

# Attachment H1b1

## Linkage between SacWAM and HEC-5Q

**Table H1b1-1. SacWAM Inputs to the Sacramento River HEC-5Q Water Temperature Model**

| Description   | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record | SacWAM Link Identification: Subtracted from the DSS Record |
|---|--|---|--|
| Trinity Lake daily storage  | ZR SS340 A=Trinity B=TRINITY C=Stor-Res-fit <sup>b</sup>                             | +trinity_reservoir_storage                          |  |
| Whiskeytown Lake daily storage                                    | ZR SS240 A=Clear CR B=WHISKEYTOWN C=Stor-Res-fit                                     | +Whiskeytown_Reservoir_Storage                      |  |
| Shasta Lake daily storage   | ZR SS220 A=Sacramento B=Shasta C=Stor-Res-fit  | +Shasta_Lake_Storage                                |  |
| Trinity Dam outflow   | ZR QA340 A=Trinity B=TRINITY C=flow-out  | +Trinity_Reservoir                                  |  |
| Whiskeytown Dam outflow   | ZR QA240 A=Clear CR B=WHISKEYTOWN C=flow-out   | +Whiskeytown_Reservoir                              |  |
| Shasta Dam outflow  | ZR QA220 A=Sacramento B=SHASTA C=flow-out  | +Shasta_Lake  |  |
| Trinity Lake inflow patterned after historical record             | ZR IN340 A=Trinity B=TRINITY C=flow-in-pat   | +I_TRNTY_Inflow                                     |  |
| Trinity Lake daily inflow based on historical record <sup>d</sup> | A=Trinity B=Trinity C=flow-in E=1DAY F=Historical_based                              |   |  |
| Lewiston Reservoir inflow   | ZR IN330 A=Trinity B=LEWISTON C=flow-in  | +I_LWSTN_Inflow                                     | -Trinity_Reservoir   |
| Clear Creek above Whiskeytown (excluding Clear Creek Tunnel)      | ZR IN240 A=Clear Cr B=WHISKEYTOWN C=flow-in-pat                                      | +Clear_Creek_above_Clear_Creek_Tunnel_Inf           |  |
| Trinity Lake inflow patterned after historical record             | A=Trinity B=Trinity C=flow-in E=1DAY F=Historical_based                              |   |  |
| Shasta Lake inflow patterned after historical record              | ZR IN220 A=Sacramento B=SHASTA C=flow-in-pat   | +I_SHSTA_Inflow                                     |  |

