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April 30, 2012

Charlie Hoppin, Chairman
State Water Resources Control Board
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Re: Water Operations Modeling and Hydro-Generation and Economic Analysis

Dear Chairman Hoppin:

The San Joaquin Tributaries Authority ("SJTA") would like to thank the State Water Resources Control Board ("State Water Board") staff for its early release of the hydro-generation and economic analysis appendices. The SJTA has reviewed the appendices, analyzed the underlying modeling, and offers the following comments pursuant to the State Water Board's request. These comments also provide the SJTA's concerns regarding the State Water Board's staff's approach to environmental analysis of the review of the San Joaquin River objectives.

The State Water Board staff modeled the impact of the proposed amendment to San Joaquin River flow objectives on both the hydropower and the agriculture sectors by assuming a specific method of operations, hereinafter referred to as "rule curves." The rule curves used by State Water Board staff are not based on any past, current, or anticipated method of operation by the tributary projects. The State Water Board staff's rule curves are overly simplistic, and appear to be developed for the purpose of making numbers work, without consideration of real-world operational objectives of water delivery goals and changing water supply conditions. Not surprisingly, application of the rule curves results in fundamental legal, operational, and modeling problems.

Rule curves are the foundation of the State Water Board staff's current environmental impacts analyses. Thus, to the extent the rule curves are flawed, so too are the impact analyses. Because the rule curves largely mask impacts, the potentially devastating impacts of the proposed flow objectives operations have not been evaluated.

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Explanation of Rule Curves

The methodology of the rule curves is described by State Water Board staff as follows:

> "On January 30th, the reservoir storage of New Melones, New Don Pedro and New Exchequer will be determined. Based on the amount of water in storage the staff has developed rule curves for how much water can be diverted in the coming year based on the percentage of unimpaired flow the State Water Board adopts. These rule curves relate the end of January storage each year to the allowable total surface water diversions (as a percentage of the maximum allowable annual diversion) for the remainder of that year, starting in February and ending the following January. … The curves were developed iteratively to maximize diversions and minimize the number of years resulting in carryover storage lower than 300 thousand acre feet (TAF), 500 TAF, and 200 TAF for New Melones, New Don Pedro, and Lake McClure reservoirs respectively. "

This means the State Water Board staff's rule curves look at a single day of storage – January 30 – and from this storage snapshot sets the amount of water each reservoir releases to water users for the entire year. The development of the rule curves is based on an iterative, or trial-and-error, analysis that looks at the results of predicted project operations over a long sequence of hydrology. The parameters used by the rule curves include: (a) the proposed flow regulation the State Water Board plans to adopt, defined as a percent of computed unimpaired flow, (b) the reservoir storage level on January 30, and (c) the maximum annual surface diversions.

The State Water Board's staff looks at storage in January and makes a determination that annual surface water diversions will be restricted or cut-back by a certain percent. These cutbacks are based on the State Water Board staff's assumption that the water operator will account for the regulatory reduction solely by reducing water deliveries and the proposed reductions will affect reservoir storage minimally, if at all. The State Water Board staff has set forth examples of the rule curves applied on each of the tributaries in Tables X-2a (Stanislaus), X-2b (Tuolumne), and X-2c (Merced).

Illustration of Rule Curve to a Hypothetical Condition

Assume the State Water Board amends the San Joaquin River flow objective requiring 40 percent of unimpaired flow. If this flow requirement were applied to the Tuolumne River on a year where the January 30 storage level at Don Pedro Reservoir was modeled as 1,000,000 acre feet, the rule curves would allow the delivery of only 45 percent of the assumed maximum annual surface water diversions. (See, Table X-2b.) The maximum annual surface water diversions assumed by staff for the Tuolumne River total 1,100,000 acre feet.[1] Therefore, in this example, the rule curves would only allow the diversion of 495,000 acre feet of surface water for delivery to water users.

[1] This analysis of implementation has major flaws regarding annual diversions within the watersheds. The use of a maximum annual diversion as the basis of annual demand does not adequately capture the variability of water demands within the watersheds from year to year.

Effects of the Rule Curves

(1) No Adjustment for Post-January 30 Precipitation and/or Runoff.

By only considering reservoir storage at the end of January, the State Water Board staff rule curves do not adequately consider the available water supply throughout the year and thus, misrepresent water deliveries for the ensuing year. The San Joaquin River basin is a snowmelt system in which over 80 percent of the San Joaquin River basin runoff occurs between February and July. Reservoir storage at the end of January may provide some insight into the previous year's water supply condition, but it is woefully inadequate to represent the water supply yet to come. Therefore, the rule curves set annual water delivery restrictions without taking into consideration (or adjusting for) approximately 80 percent of the annual water supply.

(2) Mandatory Delivery Reduction Regardless of Water Year Type.

Application of the rule curves methodology would result in reducing water deliveries in every year, regardless of the actual quantity of computed unimpaired flow. This outcome does not make sense. For instance, in the case of the Tuolumne River (See Table X-2b), staff's rule curves would allow only 45-85 percent of deliveries in years of healthy storage under a 30 percent unimpaired flow alternative. This result would require that even when reservoirs are full and the annual computed unimpaired flow is well above normal, deliveries would be curtailed.

The absurdity of this outcome is demonstrated when you look at years like 1982 and 1983, in which there was flooding and high river flows. The application of staff's rule curves would maintain the cutbacks in these types of years, shorting water delivery and compounding flood problems. Another illustration occurs for wet years that follow prolonged droughts. January reservoir storage can be relatively low entering wet years, such as 1978 and 1993, because of preceding drought. Staff's rule curves would result in extreme diversion curtailments during such years due to the storage-only rule curves, whereas current operations would allow near full delivery in such plentiful years.

