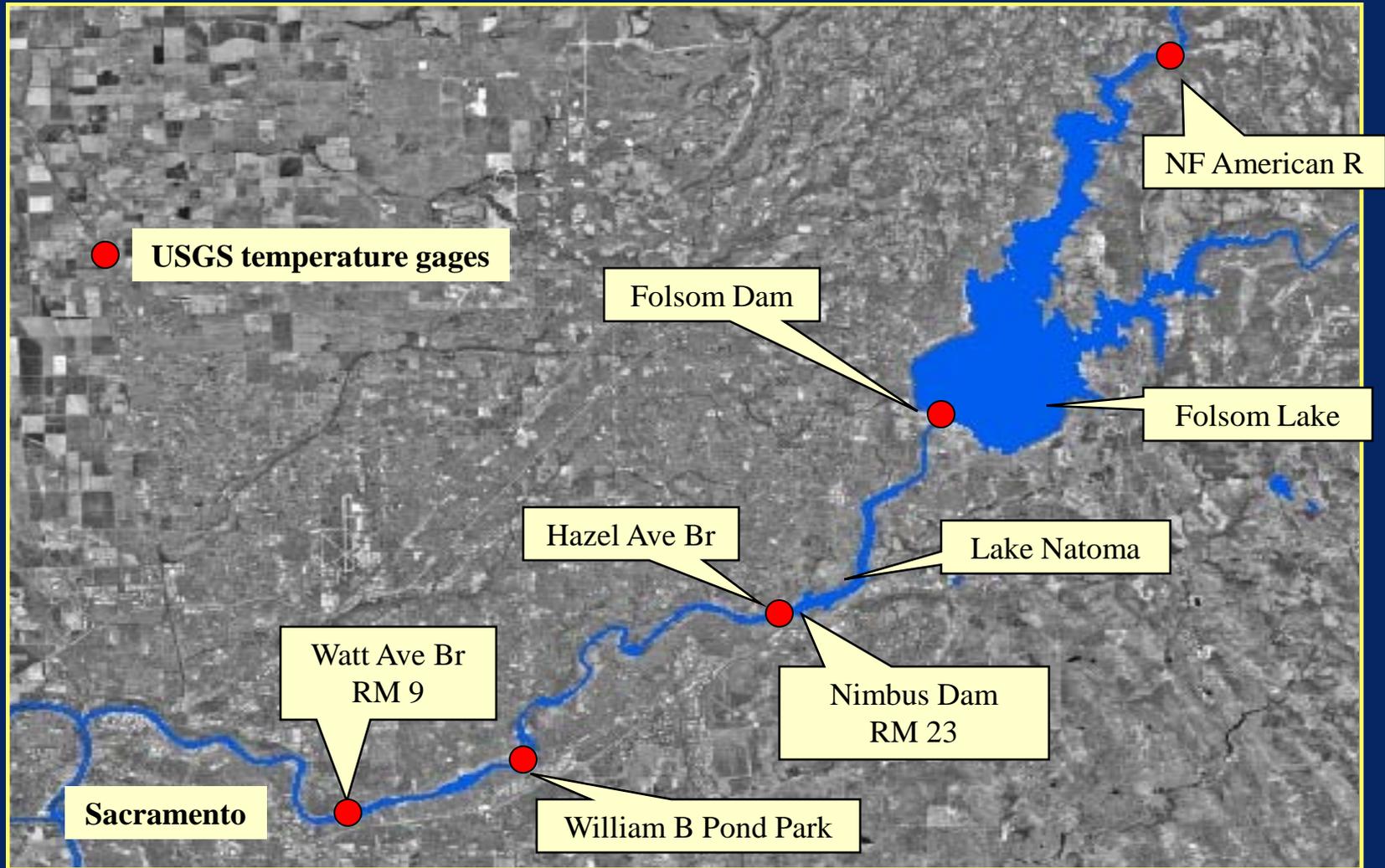


Annual Report – American River

June 5, 2009 to September 30, 2010



Lower American River



Central Valley Project (CVP)

- American River Division -

- **Folsom Dam is a multi-purpose project and a major component of the CVP**
- **CVP operational decision processes and tools**
 - **Monthly CVP operation outlooks consider flood control requirements, snowmelt/runoff estimates, in-stream and delta flow requirements, and water supply allocations**
 - **Day-to-day operation requires close coordination with the State Water Project and regulatory agencies, and effective use of short-term weather forecasts and available real-time information**
 - **CVP operation outlooks and lake temperature profiles are used to develop the annual temperature management plan for the lower American River**

