APPENDIX E-**3**

FINDINGS OF SUPPLEMENTAL MODELING RESULTS

September 201**6**

Upper North Fork Feather River Hydroelectric Project

Revised Draft Environmental Impact Report

State Water Resources Control Board
Sacramento, CA

May 2020

Summary of Supplemental Modeling Results to Support the UNFFR Project Recirculated EIR

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Summary of Supplemental Modeling Results to Support the UNFFR Project Recirculated EIR

Introduction

Stetson Engineers was tasked with performing supplemental modeling work for three alternatives recommended by the State Water Board (SWB) to evaluate effects on river temperature, lake/reservoir habitat, and power generation:

- Alternative 1: Proposed Project plus implementation of thermal curtains at both Prattville and Caribou Intakes (without removal of submerged levees near Prattville Intake) and release of 250 cfs from Canyon Dam from June 16 to September 15.

- Alternative 2: Proposed Project plus implementation of thermal curtains at both Prattville and Caribou Intakes (without removal of submerged levees near Prattville Intake).

- Alternative 3: Proposed Project plus stand-alone release of 250 cfs from Canyon Dam from June 16 to September 15.

Proposed Project includes the 2004 UNFFR Project Settlement Agreement, mandatory conditions, and the FERC staff alternative (i.e., Settlement flows, pulse flows, and recreation flows).

The 250 cfs stand-alone release from Canyon Dam was selected by SWB based on the Stetson's analysis results of four different stand-alone releases of 250 cfs, 350 cfs, 500 cfs, and 600 cfs[1]. The results of Stetson's analysis are documented in the report entitled "Documentation of Analysis of Stand-Alone Increased Canyon Dam Release Scenarios", dated July 12, 2016.

Results of modeling Baseline and "Present Day" conditions are also included in the presentation to provide a basis for comparison. 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"

[1]According to the PG&E's license application (PG&E 2002), at 700 cfs, the river stage is approximately at bankfull in the lower half of the Seneca Reach near the Seneca Resort and China Bar areas. Flows exceeding about 700 cfs result in over bank flows in this reach, which should, therefore, be avoided. Flows between 600 and 700 cfs begin to mobilize spawning gravel and flows greater than 700 cfs can result in significant movement of streambed materials in the Seneca reach. Based on this information, 600 cfs was judged to be the maximum allowable release out of Canyon Dam for normal operations.

The 250 cfs originally came from the Level 1 & 2 Study, Chapter 4, pages 4-9 to 4-11. It was found that a 250 cfs Canyon Dam release combined with thermal curtains would reduce Belden Reservoir 2002 summertime water temperature to below 20°C.

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). These two conditions were already analyzed in Stetson's Level 3 Report[2].

The Level 3 modeling work for Baseline and "Present Day" conditions and the supplemental modeling work for the three alternatives considered the flow releases described below:

Baseline Conditions

CEQA Baseline conditions, for purposes of modeling flow regimes for the UNFFR, were the conditions that existed at the time the Notice of Preparation (NOP) was filed. The NOP for 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 at the time 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 at the time 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 at the time 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 at the time 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 at the time 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:

[2] With respect to flows, the "Present Day" condition here is not exactly the same as the "Present Day" condition analyzed in Level 3 Report. The "Present Day" condition analyzed in Level 3 Report assumed the second 5-year releases for Rock Creek and Cresta Dams. The "Present Day" condition herein used the third 5-year releases for Rock Creek and Cresta Dams. The modeling results for the "Present Day" condition in Level 3 Report were updated to reflect this flow change.

- 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 (see Table 1);
- Rock Creek Dam releases to the Rock Creek Reach were those given in the proposed changes in the 2014 FERC Order to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the third 5-year (see Table 2);
- Cresta Dam releases to the Cresta Reach were those given in the proposed changes in the 2014 FERC Order to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the third 5-year (see Table 2); and,
- Poe Dam releases to the Poe Reach were those of current operations (about 100 cfs).

Alternatives Conditions

- Canyon Dam releases to the Seneca Reach were those agreed to in the Partial Settlement for the UNFFR Project, except that the Canyon Dam release of 250 cfs to the Seneca Reach from June 16 through September 15 was replaced by Alternatives 1 and 3;
- Belden Dam releases to the Belden Reach were those agreed to in the Partial Settlement for the UNFFR Project;
- Rock Creek Dam releases to the Rock Creek Reach were those given in the proposed changes in the 2014 FERC Order to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the third 5-year;
- Cresta Dam releases to the Cresta Reach were those given in the proposed changes in the 2014 FERC Order to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project for the third 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 Rock Creek and Cresta Instream Flow Release Schedule (cfs), FERC #1962

	Rock Creek Reach				**Cresta Reach**			
Water Year Type	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep
First 5-year								
Normal/Wet	220	180	180	180	240	220	220	220
Dry	175	150	150	150	190	175	175	175
Critical Dry	150	150	150	150	140	140	140	140
Second 5-year								
Normal/Wet	260	260	260	260	325 (500)	325	325	325
Dry	210	210	210	210	260 (400)	260	260	260
Critical Dry	150	150	150	150	140	140	140	140
Third 5-year								
Normal/Wet	390	390	390	390	440 (460)	440	440 (350)	440 (300)
Dry	310	310	310	310	350 (400-370)	350	350 (300)	350 (250)
Critical Dry	150	150	150	150	140	140	140	140

Note: The numbers in parenthesis for the third 5-year are those given in the changes in the 2014 FERC Order to the 2000 Relicensing Settlement Agreement for the Rock Creek-Cresta Project. The 2014 FERC Order incorporated revised 4(e) conditions in the Rock Creek – Cresta license, FERC Project No. 1962.

Methods Used in the Supplemental 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 were run to develop mean daily water temperature profiles and maximum weekly average water temperature (MWAT) profiles along the bypass reaches for the three alternatives. Detailed model simulations were run to analyze the effects of the three alternatives on cold freshwater habitat in Lake Almanor and Butt Valley Reservoir. Following is a brief summary of the steps used in the supplemental modeling work:

1) Long-term (1984-2002) daily hydrologic flow inputs for the Lake Almanor and Butt Valley Reservoir models were generated. 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 proposed minimum flow releases during the non-summertime and the increased releases at Canyon Dam during the summertime (i.e., 250 cfs from June 16 through September 15 for Alternatives 1 and 3).

2) Mean daily water temperature profile analyses along the bypass reaches for different exceedance levels were performed: Ran the linked MITEMP/ CE-QUAL-W2 daily reservoir water temperature models for Lake Almanor (MITEMP) and Butt Valley Reservoir (CE-QUAL-W2) and the SNTEMP stream temperature models for the bypass reaches, and then post-processed the modeling results.

3) MWAT profile analyses along the bypass reaches for different exceedance levels were performed: 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; performed MWAT modeling along the NFFR using the linked SNTEMP stream temperature models for the bypass reaches; and then post-processed the modeling results.

4) Cold freshwater habitat analyses for Lake Almanor and Butt Valley Reservoir were performed using CE-QUAL-W2 models for the years 2000 (normal hydrologic year), 2009 (dry year)[3], 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.

[3] In the Level 3 Report, Stetson performed cold freshwater habitat assessment for Lake Almanor and Butt Valley Reservoir using CE-QUAL-W2 models for the normal hydrologic year 2000 and critical dry year 2001, but did not analyze for a dry year. Adding a dry year in this analysis was intended to address the CDFW comment that there is a need to analyze a dry year because, in their opinion, cold freshwater habitat may also be limited in dry years. The dry year 2009 was selected by PG&E based on data availability. To analyze the dry year, Stetson collected and prepared data input for the lake/reservoir CE-QUAL-W2 models and verified the models for the selected dry year. Model verifications were documented in the format of attachment to Appendix A of the Level 3 Report (Lake Almanor CE-QUAL-W2 model documentation) and Appendix B of the Level 3 Report (Butt Valley Reservoir CE-QUAL-W2 model documentation).

Methods Used in the Annual Foregone Power Generation Loss Analysis

Annual foregone power generation loss was estimated based on the potential commensurate flow reduction[4] in each respective powerhouse resulting from the particular measure, static head of the powerhouse, and normal operating efficiency of the powerhouse turbines. The following table lists static heads and turbine efficiencies of the UNFFR Project powerhouses that were used in the foregone power generation loss estimates.

Powerhouse Static Head and Turbine Efficiencies Used in Foregone Power Generation Loss Estimates

Powerhouse	Static Head (ft)	Turbine Efficiency	Hydraulic Capacity (cfs)
Butt Valley PH	362	80.6%	2,118
Caribou #1 PH	1,151	69.1%	1,114
Caribou #2 PH	1,150	84.2%	1,464
Oak Flat PH	137	80.1%	140
Belden PH	770	79.6%	2,410

The following table summarizes the 2004 Partial Settlement-required pulse flow releases from Canyon Dam and Belden Forebay Dam in January, February, and March and Belden Reach summertime recreational flows. The effect of one-day pulse flow releases from Canyon Dam and Belden Forebay Dam in January, February, and March on power generation was analyzed, but its effects on river temperature and lake thermal structure were not analyzed[5]. The effect of Belden Reach summertime recreational flows on power generation was analyzed, but its potential beneficial effect on reducing the warming of river temperature was not analyzed since this is of no interest -- the main purpose of the recreational flows is to provide water for kayakers, not to reduce water temperature[6].

[4] Increased releases through Canyon Dam for minimum instream flow and pulse flow releases were matched by commensurate flow reductions through the Butt Valley, Caribou #1, and Caribou #2 powerhouses for power generation in order to maintain target lake/reservoir water levels.

[5] Level 3 SNTEMP river water temperature modeling was performed for the four summer months only (June through September). Lake Almanor MITEMP and Butt Valley Reservoir CE-QUAL-W2 water temperature modeling simulated mean daily water temperatures in the vertical direction and mean daily outflow temperatures beginning March 1 and ending September 30 for each year. January and February were not included in the reservoir modeling period because in these months the reservoirs are not stratified and water temperatures are cold, so pulse flows would have no effect on reservoir water temperature modeling results. Incorporating the one-day March pulse flow into the Lake Almanor MITEMP modeling would require modifying the source code of Lake Almanor MITEMP because a portion of the pulse flow would need to be released from the mid-level gates in addition to the low-level gates that were currently used to model the minimum flows or the increased Canyon Dam releases up to 600 cfs. Modifying MITEMP is impractical. It would be expected that the effect of March pulse flow releases on the lake thermal structure in the summer months would be negligible because in March Lake Almanor is typically not stratified. When the lake is not stratified, lake water temperature would not be affected by the point of release, be it through Canyon Dam or the Prattville intake.

[6] Belden Reach recreational flows would not have an impact on Lake Almanor and Butt Valley Reservoir habitat.

Pulse Flow Releases from Canyon Dam and Belden Forebay Dam in January, February, and March and Belden Reach Summertime Recreational Flows

	Water Year Type	Pulse Flow Releases in Each Month of Jan, Feb, and Mar		Recreational Flow Releases in Each Month of Jul, Aug, Sep, and Oct	
		Flow	Duration	Flow (cfs)	Duration
Canyon Dam	Critical Dry	0	0	-	-
	Dry	0	0	-	-
	Normal	900 cfs	1 Day	-	-
	Wet	900 cfs	1 Day	-	-
Belden Forebay Dam	Critical Dry	0	0	650 cfs	1 Day
	Dry	0	0	650 cfs	2 Days
	Normal	900 cfs	1 Day	750 cfs	2 Days
	Wet	900 cfs	1 Day	750 cfs	2 Days

The pulse flows and recreational flows are related to water year type. In order to estimate the annual foregone power generation loss, there was a need to know the recurrence frequency of each water year type over the long-term. Over the 19-year modeling analysis period (1984-2002), there were 7 wet years (36.8%), 3 normal years (15.8%), 2 dry years (10.5%), and 7 critical dry years (36.8%).

Following is a brief summary of the steps used in the annual foregone power generation loss analysis:

1) Gather the results of the Level 3 analysis of power generation loss under the "Present Day" condition (i.e., increased minimum flows specified in the Settlement Agreement) relative to the existing condition.

2) Analyze the additional power generation loss due to increased Canyon Dam summertime releases up to 250 cfs relative to the "Present Day" condition for Alternatives 1 and 3.

3) Analyze the additional power generation loss due to the required pulse flow releases relative to the "Present Day" condition; conservatively assume the March water temperatures of dam releases from Canyon Dam and Belden Forebay Dam were always lower than 10ºC[7].

4) Analyze the additional power generation loss due to the required Belden Reach recreational flows relative to "Present Day" condition; conservatively assume the boat number per day is greater than 100 every year[8].

[7] The Settlement Agreement states that "No pulse flows will be required in March in the respective reach if two successive days of mean daily water temperature greater than 10 degree C are measured at gages NF-2 (Seneca Reach) or NF-70 (Belden Reach), or if rainbow trout spawning in the Seneca or Belden Reaches are observed and reported to Licensee by CDFG or FS."

[8] The Settlement Agreement states that "If the number of boats per day on the first recreation river flow release day for a month exceeds 100 boats per day, one day of recreation river flow release shall be added to the recreation river flow release schedule in that month the next year."

Analytical Exhibits

Figures 1 - 4

Mean daily water temperature longitudinal profiles comparing the three alternatives, 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 3- 6

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

Figures 5 - 8

Monthly MWAT longitudinal profiles comparing the three alternatives, Baseline, and "Present Day".

Tables 7 – 9; Figures 9 - 11

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

Tables 10 – 18; Figures 12 - 20

Lake Almanor coldwater habitat volume tables and figures.

Tables 19 – 21; Figures 21 – 23

Lake Almanor metalimnion surface area tables and figures.

Tables 22 – 30; Figures 24 – 32

Butt Valley reservoir coldwater habitat tables and figures.

Table 31; Figure 33

Annual foregone power generation loss table and figure.

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

Similar to Figure 2-2 in Level 3 Report

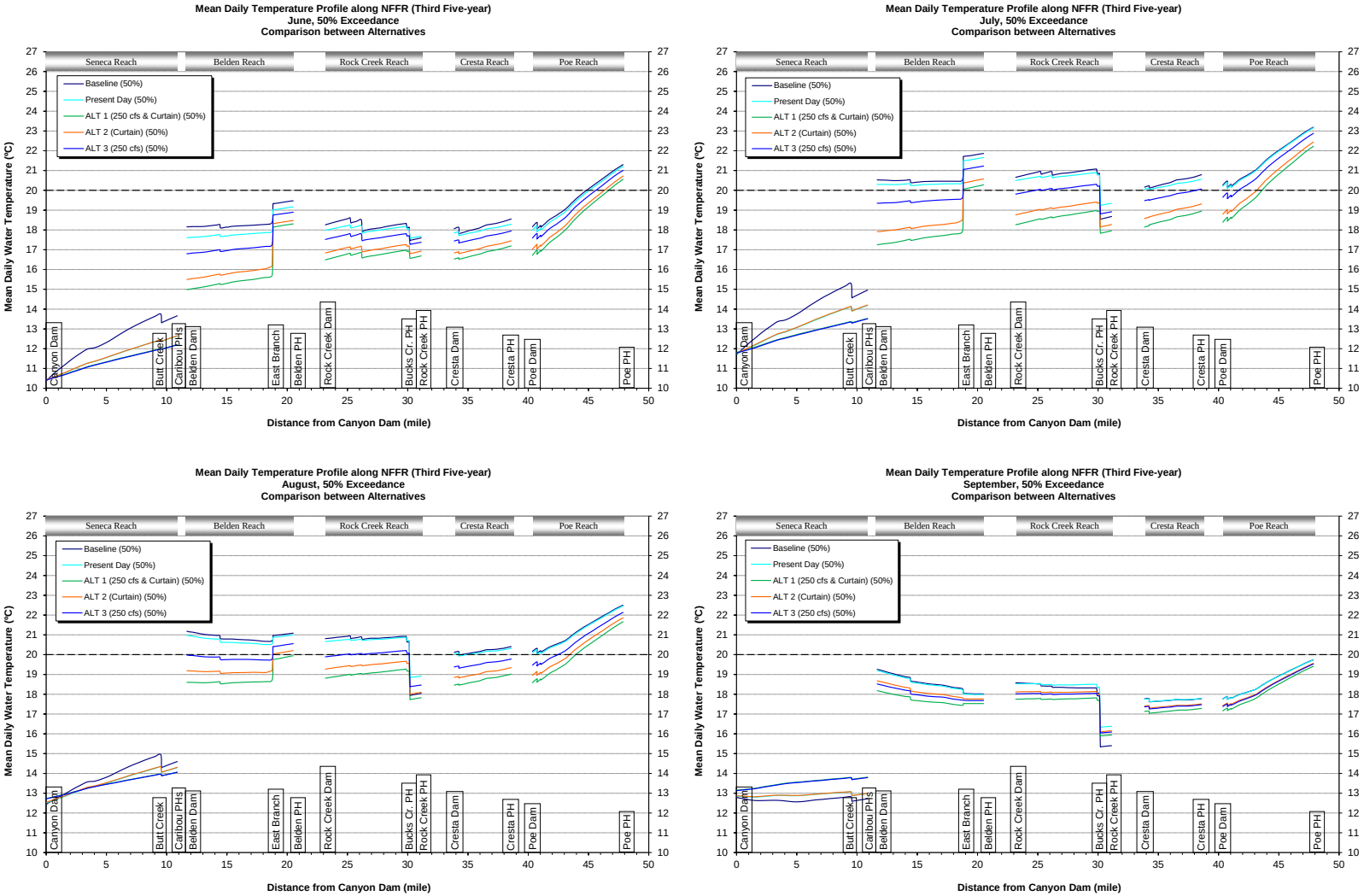


Figure 2 Comparison of NFFR Mean Daily Water Temperature Longitudinal Profiles between Alternatives for the Summer Months – 25% Exceedance

Similar to Figure 2-3 in Level 3 Report

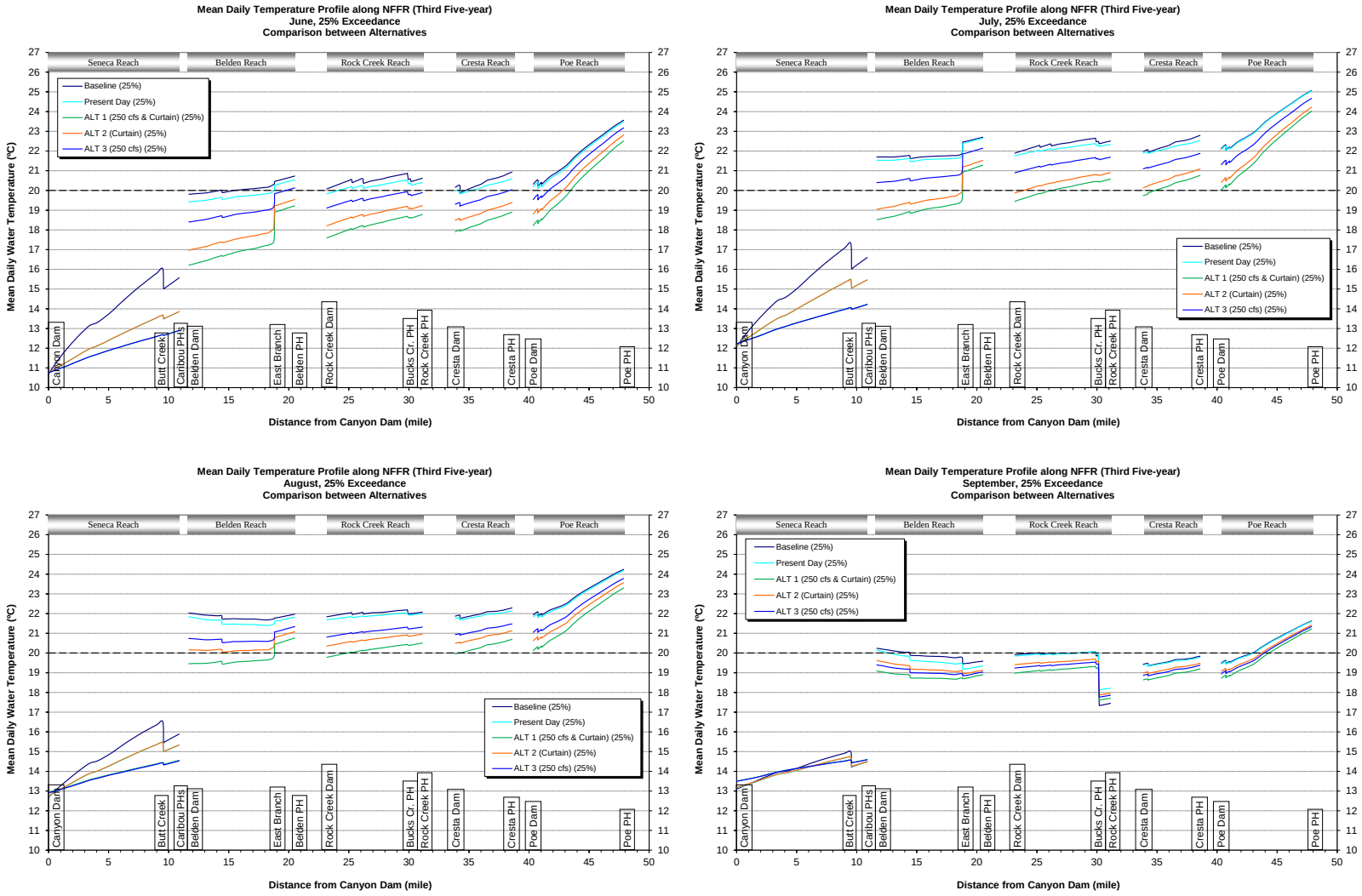


Figure 3 Comparison of NFFR Mean Daily Water Temperature Longitudinal Profiles between Alternatives for the Summer Months – 10% Exceedance

Similar to Figure 2-4 in Level 3 Report

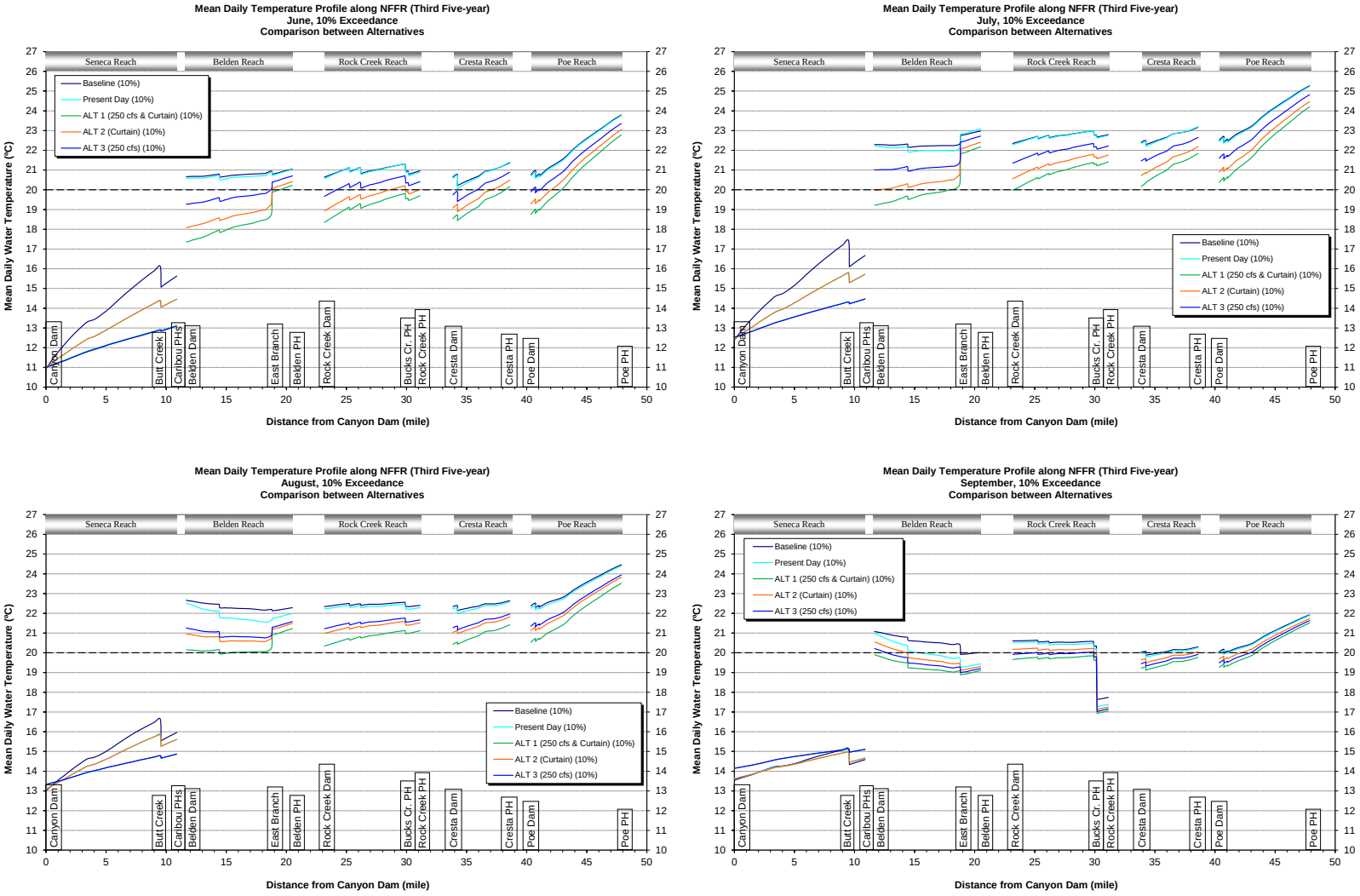


Figure 4 Comparison of NFFR Mean Daily Water Temperature Longitudinal Profiles between Alternatives for the Summer Months – Maximum

