

**SACRAMENTO MUNICIPAL UTILITY DISTRICT'S
UPPER AMERICAN RIVER PROJECT
(FERC NO. 2101)**

APPLICATION FOR NEW LICENSE

**APPLICANT-PREPARED
PRELIMINARY DRAFT
ENVIRONMENTAL ASSESSMENT**

Sacramento Municipal Utility District
Sacramento, California

JUNE 2005

COVER SHEET

- a. Title: Applicant-Prepared Preliminary Draft Environmental Assessment (PDEA), Upper American River Project – FERC Project No. 2101, California. Sacramento Municipal Utility District, Sacramento, California.
- b. Subject: Applicant-prepared Preliminary Draft Environmental Assessment
- c. Lead Agency: Federal Energy Regulatory Commission (FERC)
- d. Abstract: Sacramento Municipal Utility District (SMUD) filed with FERC an application for new license for the existing Upper American River Project (UARP), which is located on Silver Creek, Rubicon River, and South Fork American River in El Dorado and Sacramento counties, California. The UARP occupies private lands, and federally-owned lands some of which are administered by the U.S. Department of Agriculture, Forest Service and some of which are managed by the U. S. Bureau of Land Management.
- This applicant-prepared PDEA presents SMUD’s evaluation of the developmental and non-developmental consequences of SMUD’s Proposed Alternative, the UARP-Only Alternative, and the No Action alternative and is part of SMUD’s application for a new license.
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- g. Transmittal: This PDEA has been filed with FERC and distributed to interested parties as part of SMUD’s application for a new license.

FOREWORD

This applicant-prepared Preliminary Draft Environmental Assessment (PDEA) for the Upper American River Project (FERC No. 2101) is filed by the Sacramento Municipal Utility District (SMUD) as part of its application for a new license.

The Federal Energy Regulatory Commission (Commission), pursuant to the Federal Power Act (FPA)¹ and the U.S. Department of Energy Organization Act² is authorized to issue licenses for up to 50 years for the construction and operation of a non-federal hydroelectric development subject to its jurisdiction, on the necessary conditions:

That the project...shall be such as in the judgment of the Commission will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of water-power development, for the adequate protection, mitigation, and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational and other purposes referred to in Section 4(e)...³

The Commission may require such other conditions not inconsistent with the FPA as may be found necessary to provide for the various public interests to be served by the Project.⁴ Compliance with such conditions during the licensing period is required. The Commission's Rules of Practice and Procedure allow any person objecting to a licensee's compliance or noncompliance with such conditions to file a complaint noting the basis for such objection for the Commission's consideration.⁵

¹ 16 U.S.C. §791(a)-825r, as amended by the Electric Consumers Protection Act of 1986, Public Law 99-495 (1986), and the Energy Policy Act of 1992, Public Law 102-486 (1992).

² Public Law 95-91, 91 Stat. 556 (1977).

³ 16 U.S.C. §803(a)(1).

⁴ 16 U.S.C. §803(g).

⁵ 18 CFR 385.206 (1987).

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GLOSSARY OF TERMS

TERM	DEFINITION
A	
ac-ft	A measure of volume; 1 acre of water, 1 foot deep (43,560 cubic feet). About two (86,400 ÷ 43,560) acre-feet of water will accumulate over one day from a flow of 1 cfs.
Accretion Flow	Any tributary flow to a larger stream that is controlled by releases from a dam
ADA	Americans with Disabilities Act
Adit	A short horizontal passage that provides access to a tunnel.
Afterbay	A reservoir located immediately downstream from a powerhouse, sometimes used to re-regulate flows to the river or stream.
Akin Powerhouse	A unit of the El Dorado Project (FERC License No. 184) located on the SFAR upstream of the UARP's Camino Powerhouse
ALP	Alternative Licensing Process as defined by FERC regulations
AMSL	Above mean sea level
AnaBat™	An electronic instrument used to detect and record high frequency vocalization of bats, manufactured by Titley Electronics
APE	Area of Potential Effect as pertaining to Section 106 of the National Historic Preservation Act
APLIC	Avian Powerline Interaction Committee
AR	American River
Automatic/Semi-Automatic/Manual Powerhouses	An automatic powerhouse is one that can be started, stopped, and have its frequency and voltage changed from a remote or master station, via supervisory control. A semiautomatic powerhouse may allow a remote station to change frequency or voltage, and may allow a remote shutdown, but must be started manually. A manual powerhouse can only be controlled onsite
B	
BA	Biological Assessment
Base-load generation	Generation that is not load following, but rather meets the demand for "blocks" of power needs.
Basin Plan	The RWQCB Water Quality Control Plan for the Sacramento and San Joaquin rivers.
BLM	Bureau of Land Management
BLMS	BLM sensitive species
BMP	Best Management Practice
BO	Biological Opinion, as issued by the USFWS
BP	Before Present
BRM	Bedrock Mortar
Brush Creek Dam	A double curvature concrete arch dam that impounds natural flows on Brush Creek to form Brush Creek Reservoir.
Brush Creek Dam Reach	The 2.2-mile-long section of Brush Creek from Brush Creek Dam to the normal high water elevation of Slab Creek Reservoir.
Brush Creek Intake Structure	A reinforced concrete structure submerged in Brush Creek Reservoir that directs releases into the Brush Creek Tunnel.
Brush Creek Reservoir	Reservoir located on Brush Creek with an approximate capacity of 1,530 ac-ft. Releases water through the Brush Creek Tunnel to the Camino Tunnel and Penstock.
Brush Creek Tunnel	A 0.8-mile-long tunnel that conveys water from the Brush Creek Intake Structure to the Camino Tunnel.
Buck Island Dam	A concrete gravity dam that impounds water from Buck Island Creek to form Buck Island Reservoir.

