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**REVISION 60.5.4**

1. NEW\_INPUT\_FILES

Contains a list of new input files that are being tested.

1. NEW\_OUTPUT\_FILES

Contains a list of new output files being review.

1. Existing output files

List of changes in output files

1. Existing input files

List of changes in input files

1. Other
2. **NEW INPUT FILES**
3. **NEW OUTPUT\_FILES**
4. **EXISTING OUTPUT FILES**

* Output files: BASIN\_WB/HRU\_WB/LSUNIT\_WB/HRU-LTE\_WB
* TLOSS mm column renamed to ECANOPY mm

Amount of water evaporated from canopy;

* 7 new outputs added at the end;

GWTRANQ mm - groundwater transferred to soil profile

SATEX mm - saturation excess flow developed from high water table

SATEX\_CHAN mm - saturation excess flow reaching main channel

DELSW mm - change in soil water volume

LAGSURF mm - surface runoff in transit to channel

LAGLATQ mm - lateral flow in transit to channel

LAGSATEX mm - saturation excess flow in transit to channel

* Output files: BASIN\_NB/HRU\_NB/LSUNIT\_NB/HRU-LTE\_NB/
* 3 new columns added to the end, after NH4ATMO:

NUPTAKE kgha - plant nitrogen uptake

PUPTAKE kgha - plant phosphorus uptake

GWTRANN kgha - nitrate added to the soil from the aquifer

GWTRANP kgha - phosphorus added to the soil from the aquifer

* Output files: BASIN\_LS/HRU\_LS/LSUNIT\_LS/HRU-LTE\_LS
* SEDMIN column units edited;

Originally ‘----’ changed to ‘kgha’

* TILENO3 column units added

Originally ‘----’ changed to ‘kgha’

* 3 new columns added to the end, after TILENO3:

LCHLABP kgha - soluble P (labile)leaching past bottom of soil layer

TILELABP kgha - soluble P (labile) NO3 in tile flow

SATEXN kgha - amt of NO3-N in saturation excess surface runoff in HRU  
 for the day

* Output files: BASIN\_PW/HRU\_PW/LSUNIT\_PW/HRU-LTE\_PW
* 4 new columns added to the end, after PHUBAS0:

LAI\_MAX m\*\*2/m\*\*2 - maximum leaf area index during timestep

BM\_MAX kg/ha - maximum total plant biomass during timestep

BM\_GROW kg/ha - total plant biomass growth during timestep

C\_GRO kg/ha - total plant carbon growth during timestep

* Output files: BASIN\_SD\_CHAMORPH/CHANNEL\_SDMORPH
* Existing \_IN m^3/s column renamed GEO\_BF m^3/s   
   Geomorphic aquifer flow in channel/aquifer inflow using geomorphic baseflow method;
* Output files: RESERVOIR
* Existing FLO\_STOR/FLO\_IN/FLO\_OUT were labelled as m^3/s and should be changed to m^3;

1. **EXISTING INPUT FILES**

* **CODES.BSN**

**bsn\_cc%pet\_file** – The filename of this file is hardcoded as ‘pet.cli’; if does not exist, null will be entered;

**bsn\_cc%cn** – The options for this variable have changed; new definitions are:

integer :: cn = 0 !! 0=call cal\_soft\_hyd\_bfr(CEAP); 1=call cal\_soft\_hyd;

**baseflo** variable renamed to **lapse**:

integer :: lapse = 0 !! precip and temperature lapse rate control

!! 0 = do not adjust for elevation

!! 1 = adjust for elevation

**abstr\_init** variable renamed to **gampt**:

integer :: gampt = 0 !! Initial abstraction on impervious cover (mm)

**headwater** variable renamed to **i\_fpwet**:

integer :: i\_fpwet = 0 !! new flood routing model (work in progress) **(range 0-1)**

* **PARAMETERS.BSN**

**trans\_loss** variable renamed to **nperco\_lchtile**

real :: nperco\_lchtile = .5 !!n concentration coeff for tile flow and leach from bottom layer

**s\_max** variable renamed to **plaps**

real :: plaps = 0. !! mm/km |precipitation lapse rate: mm per km of elevation difference

**n\_fix** variable renamed to **tlaps**

real :: tlaps = 6.5 !! deg C/km |temperature lapse rate: deg C per km of elevation difference

**vel\_crit** variable renamed to **urb\_init\_abst**

real :: urb\_init\_abst = 1. !! maximum initial abstraction for urban areas when using Green & Ampt

**res\_sed** variable renamed to **petco\_pmpt**

real :: petco\_pmpt = 1.0 !! PET adjustment (%) for Penman-Montieth and Priestly-Taylor methods

