WebTable 3. Individual model parameter values

Parameter	File	Spatial level	Description	Range	Final or calibrated value				
					HU	LT	OSU	TAMU	UM
Parameters that turn sub-routines on or off									
ICN	.bsn	Watershed	Daily curve number (CN) calculation method: 0-calculate daily CN value as a function of soil moisture; 1-calculate daily CN value as a function of plant evapotranspiration	0/1	0	0	0	1	0
IRTE	.bsn	Watershed	Channel water routing method; 0=variable travel-time; 1=Muskingum	0/1	0	0	1	0	0
ISMAX	.bsn	Watershed	Maximum depressional storage flag, 0 = static stmaxd from .sdr	0/1	0	0	0	NA	1
ITDRN	.bsn	Watershed	Tile drainage equations flag; 1=SWAT_HKdc routine using DRAINMOD; 0=SWAT_TDRAIN method.	0/1	1	1	1	0	1
IWQ	.bsn	Watershed	In-stream water quality model: 0-do not simulate nutrient transformations in stream; 1-activate simulation of in-stream nutrient transformations using QUAL2E; 2-watqual2 simulation; 3-watqual3‡.	0/1	1	3	1	1	1
IWTDN	.bsn	Watershed	Water table depth algorithms flag	0/1	1	0	0	0	1
SOL_P_MODEL$^{\Delta}$	.bsn	Watershed	Soil phosphorus sub-routine: 0=new model; 1=old model	0/1	1	0	0	1	0
Parameters that were calibrated in at least one model									
ADJ_PKR	.bsn	Watershed	Peak rate adjustment factor	0.5-1.5	1.474	0	1	1	1
ALPHA_BF	.gw	HRU	Baseflow recession constant	0.1-0.99	0.937	0.254	DF	DF	DF
ANION_EXCL	.sol	HRU	Fraction of soil pore space from which anions are excluded	0-1	DF	DF	0.5	DF	0.1
BC1	.swq	Subbasin	Biological oxidation rate of NH_4 to NO_2 in the reach at 20° (1/day)	0.1-1	DF	0.36	0.55	0.55	0.1
BC3	.swq	Subbasin	Hydrolysis rate of organic N to NH4 in the reach at 20° (1/day)	0.2-0.4	DF	DF	DF	DF	0.02
BC4	.swq	Subbasin	Mineralization rate of organic P to DRP in the reach at 20° (1/day)	0.01-0.7	0.012	0.02	0.05	0.004	0.01
BIOMIX	.mgt	HRU	Biological mixing efficiency	NA	DF	0.2	0.75	DF	0.3
CANMX	.hru	HRU	Maximum canopy storage (mm H_2O)	NA	DF	5.732	DF	DF	DF
CDN	.bsn	Watershed	Rate coefficient for dentirification	0-3	1.4	0.5	1.4	.181	1.4
CH_COV1	.rte	Subbasin	Channel cover factor 1	0-1	DF	0.048	0	0.037	0.5
CH_COV2	.rte	Subbasin	Channel cover factor 2	0-1	DF	0.048	0	0.219	0.5
CH_K1	.sub	Subbasin	Effective hydraulic conductivity (mm/hr)	0.025-25	9.811	DF	DF	DF	DF
CH_K2	.rte	Subbasin	Effective hydraulic conductivity of channel (mm/hr)	0.025-25	13.65	DF	DF	DF	DF
CH_N1	.sub	Subbasin	Manning's roughness for tributary	0-0.15	0.117	DF	0.014	0.014	0.025

