

Truly a Watershed Event: California's Water Board Proposes Base Flows for the San Joaquin River Tributaries

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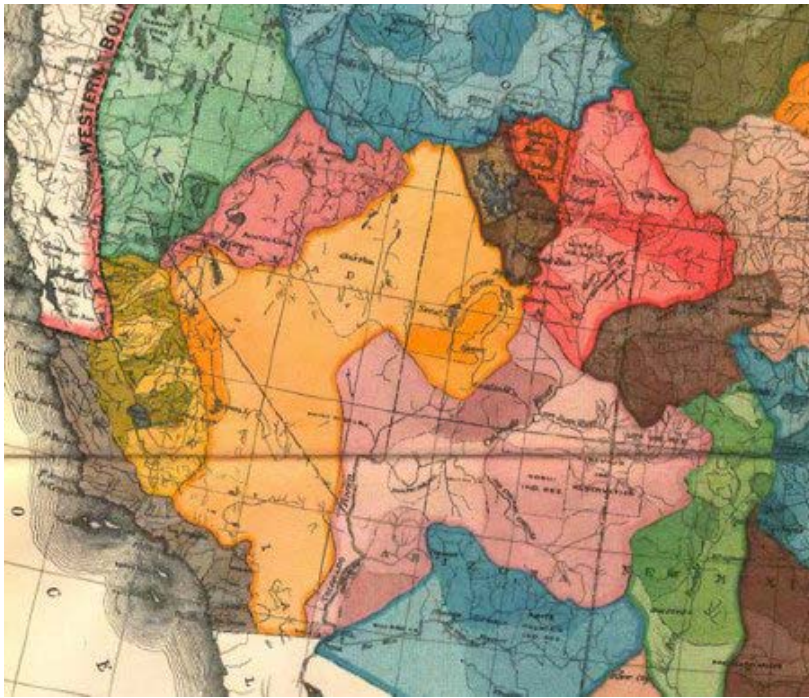
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The Watershed Legacy of John Wesley Powell

In 1878, John Wesley Powell, the first director of the United States Geological Survey, published his *Report on the Lands in the Arid Regions of the United States*. In his *Arid Lands Report*, Powell foresaw the essential role that water would play in the development of the American west and the challenges faced in managing watersheds that included not only mainstem rivers but networks of tributaries that contributed water to mainstem rivers.

The San Joaquin River-Sacramento River-San Francisco Bay basin illustrates the hydrology and landscape Powell described. The mainstem of the San Joaquin River drains into the Carquinez Strait and then to San Francisco Bay but the flow of the San Joaquin River is itself a product of the flows of the Stanislaus, Tuolumne and Merced Rivers that contribute to it. Similarly, the mainstem of the Sacramento River also drains into the Carquinez Strait and then to San Francisco Bay but the flow of the Sacramento River is itself a product of the flows of Feather River and American River that contribute to it. Moreover, anadromous salmon and steelhead trout fisheries in this basin often originate in the tributaries before heading downstream to the mainstems of the San Joaquin and Sacramento Rivers and through San Francisco Bay and then retrace this route back upstream when they return to spawn.¹

In light of the ways that the flows of mainstem rivers are dependent on the contributing flows of tributaries, and in light of how fisheries such as salmon and steelhead trout migrate downstream and upstream between mainstem rivers and tributaries, what did Powell recommend? Powell advocated for the creation of governmental entities with authority to manage water resources and water supply at the "watershed" level to enable them to take account of the inter-relationship between tributaries and mainstem rivers. He even went so far as to recommend drawing the borders of states to correspond to major watersheds/drainage basins.²



John Wesley Powell's Watershed States Map

Although Powell's proposal to designate state borders in the American west on a watershed basis came too late, as most of the state borders were already established by the time his *Arid Lands Report* was published in 1878, his concept of watershed-based governance lies at the root of recent actions by California's State Water Resources Control Board.