**sig\_g(cha\_part\_sd)**  variable renamed to **co2**

real :: co2 = 400. !! co2 concentration at start of simulation (ppm)

**adj\_cn** variable renamed to **day\_lag\_max**

integer :: day\_lag\_mx = 0 !! max days to lag hydrographs for hru, ru and channels non-draining soils

* **TMP.CLI**

All temperature files with extension ‘.tmp’ renamed to ‘.tem’

* **HYD-SED-LTE.CHA**

**t\_conc** variable renamed to **fps**

real :: fps = 0. !m/m |flood plain slope

**shear\_bnk** variable renamed to **fpn**

real :: fpn = 0. ! |flood plain Manning's n

**hc\_erod** variable renamed to **n\_conc**

real :: n\_conc = 0. !mg/kg |nitrogen concentration in channel bank

**hc\_ht** variable renamed to **p\_conc**

real :: p\_conc = 0. !mg/kg |phosphorus concentration in channel bank

**hc\_len** variable renamed to **p\_bio**

real :: p\_bio = 0. !frac |fraction of p in bank that is bioavailable

* **CAL\_PARMS.CAL**

Added PLAPS and TLAPS;

Deleted TRNSRCH;

* **NUTRIENTS.SOL** - Previous name **bolded** at the end of definition.

real :: **exp\_co** = .001           !                      |depth coefficient to adjust concentrations for depth (**DP\_CO)**

real :: **lab\_p** = 5.             !ppm              |labile P in soil surface             **(TOT\_N)**  
real :: **nitrate** = 7.           !ppm              |nitrate N in soil surface          **(MIN\_N)**  
real :: **fr\_hum\_act** = .02   !0-1             |fraction of soil humus that is active   
**(range 0-1) (ORG\_N)**

real :: **hum\_c\_n** = 10.       !0-1             |humus C:N ratio **(range 0-1) (TOT\_P)**   
  
real :: **hum\_c\_p** = 80.       !0-1             |humus C:P ratio **(range 0-1) (MIN\_P)**

real :: **inorgp** = 3.5            !ppm     |inorganic P in soil surface -**(ORG\_P)  
 (not currently used)**  
real :: **watersol\_p** = .15   !ppm           |water soluble P in soil surface **(SOL\_P)**   
 (**not currently used)**  
real :: **h3a\_p** = .25            !ppm           |h3a P in soil surface  **(H3A\_P)**  
 (**not currently used**)

real :: **mehlich\_p** = 1.2    !ppm       |Mehlich P in soil surface **(MEHL\_P)**  **(not currently used**)  
  
real :: **bray\_strong\_p** = .85   !ppm       |Bray P in soil surface **(BRAY\_P)**  
 **(not currently used**)

* RECALL –
* Updated the format of all timesteps of the recall files
* PLANTS.PLT

**WND\_LIVE** variable is now **AERATION**

real :: aeration = 0.2 ! |aeration stress factor

* Added a column at the end of the properties that includes longer descriptions for most plants.

1. **OTHER**

* Added SWAT+ code revision number/date at the top of the input files
* Allowed the user to add a more descriptive watershed location in the name column of the ‘object.cnt’ file.
* New set of standard decision tables added to the database\_files directory:

flo\_con\_std.dtl

lum\_std.dtl

res\_rel\_std.dtl

scen\_lu\_std.dtl

* The following subroutines were removed from this revision:

|  |
| --- |
| **hru\_soil\_test\_update.f90** |
| **ls\_link.f90** |
| **mgt\_trop\_gro.f90** |
| **pl\_moisture\_gro.f90** |
| **pl\_moisture\_gro\_init.f90** |
| **pl\_moisture\_senes.f90** |
| **pl\_moisture\_senes\_init.f90** |
| **proc\_allo.f90** |
| **readtime\_read.f90** |
| **ru\_allo.c90** |
| **sim\_inityr.f90** |
| **soiltest\_init.f90** |
| **soiltest\_all\_init.f90** |
| **water\_allocation.f90** |
| **water\_hru.f90** |

* The following subroutines were added to this revision:

|  |
| --- |
| aqu\_pest\_output\_init.f90 |
| cli\_lapse.f90 |
| cn2\_init\_all.f90 |
| cond\_integer.f90 |
| cond\_real.f90  gwflow\_riv.f90 |
| header\_lu\_change.f90 |
| hru\_fr\_change.f90 |
| hru\_lum\_init\_all.f90 |
| rcurv\_interp\_dep.f90 |
| rcurv\_interp\_flo.f90 |
| sd\_channel\_control2.f90 |
| sd\_rating\_curve.f90 |
| wallo\_control.f90  wallo\_demand.f90 |
| water\_withdraw.f90 |
| wet\_fp\_init.f90 |