(3) Limitation of Reservoir Operations.

Another problem with the rule curves is the State Water Board staff's objective to retain "end-of-September storages (carryover storage)" similar to baseline amounts. (SWRCB Technical Report, at 5-8.) This objective denies the reality that regulatory flow objectives may cause project operators to operate their reservoirs more aggressively from year to year in order to serve their mission of delivering water. The result of a more aggressive operation would be a greater fluctuation of storage within years and between years compared to history or baseline; thus resulting in less carryover storage.

Figure 1 illustrates the fundamental differences between staff's rule curves and how the SJTA depicts anticipated operations resulting from a proposed flow requirement based on computed unimpaired flow. The illustration shown in Figure 1 assumes the 30 percent unimpaired flow requirement scenario developed by State Water Board staff. For an example of the difference in results between staff and SJTA modeling, Tuolumne River operations are shown. Figure 1 illustrates the

annual diversions for staff's and SJTA depictions of the 30 percent computed unimpaired flow requirement scenario. Also shown is the SJTA's depiction of existing conditions (baseline). Figure 1 shows there are significant differences, most notably the absence of full diversions in any year by staff's modeling.

Figure 2 shows the differences in reservoir storage that occur between the two models, manifesting from the difference in surface water diversions. Staff's simulation of storage traces relatively consistent with the baseline conditions, even with the 30 percent computed unimpaired flow requirement. Contrary to that result is storage under current operations; current operations would result in increased fluctuation in reservoir storage in an attempt to meet the needs of water users and capture more water in wet years. The resulting limitations in reservoir operations would manifest as differences in river flows and hydropower generation.

(4) Misrepresented and Increased Spill.

Because the rule curves implement the proposed flow objectives through curtailed water delivery, reservoir storage remains unchanged or higher than baseline levels. In turn, the amount of storage available for capturing water in wet years would be limited and the frequency of required flood control spills would increase. Additionally, one year's misrepresentation of deliveries may result in affecting the following year's storage. Because storage is the basis for determining annual allowed water delivery, the error is compounded from year to year.

(5) Proposed Objective Results in More than the Required Unimpaired Flow.

The implementation of staff's rule curves would result in providing more than the regulatory proposed percentage of computed unimpaired flow. The rule curves push water into storage, which results in more frequent spills in excess of the regulatory required flow. These spills would be in addition to the required percent of unimpaired flow and result in water in excess of the regulatory mandated percent of unimpaired flow being sent down the San Joaquin River.

(6) Masked Impact to Storage

The implementation of the rule curves would reduce water delivery by pushing water into storage. The effect of pushing water into storage instead of allowing water to be delivered masks the impacts of the proposed regulation to the extent the impacts are measured by reservoir storage. A more realistic depiction of operations would result in impacts in water storage at the reservoirs, in addition to impacts to water delivery. Staff's rule curves result in little to no impact to storage. A completely different outcome would occur if the rule curves recognized that reservoirs will be operated to maximize water deliveries.

(7) Masked Impact to Hydropower

State Water Board staff's use of rule curves shows essentially no impact to hydropower generation between the alternatives at the major dam hydroelectric facilities. This is unsurprising because the result of staff's modeling maintains similar reservoir storage among the unimpaired flow alternatives and the baseline. Similar to the misrepresentation of reservoir storage, the hydropower

impacts are masked. Real-world operation of the proposed regulations (without rule curves) creates fluctuation in reservoir storage, lowering the head in the reservoirs and resulting in increased hydropower impacts.

(8) Maximum/Minimum Bounds on Required Flows

The staff's rule curves also incorporate a maximum and minimum requirement in addition to the percent of unimpaired flow, e.g., if X percent of computed unimpaired flow is less than a minimum flow, the minimum flow is required and if X percent of computed unimpaired flow is more than the maximum, only the maximum instream flow is required. These floor and ceiling caps are described in Table X-1. The staff's rule curves assumes these flow constraints on a monthly average flow basis while the proposed flow requirement and its implementation have not yet been defined. The impact of such a bounding mechanism cannot be fully analyzed unless the metric of compliance is known, such as, will it be applied on a daily, weekly average or other method.

Fundamental Problems with the Application of Staff's Rule Curves

As reflected in the above section on how the rule curves methodology affects the environmental analysis, there are several fundamental problems with the application of the staff's rule curves. Some of these flaws are obvious. However, some of the most fundamental problems are not readily apparent. The SJTA summarizes the dangers of using the rule curves below:

(1) Fails to Properly Analyze Impacts.

State Water Board staff is attempting to use the rule curves to estimate the impacts of adopting a flow regiment based on a certain percent of computed unimpaired flows. The fact that staff has based its analysis on a depiction of operations that would never occur is a major problem. Because the rule curves represent a method of operations that would never be implemented, modeling based on the rule curves does not amount to analysis of the actual impacts that will result from imposed flow objectives.

(2) Fails to Comply with Required Environmental Analysis

As State Water Board staff mentioned several times in the informational meeting on March 21, 2012, it will use a Substitute Environmental Document ("SED") to analyze the environmental impacts of the proposed flow regulation. California Code of Regulations ("CCR") section 3775.5 sets forth the requirements of SED. In pertinent part, CCR section 3777 requires a SED to analyze all "reasonably foreseeable methods of compliance." Specifically, this analysis must: (a) identify reasonably foreseeable methods of compliance with the project; (b) analyze any reasonably foreseeable significant adverse impacts associated with those methods of compliance; (c) analyze reasonably foreseeable alternative methods of compliance that would have significant adverse impacts; and (d) analyze reasonably foreseeable mitigation measures that would minimize any unavoidable significant adverse environmental impacts of the reasonably foreseeable methods of compliance. (23 C.C.R. §3777(b)(4)(A)-(D).)

