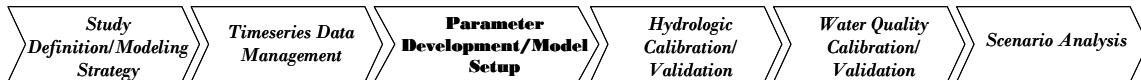




Exercise 15 – HSPFParm

BASINS/HSPF Application Steps



Question addressed in this section:

- 1) What is the purpose of HSPFParm?
- 2) How do I get some general information about the HSPF applications in my area of interest?
- 3) How can I export HSPFParm data to a report file?
- 4) How do I import an HSPFParm report file into WinHSPF?

A. Introduction to HSPFParm

QUESTION ANSWERED:

1) What is the purpose of HSPFParm?

Successful application of HSPF requires modelers to evaluate parameters for a large number of process-based algorithms. One of the most pressing needs to support the expanding community of HSPF modelers is for a readily available source of model parameter values that can provide the best possible starting point for developing new watershed applications. To meet this need, EPA has funded the collection of HSPF parameter values from previous applications across North America, assimilation of the parameter values into a single database, and development of an interface that enables modelers to access and utilize the database.

The pilot HSPFParm database contains parameter values for model applications in over 40 watersheds in 14 states. The parameter values that are contained in the database characterize a broad variety of physical settings, land use practices, and water quality constituents. The database has been provided with a simplified interactive interface that enables modelers to access and utilize HSPF parameter values developed and calibrated in various watersheds across the United States. It is anticipated that the HSPFParm database will be expanded as current and future model applications are completed.

The purpose of developing the model parameter database is to provide future BASINS and HSPF users with the best possible starting point for evaluating HSPF parameter values for calibration efforts on new watershed applications, or additional studies on watersheds that have already been modeled. Nearly two decades of HSPF applications provide a valuable resource for expediting and improving the parameter evaluation process for future model applications. The collection of available parameter values into a single database with straightforward user interaction capabilities enables modelers to efficiently identify and

access calibrated parameter values for modeling studies performed on watersheds that may have similar characteristics/settings to the watersheds which they intend to model.

Limitations to the database product resulting from this pilot effort include those related to (1) the type of assistance made available to modelers for evaluation of model parameters, (2) the completeness of the database of parameter values and (3) the capabilities currently available for exploring and efficiently using the data contained in the database (Donigian et al., 1999).

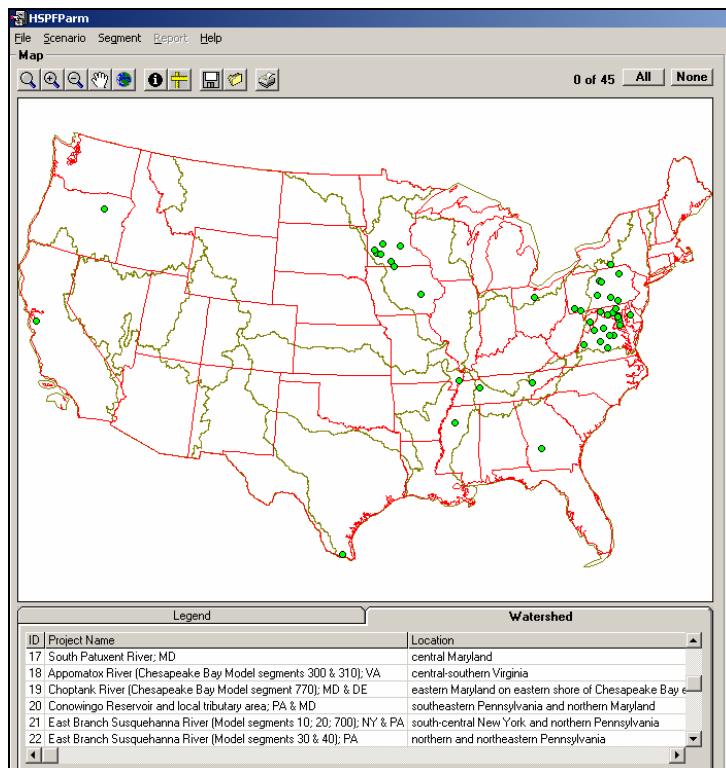
B. Coarse Characterization in HSPFParm

QUESTION ANSWERED:

- 2) How do I get some general information about the HSPF applications in my area of interest?***

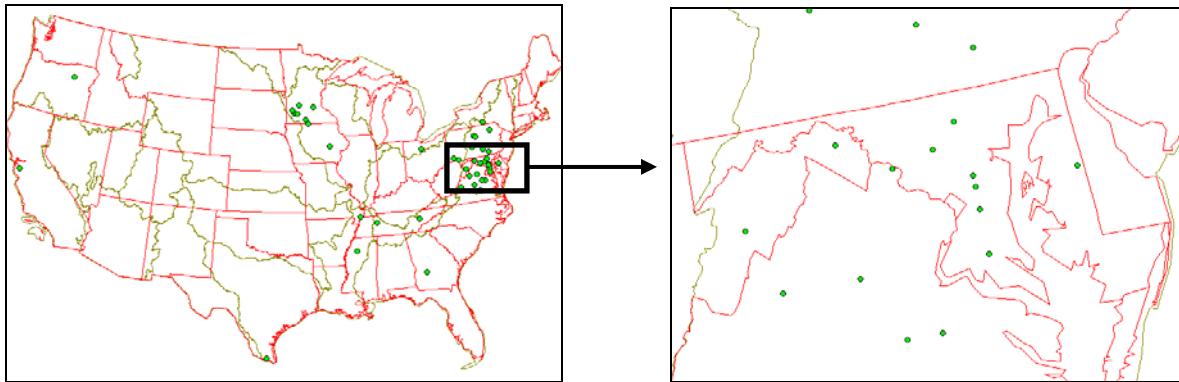
We will use HSPFParm to find the HSPF applications in our area of interest. We will then determine which of the nearby applications will be useful given the needs of our study (e.g., given that we need to model nutrients, we will need to find a nearby application that included nutrient modeling).

1. From the **Start** menu under **Programs**, select **BASINS** and then **HSPFParm**. Your screen should look like the following:



Note: Notice the distribution of data locations. As you can see, HSPF parameter value information is significantly limited, particularly in the West.

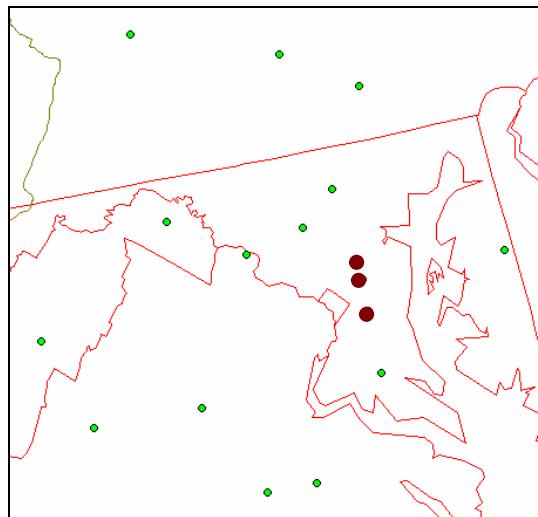
2. Click the “Zoom” button, 
3. Zoom to the West Branch Patuxent area (Maryland).



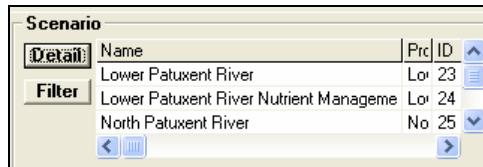
4. Click the “Identify” button,  Using this tool, click on various parameter information locations (the green dots). Find the locations near our watershed.

There are several data locations near our watershed. We will look at a few of them to get an idea of how the data varies among locations.