NMFS RPA Actions

- American River -

- **Action II.1. Lower American River Flow Management**
 - Provide minimum flows for all steelhead life stages
- **Action II.2. Lower American River Temperature Management**
 - Maintain suitable temperatures to support over-summer rearing of juvenile steelhead in the lower American River
- **Action II.4. Minimize Flow Fluctuation Effects**
 - Reduce stranding and isolation of juvenile steelhead through ramping protocol
- **Monitoring**
 - Reclamation and DWR shall participate in the design, implementation, and funding of the comprehensive CV steelhead monitoring program

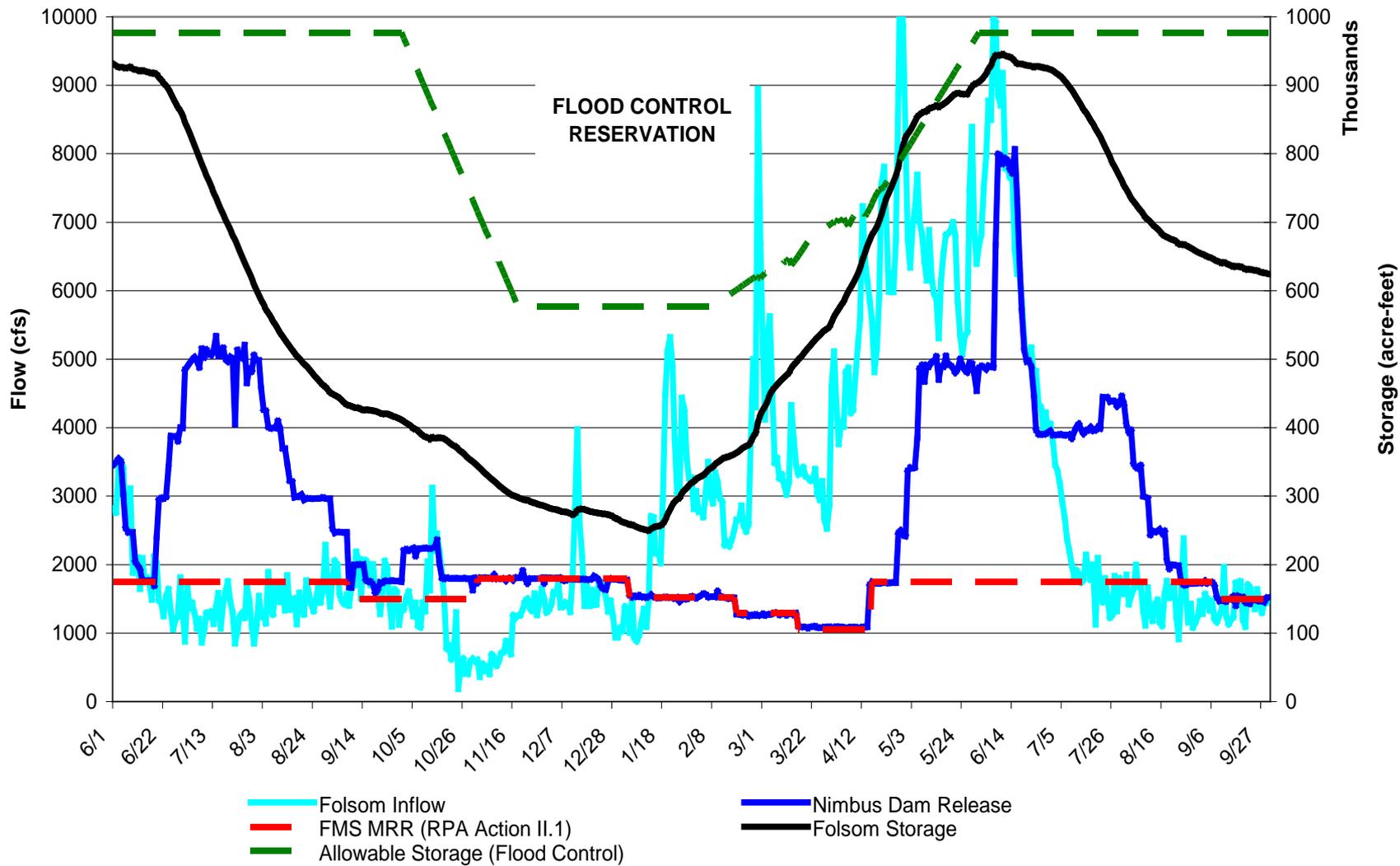
Action II.1. Lower American River Flow Management

