

Converting a Project from NPSM to WinHSPF

The Windows interface to HSPF in BASINS 2.0 was known as the Non-Point Source Model (**NPSM**). For BASINS 3.0, the interface to HSPF has been redesigned and enhanced. This new interface to HSPF in BASINS 3.0 is known as **WinHSPF**. Users of NPSM from BASINS 2.0 may wish to migrate existing NPSM projects to WinHSPF to take advantage of the many features of WinHSPF. WinHSPF provides access to all features of HSPF version 12, plus it offers advanced visualization, editing, and file management capabilities.

One of the main advantages of using WinHSPF is its ability to manage model simulation scenarios. A scenario is defined by the model input sequence and includes the input sequence and associated output data sets. WinHSPF facilitates the development of new simulation scenarios based on existing simulation scenarios, and allows the output results from the multiple scenarios to be compared and analyzed.

This technical note provides guidance in making the transition from NPSM to WinHSPF so that the user can take full advantage of the features of WinHSPF.

Step 1: Obtain the NPSM UCI file

NPSM used a file known as the project (or *.prj*) file for storing all model parameters and other project related information. When the NPSM user clicked the button to run HSPF, the input file for HSPF was written. This input file is known as the User's Control Input, or **UCI** file. WinHSPF stores all model parameters and other project related information in the UCI file itself. Thus an existing UCI file can be opened in WinHSPF, modified as desired, and saved back to the UCI file. The existing UCI file can be overwritten, or the UCI can be written to a new file name, thus creating a new simulation scenario.

The first step in migrating from NPSM to WinHSPF is to locate the UCI file used to run HSPF from NPSM. This file customarily resides in the `\BASINS\modelout\<project>` folder, along with the NPSM project file (see Figure 1).

If the user has only the NPSM project file, the user will need to open that project in NPSM and click the *Run HSPF* button to create the UCI file. This should also be done if you previously made edits to the NPSM project without subsequently running the model. Note from an earlier general FAQ: You can maintain multiple versions of BASINS on the same computer simply by swapping directory names such that the version you want currently operable is called **BASINS**, while other versions are given different names such as **BASINS2** or **BASINS2.01**. During installation of version 3, rename the existing **BASINS** directory **BASINS2** (for example). You can then switch back and forth between versions by simply renaming both directories (e.g. **BASINS** -> **BASINS3**, **BASINS2** -> **BASINS**). Place the uci file in the `BASINS\modelout\<project>` folder for BASINS 3.

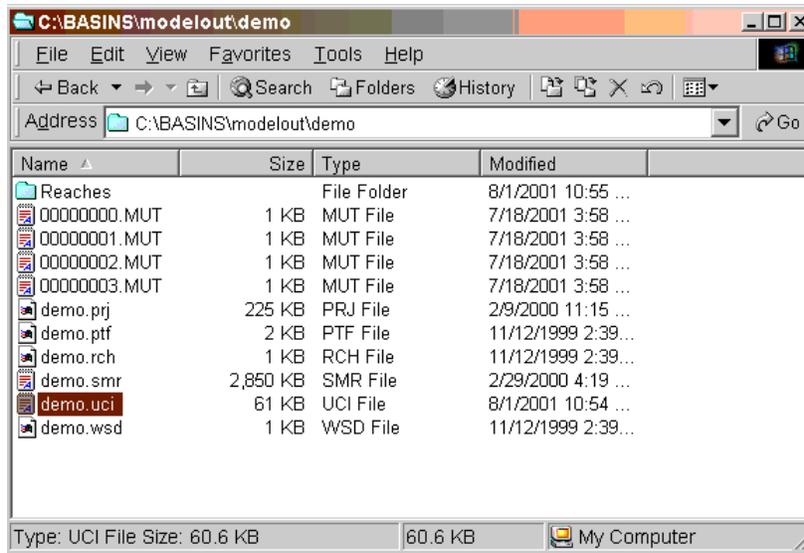


Figure 1: Locate the UCI file

Step 2: Create a project WDM file

NPSM read input timeseries for point source inputs from a series of MUTSIN files and wrote model output timeseries to a series of PLTGEN files. WinHSPF uses a project WDM file to store the point source input and model output timeseries. Using a WDM file to store these timeseries provides an efficient means of storing all of these timeseries within one file, while providing advanced scenario management capabilities. When migrating an NPSM project to WinHSPF, this project WDM file must be created. Note: This step can be skipped if the user wishes to use an existing WDM file as the project WDM file.

