COVER SHEET

FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE UPPER AMERICAN RIVER AND CHILI BAR
HYDROELECTRIC PROJECTS
Docket Nos. P-2101-084 and P-2155-024

Table of Contents
Pages ix through xxiv

FEIS

TABLE OF CONTENTS

LIST OF FIGURES xv

LIST OF TABLES xvii

ACRONYMS AND ABBREVIATIONS xxiii

EXECUTIVE SUMMARY xxv

1.0 PURPOSE AND NEED FOR ACTION 1-1
- 1.1 PURPOSE OF ACTION 1-1
- 1.2 NEED FOR POWER 1-3
  - 1.2.1 Regional Power Considerations 1-3
  - 1.2.2 Iowa Hill Implications 1-4
- 1.3 SCOPING PROCESS 1-5
  - 1.3.1 Upper American River Project 1-5
  - 1.3.2 Chili Bar Project 1-5
- 1.4 AGENCY CONSULTATIONS 1-6
  - 1.4.1 Alternative Licensing Process for UARP 1-6
  - 1.4.2 Interventions and Comments 1-6
  - 1.4.3 Settlement Agreement 1-9

2.0 PROPOSED ACTION AND ALTERNATIVES 2-1
- 2.1 NO-ACTION ALTERNATIVE 2-1
- 2.2 UPPER AMERICAN RIVER PROJECT 2-1
  - 2.2.1 Existing Facilities 2-1
  - 2.2.2 Current Operations 2-6
  - 2.2.3 Existing Project Boundary 2-9
  - 2.2.4 Project Safety 2-9
- 2.3 CHILI BAR PROJECT 2-10
  - 2.3.1 Existing Project Facilities 2-10
  - 2.3.2 Current Operations 2-10
  - 2.3.3 Existing Project Boundary 2-10
  - 2.3.4 Project Safety 2-10
- 2.4 SMUD'S PROPOSAL 2-11
  - 2.4.1 Proposed Project Facilities—Iowa Hill Development 2-11
  - 2.4.2 Proposed Operations 2-15
  - 2.4.3 Proposed Environmental Measures under the Settlement Agreement 2-15
  - 2.4.4 Project Boundary 2-31
  - 2.4.5 Alternative Sites Analysis 2-32

2.5 PG&E'S PROPOSAL 2-32
2.5.1 Proposed Project Facilities 2-32
2.5.2 Proposed Operations 2-33
2.5.3 Proposed Environmental Measures 2-33
2.5.4 Project Boundary 2-39
2.6 UPPER AMERICAN RIVER PROJECT-ONLY ALTERNATIVE 2-39
2.7 MODIFICATIONS TO APPLICANTS' PROPOSALS 2-39
2.7.1 Water Quality Certification 2-39
2.7.2 Section 18 Fishway Prescriptions 2-40
2.7.3 Section 4(e) Federal Land Management Conditions 2-40
2.7.4 Section 10(j) Recommendations 2-41
2.7.5 Proposed Action with Staff Modifications (Staff Alternative) 2-41
2.8 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY 2-43
2.8.1 Federal Government Takeover 2-43
2.8.2 Nonpower License 2-43
2.8.3 Project Retirement 2-43

3.0 ENVIRONMENTAL ANALYSIS 3-1
3.1 GENERAL DESCRIPTION OF THE RIVER BASINS 3-1
3.1.1 Rubicon River 3-1
3.1.2 Silver Creek 3-1
3.1.3 South Fork of the American River 3-2
3.2 CUMULATIVELY AFFECTED RESOURCES 3-2
3.2.1 Geographic Scope 3-2
3.2.2 Temporal Scope 3-3
3.3 PROPOSED ACTION AND ACTION ALTERNATIVES 3-3
3.3.1 Geology and Soils 3-3
3.3.1.1 Affected Environment 3-3
3.3.1.2 Environmental Effects 3-15
3.3.1.3 Unavoidable Adverse Effects 3-21
3.3.2 Water Resources 3-21
3.3.2.1 Affected Environment 3-21
3.3.2.2 Environmental Effects 3-70
3.3.2.3 Cumulative Effects 3-115
3.3.2.4 Unavoidable Adverse Effects 3-116
3.3.3 Aquatic Resources 3-116
3.3.3.1 Affected Environment 3-116
3.3.3.2 Environmental Effects 3-133
3.3.3.3 Unavoidable Adverse Effects 3-171