- **Implement the flow schedule specified in the Water Forum's (WF) Flow Management Standard (FMS)**
 - **FMS flow schedule was developed by the WF, Reclamation, USFWS, NMFS, and CDFG to establish Minimum Release Requirements (MRR) for anadromous salmonids**
- **Reclamation to convene the American River Group (ARG)**
 - **ARG is comprised of representatives from Reclamation, NMFS, USFWS, and CDFG**
 - **The ARG (established in 1996) convenes monthly, or more frequently if necessary, to provide fishery updates and recommendations for managing temperature and flows for fish resources in the lower American River.**

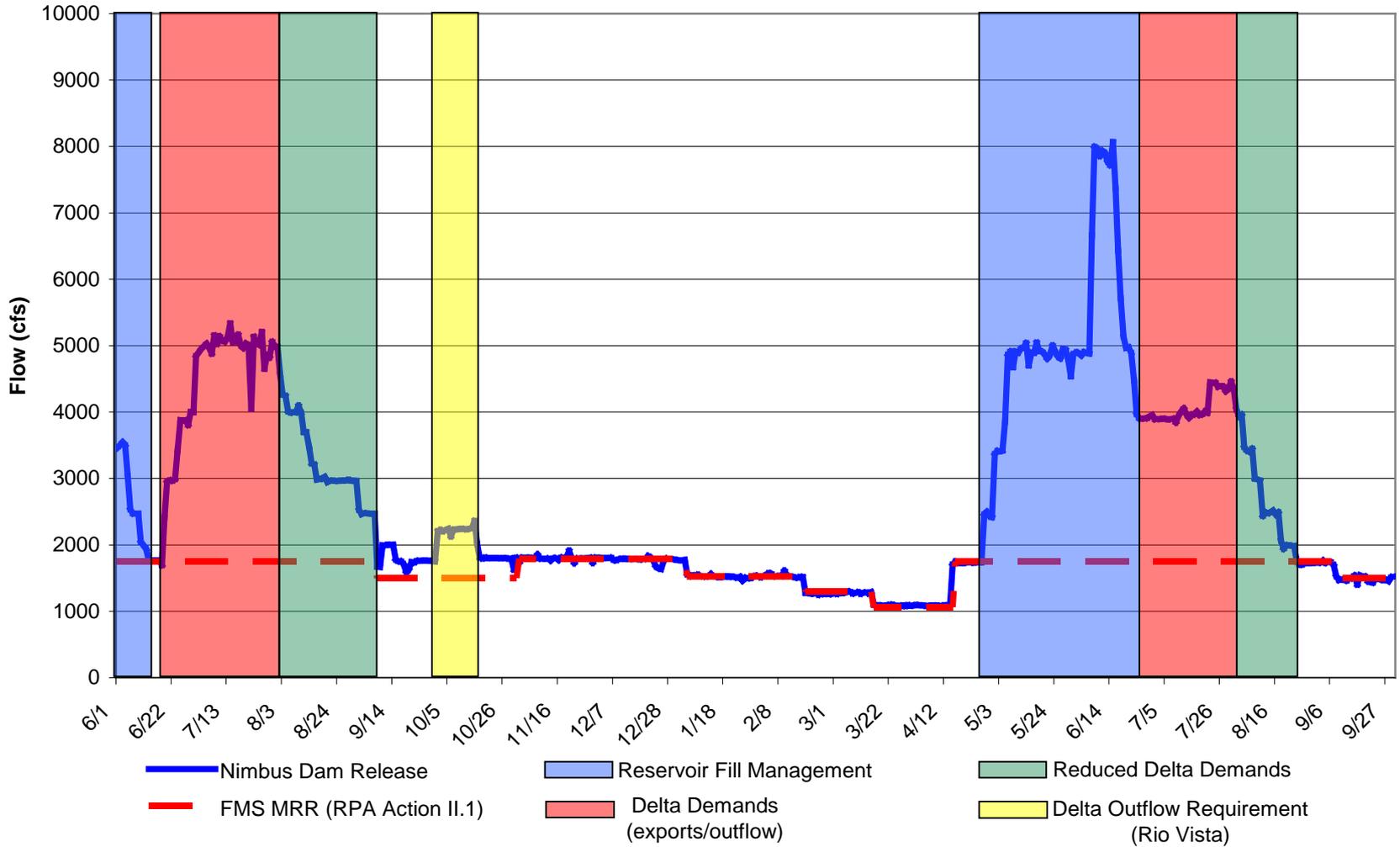
Action II.4. Minimize Flow Fluctuation Effects

