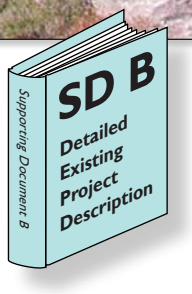
FRENCH MEADOWS RESERVOIR

HELL HOLE RESERVOIR



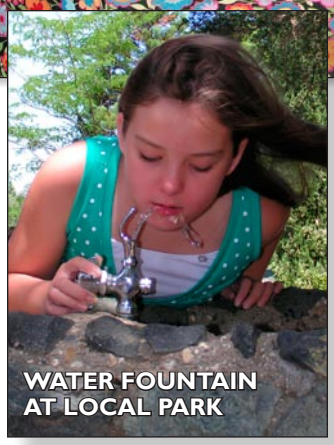
Project Description

The backbone of the MFP is the capture and storage of water in French Meadows and Hell Hole reservoirs.

THE MFP SERVES AS A MULTI-PURPOSE WATER SUPPLY and hydro-generation project designed to conserve and control waters of the Middle Fork American River, the Rubicon River, and several associated tributary streams. The MFP is located within the Middle Fork American River Watershed (Watershed) at elevations ranging from approximately 1,100 feet to 5,300 feet. Water for hydroelectric generation and consumptive use is diverted and stored under permits and licenses issued by the SWRCB.

The MFP seasonally stores and releases water to meet consumptive demands within western Placer County and to generate power for the California electrical grid. Water for consumptive purposes is released from the MFP and re-diverted at two locations: (1) the American River Pump Station, located on the North Fork American River near the City of Auburn; and (2) Folsom Reservoir. Both points of re-diversion are downstream of the MFP facilities and neither is part of the MFP as defined in the FERC Project

The MFP benefits the people of Placer County by providing water and electricity.



License. PCWA's water rights and water supply agreements currently allow for the consumptive use of up to 120,000 ac-ft of MFP water per year. Consumptive water supplied by PCWA is used to meet municipal, industrial, and agricultural demands.

Hydroelectric power from the MFP is produced at five Project powerhouses with a combined nameplate generating capacity of approximately 224 MW. The total annual flow through the MFP and the resulting total annual generation are highly variable. The MFP produces an average of 1,030,000 MWh annually on mean generation flows of 452,000 ac-ft. The highest annual generation was in 1983, a wet water year, when the MFP produced approximately 1,815,000 MWh on flows of 714,400 ac-ft. The lowest annual generation was in 1977, a critically dry water year, when the MFP only produced 211,000 MWh on flows of 75,000 ac-ft.

