Technical Appendix A: Methodology Spreadsheet Description

This appendix outlines the process used to assess water supply and demand in the Sacramento-San Joaquin Delta (Delta) watershed and describes each input used for the analysis and output produced by the analysis. Each section of this document describes a separate tab in the Delta Water Unavailability Methodology Excel workbook ("spreadsheet"), the significance of each column, and data sources. While the spreadsheet posted on the Delta Drought webpage represents a single "snapshot" analysis conducted to determine water unavailability on a given day, it contains multiple interactive elements which allow any user to run a similar analysis with different input data. Each tab that contains static data (e.g., multipliers, streamflows, or water right records) indicates in the top-left cell the date that data was last updated.

NOTE: The spreadsheet is a large file with links to external online files and many complex formulas. It performs best with automatic formula calculation turned off, so that recalculations can be done manually rather than each time a single value is changed.

Subwatersheds

This tab shows how Hydrologic Unit Code Level 8 (HUC8) watersheds from the U.S. Geological Survey (USGS) Watershed Boundary Database (WBD) are categorized into "subwatersheds" for the purpose of this analysis. It also indicates the primary watershed that each subwatershed is tributary to, as well as the subwatershed "type" (headwater or lower) assigned to each. These relationships underpin much of the analysis. A map of Delta subwatersheds can be found in Figure 5 of the main report.

Field Name(s)	Definition & Methodology	Data Source(s)
Watershed	The two primary river systems in the Delta watershed: Sacramento and San Joaquin.	USGS WBD
Subwatershed	An area encompassing one or more HUC8 watersheds, determined based on geospatial mapping of stream and diversion locations and the unavailability of full natural flow (FNF) supply locations ("gages"). Subwatershed is the smallest area over which water unavailability is determined.	Staff-determined

Field Name(s)	Definition & Methodology	Data Source(s)
Subwatershed Type	Subwatersheds are categorized as either 'headwater' or 'lower' for the purpose of this analysis: - A headwater subwatershed contains water demands which can only be met by water supplies within the subwatershed (i.e., there are no tributaries flowing into the subwatershed). - A lower subwatershed can receive water supplies from outside its boundaries (i.e., it is located downstream of the headwaters).	Staff-determined
HUC8[1]	The boundaries of watersheds which contain land that all drains to the outlet, as delineated and classified by the USGS. This delineation provides a consistent boundary for classifying water supplies and demands for the analysis.	USGS WBD

To the right of the data table is a key for the various colors used for each tab of the spreadsheet. **Yellow tabs** contain data fields that can be updated or revised to change the analysis; cells with modifiable data are highlighted yellow in those tabs. **Blue tabs** contain data related to water supply, **green tabs** contain data related to water demand, and **orange tabs** contain analyses of water unavailability at various scales that are used to determine water right curtailments.

Supply Forecast

This tab contains forecasted supply data for a user-specified date range. Water supply forecasts are obtained either from the Department of Water Resources (DWR) Bulletin 120 Water Supply Forecast (B-120) or from the California Nevada River Forecast Center (CNRFC) and consist of full natural flow (FNF, also known as "unimpaired flow") estimates. Direct links to individual forecast datasets are provided in the spreadsheet. Supply volumes are provided in units of thousand acre-feet (TAF).

[1] As described in Section 2.3.1 of the main report, any records assigned to the Upper Mokelumne, Middle San Joaquin-Lower Chowchilla, or Fresno River HUC8s (headwater subwatersheds) in the spreadsheet were based on a closer analysis of Hydrologic Unit Code Level 10 (HUC10) boundaries and other criteria. Points of Diversion (PODs) located in these HUC8s that did not meet these criteria are assigned to the Lower San Joaquin River or San Joaquin Delta HUC8s (lower subwatersheds) in this spreadsheet.

This tab is grouped vertically into three tables separated by gray rows. The top table contains user-specified start and end dates (inclusive) over which water supply forecasts are calculated; water demands described later in the spreadsheet are also calculated based on these values. The dates entered in these cells must be between the current date and one year from the current date (e.g., if the spreadsheet is modified on October 1, 2021, any date between October 1, 2021 and October 1, 2022 could be entered). As described in the Headwaters and Watersheds sections, however, water demands calculated based on these cells will only be from a single month's demand (the month of the Start Date). At the time of publishing DWR's B-120 publication is not available, so all water supply forecasts in this table are obtained from the CNRFC.

The middle table contains forecasted FNF values for the user-specified time period for each CNRFC gage in each subwatershed. The row of gage names includes direct links to each forecast comma-separated value (CSV) file on the CNRFC website, which are updated daily; to update the forecasts in the spreadsheet, the user must click these links (or open all using Excel's Edit Links window in the Data toolbar) to open all forecast CSVs then re-calculate these formulas. Forecasts are presented as volumes with seven different exceedance probabilities: 99% (equivalent to the minimum forecast), 90%, 75%, 50% (equivalent to the median forecast), 25% 10%, and 1% (equivalent to the maximum forecast). Each forecast exceedance is calculated from the 41 different "traces" for the respective gage in the lower table; the 75% through 10% exceedances are calculated using Excel's exclusive percentile function, which is equivalent to computing plotting positions with the Weibull formula.

The lower table contains forecasted FNF values for each CNRFC gage. Forecasts are presented in the form of 41 different "traces" for each gage each day; this table contains the total forecasted supply over the user-specified time period in the top table, referencing the online forecast CSV file for each gage. CNRFC forecasts are presented as daily average FNF in thousand cubic feet per second (TCFS), which are converted to volumes of TAF in the spreadsheet.

Final Supply

This tab contains water supply data from the Supply Forecast tab that is reformatted and computed to represent available supply data for each of the Delta watershed's 20 subwatersheds. User-specified exceedance values for each subwatershed are used to determine available supplies for water unavailability analyses, or a custom supply forecast volume can be entered for any subwatershed. This tab also contains intermediate supply calculations which are used in water unavailability analyses at the headwater and subwatershed scales. All supply volumes in this tab are provided in units of acre-feet (AF).

This tab is grouped vertically into four tables separated by gray rows. The top table contains user-specified supply exceedance probabilities for each subwatershed. Valid exceedance values include 99%, 90%, 75%, 50%, 25%, 10%, 1%, or "Custom", which uses user-specified volumes entered at the bottom row of the table. Monthly supply ratios for the Delta watershed are also calculated for each watershed for the purpose of Legal Delta demand proration. Water supply computations for each subwatershed based on the forecasted values in the Supply Forecast tab are explained in the table below. Some subwatersheds are computed using Gap Filling (GF) factors that are explained in the next section.