| Description   | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record   | SacWAM Link Identification: Subtracted from the DSS Record    |
|---|--|---|---|
| Shasta Lake daily inflow based on historical record <sup>d</sup>  | A=Sacramento B=Shasta C=flow-in E=1DAY F=Historical_based                            |   |   |
| SacWAM runoff allocated above Keswick Lake  | ZR IN210 A=Sacramento B=RunoffAbvKeswick C=flow-in                                   | +runoff_infiltration_from_a_02_na_to_sacramento_river |   |
| South Fork Clear Creek inflow at Igo - mile 9.4   | ZR IN180 A=Sacramento B=Clear Creek C=FLOW-IN >0                                     | +clear_creek_inflow_to_sacramento_river               | -Whiskeytown_Reservoir  |
| Sacramento inflows - Churn and Cow Creeks (miles 284.5 & 280.1)   | ZR IN178 A=Sacramento B=Cow Cr C=flow-in >0  | +cow_creek_inflow_to_sacramento_rm_277                | -clear_creek_inflow_to_sacramento_river<br>-keswick_reservoir |
| Sacramento inflows - Bear and Anderson Creeks (miles 277.3 & 273.5)   | ZR IN174 A=Sacramento B=Cottonwood Cr C=flow-in >0                                   | +Cottonwood_Creek_Inflow_to_Sacramento_RM_271         | -cow_creek_inflow_to_sacramento_rm_277                        |
| Sacramento inflows - Battle Creek (mile 271.3)  | ZR IN172 A=Sacramento B=Battle Cr C=flow-in >0                                       | +battle_creek_inflow_to_sacramento_rm_269             | -Cottonwood_Creek_Inflow_to_Sacramento_RM_271                 |
| Sacramento inflows - Inks Creek (mile 260.5)  | ZR IN170 A=Sacramento B=Bend Bridge C=flow-In >0                                     | +swrcb_sac_abv_bend_bridge                            | -battle_creek_inflow_to_sacramento_rm_269                     |
| Sacramento inflows - Paynes Creek (mile 253.3)  | ZR IN160 A=Sacramento B=Red Bluff C=flow-in >0                                       | +Sacramento_River_70                                  | -swrcb_sac_abv_bend_bridge                                    |
| Sacramento inflows - Antelope, Elder, Mill, Thomes, Deer, and Jewett Creeks, (miles 234.3, 230.4, 230.2, 226.0, 219.6, & 218.3) | ZR IN150 A=Sacramento B=below Red Bluff C=flow-in >0                                 | +deer_creek_inflow_to_sacramento_rm_218               | -tehama_colusa_outflow_from_sacramento_rm_240                 |
| Sacramento River accretions (miles 214-206)   | ZR IN140 A=Sacramento B=Glenn Colusa C=flow-in >0                                    | +glenn_colusa_canal_outflow_from_sacramento_rm_207    | -deer_creek_inflow_to_sacramento_rm_218                       |
| Sacramento inflows - Pine, Big Chico, and Stoney Creek (miles 196, 191.5, & 190.5)  | ZR IN1132 A=Sacramento B=Stony Creek C=FLOW-in >0                                    | +swrcb_sac_at_ord_ferry                               | -glenn_colusa_canal_outflow_from_sacramento_rm_207            |

| Description  | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record  | SacWAM Link Identification: Subtracted from the DSS Record |
|--|--|--|--|
| Sacramento River accretions (miles 184–169)                          | ZR IN130 A=Sacramento B=Butte City C=flow-in >0                                      | +swrcb_sac_at_butte_city   | -swrcb_sac_at_ord_ferry                                    |
| Sacramento River accretions (miles 159–146)                          | ZR IN120 A=Sacramento B=Colusa weir C=flow-in >0                                     | +Colusa_weir   | -sacramento_river_rm_159                                   |
| Sacramento River accretions (miles 146–121)                          | ZR IN118 A=Sacramento B=abv Tisdale weir C=flow-in >0                                | +Tisdale_weir  | -colusa_weir   |
| Sacramento River accretions (miles 119–86)                           | ZR IN114 A=Sacramento B=Knights Landing C=flow-in >0                                 | +swrcb_sac_at_knights_landing  | -Tisdale_weir  |
| Trinity Lake evaporation   | ZR QD340 A=Trinity B=TRINITY C=flow-div  | +Trinity_Reservoir_Evap  |  |
| Trinity Lake evaporation (ZR EV340 control requirement)              | ZR EV340 A=Trinity B=TRINITY C=flow-evap   | +Trinity_Reservoir_Evap  |  |
| Trinity system, Clear Creek Tunnel withdrawal                        | ZR QD320 A=Trinity B=LEWISTON C=flow-div   | +Clear_Creek_Tunnel_0<br>ADD QMIN <sup>c</sup>   |  |
| Total Whiskeytown Lake withdrawal including evaporation <sup>e</sup> | ZR QD240 A=Clear CR B=WHISKEYTOWN1 C=flow-div  | +spring_creek_conduit_0<br>+Transmission_Link_from_Clear_Creek_WTP_to_A_02_PA<br>+Transmission_Link_from_Clear_Creek_WTP_to_U_02_PU<br>+Transmission_Link_from_Whiskeytown_Reservoir_to_U_02_PU<br>+Transmission_Link_from_Whiskeytown_Reservoir_to_U_03_PU<br>+Whiskeytown_Reservoir_Evap |  |
| Component of Whiskeytown withdrawal not delivered to Keswick Lake    | ZR QD212 A=Clear CR B=Spring CR PH C=flow-div  | +Transmission_Link_from_Clear_Creek_WTP_to_A_02_PA<br>+Transmission_Link_from_Clear_Creek_WTP_to_U_02_PU<br>+Transmission_Link_from_Whiskeytown_Reservoir_to_U_02_PU<br>+Transmission_Link_from_Whiskeytown_Reservoir_to_U_03_PU   |  |