5. Click NONE (upper right corner).
6. Click on the green dots corresponding to “Lower Patuxent River,” “Patuxent River,” and “North Patuxent River.” The green dots will turn red once selected.



Note: You will now see “Lower Patuxent River,” “Patuxent River,” and “North Patuxent River” in the “Scenarios” frame in the upper right hand corner.



7. In the “Scenario” frame, click on “Lower Patuxent River.”
8. Click “Detail.” You should get the following:

ID:	23
Name:	Lower Patuxent River
Type:	calibration
UCIName:	lower_wq
WatershedID:	15
StartDate:	1/1/1986
EndDate:	12/31/1990
UCIUnits:	1
NumSegments:	56
NumReaches:	13
LandUseType:	19 separate land use categories: forest; conventional tillage (each for corn; soybeans; other crops); conservation tillage (each for corn; soybeans; other crops)
Channels:	natural channels; includes mainstem of Patuxent below reservoirs down to USGS gage at Bowie MD as well as Western Branch
WQConstituents:	water temp;sediment;DO;BOD;nitrogen;phosphorus;Chl a;organic carbon
ChemicalSources:	fertilizer and animal waste/sludge applications; atmospheric deposition; municipal and industrial point sources; urban runoff; forest and streambank erosion
StudyPurpose:	quantify multimedia pollutant contributions (point; nonpoint; other) and impacts on local water quality within the Patuxent River; delivery to Chesapeake Bay
Version:	11
ApplicationReference:	Patuxent Watershed Model - FINAL REPORT. Maryland Department of the Environment; Baltimore; MD
ContactName:	Angelica Gutierrez-Magness
ContactOrganization:	Maryland Department of the Environment; Baltimore; MD
ContactPhoneEmail:	410-631-4476
Comments:	relatively detailed model segments with up to 19 land uses in each; much greater detail than in CBP version of Patuxent; detailed soil
<input type="button" value="First"/> <input type="button" value="Prev"/> <input type="button" value="Next"/> <input type="button" value="Last"/> <input type="button" value="Print"/> <input type="button" value="Close"/>	

Note: The information in the “Scenario Details” window gives a coarse characterization of the HSPF study previously conducted. This includes information regarding the simulation time period, the constituents modeled, the land uses incorporated, etc. This information will assist in deciding which of the local HSPF studies will be useful given the needs of your study.

9. Repeat these steps for the “Patuxent River,” and “North Patuxent River” applications.

Given the details about these three applications, you should find out that the Western Branch was actually included in the “Patuxent River” application. Because of this, we will focus on using the information in the “Patuxent River” application for our Western Branch study.

C. Creating a Report File in HSPFParm

Now that we know the “Patuxent River” application is most relevant to the Western Branch, we will use HSPFParm to acquire input values for Western Branch from the “Patuxent River” application. We will begin by creating a report file that contains the values for the selected location, land use categories, and parameters. We will then import this information into WinHSPF in Section D.

QUESTION ANSWERED:

3) How can I export HSPFParm data to a report file?

1. In the “Scenario” frame, select “Patuxent River.”

Scenario		
Detail	Name	Proj ID
Detail	Lower Patuxent River Nutrient Management	Low 24
Filter	North Patuxent River	Nort 25
	Patuxent River	Pat 43

2. In the “Segment” frame, press SHIFT while you select PERLNDs 331 – 336 for the “Patuxent River” scenario.
3. In the “Tables/Parameters” frame, click the “Tables” tab.
4. In the “Tables” list, select “PWAT-PARM2.” The table in the “Values” frame should look like the following:

Op Num	Scen	Table PWAT-PARM2							
		FOREST	LZSN	INFILT	LSUR	SLSUR	KVARY	AGWRC	
331	Patuxent	0.000	6.500	0.0800	270.	0.10000	0.000	0.972	
332	Patuxent	0.000	6.500	0.0600	300.	0.07000	0.000	0.972	
333	Patuxent	0.000	6.500	0.0600	300.	0.07000	0.000	0.972	
334	Patuxent	0.000	6.500	0.0550	300.	0.08000	0.000	0.972	
335	Patuxent	0.000	6.500	0.0550	300.	0.07000	0.000	0.972	
336	Patuxent	0.000	6.500	0.0550	300.	0.08000	0.000	0.972	

In order to more easily use these values in our WinHSPF project, we will create a report file that contains the parameter values associated with this location.