3.3.4 Terrestrial Resources 3-171
3.3.4.1 Affected Environment 3-171
3.3.4.2 Environmental Effects 3-196
3.3.4.3 Cumulative Effects 3-233
3.3.4.4 Unavoidable Adverse Effects 3-234
3.3.5 Threatened and Endangered Species 3-234
3.3.5.1 Affected Environment 3-234
3.3.5.2 Environmental Effects 3-240
3.3.5.3 Cumulative Effects 3-245
3.3.5.4 Unavoidable Adverse Effects 3-245
3.3.6 Recreational Resources 3-246
3.3.6.1 Affected Environment 3-246
3.3.6.2 Environmental Effects 3-257
3.3.6.3 Cumulative Effects 3-284
3.3.6.4 Unavoidable Adverse Effects 3-284
3.3.7 Land Use 3-284
3.3.7.1 Affected Environment 3-284
3.3.7.2 Environmental Effects 3-291
3.3.7.3 Unavoidable Adverse Effects 3-298
3.3.8 Aesthetic Resources 3-298
3.3.8.1 Affected Environment 3-298
3.3.8.2 Environmental Effects 3-310
3.3.8.3 Unavoidable Adverse Effects 3-313
3.3.9 Cultural Resources 3-313
3.3.9.1 Affected Environment 3-313
3.3.9.2 Environmental Effects 3-318
3.3.9.3 Cumulative Effects 3-319
3.3.9.4 Unavoidable Adverse Effects 3-320
3.3.10 Socioeconomic Resources 3-320
3.3.10.1 Affected Environment 3-320
3.3.10.2 Environmental Effects 3-323
3.3.10.3 Unavoidable Adverse Effects 3-343
3.3.11 Air Resources 3-344
3.3.11.1 Affected Environment 3-344
3.3.11.2 Environmental Effects 3-347
3.3.11.3 Cumulative Effects 3-352
3.3.11.4 Unavoidable Adverse Effects 3-353
3.3.12 Noise Resources 3-353
3.3.12.1 Affected Environment 3-353
3.3.12.2 Environmental Effects 3-356
3.3.12.3 Unavoidable Adverse Effects 3-358

3.4 NO-ACTION ALTERNATIVE 3-359
3.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 3-359
3.6 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM USES 3-359

4.0 DEVELOPMENTAL ANALYSIS 4-1
4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECTS 4-1
4.1.1 Economic Assumptions 4-1
4.1.2 Current Annual Costs and Future Capital Costs for the UARP and Chili Bar Project under the No-action Alternative 4-2
4.2 COST OF IOWA HILL DEVELOPMENT 4-4
4.3 COST OF ENVIRONMENTAL MEASURES 4-5
4.3.1 Cost of Environmental Measures for UARP 4-5
4.3.2 Effect of Proposed Operations on UARP and Chili Bar Project 4-8
4.4 COMPARISON OF ALTERNATIVES 4-10
4.5 OTHER ECONOMIC CONSIDERATIONS 4-11

5.0 STAFF'S CONCLUSIONS 5-1
5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE 5-1
5.1.1 Upper American River Project 5-3
5.1.2 Chili Bar 5-13
5.1.3 Rationale for Staff Recommendations 5-17
5.2 CUMULATIVE EFFECTS SUMMARY 5-43
5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS 5-44
5.4 CONSISTENCY WITH COMPREHENSIVE PLANS 5-45
5.5 RELATIONSHIP OF LICENSE PROCESS TO LAWS AND POLICIES 5-47
5.5.1 Water Quality Certification 5-47
5.5.2 Endangered Species Act 5-47
5.5.3 National Historic Preservation Act 5-49
5.5.4 Americans with Disabilities Act 5-49
5.5.5 Clean Air Act 5-50

6.0 LITERATURE CITED 6-1

7.0 LIST OF PREPARERS 7-1

8.0 LIST OF RECIPIENTS 8-1

APPENDIX A—Comments on the Draft Environmental Impact Statement for the Upper American River Hydroelectric Project (Project No. 2101-084) and the Chili Bar Hydroelectric Project (Project No. 2155-024)
APPENDIX B—Clean Air Act Conformity Analysis
APPENDIX C—Capital and Annual Costs of Measures for the UARP and Chili Bar Project

This page intentionally left blank.