- **From January 1 through May 30**
 - **For flow levels <5,000 cfs, flow reductions not to exceed 500 cfs/day and 100 cfs/hr**
 - **Exception – In September, flows are typically decreased for approximately 6 hours to install the pickets for the Nimbus Hatchery fish weir (Flow reduction objectives are relaxed during installation to minimize duration of reduced flows)**
 - **Reclamation to coordinate with NMFS, CDFG and USFWS to fund and implement monitoring to estimate incidental take of salmonids associated with release reductions**
- **Minimize occurrence of flows exceeding 4,000 cfs throughout the year, except as necessary for flood control**

Folsom Lake and the Lower American River 2009 - 2010



Lower American River Release 2009 - 2010



Action II.2. Lower American River Temperature Management

- **Reclamation to prepare draft Operations Forecast and Temperature Management Plan for Temperatures at Watt Avenue Bridge**
 - **Submit draft plan to NMFS for review by May 1**
 - **Produce and implement “final” plan**
 - **Update plan every month based on hydrology and operation and seek NMFS’ concurrence on proposed deviations**
 - **Temperature operation plans and updates are presented and discussed at monthly ARG meetings**
- **Temperature plan shall contain: (1) forecasts of hydrology and storage; (2) modeling runs; (3) operations plan showing that all other non-discretionary requirements are met; and (4) allocations for discretionary deliveries that conform to the plan**

Action II.2. Lower American River Temperature Management

- Reclamation to manage Folsom and Nimbus Dams and the Folsom Dam temperature control shutters to achieve 65°F or cooler at Watt Avenue throughout the summer**
- 65°F or cooler at Watt Avenue throughout the summer is rarely achieved because of structural and operational limitations, and end-of-May storage and cold-water pool conditions, so the temperature target ends up being set at the lowest temperature that the plan suggests can be met.**

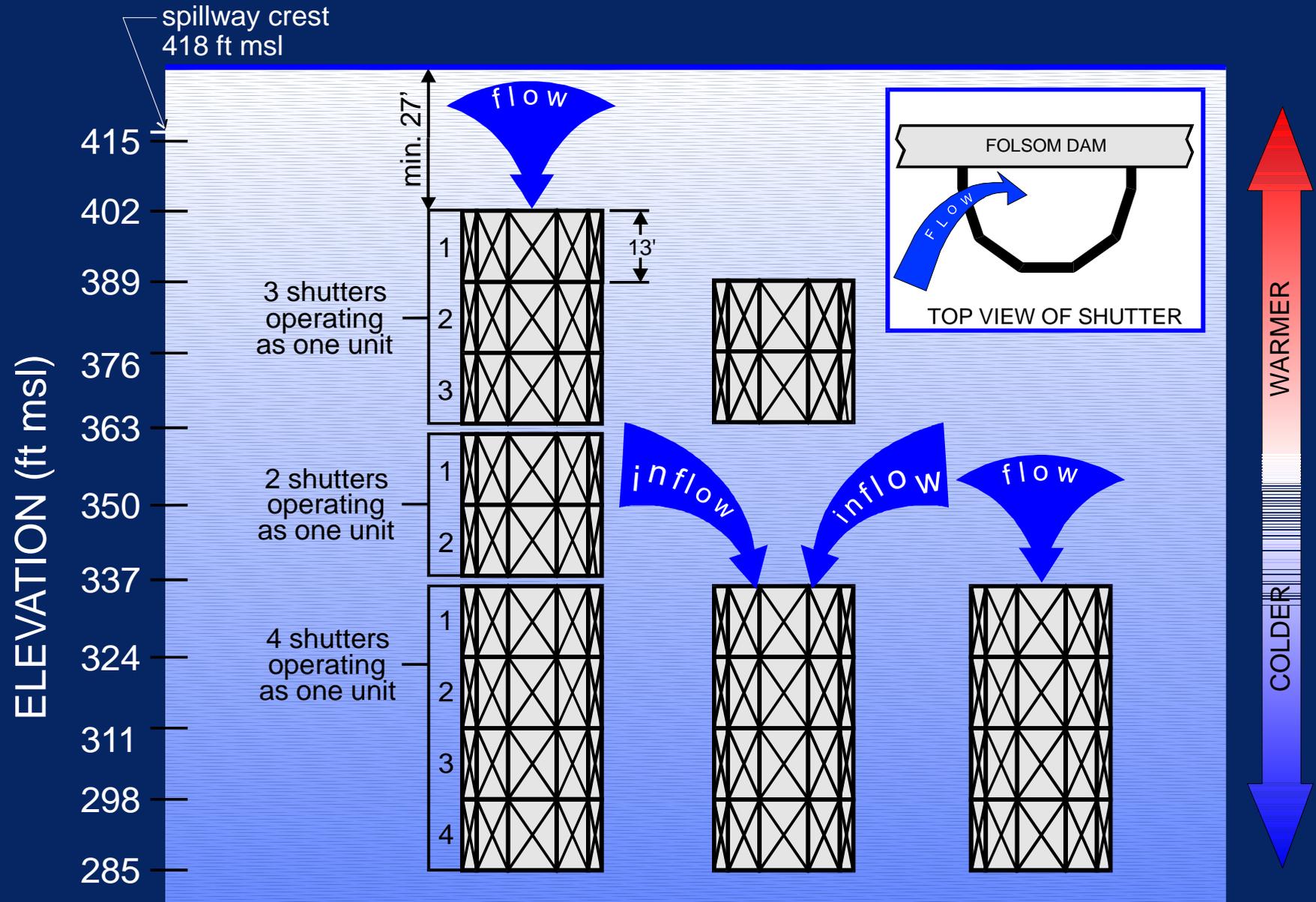
Temperature Operation Modeling and Facilities

