CHAPTER 3

SWAT INPUT DATA: FILE.CIO

File management is performed with the master watershed file (file.cio). The master watershed file contains information related to modeling options, climate inputs, databases, and output specifications.

The master watershed file can be divided into several sections. A brief description of the variables in the master watershed file follows. They are grouped by section and listed in the order they appear within the file.

3.1 TITLE SECTION

Variable name	Definition
TITLE	Three lines of 'file.cio' are reserved for a description of the simulation run. The description may take up to 80 spaces per line. The title given in file.cio is printed to every output file. Optional.

3.2 GENERAL INFORMATION/ WATERSHED CONFIGURATION

Variable name	Definition
FIGFILE	Name of watershed configuration file (**.fig**). Contains the commands to add and route loadings through the watershed. This file is reviewed in Chapter 2. Required.
NBYR	Number of calendar years simulated. The number of years simulated in a SWAT run is unlimited. If a simulation is begun on August 1st of the year 1995 and ends July 30th of the year 1997, the model will be simulating 3 calendar years (1995, 1996 and 1997). If a forecast period is simulated, NBYR should include the forecast period as well as the period of normal simulation. Required.
IYR	Beginning year of simulation (for example, 1980). The value entered for this variable is not important unless measured data (e.g. weather) is used in the run. When measured data is used, the model uses IYR to locate the beginning year within the data file. Required.
IDAF	Beginning Julian day of simulation. With this variable, SWAT is able to begin a simulation at any time of the year. If the variable is left blank or set to zero, the model starts the simulation on January 1st. Required.

Variable name	Definition
IDAL	Ending Julian day of simulation. With this variable, SWAT will end the simulation on the date specified. If the variable is left blank or set to zero, the model ends the simulation on December 31st. If a forecast period is simulated, IDAL should be set to the last day of the forecast period. Required.

3.3 CLIMATE

Variable name	Definition
IGEN	Random generator seed code. A set of random numbers is needed by SWAT to generate weather data. SWAT has a set of default random numbers embedded in the code. To use the default random numbers, the user should set IGN = 0. This is the default value for IGN. In some situations, a user may wish to vary the weather sequence between runs. One method to do this is to set IGN to a different number every time the model is run. This code will activate a random number generator, which will replace the default set of random numbers with a new set. The value to which IGN is set determines the number of times the random number generator is cycled before the simulation begins. The seeds produced by the random number generator are then utilized by the weather generator instead of the default values. Measured weather data read into the model is not affected by this variable. However, if the measured data contains missing values, the weather generator is activated to produce data to replace the missing values. The data produced to replace missing values will be affected by this variable. Required.

Variable name	Definition
PCPSIM	Rainfall input code. This variable identifies the method the model will use to process rainfall data. There are two options: 1 measured data read for each subbasin 2 rainfall generated for each subbasin If observed rainfall data is available for a watershed, the user should read in the measured data. Required.
IDT	Time step used to report measured rainfall data (minutes). Required if IEVENT = 2 or 3 (see Chapter 4 for a description of IEVENT). One of the following should be chosen: 1 min, 2 min, 3 min, 4 min, 5 min, 6 min, 10 min, 12 min, 15 min, 20 min, 30 min.
IDIST	Rainfall distribution code used to generate daily precipitation values. There are two options: 0 skewed distribution 1 mixed exponential distribution Required.
REXP	Value of exponent for mixed exponential rainfall distribution. A value for REXP is needed only if IDIST = 1. The model will set REXP = 1.3 if no value is entered.
NRGAGE	Number of precipitation gage (.pcp) files used in the simulation. Up to 18 files may be used. Required if measured precipitation data are used.
NRTOT	Total number of precipitation gage records used in the simulation. If each .pcp file contains only one precipitation gage record, NRTOT = NRGAGE. Otherwise, NRTOT > NRGAGE. A maximum of 5400 precipitation gage records may be used in a simulation. Required if measured precipitation data are used.

Variable name	Definition
NRGFIL	Number of precipitation gage records within each .pcp file. A maximum of 300 precipitation gage records may be placed in each .pcp file. Required if measured precipitation data are used.
TMPSIM	Temperature input code. This variable identifies the method the model will use to process temperature data. There are two options: 1 measured date read for each subbasin 2 daily max/min generated for each subbasin If observed temperature data is available for the watershed, the user should read in the measured data. Required.
NTGAGE	Number of temperature gage (.tmp) files used in the simulation. Up to 18 files may be used. Required if measured temperature data are used.
NTTOT	Total number of temperature gage records used in the simulation. If each .tmp file contains only one temperature gage record, NTTOT = NTGAGE. Otherwise, NTTOT > NTGAGE. A maximum of 2700 temperature gage records may be used in a simulation. Required if measured temperature data are used.
NTGFIL	Number of temperature gage records within each .tmp file. A maximum of 150 temperature gage records may be placed in each .tmp file. Required if measured temperature data are used.

