for water temperature; therefore it is excluded from this table.
The length of the lower Belden Reach below East Branch = 1.6 miles.
The length of the lower Rock Creek Reach below Bucks Creek = 1.2 miles.

Table 5. Summary of Mean Daily Water Temperature Profiles for Different Alternatives — August.

Similar to Table 2-3b in Level 3 Report.

Alt.	Exceedance Level	Belden Reach (Reach length = 8.8 miles)		Rock Creek Reach (Reach length = 7.9 miles)		Cresta Reach (Reach length = 4.7 miles)		Poe Reach (Reach length = 7.5 miles)	
		Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach
Baseline	Maximum	Entire reach	22.8-23.8°C	Entire reach	23.0-23.3°C	Entire reach	22.9-23.2°C	Entire reach	23.1-24.9°C
	10% Exceedance	Entire reach	22.1-22.7°C	Entire reach	22.3-22.6°C	Entire reach	22.2-22.6°C	Entire reach	22.3-24.5°C
	25% Exceedance	Entire reach	21.7-22.0°C	Entire reach	21.8-22.2°C	Entire reach	21.8-22.3°C	Entire reach	21.9-24.2°C
	50% Exceedance	Entire reach	20.7-21.2°C	6.9	18.0-20.9°C	Entire reach	20.0-20.4°C	Entire reach	20.1-22.5°C
Present Day	Maximum	Entire reach	22.2-23.7°C	Entire reach	22.8-23.1°C	Entire reach	22.8-23.1°C	Entire reach	23.0-24.9°C
	10% Exceedance	Entire reach	21.5-22.5°C	Entire reach	22.2-22.5°C	Entire reach	22.0-22.5°C	Entire reach	22.2-24.4°C
	25% Exceedance	Entire reach	21.4-21.8°C	Entire reach	21.7-22.0°C	Entire reach	21.7-22.2°C	Entire reach	21.8-24.2°C
	50% Exceedance	Entire reach	20.5-21.0°C	6.9	18.2-20.8°C	Entire reach	19.9-20.3°C	Entire reach	20.0-22.5°C
Comb 1	Maximum	Entire reach	21.3-21.7°C	Entire reach	21.5-22.0°C	Entire reach	21.4-22.1°C	Entire reach	21.6-24.1°C
	10% Exceedance	Entire reach	20.1-21.0°C	Entire reach	20.3-21.1°C	Entire reach	20.4-21.4°C	Entire reach	20.5-23.5°C
	25% Exceedance	1.6	19.5-20.6°C	6.6	19.8-20.6°C	4.2	19.9-20.7°C	Entire reach	20.1-23.3°C
	50% Exceedance	0	18.6-19.9°C	0	17.3-19.3°C	0	18.4-19.0°C	3.6	18.5-21.8°C
Comb 2	Maximum	Entire reach	22.0-22.4°C	Entire reach	22.1-22.4°C	Entire reach	22.0-22.5°C	Entire reach	22.2-24.4°C
	10% Exceedance	Entire reach	20.7-21.4°C	Entire reach	20.9-21.6°C	Entire reach	21.0-21.8°C	Entire reach	21.1-23.8°C
	25% Exceedance	Entire reach	20.0-20.9°C	Entire reach	20.2-21.0°C	Entire reach	20.4-21.1°C	Entire reach	20.5-23.5°C
	50% Exceedance	1.6	19.0-20.2°C	0	17.5-19.7°C	0	18.8-19.3°C	4.1	18.9-21.8°C

Notes:
The State Water Board has determined that the Seneca Reach is not impaired for water temperature; therefore it is excluded from this table.
The length of the lower Belden Reach below East Branch = 1.6 miles.
The length of the lower Rock Creek Reach below Bucks Creek = 1.2 miles.

Table 6. Summary of Mean Daily Water Temperature Profiles for Different Alternatives — September.

Alt.	Exceedance Level	Belden Reach (Reach length = 8.8 miles)		Rock Creek Reach (Reach length = 7.9 miles)		Cresta Reach (Reach length = 4.7 miles)		Poe Reach (Reach length = 7.5 miles)	
		Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach	Reach Length That Exceeds 20°C (mile)	Temperature Range along the Reach
Baseline	Maximum	Entire reach	21.0-23.1°C	6.9	18.3-22.2°C	Entire reach	21.2-21.5°C	Entire reach	21.2-22.6°C
	10% Exceedance	Entire reach	20.0-21.1°C	6.9	17.6-20.6°C	3.0	19.8-20.3°C	Entire reach	20.0-21.9°C
	25% Exceedance	2.7	19.5-20.2°C	1.3	17.3-20.1°C	0	19.4-19.8°C	4.8	19.5-21.6°C
	50% Exceedance	0	18.0-19.3°C	0	15.4-18.6°C	0	17.6-17.8°C	0	17.8-19.7°C
Present Day	Maximum	7.9	19.9-22.9°C	6.9	17.8-22.0°C	Entire reach	21.0-21.4°C	Entire reach	21.2-22.6°C
	10% Exceedance	3.7	19.3-21.0°C	6.9	17.3-20.5°C	2.9	19.8-20.3°C	Entire reach	20.0-21.9°C
	25% Exceedance	0.8	19.3-20.2°C	0	17.6-20.0°C	0	19.3-19.8°C	4.8	19.5-21.6°C
	50% Exceedance	0	18.0-19.2°C	0	15.7-18.5°C	0	17.6-17.8°C	0	17.8-19.7°C
Comb 1	Maximum	Entire reach	20.3-21.7°C	6.9	17.5-21.2°C	Entire reach	20.4-20.7°C	Entire reach	20.5-22.2°C
	10% Exceedance	0	19.3-19.9°C	0	16.9-19.9°C	0	19.2-19.8°C	4.3	19.3-21.5°C
	25% Exceedance	0	18.9-19.1°C	0	17.1-19.2°C	0	18.6-19.2°C	3.8	18.7-21.2°C
	50% Exceedance	0	17.5-18.2°C	0	15.3-17.8°C	0	17.0-17.3°C	0	17.1-19.4°C
Comb 2	Maximum	Entire reach	20.7-22.5°C	6.9	17.8-21.7°C	Entire reach	20.7-21.1°C	Entire reach	20.9-22.4°C
	10% Exceedance	7.2	19.6-20.6°C	6.9	17.1-20.2°C	0	19.5-20.0°C	5.6	19.7-21.7°C
	25% Exceedance	0	19.1-19.6°C	0	17.4-19.7°C	0	19.0-19.5°C	4.2	19.1-21.4°C
	50% Exceedance	0	17.8-18.7°C	0	15.5-18.1°C	0	17.3-17.5°C	0	17.5-19.6°C

Notes:
The State Water Board has determined that the Seneca Reach is not impaired for water temperature; therefore it is excluded from this table.
The length of the lower Belden Reach below East Branch = 1.6 miles.
The length of the lower Rock Creek Reach below Bucks Creek = 1.2 miles.

Figure 5. Comparison of Monthly (Jul, Aug, Sep) and Annual MWAT Longitudinal Profiles between Alternatives — 50% Exceedance

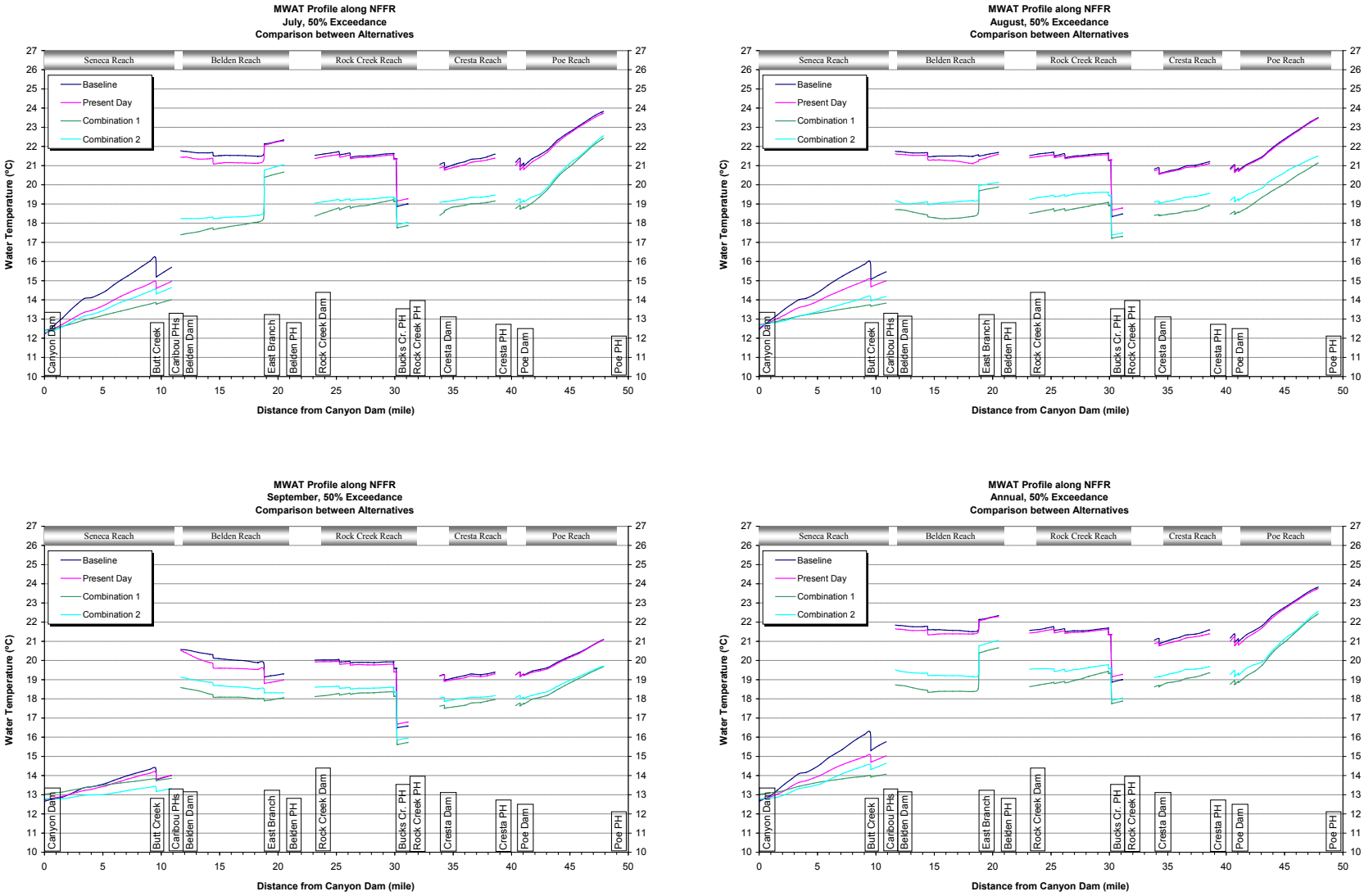


Figure 6. Comparison of Monthly (Jul, Aug, Sep) and Annual MWAT Longitudinal Profiles between Alternatives — 25% Exceedance