- **An iterative Cold-Water Pool Management Model (iCPMM) is used to develop the temperature operation plan and monthly updates**
 - **Uses current Folsom Lake temperature profiles**
 - **Utilizes information from the latest CVP operation outlook of hydrology and storage**
- **Folsom Dam temperature shutters on the power penstocks**
 - **Each of Folsom Dam's three power penstocks has a temperature shutter mechanism allowing access to water from four elevations within the lake (Shutter sets are raised by the gantry crane on the dam)**
 - **Water temperature blending is accomplished by specifying the percent daily load on individual penstock units in different shutter configurations**

Temperature Shutters on Penstocks for Selective Withdrawal



Folsom Dam Shutters



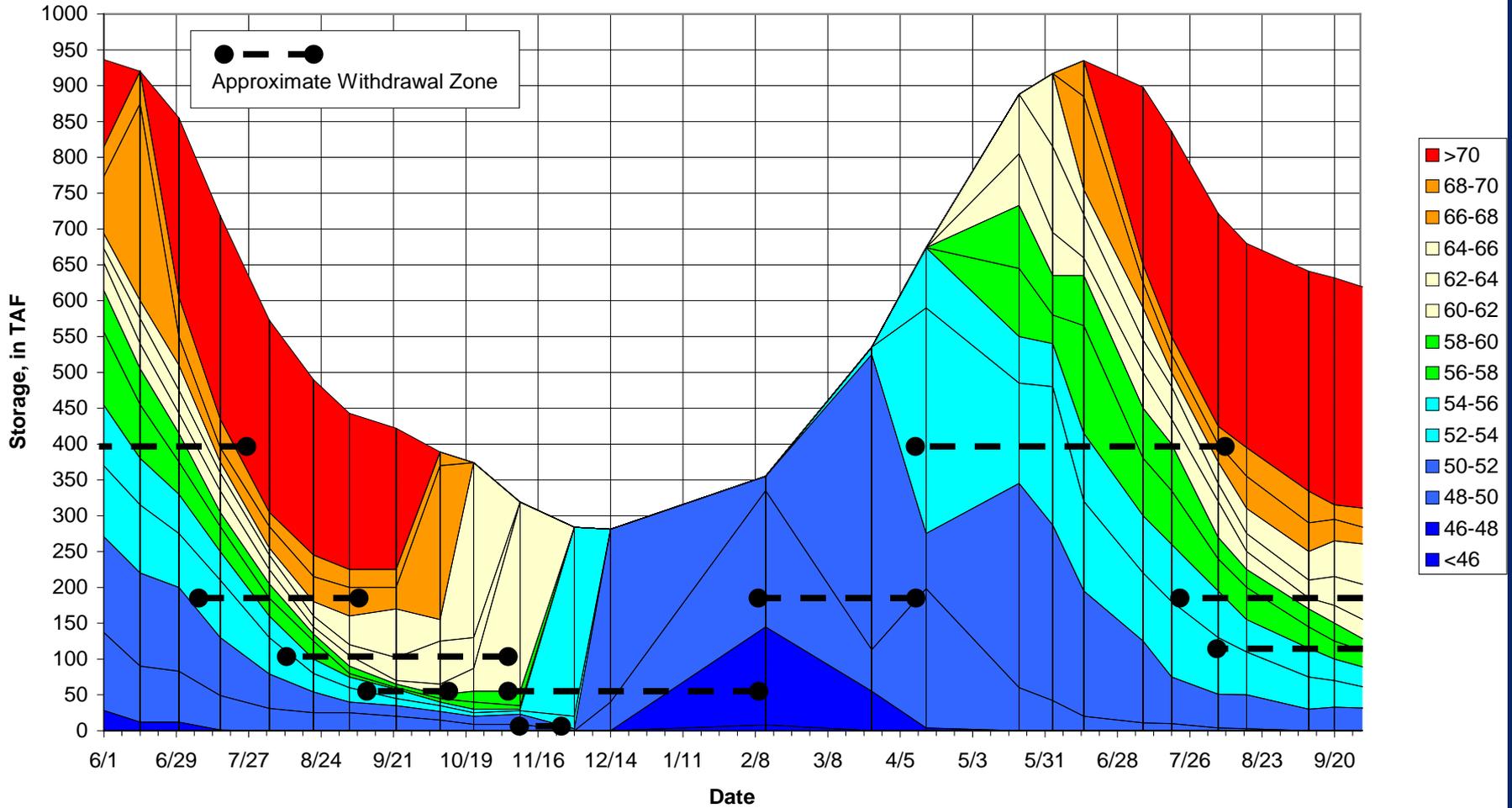
Temperature Shutter and Penstock Operation for Selective Withdrawal

Table 1 Temperature Shutter Configuration			
Date	Folsom Penstock Unit		
	1	2	3
12-Mar-09	A	A	A
07-Jul-09	A	A	U
28-Jul-09	A	U	U
29-Jul-09	U	U	U
13-Aug-09	M	U	U
25-Aug-09	M	M	U
10-Sep-09	M	M	L
05-Nov-09	L	L	L
03-Feb-10	U	L	L
09-Feb-10	U	U	U
14-Apr-10	A	A	A
21-Jul-10	U	A	A
06-Aug-10	U	A	M
11-Aug-10	U	U	M

