Fact Sheet

Frequently Asked Questions About Water Unavailability in the Sacramento-San Joaquin Delta (Delta) Watershed

General Questions:

How is the State Water Board planning to determine if water is unavailable for diversion in the Delta watershed starting in summer of 2021?

The State Water Board has developed a Methodology (also known as the Water Unavailability Methodology or methodology) for identifying when water is unavailable for diversion in the Delta watershed. Currently, the methodology evaluates water unavailability for post-1914 appropriative water right holders during the irrigation season, but is expected to be further modified for use beyond the irrigation season and for possible application in evaluating water unavailability for riparian and pre-1914 appropriative water rights.

The Water Unavailability Methodology relies on available data to indicate when natural and abandoned water supplies (defined below) are unavailable for diversion or diversion to storage. Diversions of previously stored water and water supplied by contracts or transfers are not part of this methodology. The methodology compares the best available full natural flow (defined below) supply data for the Delta watershed to the best available estimates of demand for the same area. The methodology evaluates monthly water supplies and demands at the subwatershed scale[1] and watershed scale for both the Sacramento River and San Joaquin River watersheds.

What is the purpose of the Water Unavailability Methodology?

The methodology determines when natural and abandoned flows in the Delta watershed are unavailable for diversion for a given priority of water right. The State Water Board plans to use this information to issue notices of water unavailability to diverters starting as early as June of 2021. The methodology and the resultant notices of water unavailability will help diverters make more informed decisions regarding their water use during the summer irrigation season.

[1] Subwatershed boundaries were defined using the U.S. Geologic Survey (USGS) Watershed Boundary Dataset (WBD) and National Hydrography Dataset (NHD), which delineate land areas draining to streams. Subwatersheds were established based on Hydrologic Unit Code level 8 watersheds (HUC8s), which represent areas of sufficient size to separate water supplies within the Delta watershed.

Determining when water supplies are unavailable to certain users will be important to ensure that supplies are available to meet more senior water right priorities, and ensure that water released from upstream storage for purposes of meeting water quality and flow requirements is not diverted. The methodology may also be used to support possible emergency curtailment regulations pursuant to the Governor's May 10, 2021 Drought Emergency Proclamation.

Does the Water Unavailability Methodology address the availability of stored water releases or contract water supplies?

The methodology addresses the availability of natural and abandoned flows for use by water right holders. The methodology does not apply to rediversion of storage releases, water contract deliveries, or water transfers. Releases of previously stored water by the Department of Water Resources (DWR) from State Water Project reservoirs and the U.S. Bureau of Reclamation (Reclamation) from Central Valley Project reservoirs (collectively, the Projects) to meet contractual purposes and water quality and flow requirements are not available for diversion by users that do not have a contract with the Projects. However, it can be difficult for diverters to distinguish storage releases from natural streamflow or for diverters to know when natural flow is needed by more senior downstream water right holders. The methodology informs diverters when natural or abandoned flows are not available for diversion under their priority of right.

What is a notice of water unavailability, and how does a notice of water unavailability differ from a notice of curtailment?

Notices of water unavailability are used to inform diverters that, based on the best available information, there is insufficient water available to divert under their priority of right. Notices of water unavailability are not directives to stop diverting and are different from curtailment orders. Notices of water unavailability inform affected diverters that water is either currently unavailable or will be unavailable in the near future for their diversion. Notices of water unavailability play an important role by offering the opportunity for voluntary compliance prior to the initiation of any formal enforcement action by the State Water Board. Diverting unavailable water can result in penalties for injuring more senior water right holders and public trust resources. Before the State Water Board takes enforcement action, diverters will be afforded notice and an opportunity for a hearing.

Notices of curtailment direct diverters to stop diverting water pursuant to established regulatory requirements such as Standard Water Right Term 91 or any future emergency regulation adopted by the State Water Board in line with the Governor's May 10, 2021 Emergency Drought Proclamation. Term 91 curtailments in the Delta watershed have been in place since April 29, 2021, and are expected to be in place until there is significant precipitation and releases of previously stored water by the Projects

to meet Delta water quality standards ceases. For more information on Term 91 and notices of curtailment, please visit the State Water Board's Term 91 Curtailment Information webpage.

How soon will the Water Unavailability Methodology be implemented to issue notices of water unavailability?

