

## State Water Resources Control Board

### MEMORANDUM

**TO:** Erik Ekdahl  
Deputy Director  
**DIVISION OF WATER RIGHTS**



**FROM:** Sam Boland-Brien  
Supervising Water Resource Control Engineer  
**DIVISION OF WATER RIGHTS**

**DATE:** JUN 2, 2022

**SUBJECT:** ASSESSMENT OF VOLUNTARY WATER SHARING AGREEMENT  
PROPOSED FOR STATE WATER BOARD APPROVAL

This memorandum provides a report from Division of Water Rights (Division) staff assessing the Upper Russian River Voluntary Water Sharing Agreement (VSA, or Program) proposed by water users from the Upper Russian River watershed (Watershed). The proposed VSA, if approved by the State Water Resources Control Board (State Water Board, or Board), would provide an exception to curtailment pursuant to California Code of Regulations, Title 23, section 877.4. Section 877.4 requires the Board to make certain findings regarding a proposed water sharing agreement; this memorandum provides supporting information to substantiate findings put forth in a draft resolution approving the VSA. Finally, this memorandum summarizes the activities Board staff will conduct to provide administrative and technical support and oversight of the Program during its implementation, if approved. Board staff recommend approving the VSA and believe it meets the necessary requirements of 877.4.

### 1.0 BACKGROUND

On April 21, 2021, Governor Gavin Newsom declared a drought state of emergency in Mendocino and Sonoma counties due to drought conditions in the Russian River watershed ([April 2021 Proclamation](#)). In response to the April 2021 Proclamation, the State Water Board adopted an emergency regulation for the Russian River watershed on June 15, 2021. On May 10, 2022, the State Water Board readopted the Russian River Drought Emergency Regulation for the 2022-2023 water year (the Regulation). Section 877.4 of the readopted Regulation authorizes Russian River water users to

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

propose a voluntary water sharing agreement that, if approved by the State Water Board, could operate as an authorized exception to curtailment for signatories diverting in accordance with that agreement.

Section 877.4 further provides that approval of a voluntary water sharing agreement requires that the State Water Board find (a) that the agreement will not adversely affect the availability of water for non-signatories, and (b) that the proposed agreement includes support from prospective signatories in both Mendocino and Sonoma Counties. Section 877.4, subdivision (c), authorizes the Deputy Director for the Division of Water Rights (Deputy Director) to notify signatories that the exception to curtailment no longer applies if, at any time after State Water Board approval of the voluntary water sharing agreement, stream gage data and other relevant information indicate that the agreement is adversely affecting or threatens to adversely affect the availability of water for non-signatories.

## **2.0 SUMMARY OF EMERGENCY REGULATION CURTAILMENT METHODOLOGY**

Section 877.2 of the Regulation describes the process, data, and calculations of water availability that will be relied upon by the Deputy Director to curtail water rights pursuant to the Regulation. The methodology for establishing water available to water right holders is further described in the Finding of Emergency supporting the Regulation. The methodology involves applying a Water Rights Allocation Tool (Allocation Tool) to match water rights demands with available supplies based on the location and priority of water rights associated with those demands.

Water rights demands are based on monthly average values reported through annual reports of water diversion and use for the calendar years 2017, 2018, and 2019. Board staff applied the analyses described in the *Water Rights Demand Data Analysis Methodology* to improve the quality of the reported data and ensure locations of diversions were accurate.

The Watershed, defined as the watershed upstream of the confluence of Dry Creek with the Russian River, has two sources available for diversion: natural flows, and flows originating from the Eel River due to transfers through the Potter Valley Project (referred to here as PVP flows) by Pacific Gas and Electric (PG&E). Unimpaired natural flows for the Watershed will be estimated using a Precipitation Runoff Modeling System (PRMS) model calibrated to the Russian River. PVP flows will be based on similar historical periods of PVP transfers where transfers were operated under similar requirements from the Federal Energy Regulatory Commission (FERC). PG&E recently filed a variance request with FERC that will result in PVP flows being comparable to 2021 to start, with a possibility of increasing to conditions comparable to a "Dry Year" hydrologic year type. Evaporative losses occurring along the mainstem of the Russian River are subtracted from the estimates of available supplies.