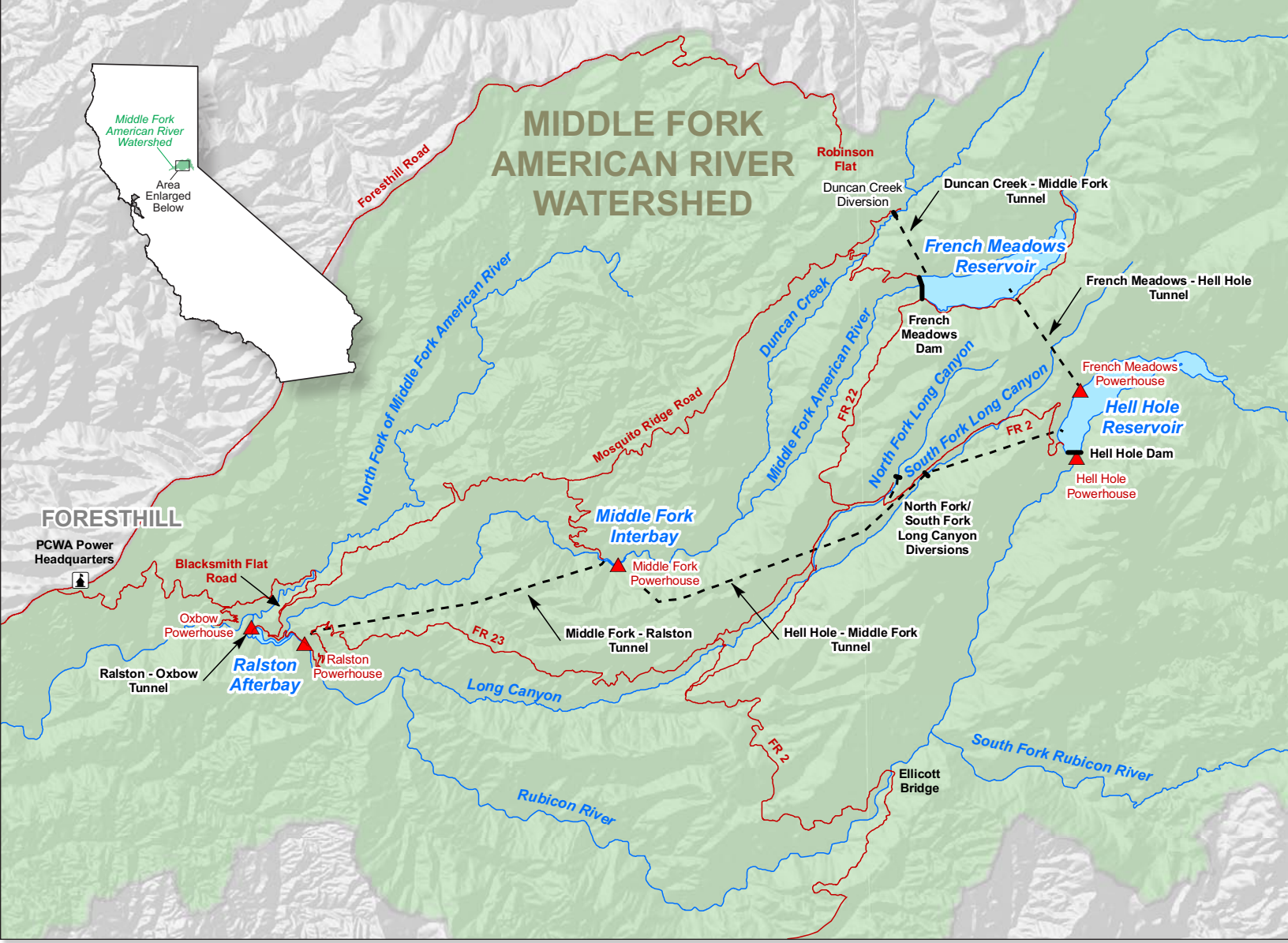
Project Facilities

The MFP diverts, stores, and transports water through a series of stream diversions, reservoirs, water conveyance systems, and powerhouses before it is released back into the Middle Fork American River below Oxbow Powerhouse, approximately 29 miles upstream of Folsom Reservoir. Instream flow releases below each diversion are made in accordance with FERC license requirements. All electricity generated by the MFP is delivered to Pacific Gas and Electric's (PG&E's) transmission system at Project switchyards and substations, typically located near powerhouses. PG&E's transmission system is not part of the MFP.

The backbone of the MFP is its two principal water storage reservoirs, French Meadows and Hell Hole. These reservoirs are located on the Middle Fork American River and the Rubicon River, respectively, and have a combined gross storage capacity of 342,583 ac-ft.

Starting at the highest elevation of the MFP, water is diverted from Duncan Creek at the Duncan Creek Diversion and routed through the 1.5 mile-long Duncan Creek-Middle Fork Tunnel into French Meadows Reservoir (134,993 ac-ft of gross storage).

Flows in the Middle Fork American River are captured and stored in French Meadows Reservoir along with diversions from Duncan Creek. From French Meadows Reservoir, water is transported via the 2.6 mile-long French Meadows-Hell Hole Tunnel, passed through the French Meadows Powerhouse (installed generating capacity of 15.3 MW) and released into Hell Hole Reservoir (207,590 ac-ft of gross storage). Flows in the Rubicon River are captured and stored in Hell Hole Reservoir along with water released from French Meadows Reservoir through French Meadows Powerhouse. Water released from Hell Hole Reservoir into the Rubicon River to meet instream flow requirements first pass through the Hell Hole



Powerhouse (installed generating capacity of 0.73 MW), which is located at the base of Hell Hole Dam.

