Duplicate DIVERSION, STORAGE, and USE Values

Calculator/processing module:

 ExpectedDemand_ExceedsFV_UnitConversion_StorVsUseVsDiv_Statistics

Description: Identifies water right reports with the same storage, use, and/or diversion values reported throughout the year, which may indicate inaccurate reporting and verification may be needed. Typically, seasonal storage is used to offset the time water is diverted to storage from the time period when water is used for beneficial purposes (e.g., diversion to storage in the wet season for use in the dry season). Reports are also flagged when total use of water significantly diverges from total diversion over time.

> **Example:**
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> - A water right holder repeatedly reports the **same** AMOUNT (USE) value as AMOUNT (STORAGE) value – this is likely inaccurate reporting; typically water right holders will not *use* the exact amount of water diverted to *storage* each month.

What (is being flagged): Water rights with the "same" annual reported values for AMOUNT (USE), AMOUNT (STORAGE), and/or AMOUNT (DIVERSION)

Why: Identifying inaccurately reported diversion amounts for manual review and/or DMU follow-up provides a more accurate account of water supply/demand.

How: Using the RMS Data (water_use_report.csv), Group by "YEAR" then calculate the sum of "AMOUNT (USE)", the sum of "AMOUNT (STORAGE)", and the sum of "AMOUNT (DIVERSION)". If the values are the same, then populate new fields "DUPLICATE_STORAGE_USE" or "DUPLICATE_DIRECT_STORAGE" as appropriate. Additionally, total cumulative USE is compared to total accumulated TOTAL DIVERSION (DIRECT + STORAGE). Over time, total USE should equal TOTAL DIVERSION, so their ratios should approach 1. For example, even considering drawing from a reservoir, where water was previously diverted to storage, the total accumulated USE should not exceed total accumulated DIVERSION. Any ratios substantially greater than 1 suggest inaccurate storage. Similarly, over time, the total DIVERSION and total USE should converge, so any ratio substantially smaller than 1 also suggests an error in reporting, and potentially duplicate reporting of the same water as both direct diversion and diversion to storage.

Resolution: Review water rights flagged as DUPLICATE_STOR_USE, DUPLICATE_DIV_STOR, or where Total_Use_as_a_Percent_of_Total_Diverted substantially diverges from a ratio of 1.0. Make changes as needed to the individual reports or the Expected monthly diversion values in the QAQC Working File.

Other Related Flags (share new field, etc.): Exceeds Face Value, Diversion Statistics, Unit Conversions

Data Source(s):

- water_use_report.csv
- ewrims_flat_file.csv

Existing Fields (verify for accuracy):

- APPL_ID - From water_use_report.csv
- WATER_RIGHT_ID - From water_use_report.csv
- YEAR - From water_use_report.csv
- MONTH - From water_use_report.csv
- AMOUNT - From water_use_report.csv
- DIVERSION_TYPE - From water_use_report.csv
- APPLICATION_NUMBER - From ewrims_flat_file.csv
- INI_REPORTED_DIV_AMOUNT - From ewrims_flat_file.csv
- INI_REPORTED_DIV_UNIT - From ewrims_flat_file.csv
- FACE_VALUE_AMOUNT - From ewrims_flat_file.csv
- FACE_VALUE_UNITS - From ewrims_flat_file.csv

New Fields (include definitions):

- DUPLICATE_STOR_USE
- DUPLICATE_DIV_STOR
- Total_Use_as_a_Percent_of_Total_Diverted