Variable name	Definition
SLRSIM	Solar radiation input code. This variable identifies the method the model will use to process solar radiation data. There are two options: 1 measured data read for each subbasin 2 solar radiation generated for each subbasin Option 1 allows users to use recorded data or import values generated with an independent weather generator. The default or recommended option is #2—allow SWAT to generate solar radiation values. Required.
NSTOT	Number of solar radiation records within the .slr file. A maximum of 300 solar radiation records may be placed in the .slr file. Required if measured solar radiation data are used.
RHSIM	Relative humidity input code. This variable identifies the method the model will use to process relative humidity data. There are two options: 1 measured data read for each subbasin 2 relative humidity generated for each subbasin Option 1 allows users to use recorded data or import values generated with an independent weather generator. The default or recommended option is #2—allow SWAT to generate relative humidity values. Required.
NHTOT	Number of relative humidity records within the .hmd file. A maximum of 300 relative humidity records may be placed in the .hmd file. Required if measured relative humidity data are used.

Variable name	Definition
WNDSIM	Wind speed input code. This variable identifies the method the model will use to process wind speed data. There are two options: 1 measured data read for each subbasin 2 wind speed generated for each subbasin Option 1 allows users to use recorded data or import values generated with an independent weather generator. The default or recommended option is #2—allow SWAT to generate wind speed values. Required.
NWTOT	Number of wind speed records within the .wnd file. A maximum of 300 wind speed records may be placed in the .wnd file. Required if measured wind speed data are used.
FCSTYR	Year that forecast period begins. Required only if forecast data is being used for a portion of the simulation
FCSTDAY	Day that forecast period begins. Julian date. Required only if forecast data is being used for a portion of the simulation.
FCSTCYCLES	Number of times that the forecast period is simulated Required only if forecast data is being used for a portion of the simulation. The forecast period should be simulated a minimum of 20 times to obtain a representative distribution of possible weather scenarios given the predicted probabilities.
RFILE(1)	Name of measured precipitation input file #1 (**.pcp**). This file is reviewed in Chapter 6. Required only if measured precipitation data are used.
RFILE(2)	Name of measured precipitation input file #2 (**.pcp**). Optional.
RFILE(3)	Name of measured precipitation input file #3 (**.pcp**). Optional.

Variable name	Definition
RFILE(4)	Name of measured precipitation input file #4 (**.pcp**). Optional.
RFILE(5)	Name of measured precipitation input file #5 (**.pcp**). Optional.
RFILE(6)	Name of measured precipitation input file #6 (**.pcp**). Optional.
RFILE(7)	Name of measured precipitation input file #7 (**.pcp**). Optional.
RFILE(8)	Name of measured precipitation input file #8 (**.pcp**). Optional.
RFILE(9)	Name of measured precipitation input file #9 (**.pcp**). Optional.
RFILE(10)	Name of measured precipitation input file #10 (**.pcp**). Optional.
RFILE(11)	Name of measured precipitation input file #11 (**.pcp**). Optional.
RFILE(12)	Name of measured precipitation input file #12 (**.pcp**). Optional.
RFILE(13)	Name of measured precipitation input file #13 (**.pcp**). Optional.
RFILE(14)	Name of measured precipitation input file #14 (**.pcp**). Optional.
RFILE(15)	Name of measured precipitation input file #15 (**.pcp**). Optional.
RFILE(16)	Name of measured precipitation input file #16 (**.pcp**). Optional.
RFILE(17)	Name of measured precipitation input file #17 (**.pcp**). Optional.
RFILE(18)	Name of measured precipitation input file #18 (**.pcp**) Optional.

