

March 10, 2014

Mr. Tom Howard  
Executive Director  
State Water Resources Control Board  
Post Office Box 100  
Sacramento, California 95812-0100

**VIA E-MAIL**  
Tom.howard@waterboards.ca.gov

Re: CVP/SWP Temporary Urgency Change – Request for Folsom Reservoir Operations Plan

Dear Mr. Howard:

The Cities of Folsom and Roseville and San Juan Water District serve approximately 500,000 people in Sacramento and Placer Counties. The American River is our local water source and each of our agencies depends on deliveries from Folsom Reservoir by the Bureau of Reclamation as our primary water supply. Consistent with the SWRCB's March 3, 2014 Modified Announcement for Revised Order on Temporary Urgency Change Petition for the Central Valley Project (CVP) and the State Water Project (SWP), we request that the SWRCB include in the order for Reclamation to issue, by April 15, 2014, an operations plans for Folsom Reservoir and the American River that would describe how Reclamation will ensure that adequate water supplies are available in that reservoir for our agencies and the American River region throughout this water year and into the 2014-2015 water year.

*Background on Our Agencies*

The primary water supply for our agencies and the approximately 500,000 people we serve is water diverted from Folsom Reservoir through the reservoir's water-supply intake. That intake would be dry if the amount of water stored in the reservoir were to drop below approximately 100,000 acre-feet (AF). Our agencies would begin to have serious water-supply problems at reservoir levels well above 100,000 AF because the intake's efficiency declines significantly as the intake is uncovered and air is drawn into our pipelines. As has been well reported, our intake was at serious risk of being dry as early as March or April before recent storms increased the amount of water stored in Folsom Reservoir. The reservoir reached its low point so far this year on February 6, 2014, when 162,617 AF were stored in the reservoir. As the SWRCB probably is aware, this water level was low enough that the foundations of buildings that had been inundated by the reservoir were exposed.

All of our agencies are located in the area of origin protected from impacts from the CVP's operation. (See Water Code §§ 11128, 11460.) In addition, each of our agencies holds priority rights in the operation of Folsom Reservoir.

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Folsom owns portions of the oldest water right in the South Fork of the American River, specifically a right based on an 1851 notice by the Natomas Water Company. That right is the basis for settlement contracts with Reclamation in which the City of Folsom holds rights, specifically Contract No. 14-06-200-5515A and Contract No. 14-06-200-4816A. Under those contracts, Folsom has the right to 27,000 AF a year (AFY) of deliveries from Folsom Reservoir. Those contracts do not authorize dry-year reductions by Reclamation. As authorized by Public Law No. 101-514, Folsom is also a subcontractor under Sacramento County Water Agency's CVP water-service contract.

San Juan Water District owns the oldest water right in the North Fork of the American River, specifically a right initiated by the North Fork Ditch Company in 1853. That right is the basis of a settlement contract with Reclamation that the District holds, namely Contract No. DA-04-167-eng-610. Under that contract, the District holds a right to 33,000 AFY of deliveries from Folsom Reservoir. That contract does not authorize dry-year reductions by Reclamation. The District also holds a 24,200 AFY CVP water-service contract with Reclamation.

Before Reclamation received its water-right permits for Folsom Dam and Reservoir, Roseville filed a water-right application for at least 120,000 AF a year from the American River. The State Water Rights Board (SWRB) considered that application while considering Reclamation's applications for Folsom Dam and Reservoir. In Decision 893, the SWRB decided not to approve Roseville's application, stating:

Permits are being issued to the United States to appropriate enough American River water to adequately supply the applicants naturally dependent on that sources and availability of water to such applicants is reasonably assured by the terms to be contained in the permits to be issued to the United States restricting exportation of water under those permits insofar as exportation interferes [*sic*] with fulfillment of needs within Placer, Sacramento and San Joaquin Counties.

The SWRB inserted Term 14 in Reclamation's Permits Nos. 11315 and 11316 to reflect this intent. (See *State Water Resources Control Board Cases* (2006) 136 Cal.App.4<sup>th</sup> 674, 814.) Roseville signed its 32,000 AFY CVP water-service contract with Reclamation in 1967. That contract is protected by Term 14. San Juan's CVP water-service contract also is protected by Term 14. Like Roseville, San Juan's predecessor agency also had filed its own pre-CVP water-right application for American River water.

In addition to Roseville's and San Juan's contracts with Reclamation, both agencies also have and use water-supply contracts with Placer County Water Agency (PCWA) for water that PCWA appropriates in its Middle Fork Project. Roseville's PCWA contract is for 30,000 AFY and San Juan's contract is for 25,000 AFY. Crucially, however, both Roseville and San Juan currently can only take delivery of their PCWA supplies through Folsom Reservoir's intake. Similarly, Folsom can only access water under its CVP water-service subcontract through that intake. While Folsom, Roseville and San Juan have contracts to water supplies under diverse sources, all of those supplies are dependent on Reclamation's operation of Folsom Reservoir

because all or nearly all water from those sources must be delivered through the intake in the reservoir.