The program WDMUtil, distributed with BASINS 3.0, provides an easy means of creating a WDM file. From a BASINS Arcview project with the BASINS Data extension WDMUtil checked, start WDMUtil from the BASINS *Data* pull-down menu, or by using the *Start* button on the Windows taskbar and navigating to *BASINS* program folder – *WDMUtil*. From the main WDMUtil window, choose the *File:New* menu option. In the file dialog, browse or create a file path and any name you choose as the WDM file name, and click *Open* (see Figure 2). A message box will inform you that this WDM file does not yet exist. Click *Yes* to create the file (see Figure 3). Then from the main WDMUtil window, close WDMUtil by choosing the *File:Exit* menu option.

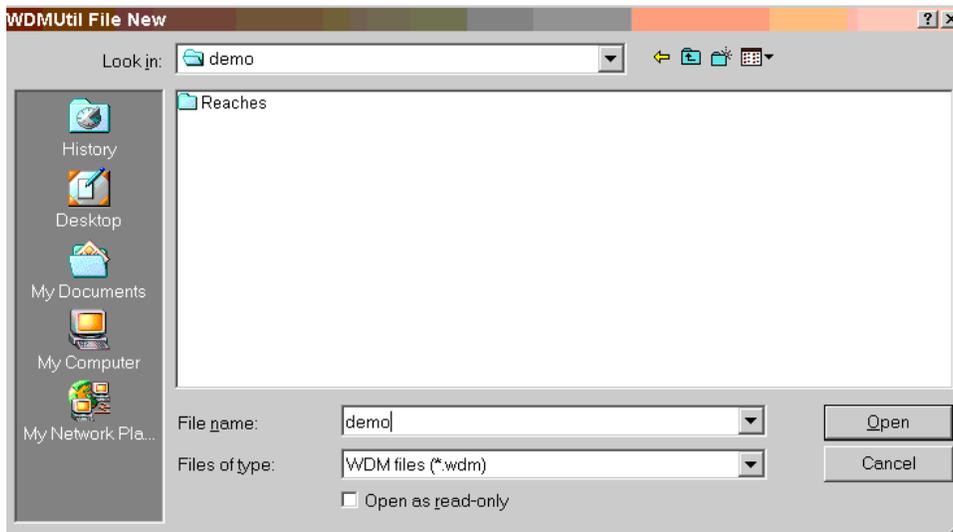


Figure 2: Creating a WDM file with WDMUtil

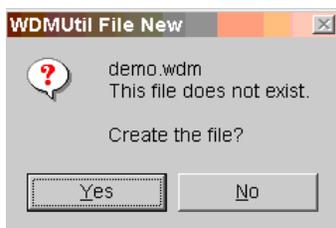


Figure 3: Confirming the new WDM file name

Step 3: Add the project WDM file to the UCI file

This step requires modifying the UCI file to reference the new project WDM file. Open the UCI file in a text editor (see Figure 4).

WinHSPF assumes the project WDM file is the first WDM file referenced, as *WDM1*, but the NPSM UCI is already using *WDM1* to refer to the meteorologic WDM file. Thus it is necessary to change the references to the met WDM file from *WDM1* to *WDM2*. This change can be accomplished easily by using the text editor's find and replace capabilities. Find each reference to the text *WDM1* and replace it with the text *WDM2*. Since the UCI file is column-dependent, be sure not to add any extraneous characters such as additional spaces or tabs (see Figure 5).

Next, a line will need to be added to the *Files Block* to reference the project WDM file. The Files Block is a series of rows of text near the top of the UCI file beginning with a line reading *FILES* and ending with a line reading *END FILES* (see Figure 4). Look for the line of text about 10 rows from the top of the file that looks like the following:

```
WDM2    15  C:\BASINS\data\met_data\

```

Just before that line, enter a line of text that looks very similar, except that it will reference the project WDM created in step 2 as *WDM1*.