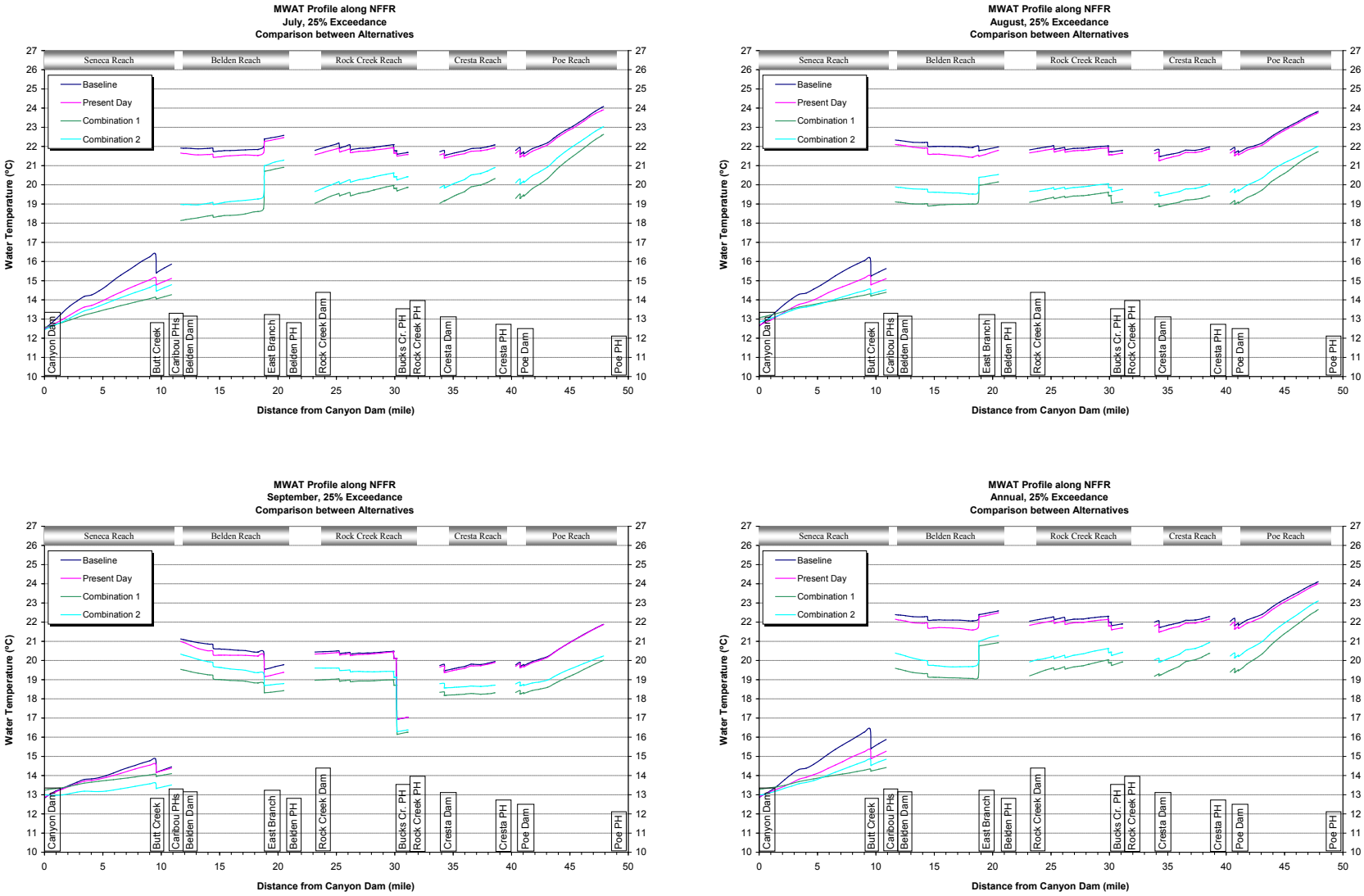


Figure 7. Comparison of Monthly (Jul, Aug, Sep) and Annual MWAT Longitudinal Profiles between Alternatives — 10% Exceedance

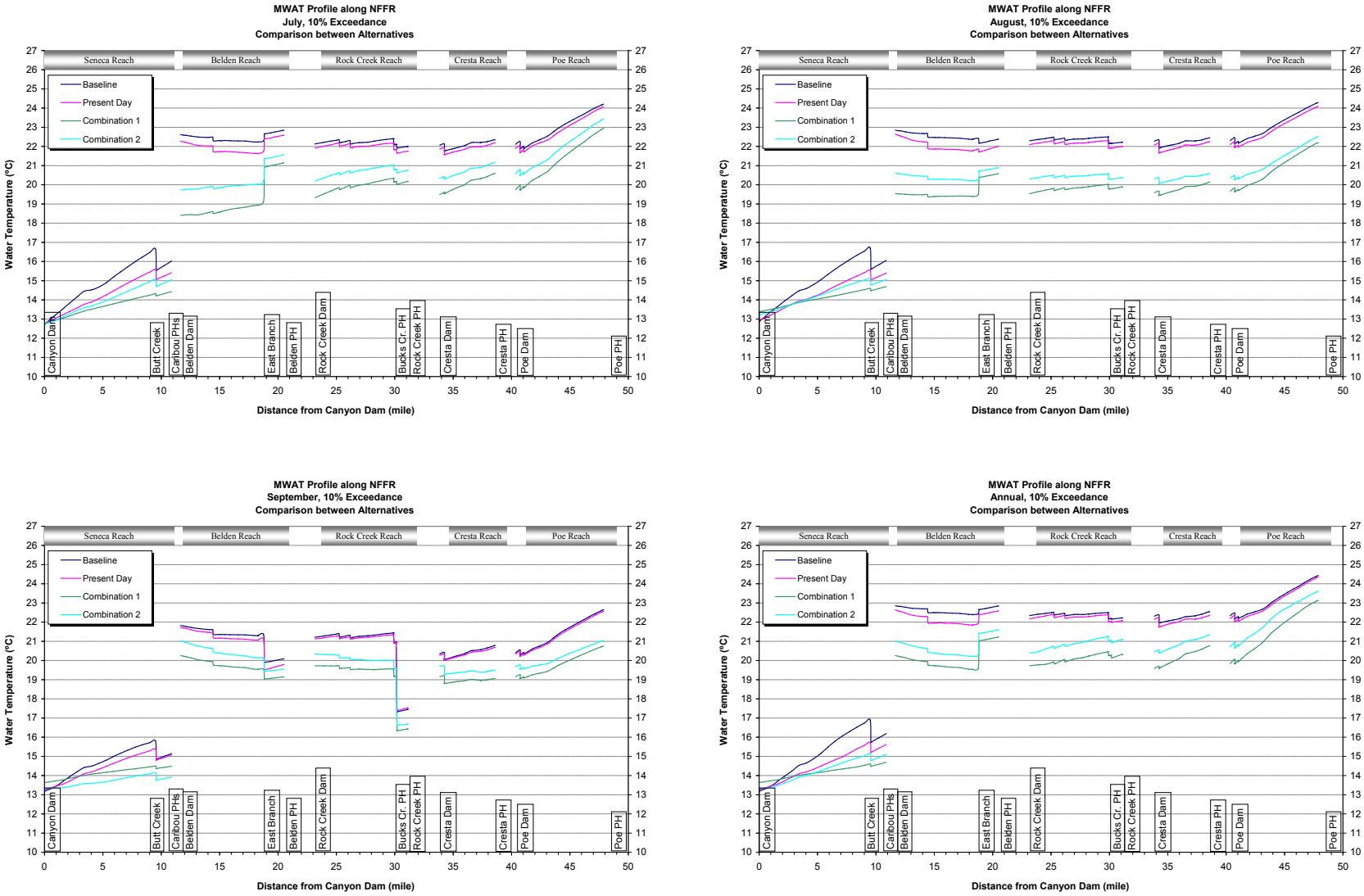


Figure 8. Comparison of Monthly (Jul, Aug, Sep) and Annual MWAT Longitudinal Profiles between Alternatives — Maximum

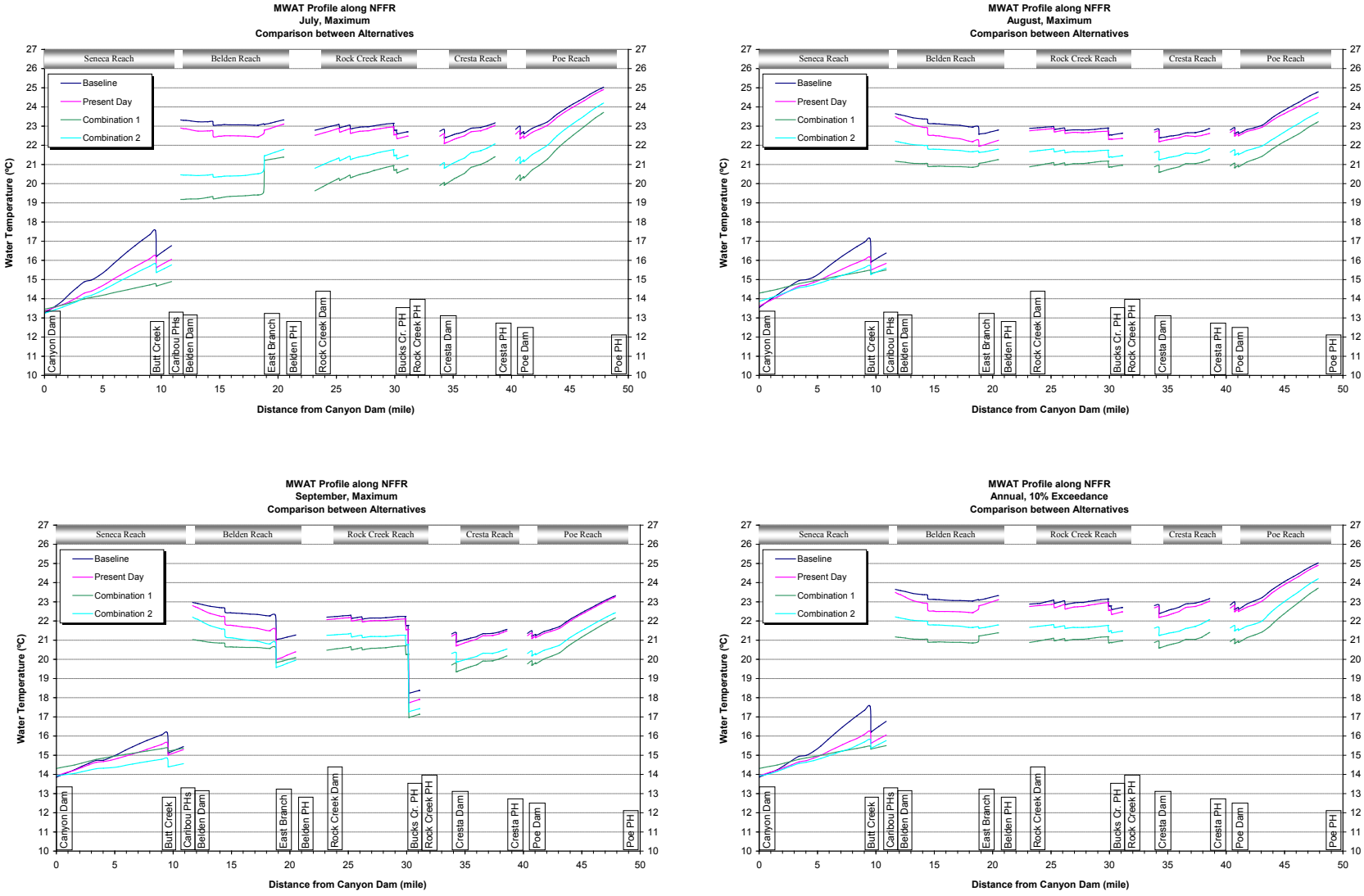


Table 7. Summary of Simulated Lake Almanor Thermocline Elevation for Different Alternatives and Change in Thermocline Elevation Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-4 in Level 3 Report.