LIST OF FIGURES

Figure 1-1. General vicinity of the UARP and Chili Bar Project 1-2
Figure 2-1. Diversions and storage in Rubicon River Basin..... 2-7
Figure 2-2. Diversions and storage in the South Fork of the American River Basin 2-8
Figure 2-3. Schematic of the proposed Iowa Hill pumped-storage operation 2-12
Figure 2-4. Plan view of the Iowa Hill development 2-13
Figure 3-1. Profile of the Upper American River system, Rubicon Lake to the Chili Bar Project 3-22
Figure 3-2. Existing USGS gages within the Upper American River system. 3-23
Figure 3-3. Rubicon reservoir daily water surface elevations 3-25
Figure 3-4. Buck Island reservoir daily water surface elevations..... 3-26
Figure 3-5. Loon Lake reservoir daily water surface elevations..... 3-27
Figure 3-6. Ice House reservoir daily water surface elevations..... 3-28
Figure 3-7. Union Valley reservoir daily water surface elevations 3-29
Figure 3-8. Slab Creek reservoir daily water surface elevations 3-31
Figure 3-9. Loon Lake reservoir modeled elevations for 1992 to 1999 water years..... 3-74
Figure 3-10. Ice House reservoir modeled elevations for 1992 to 1999 water years..... 3-75
Figure 3-11. Union Valley reservoir modeled elevations for 1992 to 1999 water years..... 3-76
Figure 3-12. Union Valley reservoir modeled base and Proposed Action water surface elevations from July to September 30 for 1977, 1988, and 1992 3-77
Figure 3-13. Rubicon reservoir modeled elevations between May 1 and September 10 for 1992 to 1999 3-79
Figure 3-14. Buck Island reservoir modeled elevations between May 1 and September 10 for 1992 to 1999 3-79
Figure 3-15. Gerle Creek reservoir modeled elevations between May 1 and September 10 for 1992 to 1999 3-80
Figure 3-16. Slab Creek reservoir historical one hour and modeled half hour elevations between May 1 and September 10 1999 3-81
Figure 3-17. Stream segment sampling reaches—UARP northeast area 3-122
Figure 3-18. Stream segment sampling reaches—UARP southeast area 3-123
Figure 3-19. Stream segment sampling reaches—UARP southwest area 3-124
Figure 3-20. Stream segment sampling reaches—UARP western area..... 3-125
Figure 3-21. Species presence by river mile in Slab Creek dam reach..... 3-130
Figure 3-22. Weighted usable area for rainbow trout in the Rubicon River downstream of Rubicon dam..... 3-138
Figure 3-23. Rainbow trout composite WUA for Gerle Creek below Loon Lake dam 3-141

Figure 3-24. Brown trout composite WUA for Gerle Creek below Loon Lake dam 3-142
Figure 3-25. Brown trout composite WUA for Gerle Creek below Gerle dam....3-144
Figure 3-26. Rainbow trout composite WUA for Gerle Creek below Gerle dam 3-145
Figure 3-27. Rainbow trout composite WUA for the SFSC below Ice House dam 3-149
Figure 3-28. Rainbow trout WUA for Silver Creek below Junction dam 3-152
Figure 3-29. Rainbow trout WUA for Silver Creek below Camino dam 3-155
Figure 3-30. Rainbow trout WUA for Brush Creek below Brush Creek dam....3-157
Figure 3-31. Rainbow trout WUA in the SFAR below Slab Creek dam....3-161
Figure 3-32. Recreational facilities at Loon Lake reservoir 3-247
Figure 3-33. Recreational facilities at Gerle Creek reservoir 3-248
Figure 3-34. Recreational facilities at Union Valley reservoir 3-249
Figure 3-35. Recreational facilities at Ice House reservoir....3-250
Figure 3-36. Key observation points in Project area....3-304