The best estimates of available supply flows, diversion demand, and priority of right provide the quantitative basis to inform curtailment decisions through use of the

Allocation Tool. During the drought beginning in 2014, the State Water Board funded the development and initial iteration of an approach to optimizing allocations by the UC Davis Center for Watershed Sciences. The result was the Drought Water Rights Allocation Tool (DWRAT) as outlined in “Drought Water Right Curtailment Analysis for California’s Eel River.” Division staff built upon DWRAT to develop the Allocation Tool formulations and Python code-base. The Allocation Tool works by solving equations that maximize the allocation of water to diverters based upon their demands and priority of right, subject to water availability mass-balance equations and legal constraints applicable to each water right. The stream network is mathematically represented by a series of sub-basins and matrices that encode physical connectivity among sub-basins and diverters. Unimpaired flow is estimated for each sub-basin, and water allocations are made at the sub-basin level ensuring that allocated flow is locally and physically available for diversion. Allocations are determined in two separate modules. The first module allocates to riparian users who share connectivity based upon the principle of equal seniority and correlative sharing of any shortfall. In the second module, any remaining sub-basin flow is then determined and allocated to appropriative users according to their demand and priority of right.

### **3.0 SUMMARY OF PROPOSED AGREEMENT**

Russian River stakeholders have developed the VSA as a locally driven approach for managing water demand under drought conditions. Given uncertainties regarding potential curtailments of water right holders in the Watershed, there is a desire from water users in the Watershed to achieve, where possible, an organized effort to conserve water in the Watershed to ensure that no participant is unable to divert sufficient water to satisfy minimum needs through the current water year and to avoid curtailments imposed due to reduced water supplies. Participation in the VSA is a voluntary effort to balance rights to water under existing law with the various needs for water in the Watershed.

The VSA is designed to achieve sharing of water supplies by those water right holders that continue to have water available under their water rights with those that no longer do. Enrollment in the VSA will be available to all water right holders in the Watershed. The VSA includes a series of recitals establishing the basis for the agreement and identifies a series of commitments that signatories must undertake to participate in the VSA. These commitments include water use reductions, described in the VSA as Forbearance Thresholds. These Forbearance Thresholds provide the basis for calculating the amounts of water available to VSA signatories and the extent to which that available water is being shared. The process for establishing Forbearance Thresholds is described in Exhibit B of the VSA and involves two primary components: (1) a streamlined method for identifying when water is available to each VSA signatory’s underlying water right; and (2) a method for calculating water use reductions for those that have water available (not in shortage) and the resulting amounts of water use reduction for those that do not have water available (in shortage). The amount of water made available by those signatories not in shortage for a given month will be used to determine the extent to which those in shortage must reduce their water use.

### 3.1 Water Availability Methodology in Exhibit B

The methods described in Exhibit B for determining which signatories have water available is comparable to the Allocation Tool, but with several important simplifying assumptions that facilitate the implementation of the agreement. The same water rights demand dataset described above in Section 2.0 will be used in Exhibit B to represent the water rights demands in the Watershed. The 2017 to 2019 average monthly demand dataset will also be used as the baseline water usage for the Forbearance Thresholds. The same water supply information described above in Section 2.0 will be used for estimating available natural flows and PVP flows. These demand and supply datasets will be used to establish which signatories have water available under their water right for the purpose of the agreement and which water right holders are experiencing a lack of supply, or shortage.

The simplifying assumptions related to establishing water availability under Exhibit B involve water right priorities, the location of diversions, and the reductions in available supplies. While the Allocation Tool analyzes water availability based on the specific priority date of each individual water right, Exhibit B identifies water right priority levels that aggregate water right demand based on the following water right priorities:

1. Riparian
2. Pre-1914
3. Pre-1949 and rights with a priority date in 1949
4. RRFCD and SCWA
5. 1950 to 1952
6. 1953 to 1954
7. 1955 to 1957
8. 1958 to 1959
9. 1960 to 1970
10. 1971 to present

When comparing available supplies to these priority levels, all water right holders in a priority level are assumed to be in shortage if supply is insufficient to satisfy the junior most water right holder in that priority level. For example, if available supply was only sufficient to satisfy half of the demand in the level 1950 to 1952, then for the purposes of the VSA, all water right holders in the 1950 to 1952 priority level would be deemed in shortage and not have water available for diversion. Exhibit B also simplifies the analysis of water availability by aggregating all demands and supplies at the scale of the Watershed, resulting in a reconciling of supply against demand at the outlet of the Watershed, rather than at the more refined sub-basin scale used by the Allocation Tool. Exhibit B also uses the same method for estimating evaporative losses of available supplies, and applies those losses to natural flows, PVP flows, and releases from Lake Mendocino. Finally, Exhibit B assumes that three cubic feet per second (cfs) of available supply is not available to the VSA because it will be needed to satisfy the minimum human health and safety (HH&S) needs of certain water right holders. This three cfs is based on the approximate volume of HH&S needs requested through petitions during implementation of the Regulation in 2021.