Similar to Figure 2-5 in Level 3 Report

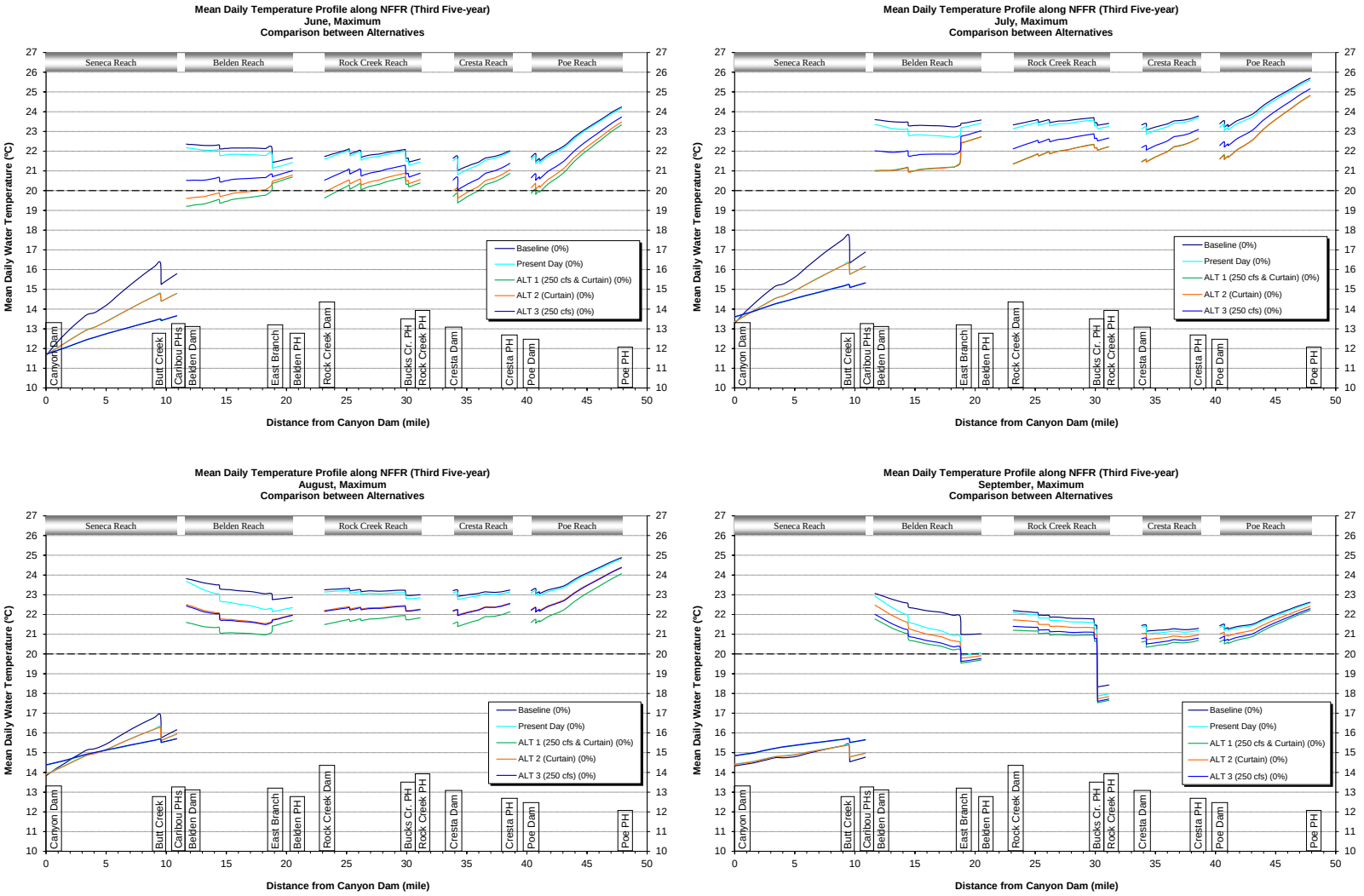


Table 3 Summary of Mean Daily Water Temperature Profiles for Different Alternatives - June

Similar to Table 2-3a in Level 3 Report

Alt.	Exceedence 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% Exceedence	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% Exceedence	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% Exceedence	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	21.1-22.2°C	Entire reach	21.3-22.1°C	Entire reach	20.8-22.0°C	Entire reach	21.4-24.2°C
	10% Exceedence	Entire reach	20.5-21.0°C	Entire reach	20.6-21.3°C	Entire reach	20.1-21.4°C	Entire reach	20.6-23.8°C
	25% Exceedence	1.7	19.4-20.5°C	7.0	19.8-20.5°C	3.6	19.8-20.6°C	Entire reach	20.1-23.5°C
	50% Exceedence	0	17.6-19.2°C	0	17.6-18.3°C	0	17.7-18.3°C	2.8	17.9-21.2°C
Alternative 1	Maximum	1.7	19.2-20.7°C	6.8	19.6-20.7°C	2.6	19.4-20.9°C	6.9	19.8-23.3°C
	10% Exceedence	1.1	17.4-20.2°C	0	18.4-19.8°C	0.4	18.5-20.2°C	5.0	18.8-22.8°C
	25% Exceedence	0	16.2-19.2°C	0	17.6-18.8°C	0	17.9-18.9°C	4.4	18.2-22.5°C
	50% Exceedence	0	15.0-18.3°C	0	16.5-17.0°C	0	16.5-17.2°C	1.2	16.7-20.6°C
Alternative 2	Maximum	2.9	19.6-20.8°C	7.7	19.9-20.9°C	3.7	19.6-21.1°C	Entire reach	20.1-23.5°C
	10% Exceedence	1.7	18.1-20.4°C	1.4	18.9-20.2°C	1.5	18.9-20.5°C	5.8	19.3-23.1°C
	25% Exceedence	0	17.0-19.5°C	0	18.2-19.2°C	0	18.5-19.4°C	5.1	18.8-22.8°C
	50% Exceedence	0	15.5-18.5°C	0	16.8-17.3°C	0	16.8-17.5°C	1.6	17.0-20.7°C
Alternative 3	Maximum	Entire reach	20.4-21.0°C	Entire reach	20.5-21.3°C	Entire reach	20.0-21.4°C	Entire reach	20.5-23.7°C
	10% Exceedence	1.8	19.3-20.7°C	6.9	19.7-20.7°C	2.7	19.4-20.9°C	7.0	19.9-23.4°C
	25% Exceedence	0.7	18.4-20.1°C	0	19.1-19.9°C	0.2	19.2-20.0°C	6.2	19.5-23.2°C
	50% Exceedence	0	16.8-18.9°C	0	17.3-17.8°C	0	17.3-18.0°C	2.3	17.5-21.0°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 2-3b in Level 3 Report

Alt.	Exceedence 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% Exceedence	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% Exceedence	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% Exceedence	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	22.7-23.4°C	Entire reach	23.1-23.6°C	Entire reach	22.9-23.7°C	Entire reach	23.1-25.6°C
	10% Exceedence	Entire reach	21.9-23.0°C	Entire reach	22.3-23.0°C	Entire reach	22.2-23.2°C	Entire reach	22.4-25.2°C
	25% Exceedence	Entire reach	21.5-22.7°C	Entire reach	21.8-22.4°C	Entire reach	21.9-22.5°C	Entire reach	22.0-25.1°C
	50% Exceedence	Entire reach	20.2-21.7°C	7.0	19.2-20.9°C	Entire reach	20.0-20.6°C	Entire reach	20.1-23.2°C
Alternative 1	Maximum	Entire reach	21.0-22.7°C	Entire reach	21.4-22.4°C	Entire reach	21.5-22.7°C	Entire reach	21.6-24.8°C
	10% Exceedence	2.5	19.2-22.2°C	7.9	20.0-21.4°C	Entire reach	20.2-21.8°C	Entire reach	20.4-24.2°C
	25% Exceedence	1.7	18.5-21.3°C	4.9	19.5-20.6°C	3.8	19.7-20.8°C	Entire reach	20.0-24.0°C
	50% Exceedence	1.7	17.3-20.3°C	0	17.8-19.0°C	0	18.2-19.0°C	4.3	18.4-22.2°C
Alternative 2	Maximum	Entire reach	20.9-22.7°C	Entire reach	21.3-22.3°C	Entire reach	21.5-22.6°C	Entire reach	21.6-24.8°C
	10% Exceedence	8.5	20.0-22.4°C	Entire reach	20.6-21.8°C	Entire reach	20.7-22.2°C	Entire reach	20.9-24.5°C
	25% Exceedence	1.7	19.1-21.5°C	7.3	19.9-20.9°C	Entire reach	20.1-21.1°C	Entire reach	20.4-24.2°C
	50% Exceedence	1.7	17.9-20.6°C	0	18.2-19.4°C	0	18.6-19.3°C	4.7	18.8-22.4°C
Alternative 3	Maximum	Entire reach	21.8-23.0°C	Entire reach	22.1-22.9°C	Entire reach	22.1-23.1°C	Entire reach	22.2-25.2°C
	10% Exceedence	Entire reach	21.0-22.7°C	Entire reach	21.4-22.4°C	Entire reach	21.5-22.7°C	Entire reach	21.6-24.8°C
	25% Exceedence	Entire reach	20.4-22.1°C	Entire reach	20.9-21.7°C	Entire reach	21.1-21.9°C	Entire reach	21.3-24.7°C
	50% Exceedence	1.7	19.4-21.2°C	5.3	18.8-20.3°C	0.5	19.5-20.1°C	6.2	19.6-22.9°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 2-3c in Level 3 Report

Alt.	Exceedence 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% Exceedence	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% Exceedence	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% Exceedence	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	22.8-23.2°C	Entire reach	22.8-23.1°C	Entire reach	23.0-24.8°C
	10% Exceedence	Entire reach	21.5-22.5°C	Entire reach	22.2-22.5°C	Entire reach	22.0-22.6°C	Entire reach	22.2-24.4°C
	25% Exceedence	Entire reach	21.4-21.8°C	Entire reach	21.7-22.0°C	Entire reach	21.7-22.1°C	Entire reach	21.8-24.2°C
	50% Exceedence	Entire reach	20.5-21.0°C	7.0	18.8-20.9°C	4.0	19.9-20.3°C	Entire reach	20.0-22.5°C
Alternative 1	Maximum	Entire reach	21.0-21.7°C	Entire reach	21.5-22.0°C	Entire reach	21.4-22.1°C	Entire reach	21.6-24.1°C
	10% Exceedence	8.0	19.9-21.2°C	Entire reach	20.3-21.1°C	Entire reach	20.4-21.4°C	Entire reach	20.5-23.5°C
	25% Exceedence	1.7	19.4-20.8°C	6.3	19.8-20.5°C	4.4	20.0-20.7°C	Entire reach	20.1-23.3°C
	50% Exceedence	0	18.5-19.9°C	0	17.7-19.3°C	0	18.5-19.0°C	3.9	18.6-21.7°C
Alternative 2	Maximum	Entire reach	21.5-22.5°C	Entire reach	22.2-22.5°C	Entire reach	22.0-22.6°C	Entire reach	22.2-24.4°C
	10% Exceedence	Entire reach	20.6-21.5°C	Entire reach	21.0-21.6°C	Entire reach	21.0-21.8°C	Entire reach	21.1-23.8°C
	25% Exceedence	Entire reach	20.0-21.1°C	Entire reach	20.4-21.0°C	Entire reach	20.5-21.1°C	Entire reach	20.6-23.6°C
	50% Exceedence	1.7	19.1-20.2°C	0	18.0-19.7°C	0	18.8-19.3°C	4.4	19.0-21.9°C
Alternative 3	Maximum	Entire reach	21.5-22.4°C	Entire reach	22.2-22.4°C	Entire reach	22.0-22.6°C	Entire reach	22.1-24.4°C
	10% Exceedence	Entire reach	20.8-21.6°C	Entire reach	21.2-21.8°C	Entire reach	21.2-22.0°C	Entire reach	21.3-23.9°C
	25% Exceedence	Entire reach	20.5-21.3°C	Entire reach	20.8-21.3°C	Entire reach	20.9-21.5°C	Entire reach	21.1-23.8°C
	50% Exceedence	1.7	19.7-20.6°C	5.3	18.4-20.2°C	0	19.3-19.8°C	5.4	19.4-22.1°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

Similar to Table 2-3d in Level 3 Report

Alt.	Exceedence 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% Exceedence	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% Exceedence	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% Exceedence	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	7.0	17.9-22.1°C	Entire reach	21.0-21.4°C	Entire reach	21.2-22.6°C
	10% Exceedence	3.7	19.3-21.0°C	7.0	17.3-20.6°C	2.6	19.8-20.3°C	7.2	19.9-21.9°C
	25% Exceedence	1.0	19.2-20.2°C	1.4	18.1-20.1°C	0	19.3-19.8°C	4.8	19.4-21.6°C
	50% Exceedence	0	18.0-19.2°C	0	16.3-18.5°C	0	17.6-17.8°C	0	17.7-19.7°C
Alternative 1	Maximum	7.1	19.5-21.8°C	7.0	17.5-21.2°C	Entire reach	20.4-20.7°C	Entire reach	20.5-22.2°C
	10% Exceedence	0	18.9-19.9°C	0	16.9-19.9°C	0	19.1-19.8°C	4.5	19.3-21.5°C
	25% Exceedence	0	18.7-19.1°C	0	17.6-19.3°C	0	18.6-19.2°C	3.5	18.7-21.2°C
	50% Exceedence	0	17.4-18.2°C	0	15.9-17.8°C	0	17.0-17.3°C	0	17.2-19.4°C
Alternative 2	Maximum	7.1	19.8-22.5°C	7.0	17.7-21.7°C	Entire reach	20.7-21.1°C	Entire reach	20.9-22.4°C
	10% Exceedence	2.7	19.1-20.6°C	6.8	17.1-20.2°C	0.3	19.5-20.1°C	5.7	19.7-21.7°C
	25% Exceedence	0	18.9-19.6°C	0	17.9-19.7°C	0	19.0-19.5°C	4.2	19.1-21.4°C
	50% Exceedence	0	17.8-18.7°C	0	16.1-18.1°C	0	17.3-17.5°C	0	17.4-19.6°C
Alternative 3	Maximum	7.1	19.6-22.0°C	7.0	17.6-21.4°C	Entire reach	20.5-20.8°C	Entire reach	20.7-22.3°C
	10% Exceedence	1.0	19.0-20.2°C	1.3	17.0-20.0°C	0	19.3-19.9°C	5.0	19.5-21.6°C
	25% Exceedence	0	18.8-19.4°C	0	17.8-19.5°C	0	18.9-19.4°C	4.0	19.0-21.3°C
	50% Exceedence	0	17.7-18.5°C	0	16.1-18.1°C	0	17.3-17.5°C	0	17.4-19.5°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

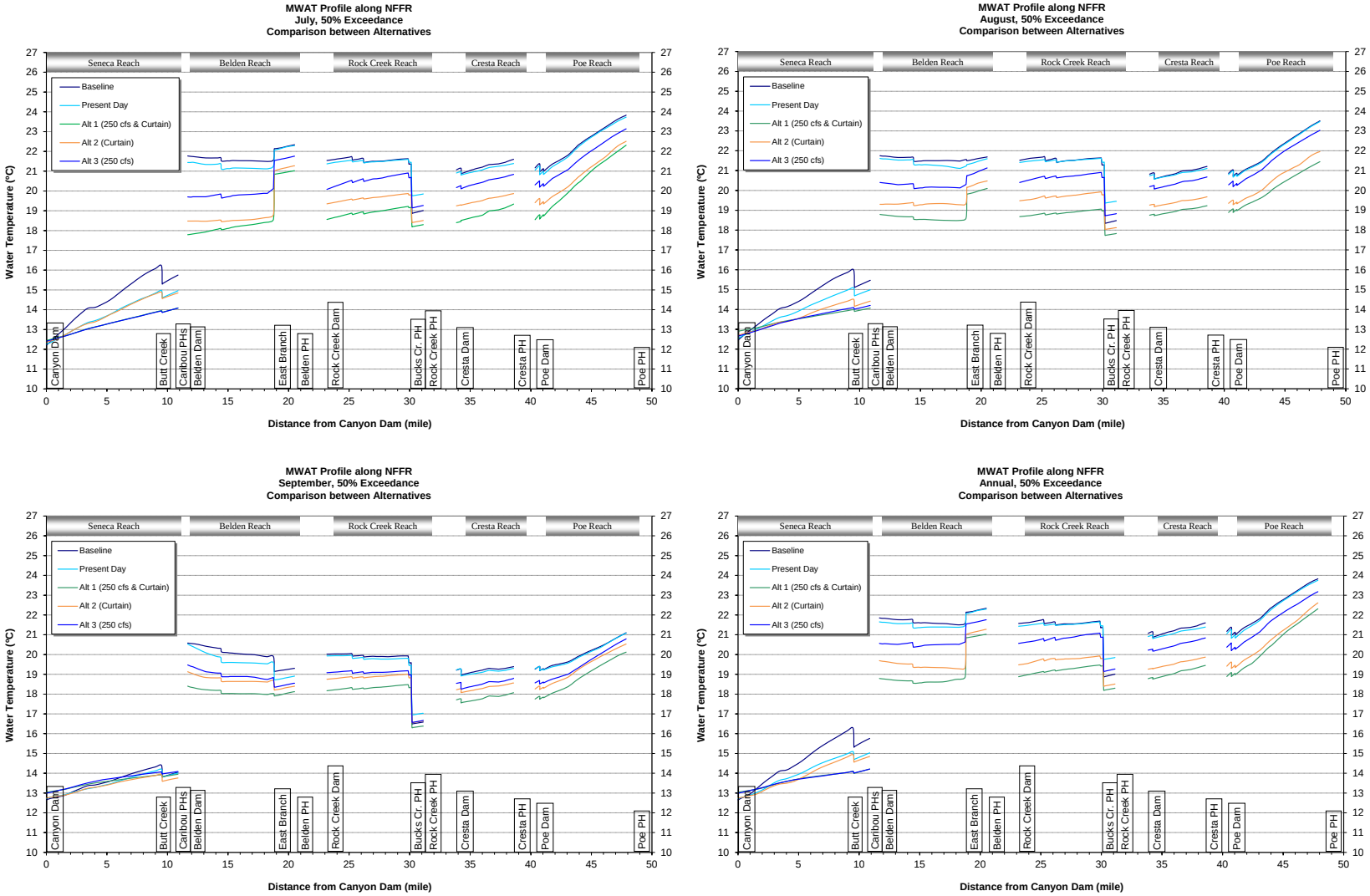
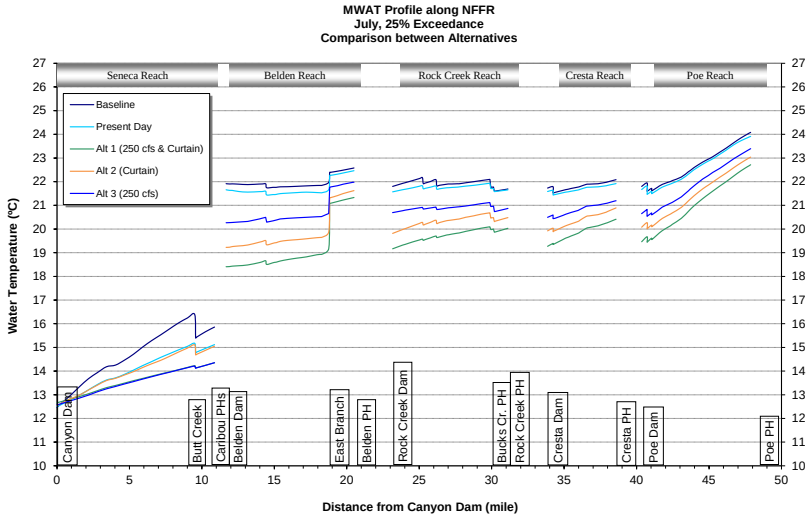
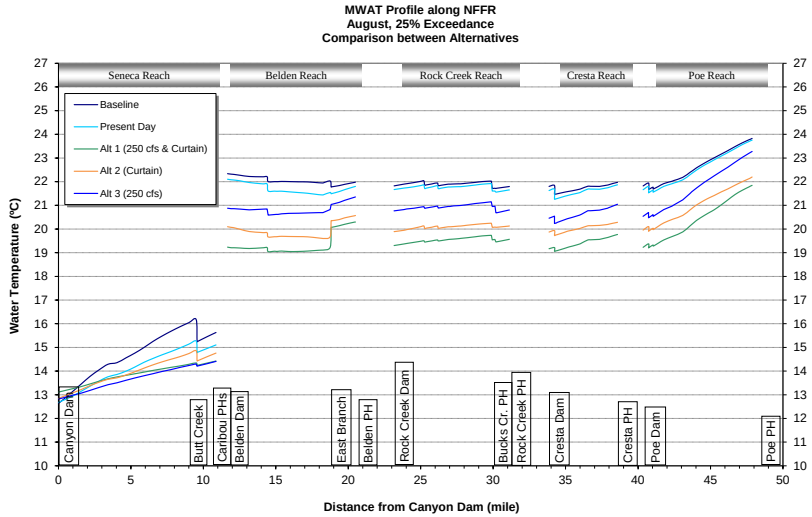
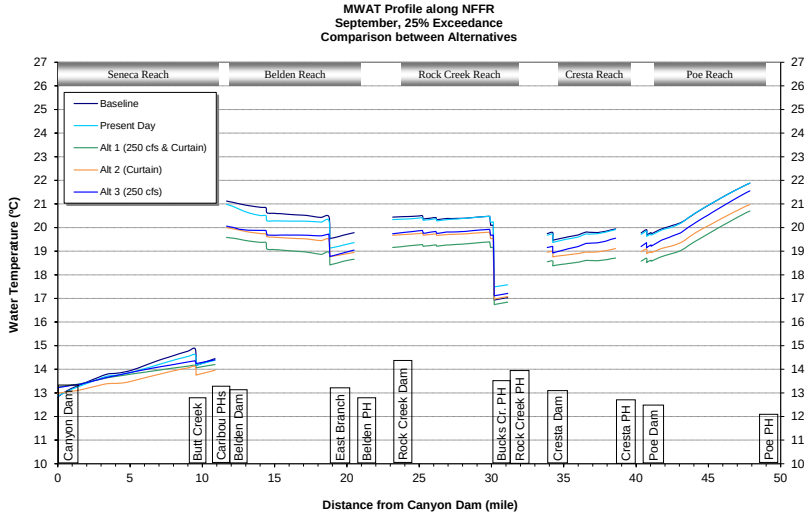


Figure 6 Comparison of Monthly (Jul, Aug, Sep) and Annual MWAT Longitudinal Profiles between Alternatives – 25% Exceedance







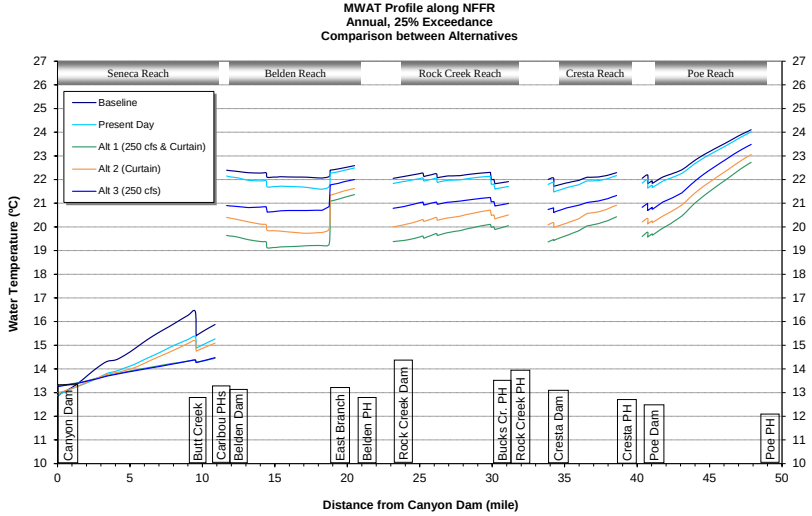


Figure 7 Comparison of Monthly (Jul, Aug, Sep) and Annual MWAT Longitudinal Profiles between Alternatives – 10% Exceedance