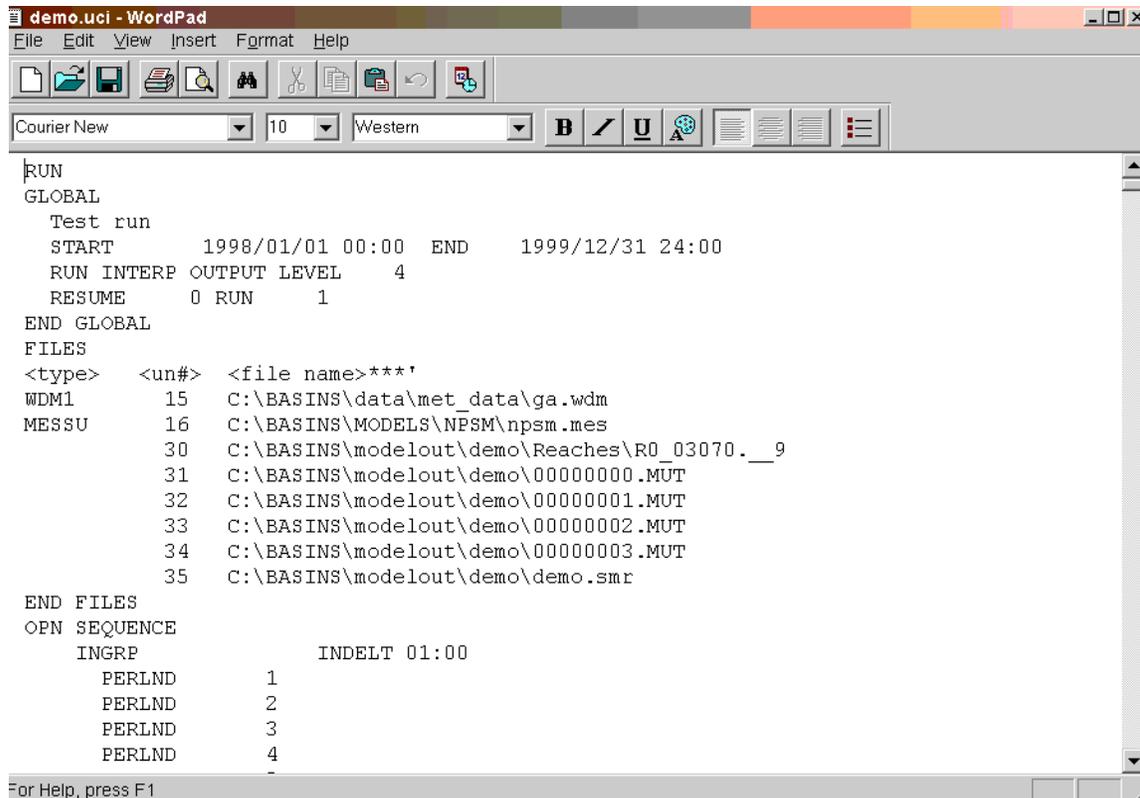


Figure 4: The UCI file in a text editor

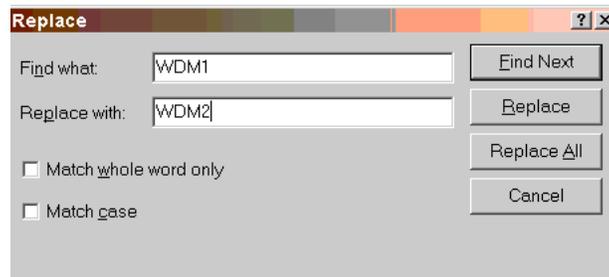


Figure 5: Replace *WDM1* with *WDM2*

Use the space bar to space the text exactly as the line above. Do not use the tab character. This line should look like the following:

WDM1 17 C:\BASINS\modelout\<<project>\<project>.wdm

Make sure the 4th character is a '1' (one), indicating that the new project WDM will be referenced throughout the UCI file as *WDM1*. The integer in positions 12 and 13 represents the file unit number '17'. This number must be unique when compared with the file unit numbers for the other lines in the Files Block. NPSM assigned '15' to the met WDM file and '16' to the file named *npsm.mes*. '17' should be available to use as the file unit number for the project WDM. Enter '17' in this position. Specify the full path and name of the project WDM file (see Figure 6).

```

demo.uci - WordPad
File Edit View Insert Format Help
Courier New 10 Western B / U A
RUN
GLOBAL
  Test run
  START      1998/01/01 00:00  END      1999/12/31 24:00
  RUN INTERP OUTPUT LEVEL    4
  RESUME     0 RUN           1
END GLOBAL
FILES
<type>  <un#>  <file name>***
WDM1     17    C:\BASINS\modelout\demo\demo.wdm|
WDM2     15    C:\BASINS\data\met_data\ga.wdm
MESSU    16    C:\BASINS\MODELS\NPSM\npsm.mes
          30    C:\BASINS\modelout\demo\Reaches\R0_03070.__9
          31    C:\BASINS\modelout\demo\00000000.MUT
          32    C:\BASINS\modelout\demo\00000001.MUT
          33    C:\BASINS\modelout\demo\00000002.MUT
          34    C:\BASINS\modelout\demo\00000003.MUT
          35    C:\BASINS\modelout\demo\demo.smr
END FILES
OPN SEQUENCE
  INGRP                INDELT 01:00
    PERLND              1
    PERLND              2
    PERLND              3
For Help, press F1

