

## Data Processing Modules Workflow

This Document describes the workflow to use the various Excel Calculator Modules<sup>1</sup>. An R script was developed to download Report Management System (RMS) and electronic Water Rights Information Management System (eWRIMS) flat files and format these data into tables that can be read by their corresponding Excel Calculator Module. Please note: the Priority Date Calculator Module must be run first to ensure that the other Modules run correctly.

Download the demandanalysis.zip file, Navigate to the Standard Operating Procedures folder, and follow the instructions to run the R program scripts using the Data Pre-Processing R-Script Procedures file.

1. Locate the [Data Processing Modules](#) Folder.
2. The QAQC R Script will produce a CSV file for each Module containing the relevant eWRIMS/RMS data. You will need to open each Module, find the orange data input fields, and paste those corresponding fields from the appropriate CSV files. This process is shown in steps 3-8 below.
3. Review the Excel Module and take note of the sheets and tabs present. In this Module for example, it has a Description, Module Calculator (filename) sheet, and a Data Dictionary sheet.

File Name	Location	Description	Source Files	Table Structure	Action
<i>Spreadsheet file name</i>	<i>Final location</i>	<i>Briefly describe the intent of the process / flag.</i>	<i>Which flat files was the data derived from?</i>	<i>How are the records organized? (by Application, by Report, by month, etc)</i>	<i>What action items result from this process / flag?</i>
<a href="#">DuplicateMonths_Years</a>	TBD	Identify water rights with duplicate values reported for multiple months in year of annual report	water_use_report.csv	Report and Year/Month	Remove annual report(s)

Figure 1: The Module general description in the Description sheet

LEGEND of COLOR CODING	
Color	Meaning
	Paste new data here
	Manually Entered Values
	Formulas - FILL DOWN, BUT DON'T MODIFY
	Results of calculations

Figure 2: The Legend in the Description Sheet

<b>INFO:</b>	INPUT DATA FOR SPREADSHEET - FROM FLAT FILES
<b>ACTION:</b>	PASTE NEW INPUT DATA FROM [NAME OF SCRIPT] SCRIPT HERE - DELETE SA
	<b>APPLICATION WATER_RIGHT_ID YEAR MONTH AMOUNT DIVERSION_TYPE</b>

Figure 3: Preview of the Input tabs (orange highlight) in the Module Calculator (filename) sheet

<sup>1</sup> These include the Priority Date; Missing RMS Reports; Beneficial Use and Return Flow; Duplicate Values – Months and Years; Duplicate Diversion for Multiple Water Rights; Diversion Out of Season; and Statistics, Diversion Exceeds Face Value, and Unit Conversion Modules.

FORMULA - INTERMEDIATE CALCULATION		
FILL DOWN FORMULA - DO NOT MODIFY FORMULA		
<b>TotalMonthlyDiverted</b>	<b>AnnualReportedTotalDirect</b>	<b>AnnualTotalStorage</b> <b>AnnualTotalDiversion</b>

Figure 4: Preview of the Intermediate Calculation tabs (grey highlight) in the Module Calculator (filename) sheet

FINAL RESULTS - DUPLICATE MONTHS_YEARS			
FILL DOWN FORMULA - DO NOT MODIFY FORMULA - USE THESE RESULTS FOR QAQC - REFER TO DESCRIPTION			
<b>NumberOfOccurencesWithinSingleReport</b>	<b>OccurencesAcrossReports</b>		

Figure 5: Preview of the Results tab (blue highlight) in the Module Calculator (filename) sheet

- Find the QAQC R Script Output CSV and copy the input data from the CSV (make sure columns match).

APPLICATI	WATER_RI	YEAR	MONTH	AMOUNT	DIVERSION_TYPE
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Figure 6: Input Column Headers

<b>ACTION:</b>	PASTE NEW INPUT DATA FROM [NAME OF SCRIPT] SCRIPT HERE - DELETE SA
<b>APPLICATION</b>	<b>WATER_RIGHT_ID</b> <b>YEAR</b> <b>MONTH</b> <b>AMOUNT</b> <b>DIVERSION_TYPE</b>

Figure 7: Module Calculator Input Headers

- Before performing calculations, on the Excel tabs, click “Formulas”, look at the right-hand side, select “Calculation Options” drop down and select “Manual”.

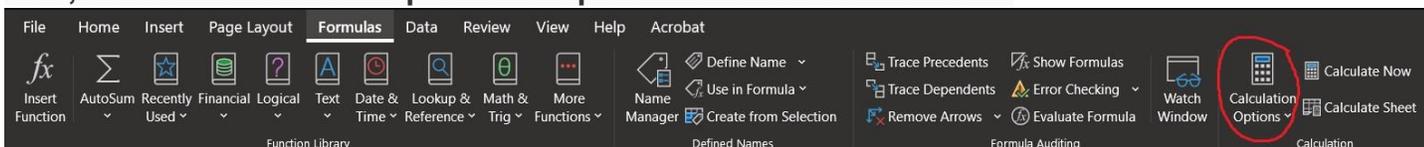


Figure 8: Excel tab showing Calculation Options

- Move over to the grey tabs mentioned in Step 2 and fill down the formulas in the first cell and fill it down to the last row entry. Repeat until all grey tabs are filled down. Then, click “Calculate Now” (refer to Step 4 for figure). (NOTE: depending on the number of entries in the input file, the calculation process may take a significant amount of time.)