Date	Water Surface Elevation	Simulated Thermocline Elevation (Feet In USGS Datum)				Change In Thermocline Elevation Relative To Baseline Condition (Ft)		
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2
5/15/2000	4,500.2							
6/7/2000	4,500.3	4,473.8	4,473.8	4,473.8	4,473.8	0	0	0
6/22/2000	4,500.1	4,480.3	4,480.3	4,480.3	4,480.3	0	0	0
7/7/2000	4,499.5	4,463.9	4,463.9	4,463.9	4,463.9	0	0	0
7/20/2000	4,497.2	4,467.2	4,467.2	4,463.9	4,463.9	0	-3	-3
8/7/2000	4,496.2	4,467.2	4,467.2	4,463.9	4,463.9	0	-3	-3
8/17/2000	4,493.9	4,460.7	4,460.7	4,460.7	4,460.7	0	0	0
9/7/2000	4,492.9	4,454.1	4,454.1	4,447.5	4,450.8	0	-7	-3
9/28/2000	4,490.3	4,454.1	4,454.1	4,447.5	4,447.5	0	-7	-7
10/15/2000	4,489.6	4,444.3	4,441.0	4,441.0	4,441.0	-3	-3	-3

Note: The ***italic and bold*** dates have observed profiles.

Figure 9. Comparison of Simulated Lake Almanor Thermocline Elevation for Different Alternatives (2000, Normal Hydrologic Year.)

Similar to Figure 3-8 in Level 3 Report.

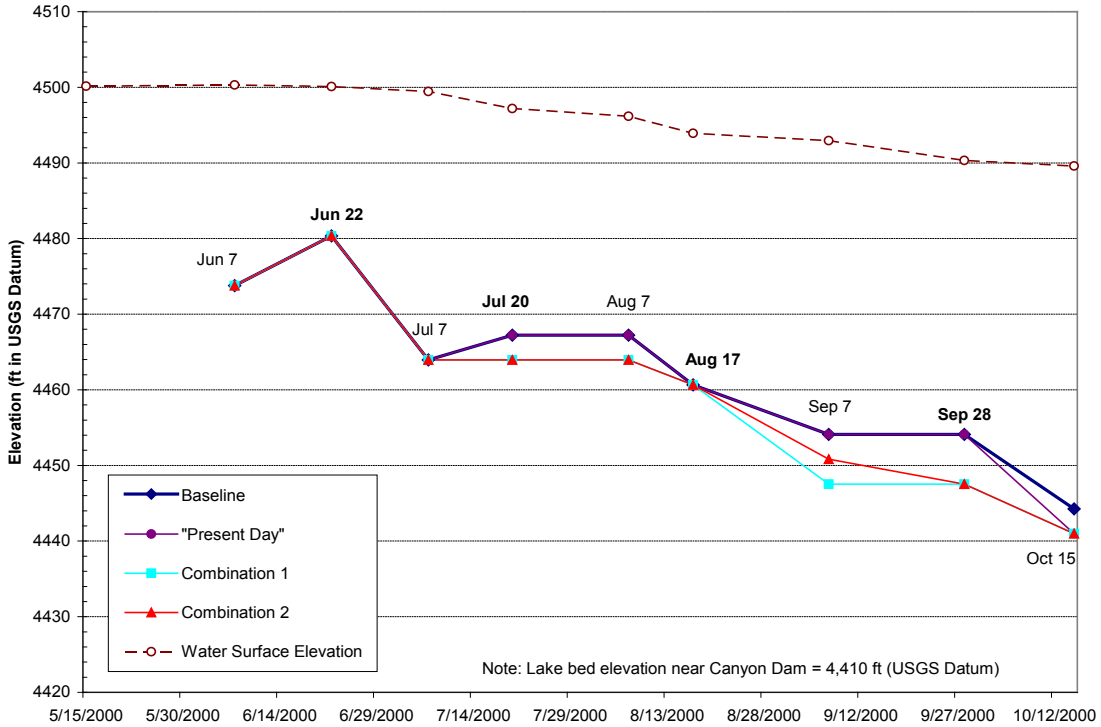


Table 8. Summary of Simulated Lake Almanor Thermocline Elevation for Different Alternatives and Change in Thermocline Elevation Relative to Baseline Condition. (2001, Critical Dry Year.)

Similar to Table 3-5 in Level 3 Report.

Date	Water Surface Elevation	Simulated Thermocline Elevation (feet in USGS Datum)				Change in Thermocline Elevation Relative to Baseline Condition (ft)		
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2
5/15/2001	4,487.6	4,450.8	4,450.8	4450.8	4,450.8	0	0	0
6/6/2001	4,487.8	4,467.2	4,467.2	4467.2	4,467.2	0	0	0
6/22/2001	4,487.5	4,470.5	4,470.5	4470.5	4,470.5	0	0	0
7/10/2001	4,486.9	4,457.4	4,457.4	4454.1	4,454.1	0	-3	-3
7/20/2001	4,486.6	4,463.9	4,463.9	4460.7	4,460.7	0	-3	-3
8/9/2001	4,484.3	4,457.4	4,457.4	4457.4	4,457.4	0	0	0
8/17/2001	4,484.0	4,457.4	4,457.4	4454.1	4,457.4	0	-3	0
9/12/2001	4,483.6	4,444.3	4,444.3	4441.0	4,444.3	0	-3	0
9/28/2001	4,483.2	4,447.5	4,444.3	4441.0	4,444.3	-3	-7	-3
10/15/2001	4,480.8	4,427.9	4,424.6	4421.3	4,424.6	-3	-7	-3

Note: The ***italic and bold*** dates have observed profiles.

Figure 10. Comparison of Simulated Lake Almanor Thermocline Elevation for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-9 in Level 3 Report.

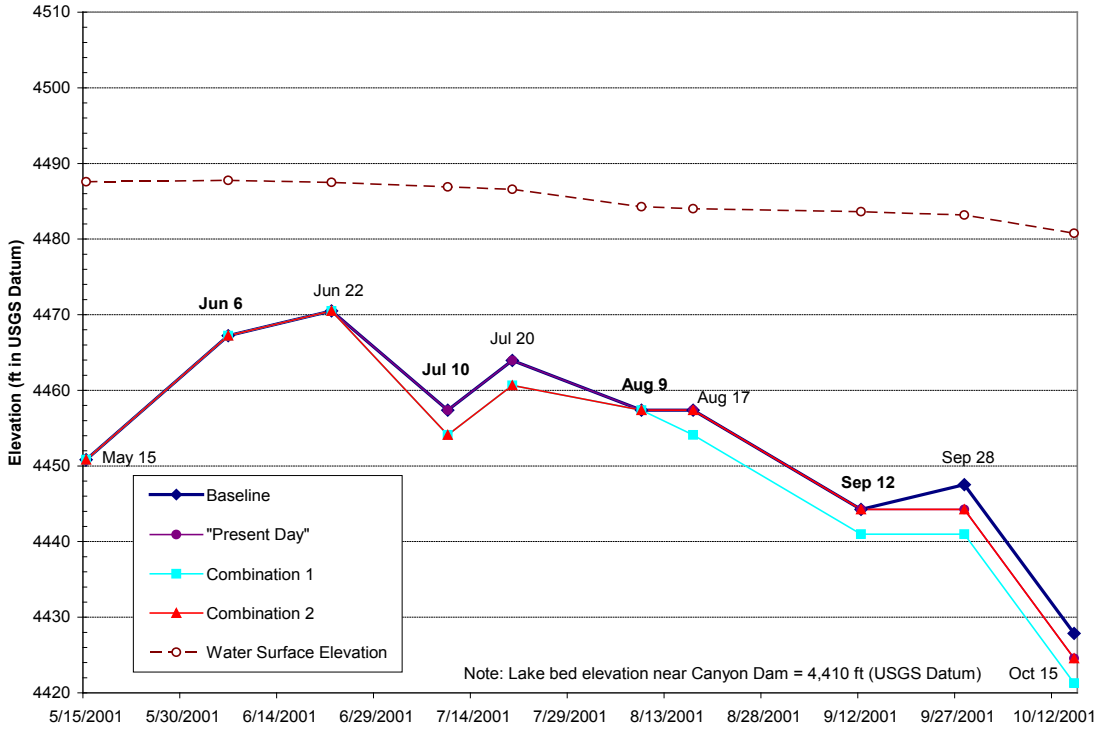


Table 9. Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-2a in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)				Change in Habitat Volume Relative to Baseline Condition (acre-ft)			% of Habitat Volume to Total Reservoir Storage on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	1,011,490	993,600	989,670	990,060	990,060	-3,930	-3,540	-3,540	98%	98%	98%	98%
June 7	1,015,410	876,500	874,470	882,220	882,220	-2,030	5,720	5,720	86%	86%	87%	87%
Jun 22	1,010,250	452,400	449,750	463,360	462,510	-2,650	10,960	10,110	45%	45%	46%	46%
July 7	993,780	216,200	214,940	228,230	227,740	-1,260	12,030	11,540	22%	22%	23%	23%
Jul 20	938,020	145,600	143,790	149,340	148,400	-1,810	3,740	2,800	16%	15%	16%	16%
Aug 7	913,180	65,000	63,690	61,670	61,150	-1,310	-3,330	-3,850	7%	7%	7%	7%
Aug 17	859,160	44,400	40,910	33,980	35,030	-3,490	-10,420	-9,370	5%	5%	4%	4%
Sep 7	836,720	636,600	639,480	689,290	683,250	2,880	52,690	46,650	76%	76%	82%	82%
Sep 28	777,330	607,400	609,130	655,720	649,750	1,730	48,320	42,350	78%	78%	84%	84%
Oct 15	761,020	676,200	678,940	710,930	702,680	2,740	34,730	26,480	89%	89%	93%	92%

Note: The ***italic and bold*** dates have observed profiles.