Field Name(s)	Definition & Methodology	Data Source(s)
Exceedance	The probability of the water supply over the user-specified period exceeding the given volume.	--
Sacramento Bend	Supply forecasts for the Sacramento River at Bend subwatershed: - CNRFC gage BDBC1. - B-120 SRSWI.	CNRFC, B-120
Stony	Supply forecasts for the Stony Creek subwatershed (at East Park Reservoir): - Augmented, CNRFC gage EPRC1 * GF Stony Increase Factor.	CNRFC w/ staff adjustments
Cache	Supply forecasts for the Cache Creek subwatershed (above Rumsey): - Extrapolated, Stony * GF Cache-Stony Ratio.	Staff estimates
Upper Feather	Supply forecasts for the Upper Feather River subwatershed (at Lake Oroville): - CNRFC gage ORDC1. - B-120 SRSWI.	CNRFC, B-120
Yuba	Supply forecasts for the Yuba River subwatershed (at Englebright Reservoir or near Smartville plus Deer Creek): - CNRFC gage HLEC1. - B-120 SRSWI.	CNRFC, B-120
Bear	Supply forecasts for the Bear River subwatershed (near Wheatland): - Extrapolated, Upper Feather * GF Bear-Yuba Ratio.	Staff estimates

Field Name(s)	Definition & Methodology	Data Source(s)
Upper American	Supply forecasts for the Upper American River subwatershed (at Folsom Lake): - CNRFC gage FOLC1. - B-120 SRSWI.	CNRFC, B-120
Putah	Supply forecast for the Putah Creek subwatershed (near Winters): - Extrapolated, Stony * GF Putah-Stony Ratio.	Staff estimates
Upper Sacramento Valley	Supply forecasts for the Upper Sacramento River Valley subwatershed (tributaries between Bend and Butte Slough, including Redbank, Elder, Thomes, Antelope, Mill, Deer, Big Chico, and Butte Creeks): - Augmented, CNRFC gages (EDCC1+TCRC1) * GF Elder-Thomes Increase Factor + (MLMC1+DCVC1+BKCC1) * GF Mill-Deer-Butte Increase Factor.	CNRFC w/ staff adjustments
Sacramento Valley Floor	Supply forecasts for the Sacramento Valley Floor subwatershed (minor east and west side tributaries between Stony Creek and the Delta, including tributaries to the Lower Feather and American Rivers): - Extrapolated, (Sacramento Bend+Upper Feather+Upper American) * GF Sacramento Valley Ratio.	Staff estimates
Sacramento Total	The sum of all subwatershed supplies in the Sacramento River watershed for the given forecast exceedance over the user-specified time period.	Calculated
Chowchilla	Supply forecasts for the Chowchilla River subwatershed (at Buchanan Reservoir): - CNRFC gage BHNC1.	CNRFC
Upper San Joaquin	Supply forecasts for the Upper San Joaquin River subwatershed (at Millerton Reservoir): - CNRFC gage FRAC1. - B-120 SJSWI.	CNRFC, B-120

Field Name(s)	Definition & Methodology	Data Source(s)
Fresno	Supply forecasts for the Fresno River subwatershed (at Hensley Lake): - CNRFC gage HIDC1.	CNRFC
Merced	Supply forecasts for the Merced River subwatershed (at Exchequer Reservoir or below Merced Falls): - CNRFC gage EXQC1. - B-120 SJSWI.	CNRFC, B-120
Tuolumne	Supply forecasts for the Tuolumne River subwatershed (at New Don Pedro Reservoir or below La Grange Reservoir): - CNRFC gage NDPC1. - B-120 SJSWI.	CNRFC, B-120
Stanislaus	Supply forecasts for the Stanislaus River subwatershed (at New Melones Reservoir or below Goodwin Reservoir): - CNRFC gage NMSC1. - B-120 SJSWI.	CNRFC, B-120
Calaveras	Supply forecasts for the Calaveras River subwatershed (at New Hogan Reservoir): - CNRFC gage NHGC1.	CNRFC
Mokelumne	Supply forecasts for the Mokelumne River subwatershed (at Pardee Reservoir): - CNRFC gage CMPC1.	CNRFC
Cosumnes	Supply forecasts for the Cosumnes River subwatershed (at Michigan Bar): - CNRFC gage MHBC1.	CNRFC
San Joaquin Valley Floor	Supply forecasts for the San Joaquin River Valley Floor subwatershed (including minor east and west side tributaries between the Chowchilla and American Rivers): - Extrapolation, CNRFC gages MPAC1+OWCC1+MEEC1 + (Upper San Joaquin+Merced+Tuolumne+Stanislaus)* GF San Joaquin Valley Ratio + (Mokelumne+Cosumnes) * GF San Joaquin-Mokelumne-Cosumnes Ratio.	CNRFC, staff estimates

Field Name(s)	Definition & Methodology	Data Source(s)
San Joaquin Total	The sum of all subwatershed supplies in the San Joaquin River watershed for the given forecast exceedance over the user-specified time period.	Calculated
Delta Watershed Total	The sum of all supplies in the Delta watershed for the given forecast exceedance over the user-specified time period.	Calculated
% Sacramento	The percent of total Delta watershed supply for the given forecast exceedance and user-specified timer period which came from the Sacramento River watershed.	Calculated
% San Joaquin	The percent of total Delta watershed supply for the given forecast exceedance and user-specified timer period which came from the San Joaquin River watershed.	Calculated

The second table in this tab indicates if any Riparian claims within each subwatershed faced water unavailability over the user-specified period in the Supply Forecast tab (i.e., if the subwatershed's supplies and demands should be excluded from the Watershed unavailability analysis due to lack of connectivity with the Delta watershed). These cells have conditional formatting to **highlight red** if the subwatershed lacks connectivity. Lower subwatersheds have static values that indicate they are never disconnected from the watershed.

The third table in this tab indicates the supply volumes used for each subwatershed in the watershed-wide unavailability analysis, which are summed to a total for each watershed. If any headwater subwatersheds are determined to be disconnected (see above), their supply is shown as zero. If the abandoned instream flow within a given headwater subwatershed is greater than its FNF (see Instream Flows section), the instream flow value for the respective subwatershed and specified time period is shown instead of the supply forecast from the top table.

The final table in this tab indicates the priority date of the most senior right or claim in each subwatershed, as well as the Sacramento and San Joaquin watersheds and the Legal Delta as a whole, that would be under curtailment for the user-specified time period with the user-specified supply forecasts (see the first table above) and the Watershed-wide unavailability analysis (see Watersheds section below). These cells will only display "Riparian" priority if the supply in the given headwater subwatershed is forecasted to be zero; they will display "All Pre-14" if all pre-1914 appropriative water right claims are under curtailment. Values of "Project" mean that one or more Project water rights (assumed to be the most junior in the Delta watershed) are under

curtailment. These cells display "-" if no water rights or claims are under curtailment for the given subwatershed/watershed.