Variable name	Definition
TFILE(1)	Name of measured temperature input file #1 (**.tmp**). This file is reviewed in Chapter 7. Required if measured temperature data are used.
TFILE(2)	Name of measured temperature input file #2 (**.tmp**). Optional.
TFILE(3)	Name of measured temperature input file #3 (**.tmp**). Optional.
TFILE(4)	Name of measured temperature input file #4 (**.tmp**). Optional.
TFILE(5)	Name of measured temperature input file #5 (**.tmp**). Optional.
TFILE(6)	Name of measured temperature input file #6 (**.tmp**). Optional.
TFILE(7)	Name of measured temperature input file #7 (**.tmp**). Optional.
TFILE(8)	Name of measured temperature input file #8 (**.tmp**). Optional.
TFILE(9)	Name of measured temperature input file #9 (**.tmp**). Optional.
TFILE(10)	Name of measured temperature input file #10 (**.tmp**). Optional.
TFILE(11)	Name of measured temperature input file #11 (**.tmp**). Optional.
TFILE(12)	Name of measured temperature input file #12 (**.tmp**). Optional.
TFILE(13)	Name of measured temperature input file #13 (**.tmp**). Optional.
TFILE(14)	Name of measured temperature input file #14 (**.tmp**). Optional.
TFILE(15)	Name of measured temperature input file #15 (**.tmp**). Optional.

Variable name	Definition
TFILE(16)	Name of measured temperature input file #16 (**.tmp**). Optional.
TFILE(17)	Name of measured temperature input file #17 (**.tmp**). Optional.
TFILE(18)	Name of measured temperature input file #18 (**.tmp**). Optional.
SLRFILE	Name of measured solar radiation input file (**.slr**). This file is reviewed in Chapter 8. Required if measured solar radiation data are used.
RHFILE	Name of measured relative humidity input file (**.hmd**). This file is reviewed in Chapter 10. Required if measured relative humidity data are used.
WNDFILE	Name of measured wind speed input file (**.wnd**). This file is reviewed in Chapter 9. Required if measured wind speed data are used.
FCSTFILE	Name of weather forecast input file (**.cst**). This file is reviewed in Chapter 13. Required if a forecast period is simulated.

3.4 WATERSHED MODELING OPTIONS

Variable name	Definition
BSNFILE	Name of basin input file (**.bsn**). Contains inputs for physical processes modeled or defined at the watershed level. This file is reviewed in Chapter 4. Required.

3.5 DATABASE FILES

Variable name	Definition
PLANTDB	Name of land cover/plant growth database file (**crop.dat**). This file contains growth parameters for the different land covers. This file is reviewed in Chapter 14. Required.
TILLDB	Name of tillage database file (**till.dat**). This file contains mixing efficiencies for different tillage implements. This file is reviewed in Chapter 15. Required.
PESTDB	Name of pesticide database file (**pest.dat**). This file contains parameters governing movement and degradation of pesticides. This file is reviewed in Chapter 16. Required.
FERTDB	Name of fertilizer/manure database file (**fert.dat**). This file contains nutrient content data for fertilizers. This file is reviewed in Chapter 17. Required.
URBANDB	Name of urban land type database file (**urban.dat**). This file contains data required to model build-up/wash-off in urban areas. This file is reviewed in Chapter 18. Required.

3.6 SPECIAL PROJECTS

Variable name	Definition
ISPROJ	Special project flag. SWAT includes sections of code specific to particular projects. This variable flags the code used in the particular simulation. There are two options: 0 not a special project 1 Repeat simulation (test variable initialization) A user will set this variable to something other than zero only if the SWAT programmers have told him to do so. Required.
ICLB	Automated method flag. This variable defines the automated method used in a SWAT simulation. 0 no automated method performed 1 sensitivity analysis 2 uncertainty analysis/ autocalibration 3 sensitivity and uncertainty analysis/ autocalibration This variable should be set to a value other than 0 only after an initial manual calibration has been performed. Optional.
CALFILE	Name of file containing auto-calibration parameters. Required only if ICLB is set to a value other than 0. This file is reviewed in the SWAT User's Manual.

3.7 OUTPUT INFORMATION

Variable name	Definition
IPRINT	Print code. This variable governs the frequency that model results are printed to output files. There are three options: 0 Monthly 1 Daily 2 Annually If you choose to print results on a daily basis, the number of years simulated should be limited and/or the variables printed to the output file should be restricted. If these precautions are not taken, the output files will be too large to view. Required.
NYSKIP	Number of years to ***not*** print output. The options are 0 print output for all years of the simulation 1 print output after the first year of simulation 2 print output after the second year of simulation ⋮ nbyr no output will be printed Some simulations will need a warm-up or equilibration period. The use of an equilibration period becomes more important as the simulation period of interest shortens. For 30-year simulations, an equilibrium period is optional. For a simulation covering 5 years or less, an equilibrium period is recommended. An equilibration period of one year is usually adequate to get the hydrologic cycle fully operational.