On September 15, 2016, the State Water Board released its draft of a proposed update to the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, often referred to as the *Bay Delta Water Quality Plan*. The update to the *Bay Delta Water Quality Plan* is being undertaken pursuant to requirements under the federal Clean Water Act and California's Porter-Cologne Water Quality Act. To ensure adequate water conditions for fisheries (such as salmon, steelhead trout and smelt) that are present in and migrate through the Bay Delta, the September 15, 2016 draft of the *Bay Delta Water Quality Plan* update recommended that a range of between 30 and 50 percent (with a starting point of 40 percent) of the "unimpaired flows" of the Stanislaus, Tuolumne and Merced Rivers be left instream until their confluence with the San Joaquin River. According to the State Water Board, "Unimpaired flow is the rate and volume of water that would be produced by the rain and snow accumulating in a watershed absent any diversion, storage or use of water. An unimpaired flow approach generally mimics the natural variability of California's river flows that support native fish like salmon and steelhead and for which they have evolved."³

Although current data suggests that average base flow for the Stanislaus River is already about 40 percent of unimpaired flow, the average flows for the Tuolumne River and Merced River are currently 21 percent and 26 percent, respectively, of unimpaired flow.⁴ The State Water Board's proposed base flows for the Tuolumne River and Merced River, if implemented, would therefore result in a measurable increase in water left instream in these San Joaquin River tributaries and presumably a corresponding decrease in the amount of water available for diversion from these waterways.



San Joaquin River Watershed, Mainstem and Tributaries

The State Water Board 2010 Public Trust Flow Criteria for the San Joaquin River

The State Water Board's reliance on numeric unimpaired flow benchmarks did not first emerge in the September 2016 proposed update to the *Bay Delta Water Quality Plan*. Rather, numeric unimpaired flow benchmarks were relied upon previously by the State Water Board in 2010 with the issuance of its public trust Bay Delta flow criteria. An understanding of the legal and policy context for the prior issuance of the 2010 public trust Bay Delta flow criteria is necessary to understand the approach taken by the State Water Board in the September 2016 base flow proposals for the San Joaquin River tributaries.⁵

California's 2009 Delta Reform Act added section 85086 to the California Water Code. Section 85086 provides in pertinent part:

The [Water Board] shall, pursuant to its public trust obligations, develop new flow criteria for the Delta ecosystem necessary to protect public trust resources. In carrying out this section, the board shall review existing water quality objectives and use the best available scientific information. The flow criteria for the Delta ecosystem shall include the volume, quality and timing of water necessary for the Delta ecosystem under different conditions. The flow criteria shall be developed in a public process by the board within nine months of the enactment of this division. This public process shall be in the forum of an informational proceeding.⁶

As an informational proceeding, as opposed to a water rights proceeding, the public trust flow criteria developed pursuant to section 85086 of the California Water Code would not modify any existing rights of diversion. The purpose of the public trust flow proceeding mandated in the 2009 Delta Reform Act was therefore not to directly curtail diversions but rather to compel the State Water Board to identify the inflow from the San Joaquin River and Sacramento River needed to fully protect the salmon, steelhead trout and smelt fisheries (the public trust resources in question) present in the Bay Delta.

At the time the 2009 Delta Reform Act was enacted, this approach was referred to as “flow first” — start with an informational science-based assessment of how much water the Bay Delta fisheries and ecosystem need and then use this assessment as a reference point for later adjustments of diversions through subsequent water rights or regulatory proceedings. As the April 14, 2010 comment letter to the State Water Board from the Bay Institute and the Natural Resources Defense Council explained: “It is important to be clear as to what this proceeding is and is not. It is clearly not intended to be a regulatory proceeding to review existing permits and conditions under the authority of the SWRCB or other permitting entities. On the contrary, this proceeding was intentionally decoupled by the legislature to any specific permitting action precisely in order to allow the SWRCB to freely determine the flow necessary to fully protect public trust species in the Delta without considering the impact of such criteria on any particular interest.”⁷

In August 2010, after a nine-month process of public comments and hearings, the State Water Board adopted its final public trust Bay Delta flow criteria report. In section 1.1 of the report (titled “Legislative Directive and State Water Board Approach”), the State Water Board explained that pursuant to section 85086 its flow criteria were based only on the needs of public trust resources and did not take into account consumptive use of water for irrigation or municipal purposes, noting: “The State Water Board does not make any determination regarding the feasibility of the public trust criteria . . . Any balancing of public trust values and water rights would be conducted through an adjudicative or regulatory proceeding. Instead, the State Water Board’s focus here is solely on identifying the flow criteria as directed by section 85086.”⁸ The August 2010 public trust Bay Delta flow criteria report determined:

In order to preserve the attributes of the natural variable system to which native fish species are adapted, many of the criteria developed by the State Water Board are crafted as percentages of natural or unimpaired flows. These criteria include:

75% of unimpaired Delta outflow from January through June;
75% of unimpaired Sacramento River inflow from November through June; and
60% of unimpaired San Joaquin River inflow from February through June.⁹

The State Water Board’s 2010 public trust Bay Delta flow criteria report thus found that, to fully protect and restore the fisheries and ecosystem of the Bay Delta, 60 percent of the unimpaired flow of the San Joaquin River should be kept instream until it empties into the Carquinez Strait. The August 2010 public trust flow criteria report was silent on how to balance this 60 percent unimpaired flow criteria with consumptive uses of San Joaquin River basin water, and was also silent as to the extent to which the San Joaquin River’s main tributaries (the Stanislaus River, Tuolumne River and Merced River) may need to increase their inflow into the

San Joaquin River to enhance the San Joaquin River's downstream inflow into the Bay Delta. These two open questions set the stage for the State Water Board's proposed approach to the San Joaquin River's main tributaries in its update to the *Bay Delta Water Quality Plan*.