Gap Filling

This tab contains monthly factors which are used to fill gaps in supply data for select subwatersheds, either to estimate missing past/forecasted data (extrapolation) or to adjust existing supply data (augmentation). These monthly average factors are computed outside the Methodology spreadsheet based on past supply data, and detailed methods for each subwatershed are described in the table below. Outlying values (outside the range of the overall mean plus or minus three times the overall standard deviation) were removed prior to the calculation of the monthly mean factors shown in this tab.

Field Name(s)	Definition & Methodology	Data Source(s)
Month	Month of the calendar year for which the gap-filling factor applies.	--
Cache-Stony Ratio (CSR)	Factor used to extrapolate the FNF supply for the Cache Creek subwatershed based on data for the Stony Creek subwatershed: - CSR = DWR subbasin UF3 / DWR subbasin UF4 for WY -1922-2014, removed outlying values and averaged by month. - GF Cache = CSR*(EPRC1*SIF) for WY 2015-Present and Forecasts.	Calculated
Stony Increase Factor (SIF)	Factor used to augment recent FNF supply values for the Stony Creek subwatershed to approximate the entire subwatershed's supply based on past DWR data (CNRFC gage EPRC1 is located upstream of several tributaries): - SIF = DWR subbasin UF4 / CNRFC gage EPRC1 for WYs 2013-2014, removed outlying values and averaged by month. - GF Stony = SIF*EPRC1 for WY 2015-Present and Forecasts.	Calculated

Field Name(s)	Definition & Methodology	Data Source(s)
Bear-Yuba Ratio (BYR)	Factor used to extrapolate the FNF supply for the Bear River subwatershed based on data for the Yuba River subwatershed: - BYR = DWR subbasin UF10 / CDEC gage YRS for WY -1922-2014, removed outlying values and averaged by month. - GF Bear = BYR*YRS for WY 2015-Present and Forecasts.	Calculated
Elder-Thomes Increase Factor (ETIF)	Factor used to augment recent FNF supply values for west side tributaries in the Upper Sacramento River Valley subwatershed to approximate the supply of all west side tributaries based on past DWR data (CNRFC gages EDCC1 and TCRC1 do not include all west side tributaries): - ETIF = DWR subbasin UF5 / (CNRFC gages EDCC1+TCRC1) for WYs 2013-2014, removed outlying values and averaged by month. - GF Upper Sacramento Valley West = ETIF*(EDCC1+TCRC1) for WY 2015-Present and Forecasts.	Calculated
Mill-Deer-Butte Increase Factor (MDBIF)	Factor used to augment recent FNF supply values for east side tributaries in the Upper Sacramento River Valley subwatershed to approximate the supply of all east side tributaries based on past DWR data (CNRFC gages MLMC1, DCVC1, and BKCC1 do not include all east side tributaries): - MDBIF = DWR subbasin UF7 / (CNRFC gages MLMC1+DCVC1+BKCC1) for WYs 2013-2014, removed outlying values and averaged by month. - GF Upper Sacramento Valley East = MDBIF*(MLMC1+DCVC1+BKCC1) for WY 2015-Present and Forecasts.	Calculated

Field Name(s)	Definition & Methodology	Data Source(s)
Putah-Stony Ratio (PSR)	Factor used to extrapolate the FNF supply for the Putah Creek subwatershed based on data for the Stony Creek subwatershed: - PSR = DWR subbasin UF2 / DWR subbasin UF4 for WY 1922-2014, removed outlying values and averaged by month. - GF Putah = PSR*(EPRC1*SIF) for WY 2015-Present and Forecasts.	Calculated
Sacramento Valley Ratio (SRVR)	Factor used to extrapolate the FNF supply for the Sacramento River Valley Floor subwatershed based on data for the Sacramento, Feather, and American Rivers (no recent or projected supply data exists for the Valley Floor): - SRVR = DWR subbasin UF1 / CDEC gages SBB+FTO+AMF for WY 1922-2014, removed outlying values and averaged by month. - GF Sacramento Valley Floor = SRVR*(SBB+FTO+AMF) for WY 2015-Present and Forecasted.	Calculated
San Joaquin-Mokelumne-Cosumnes Ratio (SJMCR)	Factor used to extrapolate the FNF supply for east side tributaries in the San Joaquin River Valley Floor subwatershed based on data for the Mokelumne and Cosumnes Rivers (no recent or projected supply data exists for the Valley Floor): - SJMCR = DWR subbasin UF12 / CDEC gages MKM+CSN for WY -1922-2014, removed outlying values and averaged by month. - GF San Joaquin Valley Floor East = SJMCR*(MKM+CSN) for WY 2015-Present and Forecasted.	Calculated

Field Name(s)	Definition & Methodology	Data Source(s)
San Joaquin-Merced-Tuolumne-Stanislaus Ratio (SJMTSR)	Factor used to estimate the FNF supply for west side tributaries in the San Joaquin River Valley Floor subwatershed based on data for the San Joaquin, Merced, Tuolumne, and Stanislaus Rivers (no recent or projected supply data exists for the Valley Floor): - SJMTSR = DWR subbasin UF24 / CDEC gages SJF+MRC+TLG+SNS for WY - 1922-2014, removed outlying values and averaged by month. - GF San Joaquin Valley Floor West = SJMTSR*(SJF+MRC+TLG+SNS) for WY 2015-Present and Forecasted.	Calculated

Instream Flows

This tab contains instream flow requirements for each subwatershed, which are used to increase available supplies to account for the abandonment of these dedicated flows below their intended reach. Flow requirements are sourced from the Division's Sacramento Valley Water Allocation Model (SacWAM) and Water Supply Effects (WSE) model. Only requirements which crossed subwatershed boundaries or ended near the bottom of a subwatershed (less than 30 river miles from its mouth) are included. If the instream flow reach ends higher up in the subwatershed, such that it may meet demand within that subwatershed itself, the abandoned instream flow is not considered in the analysis. The source of each instream flow requirement is detailed in the Note column.

All flow values in the Instream Flows table are given in average cubic feet per second (CFS) by month, which are converted to volumes of acre-feet (AF) later in the analysis (see Final Supply section). The supply contribution of each subwatershed to the watershed-wide analysis is represented by the greater of either the forecasted full natural flow (FNF, see Final Supply section) or the abandoned instream flow in this table for the respective subwatershed and user-specified month (see Supply Forecast tab). In other words, during very dry conditions instream flows were assumed to consist of supplemental reservoir releases which would replace available natural flows when abandoned below their intended reach. During wet conditions instream flows were assumed to consist of bypassed natural flows, which would not contribute abandoned water in excess of FNF below their intended reach.

