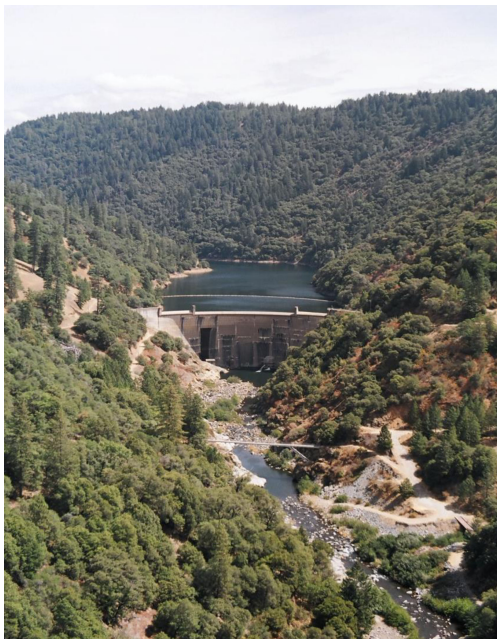
Hydropower Project Summary

UPPER AMERICAN RIVER, CALIFORNIA

UPPER AMERICAN RIVER HYDROELECTRIC PROJECT (P-2101)



South Fork of the American River Canyon

Slab Creek Dam

Photo Credit: Sacramento Municipal Utility District

This summary was produced by the

Hydropower Reform Coalition

and

River Management Society

UPPER AMERICAN RIVER, CA

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DESCRIPTION:
The Upper American River Project consists of seven developments located on the Rubicon River, Silver Creek, and South Fork American River in El Dorado and Sacramento Counties in central California. These seven developments occupy 6,190 acres of federal land within the Eldorado National Forest and 54 acres of federal land administered by the Bureau of Land Management (BLM). The proposed The Iowa Hill Development will be located in El Dorado County and will occupy 185 acres of federal land within the Eldorado National Forest. Due to the proximity of the Chili Bar Hydroelectric Project (FERC No. 2155) under licensee Pacific Gas & Electric Company(PG&E) located immediately downstream of the Upper American Project on the South Fork American River (and also under-going re-licensing), both projects were the subject of a collaborative proceeding and settlement negotiations.

The current seven developments include Loon Lake, Robbs Peak, Jones Fork, Union Valley, Jaybird, Camino, and Slab Creek/White Rock. White Rock Powerhouse discharges into the South Fork American River just upstream of Chili Bar Reservoir. In addition to generation-related facilities, the project also includes 47 recreation areas that include campgrounds, day use facilities, boat launches, trails, and a scenic overlook.

The 19 signatories to the Settlement are: American Whitewater, American River Recreation Association, BLM, California Parks and Recreation, California Fish and Wildlife, California Outdoors, California Sportfishing Protection Alliance, Camp Lotus, Foothill Conservancy, Forest Service, Friends of the River, FWS, Interior, U.S. National Park Service, PG&E, Rich Platt, Hilde Schweitzer, Theresa Simsiman, and SMUD.

A. SUMMARY

1. License application filed: July 7, 2005
2. License Issued: July 23, 2014
3. License expiration: July 23, 2064
4. Waterways: Rubicon River, Silver Creek, and South Fork American River
5. Capacity: Total capacity of 1,037.3 megawatts (MW) based on 637.3 MW for the existing capacity plus a proposed capacity for the Iowa Hill Development of 400 MW
6. Licensee: Sacramento Municipal Utility District (SMUD)
7. Licensee address: Sacramento Municipal Utility District
   P.O. Box 15830
   Sacramento, CA 95852-1830
8. Counties: Eldorado and Sacramento

9. Project Area: The Upper American Project is located on the Rubicon River, Silver Creek, and South Fork American River. The project uses water from both the South Fork American and Rubicon River watersheds, which drain the western slope of the Sierra Nevada Mountains. The project developments span more than 81 river miles and have an elevation change of about 6,000 feet msl from the uppermost Rubicon reservoir to the downstream reach of the Slab Creek/White Rock development:
    a. From its headwaters, the Rubicon River flows generally north for about 8 miles to the project's Rubicon reservoir, then northwest about 4.8 miles to the mouth of the Little Rubicon River, and about 5 miles further to Placer County Water Agency's Hell Hole reservoir, part of the Middle Fork American River Project (FERC Project No. 2079). \
    b. Silver Creek originates at the confluence of Tells Creek, Big Silver Creek and Jones Fork Silver Creek at the project's Union Valley reservoir. From there, Silver Creek flows southwesterly to its terminus at the South Fork American River, a distance of 14.6 miles.
    c. The South Fork American River headwaters originate above Echo Summit at an elevation of over 9,000 mean sea level (msl) feet in the Crystal Range. The river then flows generally westerly to its terminus at the American River at the Bureau of Reclamation's Folsom Lake, a distance of approximately 75 miles.

    The current project boundary encloses a total of 9,432 acres; 5,904 acres of which are federal land, and 130 acres being privately owned. All of the project's generation-related features, including linear corridors ranging from 50 to 100 feet for the transmission lines and tunnels at each development, are within the project boundary.

    However, several project access roads are not entirely located within the existing boundary. These include access roads at Wolf Creek, Northern Ice House, Jones Fork, and Northern Union Valley. Six campgrounds, including Gerle Creek, Pleasant, Deer Crossing, Loon Lake Equestrian, Jones Fork, and Big Silver are also only partially within the existing project boundary.