5. Click the **Report** menu at the top of the page.
6. Click SET FILE.
7. Navigate to *c:\basins\modelout\hspfparm* and type “*patux.txt*” as the file name.
8. Click SAVE.
9. Click ADD TO FILE to add the parameter table to the file we created in Step 8.
10. Click CLOSE to exit the “HSPFParm Report” window.
11. From the **File** menu, select **Exit**.

Next, we will open our project in WinHSPF and import the report into our model.

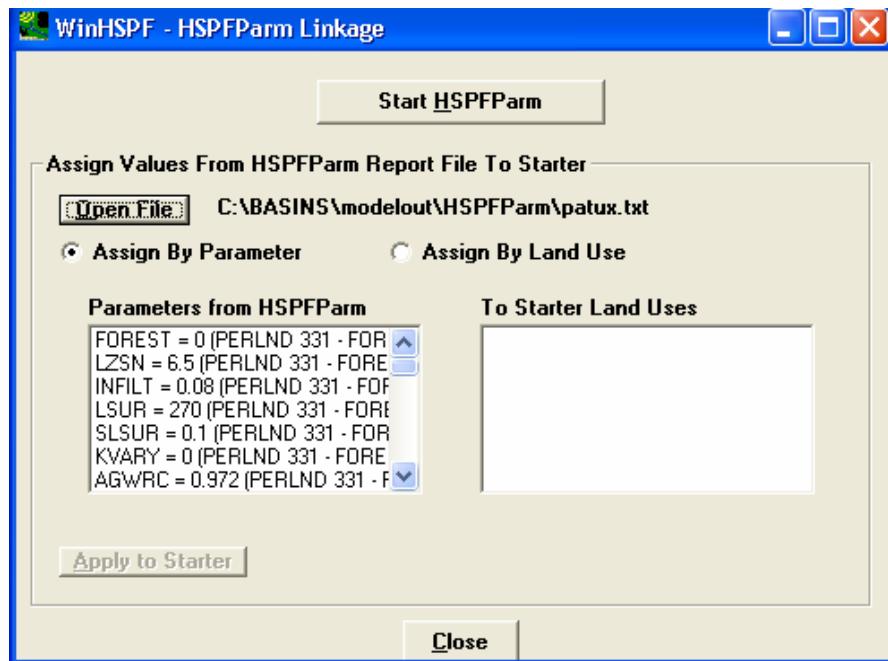
D. Implementing HSPFParm data in WinHSPF

In this section, we will open a **.uci* that was recently created by launching WinHSPF from BASINS. When launching WinHSPF from BASINS, a **.uci* file is created that contains parameter values provided by a starter file containing default values for key parameters. These default parameter values are reasonable or average values and may or may not apply to your watershed of interest. We will learn how to update values in the starter file using the values from the relevant past HSPF application we found in Section C. We will begin by taking the values exported from HSPFParm and updating the starter file. We will then update our newly created **.uci* with the values in the starter file.