Demand

This tab contains monthly water diversion (demand) data for water right records in the Delta watershed. This data originated from the State Water Board's Electronic Water Rights Information Management System (eWRIMS) database. Technical Appendix B describes the process used to select these water right records and quality-control reported data to produce this dataset. In this tab each row quantifies reported water diversions (demand) for a single water right or claim in each month of the 2018 and 2019 calendar years, which are used as proxies for 2021 water demand in this analysis. Demand data are further adjusted in the Final Demand tab (see Final Demand section) to account for water rights with diversion points in multiple subwatersheds and return flows.

Field Name(s)	Definition & Methodology	Data Source(s)
Application ID	Water Right Application ID; each water right record on file with the State Water Board (Board) is assigned a unique Application ID.	eWRIMS database
Water Right Type	Water right or claim type (see Appendix B for additional information on the different Statement assigned categories): - Appropriative: A post-1914 appropriative water right pursuant to a permit or license from the Board. - Statement of Div[ersion] and Use (Riparian): A riparian water right claim. - Statement of Div[ersion] and Use (Riparian or Pre-1914): A riparian and/or pre-1914 appropriative water right claim. - Statement of Div[ersion] and Use (Pre-1914): A pre-1914 appropriative water right claim. - Statement of Div[ersion] and Use (Reserved): A federal reserved water right claim. - Statement of Div[ersion] and Use (Other): Any other category of water right claim (e.g., court decreed/adjudicated or contract/agreement). - Statement of Div[ersion] and Use (Unclassified): A water right claim with an unspecified category. - Statement of Div[ersion] and Use (Pending): A statement filed to document diversions while an appropriative water right application is pending.	eWRIMS database w/ staff adjustments

Field Name(s)	Definition & Methodology	Data Source(s)
	- Stockpond or Federal Stockpond: A water right for a small livestock watering impoundment constructed before 1969 (Water Code §1226). - Registration (Domestic, Livestock, or Cannabis): Water rights issued for certain small projects (Water Code §§1228-1229). - Federal Claims: A claim of federal reserved water rights filed before July 1, 1984 (Water Code §1227). - Section 12 File: A specific type of water right, similar to a pre-1914 appropriative water right claim.	
Water Right Status	Status of the water right or claim: - Licensed: A post-1914 appropriative water right for which the Board has issued a license. - Permitted: A post-1914 appropriative water right for which the Board has issued a permit. - Claimed: A water right claimed by the owner (i.e., Statements of Diversion and Use) which the Board has not verified. - Certified: A Stockpond, Federal Stockpond, or Section 12 File water right for which the Board has issued a certificate. - Registered: A Domestic, Livestock, Cannabis, or other small water right Registration which has been approved by the Board.	eWRIMS database
Primary Owner	Name of the primary owner of the water right record.	eWRIMS database
Beneficial Use(s)	Concatenated list of the beneficial use(s) of water associated with the water right record, as defined by Water Code §§660-669.	eWRIMS database
Priority Date	The priority date of the water right or claim (YYYY/MM/DD): - Appropriative: Assumed to be the earlier of the Application Acceptance Date and Application Received Date attributes. - Statements (Riparian, Riparian or Pre-1914, or Other): Marked as 'Riparian' because the water right record does not contain sufficient information to further disaggregate their demands. They are conservatively assumed to	eWRIMS database

Field Name(s)	Definition & Methodology	Data Source(s)
	have a more senior priority date than all appropriative water rights and claims. [2] - Statements (Pending): Marked as 'Pending' and assumed to be the most junior of all records, because the statement was only filed to document diversions while an appropriative water right application is pending. - Project water rights listed in Board Decision 1641 (excepting 2 New Melones Project rights, per Board Decision 1422): Marked as 'Project' and assumed to be junior to other appropriative water rights and claims. - Other Records: assumed to be equal to the Priority Date value in the eWRIMS database.	
Face Value (AFA)	The maximum volume of water authorized for diversion annually under an appropriative water right. Statements, including Riparian and Pre-1914 Appropriative claims, do not have an assigned face value; for the purposes of this analysis, their face value is assumed to be zero.	eWRIMS database
2018/2019 Total Diversion (AFA)	The total reported diversion of the water right record in calendar year 2018 or 2019. These values include user-reported direct diversions and diversions to storage from annual reports. Values for select water right records were manually reviewed by staff and corrected as necessary (see Review columns).	eWRIMS database w/ staff adjustments
2018/2019 Review	Indicates whether and how the 2018 or 2019 reported diversion was reviewed or corrected by staff: - Estimated Downward: Staff reviewed and corrected the user-reported diversion value to be higher than reported.	Staff-determined

[2] For claims within the Legal Delta, this categorization of colorable riparian claims is consistent with recent judicial decisions (see e.g., *Modesto Irrigation District v. Heather Robinson Tanaka*, 48 Cal.App.5th 898 (2020)) and with the legal principles described in a memorandum dated December 15, 2017, regarding Issues Related to Overlap between Pre-1914 and Riparian Water Right Claims in the Delta and available on the website of the Office of the Delta Watermaster (Overlap Memo).

Field Name(s)	Definition & Methodology	Data Source(s)
	- Estimated Upward: Staff reviewed and corrected the user-reported diversion value to be lower than reported. - Reviewed Not Changed: Staff reviewed the reported diversion value but did not apply a correction. - Not Reviewed: Staff did not manually review the annual report.	
2018/2019 Jan-Dec Diversion (AF)	The total reported diversion of the water right record in each month of calendar year 2018 or 2019. These values include user-reported direct diversions and diversions to storage from annual reports. Values for select water right records were manually reviewed by staff and corrected as necessary (see Review columns).	eWRIMS database w/ staff adjustments

Return Flows

This tab contains factors which are used to adjust demand data to account for return flows within each subwatershed. Return Flow factors are calculated for each month in the Sacramento and San Joaquin River watersheds as the percent of diversion which returned as flow within the same month (Factor = Total Diversions / Total Return Flows) from May through September. Data used to determine the factors, which include return flows from both agricultural and municipal water uses, were sourced from CalSim 3 results published by DWR. Results from WY 2014 are used, as its hydrology most closely matches forecasts for the remainder of WY 2021.

