V. Tutorial 4: Timevar

The purpose of this tutorial is to incorporate time-varying information to the model. In the previous sections, all boundary conditions and gate timings were set as constant, and no input files were needed. In this section, the model is set to read time-varying information stored in DSS files. The following steps will instruct you on how to add the time-varying information.

1. Change the Transfer Flows:

a. In the *Simulations Navigator*:
   1) Remain in the *model: tutorial_hydro* folder.
   2) Expand the *Input Time Series* folder.
   3) Double-click on *Transfer Flows.*

b. Add a new Transfer Flow Layer:
   1) In the *Layers panel*, right-click and select *New layer*.
   2) Select *Yes* to confirm the refresh.
   3) Name the new layer, *tutorial_hydro_ts*, and add a description.
   4) Enter *2* for the layer number.

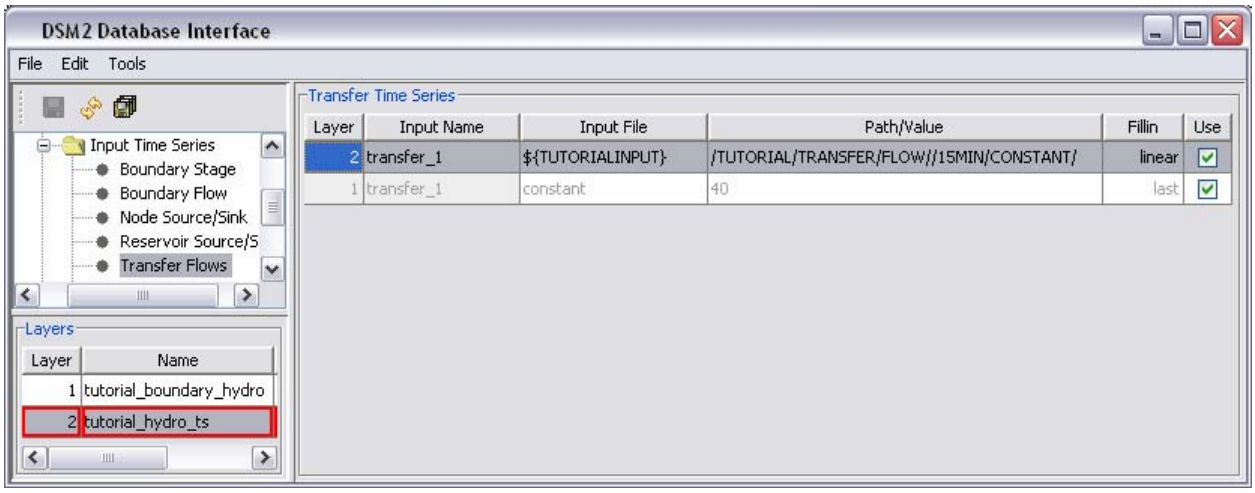
c. In the *Layers panel*, right-click and select *Set edit layer*.

d. In the *Select Layers* window, double-click the *tutorial_hydro_ts* layer.

e. In the *Transfer Time Series table*:
   1) Right-click and select *Insert row*.
   2) Enter the following values into the appropriate fields:
      i) Input Name: *transfer_1*
      ii) Input File: *${TUTORIALINPUT}*
      iii) Path/Value: */TUTORIAL/TRANSFER/FLOW//15MIN/CONSTANT/*
      iv) Fillin: *linear*
      v) Use: Make sure that the entry contains a checkmark.

f. Save the current settings.

g. At this point, the GUI should look as follows:



h. In the *Layers panel*, right-click and select *Unset edit layer* [optional].

2. Running HYDRO and QUAL

a. In Windows Explorer, navigate to the directory: *dsm2_training**tutorial**simulations**simple*\.

b. Right-click on the directory, *t4_timevar*, and select *Open Command Window Here*.

c. In the command window, type: *hydro hydro.inp*.

d. In the command window, type: *qual qual.inp*.

e. Open the *output.dss* file in the *t4_timevar* directory, and verify that the results are identical to the results from the previous tutorial (located in the *t3_layering* directory).

3. Adjust the Text Input Files:

a. In Windows Explorer, navigate to the directory: *dsm2_training**tutorial**simulations**simple**t4_timevar*

b. Open *hydro.inp* for editing.

c. In the *ENVVARS* section, change the *DSM2MODIFIER* environment variable from *timevar_1* to *timevar_2*.

d. Open *qual.inp* for editing.

e. In the *ENVVARS* section, change the *DSM2MODIFIER* environment variable from *timevar_1* to *timevar_2*.