Figure 11. Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives. (2000, Normal Hydrologic Year.)

Similar to Figure 3-4a in Level 3 Report.

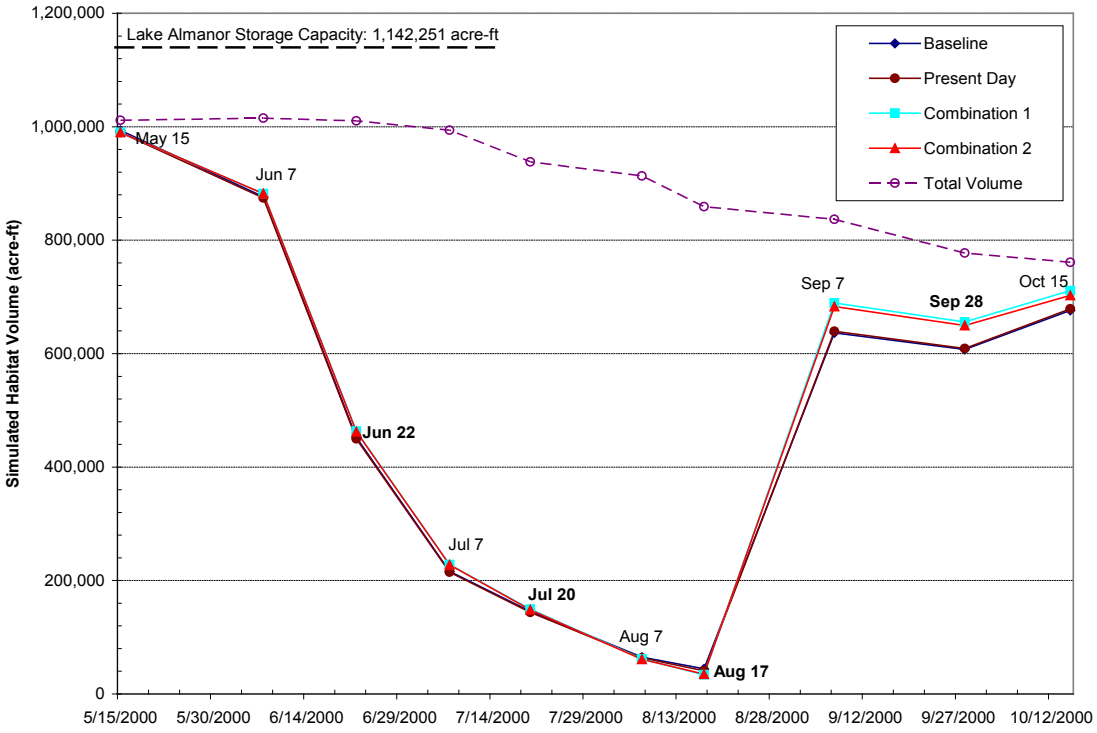


Table 10. Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-2b in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)				Change in Habitat Volume Relative to Baseline Condition (acre-ft)			% of Habitat Volume to Total Reservoir Storage on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	1,011,490	993,550	989,670	990,060	990,060	-3,880	-3,490	-3,490	98%	98%	98%	98%
June 7	1,015,410	876,510	874,470	882,220	882,220	-2,040	5,710	5,710	86%	86%	87%	87%
Jun 22	1,010,250	669,500	659,150	682,500	670,150	-10,350	13,000	650	66%	65%	68%	66%
July 7	993,780	584,410	585,350	596,550	594,810	940	12,140	10,400	59%	59%	60%	60%
Jul 20	938,020	228,530	223,930	227,790	227,170	-4,600	-740	-1,360	24%	24%	24%	24%
Aug 7	913,180	97,120	95,040	95,490	94,350	-2,080	-1,630	-2,770	11%	10%	10%	10%
Aug 17	859,160	69,040	66,590	58,620	58,750	-2,450	-10,420	-10,290	8%	8%	7%	7%
Sep 7	836,720	636,600	639,480	689,290	683,250	2,880	52,690	46,650	76%	76%	82%	82%
Sep 28	777,330	607,380	609,130	655,720	649,750	1,750	48,340	42,370	78%	78%	84%	84%
Oct 15	761,020	676,160	678,940	710,930	702,680	2,780	34,770	26,520	89%	89%	93%	92%

Note: The ***italic and bold*** dates have observed profiles.

Figure 12. Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives. (2000, Normal Hydrologic Year.)

Similar to Figure 3-4b in Level 3 Report.

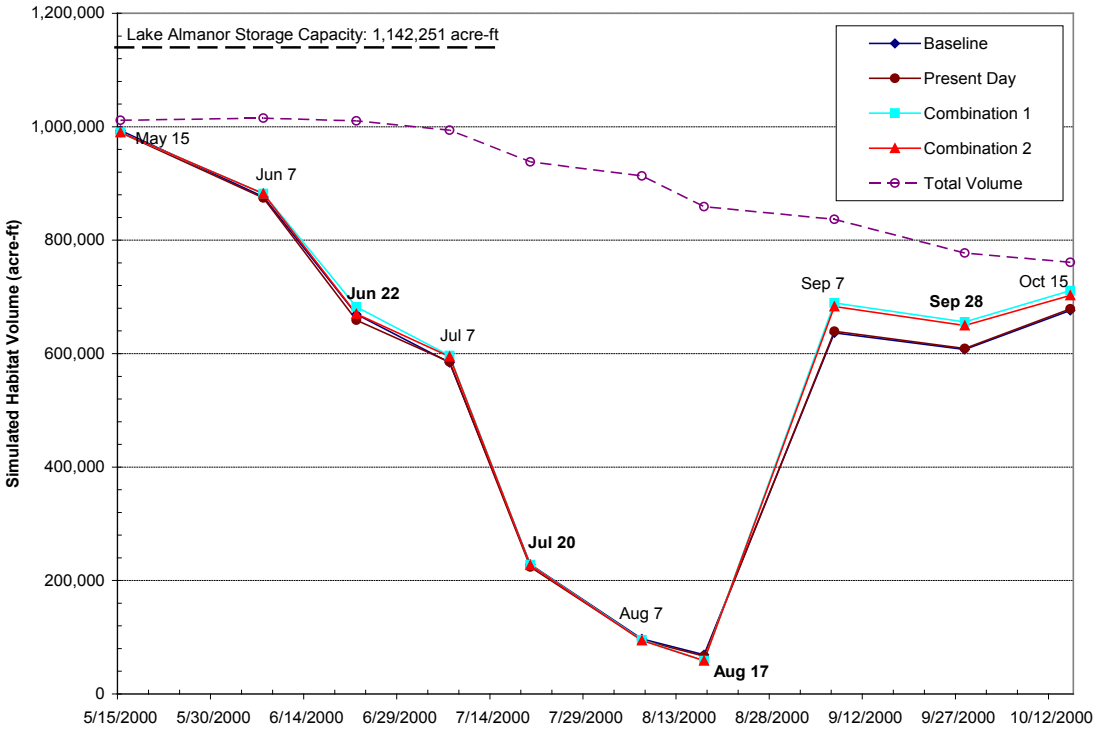


Table 11. Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-2c in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)				Change in Habitat Volume Relative to Baseline Condition (acre-ft)			% of Habitat Volume to Total Reservoir Storage on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	1,011,490	993,550	989,670	990,060	990,060	-3,880	-3,490	-3,490	98%	98%	98%	98%
June 7	1,015,410	876,510	874,470	882,220	882,220	-2,040	5,710	5,710	86%	86%	87%	87%
Jun 22	1,010,250	798,650	798,700	817,290	815,210	50	18,640	16,560	79%	79%	81%	81%
July 7	993,780	743,860	745,570	775,440	775,130	1,710	31,580	31,270	75%	75%	78%	78%
Jul 20	938,020	632,400	631,140	657,750	657,470	-1,260	25,350	25,070	67%	67%	70%	70%
Aug 7	913,180	144,170	143,320	151,220	149,440	-850	7,050	5,270	16%	16%	17%	16%
Aug 17	859,160	458,170	440,650	348,850	342,380	-17,520	-109,320	-115,790	53%	51%	41%	40%
Sep 7	836,720	636,600	639,480	689,290	683,250	2,880	52,690	46,650	76%	76%	82%	82%
Sep 28	777,330	607,380	609,130	655,720	649,750	1,750	48,340	42,370	78%	78%	84%	84%
Oct 15	761,020	676,160	678,940	710,930	702,680	2,780	34,770	26,520	89%	89%	93%	92%

Note: The ***italic and bold*** dates have observed profiles.

Figure 13. Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives. (2000, Normal Hydrologic Year.)

Similar to Figure 3-4c in Level 3 Report.

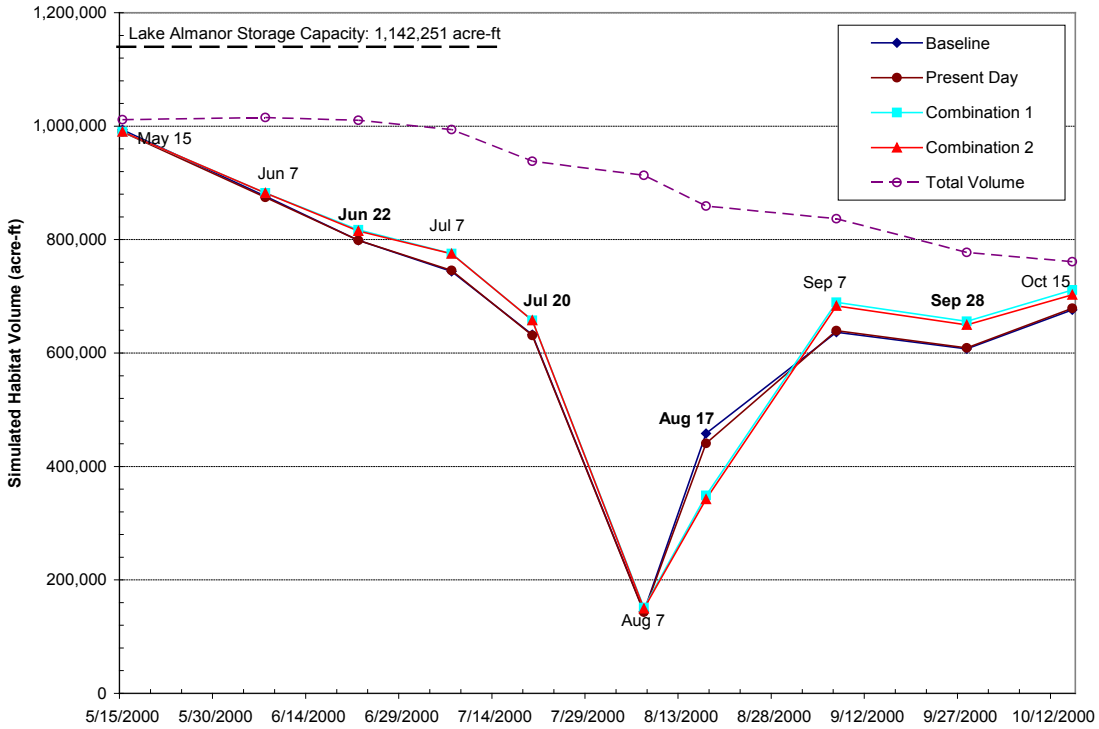


Table 12. Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2001, Critical Dry Year.)