			channels						
CH_N2	.rte	Subbasin	Manning's roughness for the main channel	0-0.15	0.016-0.149	0.057	0.014	0.005	0.035
CN2	.mgt	HRU	Initial SCS moisture condition II curve number	0.75-1.25†	28.1-99.9	30-95	DF	DF	DF
CNOP	.mgt	HRU	SCS runoff curve number for moisture condition II	NA	DF	75-89	DF	DF	DF
DDRAIN	.mgt	HRU	Depth to subsurface tile drain (mm)	0-6000	915*	1000*	900*	~1220*	1000*
DEP_IMP	.hru	HRU	Depth to the impervious layer in the soil (mm)	0-6000	2500*	2500*	3370*	2381*	1500*
DRAIN_CO	.sdr	HRU	Daily drainage coefficient (mm/day)	10-51	DF	12.7	10	NA	25
EPCO	.bsn	Watershed	Plant uptake compensation factor.	0.01-1.0	1.0	0.638	1.0	1.0	1.0
ERORGN	.hru	HRU	Nitrogen enrichment ratio for loading with sediment, 0 allows model to calculate value	NA	DF	1.1	DF	DF	DF
ERORGP	.hru	HRU	Phosphorus enrichment ratio for loading with sediment, 0 allows model to calculate value	NA	DF	1-1.2	DF	DF	DF
ESCO	.bsn, .hru	Watershed HRU	Soil evaporation compensation factor	0.01-1	0.78^{bsn}	1^{bsn}	0.99^{hru}	0.967^{bsn}	1^{bsn}
GDRAIN	.mgt	HRU	Drain tile lag time (hours)	NA	NA	NA	NA	24	NA
GW_DELAY	.gw	HRU	Delay time for aquifer recharge (days)	NA	3.747	DF	DF	DF	DF
GWQMN	.gw	HRU	Threshold water level in shallow aquifer for base flow (mm H_2O)	NA	32.41	447.6	DF	DF	DF
GW_REVAP	.gw	HRU	Revap coefficient	0.02-2	1.41	DF	DF	DF	DF
HRU_SLP	.hru	HRU	Average slope steepness (m/m)	0.75-1.25†	0.97†	DF	DF	DF	DF
IFLOD1R	.res	Subbasin	Beginning month of non-flood season	1-12	DF	12	DF	DF	DF
IFLOD2R	.res	Subbasin	Ending month of non-flood season	1-12	DF	1	DF	DF	DF
LATKSATF	.sdr	HRU	Lateral soil hydraulic conductivity in tile-drained fields as multiple of original soil conductivity value	0.01-4	DF	2-4	1	NA	1
NDTARGR	.res	Subbasin	Number of days to reach target storage from current reservoir storage	NA	DF	5	DF	DF	DF
NPERCO	.bsn	Watershed	Nitrate percolation coefficient	0.01-1	0.391	0.5	0.2	0.394	0.4
OVN	.hru	HRU	Manning's "n" value for overland flow	0.008-0.5	0.437	DF	DF	DF	DF
PHOSKD	.bsn	Watershed	Phosphorus soil partitioning coefficient (m^3/Mg)	80-350	326.9	175	200	422.5	175
PPERCO	.bsn	Watershed	Phosphorus percolation coefficient (m^3/Mg)	10-17.5	10	10	10	17.16	10
PSP	.bsn	Watershed	Phosphorus availability index	0.2-0.6	0.231	0.4	0.4	0.215	0.4
R2ADJ	.hru	HRU	Curve number adjustment for increasing infiltration in non-draining soils	0-3	DF	1.75-3.0	1	DF	8*
RE	.sdr	HRU	Effective radius of drains (mm)	3-40	DF	10*	DF	NA	DF
REVAPMN	.gw	HRU	Threshold water level level in shallow aquifer for revap (mm H_2O)	NA	97.06	388.6	DF	DF	DF
RS2	.swq	Subbasin	Benthic source rate for DRP in	NA	DF	0.05	0.05	0.022	0.01