*NMFS Biological Opinion and Reclamation's Folsom Reservoir Projections*

The National Marine Fisheries Service's (NMFS) 2009 biological opinion currently controls Reclamation's operation of Folsom Reservoir to meet streamflows in the lower American River. (A copy of the relevant portions of the biological opinion are attached.) For the American River, that biological opinion incorporates the 2006 Water Forum flow management standard (FMS). (Biological opinion, p. 613.) The FMS and the biological opinion contain an "off-ramp" from the specified flow standards that is triggered when it can be projected that storage in Folsom Reservoir will drop below 200,000 AF at any time during the next 12 months. (Biological opinion, Appendix 2-D, p. 1.) Under these off-ramp criteria, Reclamation has managed releases for lower American River streamflows in consultation with an "American River Group" (ARG) that includes NMFS, the U.S. Fish and Wildlife Service, the California Department of Fish and Wildlife and others.

The off-ramp criteria were triggered in 2013. That off-ramp remains in effect because Reclamation's latest operational projections indicate that Folsom Reservoir's storage very well might decline below 200,000 AF within the next twelve months. Reclamation's February 2014 projection for a 90% exceedance scenario with "minimum regulatory standards" – which we understand to include D-1641 Delta outflow requirements – show the reservoir's storage declining to 174,000 AF in August 2014 and reaching 127,000 AF in September. Reclamation's February 2014 projection for a 90% exceedance scenario with "minimum releases" – which we understand would involve some relief from D-1641's Delta-outflow requirements – show the reservoir's storage declining to a low of 235,000 AF in September 2014. (We have enclosed copies of both projections.) While Reclamation's projections show Folsom Reservoir storage increasing in October and November, our experience has indicated that the reservoir generally continues to decline in those months. Reclamation's projections therefore may underestimate how far the reservoir may decline before next winter. Consistent with the last three winters, Reclamation's operations plan must assume that next winter may be dry.

So far this water year, Reclamation's practice in operating under the biological opinion's off-ramp has been to determine Folsom Reservoir operations in real time through consultations with the ARG. Those consultations, along with the precipitation that our region has received, have allowed Reclamation to operate in real time beginning in December 2013 to avert the water-supply disaster that appeared to be looming in December. In order for our agencies to adequately plan for another potentially dry year next year, however, we request that the SWRCB include in the order for Reclamation to develop and submit a Folsom Reservoir operations plan to you.

*Request for Inclusion of Folsom Reservoir Operations Plan in Modified Order*

Your March 3 Modified Announcement requests comments on "[a] requirement to maintain a minimum quantity of water in Project reservoirs at the end of September sufficient to meet health and safety needs in the event of continued drought next year." As discussed above, a

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well-defined operations plan for Folsom Reservoir is critical for our agencies, and the American River region as a whole, to plan for providing water to the public during the rest of this year and into next year. We request that the SWRCB insert the following term in its next urgency order concerning CVP and SWP operations:

No later than April 15, 2014, Reclamation will deliver to the Deputy Director Reclamation's plan for operating Folsom Reservoir to meet the needs of water suppliers in the American River region, pursuant to their CVP contracts and water rights, and the lower American River during this water year and, assuming next winter is dry, the 2014-2015 water year. To develop this plan, as soon as possible, Reclamation will consult with water suppliers adjacent to Folsom Reservoir and the lower American River, as well as the Water Forum, concerning: (1) Reclamation's operation of that reservoir this water year; (2) a storage target for September 30, 2014; and (3) operations during the 2014 fall salmon spawning season. Reclamation will continue to consult with affected American River stakeholders throughout this year and will deliver any amendments to its operations plan to the SWRCB promptly upon Reclamation's adoption of those amendments. Reclamation will operate Folsom Reservoir according to its operations plan until at least January 1, 2015. Reclamation will promptly deliver copies of its operations plan that is due April 15, 2014, and any amendments to that plan, to the affected water suppliers and the Water Forum.

Such an operations plan will enable better planning for both water supplies and the lower American River's fish – including steelhead and fall-run Chinook salmon – by providing more definition to the "off-ramp" contained in NMFS's biological opinion.

*Conclusion*

We appreciate the opportunity to comment on the terms that the SWRCB may include in its revised temporary order for CVP and SWP operations. If you have any questions, please do not hesitate to contact any of us.