LIST OF TABLES

Table 2-1. Characteristics of Project reservoirs. 2-5
Table 2-2. Characteristics of Project powerhouses. 2-5
Table 2-3. Proposed environmental measures for the UARP under the Settlement Agreement. 2-16
Table 2-4. Proposed environmental measures for the Chili Bar Project under the Settlement Agreement. 2-33
Table 3-1. Reservoir shoreline data within the UARP 3-7
Table 3-2. Reservoir summary for the Projects. 3-24
Table 3-3. Data for Project reaches 3-41
Table 3-4. Current minimum streamflow requirements (cfs) for SFRR below Robbs Peak dam 3-42
Table 3-5. Current minimum streamflow requirements (cfs) for Gerle Creek below Gerle Creek dam 3-42
Table 3-6. Current minimum streamflow requirements (cfs) for SFSC below Ice House dam 3-43
Table 3-7. Current minimum streamflow requirements (cfs) for Silver Creek below Junction dam 3-43
Table 3-8. Current minimum streamflow requirements (cfs) for Silver Creek below Camino dam 3-44
Table 3-9. Current minimum streamflow requirements (cfs) for Brush Creek below Brush Creek dam 3-44
Table 3-10. Current minimum streamflow requirements (cfs) for SFAR below Slab Creek dam 3-45
Table 3-11. Monthly discharge (cfs) statistics for gages in the Project area. 3-46
Table 3-12. Summary of water rights in the UARP and Chili Bar Projects 3-50
Table 3-13. Designated beneficial uses of surface waters in the study area 3-54
Table 3-14. Water quality objectives to support designated beneficial uses in the study area 3-55
Table 3-15. Summary of selected reservoir characteristics that affect water temperatures along with vertical profiles of water temperature collected by applicants, 2000 to 2004 3-57
Table 3-16. Summary of hourly water temperature (°C) data collected by applicants 3-60
Table 3-17. Summary of the range of water quality data in reservoirs for all vertical profiles and the maximum fluctuation within any of the profiles, 2002 through 2004 3-64
Table 3-18. Frequency of dissolved cadmium, copper, lead, nickel, silver, and zinc water samples that exceed the corresponding CCC and CMC criteria, 2004 3-66

Table 3-19. Trace metal concentrations (mg/kg) in composite fish fillet and fish liver samples (shown in parentheses) from selected UARP and Chili Bar Project reservoirs, samples collected on December 16, 2003 3-67
Table 3-20. Summary of fecal coliform sampling results for UARP reservoirs and reaches and the reach downstream of Chili Bar, based on five samples collected during a 30-day period in summer 2003 3-69
Table 3-21. Loon Lake, Union Valley, and Ice House reservoir levels by water year3-71
Table 3-22. Water year types for 1992–1999 3-73
Table 3-23. Existing streamflow gages in the UARP area. 3-82
Table 3-24. Existing reservoir gages in UARP area. 3-82
Table 3-25. Existing diversion structure gages in Rubicon River watershed area of the UARP. 3-86
Table 3-26. Summary of general water temperature characteristics for the UARP and Chili Bar Project affected reaches under existing and proposed minimum instream flows and proposed Iowa Hill operations 3-89
Table 3-27. Recommended continuous stream temperature monitoring stations under the Settlement Agreement 3-105
Table 3-28. Recommended strategy for monitoring water chemistry and physical properties under the Settlement Agreement 3-110
Table 3-29. Fishes in the UARP and Chili Bar Project study area. 3-117
Table 3-30. Fish species present in UARP and Chili Bar Project reservoirs reported during historical and relicensing studies 3-119
Table 3-31. Number and composition of fish captured in reservoirs of the Projects using gill netting and beach seining, October to November 2002 and October 2003 3-120
Table 3-32. Fish presence in Project stream reaches[a] observed during historical and relicensing studies 3-121
Table 3-33. Summary information from 2002 to 2004 stream fisheries studies 3-126
Table 3-34. Summary characteristics for UARP and Chili Bar Project stream reaches 3-131
Table 3-35. Rainbow trout and brown trout biomass by reach from 2002–2004 SMUD Surveys, with agency objectives for trout biomass in each reach 3-134
Table 3-36. Proposed minimum streamflow schedule (cfs) for the Rubicon River below Rubicon dam. 3-137
Table 3-37. Proposed minimum streamflow schedule (cfs) for the Rubicon River below Buck Island dam 3-139
Table 3-38. Proposed minimum streamflow (cfs) schedule for Gerle Creek below Loon Lake dam. 3-140
Table 3-39. Proposed minimum streamflow (cfs) schedule for Gerle Creek below Gerle dam. 3-143
Table 3-40. Proposed minimum streamflow (cfs) schedule for the SFRR below Robbs Peak dam. 3-146