Hydrologic conditions in the Delta watershed are currently among the driest on record—drier than the drought years of 2014 and 2015 when water was determined to be unavailable to thousands of diverters statewide. The Governor issued a Proclamation of a State of Emergency on May 10, 2021, covering 41 counties including the Delta Watershed. It has become increasingly evident that the Water Unavailability Methodology must be implemented as soon as practicable, to protect senior water right users, previously stored water supplies needed for salinity control and human health and safety, and to provide minimal environmental protections.

Preliminary results from the Water Unavailability Methodology indicate that water will be unavailable to most if not all post-1914 appropriative water users in the Delta watershed in June. Accordingly, notices of water unavailability are planned to be issued to most/all post-1914 appropriative water right holders as early as June 2021.

Will the Water Unavailability Methodology affect riparian and pre-1914 appropriative water rights?

Not at this time. At present, the methodology is not being used to evaluate water unavailability for pre-1914 appropriative rights or riparian water right claimants. Additional analysis would be required before the methodology could be applied or made useful for evaluating water unavailability for riparian and pre-1914 diverters. That being said, the underlying tenets of the methodology could be extended to more senior rights in the near future if needed.

Will diverters in the Legal Delta receive notices of water unavailability?

Post-1914 appropriative diverters in the Legal Delta will only receive notices of water unavailability if supply is unavailable to them from both the Sacramento and the San Joaquin Rivers. Any notices of water unavailability in the Legal Delta will be issued in coordination with the Office of the Delta Watermaster. As described above, the Water Unavailability Methodology is not currently planned to be used to evaluate water unavailability for pre-1914 and riparian diverters at this time. However, the Water Unavailability Methodology may be expanded to include pre-1914 and riparian diverters in the near future.

Will water quality standards and public trust resources be affected by the Water Unavailability Methodology?

The methodology does not reduce the available water supply to account for any of the following: (a) water needs for public trust resources, (b) water needs to meet flow-dependent water quality objectives, (c) instream losses and evaporation not associated with surface water diversions, (d) non-agricultural consumptive uses in the Delta watershed (e.g., open water evaporation, riparian vegetation, etc.), or (e) diversions by users that do not have a water right or claim of right on file with the State Water Board. Notices of water unavailability will only be issued to make water available for senior water right holders and claimants and to prevent the unlawful diversion of Project storage releases, which are intended to meet water quality requirements and other Project purposes. The Projects will maintain their current responsibility for meeting Delta flow and water quality requirements. Any notices of water unavailability do not affect other obligations of water right holders, including meeting bypass or other instream flow requirements.

How does the Water Unavailability Methodology released this year compare to the methodology used in drought years 2014 and 2015? Why is an update necessary?

The Water Unavailability Methodology released in May 2021 improves on the approach used during the drought years of 2014 and 2015 and addresses many concerns previously raised by stakeholders. Major improvements are focused on ensuring that all relevant water supplies are accounted for and demands are not inflated to avoid overestimating water unavailability. Such an overestimation would cause more water users to receive notices of water unavailability, or result in those notices applying for a longer period of time. For example, the current methodology initially evaluates water unavailability at a subwatershed scale to ensure that unmet demands at the subwatershed scale do not inflate demand estimates at the overall watershed scale.

Other improvements include additional water supply estimates and forecasts accounting for uncertainty. For example, because the methodology is not being used to evaluate water unavailability for pre-1914 and riparian water right claimants, supplies that are needed to serve those demands in the headwater subwatershed basins are removed from the analysis.

Additional improvements will be possible in the future, with more time, better data, and improved tools.

What resources and tools related to the Water Unavailability Methodology are available?

The Water Unavailability Methodology consists of: 1) supply and demand datasets collected in a spreadsheet, 2) an interactive web-based supply-demand visualization tool, 3) a summary report and technical appendices, which explain data sources, assumptions, and the bases for the assumptions used to develop the methodology. These resources can be found on the Water Unavailability Methodology webpage.

How can I comment or provide feedback on the Water Unavailability Methodology?

Written public comments must be sent to Bay-Delta@waterboards.ca.gov before close of business on May 25, 2021. You can also provide oral comments and ask questions at a virtual staff-led workshop on May 21, 2021. Information about the workshop is available in the Workshop Notice. Given the serious concerns that exist with limited water supplies this year, comments should focus on any significant issues affecting the analysis and should provide specific proposals that can be applied in the near term to address those issues.