Very truly yours,

CITY OF FOLSOM

CITY OF ROSEVILLE

SAN JUAN WATER DISTRICT

By:   
\_\_\_\_\_  
Marcus Yasutake  
Environmental and  
Water Resources Director

  
By: \_\_\_\_\_  
Ed Kriz  
Director, Environmental  
Utilities

  
By: \_\_\_\_\_  
Shauna Lorange  
General Manager

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Enclosures

8618/American River/L031014rsb SWRCB Order

Cc: Felicia Marcus  
Frances Spivy-Weber  
Tam Dudoc  
Steven Moore  
Dorene D'Adamo  
Michael Buckman  
Tom Gohring

## BIOLOGICAL OPINION AND CONFERENCE OPINION

**ACTION AGENCY:** U.S. Bureau of Reclamation  
Central Valley Operations Office

**ACTIVITY:** Long-Term Operations of the Central Valley Project and State Water Project

**CONSULTATION CONDUCTED BY:** NOAA's National Marine Fisheries Service  
Southwest Region

**FILE NUMBER:** 2008/09022

**DATE ISSUED:**

### 1.0 BACKGROUND AND CONSULTATION HISTORY

#### 1.1 Purpose

The purpose of this document is to present NOAA's National Marine Fisheries Service's (NMFS) biological and conference opinion (Opinion), about whether the U.S. Bureau of Reclamation's (Reclamation) proposed long-term operations of the Central Valley Project (CVP), operated in coordination with the State Water Project (SWP; hereafter referred to as CVP/SWP operations, the proposed action, or the project), is likely to jeopardize the continued existence of the following species:

- Endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*, hereafter referred to as winter-run)
- Threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*, hereafter referred to as spring-run)
- Threatened Central Valley (CV) steelhead (*O. mykiss*)
- Threatened Central California Coast (CCC) steelhead (*O. mykiss*)
- Threatened Southern Distinct Population Segment (DPS) of North American green sturgeon (*Acipenser medirostris*, hereafter referred to as Southern DPS of green sturgeon)
- Endangered Southern Resident killer whales (*Orcinus orca*, hereafter referred to as Southern Residents)

or destroy or adversely modify the designated critical habitat of the above salmon and steelhead species, or proposed critical habitat for Southern DPS of green sturgeon. This Opinion is based on the best scientific and commercial information available.

**Action I.7. Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and Other Structures in the Yolo Bypass**

**Objective:** Reduce migratory delays and loss of adult and juvenile winter-run, spring-run, CV steelhead and Southern DPS of green sturgeon at Fremont Weir and other structures in the Yolo Bypass.

**Description of Action:** By December 31, 2011, as part of the plan described in Action I.6.1, Reclamation and/or DWR shall submit a plan to NMFS to provide for high quality, reliable migratory passage for Sacramento Basin adult and juvenile anadromous fishes through the Yolo Bypass. By June 30, 2011, Reclamation and/or DWR shall obtain NMFS concurrence and, to the maximum extent of their authorities, and in cooperation with other agencies and funding sources, begin implementation of the plan, including any physical modifications. By September 30, 2009, Reclamation shall request in writing that the Corps take necessary steps to alter Fremont Weir and/or any other facilities or operations requirements of the Sacramento River Flood Control Project or Yolo Bypass facility in order to provide fish passage and shall offer to enter into a Memorandum of Understanding, interagency agreement, or other similar mechanism, to provide technical assistance and funding for the necessary work. By June 30, 2010, Reclamation shall provide a written report to NMFS on the status of its efforts to complete this action, in cooperation with the Corps, including milestones and timelines to complete passage improvements.

Reclamation and/or DWR shall assess the performance of improved passage and flows through the bypass, to include an adult component for salmonids and sturgeon (*i.e.*, at a minimum, acoustic receivers placed at the head and tail of the bypass to detect use by adults).

**Rationale:** The Yolo Bypass and Fremont Weir has been a documented source of migratory delay to, and loss of, adult winter-run, spring-run, CV steelhead and Southern DPS of green sturgeon. The existing fish passage structure is inadequate to allow normal passage at most operational levels of the Sacramento River. The project agencies must work with the Corps, which owns and operates Fremont Weir, to achieve improvements for fish. Other structures within the Yolo Bypass, such as the toe drain, Lisbon Weir, and irrigation dams in the northern end of the Tule Canal, also can impede migration of adult anadromous fish. Additionally, stranding of juvenile salmonids and sturgeon has been reported in the Yolo Bypass in scoured areas behind the weir and in other areas. This action offsets unavoidable project effects on adult migration and minimizes the direct losses from flood management activities associated with operations.

**II. AMERICAN RIVER DIVISION**

**Introduction to American River Actions:** The CV steelhead DPS is the only species addressed in this Opinion with a spawning population in the American River. The DPS includes naturally spawned steelhead in the American River (and other Central Valley stocks) and excludes steelhead spawned and reared at Nimbus Fish Hatchery. The in-river population is small, with

observations of a few hundred adults returning to spawn in the American River each year. Limited observations made in 2003, 2004, 2005, and 2007 of whether in-river spawners were adipose fin-clipped or not indicate that some in-river spawners are of wild origin (Hannon and Deason 2008). This suggests that the listed stock has some ability to survive habitat conditions in the American River, Delta, and Ocean, even in their degraded state as described in preceding sections of this Opinion.

The in-river population is likely entirely made up of Nimbus Fish Hatchery steelhead or their descendents. Early Nimbus Fish Hatchery broodstock included naturally produced fish from the American River and stocks from the Washougal (Washington), Siletz (Oregon), Mad, Eel, Sacramento and Russian rivers, with the Eel River stock being the most heavily used (Staley 1976, McEwan and Jackson 1996).