The SED is required to analyze all reasonably foreseeable methods of compliance. The rule curves do not evaluate a single, let alone all, reasonably foreseeable methods of compliance. For this reason, the State Water Board staff's use of the rule curves fails to satisfy the requirements of environmental analysis.

(3) Violates Jurisdictional Constraints of the State Water Board.

The State Water Board staff's use of the rule curves assume the State Water Board has the jurisdiction to control all water deliveries from the San Joaquin River tributary reservoirs. These reservoirs deliver water pursuant to pre-1914 water rights, riparian water rights, and rights to divert water to storage after February 1. The rule curves attempt to exercise jurisdiction over these rights through the control of reservoir operation, which oversteps the State Water Board's limited jurisdiction.

(4) Violates Rules of Water Priority.

The staff's rule curves seem to be applied on a pro-rata basis to all water users, regardless of water priority. This application ignores the California rules of water right priority. As previously recognized, the State Water Board's review of its water quality control plan is bound by these rules and must perform priority analysis before regulating legal water users. (*El Dorado Irrigation District v. State Water Resources Control Board* (2006) 142 Cal.App.4th 937 [Cal.Rptr.3d 468].)

(5) Interferes with Existing Contractual Obligations.

The State Water Board staff's rule curves fail to recognize or accommodate existing contractual obligations. Specifically, the rule curves' approach would interfere with contractual obligations between Oakdale Irrigation District/South San Joaquin Irrigation District and the United States Bureau of Reclamation ("USBR"); Stockton East Water District's ("SEWD") contract with the USBR[2]; the Raker Act; MID/TID/CCSF 4th Agreement; and Merced Irrigation District and Cowell, just to name a few.

(6) Fails to Take Into Consideration Existing Requirements.

Staff's rule curve assumes a percent of unimpaired flow from February-June will replace existing flow requirements. This assumption raises question as to whether the State Water Board staff has adequately modeled the effects of the proposed flow requirements in the context of all other requirements that are affecting tributary operations. The impacts analysis is significantly different when comparing staff's "replacement" flows approach with an "in addition to flows" approach.

(7) Violates the Noticed Process by Regulating Water Year Round.

The State Water Board staff uses rule curves to set annual water delivery restrictions. The notice for the State Water Board's review of the San Joaquin River flow objectives stated the State Water Board was reviewing only flow from February to June; the notice specifically stated it was not

[2] Under the staff's analysis (which is even more wrong on the Stanislaus River), SEWD would receive water less than 10 percent of the time.

considering objectives outside these months. The implementation of rule curves results in the regulation of annual water delivery, which goes beyond the regulation of flow from February to June and was not included in the notice.

(8) Fails to Provide Natural Variability.

The State Water Board's stated purpose of proposing to adopt computed unimpaired flows is that the State Water Board believes computed unimpaired flows will provide fish and wildlife with more "natural" flows. However, by implementing the percent of computed unimpaired flow with maximum and minimum caps, natural system fluctuations are not achieved.

Based on the fundamental flaws with the State Water Board staff's analysis and use of rule curves, the SJTA requests the State Water Board re-notice the process and undertake proper analyses of all reasonably foreseeable methods of compliance, as required by CCR section 3777 et seq. If the State Water Board were to move forward based upon the existing staff's analysis, the entire basin planning process and the plan of implementation would be impacted by a clearly faulty, biased and illegal analysis.

Very truly yours,

O'LAUGHLIN & PARIS LLP

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Tam Doduc
Les Grober
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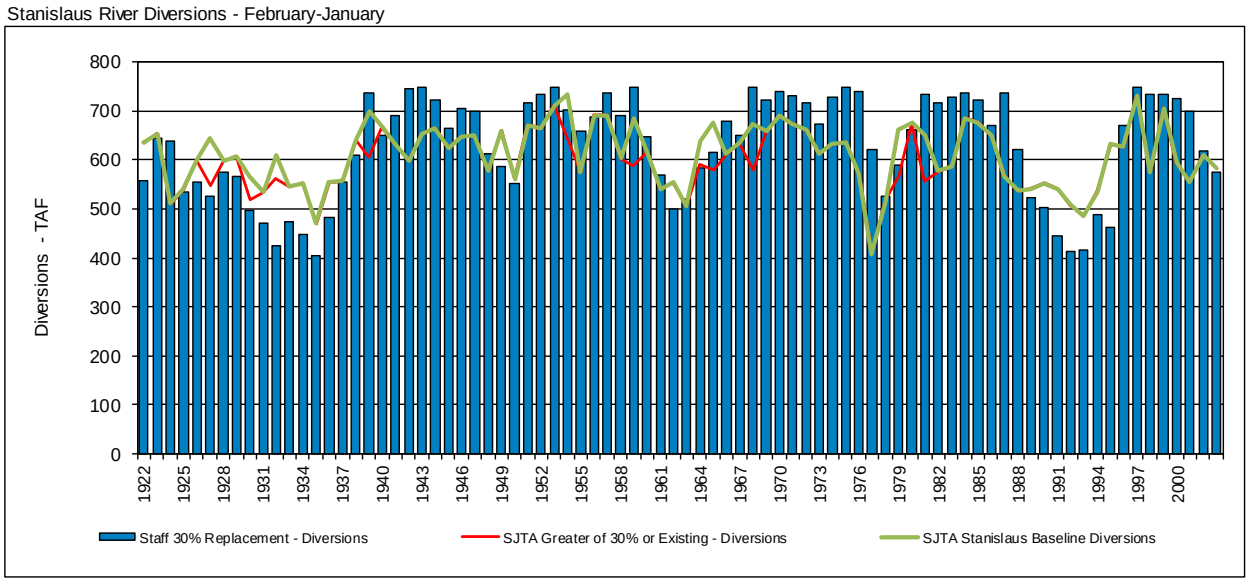
Figure 1 Series
Differences between State Water Resources Board Staff and SJTA Modeling of Diversions
30 percent Unimpaired Flow Scenarios