Variable name	Definition
NYSKIP, cont.	NYSKIP allows the user to exclude data generated during the equilibration period from output summaries. In addition to not writing data to the output files, annual averages are not computed for the skipped years. Averages for the entire simulation period will also exclude data from the skipped years. The default value for NYSKIP is 0. Required.
ILOG	Streamflow print code. This variable allows the user to take the $\log_{10}$ of the flow prior to printing streamflow values to the .rch file. There are two options: 0 print streamflow in .rch file 1 print log of streamflow in .rch file In large basins (for example, the Mississippi River basin), streamflow values printed to the .rch file may exceed the range allowed by the file format statements. This variable will eliminate print errors caused by very large values. This variable should be set to 0 unless the output files have *** symbols instead of numbers (this happens if the numbers are too big to fit in the allotted spaces). Required.
IPRP	Print code for output.pst file. There are two options: 0 do not print pesticide output (output.pst will be empty) 1 print pesticide output Required.
IPRS	Print code for soil chemical output files. There are two options: 0 do not print final soil chemical information (output.chm will be empty) 1 print final soil chemical information for every HRU in .chm format *Not operational—future feature.*

For long runs, the output files can get so large that the user may have difficulty in opening the files to look at output. The user has the option of customizing the output printed to the output files. Lines of file.cio are used to specify the variables to be printed to the reach output file (output.rch), the subbasin output file (output.sub), and the HRU output file (output.hru). If these lines contain only zeros, the model will print all the output variables to the file.

Variable name	Definition
IPDVAR(:)	Output variables printed to the *output.rch* file. (up to 20 variables may be chosen in customized output.) Optional. The codes for the output variables are: 1 FLOW_IN: Average daily streamflow into reach (m^3/s) 2 FLOW_OUT: Average daily streamflow out of reach (m^3/s) 3 EVAP: Average daily loss of water from reach by evaporation (m^3/s) 4 TLOSS: Average daily loss of water from reach by transmission (m^3/s) 5 SED_IN: Sediment transported with water into reach (metric tons) 6 SED_OUT: Sediment transported with water out of reach (metric tons) 7 SEDCONC: Concentration of sediment in reach (mg/L) 8 ORGN_IN: Organic nitrogen transported with water into reach (kg N) 9 ORGN_OUT: Organic nitrogen transported with water out of reach (kg N) 10 ORGP_IN: Organic phosphorus transported with water into reach (kg P) 11 ORGP_OUT: Organic phosphorus transported with water out of reach (kg P) 12 NO3_IN: Nitrate transported with water into reach (kg N) 13 NO3_OUT: Nitrate transported with water out of reach (kg N) 14 NH4_IN: Ammonium transported with water into reach (kg N) 15 NH4_OUT: Ammonium transported with water out of reach (kg N) 16 NO2_IN: Nitrite transported with water into reach (kg N) 17 NO2_OUT: Nitrite transported with water out of reach (kg N) 18 MINP_IN: Mineral phosphorus transported with water into reach (kg P) 19 MINP_OUT: Mineral phosphorus transported with water out of reach (kg P) 20 CHLA_IN: Chlorophyll-a transported with water into reach (kg) 21 CHLA_OUT: Chlorophyll-a transported with water out of reach (kg) 22 CBOD_IN: Carbonaceous biochemical oxygen demand transported into reach (kg O_2) 23 CBOD_OUT: Carbonaceous biochemical oxygen demand transported out of reach (kg O_2) 24 DISOX_IN: Dissolved oxygen transported into reach (kg O_2) 25 DISOX_OUT: Dissolved oxygen transported out of reach (kg O_2) 26 SOLPST_IN: Soluble pesticide transported with water into reach (mg a.i.) 27 SOLPST_OUT: Soluble pesticide transported with water out of reach (mg a.i.)