| Description  | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record                 | SacWAM Link Identification: Subtracted from the DSS Record |
|--|--|---|--|
| Whiskeytown Lake evaporation   | ZR EV240 A=Clear CR<br>B=WHISKEYTOWN C=flow-evap                                     | +Whiskeytown_Reservoir_Evap<br>+Whiskeytown_Reservoir_Evap          |  |
| Shasta Lake diversion including evaporation                                | ZR QD220 A=Sacramento<br>B=Shasta C=flow-div   | +Transmission_Link_from_Shasta_Lake_to_U_03_PU<br>+Shasta_Lake_Evap |  |
| Shasta Lake evaporation  | ZR EV220 A=Sacramento<br>B=Shasta C=flow-evap  | +Shasta_Lake_Evap   |  |
| Keswick Lake evaporation   | ZR QD200 A=Sacramento<br>B=Keswick C=flow-div  | +Keswick_Reservoir_Evap   |  |
| Sacramento ACID diversion (mile 298.5)                                     | ZR QD180 A=Sacramento B=Clear Creek C=FLOW-Div >0                                    | +Whiskeytown_Reservoir<br>+keswick_reservoir                        | -<br>clear_creek_inflow_to_sacramento_river                |
| Sacramento River depletions (miles 289–280)                                | ZR QD178 A=Sacramento B=Cow Cr C=flow-div >0   | +clear_creek_inflow_to_sacramento_river                             | -<br>cow_creek_inflow_to_sacramento_rm_277                 |
| Sacramento River depletions (miles 280–273)                                | ZR QD174 A=Sacramento<br>B=Cottonwood Cr C=flow-div >0                               | +cow_creek_inflow_to_sacramento_rm_277                              | -<br>Cottonwood_Creek_Inflow_to_Sacramento_RM_271          |
| Sacramento River depletions (miles 271–260)                                | ZR QD170 A=Sacramento B=Bend Bridge C=flow-div >0                                    | +battle_creek_inflow_to_sacramento_rm_269                           | -swrcb_sac_abv_bend_bridge                                 |
| Sacramento River depletions (miles 260–243)                                | ZR QD160 A=Sacramento B=Red Bluff C=flow-div >0                                      | +swrcb_sac_abv_bend_bridge  | -Sacramento_River_70                                       |
| Sacramento River Diversion - Tehama Colusa Canal (mile 242.5)              | ZR QD158 A=Sacramento<br>B=Tehama Colusa Canal C=flow-div >0                         | +tehama_colusa_canal_0  |  |
| Sacramento River depletions plus Glen Colusa Canal withdrawal (mile 206.3) | ZR QD140 A=Sacramento<br>B=Glenn Colusa C=flow-div >0                                | +deer_creek_inflow_to_sacramento_rm_218                             | -<br>glenn_colusa_canal_outflow_from_sacramento_rm_207     |
| Sacramento River depletions including Ord Ferry spills (mile 188.5)        | ZR QD132 A=Sacramento B=Ord Ferry C=FLOW-div >0                                      | -swrcb_sac_at_ord_ferry   | +glenn_colusa_canal_outflow_from_sacramento_rm_207         |