Figure 1A
Stanislaus River



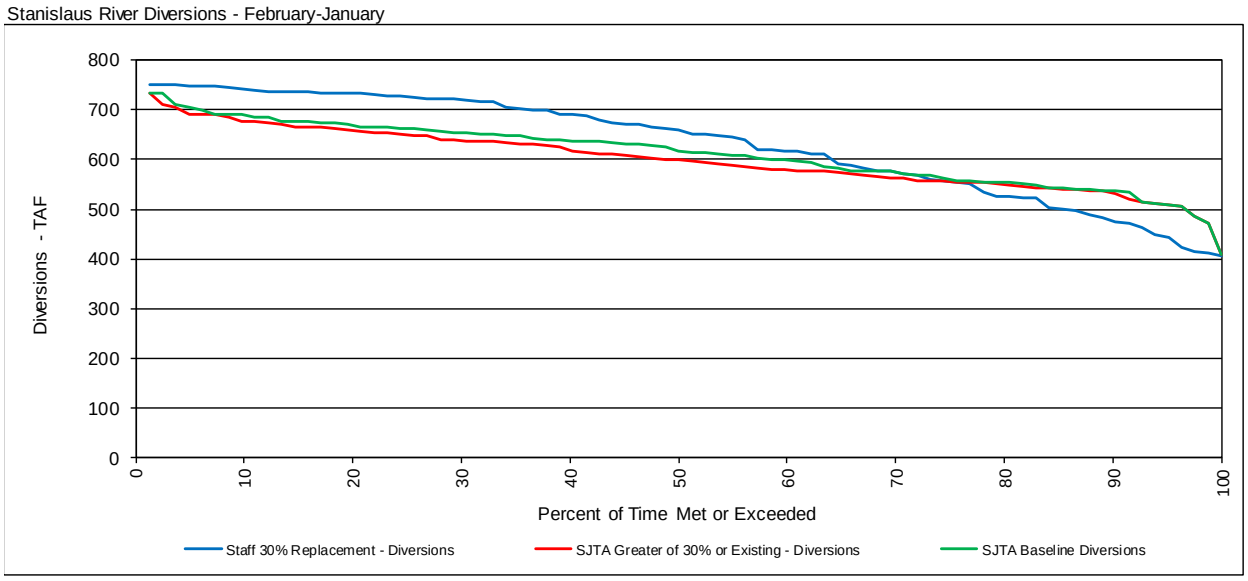
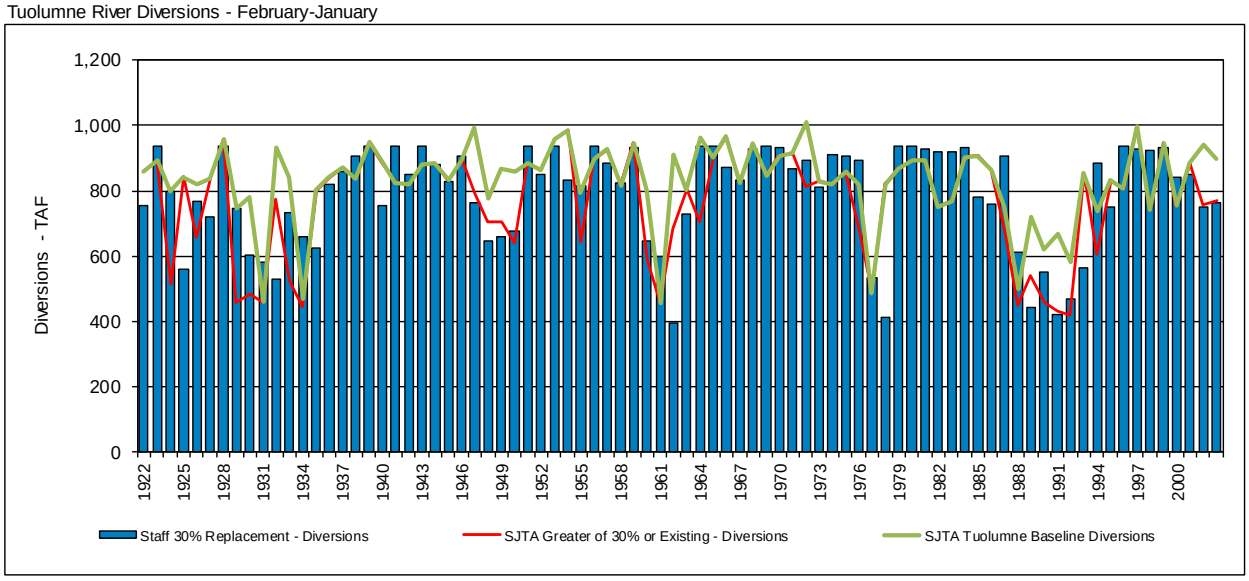