4. Add Source information into HYDRO:

a. In the *Simulations Navigator*:

1) Remain in the *Input Time Series* folder.

2) Double-click on *Node Source/Sink.*

b. In the *Layers panel*, right-click and select *Set edit layer*.

c. In the *Select Layers* window, double-click the *tutorial_hydro_ts* layer.

d. In the *Node Source Time Series Input table*:

1) Right-click and select *Insert row*.

2) Enter the following values into the appropriate fields:

i) Input Name: *source1*

ii) Node: *5*

iii) Input File: *${TUTORIALINPUT}*

iv) Path/Value: */TUTORIAL/SOURCE/FLOW//15MIN/CONSTANT/*

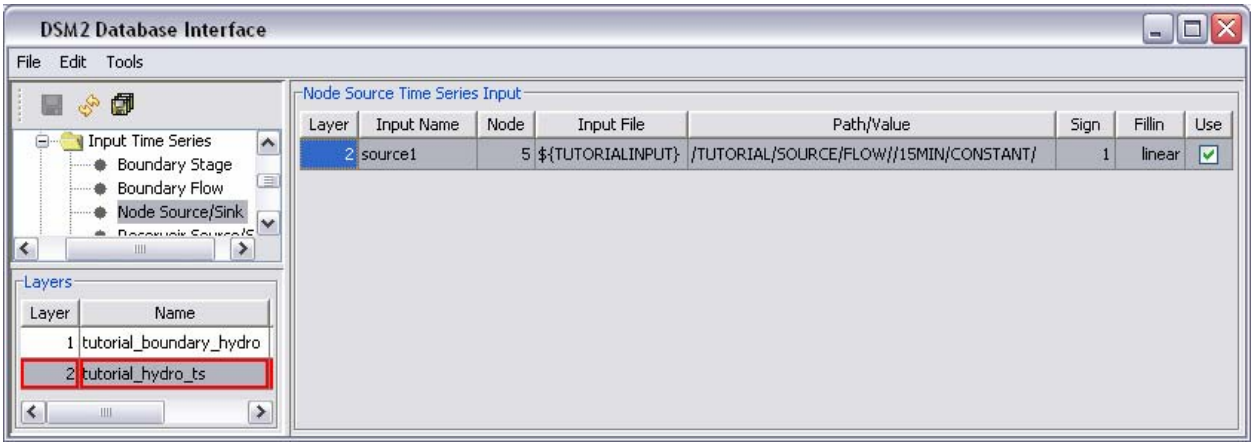
v) Sign: *1*

vi) Fillin: *linear*

vii) Use: Make sure that the entry contains a checkmark.

e. Save the current settings.

f. At this point, the GUI should look as follows:



g. In the *Layers panel*, right-click and select *Unset edit layer* [optional].

5. Add Source information into QUAL:

a. In the *Simulations Navigator*:
   1) Collapse the *model: tutorial_hydro* folder [optional].
   2) Expand the *model:tutorial_qual_ec* folder.
   3) Expand the *Input Time Series* folder.
   4) Double-click on *Node Source/Sink.*

b. Create a new QUAL Source Layer:
   1) In the *Layers panel*, right-click and select *New layer*.
   2) Select *Yes* to confirm the refresh.
   3) Name the new layer, *tutorial_qual_ts*, and add a description.
   4) Enter *2* for the layer number.