All values in the Return Flows table are given as multipliers (i.e., a value of 0.6 means that the analysis will reduce demands within the given subwatershed in the given month by 40%). Demand values in the analysis are adjusted by multiplying monthly demand for a given water right or claim by the monthly factor for the appropriate subwatershed where it diverts. The Methodology currently only applies return flow factors to reduce demands within lower valley portions of the Delta watershed (the Sacramento Bend, Upper Sacramento Valley, Sacramento Valley Floor, and San Joaquin Valley Floor subwatersheds) because return flows from diversions within headwater subwatersheds are not expected to be available within the same subwatershed (i.e., they return further downstream on the valley floor). Demand adjustments are done in the Final Demand tab of the spreadsheet (see next section).

Final Demand

This tab contains monthly demand data for water rights and claims in the Delta watershed, which are modified from the Demand tab (see previous section) to account for return flows and water rights with multiple points of diversion (PODs). This demand separation is necessary because annual water right reports, and thus the data in the Demand tab of the spreadsheet, are provided for each water right record rather than each POD. While the data necessary to separate demands to each POD originated from the Division's eWRIMS database, some staff judgement is required to develop the Demand Weights listed in this tab based on the nature of PODs associated with each right. Demand adjustments to account for return flows are sourced from the Return Flows tab of the spreadsheet. Each row quantifies monthly demands from a single water right or claim's POD.

Field Name(s)	Definition & Methodology	Data Source(s)
Application ID	Application ID of the water right or claim, sourced from the Demand tab. Water rights or claims with multiple PODs are split into multiple rows, one for each POD.	eWRIMS database
Water Right Type	Water right or claim type, sourced from the Demand tab.	eWRIMS database w/ staff adjustments
Primary Owner	Name of the primary owner of the water right record.	eWRIMS database
POD ID	Unique numeric identifier for the POD.	eWRIMS database
Latitude/ Longitude	Latitude and longitude coordinates of the POD location (NAD83).	eWRIMS database
HUC8	The name of the Hydrologic Unit Code Level 8 watershed where demand from the POD. Water right or claim PODs are automatically assigned a HUC8 value in eWRIMS based on their location. HUC8 values for some PODs in the Upper Mokelumne, Middle San Joaquin-Lower Chowchilla, and Fresno River were manually assigned to other HUC8s so that PODs within these subwatersheds represent headwater demands that can only be met by local supply.	eWRIMS database, USGS WBD

Field Name(s)	Definition & Methodology	Data Source(s)
Subwatershed	Subwatershed where demand from the POD is row is located. Sourced from the Subwatersheds tab based on the HUC8 value.	Staff-determined
Watershed	The watershed in which the demand occurs: the Sacramento River watershed or the San Joaquin River watershed. Sourced from the Subwatersheds tab based on the HUC8 value.	eWRIMS database, USGS WBD
Legal Delta?	Indicates if that POD is located in the Legal Delta (TRUE/FALSE). Assigned in the eWRIMS database based on the location of the POD.	eWRIMS database w/ staff adjustments
Priority Date	The priority date of a water right or claim, sourced from the Demand tab (YYYY/MM/DD).	eWRIMS database w/ staff adjustments
Priority Year	The year of the priority date, sourced from the previous column. Riparian, Project, or Pending priorities are shown as blank.	eWRIMS database w/ staff adjustments
Demand Weight	The percent of the specified water right or claim's demand which was assumed to occur from the specified POD: - Demand Weight = (1 if an Active point of Direct Diversion or Diversion to Storage, 0 if Inactive or Point of Rediversion) / (total number of Active Points of Diversion or Diversion to Storage within the Delta watershed for the given record). - The sum of Demand Weights for most water rights or claims is equal to one (see exception in next column).	Staff-determined

Field Name(s)	Definition & Methodology	Data Source(s)
Demand Comment	Additional detail about the Demand Weight or other aspects of the demand: - POD(s) outside Delta watershed: The water right or claim has one or more associated PODs which divert from streams outside the Delta watershed (sum of Demands Weights is less than one). - Inactive: The POD is not actively used (Demand Weight is zero). - Rediversion: The POD does not divert natural flow (Demand Weight is zero). - Project: The water right is listed in Board Decision 1641 and its Priority Date is set to 'Project.' Indicates the associated project (e.g., Shasta).	Staff-determined
Jan-Dec Demand (AF)	Monthly demands of the specified water right or claim from the specified POD. Demands for the purpose of evaluating water unavailability are assumed to be represented by 2018 reported diversions. Calculated as follows: (Application ID Demand for month of 2018, sourced from Demand tab) * (Return Flow Factor for subwatershed and month, sourced from Return Flows tab) * (Demand Weight)	Calculated
Selected Month Demand (AF)	Monthly demand of the specified water right or claim POD for the month of the user-specified Start Date in the Supply Forecast tab.	Calculated

Headwaters

This tab contains a tabular water unavailability analysis for the 17 headwater subwatersheds in the Delta watershed. In each, forecasted water supplies are used to determine water unavailability for each water right or claim in order of priority date. Rights or claims which are not expected to have water available to meet their demands due to limited local supplies are flagged for the receipt of a notice of water unavailability or curtailment order, and these unmet demands are excluded from the Watershed-level analysis (see next section). If the Headwaters Analysis indicates that any Riparian claims of right (senior demands) would face water unavailability (see calculations in

Final Supply section), all supplies and demands from that subwatershed are excluded from its respective Watershed analysis. In other words, these streams are assumed to not have connectivity to the Delta watershed due to senior demands exceeding all available water supplies.

This analysis is set-up for each headwater subwatershed as follows:

1. The water rights and claims listed in the Final Demand tab of the spreadsheet are grouped by subwatershed.
2. Any rights or claims located in the Legal Delta (Legal Delta? = TRUE) are excluded; this only occurs in the furthest downstream reaches of the Putah Creek, Stanislaus River, Calaveras River, Mokelumne River, and Cosumnes River headwater subwatersheds. Water unavailability for these rights or claims is only analyzed in the Watershed analyses, as they are assumed to have access to water from both the Sacramento and San Joaquin Rivers and not be limited by local supplies.
3. Any duplicate records (i.e., with the same Application ID, Subwatershed, and Legal Delta? values) are merged; this occurs for any records with multiple PODs within the same subwatershed. All Riparian-priority claims in each subwatershed are also merged, since water unavailability is not determined for individual Riparian-priority claims.
4. Rights and claims within each subwatershed are sorted by priority date, with the most senior rights or claims first: Riparian, Pre-1914 Appropriative, Appropriative, Project (see the explanations of Statement assigned categories and priority assumptions in the Demand and Final Demand sections). All Riparian claims of right are assumed to have senior priority over all pre-1914 appropriative claims, which are in turn assumed to have priority over all post-1914 appropriative rights.
5. For each right or claim within a subwatershed over the user-specified time period in the Supply Forecast tab, each of the following parameters is calculated or determined: demand, cumulative supply available, water unavailability (i.e., will this right or claim receive a notice of water unavailability or curtailment order?), demand met, and demand unmet. Demands are calculated, and thus water unavailability is evaluated, for the user-specified time period in the Supply Forecast tab.