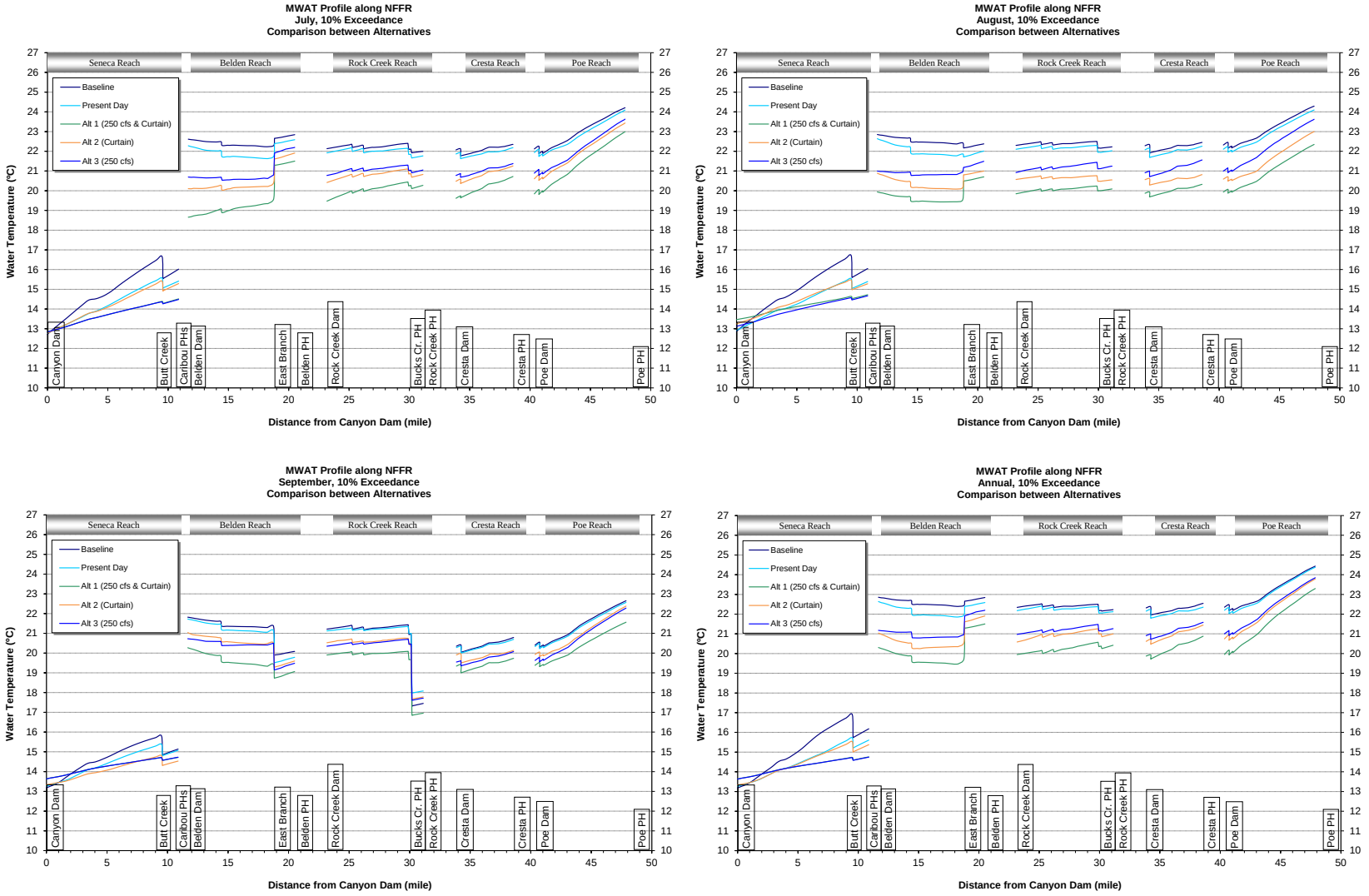


Figure 8 Comparison of Monthly (Jul, Aug, Sep) and Annual MWAT Longitudinal Profiles between Alternatives – Maximum

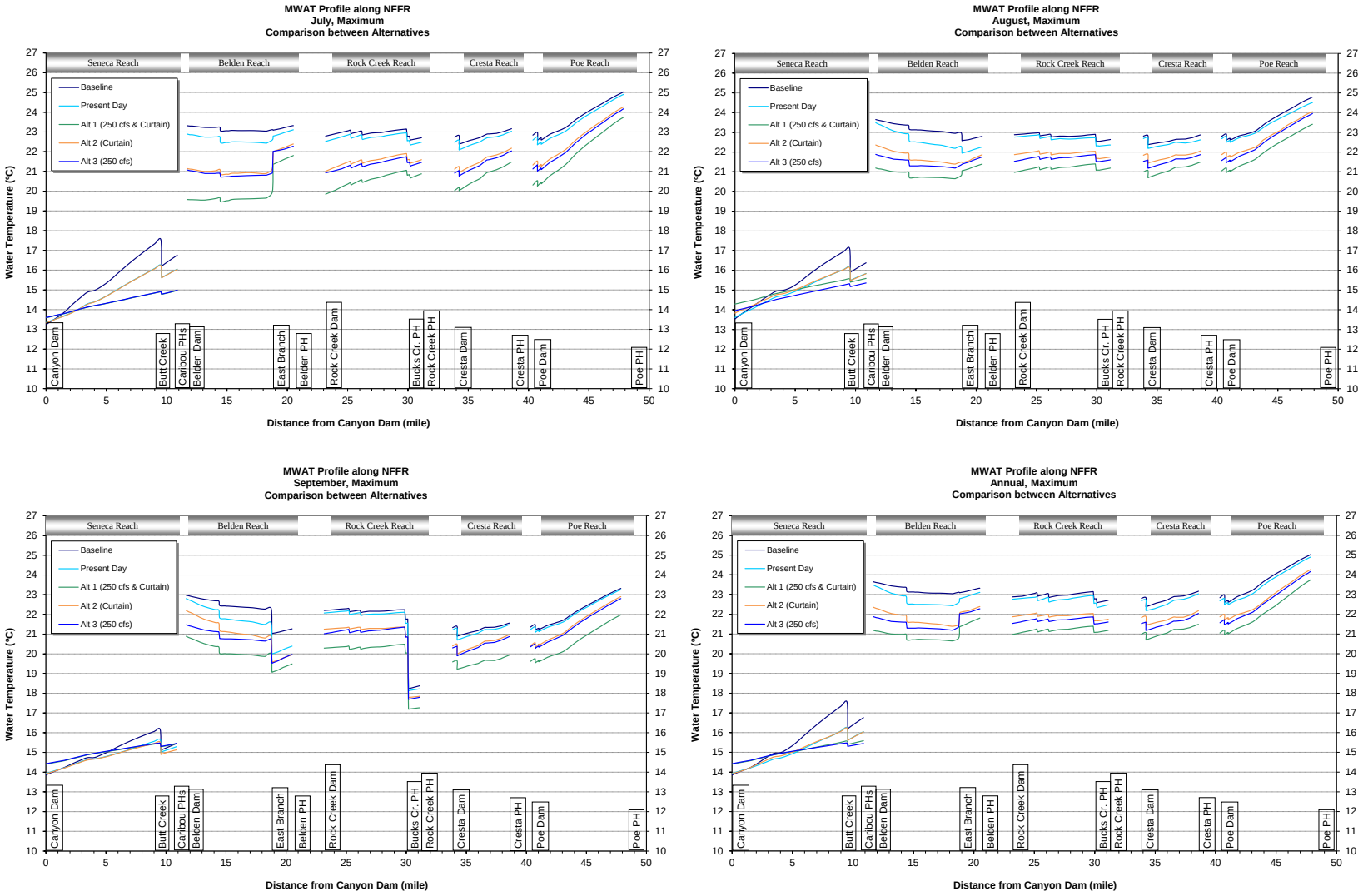


Table 7 Summary of Simulated Lake Almanor Thermocline Elevation for Different Alternatives and Change in Thermocline Elevation Relative to Baseline Condition
(2000, Normal Hydrologic Year)
Similar to Table 3-4 in Level 3 Report

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

Notes: 1) The italic and bold dates have observed profiles.
2) The blank data on May 15, 2000 indicate that the lake did not have apparent thermocline on that day.

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

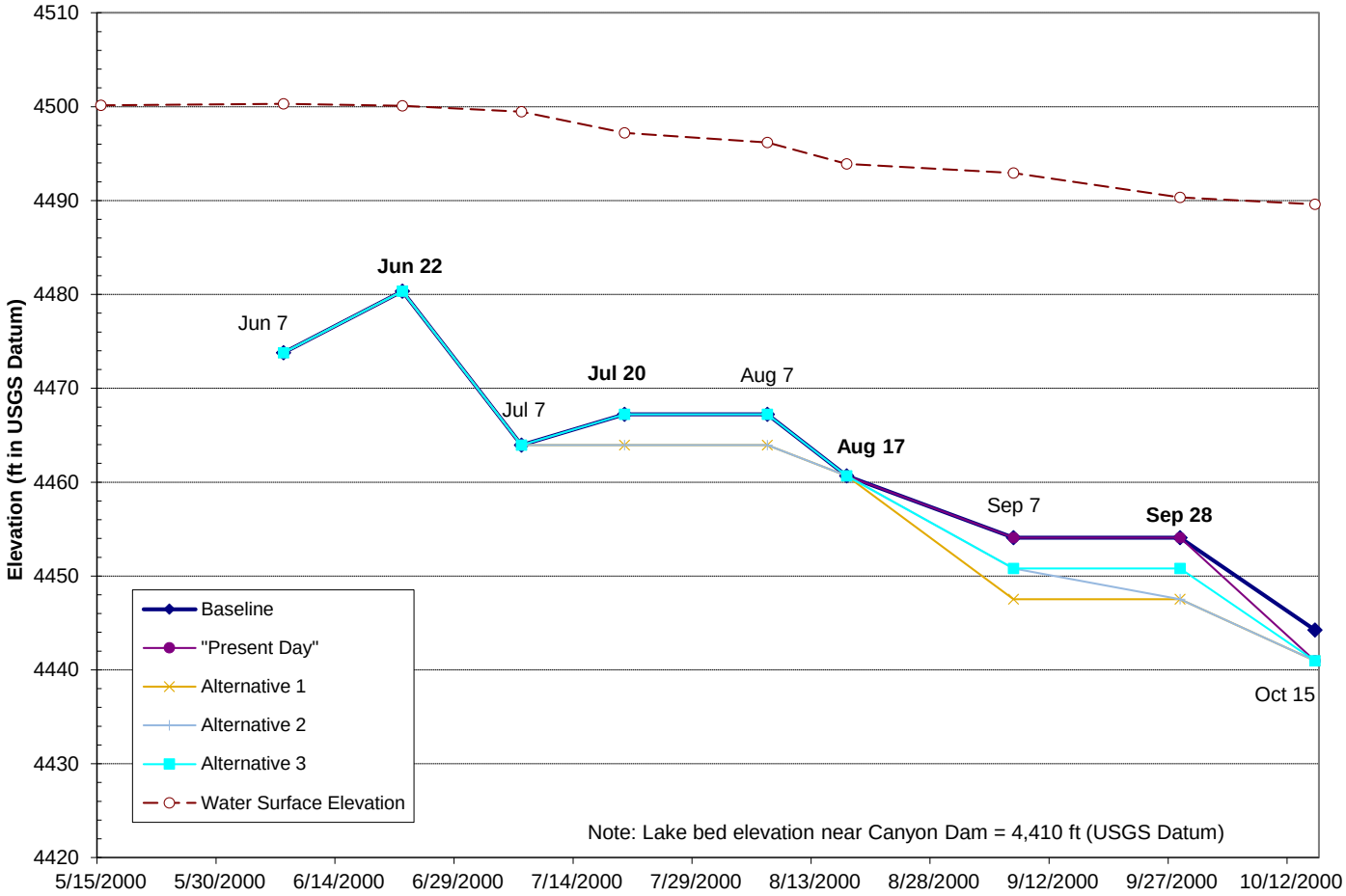


Table 8 Summary of Simulated Lake Almanor Thermocline Elevation for Different Alternatives and Change in Thermocline Elevation Relative to Baseline Condition (2009, Dry Year)

Date	Water Surface Elevation (ft)	Simulated Thermocline Elevation (feet in USGS Datum)					Change in Thermocline Elevation Relative to Baseline Condition (ft)			
		Baseline	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3
5/16/2009	4,493.7									
6/6/2009	4,494.1	4,470.5	4,470.5	4,470.5	4,470.5	4,470.5	0	0	0	0
6/19/2009	4,494.3	4,473.8	4,473.8	4,473.8	4,473.8	4,473.8	0	0	0	0
7/7/2009	4,494.2	4,467.2	4,467.2	4,467.2	4,467.2	4,467.2	0	0	0	0
7/24/2009	4,493.5	4,463.9	4,463.9	4,463.9	4,463.9	4,463.9	0	0	0	0
8/10/2009	4,492.7	4,460.7	4,460.7	4,460.7	4,460.7	4,460.7	0	0	0	0
8/28/2009	4,490.0	4,457.4	4,457.4	4,454.1	4,454.1	4,457.4	0	-3	-3	0
9/12/2009	4,489.4	4,454.1	4,454.1	4,450.8	4,450.8	4,454.1	0	-3	-3	0
9/28/2009	4,487.3	4,454.1	4,454.1	4,450.8	4,450.8	4,450.8	0	-3	-3	-3
10/6/2009	4,487.0	4,447.5	4,447.5	4,444.3	4,444.3	4,444.3	0	-3	-3	-3

Notes: 1) The italic and bold dates have observed profiles.

2) The blank data on May 16, 2009 indicate that the lake did not have apparent thermocline on that day.

Figure 10 Comparison of Simulated Lake Almanor Thermocline Elevation for Different Alternatives (2009, Dry Year)

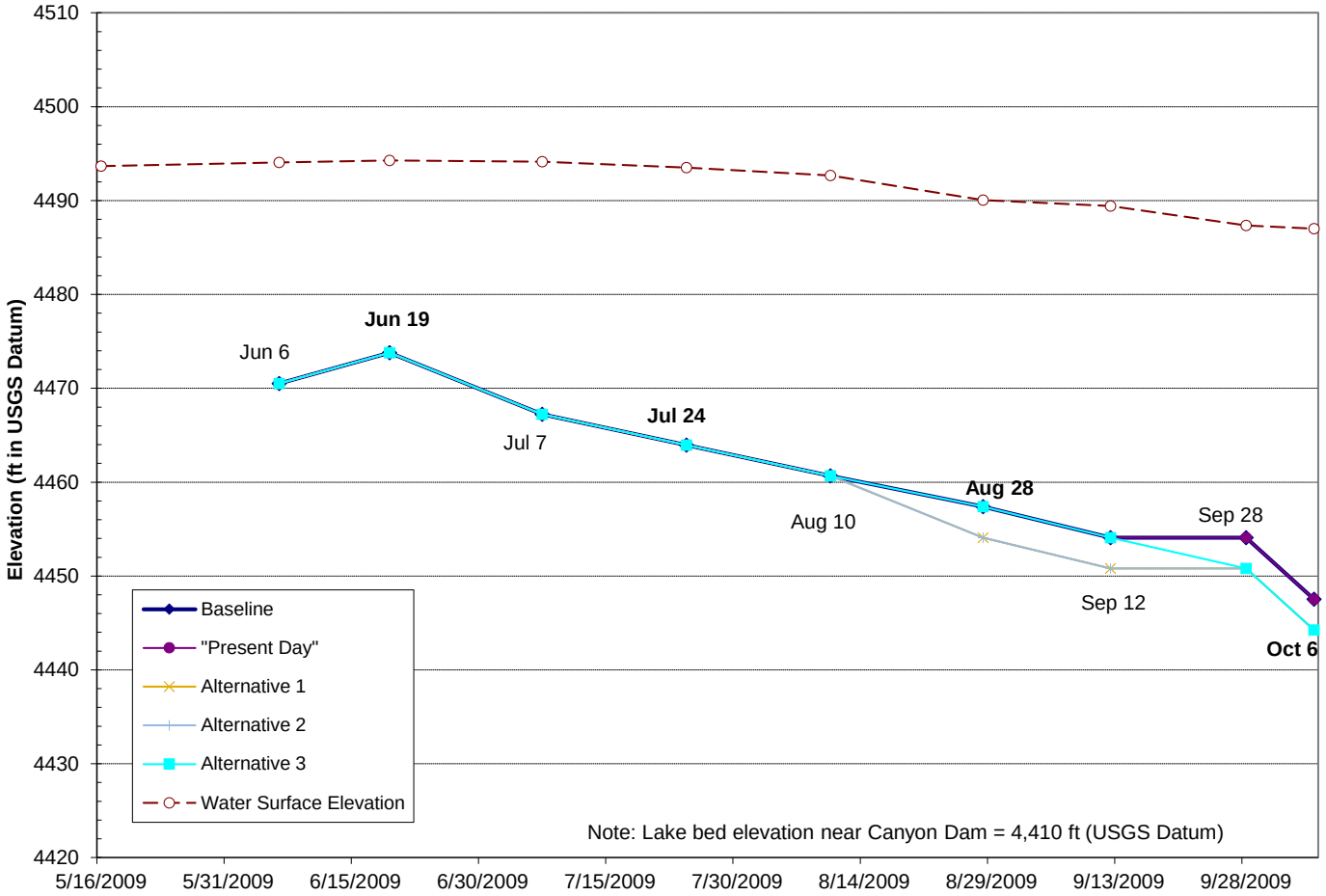


Table 9 Summary of Simulated Lake Almanor Thermocline Elevation for Different Alternatives and Change in Thermocline Elevation Relative to Baseline Condition
(2001, Critical Dry Year)
Similar to Table 3-5 in Level 3 Report

Date	Water Surface Elevation (ft)	Simulated Thermocline Elevation (feet in USGS Datum)					Change in Thermocline Elevation Relative to Baseline Condition (ft)			
		Baseline	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3
5/15/2001	4,487.6	4,450.8	4,450.8	4,450.8	4,450.8	4,450.8	0	0	0	0
6/6/2001	4,487.8	4,467.2	4,467.2	4,467.2	4,467.2	4,467.2	0	0	0	0
6/22/2001	4,487.5	4,470.5	4,470.5	4,470.5	4,470.5	4,470.5	0	0	0	0
7/10/2001	4,486.9	4,457.4	4,457.4	4,454.1	4,454.1	4,454.1	0	-3	-3	-3
7/20/2001	4,486.6	4,463.9	4,463.9	4,460.7	4,460.7	4,463.9	0	-3	-3	0
8/9/2001	4,484.3	4,457.4	4,457.4	4,457.4	4,457.4	4,457.4	0	0	0	0
8/17/2001	4,484.0	4,457.4	4,457.4	4,454.1	4,457.4	4,457.4	0	-3	0	0
9/12/2001	4,483.6	4,444.3	4,444.3	4,441.0	4,444.3	4,441.0	0	-3	0	-3
9/28/2001	4,483.2	4,447.5	4,444.3	4,441.0	4,444.3	4,444.3	-3	-7	-3	-3
10/15/2001	4,480.8	4,427.9	4,424.6	4,421.3	4,424.6	4,421.3	-3	-7	-3	-7

Note: The italic and bold dates have observed profiles.

Figure 11 Comparison of Simulated Lake Almanor Thermocline Elevation for Different Alternatives (2001, Critical Dry Year)

Similar to Figure 3-9 in Level 3 Report

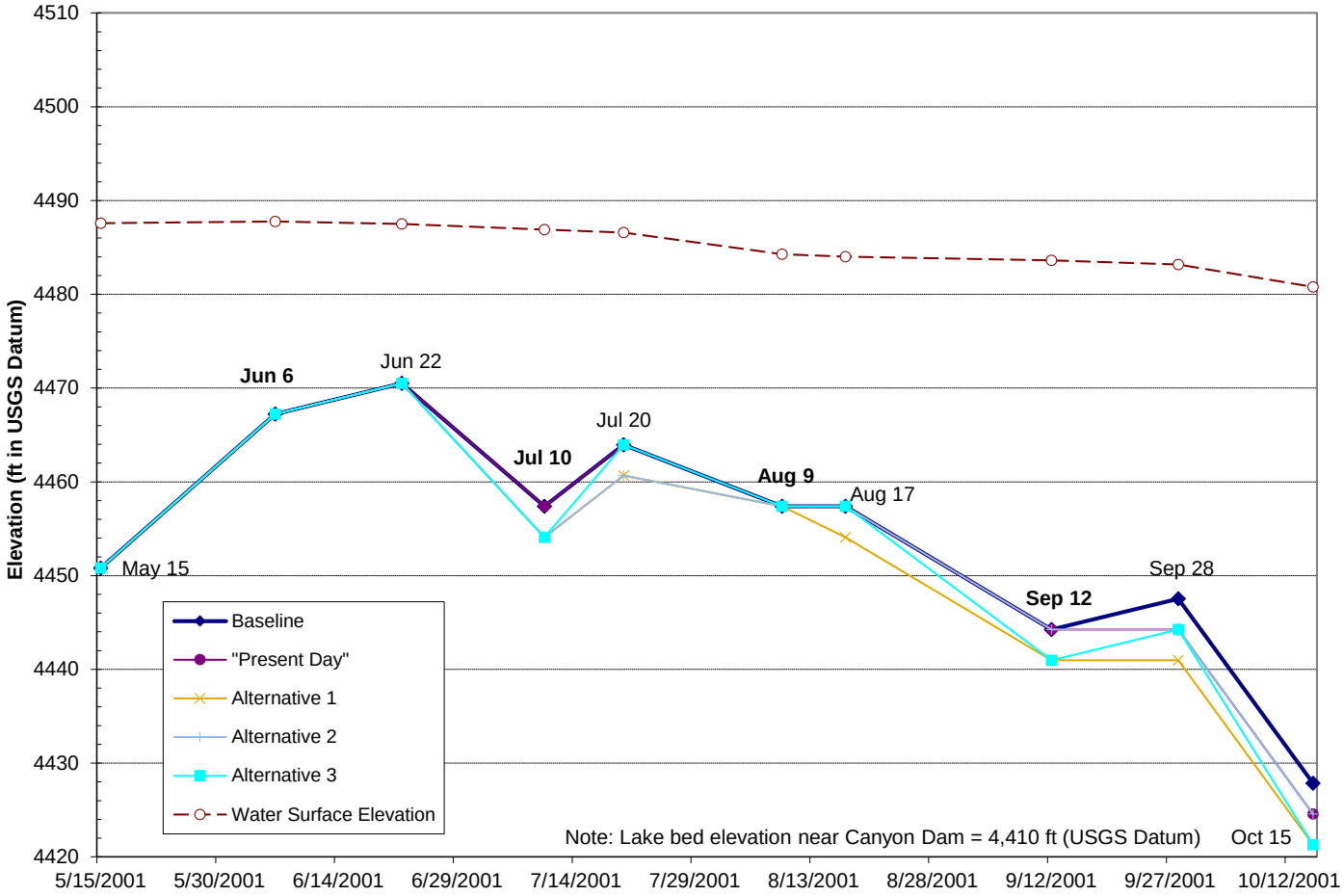


Table 10 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2000, Normal Hydrologic Year)

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)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
		Baseline	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3	Baseline	Present Day	Alt 1	Alt 2	Alt 3
May 15	1,011,490	993,600	989,670	989,110	989,110	989,670	-3,930	-4,490	-4,490	-3,930	-0.4%	-0.5%	-0.5%	-0.4%	98%	98%	98%	98%	98%
June 7	1,015,410	876,500	874,470	881,800	881,800	874,470	-2,030	5,300	5,300	-2,030	-0.2%	0.6%	0.6%	-0.2%	86%	86%	87%	87%	86%
Jun 22	1,010,250	452,400	449,750	462,760	462,510	449,590	-2,650	10,360	10,110	-2,810	-0.6%	2.3%	2.2%	-0.6%	45%	45%	46%	46%	45%
July 7	993,780	216,200	214,940	228,120	227,740	215,150	-1,260	11,920	11,540	-1,050	-0.6%	5.5%	5.3%	-0.5%	22%	22%	23%	23%	22%
Jul 20	938,020	145,600	143,790	148,900	148,400	145,050	-1,810	3,300	2,800	-550	-1.2%	2.3%	1.9%	-0.4%	16%	15%	16%	16%	15%
Aug 7	913,180	65,000	63,690	61,440	61,150	63,640	-1,310	-3,560	-3,850	-1,360	-2.0%	-5.5%	-5.9%	-2.1%	7%	7%	7%	7%	7%
Aug 17	859,160	44,400	40,910	34,130	35,030	40,340	-3,490	-10,270	-9,370	-4,060	-7.9%	-23.1%	-21.1%	-9.1%	5%	5%	4%	4%	5%
Sep 7	836,720	636,600	639,480	689,080	683,250	648,070	2,880	52,480	46,650	11,470	0.5%	8.2%	7.3%	1.8%	76%	76%	82%	82%	77%
Sep 28	777,330	607,400	609,130	655,420	649,750	617,770	1,730	48,020	42,350	10,370	0.3%	7.9%	7.0%	1.7%	78%	78%	84%	84%	79%
Oct 15	761,020	676,200	678,940	710,530	702,680	690,860	2,740	34,330	26,480	14,660	0.4%	5.1%	3.9%	2.2%	89%	89%	93%	92%	91%

Note: The italic and bold dates have observed profiles.