Base Flows for San Joaquin River Tributaries in the September 2016 Draft Update to Bay Delta Water Quality Plan

The initial *Bay Delta Water Quality Plan* was adopted in the mid-1990s and updated in 2006. The 2006 update to the *Bay Delta Water Quality Plan* included flow objectives for the lower San Joaquin River. These flow objectives were based on monitoring conducted just upstream of where the San Joaquin River empties into the Carquinez Strait. There was no flow monitoring on or flow objectives for the main tributaries to the mainstem. The San Joaquin River flow standards in the 2006 update to the *Bay Delta Water Quality Plan* were developed in reference to unimpaired flows but were not expressed as a base percentage (or range of percentages) of unimpaired flows. Instead, the 2006 San Joaquin River flow objectives referenced unimpaired flows to provide a narrative/qualitative sense of the ways flow can contribute to the health and recovery of the Bay Delta fisheries. The continuing decline of salmon, steelhead trout and smelt fisheries in the 2006 to 2016 period indicated that the more narrative/qualitative approach to San Joaquin River flows in the 2006 update to the *Bay Delta Water Quality Plan* was inadequate.

In conjunction with its September 15, 2016 draft of the San Joaquin River portion of its update to the *Bay Delta Water Quality Plan*, the State Water Board also released a draft of a substitute environmental document ("SED").¹⁰ The draft SED was prepared to satisfy the requirements of the California Environmental Quality Act ("CEQA"). A central focus of the draft SED was the impact of the proposed San Joaquin River tributaries base flows on instream temperatures for the Stanislaus River, Tuolumne River and Merced River. The draft SED noted the extensive body of science confirming that mortality rates for salmon and steelhead trout, coldwater fisheries present in the Bay Delta and San Joaquin River watershed, rise steeply when water temperatures reach 60.8 degrees Fahrenheit.¹¹

The draft SED included Table ES-15, titled *Summary of Mean Annual Temperature Benefits with Increased Flows February-June in All Years*. As explained in the text of the SED that accompanied Table ES-15, the proposed San Joaquin River tributary flows would have a substantial positive impact on keeping instream temperatures below the 60.8 degrees Fahrenheit "temperature target" for salmon and steelhead:

Temperature targets are already achieved much of the time under baseline [existing conditions] during the cold weather and high flow months of December and January. The biggest improvements [with the proposed 40 percent of unimpaired flow for the San Joaquin River tributaries] occur for the core rearing life stage in April and May. Under baseline, temperature targets in the three tributaries are achieved 69 and 54 percent, respectively, for this critical core rearing life stage. Attainment [of the 60.8 degree Fahrenheit temperature target] increases to 83 and 73 percent of the time, respectively for April and May with 40 percent unimpaired flows. This summary statistic of temperature improvement for all year types, however, masks the benefits in critically dry years when baseline flows are lowest.

Table ES-16 [titled *Summary of Mean Annual Temperature Benefits with Increased Flows February-June in Critically Dry Years*] shows the average number of mile-days that these temperature targets are achieved in all three tributaries, combined, under baseline [existing conditions] and also for unimpaired flows of 20, 30, 40, 50 and 60 percent, for only critically dry years. The improvements from baseline are much bigger than the average for all years. That is important because low flow conditions in dry years currently have a negative effect on salmon survival. Under baseline core rearing temperature targets in the three tributaries are attained 38 and 22 percent of the time in April and May, respectively in critically dry years. Attainment of the temperature

criteria increases to 64 and 46 percent of the time, respectively, for April and May with 40% unimpaired flow. The temporal and spatial attainment of the temperature targets more than doubles in May.¹²

On September 15, 2016, the State Water Board also released a document titled *Summary of Proposed Updates to the Bay Delta Water Quality Control Plan*. This document explained the relationship between the recommendations in the 2010 public trust Bay Delta flows criteria report and the recommendations in the 2016 draft update to the *Bay Delta Water Quality Plan*. This document noted:

As part of the 2009 Delta Reform Act, the [California] Legislature directed the State Water Board to develop flow criteria for the Delta ecosystem necessary to protect public trust uses. In keeping with the narrow focus of the legislation, the State Water Board's 2010 Delta Flow Criteria Report only presents a technical assessment of flow and operational requirements to provide fishery protection under existing conditions. The report does not do the analysis to inform the consideration of competing uses that is required by the California Water Code. The Delta Flow Criteria Report determined that 60 percent of the unimpaired San Joaquin River flow from February-June was necessary to preserve the attributes of a natural, variable system to which native species are adapted.¹³

...