```

Figure 6: The Modified Files Block

At this point, it is a good idea to double check the existence of each of the files and paths listed in the Files Block. Often with archived projects the files referenced in the Files Block have been relocated from where they were initially created, and as a result the paths specified in the Files Block are no longer accurate. Correct any incorrect paths as needed. Once this has been done, the modified UCI file should be saved as text, and the text editor closed.

Step 4: Convert the Network Block to the Schematic and Mass-Link Blocks

This step and the following steps can be performed easiest within WinHSPF. Start WinHSPF, and open the UCI file using the *File:Open* menu option (see Figure 7).

NPSM used the NETWORK Block for specifying all transfers between operations. WinHSPF utilizes the SCHEMATIC and MASS-LINK blocks, which are functionally equivalent to the NETWORK Block but reduce the number of records necessary in the UCI file. Also, by using the SCHEMATIC and MASS-LINK blocks, the UCI file contains more readable connectivity between HSPF operations and reduces mistakes when modifying areas and associated conversion factors. The USGS program HSPEXP requires the use of the SCHEMATIC and MASS-LINK Blocks.

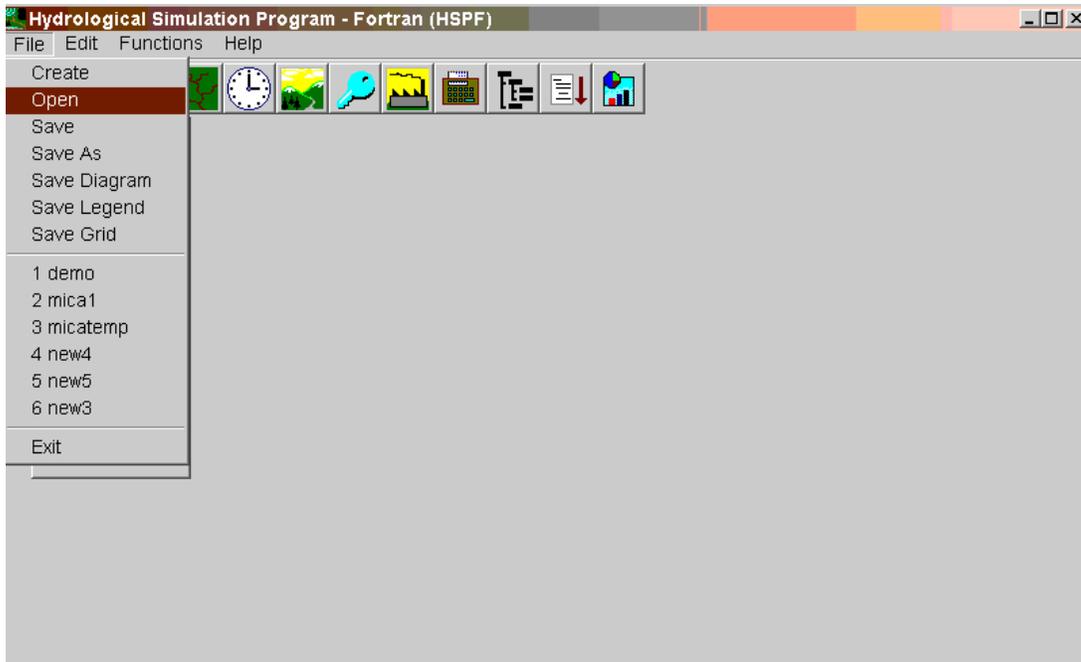


Figure 7: Open the UCI file in WinHSPF

Click on the *Land Use Editor* toolbar button  from the main WinHSPF window. For a UCI file that does not contain the SCHEMATIC and MASS-LINK Blocks, WinHSPF will prompt the user to automatically convert from the NETWORK Block to the SCHEMATIC and MASS-LINK Blocks (see Figure 8). Click *Yes*, and this conversion will be performed. Once inside the *Land Use Editor*, this conversion is complete. Exit the *Land Use Editor*, and save the UCI file using the *File:Save* menu option.