TERM	DEFINITION
Buck Island Dam Reach	The 3.0-mile-long section of Little Rubicon River from Buck Island Dam to the confluence with Rubicon River.
Buck Island Reservoir	A reservoir located on Buck Island Creek impounded by Buck Island Dam with an approximate capacity of 1,070 ac-ft. Diverts water into Loon Lake Reservoir, located on Gerle Creek, via the Buck Island–Loon Lake Tunnel.
Buck–Loon Tunnel	A 1.6-mile-long unlined tunnel that conveys water from Buck Island Reservoir to Loon Lake Reservoir.
Bypass Flows	Flows released from a location (node) that does not pass through a powerhouse.
C	
C (°C)	Degrees in Celsius or Centigrade
Cal Veg	A USFS mapping of vegetated areas that are used for fire prevention and suppression and identification of general vegetative alliances
Camino Dam	A double curvature concrete arch dam that impounds natural flows on Silver Creek plus water released from Jaybird Powerhouse to form Camino Reservoir.
Camino Dam Reach	The 6.2-mile-long section of Silver Creek from Camino Dam to the confluence with the South Fork American River
Camino Intake Structure	A reinforced concrete structure submerged in Camino Reservoir and guarded by a trashrack. Directs releases into the Camino Tunnel.
Camino–Lake Transmission Line	A 230 kV overhead line connecting the Camino switchyard to SMUD’s Lake Substation.
Camino Penstock	A 0.3 mile-long above ground steel pipe that receives water from the Camino Tunnel for conveyance to the Camino Powerhouse.
Camino Powerhouse	An above-ground reinforced concrete powerhouse located on the north bank of the South Fork American River. Receives water via the Camino Tunnel and Penstock from both the Camino and Brush Creek reservoirs. Releases water to Slab Creek Reservoir via the South Fork American River. Camino Powerhouse has an installed capacity of 150 MW.
Camino Reach	The 0.7-mile-long section of the South Fork American River from Camino Powerhouse to the normal high water elevation of Slab Creek Reservoir
Camino Reservoir	Reservoir located on Silver Creek with an 825 ac-ft capacity that is the forebay for Camino Powerhouse. Receives flows from Silver Creek plus water released from Jaybird Powerhouse, which is located just upstream. Releases water into the Camino Tunnel and Penstock.
Camino Switchyard	Switchyard located on top of Camino Powerhouse. Includes main transformers, high voltage circuit breakers, motorized and manual disconnect switches, and steel lattice pull-off structures.
Camino Tunnel	A 5-mile-long tunnel that conveys water from the Camino Intake Structure to the Camino Penstock.
Camino–Lake Transmission Line	A 230 kV overhead line connecting the Camino-Switchyard to SMUD’s Lake substation.
Camino–Union Valley Transmission Line	A 230 kV overhead line connecting the Camino Switchyard with the Union Valley Switchyard. Also referred to as the Union Valley–Camino Transmission Line.
Camino–White Rock Transmission Line	A 230 kV overhead line connecting the Camino Switchyard with the White Rock Switchyard. Also referred to as the White Rock–Camino Transmission Line.
CDEC	California Data Exchange Center, a unit of the State of California, Department of Water Resources, a clearinghouse for hydrological and meteorological data

TERM	DEFINITION
CDFG	California Department of Fish and Game (generally known as DFG)
CDFS	California Department of Forestry sensitive species
CDPR	California Department of Parks and Recreation
CDWR	California Department of Water Resources (generally known as DWR)
CE	A species or subspecies listed as endangered under the California Endangered Species Act
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
efs	A measure of flow equivalent to one cubic foot per second.
CG	Campground
CH2M Hill	Consultant to SMUD
CHEOPS™	Computer Hydro-Electric Operations and Planning Software
Chili Bar Reach	See Reach Downstream of Chili Bar.
Chili Bar Project	A 7 MW hydroelectric project (FERC Project No. 2155), consisting of a dam, powerhouse and reservoir, owned and operated by Pacific Gas and Electric Company. It is located just downstream of the UARP White Rock Powerhouse on the South Fork American River.
CIP	Capital Improvement Project
cm	Centimeter
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CNPS-1A	Plants presumed to be extinct in California
CNPS-1B	Species considered by the CNPS as rare or endangered in California and elsewhere
CNPS-2	Species considered by the CNPS as rare or endangered in California but more common elsewhere
CNPS-3	Species that require more information before assigning to other lists; a review list
CNPS-4	Species considered by the CNPS as plants of limited distribution
Conduit	A pipe, flume or canal used for moving water from one point to another, usually used when there is no existing waterway.
Control Area	An electric system bounded by interconnection metering and telemetry, capable of controlling generation to maintain its interchange schedule with other control areas and contributing to frequency regulation of the interconnection.
CP	A species or subspecies listed as protected under the California Endangered Species Act
CR	A species or subspecies listed as rare under the California Endangered Species Act
CRC	Critical rule curve
CRLF	California red-legged frog
CRMP	Cultural Resource Management Plan
CRWQCB	California Regional Water Quality Control Board
CSC	California Department of Fish and Game species of concern
CSPM	A special protected mammal under the California Fish and Game Code
CT	A species or subspecies listed as threatened under the California Endangered Species Act
cu yd	Cubic yard
CWA	Federal Clean Water Act
CWHR	California Wildlife Habitat Relationships System