As recommended in the Delta Flow Criteria Report, the new flow objectives would be based on percentages of unimpaired flows at locations on each tributary...The proposal does not contemplate flow requirements equal to natural, pre-development conditions or even the 60 percent threshold identified in the Delta Flow Criteria Report. Instead, the draft proposes narrative and numeric flow objectives, expressed as a range from 30 to 50 percent of unimpaired flow, for February through June, for the Stanislaus, Tuolumne and Merced Rivers through to the San Joaquin River near Vernalis.

The proposal recommends a 30 to 50 percent adaptive flow range, with a starting point of 40 percent, because the State Water Board's analysis shows that range will provide a reasonable protection of fish and wildlife while moderating impacts to water supply for drinking water and agriculture.¹⁴

The *Summary of Proposed Updates to the Bay Delta Water Quality Control Plan* also noted the adaptive management advantages of reliance on a range of percentages tied to unimpaired flow rather than on a uniform fixed percent of unimpaired flow: "The unimpaired flow proposal does not require rigid adherence to a fixed percent of unimpaired flows but can be thought of as a water budget. The draft proposes a block of water that can be 'shaped' or shifted in time to best align instream flows with the needs of fish and wildlife throughout the year. As such, the flow proposal accommodates an adaptive implementation process that allows the magnitude and timing of flows to be adjusted, within a prescribed range, provided that such changes protect the fishery."¹⁵

Like the San Joaquin River public trust flow criteria adopted in 2010, the State Water Board's September 2016 proposed base flows for San Joaquin River tributaries opted to define flow standards as a numeric percentage of unimpaired flow. The September 2016 proposed base flows differ from the 2010 public trust flow criteria, however, in three noteworthy ways. First, the September 2016 proposed base flows apply to San Joaquin River tributaries while the 2010 public trust flow criteria applied to San Joaquin River inflow into the Bay Delta. Second, the September 2016 proposed base flows for San Joaquin River tributaries were based on the State Water Board balancing of the needs of fisheries with the consumptive water demands of agricultural and municipal users while the State Water Board's 2010 public trust flow criteria were based solely on an assessment of the needs of fisheries. Third, the September 2016 proposed base flows for San Joaquin River tributaries were based on a 30 to 50 percent prescribed range of unimpaired flow while the 2010 public trust flow criteria adopted a fixed percentage of 60 percent of San Joaquin River inflow to the Bay Delta.

Conclusion — Flows and Fisheries at the Watershed Level

The September 2016 proposed base flows for San Joaquin River tributaries represent an important step in efforts to manage water resources at the watershed level. They also confirm that the “flow first” 2010 public trust criteria worked as designed, establishing a scientifically-grounded methodology and baseline for the full protection of fisheries that could then be relied upon as a credible reference point in subsequent regulatory proceedings such as the *Bay Delta Water Quality Plan* update. Even so, not all of the initial responses to the September 2016 proposed flows have been positive.

Some environmental and fishery conservation groups have criticized the proposed 40 percent/30 to 50 percent range of unimpaired flow standard as being too low to restore and sustain salmon, steelhead trout and smelt fisheries, and have suggested that the 60 percent of unimpaired flow standard set forth in the 2010 public trust flow criteria report is more in line with the supporting science.¹⁶ Some environmental and fishery conservation groups have also raised questions as to whether in times of drought the State Water Board will simply grant temporary emergency waivers to allow levels of diversion that result in base flows below 30 percent of unimpaired flow range.¹⁷ This latter concern is based on the experience during the 2012-2015 drought, when the State Water Board granted a series of temporary emergency waivers for compliance with water quality standards.¹⁸

Some agricultural water users have criticized the proposed 40 percent/30 to 50 percent range of unimpaired flow standard as economically unfeasible given current reliance on diversions from the Tuolumne River and Merced River for irrigation.¹⁹ Such users have also suggested that meeting the 60.8 degrees temperature target may not by itself be sufficient to restore and maintain coldwater fisheries because of other non-temperature related stressors such as pollution and invasive aquatic species.²⁰

Amidst these criticisms and concerns, however, important areas of consensus have emerged. Scientifically, there is now consensus that, independent of such other non-temperature fishery stressors such as pollution and invasive aquatic species, the survival rates of salmon and steelhead trout decline sharply once instream temperatures rise above 60.8 degrees Fahrenheit. Hydrologically, there is now consensus that adequate flows from the San Joaquin River and Sacramento River into the Bay Delta (at whatever levels they are set) cannot be ensured without also ensuring there is adequate flow contributed from these rivers’ main tributaries.