Figure 1B
Tuolumne River



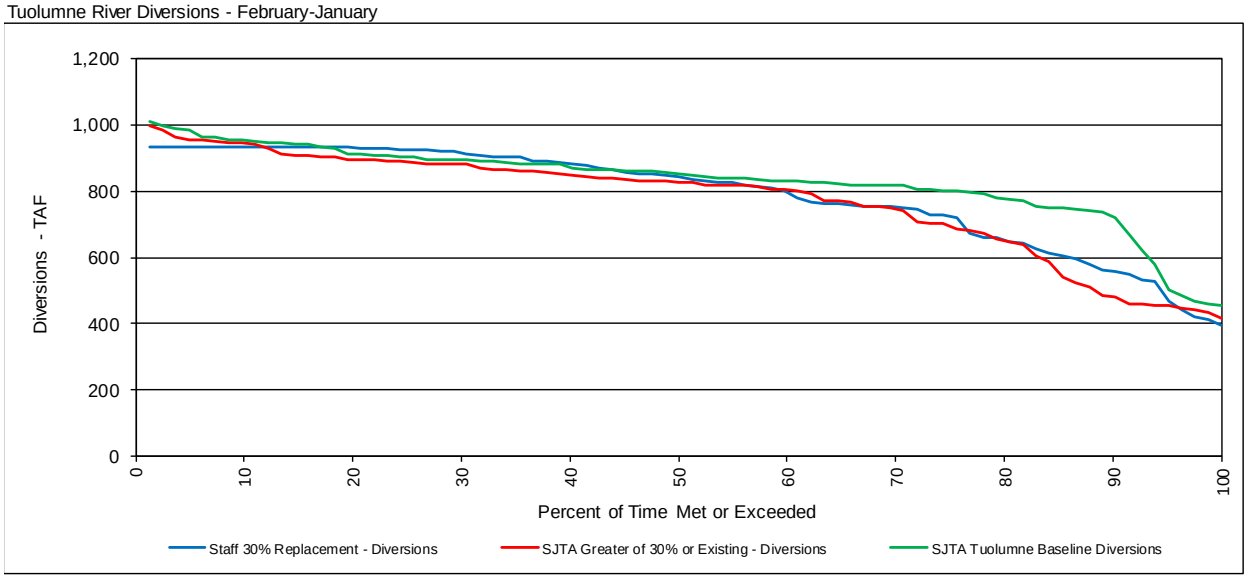
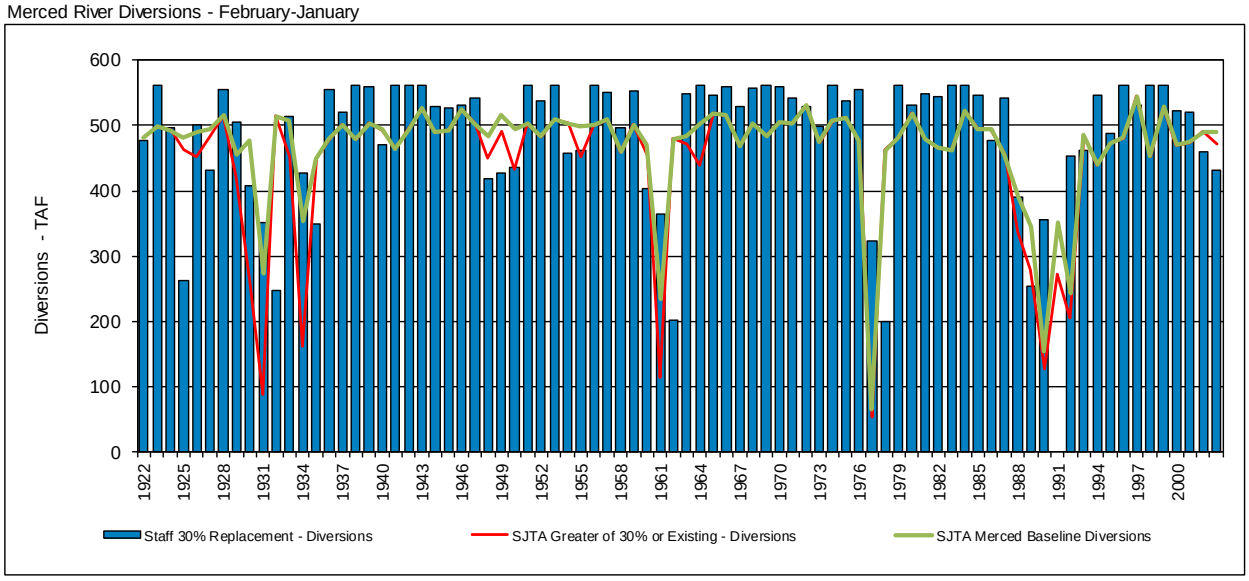