Analyses of the state's water supplies and demands face limitations due to data quantity and quality limitations. State Water Board staff is interested in any ideas or suggestions to improve upon the methodology given the existing limitations.

How can I report an unauthorized diversion?

If you have information that an unauthorized diversion may be occurring, you can submit a complaint through the CalEPA Environmental Complaint website, which provides five categories for complaints: Air, Water, Toxic Substances, Pesticides, and Solid Waste. To report an unauthorized diversion, please select "Water." You will be asked to describe the unauthorized diversion and provide the location, information about the responsible party, the nature of the "water concern" (please select "water rights"), and the date of occurrence. You will be given the option to remain anonymous.

The State Water Board relies on the public to help identify unauthorized diversions, diversions by junior water right holders that impact senior water right holders, diversions in violation of permit and license conditions, diversions that constitute the waste or unreasonable use of water, and diversions that cause adverse impacts to public trust resources (such as fish and wildlife).

Visit the Complaints Program webpage for more information.

Why does the Water Unavailability Methodology only focus on the Delta watershed?

The Sacramento-San Joaquin Delta watershed is a crucial source of water for much of California, and has immense ecological and cultural importance. The Delta watershed comprises approximately 40 percent of California's land mass and constitutes the state's largest source of surface water. Water from the Delta sustains a multi-billion dollar agricultural industry and provides a portion of the municipal and industrial supplies for roughly 27 million Californians in the San Francisco Bay Area, Central Valley, the Southern California region, and 500,000 people in the Delta itself. The Delta is also the largest estuary along the Pacific Coast of both North and South America, and its wetlands provide key habitat for migratory birds along the Pacific Flyway. The Delta is home to numerous fish, wildlife, and plant species listed as threatened, endangered, or special status under the state and federal Endangered Species Acts. The Delta watershed also supports a number of species that hold significant cultural importance to California tribes and are vital to the commercial and recreational fishing economy.

The Delta's role in California's water supply and environmental resources underscores the need for the responsible administration of water rights within its watershed. Given the critically dry conditions throughout the watershed, it is imperative that the Water Unavailability Methodology be implemented as soon as practicable. While the Delta watershed remains a priority, it is possible that the State Water Board could develop a similar methodology to evaluate water unavailability in other watersheds throughout the state.

Methodology-Specific Questions:

What are the sources of supply and demand data for the Water Unavailability Methodology?

Supply data come from monthly full natural flow (defined below) datasets, which are estimates of available water supplies assuming existing channel conditions in the absence of storage regulation and diversions. There is no single source of full natural flow data for the entire Delta watershed, so the analysis relies on different sources for varying streams and timescales (i.e., historical monthly data, including prior months of the current year, and forecasted monthly data). Sources of supply data include the California Data Exchange Center (CDEC); a 2016 DWR report on unimpaired flows in the Delta watershed; the National Oceanic and Atmospheric Administration (NOAA) National Weather Service's California Nevada River Forecast Center (CNRFC); and DWR's Bulletin 120 Water Supply Forecast.

Demand data come from annual reports of water diversion and use submitted by water right holders and claimants through the Electronic Water Right Information Management System (eWRIMS) Report Management System (RMS). Water diversion data

submitted to the State Water Board through eWRIMS RMS are self-reported and are not currently systemically verified for accuracy upon receipt. Therefore, staff conducted a data review and cleanup effort that focused on the largest diversions (greater than 5,000 acre-feet per year face value or use) in the Delta watershed.

For more information on the State Water Board's larger effort to address data quality issues and improve how water use data are collected, reviewed, and processed, please visit the Water Demand Data Assessment section on the Drought Tools and Methods webpage.

What is full natural flow (FNF) and how is it calculated?

The terms full natural flow (FNF) or "unimpaired flow" represent the natural water production of a river basin when it is unaltered by upstream water diversion, storage, or import from or export to other watersheds (DWR 2015). FNF is a theoretical water supply estimate rather than a reconstruction of pre-development streamflows (DWR 2016), and is the starting point for estimating the water supply available for diversion. Additional inputs are factored in later, including abandoned instream and return flows (see below).

How was supply data processed/refined for use in the Water Unavailability Methodology?