Similar to Table 3-3a in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)				Change in Habitat Volume Relative to Baseline Condition (acre-ft)			% of Habitat Volume to Total Reservoir Storage on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	717,310	712,230	709,010	709,480	709,480	-3,220	-2,750	-2,750	99%	99%	99%	99%
June 6	721,260	588,900	585,970	589,930	589,930	-2,930	1,030	1,030	82%	81%	82%	82%
Jun 22	715,340	210,900	207,400	209,560	207,520	-3,500	-1,340	-3,380	29%	29%	29%	29%
July 10	702,590	85,420	82,720	84,300	82,900	-2,700	-1,120	-2,520	12%	12%	12%	12%
Jul 20	695,920	40,870	39,070	36,850	37,090	-1,800	-4,020	-3,780	6%	6%	5%	5%
Aug 9	648,010	360	0	0	0	-360	-360	-360	0%	0%	0%	0%
Aug 17	642,460	0	0	0	0	0	0	0	0%	0%	0%	0%
Sep 12	634,800	490,230	493,040	429,060	463,000	2,810	-61,170	-27,230	77%	78%	68%	73%
Sep 28	625,800	543,700	545,630	563,200	558,700	1,930	19,500	15,000	87%	87%	90%	89%
Oct 15	578,400	544,160	541,910	545,330	542,930	-2,250	1,170	-1,230	94%	94%	94%	94%

Note: The ***italic and bold***dates have observed profiles.

Figure 14. Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-5a in Level 3 Report.

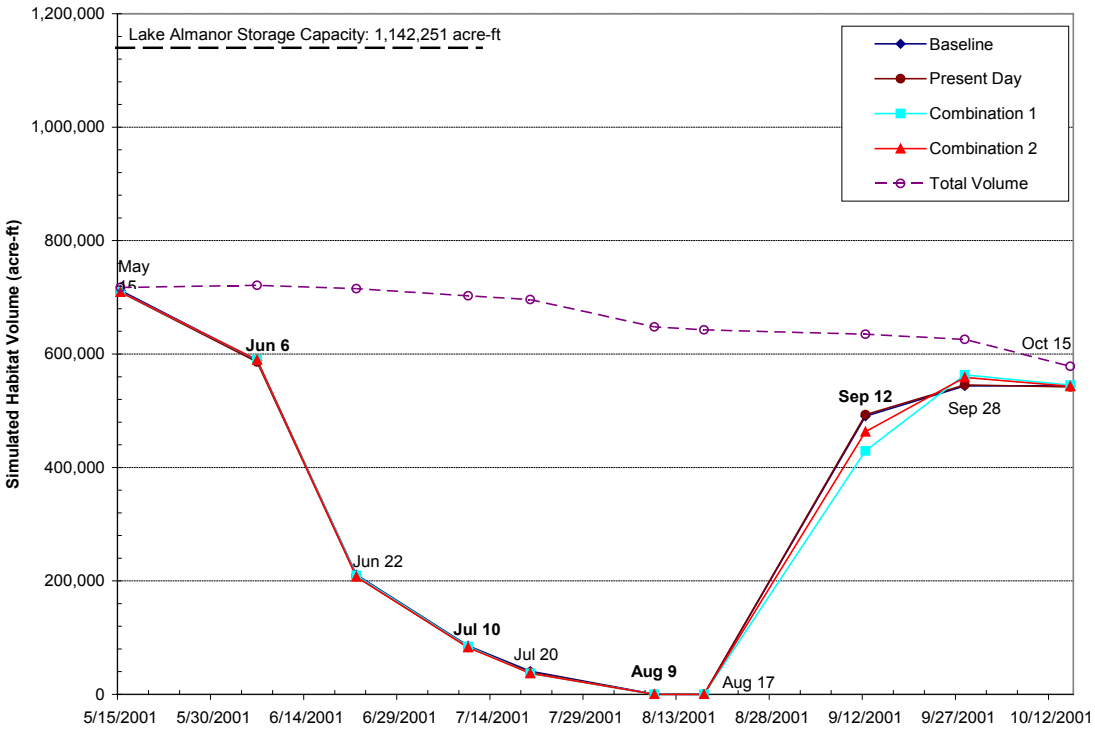


Table 13. Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2001, Critical Dry Year.)

Similar to Table 3-3b in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)				Change in Habitat Volume Relative to Baseline Condition (acre-ft)			% of Habitat Volume to Total Reservoir Storage on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	717,310	712,230	709,010	709,480	709,480	-3,220	-2,750	-2,750	99%	99%	99%	99%
June 6	721,260	588,900	585,970	589,930	589,930	-2,930	1,030	1,030	82%	81%	82%	82%
Jun 22	715,340	326,300	324,330	328,230	326,170	-1,970	1,930	-130	46%	45%	46%	46%
July 10	702,590	137,960	134,360	136,650	134,680	-3,600	-1,310	-3,280	20%	19%	19%	19%
Jul 20	695,920	74,230	73,060	69,330	68,900	-1,170	-4,900	-5,330	11%	10%	10%	10%
Aug 9	648,010	51,900	49,850	39,920	41,050	-2,050	-11,980	-10,850	8%	8%	6%	6%
Aug 17	642,460	23,260	20,250	11,730	14,730	-3,010	-11,530	-8,530	4%	3%	2%	2%
Sep 12	634,800	505,370	509,840	529,040	524,010	4,470	23,670	18,640	80%	80%	83%	83%
Sep 28	625,800	543,700	545,630	563,200	558,700	1,930	19,500	15,000	87%	87%	90%	89%
Oct 15	578,400	544,160	541,910	545,330	542,930	-2,250	1,170	-1,230	94%	94%	94%	94%

Note: The ***italic and bold*** dates have observed profiles.

Figure 15. Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-5b in Level 3 Report.

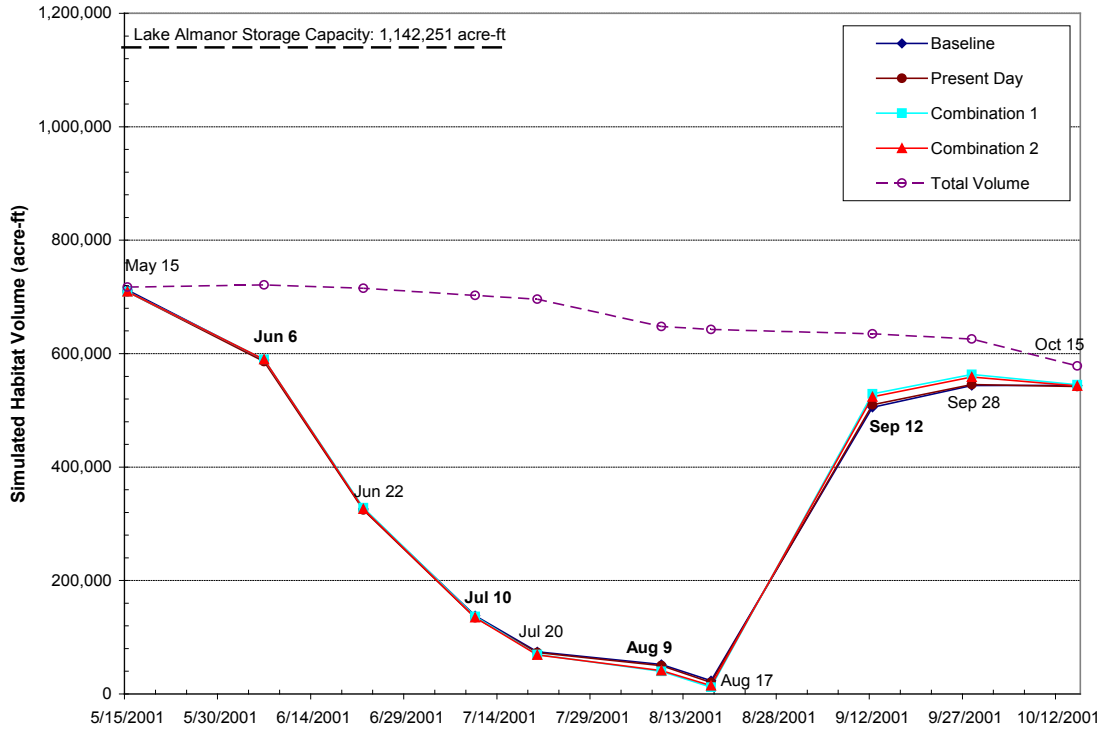


Table 14. Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2001, Critical Dry Year.)

Similar to Table 3-3c in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)				Change in Habitat Volume Relative to Baseline Condition (acre-ft)			% of Habitat Volume to Total Reservoir Storage on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	717,310	712,230	709,010	709,480	709,480	-3,220	-2,750	-2,750	99%	99%	99%	99%
June 6	721,260	588,900	585,970	589,930	589,930	-2,930	1,030	1,030	82%	81%	82%	82%
Jun 22	715,340	544,990	542,240	552,440	550,580	-2,750	7,450	5,590	76%	76%	77%	77%
July 10	702,590	427,730	428,850	423,700	420,380	1,120	-4,030	-7,350	61%	61%	60%	60%
Jul 20	695,920	420,180	421,170	407,490	405,990	990	-12,690	-14,190	60%	61%	59%	58%
Aug 9	648,010	160,750	153,060	147,710	146,780	-7,690	-13,040	-13,970	25%	24%	23%	23%
Aug 17	642,460	282,590	254,640	117,090	124,360	-27,950	-165,500	-158,230	44%	40%	18%	19%
Sep 12	634,800	505,370	509,840	529,040	524,010	4,470	23,670	18,640	80%	80%	83%	83%
Sep 28	625,800	543,700	545,630	563,200	558,700	1,930	19,500	15,000	87%	87%	90%	89%
Oct 15	578,400	544,160	541,910	545,330	542,930	-2,250	1,170	-1,230	94%	94%	94%	94%

Note: The ***italic and bold*** dates have observed profiles.

Figure 16. Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-5c in Level 3 Report.