Figure 1C
Merced River



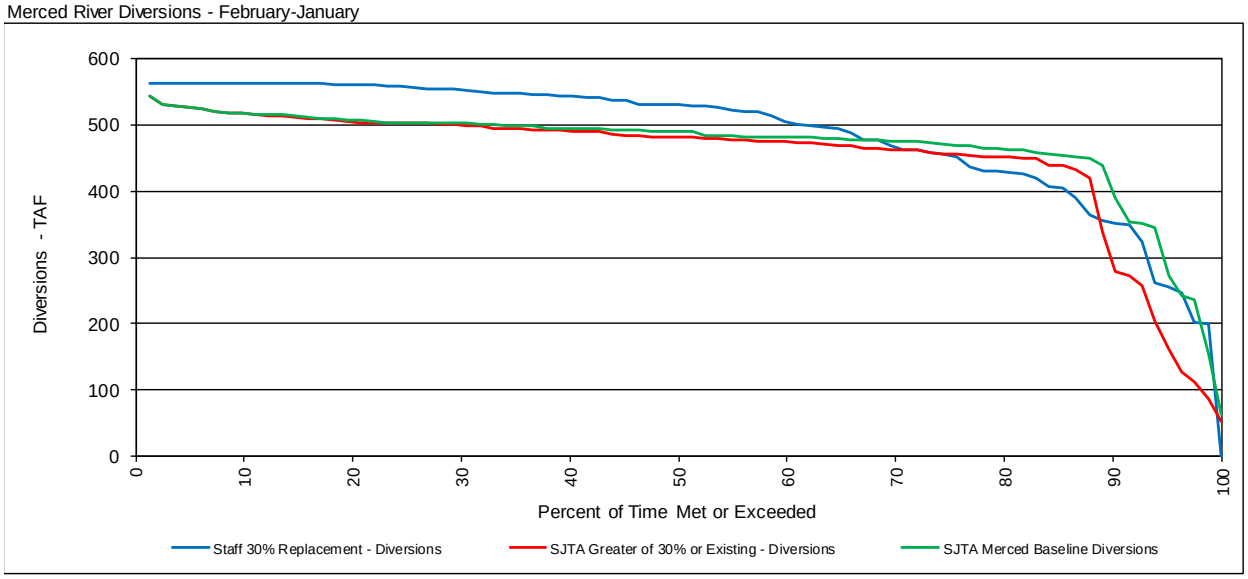
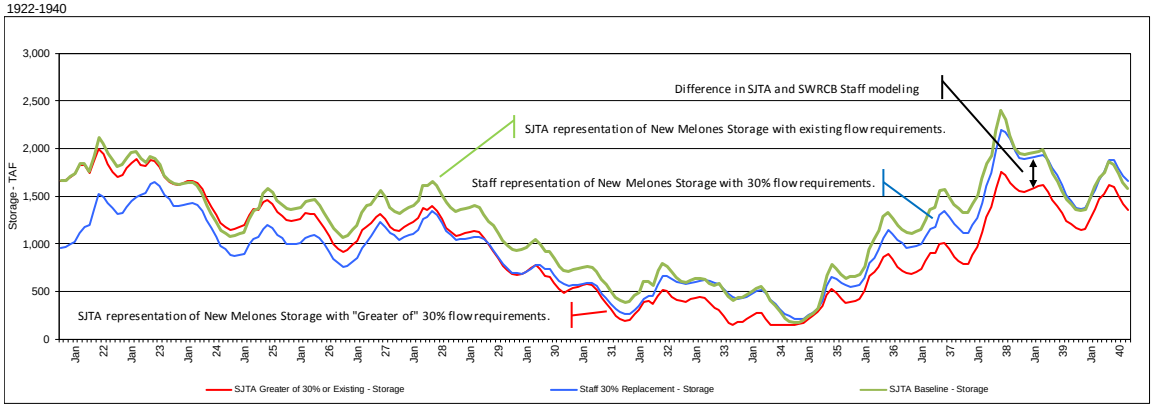


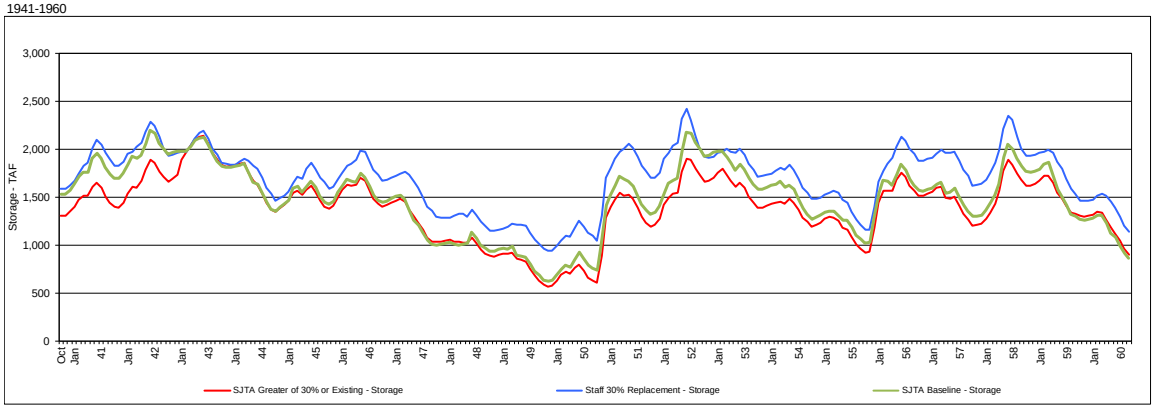
Figure 2 Series - Differences between State Water Resources Board Staff and SJTA Modeling of Reservoir Storage 30 percent Unimpaired Flow Scenarios