TERM	DEFINITION
D	
Dam Base Width	The width of the dam at its widest point of its foundation.
Dam Crest Elevation	The elevation of the lowest point along the crest.
Dam Crest Width	The width of the dam at the crest.
Dam Height	The height of the dam from the crest (see below) to the stream channel at the downstream toe.
Dam Low Level Outlet Control	The type of gate or valve that controls the release from the low level outlet.
Dam Max Low Level Outlet Capacity	The maximum flow that can be discharged through the low level outlet.
Dam Max Spillway Discharge	The maximum flow the spillway can pass with the water surface at the crest of the dam.
Dam Slope–Upstream Face	The slope of the upstream face of the dam.
Dam Slope–Downstream Face	The slope of the downstream face of the dam.
Dam Spillway Control	The type of device that controls the spillway. Most Project spillways are uncontrolled (no gates). Ice House and Union Valley dams have radial (tainter) gates and Robbs Peak and Camino reservoirs have vertical lift gates.
Dam Spillway Crest Elevation	The elevation of the lowest point of the spillway.
Dam Spillway Type	The type of spillway. All Project spillways except for Camino are ogee overflow. Camino Dam has a submerged orifice type spillway.
Dam Type	A description of the type of dam, such as concrete gravity, rockfill with center core, earthfill and double curvature arch.
DDT	Dichlorodiphenyltrichloroethane. A chemical pesticide (no longer in regulated use in the U.S.) known to cause reproductive failure in various species of birds.
DE&S	Duke Engineering & Services, Inc., the predecessor consulting company to Framatome ANP and then Devine Tarbell and Associates (DTA), Inc.
Decommission	Demolition, dismantling, removal, obliteration and/or disposal of a deteriorated or otherwise unneeded asset or component, including necessary cleanup work.
DEIS	Draft Environmental Impact Statement
Development	A major unit of the UARP, consisting of powerhouses, dams, tunnels, and transmission facilities.
Devine Tarbell & Associates, Inc.	The prime consultant to SMUD for relicensing of the UARP. Also listed under DTA.
Discharge	A release of water; flow
Dispatch	A portion of CHEOPS™ that determines, given performance data for a specific plant, the most efficient way to divide flow among a plant's units.
Distribution System	The substations, transformers and lines that convey electricity from high-power transmission lines to consumers.
District	Sacramento Municipal Utility District. See also SMUD.
DO	Dissolved oxygen, a measure of water quality
DHS	Department of Health Services
Draft EA	Draft Environmental Assessment
DSOD	California Department of Water Resources, Division of Safety of Dams
DTA	Devine Tarbell & Associates, Inc.
E	
<i>E. coli</i>	<i>Escherichia coli</i> ; a bacteria which is found in digestive tracts of warm-blooded animals
EA	Environmental Assessment
EAP	Environmental (Resource) Awareness Program

TERM	DEFINITION
EDAW	EDAW, Inc., consultant to SMUD
EDC	El Dorado County
EDCFD	El Dorado County Fire District
EDCWA	El Dorado County Water Agency
EID	El Dorado Irrigation District
EIS	Environmental Impact Statement
El Dorado Project	A 21 MW El Dorado Hydroelectric project, located upstream of SMUD's Camino Powerhouse, owned by El Dorado Irrigation District (FERC No. 184).
ENF	Eldorado National Forest, a forest district within the US Forest Service
ESA	Federal Endangered Species Act
F	
F (°F)	Degrees in Fahrenheit
FARM	Framework for Archaeological Research and Management of Forests of the North Central Sierra Nevada, a cultural resource methodology.
FC	Federal candidate for listing under the Endangered Species Act
FE	A species or subspecies listed as endangered under the Federal Endangered Species Act
FESA	Federal Endangered Species Act
FERC	Federal Energy Regulatory Commission
FERC Project Boundary	The boundary surrounding the UARP as delineated in Exhibit G (formerly Exhibit L) of the FERC license.
Forebay	A reservoir upstream from a powerhouse, from which water is drawn into a tunnel or penstock for delivery to the powerhouse
FP	A species or subspecies designated as "fully protected" under the CDFG Code
FPA	Federal Power Act
Fps	Feet per second
FSC	Federal Species of Concern. An administrative designation by USFWS (former category 2 species)
FSS	A species or subspecies designated as "sensitive" by the USFS.
FT	A species or subspecies listed as threatened under the Federal Endangered Species Act.
FYLF	Foothill yellow-legged frog
G	
Generator	A device that converts rotating mechanical energy into electrical potential.
Gerle Canal	A 1.9-mile-long open lined canal that conveys water from Gerle Creek Reservoir into Robbs Peak Reservoir. In normal operation, all flows entering Gerle Creek Reservoir are diverted into the Gerle Creek Canal, except for streamflow release requirements at Gerle Creek Dam.
Gerle Creek Dam	A concrete gravity dam that impounds water from the Loon Lake tailrace tunnel and Gerle Creek to form Gerle Creek Reservoir.
Gerle Creek Dam Reach	The 1.2-mile-long section of Gerle Creek from Gerle Creek Dam to the confluence with the South Fork Rubicon River.
Gerle Creek Reservoir	A 1,260 ac-ft reservoir that receives natural flows from Gerle Creek plus flows from Loon Lake Powerhouse via the Loon Lake Tailrace Tunnel. Water is released from Gerle Creek Reservoir into the Gerle Canal for conveyance to Robbs Peak Reservoir.
GIS	Geographic Information System
GPS	Global Positioning System