10. Project Facilities: The project works consisting of eight developments: Loon Lake, Robbs Peak, Jones Fork, Union Valley, Jaybird, Camino, Slab Creek/White Rock, and Iowa Hill [See **Figure 1**].
    a. Loon Lake development includes:
        - Rubicon Dam, located on the Rubicon River, creating the 108-acre Rubicon reservoir with a storage capacity of 1,450 acre-feet;
        - Rubicon-Rockbound tunnel which diverts water from Rubicon reservoir to Buck Island reservoir via Rockbound Lake (a non-project facility) located on Highland Creek;

- Buck Island Dam, located on the Little Rubicon River creating 78-acre Buck Island reservoir with a storage capacity of 1,070 acre-feet;
- Buck Island-Loon Lake tunnel, which diverts water from Buck Island reservoir to Loon Lake reservoir;
- Loon Lake Dam, located on Gerle Creek that creates the 1,450-acre Loon Lake reservoir with a storage capacity of 76,200 acre-feet;
- Loon Lake penstock which extends from Loon Lake reservoir to Loon Lake powerhouse;
- Loon Lake powerhouse, an underground powerhouse located over 1,100 feet below the surface of the Loon Lake reservoir which consists of one generating unit with an authorized installed capacity of 70,479 kW;
- Loon Lake tailrace tunnel which runs from Loon Lake powerhouse and discharges into Gerle Creek reservoir; and
- Two 69-kV overhead transmission lines: one (Loon Lake-Robbs Peak) extends 7.9 miles to the Robbs Peak switchyard, and the other (Loon Lake-Union Valley) extends 12.4 miles to the Union Valley switchyard.

b. The Robbs Peak development includes:
   - Gerle Creek Dam, located on Gerle Creek upstream of its confluence with the South Fork Rubicon River. This structure creates the 60-acre Gerle Creek reservoir with a storage capacity of 1,260 acre-feet and incorporates the intake of Gerle Creek canal in its left abutment;
   - Gerle Creek canal, an above-ground canal, extends 1.9 miles from Gerle Creek reservoir to Robbs Peak reservoir;
   - Robbs Peak Dam, located on the South Fork Rubicon River upstream of its confluence with Gerle Creek, creating the 2-acre Robbs Peak reservoir with a storage capacity of 30 acre-feet;
   - Robbs Peak tunnel, which extends from Robbs Peak reservoir to Robbs Peak penstock;
   - Robbs Peak penstock from Robbs Peak tunnel to Robbs Peak powerhouse;
   - Robbs Peak powerhouse, located on the northeast shore of Union Valley reservoir, equipped with one generating unit with an authorized installed capacity of 28,125 kW; and
   - Robbs Peak-Union Valley Transmission Line, a 69-kV, 6.8-mile-long overhead line which connects the Robbs Peak switchyard to the Union Valley switchyard.

c. The Jones Fork development includes:
   - Ice House Dam, located on the South Fork Silver Creek, 150-feet- high and 0.3-mile-long, creating the 678-acre Ice House reservoir with a storage capacity of 45,960 acre-feet;
   - Jones Fork tunnel from Ice House reservoir to the Jones Fork penstock;
   - Jones Fork penstock from Jones Fork tunnel to the Jones Fork powerhouse;
   - Jones Fork powerhouse, located on the southeast shore of Union Valley reservoir, with one generating unit with an authorized installed capacity of 10,400 kW; and
   - Jones Fork-Union Valley Transmission Line, a 69-kV, 4.0-mile-long overhead transmission line from the Jones Fork switchyard to the Union Valley switchyard.

d. The Union Valley development includes:
   - Union Valley Dam, located on Silver Creek, creating the 2,860-acre Union Valley reservoir with a storage capacity of 277,290 acre-feet;
   - Union Valley tunnel which connects Union Valley reservoir with Union Valley powerhouse;
   - Union Valley penstock which conveys water from the outlet of the Union Valley tunnel to the Union Valley powerhouse;
   - Union Valley powerhouse, equipped with one generating unit with an authorized installed capacity of 40,074 kW; and
   - Two 230-kV overhead transmission lines: one (Union Valley-Camino) extending 11.8 miles to the Camino switchyard, and the other (Union Valley-Jaybird) extending 5.9 miles to the Jaybird switchyard.

e. The Jaybird development includes:
   - Junction Dam, located on Silver Creek that creates the 64-acre Junction reservoir with a storage capacity of 3,250 acre-feet;
   - Jaybird tunnel which connects Junction reservoir and the Jaybird penstock;
   - Jaybird penstock connecting Jaybird tunnel and Jaybird powerhouse;
   - Jaybird powerhouse, equipped with two Pelton turbines, one with an authorized installed capacity of 55,871 kW and the other 56,841 kW; and
   - Jaybird-White Rock Transmission Line, a 230-kV, 15.9-mile-long overhead transmission line connecting the Jaybird and White Rock switchyards.

f. The Camino development includes:
- Camino Dam, located on Silver Creek which creates the 20-acre Camino reservoir with a storage capacity of 825 acre-feet;
- Camino tunnel which connects Camino reservoir with the Camino penstock;
- Brush Creek Dam, located on Brush Creek, that creates the 20-acre Brush Creek reservoir with a storage capacity of 1,530 acre-feet;
- Brush Creek tunnel which from Brush Creek reservoir to the lower end of Camino tunnel;
- Camino penstock that connects toCamino tunnel to Camino powerhouse;
- Camino powerhouse, located on the South Fork American River and equipped with two generating units, one with an authorized installed capacity of 73,760 kW and the other with an authorized installed capacity of 70,769 kW; and
- Two 230-kV overhead transmission lines originate at the Camino switchyard, one (Camino-Lake) extends 31.7 miles to the licensee's Lake Substation and the other (Camino-White Rock) extends 10.0 miles to the White Rock switchyard.

g. The Slab Creek/White Rock development includes:
- Slab Creek Dam, located on the South Fork American River that creates the 280-acre Slab Creek reservoir with a storage capacity of 16,600 acre-feet;
- Slab Creek penstock that connects Slab Creek reservoir with Slab Creek powerhouse;
- Slab Creek powerhouse, which is located at the base of Slab Creek Dam and uses minimum flow releases, has one generating unit with an authorized installed capacity of 450 kW;
- White Rock tunnel which connects Slab Creek reservoir with White Rock penstock;
- White Rock penstock that connects White Rock Tunnel to White Rock powerhouse;
- White Rock powerhouse, which is equipped with two generating units, one with an authorized installed capacity of 97,664 kW and the other at 132,824 kW; and
- Two 230-kV overhead transmission lines and one 12 kV distribution line. The two transmission lines, both 21.8 miles long, connect the White Rock switchyard to the licensee's Folsom Junction. The 12-kV, 600-foot-long Slab Creek tap line connects the Slab Creek powerhouse to the junction with Pacific Gas and Electric Company's 12-kV distribution line.

h. The Iowa Hill Development will include:
   - The 100-acre Iowa Hill reservoir with a storage capacity of 6,400-acre-feet;
   - Iowa Hill tunnel extending from Iowa Hill reservoir to Slab Creek reservoir;
   - Iowa Hill powerhouse, an underground powerhouse along the Iowa Hill tunnel that includes three variable speed turbines each with a nominal rating of 133 MW and three generators each rated at 170 MW as a pump motor. The total powerhouse authorized installed capacity is 400 MW;
   - Iowa Hill Switchyard; and
   - A 230-kV transmission line connecting the Iowa Hill Switchyard to the Camino-White Rock Transmission Line.