Figure 12 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

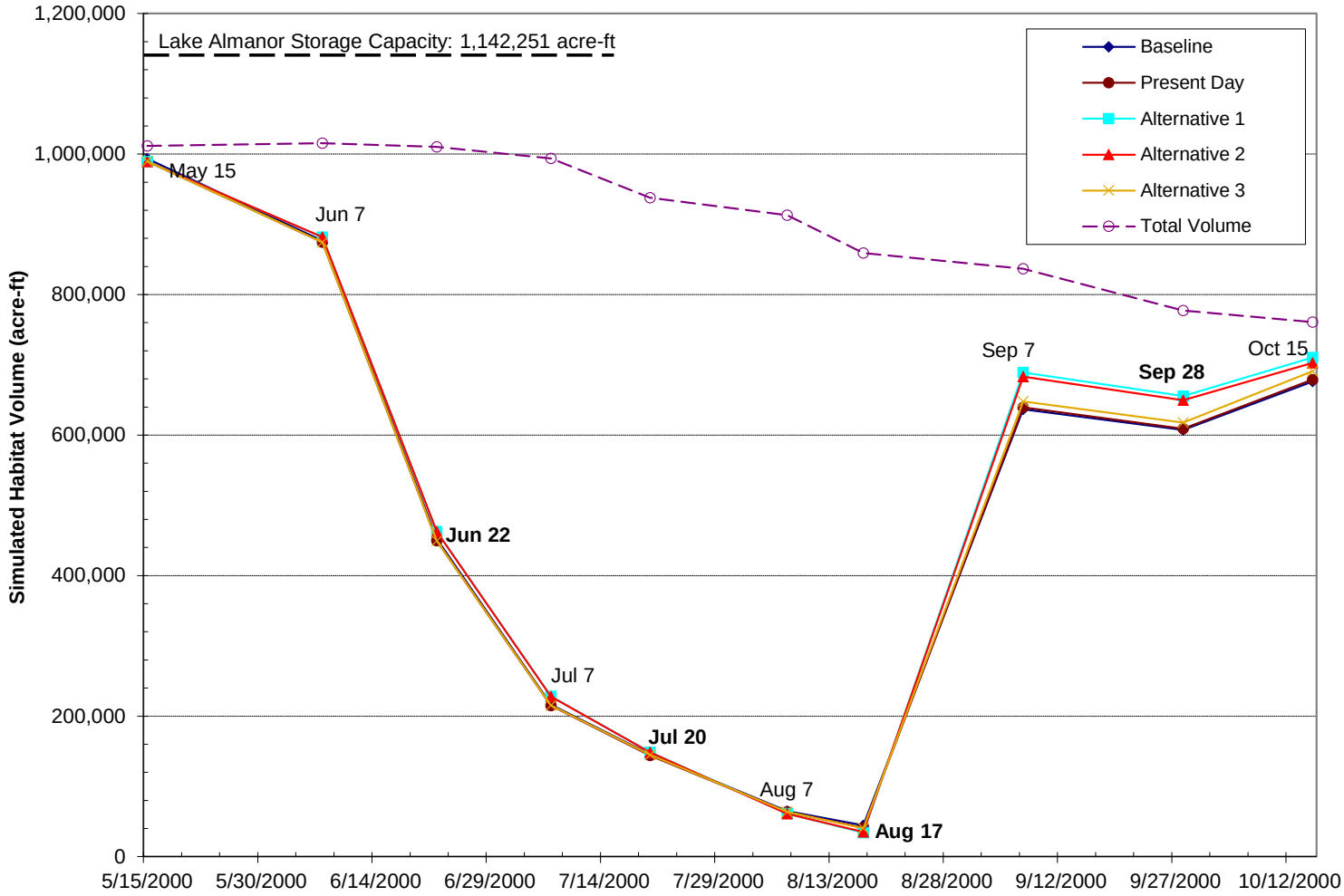


Table 11 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2000, Normal Hydrologic Year)

Similar to Table 3-2b in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	1,011,490	993,550	989,670	989,110	989,110	989,670	-3,880	-4,440	-4,440	-3,880	-0.4%	-0.4%	-0.4%	-0.4%	98%	98%	98%	98%	98%
June 7	1,015,410	876,510	874,470	881,800	881,800	874,470	-2,040	5,290	5,290	-2,040	-0.2%	0.6%	0.6%	-0.2%	86%	86%	87%	87%	86%
Jun 22	1,010,250	669,500	659,150	670,180	670,150	659,570	-10,350	680	650	-9,930	-1.5%	0.1%	0.1%	-1.5%	66%	65%	66%	66%	65%
July 7	993,780	584,410	585,350	595,120	594,810	584,750	940	10,710	10,400	340	0.2%	1.8%	1.8%	0.1%	59%	59%	60%	60%	59%
Jul 20	938,020	228,530	223,930	228,050	227,170	224,050	-4,600	-480	-1,360	-4,480	-2.0%	-0.2%	-0.6%	-2.0%	24%	24%	24%	24%	24%
Aug 7	913,180	97,120	95,040	95,030	94,350	96,220	-2,080	-2,090	-2,770	-900	-2.1%	-2.2%	-2.9%	-0.9%	11%	10%	10%	10%	11%
Aug 17	859,160	69,040	66,590	58,270	58,750	65,080	-2,450	-10,770	-10,290	-3,960	-3.5%	-15.6%	-14.9%	-5.7%	8%	8%	7%	7%	8%
Sep 7	836,720	636,600	639,480	689,080	683,250	648,070	2,880	52,480	46,650	11,470	0.5%	8.2%	7.3%	1.8%	76%	76%	82%	82%	77%
Sep 28	777,330	607,380	609,130	655,420	649,750	617,770	1,750	48,040	42,370	10,390	0.3%	7.9%	7.0%	1.7%	78%	78%	84%	84%	79%
Oct 15	761,020	676,160	678,940	710,530	702,680	690,860	2,780	34,370	26,520	14,700	0.4%	5.1%	3.9%	2.2%	89%	89%	93%	92%	91%

Note: The italic and bold dates have observed profiles.

Figure 13 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

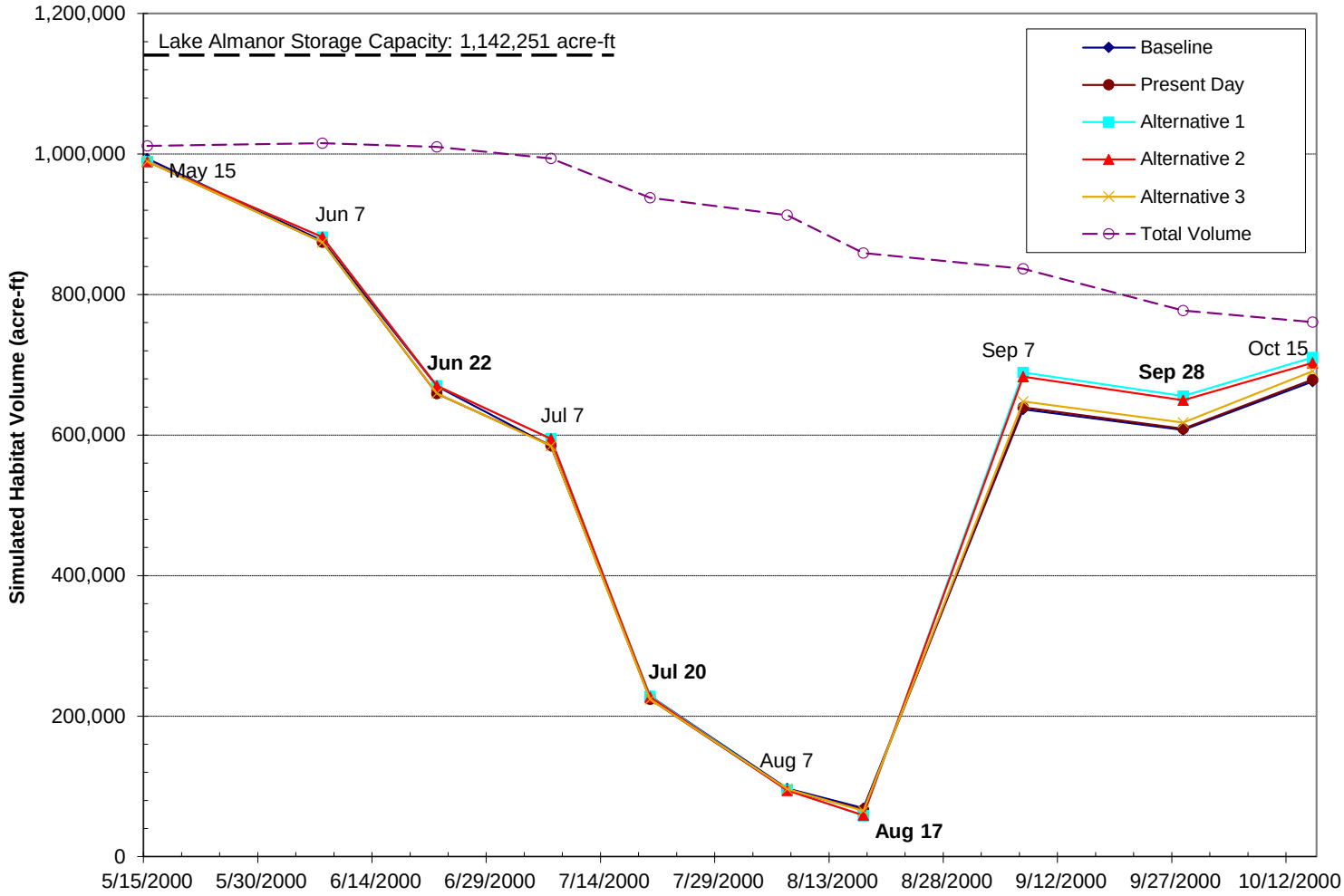


Table 12 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2000, Normal Hydrologic Year)

Similar to Table 3-2c in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	1,011,490	993,550	989,670	989,110	989,110	989,670	-3,880	-4,440	-4,440	-3,880	-0.4%	-0.4%	-0.4%	-0.4%	98%	98%	98%	98%	98%
June 7	1,015,410	876,510	874,470	881,800	881,800	874,470	-2,040	5,290	5,290	-2,040	-0.2%	0.6%	0.6%	-0.2%	86%	86%	87%	87%	86%
Jun 22	1,010,250	798,650	798,700	815,240	815,210	798,830	50	16,590	16,560	180	0.0%	2.1%	2.1%	0.0%	79%	79%	81%	81%	79%
July 7	993,780	743,860	745,570	775,510	775,130	748,180	1,710	31,650	31,270	4,320	0.2%	4.3%	4.2%	0.6%	75%	75%	78%	78%	75%
Jul 20	938,020	632,400	631,140	658,020	657,470	635,330	-1,260	25,620	25,070	2,930	-0.2%	4.1%	4.0%	0.5%	67%	67%	70%	70%	68%
Aug 7	913,180	144,170	143,320	150,640	149,440	146,180	-850	6,470	5,270	2,010	-0.6%	4.5%	3.7%	1.4%	16%	16%	16%	16%	16%
Aug 17	859,160	458,170	440,650	344,400	342,380	430,230	-17,520	-113,770	-115,790	-27,940	-3.8%	-24.8%	-25.3%	-6.1%	53%	51%	40%	40%	50%
Sep 7	836,720	636,600	639,480	689,080	683,250	648,070	2,880	52,480	46,650	11,470	0.5%	8.2%	7.3%	1.8%	76%	76%	82%	82%	77%
Sep 28	777,330	607,380	609,130	655,420	649,750	617,770	1,750	48,040	42,370	10,390	0.3%	7.9%	7.0%	1.7%	78%	78%	84%	84%	79%
Oct 15	761,020	676,160	678,940	710,530	702,680	690,860	2,780	34,370	26,520	14,700	0.4%	5.1%	3.9%	2.2%	89%	89%	93%	92%	91%

Note: The italic and bold dates have observed profiles.

Figure 14 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

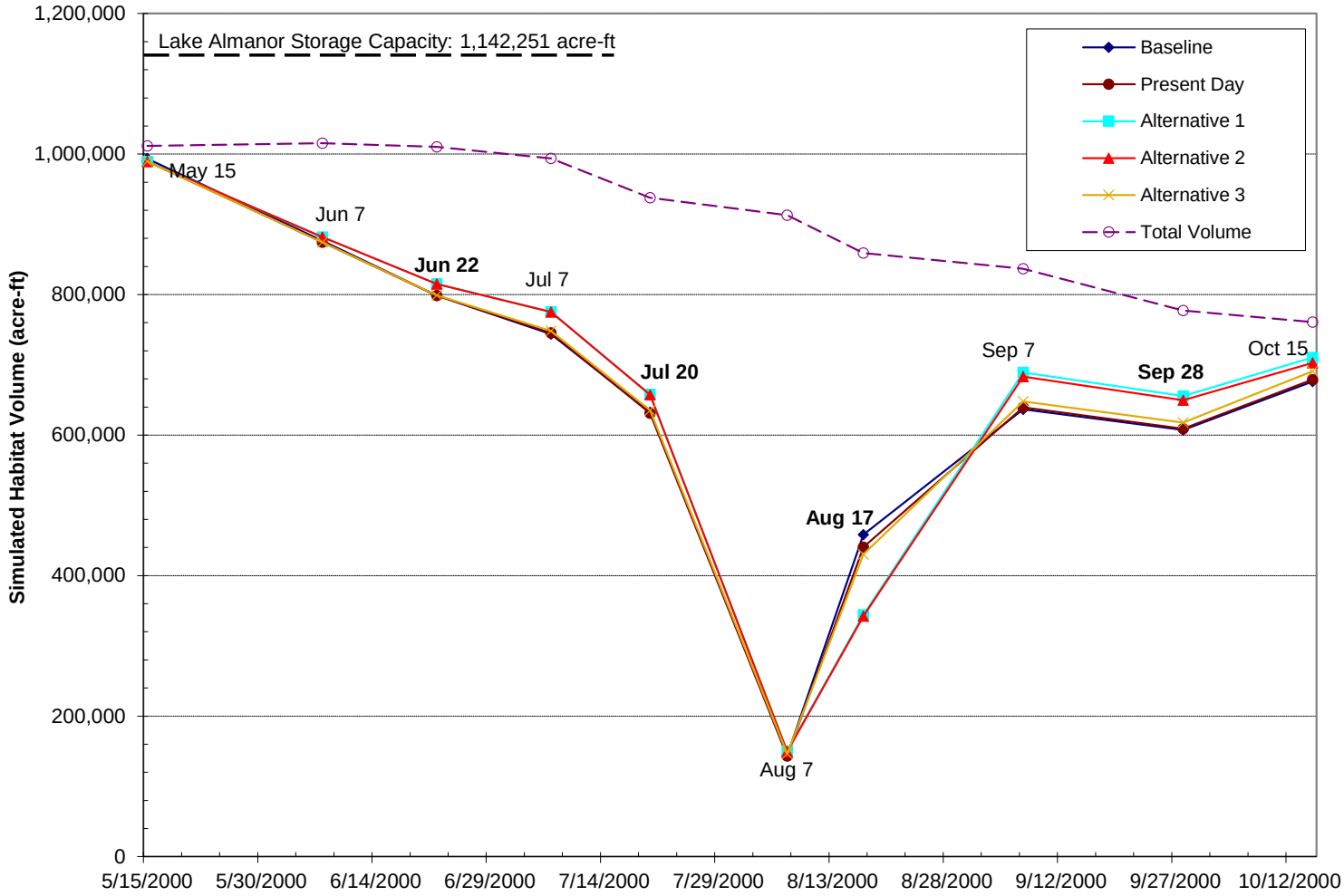


Table 13 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2009, Dry Year)

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 16	853,480	837,510	836,350	836,350	836,350	836,350	-1,160	-1,160	-1,160	-1,160	-0.1%	-0.1%	-0.1%	-0.1%	98%	98%	98%	98%	98%
June 6	862,620	731,320	729,850	732,450	732,450	729,850	-1,470	1,130	1,130	-1,470	-0.2%	0.2%	0.2%	-0.2%	85%	85%	85%	85%	85%
Jun 19	867,620	692,260	692,290	693,740	693,740	692,840	30	1,480	1,480	580	0.0%	0.2%	0.2%	0.1%	80%	80%	80%	80%	80%
July 7	864,850	149,970	149,200	153,960	153,430	150,730	-770	3,990	3,460	760	-0.5%	2.7%	2.3%	0.5%	17%	17%	18%	18%	17%
Jul 24	850,190	69,790	69,420	70,040	70,370	69,270	-370	250	580	-520	-0.5%	0.4%	0.8%	-0.7%	8%	8%	8%	8%	8%
Aug 10	830,660	16,770	16,200	13,160	13080	12,960	-570	-3,610	-3,690	-3,810	-3.4%	-21.5%	-22.0%	-22.7%	2%	2%	2%	2%	2%
Aug 28	771,120	3,050	2,650	410	420	410	-400	-2,640	-2,630	-2,640	-13.1%	-86.6%	-86.2%	-86.6%	0%	0%	0%	0%	0%
Sep 12	757,330	40,280	38,140	13,790	17,990	30,840	-2,140	-26,490	-22,290	-9,440	-5.3%	-65.8%	-55.3%	-23.4%	5%	5%	2%	2%	4%
Sep 28	712,030	550,170	552,740	589,210	582,110	565,050	2,570	39,040	31,940	14,880	0.5%	7.1%	5.8%	2.7%	77%	78%	83%	82%	79%
Oct 6	704,830	605,330	606,470	633,060	629,170	618,610	1,140	27,730	23,840	13,280	0.2%	4.6%	3.9%	2.2%	86%	86%	90%	89%	88%

Note: The italic and bold dates have observed profiles.

Figure 15 Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives (2009, Dry Year)

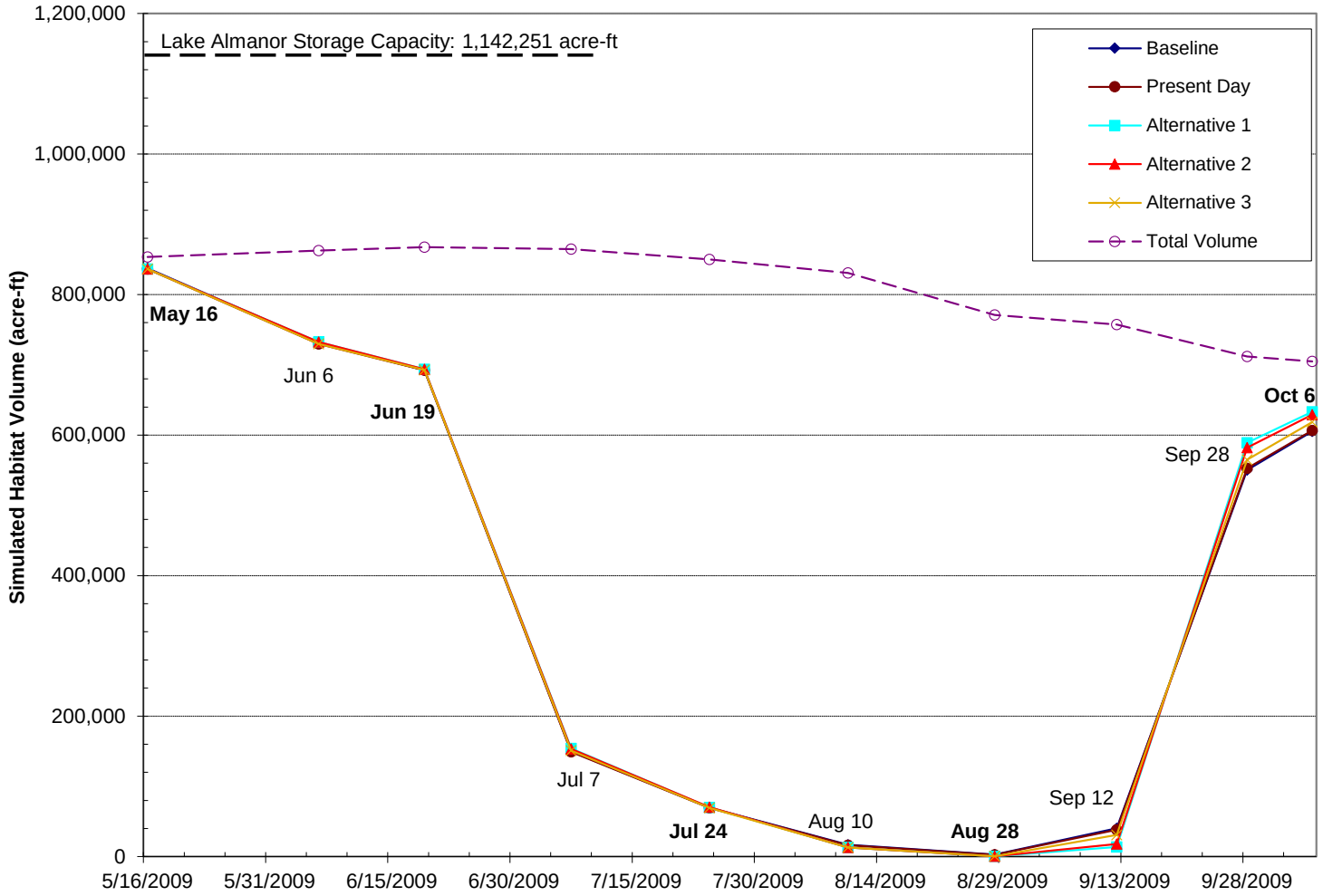


Table 14 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2009, Dry Year)

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 16	853,480	837,510	836,350	836,350	836,350	836,350	-1,160	-1,160	-1,160	-1,160	-0.1%	-0.1%	-0.1%	-0.1%	98%	98%	98%	98%	98%
June 6	862,620	731,320	729,850	732,450	732,450	729,850	-1,470	1,130	1,130	-1,470	-0.2%	0.2%	0.2%	-0.2%	85%	85%	85%	85%	85%
Jun 19	867,620	692,260	692,290	693,740	693,740	692,840	30	1,480	1,480	580	0.0%	0.2%	0.2%	0.1%	80%	80%	80%	80%	80%
July 7	864,850	216,680	216,310	222,810	221,460	218,490	-370	6,130	4,780	1,810	-0.2%	2.8%	2.2%	0.8%	25%	25%	26%	26%	25%
Jul 24	850,190	109,160	109,320	111,840	112,470	109,750	160	2,680	3,310	590	0.1%	2.5%	3.0%	0.5%	13%	13%	13%	13%	13%
Aug 10	830,660	43,360	42,160	37,780	37,610	39,000	-1,200	-5,580	-5,750	-4,360	-2.8%	-12.9%	-13.3%	-10.1%	5%	5%	5%	5%	5%
Aug 28	771,120	37,630	44,990	28,310	28,170	35,440	7,360	-9,320	-9,460	-2,190	19.6%	-24.8%	-25.1%	-5.8%	5%	6%	4%	4%	5%
Sep 12	757,330	559,950	562,170	602,070	595,790	575,170	2,220	42,120	35,840	15,220	0.4%	7.5%	6.4%	2.7%	74%	74%	79%	79%	76%
Sep 28	712,030	550,170	552,740	589,210	582,110	565,050	2,570	39,040	31,940	14,880	0.5%	7.1%	5.8%	2.7%	77%	78%	83%	82%	79%
Oct 6	704,830	605,330	606,470	633,060	629,170	618,610	1,140	27,730	23,840	13,280	0.2%	4.6%	3.9%	2.2%	86%	86%	90%	89%	88%

Note: The italic and bold dates have observed profiles.