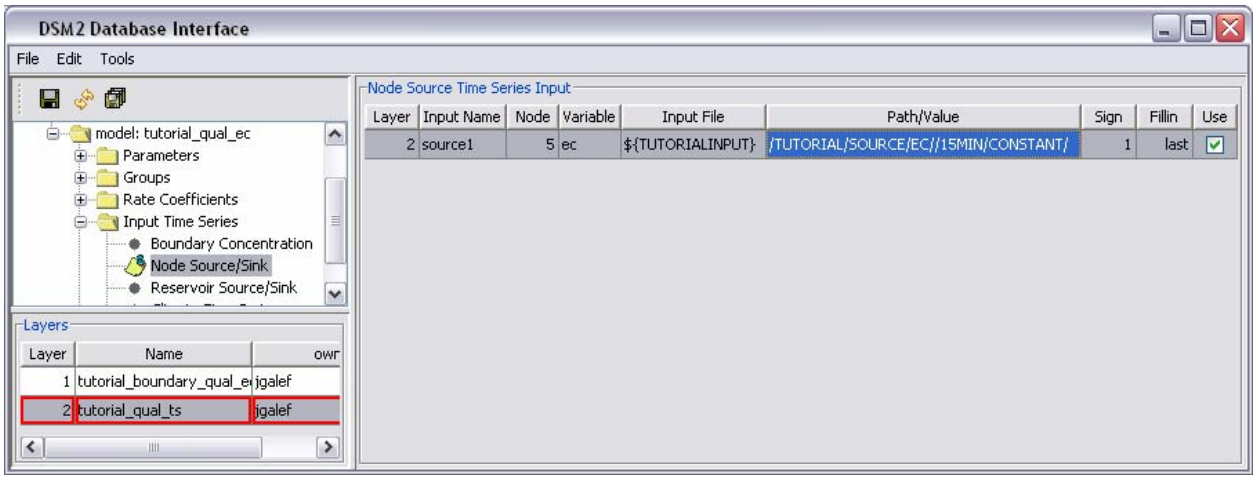
c. In the *Layers panel*, right-click and select *Set edit layer*.

d. In the *Select Layers* window, double-click the *tutorial_qual_ts* layer.

e. In the *Node Source Time Series table*:
   1) Right-click and select *Insert row*.
   2) Enter the following values into the appropriate fields:
      i) Input Name: *source1*
      ii) Node: *5*
      iii) Variable: *ec*
      iv) Input File: *${TUTORIALINPUT}*
      v) Path/Value: */TUTORIAL/SOURCE/EC//15MIN/CONSTANT/*
      vi) Sign: *1*
      vii) Fillin: *last*
      viii) Use: Make sure that the entry contains a checkmark.

f. Save the current settings.

g. At this point, the GUI should look as follows:



h. In the *Layers panel*, right-click and select *Unset edit layer* [optional].

6. Add Tide Information for Downstream Boundary in HYDRO:

a. In the *Simulations Navigator*:
   1) Collapse the *model: tutorial_qual_ec* folder [optional].
   2) Expand the *model: tutorial_hydro* folder.
   3) Expand the *Input Time Series* folder.
   4) Double-click on *Boundary Stage.*

b. Create a new HYDRO Time Series Boundary:
   1) In the *Layers panel*, right-click and select *New layer*.
   2) Select *Yes* to confirm the refresh.
   3) Name the new layer, *tutorial_ hydro_tide*, and add a description.
   4) Enter *3* for the layer number.

c. In the *Layers panel*, right-click and select *Set edit layer*.

d. In the *Select Layers* window, double-click the *tutorial_hydro_tide* layer.

e. In the *Boundary Stage table*:
   1) Right-click and select *Insert row*.
   2) Enter the following values into the appropriate fields:
      i) Input Name: *downstream_stage*
      ii) Node: *7*

iii) Input File: *${TUTORIALINPUT}*

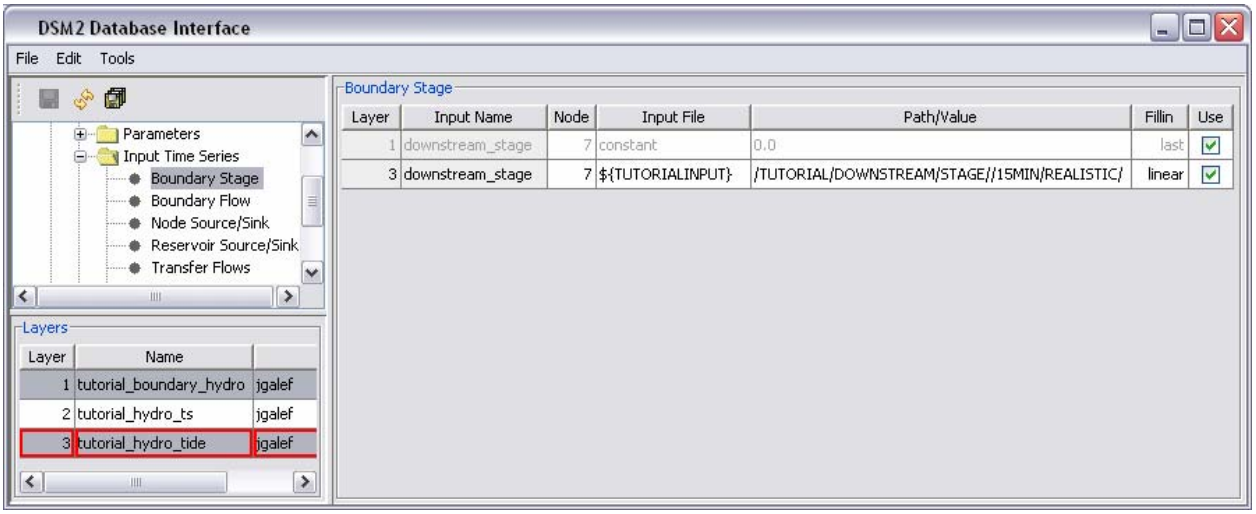
iv) Path/Value: */TUTORIAL/DOWNSTREAM/STAGE//15MIN/REALISTIC/*

