

Technical Guidance

Delta Watershed Water Availability Analysis

Demand Considerations

This document provides technical guidance on demand-side considerations when conducting a water availability analysis (WAA) to demonstrate water availability for applications within the Sacramento-San Joaquin Delta (Delta) watershed to support findings required by Water Code Section 1260, subdivision (k); Section 1375, subdivision (d); Section 1243, subdivision (a); and Section 1243.5. WAA methods vary on a case-by-case basis depending on project specifics. The intent of this document is to provide generalized guidance, not to preclude an applicant from conducting an independent analysis using an alternative approach. Applicants are strongly encouraged to consult with State Water Board Division of Water Rights (Division) staff before preparing a WAA.

Water Availability Analysis in the Delta Watershed

WAAs provide information to support California Water Code findings demonstrating the availability of water for a new appropriation, including consideration of the amount of water to remain instream for public trust resources (e.g. fisheries, recreation) and compliance with water quality objectives. WAAs are generally comprised of two major steps: estimating unimpaired flow, and accounting for demand from senior diverters and instream flow / water quality objectives. General resources for performing WAAs for water rights permitting are available on the Division's website.¹ However, there are specific demand-side considerations that are unique to the Delta watershed that are addressed in this document. Supply-side considerations are addressed in additional technical guidance, linked below. The Division has also developed a tool to assist applicants, described in further guidance linked at bottom of this document (Technical Guidance on the Delta Watershed Spreadsheet Water Availability Analysis Tool).

Applications are received for projects throughout the Delta watershed to divert water that would otherwise flow downstream to the Delta and into the Pacific Ocean via the San Francisco Bay. Flows originating anywhere within the Delta watershed are considered as part of instream flow requirements/water quality objectives associated with the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan). Conditions in the Delta relate to flow contributions from the entire Delta watershed, thus water availability at a given location in the Delta watershed can be limited by demands anywhere within the entire Delta watershed.

¹https://www.waterboards.ca.gov/waterrights/water_issues/programs/water_availability/



Senior Diverter Demand

WAAs to inform permitting decisions consider demand from senior diversions, such as riparian, pre-1914 appropriative, and post-1914 appropriative water rights, including demand from pending applications for post-1914 appropriative rights with a priority date senior to the application filing. Pending applications include those filed by parties seeking to acquire “standard” water right permits as well as State-Filed Applications (SFAs), a special type of application held in trust by the State Water Board.² WAAs typically account for senior diverter demand in the upstream watershed above the proposed point(s) of diversion as well as demand impacting the entire downstream flow path. As mentioned above, diverters within the Legal Delta depend on flows originating in both the San Joaquin and Sacramento River basins, thus WAAs for the Delta watershed account for demand within the entire Delta watershed in order to accurately capture dynamics impacting senior diverters within the Legal Delta.

Demand for post-1914 appropriative water rights, including senior pending applications, is typically based on the full face value of the water right, regardless of reported diversions. Accounting for full face value helps the State Water Board to avoid over-appropriation of stream flows as existing right holders may have the ability to increase diversions up to their maximum allocation regardless of recently reported diversion patterns.

Unlike post-1914 appropriative rights, riparian and pre-1914 appropriative rights do not have assigned face values limiting their diversions. In a small number of cases, groups of riparian and/or pre-1914 appropriative water rights have been through an adjudication process resulting in quantification of their right to divert. If such information is available, it is typically used to represent diversion demand. In absence of such information, maximum potential diverter demand for riparian and pre-1914 appropriative water rights is typically based on the highest level of diversions reported to the Division as part of annual water use reporting. The Division is currently developing a diverter demand dataset for the Delta watershed based on face values and quality-controlled reported diversions. This dataset will be made publicly available upon completion, likely in late 2025.

Bay-Delta Plan Instream Flow Requirements

The Bay-Delta Plan identifies beneficial uses of water in the Bay-Delta, water quality objectives for the reasonable protection of those beneficial uses, and a program of implementation for achieving the water quality objectives. WAAs are developed for proposed future diversions of water and thus typically consider both existing requirements as well as scenarios accounting for reasonably foreseeable changes to existing requirements. The Division recognizes the complexity of considering

²https://www.waterboards.ca.gov/waterrights/water_issues/programs/applications/state_filed_applications/#faq



reasonably foreseeable regulatory conditions and encourages applicants to consult with Division staff for guidance before preparing a WAA.

Decision 1641

The State Water Board adopted revised D-1641 in 2001, conditioning the water rights of the State Water Project and Central Valley Project (Project) to meet specified flow and water quality objectives included in the Bay-Delta Plan, including inflow, Delta outflow, salinity (measured as electrical conductivity (EC) and chloride), and Project operational requirements. These objectives vary by water year type and month³ and whichever requirement is driving Project operations is said to be the ‘controlling’ standard. In any given month a different standard might be ‘controlling’.