| Description  | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record | SacWAM Link Identification: Subtracted from the DSS Record |
|--|--|---|--|
| Sacramento River depletions (mile 184 - 169)                           | ZR QD130 A=Sacramento B=Butte City C=flow-div >0                                     | +swrcb_sac_at_ord_ferry                             | -swrcb_sac_at_butte_city                                   |
| Sacramento River depletions including Moulton Weir spills (mile 159.5) | ZR QD126 A=Sacramento B=Moulton weir C=flow-div >0                                   | +swrcb_sac_at_butte_city                            | -sacramento_river_rm_159                                   |
| Sacramento River depletions including Colusa Weir spills (mile 146.5)  | ZR QD120 A=Sacramento B=Colusa weir C=flow-Div >0                                    | +sacramento_river_rm_159                            | -colusa_weir   |
| Sacramento River depletions including Tisdale Weir spills (mile 119.5) | ZR QD116 A=Sacramento B=Tisdale weir C=flow-div >0                                   | +Colusa_weir  | -Tisdale_weir  |
| Sacramento River depletions (miles 119–86)                             | ZR QD114 A=Sacramento B=Knights Landing C=flow-div >0                                | +Tisdale_weir                                       | -swrcb_sac_at_knights_landing                              |

ACID = Anderson-Cottonwood Irrigation District

DSS = U.S. Army Corps of Engineers' Hydrologic Engineering Center Data Storage System

Smaller reservoirs have constant specified starting storage values that are not listed in this table.

">0" restricts input to positive values.

<sup>a</sup> Record types: "ZR" followed by the control point number a record ID recognized by HEC5Q; "SS" Reservoir starting storage in ACFT; "QA" flow ; "IN" inflow; "QD" diversion; "EV" evaporation in cubic feet per second.

<sup>b</sup> The complete path name would be "A=Trinity B=TRINITY C=Stor-Res-fit D=1DAY F=user specified (e.g., "F=S.base"). "Stor-Res-fit" specifies a cubic spline curve fit of the end-of-month storage volume – allows for storage set automatically on any initial starting date.

<sup>c</sup> QMIN 1" species a minimum flow rate of 1 cubic foot per second. Any flow imbalance is corrected by "ADD QMIN."

<sup>d</sup> Path name containing inflows based on historical data for scaling the monthly inflows to daily inflows (required following "C=flow-in-pat").

<sup>e</sup> HEC5 restricts reservoir diversions to a single value. Therefore, all diversions are allocated to the Spring Creek Tunnel (ZR QD240). Since the diversion links and evaporation cannot flow to Keswick Lake, "QD 212" removes that flow component at the Spring Creek Power Plant.

**Table H1b1-2. SacWAM Inputs to the Feather-American River HEC-5Q Water Temperature Model**

| Description  | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record | SacWAM Link Identification: Subtracted from the DSS Record |
|--|--|---|--|
| Lake Oroville - reservoir storage  | ZR SS490 A=Feather B=Oroville C=Stor-Res-fit <sup>b</sup>                            | +oroville_reservoir_storage                         |  |
| Folsom Lake - reservoir storage  | ZR SS590 A=AMERICAN B=FOLSOM C=STOR-RES-fit  | +folsom_lake_storage                                |  |
| Lake Oroville - reservoir inflow   | ZR IN490 A=Feather B=Oroville c=flow-in-pat  | +swrcb_oroville_inflow                              |  |
| Lake Oroville - daily inflow based on flow records (for scaling monthly inflow) <sup>c</sup> | A=Feather B=Oroville C=flow-in E=1DAY F=Historical_based                             |   |  |
| Oroville Dam - reservoir outflow   | ZR QA490 A=Feather B=Oroville C=flow-out   | +oroville_reservoir                                 |  |
| Lake Oroville - reservoir diversion including evaporation                                    | ZR QD490 A=Feather B=Oroville c=flow-div   | +oroville_reservoir_evap<br>+palermo_canal_0        |  |
| Lake Oroville - evaporation  | ZR EV490 A=Feather B=Oroville c=flow-evap  | +oroville_reservoir_evap                            |  |
| Kelly Ridge power inflow below Oroville Dam  | ZR IN482 A=Feather B=Kelly Ridge C=flow-in   | +ops_kelly_ridge_powerhouse                         |  |
| Diversion Dam diversion to the Thermalito Forebay  | ZR QD480 A=Feather B=Diversion Dam C=flow-div  | +power_canal_0                                      |  |
| Thermalito Afterbay net diversion including evaporation                                      | ZR QD450 A=Feather B=Thermalito C=flow-div   | +power_canal_0                                      | -thermalito_afterbay                                       |
| Thermalito Afterbay evaporation  | ZR EV450 A=Feather B=Thermalito C=flow-evap  | +Thermalito_afterbay_evap                           |  |
| Feather River - depletion between Yuba City and Wheatland (miles 29.4–12.4)                  | ZR QD415 A=Feather B=Weatland C=flow-div >0  | +yuba_river_inflow_to_feather_rm_028                | - bear_river_inflow_to_feather_rm_012                      |
| Feather River - depletion between Wheatland and Nicolaus (miles 12.4 –8.8)                   | ZR QD410 A=Feather B=Nicolaus C=flow-div >0  | +bear_river_inflow_to_feather_rm_012                | -swrcb_feather_river                                       |