v) Fillin: *linear*

vi) Use: Make sure that the entry contains a checkmark.

f. Save the current settings.

g. At this point, the GUI should look as follows:



h. In the *Layers panel*, right-click and select *Unset edit layer* [optional].

7. Add Tide Information for Downstream Boundary in QUAL:

a. In the *Simulations Navigator*:

1) Collapse the *model: tutorial_hydro* folder [optional].

2) Expand the *model: tutorial_qual_ec* folder.

3) Expand the *Input Time Series* folder.

4) Double-click on *Boundary Concentration.*

b. Add a new QUAL Time Series Boundary:

1) In the *Layers panel*, right-click and select *New layer*.

2) Select *Yes* to confirm the refresh.

3) Name the new layer, *tutorial_ qual_tide*, and add a description.

4) Enter *3* for the layer number.

c. In the *Layers panel*, right-click and select *Set edit layer*.

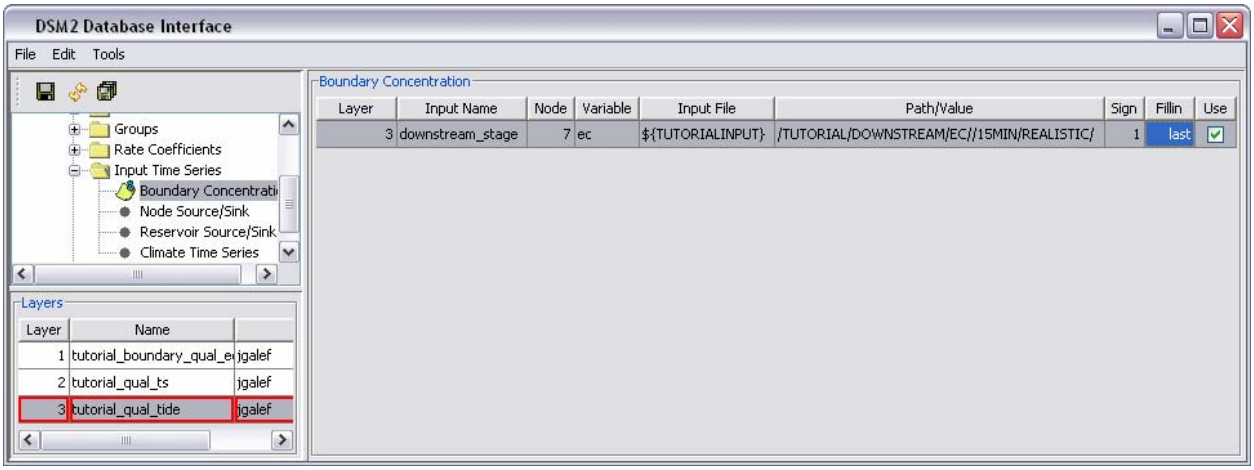
d. In the *Select Layers* window, double-click the *tutorial_qual_tide* layer.

e. In the *Boundary Concentration table*:

1) Right-click and select *Insert row*.
2) Enter the following values into the appropriate fields:
   i) Input Name: *downstream_stage*
   ii) Node: *7*
   iii) Input File: *${TUTORIALINPUT}*
   iv) Path/Value: */TUTORIAL/DOWNSTREAM/EC//15MIN/REALISTIC/*
   v) Sign: *1*
   vi) Fillin: *last*
   vii) Use: Make sure that the entry contains a checkmark.

f. Save the current settings.

g. At this point, the GUI should look as follows:



h. In the *Layers panel*, right-click and select *Unset edit layer* [optional].