In addition to generation-related facilities, the project includes 47 recreation areas that include campgrounds, day use facilities, boat launches, trails, and a scenic overlook. [See **Figure 2**]

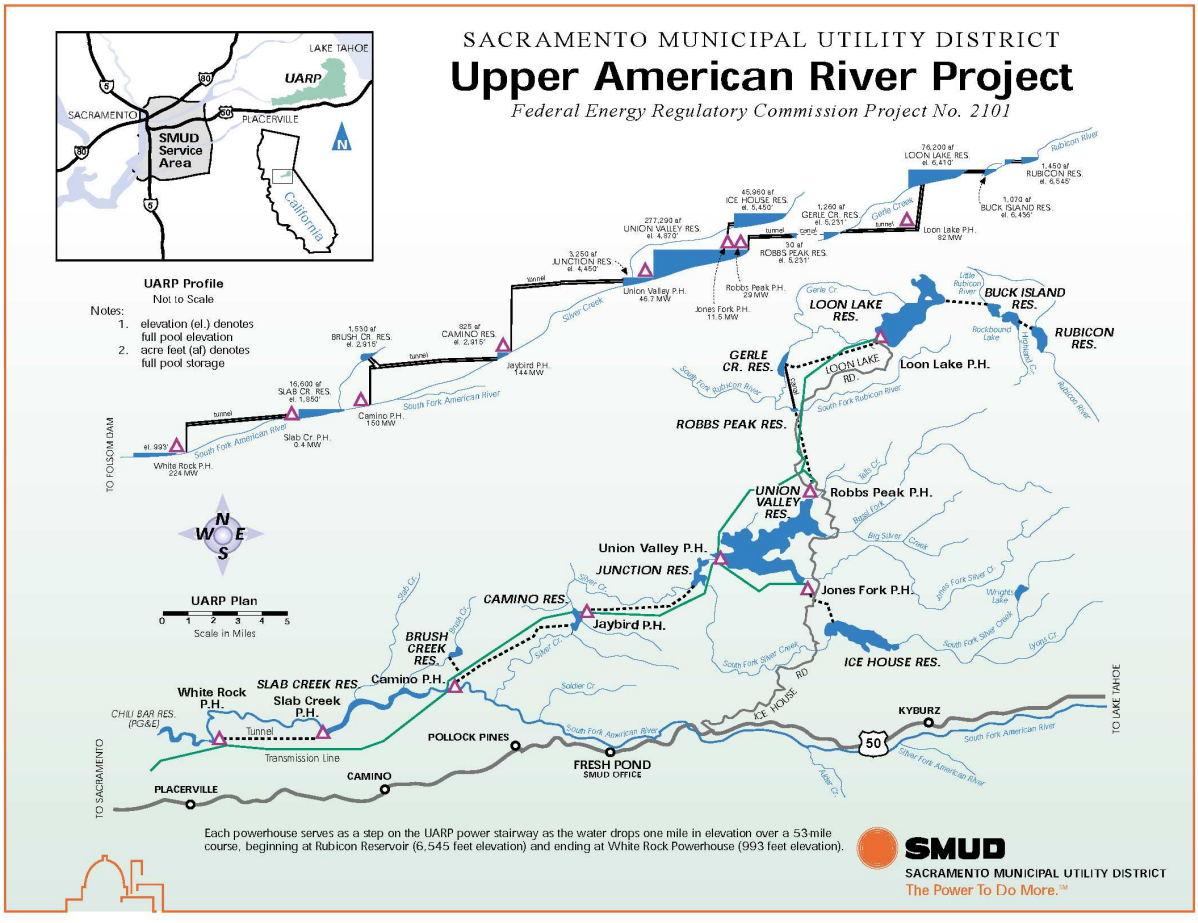

FIGURE 1

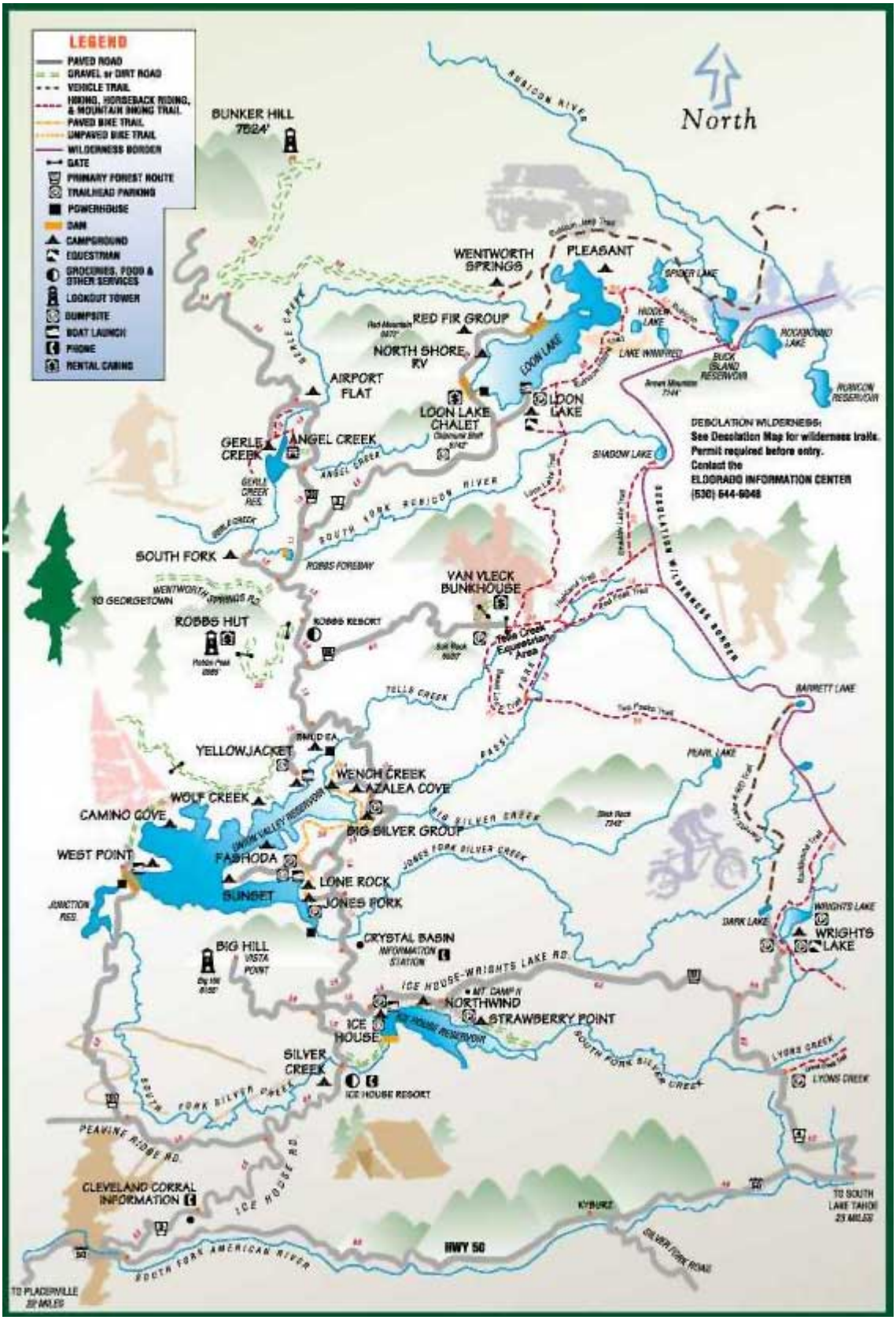
LEGEND
PAVED ROAD
GRAVEL or DIRT ROAD
VEHICLE TRAIL
HIKING, HORSEBACK RIDING, & MOUNTAIN BIKING TRAIL
PAVED BIKE TRAIL
UNPAVED BIKE TRAIL
WILDERNESS BORDER
GATE
PRIMARY FOREST ROUTE
TRAILHEAD PARKING
POWERHOUSE
DAM
CAMPGROUND
EQUESTRIAN
GROCERIES, FOOD & OTHER SERVICES
LOOKOUT TOWER
DUMPSITE
BOAT LAUNCH
PHONE
RENTAL CABINS
North
BUNKER HILL 7524'
RUBICON RIVER
WENTWORTH SPRINGS
PLEASANT
SPIDER LAKE
HIDDEN LAKE
POCKINGHAM LAKE
RED FIR GROUP
NORTH SHORE RV
LOON LAKE
LAKE HAWKINS
BUCK ISLAND RESERVOIR
RUBICON RESERVOIR
AIRPORT FLAT
LOON LAKE CHALET
LOON LAKE
GERLE CREEK
ANGEL CREEK
SHADOW LAKE
DESOLATION WILDERNESS:
See Desolation Map for wilderness trails.
Permit required before entry.
Contact the
EL DORADO INFORMATION CENTER
(530) 644-6048
SOUTH FORK RUBICON RIVER
SOUTH FORK
ROBBS FOREBAY
WENTWORTH SPRINGS RD.
TO GEORGETOWN
VAN VLECK BUNKHOUSE
ROBBS HUT
ROBBS RESORT
Tells Creek Equestrian Area
TELLS CREEK
BARRETT LAKE
PEARL LAKE
YELLOWJACKET
BRUSH CREEK
WENCH CREEK
AZALEA COVE
WOLF CREEK
CAMINO COVE
BIG SILVER GROUP
BIG SILVER CREEK
WEST POINT
FASHODA
SUNSET
LONE ROCK
JONES FORK
JONES FORK SILVER CREEK
JUNCTION RES.
DARK LAKE
WRIGHTS LAKE
WRIGHTS LAKE
BIG HILL VISTA POINT
CRYSTAL BASIN INFORMATION STATION
ICE HOUSE-WRIGHTS LAKE RD.
MT. CAMPN
NORTHWIND
STRAWBERRY POINT
ICE HOUSE
ICE HOUSE RESERVOIR
SILVER CREEK
ICE HOUSE RESORT
SOUTH FORK SILVER CREEK
LYONS CREEK
LYONS CREEK
SOUTH FORK SILVER CREEK
PEAVINE RIDGE RD.
ICE HOUSE RD.
CLEVELAND CORRAL INFORMATION
KYBURZ
TO SOUTH LAKE TAHOE 23 MILES
HWY 50
SOUTH FORK AMERICAN RIVER
SILVER FORK ROAD
TO PLACERVILLE 22 MILES

FIGURE 2

B. IMPORTANT PROVISIONS AND REQUIREMENTS IN LICENSE

The license requires a number of environmental measures that will protect and enhance fish and wildlife resources, water quality, recreational resources, and historic properties. Many of the most important license requirements fall into three categories:

1) Aquatic Resources include increased minimum stream flows, pulse flows, ramping rates and brown trout access to spawning areas in the Gerle Creek Tributary;
