CHAPTER 3: WATERSHED HYDROLOGY
APPENDIX 3.B: HSPF COMMON LOGIC FOR THE SJRWMD

Parameter	Description	Units	District Min/Max	(EPA July 2000) Tech Note 6 Min/Max	Notes
AGWRC	Base groundwater recession	none	0.9/0.999	0.85/0.999	
BASETP	Fraction of remaining evapotranspiration from baseflow	none	0.0/0.1 a little higher is OK	0.0/0.2	
CEPSC	Interception storage capacity	in.	0.03/0.20	0.01/0.40	
DEEPFR	Fraction of groundwater inflow to deep recharge	none	0.0/0.6 1.0 is OK if ephemeral stream	0.0/0.5	DEEPFR is the fraction of infiltrating water, which is lost to deep aquifers (i.e., inactive groundwater), with the remaining fraction (i.e., 1-DEEPFR) assigned to active groundwater storage that contributes base flow to the stream. It also represents any other losses that may not be measured at the flow gauge used for calibration. The SJRWMD has planning level recharge values that should be used as initial values. DEEPFR > 0 (rare exceptions) Adjust DEEPFR so that IGWI approximately matches recharge numbers from (Boniol, Williams and Minch 1993)
FOREST	Fraction of forest cover	none	0/0	0/0.95	Fraction of land that can transpire when there is snow pack
INFEXP	Exponent in infiltration equation	none	2.0/2.0	1.0/3.0	
INFILD	Ration of max/mean infiltration capacities	none	2.0/2.0	1.0/3.0	
INFILT	Index to infiltration capacity	in./hr	0.01/1.0 See table in notes	0.001/0.5	INFILT is the parameter that effectively controls the overall division of the available moisture from precipitation (after interception) into surface and subsurface flow and storage components. Thus, high values of INFILT will produce more water in the lower zone and groundwater, and result in higher base flow to the stream; low values of INFILT will produce more upper

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					zone and interflow storage water, and thus result in greater direct overland flow and interflow. INFILT is primarily a function of soil characteristics (soil type and land treatment); therefore, land use should be used to adjust this parameter providing a range of values, i.e., forest, open, pasture and agriculture should have a greater values than urban, and wetland. A soils: 0.40 to 1.00 in./hr: low runoff potential B soils: 0.10 to 0.40 in./hr: moderate runoff potential C soils: 0.05 to 0.10 in./hr: moderate to high runoff potential D soils: 0.01 to 0.05 in./hr: high runoff potential
INTFW	Interflow inflow parameter	none	0.0/3.0	1.0/10.0	INTFW determines the amount of water, which enters the ground from surface detention storage and becomes interflow, as opposed to direct overland flow and upper zone storage. Interflow can have an important influence on storm hydrographs; particularly when vertical—a shallow, less permeable soil layer has retarded percolation. For most watersheds in the District interflow should be zero due to flat land slopes and shallow depth to water do not allow much lateral flow in the vadose zone. Determined from A,B soils plus slope. Higher slope -> higher INTFW, more A,B soils -> higher INTFW
IRC	Interflow recession parameter	none	0.50/0.70	0.30/0.85	
KVARY	Variable groundwater recession	1/in.	0.0/3.0	0.0/5.0	
LSUR	Length of overland flow	ft	200/500	100/700	WinHSPF has a table of values for LSUR based on slope. That table is the preferred set of values.
LZETP	Lower zone evapotranspiration parameter	none	0.20/0.70	0.10/0.90	LZETP is a coefficient to define evapotranspiration opportunity; it affects evapotranspiration from the

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					lower zone, which represents the primary soil moisture storage and root zone of the soil profile. LZETP behaves much like a "crop coefficient" with values mostly in the range of 0.2 to 0.7; as such, it is primarily a function of vegetation. The following ranges for different vegetation are expected for the 'maximum' value during the year: Forest: 0.6 to 0.85 Grassland: 0.4 to 0.6 Row crops: 0.5 to 0.7 Barren: 0.1 to 0.4 Wetlands: 0.8 to 0.95
LZSN	Lower zone nominal soil moisture storage	in.	2.0/10.0	2.0/15.0	LZSN is related to precipitation patterns and soil characteristics in the region. Initial estimates for LZSN in the Stanford Watershed Model (SWM-IV, predecessor model to HSPF) can be determined by using one-eighth annual mean rainfall plus 4 in. for coastal, humid, or subhumid climates. Deep-rooted plants extract water from this zone; therefore, land use should be used to modify this parameter providing a range of values for various PERLNDs, i.e., wetlands, forest, and agriculture should have a greater value than urban, open, and pasture. Could base on (field capacity - wilting point) * minimum (depth to water table, root zone depth).
NSUR	Manning's "n" for overland flow	none	0.15/0.35	0.05/0.50	
PETMAX	Temperature below which evapotranspiration is reduced	°F	35.0/45.0	32.0/48.0	
PETMIN	Temperature below which evapotranspiration is zero	°F	30.0/35.0	30.0/40.0	
SLSUR	Slope of overland flow plane	ft/ft	0.001/0.15	0.001/0.30	
UZSN	Upper zone	in.	0.10/1.0	0.05/2.0	UZSN is related to land surface

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	nominal soil moisture		4.0 for wetlands		characteristics, topography, and LZSN. For agricultural conditions, tillage, and other practices, UZSN may change over the course of the growing season. Increasing UZSN value increases the amount of water retained in the upper zone and available for evapotranspiration, and thereby decreases the dynamic behavior of the surface and reduces direct overland flow; decreasing UZSN has the opposite effect. The model generally maintains a convention of using 10% of the value for LZSN. However, for wetlands, this value does not need to follow this convention—and indeed a high value for UZSN is a key way to represent standing water—as the overland flow plane does not allow for this. The upper zone is defined as surface-depression storage plus shallow-soil moisture—essentially the water that is available for direct evaporation as opposed to transpiration by plants. It is acceptable for wetlands to have values of UZSN up to 1 to 4 in.

REFERENCES

Boniol, D., M. Williams, and D. A. Minch. *Mapping recharge to the Floridan aquifer using a geographic information system.* SJ93-5, Palatka, FL: St. Johns River Water Management District, 1993.

EPA. *BASINS Technical Note 6: Estimating Hydrology and Hydraulic Parameters for HSPF*. EPA, July 2000.

U.S. Environmental Protection Agency. *Preliminary Data Summary of Urban Storm Water Best Management Practices.* U.S. Environmental Protection Agency, 1999.