Even though the American River steelhead population is small and is entirely influenced by hatchery fish with out-of-basin genetics, NMFS views the population as being important to the survival and recovery of the species. CV TRT shares this view by recommending that, “*every extant population be viewed as necessary for the recovery of the ESU*” (Lindley *et al.*, 2007). In addition, the steelhead population has presumably become somewhat locally adapted to the American River, and it has potential to substantially contribute to the viability of the DPS if water, habitat, and hatchery management efforts are coordinated and directed at achieving such a goal.

Key proposed project-related stressors include: (1) the provision of water temperatures warmer than steelhead life stage-specific requirements; (2) flow fluctuations that dewater redds, strand fry, and isolate fry and juveniles in off-channel pools where they are vulnerable to both predation and exposure to lethal and sub-lethal water temperatures; and (3) low flows limiting the availability of quality rearing habitat including predator refuge habitat.

The most influential baseline stressor to steelhead within the American River Division is the presence of Nimbus and Folsom dams, which block steelhead from all of their historic spawning and rearing habitat. This Opinion concludes that both increased water demands and effects of climate change will lead to further deterioration of suitable habitat conditions, including increased temperatures and decreased flows. Therefore, a passage program to expand the range of the American River steelhead population above Folsom Dam is necessary. If feasible, American River steelhead should be provided access to their full historic range. Given the long-term duration associated with the fish passage actions (see Fish Passage Program below, in Action V), it is necessary to plan and implement actions targeted at improving steelhead habitat below Nimbus Dam. NMFS concludes that coordinated management in four realms - water operations and associated structures, American River habitat, Nimbus Fish Hatchery operations, and in-river harvest – will substantially lower the extinction risk of American River steelhead

### **Action II.1. Lower American River Flow Management**

**Objective:** To provide minimum flows for all steelhead life stages.

**Action:** Implement the flow schedule specified in the Water Forum's<sup>29</sup> Flow Management Standard (FMS), which is summarized in Appendix 2-D of this Opinion. The FMS flow schedule has been developed by the Water Forum, Reclamation, USFWS, NMFS, and CDFG in order to establish required minimum flows for anadromous salmonids in the lower American River. The flow schedule specifies minimum flows and does not preclude Reclamation from making higher releases at Nimbus Dam.

Reclamation shall ensure that flow, water temperature, steelhead spawning, and steelhead rearing monitoring is conducted annually in order to help inform the ARG process and to evaluate take associated with flow fluctuations and warm water temperatures. Steelhead monitoring surveys should follow the objectives and protocols specified in the FMS Monitoring and Evaluation Program relating to steelhead spawning and rearing.

**Implementation procedures:** Reclamation shall convene the American River Group (ARG), comprised of representatives from Reclamation, NMFS, USFWS, CDFG and the Water Forum, to make recommendations for management within the constraints of the FMS. If there is a lack of consensus, ARG shall advise NMFS, and NMFS will make a recommendation to the WOMT for a decision.

**Rationale:** Reclamation operates Folsom Dam and Reservoir to provide water for irrigation, municipal and industrial uses, hydroelectric power, recreation, water quality, flood control, and fish protection. Reclamation operates Folsom Dam and Reservoir under a state water right permit and fish protection requirements that were adopted in 1958 as SWRCB Decision 893 (D-893). This decision allows flows at the mouth of the American River to fall as low as 250 cfs from January through mid-September, with a minimum of 500 cfs required between September 15 and December 31.

Biological, socioeconomic, legal, and institutional conditions have changed substantially since the SWRCB adopted D-893 in 1958. For example, D-893 does not address requirements of the CVPIA, the 1995 Bay Delta Plan, or previous Opinions to protect Central Valley anadromous salmonids. The SWRCB, Reclamation and many diverse stakeholders (e.g., Water Forum) involved in various American River actions have agreed that the conditions specified in D-893 are not sufficiently protective of the fishery resources within the lower American River.

The flow schedule specified in Appendix 2-D was developed to require more protective minimum flows in the lower American River in consideration of the river's aquatic resources, particularly steelhead and fall-run.

The monitoring called for in this RPA action including flow, water temperature, steelhead spawning, and steelhead rearing monitoring is necessary for the ARG to responsibly carry

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<sup>29</sup> In September 1993, the Water Forum, a diverse group of business and agricultural leaders, citizens groups, environmentalists, water managers, and local governments in the Sacramento Region, was formed to evaluate water resources and future water supply needs of the Sacramento metropolitan region.

out this mission. In addition, this monitoring is necessary to evaluate take associated with American River Division operations.

## **Action II.2. Lower American River Temperature Management**

**Objective:** Maintain suitable temperatures to support over-summer rearing of juvenile steelhead in the lower American River.