Figure 16 Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives (2009, Dry Year)

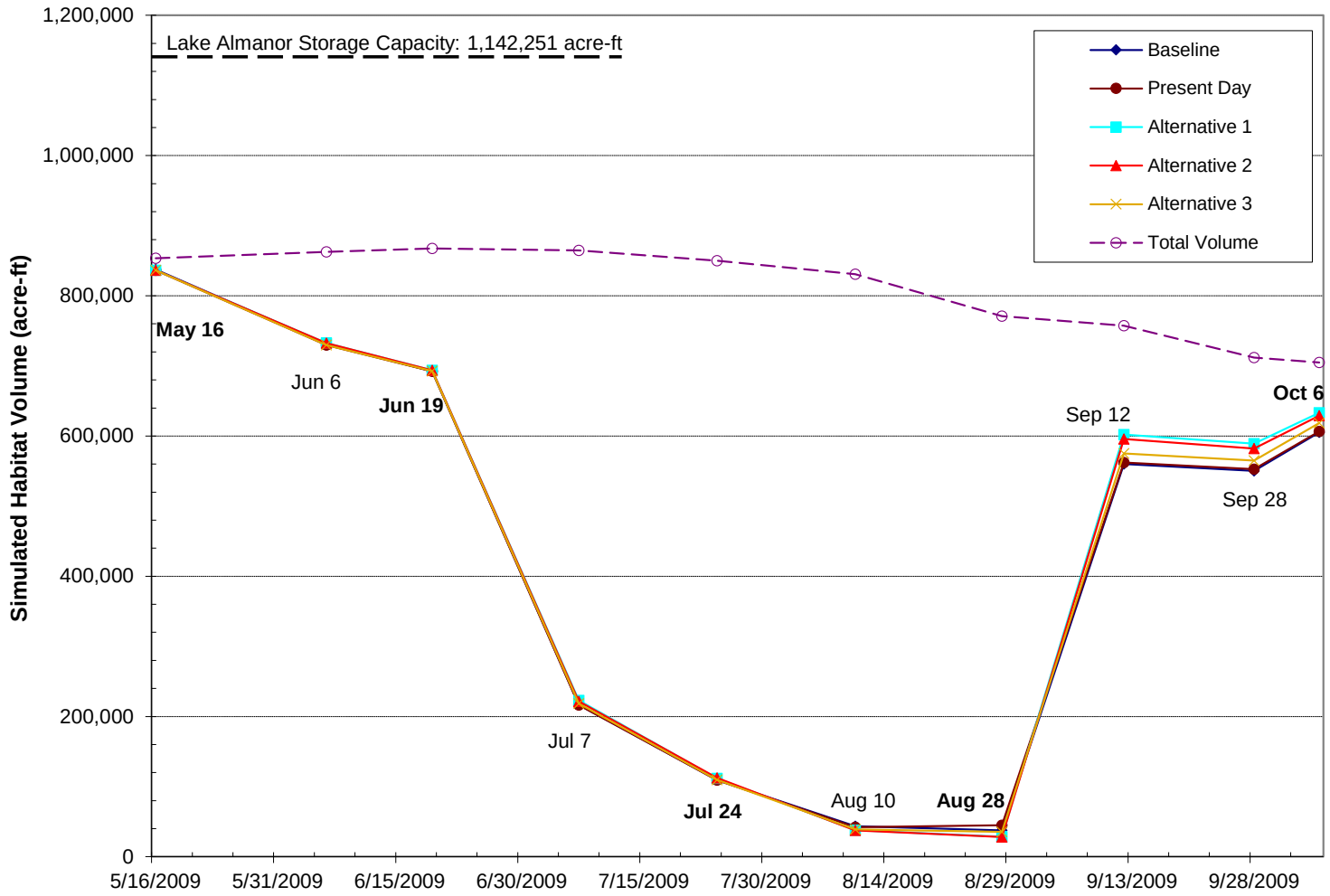


Table 15 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2009, Dry Year)

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 16	853,480	837,510	836,350	836,350	836,350	836,350	-1,160	-1,160	-1,160	-1,160	-0.1%	-0.1%	-0.1%	-0.1%	98%	98%	98%	98%	98%
June 6	862,620	731,320	729,850	732,450	732,450	729,850	-1,470	1,130	1,130	-1,470	-0.2%	0.2%	0.2%	-0.2%	85%	85%	85%	85%	85%
Jun 19	867,620	692,260	692,290	693,740	693,740	692,840	30	1,480	1,480	580	0.0%	0.2%	0.2%	0.1%	80%	80%	80%	80%	80%
July 7	864,850	586,420	587,100	596,070	594,620	589,970	680	9,650	8,200	3,550	0.1%	1.6%	1.4%	0.6%	68%	68%	69%	69%	68%
Jul 24	850,190	154,980	155,410	165,430	165,830	156,940	430	10,450	10,850	1,960	0.3%	6.7%	7.0%	1.3%	18%	18%	19%	20%	18%
Aug 10	830,660	443,020	440,100	427,000	424,760	441,080	-2,920	-16,020	-18,260	-1,940	-0.7%	-3.6%	-4.1%	-0.4%	53%	53%	51%	51%	53%
Aug 28	771,120	546,690	548,160	588,100	585,160	555,160	1,470	41,410	38,470	8,470	0.3%	7.6%	7.0%	1.5%	71%	71%	76%	76%	72%
Sep 12	757,330	559,950	562,170	602,070	595,790	575,170	2,220	42,120	35,840	15,220	0.4%	7.5%	6.4%	2.7%	74%	74%	79%	79%	76%
Sep 28	712,030	550,170	552,740	589,210	582,110	565,050	2,570	39,040	31,940	14,880	0.5%	7.1%	5.8%	2.7%	77%	78%	83%	82%	79%
Oct 6	704,830	605,330	606,470	633,060	629,170	618,610	1,140	27,730	23,840	13,280	0.2%	4.6%	3.9%	2.2%	86%	86%	90%	89%	88%

Note: The italic and bold dates have observed profiles.

Figure 17 Comparison of Simulated Lake Almanor Habitat Volume Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives (2009, Dry Year)

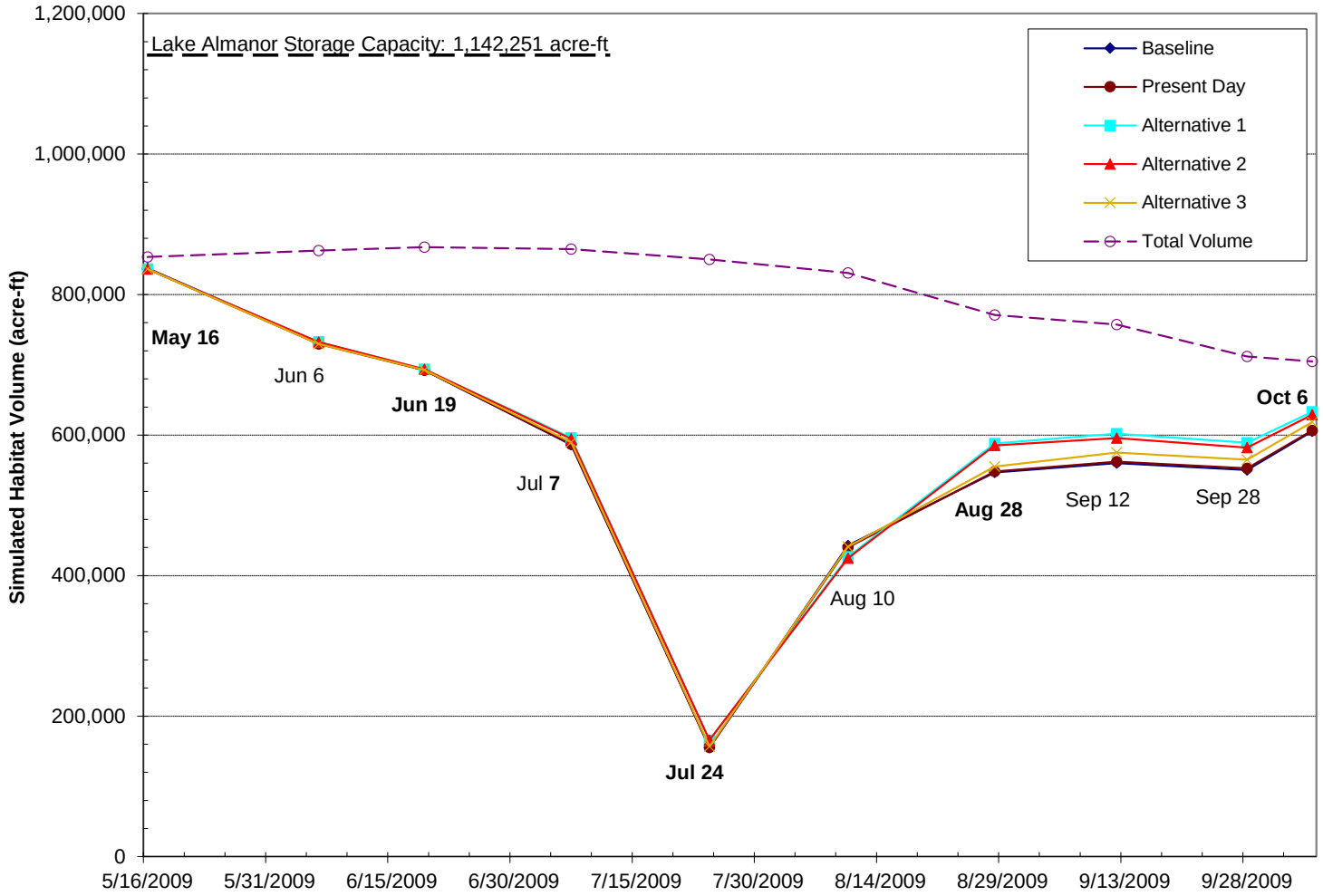


Table 16 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2001, Critical Dry Year)

Similar to Table 3-3a in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	717,310	712,230	709,010	709,010	709,010	709,010	-3,220	-3,220	-3,220	-3,220	-0.5%	-0.5%	-0.5%	-0.5%	99%	99%	99%	99%	99%
June 6	721,260	588,900	585,970	589,390	589,390	585,970	-2,930	490	490	-2,930	-0.5%	0.1%	0.1%	-0.5%	82%	81%	82%	82%	81%
Jun 22	715,340	210,900	207,400	208,900	207,520	207,890	-3,500	-2,000	-3,380	-3,010	-1.7%	-0.9%	-1.6%	-1.4%	29%	29%	29%	29%	29%
July 10	702,590	85,420	82,720	83,760	82,900	83,010	-2,700	-1,660	-2,520	-2,410	-3.2%	-1.9%	-3.0%	-2.8%	12%	12%	12%	12%	12%
Jul 20	695,920	40,870	39,070	36,410	37,090	38,480	-1,800	-4,460	-3,780	-2,390	-4.4%	-10.9%	-9.2%	-5.8%	6%	6%	5%	5%	6%
Aug 9	648,010	360	0	0	0	0	-360	-360	-360	-360	-100.0%	-100.0%	-100.0%	-100.0%	0%	0%	0%	0%	0%
Aug 17	642,460	0	0	0	0	0	0	0	0	0	-	-	-	-	0%	0%	0%	0%	0%
Sep 12	634,800	490,230	493,040	429,290	463,000	483,230	2,810	-60,940	-27,230	-7,000	0.6%	-12.4%	-5.6%	-1.4%	77%	78%	68%	73%	76%
Sep 28	625,800	543,700	545,630	562,720	558,700	558,740	1,930	19,020	15,000	15,040	0.4%	3.5%	2.8%	2.8%	87%	87%	90%	89%	89%
Oct 15	578,400	544,160	541,910	544,950	542,930	544,280	-2,250	790	-1,230	120	-0.4%	0.1%	-0.2%	0.0%	94%	94%	94%	94%	94%

Note: The italic and bold dates have observed profiles.

Figure 18 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

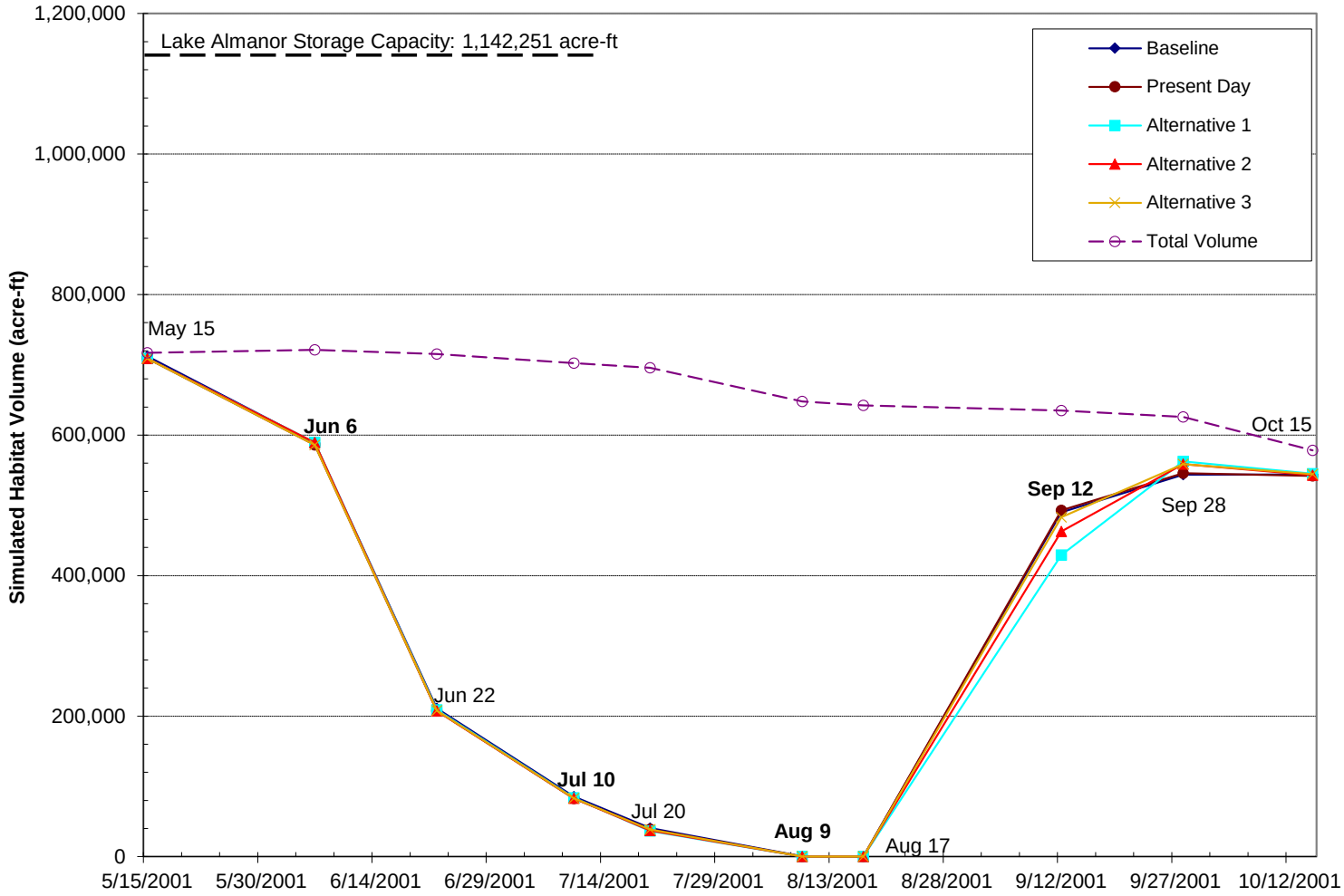


Table 17 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2001, Critical Dry Year)

Similar to Table 3-3b in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	717,310	712,230	709,010	709,010	709,010	709,010	-3,220	-3,220	-3,220	-3,220	-0.5%	-0.5%	-0.5%	-0.5%	99%	99%	99%	99%	99%
June 6	721,260	588,900	585,970	589,390	589,390	585,970	-2,930	490	490	-2,930	-0.5%	0.1%	0.1%	-0.5%	82%	81%	82%	82%	81%
Jun 22	715,340	326,300	324,330	327,630	326,170	325,540	-1,970	1,330	-130	-760	-0.6%	0.4%	0.0%	-0.2%	46%	45%	46%	46%	46%
July 10	702,590	137,960	134,360	135,970	134,680	135,170	-3,600	-1,990	-3,280	-2,790	-2.6%	-1.4%	-2.4%	-2.0%	20%	19%	19%	19%	19%
Jul 20	695,920	74,230	73,060	68,950	68,900	73,210	-1,170	-5,280	-5,330	-1,020	-1.6%	-7.1%	-7.2%	-1.4%	11%	10%	10%	10%	11%
Aug 9	648,010	51,900	49,850	40,020	41,050	47,950	-2,050	-11,880	-10,850	-3,950	-3.9%	-22.9%	-20.9%	-7.6%	8%	8%	6%	6%	7%
Aug 17	642,460	23,260	20,250	12,050	14,730	16,760	-3,010	-11,210	-8,530	-6,500	-12.9%	-48.2%	-36.7%	-27.9%	4%	3%	2%	2%	3%
Sep 12	634,800	505,370	509,840	529,030	524,010	522,240	4,470	23,660	18,640	16,870	0.9%	4.7%	3.7%	3.3%	80%	80%	83%	83%	82%
Sep 28	625,800	543,700	545,630	562,720	558,700	558,740	1,930	19,020	15,000	15,040	0.4%	3.5%	2.8%	2.8%	87%	87%	90%	89%	89%
Oct 15	578,400	544,160	541,910	544,950	542,930	544,280	-2,250	790	-1,230	120	-0.4%	0.1%	-0.2%	0.0%	94%	94%	94%	94%	94%

Note: The italic and bold dates have observed profiles.

Figure 19 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

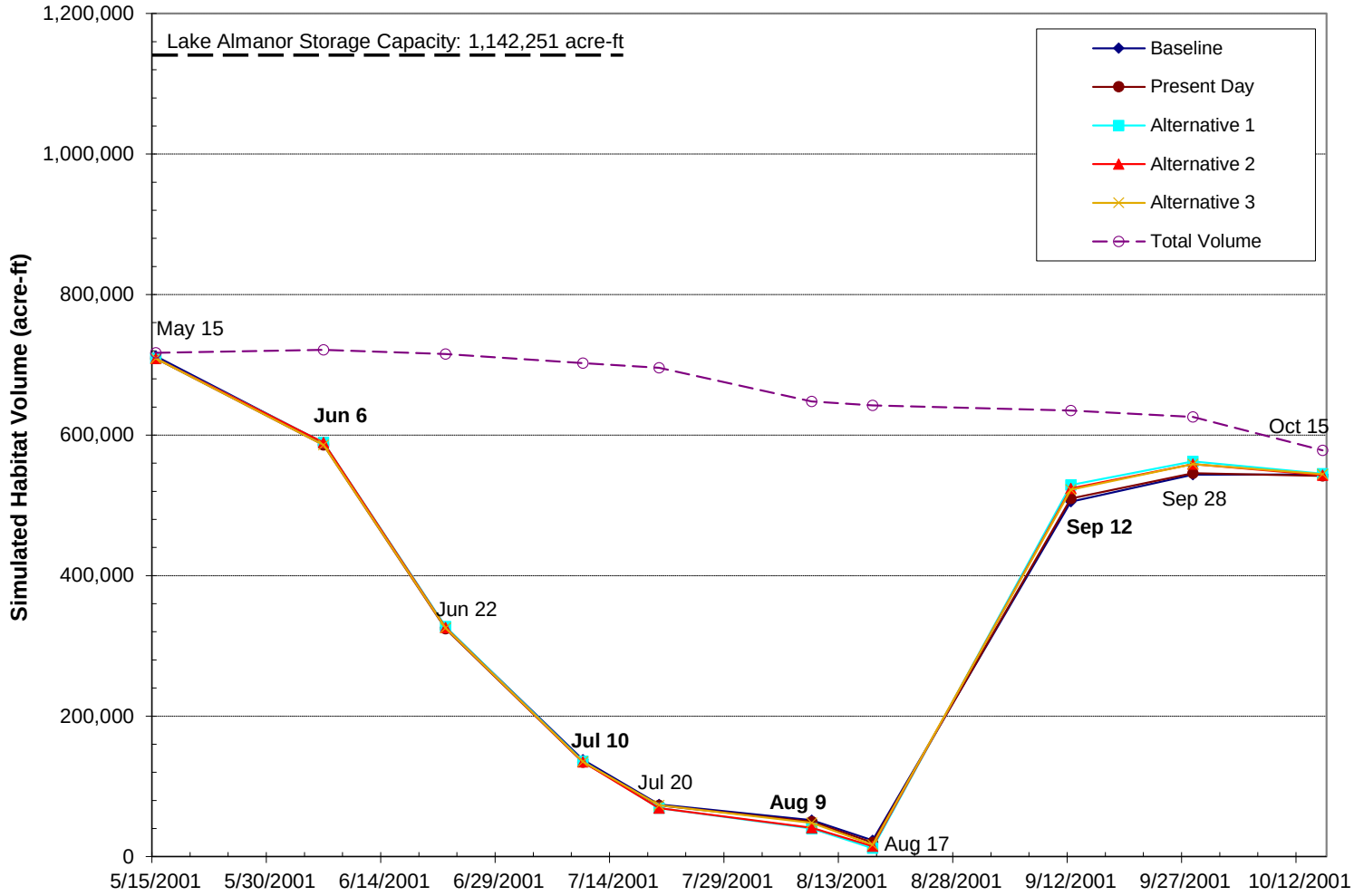


Table 18 Summary of Simulated Lake Almanor Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2001, Critical Dry Year)

Similar to Table 3-3c in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	717,310	712,230	709,010	709,010	709,010	709,010	-3,220	-3,220	-3,220	-3,220	-0.5%	-0.5%	-0.5%	-0.5%	99%	99%	99%	99%	99%
June 6	721,260	588,900	585,970	589,390	589,390	585,970	-2,930	490	490	-2,930	-0.5%	0.1%	0.1%	-0.5%	82%	81%	82%	82%	81%
Jun 22	715,340	544,990	542,240	551,880	550,580	543,780	-2,750	6,890	5,590	-1,210	-0.5%	1.3%	1.0%	-0.2%	76%	76%	77%	77%	76%
July 10	702,590	427,730	428,850	423,900	420,380	433,040	1,120	-3,830	-7,350	5,310	0.3%	-0.9%	-1.7%	1.2%	61%	61%	60%	60%	62%
Jul 20	695,920	420,180	421,170	407,280	405,990	423,580	990	-12,900	-14,190	3,400	0.2%	-3.1%	-3.4%	0.8%	60%	61%	59%	58%	61%
Aug 9	648,010	160,750	153,060	147,540	146,780	154,130	-7,690	-13,210	-13,970	-6,620	-4.8%	-8.2%	-8.7%	-4.1%	25%	24%	23%	23%	24%
Aug 17	642,460	282,590	254,640	116,850	124,360	196,430	-27,950	-165,740	-158,230	-86,160	-9.9%	-58.7%	-56.0%	-30.5%	44%	40%	18%	19%	31%
Sep 12	634,800	505,370	509,840	529,030	524,010	522,240	4,470	23,660	18,640	16,870	0.9%	4.7%	3.7%	3.3%	80%	80%	83%	83%	82%
Sep 28	625,800	543,700	545,630	562,720	558,700	558,740	1,930	19,020	15,000	15,040	0.4%	3.5%	2.8%	2.8%	87%	87%	90%	89%	89%
Oct 15	578,400	544,160	541,910	544,950	542,930	544,280	-2,250	790	-1,230	120	-0.4%	0.1%	-0.2%	0.0%	94%	94%	94%	94%	94%

Note: The italic and bold dates have observed profiles.