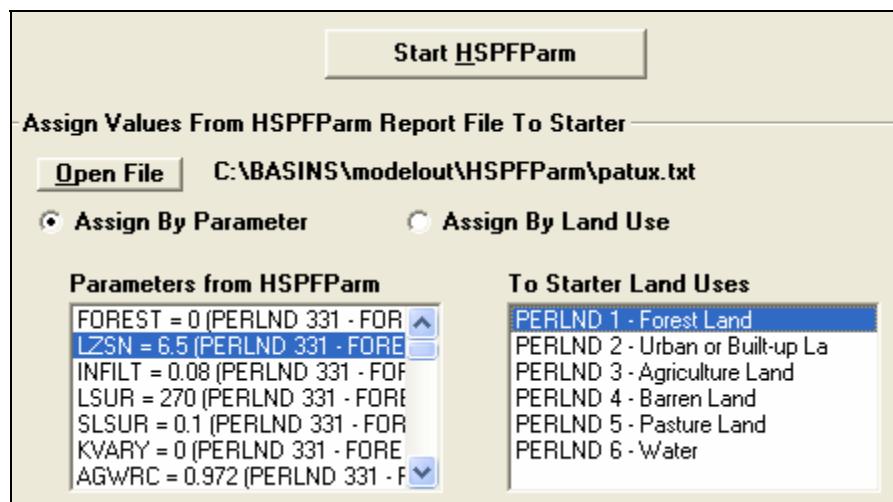
QUESTION ANSWERED:

4) How do I import an HSPFParm report file into WinHSPF?

1. From the **Start** menu under **Programs**, select **BASINS** and then **WinHSPF**.
2. From the **File** menu, select **Open**.
3. Navigate to *c:\basins\modelout\HSPFparm* and select “*parm.uci*.”
4. Click OPEN.
5. From the **Functions** menu, select **HSPFParm**.
6. Click OPEN FILE.
7. Navigate to *c:\basins\modelout\hspfparm*. Select “*patux.txt*” and click OPEN. Your screen should look like the following:



8. Maximize this screen by clicking the “maximize” button, in the upper right corner of the screen.
9. Make sure the “Assign by Parameter” option is selected. In the “Parameters from HSPFParm” list, select “LZSN = 6.5 (PERLND 331 - Forest).”
10. In the “To Starter Land Uses” box, select “PERLND 1 – Forest Land.”



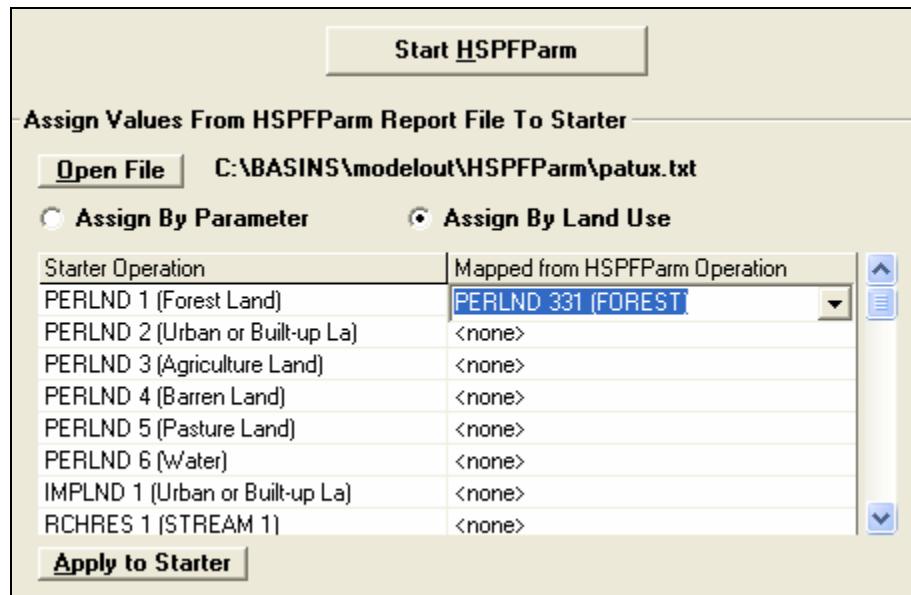
11. Click APPLY TO STARTER.

Note: This specifies that “6.5” will now be the “starter” (default) value for LZSN for Forest when new *.uci files are created in WinHPSF.

12. Select the “Assign by Land Use” radio button.

Note: This approach is used to apply all parameters from one land use in our HSPFParm report to one land use in the starter *.uci.