2) Monitoring Programs evaluate the impact of the implemented stream flow changes and recreational boating use for targeted resources including native fish populations, aquatic macroinvertebrates, amphibians and reptiles, algae, etc… including the numerous water quality parameters; and,
3) Recreation Enhancements include upgrading and expanding existing recreation facilities as well as providing for additional whitewater boating opportunities, fish stocking and managing the trails system.

Two additional provisions include:

4) The proposed Iowa Hill Development; and,
5) Annual payments to the Forest Service for recreation operation, maintenance and administration.

1. Aquatic Resources [See **Table 1** for License References]

Implementation contains six major measures, most beginning within 3 months (October 23, 2014).

Table 1: Aquatic Resources License References

License Article	Water Quality Certification (Appendix A) Condition No.	Forest Service (Appendix B) Condition No.	Description	Due Date
1-1	1	27	Increased Minimum Flows	No later than 3 months of license issuance
1-2	2	28	Pulse Flows	No later than 3 months of license issuance
1-3	3	29	Ramping Rates	No later than 3 months of license issuance
1-8 and 1-23	5	49	Reservoir Levels	Within 6 months of license issuance
402		34	Fish passage in Gerle Creek	Within 1 year of license issuance.
1-4	25	30	Coordination with Chili Bar project	Within 4 months of license issuance

These measures affect minimum flows, pulse flows, ramping rates, reservoir levels, fish passage in Gerle Creek, and coordination with the Chili Bar project:

a. Increased Minimum Flows

Beginning as early as reasonably practicable within 3 months after license issuance, minimum streamflows are required in:

1. Rubicon River below Rubicon Reservoir Dam;
2. Little Rubicon River below Buck Island Reservoir Dam;
3. Gerle Creek below Loon Lake Reservoir Dam and below Gerle Creek Reservoir Dam;
4. South Fork Rubicon River below Robbs Peak Reservoir Dam;
5. South Fork Silver Creek below Ice House Reservoir Dam;
6. Silver Creek below Junction Reservoir Dam and below Camino Reservoir Dam;
7. Brush Creek below Brush Creek Reservoir Dam; and
8. South Fork American River (SFAR) below Slab Creek Reservoir Dam.