Figure 20 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

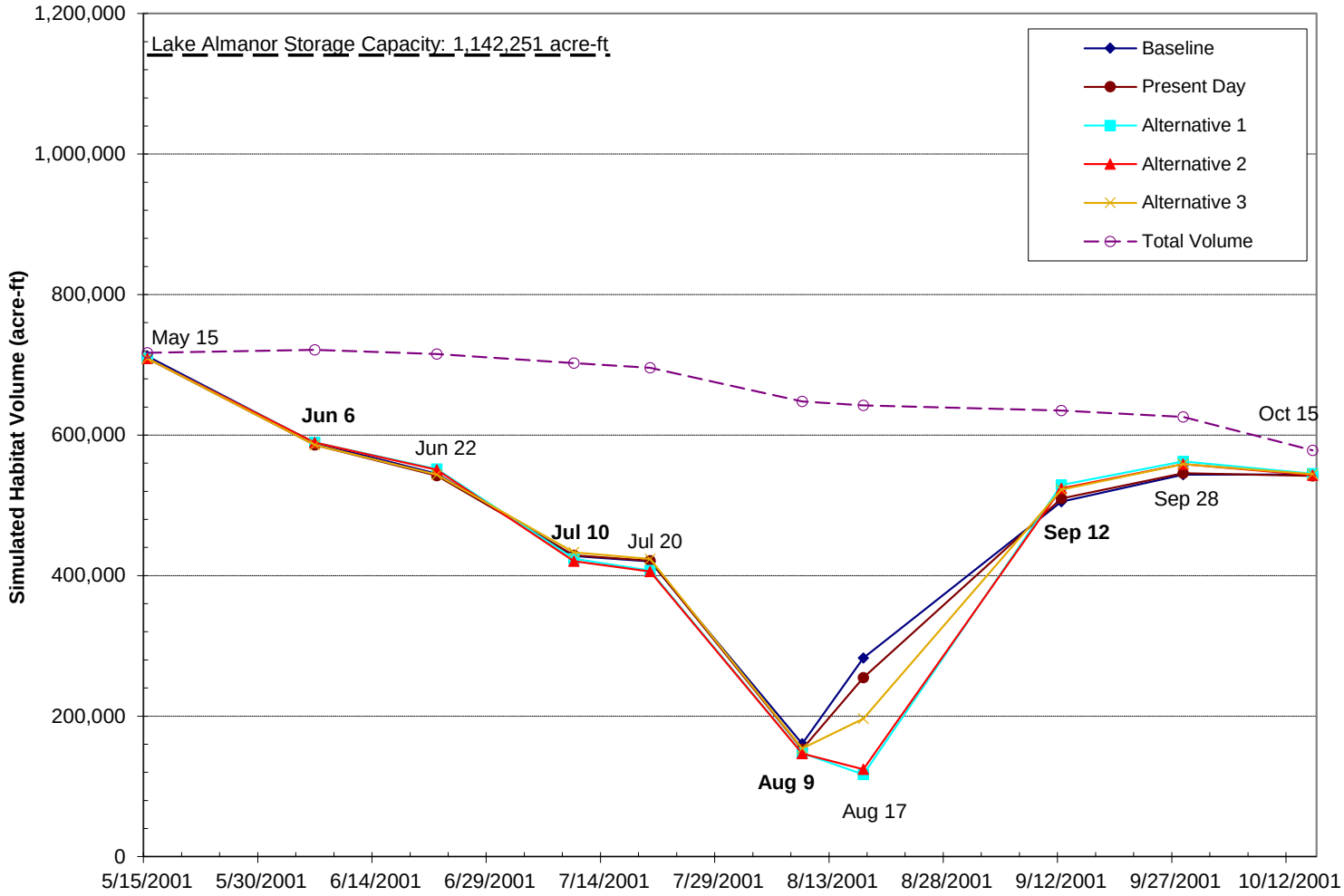


Table 19 Summary of Simulated Lake Almanor Metalimnion Surface Area (acre) for Different Alternatives and Change in Thermocline Surface Area Relative to Baseline Condition (2000, Normal Hydrologic Year)

Similar to Table 3-6 in Level 3 Report

	Lake Surface Area on Date (acre)	Simulated Metalimnion Surface Area (acre)					Change in Metalimnion SA Relative to Baseline Condition (acre)				% Change in Metalimnion SA Relative to Baseline Condition				% of Metalimnion SA to Total Lake SA on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	25,280																		
June 7	25,330	17,320	17,320	17,320	17,320	17,320	0	0	0	0	0.0%	0.0%	0.0%	0.0%	68%	68%	68%	68%	68%
Jun 22	25,260	19,370	19,370	19,370	19,370	19,370	0	0	0	0	0.0%	0.0%	0.0%	0.0%	77%	77%	77%	77%	77%
July 7	25,030	14,220	14,220	14,220	14,220	14,220	0	0	0	0	0.0%	0.0%	0.0%	0.0%	57%	57%	57%	57%	57%
Jul 20	24,240	15,080	15,080	14,220	14,220	15,080	0	-860	-860	0	0.0%	-5.7%	-5.7%	0.0%	62%	62%	59%	59%	62%
Aug 7	23,890	15,080	15,080	14,220	14,220	15,080	0	-860	-860	0	0.0%	-5.7%	-5.7%	0.0%	63%	63%	60%	60%	63%
Aug 17	23,140	13,460	13,460	13,460	13,460	13,460	0	0	0	0	0.0%	0.0%	0.0%	0.0%	58%	58%	58%	58%	58%
Sep 7	22,830	11,560	11,560	9,210	10,410	10,410	0	-2,350	-1,150	-1,150	0.0%	-20.3%	-9.9%	-9.9%	51%	51%	40%	46%	46%
Sep 28	22,020	11,560	11,560	9,210	9,210	10,410	0	-2,350	-2,350	-1,150	0.0%	-20.3%	-20.3%	-9.9%	52%	52%	42%	42%	47%
Oct 15	21,790	7,900	6,540	6,540	6,540	6,540	-1,360	-1,360	-1,360	-1,360	-17.2%	-17.2%	-17.2%	-17.2%	36%	30%	30%	30%	30%

Notes: 1) The italic and bold dates have observed profiles.

2) The blank data on May 15, 2000 indicate that the lake did not have apparent thermocline on that day.

Figure 21 Comparison of Simulated Lake Almanor Metalimnion Surface Area for Different Alternatives (2000, Normal Hydrologic Year)

Similar to Figure 3-10 in Level 3 Report

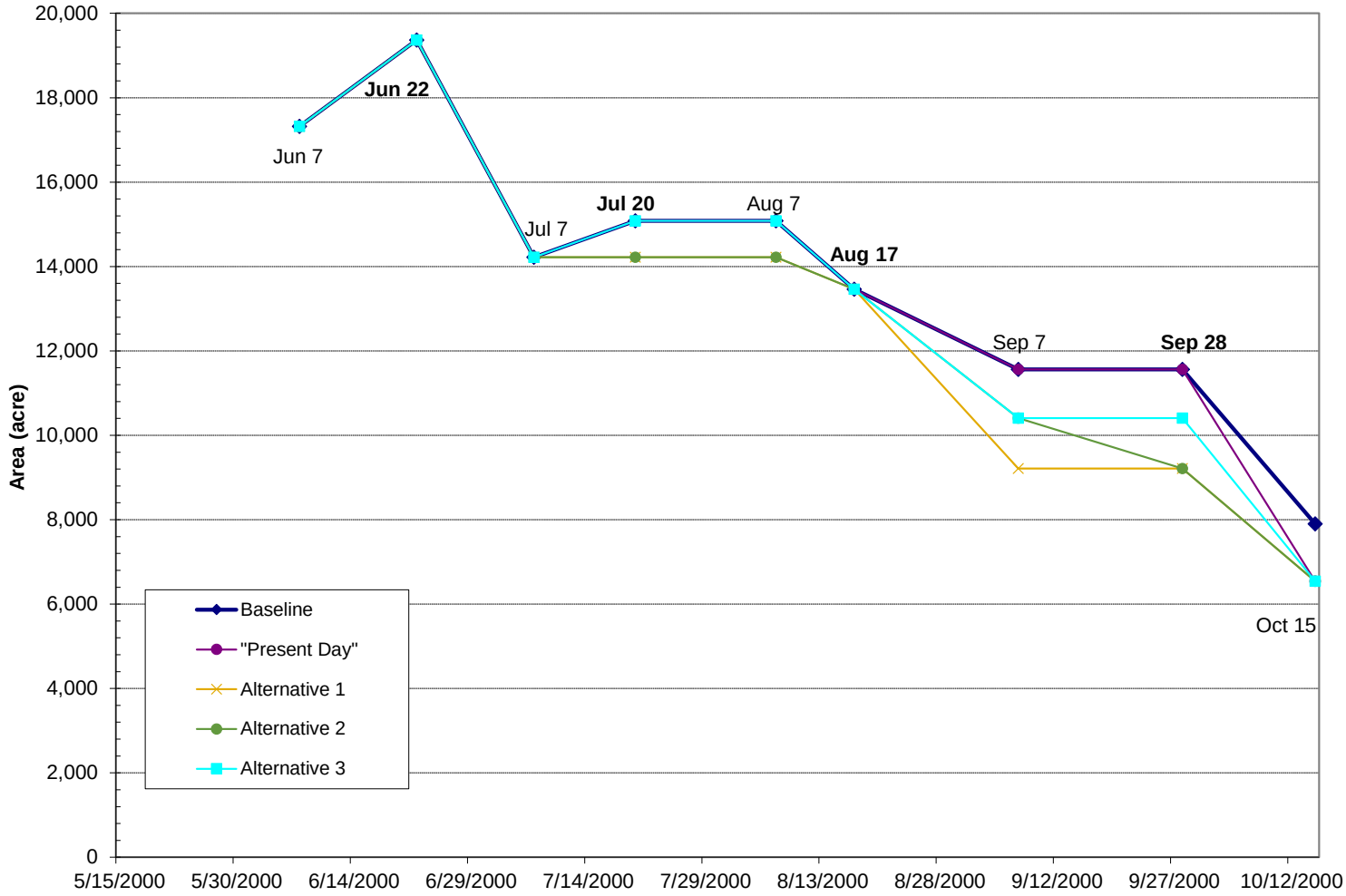


Table 20 Summary of Simulated Lake Almanor Metalimnion Surface Area (acre) for Different Alternatives and Change in Thermocline Surface Area Relative to Baseline Condition (2009, Dry Year)

	Lake Surface Area on Date (acre)	Simulated Metalimnion Surface Area (acre)					Change in Metalimnion SA Relative to Baseline Condition (acre)				% Change in Metalimnion SA Relative to Baseline Condition				% of Metalimnion SA to Total Lake SA on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 16	22,920																		
June 6	22,920	16,150	16,150	16,150	16,150	16,150	0	0	0	0	0.0%	0.0%	0.0%	0.0%	70%	70%	70%	70%	70%
Jun 19	22,920	17,320	17,320	17,320	17,320	17,320	0	0	0	0	0.0%	0.0%	0.0%	0.0%	76%	76%	76%	76%	76%
July 7	22,920	15,080	15,080	15,080	15,080	15,080	0	0	0	0	0.0%	0.0%	0.0%	0.0%	66%	66%	66%	66%	66%
Jul 24	22,920	14,220	14,220	14,220	14,220	14,220	0	0	0	0	0.0%	0.0%	0.0%	0.0%	62%	62%	62%	62%	62%
Aug 10	22,920	13,460	13,460	13,460	13,460	13,460	0	0	0	0	0.0%	0.0%	0.0%	0.0%	59%	59%	59%	59%	59%
Aug 28	22,010	12,610	12,610	11,560	11,560	12,610	0	-1,050	-1,050	0	0.0%	-8.3%	-8.3%	0.0%	57%	57%	53%	53%	57%
Sep 12	22,010	11,560	11,560	10,410	10,410	11,560	0	-1,150	-1,150	0	0.0%	-9.9%	-9.9%	0.0%	53%	53%	47%	47%	53%
Sep 28	21,120	11,560	11,560	10,410	10,410	10,410	0	-1,150	-1,150	-1,150	0.0%	-9.9%	-9.9%	-9.9%	55%	55%	49%	49%	49%
Oct 6	21,120	9,210	9,210	7,900	7,900	7,900	0	-1,310	-1,310	-1,310	0.0%	-14.2%	-14.2%	-14.2%	44%	44%	37%	37%	37%

Notes: 1) The italic and bold dates have observed profiles.

2) The blank data on May 16, 2009 indicate that the lake did not have apparent thermocline on that day.

Figure 22 Comparison of Simulated Lake Almanor Metalimnion Surface Area for Different Alternatives (2009, Dry Year)

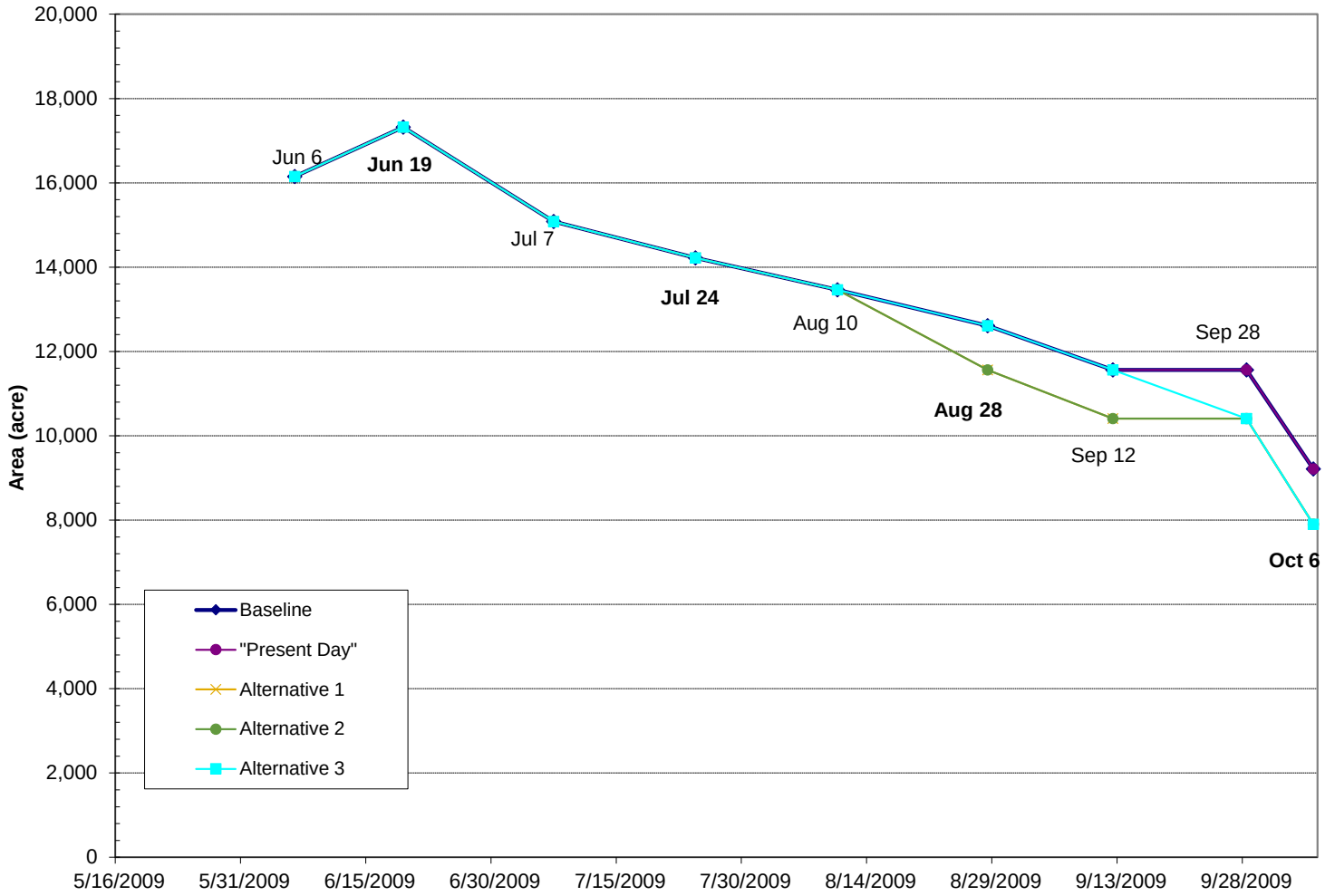


Table 21 Summary of Simulated Lake Almanor Metalimnion Surface Area (acre) for Different Alternatives and Change in Thermocline Surface Area Relative to Baseline Condition (2001, Critical Dry Year)

Similar to Table 3-7 in Level 3 Report

	Lake Surface Area on Date (acre)	Simulated Metalimnion Surface Area (acre)					Change in Metalimnion SA Relative to Baseline Condition (acre)				% Change in Metalimnion SA Relative to Baseline Condition				% of Metalimnion SA to Total Lake SA on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	21,190	10,410	10,410	10,410	10,410	10,410	0	0	0	0	0.0%	0.0%	0.0%	0.0%	49%	49%	49%	49%	49%
June 7	21,240	15,080	15,080	15,080	15,080	15,080	0	0	0	0	0.0%	0.0%	0.0%	0.0%	71%	71%	71%	71%	71%
Jun 22	21,160	16,150	16,150	16,150	16,150	16,150	0	0	0	0	0.0%	0.0%	0.0%	0.0%	76%	76%	76%	76%	76%
July 7	20,980	12,610	12,610	11,560	11,560	11,560	0	-1,050	-1,050	-1,050	0.0%	-8.3%	-8.3%	-8.3%	60%	60%	55%	55%	55%
Jul 20	20,890	14,220	14,220	13,460	13,460	14,220	0	-760	-760	0	0.0%	-5.3%	-5.3%	0.0%	68%	68%	64%	64%	68%
Aug 7	20,220	12,610	12,610	12,610	12,610	12,610	0	0	0	0	0.0%	0.0%	0.0%	0.0%	62%	62%	62%	62%	62%
Aug 17	20,150	12,610	12,610	11,560	12,610	12,610	0	-1,050	0	0	0.0%	-8.3%	0.0%	0.0%	63%	63%	57%	63%	63%
Sep 7	20,040	7,900	7,900	6,540	7,900	6,540	0	-1,360	0	-1,360	0.0%	-17.2%	0.0%	-17.2%	39%	39%	33%	39%	33%
Sep 28	19,910	9,210	7,900	6,540	7,900	7,900	-1,310	-2,670	-1,310	-1,310	-14.2%	-29.0%	-14.2%	-14.2%	46%	40%	33%	40%	40%
Oct 15	19,230	510	420	360	420	360	-90	-150	-90	-150	-17.6%	-29.4%	-17.6%	-29.4%	3%	2%	2%	2%	2%

Note: The italic and bold dates have observed profiles.

Figure 23 Comparison of Simulated Lake Almanor Metalimnion Surface Area for Different Alternatives (2001, Critical Dry Year)

Similar to Figure 3-11 in Level 3 Report

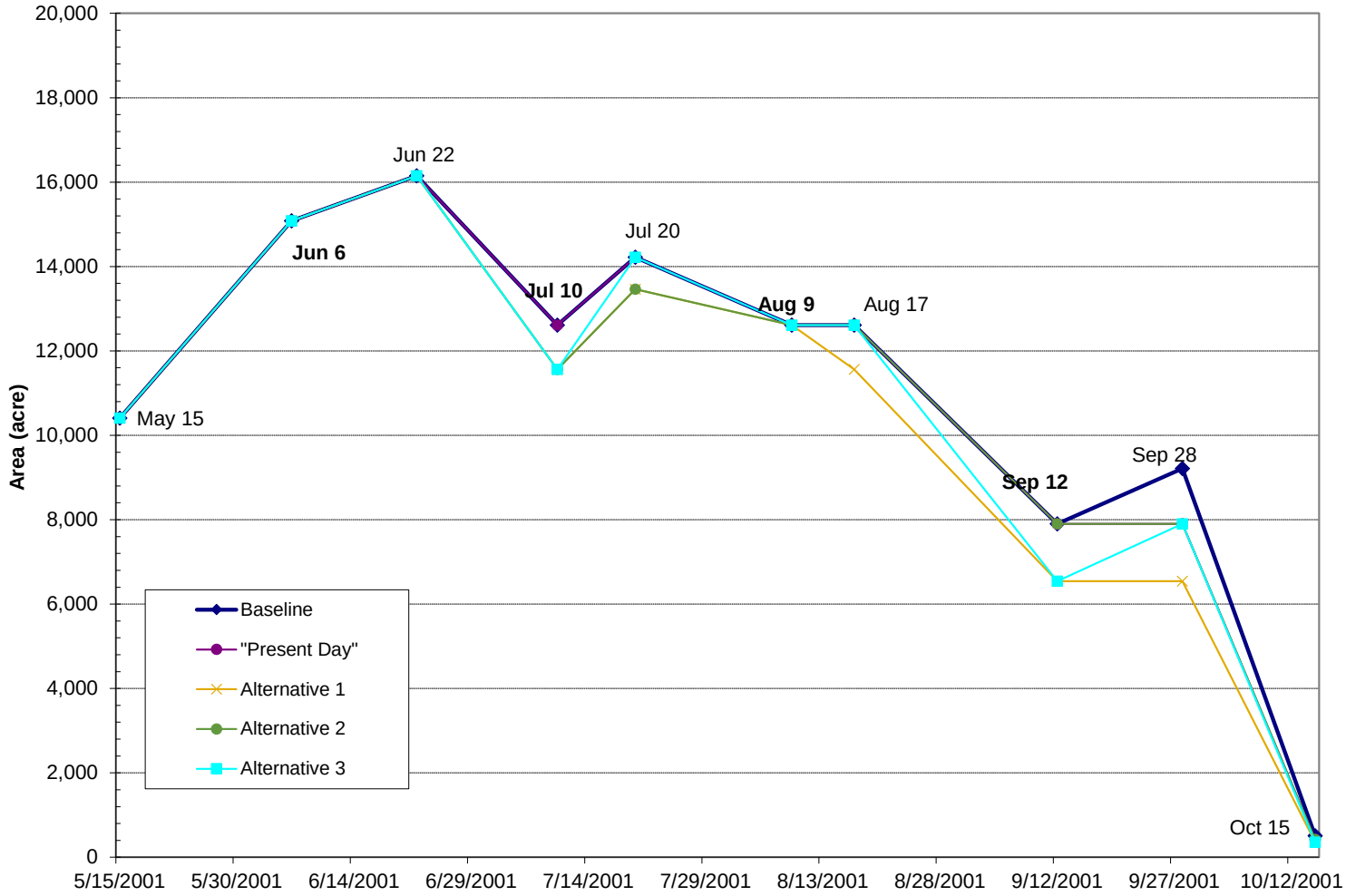


Table 22 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition
(2000, Normal Hydrologic Year)
Similar to Table 3-8a in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	34,270	33,980	31,930	32,310	32,310	31,930	-2,050	-1,670	-1,670	-2,050	-6.0%	-4.9%	-4.9%	-6.0%	99%	93%	94%	94%	93%
June 7	33,790	31,420	29,350	31,480	31,480	29,350	-2,070	60	60	-2,070	-6.6%	0.2%	0.2%	-6.6%	93%	87%	93%	93%	87%
Jun 22	32,410	24,190	23,440	20,410	20,600	22,730	-750	-3,780	-3,590	-1,460	-3.1%	-15.6%	-14.8%	-6.0%	75%	72%	63%	64%	70%
July 7	36,790	33,510	32,110	25,870	25,640	31,340	-1,400	-7,640	-7,870	-2,170	-4.2%	-22.8%	-23.5%	-6.5%	91%	87%	70%	70%	85%
Jul 20	37,390	17,690	17,340	17,870	22,020	16,120	-350	180	4,330	-1,570	-2.0%	1.0%	24.5%	-8.9%	47%	46%	48%	59%	43%
Aug 7	37,190	2,970	4,530	5,070	6,410	3,590	1,560	2,100	3,440	620	52.5%	70.7%	115.8%	20.9%	8%	12%	14%	17%	10%
Aug 17	38,570	2,170	2,040	10,160	11,530	660	-130	7,990	9,360	-1,510	-6.0%	368.2%	431.3%	-69.6%	6%	5%	26%	30%	2%
Sep 7	41,260	41,090	40,270	40,500	40,590	40,170	-820	-590	-500	-920	-2.0%	-1.4%	-1.2%	-2.2%	100%	98%	98%	98%	97%
Sep 28	34,710	34,600	32,710	32,660	32,760	32,610	-1,890	-1,940	-1,840	-1,990	-5.5%	-5.6%	-5.3%	-5.8%	100%	94%	94%	95%	94%

Note: The italic and bold dates have observed profiles.