This tab is grouped into seventeen tables separated by black rows which contain the analysis for each headwater subwatershed: Sacramento River above Bend, Stony Creek, Cache Creek, Upper Feather River, Yuba River, Bear River, Upper American River, Putah Creek, Chowchilla River, Upper San Joaquin River, Fresno River, Merced River, Tuolumne River, Stanislaus River, Calaveras River, Mokelumne River, and Cosumnes River.

Field Name(s)	Definition & Methodology	Data Source(s)
Watershed	The watershed in which the demand occurs, Sacramento River or San Joaquin River. Sourced from the Final Demand tab.	USGS WBD
Subwatershed	Smallest area over which water unavailability is determined, based on one or more HUC8s. This tab contains data for only headwater subwatersheds (see Subwatersheds section), sourced from the Final Demand tab.	Staff-determined
Application ID	Application ID of each water right or claim, sourced from the Final Demand tab. Any duplicate Application IDs within a single subwatershed are merged.	eWRIMS database
Primary Owner	Name of the primary owner of the water right or claim, sourced from the Demand tab.	eWRIMS database
Water Right Type	Water right or claim type, sourced from the Demand tab.	eWRIMS database w/ staff adjustments
Priority Date	The priority date of a water right or claim, sourced from the Demand tab (YYYY/MM/DD). Statements with 'Riparian' priority are grouped together as a single demand at the top (senior priority) of each subwatershed, while Project rights listed in Board Decision 1641 are denoted as 'Project' priority and are assumed to be junior to other appropriative demands. Statements with 'Pending' priority are assumed to be junior to all other water rights and claims and are listed at the bottom of each subwatershed.	eWRIMS database w/ staff adjustments

Field Name(s)	Definition & Methodology	Data Source(s)
Demand	Demands by each water right or claim in the respective subwatershed for the user-specified time period in the Supply Forecast tab, summed from the Selected Month Demand column of the Final Demand tab. Excludes any demands in the Legal Delta. NOTE: Even if the user-specified period spans multiple months, Demand is calculated from only a single month's daily average Demand volume (based on the Start Date) multiplied by the number of days in the user-specified time period.	eWRIMS database w/ staff adjustments
Supply Cumulative	Available water supply to meet each water right or claim's Demand over the specified time period, calculated as follows: - For the first water right or claim in each subwatershed, equal to the subwatershed's supply from the second table in the Final Supply tab. - For the next water right or claim, the Supply Cumulative available to the previous right or claim minus the previous right or claim's Demand Potentially Met in Subwatershed (see below). - Continued for each next junior water right or claim, until all Demands are accounted for or there is no remaining water supply available.	CNRFC, B-120, staff estimates
Water Unavailable in Headwater Subwatershed?	If water is anticipated to be unavailable to the respective water right or claim for the specified time period. Determined if Demand exceeds Supply Cumulative (TRUE/FALSE). These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined

Field Name(s)	Definition & Methodology	Data Source(s)
Demand Potentially Met in Subwatershed	Amount of each right or claim's Demand which can be met by available supply in the specified time period, calculated as follows: - If Supply Cumulative > Demand, equal to Demand. - If 0 < Supply Cumulative < Demand, equal to Supply Cumulative (i.e., Water Unavailable in Subwatershed, but a portion of Demand can be met). - If Supply Cumulative = 0, equal to zero (i.e., Water Unavailable in Subwatershed).	Calculated
Demand Unmet in Subwatershed	Amount of each right or claim's Demand which cannot be met by available water supply in the specified time period, calculated as follows: - If Demand Potentially Met = Demand, equal to zero. - If Demand Potentially Met < Demand, equal to Demand - Demand Potentially Met. - If Demand Potentially Met = 0, equal to Demand.	Calculated

Watersheds

This tab contains a tabular water unavailability analysis for the Sacramento and San Joaquin River watersheds. In each watershed, total forecasted supplies are used to determine water unavailability for each right or claim in order of priority date. Demands compared in this analysis include those in headwater subwatersheds which may be met by local supplies (see previous section), as well as all demands located in lower subwatersheds and within the Legal Delta. Rights or claims which are not expected to have water available to meet their demands are flagged for the receipt of a notice of water unavailability or curtailment order. This is in addition to those flagged for receipt of a notice of water unavailability or curtailments order in the Headwaters analysis; while there may be enough water present locally to meet a given demand, those supplies may not actually be available if they are needed to supply more senior rights or claims further downstream in the watershed. Headwater subwatersheds where not all senior demands (Priority Date = Riparian) can be met by available supplies have their supplies

and demands removed from the Watershed Analysis (see Final Supply and Headwaters sections).

This analysis is set-up for each watershed as follows:

1. The water rights and claims listed in the Final Demand tab of the spreadsheet are grouped by watershed. Rights or claims within the Legal Delta (Legal Delta? = TRUE), with the exception of Riparian-only claims (Water Right Type = Statement of Div and Use (Riparian)), are present in both watersheds so that they can be prorated to each based on available supplies.
2. Any duplicate records (i.e., with the same Application ID, Subwatershed, Watershed, and Legal Delta? values) are merged; this occurs for any records with multiple PODs within the same subwatershed. All Riparian-priority claims in each watershed are also merged (into three separate categories based on their specific type and Legal Delta? value), since water unavailability is not determined for individual Riparian-priority claims.
3. Rights and claims within each subwatershed are sorted by priority date, with the most senior rights or claims first: Riparian, Pre-1914 Appropriative, Appropriative, Project (see the explanations of Statement assigned categories and priority assumptions in the Demand and Final Demand sections). All Riparian claims of right are assumed to have senior priority over all pre-1914 appropriative claims, which are in turn assumed to have priority over all post-1914 appropriative rights.
6. For each right or claim within a watershed over the user-specified time period in the Supply Forecast tab, each of the following parameters is calculated or determined: demand (both total and headwater subwatershed demand which can potentially be met by local supplies), cumulative supply available, water unavailability (i.e., will this right or claim receive a notice of water unavailability or curtailment order?), demand met, and demand unmet. Demands are calculated, and thus water unavailability is evaluated, for the user-specified time period in the Supply Forecast tab.

This tab is grouped into two tables separated by black rows, one for each watershed (Sacramento and San Joaquin).

NOTE: Though this tab evaluates water unavailability for any user-specified time period entered in the Supply Forecast tab, water unavailability analyses for the purpose of issuing curtailments in the Legal Delta will not be performed on a timestep any shorter than one month.