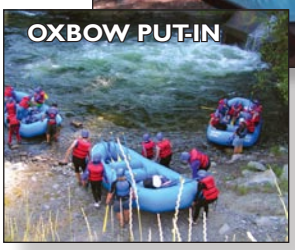
From Hell Hole Reservoir, water is also transported via the 10.4 mile-long Hell Hole-Middle Fork Tunnel, passed through the Middle Fork Powerhouse (installed generating capacity of 122.4 MW) and released into the Middle Fork Interbay (175 ac-ft of gross storage). Between Hell Hole Reservoir and Middle Fork Powerhouse, water is diverted from the North and South Forks of Long Canyon creeks directly into the Hell Hole-Middle Fork Tunnel. Water diverted from these creeks into the Hell Hole - Middle Fork Tunnel can either be stored in Hell Hole Reservoir or be used to augment releases from Hell Hole Reservoir to the Middle Fork Powerhouse.

Flows from the Middle Fork American River (including instream flow releases from French Meadows Reservoir) are captured at Middle Fork Interbay along with water released from Hell Hole Reservoir through Middle Fork Powerhouse. From Middle Fork Interbay, water is transported via the 6.7 mile-long Middle Fork-Ralston Tunnel, passed through the Ralston Powerhouse (installed generating capacity of 79.2 MW) and released into the Ralston Afterbay (2,782 ac-ft of gross storage).

Flows from the Middle Fork American River (including instream releases from Middle Fork Interbay) and flows from the Rubicon River (including instream releases from Hell Hole Reservoir) are captured in Ralston Afterbay along with water transported from Middle Fork Interbay through Ralston Powerhouse. From Ralston Afterbay, water is transported via the 400 foot-long Ralston-Oxbow Tunnel, passed through the Oxbow Powerhouse (installed generating capacity of 6.1 MW) and released from the MFP to the Middle Fork American River.

In addition to these major water and power facilities, the MFP includes 35 Project roads (totaling almost 18 miles) and 10 Project trails (totaling approximately 0.5 miles). These roads and trails are used almost exclusively

Project recreation facilities and reservoirs support a variety of recreational activities.



by PCWA to access Project facilities. The Project roads and trails represent less than 1% of the total miles of roads and trails in the Watershed. There are also over 6 miles of Project powerlines and communication lines, which provide power to operate Project equipment and allow communication between Project facilities. In addition, numerous smaller facilities and features support MFP operations including flow gaging stations and weirs, photovoltaic poles, microwave reflectors and radio towers, sediment disposal sites, generator and storage buildings, operator cottages, a maintenance shop, a dormitory facility, and security and public safety fences.

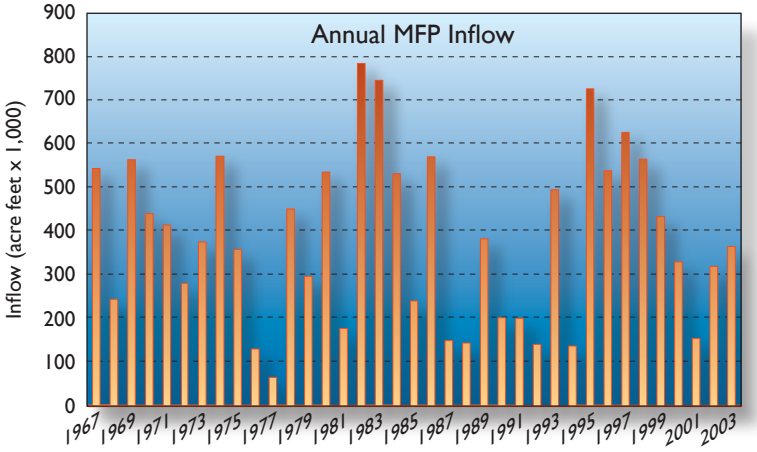
The MFP also includes 21 developed recreation facilities to enable public access to public lands and Project reservoirs. The developed Project recreation facilities are concentrated around French Meadows Reservoir, Hell Hole Reservoir, South Fork Long Canyon Diversion Pool, and Ralston Afterbay. PCWA is responsible for operation and maintenance of these facilities. The Project recreation facilities augment other recreation facilities in the Watershed operated by the TNF and ENF and the California Department of Parks and Recreation (DPR).

Project Operation

The MFP has been operated for over 40 years by PCWA as a multi-purpose project to benefit the people of Placer County. The MFP is operated with respect to four objectives, as follows:

- Meet FERC license requirements that protect environmental resources and provide for recreation;
- Meet the consumptive water demands of western Placer County;
- Generate power to help meet California's energy demand and provide valuable support services required to maintain the overall quality and reliability of the state's electrical supply system; and
- Maintain Project facilities to ensure their continued availability and reliability.