TERM	DEFINITION
Gross Head	For a reaction turbine, the difference between the headwater elevation and the tailwater elevation. Gross head includes head loss.
GWh	Gigawatt hour (equals one million kilowatt hours), a unit of energy
H	
“H”-frame structure	A wood pole transmission structure that consists of two wood poles with a horizontal cross arm above the conductor.
HPMP	Historic Properties Management Plan
Hz	Hertz (cycles per second)
I	
Ice House Dam	A rockfill with central core dam that receives flows from the South Fork of Silver Creek to form Ice House Reservoir, which also includes two earthfill dikes.
Ice House Dam Reach	The 11.5-mile-long section of the South Fork Silver Creek from Ice House Dam to the normal high water elevation of Junction Reservoir.
Ice House Intake Structure	Also known as the Jones Fork Intake Structure. A reinforced concrete structure submerged in Ice House Reservoir and guarded by trashracks. The intake structure directs releases into Jones Fork Tunnel.
Ice House Reservoir	Reservoir located on the South Fork of Silver Creek with an approximate capacity of 45,960 ac-ft.
Ice House Tunnel	Also known as the Jones Fork Tunnel. Diverts water from Ice House Reservoir to Jones Fork Powerhouse where it is discharged into Union Valley Reservoir.
IHA	Indicators of Hydrologic Alteration
IIP	Initial Information Package
Immediate Vicinity	The area extending to about one mile out from project features
IMPLAN	An economic model developed by the USFS
Impulse turbine	A hydraulic machine wherein a free jet of water impinges on a revolving element, which transforms kinetic energy to shaft energy
Inflow	Water entering a node such as a reservoir
Interchange	Electric energy that flows from one entity to another.
Iowa Hill Dike	A proposed dike on top of Iowa Hill, which is located upland and south of Slab Creek Reservoir. The dike will form Iowa Hill Reservoir, the upper reservoir for the Iowa Hill Development.
Iowa Hill Powerhouse	A proposed 400 MW underground powerhouse that would connect the existing Slab Creek Reservoir and proposed Iowa Hill Reservoir. The powerhouse would contain three equally sized, reversible pumping-generating units.
Iowa Hill Reservoir	A proposed 6,400 ac-ft, 72 surface acres, off-stream reservoir that receives water pumped from Slab Creek Reservoir through the Iowa Hill Powerhouse, and releases the water through the powerhouse to generate electricity. The normal maximum water surface elevation of the reservoir would be 3,073 feet.
Iowa Hill Switchyard	A proposed switchyard for the proposed Iowa Hill Powerhouse. The switchyard would be located on top of Iowa Hill near Iowa Hill Reservoir.
Iowa Hill Transmission Line	A proposed new 2-mile-long, 230-kV transmission line that would connect the Iowa Hill Substation with the existing Camino–White Rock transmission line.
Iowa Hill–Slab Creek Tunnel	A proposed tunnel that would connect the existing Slab Creek Reservoir and proposed Iowa Hill Reservoir. Water would flow through the tunnel to the proposed Iowa Hill Powerhouse.

TERM	DEFINITION
J	
Jaybird–Union Valley Transmission Line	A 230 kV overhead line connecting the Jaybird Switchyard with the Union Valley Switchyard. Also referred to as the Union Valley–Jaybird Transmission Line.
Jaybird–White Rock Transmission Line	A 230 kV overhead line connecting the Jaybird Switchyard with the White Rock Switchyard. Also referred to as the White Rock–Jaybird Transmission Line.
Jaybird Intake	A reinforced concrete structure submerged in Junction Reservoir that conveys water to the Jaybird Tunnel.
Jaybird Penstock	A 0.5-mile-long steel pipe that conveys water from the Jaybird Tunnel to the Jaybird Powerhouse.
Jaybird Powerhouse	An above ground powerhouse with an installed capacity of 144 MW that receives water from Junction Dam via the Jaybird Tunnel and penstock and releases water into Camino Reservoir.
Jaybird Switchyard	Switchyard interconnected with the White Rock and Union Valley switchyards via 230 kV transmission lines. Yard contains main transformers, high voltage circuit breakers, motorized and manual disconnect switches, and pull-off structures.
Jaybird Tunnel	A 4.4-mile-long tunnel that conveys water from the Jaybird Intake Structure in Junction Reservoir to Jaybird Penstock.
Jones Fork–Union Valley Transmission Line	A 69 kV transmission line that connects Jones Fork Powerhouse to the Union Valley Switchyard. Also referred to as the Union Valley–Jones Fork Transmission Line.
Jones Fork Intake Structure	See Ice House Intake Structure.
Jones Fork Penstock	A 1.6-mile-long above ground steel pipe that conveys water from the outlet of the Jones Fork Tunnel to Jones Fork Powerhouse.
Jones Fork Powerhouse	An above ground powerhouse located on the southeast shore of Union Valley Reservoir with an installed capacity of 11.5 MW. Receives water from Ice House Reservoir via the Jones Fork (a.k.a. Ice House) Tunnel and Penstock.
Jones Fork Switchyard	Located on top of Jones Fork Powerhouse; contains a main transformer, high voltage circuit breaker, and manually operated disconnect switches.
Jones Fork Tunnel	A 0.3-mile-long tunnel also known as Ice House Tunnel. Diverts water from Ice House Reservoir to the Jones Fork Penstock for conveyance to Jones Fork Powerhouse where it is discharged into Union Valley Reservoir.
JPA	Joint powers authority
Junction Dam	A double curvature concrete arch dam on Silver Creek that includes water released from Union Valley Reservoir to form Junction Reservoir.
Junction Dam Reach	The 8.3-mile-long section of Silver Creek from Junction Dam to the normal high water elevation of Camino Reservoir.
Junction Reservoir	A 3,250 ac-ft. reservoir located on Silver Creek. Junction Reservoir is the forebay for Jaybird Powerhouse and an afterbay for Union Valley Powerhouse. Receives water released from Union Valley Reservoir through the Union Valley Powerhouse.
K	
k	kilo, 1,000
KEA	KEA Environmental, Inc.
kg	kilogram; 1,000 grams
Km	kilometer; 1000 meters
KOP	Key observation point
KV	kilovolt; 1,000 volts
KVP	Key view point