**Action:** Each year, Reclamation shall prepare a draft Operations Forecast and Temperature Management Plan based on forecasted conditions and submit the draft Plan to NMFS for review by May 1 of each year. The information provided in the Operations Forecast will be used in the development of the Temperature Plan. The draft plan shall contain: (1) forecasts of hydrology and storage; (2) a modeling run or runs, using these forecasts, demonstrating that the temperature compliance point can be attained (see Coldwater Management Pool Model approach in Appendix 2-D); (3) a plan of operation based on this modeling run that demonstrates that all other non-discretionary requirements are met; and (4) allocations for discretionary deliveries that conform to the plan of operation. Reclamation shall use an iterative approach, varying proposed operations, with the objective to attain the temperature compliance point at Watt Avenue Bridge. Within ten calendar days of receiving the draft Temperature Plan, NMFS will provide a written review of this plan for the purpose of determining whether requirements in this Opinion are likely to be met. Reclamation shall produce a final plan prior to May 15 deliveries and implement the plan upon finalization. Reclamation may update the plan every month based on hydrology and must seek NMFS' concurrence on proposed deviations from the plan that may reduce the likelihood that the temperature objective will be met.

**Temperature Requirement:** Reclamation shall manage the Folsom/Nimbus Dam complex and the water temperature control shutters at Folsom Dam to maintain a daily average water temperature of 65°F or lower at Watt Avenue Bridge from May 15 through October 31, to provide suitable conditions for juvenile steelhead rearing in the lower American River. If this temperature is exceeded for three consecutive days, or is exceeded by more than 3°F for a single day, Reclamation shall notify NMFS in writing and will convene the ARG to make recommendations regarding potential cold water management alternatives to improve water temperature conditions for fish, including potential power bypasses. If there is a lack of consensus on actions to be taken, the ARG shall advise NMFS and be elevated through the WOMT standard operating procedures.

**Exception:** When preparing the Operations Forecast and Temperature Management Plan, Reclamation may submit to NMFS a written determination that, after taking all actions within its authorities, it is unlikely to meet the above temperature requirement. This determination must be supported by specific iterative modeling techniques that vary allocations and delivery schedules such as application of the Coldwater Management Pool model (see Appendix 2-D). In the event that Reclamation determines that other nondiscretionary requirements (*e.g.*, D-1641 or requirements of the USFWS' Delta smelt biological opinion) conflict with attainment of the temperature requirement, Reclamation will

# APPENDIX 2-D – SUMMARY OF AMERICAN RIVER FLOW MANAGEMENT STANDARD

## SUMMARY OF THE FLOW MANAGEMENT STANDARD PROGRAM

### FOR THE LOWER AMERICAN RIVER

#### 1.0 FLOW MANAGEMENT STANDARD DESCRIPTION

The Flow Management Standard (FMS) for the Lower American River includes provisions for: (1) minimum flow and water temperature requirements; (2) the lower American River Group (ARG) to play a consultative role in operational decisions; and (3) monitoring and evaluation to ascertain the biological and ecological status of the river, and to provide input into the river management process.

#### 1.1 MINIMUM FLOW REQUIREMENTS

The Minimum Flow Requirements prescribe the minimum flows to be released from Nimbus Dam, and are the cornerstone of the FMS. The Minimum Flow Requirements do not preclude Reclamation from making higher releases at Nimbus Dam, and can vary throughout the year in response to the hydrology of the Sacramento and American river basins.

##### Minimum Release Requirements

The Minimum Release Requirements (MRR) range from 800 to 2,000 cfs based on a sequence of seasonal indices and adjustments. The minimum Nimbus Dam release requirement is determined by applying the appropriate water availability index (Index Flow). Three water availability indices (i.e., Four Reservoir Index (FRI), Sacramento River Index (SRI), and the Impaired Folsom Inflow Index (IFII)) are applied during different times of the year, which provides adaptive flexibility in response to changing hydrological and operational conditions.

During some months, Prescriptive Adjustments may be applied to the Index Flow, resulting in the MRR. If there is no Prescriptive Adjustment, the MRR is equal to the Index Flow.

Discretionary Adjustments for water conservation or fish protection may be applied during the period extending from June through October. If Discretionary Adjustments are applied, then the resultant flows are referred to as the Adjusted Minimum Release Requirement (Adjusted MRR).

The MRR and Adjusted MRR may be suspended in the event of extremely dry conditions, represented by “conference years” or “off-ramp criteria”. Conference years are defined when the projected March through November unimpaired inflow into Folsom Reservoir is less than 400,000 acre-feet. Off-ramp criteria are triggered if forecasted Folsom Reservoir storage at any time during the next twelve months is less than 200,000 acre-feet.

Water availability indices, Index Flows, Prescriptive Adjustments, MRRs, Discretionary Adjustments, and Adjusted MRRs are presented in **Table 1**.