Figure 24 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

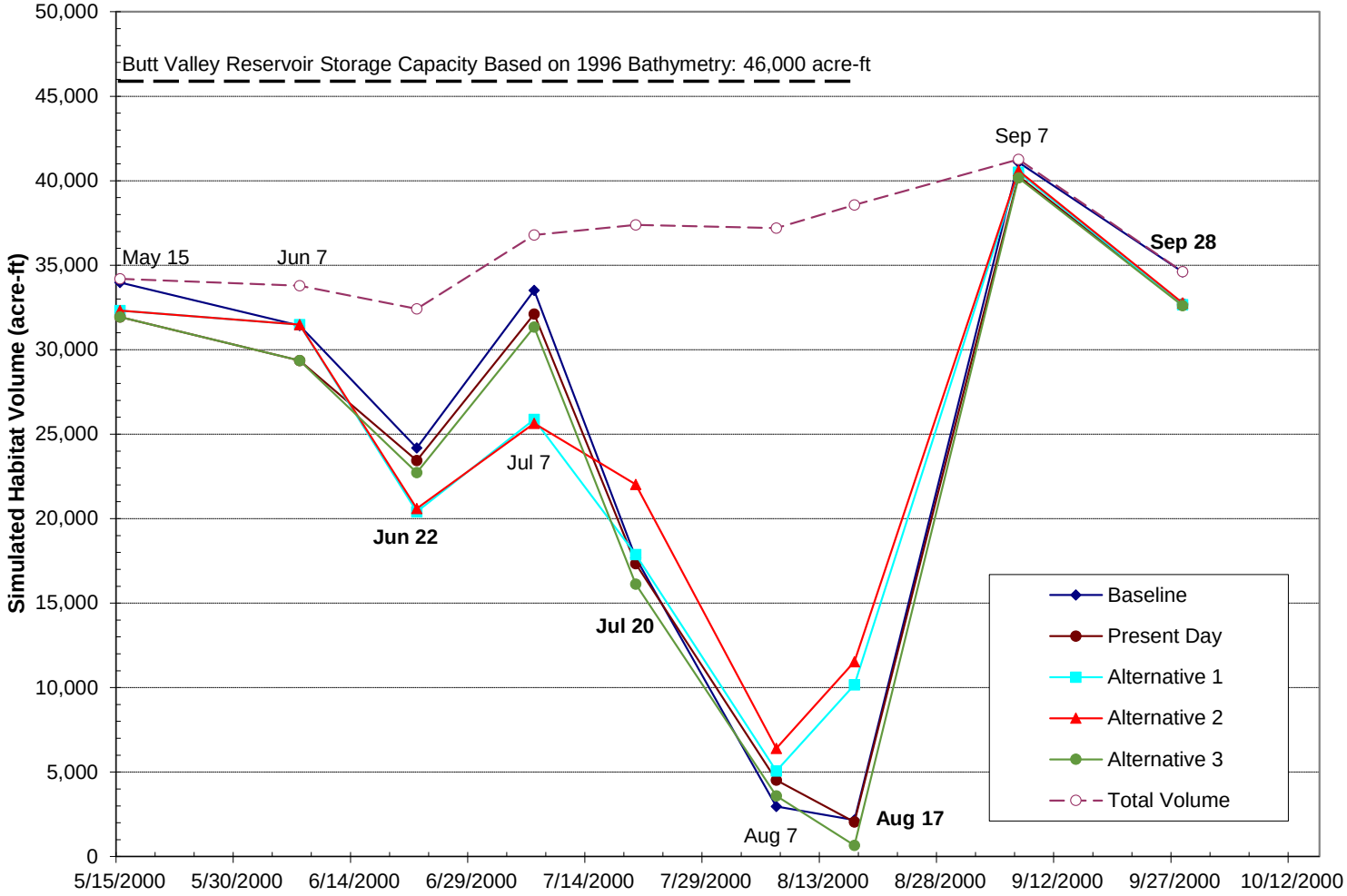


Table 23 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition
(2000, Normal Hydrologic Year)
Similar to Table 3-8b in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	34,270	33,980	31,930	32,310	32,310	31,930	-2,050	-1,670	-1,670	-2,050	-6.0%	-4.9%	-4.9%	-6.0%	99%	93%	94%	94%	93%
June 7	33,790	31,420	29,350	31,480	31,480	29,350	-2,070	60	60	-2,070	-6.6%	0.2%	0.2%	-6.6%	93%	87%	93%	93%	87%
Jun 22	32,410	28,400	28,080	23,440	23,590	27,680	-320	-4,960	-4,810	-720	-1.1%	-17.5%	-16.9%	-2.5%	88%	87%	72%	73%	85%
July 7	36,790	34,380	32,160	26,280	25,640	31,550	-2,220	-8,100	-8,740	-2,830	-6.5%	-23.6%	-25.4%	-8.2%	93%	87%	71%	70%	86%
Jul 20	37,390	32,360	31,440	26,510	26,200	31,060	-920	-5,850	-6,160	-1,300	-2.8%	-18.1%	-19.0%	-4.0%	87%	84%	71%	70%	83%
Aug 7	37,190	16,340	14,850	12,190	13,700	13,340	-1,490	-4,150	-2,640	-3,000	-9.1%	-25.4%	-16.2%	-18.4%	44%	40%	33%	37%	36%
Aug 17	38,570	34,170	34,600	28,810	27,640	32,940	430	-5,360	-6,530	-1,230	1.3%	-15.7%	-19.1%	-3.6%	89%	90%	75%	72%	85%
Sep 7	41,260	41,090	40,270	40,500	40,590	40,170	-820	-590	-500	-920	-2.0%	-1.4%	-1.2%	-2.2%	100%	98%	98%	98%	97%
Sep 28	34,710	34,600	32,710	32,660	32,760	32,610	-1,890	-1,940	-1,840	-1,990	-5.5%	-5.6%	-5.3%	-5.8%	100%	94%	94%	95%	94%

Note: The italic and bold dates have observed profiles.

Figure 25 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

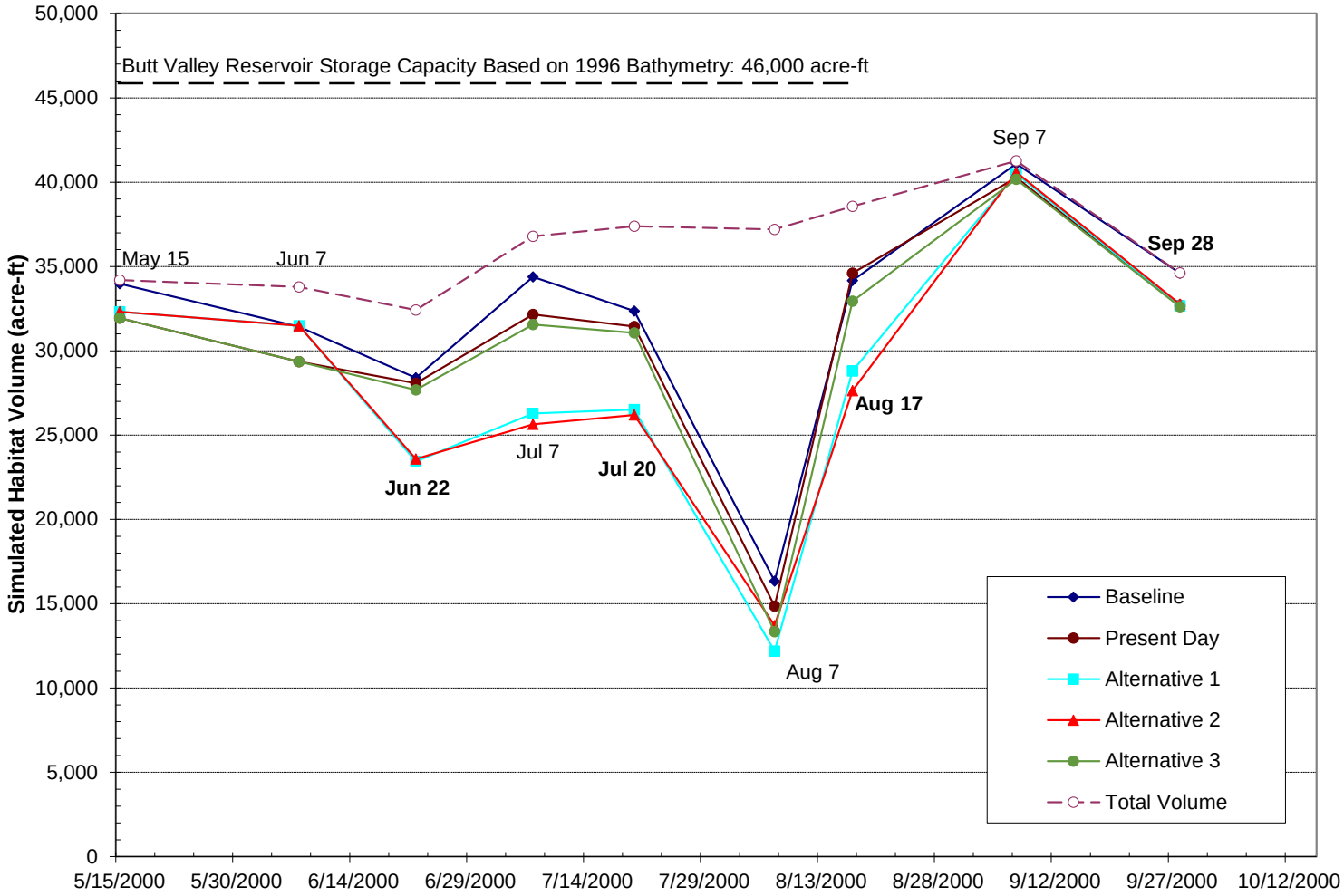


Table 24 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition
(2000, Normal Hydrologic Year)
Similar to Table 3-8c in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	34,270	33,980	31,930	32,310	32,310	31,930	-2,050	-1,670	-1,670	-2,050	-6.0%	-4.9%	-4.9%	-6.0%	99%	93%	94%	94%	93%
June 7	33,790	31,420	29,350	31,480	31,480	29,350	-2,070	60	60	-2,070	-6.6%	0.2%	0.2%	-6.6%	93%	87%	93%	93%	87%
Jun 22	32,410	29,980	29,300	28,500	28,240	29,230	-680	-1,480	-1,740	-750	-2.3%	-4.9%	-5.8%	-2.5%	93%	90%	88%	87%	90%
July 7	36,790	34,380	32,160	26,280	25,640	31,550	-2,220	-8,100	-8,740	-2,830	-6.5%	-23.6%	-25.4%	-8.2%	93%	87%	71%	70%	86%
Jul 20	37,390	33,340	32,570	27,110	26,540	32,320	-770	-6,230	-6,800	-1,020	-2.3%	-18.7%	-20.4%	-3.1%	89%	87%	73%	71%	86%
Aug 7	37,190	32,420	30,210	25,780	25,330	29,190	-2,210	-6,640	-7,090	-3,230	-6.8%	-20.5%	-21.9%	-10.0%	87%	81%	69%	68%	78%
Aug 17	38,570	36,120	36,200	28,810	27,640	35,630	80	-7,310	-8,480	-490	0.2%	-20.2%	-23.5%	-1.4%	94%	94%	75%	72%	92%
Sep 7	41,260	41,090	40,270	40,500	40,590	40,170	-820	-590	-500	-920	-2.0%	-1.4%	-1.2%	-2.2%	100%	98%	98%	98%	97%
Sep 28	34,710	34,600	32,710	32,660	32,760	32,610	-1,890	-1,940	-1,840	-1,990	-5.5%	-5.6%	-5.3%	-5.8%	100%	94%	94%	95%	94%

Note: The italic and bold dates have observed profiles.

Figure 26 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

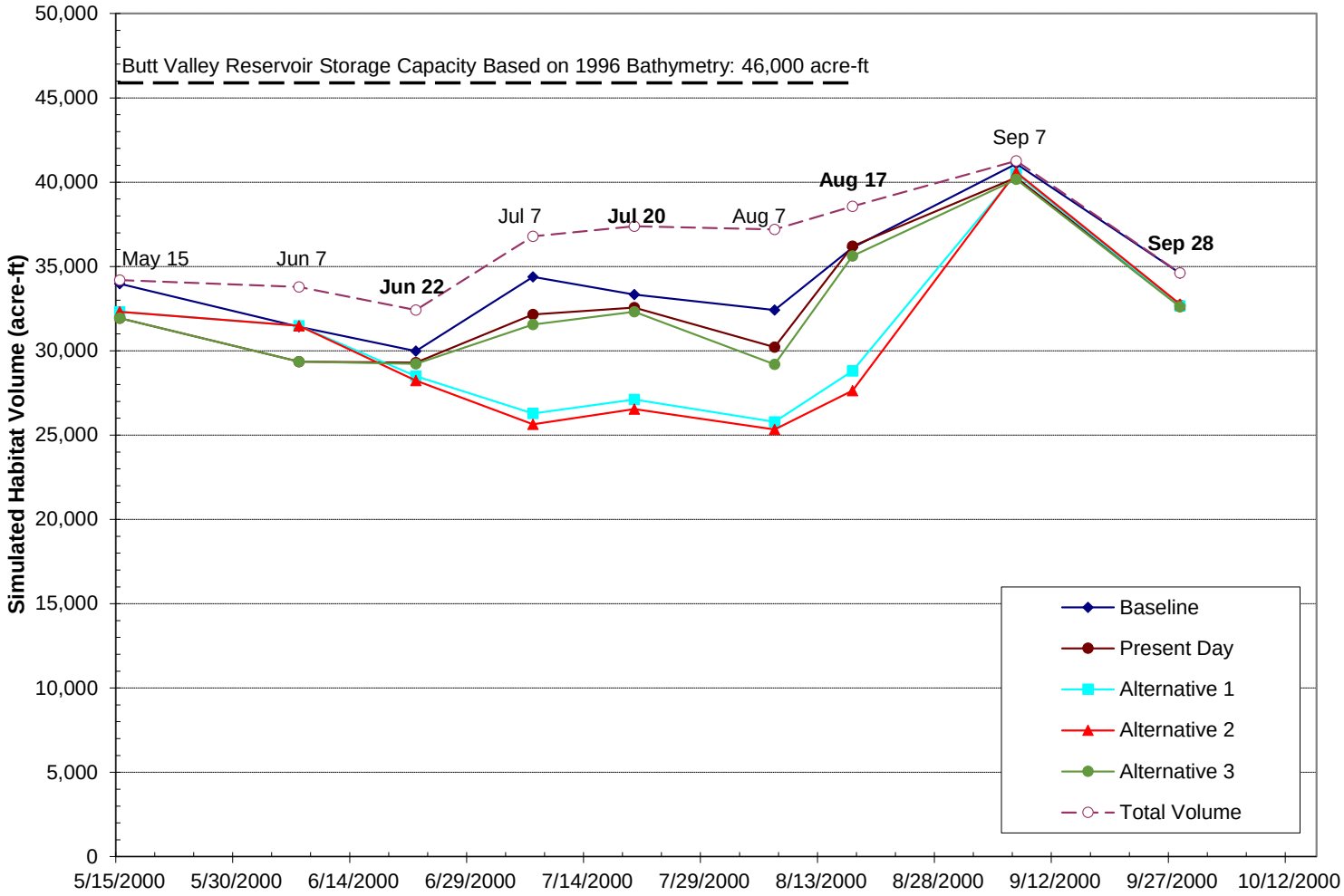


Table 25 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2009, Dry Year)

Date	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
		Baseline	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3	Baseline	Present Day	Alt 1	Alt 2	Alt 3
May 16	37,940	37,910	37,480	37,480	37,480	37,480	-430	-430	-430	-430	-1.1%	-1.1%	-1.1%	-1.1%	100%	99%	99%	99%	99%
June 6	35,000	33,500	33,300	33,540	33,540	33,300	-200	40	40	-200	-0.6%	0.1%	0.1%	-0.6%	96%	95%	96%	96%	95%
Jun 19	34,730	32,320	31,470	32,740	32,550	31,390	-850	420	230	-930	-2.6%	1.3%	0.7%	-2.9%	93%	91%	94%	94%	90%
July 7	31,060	11,760	9,900	7,090	6,490	8,560	-1,860	-4,670	-5,270	-3,200	-15.8%	-39.7%	-44.8%	-27.2%	38%	32%	23%	21%	28%
Jul 24	31,220	1,550	690	1,180	1,520	620	-860	-370	-30	-930	-55.5%	-23.9%	-1.9%	-60.0%	5%	2%	4%	5%	2%
Aug 10	31,950	10	0	5,080	6,460	0	-10	5,070	6,450	-10	-100.0%	50700.0%	64500.0%	-100.0%	0%	0%	16%	20%	0%
Aug 28	35,060	10	10	2,930	5,140	10	0	2,920	5,130	0	0.0%	29200.0%	51300.0%	0.0%	0%	0%	8%	15%	0%
Sep 12	34,660	33,970	26,530	34,280	34,310	16,090	-7,440	310	340	-17,880	-21.9%	0.9%	1.0%	-52.6%	98%	77%	99%	99%	46%
Sep 28	36,750	36,690	34,860	34,880	34,780	34,840	-1,830	-1,810	-1,910	-1,850	-5.0%	-4.9%	-5.2%	-5.0%	100%	95%	95%	95%	95%
Oct 6	36,920	36,930	35,050	35,060	35,090	35,030	-1,880	-1,870	-1,840	-1,900	-5.1%	-5.1%	-5.0%	-5.1%	100%	95%	95%	95%	95%

Note: The italic and bold dates have observed profiles.

Figure 27 Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives (2009, Dry Year)

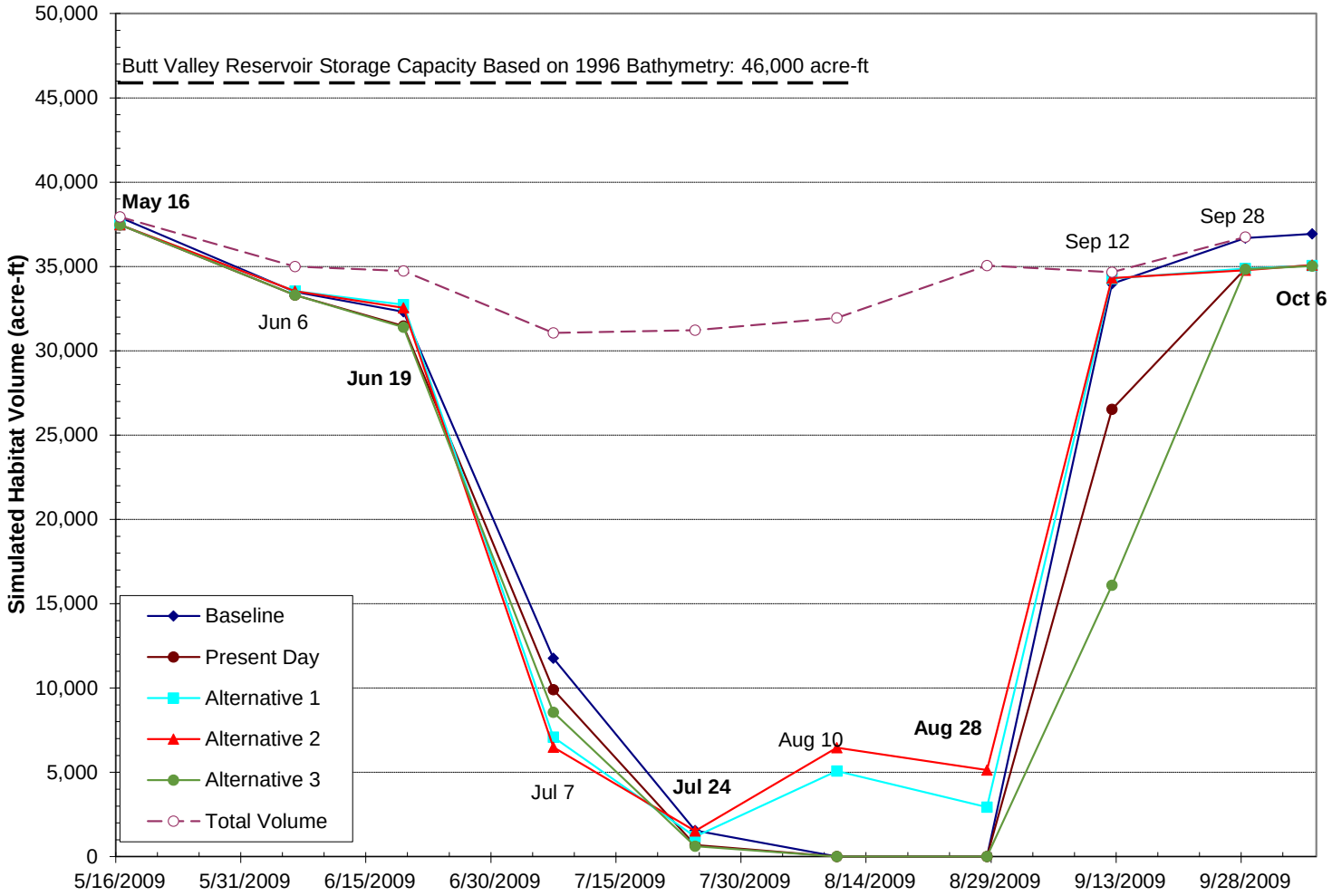


Table 26 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2009, Dry Year)

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 16	37,940	37,910	37,480	37,480	37,480	37,480	-430	-430	-430	-430	-1.1%	-1.1%	-1.1%	-1.1%	100%	99%	99%	99%	99%
June 6	35,000	33,500	33,300	33,540	33,540	33,300	-200	40	40	-200	-0.6%	0.1%	0.1%	-0.6%	96%	95%	96%	96%	95%
Jun 19	34,730	32,320	31,470	32,740	32,550	31,390	-850	420	230	-930	-2.6%	1.3%	0.7%	-2.9%	93%	91%	94%	94%	90%
July 7	31,060	25,690	23,110	13,700	18,300	18,680	-2,580	-11,990	-7,390	-7,010	-10.0%	-46.7%	-28.8%	-27.3%	83%	74%	44%	59%	60%
Jul 24	31,220	10,600	8,410	5,930	7,650	7,520	-2,190	-4,670	-2,950	-3,080	-20.7%	-44.1%	-27.8%	-29.1%	34%	27%	19%	25%	24%
Aug 10	31,950	26,590	26,790	22,360	21,730	21,570	200	-4,230	-4,860	-5,020	0.8%	-15.9%	-18.3%	-18.9%	83%	84%	70%	68%	68%
Aug 28	35,060	29,170	29,450	29,930	28,300	28,160	280	760	-870	-1,010	1.0%	2.6%	-3.0%	-3.5%	83%	84%	85%	81%	80%
Sep 12	34,660	34,710	34,260	34,280	34,310	34,230	-450	-430	-400	-480	-1.3%	-1.2%	-1.2%	-1.4%	100%	99%	99%	99%	99%
Sep 28	36,750	36,690	34,860	34,880	34,780	34,840	-1,830	-1,810	-1,910	-1,850	-5.0%	-4.9%	-5.2%	-5.0%	100%	95%	95%	95%	95%
Oct 6	36,920	36,930	35,050	35,060	35,090	35,030	-1,880	-1,870	-1,840	-1,900	-5.1%	-5.1%	-5.0%	-5.1%	100%	95%	95%	95%	95%

Note: The italic and bold dates have observed profiles.