Some subwatersheds in the Delta watershed do not have complete or consistent sets of supply data available. For example, CDEC and DWR's Bulletin 120 typically only provide FNF estimates for large rivers. While DWR has prepared historical estimates of unimpaired flow for all areas of the Delta watershed, estimates for small streams are unavailable after water year 2014. As a result, there is a period of missing historical and forecasted data for several subwatersheds. Two different practices were used to fill these data gaps:

a. Where applicable, FNF data published by CNRFC was adjusted to represent supplies for the entire subwatershed (as estimated by DWR).

b. Where supply data gaps exist, such as a lack of forecasted supplies from small tributary streams, supply values were estimated using mathematical relationships with neighboring watersheds of similar hydrology.

What is abandoned water? How is it addressed in the Water Unavailability Methodology?

Water is considered abandoned once it has been used or dedicated for a specific purpose for which it is no longer needed. If it was previously diverted, the diverter lays no further claim to the water, as is commonly the case with return flow from agricultural uses. Abandoned flows are available for downstream diversion.

Abandoned water can be broken into two categories: abandoned instream flows and abandoned return flows. Abandoned instream flows consist of storage releases and bypassed flows used for the purposes of preserving or enhancing wetlands, protecting fish and wildlife, and/or recreation. If the water was dedicated for instream use, it becomes abandoned once it flows out of the reach for which it was dedicated. Abandoned return flows consist of water returned from irrigated agriculture or municipal water treatment plants that may be discharged back to the stream system with no contemporaneous claim of control, dominion, or right of further use. In such a case, this water would be available to appropriative diverters and may be available to riparian diverters under certain circumstances.[2]

How is imported water accounted for in the Water Unavailability Methodology?

Imported supplies include supplies that are brought from one water supply source to another for consumptive or non-consumptive uses. In the Delta watershed, imported supplies are brought in from outside of the watershed, specifically from the Trinity River. These additional water supplies are not accounted for in this analysis because these supplies do not constitute natural or abandoned flows. There are also imports of supplies between subwatersheds in the Delta watershed. Where water is removed from the Yuba River and imported to the Bear and American Rivers as part of highly complex hydroelectric project operations, diversion of natural flows from the Yuba River (including abandoned and return flows) are planned to be removed from that river. This adjustment will be implemented prior to issuance of notices of water unavailability.

How is previously stored water accounted for in the methodology?

Seasonally stored water, including releases of previously stored water for downstream use, is not available for diversion or use by diverters other than the entity that stored the water, their contractors, or recipients of a transfer (other than abandoned flows discussed above). Accordingly, the methodology does not account for these storage supplies.

How are instream flow requirements addressed in the Water Unavailability Methodology?

Specific reaches of Delta streams may be subject to minimum instream flow requirements due to water right permit/license conditions, State Water Board orders/decisions/regulations, Federal Energy Regulatory Commission (FERC) hydropower license conditions, biological opinion requirements, or private agreements. If these instream flow requirements are met by diverters bypassing flow, these flows are

[2] For additional definition and limits of riparian rights, see the State Water Board's Division of Water Rights' Frequently Asked Questions on Water Rights.

already included in the FNF values. If these instream flow requirements are met via releases of stored water, these flows are not captured by the FNF calculations.

Once these instream flows become "abandoned", they may be added to FNF values to more accurately represent the amount of water available for downstream diversion. For the purposes of the Water Unavailability Methodology, this addition is done at the subwatershed scale. That is, if the instream flow reach ends near the bottom of the subwatershed, the abandoned instream flow is added to the downstream subwatershed's available supply. 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 State Water Board will evaluate this issue further prior to use of the methodology to issue notices of water unavailability. In addition, the State Water Board plans to further evaluate the degree to which instream flows should be additive to FNF flows. The State Water Board plans to modify the methodology to use the higher of the instream flow or FNF in order to avoid artificially inflating estimates of available supply.

How are return flows estimated in the Water Unavailability Methodology?

Only a portion of water diverted from streams in the Delta watershed is consumptively used, and return flows from irrigation and municipal uses may be available for diversion after they return to a stream. The Water Unavailability Methodology applies a return flow factor, which varies by month and watershed, to decrease water demands to account for the availability of return flows. These factors were developed based on CalSim 3 model results published by DWR for water year 2014, which has hydrology similar to forecasts for 2021.

How are diversions by the Projects addressed in the Water Unavailability Methodology?