Table 3-41. Percent WUA for all water year types for rainbow trout for SFRR below Robbs Peak dam. 3-146
Table 3-42. Proposed minimum streamflow (cfs) schedule for SFSC below Ice House dam 3-148
Table 3-43. Percent WUA for all water year types for rainbow trout for SFSC below Ice House dam. 3-149
Table 3-44. Proposed minimum streamflow (cfs) schedule for Silver Creek below Junction dam....3-151
Table 3-45. Percent WUA for all water year types for rainbow trout for SFSC below Junction dam....3-152
Table 3-46. Proposed minimum streamflow (cfs) schedule for Silver Creek below Camino dam....3-154
Table 3-47. Proposed minimum streamflow (cfs) schedule for Brush Creek below Brush Creek dam 3-156
Table 3-48. Proposed minimum streamflow (cfs) schedule for SFAR below Slab Creek dam, years 1–3 3-158
Table 3-49. Proposed minimum streamflow (cfs) schedule for SFAR below Slab Creek dam, years 4 through term of license....3-159
Table 3-50. Percent WUA for all water year types for rainbow trout for SFAR below Slab Creek dam....3-159
Table 3-51. Proposed minimum streamflow (cfs) schedule for SFAR below Chili Bar dam 3-162
Table 3-52. Proposed ramping rates for the SFAR below Chili Bar dam 3-164
Table 3-53. Summary of special-status plant occurrences documented in the UARP area in 2000 and 2003....3-173
Table 3-54. Noxious weeds located during 2000, 2003 and 2004 survey efforts 3-177
Table 3-55. The extent, type, and limitations of riparian vegetation along UARP reaches 3-179
Table 3-56. The extent, type, and limitations of wetlands associated with UARP 3-181
Table 3-57. Special-status wildlife species known or with the potential to occur within the UARP and Chili Bar Project areas 3-185
Table 3-58. Productivity summary for bald eagles nesting at Union Valley reservoir, 1986–2005....3-190
Table 3-59. Description of sites and survey results at sites with potential habitat for California red-legged frog 3-238
Table 3-60. Estimated recreation days at dispersed recreational sites, 2002–2003 3-252
Table 3-61. Regional whitewater recreational opportunities....3-255
Table 3-62. SMUD's proposed recreational site improvements 3-260
Table 3-63. SMUD's proposed trail enhancements....3-272
Table 3-64. Proposed recreational streamflows in the Ice House dam reach the first 5 years 3-276

