

Consumptive Use (CONS_USE) Model

1. Description of Algorithm

<https://vlab.ncep.noaa.gov/documents/207461/1893022/24consuse.pdf/>

2. Model Parameters

The CONS_USE model uses the existing NWSRFS operation definition for defining model parameters. The NWSRFS operation definition is enclosed within a single parameter element named "OPERATION_CONTENTS". An example is shown below. For further information see:

https://vlab.ncep.noaa.gov/documents/207461/1893022/533consuse.pdf

```
SNAKE SHELLEY LCL DIVERSIONS
0
SHYI1X MAT SHYI1QC SQME
SHYI1A SQME SHYI1CU SQME
RFIN SQME SHYI1RF SQME OL SQME CD SQME CE MAPE
43.65 240. 0.50 0.10
0.00 0.00 0.00 0.00 0.62 0.86
0.77 0.49 0.49 0.00 0.00 0.00
0.30 0.0150 6.
```

3. Model States

The CONS_USE model states are defined in a property file format. An example is shown below. The model state property names are:

Property Name	Description
RFSTOR	Return Flow Storage [mm]
UNIT	Units for State Variables (always METRIC)

An example is shown below.

```
UNIT=METRIC
RFSTOR=6.
```

4. Model Time Series

CONS_USE requires a minimum of 1 input time series, a maximum of 3 input time series, and 7 output time series.

INPUT TIMESERIES:

Time Series Type	Internal Model Units	Time Step	Missing Values Allowed	Required [Yes or No]
Mean Areal Temperature (MAT)	DEGC	6	No	1/
Potential ET (MAPE)	MM	24	No	2/

OUTPUT TIMESERIES:

Time Series Type	Internal Model Units	Time Step	Missing Values Allowed	Required [Yes or No]
Natural Runoff	CMSD	24	No	Yes
Adjusted Runoff	CMSD	24	No	Yes
Diversion Flow	CMSD	24	No	Yes
Return Flow In	CMSD	24	No	Yes
Return Flow Out	CMSD	24	No	Yes
Other Losses	CMSD	24	No	Yes
Crop Demand	CMSD	24	No	Yes
Actual ET	MM	24	No	Yes

1/ IF ET estimation option on Card 1 is 0.

2/ IF ET estimation option on Card 1 is 1.

5. Notes about configuring Model in FEWS workflow

The Consumptive Use model produces daily model output. All runs are assumed to start at 12Z; the element <modelTimeStep id="12Z"/> will appear in the FEWS General Adapter Configuration file. All inputs should be in synch. For example if 24 hour MAPE is used then at the end of the day, the 6 hour MAT should line up.

Examples:

Module Configuration File

[ModuleConfigFiles\CONSUSE_CAMI1_CAMI1_Forecast.xml](#)

Module Parameter File

[ModuleParFiles\CONSUSE_CAMI1_CAMI1_UpdateStates.xml](#)

FEWS Adapter Used

The Consumptive Use model uses the OHDFewsadapter to communicate.

Information about this adapter can be found at [OHDFewsadapter](#).