### **3.2 Establishing Forbearance Thresholds**

The results of the analysis described in Section 3.1 above will establish which signatories have water available to meet their diversions and which signatories are experiencing a shortage. Priority levels identified as having water available will be required to reduce water use from zero to 30 percent, with the Pre-1914 priority level being limited to a maximum commitment of 20 percent water use reduction. Signatories with water available will reduce their water use between zero and 30 percent from a baseline average water usage from 2017 to 2019, which will result in additional water being made available to signatories who have water rights experiencing supply shortage. The extent to which signatories within a priority level in shortage have to reduce water use will be based on the number of signatories in shortage, their cumulative baseline demand, and the total volume of water made available by water use reduction of those signatories not in shortage.

The amount of water use reduction will likely range between 20-75% depending on water rights priority, water supply conditions, and the number of signatories. The amount of water made available through the VSA relies not just upon the quantity of enrollees but the composition of signatories' water right seniority, recognizing the need for non-curtailed water users to participate for the agreement to be viable. Once interested water right holders enroll and identify their specific rights, Division staff shall implement the calculations described in Exhibit B and notify signatories of the Forbearance Thresholds required for each month. The Forbearance Thresholds will not be in effect if the water supply is limited to the point that the Pre-1914 or Pre-1949 priority levels are experiencing shortage.

### **4.0 ASSESSMENT OF ASSUMPTIONS IN VOLUNTARY SHARING AGREEMENT**

The design and assumptions of the VSA were established with the intent to ensure the VSA would not adversely affect the water supply of non-signatories. This is primarily accomplished through the assumptions around when water is available at signatories' water right priority level relative to what the Allocation Tool would say is available under their water right priority. The Allocation Tool reflects the Division's best available information on water availability; the assumptions of the VSA are conservative, resulting in slightly more water right holders in shortage, compared to the results of the Allocation Tool. Given the specificity of the VSA commitments and the design of the Forbearance Thresholds to define water sharing among signatories, the VSA will not result in more water usage than in the absence of an agreement if the methodology for determining water availability under Exhibit B is equal to or more conservative than the results of the Allocation Tool.

In other words, the calculation of water supplies available for sharing is accurate provided Exhibit B does not identify water rights as having water available when the Allocation Tool identifies them as curtailed. The only potential source of inconsistency would be a site-specific circumstance where two or more diverters were on the same tributary to the mainstem of the Russian River and an upstream diverter was a signatory

with a water right priority junior to a downstream diverter who was not a signatory on that tributary. There are certain permutations of available supply and demand where the Allocation Tool could identify only the upstream junior diverter as curtailed but the VSA would not curtail that upstream user, because the VSA aggregates supply and demand across the Watershed. This circumstance is unlikely given the limited volume of diversions in the tributaries relative to the mainstem; demand in the tributaries is approximately five percent of total demand in the Watershed for the months of July through September. Appropriative demand (which is junior to riparian diversions in the tributaries) is only three percent of total demand in the Watershed. While the majority of demand occurs along the mainstem, Division staff will review enrollment for the occurrence of this inconsistency, as described below in Section 5.0.

Regarding the conservative assumptions of the VSA, the first conservative component in the VSA is the assumption that minimum HH&S needs in 2022 will be the same as in 2021, three cfs. All water right holders in the Watershed were curtailed in August 2021, resulting in an upper limit in the amount of anticipated HH&S exception requests. By removing three cfs from the supply available to signatories, the VSA is assuming less supply is available than what the Allocation Tool would rely upon, assuming curtailments in 2022 do not require the cessation of all diversions in the Watershed. If the Allocation Tool does require the cessation of all diversions, the VSA functionally would not be in effect because the Forbearance Thresholds would not be in effect once Pre-1914 or Pre-1949 water right holders are experiencing a shortage.

The second conservative component in the VSA is the use of priority levels in lieu of identifying shortage down to the specificity of an individual priority date. When comparing available supply across the Watershed to existing demand, the VSA will identify all water rights at a certain priority level in shortage if available supply in the Watershed is insufficient to meet the demands of all water rights in that priority level. If in shortage, all signatories in that priority level are treated under the VSA as reliant on water being made available by the sharing of more senior signatories. The Allocation Tool will identify shortage starting at a specific water right priority date, and that date would likely be within the range of one of the VSA priority levels, resulting in the allocation of water to more water right holders in that priority level of the VSA than what the VSA would identify. If the Allocation Tool identifies a cutoff at exactly the transition from one priority level to another, the results of the Allocation Tool and the VSA would be the same (if ignoring the other conservative assumptions described here).