TERM	DEFINITION
KW	kilowatt: 1,000 watts
KWh	kilowatt-hour: 1,000 watt hours
L	
L	Liter
Lb.	Pound
LBG	Louis Berger Group, consultant to SMUD
LDC	Load duration curve
Level	Reservoir surface elevation
Level Fluctuation	The change in reservoir surface elevation
Level Fluctuation Limits	A constraint specifying the change between the maximum elevation and minimum elevation achieved each day
Level Fluctuation Rates	A constraint specifying the maximum allowable rate of elevation change for the reservoir
License Application	SMUD's application for a new license for the UARP.
License Term	The period for which a license is issued by FERC, usually between 30 and 50 years.
Licensee(s)	Holder of the federal license for a hydro project; Sacramento Municipal Utility District for the UARP and Pacific Gas and Electric Company, Inc. for the Chili Bar Project
Local Inflow	The incremental inflow between two nodes (also known as accretion flows)
Loon Lake–Robbs Peak Transmission Line	A 69 kV overhead line that connects Loon Lake Powerhouse to the Robbs Peak Switchyard. Also referred to as the Robbs Peak–Loon Lake Transmission Line.
Loon Lake–Union Valley Transmission Line	A 69 kV overhead line that connects Loon Lake Switchyard to the Union Valley Switchyard. Also referred to as the Union Valley–Loon Lake Transmission Line.
Loon Lake Access Building	A reinforced concrete structure located south of the Loon Lake Auxiliary Dam. The building contains the hoisting equipment for an inclined shaft cable car that is the primary access to the powerhouse, an emergency generator, fuel storage and communications equipment.
Loon Lake Dam	A rockfill with center core dam that impounds water from Gerle Creek and Buck Island Creek to form Loon Lake Reservoir. An auxiliary dam and earthfill dike are also present.
Loon Lake Dam Reach	The 8.5-mile-long section of Gerle Creek from Loon Lake Dam to the normal high water elevation of Gerle Reservoir
Loon Lake Intake Structure	A submerged reinforced concrete intake structure for the Loon Lake Powerhouse that includes a 250 ft long open cut channel leading to the intake structure as well as a trashrack and bulkhead slot gate.
Loon Lake Penstock	A 0.3-mile-long concrete and steel-lined tunnel that conveys water from Loon Lake Reservoir to Loon Lake Powerhouse.
Loon Lake Powerhouse	A powerhouse located approximately 1,100 ft below ground in an excavated chamber with an installed capacity of 82.0 MW that receives water from Loon Lake Reservoir and discharges to Gerle Creek Reservoir via the Loon Lake Tailrace Tunnel.
Loon Lake Reservoir	A 76,200 ac-ft reservoir located on Gerle Creek that receives water diverted from Buck Island Creek via Buck Island–Loon Lake Tunnel.
Loon Lake Switchyard	An above ground switchyard located adjacent to the Loon Lake Powerhouse access building that contains a main transformer and three 69 kV circuit breakers.
Loon Lake Tailrace Tunnel	A 3.8-mile-long tunnel that conveys water from Loon Lake Powerhouse to Gerle Reservoir. The tunnel is also used for vehicular access to Loon Lake

TERM	DEFINITION
	Powerhouse with access to the tunnel via an adit located near the downstream portal.
LOP	Limited operating period; a period of activity restrictions for USFS protected species
LORS	Laws, ordinances, regulations and standards
LOS	Level of service
LRMP	Land and Resource Management Plan
LTBMU	Lake Tahoe Basin Management Plan
LWD	Large woody debris
M	
µg	Microgram
µ	Micro, 10 ⁻⁶
µg/l	Micrograms per liter
µmho/cm	Micromhos per centimeter, a measurement of water conductivity
M	Mega, 10 ⁶
M	Meter
Maintenance	The scheduled removal of unit from service for repair or upgrade.
MCL	Maximum contamination level
MFAR	Middle Fork of the American River
mg	Milligram
mg/l	Milligrams per liter
mgC/m ²	Milligrams of carbon per square meter
mi.	Mile
mills/kWh	0.1¢ per kilowatt hour, equivalent to dollars per megawatt hour
Minimum Reservoir Elevation	The lowest allowable reservoir elevation, below which no release will be made.
MIS	USFS Management Indicator Species
Mm	Millimeters
MMOU	Master Memorandum of Understanding
MNBMC	Species designated by the USFWS as a Migratory Bird of Management Concern because of: (1) Documented or apparent population declines; (2) small or restricted populations; or (3) dependence on restricted or vulnerable habitats.
MOU	Memorandum of Understanding
MSL	Mean sea level
MTRL	Maximum Tissue Residue Levels, a state guideline for assessing metal concentrations in fish and other animal tissue
MVA	Megavolt-ampere
MW	Megawatt = 1,000 kW
MWh	Megawatt-hours = 1,000 kWh
MYLF	Mountain yellow-legged frog
N	
Natural Inflow	The inflow at a particular node that would have occurred if there was no upstream impairment in the system. This flow is equal to the sum of all upstream accretion inflows.
ND	Not detectable
NDT	Northrop, Devine & Tarbell, predecessor to DE&S
NEPA	National Environmental Policy Act
New License	A license issued for a project for which FERC has previously issued an initial license.