Variable name	Definition
	continued from previous page: 28 SORPST_IN: Pesticide sorbed to sediment transported with water into reach (mg a.i.) 29 SORPST_OUT: Pesticide sorbed to sediment transported with water out of reach (mg a.i.) 30 REACTPST: Loss of pesticide from water by reaction (mg a.i.) 31 VOLPST: Loss of pesticide from water by volatilization (mg a.i.) 32 SETTLPST: Transfer of pesticide from water to river bed sediment by settling (mg a.i.) 33 RESUSP_PST: Transfer of pesticide from river bed sediment to water by resuspension (mg a.i.) 34 DIFFUSEPST: Transfer of pesticide from water to river bed sediment by diffusion (mg a.i.) 35 REACBEDPST: Loss of pesticide from river bed sediment by reaction (mg a.i.) 36 BURYPST: Loss of pesticide from river bed sediment by burial (mg a.i.) 37 BED_PST: Pesticide in river bed sediment (mg a.i.) 38 BACTP_OUT: Number of persistent bacteria transported out of reach (# cfu/ 100 mL) 39 BACTLP_OUT: Number of less persistent bacteria transported out of reach (# cfu/ 100 mL) 40 CMETAL#1: Conservative metal #1 transported out of reach (kg) 41 CMETAL#2: Conservative metal #2 transported out of reach (kg) 42 CMETAL#3: Conservative metal #3 transported out of reach (kg)
IPDVAB(:)	Output variables printed to the *output.sub* file (up to 15 variables may be chosen in customized output.) Optional. The codes for the output variables are: 1 PRECIP: Average total precipitation on subbasin (mm H_2O) 2 SNOMELT: Snow melt (mm H_2O) 3 PET: Potential evapotranspiration (mm H_2O) 4 ET: Actual evapotranspiration (mm H_2O) 5 SW: Soil water content (mm H_2O) 6 PERC: Amount of water percolating out of root zone (mm H_2O) 7 SURQ: Surface runoff (mm H_2O) 8 GW_Q: Groundwater discharge into reach (mm H_2O) 9 WYLD: Net water yield to reach (mm H_2O) 10 SYLD: Sediment yield (metric tons/ha) 11 ORGN: Organic N released into reach (kg/ha) 12 ORGP: Organic P released into reach (kg/ha) 13 NSURQ: Nitrate released into reach (kg/ha) 14 SOLP: Soluble P released into reach (kg/ha) 15 SEDP: Mineral P attached to sediment released into reach (kg/ha)

Variable name	Definition

continued from previous page:

IPDVAS(:) Output variables printed to the *output.hru* file (up to 20 variables may be chosen in customized output.)

Optional.

The codes for the output variables are:

1 PRECIP: Total precipitation on HRU (mm H_2O)
2 SNOFALL: Precipitation falling as snow, sleet, or freezing rain (mm H_2O)
3 SNOMELT: Amount of snow or ice melting (mm H_2O)
4 IRR: Amount of irrigation water applied to HRU (mm H_2O)
5 PET: Potential evapotranspiration (mm H_2O)
6 ET: Amount of water removed by evapotranspiration (mm H_2O)
7 SW_INIT: Soil water content at beginning of time period (mm H_2O)
8 SW_END: Soil water content at end of time period (mm H_2O)
9 PERC: Amount of water percolating out of the root zone (mm H_2O)
10 GW_RCHG: Amount of water entering both aquifers (mm H_2O)
11 DA_RCHG: Amount of water entering deep aquifer from root zone (mm H_2O)
12 REVAP: Water in shallow aquifer returning to root zone (mm H_2O)
13 SA_IRR: Amount of water removed from shallow aquifer for irrigation (mm H_2O)
14 DA_IRR: Amount of water removed from deep aquifer for irrigation (mm H_2O)
15 SA_ST: Amount of water in shallow aquifer storage at end of time period (mm H_2O)
16 DA_ST: Amount of water in deep aquifer storage at end of time period (mm H_2O)
17 SURQ_GEN: Surface runoff generated during time step (mm H_2O)
18 SURQ_CNT: Surface runoff contribution to reach (mm H_2O)
19 TLOSS: Amount of water removed from tributary channels by transmission (mm H_2O)
20 LATQ: Lateral flow contribution to reach (mm H_2O)
21 GW_Q: Groundwater discharge into reach (mm H_2O)
22 WYLD: Net amount of water contributed by the HRU to the reach (mm H_2O)
23 DAILYCN: Average curve number for time period.
24 TMP_AV: Average air temperature for time period (°C)
25 TMP_MX: Average of daily maximum air temperatures for time period (°C).
26 TMP_MN: Average of daily minimum air temperatures for time period (°C).
27 SOL_TMP: Average soil temperature in time period (°C).
28 SOLAR: Average daily solar radiation for time period (MJ/m^2).
29 SYLD: Amount of sediment contributed by the HRU to the reach (metric tons/ha)
30 USLE: USLE soil loss (metric tons/ha)
31 N_APP: Amount of N fertilizer applied in regular fertilizer operation (kg N/ha)
32 P_APP: Amount of P fertilizer applied in regular fertilizer operation (kg P/ha)