			the reach at 20° (mg P/m^2-d)						
RS3	.swq	Subbasin	Benthic source rate for ammonium in the reach at 20° ($mgNH_4$-N/m2/d)	NA	DF	0.5	0.5	DF	1
RS4	.swq	Subbasin	Organic N settling rate in the reach at 20° (1/day)	0.001-0.1	DF	0.05	0.05	DF	0.001
RS5	.swq	Subbasin	Local settling rate for organic phosphorus mineralization at 20° (day^{-1})	0.001-0.1	DF	0.07	0.05	DF	0.05
SDNCO	.bsn	Watershed	Threshold value of nutrient cycling water factor for denitrification to occur	0.75-1.4	1.005	1	1.1	1.041	1.1
SDRAIN	.sdr	HRU	Tile drain spacing (mm)	7600-30,000	DF*	13720*	15000*	NA	15000*
SFTMP	.bsn	Watershed	Mean air temperature at which precipitation is equally likely to be rain as snow/freezing rain (°C)	-5-5	-1.51	1	1	1	-2
SHALLST	.gw	HRU	Initial depth of water in the shallow aquifer (mm H_2O)	NA	DF	500	DF	DF	DF
SLSUBSN	.hru	HRU	Average slope length	0.75-1.25	0.97†	DF	DF	DF	DF
SMFMN	.bsn	Watershed	Minimum snow melt factor (mm H_2O/day-°C)	1.4-6.9	3.547	3	4.5	4.5	2
SMFMX	.bsn	Watershed	Maximum snow melt factor (mm H_2O/day-°C)	1.4-6.9	6.027	4.5	4.5	2.5	2
SMTMP	.bsn	Watershed	Threshold temperature for snowmelt (°C)	-5-5	1.611	0.5	0.5	2.5	-2
SOL_AWC	.sol	HRU	Available water capacity	0.75-1.25	0.96†	DF	DF	DF	DF
SOL_CRK	.sol	HRU	Potential crack volume for soil profile	0-1	DF	DF	DF	0.11	0.45
SOL_K	.sol	HRU	Saturated hydraulic conductivity (mm/hr)	0.75-1.25	0.92†	DF	DF	DF	DF
SOL_ORGP	.chm	HRU	Initial humic organic phosphorus in soil layer (mg/kg or ppm)	50-250	94.906	DF	DF	DF	DF
SOL_SOLP	.chm	HRU	Initial labile P in the soil layer (mg labile P/kg soil)	5-100	7.002	DF	10	34	1
SPCON	.bsn	Watershed	Parameter drives the maximum concentration of sediment the river can route	0.0001-0.01	1e-4	1e-3	1e-4	2.3e-3	2.7e-4
SURLAG	.bsn	Watershed	Surface runoff lag coefficient	NA	1.08	2.872	4	0.023	1
TDRAIN	.mgt	HRU	Time to drain soil to field capacity (hours)	NA	NA	NA	NA	48	NA
TIMP	.bsn	Watershed	Snow pack temperature lag	0.01-1	0.13	0.06	1	1	0.05
USLE_C	crop.dat	By land-use	Minimum value for the cover and management factor for the land cover	0.75-1.25	1.21†	DF	DF	DF	DF
USLE_K	.sol	HRU	USLE soil erodibility factor (0.013 metric ton m^2-hr/m^3-metric ton cm)	0.75-1.25	0.887†	DF	DF	DF	DF
USLE_P	.mgt	HRU	USLE support practice factor	0.50-1.25	1.078†	0.6-1.0	DF	DF	DF
VCRIT	.bsn	Watershed	Critical velocity at which a river will resuspend sediments	NA	5	0	5	5	1

Notes: Values highlighted in gray for a given model indicate that the parameter was actually changed from its default value for that model. Values not highlighted were left at default (DF); since different model versions may have different model defaults, the basin-level default values were included. *Indicates value was only changed on tile-drained lands. †Indicates value was changed by a percentage, and is therefore not an absolute value for the parameter. Some values have been rounded off for presentation purposes. NA indicates the parameter was not applicable to the model given the set of sub-routines activated. DRP =

dissolved reactive phosphorus; HRU = hydrologic response unit; HU = Heidelberg University; LT = LimnoTech; N = nitrogen; OSU = Ohio State University; P = phosphorus; SWAT = Soil and Water Assessment Tool; TAMU = Texas A&M University; UM = University of Michigan; USLE = Universal Soil Loss Equation; SCS = Soil Conservation Service.

‡watqual3 routine is an adaption LimnoTech developed based on White *et al.* (2014).

[Δ]SWAT 2012 revision 635 indicate in basins.bsn that 1 is the new soil phosphorus model; however, examination of the source code followed by confirmation from N Sammons (in a post to the SWAT-user group on 26 Feb 2014) confirms that setting this parameter equal to 0 will run the new soil phosphorus sub-routine.

WebReference

White MJ, Storm DE, Mittelstet A, *et al*. 2014. Development and testing of an In-Stream Phosphorus Cycling Model for the Soil and Water Assessment Tool. *Environ Qual* **43**: 215–23.