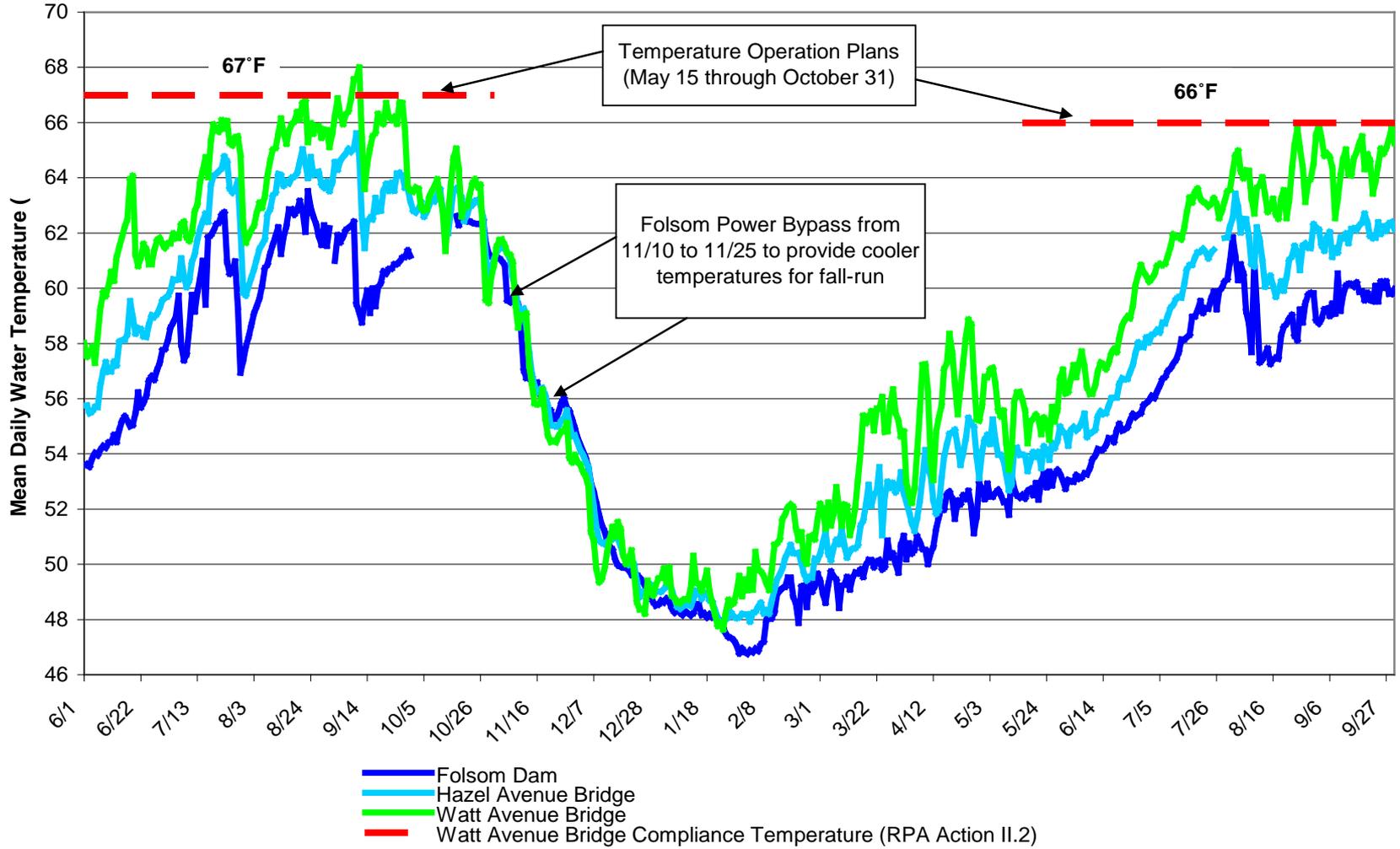
Shutter Position (U-Upper raised; M-Middle raised; L-Lower raised; A-All lowered)

Table 2 Folsom Penstock Unit Blending Operation (Approximate % Daily Load)			
Dates	Folsom Penstock Unit		
	1	2	3
2009			
01Jun-06Jul	No Unit Preferences		
07Jul-23Jul	No Unit Preferences		20
24Jul-25Jul	No Unit Preferences		30
26Jul-28Jul	No Unit Preferences		40
29Jul-12Aug	No Unit Preferences		
13Aug-20Aug	20	No Unit Preferences	
21Aug-22Aug	30	No Unit Preferences	
23Aug-28Aug	40	No Unit Preferences	
29Aug-10Sep	No Unit Preferences		30
11Sep-04Nov	No Unit Preferences		20
2010			
05Nov-20Jul	No Unit Preferences		
21Jul-01Aug	20	No Unit Preferences	
02Aug-03Aug	30	No Unit Preferences	
04Aug-10Aug	40	No Unit Preferences	
11Aug-31Aug	No Unit Preferences		10
01Sep-08Sep	No Unit Preferences		30
09Sep-10Sep	No Unit Preferences		20
11Sep-15Sep	No Unit Preferences		30
16Sep-17Sep	No Unit Preferences		40
18Sep-27Sep	No Unit Preferences		50
28Sep-30Sep	No Unit Preferences		60

Folsom Lake Isothermobaths 2009-2010 (Water Temperature, in ° F)



Lower American River Temperature 2009 - 2010



Summary

Action II.1. Lower American River Flow Management

- FMS flows were met

Action II.2. Lower American River Temp. Management

- Temp. plan developed and successfully implemented
- Iterative model developed
- Reclamation and NMFS are continuing to work together to refine the implementation plan for the action

Action II.4. Minimize Flow Fluctuation Effects

- Flow fluctuations were minimized and monitoring for stranded or isolated steelhead occurred when needed

Monitoring

- Steelhead redd surveys were conducted
- Reclamation and NMFS are working to refine monitoring activities