Figure 28 Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives (2009, Dry Year)

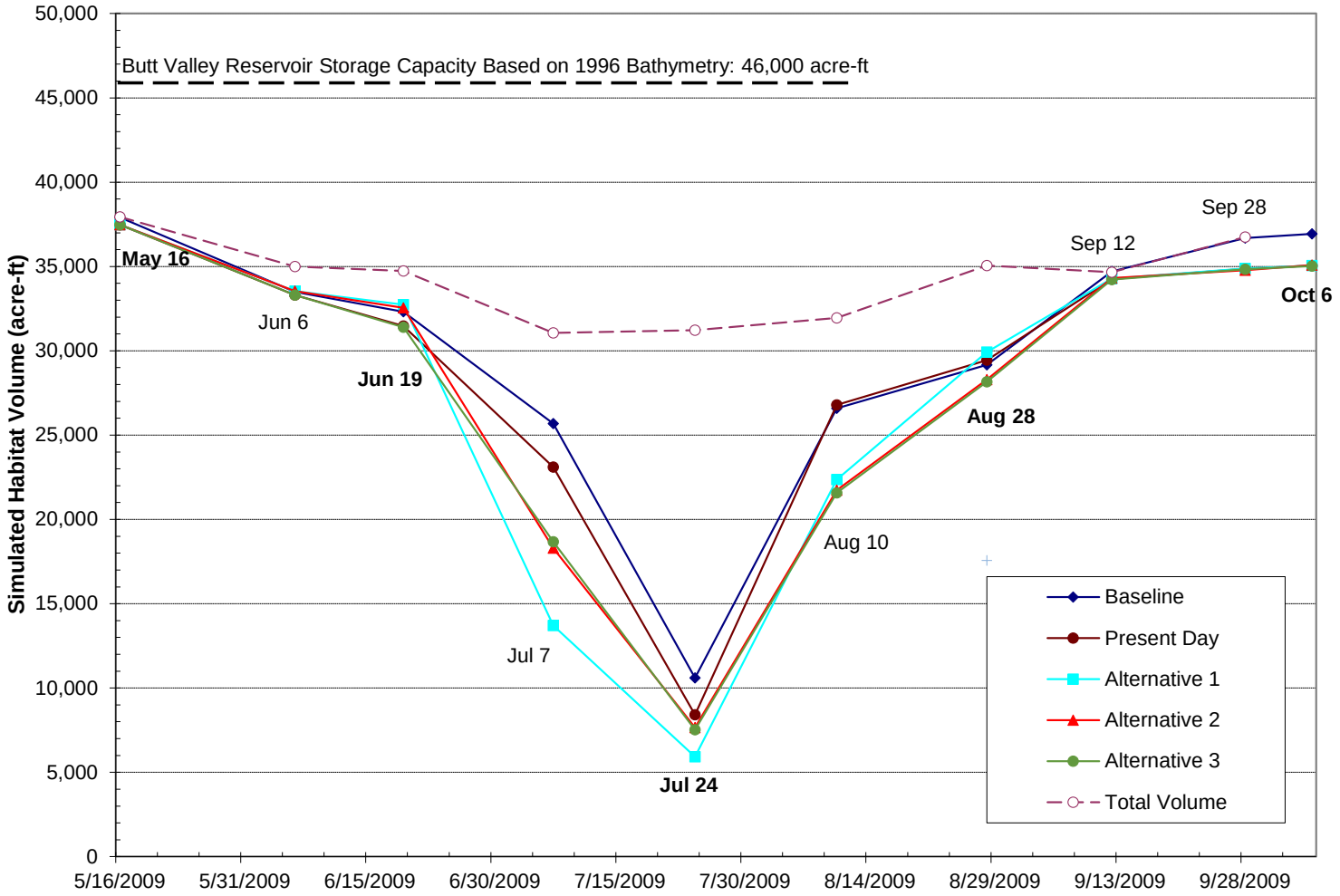


Table 27 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition (2009, Dry Year)

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		Baseline	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3	Present Day	Alt 1	Alt 2	Alt 3	Baseline	Present Day	Alt 1	Alt 2	Alt 3
May 16	37,940	37,910	37,480	37,480	37,480	37,480	-430	-430	-430	-430	-1.1%	-1.1%	-1.1%	-1.1%	100%	99%	99%	99%	99%
June 6	35,000	33,500	33,300	33,540	33,540	33,300	-200	40	40	-200	-0.6%	0.1%	0.1%	-0.6%	96%	95%	96%	96%	95%
Jun 19	34,730	32,320	31,470	32,740	32,550	31,390	-850	420	230	-930	-2.6%	1.3%	0.7%	-2.9%	93%	91%	94%	94%	90%
July 7	31,060	28,110	26,540	26,030	24,420	26,220	-1,570	-2,080	-3,690	-1,890	-5.6%	-7.4%	-13.1%	-6.7%	91%	85%	84%	79%	84%
Jul 24	31,220	26,090	21,050	20,280	20,890	16,190	-5,040	-5,810	-5,200	-9,900	-19.3%	-22.3%	-19.9%	-37.9%	84%	67%	65%	67%	52%
Aug 10	31,950	31,370	30,740	23,100	21,760	30,020	-630	-8,270	-9,610	-1,350	-2.0%	-26.4%	-30.6%	-4.3%	98%	96%	72%	68%	94%
Aug 28	35,060	33,740	33,370	29,930	28,300	33,710	-370	-3,810	-5,440	-30	-1.1%	-11.3%	-16.1%	-0.1%	96%	95%	85%	81%	96%
Sep 12	34,660	34,710	34,260	34,280	34,310	34,230	-450	-430	-400	-480	-1.3%	-1.2%	-1.2%	-1.4%	100%	99%	99%	99%	99%
Sep 28	36,750	36,690	34,860	34,880	34,780	34,840	-1,830	-1,810	-1,910	-1,850	-5.0%	-4.9%	-5.2%	-5.0%	100%	95%	95%	95%	95%
Oct 6	36,920	36,930	35,050	35,060	35,090	35,030	-1,880	-1,870	-1,840	-1,900	-5.1%	-5.1%	-5.0%	-5.1%	100%	95%	95%	95%	95%

Note: The italic and bold dates have observed profiles.

Figure 29 Comparison of Simulated Butt Valley Reservoir Habitat Volume Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives (2009, Dry Year)

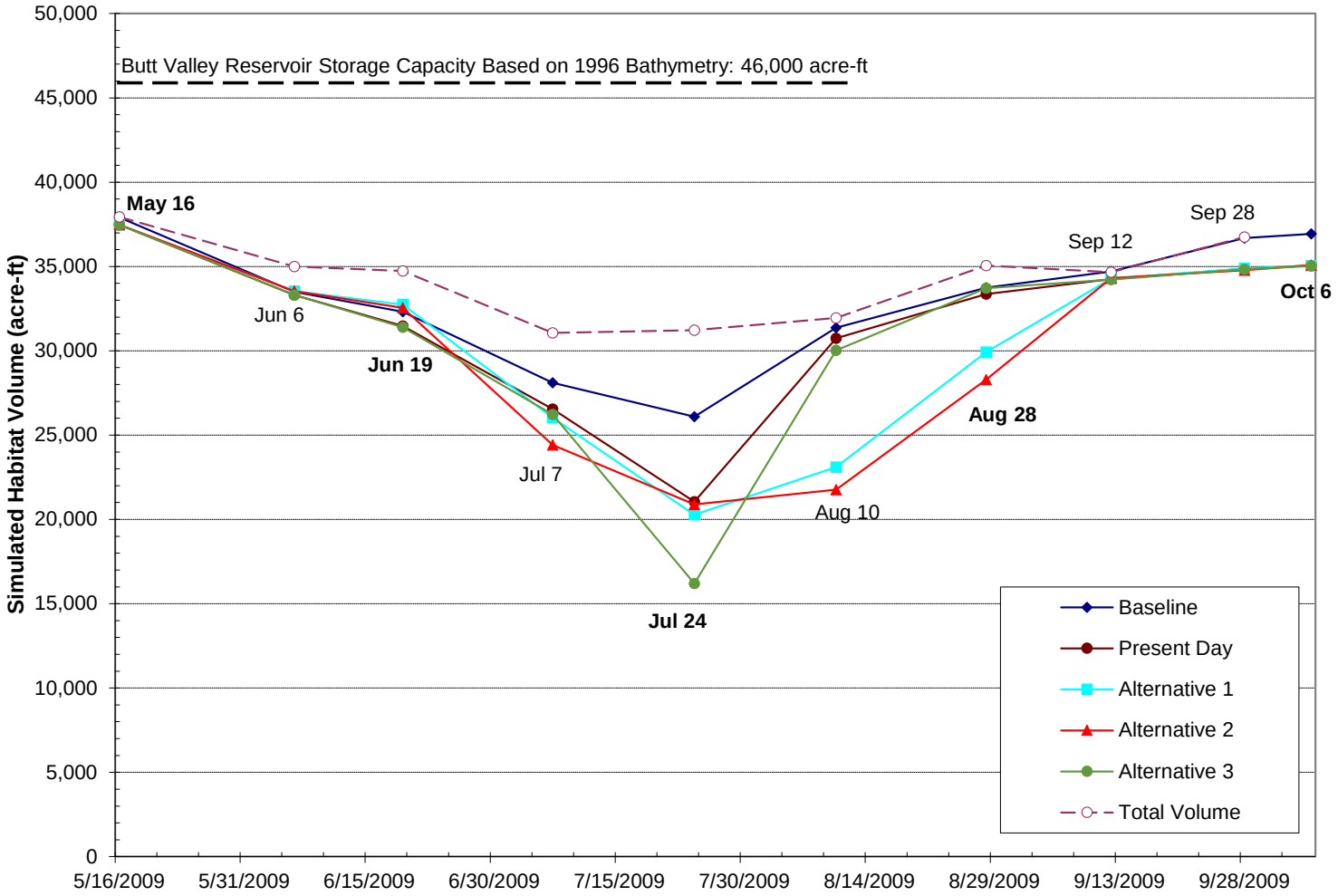


Table 28 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 20°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition
(2001, Critical Dry Year)
Similar to Table 3-9a in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	38,210	38,160	38,150	38,140	38,140	38,150	-10	-20	-20	-10	0.0%	-0.1%	-0.1%	0.0%	100%	100%	100%	100%	100%
June 6	41,400	39,550	39,110	39,250	39,250	39,110	-440	-300	-300	-440	-1.1%	-0.8%	-0.8%	-1.1%	96%	94%	95%	95%	94%
Jun 22	39,840	15,660	17,450	18,500	18,630	16,590	1,790	2,840	2,970	930	11.4%	18.1%	19.0%	5.9%	39%	44%	46%	47%	42%
July 11	40,530	5,290	5,100	8,000	8,910	5,230	-190	2,710	3,620	-60	-3.6%	51.2%	68.4%	-1.1%	13%	13%	20%	22%	13%
Jul 20	40,490	1,040	990	3,270	3,760	1,180	-50	2,230	2,720	140	-4.8%	214.4%	261.5%	13.5%	3%	2%	8%	9%	3%
Aug 7	36,840	0	0	70	40	0	0	70	40	0	-	-	-	-	0%	0%	0%	0%	0%
Aug 20	34,980	0	0	0	10	0	0	0	10	0	-	-	-	-	0%	0%	0%	0%	0%

Note: The italic and bold dates have observed profiles.

Figure 30 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

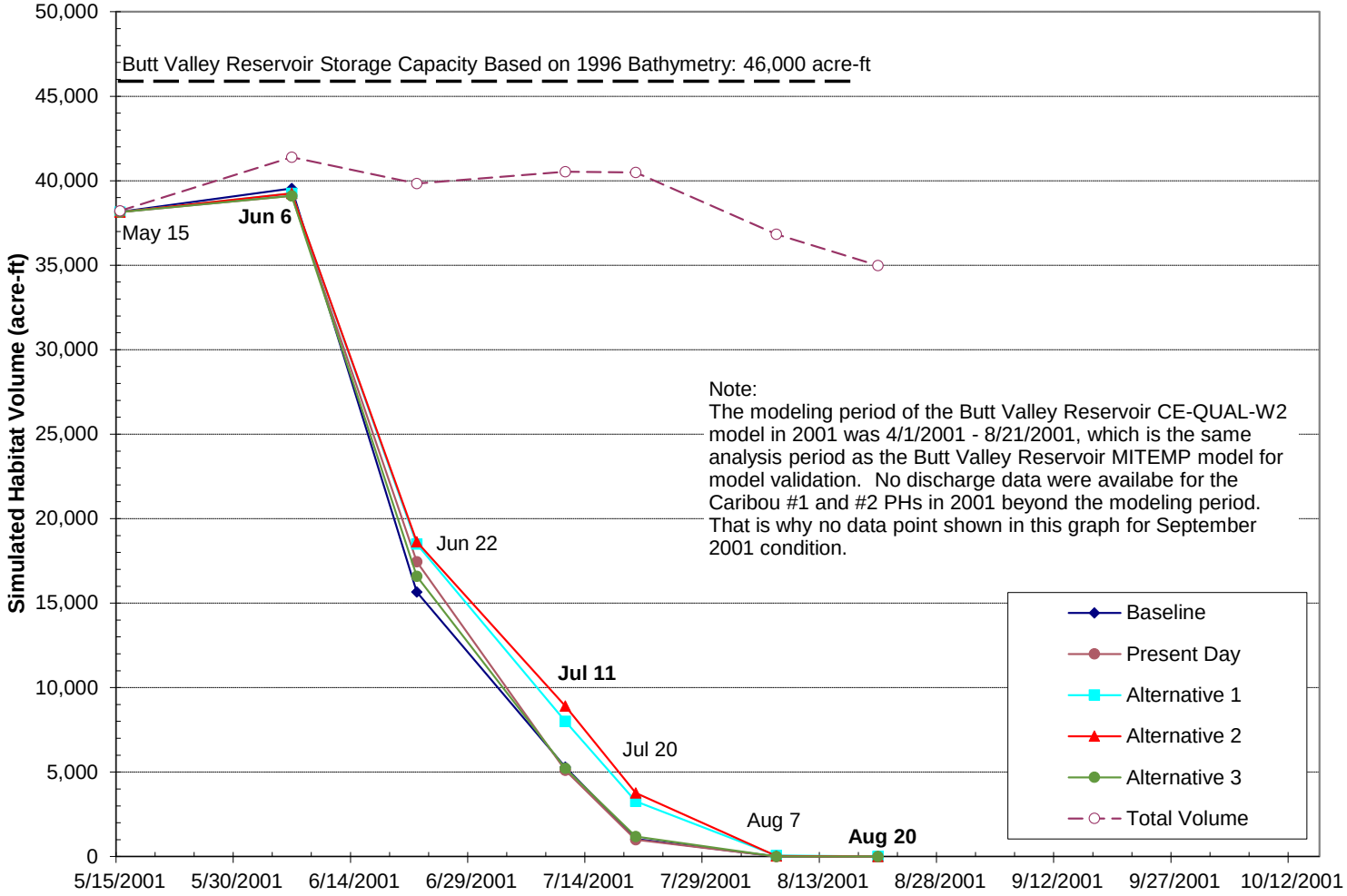


Table 29 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 21°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition
(2001, Critical Dry Year)
Similar to Table 3-9b in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	38,210	38,160	38,150	38,140	38,140	38,150	-10	-20	-20	-10	0.0%	-0.1%	-0.1%	0.0%	100%	100%	100%	100%	100%
June 6	41,400	40,220	39,430	39,270	39,270	39,430	-790	-950	-950	-790	-2.0%	-2.4%	-2.4%	-2.0%	97%	95%	95%	95%	95%
Jun 22	39,840	24,890	24,860	25,430	25,460	24,210	-30	540	570	-680	-0.1%	2.2%	2.3%	-2.7%	62%	62%	64%	64%	61%
July 11	40,530	14,980	13,850	16,990	19,810	12,580	-1,130	2,010	4,830	-2,400	-7.5%	13.4%	32.2%	-16.0%	37%	34%	42%	49%	31%
Jul 20	40,490	10,870	7,510	12,510	16,660	6,610	-3,360	1,640	5,790	-4,260	-30.9%	15.1%	53.3%	-39.2%	27%	19%	31%	41%	16%
Aug 7	36,840	210	130	1,490	3,600	120	-80	1,280	3,390	-90	-38.1%	609.5%	1614.3%	-42.9%	1%	0%	4%	10%	0%
Aug 20	34,980	910	1,140	3,410	5,430	400	230	2,500	4,520	-510	25.3%	274.7%	496.7%	-56.0%	3%	3%	10%	16%	1%

Note: The italic and bold dates have observed profiles.

Figure 31 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

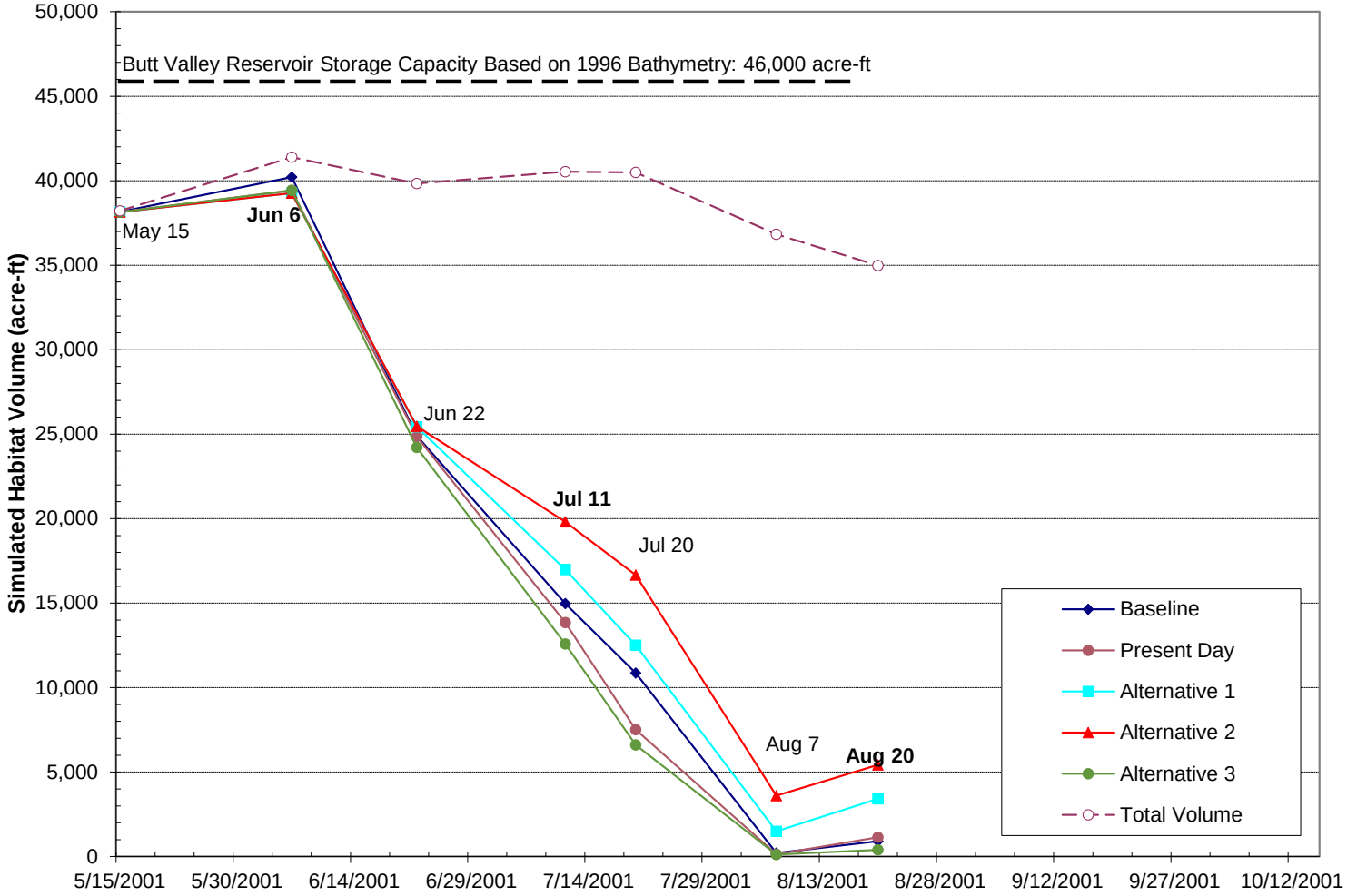


Table 30 Summary of Simulated Butt Valley Reservoir Habitat Volume (acre-ft) Having Water Temperature ≤ 22°C and DO ≥ 5 mg/L for Different Alternatives and Change in Habitat Volume Relative to Baseline Condition
(2001, Critical Dry Year)
Similar to Table 3-9c in Level 3 Report

	Total Reservoir Storage on Date (acre-ft)	Simulated Habitat Volume (acre-ft)					Change in Habitat Volume Relative to Baseline Condition (acre-ft)				% Change in Habitat Volume Relative to Baseline Condition				% of Habitat Volume to Total Reservoir Storage on Date				
Date		**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**	**Baseline**	**Present Day**	**Alt 1**	**Alt 2**	**Alt 3**
May 15	38,210	38,160	38,150	38,140	38,140	38,150	-10	-20	-20	-10	0.0%	-0.1%	-0.1%	0.0%	100%	100%	100%	100%	100%
June 6	41,400	40,220	39,430	39,270	39,270	39,430	-790	-950	-950	-790	-2.0%	-2.4%	-2.4%	-2.0%	97%	95%	95%	95%	95%
Jun 22	39,840	35,140	32,840	35,960	35,220	32,620	-2,300	820	80	-2,520	-6.5%	2.3%	0.2%	-7.2%	88%	82%	90%	88%	82%
July 11	40,530	37,560	36,860	36,680	36,200	36,010	-700	-880	-1,360	-1,550	-1.9%	-2.3%	-3.6%	-4.1%	93%	91%	91%	89%	89%
Jul 20	40,490	35,920	35,530	35,840	35,660	34,390	-390	-80	-260	-1,530	-1.1%	-0.2%	-0.7%	-4.3%	89%	88%	89%	88%	85%
Aug 7	36,840	21,110	17,390	23,900	27,950	14,180	-3,720	2,790	6,840	-6,930	-17.6%	13.2%	32.4%	-32.8%	57%	47%	65%	76%	38%
Aug 20	34,980	31,210	31,040	32,370	31,770	28,900	-170	1,160	560	-2,310	-0.5%	3.7%	1.8%	-7.4%	89%	89%	93%	91%	83%

Note: The italic and bold dates have observed profiles.

Figure 32 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

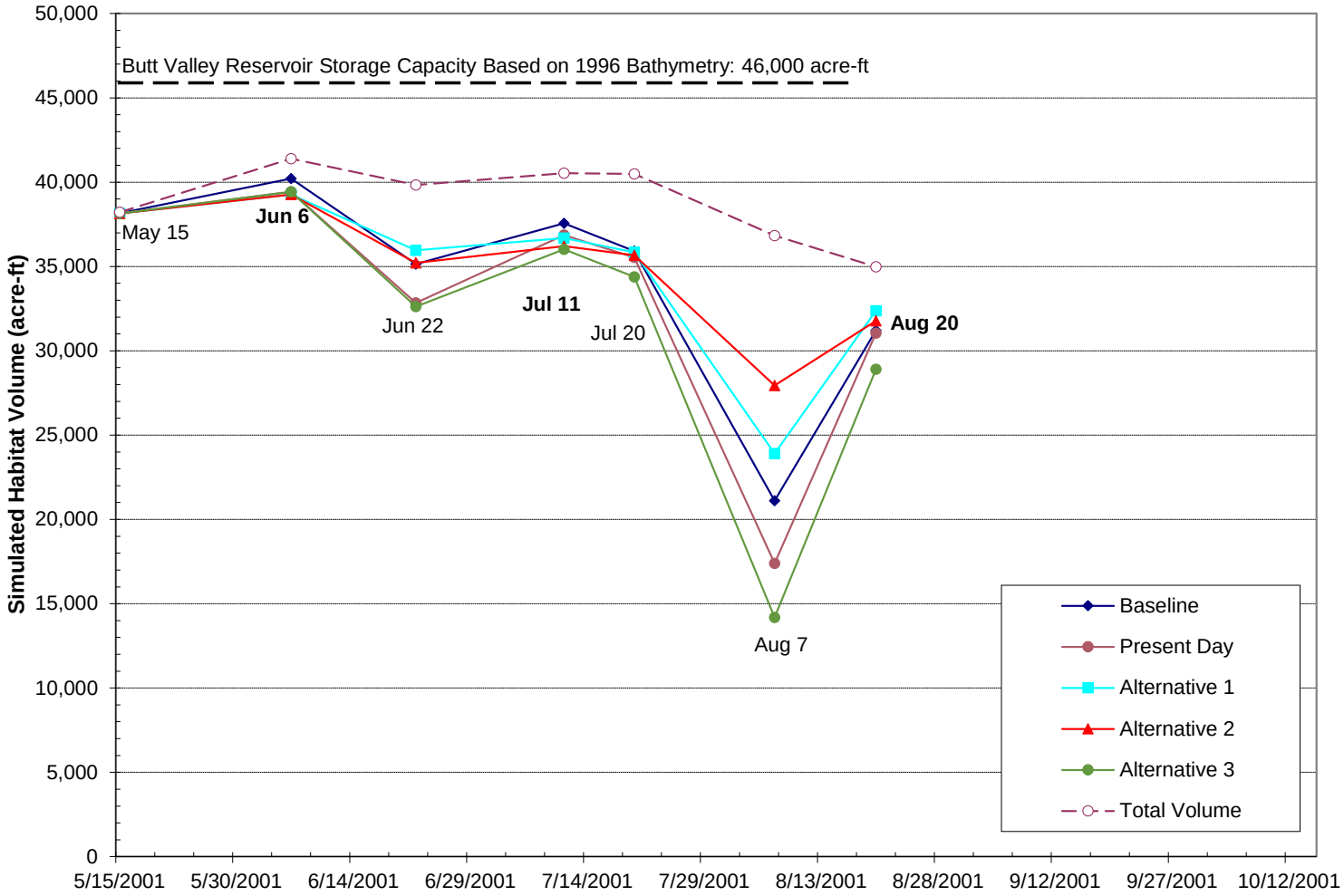


Table 31 Estimated Annual Foregone Power Generation Loss (GWh/Year)

Alternative	Power Generation Loss due to Increased Minimum Flow Releases Given in the Settlement Agreement	Power Generation Loss due to Increased Canyon Dam Releases (in Jun 16 to Sep 15) for Water Temperature Reduction	Power Generation Loss due to Required Pulse Flow Releases at Canyon Dam and Belden Forebay Dam	Power Generation Loss due to Required Summertime Recreational Flow Releases at Belden Forebay Dam	Total Power Generation Loss
Present Day	47.94	-	9.05	4.71	61.70
Alternative 1	47.94	37.89	9.05	4.71	99.59
Alternative 2	47.94	-	9.05	4.71	61.70
Alternative 3	47.94	37.89	9.05	4.71	99.59

Figure 33 Estimated Annual Foregone Power Generation Loss