Figure 2A Stanislaus River – New Melones

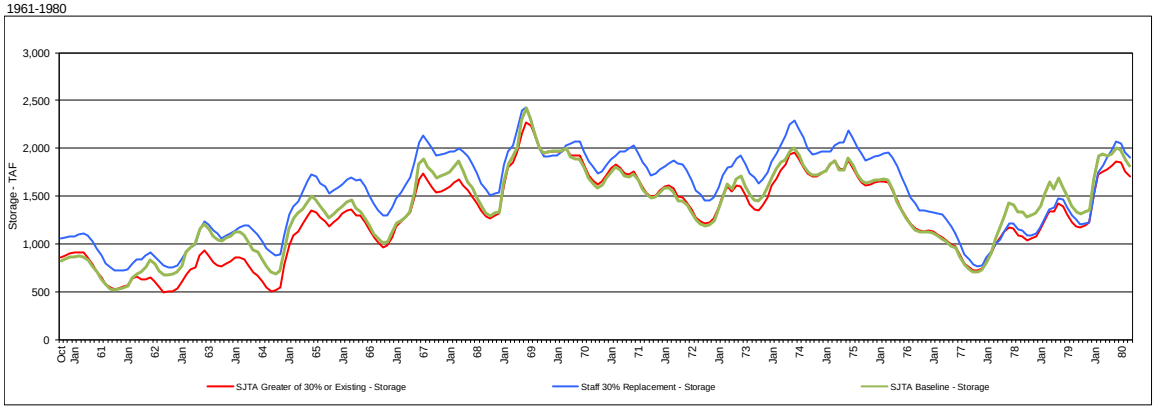
1922-1940



1941-1960



1961-1980



1981-2003

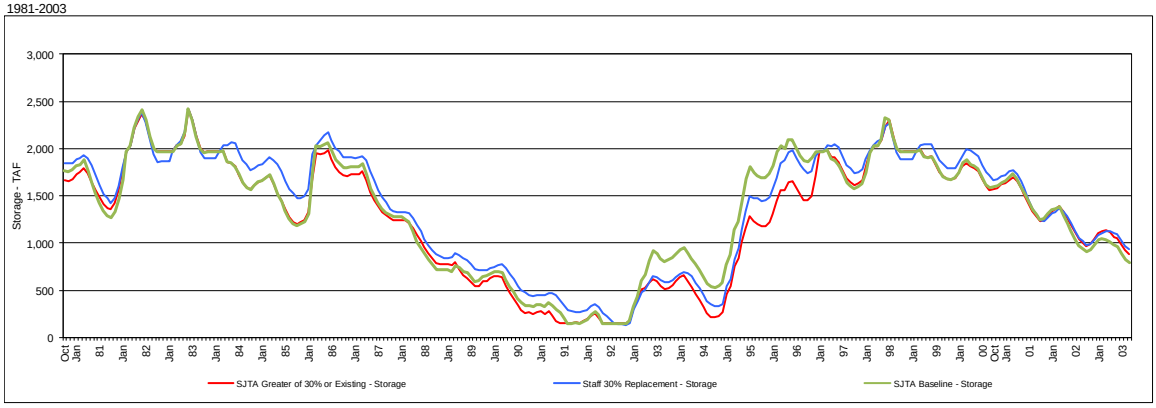


Figure 2B

Tuolumne River – Don Pedro Reservoir

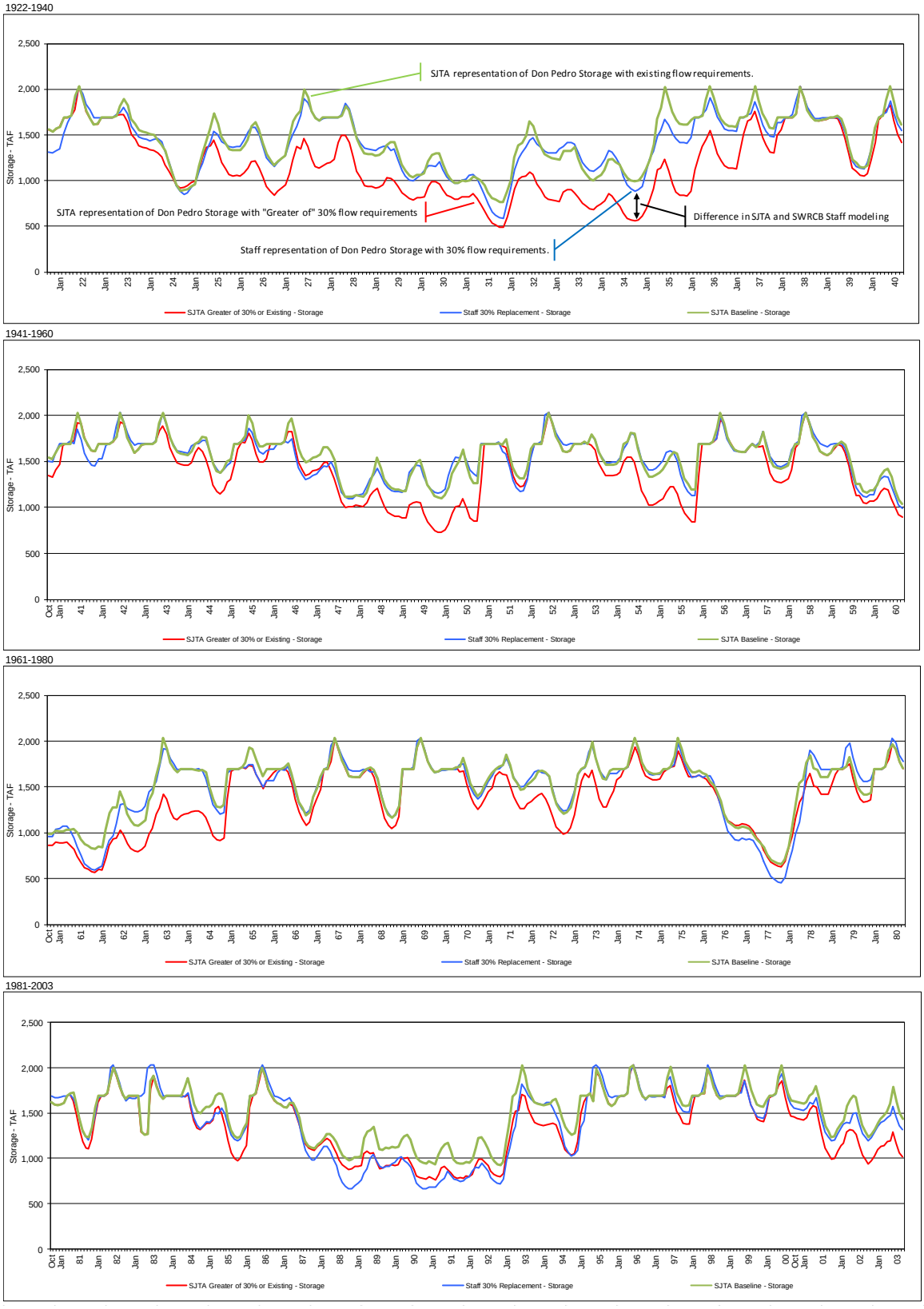
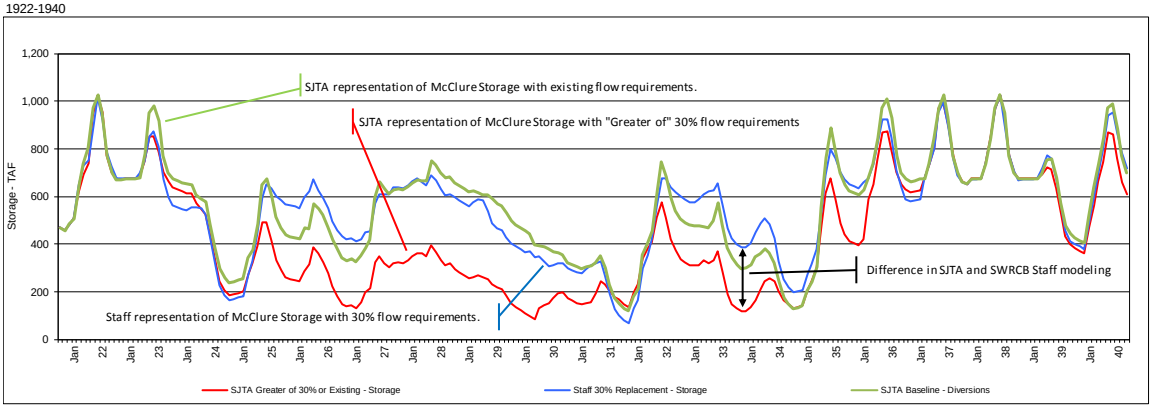