TERM	DEFINITION
NF	No flow; also north fork
NFAR	North Fork of the American River
NFMA	National Forest Management Act
NGVD-29	National Geodetic Vertical Datum of 1929, based on a definition of the size and shape of the earth. It is a datum for map projections and coordinates throughout North America.
NMFS	Department of Commerce, National Marine Fisheries Service, NOAA Fisheries
NOAA	National Oceanic and Atmospheric Administration
Node	The system representation descriptor in the water balance model representing a point of flow, storage, generation or decision.
NPS	National Parks Service
NRHP	National Register of Historic Places
NTU	Nephelometric turbidity unit
O	
O&M	Operation and Maintenance
OHV	Off-highway vehicle
Original License	The initial license for a hydropower project issued by the FERC
Overlapping Issues and Studies	Relicensing issues/studies between the UARP and Chili Bar Project. Overlapping issues/studies are related to: (a) quantity of flow into and out of Chili Bar Reservoir; (b) timing of flows into and out of Chili Bar Reservoir; and (c) operational coordination between White Rock Powerhouse and Chili Bar Powerhouse.
P	
PAC	Protected activity center
PAOT	People at one time
PCWA	Placer County Water Agency
PDEA	Preliminary Draft Environmental Assessment
Peaking	Operation of generating facilities to meet maximum instantaneous electrical demands
Penstock	An inclined pipe through which water flows from a forebay or tunnel to the powerhouse turbine.
Penstock Capacity	The maximum design flow in the penstock
Penstock Diameter	The nominal diameter of the penstock
Penstock Length	The length of the penstock from the tunnel (see above) or upstream inlet to the turbine shut off valve (TSV). For Union Valley, the length is measured from the beginning of the steel lining in the tunnel to the TSV.
Penstock Max. Penstock Velocity	The maximum velocity in the penstock at the "capacity" as defined above. This will occur at the smallest penstock diameter.
Penstock Type	A description of the type of pipe and whether the pipe is surface or buried.
PG&E Company	Pacific Gas and Electric Company, regulated utility subsidiary of PG&E Corporation
PH	Powerhouse
pH	The measure of the acidity or alkalinity of a substance or liquid
PH Maximum Capability	Maximum megawatt output generated by the specific powerhouse. For powerhouses with two units, this value is the maximum simultaneous total output generated.
PHABSIM	Physical Habitat Simulation Models
PM&E	Protection, mitigation and enhancement measure
Powerhouse	Maximum megawatt output generated by the specific powerhouse. For

TERM	DEFINITION
Maximum Capability	powerhouses with 2 units, this value is the maximum simultaneous total output generated.
Ppb	Parts per billion
Ppm	Parts per million
Project Area	Area within the FERC project boundary
Project Region	An area on the order of county or national forest size
Project Vicinity	The geographic area that includes the Proposed Action and reasonable alternatives.
Proposed Action	SMUD's Upper American River Project including the seven existing developments and the proposed Iowa Hill Development.
Psi	Pounds per square inch
PSR	Pacific Southwest Region of USFS
PURPA	Public Utilities Regulatory Policies Act
PV	Photovoltaic; energy that is generated directly from the sun
Q R	
Ramping	The act of increasing or decreasing stream flows from a powerhouse, dam or diversion structure
Ramping Rates	Constraints on the rate at which a plant's discharge can change
Reach	A stretch of stream between readily identifiable endpoints (such as structures or stream confluence)
Reach Downstream of Chili Bar	The 19.1-mile-long section of the South Fork American River from Chili Bar Dam to the normal high water elevation of Folsom Reservoir. This reach is influenced by the UARP and Chili Bar Project.
Relicensing	The process of acquiring a new license for a project that has an existing license from FERC
Reservoir	The water retained by a dam. Also referred to as headwater, storage or forebay.
Reservoir Drainage Area	The extent of the watershed that drains into a reservoir.
Reservoir Maximum Storage Capacity	The gross volume of water that can be stored in the reservoir between its deepest point and its dam spillway
Reservoir NMWS Elevation (ft)	Normal Maximum Water Surface—the elevation of the lowest spill crest if uncontrolled, the top of the gates for gates at the top of the dam, or the maximum design water surface for submerged gates (Camino Dam).
Reservoir Storage Curve	A reservoir's contents (acre-ft) at various surface elevations.
Reservoir Surface Area (acres)	The surface area of the reservoir at the normal maximum water surface
Reservoir Useable Capacity	The volume of water that can be stored for productive use, between the low-level outlet and the dam spillway
Riparian	Relating to the bank of a natural course of water
Riparian Vegetation	The vegetation immediately adjacent to a body of water. Typically a structurally diverse community consisting of herbaceous shrub, and woody components.
RM	River mile as measured upstream along the river course
Robbs Peak–Union Valley Transmission Line	A 69 kV overhead line that connects Robbs Peak Switchyard to the Union Valley Switchyard. Also referred to as the Union Valley–Robbs Peak Transmission Line.
Robbs Peak Dam	A concrete gravity dam that impounds natural flows from the South Fork Rubicon River plus water received from the Gerle Canal to form Robbs Peak Reservoir. In normal operation, the dam diverts all flows into the Robbs Peak Tunnel, except for minimum flow release requirements at the dam. Part of the UARP.
Robbs Peak Dam Reach	The South Fork Rubicon River downstream of Robbs Peak Dam