The minimum streamflows specified in the schedules may be temporarily modified if required by equipment malfunction or operating emergencies. Where facility modification is required to maintain the specified minimum streamflows, SMUD will complete such modifications as soon as reasonably practicable and no later than 3 years after license issuance. Prior to such required facility modifications, SMUD is required to make a good-faith effort to provide the specified minimum streamflows within the capabilities of the existing facilities. In order to adjust operations to meet the required minimum streamflows, SMUD is allowed a 3-year period after the license is issued or 3 years after completion of necessary facility modifications, whichever is later, in which daily mean streamflows may vary up to 10 percent below the amounts specified in the minimum streamflow schedules, provided that the average monthly streamflow in any given month equals or exceeds the required minimum streamflow for the month. After the applicable period, SMUD is required to meet the minimum streamflow requirements specified in the minimum streamflow schedules.

The minimum streamflow schedules are separated into five water year types: Wet, Above Normal (AN), Below Normal (BN), Dry, and Critically Dry (CD). The water year types are defined in **Table 2**.

Table2: Year Type Forecasts for American River

Year Type	American River Water Year Forecast
Wet	greater than or equal to 3.5 MAF
Above Normal (AN)	greater than or equal to 2.6 MAF but less than 3.5 MAF
Below Normal (BN)	greater than 1.7 MAF or equal to but less than 2.6 MAF
Dry	greater than 0.9 MAF or equal to but less than 1.7 MAF
Critically Dry (CD)	less than 0.9 MAF

MAF- million acre feet

Each February through May SMUD is required to determine the water year type based on the Division of Water Resources Bulletin 120 forecast and operate for that month based on that forecast beginning 3 days after issuance of the forecast and continuing until 2 days after issuance of a subsequent monthly forecast. The May forecast will be used to establish the final water year type for the remaining months of the water year and the month of October. The water year type for the months of November through January will be based on the Department of Water Resources' Full Natural Flow record for the American River at Folsom for the preceding water year. SMUD is required to operate based on that record beginning November 1.

b. Pulse Flows

Beginning as early as reasonably practicable within 3 months after license issuance (but not prior to the implementation of the new minimum stream flows), SMUD is required to provide annual pulse flow events as specified in the following pulse flow schedule by water year type in:

1. Rubicon River below Rubicon River Reservoir Dam;
2. Gerle Creek below Loon Lake Reservoir Dam; and
3. South Fork Silver Creek below Ice House Reservoir Dam

Pulse flows are not required in water years where natural spill events provide flows of equivalent magnitude and duration during either (1) spring snowmelt runoff or (2) a natural storm event that occurs in the months of January through May in the specific watershed in which a pulse flow is required. Modifications of pulse flows follow the same criteria as minimum instream flows.

c. Ramping Rates

Beginning as early as reasonably practicable within 3 months after license issuance, SMUD is required to use a ramping rate of 1 foot per hour when making the following licensee-controlled releases:

1. Pulse flow releases in Gerle Creek below Loon Lake Reservoir Dam and South Fork Silver Creek below Ice House Reservoir Dam.
2. Minimum streamflow releases in Silver Creek below Junction Reservoir Dam, Silver Creek below Camino Reservoir Dam, and SFAR below Slab Creek Reservoir Dam.
3. Recreational streamflow releases in South Fork Silver Creek below Ice House Reservoir Dam and SFAR below Slab Creek Reservoir Dam.

Modifications of pulse flows follow the same criteria as minimum instream flows.

d. Reservoir Levels
Beginning as early as reasonably practicable within 6 months after license issuance, SMUD is required to meet or exceed the end-of-month reservoir elevations for Loon Lake, Union Valley, and Ice House reservoirs as required in the license.

e. Fish Passage in Gerle Creek
The reservoir level at Gerle Creek Reservoir shall be maintained at an elevation that provides fish passage into Gerle Creek from August through October.

f. Coordination with Chili Bar Project
SMUD is required to coordinate with the Chili Bar Project for operations and in implementing certain license conditions:
    1. Coordination of Operations
    SMUD is required to coordinate operation with PGE to comply minimum stream flows, ramping rates, and recreational stream flows.
    2. Coordination in Implementing Certain License Conditions
    SMUD is required to coordinate operation with PGE to comply minimum stream flows, ramping rates, the monitoring program, the adaptive management program, the sediment management plan, BLM recreation improvements, public information services, and recreational stream flows.

2. **Monitoring Programs** [See **Table 3** for License References]
The implementation schedules for the various monitoring programs begin as early as one year (July 23, 2015) after license issuance.

Table 3: Monitoring Programs License References

License Article	Water Quality Certification (Appendix A) Condition No.	Forest Service (Appendix B) Condition No.	Description	Due Date
1-5 1-6	8,9	31, 32	Various Monitoring rograms and adaptive management conditions including fish population, macroinvertebrate, amphibian and reptile, water temperature, water quality, etc…	Varies from 12 to 28 months of license issuance
	6	36	Streamflow and Elevation Gaging plan	Within 1 year of license issuance.
	7	51	Public Information for Streamflow and Reservoir Level	Within 1 year of license issuance.

The programs include monitoring numerous measures for a variety of species populations, stream flow gaging, and stream flow and a reservoir level information plan.

a. Various Monitoring Programs
SMUD is required to file an annual report by June 30 for the following:
    - Fish populations
    - Amphibians and reptiles
    - Riparian vegetation
    - Algae species
    - Geomorphology
    - Terrestrial wildlife

b. Streamflow and Elevation Gauging
SMUD is required to develop a Streamflow and Reservoir Elevation Gaging Plan within 1 year (by July 23, 2015). The streamflow gaging locations are:
    - Rubicon River below Rubicon Reservoir Dam;
    - Little Rubicon River below Buck Island Reservoir Dam;
    - Gerle Creek below Loon Lake Reservoir Dam and below Gerle Creek Reservoir Dam;
    - South Fork Rubicon River below Robbs Peak Reservoir Dam;

- South Fork Silver Creek below Ice House Reservoir Dam;
- Silver Creek below Junction Reservoir Dam and below Camino Reservoir Dam;
- Brush Creek below Brush Creek Reservoir Dam, and
- SFAR below Slab Creek Reservoir Dam (sufficient to record spills).

