Water Rights Demand Data Analysis Methodology Road Map

The State Water Resources Control Board Division of Water Rights (Division) has developed a methodology to standardize and improve the accuracy of water diversion and use data that is used to determine water availability and inform water management and regulatory decisions. The Water Rights Demand Data Analysis Methodology (Methodology) is a series of data pre-processing steps, R Scripts, and data processing modules that identify and help address data quality issues related to both the self-reported water diversion and use data from water right holders or their agents and the Division of Water Rights electronic water rights data. The road map below guides the user through the sequential individual steps of the Methodology process and provide quick access links to the detailed instructions and standard operating procedures (SOPs) associated with each step.

1. If you have not already done so, the first step is to review the Water Rights Demand Data Analysis Methodology Overview document and the workflow diagram below.
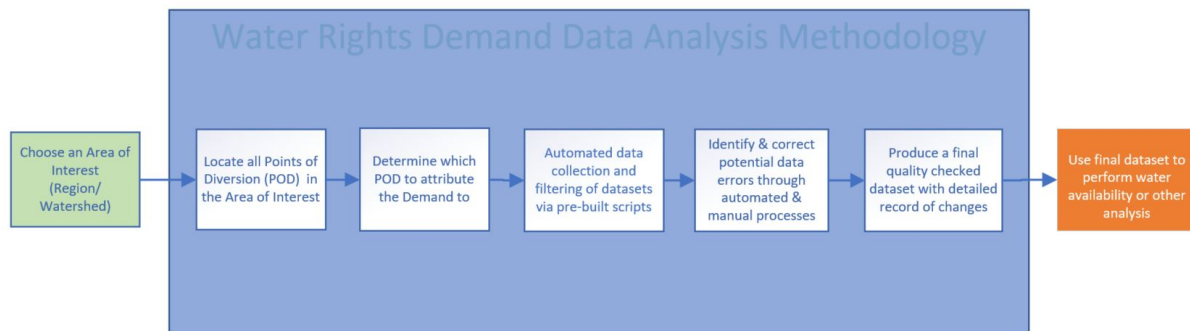

Figure 1. Overview of the Demand Data Analysis Methodology Workflow.

2. Download and unzip the demandanalysis.zip file to your local hard drive.

3. Prior to any data analysis, you will complete a series of pre-processing steps in which the raw Report Management System (RMS) and electronic Water Rights Information Management System (eWRIMS) data is retrieved, compiled, and filtered using an R Script. The dataset is then input into ArcGIS Pro for further data pre-processing during which you will verify the location of the water rights included in the analysis and assign a single point of diversion (POD) for water rights with multiple PODs.

   Data Pre-Processing R Script Instructions

4. The next step is to input the dataset into the Data Processing Modules. An overview of each module is provided below. You will need to complete the Priority Date Module (a) first because the remaining modules require its results to formulate

properly. You will then use the resulting updated dataset with priority dates as the inputs for the remaining Data Processing Modules (b – g).

Data Processing Module Procedures

a. Priority Date

Assigns a single priority date for each water right or assigns a date code for riparian and/or pre-1914 water rights when a priority date is not available. Note: the calculations in the other modules are dependent upon the results of the Priority Date module, therefore it must be completed first.

b. Beneficial Use and Return Flow

Assigns a primary beneficial use for each water right and calculates the percentage of return flow for water rights with a non-consumptive primary beneficial use.

c. Missing RMS Reports

Identifies water rights that have missing annual RMS reports and calculates the number of missing annual RMS reports versus the number of reports expected.

d. Duplicate Values – Months and Years

Identifies water rights with duplicate values reported for multiple months in a single annual water diversion and use report.

e. Duplicate Diversion for Multiple Water Rights

Identifies water rights with the same annual diversion amount reported across multiple water rights by a single water right owner.

f. Duplicate Points of Diversion

Identifies when multiple water rights might be sharing an identical reported point of diversion

g. Diversion Out of Season Part A and B

Identifies water rights reporting diversion amounts outside of the diversion season authorized by water right.

h. Expected Monthly Demands, Diversion Exceeds Face Value, Unit Conversion, Duplicate Diversion/Storage/Use, and Diversion Statistics

Restructures the diversion and use data into more understandable tables at annual, monthly, and individual report scales and does the following:

- Provides specific metrics for assessing whether diversions exceed expected total annual amounts using Face Value and Initial Reported Diversion data;
- Pre-calculates common potential unit conversion reference values;
- Flags potential errors related to duplicate reported diversion, storage, or use; and

- Generates statistics on average and standard deviation across monthly and annual reported values to assist the user in identifying outlier reported data.

5. The next step is to copy the results of each module into their respective tab within the Excel Working File provided in the .zip folder. The data flagged as potentially erroneous by the modules should then be manually reviewed using the QA/QC Suggested Review Guidelines. Any manual changes you make to the dataset must be memorialized using the instructions outlined in step 9 of the Data Processing Modules Procedures Document.

6. Finally, you will compile the final water demand dataset into a final master table that can be used as an input for data visualization tools and/or water availability models.