FORMULA - INTERMEDIATE CALCULATION				
FILL DOWN FORMULA - DO NOT MODIFY FORMULA				
TotalMonthlyDiverted	AnnualReportedTotalDirect	AnnualTotalStorage	AnnualTotalDiversion	
0	15.72	0	15.72	
2.465922528	6.781286952	6.781286952	13.5625739	
2.1	13.5	0	13.5	
0	15.72	0	15.72	
0	15.72	0	15.72	
1.8	13.5	0	13.5	
0	13.5	0	13.5	
0	6.77	0	6.77	
0	13.5	0	13.5	
2.1	13.5	0	13.5	
1.232961264	6.781286952	6.781286952	13.5625739	
0	6.77	0	6.77	
2.465922528	6.781286952	6.781286952	13.5625739	
2.9	13.5	0	13.5	
0	6.77	0	6.77	
2.465922528	6.781286952	6.781286952	13.5625739	
0.6	11.2	0	11.2	
2.465922528	6.781286952	6.781286952	13.5625739	
0	15.72	0	15.72	

Figure 9: Calculation section example of filling down the formula

7. Go over to the blue tabs and repeat Step 6 to get the final results from the Module Calculator.

FINAL RESULTS - DUPLICATE MONTHS_YEARS	
FILL DOWN FORMULA - DO NOT MODIFY FORMULA - USE THESE RESULTS FOR QAQC - REFER TO DESCRIPTION	
NumberOfOccurencesWithinSingleReport	OccurencesAcrossReports
0	1
0	1
0	1
0	1
0	1
0	1
0	1
0	1
0	2
0	1
0	1
0	1
0	2
0	1
1	1
0	2
5	1
1	1
5	1
0	1
1	1
1	1
0	2
5	2
0	2
1	1

Figure 10: Final Results section example of filling down the formula to get the final result

**8. Copy the “Final Results” section as data into the corresponding tab on the “QAQC Working file.”**

APPLICATION_NUMBER	WATER_RIGHT_TYPE	PRIORITY_DATE	APPLICATION_REC'D_DATE	APPLICATION_ACCEPTANCE_DATE	SUB_TYPE	YEAR_DIVERSION_COMMENCED	ASSIGNED_PRIORITY_DATE	ASSIGNED_PRIORI
298	A001983	Appropriative				8/26/1920	NA	
411	A002723	Appropriative		1/16/1922		1/16/1922	NA	
442	A002928	Appropriative				7/14/1922	NA	
539	A003421	Appropriative				5/16/1923	NA	
568	A003565	Appropriative				8/3/1923	NA	
576	A003601	Appropriative				8/20/1923	NA	
755	A004307	Appropriative		11/7/1924		11/7/1924	NA	
756	A004308	Appropriative		11/7/1924		11/7/1924	NA	
889	A004832	Appropriative				11/12/1925	NA	
1274	A006464	Appropriative				10/21/1929	NA	
1318	A006642	Appropriative				4/16/1930	NA	
1354	A006805A	Appropriative				9/26/1930	NA	
1366	A006854	Appropriative				12/26/1930	NA	
1367	A006855	Appropriative				12/26/1930	NA	
1824	A008974	Appropriative				5/17/1937	NA	
2084	A009832A	Appropriative		2/20/1940		2/20/1940	NA	
2085	A009832B	Appropriative				2/20/1940	NA	
2647	A011383	Appropriative				4/23/1946	NA	
2838	A011846	Appropriative				4/28/1947	NA	
3020	A012232	Appropriative		1/8/1948		1/8/1948	NA	
3127	A012525	Appropriative				5/27/1948	NA	
3246	A012850	Appropriative				12/6/1958	NA	
3277	A012919A	Appropriative				1/28/1949	NA	
3278	A012919B	Appropriative		1/28/1949		1/28/1949	NA	
3292	A012951	Appropriative				2/24/1949	NA	
3294	A012958	Appropriative				3/3/1949	NA	
3322	A013030A	Appropriative				4/18/1949	NA	
3323	A013030B	Appropriative				4/18/1949	NA	

Figure 11: Tab selected (red circle to emphasize selected tab, make sure the correct one is selected)

9. Use the Data Processing Module Tabs of the QAQC Working File to identify errors or other changes that need to be made Use the QAQC Suggested Review Guidelines document for considerations to make when evaluating the results of the Data Processing Modules. If it's determined that any changes need to made, overwrite the corresponding data field in the Master Demand Table within the QA/QC Working file and update the three QA/QC action columns to document whether a change was made, what the specific change was, and the reason for the change.

QAQC_ACTION_TAKEN_Y_N	CHANGE_MADE	REASON_FOR_CHANGE
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Figure 12: Example of the manual QAQC fields in the Master Demand Table tab within the QAQC Working File.