TERM	DEFINITION
Robbs Peak Intake	A reinforced concrete structure in Robbs Peak Reservoir that directs water into Robbs Peak Tunnel. Equipped with a trashrack.
Robbs Peak–Loon Lake Transmission Line	A 69 kV overhead line that connects Loon Lake Switchyard to the Robbs Peak Switchyard. Also referred to as the Loon Lake–Robbs Peak Transmission Line.
Robbs Peak Penstock	A 0.4-mile-long steel penstock that conveys water from the outlet of the Robbs Peak Tunnel to Robbs Peak Powerhouse.
Robbs Peak Powerhouse	A 29.0 MW above ground powerhouse located on the northeast shore of Union Valley Reservoir. The powerhouse receives water from the Robbs Peak Tunnel and the Robbs Peak Penstock and discharges this water into Union Valley Reservoir.
Robbs Peak Reservoir	A small regulating reservoir with a storage capacity of 30 ac-ft that receives natural flows from the South Fork Rubicon River plus water from Gerle Creek Reservoir via the Gerle Canal.
Robbs Peak Switchyard	Located adjacent to the Robbs Peak Powerhouse and includes a main transformer, high voltage circuit breakers, and manually operated disconnect switches.
Robbs Peak Tunnel	A 3.2-mile-long tunnel that conveys water released into Robbs Peak Reservoir to the Robbs Peak Penstock. In normal operation, Robbs Peak Dam diverts all flows into the tunnel, except for flow release requirements at the dam.
Rockbound Dam Reach	The 0.3-mile-long section of Rockbound Creek from Rockbound Dam to the normal high water elevation of Buck Island Reservoir.
Rockbound Lake	A non-project lake that receives water from the Rockbound Tunnel and conveys water to Buck Island Reservoir.
Rockbound Tunnel	A 0.2-mile-long unlined tunnel that conveys water from Rubicon Reservoir and Dam into Rockbound Lake
ROS	Recreation Opportunity Spectrum
Rpm	Revolutions per minute
Rubicon Dam	A concrete gravity diversion dam in the upper reaches of the Rubicon River that forms Rubicon Reservoir and serves to divert water through the Rockbound Tunnel into Rockbound Lake
Rubicon Dam Reach	The Rubicon River downstream of Rubicon Dam
Rubicon Reservoir	Reservoir located in the headwaters of the Rubicon River with capability to impound 1,450 ac-ft.
Run-of-the-River	A hydro project that uses the flow of a stream with little or no reservoir capacity for storing water.
RWQCB	California Central Valley Regional Water Quality Control Board
S	
Scenario	A collection of settings that constitutes a CHEOPS™ operation model run.
Secchi disk	A method of measuring water clarity in a reservoir using a disk divided into black and white quarters.
Section 106	Refers to section 106 of the National Historic Preservation Act
Section 401	A section of the Clean Water Act that requires each state to certify that water quality resulting from a project meets specific standards.
Setting	A collection of conditions that form the building blocks of a scenario. A setting is made up of conditions.
SD1	Scoping Document 1
SD2	Scoping Document 2
SFAR	South Fork American River
SFAR Reach	The 2.6-mile-long section of the South Fork American River from the

TERM	DEFINITION
	confluence with Silver Creek to Camino Powerhouse
SFRR	South Fork Rubicon River
SFSC	South Fork Silver Creek
SHPO	California Department of Parks and Recreation, Office of Historic Preservation, State Historic Preservation Officer
Site Development Plan for Recreation Facilities	A site development plan depicts the logical and progressive establishment or replacement of buildings, pedestrian and vehicular circulation ways, and utilities needed for effective use of the site. Physical conditions, opportunities, needs, zoning and management objectives shape the site development plan.
Slab Creek Dam	A double curvature arch dam that impounds natural flows on the South Fork American River plus water released from the Camino Powerhouse to form Slab Creek Reservoir.
Slab Creek Dam Reach	The 8.0-mile-long section of the South Fork American River from Slab Creek Dam/Powerhouse to White Rock Powerhouse
Slab Creek Penstock	A 40 ft steel pipe through Slab Creek Dam that conveys water from Slab Creek Reservoir to Slab Creek Powerhouse.
Slab Creek Powerhouse	A reinforced concrete structure built on the downstream face of Slab Creek Dam. Utilizes releases from Slab Creek Dam through the Slab Creek Penstock.
Slab Creek Reservoir	A 16,600 ac-ft storage facility located on the South Fork American River. Receives water released from the Camino Powerhouse and releases water through the White Rock Tunnel and Penstock to White Rock Powerhouse and to the Slab Creek Powerhouse via instream releases from Slab Creek Dam.
Slab Creek Switchyard	Located on top of the White Rock Tunnel Valve House; consists of a 500 KVA, 12 kV-480 kV transformer located near the generator in the dam structure.
Slab Creek Transmission Line	A 12 kV overhead circuit owned by PG&E that connects Slab Creek generator output to the PG&E system.
SMUD	Sacramento Municipal Utility District
SNTEMP	USFWS Stream Temperature Model
Special Status Species	Species or subspecies listed under the FESA or CESA as endangered or threatened, or by a Federal or State agency as a species of special concern, sensitive species, fully protected species or management indicator species.
SPI	Sierra Pacific Industries, a private timber company with extensive land holdings in the UARP area and operator of a mill in Camino, California
Spill	To release water over a spillway; water which passes over a spillway
Spillway	A passage for releasing water from a reservoir
sq. ft.	square foot
sq. mi.	square mile
State	State of California
Station power	Energy provided to operate the generating facility's auxiliary equipment
Stillwater Sciences, Inc.	A consultant to SMUD
Study Area	The geographic area covered by a specific study
Surge Chamber	A structure, similar to a holding tank, located above a tunnel or penstock used to attenuate a sudden change in water pressure.
SWRCB	California State Water Resources Control Board
T	
Tailrace	Channel through which water is discharged from the turbine.
TDS	Total dissolved solids; a water quality determinant
TMDL	Total maximum daily load; a water quality determinant