| Description  | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record | SacWAM Link Identification: Subtracted from the DSS Record                 |
|--|--|---|--|
| Feather River low flow channel - net accretions (miles 66.7–59.7)      | ZR IN442 A=Feather B=blw Diversion Dam C=flow-net                                    | +power_canal_0<br>+power_canal_inflow               | -oroville_reservoir<br>-ops_kelly_ridge_powerhouse<br>-thermalito_afterbay |
| Feather River at Live Oak, mile 44.8 (3.7 miles below Honcut Creek)    | ZR IN425 A=Feather B=Live Oak C=flow-IN >0   | +honcut_creek_inflow                                | -power_canal_inflow  |
| Feather River at Yuba City, mile 29.4 (1.9 miles below the Yuba River) | ZR IN420 A=Feather B=Yuba City C=flow-in >0  | +yuba_river_inflow_to_feather_rm_028                | -honcut_creek_inflow   |
| Feather River at Wheatland, mile 12.4 (1.4 miles below the Bear River) | ZR IN415 A=Feather B=Weatland C=flow-in >0   | +bear_river_inflow_to_feather_rm_012                | -yuba_river_inflow_to_feather_rm_028                                       |
| Feather River at Nicolaus - net accretions (miles 12.1–8.8)            | ZR IN410 A=Feather B=Nicolaus C=flow-in >0   | +swrcb_feather_river                                | -bear_river_inflow_to_feather_rm_012                                       |
| Sacramento River below Knights Landing (mile 81)                       | ZR IN106 A=Sacramento B=Knights Landing C=flow-IN                                    | +swrcb_sac_at_knights_landing                       |  |
| Sacramento River at Verona - balancing inflow (mile 78.5)              | ZR IN98 A=Sacramento B=Verona C=flow-in  | +swrcb_sac_at_verona                                | -swrcb_feather_river<br>-swrcb_sac_at_knights_landing                      |
| Folsom Lake inflow   | ZR IN590 A=AMERICAN B=FOLSOM C=FLOW-IN   | +swrcb_folsom_inflow                                |  |
| Folsom Dam release   | ZR QA590 A=AMERICAN B=FOLSOM C=FLOW-OUT  | +folsom_lake  |  |
| Folsom Lake diversion including evaporation                            | ZR QD590 A=AMERICAN B=FOLSOM C=FLOW-DIV  | +folsom_lake_evap<br>+folsom_reservoir_diversions   |  |
| Folsom Lake evaporation  | ZR EV590 A=AMERICAN B=FOLSOM C=FLOW-EVAP   | +folsom_lake_evap                                   |  |
| Lake Natoma diversion including evaporation                            | ZR QD582 A=AMERICAN B=abv NATOMA C=FLOW-div  | +folsom_lake  | -lake_natoma<br>-lake_natoma_evap  |
| Lake Natoma evaporation  | ZR QD580 A=AMERICAN B=NATOMA C=FLOW-DIV  | +lake_natoma_evap                                   |  |