**Table 1. Flow Management Standard Indices and Flow Requirements**

Month	Index	Index Flows (cfs)	Prescriptive Adjustments	Minimum Release Requirements (cfs)	Discretionary Adjustments	Adjusted Minimum Release Requirements (cfs)
October	FRI	800-1,500	NA	800-1,500	Fish Protection Adjustment	1,250-1,499
November	FRI	800-2,000	Spawning Flow Progression	800-2,000	NA	
December	FRI	800-2,000	NA	800-2,000	NA	
January	SRI If Above Normal or Wet Year (SRI $\geq$ 15.7 MAF) then release 1,750 cfs	1,750	December End-of-Month Storage Adjustment	800-1,750	NA	
	SRI If Dry or Below Normal Year (10.2 < SRI < 15.7 MAF) then maintain December MRR up to 1,750 cfs	800-1,750	When End-Of-December Storage is < 300 TAF, then January MRR is 85% of December MRR		NA	
	SRI If Critical Year (SRI < 10.2 MAF) then reduce MRR	85% of December MRR, but not less than 800	NA		NA	
February	SRI If Above Normal or Wet Year (SRI $\geq$ 15.7 MAF) then release 1,750 cfs	1,750	January End-of-Month Storage Adjustment	800-1,750	NA	
	SRI If Dry or Below Normal Year (10.2 < SRI < 15.7 MAF) then maintain January MRR up to 1,750 cfs	800-1,750	When End-Of-January Storage is < 350 TAF, then February MRR is 85% of January MRR		NA	
	SRI If Critical Year (SRI < 10.2 MAF) then reduce MRR	85% of January MRR, but not less than 800	NA		NA	
March through May	IFII	800-1,750	May End-of-Month Storage Adjustment When Calculated End-Of-May storage is < 700 TAF, then IFII Index Flow or February MRR, whichever is less	800-1,750	NA	
June through Labor Day	IFII	800-1,750	September End-of-Month Storage Adjustment When Calculated End-Of-September storage is < 300 TAF, then IFII Index Flow or Calculated Storage-Based Flow, whichever is less	800-1,750	Water Conservation or Fish Protection Adjustment	1,500-1,749
Post-Labor Day through September 30	IFII	June through Labor Day MRR, but not more than	NA	800-1,500	Fish Protection Adjustment	1,250-1,499

**Table 1. Flow Management Standard Indices and Flow Requirements**

Month	Index	Index Flows (cfs)	Prescriptive Adjustments	Minimum Release Requirements (cfs)	Discretionary Adjustments	Adjusted Minimum Release Requirements (cfs)
		1,500				

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## Water Availability Indices and Other Definitions

### *Four Reservoir Index*

The FRI is an index of the end-of-September combined carryover storage in Folsom, French Meadows, Hell Hole, and Union Valley reservoirs and is used to calculate the Index Flow for October through December.

### *Sacramento River Index*

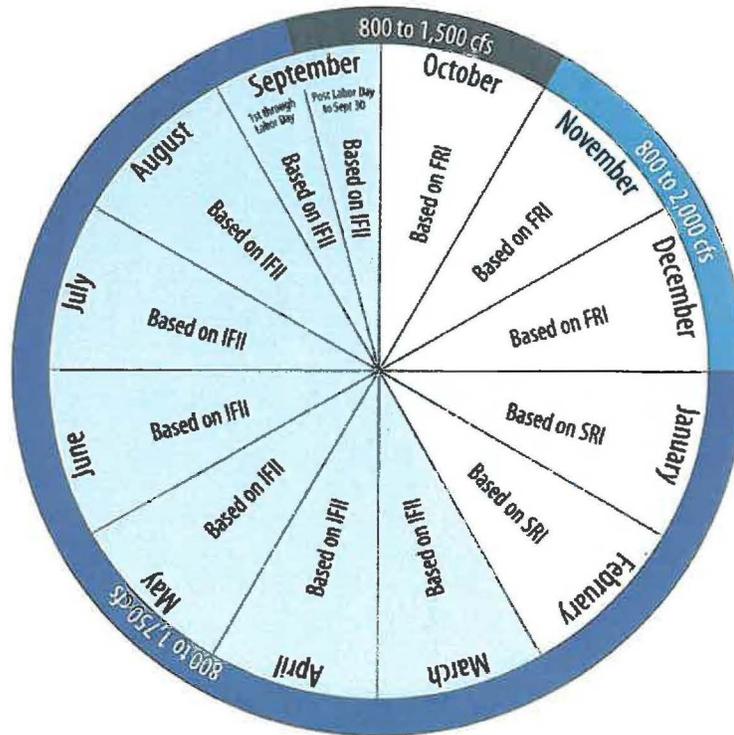
The SRI is an index of forecasted water year runoff for the Sacramento River Basin, and is used to calculate the Index Flow for the months of January and February.

### *Impaired Folsom Inflow Index*

The IFII is an index of the forecasted volume of flow into Folsom Reservoir from May through September, and is used to calculate the Index Flow from March through September.