13. In the “Starter Operation” column, select “PERLND 1 (Forest Land).”
14. **Double click** the cell that corresponds to PERLND 1 and “Mapped from HSPFParm Operation.” Select “PERLND 331 (FOREST)” from the list. Your screen should look like the following:

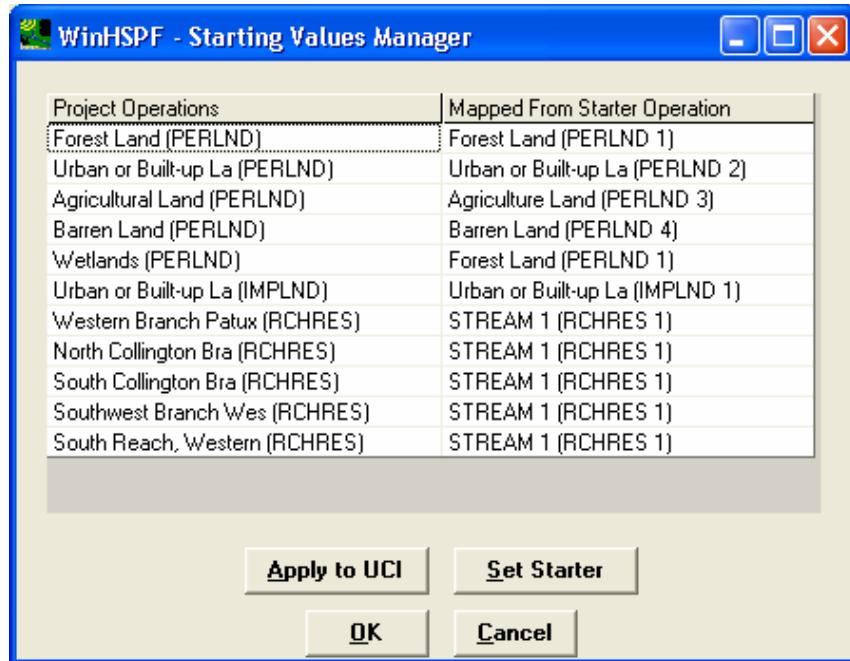


15. Click CLOSE (do not click APPLY TO STARTER).

Note: If we were to click APPLY TO STARTER, the starter .uci file would be rewritten with all the PWAT-PARM2 values for the forest land use category. We do not wish to do that.

Now that we have updated the starter file, we will now apply the starter values to our *.uci.

16. From the **Functions** menu, select **Starter**. You should get the following:

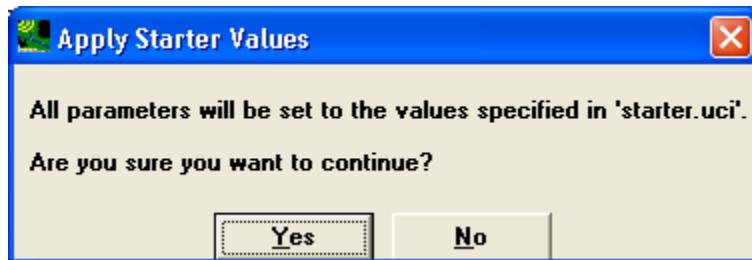


Note: This is used to specify which land use segments in the project are linked to specific starter operations for obtaining the initial default values. Note that WinHSPF has connected Forest land to forest land, urban land to urban land, etc. Clicking the apply button will apply our new forest LZSN values to the *.uci file.

17. Click "APPLY to UCI."

Note: We have now taken all the values from the starter file and applied them to our *.uci file.

18. Click YES when the following message appears.



19. Click OK.

We used the values from HSPFParm to only update LZSN for Forest in the starter file, but in practice, you could use HSPFParm to import values for several (or all) parameters and land uses to create a starter file that is specific to the area you are working in.

References:

Donigian, A.S. Jr., J.C. Imhoff and J.L. Kittle Jr. 1999. HSPFParm: An Interactive Database of HSPF Model Parameters. EPA-823-R-99-004. U.S. EPA Office of Water, Washington DC.