| Description  | HEC-5Q Record Type; A, B, and C Parts of the DSS Path Name and Controls <sup>a</sup> | SacWAM Link Identification: Added to the DSS Record | SacWAM Link Identification: Subtracted from the DSS Record |
|--|--|---|--|
| American River - net diversion (Sacramento City diversion, mile 7) | ZR QD570 A=AMERICAN<br>B=FAIRBAIRN C=FLOW-DIV >0                                     | +lake_natoma  | -swrcb_american_river                                      |
| American River accretions below Lake Natoma                        | ZR IN560 A=AMERICAN<br>B=Discovery Park C=FLOW-in >0                                 | +swrcb_american_river                               | -lake_natoma   |

DSS = U.S. Army Corps of Engineers' Hydrologic Engineering Center Data Storage System

Smaller reservoirs have constant specified starting storage values that are not listed in this table.

">0" restricts input to positive values.

<sup>a</sup> Record types: "ZR" followed by the control point number a record ID recognized by HEC5Q; "SS" Reservoir starting storage in ACFT; "QA" flow ; "IN" inflow; "QD" diversion; "EV" evaporation in cubic feet per second.

<sup>b</sup> The complete path name would be "A=Feather B=Oroville C=Stor-Res-fit D=1DAY F=user specified (e.g., "F=F.base"). "Stor-Res-fit" specifies a cubic spline curve fit of the end-of-month storage volume – allows for storage set automatically on any initial starting date.

<sup>c</sup> Path name containing inflows based on historical data for scaling the monthly inflows to daily inflows (required following "C=flow-in-pat").

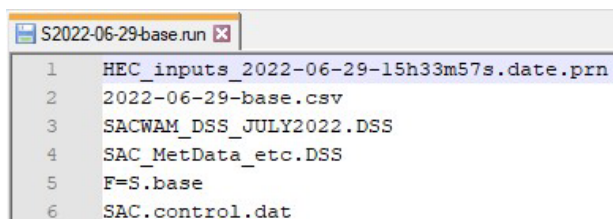


## H1b1.1 PowerPoint Slides Describing SacWAM to HEC-5Q Tool

### SacWAM to HEC5Q Utility Inputs (1)

Batch run / control file e.g., *S2022-06-29-base.run*

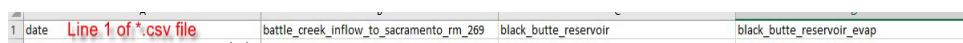
File assignments and controls: (Note that none of the inputs are case sensitive)



```

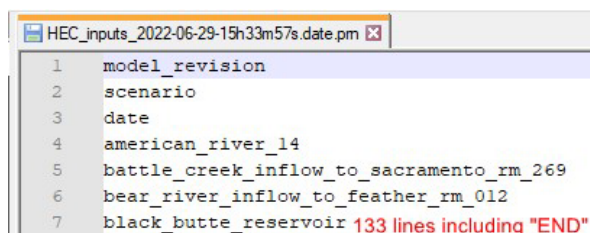
1 HEC_inputs_2022-06-29-15h33m57s.date.prn
2 2022-06-29-base.csv
3 SACWAM_DSS_JULY2022.DSS
4 SAC_MetData_etc.DSS
5 F=S.base
6 SAC.control.dat
  
```

Line 1 *HEC\_inputs\_2022-06-29-15h33m57s.date.prn*.... First line of the \*.csv SacWAM output file looks like:



|   |      |  |                       |                            |
|---|------|--|-----------------------|----------------------------|
| 1 | date | battle_creek_inflow_to_sacramento_rm_269 | black_butte_reservoir | black_butte_reservoir_evap |
|---|------|--|-----------------------|----------------------------|

After the first line has been copied, transposed and saved as a \*.prn file, the resulting file will look like:



```

1 model_revision
2 scenario
3 date
4 american_river_l4
5 battle_creek_inflow_to_sacramento_rm_269
6 bear_river_inflow_to_feather_rm_012
7 black_butte_reservoir 133 lines including "END"
  
```

## SacWAM to HEC5Q Utility Inputs (1 - continued)

Line 2 SacWAM model output. Note that the file cannot be an \*.xlsx file since the model output is read by the utility as a comma separated text file.