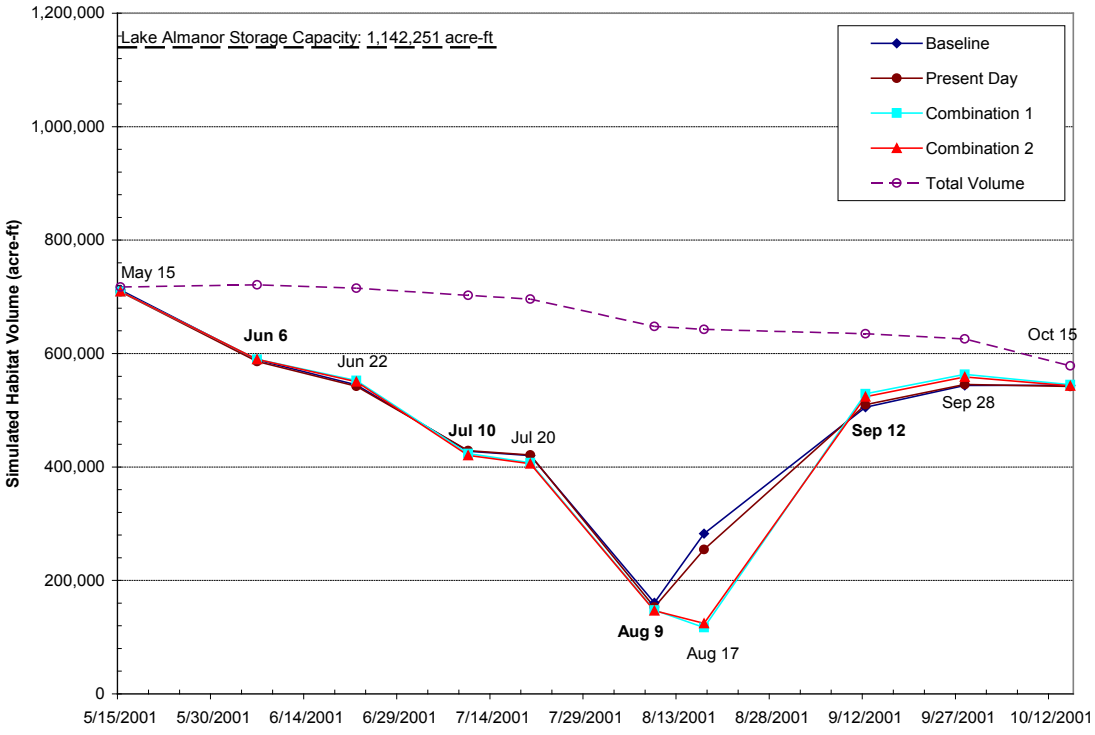


Table 15. Summary of Simulated Lake Almanor Metalimnion Surface Area (acre) for Different Alternatives and Change in Thermocline Surface Area Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-6 in Level 3 Report.

Date	Lake Surface Area on Date (acre)	Simulated Metalimnion Surface Area (acre)				Change in Metalimnion SA Relative to Baseline Condition (acre)			% of Metalimnion SA to Total Lake SA on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	25,280											
June 7	25,330	17,320	17,320	17,320	17,320	0	0	0	68%	68%	68%	68%
Jun 22	25,260	19,370	19,370	19,370	19,370	0	0	0	77%	77%	77%	77%
July 7	25,030	14,220	14,220	14,220	14,220	0	0	0	57%	57%	57%	57%
Jul 20	24,240	15,080	15,080	14,220	14,220	0	-860	-860	62%	62%	59%	59%
Aug 7	23,890	15,080	15,080	14,220	14,220	0	-860	-860	63%	63%	60%	60%
Aug 17	23,140	13,460	13,460	13,460	13,460	0	0	0	58%	58%	58%	58%
Sep 7	22,830	11,560	11,560	9,210	10,410	0	-2,350	-1,150	51%	51%	40%	46%
Sep 28	22,020	11,560	11,560	9,210	9,210	0	-2,350	-2,350	52%	52%	42%	42%
Oct 15	21,790	7,900	6,540	6,540	6,540	-1,360	-1,360	-1,360	36%	30%	30%	30%

Note: The ***italic and bold*** dates have observed profiles.

Figure 17. Comparison of Simulated Lake Almanor Metalimnion Surface Area for Different Alternatives. (2000, Normal Hydrologic Year.)

Similar to Figure 3-10 in Level 3 Report.

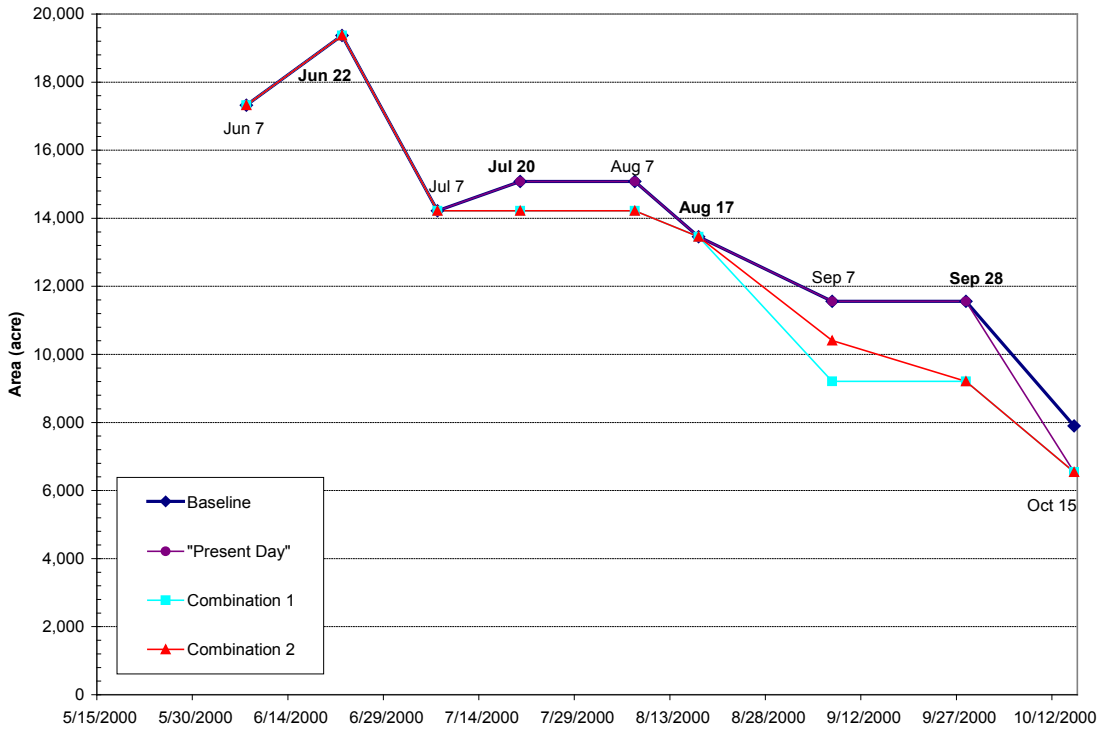


Table 16. Summary of Simulated Lake Almanor Metalimnion Surface Area (acre) for Different Alternatives and Change in Thermocline Surface Area Relative to Baseline Condition. (2001, Critical Dry Year.)

Similar to Table 3-7 in Level 3 Report.

Date	Lake Surface Area on Date (acre)	Simulated Metalimnion Surface Area (acre)				Change in Metalimnion SA Relative to Baseline Condition (acre)			% of Metalimnion SA to Total Lake SA on Date			
		Baseline	Present Day	Comb 1	Comb 2	Present Day	Comb 1	Comb 2	Baseline	Present Day	Comb 1	Comb 2
May 15	21,190	10,410	10,410	10,410	10,410	0	0	0	49%	49%	49%	49%
June 6	21,240	15,080	15,080	15,080	15,080	0	0	0	71%	71%	71%	71%
Jun 22	21,160	16,150	16,150	16,150	16,150	0	0	0	76%	76%	76%	76%
July 10	20,980	12,610	12,610	11,560	11,560	0	-1,050	-1,050	60%	60%	55%	55%
Jul 20	20,890	14,220	14,220	13,460	13,460	0	-760	-760	68%	68%	64%	64%
Aug 9	20,220	12,610	12,610	12,610	12,610	0	0	0	62%	62%	62%	62%
Aug 17	20,150	12,610	12,610	11,560	12,610	0	-1,050	0	63%	63%	57%	63%
Sep 12	20,040	7,900	7,900	6,540	7,900	0	-1,360	0	39%	39%	33%	39%
Sep 28	19,910	9,210	7,900	6,540	7,900	-1,310	-2,670	-1,310	46%	40%	33%	40%
Oct 15	19,230	510	420	360	420	-90	-150	-90	3%	2%	2%	2%

Note: The ***italic and bold*** dates have observed profiles.

Figure 18. Comparison of Simulated Lake Almanor Metalimnion Surface Area for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-11 in Level 3 Report.

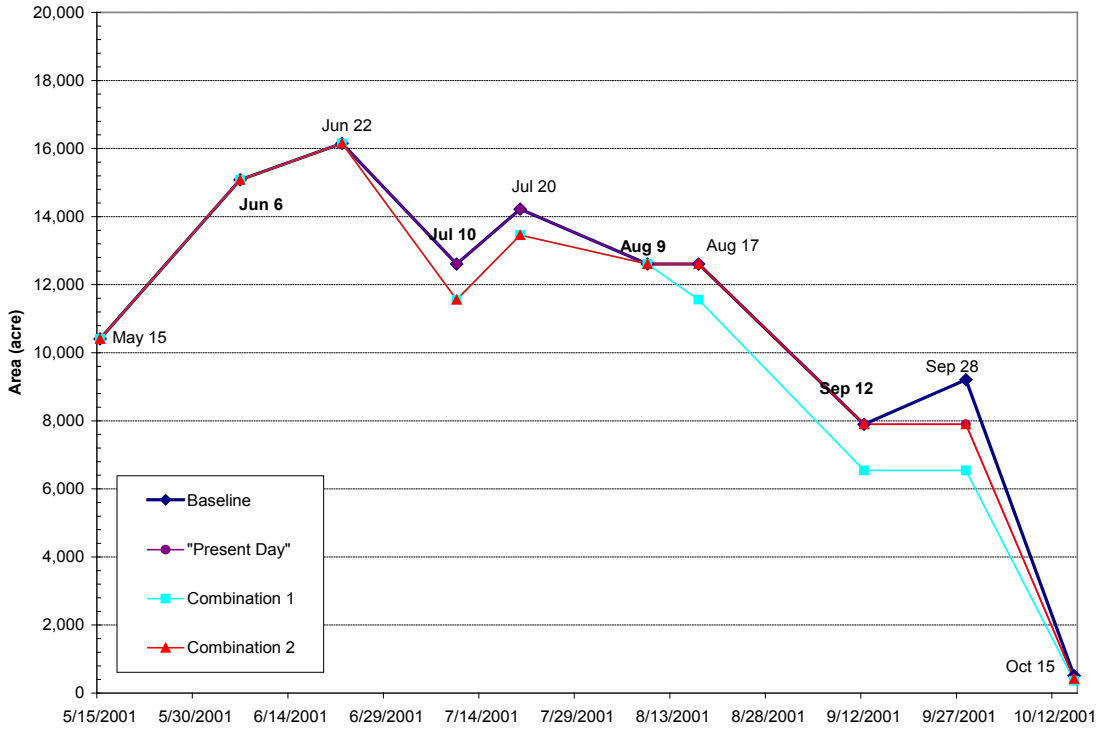


Table 17. Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-8a in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)			Change in Habitat Volume Relative to Baseline Condition (acre-ft)		% of Habitat Volume to Total Reservoir Storage		
		Baseline	Comb 1	Comb 2	Comb 1	Comb 2	Baseline	Comb 1	Comb 2
May 15	34,270	33,980	33,810	33,810	-170	-170	99%	99%	99%
June 7	33,790	31,420	31,560	31,560	140	140	93%	93%	93%
Jun 22	32,410	24,190	20,500	21,500	-3,690	-2,690	75%	63%	66%
July 7	36,790	33,510	26,030	26,460	-7,480	-7,050	91%	71%	72%
Jul 20	37,390	17,690	18,010	22,680	320	4,990	47%	48%	61%
Aug 7	37,190	2,970	5,170	7,710	2,200	4,740	8%	14%	21%
Aug 17	38,570	2,170	10,110	12,310	7,940	10,140	6%	26%	32%
Sep 7	41,260	41,090	40,570	41,110	-520	20	100%	98%	100%
Sep 28	34,710	34,600	32,740	34,710	-1,860	110	100%	99%	99%