Table 1 – D-1641 flow, EC, and chloride requirements used in the Delta WAA Tool

D-1641 Requirement		Parameter	Compliance Location	Timing	D-1641 Reference
Delta Inflow and Delta Outflow	Table 3 Delta Outflow	Net Delta Outflow Index (NDOI)	-	Jul – Jan	Table 3
	Table 4 Delta Outflow	NDOI or EC ¹	NDOI or salinity at a specified location	Feb – Jun	Table 4
	Sac @ Rio Vista	Flow rate	Rio Vista	Sep – Dec	Table 3
	SJR @ Vernalis	Flow rate	Vernalis	Oct; Feb - Jun	Table 3
Electrical Conductivity	Sac @ Emmaton	Conductivity	Emmaton	Apr - Aug	Table 2
	SJR @ Jersey Point	Conductivity	Jersey Point	Apr - Aug	Table 2
Chloride	Contra Costa Canal	Chloride	Rock Slough	Oct - Sep	Table 1

¹The Table 4 Delta outflow requirements require a certain number of days of compliance with either a daily or 14-day running average EC or 3-day running average NDOI at specified locations depending on hydrology.

Under many conditions, the D-1641 requirements are incidentally met. When they are not, the Projects must take action to meet the requirements by either reducing exports, bypassing inflows to their reservoirs or, at times, releasing water from storage. When the Projects are releasing previously stored water to meet flow or water quality requirements, curtailments under Standard Water Right Term 91⁴ are triggered water right holders with a priority date more junior than approximately 1965. New water right

³See D-1641, Tables 1-4 for an explanation of the various water quality objectives:
https://www.waterboards.ca.gov/waterrights/water_issues/programs/compliance_monitoring/sacramento_sanjoaquin/

⁴https://www.waterboards.ca.gov/waterrights/water_issues/programs/permits/terms/permitterm091.pdf



permits in the Delta watershed, with limited exceptions, are expected to be subject to Term 91 diversion restrictions.

2018 Bay-Delta Plan Update

On December 12, 2018, the State Water Board adopted amendments to the Bay-Delta Plan pursuant to Resolution No. 2018-0059. As part of the 2018 Bay-Delta Plan updates, the southern Delta salinity objective for the reasonable protection of agricultural beneficial uses was revised and new and revised water quality flow objectives for the Lower San Joaquin River watershed were adopted as a numeric range expressed as a percent of unimpaired flow to provide flexibility and reasonably protect fish and wildlife beneficial uses. These updates require 40 percent of unimpaired flow to be maintained in the Stanislaus, Tuolumne, and Merced Rivers from February through June. In 2022, the State Water Board issued a Notice of Preparation (NOP) for a proposed regulation to implement the Lower San Joaquin River/Southern Delta updates to the Bay-Delta Plan.

Sacramento/Delta Update to Bay-Delta Plan

In September 2023, a draft Staff Report/Substitute Environmental Document (draft Staff Report) was prepared in support of consideration of updates to the Bay-Delta Plan focused on the reasonable protection of fish and wildlife in the Sacramento River and its tributaries, Delta eastside tributaries (including the Calaveras, Cosumnes, and Mokelumne Rivers), and Delta (referred to as the Sacramento/Delta watershed). This effort is referred to as the Sacramento/Delta update to the Bay-Delta Plan. The State Water Board is currently considering a range of alternatives. The draft Staff Report identified staff proposed updates that would require 55 percent unimpaired flow to be maintained year-round in the Sacramento River, its tributaries, and Delta eastside tributaries (with an adaptive range from 45 percent to 65 percent), as well as inflow based Delta outflows that would require the required inflows from the Sacramento/Delta as well as the Lower San Joaquin River to be provided as outflow.

Representing Bay-Delta Plan Considerations in WAAs

Representation of current and reasonably foreseeable regulatory requirements is an inherently dynamic consideration. Based on current information, Division staff recommend that WAAs account for the potential unimpaired flow requirements for the Stanislaus, Tuolumne, and Merced Rivers, and those for the Sacramento River, its tributaries, Delta eastside tributaries, and the Delta as described above. WAAs should assess multiple scenarios to capture the range of potential future conditions. Further guidance on the analytical framework for WAAs for the Delta watershed is provided in additional technical guidance, linked below.



Additional Resources

[Technical Guidance on Delta Watershed Water Availability Analysis Climate Scenario Analysis](#)

[Technical Guidance on Delta Watershed Water Availability Analysis Analytical Framework](#)

[Technical Guidance on the Delta Watershed Spreadsheet Water Availability Analysis Tool](#)

(This Technical Guidance was last updated on June 20, 2025)