The reservoir elevation gaging locations are:

- Rubicon Reservoir
- Loon Lake Reservoir
- Gerle Creek Reservoir
- Ice House Reservoir
- Union Valley Reservoir
- Junction Reservoir
- Camino Reservoir
- Brush Creek Reservoir
- Slab Creek Reservoir

c. Streamflow and Reservoir Information Plan
SMUD is required to develop Public Information for Streamflow and Reservoir Level within 1 year (by July 23, 2015). This includes:

- Real-time (15-minute increments and refresh rates or at the capacity of the reporting technology) lake stage height and storage information for each of the following reservoirs: Rubicon Reservoir, Loon Lake Reservoir, Ice House Reservoir, Union Valley Reservoir, Gerle Creek Reservoir, Brush Creek Reservoir, and Junction Reservoir;
- Installation of up to two simple staff gages for use by the public on each of the following stream reaches: South Fork Silver Creek below Ice House Reservoir Dam, and South Fork American River below Slab Creek Reservoir Dam;
- Real-time (15-minute increments at refresh rates or at the capacity of the reporting technology) streamflow and reservoir level information that is available to the public year-round via toll-free telephone number or other appropriate technology approved by FS; and,

- Streamflow information on a website for:
    - Rubicon River Below Rubicon Reservoir Dam
    - Little Rubicon River Below Buck Island Reservoir Dam
    - Gerle Creek Below Loon Lake Reservoir Dam
    - Gerle Creek Below Gerle Creek Reservoir Dam
    - South Fork Rubicon River Below Robbs Peak Reservoir Dam
    - South Fork Silver Creek Below Ice House Reservoir Dam
    - Silver Creek Below Junction Reservoir Dam
    - Silver Creek Below Camino Reservoir Dam
    - Brush Creek Below Brush Creek Reservoir Dam
    - SFAR Below Slab Creek Reservoir Dam

SMUD is also required to develop project recreation brochures and maps that describe the recreation opportunities, recreation facilities, rules, and responsibilities for the area of the Project, including the canyonlands, high country lakes, and streams.

An Interpretive, Education, and Public Information Plan is required within 2 years that will include at a minimum, themes, design, audience, delivery methods, and schedule for implementation for providing up-to-date information such as: sightseeing, hiking, observing wildlife, and utilizing facilities such as boat ramps, campgrounds, and beaches. This plan will be coordinated with PGE and the Chili Bar Hydroelectric Project.

3. **Recreation Enhancements** [See **Table 4** for License References]
   The license requires extensive recreation enhancements as summarized in **Table 4**.

Table 4: Recreation Enhancements License References

License Article	Water Quality Certification (Appendix A) Condition No.	Forest Service (Appendix B) Condition No.	Description	Due Date
1-15 thru 1-26 and 1-31	4, 6, 22	44, 45, 50, 57, 75	Recreation enhancements including whitewater boating opportunities, fish stocking, and trail system management.	Varies from 3 months of 5 years 18 of license issuance
408	14	41	Recreation Implementation Plan	Within 6 months of license issuance
	4.A	50.1	Plan to monitor recreational boating use below Slab Creek Dam	Within 6 months of license issuance.
		50.1	Whitewater boating recreation plan for the South Fork American River below Slab Creek Dam	At the end of year 5 if Iowa Hill Pump Storage Project construction has not commenced.
		50.1	Access and Parking Plan for White Rock powerhouse	Within 18 months of license issuance.
	4.B	50.2	Whitewater Recreation management plan for the South Fork Silver Creek below Ice House Dam	Within 2 years of license issuance.
		57	Plan for identification of all trails for project use	Within 1 year of license issuance
	22	75	Recreation access plan for Slab Creek reservoir	6 months prior to Iowa Hill construction.

Whitewater boating enhancements include recreational streamflows for SFAR and South Fork Silver Creek based on the five water year types (See **Table 2**).

a. SFAR Below Slab Creek Reservoir Dam
   Within 3 months of license issuance, SMUD is required to provide recreational streamflows below Slab Creek Reservoir Dam as follows:
   - In BN, AN, and Wet water years, SMUD will spill water from Slab Creek Reservoir to provide streamflows between 850 and 1,500 cfs between the hours of 10:00 am and 4:00 pm for 6 days in no less than three events in the period beginning March 1 and ending May 31.
   - If conditions permit, one of the events will be replaced with a 3-day event on the Memorial Day weekend, in which case the total number of days for the year will be increased to 7 days.

   These recreational streamflows will be provided until the Iowa Hill Pumped Storage Project is constructed, or if the Iowa Hill Pumped Storage Project is not constructed, until year 15 after license issuance. If the Iowa Hill Pumped Storage Project is not constructed, and the triggers described below for increase in recreational streamflow days have not been met by year 15 after license issuance, these recreational streamflows will continue after year 15.

   After either (1) the Iowa Hill Pumped Storage Project is constructed or (2) in year 15 of license issuance if the triggers described below for increase in recreational streamflow days have been met, SMUD will provide recreational streamflows as follows in **Table 5**:

Table 5: Recreational Streamflows South Fork of the American below Slab Creek

Water Year Type	Month	Flow (cfs)	Time	Duration	Purpose
CD	April	850-950 **Plus*** 1400-1500 850-950	10 am-1 pm **Plus*** 10 am-1 pm 1:30 pm-4 pm	4 weekend days **Plus*** 2 weekend days	Kayak **Plus*** Rafting Kayak
D	March/ April	850-950 **Plus*** 1400-1500 850-950	10 am-1 pm **Plus*** 10 am-1 pm 1:30 pm-4 pm	4 weekend days **Plus*** 6 weekend days	Kayak **Plus*** Rafting Kayak
	October**	850-950	10 am-1 pm	2 weekend days	Kayak
BN	April/May	850-950 **Plus*** 1400-1500 850-950	10 am-1 pm **Plus*** 10 am-1 pm 1:30 pm-4 pm	3 weekend days*/holidays **Plus*** 9 weekend days***/ holidays	Kayak **Plus*** Rafting Kayak
	October**	850-950	10 am-1 pm	6 weekend days	Kayak
AN	April/May	1400-1500 850-950	10 am-1 pm 1:30 pm-4 pm	12 weekend days***/ holidays	Rafting Kayak
	October**	850-950	10 am-1 pm	6 weekend days	Kayak
W	March/ April/May	1400-1500 850-950	10 am-1 pm 1:30 pm-4 pm	12 days, weekend days***/ holidays	Rafting Kayak
	October**	850-950	10 am-1 pm	6 weekend days	Kayak

* During CD, D and BN water years, a split flow schedule is required to allow the preferred rafting flow and kayaking flow to occur during the same day, which is in addition to the requirement to provide the specified kayak flows.