Variable name	Definition
	continued from previous page:
	33 NAUTO: Amount of N fertilizer applied automatically (kg N/ha)
	34 PAUTO: Amount of P fertilizer applied automatically (kg P/ha)
	35 NGRZ: Nitrogen applied to HRU in grazing operation during time step (kg N/ha)
	36 PGRZ: Phosphorus applied to HRU in grazing operation during time step (kg P/ha)
	37 CFERTN: Nitrogen applied to HRU in continuous fertilizer operation during time step (kg N/ha)
	38 CFERTP: Phosphorus applied to HRU in continuous fertilizer operation during time step (kg P/ha)
	39 NRAIN: Nitrate added in rainfall (kg N/ha)
	40 NFIX: Amount of N fixed by legumes (kg N/ha)
	41 F-MN: Transformation of N from fresh organic to mineral pool (kg N/ha)
	42 A-MN: Transformation of N from active organic to mineral pool (kg N/ha)
	43 A-SN: Transformation of N from active organic to stable organic pool (kg N/ha)
	44 F-MP: Transformation of P from fresh organic to mineral (solution) pool (kg P/ha)
	45 AO-LP: Transformation of P from organic to labile pool (kg P/ha)
	46 L-AP: Transformation of P from labile to active mineral pool (kg P/ha)
	47 A-SP: Transformation of P from active mineral to stable mineral pool (kg P/ha)
	48 DNIT: Amount of N removed from soil by denitrification (kg N/ha)
	49 NUP: Nitrogen uptake by plants (kg N/ha)
	50 PUP: Phosphorus uptake by plants (kg P/ha)
	51 ORGN: Organic N contributed by HRU to reach (kg N/ha)
	52 ORGP: Organic P contributed by HRU to reach (kg P/ha)
	53 SEDP: Mineral P attached to sediment contributed by HRU to reach (kg P/ha)
	54 NSURQ: NO_3 contributed by HRU in surface runoff to reach (kg N/ha)
	55 NLATQ: NO_3 contributed by HRU in lateral flow to reach (kg N/ha)
	56 NO3L: NO_3 leached below the soil profile (kg N/ha)
	57 NO3GW: NO_3 contributed by HRU in groundwater flow to reach (kg N/ha)
	58 SOLP: Soluble phosphorus contributed by HRU in surface runoff to reach (kg P/ha)
	59 P_GW: Soluble phosphorus contributed by HRU in groundwater flow to reach (kg P/ha)
	60 W_STRS: Number of water stress days.
	61 TMP_STRS: Number of temperature stress days
	62 N_STRS: Number of nitrogen stress days.
	63 P_STRS: Number of phosphorus stress days.
	64 BIOM: Total plant biomass (metric tons/ha)
	65 LAI: Leaf area index
	66 YLD: Harvested yield (metric tons/ha)
	67 BACTP: Persistent bacteria in surface runoff (# cfu/m^2)
	68 BACTLP: Number of less persistent bacteria in surface runoff (# cfu/m^2)

Variable name	Definition
	continued from previous page:
IPDHRU(:)	Numbers of HRUs whose data will be printed to the HRU output files (up to 20 HRUs may be specified in customized output.) If all IPDHRU values are set to zero, the model will print output data for all HRUs in the watershed.
ATMOFILE	Atmospheric deposition filename.
IPHR	Code for printing hourly output file (hourq.dat) 0 = no print 1 = print file
ISTO	Code for printing soil storage values by soil layer (soilst.out) 0 = no print 1 = print file
ISOL	Code for printing phosphorus/nitrogen in soil profile (output.sol) 0 = no print 1 = print file
I_SUBW	We define headwaters as subbasins where the streams originate and do not have any incoming flow. For sediment, the MUSLE equation estimates the amount of sediment reaching the subbasin outlet. Routing sediment through the main channel may "double account" for the delivery that is implicit in MUSLE. Thus, the user may opt not to route sediment through the headwater channels. Code for routing headwaters. 0 = do not route 1 = route
SEPTDB	Septic database filename (septwq.dat). Optional.
IA_B	Code for binary output of files (.rch, .sub, .hru files only) 0 = do not print binary files 1 = print binary files
IHUMUS	Code for output file for humus 0 = do not print watqual.out file 1 = print watqual.out
ITEMP	Code for channel velocity and water depth output files (input code affects both files) 0 = do not print chanvel.out/watrdep.out 1 = print chanvel.out/watrdep.out
ISNOW	Code for printing snowband.out file: 0 = do not print snowband.out file 1 = print snowband.out file