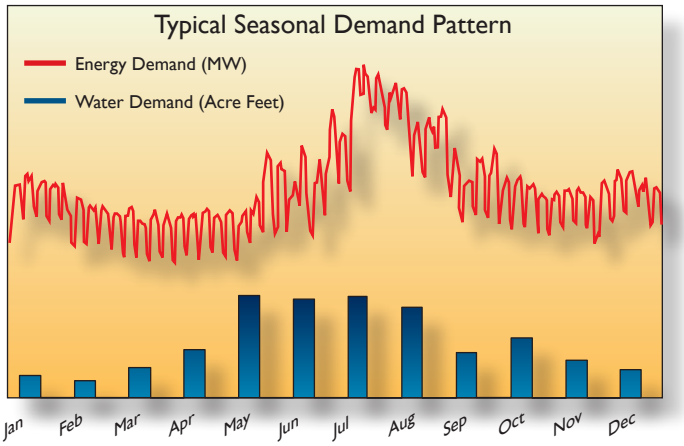
Project operations for water supply and electric power generation are constrained by regulatory and contract requirements, the physical capacities of the Project facilities, and water availability. Regulatory and contract requirements include conditions imposed by the FERC license, water rights permits, water delivery contracts, and the existing power purchase contracts with PG&E. Water availability is influenced by carryover storage in the Project reservoirs and the timing and quantity of annual runoff.



Annual operations are strongly influenced by inflow into the MFP.

Typical annual operation of the Project results in the capture of runoff which is diverted to increase storage in French Meadows and Hell Hole reservoirs in the winter and spring (filling period), and drawdown of the reservoirs during the summer, fall, and early winter (release period). Operation of the MFP varies from year-to-year based on the timing and magnitude of spring runoff, which is influenced by the amount of winter snow pack and ambient temperature conditions, as well as precipitation.

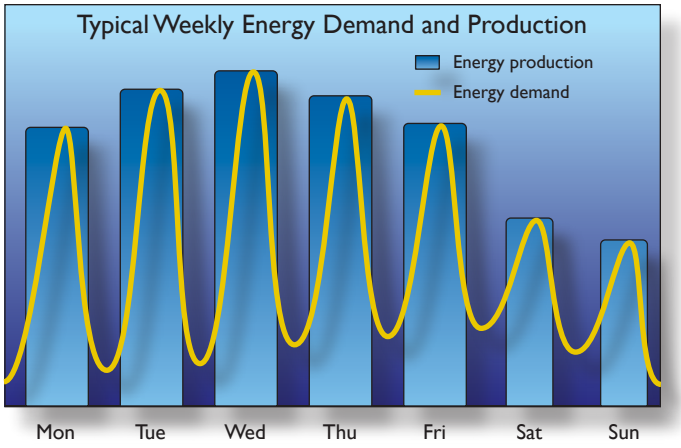
During the filling period, flows through the MFP powerhouses are highly dependent on projected and actual runoff conditions. In drier years, power releases are minimized during the filling period to increase the volume of water in storage to meet upcoming summer consumptive use and peak power demands. In wetter years, power releases during the filling period are increased to minimize spills from the reservoirs. In years when minimum storage levels to meet consumptive demands are reasonably assured and the chance of spilling is low, power releases are adjusted through the filling season based on the volume of water in storage, projected runoff, and current and projected power demands.



The MFP is operated to meet consumptive water and energy demands.

During the release period, after the reservoirs have reached their maximum storage capacity, monthly releases for generation are largely predictable for the remainder of the year. However, daily and hourly releases for generation, which respond to demand for electricity and electrical grid reliability, remain highly variable. During the release period, flows are managed to: (1) meet storage and flow license requirements; (2) meet consumptive water supply requirements; (3) optimize power generation to meet peak electrical demand; and (4) achieve end-of-year carryover target storage levels.