Field Name(s)	Definition & Methodology	Data Source(s)
Watershed	The watershed in which the demand occurs, Sacramento River or San Joaquin River. Sourced from the Final Demand tab. Legal Delta demands (Legal Delta? = TRUE, with the exception of Water Right Type = Statement of Div and Use (Riparian)) are present in both watersheds, with their demands prorated between them.	USGS WBD
Subwatershed	Smallest area over which water unavailability is determined, based on one or more HUC8s. Sourced from the Final Demand tab.	Staff-determined
Application ID	Application ID of each water right or claim, sourced from the Final Demand tab. Any duplicate Application IDs within a single subwatershed are merged.	eWRIMS database
Primary Owner	Name of the primary owner of the water right or claim, sourced from the Demand tab.	eWRIMS database
Water Right Type	Water right or claim type, sourced from the Demand tab.	eWRIMS database w/ staff adjustments
Priority Date	The priority date of a water right or claim, sourced from the Demand tab (YYYY/MM/DD). Statements with 'Riparian' priority are grouped together as single demands at the top (senior priority) of each watershed, while Project rights listed in Board Decision 1641 are denoted as 'Project' priority and are assumed to be junior to other appropriative demands. Statements with 'Pending' priority are assumed to be junior to all other water rights and claims and are listed at the bottom of each watershed.	eWRIMS database w/ staff adjustments

Field Name(s)	Definition & Methodology	Data Source(s)
Legal Delta?	If demand for that row occurs within the Legal Delta (TRUE/FALSE), sourced from the Final Demand tab. Each water right or claim located in the Legal Delta (with the exception of Water Right Type = Statement of Div and Use (Riparian)) is present in both the Sacramento and San Joaquin Watershed Analyses.	eWRIMS database
Headwater Subwatershed?	If demand for that row occurs within a headwater subwatershed (TRUE/FALSE), sourced from the Subwatersheds tab based on the Subwatershed value.	Staff-determined
Demand	Demands by each water right or claim in the respective subwatershed for the user-specified time period in the Supply Forecast tab, summed from the Final Demand tab. Excludes any demands in the Legal Delta. If the right or claim is located in the Legal Delta (Legal Delta? = TRUE, with the exception of Water Right Type = Statement of Div and Use (Riparian)), the demand is multiplied by the respective watershed's supply ratio (see third table in Final Supply tab) in order to prorate these demands between both watersheds. NOTE: Even if the user-specified period spans multiple months, Demand is calculated from only a single month's daily average Demand volume (based on the Start Date) multiplied by the number of days in the user-specified time period.	eWRIMS database w/ staff adjustments

Field Name(s)	Definition & Methodology	Data Source(s)
Water Unavailable in Headwater Subwatershed?	If water is anticipated to be unavailable in a headwater subwatershed (TRUE/FALSE): - If located in a headwater subwatershed, equal to the Water Unavailable in Subwatershed? value in the Headwaters tab for the respective right or claim. - FALSE if located in a lower subwatershed. These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined
Demand Potentially Met in Subwatershed	Demand by each water right or claim which can physically be met within the respective subwatershed: - If supply is less than the total demand of Riparian-priority Statements in the given headwater subwatershed (see second table in Final Supply tab), equal to zero. - If located in a headwater subwatershed and nonzero, equal to the Demand Potentially Met in Subwatershed value in the Headwaters tab for the respective right or claim. - If located in a lower subwatershed, equal to Demand.	Calculated

Field Name(s)	Definition & Methodology	Data Source(s)
Supply Cumulative	Available water supply to meet each water right or claim's Demand Potentially Met in Subwatershed, calculated as follows: - For the first water right or claim in each watershed, equal to the total watershed Supply from the third table in the Final Supply tab. - For the next water right or claim, the Supply Cumulative available to the previous right or claim minus the previous right or claim's Demand Met in Watershed (see below). - Continued for each next junior water right or claim, until all Demands are accounted for or there is no remaining water supply available.	CNRFC, B-120, staff estimates
Water Unavailable in Watershed?	If water is anticipated to be unavailable to the respective water right or claim. Determined if Demand Potentially Met exceeds Supply Cumulative (TRUE/FALSE). These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined
Demand Met in Watershed	Amount of each right or claim's Demand Potentially Met which can be met by available supply, calculated as follows: - If Supply Cumulative > Demand Potentially Met, equal to Demand Potentially Met. - If 0 < Supply Cumulative < Demand Potentially Met, equal to Supply Cumulative (i.e., Water Unavailable in Watershed, but a portion of Demand can be met). - If Supply Cumulative = 0, equal to zero (i.e., Water Unavailable in Watershed).	Calculated

Field Name(s)	Definition & Methodology	Data Source(s)
Demand Unmet in Watershed	Amount of each right or claim's Demand which can be physically met in the watershed but will be unmet by available water supply, calculated as follows: - If Demand Met = Demand Potentially Met, equal to zero. - If Demand Met < Demand Potentially Met, equal to Demand Potentially Met - Demand Met. - If Demand Met = 0, equal to Demand Potentially Met.	Calculated
Water Unavailable?	If water is anticipated to be unavailable to the given water right or claim in the specified time period (i.e., will this right or claim receive a notice of water unavailability or curtailment order?), either from the Headwaters Analysis (Water Unavailable in Subwatershed?) or Watershed Analysis (Water Unavailable in Watershed?). These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined

Legal Delta

This tab contains information on water rights and claims located in the Legal Delta. Because these rights and claims are assumed to have access to supplies from both the Sacramento and San Joaquin Rivers to meet their demands (see Demand column in Watersheds tab), this tab quantifies total demands and demands met from each watershed to identify which rights or claims may receive notices of water unavailability or curtailment orders. All riparian-priority claims in the Legal Delta are merged into a single row since water unavailability is not determined for individual Riparian-priority claims. Riparian-only claims (Water Right Type = Statement of Div and Use (Riparian)) are listed separately. Per State Water Board Order WR 89-8, this analysis assumes that demands by Statements of Diversion and Use claiming only Riparian water rights can only be met by supply from the watershed in which they are located; therefore, they are excluded from all demand proration between watersheds.

Water rights or claims in the Legal Delta will only receive a notice of water unavailability or curtailment order if water is anticipated to be unavailable from both watersheds. This

tab does not contain any new analysis, it only compiles values from the Watersheds tab for rights or claims located in the Legal Delta (Legal Delta? = TRUE in the Final Demand tab). Duplicate rights were merged in this tab, so each row represents a single water right's total demand. Water rights that have PODs both outside and within the Legal Delta are not included in this tab because they will only receive a notice of water unavailability or curtailment order if water is determined to be unavailable from all potential sources; these rights can be found in the Curtailments tab (see next section).