8. Add a Gate Time Series to HYDRO:

This gate time series will control the weir. The pipe is to be left open.

a. In the *Simulations Navigator*:
   1) Collapse the *model: tutorial_ qual_ec* folder [optional].
   2) Expand the *model: tutorial_ hydro* folder.
   3) Expand the *Input Time Series* folder.
   4) Double-click on *Gate Time Series.*

b. Add a Gate Time Series Layer:
   1) In the *Layers panel*, right-click and select *New layer*.

2) Select *Yes* to confirm the refresh.
3) Name the new layer, *tutorial_ gate_input*, and add a description.
4) Enter *4* for the layer number.

c. In the *Layers panel*, right-click and select *Set edit layer*.

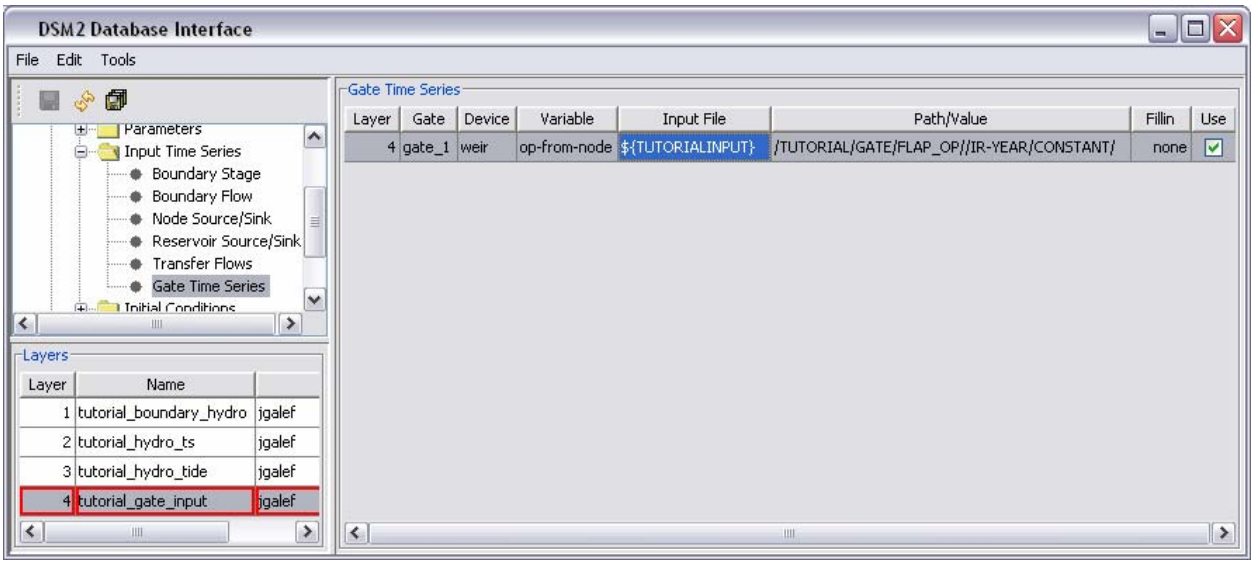
d. In the *Select Layers* window, double-click the *tutorial_gate_input* layer.

e. In the *Gate Time Series table:*

1) Right-click and select *Insert row*.
2) Enter the following values into the appropriate fields:
   i) Gate: *gate_1*
   ii) Device: *weir*
   iii) Variable: *op_from_node*
   iv) Input File: *${TUTORIALINPUT}*
   v) Path/Value: */TUTORIAL/GATE/FLAP_OP//IR-YEAR/CONSTANT/*
   vi) Fillin: *none*
   vii) Use: Make sure that the entry contains a checkmark.

f. Save the current settings.

g. At this point, the GUI should look as follows:



h. In the *Layers panel*, right-click and select *Unset edit layer* [optional].

9. Running HYDRO and QUAL

a. In Windows Explorer, navigate to the directory: *dsm2_training**tutorial**simulations**simple*\.

b. Right-click on the directory, *t4_Timevar*, and select *Open Command Window Here*.

c. In the command window, type: *hydro hydro.inp*.

d. In the command window, type: *qual qual.inp*.

e. Open the *output.dss* file in the *t4_timevar* directory, and examine the results.