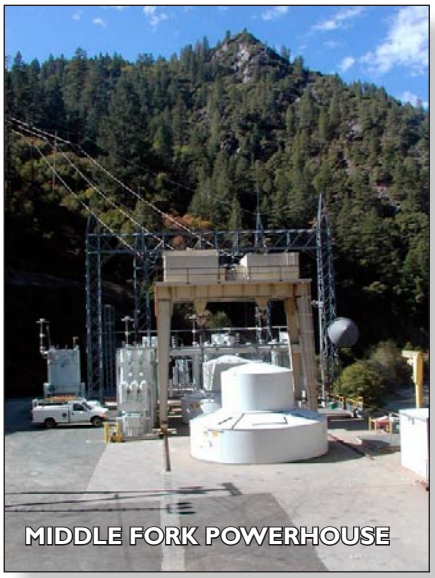
Decisions on the extent of the drawdown and the carryover target storage level is based on balancing of competing needs including: (1) providing sufficient empty storage space to minimize potential spills from the reservoirs during the next filling period if the runoff is high (wet year); and (2) retaining enough water in storage to ensure that license requirements and consumptive demands can be met in the following year if the next filling period runoff is low (dry year).

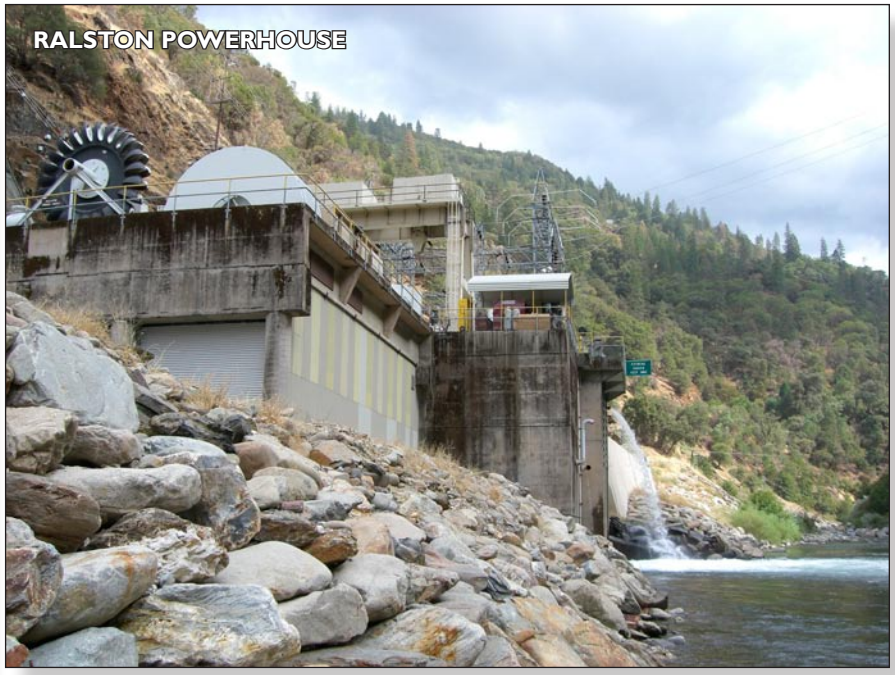


The ability of the hydroelectric project to generate electricity during periods of peak demand maximizes the value of the MFP.

Water supply operations take priority over power generation operations. However, in all but dry years, current water supply demands are easily met as a by-product of power generation. The reason is that both consumptive water and electrical demands tend to coincide seasonally and the MFP generally controls and releases far more water annually than

The Middle Fork and Ralston powerhouses account for over 90% of total MFP power generation.





The heart of the MFP is generation produced at Middle Fork and Ralston powerhouses.

PCWA requires to meet its consumptive water demand. The majority of PCWA's consumptive deliveries are withdrawn from Folsom Reservoir, where the United States Bureau of Reclamation (USBR) allows for a 30-day balancing of supply and demand; thus hourly or even daily releases from the MFP do not need to explicitly match consumptive deliveries from Folsom Reservoir. Only the re-diversion of water for consumptive demand at the American River Pump Station near Auburn (maximum 100 cfs) requires hourly MFP system balancing to meet continuous minimum instream flows requirements below the pumping station.

The Middle Fork and Ralston powerhouses are the heart of MFP generation. These two powerhouses generally run in tandem, using water transported from Hell Hole Reservoir to Ralston Afterbay. Together the two powerhouses have a rated capacity of 201.6 MW and produce about 90% of the MFP annual generation. Although Middle Fork Interbay is located between these powerhouses, Middle Fork Interbay has little ability to re-regulate flows because of its small storage capacity (175 ac-ft). If the flows through the Middle Fork and Ralston powerhouses are not matched, Middle Fork Interbay would be either drained or overtopped very quickly.