** October flows may be affected by their environmental impact.

*** Priority will be given to recreational streamflows on Memorial Day weekend

SMUD will provide the October recreation streamflows specified based on a determination that such streamflows can be provided without unacceptable environmental impact. If October flows cannot be provided for operational, aquatic, or other reasons, the equivalent flow volume will be provided in addition to the specified recreational streamflows for the following spring upon approval. Scheduled boating days will not exceed the total (see **Table 5**); however, if October flows are provided the following spring, the boating days in the spring may exceed those displayed in the table. In addition, the frequency and magnitude of the boating flows may be adjusted within the total volume of water displayed in the table after consultation per the license agreement.

Recreational streamflows may be modified or suspended in the event specific instances outlined in the license. In the event boating days are modified or suspended, SMUD is required to reschedule days as soon as practicable; however, SMUD is not be obligated to provide such days if weather or other operational conditions do not permit such days to be rescheduled by May 31. Preference for rescheduled days will be weekend days; however, weekdays may be substituted if there are not sufficient weekend days prior to May 31.

Within 3 months of license issuance and continuing at least through year 5, SMUD is required to monitor all boating use taking place on days provided for recreational streamflows. The monitoring plan shall include but is not limited to a complete accounting of all boating users entering the SFAR in the 1/2 mile below Slab Creek Reservoir Dam, a description of the type of watercraft being used, and to the extent possible, a determination of where the boaters are ending their trip.

Contingent on the construction of the of the Iowa Hill Pumped Storage Project at 5 and 10 years after the license issuance, the license requires continued monitoring and the preparation of a Whitewater Boating Recreation Plan in consultation with designated agencies and the whitewater boating community (per Water Quality Certificate Condition No. 4).

b. South Fork Silver Creek Below Ice House Reservoir Dam
Within 3 months of license issuance, SMUD is required to provide recreational streamflows below Ice House Reservoir Dam as follows as follows in **Table 6**:

Table 6: Recreational Streamflows for South Fork Silver Creek Below Ice House Reservoir Dam (First Five Years)

Water Year Type	Month	Flow (cfs)	Time	Duration
CD	May	300	10 am-3 pm	1 weekend day
D	May	300	10 am- 3 pm	3 weekend days
BN	May/June	400 **Plus*** 500	10 am- 3 pm	2 weekend days/holidays **Plus*** 2 weekend days/holidays
AN	May/June	400 **Plus*** 500	10 am- 3 pm	2 weekend days/holidays **Plus*** 4 weekend days/holidays
W	May/June	400 **Plus*** 500	10 am- 3 pm	4 weekend days/holidays or Fridays **Plus*** 5 weekend days/holidays or Fridays

* Two different flow levels are required for the specified number of days.

Prior to the end of the 5-year period, SMUD is required to prepare a recreation plan in consultation with the designated agencies and whitewater boating community, to determine triggers for establishing when SMUD will increase the provided number of days of recreation streamflows. Within 5 years of license issuance and every 5 years thereafter, SMUD is required to prepare a report describing whitewater recreation use and impacts, whether use has exceeded predetermined triggers such that recreation streamflow days should be adjusted. The total number of boating days will not exceed the total amount displayed in the **Table 7**; however, the frequency and magnitude of the boating flows may be adjusted within the total volume of water. Recreational streamflows may be modified or suspended in the event specific instances outlined in the license.

Table 7: Recreational Streamflows for South Fork Silver Creek Below Ice House Reservoir Dam (Year 6 through License Term)

Water Year Type	Month	Flow (cfs)	Time	Duration
CD	May	300	10 am-3 pm	2 weekend days
D	May	300	10 am- 3 pm	6 weekend days
BN	May/June	400 **Plus*** 500	10 am- 3 pm	5 weekend days/holidays **Plus*** 2 weekend days/holidays
AN	May/June	400 **Plus*** 500	10 am- 3 pm	5 weekend days/holidays **Plus*** 6 weekend days/holidays
W	May/June	400 **Plus*** 500	10 am- 3 pm	7 weekend days/holidays or Fridays **Plus*** 9 weekend days/holidays or Fridays

* Two different flow levels are required for the specified number of days.

Other recreational enhancements include a Trail Systems Management Plan and specific measures associated with four areas: Buck Island Reservoir Area, High Country Trails, Crystal Basin, and Canyonlands.

a. Buck Island Reservoir Area
   Buck island enhancements include improving or relocating existing non-motorized trails connecting to the Rubicon Hiking Trail within 4 years (July 23, 2018).
b. High Country Trails
   Improvements to the Rubicon Hiking Trail and the Trail connecting Pleasant Boat-In Campground to the Rubicon Trail include drainage and signage improvements within 2 years (July 23, 2016).

c. Crystal Basin
Implementation of enhancements for Crystal Basin range from 2 to 20 years and include Recreation Plans. The plans will address, at a minimum, the following six measures:

- Sanitation
- User conflicts, carrying capacity
- Day use versus overnight camping
- Vehicle control
- Boating access
- Emergency resource protection measures

The specific areas include:

1. Loon Lake Area
   Within 2 years (July 23, 2016) SMUD will prepare a development plan for implementation within 5 years to address the impacts to the lakeshore zone and islands from unmanaged recreation and the need for additional day use opportunities.
2. Gerle Creek Reservoir Area
   Within 2 years (July 23, 2016) SMUD will prepare a development plan for implementation within 15 years to address the impacts from unmanaged recreation and the need for additional day use opportunities.
3. Union Valley Area
   Within 2 years (July 23, 2016) SMUD will prepare a development plan for implementation within 10 years to address the impacts from unmanaged recreation and the need for additional day use opportunities. Within 2 years SMUF is also required to develop a Boating Management Plan including:
   - User conflicts between differing types of watercraft
   - Human and wildlife conflicts
   - Marking or removal of manmade underwater hazards to enhance boater safety
   - Speed limits and need for marker buoys.
4. Ice House Reservoir Area
   Within 2 years (July 23, 2016) SMUD will prepare a development plan for implementation within 8 years to address the impacts from unmanaged recreation and the need for additional day use opportunities. This plan also will address the whitewater recreation opportunities in South Fork Silver Creek, above and below Ice House Reservoir. In addition to the basic six measures, the plan will also address:
   - Boating access including day use and overnight camping along the shore

- Vehicle and foot access to the reservoir
- Necessary put-ins, take-outs, and parking for whitewater activities
- On-river boat patrol.

d. Canyonlands
Implementation of enhancements range from 2 to 10 years and include:

1. Junction Reservoir
Within 10 years (July 23, 2024) SMUD will make specific improvements for day use boat launch as outlined in the license.
2. Brush Creek Boat Launch
Within 2 years (July 23, 2016) SMUD will prepare a development plan that addresses reservoir access, day use opportunities, and facility needs or improvements for implementation within 8 years.
3. Slab Creek Reservoir
Within 2 years (July 23, 2016) SMUD will prepare a development plan that addresses, in addition to the basic six measures, safe and reasonable boating access in addition to:
    - Foot access that extends to the minimum reservoir level
    - Parking and vehicle control
    - Informational and directional signage
    - Resource protection measures.

    Measures as specified in the license are provided to ensure boating access in the event that construction of the Iowa Hill Reservoir causes temporary access closures.

4. **Proposed Iowa Hill Development** [Reference: License Articles 301 to 310]
The proposed Iowa Hill Development will be an off-stream pumped storage facility that pumps water from the existing Slab Creek reservoir (lower reservoir) during off-peak hours to a new upper reservoir (Iowa Hill reservoir) to be constructed atop Iowa Hill. Water will be released from the upper reservoir for generation through a tunnel system and powerhouse during peak-load hours. The difference in elevation between the two reservoirs will be about 1,200 feet, providing a generating capacity of 400 MW via three 133-MW pump turbines. Power from the development will run through a switchyard and then to the Camino-White Rock Transmission Line over a 2-mile-long 230-kV transmission line. The Development is considered within Aquatic Resources, Monitoring Programs, and Recreation Enhancements.

SMUD is required to begin construction of the Iowa Hill Development project works within five years (July 23, 2019) from the issuance date of the license and to complete construction of the project works within ten years (July 23, 2024) from the issuance date of the license.

The license includes a series of measures for, among other things, recreational access to Slab Creek, visual quality enhancements, mitigation for construction noise, and erosion and sediment control during the construction and operation of the Iowa Hill Development. These proposals also include monitoring native fish in Slab Creek reservoir and other environmental resources of the Eldorado National Forest and surrounding landscape and mitigating for lost wildlife habitat.

At the end of year 5 after license issuance, if construction has not begun, monitoring (See **2. Monitoring Programs**) are required to continue. SMUD, in consultation with specified agencies, is required to prepare a Whitewater Boating Recreation Plan describing whitewater recreation use and impacts. At the end of year 10 after license issuance, if construction has not begun, SMUD will determine if the facility is to be modified based on the information collected as a result of the Whitewater Boating Recreation Plan.

If the Iowa Hill Pumped Storage Project is not constructed, and the triggers specified in the Whitewater Boating Recreation Plan have been met, the facilities will be modified and functional within 15 years of license issuance. If the triggers have not been met by year 10, use will continue to be monitored and a new determination will be made every 5 years as to whether the triggers have been met. Once they are met, the facilities will be modified and the recreational streamflows described in the license will be implemented through the term of the license.

If construction activities associated with the Iowa Hill Pumped Storage Project or other facility modifications prevent SMUD from providing recreation streamflows due to construction activities associated with the Iowa Hill Pumped Storage Project or other facility modifications, SMUD is required to develop an interim plan to address recreation streamflows.

5. **Recreation Operation, Maintenance, and Administration** [Reference: Appendix B, Condition No. 47]
   Beginning the first full year after license issuance, SMUD is required to make an annual payment to the Forest Service in the amount of $1,000,000.00 (year 2007 cost basis), escalated annually based on the U.S. Gross Domestic Product – Implicit Price Deflator. These funds are for the Forest Service to provide operation, maintenance, and administration of those developed recreation sites, facilities, or uses that are adjacent to or in the vicinity of Project reservoirs and

facilities listed in Condition Nos. 44 and 45 (either developed as part of the original/amended license or affected by operations). This will include, but not be limited to, managing use within and immediately adjacent to the Project boundary, and performing both regular and annual maintenance. In addition, this will fund the special use permit administration required for facilities developed as part of the original/amended license and operated by a concessionaire. Work to be completed within these areas is to consist of conducting patrols, picking up litter, providing public information, enforcing rules and regulations, rehabilitating impacted areas, addressing sanitation, maintaining day use sites (such as concentrated use areas), maintaining trails, information signs, and regulatory signs, responding to fires and other emergencies, assisting in search and rescue, addressing resource impacts, and area condition monitoring.

C. MAP

There are two convenient ways to become familiar with this project on the Hydropower Reform Coalition website, www.hydroreform.org.

- Go directly to the project page http://www.hydroreform.org/projects/upper-american-river-p-2101.
- To understand the geographical context of the project, visit the *On Your River* section of the site. This link (http://www.hydroreform.org/on-your-river/California) will take you to the section for rivers in California. Zoom in until you can see the Sacramento and Carson City area. P-2101 is the marker west of Carson City.

D. UPDATE

Post-license Activities: SMUD maintains a fairly up-to-date website for the UARP Hydro Project which includes: License Compliance and Implementation Reports, Recreation Management Plans, Annual Monitoring Reports, and a Hydro Relicensing Library. These include Ecological Monitoring Plans, Facilities and Resource Management Plans. This website is updated annually, with the last edition being 2018.

https://www.smud.org/en/Corporate/Environmental-Leadership/Power-Sources/Upper-American-River-Project/Hydro-Relicensing-Compliance