Notes: 1) The ***italic and bold*** dates have observed profiles. 2) The "Present Day" condition was not analyzed for Butt Valley Reservoir because it would have little effect on the reservoir habitat.

Figure 19. Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives. (2000, Normal Hydrologic Year.)

Similar to Figure 3-14a in Level 3 Report.

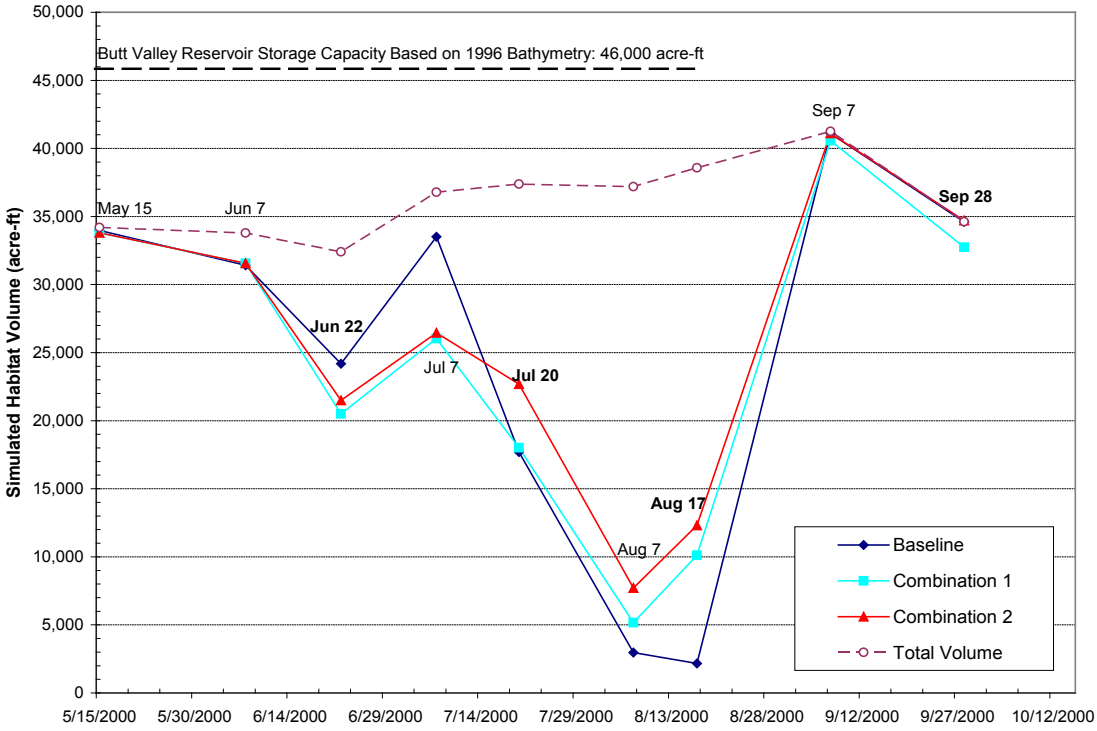


Table 18. Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-8b in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)			Change in Habitat Volume Relative to Baseline Condition (acre-ft)		% of Habitat Volume to Total Reservoir Storage		
		Baseline	Comb 1	Comb 2	Comb 1	Comb 2	Baseline	Comb 1	Comb 2
May 15	34,270	33,980	33,810	33,810	-170	-170	99%	99%	99%
June 7	33,790	31,420	31,560	31,560	140	140	93%	93%	93%
Jun 22	32,410	28,400	23,410	24,980	-4,990	-3,420	88%	72%	77%
July 7	36,790	34,380	26,300	27,080	-8,080	-7,300	93%	71%	74%
Jul 20	37,390	32,360	26,690	26,250	-5,670	-6,110	87%	71%	70%
Aug 7	37,190	16,340	12,320	16,010	-4,020	-330	44%	33%	43%
Aug 17	38,570	34,170	29,040	27,290	-5,130	-6,880	89%	75%	71%
Sep 7	41,260	41,090	40,570	41,110	-520	20	100%	98%	100%
Sep 28	34,710	34,600	32,740	34,710	-1,860	110	100%	99%	99%

Notes: 1) The ***italic and bold*** dates have observed profiles. 2) The "Present Day" condition was not analyzed for Butt Valley Reservoir because it would have little effect on the reservoir habitat.

Figure 20. Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives. (2000, Normal Hydrologic Year.)

Similar to Figure 3-14b in Level 3 Report.

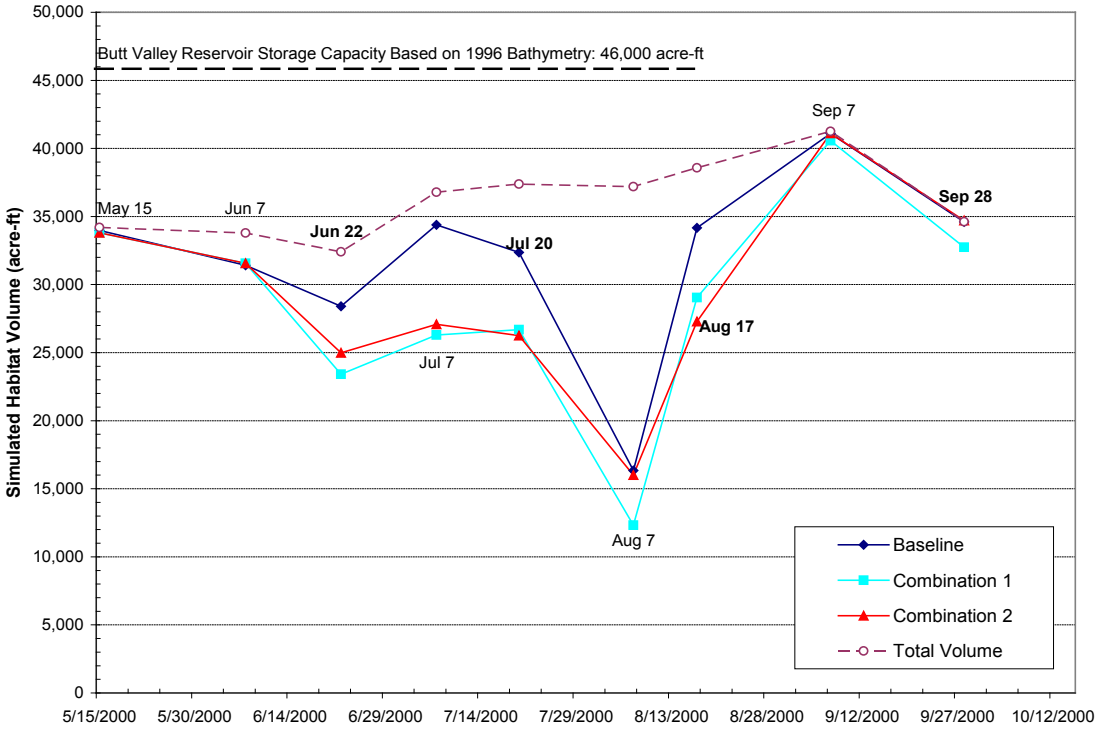


Table 19. Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2000, Normal Hydrologic Year.)

Similar to Table 3-8c in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)			Change in Habitat Volume Relative to Baseline Condition (acre-ft)		% of Habitat Volume to Total Reservoir Storage		
		Baseline	Comb 1	Comb 2	Comb 1	Comb 2	Baseline	Comb 1	Comb 2
May 15	34,270	33,980	33,810	33,810	-170	-170	99%	99%	99%
June 7	33,790	31,420	31,560	31,560	140	140	93%	93%	93%
Jun 22	32,410	29,980	28,600	28,700	-1,380	-1,280	93%	88%	89%
July 7	36,790	34,380	26,300	27,080	-8,080	-7,300	93%	71%	74%
Jul 20	37,390	33,340	27,240	26,250	-6,100	-7,090	89%	73%	70%
Aug 7	37,190	32,420	25,960	26,740	-6,460	-5,680	87%	70%	72%
Aug 17	38,570	36,120	29,040	27,290	-7,080	-8,830	94%	75%	71%
Sep 7	41,260	41,090	40,570	41,110	-520	20	100%	98%	100%
Sep 28	34,710	34,600	32,740	34,710	-1,860	110	100%	99%	99%

Notes: 1) The ***italic and bold*** dates have observed profiles. 2) The "Present Day" condition was not analyzed for Butt Valley Reservoir because it would have little effect on the reservoir habitat.

Figure 21. Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives. (2000, Normal Hydrologic Year.)

Similar to Figure 3-14c in Level 3 Report.