A third conservative component of the VSA, and a contrast with the Allocation Tool assumptions, is the use of a baseline demand for determination of the Forbearance Thresholds. The Allocation Tool relies on the water use annual reports from 2017 to 2019 as the best available estimate of current water right demands. While the Allocation Tool uses this demand dataset as representative of demands in the Watershed, the curtailment orders do not limit appropriative diversions to those 2017 to 2019 average amounts. Riparian diversions will be limited, with an opportunity to change limits, as described in section 877.3 of the Regulation. Approximately 35 percent of appropriative water right holders reported zero water use during 2017 to 2019; these water rights are still considered in the Allocation Tool and could be exercised during 2022 if the

Allocation Tool says there is water available for their priority. There are also appropriative water rights that reported diverting less than their face value; diversion under these rights could increase in 2022. In contrast, the VSA limits all signatories based on a maximum of what they diverted from 2017 to 2019, with the exceptions of riparian diversions, who may update their demand amounts in accordance with section 877.3 of the Regulation. The VSA establishes water use reductions from this baseline; calculating the Forbearance Thresholds in this manner helps ensure that signatories would not be using more water than in the absence of the agreement.

The treatment of evapotranspiration (ET) losses that result from evaluating supply conditions in the aggregate under the VSA, in contrast to calculating them at the sub-basin scale of the Allocation Tool, will also likely result in slightly lower allocations being made to riparian diversions under the VSA. Riparian diverters can only divert natural flows, and those natural flows are forecasted to be low this summer. The current calculations developed for Exhibit B indicate that in the aggregate, there will be no natural supply available to riparian diverters, and therefore these diverters are in shortage and reliant on the sharing of other signatories for continued diversions. The Allocation Tool's evaluation of natural supply and ET may result in natural flow available for riparian diversions – for example, certain tributaries may continue to have natural flow available prior to application of ET losses occurring in the mainstem, whereas the VSA identifies riparian diverters as entirely in shortage.

It is important to note that while the assumptions of the VSA described above are conservative relative to the Allocation Tool, the estimates of available supply and shortages in the aggregate are not anticipated to be significantly different. This is partly due to most of the water rights demands in the Watershed being clustered along the mainstem of the river as described above, and PVP flows being available along the mainstem of the Russian River. Many signatories may be able to continue diversions at a reduced rate under the terms of the VSA in lieu of completely ceasing diversions under application of the Allocation Tool, and thus the VSA will likely be a better outcome for many signatories that would in all likelihood be identified as having a lack of water availability under both the methods described in Exhibit B and under the Allocation Tool.

## **6.0 ANTICIPATED STAFF ACTIVITIES IF PROGRAM IS APPROVED**

Staff propose to support the implementation of the VSA during its inaugural year to assist with the technical and logistical aspects because a local entity is not yet in place to administer the Program. These activities would include performing the analyses described in Exhibit B, administering the online forms necessary for the Program (enrollment, withdrawal, and additional exchanges beyond the Forbearance Thresholds), and updating the Forbearance Thresholds based on which water rights enrolled in the program and if supply or enrollment levels change during implementation.

Staff will conduct analyses to ensure the Deputy Director is able to identify whether a determination under Regulation section 877.4, subdivision (c) must be made. Subdivision (c) authorizes the Deputy Director to determine that the exception provided

by section 877.4 no longer applies where the VSA threatens to adversely affect the availability of water for non-signatories. Once the enrollment process for the VSA has been completed, staff will be able to do a direct comparison of the allocations for signatories to the VSA under Exhibit B to whether those signatories would be curtailed under the Allocation Tool. Following enrollment, staff will review the extent and distribution of enrollment to determine if there are any risks of adverse effects to the water supply of individuals on tributaries where there is a mix of signatory and non-signatory water right holders. Should the composition of enrollment for a given tributary, in conjunction with the level of curtailment identified by the Allocation Tool for that tributary, indicate there is a risk of adversely affecting the water supply of a non-signatory, the Deputy Director may determine that the exception to curtailment provided by the VSA does not apply to signatories on that tributary.

Division staff also plan to provide additional comparative analyses of the VSA relative to the Allocation Tool in subsequent months of implementation to ensure that the assumptions described above and the findings necessary for approval of the VSA under section 877.4 continue to be valid. These initial and ongoing analyses following enrollment, in conjunction with the conservative assumptions described above in Section 4.0 and the exercise of the Deputy Director's authority to determine the exception no longer applies, will ensure that the VSA will not adversely affect the availability of water for non-signatories.

#### **APPENDIX. CALCULATION TABLES USED FOR PROGRAM**

The Microsoft Excel file titled "20220523 Exhibit B Calculations" contains the calculations for implementing Exhibit B. Staff plan to use these tables and calculations, or an updated version of this file to support implementation of the VSA. Values that will be updated include the extent of enrollment (currently assumed to be 100 percent for calculation purposes), current water supply information consistent with what is used for the Allocation Tool, and adjustments to the Forbearance Thresholds based on the enrollment and water supply information, as described in Exhibit B.