TERM	DEFINITION
TSS	Total suspended solids
Tunnel Capacity	The maximum design flow in the tunnel
Tunnel Diameter	The nominal design size of the tunnel
Tunnel Length	The length of the tunnel from the upstream portal to the downstream portal
Tunnel Lining	The composition of the internal walls of a water conveyance tunnel, such as concrete or gunite.
Tunnel Maximum Velocity	The maximum velocity of water in the tunnel at its flow capacity and nominal diameter
Turbine	A machine in which the kinetic energy and pressure in flowing water is converted to mechanical energy by the impulse of interaction of the water with buckets or blades.
TWG	Technical Work Group
U	
UARP	Upper American River Project, a 688 MW project (FERC Project No. 2101), owned and operated by SMUD
Union Valley–Camino Transmission Line	A 230 kV overhead line connecting Union Valley Switchyard with the Camino Switchyard. Also referred to as the Camino–Union Valley Transmission Line.
Union Valley–Jaybird Transmission Line	A 230 kV overhead line connecting Union Valley Switchyard with the Jaybird Switchyard. Also referred to as the Jaybird–Union Valley Transmission Line.
Union Valley–Jones Fork Transmission Line	A 69 kV overhead line that connects Union Valley Powerhouse to the Jones Fork Switchyard. Also referred to as the Jones Fork–Union Valley Transmission Line.
Union Valley–Loon Lake Transmission Line	A 69 kV overhead line that connects Loon Lake Switchyard to the Union Valley Switchyard. Also referred to as the Loon Lake–Union Valley Transmission Line.
Union Valley–Robbs Peak Transmission Line	A 69 kV overhead line that connects Robbs Peak Powerhouse to the Union Valley Switchyard. Also referred to as the Robbs Peak–Union Valley Transmission Line.
Union Valley Dam	A zoned earthfill dam that impounds water from 82 square miles of watershed, plus releases from Robbs Peak and Jones Fork powerhouses, to form Union Valley Reservoir.
Union Valley Intake	A reinforced concrete structure submerged in Union Valley Reservoir. Intake is guarded by trashracks.
Union Valley Penstock	A 0.3-mile-long steel penstock that conveys water from the outlet of the Union Valley Tunnel to the Union Valley Powerhouse.
Union Valley Powerhouse	An above ground facility located at the toe of Union Valley Dam with a maximum capability of 46.7 MW. Water is received from Union Valley Reservoir via the Union Valley Tunnel and Penstock and discharged into Junction Reservoir.
Union Valley Reservoir	A large reservoir located on Silver Creek with a capacity of about 277,290 ac-ft.
Union Valley Switchyard	Divided into a 69 kV yard and a 230 kV yard. Contains main transformers, high voltage circuit breakers, motor-operated and manual disconnect switches, lattice structures for transmission line take-offs, 69 kV transmission lines connecting to Loon Lake, Robbs Peak and Jones Fork powerhouses, and 230 kV lines connecting to Jaybird and Camino powerhouses.
Union Valley Tunnel	A 268 ft concrete-lined and tunnel that conveys water from Union Valley Reservoir Intake Structure to the Union Valley Penstock.
Unit	A term referring to the combined turbine-generator machine

TERM	DEFINITION
US	United States
USACE	U.S. Army Corps of Engineers
USBC	U.S. bird conservation watch list
USBLM	U.S. Bureau of Land Management
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Department of Interior, Fish and Wildlife Service
USGS	U.S. Department of Interior, Geological Survey
UVR	Union Valley Reservoir
V	
V	Volts
VELB	Valley elderberry longhorn beetle
VQO	Visual Quality Objectives, a USFS visual classification system
W	
W	Watt, a unit of energy rate (real power)
WECC	Western Energy Coordinating Council
White Rock–Camino Transmission Line	A 230 kV overhead line connecting the White Rock and Camino Switchyards. Also referred to as the Camino–White Rock Transmission Line.
White Rock–Hedge Transmission Line	A 230 kV line feeding power from the White Rock Powerhouse to the Hedge Substation.
White Rock–Jaybird Transmission Line	A 230 kV overhead line connecting the Jaybird Switchyard with the White Rock Switchyard. Also referred to as the Jaybird–White Rock Transmission Line.
White Rock–Orangevale Transmission Line	A 230 kV line feeding power from the White Rock Powerhouse to the Orangevale Substation.
White Rock Intake Structure	A submerged, reinforced concrete structure located in Slab Creek Reservoir and protected by a trashrack. Intake directs flows into the White Rock Tunnel.
White Rock Penstock	A 0.3-mile-long above ground steel pipe that conveys water from the White Rock Tunnel to the White Rock Powerhouse.
White Rock Powerhouse	An above ground reinforced concrete facility located on the south bank of the South Fork American River with a total maximum capability of 224.0 MW. Receives water from Slab Creek Reservoir via the White Rock Tunnel and Penstock.
White Rock Switchyard	Located in a separate yard adjacent to White Rock Powerhouse. Includes two main transformers, circuit breakers, motorized and manual disconnect switches and steel lattice take-off structures.
White Rock Tunnel	A 4.9-mile-long tunnel that diverts water released from Slab Creek Reservoir on the South Fork American River to White Rock Penstock.
WHR	California Wildlife Habitat Relationships Database
WPT	Western pond turtle
WUA	Weighted Usable Area
X Y Z	
YOY	Young of Year, an age class of fish

TERM	DEFINITION
OTHER	
401 Certification	Water quality certification that is issued by the state agency responsible for administering Section 401 of the Clean Water Act.