Variable name	Definition
	continued from previous page:
IMGT	Code for printing output.mgt file 0 = do not print output.mgt 1 = print output.mgt
IWTR	Code for printing output.wtr and output.pot files 0 = do not print files 1 = print files
ICALEN	Code for writing calendar or julian day to daily outputs of output.rch, output.sub and output.hru files 0 = print Julian day 1 = print calendar day mm/dd/yyyy

The format of file.cio is:

Variable name	Line #	Position	Format	F90 Format
Comment lines	1-2	space 1-80	character	a80
TITLE	3-5	space 1-80	character	a80
Comment line	6	space 1-80	character	a80
FIGFILE	7	space 1-13	character	a13
NBYR	8	none	integer	free
IYR	9	none	integer	free
IDAF	10	none	integer	free
IDAL	11	none	integer	free
Comment line	12	space 1-80	character	a80
IGEN	13	none	integer	free
PCPSIM	14	none	integer	free
IDT	15	none	integer	free
IDIST	16	none	integer	free
REXP	17	none	real	free
NRGAGE	18	none	integer	free
NRTOT	19	none	integer	free
NRGFIL	20	none	integer	free
TMPSIM	21	none	integer	free
NTGAGE	22	none	integer	free
NTTOT	23	none	integer	free
NTGFIL	24	none	integer	free

Variable name	Line #	Position	Format	F90 Format
SLRSIM	25	none	integer	free
NSTOT	26	none	integer	free
RHSIM	27	none	integer	free
NHTOT	28	none	integer	free
WNDSIM	29	none	integer	free
NWTOT	30	none	integer	free
FCSTYR	31	none	integer	free
FCSTDAY	32	none	integer	free
FCSTCYCLES	33	none	integer	free
COMMENT LINE	34	space 1-80	character	a80
RFILE(1)	35	space 1-13	character	a13
RFILE(2)	35	space 14-26	character	a13
RFILE(3)	35	space 27-39	character	a13
RFILE(4)	35	space 40-52	character	a13
RFILE(5)	35	space 53-65	character	a13
RFILE(6)	35	space 66-78	character	a13
RFILE(7)	36	space 1-13	character	a13
RFILE(8)	36	space 14-26	character	a13
RFILE(9)	36	space 27-39	character	a13
RFILE(10)	36	space 40-52	character	a13
RFILE(11)	36	space 53-65	character	a13
RFILE(12)	36	space 66-78	character	a13
RFILE(13)	37	space 1-13	character	a13
RFILE(14)	37	space 14-26	character	a13
RFILE(15)	37	space 27-39	character	a13
RFILE(16)	37	space 40-52	character	a13
RFILE(17)	37	space 53-65	character	a13
RFILE(18)	37	space 66-78	character	a13
COMMENT LINE	38	space 1-80	character	a80
TFILE(1)	39	space 1-13	character	a13
TFILE(2)	39	space 14-26	character	a13
TFILE(3)	39	space 27-39	character	a13
TFILE(4)	39	space 40-52	character	a13
TFILE(5)	39	space 53-65	character	a13
TFILE(6)	39	space 66-78	character	a13
TFILE(7)	40	space 1-13	character	a13

Variable name	Line #	Position	Format	F90 Format
TFILE(8)	40	space 14-26	character	a13
TFILE(9)	40	space 27-39	character	a13
TFILE(10)	40	space 40-52	character	a13
TFILE(11)	40	space 53-65	character	a13
TFILE(12)	40	space 66-78	character	a13
TFILE(13)	41	space 1-13	character	a13
TFILE(14)	41	space 14-26	character	a13
TFILE(15)	41	space 27-39	character	a13
TFILE(16)	41	space 40-52	character	a13
TFILE(17)	41	space 53-65	character	a13
TFILE(18)	41	space 66-78	character	a13
SLRFILE	42	space 1-13	character	a13
RHFILE	43	space 1-13	character	a13
WNDFILE	44	space 1-13	character	a13
FCSTFILE	45	space 1-13	character	a13
Comment line	46	space 1-80	character	a80
BSNFILE	47	space 1-13	character	a13
Comment line	48	space 1-80	character	a80
PLANTDB	49	space 1-13	character	a13
TILLDB	50	space 1-13	character	a13
PESTDB	51	space 1-13	character	a13
FERTDB	52	space 1-13	character	a13
URBANDB	53	space 1-13	character	a13
Comment line	54	space 1-80	character	a80
ISPROJ	55	none	integer	free
ICLB	56	none	integer	free
CALFILE	57	space 1-13	character	a13
Comment line	58	space 1-80	character	a80
IPRINT	59	none	integer	free
NYSKIP	60	none	integer	free
ILOG	61	none	integer	free
IPRP	62	none	integer	free
IPRS	63	none	integer	free
Comment line	64	space 1-80	character	a80