These powerhouses, running in tandem, are often used to help maintain reliable operations of the transmission grid by fine-tuning the flow of electricity in the grid to balance supply and demand. When operated to provide grid regulation, flow rates through the powerhouses vary quickly to meet constantly changing energy supply and demand conditions. These powerhouses

Critical elements of MFP operations

- ✓ The flexibility to raise and lower water levels (water storage) at French Meadows and Hell Hole reservoirs at different rates and times throughout the year
- ✓ The ability to release water from storage at the appropriate time to meet an annual consumptive demand of up to 120,000 ac-ft
- ✓ The ability to maximize generation during periods of high electrical demand, especially in the summer and fall of dry years when water availability may limit generating opportunities
- ✓ The ability to simultaneously operate the Middle Fork and Ralston powerhouses (timing and flow) to maximize peak generation while avoiding spills at the Middle Fork Interbay
- ✓ The ability to independently generate at Oxbow Powerhouse (decoupled from operations of the Middle Fork and Ralston powerhouses) by using the re-regulation capability of the Ralston Afterbay
- ✓ The ability to shutdown the MFP annually for relatively short periods to perform routine maintenance

are also frequently block loaded. When block loaded, flows through the powerhouses are usually set at an efficient operating level and run for a prescribed number of hours per day, depending upon hydrology.

French Meadows Powerhouse is used when water is moved from French Meadows Reservoir to Hell Hole Reservoir. It is nearly always operated in block loaded condition, with the duration of the block of operation set depending on the volume of water to be moved.

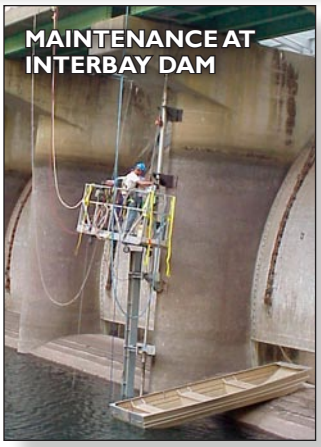
Ralston Afterbay and Oxbow Powerhouse are the final steps in the MFP system. Oxbow Powerhouse frequently runs in tandem with Middle Fork and Ralston powerhouses. Presently, water is released from Oxbow Powerhouse to the Middle Fork American River at the same rate it enters Ralston Afterbay. However, Ralston Afterbay has sufficient operational storage capacity (about 1,200 ac-ft out of 2,782 ac-ft gross) to allow Oxbow Powerhouse to operate independently of Middle Fork and Ralston powerhouses for several hours at a time. This independent operational flexibility is used to meet the ramping rate requirement downstream of Oxbow Powerhouse, and to make weekend releases for whitewater rafting without requiring operation of the Middle Fork and Ralston powerhouses.

Testing and Maintenance

To maintain and protect system reliability, PCWA conducts annual inspections, testing, and maintenance of Project facilities. Annual maintenance is scheduled at a time when the work can be expeditiously completed (during favorable flow and weather conditions) and have the least effect on water supply deliveries and power production.

These activities typically occur for facilities in the lower Project area beginning in late September, and require that the lower MFP powerhouses (Middle Fork, Ralston, and Oxbow) be taken out-of-service for 3-6 weeks. During the fall maintenance period, Middle Fork Interbay and Ralston Afterbay water levels are lowered to allow access to the facilities. Consumptive demands and instream flow requirements downstream of Oxbow Powerhouse during the fall outage are typically met by increasing flow releases from Hell Hole Reservoir into the Rubicon River. Inspection, testing, and the maintenance of facilities in the upper Project area (i.e., French Meadows and Hell Hole powerhouses), typically occur during the spring, once the roads to the Project facilities are passable.

Ongoing maintenance is essential for system reliability.



PCWA also implements routine maintenance activities within and around Project facilities to:

- Preserve Project flow and storage capacities by implementing sediment and debris management;
- Protect worker and public health and safety by implementing vegetation management, pest management, signage, and erosion and rock control measures;
- Provide facility access by implementing road and trail maintenance; and
- Protect facility reliability by implementing equipment maintenance, erosion and rock control measures, facility painting, and powerline and communication line pole replacement.

For Project recreational facilities, PCWA has on-going agreements with the TNF and ENF under which it provides the financial resources necessary to support a portion of the operation and restoration of these facilities by the respective National Forests. PCWA also has a cost-sharing agreement with the TNF and ENF to contribute funding for a portion of road maintenance on non-Project Forest Service roads used by PCWA.