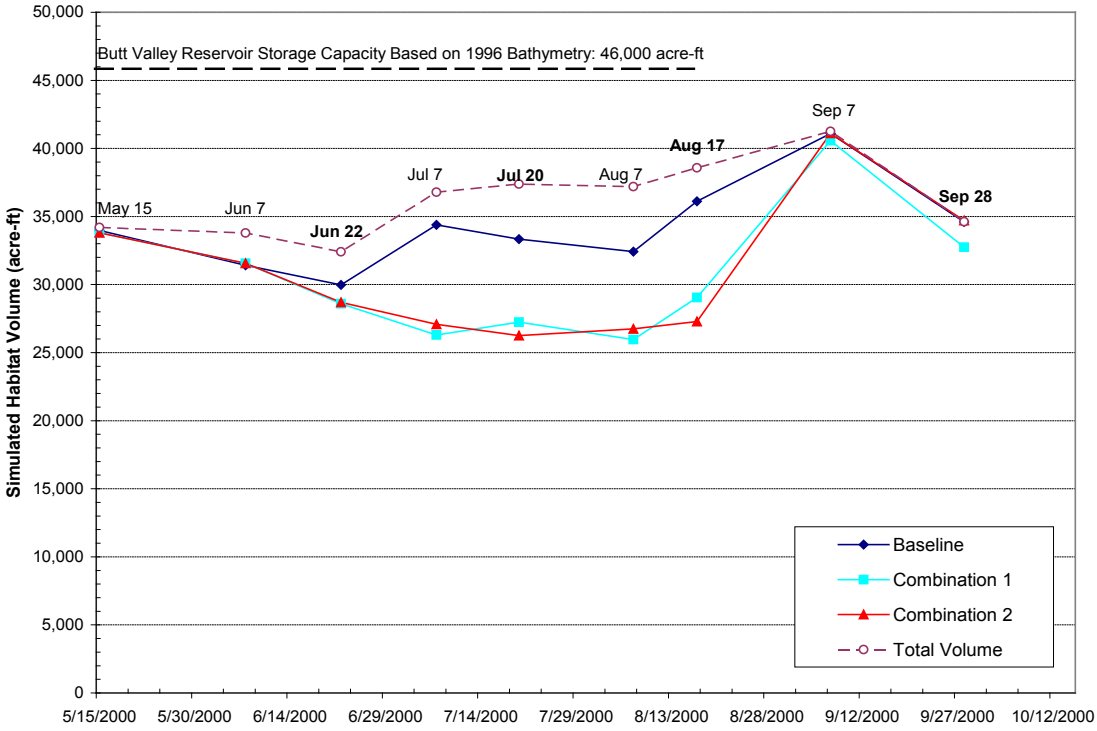


Table 20. Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2001, Critical Dry Year.)

Similar to Table 3-9a in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)			Change in Habitat Volume Relative to Baseline Condition (acre-ft)		% of Habitat Volume to Total Reservoir Storage		
		Baseline	Comb 1	Comb 2	Comb 1	Comb 2	Baseline	Comb 1	Comb 2
May 15	38,210	38,160	38,150	38,150	-10	-10	100%	100%	100%
June 6	41,400	39,550	39,700	39,700	150	150	96%	96%	96%
Jun 22	39,840	15,660	17,050	17,830	1,390	2,170	39%	43%	45%
July 11	40,530	5,290	7,630	9,010	2,340	3,720	13%	19%	22%
Jul 20	40,490	1,040	3,010	4,030	1,970	2,990	3%	7%	10%
Aug 7	36,840	0	80	50	80	50	0%	0%	0%
Aug 20	34,980	0	0	20	0	20	0%	0%	0%

Notes: 1) The ***italic and bold*** dates have observed profiles. 2) The "Present Day" condition was not analyzed for Butt Valley Reservoir because it would have little effect on the reservoir habitat.

Figure 22. Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-15a in Level 3 Report.

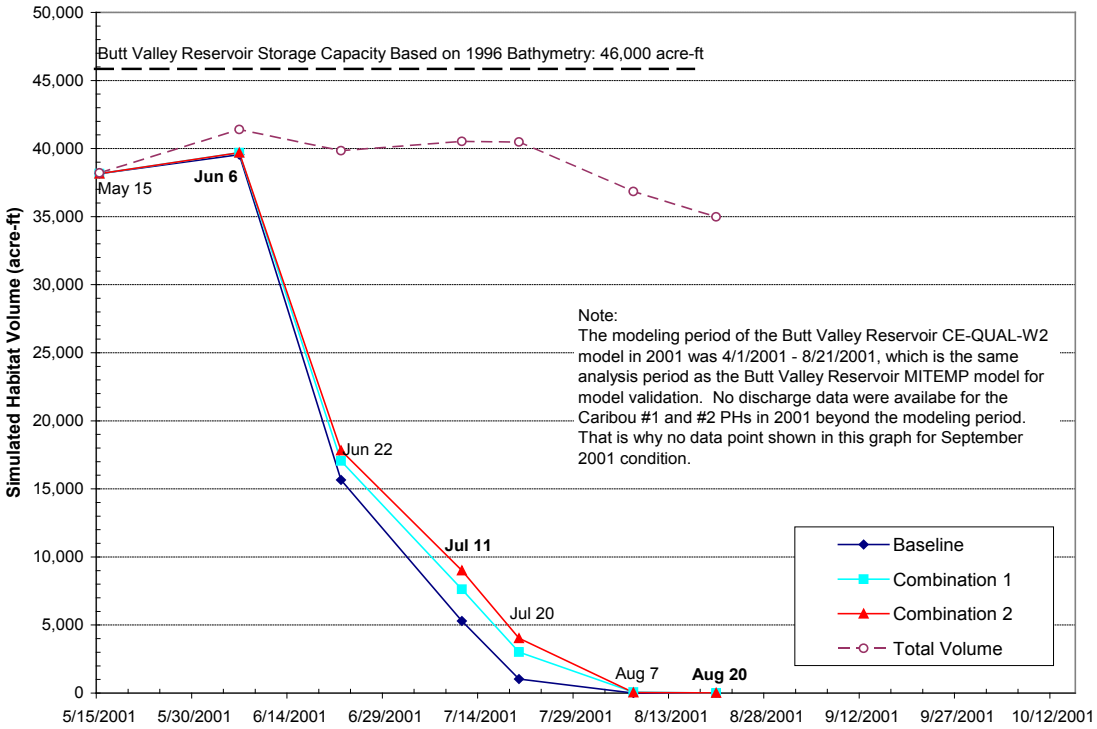


Table 21. Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2001, Critical Dry Year.)

Similar to Table 3-9b in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)			Change in Habitat Volume Relative to Baseline Condition (acre-ft)		% of Habitat Volume to Total Reservoir Storage		
		Baseline	Comb 1	Comb 2	Comb 1	Comb 2	Baseline	Comb 1	Comb 2
May 15	38,210	38,160	38,150	38,150	-10	-10	100%	100%	100%
June 6	41,400	40,220	39,950	39,950	-270	-270	97%	96%	96%
Jun 22	39,840	24,890	23,920	24,690	-970	-200	62%	60%	62%
July 11	40,530	14,980	16,130	20,010	1,150	5,030	37%	40%	49%
Jul 20	40,490	10,870	11,710	17,370	840	6,500	27%	29%	43%
Aug 7	36,840	210	1,420	4,670	1,210	4,460	1%	4%	13%
Aug 20	34,980	910	1,350	4,330	440	3,420	3%	4%	12%

Notes: 1) The ***italic and bold*** dates have observed profiles. 2) The "Present Day" condition was not analyzed for Butt Valley Reservoir because it would have little effect on the reservoir habitat.

Figure 23. Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-15b in Level 3 Report.

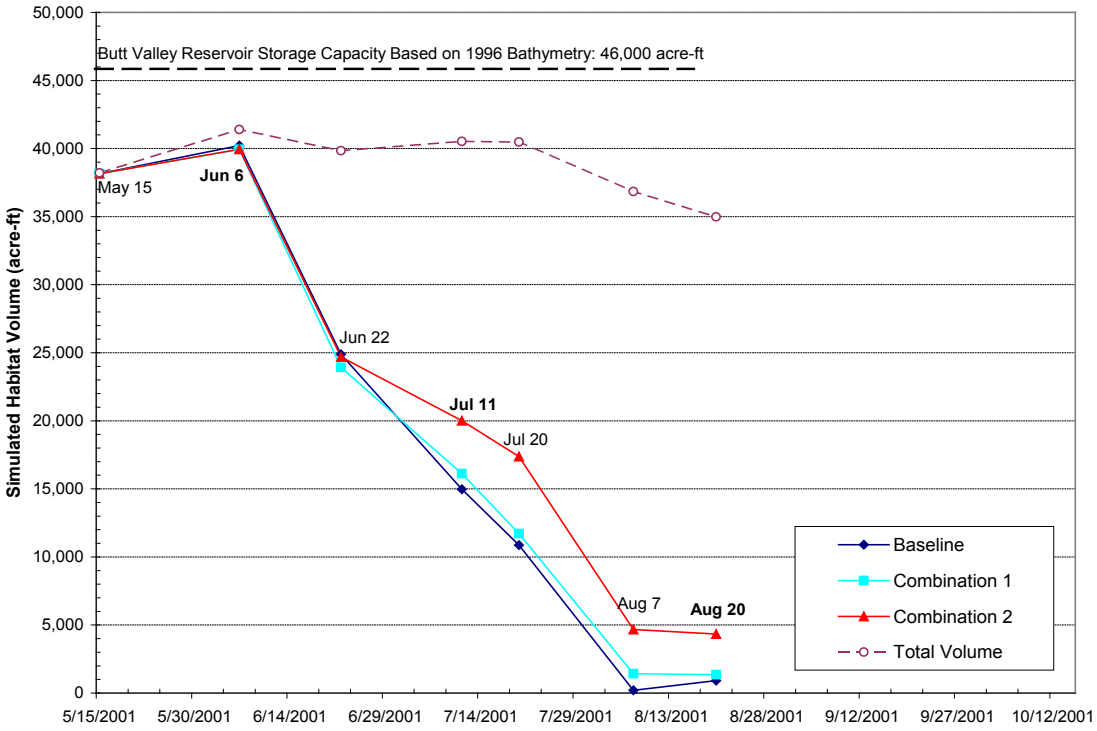


Table 22. Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition. (2001, Critical Dry Year.)

Similar to Table 3-9c in Level 3 Report.

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)			Change in Habitat Volume Relative to Baseline Condition (acre-ft)		% of Habitat Volume to Total Reservoir Storage		
		Baseline	Comb 1	Comb 2	Comb 1	Comb 2	Baseline	Comb 1	Comb 2
May 15	38,210	38,160	38,150	38,150	-10	-10	100%	100%	100%
June 6	41,400	40,220	39,950	39,950	-270	-270	97%	96%	96%
Jun 22	39,840	35,140	35,720	35,020	580	-120	88%	90%	88%
July 11	40,530	37,560	36,940	36,210	-620	-1,350	93%	91%	89%
Jul 20	40,490	35,920	35,700	35,680	-220	-240	89%	88%	88%
Aug 7	36,840	21,110	23,460	29,070	2,350	7,960	57%	64%	79%
Aug 20	34,980	31,210	31,430	30,970	220	-240	89%	90%	89%

Notes: 1) The ***italic and bold*** dates have observed profiles. 2) The "Present Day" condition was not analyzed for Butt Valley Reservoir because it would have little effect on the reservoir habitat.

Figure 24. Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives. (2001, Critical Dry Year.)

Similar to Figure 3-15c in Level 3 Report.