### *Index Flows*

Index Flows are the initial flows (nominal flows) identified by application of the various water availability indices, and are subject to Prescriptive and Discretionary Adjustments, which result in Minimum Release Requirements (defined below). Year-round water availability indices and corresponding Index Flows are presented in **Figure 2**. The October 1 through December 31 Index Flows range between 800 and 2,000 cfs. The January 1 through Labor Day Index Flows range between 800 and 1,750 cfs. The post-Labor Day through September 30 Index Flows range between 800 and 1,500 cfs.



## Figure 2. Index Flow Requirements

### Prescriptive Adjustments

The FMS includes five Prescriptive (non-discretionary) Adjustments to the Index Flows in consideration of Folsom Reservoir storage and water conservation.

- Chinook Salmon Spawning Flow Progression Adjustment
- December End-of-Month Storage Adjustment
- January End-of-Month Storage Adjustment
- May End-of-Month Storage Adjustment
- September End-of-Month Storage Adjustment

When Prescriptive Adjustments are applicable, the MRR is equal to the value that results from applying the given adjustment to the Index Flow. When Prescriptive Adjustments are not applicable, the MRR is equal to the Index Flow.

### Discretionary Adjustments

Two types of discretionary adjustments are possible: (1) water conservation; and (2) fish protection. A water conservation Discretionary Adjustment may be implemented in consideration of Folsom Reservoir storage, but will not be permitted if it would be likely to cause or exacerbate harmful water temperature-related impacts to rearing juvenile steelhead or spawning fall-run Chinook salmon. Fish protection includes conservation of remaining cold water reserves, taking into account effects of the Discretionary Adjustment on in-river water temperature and habitat.

## Overview of the Coldwater Pool Management Model and the Automated Temperature Selection Procedure

### Coldwater Pool Management Model

Flexibility to meet the Flow Management Standard (FMS) water temperature objectives may be promoted by using the Coldwater Pool Management Model (CPMM) in the development and updating of the Annual Water Temperature Management Plan. The CPMM may be used to select the most beneficial seasonal target temperature objectives for the lower American River during a given year. Selection of seasonal water temperatures is:

- Characterized by the rate and duration with which available cold water will be released from Folsom Reservoir to control water temperatures
- Based on the biological benefit expected from controlling lower American River water temperatures
- Limited by the amount of cold water available in Folsom Reservoir.

The CPMM requires:

February 2014 90% b2 Forecast - Minimum Releases

**Storages**

**Federal End of the Month Storage/Elevation (TAF/Feet)**

		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
Trinity		1162	1148	1150	1111	963	795	639	484	334	302	#N/A	#N/A	#N/A
	Elev.	2271	2271	2267	2251	2230	2208	2182	2150	2142	#N/A	#N/A	#N/A	
Whiskeytown		205	206	206	238	238	238	238	230	206	201	186	206	
	Elev.	1199	1199	1199	1209	1209	1209	1209	1207	1199	1197	1192	1199	
Shasta		1656	1678	1703	1625	1462	1244	928	707	690	654	692	762	885
	Elev.	937	939	934	923	906	878	855	853	849	853	861	874	
Folsom		164	290	310	315	321	302	273	254	235	240	251	272	303
	Elev.	385	389	390	391	388	382	379	375	376	378	382	388	
New Melones		1046	1051	1026	962	876	782	675	569	491	472	474	479	483
	Elev.	949	946	937	924	910	892	872	856	852	852	853	854	
San Luis		333	342	350	344	310	245	170	106	64	107	230	374	524
	Elev.	414	412	402	386	372	356	340	331	360	399	434	466	
<b>Total</b>		4714	4744	4595	4170	3607	2924	2358	2043	1981	#N/A	#N/A	#N/A	

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**Monthly River Releases (TAF/cfs)**

Trinity	TAF	17	18	36	92	47	28	28	27	23	18	18	18
	cfs	300	300	600	1,498	783	450	450	450	373	300	300	300
Clear Creek	TAF	11	12	12	12	9	7	5	9	12	12	12	12
	cfs	200	200	200	200	150	120	85	150	200	200	200	200
Sacramento	TAF	180	200	292	406	470	546	436	238	264	201	200	200
	cfs	3250	3250	4900	6600	7900	8889	7095	4001	4300	3373	3250	3250
American	TAF	28	31	30	31	30	31	31	30	31	30	31	31
	cfs	500	500	500	500	500	500	500	500	500	500	500	500
Stanislaus	TAF	12	16	29	25	33	24	22	14	35	12	12	13
	cfs	214	268	480	410	561	396	352	240	577	210	200	213

**Trinity Diversions (TAF)**

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Carr PP	6	1	39	76	127	128	127	122	17	15	4	29
Spring Crk. PP	5	8	10	70	120	120	120	120	30	10	11	4

**Delta Summary (TAF)**

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Tracy	55	45	45	46	45	45	45	45	110	150	160	170
USBR Banks	0	0	0	0	0	0	0	0	0	0	0	0
Contra Costa	7	7	6.4	6.4	6.4	4.9	5.6	6.4	7	8.4	9.2	9.2
<b>Total USBR</b>	62	52	51	53	51	50	51	51	117	158	169	179
<b>Total Export</b>	107	97	72	74	96	95	96	96	227	308	329	349
<b>COA Balance</b>	0	0	0	0	0	0	0	0	0	0	0	0