Specific provisions for the Projects' diversions from the Delta watershed were made due to the unique circumstances that exist with respect to those diversions. Specifically, due to area of origin protections,[3] demands associated with export diversions were assumed to have the lowest priority date. This priority also ensures that any duplicate reporting between the Projects and their various settlement contractors, who have their own underlying water rights, do not create inflated demands that materially affect the analysis. The exception to this approach is for New Melones Project water rights, which were assumed to have their original priority dates since New Melones water is not authorized for export out of the Delta watershed.

[3] For additional information on Area of Origin Laws, see the Office of the Delta Watermaster's Report on California's Area of Origin Laws.

Generally, when conditions exist that would trigger issuance of water unavailability notices during the dry season, the Projects will not be diverting but releasing previously stored water to meet flow and water quality requirements and other in-basin needs (and Term 91 will be triggered). The responsibility to meet water quality and flow requirements effectively results in curtailment of Project water rights without any further action. Accordingly, while notices of water unavailability may still be issued to the Projects, such notices would not affect Project diversions.

How does the Water Unavailability Methodology address demand in the Legal Delta, given its complex hydrology?

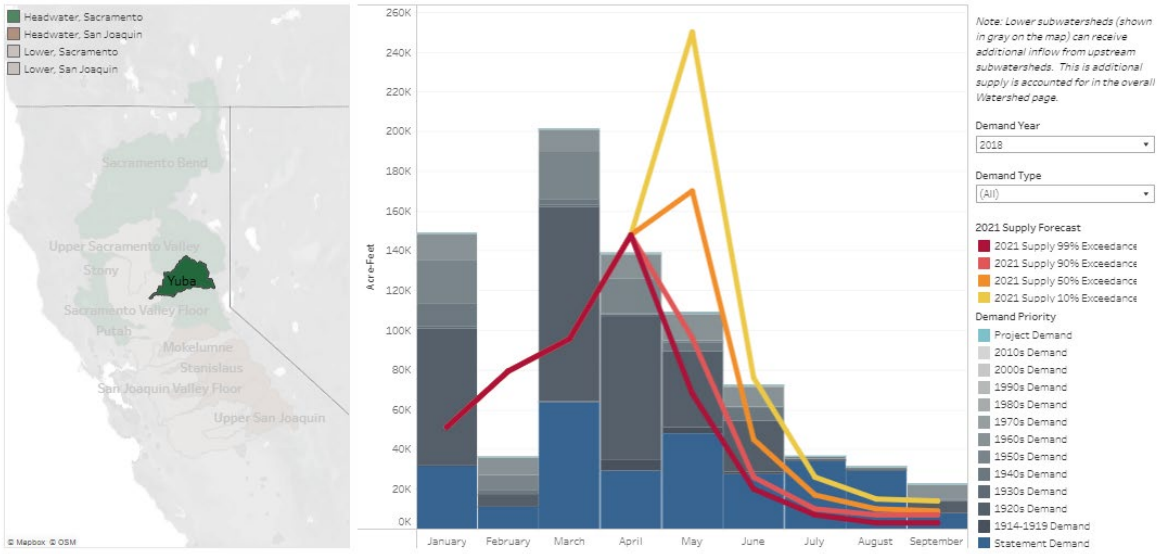
Diverters in the Legal Delta (as defined by the 1959 Delta Protection Act) may have access to water supplies from both the Sacramento and San Joaquin River watersheds. To account for this, demands within the Legal Delta were divided based on the monthly proportion of supply available within each watershed. For example, if the Sacramento River watershed constitutes 80% of the supply within the Delta watershed for a given month, 80% of Legal Delta demand is charged against the Sacramento River watershed supply for that month and 20% is charged against San Joaquin River watershed supply. Monthly supply ratios between Sacramento and San Joaquin River watersheds were calculated based on data for 2021—either previous months' FNF values or dry supply forecast scenarios (90 percent exceedance) for future months. (Note: current conditions in the Delta watershed are extremely dry, tracking even drier than the 99 percent exceedance.) Post-1914 appropriative diverters within the Legal Delta would only receive notices of water unavailability if both the Sacramento and San Joaquin River watershed analyses show that water will be unavailable for their priority of right. The State Water Board's Division of Water Rights and Office of Delta Watermaster will coordinate on the issuance of any notices of water unavailability in the Legal Delta.