These points of consensus, reflected in State Water Board’s September 2016 proposed base flows for the San Joaquin River tributaries, represent tangible movement in the direction of watershed-based governance. This is a water policy trajectory of which John Wesley Powell would have approved.

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¹ Patrick Wright, *Fixing the Delta: The CALFED Bay-Delta Program and Water Policy Under the Davis Administration*, 31 GOLDEN GATE UNIVERSITY LAW REVIEW 331 (2001).

² John Wesley Powell, *Report on the Lands of the Arid Regions of the United States* (1878).

³ California State Water Resources Control Board, *Summary of Proposed Updates to the Bay-Delta Water Quality Control Plan* (September 15, 2016) p. 3.

⁴ California State Water Resources Control Board, *Summary of Proposed Updates to the Bay-Delta Water Quality Control Plan* (September 15, 2016) p. 4.

⁵ Paul Stanton Kibel, *The Public Trust Navigates California's Bay Delta*, 51 NATURAL RESOURCES JOURNAL 35 (2011).

⁶ Section 85086 of California Water Code.

⁷ Closing Comments of the Bay Institute and Natural Resources Defense Council for the Informational Proceeding to Develop Flow Criteria for the Delta Ecosystem to Public Trust Resources (submitted to the State Water Resources Control board, April 14, 2010).

⁸ California State Water Resources Control Board, DEVELOPMENT OF FLOW CRITERIA FOR THE SACRAMENTO-SAN JOAQUIN DELTA ECOSYSTEM, PREPARED PURSUANT TO THE SACRAMENTO-SAN JOAQUIN DELTA REFORM ACT OF 2009 (adopted August 3, 2010).

⁹ California State Water Resources Control Board, DEVELOPMENT OF FLOW CRITERIA FOR THE SACRAMENTO-SAN JOAQUIN DELTA ECOSYSTEM, PREPARED PURSUANT TO THE SACRAMENTO-SAN JOAQUIN DELTA REFORM ACT OF 2009 (adopted August 3, 2010).

¹⁰ Substitute Environmental Document (SED) on *Evaluation of San Joaquin River Flow and Southern Delta Water Quality Objectives and Implementation* (September 2016).

¹¹ Substitute Environmental Document (SED) on *Evaluation of San Joaquin River Flow and Southern Delta Water Quality Objectives and Implementation* (September 2016), Chapter 7 on Aquatic Biological Resources, pp. 15-16, 105-131.

¹² Substitute Environmental Document (SED) on *Evaluation of San Joaquin River Flow and Southern Delta Water Quality Objectives and Implementation* (September 2016) pp. ES-42 to ES-43.

¹³ California State Water Resources Control Board, *Summary of Proposed Updates to the Bay-Delta Water Quality Control Plan* (September 15, 2016) pp. 2-3.

¹⁴ California State Water Resources Control Board, *Summary of Proposed Updates to the Bay-Delta Water Quality Control Plan* (September 15, 2016) pp. 3-4.

¹⁵ California State Water Resources Control Board, *Summary of Proposed Updates to the Bay-Delta Water Quality Control Plan* (September 15, 2016) p. 4.

¹⁶ Doug Obegi, *State Water Board's Flow Proposal Falls Short* (September 15, 2016 Press Release from the Natural Resources Defense Council).

¹⁷ Doug Obegi, *State Water Board's Flow Proposal Falls Short* (September 15, 2016 Press Release from the Natural Resources Defense Council).

¹⁸ Order Approving in Part and Denying in Part a Petition for Temporary Urgency Changes to the License and Permit Terms and Condition Requiring Compliance with the Delta Water Quality Objectives in Response to Drought Conditions (February 3, 2105, California State Water Resources Control Board).

¹⁹ California Farmwater Coalition, *Reactions to State Board Unimpaired Flows Action* (September 16, 2016).

²⁰ California Farmwater Coalition, *Reactions to State Board Unimpaired Flows Action* (September 16, 2016).

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