Old/Middle River Std.												
Old/Middle R. calc.	-1,410	-1,055	-873	-894	-1,351	-1,359	-1,424	-1,473	-2,654	-4,018	-4,162	-4,407

Computed DOI	9744	5840	2152	2765	437	146	1887	3446	4132	4152	3953	4067
Excess Outflow	9744	5840	2152	2765	437	146	1887	3446	4132	4152	3953	4067
% Export/Inflow	16%	17%	21%	17%	24%	26%	25%	23%	46%	56%	63%	61%
% Export/Inflow std.	45%	35%	35%	35%	35%	65%	65%	65%	65%	65%	65%	65%

**Hydrology**

Water Year Inflow (TAF)	Clair Engle	Shasta	Folsom	New Melones
Year to Date + Forecasted	150	1,973	568	215
% of mean	12%	36%	21%	20%

**February 2014 90% b2 Forecast  
Minimum Regulatory Standards**

**Storages**

**Federal End of the Month Storage/Elevation (TAF/Feet)**

		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	
Trinity		1162	1148	1150	1111	963	795	639	484	334	302	#N/A	#N/A	#N/A
	Elev.	2271	2271	2267	2251	2230	2208	2182	2150	2142	#N/A	#N/A	#N/A	
Whiskeytown		205	206	206	238	238	238	238	230	206	201	186	206	
	Elev.	1199	1199	1209	1209	1209	1209	1209	1207	1199	1197	1192	1199	
Shasta		1656	1678	1703	1566	1326	948	442	194	150	84	93	152	276
	Elev.	937	939	930	913	880	819	765	751	722	727	752	786	
Folsom		164	290	310	312	316	273	210	174	127	133	143	165	196
	Elev.	385	389	389	390	382	369	360	346	348	351	358	366	
New Melones		1046	1051	1026	962	876	782	675	569	491	472	474	483	
	Elev.	949	946	937	924	910	892	872	856	852	852	853	854	
San Luis		333	342	350	344	310	245	170	124	189	335	464	617	777
	Elev.	415	413	404	389	374	356	341	354	391	431	464	494	
<b>Total</b>		4714	4744	4533	4028	3281	2375	1781	1521	1532	#N/A	#N/A	#N/A	

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**Monthly River Releases (TAF/cfs)**

Trinity	TAF	17	18	36	92	47	28	28	27	23	18	18	18
	cfs	300	300	600	1,498	783	450	450	450	373	300	300	300
Clear Creek	TAF	11	12	12	12	9	7	5	9	12	12	12	12
	cfs	200	200	200	200	150	120	85	150	200	200	200	200
Sacramento	TAF	180	200	351	483	631	738	467	268	295	230	218	200
	cfs	3250	3250	5900	7850	10600	12000	7595	4501	4800	3873	3552	3250
American	TAF	28	31	33	33	54	65	49	58	31	30	31	31
	cfs	500	500	556	534	908	1054	798	973	500	500	500	500
Stanislaus	TAF	12	16	29	25	33	24	22	14	35	12	12	13
	cfs	214	268	480	410	561	396	352	240	577	210	200	213

**Trinity Diversions (TAF)**

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Carr PP	6	1	39	76	127	128	127	122	17	15	10	29
Spring Crk. PP	5	8	10	70	120	120	120	120	30	10	17	4

**Delta Summary (TAF)**

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Tracy	55	45	45	46	45	45	63	153	213	155	170	180
USBR Banks	0	0	0	0	0	0	0	0	0	0	0	0
Contra Costa	7	7	6.4	6.4	6.4	4.9	5.6	6.4	7	8.4	9.2	9.2
<b>Total USBR</b>	62	52	51	53	51	50	69	159	220	163	179	189
<b>Total Export</b>	117	97	72	74	81	80	95	198	328	377	349	369
<b>COA Balance</b>	0	0	5	-14	-11	65	68	81	81	81	81	81

Old/Middle River Std.												
Old/Middle R. calc.	-1,549	-1,055	-873	-894	-1,157	-1,171	-1,412	-2,793	-3,919	-4,911	-4,413	-4,658

Computed DOI	9563	5840	4001	4002	4001	4002	2993	3009	2993	3496	3920	3741
Excess Outflow	2467	1838	0	0	0	0	0	0	0	0	423	244
% Export/Inflow	17%	17%	15%	14%	13%	13%	21%	41%	63%	65%	65%	64%
% Export/Inflow std.	45%	35%	35%	35%	35%	65%	65%	65%	65%	65%	65%	65%

**Hydrology**

Water Year Inflow (TAF)	Clair Engle	Shasta	Folsom	New Melones
Year to Date + Forecasted	150	1,973	568	215
% of mean	12%	36%	21%	20%