The hydrology of the Legal Delta is complex. This proration method offers a simplified and generous assessment of water availability in the Legal Delta in this critically dry period.

Are there any visual tools for the Water Unavailability Methodology?

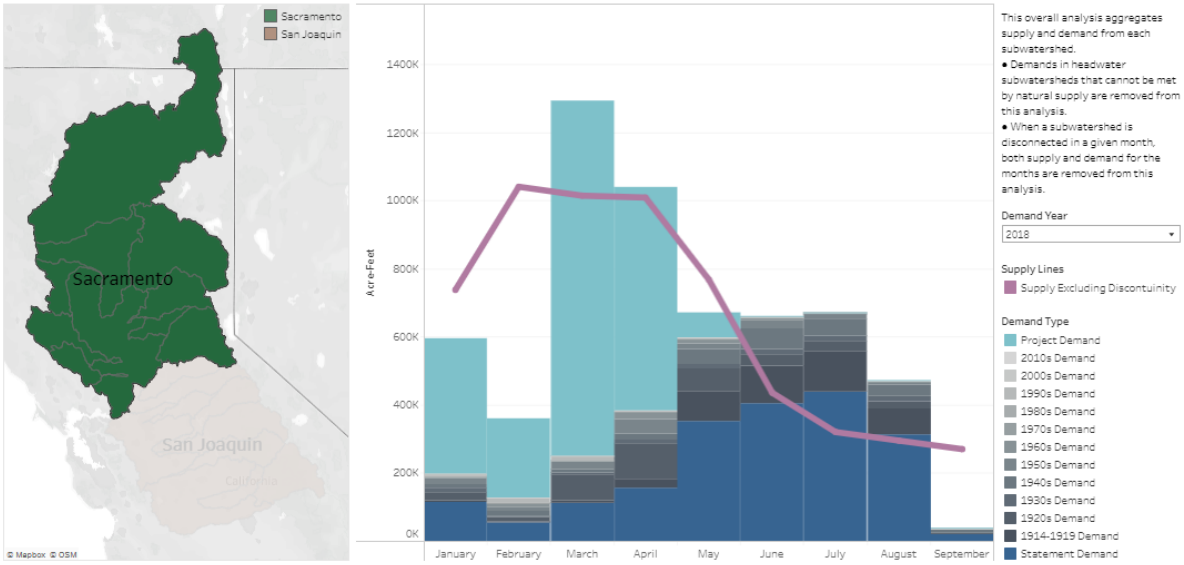
The Water Unavailability Methodology includes two major types of water unavailability visualizations: headwater subwatershed visualizations (14 in total) and watershed-wide visualizations (one for the Sacramento River watershed and one for the San Joaquin River watershed). Each graph in the visualization displays demand data from both the 2018 and 2019 demand datasets. The demands are sorted by water right priority, with riparian and pre-1914 appropriative demands combined into the "statement demand" category at the base of the graph, post-1914 appropriative rights grouped by decade and stacked above statement demand, and Project demands stacked at the top. The subwatershed visualization displays four water supply scenarios: the 10 percent, 50

percent, 90 percent, and 99 percent FNF exceedance forecasts, representing wetter than average, average, dry, and extremely dry forecasts, respectively looking into the future.



Sample Headwater Subwatershed Water Unavailability Visualization (Yuba River)

Because conditions in the Delta watershed are currently extremely dry, the adjustments to the supply and demand datasets were done using the dry scenario (90 percent FNF exceedance) forecast. As a result, the watershed-wide visualizations display a single supply scenario, the adjusted 90 percent exceedance forecast. As appropriate, other forecast scenarios can also be used.



Sample Sacramento River Watershed Water Unavailability Visualization

The visualizations have been made available to the public on the State Water Board's Water Unavailability Methodology webpage using the Tableau interactive platform and will be updated monthly to reflect current supply conditions. Visitors to the site will be able to toggle between the 2018 and 2019 demand datasets. However, the 2018 demand dataset is currently planned to be used to assess if insufficient supply is available to meet certain priorities of post-1914 appropriative water right demands (i.e., the post-1914 priorities of right positioned above the applicable supply line(s) in the visualizations).

Note that the visualization developed for the Water Unavailability Methodology has not yet been incorporated into the separate Water Supply and Demand Visualization Tool developed for the entire state.

(*This fact sheet was last updated May 17, 2021*)