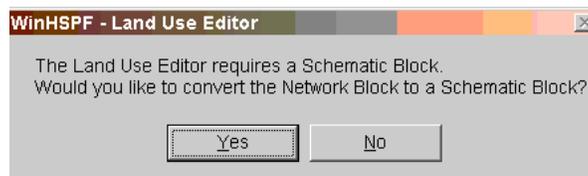


Figure 8: Converting to the Mass-Link and Schematic Blocks

Step 5: Convert point source inputs from MUTSIN to WDM format

NPSM used a series of MUTSIN format files for containing point source inputs to the model. These MUTSIN files are referenced through MUTSIN operations in the NPSM UCI file. WinHSPF uses WDM for managing these point sources, storing all point source timeseries in the project WDM file.

The NPSM MUTSIN point sources can easily be converted to WDM format using the

Point Source Editor toolbar button  in WinHSPF. Click on the *Point Source Editor* toolbar button from the main WinHSPF window. The *Point Sources* window will appear, with an empty list in the *Existing* frame (see Figure 9).

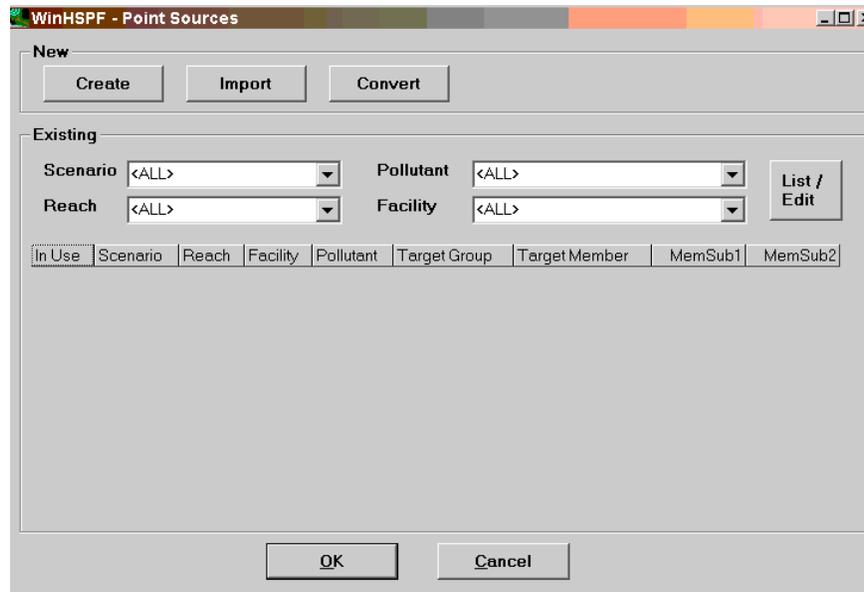


Figure 9: Converting Point Source Specifications to WDM format

Click on the *Convert* button in the *New* frame. When this button is clicked, WinHSPF will search the UCI file for existing MUTSIN format point source inputs and convert these inputs to WDM format. Note that these point source inputs will be written to the project WDM as daily values. As each point source is converted, a record is added to the External Sources Block of the UCI file to represent this point source input. Click the *OK* button to return to the main WinHSPF window.

Step 6: Convert output timeseries from PLTGEN to WDM format

NPSM used a series of PLTGEN format files for output timeseries data. These output files are managed through PLTGEN operations in the NPSM UCI file. WinHSPF uses WDM for managing these outputs, storing all output timeseries in the project WDM file.

In order to obtain the NPSM PLTGEN output timeseries in WDM format, the NPSM output specifications must be recreated in WinHSPF. Where these output specifications were made in NPSM using the NPSM *Output Manager* toolbar button  these same output specifications can be made in WinHSPF through the use of the WinHSPF *Output Manager*.