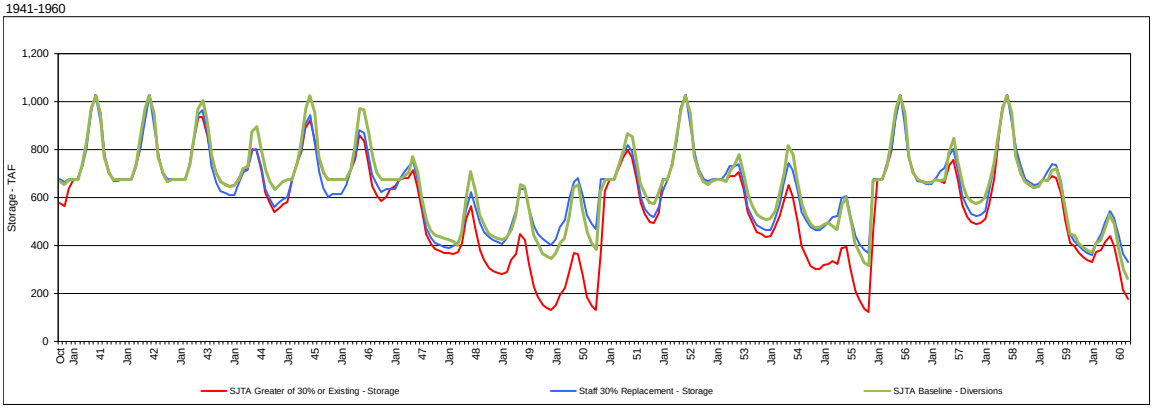
Figure 2C

Merced River – McClure Reservoir

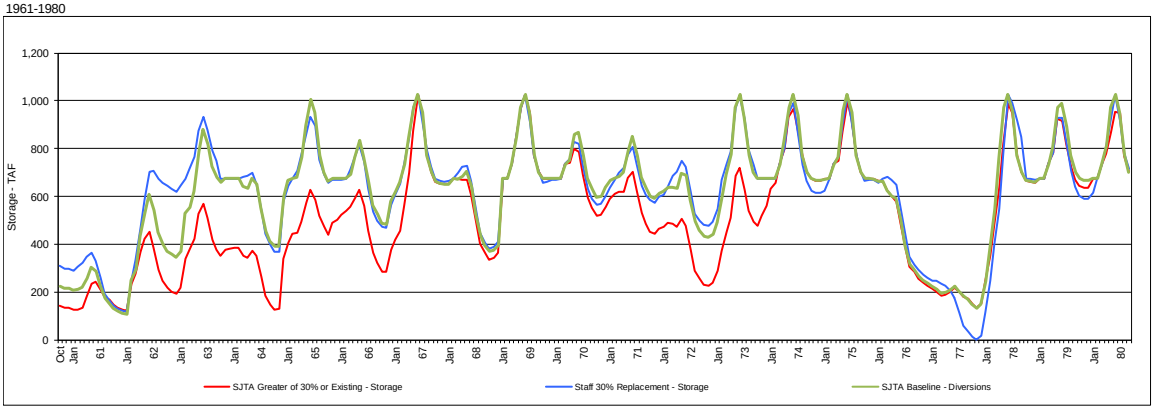
1922-1940



1941-1960



1961-1980



1981-2003