Line 3 Input DSS output file containing records required by HEC5Q that are extracted from SacWAM output

Line 4 Input meteorology and other data that are required by HEC5Q as well as flow patterns required by the patterning option. These data are copied to SACWAM\_DSS\_JULY2022.DSS.

Line 5 Output DSS F part that references the SacWAM model. Identifying each scenario allows multiple scenarios in a single DSS file

Line 6 Input file that controls how the SacWAM output is processed to create the individual records required by HEC5Q

To run the SacWAM utility, double click on "SacWAM\_HEC5Q.exe" and enter the run file name.

## SacWAM to HEC5Q Utility Inputs (2)

Example ZR records and corresponding SacWAM records contained in the Sac.control.dat. The “SacWAM.2.HEC5Q.xlsx” file contains all of the control records in a more convenient format.

```

75
76 ZR QD320 A=Trinity B=LEWISTON C=flow-div
77 +Lewiston_Lake_Evap
78 +Clear_Creek_Tunnel_0
79 ZR EV320 A=Trinity B=LEWISTON C=flow-evap
80 +Lewiston_Lake_Evap
81
82 ZR QD240 A=Clear_CR B=WHISKEYTOWN C=flow-div
83 +Whiskeytown_Reservoir_Evap
84 +spring_creek_conduit_0
85 +Transmission_Link_from_Clear_Creek_WTP_to_A_02_PA
86 +Transmission_Link_from_Clear_Creek_WTP_to_U_02_PU
87 +Transmission_Link_from_Whiskeytown_Reservoir_to_U_02_PU
88 +Transmission_Link_from_Whiskeytown_Reservoir_to_U_03_PU
89

```

1. *ZR QD320 record* .... Defines the total diversion (including evaporation) from Lewiston Lake followed by the SacWAM components\*\*
2. *ZR EV320 record* .... Defines the Lewiston evaporation component
3. *ZR QD240 record* .... Defines the total diversion from Whiskeytown\*\*

\*\* The + (or -) in column 1 controls how the components are processed (Plus or minus)

Note that the four transmission links are included in the Spring Creek diversion but are removed for the Rock Creek Siphon

## SacWAM to HEC5Q Utility Inputs (3)

Curve fit and flow pattering ... add “FIT” or “-PAT” to the Cpart. Note than any record not beginning in column 1 is ignored. E.g., “Shasta” The PAT options requires a historical record input as a DSS record.

```

.....Shasta
ZR SS220...A=Sacramento B=Shasta...C=Stor-Res-fit
+Shasta_Lake_Storage

ZR IN220...A=Sacramento B=SHASTA...C=flow-in-pat
A=Sacramento B=SHASTA...C=flow-in...E=1DAY...F=HISTORICAL_BASED
+I_SHSTA_Inflow

ZR QA220...A=Sacramento B=SHASTA...C=flow-out
+Shasta_Lake

```

+/- partitioning / constraints ... by adding the “>0” in beginning in column 71, only positive values will be saved. Note that the signs for the SacWAM records are reversed to distinguish between inflow and diversion

```

ZR IN178 A=Sacramento B=Cow Cr C=flow-in >0
-clear_creek_inflow_to_sacramento_river
+cow_creek_inflow_to_sacramento_rm_277

ZR QD178 A=Sacramento B=Cow Cr C=flow-div >0
+clear_creek_inflow_to_sacramento_river
-cow_creek_inflow_to_sacramento_rm_277

```