Variable name	Line #	Position	Format	F90 Format
IPDVAR(1)	65	none	integer	free
IPDVAR(2)	65	none	integer	free
IPDVAR(3)	65	none	integer	free
IPDVAR(4)	65	none	integer	free
IPDVAR(5)	65	none	integer	free
IPDVAR(6)	65	none	integer	free
IPDVAR(7)	65	none	integer	free
IPDVAR(8)	65	none	integer	free
IPDVAR(9)	65	none	integer	free
IPDVAR(10)	65	none	integer	free
IPDVAR(11)	65	none	integer	free
IPDVAR(12)	65	none	integer	free
IPDVAR(13)	65	none	integer	free
IPDVAR(14)	65	none	integer	free
IPDVAR(15)	65	none	integer	free
IPDVAR(16)	65	none	integer	free
IPDVAR(17)	65	none	integer	free
IPDVAR(18)	65	none	integer	free
IPDVAR(19)	65	none	integer	free
IPDVAR(20)	65	none	integer	free
Comment line	66	space 1-80	character	a80
IPDVAB(1)	67	none	integer	free
IPDVAB(2)	67	none	integer	free
IPDVAB(3)	67	none	integer	free
IPDVAB(4)	67	none	integer	free
IPDVAB(5)	67	none	integer	free
IPDVAB(6)	67	none	integer	free
IPDVAB(7)	67	none	integer	free
IPDVAB(8)	67	none	integer	free
IPDVAB(9)	67	none	integer	free
IPDVAB(10)	67	none	integer	free
IPDVAB(11)	67	none	integer	free
IPDVAB(12)	67	none	integer	free
IPDVAB(13)	67	none	integer	free
IPDVAB(14)	67	none	integer	free
IPDVAB(15)	67	none	integer	free

Variable name	Line #	Position	Format	F90 Format
Comment line	68	space 1-80	character	a80
IPDVAS(1)	69	none	integer	free
IPDVAS(2)	69	none	integer	free
IPDVAS(3)	69	none	integer	free
IPDVAS(4)	69	none	integer	free
IPDVAS(5)	69	none	integer	free
IPDVAS(6)	69	none	integer	free
IPDVAS(7)	69	none	integer	free
IPDVAS(8)	69	none	integer	free
IPDVAS(9)	69	none	integer	free
IPDVAS(10)	69	none	integer	free
IPDVAS(11)	69	none	integer	free
IPDVAS(12)	69	none	integer	free
IPDVAS(13)	69	none	integer	free
IPDVAS(14)	69	none	integer	free
IPDVAS(15)	69	none	integer	free
IPDVAS(16)	69	none	integer	free
IPDVAS(17)	69	none	integer	free
IPDVAS(18)	69	none	integer	free
IPDVAS(19)	69	none	integer	free
IPDVAS(20)	69	none	integer	free
Comment line	70	space 1-80	character	a80
IPDHRU(1)	71	none	integer	free
IPDHRU(2)	71	none	integer	free
IPDHRU(3)	71	none	integer	free
IPDHRU(4)	71	none	integer	free
IPDHRU(5)	71	none	integer	free
IPDHRU(6)	71	none	integer	free
IPDHRU(7)	71	none	integer	free
IPDHRU(8)	71	none	integer	free
IPDHRU(9)	71	none	integer	free
IPDHRU(10)	71	none	integer	free
IPDHRU(11)	71	none	integer	free
IPDHRU(12)	71	none	integer	free
IPDHRU(13)	71	none	integer	free
IPDHRU(14)	71	none	integer	free

Variable name	Line #	Position	Format	F90 Format
IPDHRU(15)	71	none	integer	free
IPDHRU(16)	71	none	integer	free
IPDHRU(17)	71	none	integer	free
IPDHRU(18)	71	none	integer	free
IPDHRU(19)	71	none	integer	free
IPDHRU(20)	71	none	integer	free
COMMENT LINE	72	space 1-80	character	a80
ATMOFILE	73	space 1-80	character	a80
IPHR	74	none	integer	free
ISTO	75	none	integer	free
ISOL	76	none	integer	free
I_SUBW	77	none	integer	free
SEPTDB	78	space 1-80	character	a80
IA_B	79	none	integer	free
IHUMUS	80	none	integer	free
ITEMP	81	none	integer	free
ISNOW	82	none	integer	free
IMGT	83	none	integer	free
IWTR	84	none	integer	free
ICALEN	85	none	integer	free