If the user remembers exactly which timeseries were being output by NPSM, the user may enter the WinHSPF *Output Manager* and add the corresponding specifications from the interface. However, it is likely that the user will not remember the specifics of the timeseries output from NPSM. In this case, the user may follow the instructions, below, for reading these specifications from the NPSM UCI file and re-creating them in WinHSPF.

```

demo.uci - WordPad
File Edit View Insert Format Help
[Icons]
Courier New 10 Western B U [Icons]
WDM1 7003 FLOW ENGL 0.0826SAME RCHRES 4 INFLOW IVOL
WDM1 7004 FLOW ENGL 0.0826SAME RCHRES 4 INFLOW IVOL
WDM1 7005 FLOW ENGL 0.0826SAME RCHRES 7 INFLOW IVOL
END EXT SOURCES

NETWORK
<-Volume-> <-Grp> <-Member-><---Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> x <Name> x x<-factor->strg <Name> x x <Name> x x ***
*** Reach: 030701030102 290
RCHRES 9 HYDR RO 1 1 COPY 1 INPUT MEAN 1
COPY 1 OUTPUT MEAN 1 PLTGEN 1 INPUT MEAN 1
END NETWORK

SCHEMATIC
<-Volume-> <---Area--> <-Volume-> <ML#> *** <sb>
<Name> x <-factor-> <Name> x *** x x
PERLND 3 2940 RCHRES 4 1
PERLND 4 79.2 RCHRES 4 1
IMPLND 2 878.4 RCHRES 4 2
PERLND 11 2085.6 RCHRES 3 1
PERLND 12 757.2 RCHRES 3 1
PERLND 13 3.6 RCHRES 3 1
PERLND 14 12 RCHRES 3 1
IMPLND 5 622.8 RCHRES 3 2
RCHRES 4 RCHRES 2 2
For Help, press F1

```

Figure 10: The Network Block

Open the NPSM UCI file in a text editor and search for the NETWORK Block (see Figure 10). Within the NETWORK Block, notice the pairs of records where the first specifies a PERLND, IMPLND, or RCHRES operation to a COPY operation, and the

second specified that COPY operation to a PLTGEN operation. These are NPSM output specifications using the PLTGEN file. For each of these output record pairs, an analogous record will be added using WinHSPF to write that element to WDM.

In the WinHSPF Output Manager, with the *Other* radio button selected, click the *Add* button. A new window will appear for adding output specifications. In the *Operation* list, choose the operation name and number from the first record pair in the NETWORK block. For the example shown above, choose *RCHRES 9*. Then in the *Group/Member* list, choose the group and member name from the same record of the NETWORK block. For the example shown above, choose *HYDR:RO* (see Figure 11). Click *OK*. At this point a new output WDM data set has been added to the project WDM file, and the output specification has been added to the EXT TARGETS Block of the UCI file. Proceed through each of the output pairs in the NETWORK block, adding additional output specifications for each operation, group, and member specified.

Once this process is complete, the references to the PLTGEN operations in the UCI file can be deleted if desired, or left in place if the user wishes to maintain these output files. To delete these references, choose the *Edit:OPN SEQUENCE* menu item, select the PLTGEN operation, and click the *Remove* button. Close the text editor, save the UCI file in WinHSPF, and click the *Simulate* button to run HSPF.

At this point the UCI file has been completely transformed to take advantage of all of the features of WinHSPF.

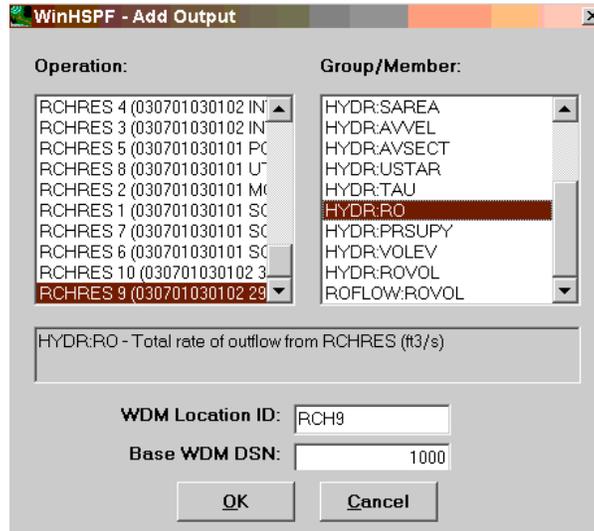


Figure 11: Adding output specifications in WinHSPF