Table 3-65. Maximum possible recreational streamflows in the Ice House dam reach after year 5 3-276
Table 3-66. Proposed recreational streamflows in the Slab Creek dam reach after Iowa Hill development is constructed, or year 15 if criteria are met 3-278
Table 3-67. South Fork of the American River downstream of Chili Bar reservoir dam minimum recreational flow by water year (cfs). 3-279
Table 3-68. Land ownership (acres) within the FERC Project boundaries, by development 3-285
Table 3-69. Aesthetics resources at UARP, key viewpoints. 3-299
Table 3-70. Comparison of Project visibility in the photographic visual simulations and 3-D visual simulations 3-307
Table 3-71. Iowa Hill development construction cost estimates, 2004 3-327
Table 3-72. Iowa Hill operational payroll and operation and maintenance expenditures, 2004 3-329
Table 3-73. California and federal ambient air quality standards. 3-345
Table 3-74. California State area designations for criteria air pollutants. 3-346
Table 3-75. Predicted total ambient concentrations during construction period. 3-348
Table 3-76. Estimated air emissions from construction activities. 3-349
Table 3-77. Energy generation and requirements for all Project alternatives. 3-350
Table 3-78. Estimated air emissions from operational activities. 3-351
Table 3-79. Net peak-year emissions due to the UARP-only Alternative and Proposed Action following operation of Iowa Hill Development (post 2014). 3-352
Table 3-80. A-weighted (dBA) sound levels of typical noise environments 3-354
Table 3-81. Maximum allowable noise exposure for non-transportation noise sources in rural regions—construction noise. 3-356
Table 4-1. Staff assumptions for economic analysis of SMUD's UARP Project. 4-1
Table 4-2. Staff assumptions for economic analysis of PG&E's Chili Bar Project. 4-2
Table 4-3. Summary of current annual costs and future costs for SMUD's UARP under the No-action Alternative. 4-3
Table 4-4. Summary of current annual costs and future capital costs for PG&E's Chili Bar Project under the No-action Alternative. 4-3
Table 4-5. Summary of Iowa Hill development capital costs under the Proposed Action. 4-4
Table 4-6. Summary of Iowa Hill development annual costs under the Proposed Action 4-4
Table 4-7. Summary of annualized costs for measures included in the UARP-only Alternative. 4-5
Table 4-8. Summary of annualized costs for measures included in the Proposed Action (with Iowa Hill development) and the Proposed Action with Staff Modifications. 4-6

Table 4-9. Summary of annualized costs for measures associated with the Iowa Hill component of the Proposed Action 4-7
Table 4-10. Summary of annualized costs for measures included in the Proposed Action and Proposed Action with Staff Modifications for the Chili Bar Project. 4-7
Table 4-11. Summary of the energy and capacity effect 4-9
Table 4-12. Summary of the effect of environmental measures on energy.....4-9
Table 4-13. Summary of annual net benefits for the No-action, UARP-only Alternative, Proposed Action (with Iowa Hill development), and Proposed Action with Staff Modifications for SMUD's UARP. 4-11
Table 4-14. Summary of annual net benefits for the Chili Bar Project under the No-action, UARP-only Alternative, Proposed Action, and Proposed Action with Staff Modifications. 4-13

This page intentionally left blank.

ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
Agencies	CDFG, the Forest Service, FWS, and the Water Board
AN	above normal water year
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
BBS	breeding bird survey
applicants	Pacific Gas and Electric Company and or Sacramento Municipal Utility District
BLM	U.S. Department of Interior, Bureau of Land Management
BN	below normal water year
ºC	degrees Celsius
CAA	Clean Air Act
CARB	California Air Resources Board
CCC	criterion continuous concentrations
CD	critically dry water year
CDFG	California Department of Fish and Game
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMC	criterion maximum concentrations
Commission	Federal Energy Regulatory Commission
DO	dissolved oxygen
DWR	California Department of Water Resources
EID	El Dorado Irrigation District
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture, Forest Service
FPA	Federal Power Act
FWS	U.S. Fish and Wildlife Service
g	gram
GDP-IDP	U.S. Gross Domestic Product—Implicit Price Deflator
HPMP	Historic Properties Management Plan
Interior	U.S. Department of the Interior
kg	kilogram
kV	kilovolt
L	liter
MCL	maximum contaminant level
mg	milligram

MIS	management indicator species
mL	milliliter
mm	millimeter
MPN	most probable number
MW	megawatt
MWh	megawatt-hours
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NGO	non-governmental organization
NGVD	National Geodetic Vertical Datum
NMFS	National Marine Fisheries Service
NTU	nephelometric turbidity units
PA	programmatic agreement
PAOT	people-at-one-time
PDEA	preliminary draft environmental assessment
PG&E	Pacific Gas and Electric Company
Projects	UARP and Chili Bar Projects
SD	super dry water year
SHPO	State Historic Preservation Officer
SFAR	South Fork of the American River
SFRR	South Fork of the Rubicon River
SFSC	South Fork of Silver Creek
SIP	State Implementation Plan
SMUD	Sacramento Municipal Utility District
TCP	traditional cultural property
UARP	Upper American River Project
USGS	U.S. Geological Survey
μg/L	microgram per liter
VES	visual encounter survey
VQO	visual quality objective
Water Board	State Water Resources Control Board
YOY	young-of-the-year