NOTE: Though this tab evaluates water unavailability for any user-specified time period entered in the Supply Forecast tab, water unavailability analyses for the purpose of issuing curtailments in the Legal Delta will not be performed on a timestep any shorter than one month.

Field Name(s)	Definition & Methodology	Data Source(s)
Application ID	Application ID of each water right or claim, sourced from the Final Demand tab.	eWRIMS database
Primary Owner	Name of the primary owner of the water right or claim, sourced from the Demand tab.	eWRIMS database
Water Right Type	Water right or claim type, sourced from the Demand tab.	eWRIMS database w/ staff adjustments
Priority Date	The priority date of a water right or claim, sourced from the Demand tab (YYYY/MM/DD).	eWRIMS database w/ staff adjustments
Sacramento Demand	Demands by each water right or claim in the Sacramento River watershed in the specified time period, sourced from the Demand column of the Watersheds tab.	eWRIMS database w/ staff adjustments
San Joaquin Demand	Demands by each water right or claim in the San Joaquin River watershed in the specified time period, sourced from the Demand column of the Watersheds tab.	eWRIMS database w/ staff adjustments

Field Name(s)	Definition & Methodology	Data Source(s)
Water Unavailable in Sacramento?	If the water right or claim is anticipated to face water unavailability from the Sacramento River watershed, sourced from the Water Unavailable in Watershed? column of the Watersheds tab. These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined
Water Unavailable in San Joaquin?	If the water right or claim is anticipated to face water unavailability from the San Joaquin River watershed, sourced from the Water Unavailable in Watershed? column of the Watersheds tab. These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined
Sacramento Demand Met	Amount of each right or claim's Demand in the Sacramento River watershed which can be met by available supplies, sourced from the Watersheds tab.	Staff-determined
San Joaquin Demand Met	Amount of each right or claim's Demand in the San Joaquin River watershed which can be met by available supplies, sourced from the Watersheds tab.	Staff-determined
Water Unavailable?	If the water right or claim is anticipated to face water unavailability in both the Sacramento and San Joaquin River watersheds in the specified time period (i.e., will this right or claim receive a notice of water unavailability or curtailment order?). These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined

Curtailments

This tab contains information on the curtailment status of all water rights and claims in the Delta watershed. It does not contain any new analysis, it only compiles values from the Watersheds tabs to determine which rights or claims face water unavailability over the user-specified time period in the Supply Forecast tab. Information presented for each right or claim includes ownership, location, total demands, and curtailment status

based on either headwater subwatershed or watershed-wide water unavailability. Any rights with multiple PODs are merged into single rows in this tab, including rights and claims in the Legal Delta that are assumed to have access to supplies from both the Sacramento and San Joaquin River watersheds. These rights and claims will only receive a notice of water unavailability or curtailment order if water is unavailable from all potential water sources (i.e., all subwatersheds where PODs are located or both the Sacramento and San Joaquin River watersheds).

NOTE: Though this tab contains water unavailability determinations for any user-specified time period entered in the Supply Forecast tab, water unavailability analyses for the purpose of issuing curtailments in the Legal Delta will not be performed on a timestep any shorter than one month.

Field Name(s)	Definition & Methodology	Data Source(s)
Application ID	Application ID of each water right or claim, sourced from the Final Demand tab.	eWRIMS database
Primary Owner	Name of the primary owner of the water right or claim, sourced from the Demand tab.	eWRIMS database
Water Right Type	Water right or claim type, sourced from the Demand tab.	eWRIMS database w/ staff adjustments
Priority Date	The priority date of a water right or claim, sourced from the Demand tab (YYYY/MM/DD.	eWRIMS database w/ staff adjustments
Watershed	The watershed in which the demand occurs, Sacramento River or San Joaquin River. Sourced from the Final Demand tab; water rights with multiple PODs that fall in both watersheds are denoted as ‘Both.’	USGS WBD
Subwatershed	Smallest area over which water unavailability is determined, based on one or more HUC8s. Sourced from the Final Demand tab; water rights with PODs in multiple subwatersheds are denoted as ‘Multiple.’	Staff-determined

Field Name(s)	Definition & Methodology	Data Source(s)
Legal Delta?	If demand for that row occurs within the Legal Delta (TRUE/FALSE), sourced from the Final Demand tab; water rights with multiple PODs both within and outside the Legal Delta are denoted as 'Partial.'	eWRIMS database w/ staff adjustments
Demand	Total demands by each water right or claim for the specified time period, sourced from the Watersheds tab.	eWRIMS database w/ staff adjustments
Demand Met	Amount of each right or claim's Demand which can be met by available supply, sourced from the Demand Met in Watershed column in the Watersheds tab. NOTE: This column does not compute partially met demands for Riparian-priority claims; these claims will either appear as having all of their demand met (if some supply is available) or having zero demand met (if there is zero supply available in their respective subwatershed or watershed).	
Water Unavailable in Subwatershed?	If the water right or claim is anticipated to face water unavailability due to limited local supplies in a headwater subwatershed. Sourced from the Water Unavailable in Subwatershed? column of the Watersheds tab. Riparian claims will only equal TRUE if zero supply is available within their respective subwatershed. Rights or claims in the Legal Delta or rights with PODs in multiple subwatersheds will only equal TRUE if water is unavailable from all potential sources. These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined

Field Name(s)	Definition & Methodology	Data Source(s)
Water Unavailable in Watershed?	If the water right or claim is anticipated to face water unavailability due to limited supplies in its respective watershed. Sourced from the Water Unavailable in Watershed? column of the Watersheds tab. Riparian claims will only equal TRUE if zero supply is available within their respective watershed. Rights or claims in the Legal Delta or rights with PODs in multiple subwatersheds will only equal TRUE if water is unavailable from all potential sources. These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined
Water Unavailable?	If the water right or claim is anticipated to face water unavailability from all potential sources (i.e., will this right or claim receive a notice of water unavailability or curtailment order?). These cells have conditional formatting to **highlight red** if water is unavailable for a given right or claim.	Staff-determined
Curtailment Status	If the water right or claim is curtailed for the specified time period. Based on the Water Unavailable? value (TRUE = Curtailed, FALSE = Not Curtailed), with some exceptions: - Pending Statements are marked as "Not Authorized to Divert" at all times. - Cannabis Registration rights are marked as "Not Authorized to Divert" if the specified time period (based on the Start Date in the Supply Forecast tab) is during the dry season forbearance period of April 1-October 31.	Staff-determined